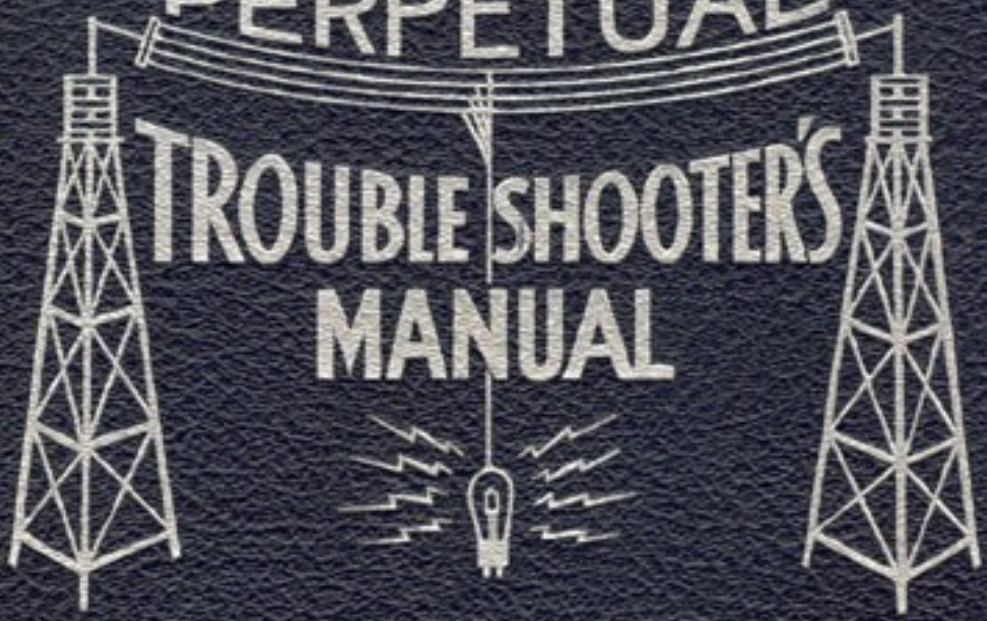
# PERPETUAL TROUBLE SHOOTER'S MANUAL



JOHN F. RIDER

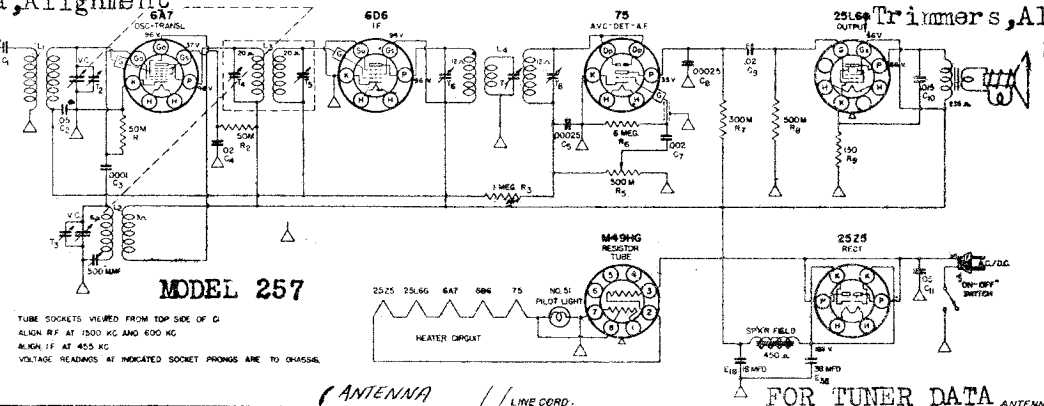
# Rider's Perpetual Trouble Shooter's Manual

# Volume 10

MODEL 912
Schematic, Socket, Trimmers
Tuner Data, Alignment

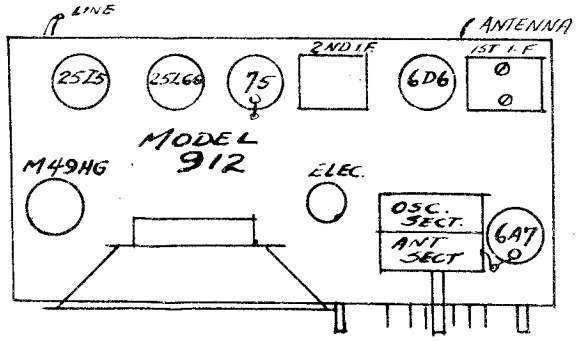
# AIR KING PRODUCTS CORP.

MODEL 257
Schematic, Voltage,
Trimmers, Alignment
Socket

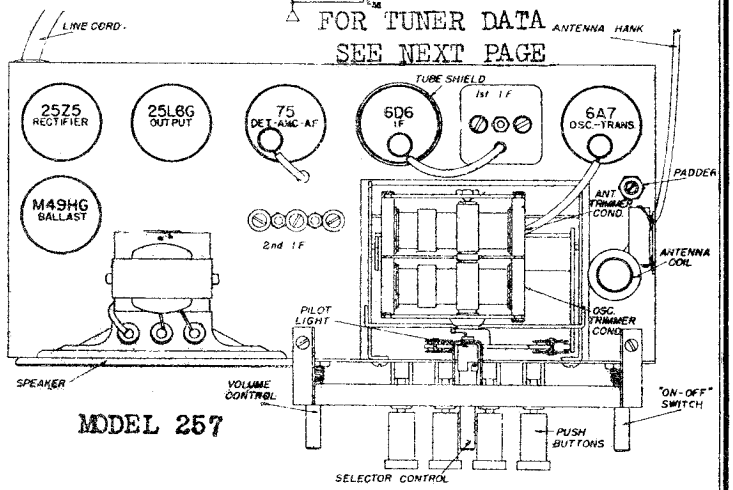



MODEL 257

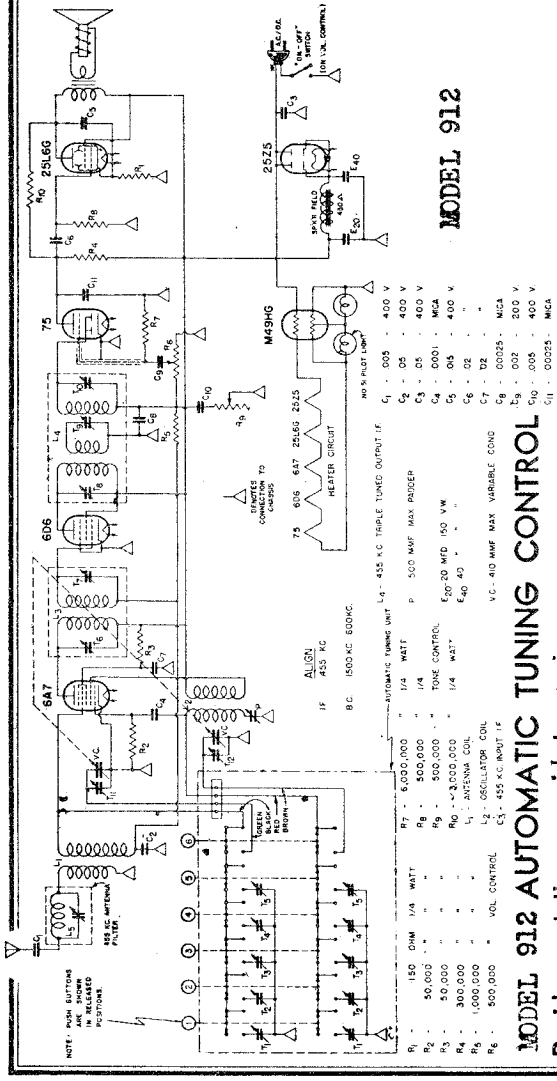
TUBE SOCKETS VIEWED FROM TOP SIDE OF C
ALIGN R.F. AT 1500 KC AND 600 KC
ALIGN I.F. AT 455 KC
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS




FOR TUNER DATA SEE NEXT PAGE




MODEL 257




## MODEL 912 AUTOMATIC TUNING CONTROL

Decide on station you wish to receive.

Refer to the diagram underneath cabinet and see which set of adjustment screws will have a tuning range that includes the frequency of the station desired. This is the pair of screws to be adjusted for this particular station. The ranges of the adjustment screws are divided into two groups, one group covering from 530-1100 kc, the other covering from 625-1600 kc.

From the same diagram, after finding where the proper pair of adjustment screws are located, trace dotted line connecting these screws to one of the push buttons. This is the button which, after the adjustments are completed, will tune in the station.

Push button located "IN."

Turn volume control knob on full (to the extreme right) and adjust screw marked "O" until desired station is heard. (In this case until WJZ is heard.) If when making this adjustment, a number of stations can be brought in as the screw is turned and it is doubtful which station is the correct one, press button No. 6 (Manual Tuning) "IN" and move dial pointer by turning station selector knob, to the number on the dial that corresponds to the frequency of the station. (Turn pointer to 76 on the dial. This corresponds to WJZ's frequency 760 kc. The number on the dial must be multiplied by ten to give the frequency in kilocycles.) Listening to the program being broadcast will identify the station when adjusting screw "O."

Adjust screw marked "A" for maximum volume, retarding the volume control and readjusting if necessary. This completes the adjustments for this particular station.

Cut out name of station from list supplied and insert in button.

Insert celluloid disc.

In a like manner, select a station for each of the other buttons (four other buttons) and make necessary adjustments for each station.

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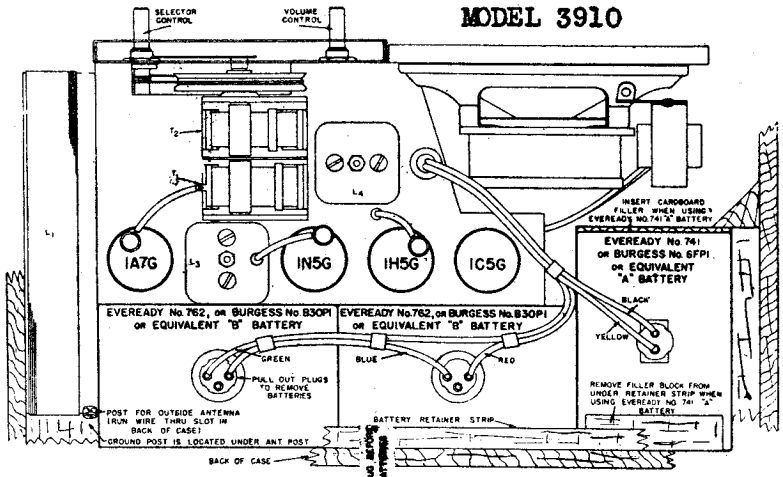
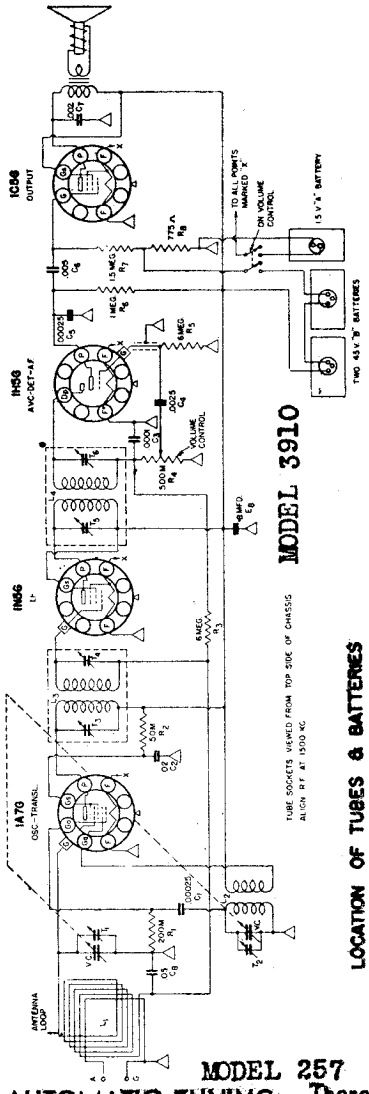
MODEL 257
Tuner Data
MODEL 3905
Schematic, Voltage
Alignment, Socket

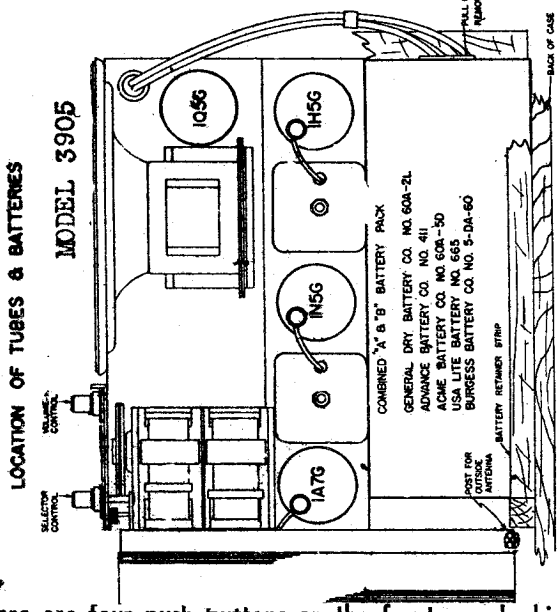
# AIR KING PRODUCTS CORP.

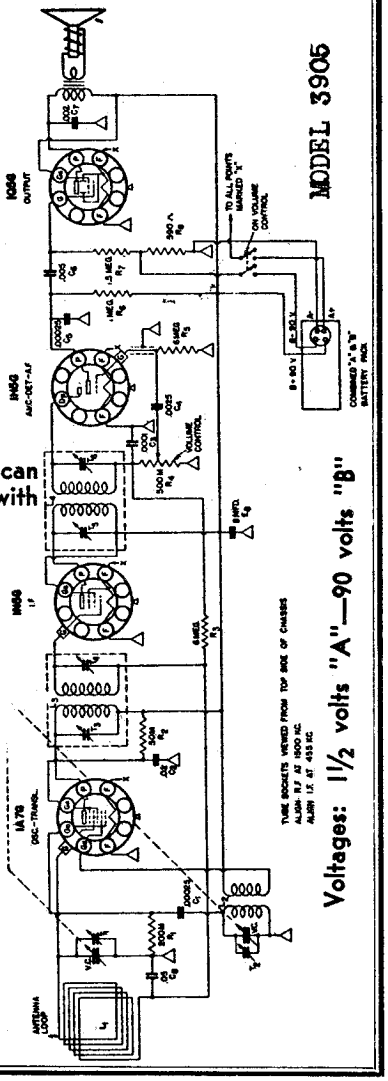
MODEL 3910
Schematic, Socket

LOCATION OF TUBES & BATTERIES
MODEL 3910


SELECTOR CONTROL
VOLUME CONTROL
1A7G
1N5G
1H5G
1C5G
INSERT CARDBOARD FILLER WHEN USING EVEREADY NO. 741 "A" BATTERY
EVEREADY No. 741 OR BURGESS No. 6FPI OR EQUIVALENT "A" BATTERY
BLACK
YELLOW
EVEREADY No. 762, OR BURGESS No. B30PI OR EQUIVALENT "B" BATTERY
EVEREADY No. 762, OR BURGESS No. B30PI OR EQUIVALENT "B" BATTERY
GREEN
BLUE
RED
PULL OUT PLUGS TO REMOVE BATTERIES
REMOVE FILLER BLOCK FROM UNDER RETAINER STRIP WHEN USING EVEREADY NO. 741 "A" BATTERY
POST FOR OUTSIDE ANTENNA (RUN WIRE THRU SLOT IN BACK OF CASE)
GROUND POST IS LOCATED UNDER ANT POST
BACK OF CASE
BATTERY RETAINER STRIP
PULL OUT PLUG BEFORE REMOVING BATTERIES




Voltages: 1½ volts "A"—90 volts "B"

MODEL 257

**AUTOMATIC TUNING:** There are four push buttons on the front panel which can be set so that by simply pushing the button marked with a station's call letters, any of four different stations may be received.

Allow the receiver to warm up for 20 minutes before making the station adjustments.

Decide on the station you wish to receive.

Tune to this station as accurately as possible with the selector knob.

Next, push in this button as far as possible, being careful not to disturb the station setting on the dial.

Turn this push button knob about one turn to the left, or until it starts to unscrew easily.

Holding the button at the "IN" position, screw the push button knob to the right until it is tight.

Cut out name of station from list supplied and insert in face of button.

Insert celluloid disk.

This completes the adjustments for one station. The three other buttons may be set in a similar manner.

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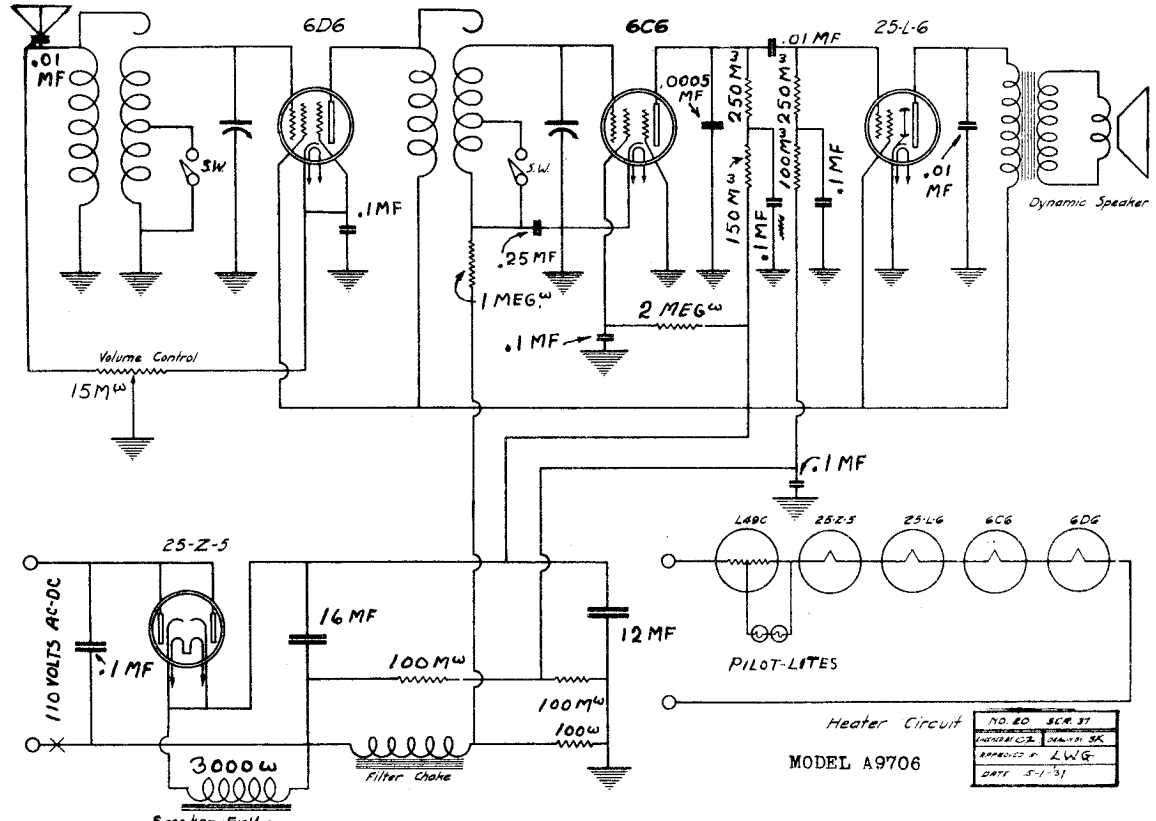
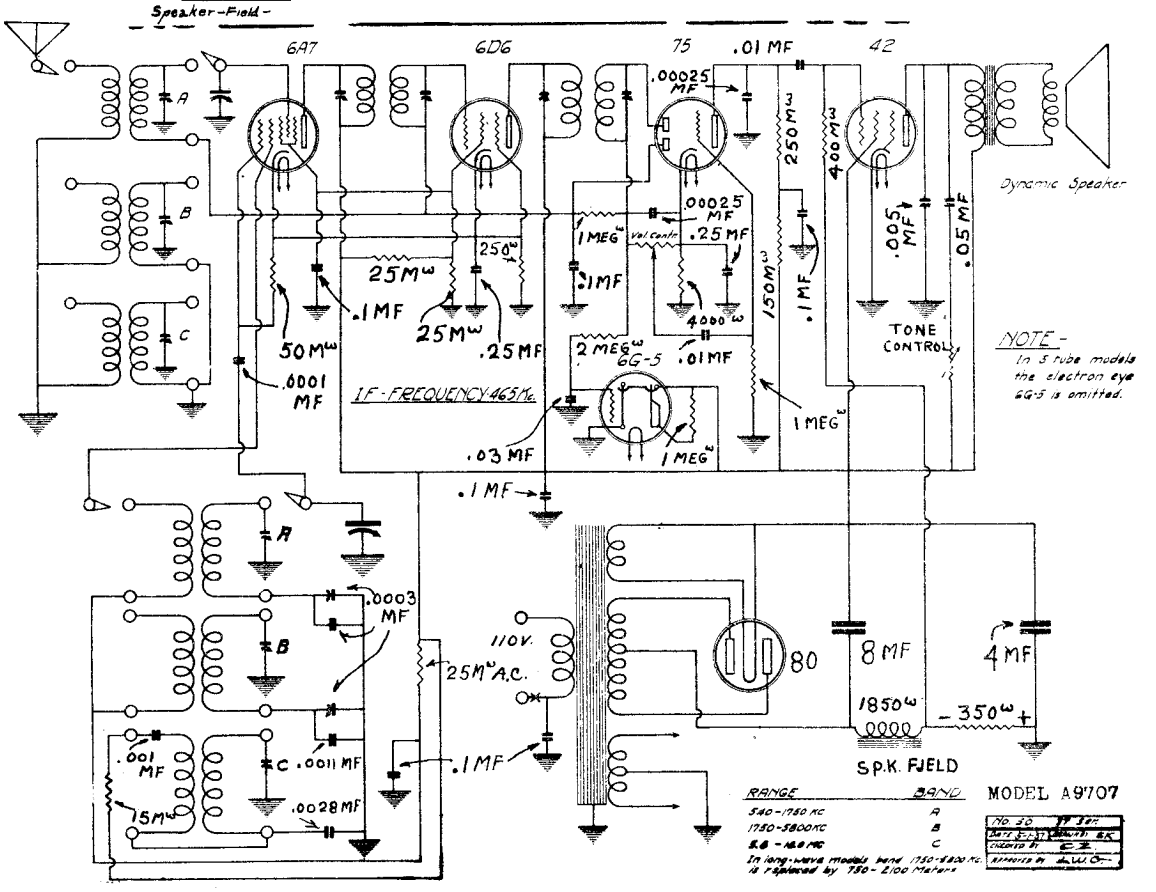
# ALLIED RADIO CORP.

MODEL A-9706
MODEL A-9707
Schematics

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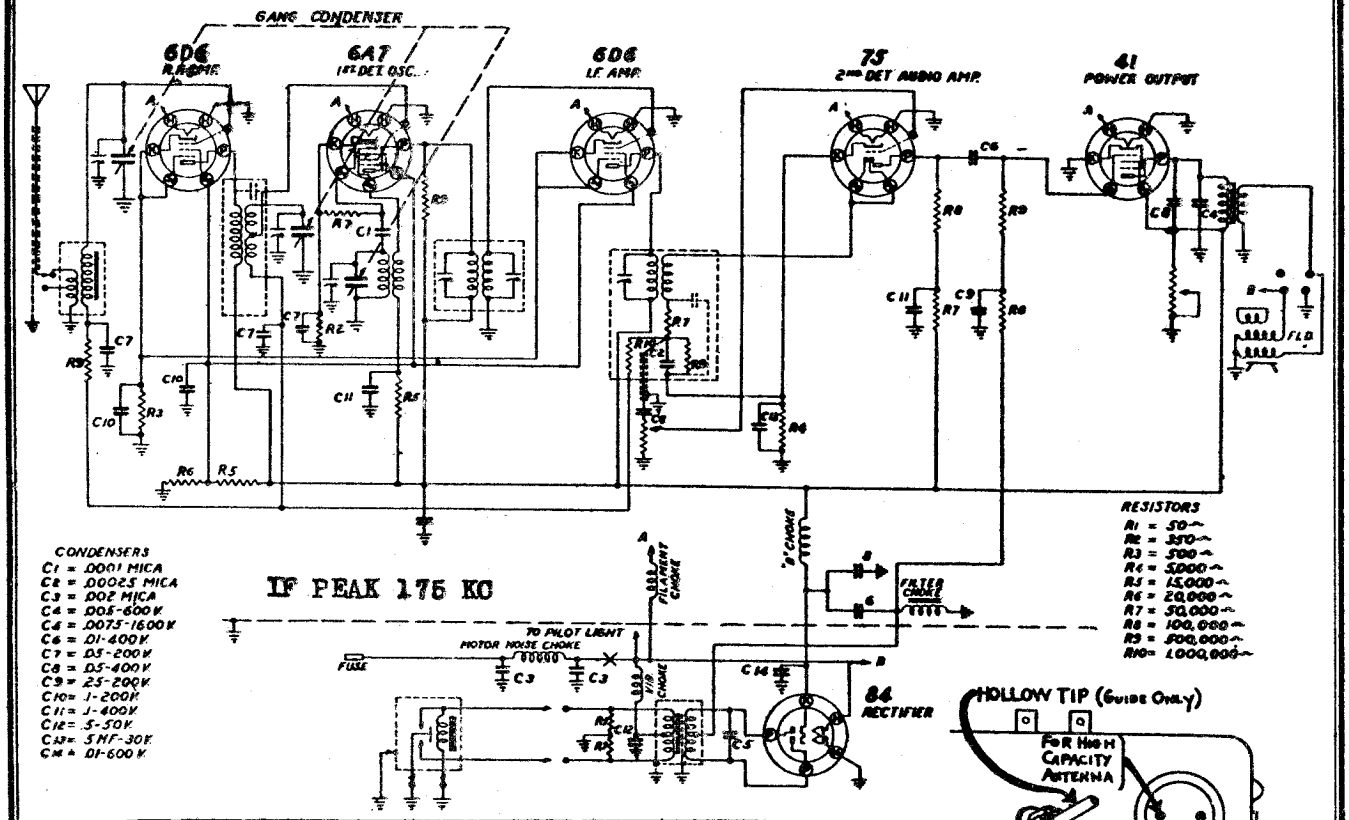
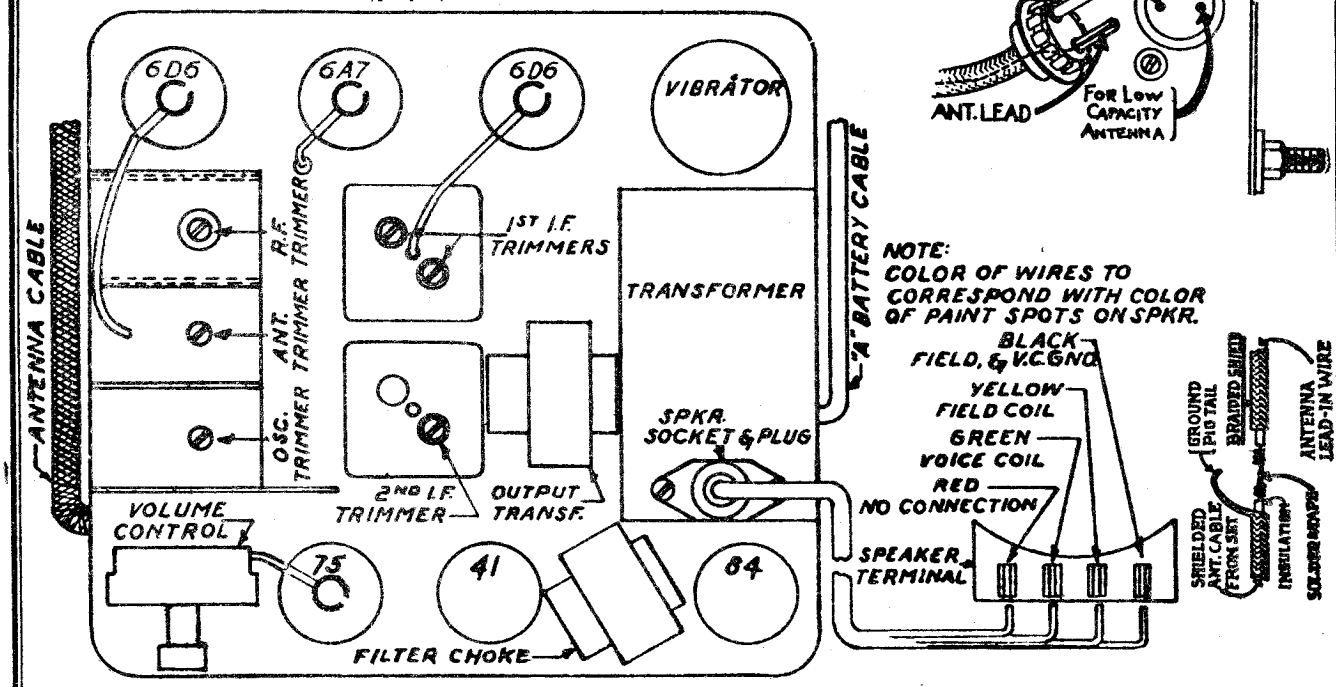
MODELS A-9780,A-9781
Chassis B-6
Schematic,Socket,Alignment
Trimmers

# ALLIED RADIO CORP.




IF ALIGNMENT - Adjust Generator to 175 KC, connect output to grid of 6A7, the omission of series cond and resistor to block out AVC action. Generator grounded to chassis. Align trimmers of IF trnasformers (three).

OSCILLATOR - Adjust Generator to 1400 KC, connect through 100 MMFD cond. to the antenna of receiver. Adjust 1st section of gang condenser trimmer to max. peak.

RF ALIGNMENT - Adjust the Antenna and RF trimmers on gang condenser to maximum peak at 1400 KC. Repeat all adjustments for maximum performance.

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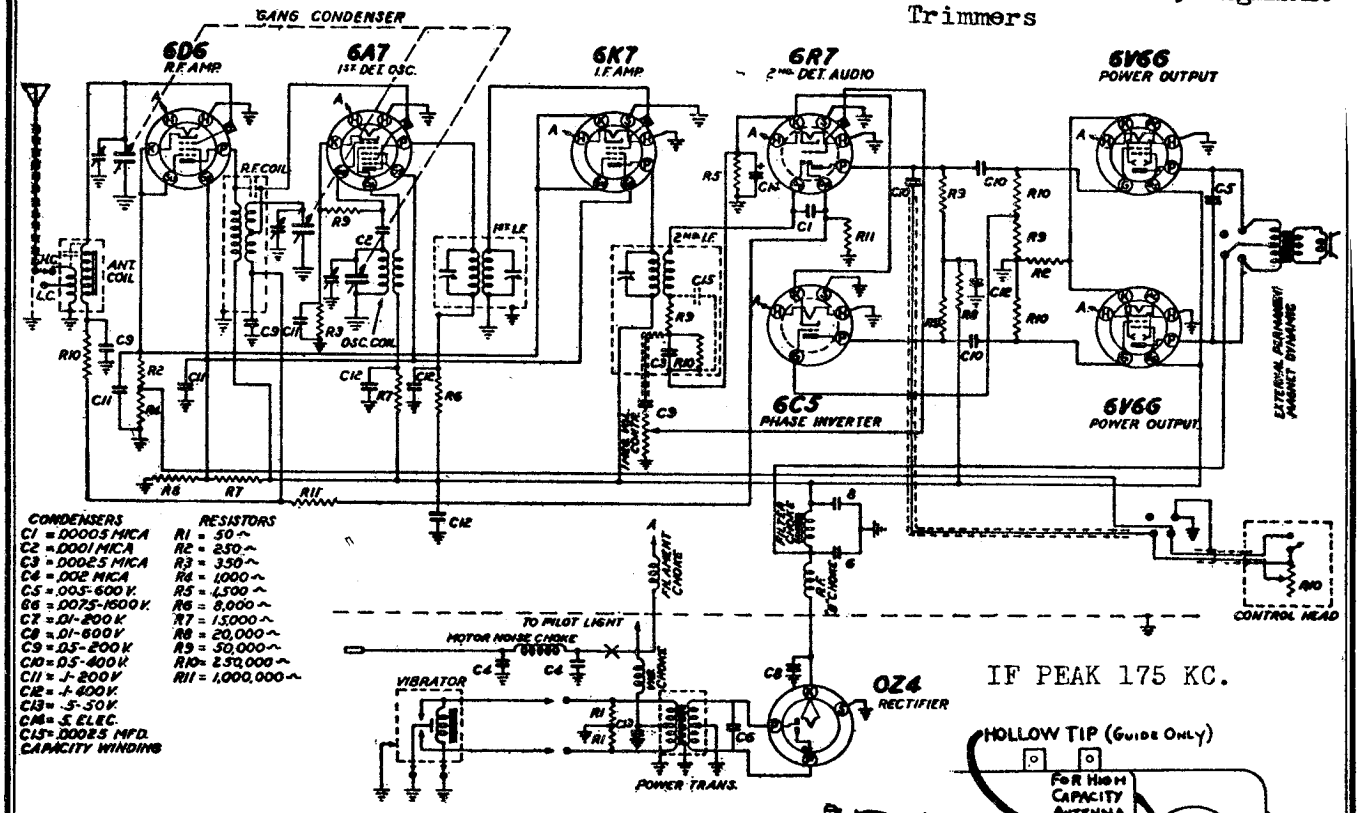
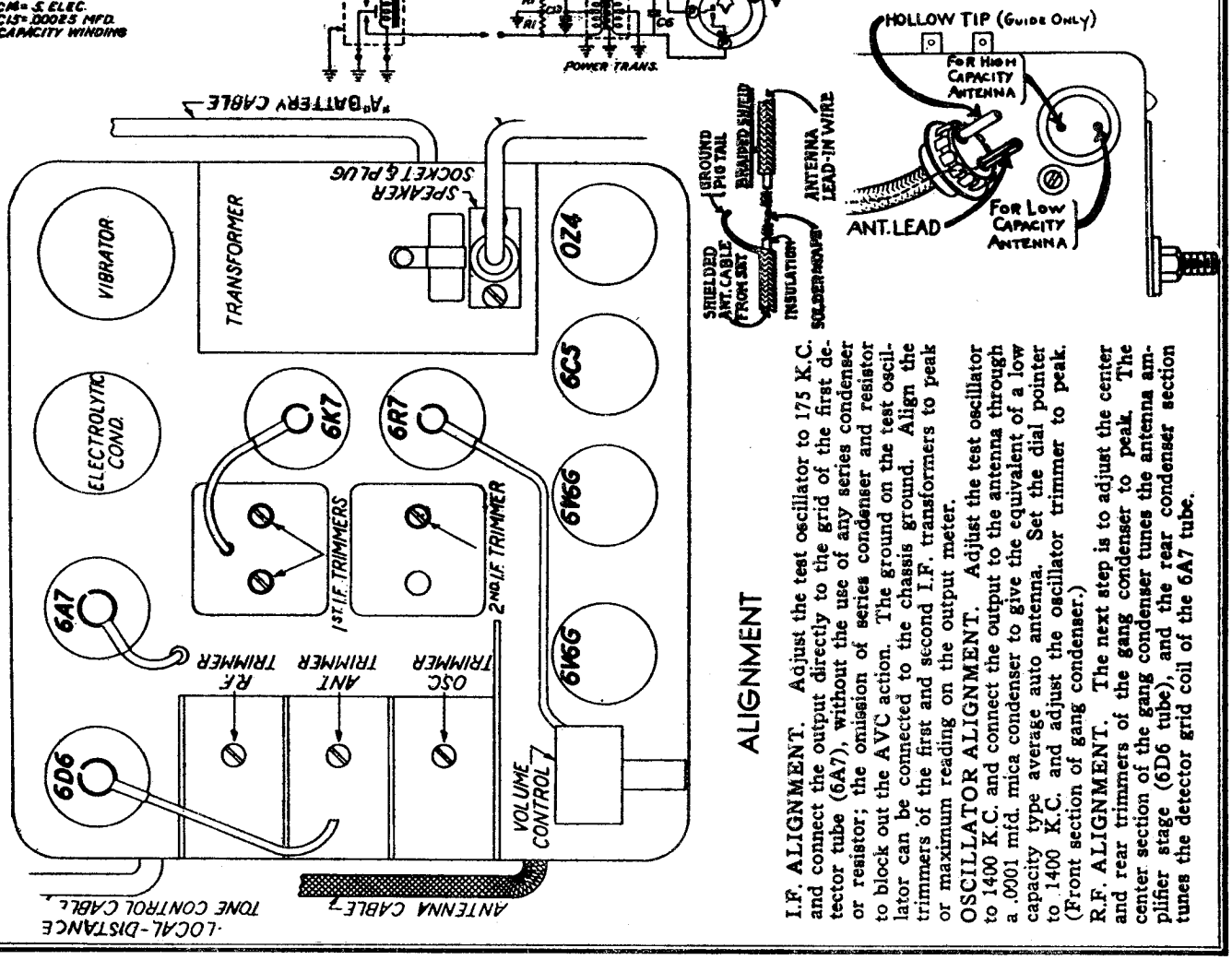
# ALLIED RADIO CORP.

MODEL A-9784
Chassis B-8
Schematic, Socket, Alignment
Trimmers




## ALIGNMENT

I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

OSCILLATOR ALIGNMENT. Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

R.F. ALIGNMENT. The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

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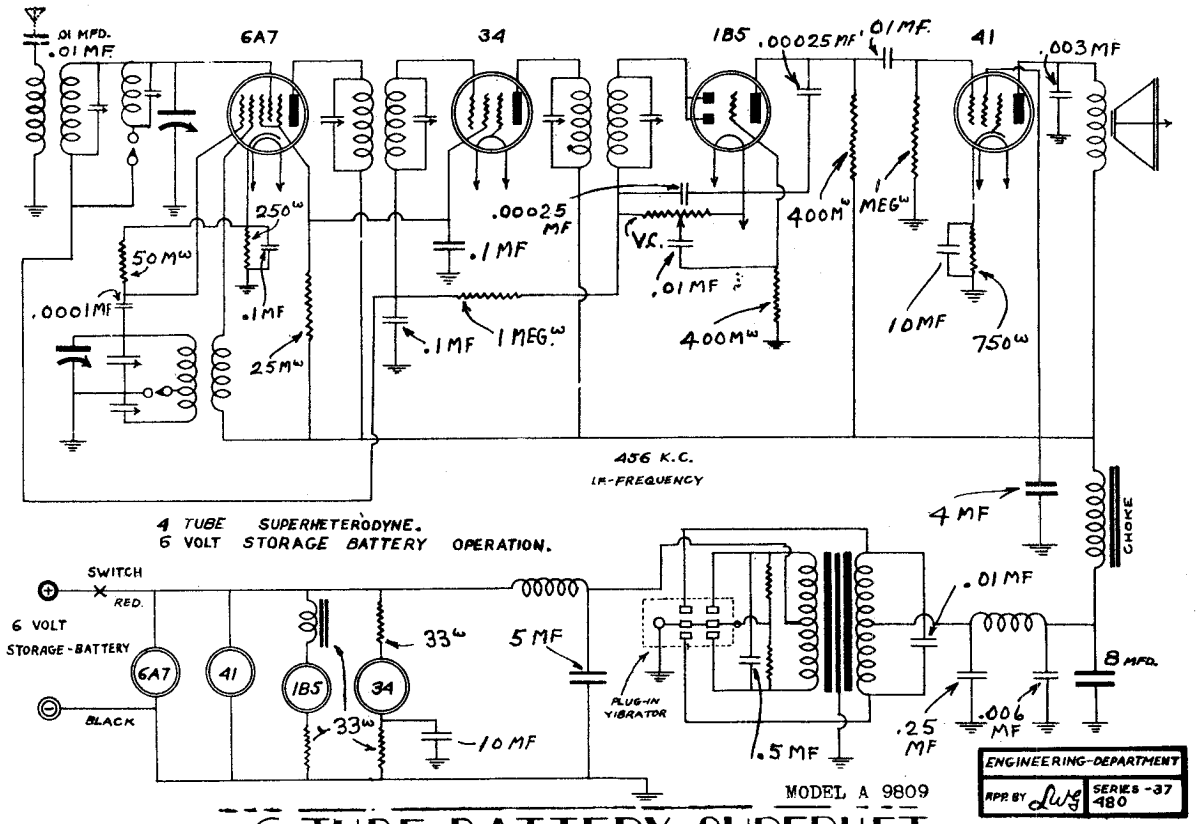
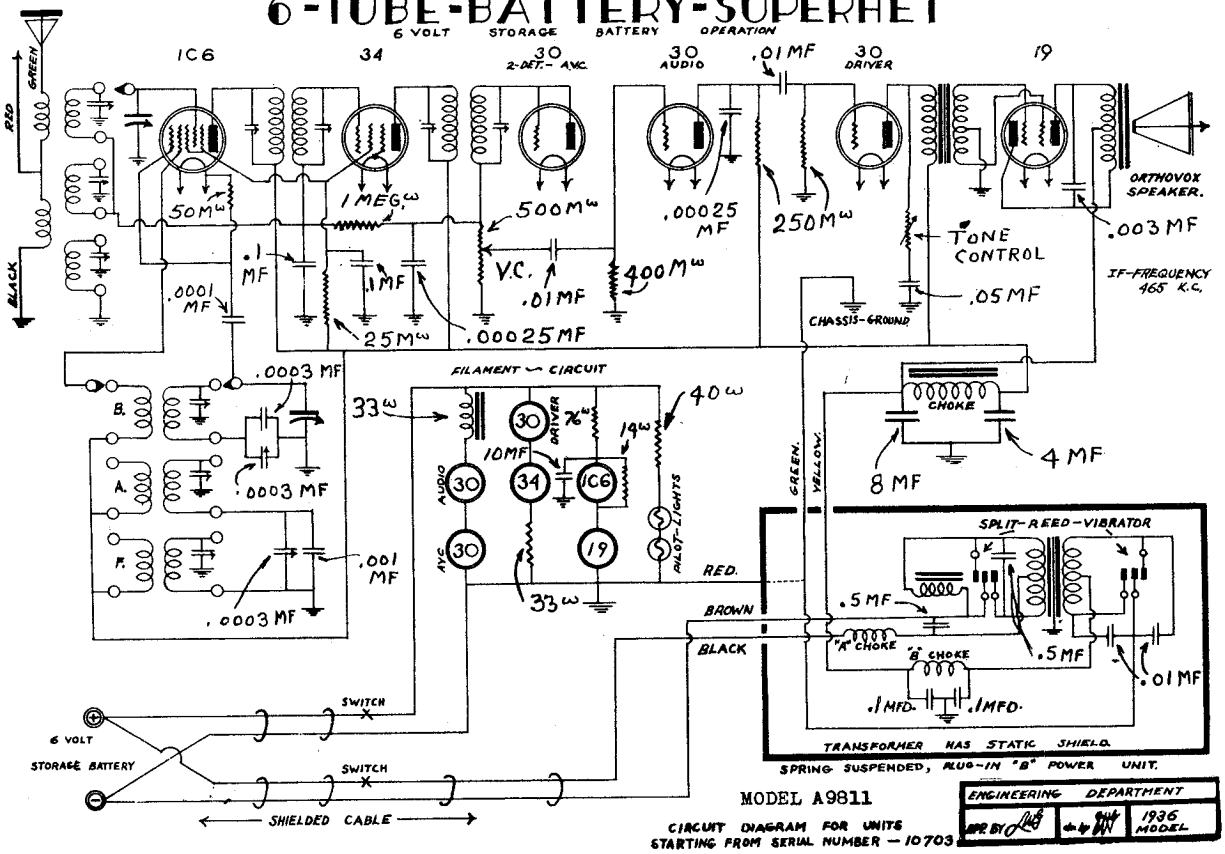
MODEL A-9809
MODEL A-9811
Schematics

# ALLIED RADIO CORP.




## 6-TUBE-BATTERY-SUPERHET

6 VOLT STORAGE BATTERY OPERATION

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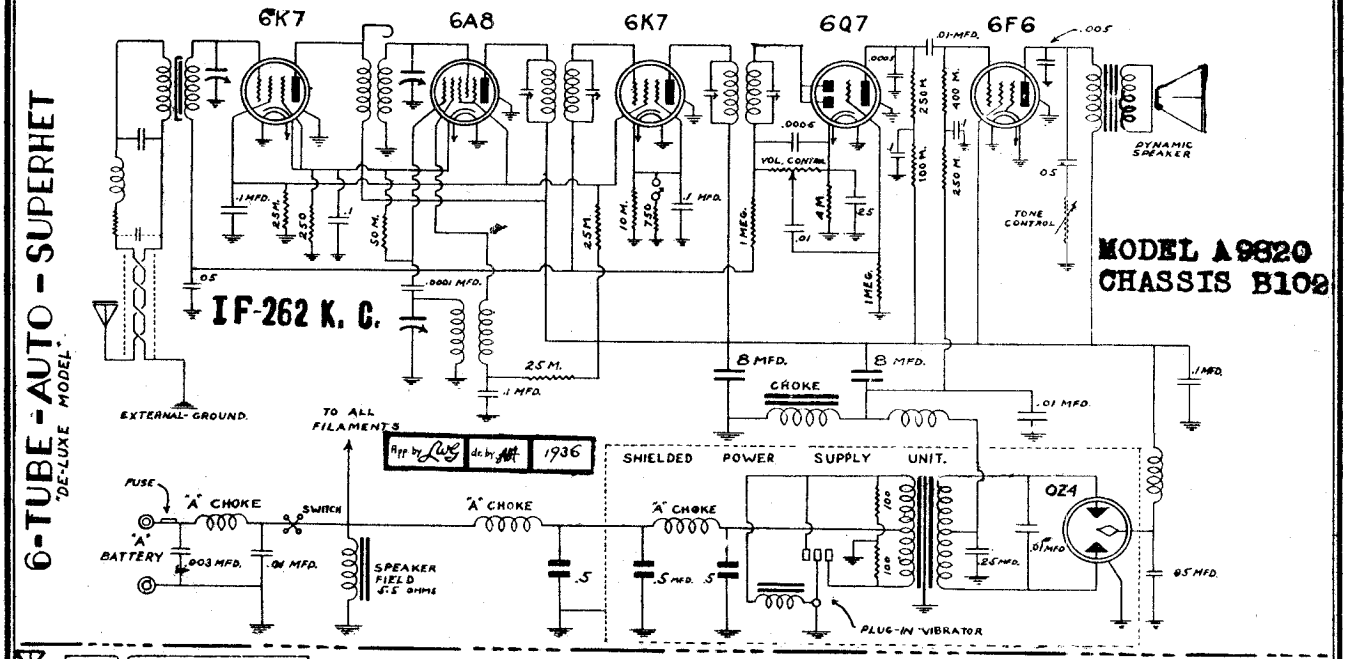
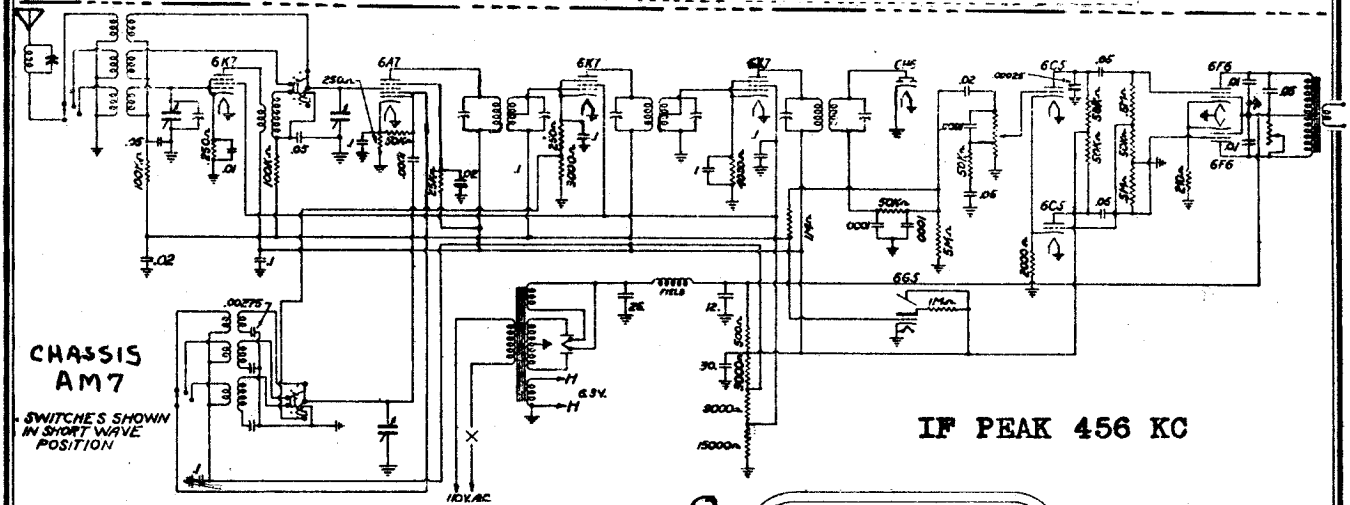
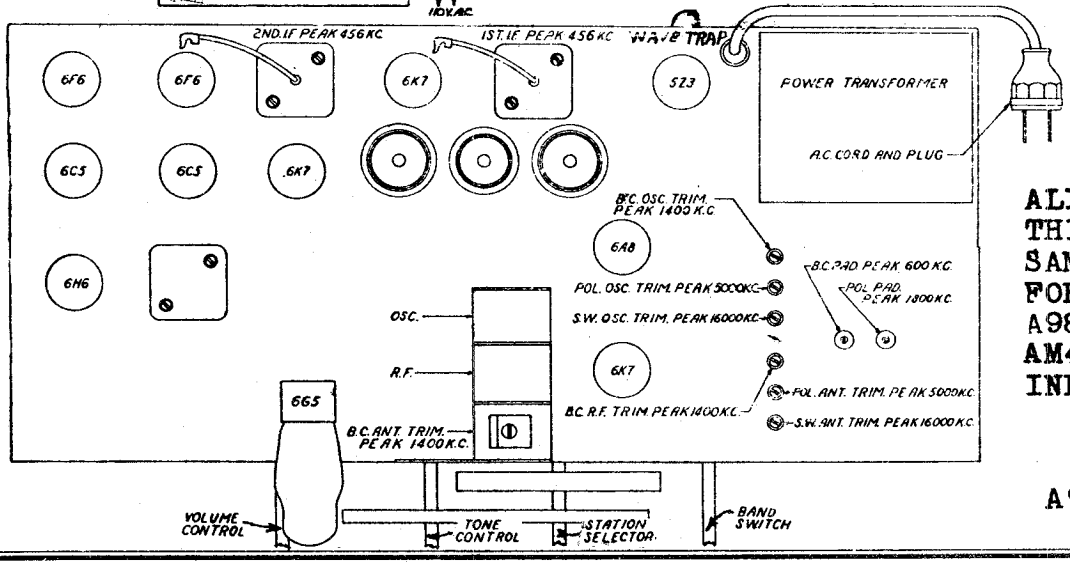
MODELS A-9852, A-9854
Chassis AM-7
Schematic, Socket
Trimmers, Alignment

# ALLIED RADIO CORP.

MODEL A-9820
Chassis B-102
Schematic




ALIGNMENT FOR THIS MODEL IS SAME AS GIVEN FOR THE MODEL A9890-CHASSIS AM4. (SEE THE INDEX)

MODELS
A9852, A9854

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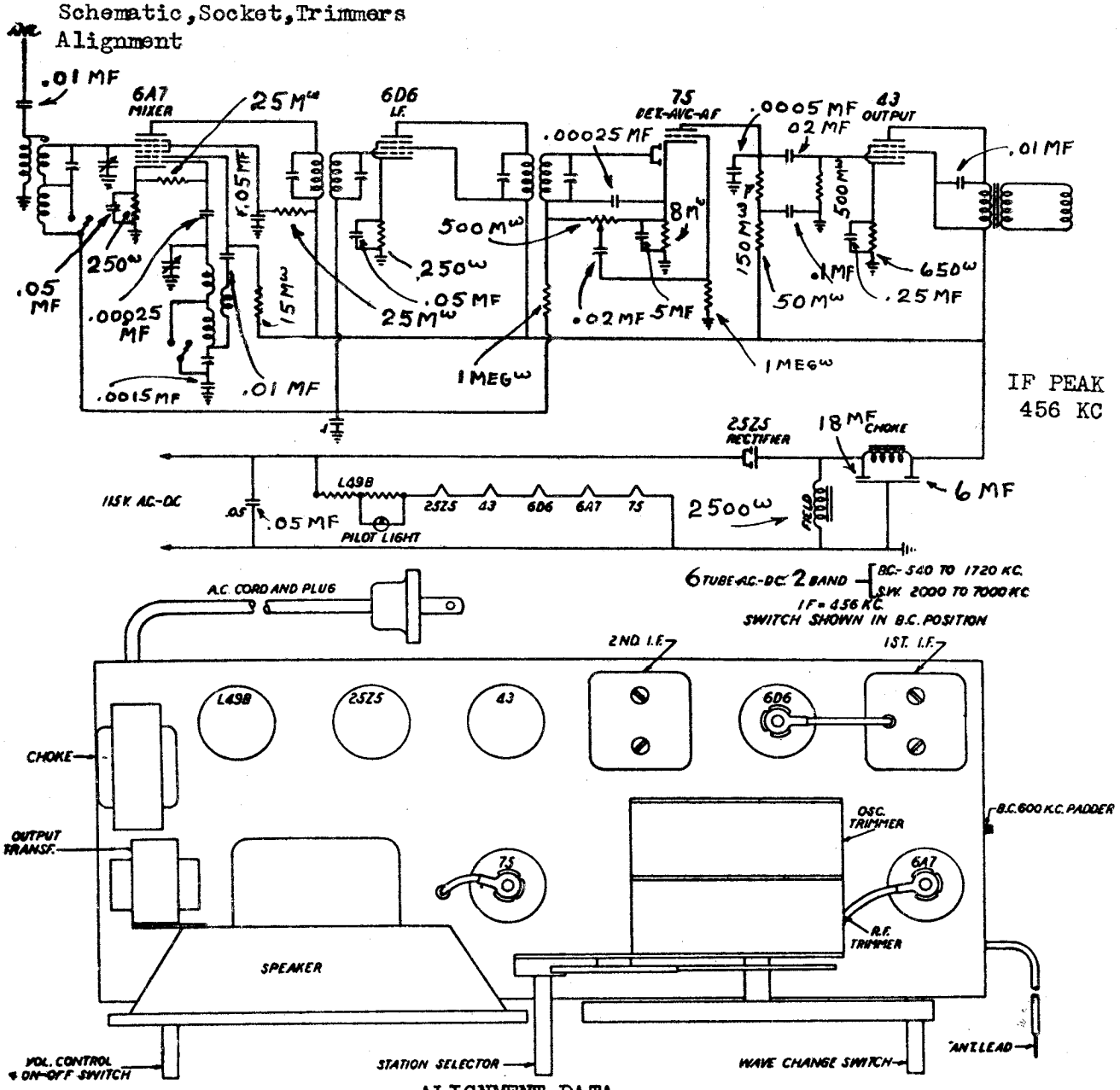
MODEL A-9851
Chassis B-2
Schematic, Socket, Trimmers
Alignment

# ALLIED RADIO CORP.




## ALIGNMENT DATA

INTERMEDIATE FREQUENCY - Connect the Signal Generator to Grid of 6A7 tube through a .05 MFD. condenser. Ground Generator to Ground of Chassis. Set Generator at 456 KC and adjust Trimmers on IF Transformers for maximum peak.

BROADCAST BAND - Connect the Generator to the Antenna of receiver through a .0001 MFD condenser. Ground Generator to Ground of Chassis. Range switch in Broadcast Position. Set Generator to 1400 KC and adjust Oscillator and RF Trimmers to Maximum peak. Dial of Receiver set on 1400 KC.

Pad the Broadcast Band at 600 KC, rocking the variable condenser during the adjustment.

SHORTWAVE BAND - Set Receiver and Generator to 6000 KC. Range switch in SW Position. Adjust SW Antenna Trimmer for maximum peak. No Oscillator adjustment is needed on this range.

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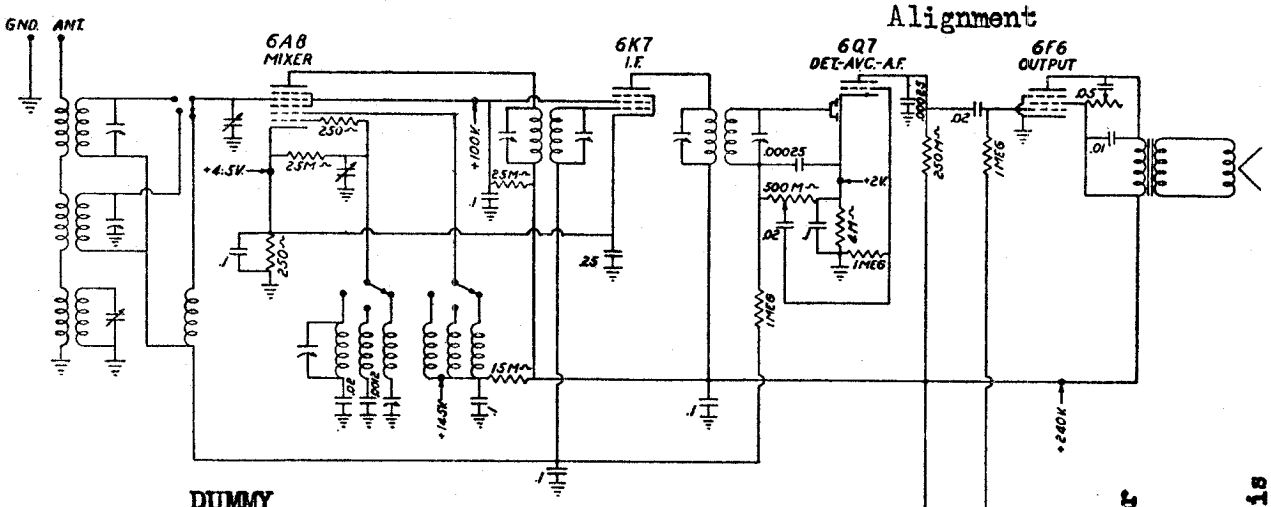
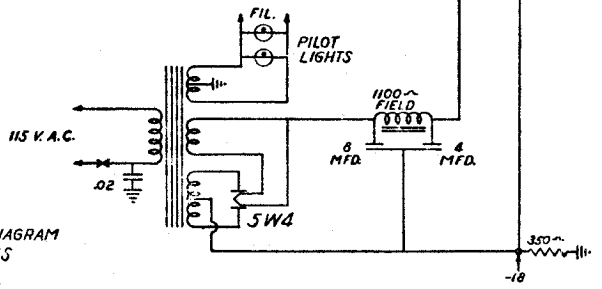
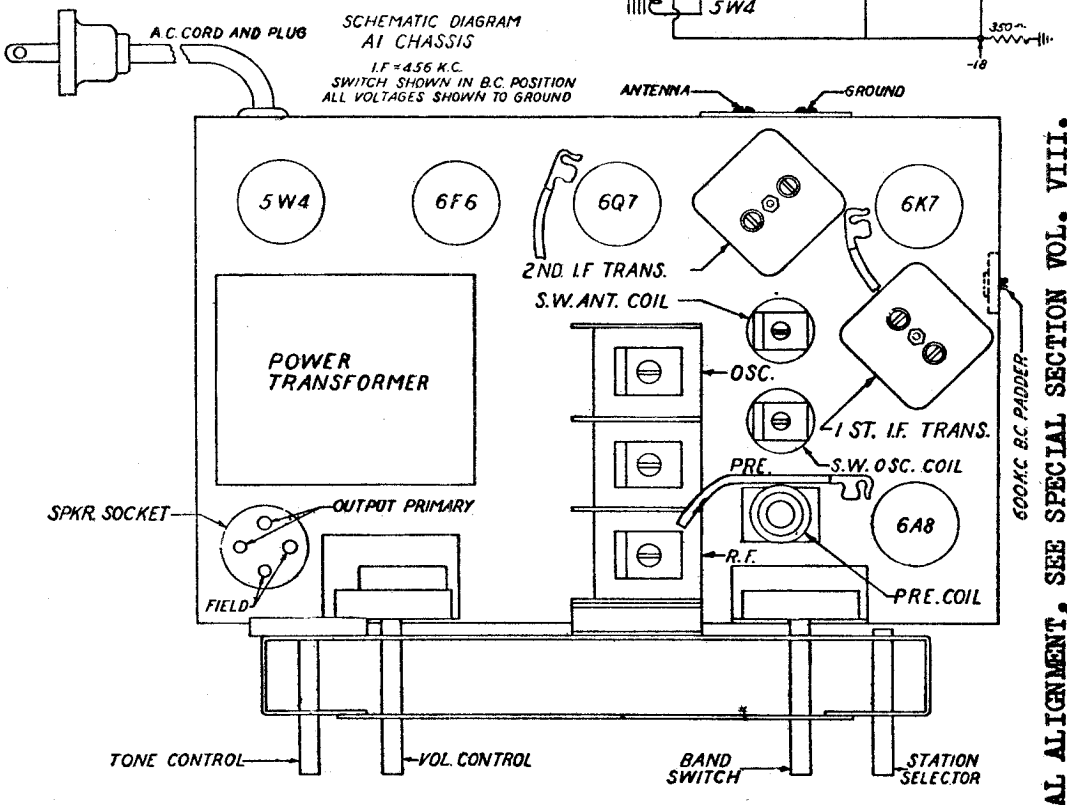
# ALLIED RADIO CORP.

MODELS A-9857, A-9857E
Chassis A-1
Schematic, Socket, Trimmers
Alignment




**DUMMY ANTENNAS**
IF:.05 mfd.cond. to 6A8 grid. OSC. gnd.,to chassis. B.C;.0001 mfd. to ant. post "A".




**CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.**
**IF:Peak all four IF trimmers at 456 kc.**
**BROADCAST BAND: Adjust oscillator trimmer at 1400kc. Adjust broadcast padder at 600kc. Then repeat adjustment at 1400kc.**
**FOREIGN BAND: Adjust s.w. oscillator and s.w. antenna coil trimmers for 14000kc peak. (Start with osc. trimmer loose, ant. trimmer tightened).**
**POLICE BAND: Adjust antenna coil trimmer to resonance at 4000 kc. (Trimmer is located on top of the chassis, right front corner alongside wave band switch).**

## Five Tube AC Superheterodyne

## A1 Chassis

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (AC). Never plug into a DC outlet.

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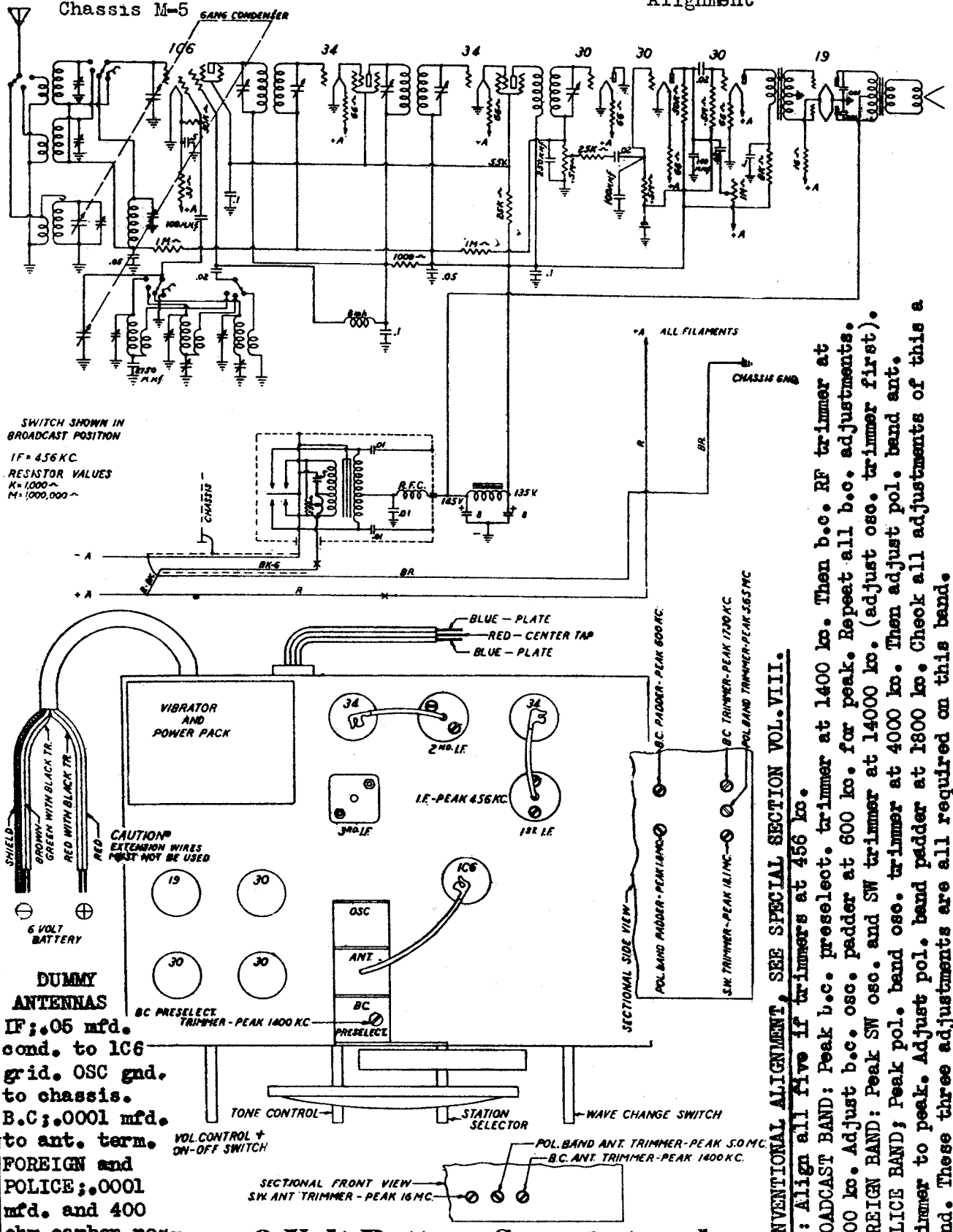
MODELS A-9861, A-9862, A-9863
A-9864, A-9865, A-9866
Chassis M-5

ALLIED RADIO CORP.

Schematic, Socket, Trimmers
Alignment




**DUMMY ANTENNAS**

IF;.05 mfd. cond. to 1C6 grid. OSC gnd. to chassis. B.C;.0001 mfd. to ant. term. FOREIGN and POLICE;.0001 mfd. and 400 ohm carbon resistor in series, to ant. term.

**6 Volt Battery Superheterodyne**

**M 5 Chassis**

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.

IF: Align all five if trimmers at 456 kc.

BROADCAST BAND: Peak b.c. preselect. trimmer at 1400 kc. Then b.c. RF trimmer at 1400 kc. Adjust b.c. osc. padder at 600 kc. for peak. Repeat all b.c. adjustments.

FOREIGN BAND: Peak SW osc. and SW trimmer at 14000 kc. (adjust osc. trimmer first).

POLICE BAND; Peak pol. band osc. trimmer at 4000 kc. Then adjust pol. band ant. trimmer to peak. Adjust pol. band padder at 1800 kc. Check all adjustments of this a band. These three adjustments are all required on this band.

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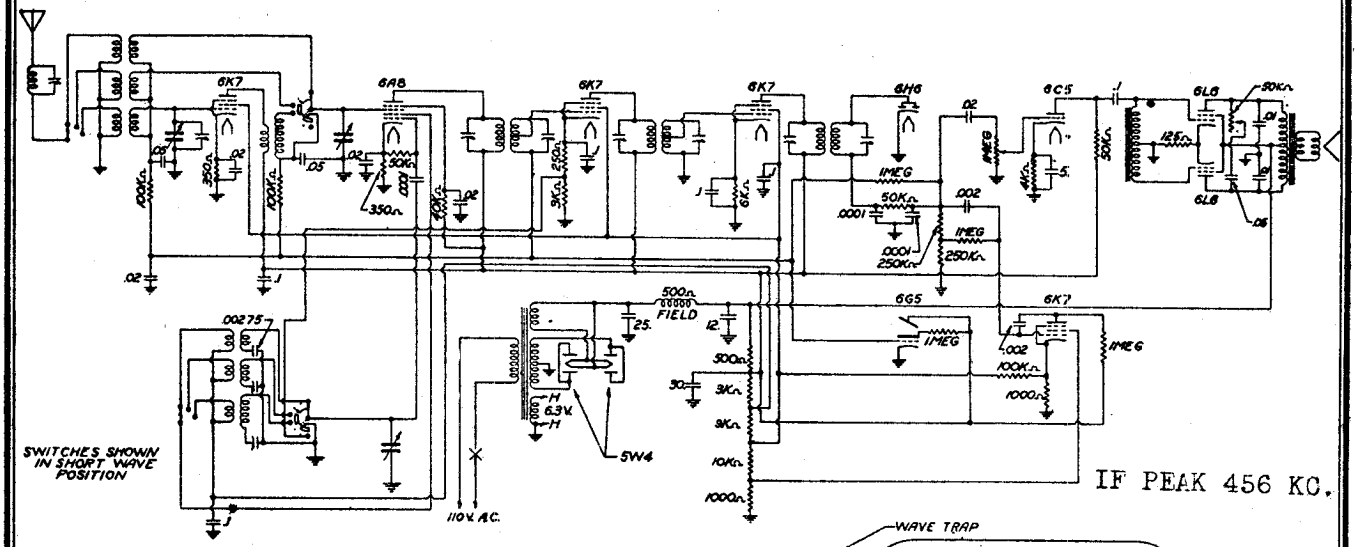
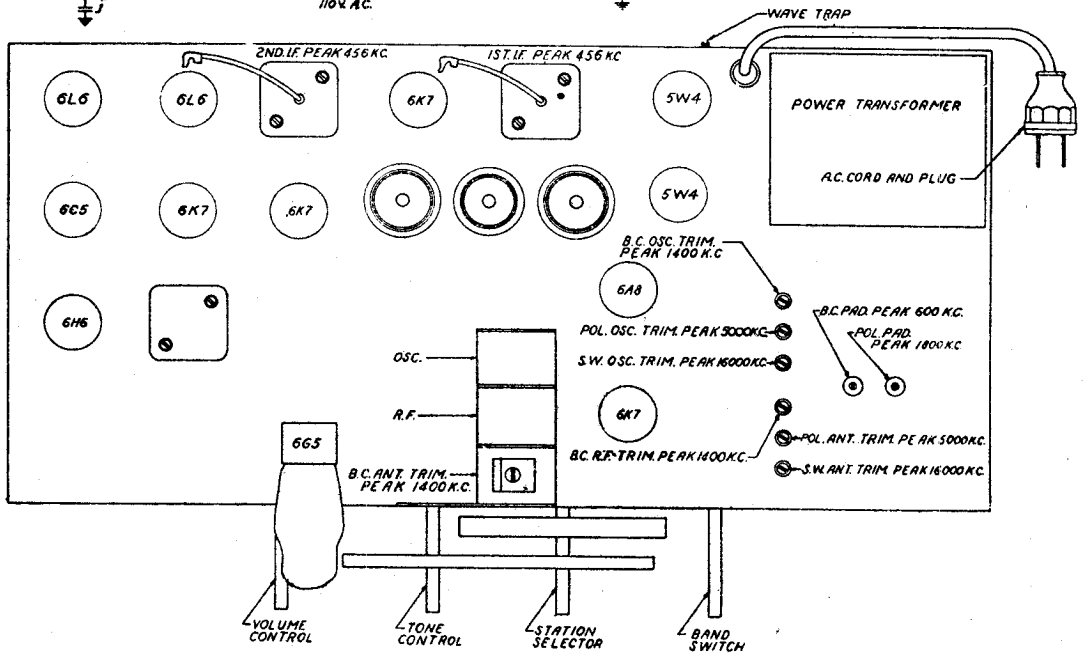
ALLIED RADIO CORP.

MODEL A-9891
Chassis AM-4
Schematic, Socket, Trimmers
Alignment





WAVE TRAP
2ND I.F. PEAK 456 KC.
1ST I.F. PEAK 456 KC.
POWER TRANSFORMER
A.C. CORD AND PLUG
B.C. OSC. TRIM. PEAK 1400 K.C.
B.C. PAD. PEAK 600 KC.
POL. OSC. TRIM. PEAK 5000 KC.
POL. PAD. PEAK 1800 K.C.
S.W. OSC. TRIM. PEAK 16000 KC.
OSC.
R.F.
B.C. ANT. TRIM. PEAK 1400 K.C.
B.C. R.F. TRIM. PEAK 1400 K.C.
POL. ANT. TRIM. PEAK 5000 K.C.
S.W. ANT. TRIM. PEAK 16000 K.C.
VOLUME CONTROL
TONE CONTROL
STATION SELECTOR
BAND SWITCH

## ALIGNMENT DATA

**IF ALIGNMENT** - Wave change switch on BC position. Generator connected to grid of 6A8 thru a .05 MFD condenser, and align six IF trimmers to peak.

**BROADCAST** - Connect Generator to ANT lead thru 1000 MMFD condenser. Receiver, Generator set to 1400 KC, adjust Oscillator trimmer to peak, then RF trimmers. Pad the Oscillator circuit at 600 KC while rocking variable condenser.

**POLICE** - Replace 1000 MMFD condenser with 400 ohm resistor in series with 100 MMFD condenser and connect Generator to ANT lead. Generator and receiver set to 4000 KC, adjust Oscillator and ANT Police trimmers to maximum peak. Reset the Generator and receiver to 1800 KC, rock variable condenser while padding OSC.

**FOREIGN** - Set Generator and Receiver to 14000 KC, adjust Oscillator trimmer, and the Foreign ANT trimmer to peak. Readjust receiver to 13100 KC, generator still at 14000 KC and check for image response which should be weaker. Adjustments should be started with oscillator trimmer loose and ANT trimmer tight. Repeat all adjustments for maximum performance of the receiver.

**WAVE TRAP** - Used only in event of code interference, adjusted to 456 KC.

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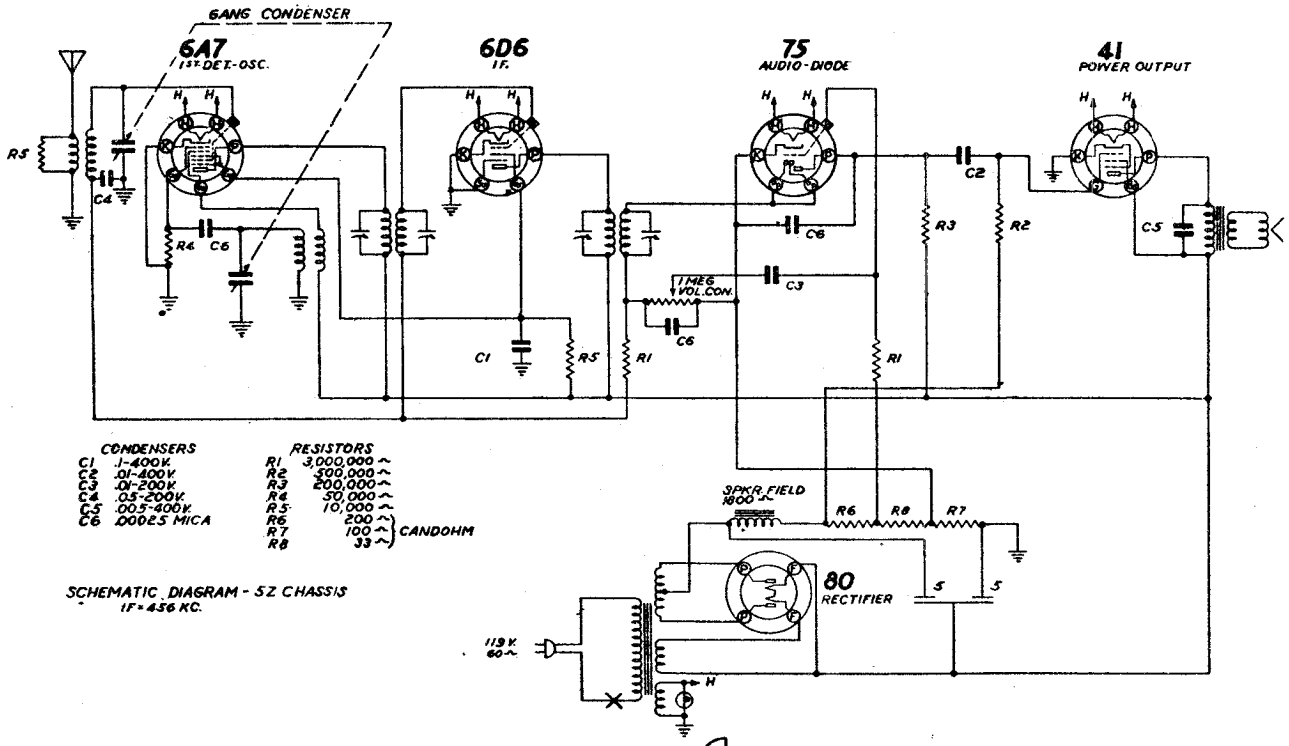
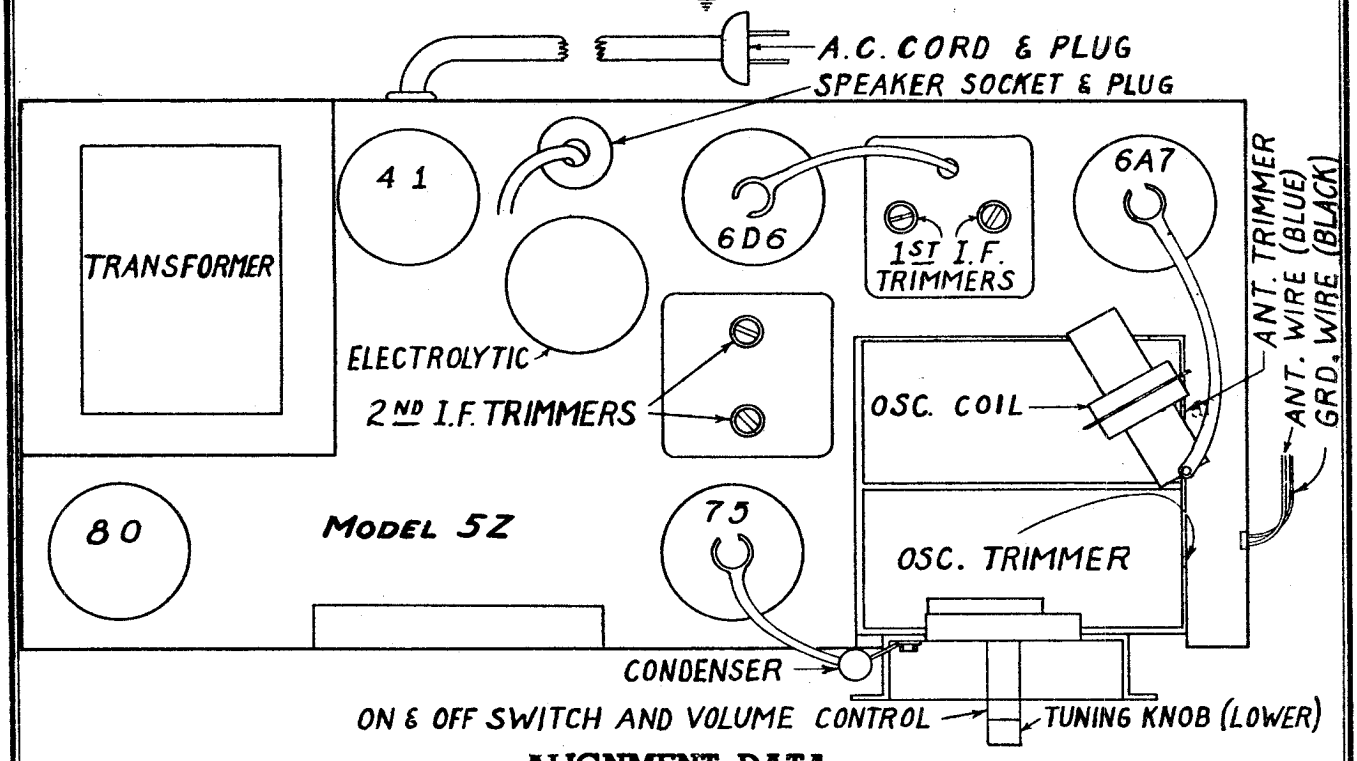
MODELS A-10500,A-10501
Chassis 5Z
Schematic,Socket,Trimmers
Alignment

# ALLIED RADIO CORP.




SCHEMATIC DIAGRAM - 5Z CHASSIS
IF = 456 KC.




## ALIGNMENT DATA

IF ALIGNMENT - Wave switch on B.C. position. Generator connected to grid of 6A7 tube through a .05 MFD Cond. Align four trimmers.

BROADCAST - Connect generator to ANT. lead (blue) through a 200 MMFD cond. Gang condenser at minimum, generator set at 1730 KC, adj. OSC. trimmer to peak. Set generator to 1400 KC and adjust ANT. trimmer to peak. Generator and receiver set to 600 KC. Rock

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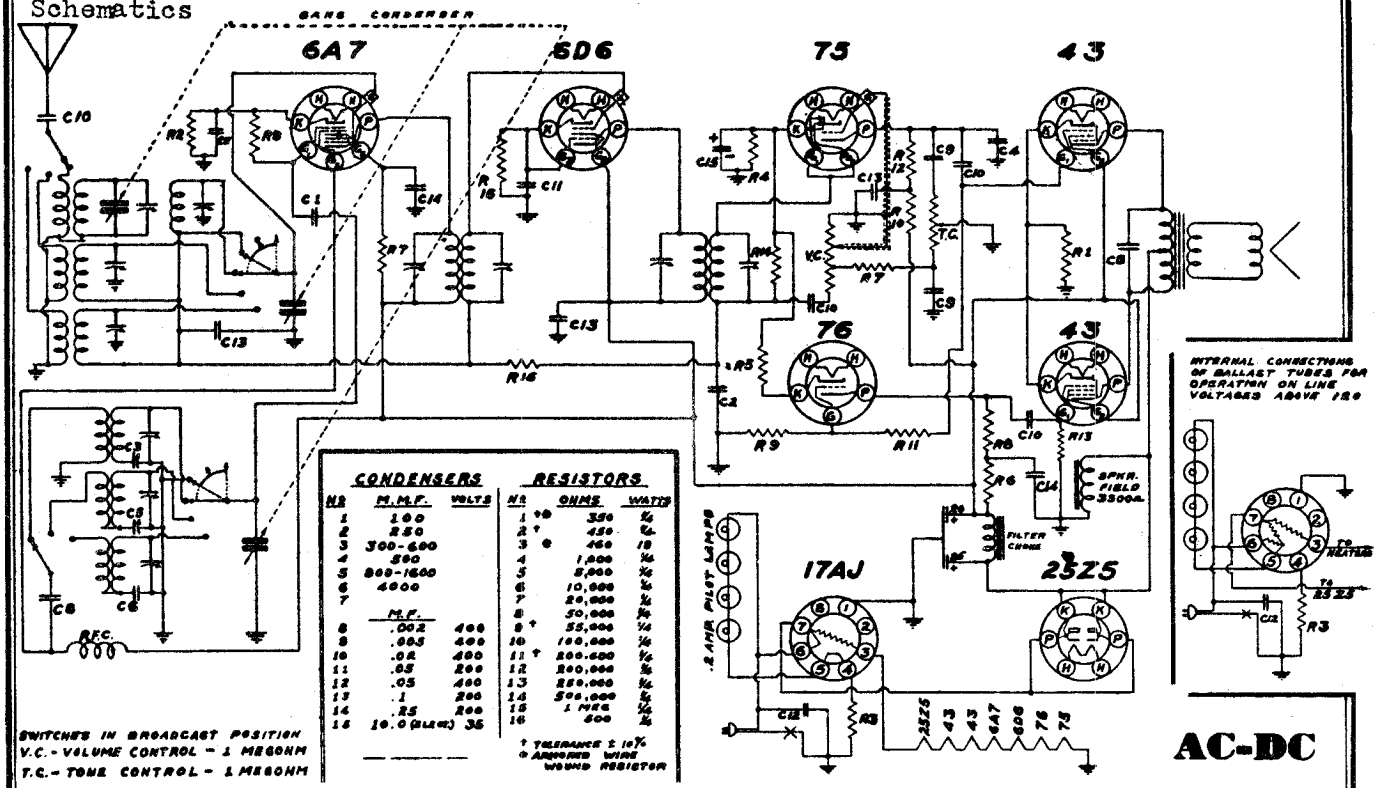
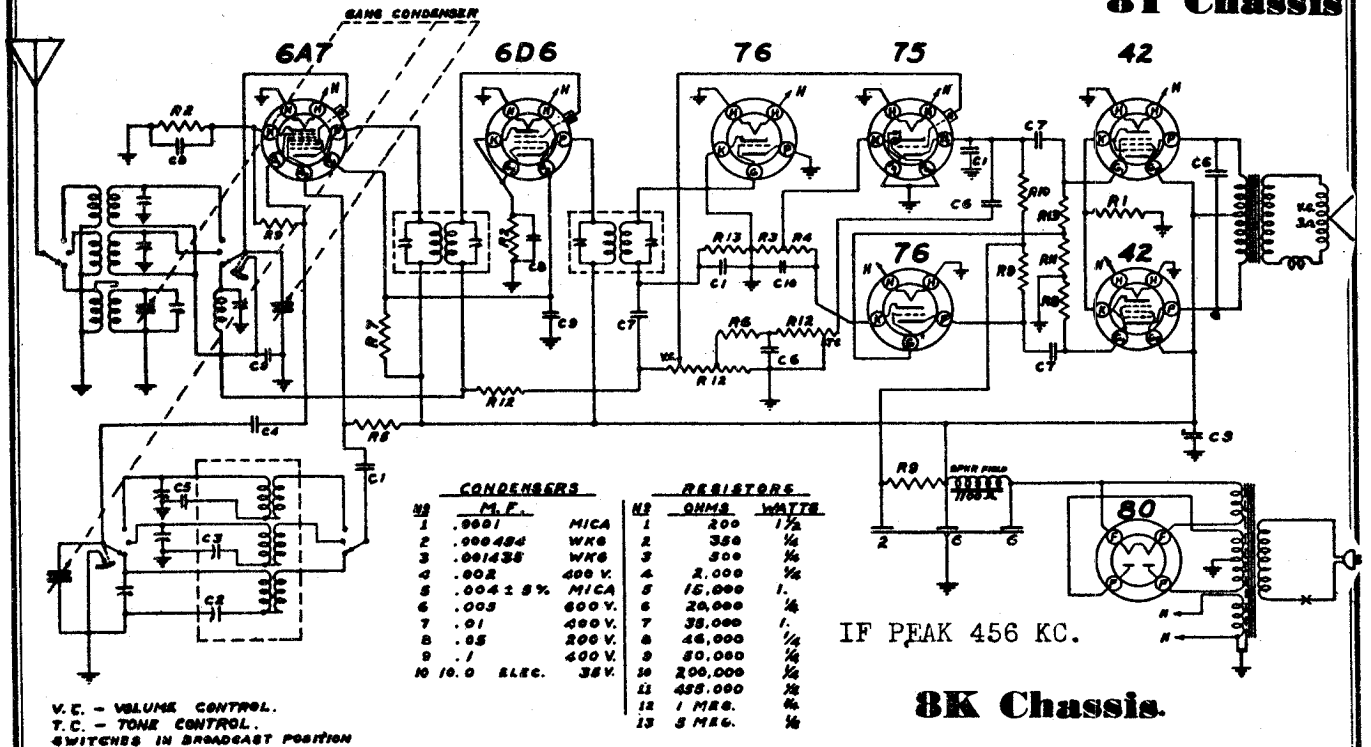
MODELS A-10515 to A-10518 incl. Chassis 8-T Schematics

# ALLIED RADIO CORP.

MODELS A-10510 to A-10513 incl. Chassis 8-K




**8K and 8T are** designed to operate over three tuning ranges with a pointer swing of 340°; the broadcast range which extends from 535 to 1730 Kilocycles (KC) (173 to 560 meters), Police and Aviation Band which extends from 1.7 to 5.6 Megacycles (MC) (53 to 176 Meters) and the International Short Wave Band which extends from 5.6 to 18.1 Megacycles (MC) (16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

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# MODELS A-10510 to A-10513 incl. Chassis 8-K
# MODELS A-10515 to A-10518 incl. Chassis 8-T

# ALLIED RADIO CORP.

## Alignment, Socket Trimmers, Tuner

## HOW TO TUNE IN STATIONS ON THE TELEPHONE DIAL

Press in the button of the station desired tuned and rotate the dial slowly until a click is heard and the dial will not turn in either direction until the button is released. The station is now tuned in and can be adjusted to the volume desired by means of the volume control. The proper direction of rotation of the dial can be determined by turning the dial in the direction which will not allow the wide space adjacent to the pointer to converge into the space at the bottom of the dial. See Fig. (1).

## PROCEDURE FOR ADJUSTING THE TELEPHONE DIAL BUTTONS

(1) Choose one of the stations out of the list of stations selected and by means of the station selector very carefully tune in this station, noting at the same time the exact pointer location on the dial.

(2) Now select the proper button for the first station chosen by referring to Fig. 1 and noting the button into whose range the station falls. For example, station WGN with a frequency of 720 KC comes under the button whose frequency ranges from 670 to 755 KC. Usually the button nearest the tuning point or the bottom of the dial will be the proper button.

(3) Loosen the button by unscrewing it (not the dial) ½ turn to the left. Now press the button in all the way and rock the dial back and forth a trifle until a click is heard. Do not release the button now but set the pointer to its former location and with the dial in this position, being careful not to move it, proceed to tighten the button by turning it in the opposite direction (to the right). Make sure the button is very securely tightened as it may get out of adjustment.

(4) From the station call sheet supplied remove the proper station disc and insert into the push button so that the wording is horizontal when the button is at the bottom, and then insert a clear celluloid insert. Follow this same procedure for the remaining buttons.

Shown in Fig. 1 is the approximate frequency range that each button will cover. **Note:** If 2 stations happen to fall within the range of one button, one station will necessarily have to be tuned in with the selector knob.

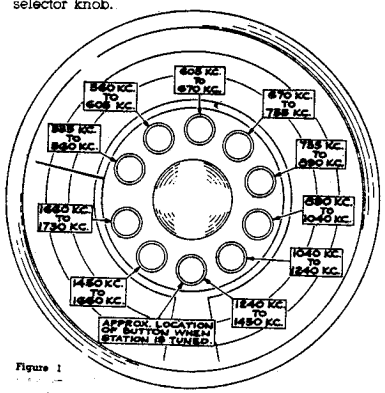

605 KC. TO 670 KC.
540 KC. TO 605 KC.
670 KC. TO 755 KC.
485 KC. TO 540 KC.
755 KC. TO 880 KC.
1440 KC. TO 1730 KC.
880 KC. TO 1040 KC.
1040 KC. TO 1240 KC.
1460 KC. TO 1640 KC.
1240 KC. TO 1450 KC.
APPROX. LOCATION OF BUTTON WHEN STATION IS TUNED.

Figure 1

## ALIGNMENT DATA, 8K. 8T.

**GENERAL DATA** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE** The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

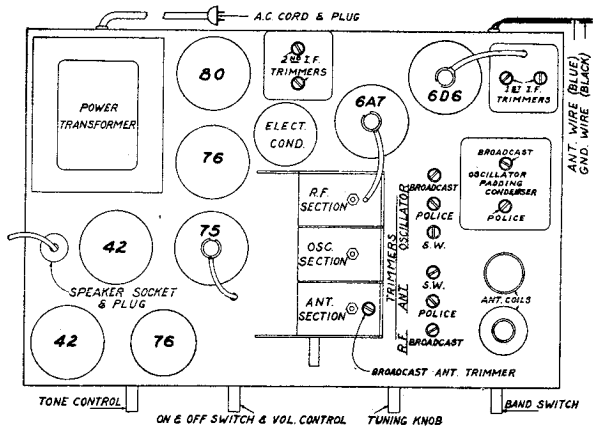
**I.F. ALIGNMENT** With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground if the test oscillator is not grounded to one side of the power line. In case one side is connected to ground, connect a large condenser from ground on the test oscillator to ground of the chassis. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT** Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

**POLICE BAND ALIGNMENT** The police band is adjusted by first replacing the .0002 dummy with a 400-ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

**SHORT WAVE BAND ALIGNMENT** The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

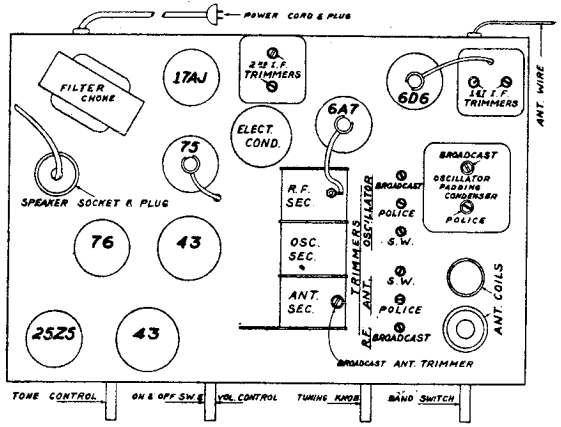
MODELS A10510, A10511, A10512, A10513 Chassis 8K.




## Eight Tube AC Telephone Dial All Wave Superheterodyne

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (AC). Never plug into a DC outlet.

MODELS A10515, A10516, A10517, A10518 Chassis 8T.




**BALLAST TUBES** This receiver is designed to operate from any 60 cycle AC (alternating current) or DC (direct current) power supply main of 110 to 120 volts. However by the use of the proper tube (listed below) any one of the following line voltages can be employed: 115, 130, 150, 230.

| Type Tube | Line Voltage |
|---|---|
| 17AJ | 115 Volts — 60 Cycle |
| 35A1 | 130 Volts — 60 Cycle |
| M50E3] | 150 Volts — 60 Cycle |
| M130E3] | 230 Volts — 60 Cycle |

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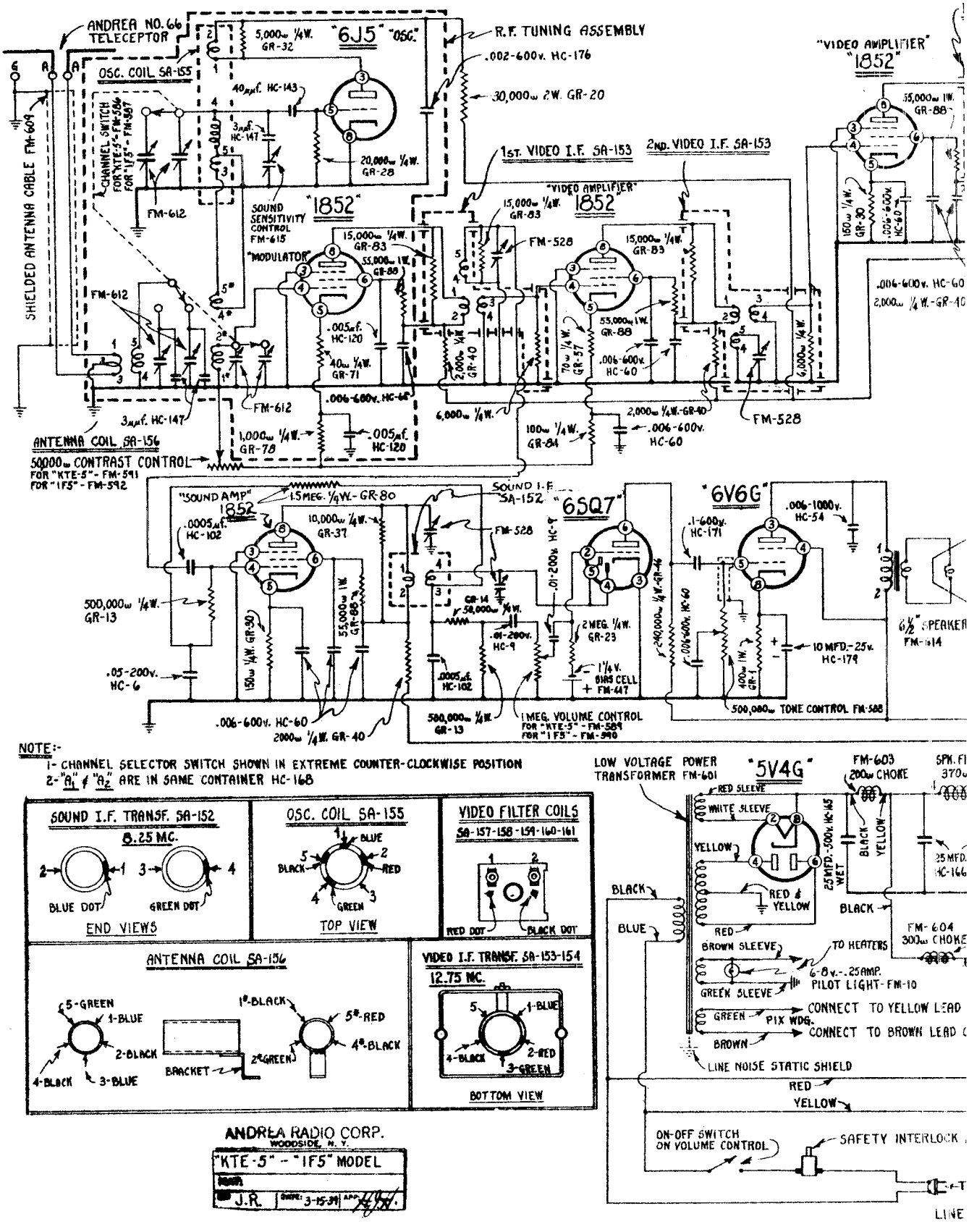


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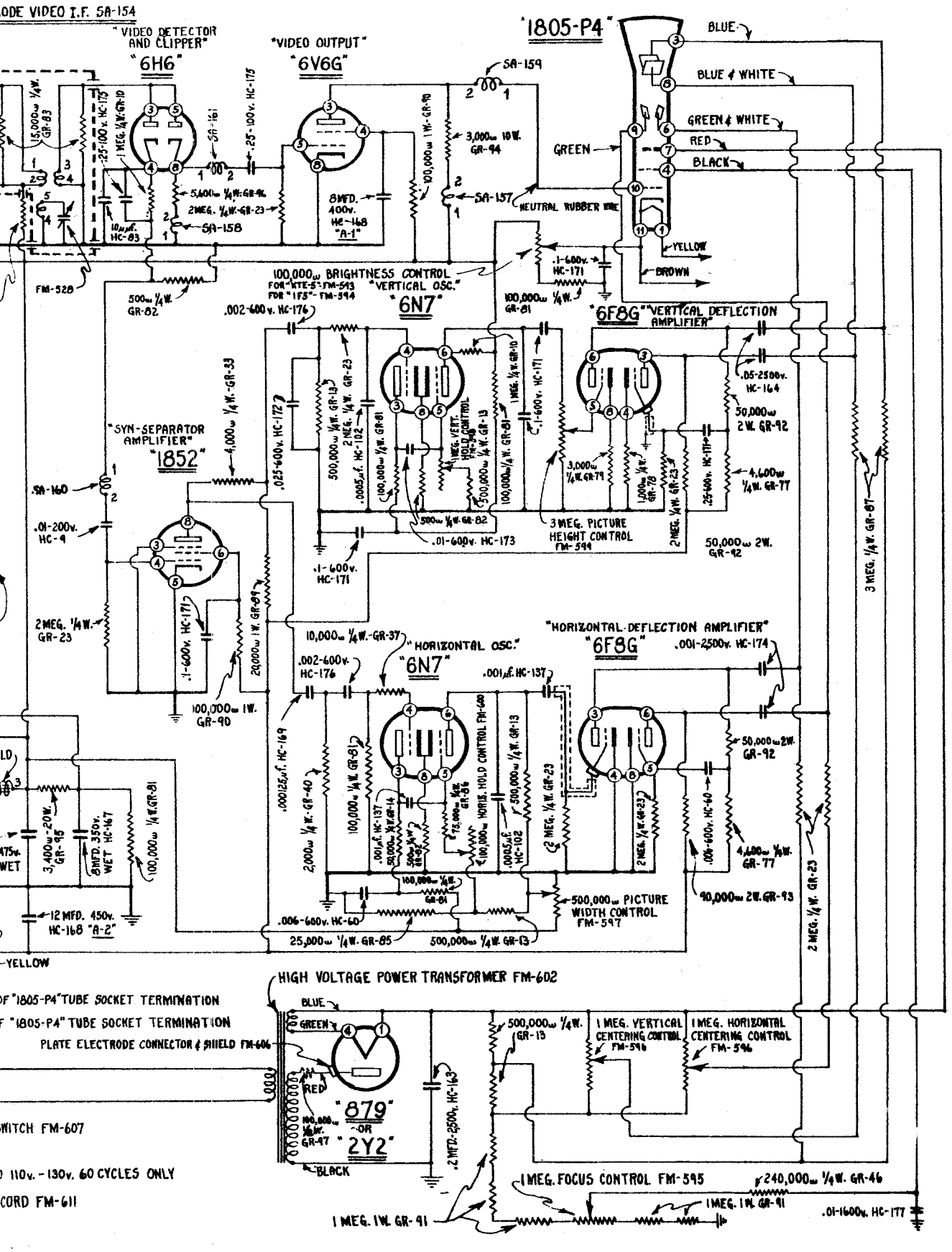
ADIO CORP.

MODEL 1F5
Schematic, Coils



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## CHART INDICATING TUBE FAILURES

| *Tube and Function* | *Picture* Raster, no picture | *Sound* | *Sync* | *Miscellaneous* |
|---|---|---|---|---|
| 1852 Modulator | Picture | | | Tube is microphonic, gray bars appear when cabinet is tapped, or when loud audio signals are heard. |
| 6J5 Oscillator | Distorted picture | | | |
| | No picture | No sound | | |
| 1852 1st Video I.F. | No picture | Sound O.K. | | |
| 1852 2nd Video I.F. | No picture | Sound O.K. | | |
| 6H6 Video Detector and Clipper | No picture | Sound O.K. | | |
| | Picture | | Slipping | |
| 6V6G Video Output | No picture | Sound O.K. | | |
| 1852 Snyc Separator | Picture | Sound O.K. | Slipping | |
| 6N7 Vertical Oscillator | Insufficient height | | | |
| | Out of frame | | | Picture syncs slightly down from top or up from bottom. |
| 6F8G Vertical Deflection Amp. | Insufficient height | | | Picture may appear as merely a horizontal line. |
| 6N7 Horizontal Oscillator | Insufficient width | | | Picture may appear as a vertical line. |
| 6F8G Horizontal Deflection Amp. | Insufficient width | | | Picture may appear as a vertical line. |
| 879 or 2Y2 High Voltage Rectifier | No picture | Sound O. K. | | Centering controls have no effect. |
| 5V4G Low Voltage Rectifier | No picture | No sound | | |
| 1805—P4 Picture Tube | Momentary | | | Momentary picture, screen blooms, picture disappears. |
| | Spot | | | Yellow spot: burn, due to operation at excessive brightness. |
| | Dull | | | Dull picture due to long use of picture tube |
| | Odd Size | | | Note: If faulty picture size can not be corrected by size or hold controls, look for open connection from cable to picture tube socket. |

**Checking Tube Failures:** If you have determined that the fault lies in the set and not in the antenna, the first source of trouble to examine is the tubes. Consequently, a set of tested tubes must be at hand for television service work. Different tubes display quite definite symptoms of failure. With the Chart provided here, it is easy to locate the defective tube quickly.

| | | | | |
|---|---|---|---|---|
| 1852 Sound I.F. | Picture O.K. | No sound | | |
| 6SQ7 Detector and 1st Audio | Picture O.K. | Microphonic howl | | |
| | Picture O.K. | No sound | | |
| | Picture O.K. | Distortion | | |
| | Picture O.K. | Noise in speaker | | |
| 6V6G Audio Output | Picture O.K. | No sound | | |
| | Picture O.K. | Weak, distorted | | |

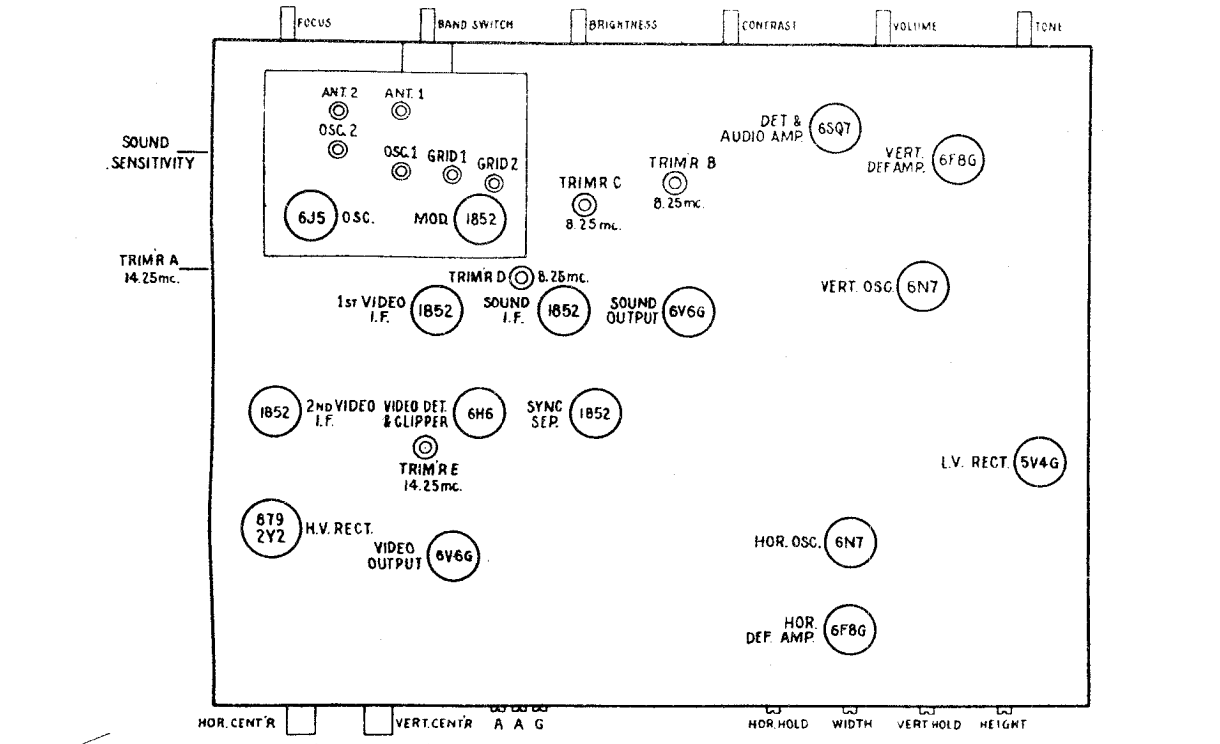
**Other Failures:** If, after checking the tubes, reception of pictures or sound is not satisfactory, go through the Sight and Sound Chart.

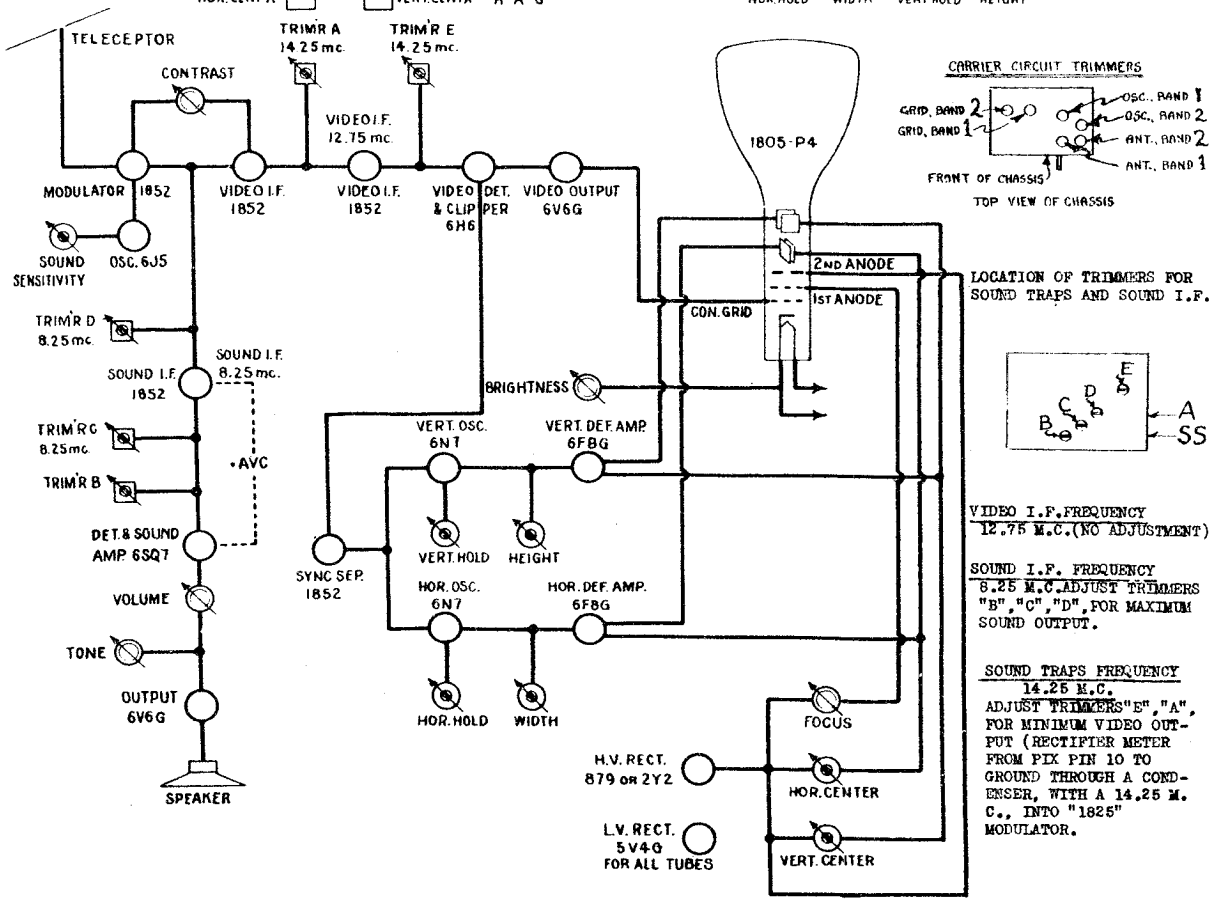
## SIGHT AND SOUND CHART

| SYMPTOM | REMEDY |
|---|---|
| Picture will not hold vertical sync | Adjust vertical hold control. Do this with contrast control as low as possible. |
| | Insufficient Signal: Antenna must be oriented, moved to more favorable location, or raised in height. Ratio of signal to noise may be too low. Increase height of antenna. If lead is over 100 ft. long, coaxial cable may be required. Note: May be due to losses introduced by antenna leads to other television receivers. Remove such leads. |
| | Interference: Ratio of signal to noise may be too low. See Insufficient Signal notes above. |
| Picture tears | Adjust horizontal hold control. |
| | Interference: Ignition interference may cause tearing in all or part of the picture area. See Insufficient Signal notes above. |
| Picture shows horizontal distortion | Adjust horizontal hold control. |
| | Interference: See Insufficient Signal notes above. |
| Picture is broken by angular pattern | Interference: See Insufficient Signal notes above. |
| Picture has white retrace lines | Brightness control too high, contrast control too low. |
| | Insufficient signal: If contrast control is at maximum see Insufficient Signal notes above. |
| | Transmitter adjustment is not correct. |
| Picture is distorted by sound | Adjust trimmers A and E for minimum signal at 14.25 mc. |
| Pictures without sound | Adjust trimmers B, C, and D for maximum audio output at 8.25 mc., and check adjustment of Sound Sensitivity trimmer at the side of the chassis. |
| Pictures and sound weak | As a last resort, after you have checked everything else, realign R.F. plunger condensers. |

MODEL 1F5
Socket, Alignment
Video Block Diagram

# ANDREA RADIO CORP.




VIDEO I.F. FREQUENCY
12.75 M.C. (NO ADJUSTMENT)

SOUND I.F. FREQUENCY
8.25 M.C. ADJUST TRIMMERS "B", "C", "D", FOR MAXIMUM SOUND OUTPUT.

SOUND TRAPS FREQUENCY
14.25 M.C.
ADJUST TRIMMERS "E", "A", FOR MINIMUM VIDEO OUTPUT (RECTIFIER METER FROM PIX PIN 10 TO GROUND THROUGH A CONDENSER, WITH A 14.25 M.C., INTO "1825" MODULATOR.

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Trimmers, Socket

# BELMONT RADIO CORP.

MODEL 403, Series A
Schematic, Voltage

Power Output.....200 Milliwatts Undistorted, 300 Milliwatts Maximum

Slight adjustments to the oscillator and antenna circuits can be made without removing the chassis from the cabinet through two holes on the front of the radio cabinet under the nameplate (see Fig. 4).

## PARTS (SERIAL No. 9C617100 and UP)

| Diagram Ref. No. | Part No. | Description |
|---|---|---|
| **RESISTORS** | | |
| R1 | 1309 | 200M ohm—½ w. |
| R2 | 13071 | 4M ohm—½ w. |
| R3 | 130208 | 40M ohm—½ w. |
| R4 | 13026 | 1000 ohm—½ w. |
| R5 | 13020 | 100M ohm—½ w. |
| R6 | 13026 | 1000 ohm—½ w. |
| R7 | 13040 | 19M ohm—½ w. |
| R8 | 13038 | 2 megohm—½ w. |
| R9 | 13038 | 2 megohm—½ w. |
| R10 | 101163 | 1 megohm volume control |
| R11 | 13019 | 1 megohm—½ w. |
| R12 | 1303 | 500M ohm—½ w. |
| R13 | 130283 | 750 ohm—½ w. |
| R14 | 13038 | 2 megohm—½ w. |
| R15 | 130218 | 5M ohm—½ w. |
| **CONDENSERS** | | |
| C | 102103 | 2 gang variable condenser |
| C1 | 10022 | .05 x 200 v. Loop ant. trimmer on gang |
| C2 | | Oscillator trimmer on gang |
| C3 | | .00025 mica |
| C4 | 12912 | .05 x 200 v. |
| C5 | 10022 | .01 x 200 v. |
| C6 | 10078 | .01 x 200 v. |
| C7 | 10078 | .01 x 200 v. |
| C8 | 10078 | .25 x 200 v. |
| C9 | 10064 | .0001 mica |
| C10 | 1295 | .0001 mica |
| C11 | 1295 | .01 x 200 v. |
| C12 | 10078 | .00025 mica |
| C13 | 12912 | .01 x 200 v. |
| C14 | 10078 | .25 mfd. 25 w. |
| C15 | 11935 | .5 x 200 v. |
| C16 | 10056 | .003 x 600 v. |
| C17 | 10012 | |
| T5 | 108143 | Output I.F. coil |
| T6 | 114158 | 5" P.M. Speaker |
| S1 | | Off-on switch D.P.S.T. on vol. control |
| T1 | 1236 | Antenna load coil (on loop) |
| T2 | 120257 | Loop antenna coil (complete) |
| T3 | 110110 | Oscillator coil |
| T4 | 108142 | Input I.F. coil |

FREQUENCY RANGE
545 to 1650 K.C.

I.F. 465 K.C.

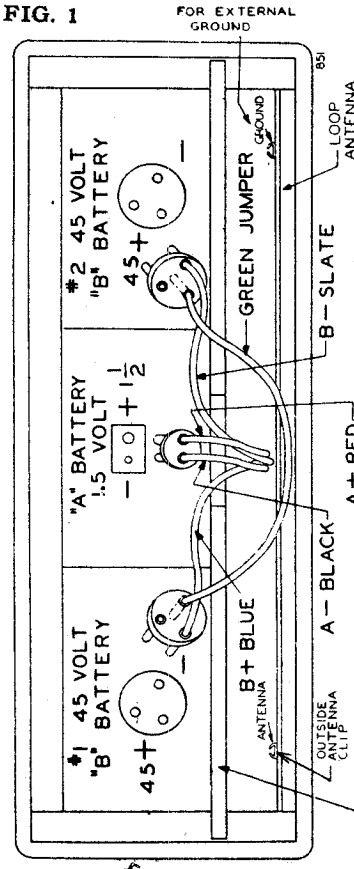
Frequency Range
545 - 1650 Kilocycles

IC5G OUTPUT
IH5G 2ND DET AVC 1ST AUDIO
IN5G I F AMP
IA7G 1ST DET & OSCILLATOR

MODEL 403
Series A

## Broadcast Band 1½-Volt Battery Operated Superheterodyne Receiver with Self-Contained Loop Antenna

FIG. 1




The approximate current consumption is as follows: "A"—200ma., "B"—12.5ma.

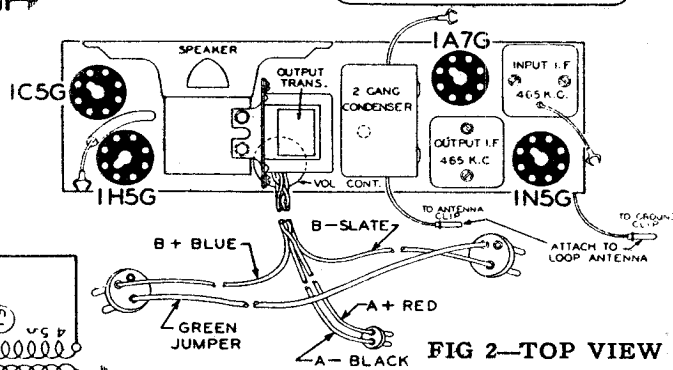


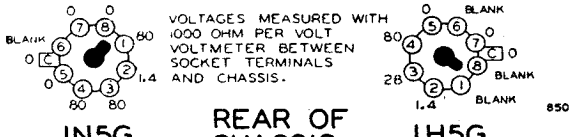

FIG 2—TOP VIEW

BOTTOM VIEW OF CHASSIS

[A] CANNOT BE READ WITH VOLTMETER.

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.

REAR OF CHASSIS




**A ground is essential when an outside antenna is employed.**

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# BELMONT RADIO CORP.

## ALIGNMENT PROCEDURE

### MODEL 418 SERIES A

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1N5G I. F. Tube | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1A7G | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1735 Kc. | 200 mmf. | Antenna lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Antenna Broadcast | Adjust to maximum output |

### MODEL 403 Series A

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1A7G Tube | Rotor full open (Plates out of mesh) | Four trimmers on top (See Fig. 1) | Output and input I. F. | (See Note "A") Adjust to maximum output |
| BROAD-CAST BAND | 1650 Kc. | 200 mmf. | Grid of 1A7G Tube | Rotor full open (Plates out of mesh) | Trimmer (C3) front section of gang (See Fig. 4) | Oscillator | (See Note "A") Adjust to maximum output |
| | 1400 Kc. | | See Note "C" | Set dial at 1400 Kc. | Trimmer (C2) rear section of gang (See Fig. 4) | Antenna | (See Note "B") Adjust to maximum output |

**NOTE "A"** — A 1 megohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer, (C3). The loop antenna must be disconnected from the chassis.

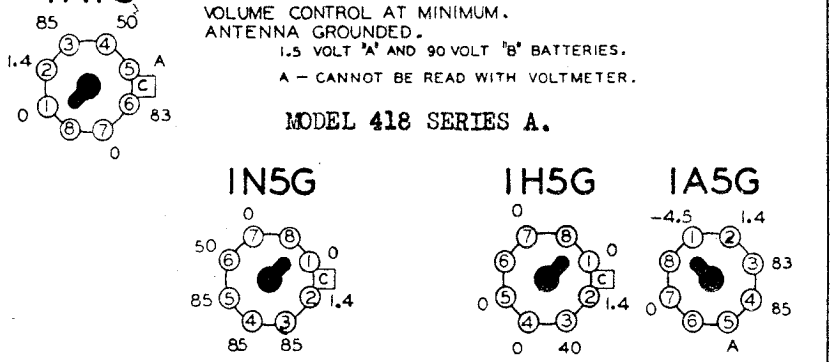
**NOTE "B"** — Remove the 1 megohm resistor from the loop antenna leads; mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust trimmer (C2). (See note "C.")

**NOTE "C"** — Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

## BOTTOM VIEW OF CHASSIS

D.C. VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.
VOLUME CONTROL AT MINIMUM.
ANTENNA GROUNDED.
1.5 VOLT "A" AND 90 VOLT "B" BATTERIES.
A — CANNOT BE READ WITH VOLTMETER.

MODEL 418 SERIES A.




## PROCEDURE FOR SETTING THE AUTOMATIC LEVERS: MODEL 418 SERIES A.

There are six levers on the front of the radio by means of which six stations may be selected, (See "B" Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the cabinet is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in the cabinet above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

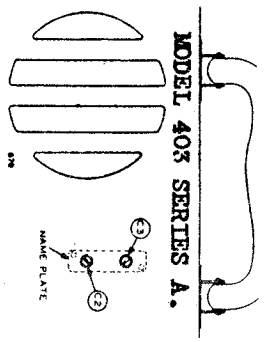



Fig. 4

# BELMONT RADIO CORP.

MODEL 418, Series A
Schematic, Socket
Trimmers

## Broadcast Band 1½-Volt Battery Operated Superheterodyne Receiver

### Frequency Range—530 - 1735 Kilocycles

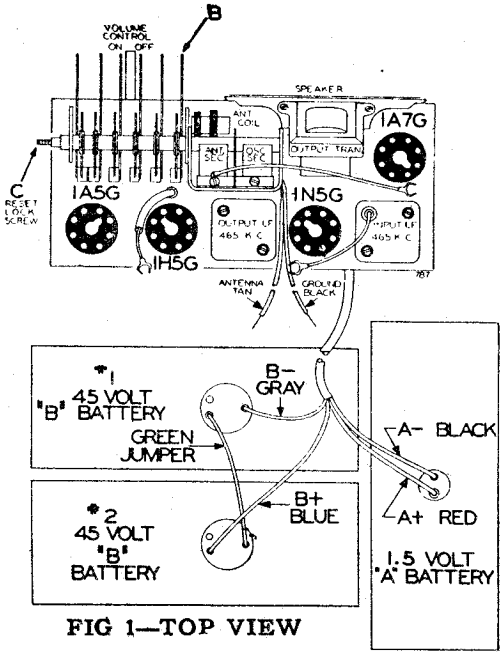



FIG 1—TOP VIEW

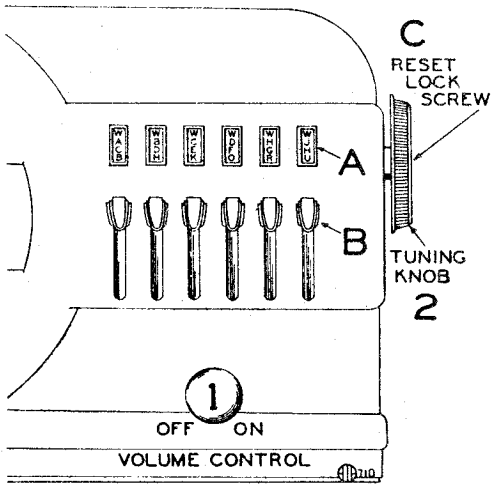
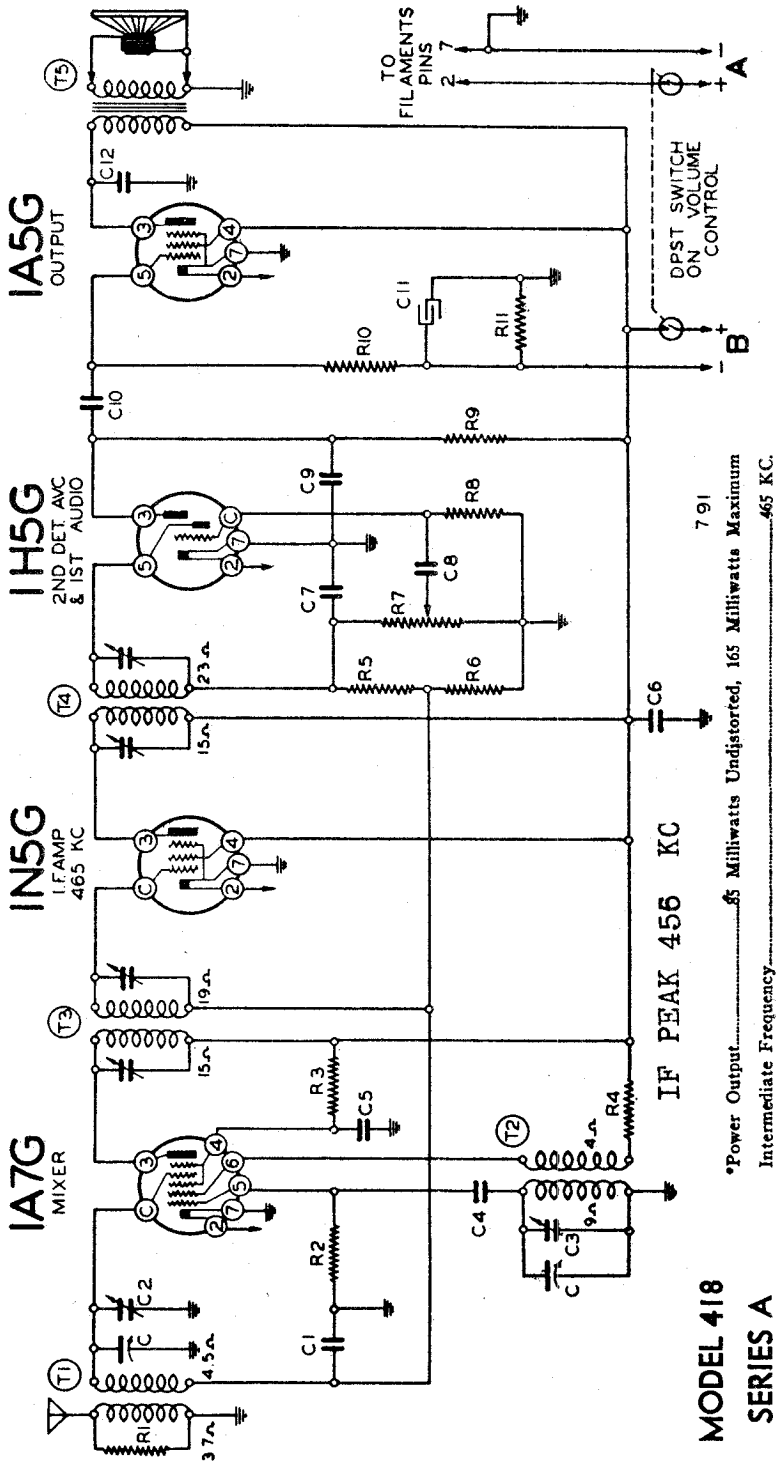



FIG. 2—FRONT VIEW

| Circuit Reference No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 13021 | 20M ohm—⅓ w. |
| R2 | 1309 | 200M ohm—⅓ w. |
| R3 | 130208 | 40M ohm—⅓ w. |
| R4 | 13031 | 1500 ohm—⅓ w. |
| R5 | 13038 | 2 megohm—⅓ w. |
| R6 | 13038 | 2 megohm—⅓ w. |
| R7 | 101155 | 1 megohm volume control |
| R8 | 13019 | 1 megohm—⅓ w |
| R9 | 130268 | 350M ohm—⅓ w |
| R10 | 13019 | 1 megohm—⅓ w. |
| R11 | 130267 | 550 ohm—⅓ w. |
| | | **CONDENSERS** |
| C | 10287B | 2 gang variable condenser |
| C1 | 1009 | .05 x 200 v. |
| C2 | | Antenna Trimmer |
| C3 | | Oscillator Trimmer |
| C4 | 12912 | .00025 mica |
| C5 | 10064 | .25 x 200 v. |
| C6 | 10064 | .25 x 200 v |
| C7 | 1295 | .0001 mica |
| C8 | 10011 | .01 x 400 v. |
| C9 | 1295 | .0001 mica |
| C10 | 10011 | .01 x 400 v. |
| C11 | 11952 | 25 mfd. x 25 w. v. |
| C12 | 10037 | .003 x 600 v. |

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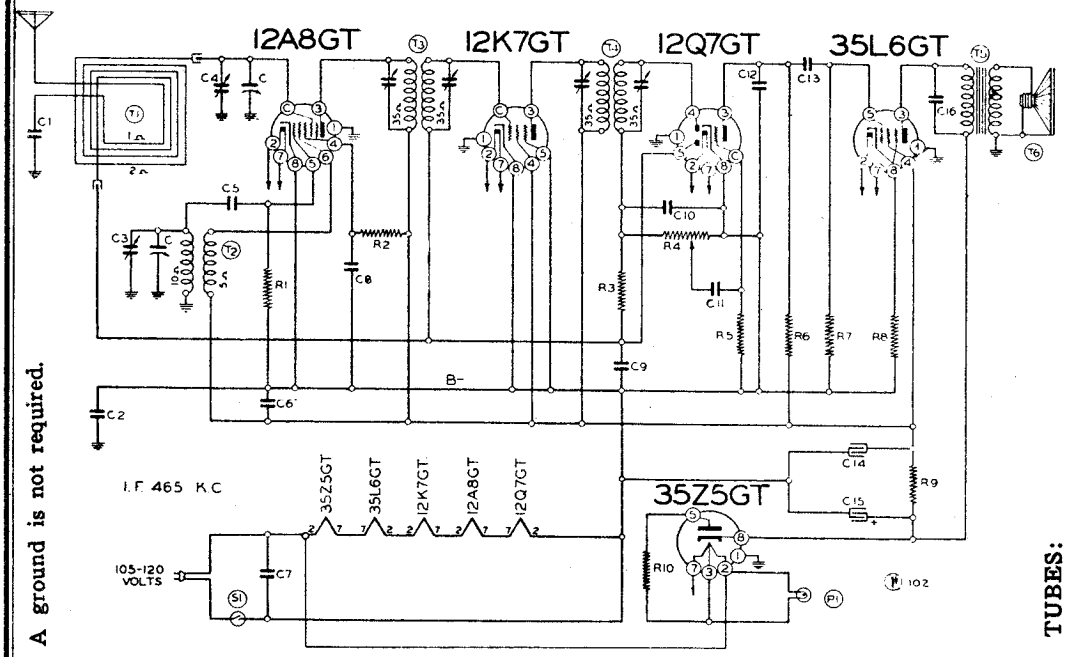
MODEL 519
Schematic, Voltage
Alignment

# BELMONT RADIO CORP.




**TUBES:**

**DESCRIPTION:**
The tube complement of this chassis consists of the following octal base glass tubes.
The type and function of each tube is as follows:
1—Type 12A8GT Mixer, First Detector-oscillator.
1—Type 12K7GT I. F. Amplifier.
1—Type 12Q7GT Second Detector, A.V.C. and First Audio.
1—Type 35L6GT Beam Output Amplifier.
1—Type 35Z5GT High Vacuum Rectifier.

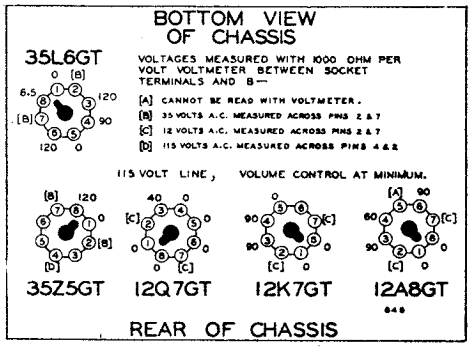

BOTTOM VIEW
OF CHASSIS
35L6GT
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B—
[A] CANNOT BE READ WITH VOLTMETER.
[B] 35 VOLTS A.C. MEASURED ACROSS PINS 2 & 7
[C] 12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7
[D] 115 VOLTS A.C. MEASURED ACROSS PINS 4 & 2
115 VOLT LINE, VOLUME CONTROL AT MINIMUM.
35Z5GT
12Q7GT
12K7GT
12A8GT
REAR OF CHASSIS

**FIG. 3**

## PARTS (Serial No. 620,000 and up)

| Circuit Diagram Ref. No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 13012 | 50M ohm—½ w. |
| R2 | 130149 | 15M ohm—½ w. |
| R3 | 1304 | 3 megohm—½ w. |
| R4 | 101164 | 1 megohm—volume control |
| R5 | 130225 | 15 megohm—½ w. |
| R6 | 13011 | 250M ohm—½ w. |
| R7 | 1303 | 500M ohm—½ w. |
| R8 | 130166 | 150 ohm—½ w. |
| R9 | 130282 | 2M ohm—1 watt |
| R10 | 130215 | 25 ohm—½ w. |
| | | **CONDENSERS** |
| C | 102102 | 2 gang variable condenser |
| C1 | 1292 | .0005 mica |
| C2 | 10091 | .15 x 400 v. |
| C3 | | Oscillator Trimmer on Gang |
| C4 | | Antenna Trimmer on Gang |
| C5 | 12912 | .00025 Mica |
| C6 | 1009 | .05 x 200 v. |
| C7 | 1001 | .1 x 400 v. |
| C8 | 10022 | .05 x 200 v. |
| C9 | 10022 | .05 x 200 v. |
| C10 | 1295 | .0001 Mica |
| C11 | 10071 | .004 x 600 v. |
| C12 | 12912 | .00025—Mica |
| C13 | 10011 | .01 x 400 v. |
| C14 | 11982 | 30 mfd. lytic |
| C15 | 11982 | 30 mfd. lytic |
| C16 | 10095 | .035 x 400 v. |
| | | C14 and C15 in same unit |
| | | **PARTS** |
| T1 | 120255 | Loop Antenna |
| T2 | 110112 | Oscillator Coil |
| T3 | 108140 | Input I. F.—465 kc. |
| T4 | 108141 | Output I. F.—465 kc. |
| T5 | 10587 | Output Transformer |
| T6 | 114157 | 4" P.M. Speaker |
| P1 | 10794 | Pilot Light T44 |
| S1 | | Off-on switch on volume control |

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of singal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 Mfd.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 12A8GT | Rotor full open (Plates out of mesh) | Four Trimmers on Top (See Fig. 1) | Output and Input I.F. | Adjust to maximum output |
| BROAD-CAST BAND | 1650 Kc. | .1 MFD. | Grid of 12A8GT | Rotor full open (Plates out of mesh) | Trimmer bottom of rear section of gang. (See bottom of radio) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | See Note "A" | | Set dial at 1400 Kc. | Trimmer bottom of front section of gang. (See bottom of radio) | Broadcast Antenna | Adjust to maximum output |

**NOTE "A"** Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

**FREQUENCY RANGE**
**540 to 1650 K.C.**

Power Consumption.....40 Watts
Power Output.....1.3 Watts Undistorted, 2.5 Watts Maximum
Intermediate Frequency.....465 K.C.

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# BELMONT RADIO CORP.

MODEL 519
Socket, Trimmers, Tuner
MODEL 520, Series A
Alignment

## MODEL 519

### PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the front of the radio by means of which six stations may be selected, (See "B" Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner button an opening is provided for inserting the call letter tabs. (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station you have assigned to this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station assigned to this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw "C" one or two turns; select the new station as explained. **Be sure to retighten the locking screw,** otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and—your favorite station is selected.

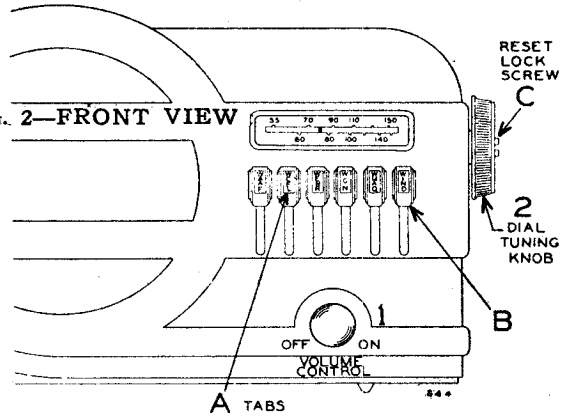

FIG. 2—FRONT VIEW

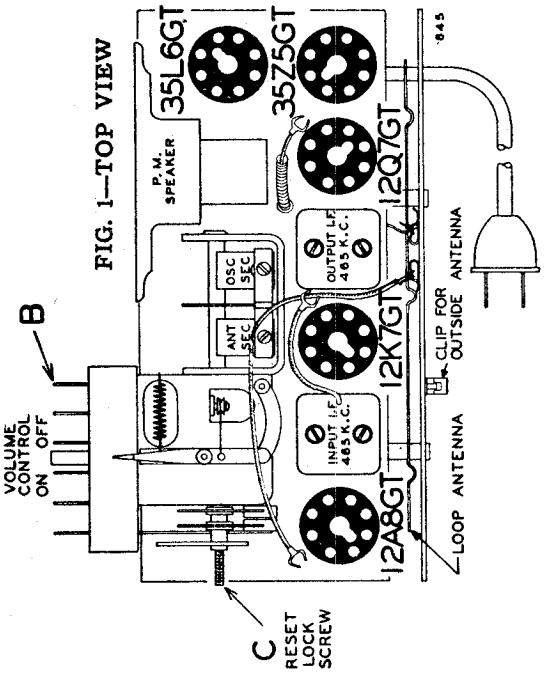

FIG. 1—TOP VIEW

## MODEL 520 SERIES A.
## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 100 mmf.

**FREQUENCY RANGE**
530 to 1720 K.C.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6A8 | Rotor full open (Plates out of mesh) | Two trimmers (See Fig. 3) | I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1720 Kc. | 100 mmf. | Antenna Lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 100 mmf. | Antenna Lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Broadcast Antenna | Adjust to maximum output |

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MODEL 520, Series A
Schematic, Socket
Trimmers,
Voltage

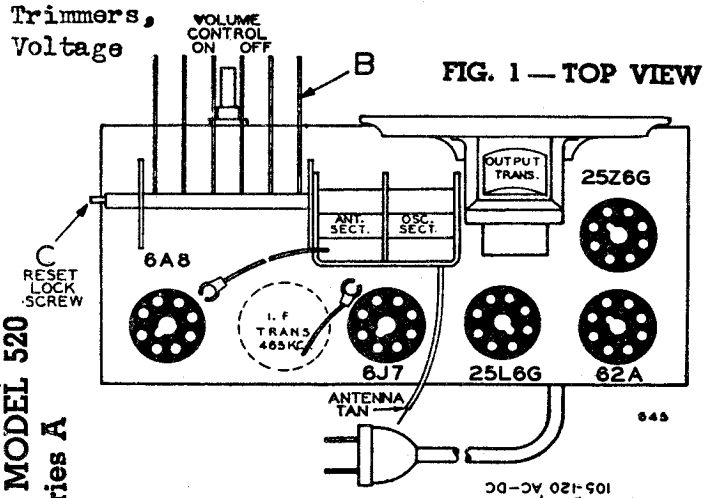
BELMONT RADIO CORP.

# Broadcast Band A. C.-D. C. Superheterodyne Receiver

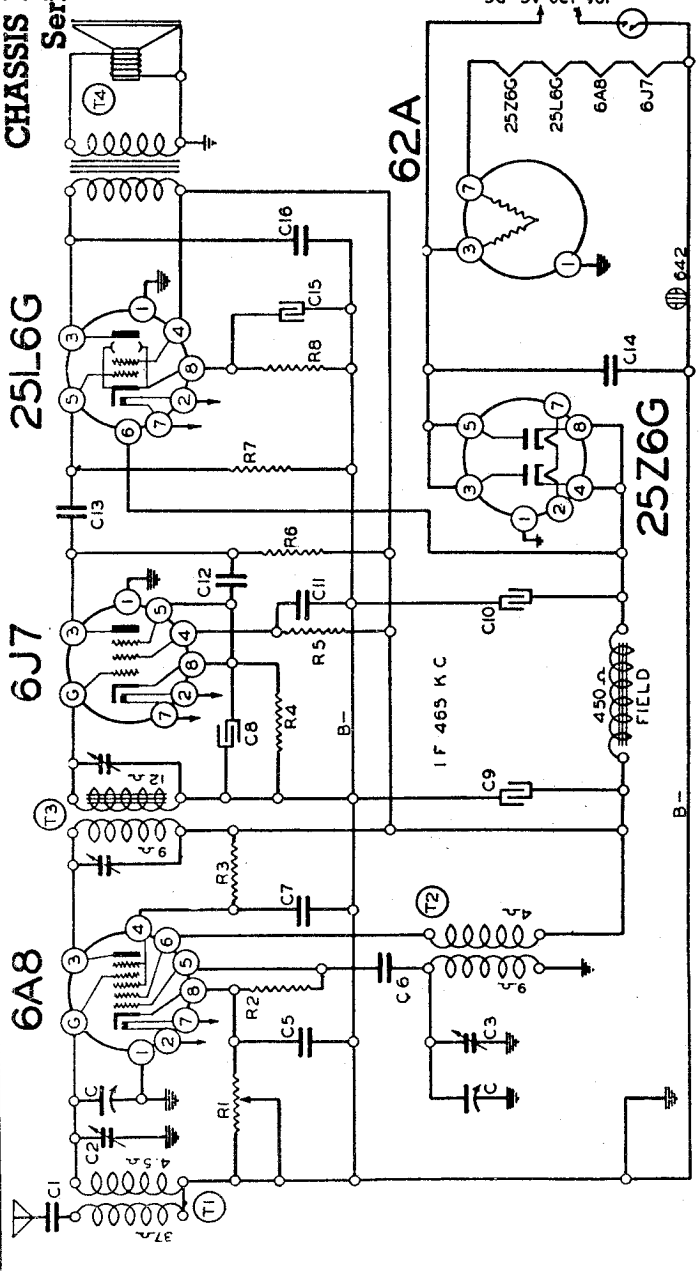
## Frequency Range 530-1720 Kilocycles

For setting Automatic Levers see Model 418.

FIG. 1 — TOP VIEW




CHASSIS MODEL 520
Series A




Power Consumption.....45 Watts
Power Output.....800 Milliwatts Undistorted, 1300 Milliwatts Maximum

**I. F. Frequency 465 K. C.**

| Code No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 101138 | 20M ohm volume control |
| R2 | 13012 | 50M ohm—½ w. |
| R3 | 130194 | 35M ohm—½ w. |
| R4 | 13082 | 10M ohm—½ w. |
| R5 | 13038 | 2 megohm—½ w. |
| R6 | 13045 | 250M ohm—½ w. |
| R7 | 1303 | 500M ohm—½ w. |
| R8 | 130251 | 160 ohm—½ w. |
| | | **CONDENSERS** |
| C | 10287 | 2 gang variable condenser |
| C1 | 1292 | .0005 mica |
| C2 | | Antenna Trimmer |
| C3 | | Oscillator Trimmer |
| C5 | 1009 | .05 x 200 v. |
| C6 | 12912 | .00025 mica |
| C7 | 1009 | .05 x 200 v. |
| C8 | 11971 | 5 mfd. x 25 v. lytic |
| C9 | 11970 | 30 mfd. x 150 v. lytic |
| C10 | 11970 | 30 mfd. x 150 v. lytic |
| C11 | 10030 | .1 x 200 v. |
| C12 | 1292 | .0005 mica |
| C13 | 10026 | .02 x 400 v. |
| C14 | 1001 | .1 x 400 v. |
| C15 | 11970 | 40 mfd. x 25 w. v. lytic |
| C16 | 10095 | .035 x 400 v. |
| | | C9, C10 and C15 in one unit, part no. 11970 |
| | | **PARTS** |
| T1 | 111110 | Antenna Coil |
| T2 | 11095 | Oscillator Coil |
| T3 | 108123 | I. F. Transformer—465 kc. |
| T4 | 114130 | 5 inch Dynamic Speaker |

BOTTOM VIEW OF CHASSIS

DC VOLTAGES MEASURED WITH 1000 OHM PER VOLT METER BETWEEN SOCKET TERMINALS AND B-, WITH LINE VOLTAGE OF 115 VOLTS A.C. OR D.C.
NOTE: TERMINALS MARKED "G" ARE B- POINTS.
(1) NO READING (CONNECTED TO CHASSIS)
(2) 6.3 VAC READ BETWEEN TERMINALS 2&7 OF SAME SOCKET
(3) CANNOT BE READ WITH VOLTMETER




FIG. 3

TUBES:

1—Type 6A8 Pentagrid Mixer, First Detector-oscillator.
1—Type 6J7 Second Detector.
1—Type 25L6G Beam Output Amplifier.
1—Type 25Z6G High Vacuum Rectifier.
1—Type 62A Ballast Tube.

DESCRIPTION:

The tube complement of this chassis consists of the following octal base glass and metal tubes.

The type and function of each tube is as follows:

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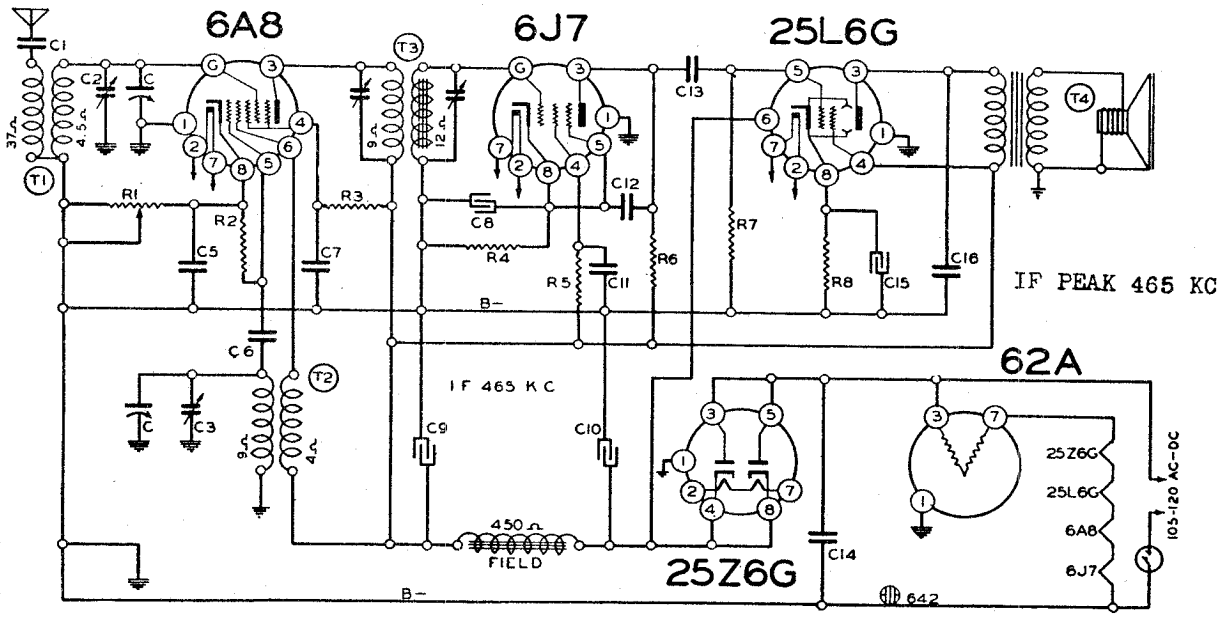
BELMONT RADIO CORP.

MODEL 521, Series A
Schematic




# CHASSIS MODEL 521
## Series A

When ordering parts always mention complete factory model number, series and issue.

## LIST OF REPAIR PARTS (Serial No. 286700 and up)

Use Only Genuine Factory Replacement Parts

| Part No. | Circuit Diagram Reference | Description | No. Used in Set | List Price Each |
|---|---|---|---|---|
| | | **CONDENSERS** | | |
| 1001 | C14 | .1 x 400 Volt Tubular Condenser | 1 | $ .25 |
| 1009 | C5, C7 | .05 x 200 Volt Tubular Condenser | 2 | .25 |
| 10020 | C11 | .1 x 200 Volt Tubular Condenser | 1 | .25 |
| 10026 | C13 | .02 x 400 Volt Tubular Condenser | 1 | .25 |
| 10095 | C16 | .035 x 400 Volt Tubular Condenser | 1 | .25 |
| 11971 | C8 | 5 MFD x 25 Volt Electrolytic Condenser | 1 | .50 |
| 11970 | C9, C10, C15 | 30 MFD x 150 V; 30 MFD x 150 V; 40 MFD x 25 V. Electrolytic Condenser (for 60 cycle) | 1 | 1.50 |
| 11972 | C9, C10, C15 | 60 MFD x 150 V; 60 MFD x 150 V; 40 MFD x 25 V. Electrolytic Condenser (for 25 cycle) | 1 | |
| 1292 | C1, C12 | .0005 Mica Type Condenser—20% | 2 | .25 |
| 12912 | C6 | .00025 Mica Type Condenser—20% | 1 | .25 |
| | | **RESISTORS** | | |
| 1303 | R7 | 500M Ohm—1/3 Watt Resistor—20% | 1 | .20 |
| 13012 | R2 | 50M Ohm—1/3 Watt Resistor—20% | 1 | .20 |
| 13038 | R5 | 2 Megohm—1/3 Watt Resistor—20% | 1 | .20 |
| 13045 | R6 | 250M Ohm—1/3 Watt Resistor—20% | 1 | .20 |
| 130194 | R3 | 35M Ohm—1/3 Watt Resistor—10% | 1 | .20 |
| 130251 | R8 | 160 Ohm—1/3 Watt Resistor—10% | 1 | .20 |
| 130252 | R4 | 6M Ohm—1/3 Watt Resistor—20% | 1 | .20 |
| | | **COILS** | | |
| 108123 | T3 | I. F. Transformer Coil Assembly, Less Cardboard Cover | 1 | 1.25 |
| 11095 | T2 | Oscillator Coil Assembly Complete | 1 | .50 |
| 111110 | T1 | Antenna Coil Assembly Complete | 1 | .75 |
| | | **SOCKETS** | | |
| 12193 | | Eight Prong Octal Socket | 3 | .15 |
| 12194 | | Seven Prong Octal Socket | 2 | .15 |
| | | **SPEAKER** | | |
| 114130 | T4 | Five Inch Dynamic (Field Resis. 450 Ohms) | 1 | 3.50 |
| | | **MISCELLANEOUS** | | |
| 101138 | R1 | Volume Control & On-Off Switch (20M Ohm) | 1 | 1.00 |
| 10287 | C, C2, C3 | Two Gang Variable Condenser | 1 | 2.50 |
| 10798 | | Line Cord and Plug | 1 | .50 |
| 115241 | | Cover Shield for 108123 I. F. Coil | 1 | .10 |
| 128178BR | | Brown Bakelite Cabinet Complete | 1 | 2.50 |
| 128178W | | Ivory Finish Bakelite Cabinet Complete | 1 | 3.00 |
| 128202 | | Back for Cabinet (Specify Color) | 1 | .10 |
| 128203BR | | Brown Bakelite Knob (Volume) | 1 | .10 |
| 128203W | | Ivory Bakelite Knob (Volume) | 1 | .15 |
| 128190BR | | Brown Bakelite Knob (Tuning) | 1 | .15 |
| 128190W | | Ivory Bakelite Knob (Tuning) | 1 | .20 |
| 128173BR | | Brown Buttons for Tuner Levers | 6 | .10 |
| 128173W | | Ivory Buttons for Tuner Levers | 6 | .10 |
| 62A | | Ballast Resistor (in Tube, Shell and Base) | 1 | .75 |

| Part No. | Diagram Circuit Reference | Description | Used No. in Set | Price List Each |
|---|---|---|---|---|
| | | **DIAL PARTS LIST** | | |
| 115251 | | Support Bracket for Automatic Tuning Mechanism (Mounts to Variable Condenser) | 1 | .10 |
| 115251B | | Support End Bracket for Automatic Tuning Mechanism | 1 | .10 |
| 115146 | | Tuner Cam | 6 | .05 |
| 115143 | | Key Washers (Used on Each Side of Tuner Cams) | 13 | .02 |
| 115252 | | Lever Complete with 117309 Roller | 6 | .15 |
| 117418 | | Shaft for Tuner Levers | 1 | .10 |
| 117416 | | Spacer | 4 | .03 |
| 117419 | | Spacer | 2 | .03 |
| 117417 | | Locking Collar (for Right End of Cam Shaft) | 1 | .10 |
| 117390 | | Locking Screw (Lock Tuner Cams; Inserted Through Center of Tuning Knob) | 1 | .10 |
| 131181 | | Compression Spring Washer (Used Between Locking Collar and First Tuner Cam on Right End of Cam Shaft) | 1 | .02 |
| 120204 | | Hair Pin Spring for Tuner Levers | 6 | .03 |
| 128173BR | | Brown Spring for Tuner Levers | 6 | .10 |
| 128173W | | Ivory Spring for Tuner Levers | 6 | .10 |
| 112445 | | Set of 2 Sheets of Station Call Letters | 1 | .15 |
| 112336 | | Clear Pyralin Tabs for Station Call Letter Tabs | 6 doz. | .10 |

Tubes are coded and guaranteed by the tube manufacturer.

Prompter service can be rendered on adjustments if defective tubes are returned direct to the tube manufacturer rather than through our factory.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

| Tolerance percent | Color of Dot |
|---|---|
| 2½% | White |
| 5% | Green |
| 10% | Blue |
| 15% | Yellow |
| 20% | Red |
| More Than 20% | None |

All prices quoted are list and are subject to the usual trade discounts.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER, CONES OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.00 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

BRC—CHGO

Form 5996 7M 9-38

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MODEL 521, Series A
Socket, Trimmers, Voltage Alignment, Tuner

# BELMONT RADIO CORP.

## POWER SUPPLY:

Caution:—This radio, unless otherwise marked, must be operated from 105-125 volts, A.C. or D.C. supply only. If you are in doubt as to the voltage rating of the power supply, consult your local power company before inserting plug. Do not insert plug unless all tubes are in their proper sockets.

Receivers of this model which are to be used on voltages other than 105-125 volts, 50/60 cycle, are so marked. The power consumption of this receiver is 45 watts.

## HOW TO REMOVE CABINET:

CAUTION:—Always disconnect the line cord from the house current before removing the chassis from the cabinet.

To remove chassis from the cabinet unscrew the locking screw in the center of the tuning knob and pull tuning knob and volume knob off their shafts. Remove the back of the cabinet and the two screws that hold the chassis to the cabinet. Pull off the six buttons on the Automatic levers. Move the chassis toward back of cabinet so that control shafts and tuner assembly clear holes in cabinet, then chassis can be slipped out.

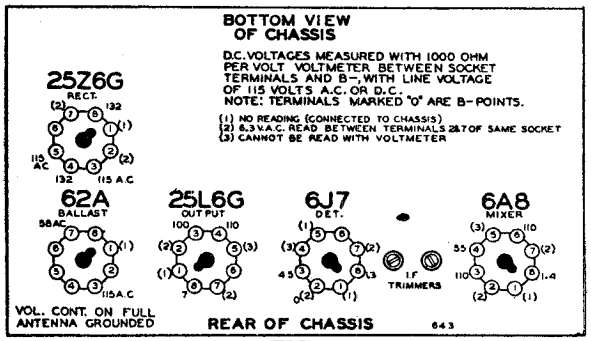


FIG. 3

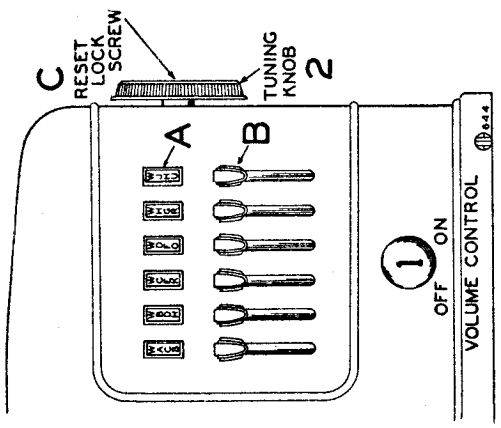


FIG. 2—FRONT VIEW

The procedure for setting the Automatic Tuning Levers in this receiver is the same as that for Model 633 with the exception that this receiver has six levers instead of five.

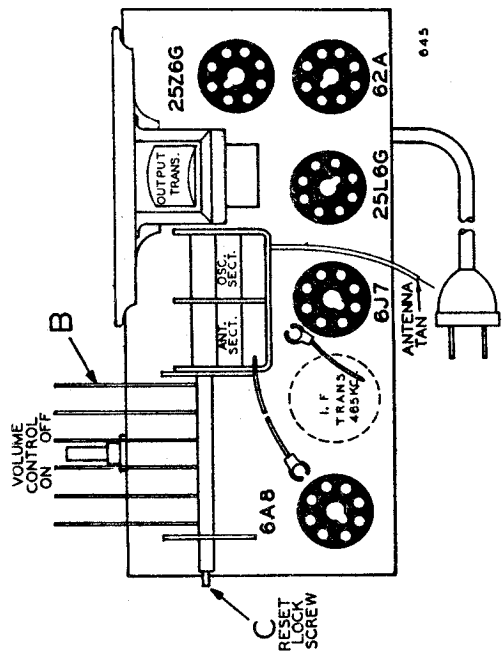


FIG. 1—TOP VIEW

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 100 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6A8 | Rotor full open (Plates out of mesh) | Two trimmers (See Fig. 3) | I. F. | Adjust to maximum output |
| BROADCAST BAND | 1720 Kc. | 100 mmf. | Antenna Lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output. |
| | 1400 Kc. | 100 mmf. | Antenna Lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Broadcast Antenna | Adjust to maximum output |

FREQUENCY RANGE
530 to 1720 K.C.

Power Consumption.....45 Watts
Power Output.....800 Milliwatts Undistorted, 1300 Milliwatts Maximum
Intermediate Frequency.....465 K.C.

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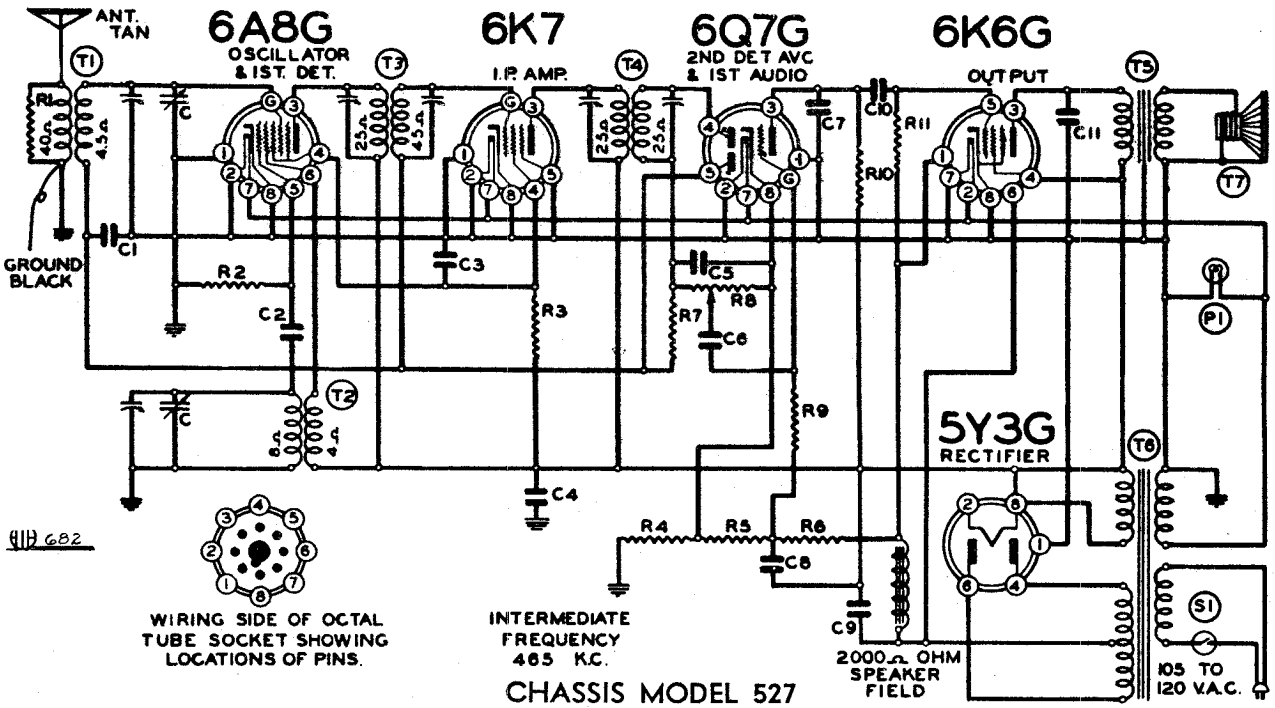
BELMONT RADIO CORP.

MODEL 527, Series A
Schematic




# CHASSIS MODEL 527

## Series A

When ordering parts always mention complete factory model number, series and issue.

## LIST OF REPAIR PARTS (Serial No. 307600 and up)

Use Only Genuine Factory Replacement Parts

| Part No. | Circuit Diagram Reference | Description | List Price Each |
|---|---|---|---|
| | | **CONDENSERS** | |
| 1001 | C3 | .1 x 400 Volt Tubular Condenser | .25 |
| 1009 | C1 | .05 x 200 Volt Tubular Condenser | .25 |
| 10011 | C6, C10 | .01 x 400 Volt Tubular Condenser | .25 |
| 10013 | C4 | .05 x 400 Volt Tubular Condenser | .25 |
| 10019 | C11 | .006 x 600 Volt Tubular Condenser | .25 |
| 11947E | C8, C9 | Dual 5 Mfd. x 250 W. V. Filter Condenser | 1.50 |
| 1292 | C7 | .0005 Mica Type Condenser—20% | .25 |
| 1295 | C5 | .0001 Mica Type Condenser—20% | .25 |
| 12912 | C2 | .00025 Mica Type Condenser—20% | .25 |
| | | **RESISTOR** | |
| 10635 | R4, R5, R6 | 65 Ohm, 450 Ohm, 220 Metal Clad Resistor | .35 |
| 1309 | R10 | 200M Ohm—½ Watt Resistor—20% | .20 |
| 13012 | R2 | 50M Ohm—½ Watt Resistor—20% | .20 |
| 13021 | R1, R3 | 20M Ohm—½ Watt Resistor—20% | .20 |
| 130118 | R11 | 600M Ohm—½ Watt Resistor—20% | .20 |
| 130170 | R7, R9 | 3 Megohm—½ Watt Resistor—25% | .20 |
| | | **COILS** | |
| 10895E | T4 | Output I. F. Coil Assembly Complete with Can | 1.25 |
| 10896F | T3 | Input I. F. Coil Assembly Complete with Can | 1.25 |
| 11073 | T2 | Oscillator Coil Assembly Complete | .50 |
| 11192 | T1 | Antenna Coil Assembly Complete | .60 |
| | | **SOCKETS** | |
| 12193 | | Eight Prong Octal Base Tube Sockets | .15 |
| 12195 | | Five Prong Octal Base Tube Socket | .10 |
| | | **TRANSFORMERS** | |
| 104149 | T6 | 50/60 Cycle Power Transformer 105-115 Volt Primary | 2.75 |
| 104— | | 25/60 Cycle Power Transformer 105-115 Volt Primary | |
| 104— | | 40/60 Cycle Power Transformer Universal Primary | |
| 10555D | T5 | Output Transformer for Speaker | 1.00 |
| | | **SPEAKER** | |
| 114133 | T7 | Five Inch Dynamic Speaker (Field 2000 Ohms) | 3.00 |
| 10555D | T5 | Output Transformer for Speaker | 1.00 |
| | | **MISCELLANEOUS** | |
| 101141 | R8, S1 | Volume Control and Switch (500M Ohms) | 1.00 |
| 10290 | C | Two Gang Variable Condenser | 2.50 |
| 10555D | T5 | Output Transformer for Speaker | 1.00 |
| 10798 | | Line Cord and Plug | .50 |
| 128163BR | | Brown Bakelite Cabinet Complete (with Carton) | 3.00 |
| 128163W | | Ivory Bakelite Cabinet Complete (with Carton) | 5.00 |
| 128207BR | | Brown Bakelite Knob (Tuning) | .15 |
| 128207W | | Ivory Bakelite Knob (Tuning) | .20 |
| 128203BR | | Brown Bakelite Knob (Volume) | .10 |
| 128203W | | Ivory Bakelite Knob (Volume) | .15 |
| 128205 | | Back for Cabinet (Specify Color) | .10 |
| | | **DIAL PARTS LIST** | |
| 10794 | P1 | 6-8 Volt Pilot Light Bulb Type 44 | .10 |
| 107203 | | Socket and Bracket for Pilot Light | .10 |
| 115255 | | Support Bracket for Automatic Tuning Mechanism (Mounts to Variable Condenser) | .10 |
| 115254 | | Support End Bracket for Automatic Tuning Mechanism | .10 |
| 115250 | | Lever Complete with 117309 Roller | .10 |
| 115256 | | Dial Bracket Housing (For Dial Scale) Complete with Two Brass Idler Pulleys | .25 |
| 115143 | | Key Washers (Used on each Side of Tuner Cams) | .02 |
| 115146 | | Cams | .05 |
| 115253 | | Crown Gear (Mounts on Cam Shaft, Used to Drive Pinion Shaft and Gear for Pointer Drive String) | .10 |
| 117405 | | Locking Collar (For Right End of Cam Shaft to Compress Tuner Cams) | .10 |
| 117424 | | Locking Screw (For Center of Tuning Knob; Lock Tuner Cams) | .10 |
| 117409 | | Shaft for Tuner Levers | .15 |
| 117406 | | Brass Spacer (Between Crown Gear and 1st Cam) | .03 |
| 117407 | | Brass Spacer (Between Cams; Three Used) | .03 |
| 117408 | | Brass Spacer (Between 4th and 5th Cam) | .03 |
| 117411 | | Pinion Gear | .07 |
| 117412 | | Shaft for Pinion Gear (Drives Pointer String) | .15 |
| 1209 | | Linen Drive String | .10 |
| 120163 | | Take-up Spring for Drive String | .05 |
| 120211 | | Hair Pin Spring for Tuner Levers | .02 |
| 131181 | | Compression Spring Washer (Used Between Locking Collar and First Tuner Cam) | .02 |
| 112499 | | Pointer | .15 |
| 112501 | | Dial Scale (Calibrated) | .50 |
| 112500 | | Light Diffuser (For Dial Scale) | .15 |
| 112514 | | Set of Station Call Letter Sheets | .15 |
| 112515 | | Clear Pyralin Tabs for Station Call Letters | Doz. .10 |
| 128192 | | Bakelite Button for Levers (Specify Color; 4 Used) | .15 |
| 128192B | | Bakelite Button for Levers (Specify Color; 1 Used) Special Type, Has Rim on Both Sides to Block Light Between Lever Buttons) | .15 |

Tubes are coded and guaranteed by the tube manufacturer.

Prompter service can be rendered on adjustment if defective tubes are returned direct to the tube manufacturer rather than through our factory.

All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

| Tolerance percent | Color of Dot |
|---|---|
| 2½% | White |
| 5% | Green |
| 10% | Blue |
| 15% | Yellow |
| 20% | Red |
| More Than 20% | None |

All prices quoted are list and are subject to the usual trade discounts.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER CONES, OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $1.00 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

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MODEL 527, Series A
Socket, Trimmers
Voltage, Alignment
Tuner Data

BELMONT RADIO CORP.

For Instructions for setting Automatic Tuning Levers, see Model 633

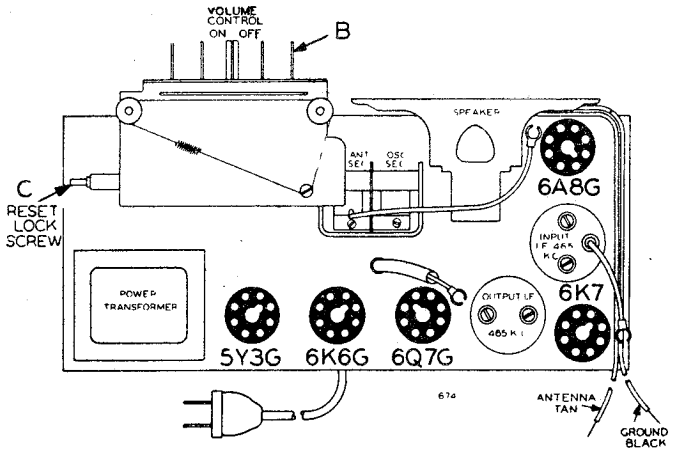



FIG. 1—TOP VIEW

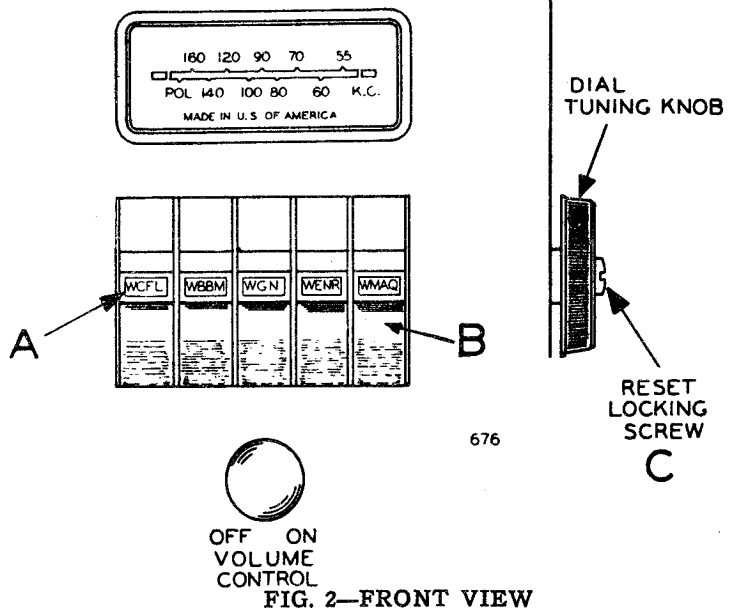



FIG. 2—FRONT VIEW

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 100 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6A8G | Rotor full open (Plates out of mesh) | Four trimmers (See Fig. 1) | Input I. F. and Output I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1720 Kc. | 100 mmf. | Antenna Lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 100 mmf. | Antenna Lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Broadcast Antenna | Adjust to maximum output |

FREQUENCY RANGE
535 to 1720 K.C.

Power Consumption ..... 50 Watts
Power Output ..... 1 Watt Undistorted, 1.7 Watts Maximum
Intermediate Frequency ..... 465 K.C.

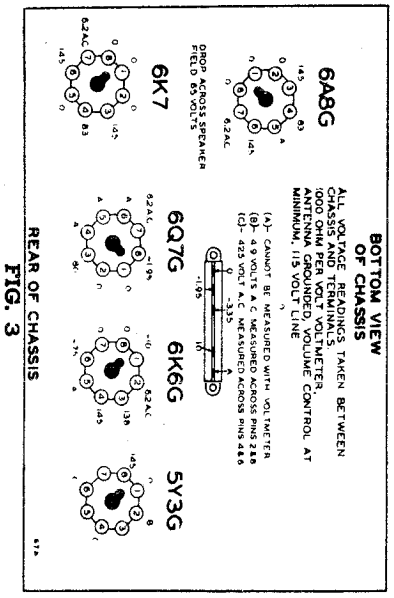
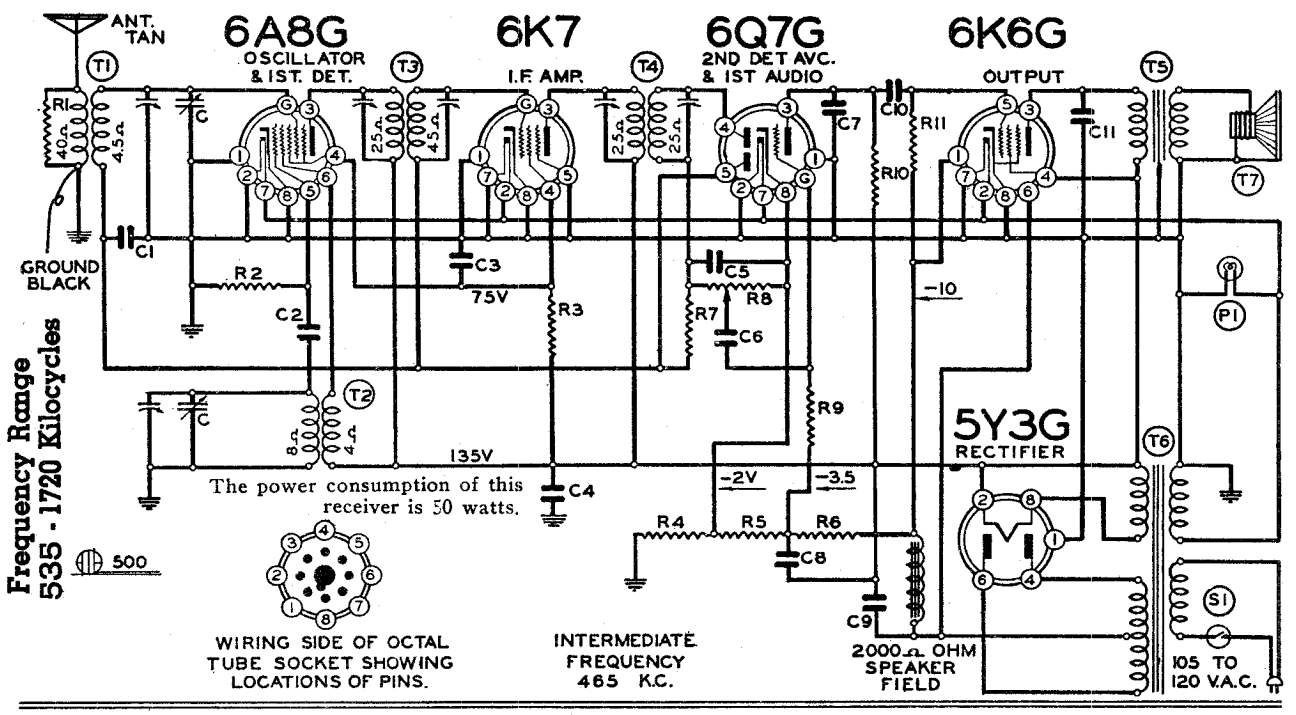

BOTTOM VIEW OF CHASSIS
ALL VOLTAGE READINGS TAKEN BETWEEN CHASSIS AND INDICATED PINS WITH 1000 OHM PER VOLT VOLTMETER. ANTENNA GROUNDED, VOLUME CONTROL AT MINIMUM, 115 VOLT LINE
6A8G
6K7
6Q7G
6K6G
5Y3G
6.2AC
DROP ACROSS SPEAKER FIELD 65 VOLTS
(A)- CANNOT BE MEASURED WITH VOLTMETER
(B)- 4.9 VOLTS A.C. MEASURED ACROSS PINS 2 & 6
(C)- 425 VOLT A.C. MEASURED ACROSS PINS 4 & 6
REAR OF CHASSIS

FIG. 3

©John F. Rider, Publisher

MODEL 529
Schematic

# BELMONT RADIO CORP.




## LIST OF REPAIR PARTS (Serial No. 542,699 and up)

**Use Only Genuine Factory Replacement Parts**

| Part No. | Circuit Diagram Reference | Description | List Price Each |
|---|---|---|---|
| | | **CONDENSORS** | |
| 100-1 | C3 | .1 x 400 volt Tubular Condenser | $ .25 |
| 100-9 | C1 | .05 x 200 volt Tubular Condenser | .25 |
| 100-11 | C6, C10 | .01 x 400 volt Tubular Condenser | .25 |
| 100-13 | C4 | .05 x 400 volt Tubular Condenser | .25 |
| 100-19 | C11 | .006 x 600 volt Tubular Condenser | .25 |
| 119-47D | C8, C9 | Dual 5MFD x 250 W. V. Filter Condenser | 1.50 |
| 129-2 | C7 | .0005 Mica Type Condenser — 20% | .25 |
| 129-5 | C5 | .0001 Mica Type Condenser — 20% | .25 |
| 129-12 | C2 | .00025 Mica Type Condenser — 20% | .25 |
| | | **RESISTORS** | |
| 106-35 | R4, R5, R6 | 65 Ohm, 45 Ohm, 220 Ohm Metal Clad | .35 |
| 130-9 | R10 | 200M Ohm — ½ Watt Resistor — 20% | .20 |
| 130-12 | R2 | 50M Ohm — 1/3 Watt Resistor — 20% | .20 |
| 130-21 | R1 | 20M Ohm — 1/3 Watt Resistor — 20% | .20 |
| 130-118 | R11 | 600M Ohm — 1/3 Watt Resistor — 20% | .20 |
| 130-21 | R3 | 20M Ohm — ½ Watt Resistor — 20% | .20 |
| 130-170 | R7, R9 | 3 Megohm — 1/3 Watt Resistor — 25% | .20 |
| | | **COILS** | |
| 108-95B | T4 | Output I.F. Coil Assembly Complete with can | 1.25 |
| 108-96 | T3 | Input I.F. Coil Assembly Complete with can | 1.25 |
| 110-73 | T2 | Oscillator Coil Assembly Complete | .50 |
| 111-92 | T1 | Antenna Coil Assembly Complete | .60 |
| | | **SOCKETS** | |
| 121-93 | | Eight Prong Octal Socket for "6K6" | .15 |
| 121-93 | | Eight Prong Octal Socket for "6Q7" | .15 |
| 121-93 | | Eight Prong Octal Socket for "6A8" | .15 |
| 121-93 | | Eight Prong Octal Socket for "5Y3" | .15 |
| 121-94 | | Seven Prong Octal Socket for "6K7" | .15 |
| | | **TRANSFORMERS** | |
| 104-129 | T6 | 50/60 Cycle Transformer 105-115 volt Primary | 2.75 |
| 104-130 | | 25/60 Cycle Transformer 105-115 volt Primary | |
| 104-134 | | 40/60 Cycle Transformer Universal Primary | |
| | | **SPEAKER** | |
| 114-111 | T7 | Five Inch Dynamic Speaker (Field 2000 Ohms) | 3.00 |
| 105-55c | T5 | Output Transformer for Speaker (Mounted on Chassis) | 1.00 |
| | | **MISCELLANEOUS** | |
| 101-107 | R8, S1 | Volume Control and Switch (500M Ohms) | 1.00 |
| 102-78 | C | Two Gang Variable Condenser | 3.00 |
| 105-55c | T5 | Output Transformer for Speaker | 1.00 |
| 107-98 | | Line Cord and Plug | .50 |
| 117-133 | | Brass Bushings for Mounting Bottom Plate | .02 |
| 118-48B | | Bottom Cover Plate for Chassis | .35 |
| 128-134E | | Black Bakelite Volume Knob | .10 |
| 128-134BR | | Walnut Bakelite Volume Knob | .10 |
| 128-134W | | Ivory Bakelite Volume Knob | .10 |
| 128-137E | | Black Bakelite Tuning Knob | .10 |
| 128-137BR | | Walnut Bakelite Tuning Knob | .10 |
| 128-137W | | Ivory Bakelite Tuning Knob | .15 |
| 128-142E | | Black Bakelite Cabinet Complete Including Baffle, Grill Cloth and Carton | 3.00 |
| 128-142BR | | Walnut Bakelite Cabinet Complete Including Baffle, Grill Cloth and Carton | 3.00 |
| 128-142W | | Ivory Bakelite Cabinet Complete Including Baffle, Grill Cloth and Carton | 5.00 |
| 128-101 | | Baffle Board | .10 |
| 128-102 | | Grill Cloth Back and Front | .15 |
| 128-102B | | Grill Cloth, For Side | .05 |
| 132-82 | | No. 6 x 32 x ¼ Bottom Plate Mounting Screws, Doz. | .07 |
| 134-48B | | Rubber Grommet (For Bottom Plate) | .03 |
| 134-66E | | Black Felt Shield for Lever Openings in Cabinet | .05 |
| 134-66BR | | Walnut Felt Shield for Lever Openings in Cabinet | .05 |
| 134-66W | | Ivory Felt Shield for Lever Openings in Cabinet | .05 |

| Part No. | Circuit Diagram Reference | Description | List Price Each |
|---|---|---|---|
| | | **DIAL PARTS LIST** | |
| 107-97 | PI | 6-8 Volt Pilot Light Bulb Type 51 | .10 |
| 107-152 | | Pilot Light Bracket and Socket | .10 |
| 112-370 | | Top and Bottom Wood Pulley Complete with 117-287 Shaft for Indicator Film | .05 |
| 112-371 | | Drive Drum for Indicator Film | .10 |
| 112-372 | | Indicator Film | .05 |
| 112-374 | | Center Wood Idler Pulley for Indicator Film | .03 |
| 112-376 | | Dial Scale (Calibrated) | .35 |
| 115-134 | | Support Bracket for Automatic Tuning Mechanism (Mounts to Variable Condenser) | .10 |
| 115-135 | | Support Bracket for Automatic Tuning Mechanism (Right End of Mechanism) | .10 |
| 115-136 | | Lever Complete with 117-290 Roller | .25 |
| 115-144 | | Dial Bracket Housing (For Dial Scale) | .20 |
| 117-256 | | Brass Spacer (Used on Cam Shaft Between Second and Third Tuner Cam on Left Side of Tuner Assembly) | .05 |
| 117-257 | | Locking Screw for Tuning Knob | .10 |
| 117-258 | | Tuner Cam | .05 |
| 117-283 | | Locking Collar (For Right End of Cam Shaft) | .15 |
| 117-359 | | Spacers (Used on Cam Shaft to Mount Dial Housing Assembly) | .05 |
| 117-285 | | Brass Spacer (Used on Cam Shaft Between Drive Drum and Tuner Cam to Left of Drive Drum | .05 |
| 117-286 | | Brass Spacer (Used on Cam Shaft Between Drive Drum and Tuner Cam to Right of Drive Drum) | .05 |
| 120-181 | | Hair Pin Spring for Tuner Lever | .02 |
| 120-163 | | Take-Up Spring for Indicator Film | .05 |
| 128-173BR | | Moulded Button Keys for Automatic Tuner Levers | .10 |
| 131-43 | | Cinch Buttons (Used to Fasten Dial Scale to Dial Housing) | .03 |
| 131-141 | | Compression Spring Washer (Used Between Locking Collar and first Tuner Cam on Right End of Cam Shaft) | .02 |
| 131-157 | | Key Washers (Used on Each Side of Tuner Cams) | .02 |

Tubes are coded and guaranteed by the tube manufacturer.

Prompter service can be rendered on adjustment if defective tubes are returned direct to the tube manufacturer rather than through our factory. All resistors are RMA color coded—specify value and/or resistor number (per schematic diagram) and model number.

When ordering condensers, specify part number, model number and/or capacitor (per schematic diagram) and model number.

Mica condensers are coded with an additional dot indicating tolerance:

| Tolerance percent | Color of Dot |
|---|---|
| 2½% | White |
| 5% | Green |
| 10% | Blue |
| 15% | Yellow |
| 20% | Red |
| More Than 20% | None |

All prices quoted are list and are subject to the usual trade discounts. Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER CONES, OR FIELDS SEPARATELY. WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $.85 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

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MODEL 529
Socket, Trimmers
Alignment, Tuner Data

# BELMONT RADIO CORP.

## SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 115 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

Transformers are available and chassis are sometimes equipped with transformers for operation on 25, 40 and 60 cycles (see parts list).

## ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the four bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screwdriver.

## RESONANCE INDICATOR:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6K6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

## ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No.108-95B Output I.F. Transformer
Part No. 108-96 Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condensor, to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-95B) to resonance.
   (b) Move oscillator output clip from grid of 6K7 to grid of 6A8G and adjust input I.F. transformer (No. 108-96) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-95B) if necessary.

1. **R.F. ALIGNMENT: (535-1720 K.C.)**

1. With the gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mmf. condensor to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

## PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected, (See "B" Fig. 2).

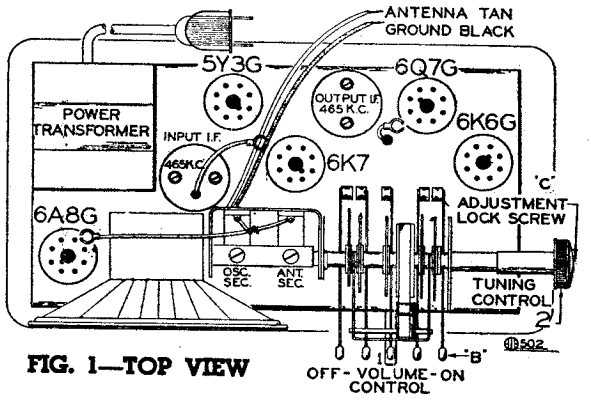


FIG. 1—TOP VIEW

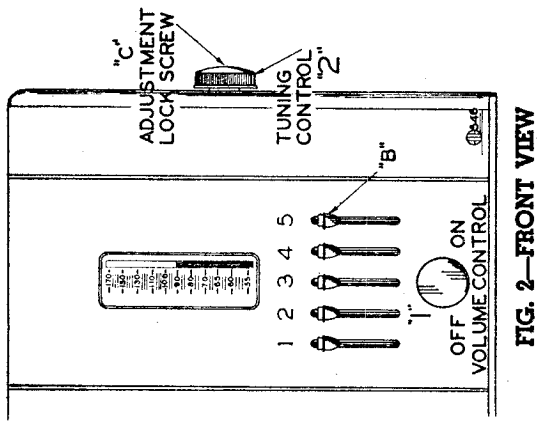


FIG. 2—FRONT VIEW

Make a list of local stations you tune in regularly; any number up to and including five.

Numbers are placed on the cabinet above each automatic tuner lever. These numbers (1 to 5) are used to designate the stations you have chosen them to represent.

Any order of grouping can be used, either by assigning call letters for the levers numerically (1 to 5) or arranging them to correspond with the calibration on the dial scale, namely, starting with the lowest frequency station on the right and so on up in frequency to the highest frequency station on the left.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station you have assigned to this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station assigned to this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 1).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw "C" one or two turns; select the new station as explained. Be sure to retighten the locking screw, otherwise the stations you have selected will not stay adjusted to the levers.

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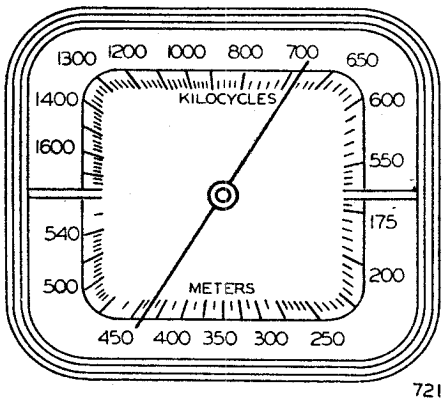
MODEL 551, Series A
Schematic, Voltage
Socket, Trimmers

BELMONT RADIO CORP.

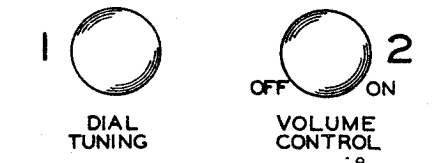
# Broadcast Band 1½-Volt Battery Operated Superheterodyne Receiver

## MODEL 551
## Series A

| Circuit Reference No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 13021 | 20M ohm—½ w. |
| R2 | 13020 | 100M ohm—½ w. |
| R3 | 1309 | 200M ohm—½ w. |
| R4 | 130208 | 40M ohm—½ w. |
| R5 | 13071 | 4M ohm—½ w. |
| R6 | 13033 | 2 megohm—½ w. |
| R7 | 101140 | 1 megohm—volume control |
| R8 | 13038 | 2 megohm—½ w. |
| R9 | 13019 | 1 megohm—½ w. |
| R10 | 13037 | 750M ohm—½ w. |
| R11 | 13019 | 1 megohm—½ w. |
| R12 | 13019 | 1 megohm—½ w. |
| R13 | 130222 | 350 ohm—½ w. |
| R14 | 13019 | 1 megohm—½ w. |
| R15 | 130232 | 25M ohm—½ w. |
| R16 | 130264 | 1000 ohm—½ w. |
| | | **CONDENSERS** |
| C | 10289 | 2 gang Variable Condenser |
| C1 | 1009 | .05 x 200 v.—25% Antenna Section Trimmer |
| C2 | | Oscillator Section Trimmer |
| C3 | 12464 | Series Pad |
| C4 | 10070 | .5 x 120 v.—20% |
| C5 | 10048 | .25 x 200 v. |
| C6 | 1009 | .05 x 200 v. |
| C7 | 1295 | .0001 Mica |
| C8 | 10011 | .01 x 400 v. |
| C9 | 12921 | .0002 Mica |
| C10 | 10078 | .01 x 200 v. |
| C11 | 11935 | 10 mfd. x 25 volts—lytic |
| C12 | 10078 | .01 x 200 v. |
| C13 | | |
| | | **PARTS** |
| T1 | 11192B | Antenna Coil Complete |
| T2 | 11096 | Oscillator Coil Complete |
| T3 | 108111C | Input I. F. Complete |
| T4 | 108112 | Output I. F. Complete |
| T5 | 10578 | Output Transformer |
| T6 | 114137 | 6" P. M. Speaker |




721



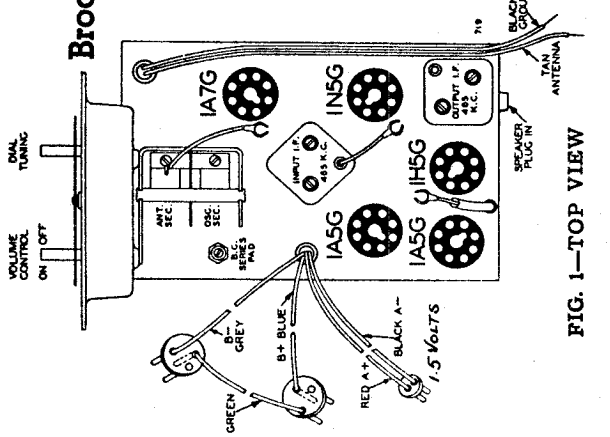
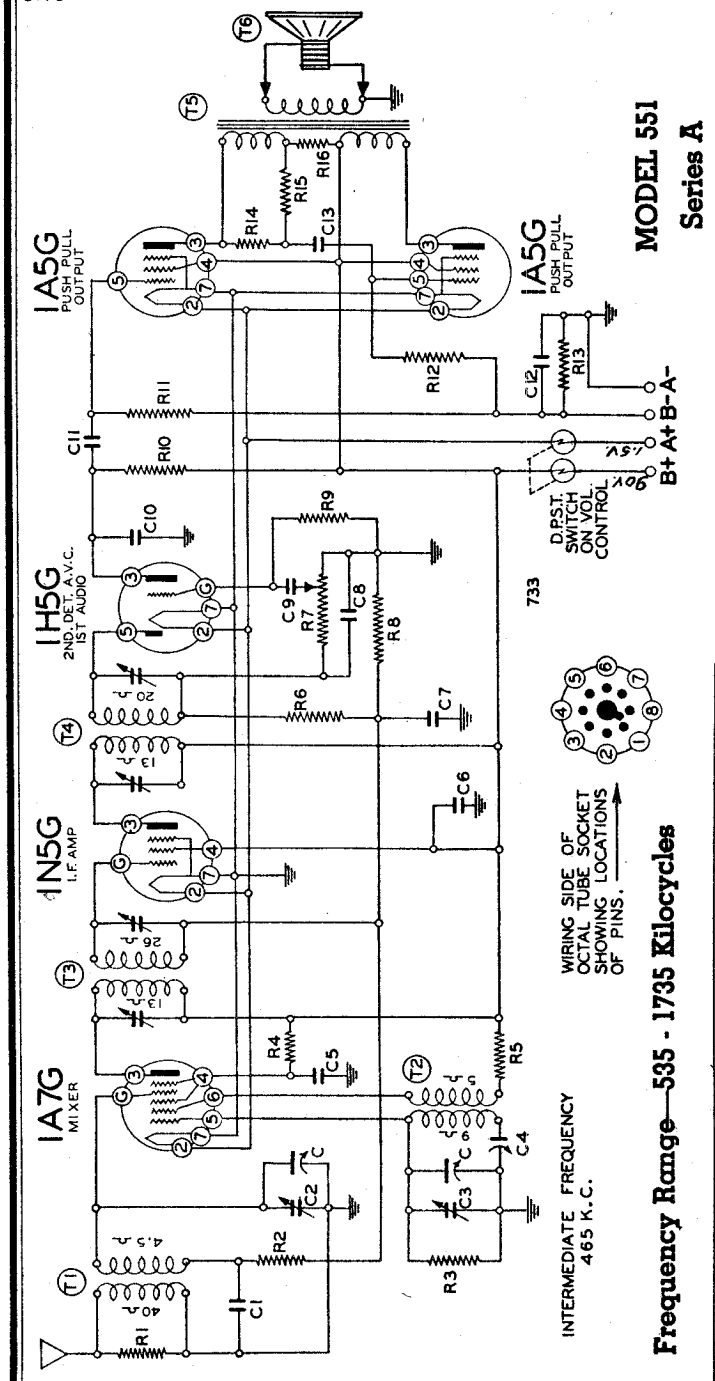
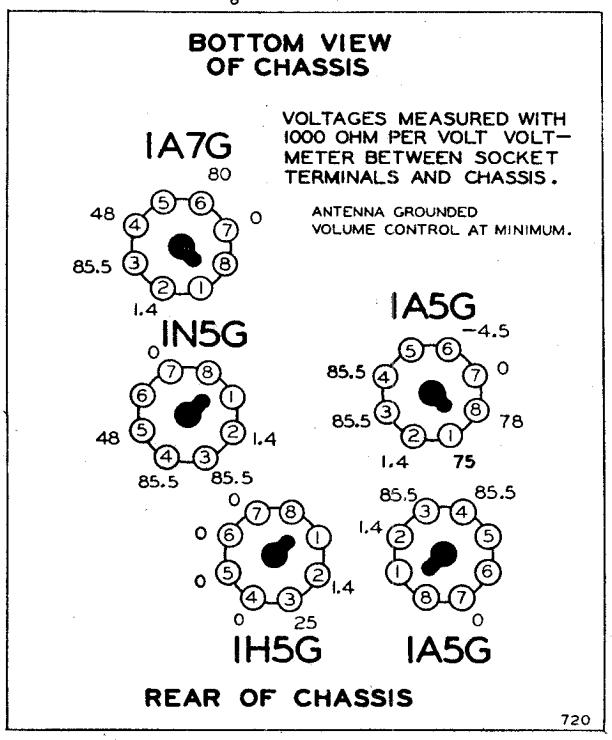




FIG. 1—TOP VIEW




**Frequency Range—535 - 1735 Kilocycles**




720

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# Broadcast Band 1½-Volt Battery Operated Superheterodyne Receiver

## MODEL 551 Series A

## 5 TUBE Frequency Range—535 - 1735 Kilocycles

### DESCRIPTION:

**TUBES:**

The tube complement of this chassis consists of the following tubes.

The type and function of each tube is as follows:

1—Type 1A7G Mixer, First Detector-oscillator.

1—Type 1N5G Remote Cut-Off Pentode, 1st I. F. Amplifier (465 K. C.)

1—Type 1H5G Second Detector, A.V.C., 1st Audio.

2—Type 1A5G Push-Pull Output Amplifier.

**SERVICE NOTES:**

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with a new set of batteries.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

The approximate current consumption is as follows: "A"—ma., "B"—ma.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good.

### ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low battery voltage, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. Remove the knobs and the 3 bolts which are used to fasten the chassis.

All adjustments should be made with a non-metallic screw driver.

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1N5G I.F. Tube | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1A7G | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROADCAST BAND | 1735 Kc. | 200 mmf. | Antenna lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Antenna Broadcast | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Set dial at 600 Kc. | B.C. Series Pad (See Fig. 1) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

**FREQUENCY RANGE**
**535 to 1735KC.**

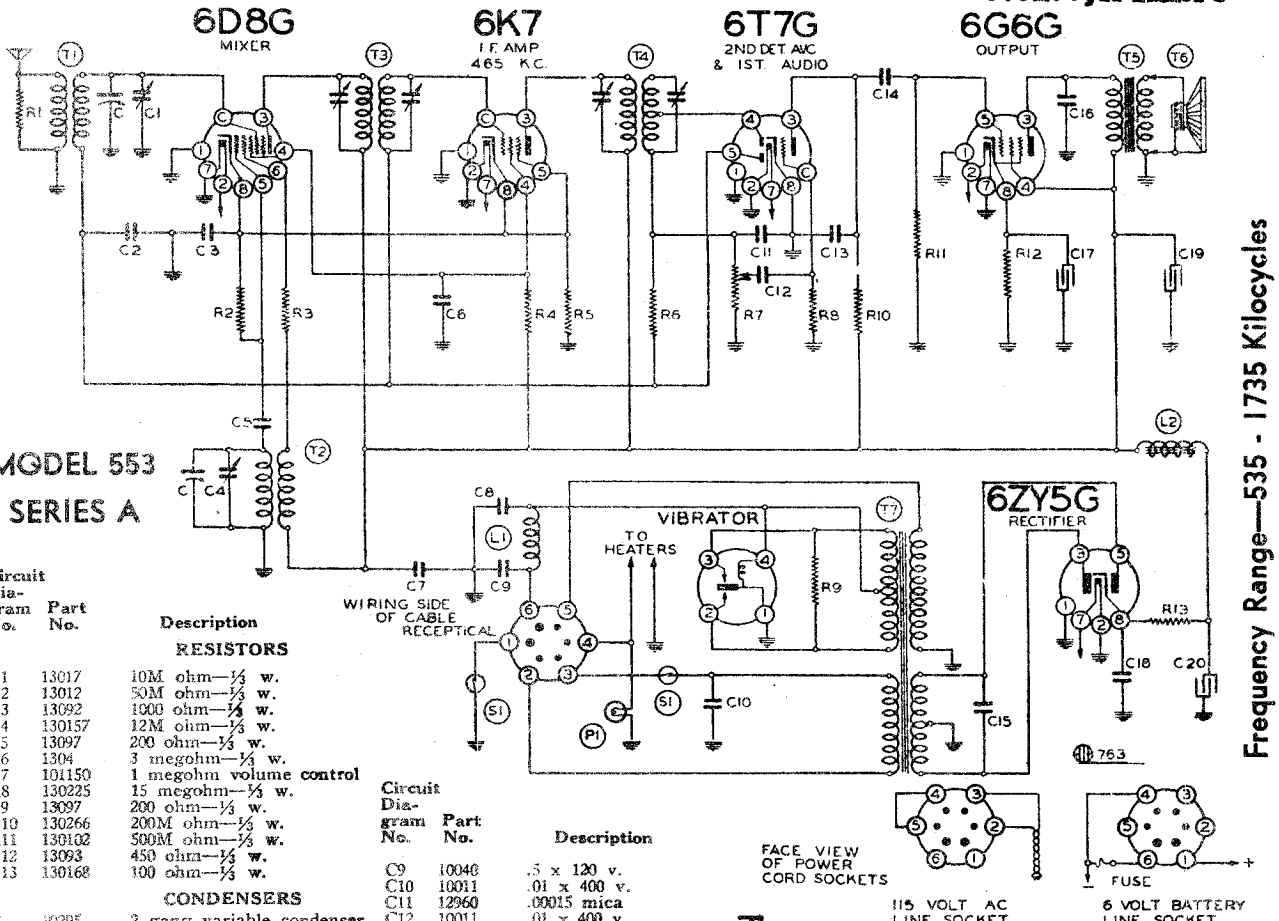
*Power Output.....130 Milliwatts Undistorted, 270 Milliwatts Maximum

Intermediate Frequency .....465 KC.

*Power Output Measured Across 3 Ohm Voice Coil.

# BELMONT RADIO CORP.

MODEL 553, Series A
Schematic, Voltage
Socket, Trimmers




| Circuit Diagram No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 13017 | 10M ohm—⅓ w. |
| R2 | 13012 | 50M ohm—⅓ w. |
| R3 | 13092 | 1000 ohm—⅓ w. |
| R4 | 130157 | 12M ohm—⅓ w. |
| R5 | 13097 | 200 ohm—⅓ w. |
| R6 | 1304 | 3 megohm—⅓ w. |
| R7 | 101150 | 1 megohm volume control |
| R8 | 130225 | 15 megohm—⅓ w. |
| R9 | 13097 | 200 ohm—⅓ w. |
| R10 | 130266 | 200M ohm—⅓ w. |
| R11 | 130102 | 500M ohm—⅓ w. |
| R12 | 13093 | 450 ohm—⅓ w. |
| R13 | 130168 | 100 ohm—⅓ w. |
| | | **CONDENSERS** |
| C | 10295 | 2 gang variable condenser |
| C1 | | Antenna Trimmer |
| C2 | 1009 | .05 x 200 v. |
| C3 | 10064 | .25 x 200 v. |
| C4 | | Oscillator Trimmer |
| C5 | 1295 | .0001 mica |
| C6 | 10020 | .1 x 200 v. |
| C7 | 10020 | .1 x 200 v. |
| C8 | 10046 | .5 x 120 v. |

| Circuit Diagram No. | Part No. | Description |
|---|---|---|
| C9 | 10046 | .5 x 120 v. |
| C10 | 10011 | .01 x 400 v. |
| C11 | 12960 | .00015 mica |
| C12 | 10011 | .01 x 400 v. |
| C13 | 1292 | .0005 mica |
| C14 | 1009 | .05 x 200 v. |
| C15 | 10073 | .008 x 1200 v. |
| C16 | 10019 | .006 x 600 v. |
| C17 | 11979 | 20 mfd. x 25 w. volt |
| C18 | 10020 | .1 x 200 v. |
| C19 | 11979 | 16 mfd. x 200 w. volt |
| C20 | 11979 | 16 mfd. x 200 w. volt |

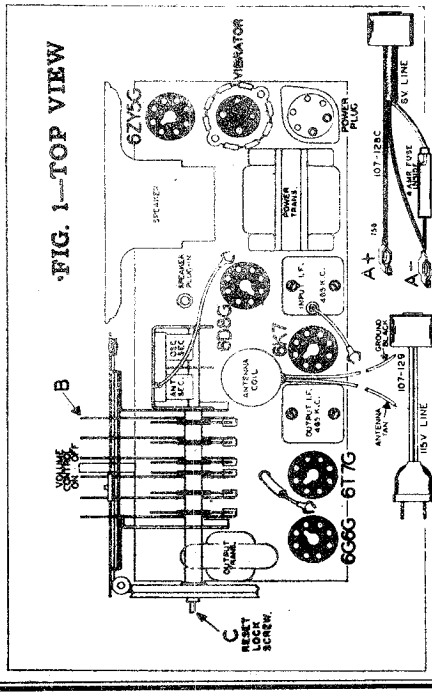
FACE VIEW OF POWER CORD SOCKETS

115 VOLT AC LINE SOCKET

6 VOLT BATTERY LINE SOCKET

1. For 6 volt storage battery operation:
   (a) Use cable No. 107128C.
   (b) Connect the lead (containing the fuse receptacle) marked A negative (—) to the negative (—) post of the storage battery.
   (c) Connect the lead marked A positive (+) to the positive (+) post of the storage battery.
2. For 105-115 volts, 60 cycle operation:
   (a) Use special cable No. 107129.
   (b) Plug receptacle of cable into power socket on chassis.

FIG. 1—TOP VIEW

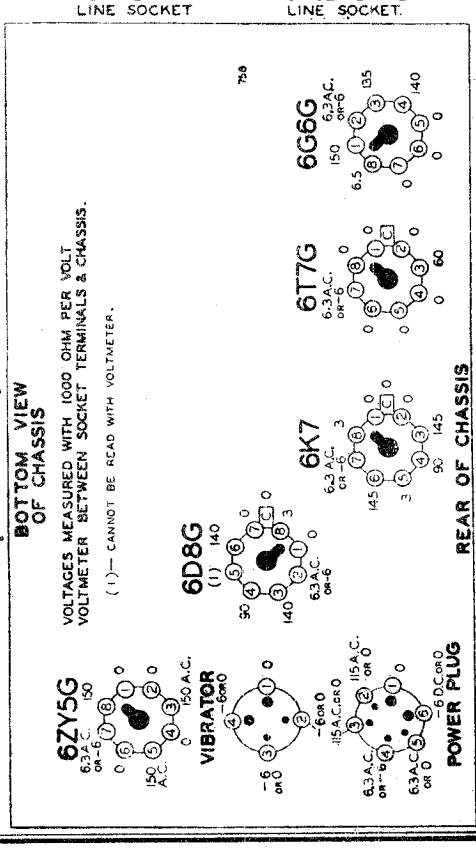



Broadcast Band A. C. and 6-Volt Storage Battery Operated Superheterodyne Receiver

BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.

(1)— CANNOT BE READ WITH VOLTMETER.

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## SERVICE NOTES:

Voltage taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages are to be measured with 6.3 volts input to receiver.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

## ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low battery voltage, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

## TO REMOVE CHASSIS FROM THE CABINET:

Remove the four bolts which are used to fasten the chassis to the cabinet shelf; pull the knobs off their shafts and pull off the six button lever keys on front of dial.

## PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the dial by means of which six stations may be selected, (See "B", Fig. 2).

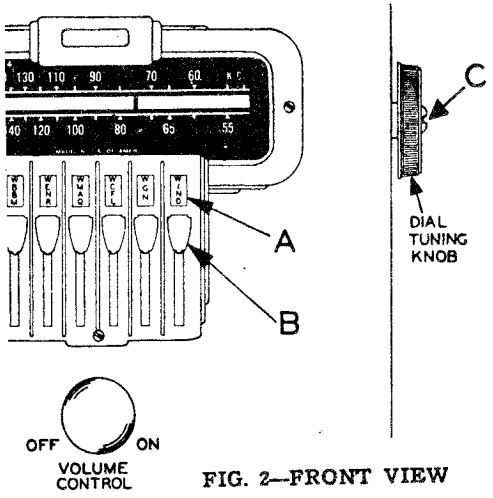



FIG. 2—FRONT VIEW

Press down any one of the six Automatic levers. Holding it down, tune in by means of tuning knob No. 2 any one of your favorite stations. Turn the tuning knob very slowly back and forth until signal is clearest. The station will then be accurately tuned in.

Release this lever and press down any other Automatic lever. Hold this lever down and tune in by means of knob No. 2 another favorite station.

Follow this procedure until stations have been set on all the levers. Hold tuning knob securely with left hand to prevent it from turning and with a coin or screw driver, tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

This screw will lock in place all stations you have selected on the Automatic levers. (Note: Locking Screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob securely and loosen locking screw ("C") one or two turns; select the new station as explained.

**BE SURE TO RETIGHTEN THE LOCKING SCREW, otherwise the stations will not stay adjusted to the levers.**

Above each Automatic lever an opening in the escutcheon is provided for inserting station call letters, (See "A", Fig. 2).

Punch the correct station call letter tabs from the set of sheets supplied and insert them into the rectangular openings in the escutcheon above each of the levers. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

The Automatic Tuner dial is now set up for quick tuning. Press down on the lever and your favorite station is selected.

# ALIGNMENT PROCEDURE

MODEL 553
SERIES A

FREQUENCY RANGE
535 to 1735 KC.

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 I. F. Tube | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6D8G | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROADCAST BAND | 1730 Kc. | 200 mmf. | Antenna Lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna Lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Antenna Broadcast | Adjust to maximum output |

**Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.**

**After each band is completed, repeat the procedure as a final check.**

Power Consumption——40 Watts (at 115 Volts 50/60 Cycles) or 2.5 Amperes at 6.3 Volts

Power Output——6 Watts Undistorted, 1 Watt Maximum

# BELMONT RADIO CORP.

MODEL 577C
Above Serial 203070
Schematic, Voltage, Notes

## GENERATOR INTERFERENCE

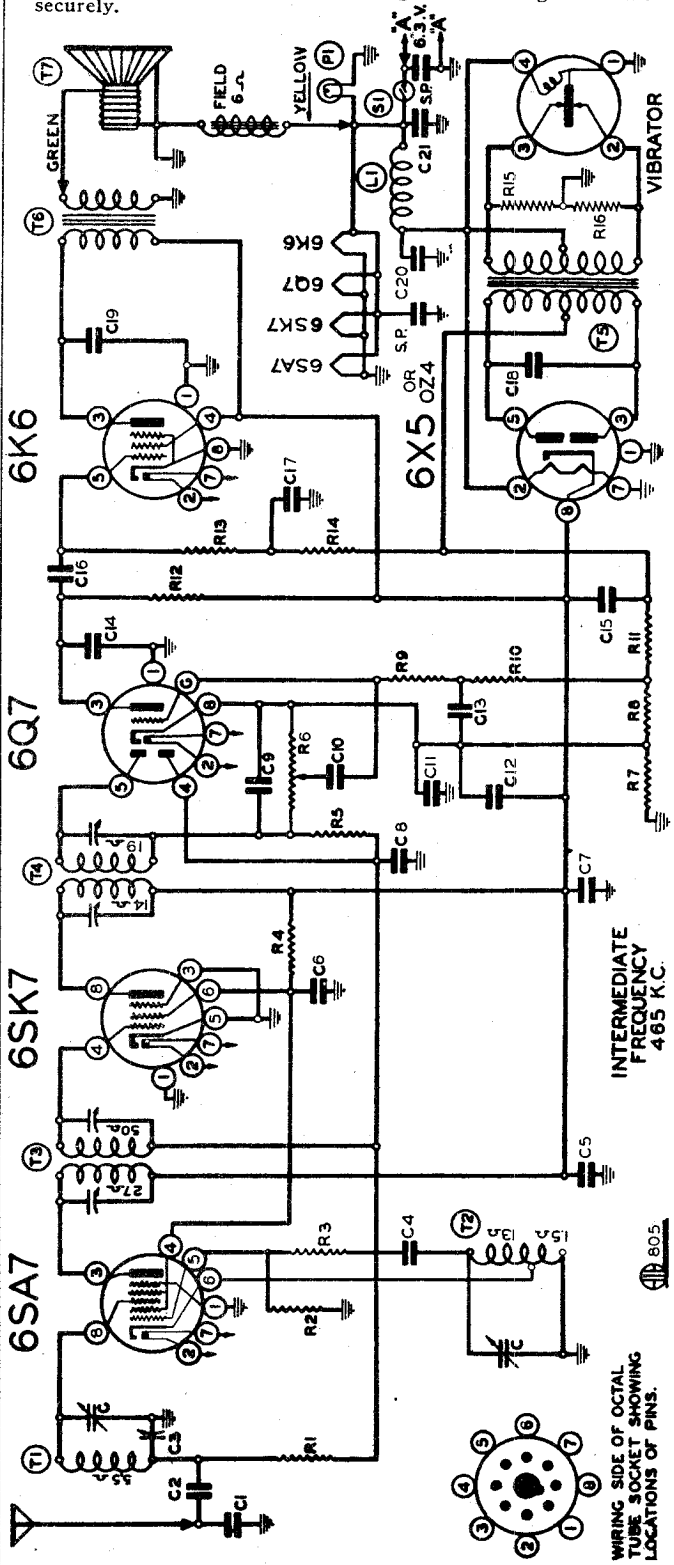
Remove the generator cutout mounting screw and fasten the condenser (100-81) bracket on the generator cutout mounting lug. Replace the cutout mounting screw and tighten down securely.

Connect the condenser lead to the battery terminal of the cutout. The generator condenser is absolutely necessary as it is used to eliminate a high pitched whining noise which would otherwise be heard as the motor is accelerated

## CONNECTIONS TO BATTERY

The battery cable, number 107-82, (red wire with fuse receptacle at one end and terminal lug at other end) must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 100-82, to battery terminal of ammeter, other end of condenser to any convenient grounded screw on back of instrument panel. Make certain that insulating sleeve is slipped over fuse when fuse is placed in receptacle, before connecting to short battery cable from receiver.

When connected properly, the discharge due to current drawn by the receiver should not indicate on the ammeter. This is important, since if improperly connected, as shown by the deflection of ammeter, additional motor interference may be encountered.




| Code No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 13011 | 250M ohm - ½ w. 20% |
| R2 | 130176 | 20M ohm - ½ w. 10% |
| R3 | 130272 | 10 ohm - ½ w. 10% |
| R4 | 130245 | 10M ohm - 1 w. 10% |
| R5 | 1304 | 3 megohm - ½ w. 20% |
| R6 | 101110 | 1 megohm volume control |
| R7 | 130174 | 50 ohm - ½ w. 10% |
| R8 | 130211 | 30 ohm - ½ w. 10% |
| R9 | 130209 | 2 megohm - ½ w. 20% |
| R10 | 130210 | 1 megohm - ½ w. 20% |
| R11 | 130212 | 250 ohm - 1 watt 10% |
| R12 | 13011 | 250M ohm - ½ w. 20% |
| R13 | 13011 | 250M ohm - ½ w. 20% |
| R14 | 13011 | 250M ohm - ½ w. 20% |
| R15 | 13060 | 100 ohm - ½ w. 10% |
| R16 | 13060 | 100 ohm - ½ w. 10% |
| | | **CONDENSERS** |
| C | 10269 | 2 gang variable condenser |
| C1 | 1293 | .00002 Mica 20% |
| C2 | 10055 | .01 x 400 v. 25% |
| C3 | 12434 | Antenna Trimmer |
| C4 | 12912 | .00025 Mica 20% |
| C5 | 1001 | .1 x 400 v. 25% |
| C6 | 10020 | .1 x 200 v. 25% |
| C7 | 1295 | .0001 Mica |
| C8 | 1009 | .05 x 200 v. 25% |
| C9 | 1295 | .0001 Mica 20% |
| C10 | 10078 | .01 x 200 v. 25% |
| C11 | 10020 | .1 x 200 v. |
| C12 | 11950 | 8 mfd. lytic |
| C13 | 10078 | .01 x 200 v. |
| C14 | 1292 | .0005 Mica |
| C15 | 11950 | 8 mfd. lytic |
| C16 | 10055 | .01 x 400 v. 25% |
| C17 | 10019 | .006 x 600 v. |
| C18 | 10034 | .005 x 1200 v. |
| C19 | 10087 | .01 x 600 v. |
| C20 | 10031 | .5 x 120 v. + 50-10% |
| C21 | 10031 | .5 x 120 v. + 50-10% C12 and C15 in same unit. |
| | | **PARTS** |
| T1 | 11195B | Antenna coil complete |
| T2 | 110107 | Oscillator coil complete |
| T3 | 108139 | Input I.F. 465 kc. - complete |
| T4 | 108121 | Output I.F. 465 kc. - complete |
| T5 | 104131 | Power Transformer |
| T6 | 10567 | Output Transformer |
| T7 | 114114 | 5" Dynamic Speaker |
| L1 | 10568 | "A" Filter Choke |
| P1 | 10797 | 6.8 v. pilot light |
| S1 | | Off-on Switch on Volume Control |
| SP | | Spark Plates |

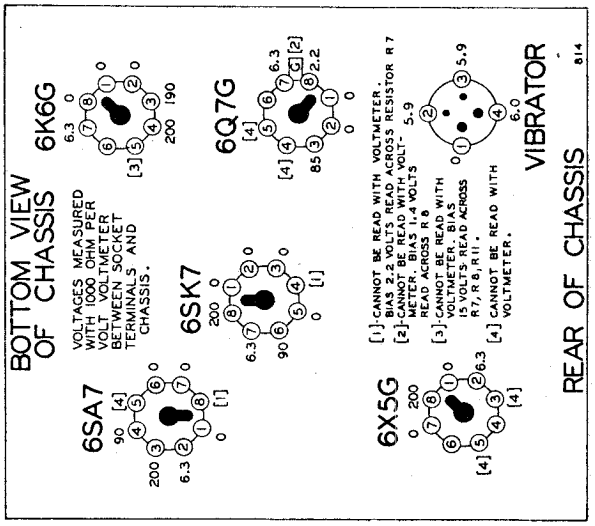

BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
6K6G
6Q7G
6SK7
6SA7
6X5G
VIBRATOR
[1]-CANNOT BE READ WITH VOLTMETER. BIAS 2.2 VOLTS READ ACROSS RESISTOR R 7
[2]-CANNOT BE READ WITH VOLT- METER. BIAS 5.9 VOLTS READ ACROSS R 8
[3]-CANNOT BE READ WITH VOLTMETER. BIAS 15 VOLTS READ ACROSS R 7, R 8, R 11.
[4]-CANNOT BE READ WITH VOLTMETER.
REAR OF CHASSIS
814

FIG. 4

## ADJUST ANTENNA TRIMMER

Tune in a weak signal at approximately 600 K.C. with volume control about three-fourths on. Adjust trimmer screw "X" until maximum output is obtained. (See Fig. 1, Adjustment "X" on right side of radio)

**January 1939**
**Serial No. 203070 Up**

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MODEL 577C
Above Serial 203070

# BELMONT RADIO CORP.

MODEL 677C
Tuner Data

## SERVICE NOTES Alignment, Socket, Trimmers Tuner Data

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the bottom view.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

## ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a test oscillator, as well as an output meter, must be used.

## DUMMY ANTENNAS

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .5 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 125 mmfd. condenser connected in series with the output lead of the test oscillator.

## RESONANCE INDICATOR

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6K6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

## I.F. ALIGNMENT: (465 K.C.)

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6SK7 I.F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108121 to resonance with oscillator.
3. Move test oscillator connection to grid of 6SA7 tube and adjust trimmer condensers of input I.F. transformer No. 108139 to resonance with oscillator. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver. (See Fig. 3—top view, page 3.)

## BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is the rear section of the two-gang condenser—see top view, Fig. 3).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust antenna trimmer (front section of gang condenser) to resonance (see top view, Fig. 3).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 K.C. Adjust series pad in the antenna circuit for maximum gain. This pad is mounted on the side of the antenna can, adjustment "X."
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.

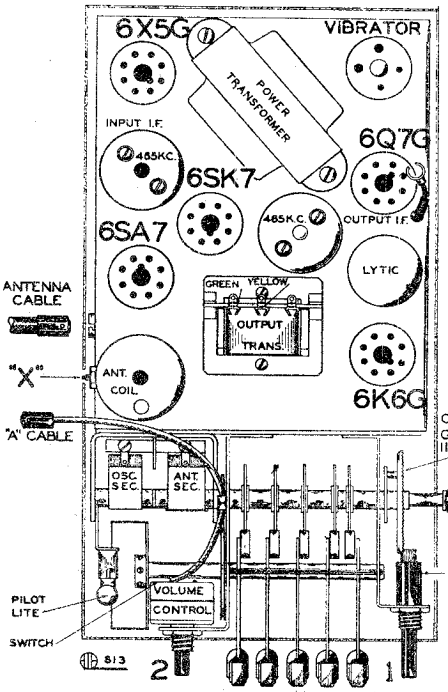


FIG. 3—TOP VIEW

## PROCEDURE FOR SETTING THE AUTOMATIC LEVERS

There are five levers on the dial by means of which five stations may be selected, (See "B" Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including five.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner lever an opening is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings of each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 1) the station you have assigned to this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station assigned to this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 1) to the right (clockwise) as far as it will turn, and tighten the special locking screw ("C") located on left side of tuner dial assembly (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the locking screw "C" one or two turns, select the new station as explained. Be sure to retighten the locking screw, otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and your favorite station is selected.

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# BELMONT RADIO CORP.

MODEL 633, Series A
Schematic, Socket
Trimmers, Voltage

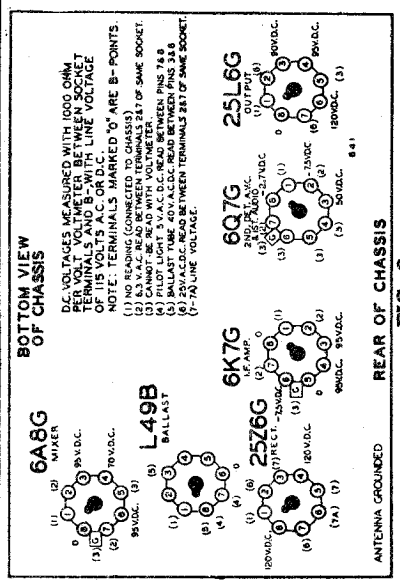


FIG. 3

| Code No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 13017 | 10M ohm—½ w. |
| R2 | 13012 | 50M ohm—½ w. |
| R3 | 130149 | 15M ohm—½ w. |
| R4 | 13012 | 50M ohm—½ w. |
| R5 | 130170 | 3 megohm—½ w. |
| R6 | 101127 | Volume control (1 megohm) |
| R7 | 130225 | 15 megohm—½ w. |
| R8 | 130100 | 150M ohm—½ w. |
| R9 | 13011 | 250M ohm—½ w. |
| R10 | 130231 | 75 ohm—½ w. |
| R11 | 130174 | 50 ohm—½ w. |
| | | **CONDENSERS** |
| C | 10284 | 2 gang variable condenser |
| C1 | 1292 | .0005 mica |
| C2 | 10026 | .02 x 400 v. |
| C3 | | Antenna Trimmer—on gang |
| C4 | | Oscillator Trimmer—on gang |
| C5 | 12912 | .00025 mica |
| C6 | 1009 | .05 x 200 v. |
| C7 | 1001 | .1 x 400 v. |
| C8 | 1295 | .0001 mica |
| C9 | 1295 | .0001 mica |
| C10 | 10011 | .01 x 400 v. |
| C11 | 11953C | 30 mfd. lytic |
| C12 | 12912 | .00025 mica |
| C13 | 10011 | .01 x 400 v. |
| C14 | 1009 | .05 x 200 v. |
| C15 | 11953C | 30 mfd. lytic |
| C16 | 11953C | 40 mfd. lytic |
| C17 | 10091 | .15 x 400 v. |
| C18 | 10067 | .025 x 400 v. |
| NOTE.—C11, | | 15 and I6—One unit for 60 cycle |
| | Use 11953C | (30 mfd. 30 mfd. 40 mfd.) |
| | C11, | 15 and I6—One unit for 25 cycle |
| | Use 11962C | (60 mfd. 60 mfd. 40 mfd.) |
| | | **PARTS** |
| T1 | 111108 | Antenna Coil complete |
| T2 | 11073 | Oscillator Coil complete |
| T3 | 10882F | Input I.F.—470 kc. complete |
| T4 | 10883F | Output I.F.—470 kc. complete |
| T5 | 10560 | Output Transformer |
| T6 | 114116E | 5 inch Dynamic Speaker (450 ohm field) |
| S1 | | Off-on switch on volume control |
| P1 | 10794 | T-44 Pilot Light |

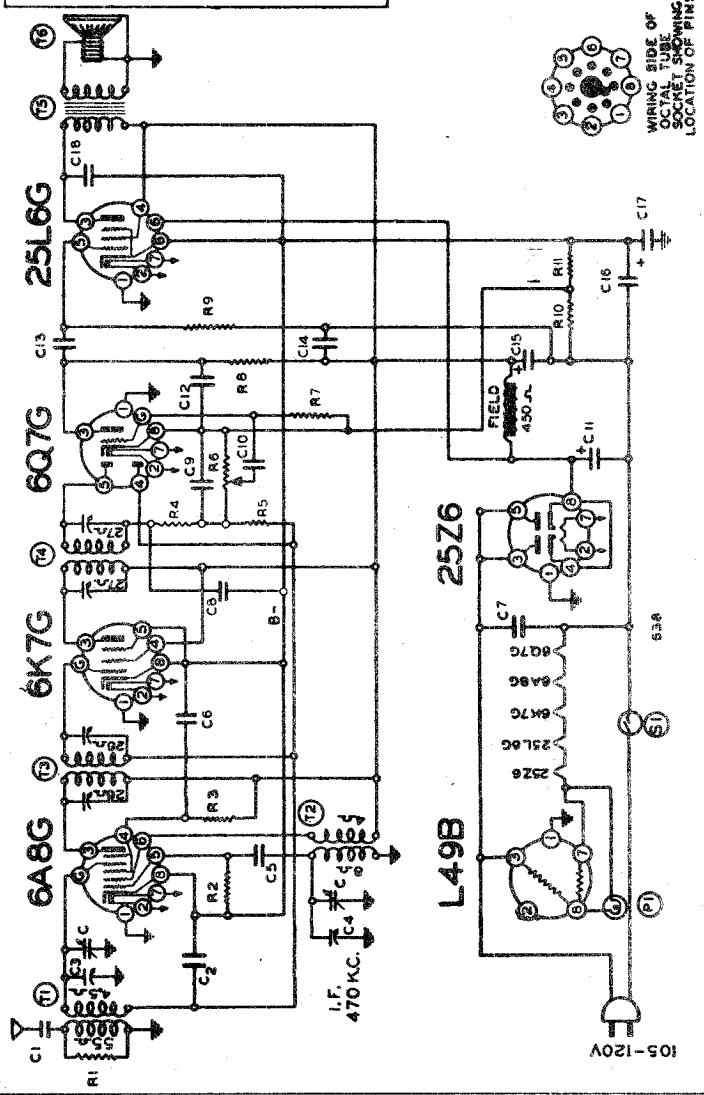


FIG. 1.—TOP VIEW

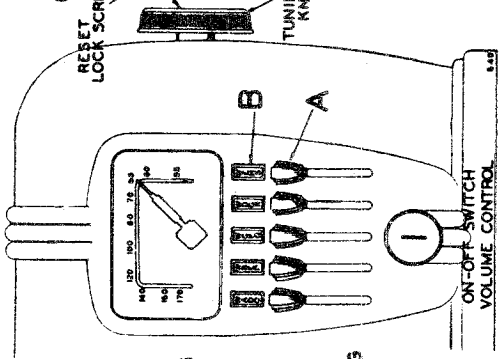


FIG. 2.—FRONT VIEW

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MODEL 633, Series A
Alignment, Tuner, Parts

BELMONT RADIO CORP.

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 100 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 470 Kc. | .1 MFD. | Grid of 6A8G | Rotor full open (Plates out of mesh) | Four trimmers (See Fig. 1) | Output and input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1720 Kc. | 100 mmf. | Antenna Lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 100 mmf. | Antenna Lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Broadcast Antenna | Adjust to maximum output |

**FREQUENCY RANGE**
**535 to 1720 K.C.**

Power Consumption ..... 45 Watts
Power Output ..... 1.2 Watts Undistorted, 2.1 Watts Maximum
Intermediate Frequency ..... 470 K.C.

**9-38**

### PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the front of the radio by means of which five stations may be selected, (See "B" Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including five.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the cabinet is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in the cabinet above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

### ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltage, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

### HOW TO REMOVE CABINET:

CAUTION:—Always disconnect the line cord from the house current before removing the chassis from the cabinet.

To remove chassis from the cabinet unscrew the locking screw in the center of the tuning knob and pull tuning knob and volume knob off their shafts. Remove the back of the cabinet and the two screws that hold the chassis to the cabinet. Pull off the five buttons on the Automatic levers. Move the chassis toward back of cabinet so that control shafts and tuner assembly clear holes in cabinet, then chassis can be slipped out.

### SPEAKER

| | | | |
|---|---|---|---|
| 114116E | T6 | Five Inch Dynamic Speaker (450 Ohm Field) | 3.00 |
| 10560 | T5 | Output Transformer for Speaker | .75 |

### MISCELLANEOUS

| | | | |
|---|---|---|---|
| 101127 | R6, S1 | Volume Control and Switch (1 Megohm) | 1.00 |
| 10284 | C, C3, C4 | Two Gang Variable Condenser | 2.50 |
| 10560 | T5 | Output Transformer for Speaker | .75 |
| 10798 | | Line Cord and Plug | .50 |
| 128176BR | | Brown Bakelite Cabinet Complete | 3.00 |
| 128176W | | Ivory Finish Bakelite Cabinet Complete | 3.50 |
| 128134BR | | Brown Bakelite Volume Knob | .10 |
| 128134W | | Ivory Bakelite Volume Knob | .10 |
| 128189BR | | Brown Bakelite Tuning Knob | .15 |
| 128189W | | Ivory Bakelite Tuning Knob | .20 |
| 128200 | | Back for Cabinet (Specify Color) | .10 |
| 128173BR | | Brown Buttons for Tuner Levers | .10 |
| 128173W | | Ivory Buttons for Tuner Levers | .10 |
| L49B | | Ballast Resistor (in Tube Shell with Base) | .75 |

### DIAL PARTS LIST

| | | | |
|---|---|---|---|
| 10794 | P1 | 6-8 Volt Pilot Light Type T-44 | .10 |
| 107201 | | Socket and Bracket for Pilot Light | .10 |
| 115224 | | Support Bracket for Automatic Tuning Mechanism (Mounts to Variable Condenser) | .10 |
| 115176 | | End Support Bracket for Automatic Tuning Mechanism | .10 |
| 117398 | | Brass Pulley (String Drive for Pointer; Mounts on Cam Shaft at Variable Condenser End) | .15 |
| 117399 | | Brass Pulley (String Drive for Pointer; Mounts on Right End of Cam Shaft with Spring Take-Up | .15 |
| 120200 | | Take-Up Spring for Drive Spring Pulley | .03 |
| 117258 | | Tuner Cams (Five Used) | .05 |
| 131157 | | Keywashers (Used on Each Side of Tuner Cams) | .02 |
| 131157B | | Keywashers (Two Used; Have Holes to Attach Take-Up Spring) | .02 |
| 115174 | | Lever Complete with 117337 Roller | .15 |
| 117401 | | Lever Shaft | .15 |
| 117400 | | Locking Collar (for Right End of Cam Shaft) | .15 |
| 131141 | | Compression Spring Washer (for Locking Collar) | .02 |
| 117390 | | Locking Screw (Lock Tuner Cams; Inserted through Center of Tuning Knob) | .10 |
| 120181 | | Hairpin Springs (for Tuner Levers) | .03 |
| 117256 | | Brass Spacer (Three Used on Cam Shaft) | .05 |
| 117340 | | Brass Spacer (One Used on Cam Shaft) | .05 |
| 115249 | | Bracket for Dial Scale Complete with Two Small Brass Pulleys and Bushing for Pointer Shaft | .20 |
| 117403 | | Threaded Pulley and Stud for Pointer | .10 |
| 112489 | | Pointer | .25 |
| 112487 | | Dial Scale Calibrated | .35 |
| 112488 | | Crystal (Cover for Dial Scale) | .25 |
| 13143 | | Cinch Buttons (Fasten Dial Scale to Bracket) | .01 |
| 112445GW | | Set of Call Letter Sheets | .15 |
| 112336 | | Clear Celluloid Tabs for Station Call Letters | Doz. .10 |
| 128173BR | | Brown Bakelite Buttons for Tuner Levers | .10 |
| 128173W | | Ivory Bakelite Buttons for Tuner Levers | .10 |

Mica condensers are coded with an additional dot indicating tolerance:

| Tolerance Percent | Color of Dot |
|---|---|
| 2½% | White |
| 5% | Green |
| 10% | Blue |
| 15% | Yellow |
| 20% | Red |
| More Than 20% | None |

All prices quoted are list and are subject to the usual trade discounts.

Shipments are F.O.B. our Factory. When remitting in advance, please include postage.

WE CANNOT SUPPLY SPEAKER, CONES OR FIELDS SEPARATELY, WE CAN REPLACE OR REPAIR A DAMAGED SPEAKER FOR $0.90 NET, IF IT IS RETURNED TO OUR FACTORY, TRANSPORTATION CHARGES PREPAID.

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Voltage, Alignment

MODEL 634, Series A

# BELMONT RADIO CORP.

Schematic, Socket, Trimmers

IF 470 kc. Dummy ant. .1mfd. cond. to grid of 6K7G tube. Variable plates out of mesh. Adjust 1st. IF trimmers to max. output. As above, connect to grid of 6A8G tube. Adjust 2nd IF trimmers to max. output.

B.C. 1720 kc, osc. sec. Variable plates out of mash. Dummy ant. 100 mmf. to ant. lead. Adjust b.c.osc. trimmer to max. output. At 1400 kc ant. sec. Dummy ant. 100 mmf. Variable set at 1400 kc. Adjust ant. sec. trimmer to max. output.

BOTTOM VIEW OF CHASSIS

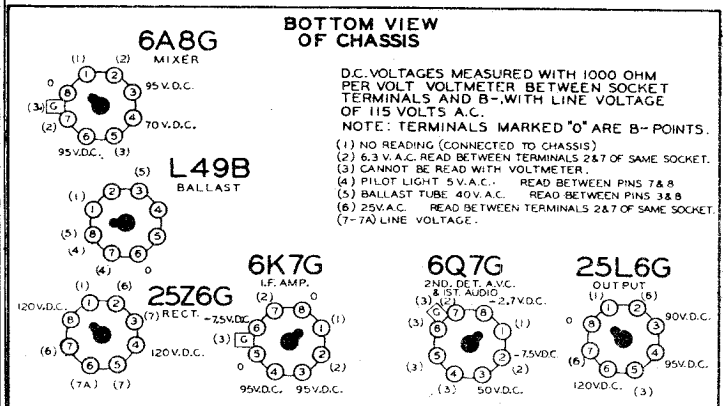
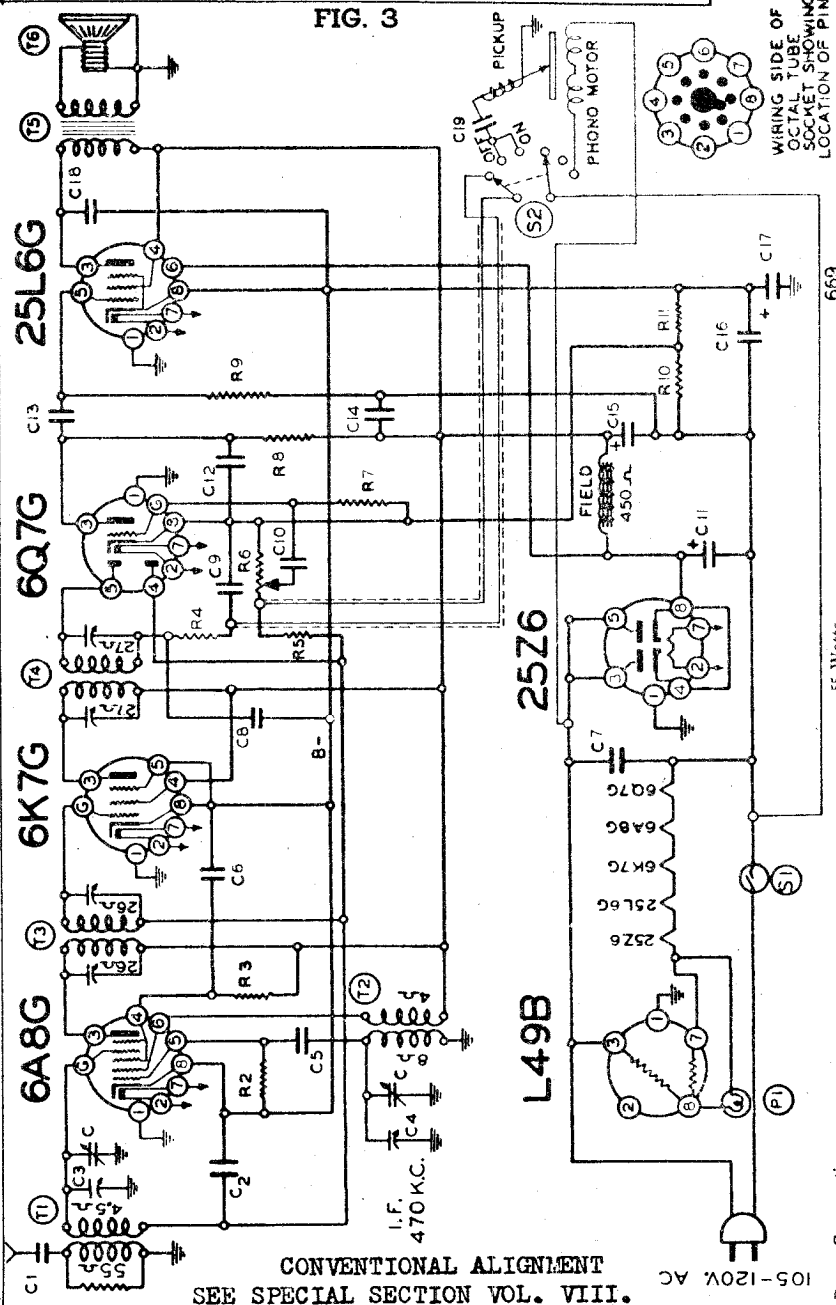



FIG. 3



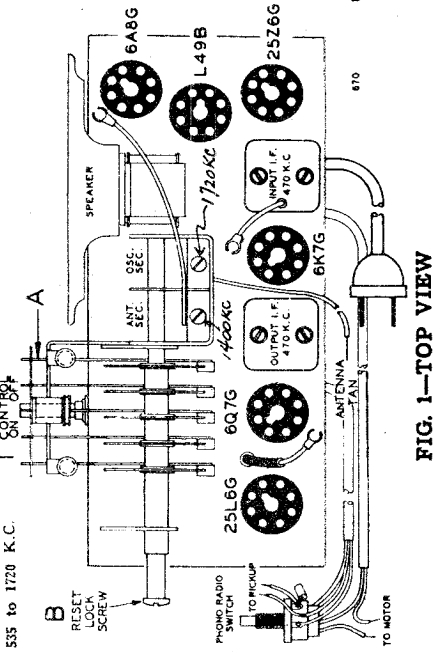




FIG. 1—TOP VIEW

Power Consumption.....55 Watts
Power Output.....1.2 Watts Undistorted, 2.1 Watts Maximum
FREQUENCY RANGE 535 to 1720 K.C.

| Code No. | Part No. | Description | Code No. | Part No. | Description |
|---|---|---|---|---|---|
| | | **RESISTORS** | C10 | 10011 | .01 x 400 v. |
| R1 | 13017 | 10M ohm—½ w. | C11 | 11953C | 30 mfd. lytic |
| R2 | 13012 | 50M ohm—½ w. | C12 | 12912 | .00025 mica |
| R3 | 130149 | 15M ohm—½ w. | C13 | 10011 | .01 x 400 v. |
| R4 | 13012 | 50M ohm—½ w. | C14 | 1009 | .05 x 200 v. |
| R5 | 130170 | 3 megohm—½ w. | C15 | 11953C | 30 mfd. lytic |
| R6 | 101139 | 1 megohm volume control | C16 | 11953C | 40 mfd. lytic |
| R7 | 130225 | 15 megohm—½ w. | C17 | 10091 | .15 x 400 v. |
| R8 | 130100 | 150M ohm—½ w. | C18 | 10067 | .025 x 400 v. |
| R9 | 13011 | 250M ohm—½ w. | C19 | 19006 | .02 x 400 v. |
| R10 | 130231 | 75 ohm—½ w. | NOTE: | | C11, 15 and 16—One unit for 60 cycle |
| R11 | 130174 | 50 ohm—½ w. | | | Use 11953C (30 mfd. 30 mfd. 40 mfd.) |
| | | | | | C11, 15 and 16—One unit for 25 cycle |
| | | | | | Use 11962C (60 mfd. 60 mfd. 40 mfd.) |
| | | **CONDENSERS** | | | **PARTS** |
| C | 10288 | 2 gang variable condenser | T1 | 111108 | Antenna Coil Complete |
| C1 | 1292 | .0005 mica | T2 | 11073 | Oscillator Coil Complete |
| C2 | 10026 | .02 x 400 v. | T3 | 10882F | Input I. F.—470 kc. complete |
| C3 | | Antenna Trimmer—on gang | T4 | 10883F | Output I. F.—470 kc. complete |
| C4 | | Oscillator Trimmer—on gang | T5 | 10560 | Output Transformer |
| C5 | 12912 | .00025 mica | T6 | 114116D | 5" Dynamic Speaker (450 ohm field) |
| C6 | 1009 | .05 x 200 v. | S1 | | Off-on switch on volume control |
| C7 | 1001 | .1 x 400 v. | S2 | | Phono Switch |
| C8 | 1295 | .0001 mica | P1 | 10794 | T-44 Pilot Light |
| C9 | 1295 | .0001 mica | | | |

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MODEL 634, Series A
Tuner, Phono Data, Parts

BELMONT RADIO CORP.

# CHASSIS MODEL 634

## Series A

**When ordering parts always mention complete factory model number, series and issue.**

## LIST OF REPAIR PARTS (Serial No. 221300 and up)

**Use Only Genuine Factory Replacement Parts**

| Part No. | Circuit Diagram Reference | Description | List Price Each |
|---|---|---|---|
| | | **CONDENSERS** | |
| 1001 | C7 | .1 x 400 Volt Condenser | .25 |
| 1005 | C6, C14 | .05 x 200 Volt Condenser | .25 |
| 10011 | C10, C13 | .01 x 400 Volt Condenser | .25 |
| 10026 | C2, C19 | .02 x 400 Volt Condenser | .25 |
| 10025 | C18 | .025 x 400 Volt Condenser | .25 |
| 10001 | C17 | .15 x 400 Volt Condenser | .25 |
| 11953C | C11, C15, C16 | 30 MFD—30 MFD—40 MFD Electrolytic Condenser (for 60 Cycle) | 1.50 |
| 11952C | C11, C15, C16 | 60 MFD—60 MFD—40 MFD Electrolytic Condenser (for 25 Cycle) | 1.75 |
| 1200 | C1 | .0005 Mica Type Condenser—20% | .25 |
| 1201 | C2, C9 | .0001 Mica Type Condenser—20% | .25 |
| 12012 | C5 | .00025 Mica Type Condenser—20% | .25 |
| | | **RESISTORS** | |
| 13011 | R9 | 250M Ohm—½ Watt Resistor—20% | .20 |
| 13012 | R2, R4 | 50M Ohm—½ Watt Resistor—20% | .20 |
| 13017 | R1 | 10M Ohm—½ Watt Resistor—20% | .20 |
| 130109 | R8 | 150M Ohm—½ Watt Resistor—20% | .20 |
| 130149 | R3 | 15M Ohm—½ Watt Resistor—20% | .20 |
| 130170 | R5 | 3 Megohm—½ Watt Resistor—25% | .20 |
| 130174 | R11 | 50 Ohm—½ Watt Resistor—10% | .20 |
| 130225 | R7 | 15 Megohm—½ Watt Resistor—30% | .20 |
| 130231 | R10 | 75 Ohm—½ Watt Resistor—10% | .20 |
| | | **COILS** | |
| 10882F | T3 | Input I. F. Coil Assembly Complete with Can | 1.25 |
| 10883F | T4 | Output I. F. Coil Assembly Complete with Can | 1.25 |
| 11073 | T2 | Oscillator Coil Assembly Complete | .50 |
| 11110 | T1 | Antenna Coil Assembly Complete | .75 |
| | | **SOCKETS** | |
| 12193 | | Eight Prong Octal Sockets | .15 |
| | | **SPEAKER** | |
| 114116D | T6 | Five Inch Dynamic Speaker (450 Ohm Field) | 3.00 |
| 10560 | T5 | Output Transformer for Speaker | .75 |
| | | **MISCELLANEOUS** | |
| 101139 | R6, S1 | Volume Control and Switch (1 Megohm) | 1.00 |
| 10288 | C, C3, C4 | Two Gang Variable Condenser | 2.50 |
| 10560 | T5 | Output Transformer for Speaker | .75 |
| 10798 | | Line Cord and Plug | .50 |
| 128134BR | | Brown Bakelite Volume Knob | .10 |
| 128189BR | | Brown Bakelite Tuning Knob | .15 |
| 128173BR | | Brown Buttons for Tuner Levers | .10 |
| L49B | | Ballast Resistor (in Tube Shell with Base) | .75 |
| | | **PHONOGRAPH PARTS LIST** | |
| 104138 | T7 | Motor Complete with Turntable and Mounting Screws, Washers, etc. | 6.50 |
| 12221 | | Turntable Only Less Motor | |
| 107131 | | Phono Connector Cable | .50 |
| 107182 | | Motor Connector Cable | .10 |
| 115102 | | Needle Cup | .10 |
| 114120 | | Pick-Up Arm Complete | 4.95 |
| 12541C | S2 | Phono-Radio Switch | .75 |
| 112335 | | Indicator Plate for Phono-Radio Switch | .15 |
| 128109B | | Wood Knob for Phono-Radio Switch | .15 |

| Part No. | Circuit Diagram Reference | Description | List Price Each |
|---|---|---|---|
| | | **DIAL PARTS LIST** | |
| 10794 | P1 | 6-8 Volt Pilot Light Type T-44 | .10 |
| 10720 | | Socket and Bracket for Pilot Light | .10 |
| 115224 | | Support Bracket for Automatic Tuning Mechanism (Mounts to Variable Condenser) | .10 |
| 115176 | | End Support Bracket for Automatic Tuning Mechanism | .10 |
| 117398 | | Brass Pulley (String Drive for Pointer; Mounts on Cam Shaft at Variable Condenser End) | .15 |
| 117399 | | Brass Pulley (String Drive for Pointer; Mounts on Right End of Cam Shaft with Spring Take-Up | .15 |
| 120200 | | Take-Up Spring for Drive Spring Pulley | .03 |
| 117258 | | Tuner Cams (Five Used) | .05 |
| 131157 | | Keywashers (Used on Each Side of Tuner Cams) | .02 |
| 131157B | | Keywashers (Two Used; Have Holes to Attach Take-Up Spring) | .02 |
| 115174 | | Lever Complete with 117337 Roller | .15 |
| 117401 | | Lever Shaft | .15 |
| 117400 | | Locking Collar (for Right End of Cam Shaft) | .15 |
| 131141 | | Compression Spring Washer (for Locking Collar) | .02 |
| 117390 | | Locking Screw (Lock Tuner Cams; Inserted through Center of Tuning Knob) | .10 |
| 120181 | | Hairpin Springs (for Tuner Levers) | .03 |
| 117256 | | Brass Spacer (Three Used on Cam Shaft) | .05 |
| 117340 | | Brass Spacer (One Used on Cam Shaft) | .05 |
| 115249 | | Bracket for Dial Scale Complete with Two Small Brass Pulleys and Bushing for Pointer Shaft | .20 |
| 117403 | | Threaded Pulley and Stud for Pointer | .10 |
| 112499 | | Pointer | .25 |
| 112487 | | Dial Scale Calibrated | .35 |
| 112488 | | Crystal (Cover for Dial Scale) | .25 |
| 13143 | | Cinch Buttons (Fasten Dial Scale to Bracket) | .01 |
| 128173BR | | Brown Bakelite Buttons for Tuner Levers | .10 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

### PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected, (See "A" Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including five.

Numbers are placed on the cabinet above each of the automatic tuner levers. These numbers (1 to 5) are used to designate the stations instead of station call letter tabs.

Assign Stations for the levers numerically letting the numbers represent the stations you have chosen.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station you have assigned to this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station assigned to this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw ("B") in the center of the tuning knob, (See Fig. 1).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "B" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw "B" one or two turns; select the new station as explained. **Be sure to retighten the locking screw**, otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and your favorite station is selected.

### RADIO—PHONOGRAPH SWITCH:

The knob for the Radio—Phonograph Switch is located in the front left hand corner of the phonograph compartment. It is marked with a pin and under the knob an escutcheon plate is marked as follows: "Radio"—"Phono Off"—"Phono On"

Rotating the knob so that the pin marker on the knob is in line with the word "Radio" the switch is in radio playing position; when the pin is in line with the word "Phono Off" the switch disconnects the radio and connects the phonograph pick-up; when the pin is in line with the word "Phono-On" the switch connects the phonograph motor and is in phonograph playing position. **The motor must be started by hand.** Press down on the turntable with the fingers, spread and give the record and turntable a quick spin in a clockwise direction. The motor can be started rotating in either direction. For proper operation, however, it must rotate in a clockwise (to the right) direction.

To stop the phonograph motor turn the switch knob to "Phono-Off" position.

To disconnect phonograph entirely turn switch knob to extreme left to "Radio" position.

Volume control knob No. 1 on front of the radio controls the volume in either case; for radio, or for phonograph.

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Trimmers, Voltage
Above Serial 50672

# BELMONT RADIO CORP.

MODEL 677, Issue C
Schematic, Socket

## TUBE COMPLEMENT

The tube complement of this chassis consists of the following octal base glass and metal tubes which are interchangeable with metal tubes.

1—Type No. 6K7—Remote Cut-off Pentode as an R.F. Amplifier.
1—Type No. 6A8—Pentagrid Converter (composite first detector and oscillator).
1—Type No. 6K7—Remote Cut-off Pentode as an I.F. Amplifier.
1—Type No. 6Q7G—Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type No. 6V6—Beam—Power Amplifier.
1—Type No. OZ4—Rectifier.

The output of the receiver is 6 watts.

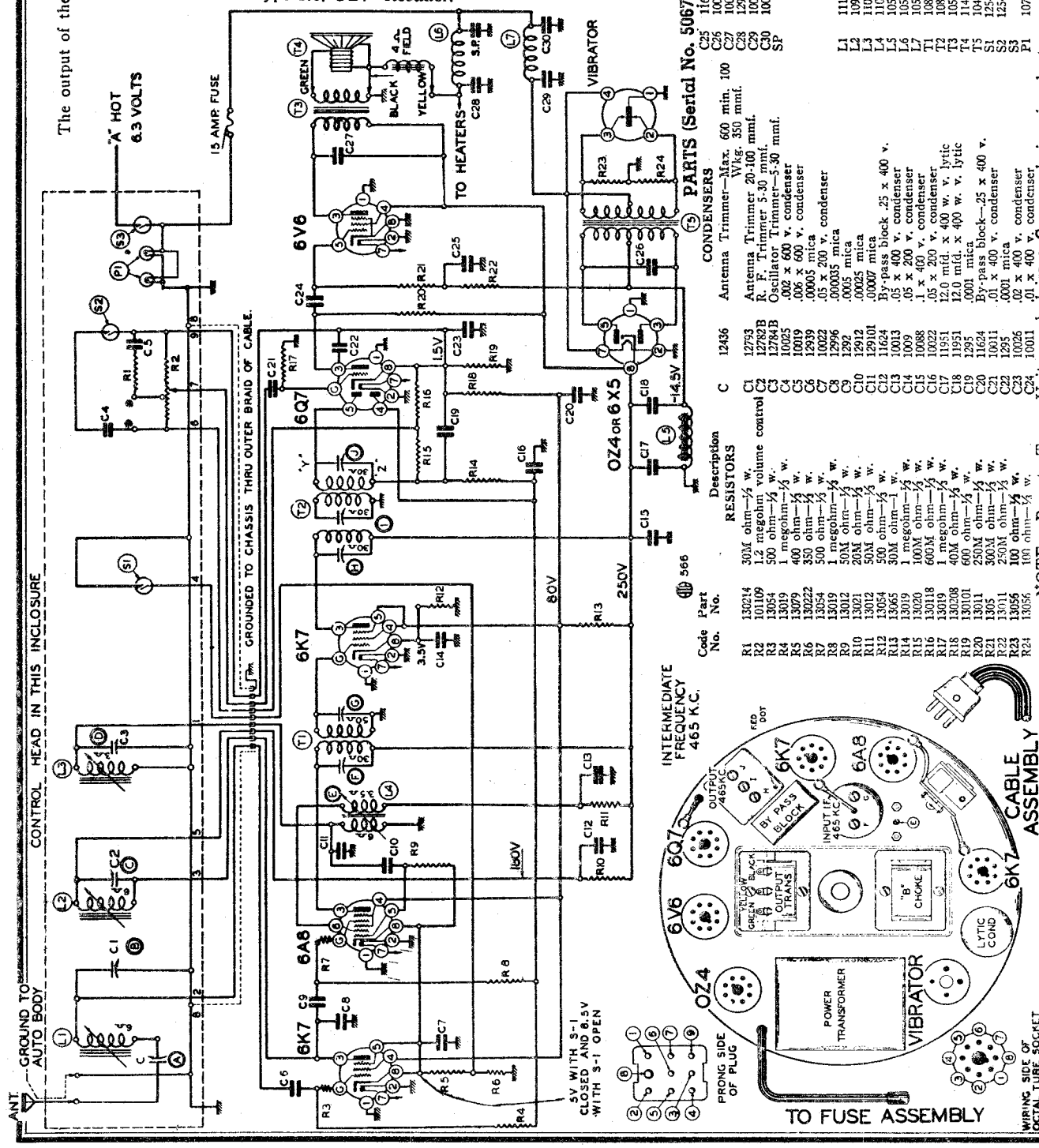


Fig. 3—Top View of Chassis

## PARTS (Serial No. 50672 and up).

| Code No. | Part No. | Description | C |
|---|---|---|---|
| | | **RESISTORS** | |
| R1 | 130214 | 30M ohm—½ w. | C1 |
| R2 | 101109 | 1.2 megohm volume control | C2 |
| R3 | 13054 | 500 ohm—½ w. | C3 |
| R4 | 13019 | 1 megohm—½ w. | C4 |
| R5 | 13079 | 400 ohm—½ w. | C5 |
| R6 | 130222 | 350 ohm—½ w. | C6 |
| R7 | 13054 | 500 ohm—½ w. | C7 |
| R8 | 13019 | 1 megohm—½ w. | C8 |
| R9 | 13012 | 50M ohm—½ w. | C9 |
| R10 | 13021 | 20M ohm—½ w. | C10 |
| R11 | 13012 | 50M ohm—½ w. | C11 |
| R12 | 13054 | 500 ohm—½ w. | C12 |
| R13 | 13065 | 30M ohm—1 w. | C13 |
| R14 | 13019 | 1 megohm—½ w. | C14 |
| R15 | 13020 | 100M ohm—½ w. | C15 |
| R16 | 130118 | 600M ohm—½ w. | C16 |
| R17 | 13019 | 1 megohm—½ w. | C17 |
| R18 | 130208 | 40M ohm—½ w. | C18 |
| R19 | 130101 | 600 ohm—½ w. | C19 |
| R20 | 13011 | 250M ohm—½ w. | C20 |
| R21 | 1305 | 300M ohm—½ w. | C21 |
| R22 | 13011 | 250M ohm—½ w. | C22 |
| R23 | 13056 | 100 ohm—½ w. | C23 |
| R24 | 13056 | 100 ohm—½ w. | C24 |

| | | | |
|---|---|---|---|
| | | **CONDENSERS** | |
| C | 12436 | Antenna Trimmer—Max. 600 min. 100 Wkg. 350 mmf. | C25 |
| C1 | 12793 | Antenna Trimmer 20-100 mmf. | C26 |
| C2 | 12782B | R. F. Trimmer 5-30 mmf. | C27 |
| C3 | 12784B | Oscillator Trimmer—5-30 mmf. | C28 |
| C4 | 10025 | .002 x 600 v. condenser | C29 |
| C5 | 10019 | .006 x 600 v. condenser | C30 |
| C6 | 12939 | .0005 mica | SP |
| C7 | 10022 | .05 x 200 v. condenser | |
| C8 | 12996 | .000035 mica | |
| C9 | 1292 | .0005 mica | |
| C10 | 12912 | .00025 mica | |
| C11 | 129101 | .00007 mica | |
| C12 | 11624 | By-pass block .25 x 400 v. | |
| C13 | 10013 | .05 x 400 v. condenser | |
| C14 | 1009 | .05 x 200 v. condenser | |
| C15 | 10088 | .1 x 400 v. condenser | |
| C16 | 10022 | .05 x 200 v. condenser | |
| C17 | 11951 | 12.0 mid. x 400 w. v. lytic | |
| C18 | 11951 | 12.0 mid. x 400 w. v. lytic | |
| C19 | 1295 | .0001 mica | |
| C20 | 11624 | By-pass block—.25 x 400 v. | |
| C21 | 10011 | .01 x 400 v. condenser | |
| C22 | 1295 | .0001 mica | |
| C23 | 10026 | .02 x 400 v. condenser | |
| C24 | 10011 | .01 x 400 v. condenser | |

| | | |
|---|---|---|
| | | **PARTS** |
| C25 | 11624 | By-pass block—.25 x 200 v. |
| C26 | 10036 | .01 x 1400 v. condenser |
| C27 | 10089 | .008 x 800 v. condenser |
| C28 | 1296 | .002 mica |
| C29 | 10031 | .5 x 120 v. condenser |
| C30 | 10031 | .5 x 120 v. condenser |
| SP | | Spark Plate |
| | | C12, C20, C25 in same unit |
| | | C17, C18 in same unit |

| | | |
|---|---|---|
| | | **PARTS** |
| L1 | 111101 | Antenna Permeability Coil Complete |
| L2 | 10940 | R. F. Permeability Coil Complete |
| L3 | 11084 | Oscillator Permeability Coil Complete |
| L4 | 11075 | Adjustable Shunt Oscillator Coil |
| L5 | 10562 | Filter Choke—250 ohms |
| L6 | 10566 | "A" Choke |
| L7 | 10565 | "A" Choke |
| T1 | 108120 | Input I. F. Coil Complete—465 kc. |
| T2 | 108115 | Output I. F. Coil Complete—465 kc. |
| T3 | 10561 | Output Transformer |
| T4 | 114113 | 8" Dynamic Speaker |
| T5 | 104132 | Power Transformer |
| S1 | 12547 | Sensitivity Switch |
| S2 | 12547 | Tone Control Switch |
| S3 | | Off-on switch on volume control |
| P1 | 10797 | 6-8 v. pilot light (2) |

NOTE: Remote Tuner Units marked issue C were designed only to operate with radio chassis units marked issue C.

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MODEL 677, Issue C
Alignment, Tuner Data
Notes

# BELMONT RADIO CORP.

## SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently and insulating sleeve has been properly placed over fuse, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

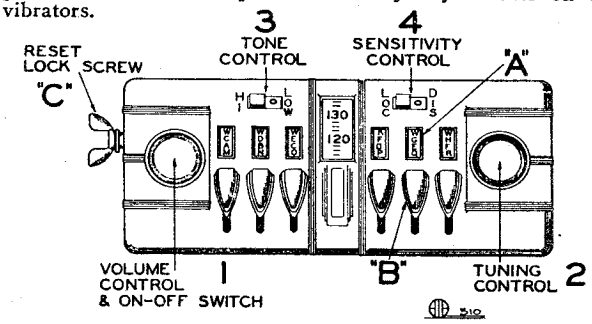


Fig. 2—Front View of Remote Tuner Unit

## ALIGNING INSTRUCTIONS

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a test oscillator, as well as an output meter, must be used.

## DUMMY ANTENNAS

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .5 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 125 mmfd. condenser connected in series with the output lead of the test oscillator.

## RESONANCE INDICATOR

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 6V6 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

## I.F. ALIGNMENT: (465 K.C.)

IMPORTANT:

To align the output I.F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the tertiary coil of this unit.

Connect the resistor as indicated by points "Y" and "Z" on the circuit diagram as follows:

Locate the wires coming from the bottom of the output I.F. coil assembly on the underside of the radio chassis.

The white lead with green tracer which is connected to diode plate terminal No. 5 on the 6Q7 tube socket is one point and the white lead with brown tracer which is connected to the end terminal of the terminal strip is the other point. Proceed as follows:

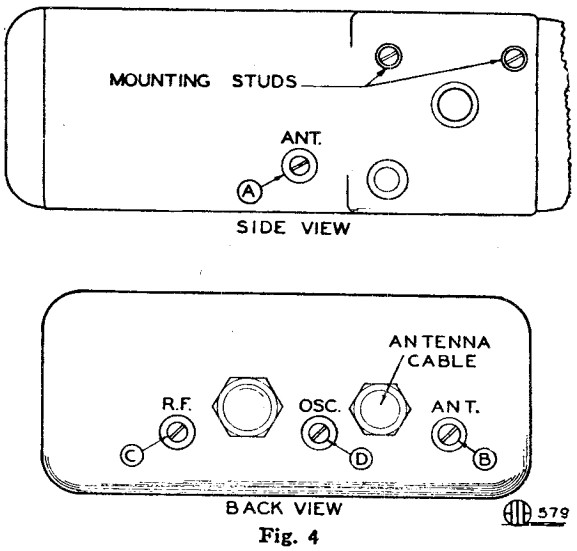


Fig. 4

1. With the dial of the Remote Tuner Unit set at 1400 K.C. and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy to grid of 6K7 I.F. tube.
2. Adjust trimmers "H" and "I" of output I.F. transformer for maximum gain, (See Fig. 3, top view).
3. Disconnect the 10M ohm resistor which has been shunted across the tertiary winding and adjust trimmer "J" for maximum gain.
   (a) This transformer is now correctly tuned. Under no circumstances re-adjust trimmers "H" and "I" after the 10M ohm resistor has been removed.
   (b) For alignment of the output I.F. transformer using a cathode ray oscillograph the 10M ohm resistor is not used and the procedure is similar to the alignment of any two circuit I.F. transformer; merely tune for a symmetrical curve of maximum amplitude.
   (c) Output connections for the cathode ray oscillograph should be made to pin No. 8 on 6Q7 tube socket and to the end terminal on the terminal strip; at this point the diode load resistors terminate.
4. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers "F" and "G" of input I.F. transformer for maximum gain.

NOTE: A red dot on top of output I.F. can designates location of trimmer "H"

## BROADCAST ALIGNMENT:

1. With the dial on the Remote Tuner Unit set at 1560 K. C., connect test oscillator set at 1560 K. C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjuts oscillator trimmer (adjustment "D", on back of Remote Tuner Unit) to resonance. (See Fig. 4, back view).
3. Re-set test oscillator to 1400 K. C. and pick up signal by rotating dial on Remote Tuner Unit. Adjust R. F. Trimmer (adjustment "C", on back of Remote Tuner Unit), to resonance. (See Fig. 4, back view).
   CAUTION: In order to realize maximum gain out of the antenna adjustments, back out antenna shunt trimmer (adjustment "B") on back of remote tuner unit all the way out and then adjust antenna series trimmer (adjustment "A") on side of remote tuner unit to resonance.
4. Re-set test oscillator to 600 K.C. and rotate Remote Tuner Unit dial to 600 K. C.
   Adjust shunt oscillator adjustment "E", rotating dial to and fro at the same time adjusting shunt oscillator for maximum gain. This adjustment is accessible from the top of the radio chassis, (See Fig. 3, top view).
5. Go back and check 1400 K. C. If adjustment is made here, check 600 K. C. again.

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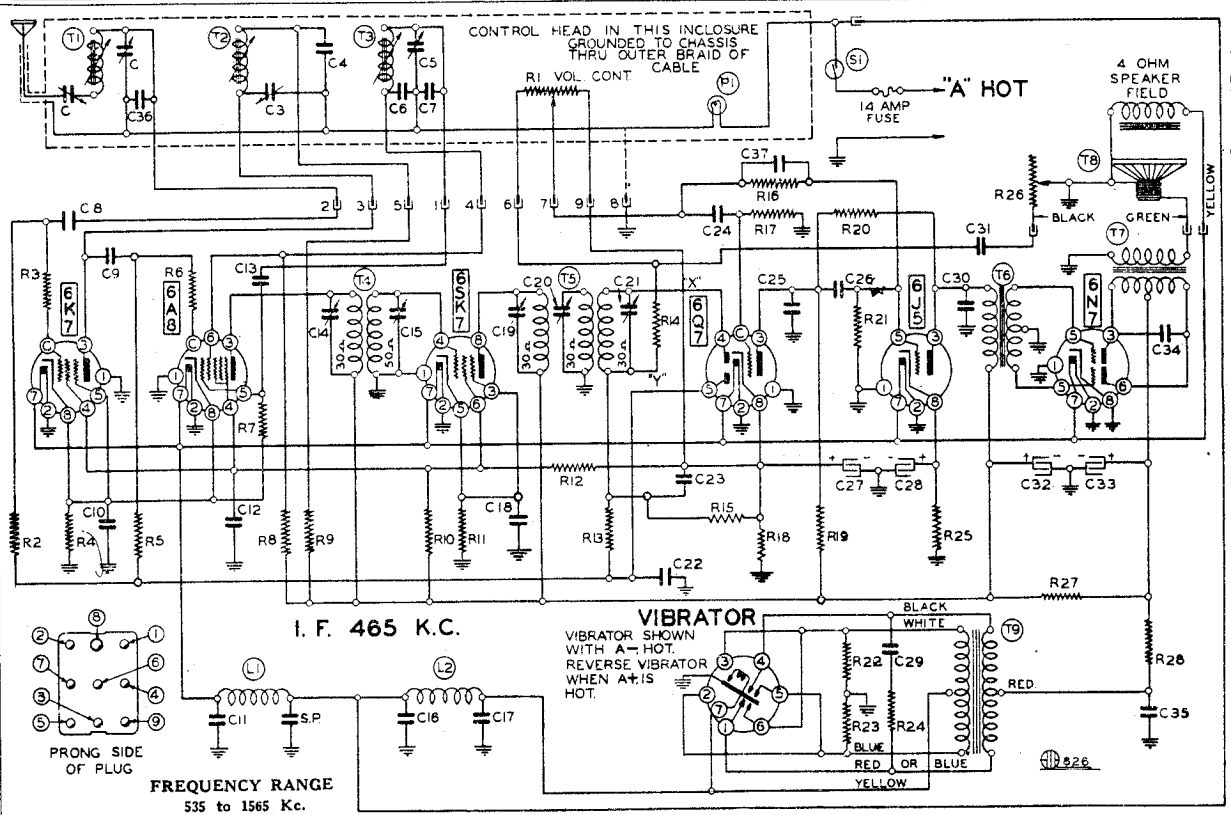
# BELMONT RADIO CORP.

MODEL 678, Issue A
Schematic, Voltage
Socket, Trimmers

Power Output.....7 Watts Undistorted, 9 Watts Maximum
Power Consumption.....77 Amperes at 6.3 Volts


CONTROL HEAD IN THIS INCLOSURE GROUNDED TO CHASSIS THRU OUTER BRAID OF CABLE
R1 VOL CONT
"A" HOT
14 AMP FUSE
4 OHM SPEAKER FIELD
I. F. 465 K.C.
VIBRATOR
VIBRATOR SHOWN WITH A— HOT. REVERSE VIBRATOR WHEN A+ IS HOT.
PRONG SIDE OF PLUG
FREQUENCY RANGE
535 to 1565 Kc.

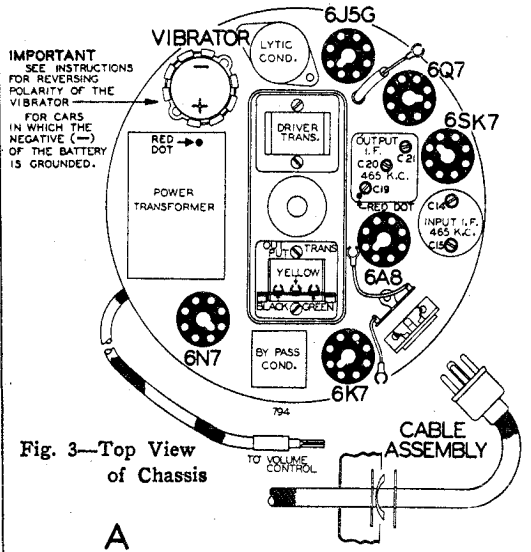
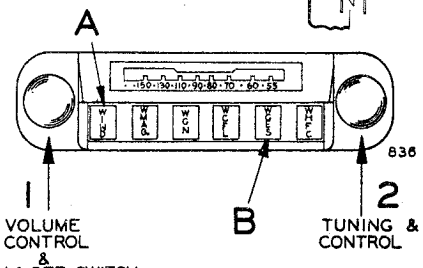



Fig. 3—Top View of Chassis




## MODEL 678, Issue A MARCH 1939 Serial No. 50,001 UP

Fig. 2—Front View of Remote Tuner Unit

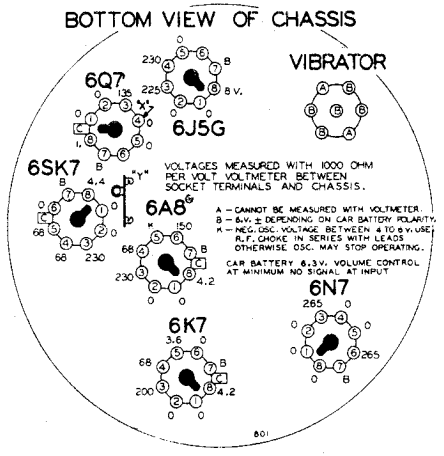

BOTTOM VIEW OF CHASSIS
6Q7
6J5G
VIBRATOR
6SK7
6A8
6N7
6K7
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
A — CANNOT BE MEASURED WITH VOLTMETER.
B — 6 V. ± DEPENDING ON CAR BATTERY POLARITY.
K — NEG. OSC. VOLTAGE BETWEEN 4 TO 6 V. USE R.F. CHOKE IN SERIES WITH LEADS OTHERWISE OSC. MAY STOP OPERATING.
CAR BATTERY 6.3 V. VOLUME CONTROL AT MINIMUM NO SIGNAL AT INPUT

FIG. 5

| Circuit Diagram Ref. No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 101161 | 1.2 megohm volume control |
| R2 | 13019 | 1 megohm—½ w. |
| R3 | 130275 | 500 ohm—½ w. |
| R4 | 13079 | 400 ohm—½ w. |
| R5 | 13019 | 1 megohm—½ w. |
| R6 | 130275 | 500 ohm—½ w. |
| R7 | 13012 | 50M ohm—½ w. |
| R8 | 13012 | 50M ohm—½ w. |
| R9 | 13021 | 20M ohm—½ w. |
| R10 | 130196 | 30M ohm—1 watt |
| R11 | 130235 | 1500 ohm—½ w. |
| R12 | 1307 | 40M ohm—½ w. |
| R13 | 13019 | 1 megohm—½ w. |
| R14 | 13020 | 100M ohm—½ w. |
| R15 | 130118 | 600M ohm—½ w. |
| R16 | 130257 | 5 megohm—½ w. |
| R17 | 13019 | 1 megohm—½ w. |
| R18 | 130101 | 600 ohm—½ w. |
| R19 | 13011 | 250M ohm—½ w. |
| R20 | 13038 | 2 megohm—½ w. |
| R21 | 1303 | 500M ohm—½ w. |
| R22 | 130269 | 100 ohm—½ w. |
| R23 | 130269 | 100 ohm—½ w. |
| R24 | 13071 | 4M ohm—½ w. |
| R25 | 13092 | 1M ohm—½ w. |
| R26 | 101162 | 1 megohm tone control |
| R27 | 130199 | 1500 ohm Resistor—1 watt |
| R28 | 130231 | 75 ohm—½ w. |
| | | **CONDENSERS** |
| C1 | 12480 | Antenna Shunt Trimmer |
| C2 | 12481 | Antenna Series Trimmer |
| C3 | 12480 | R. F. Shunt Trimmer |
| C4 | 100102 | .15 x 400 v. |
| C5 | 12480 | Oscillator Shunt Trimmer |
| C6 | 129137 | .0005 Mica |
| C7 | 129136 | .00017 Mica |
| C8 | 12997 | .00005 Mica—5% |
| C9 | 1292 | .0005 Mica |
| C10 | 11625 | .05 x 200 v. |
| C11 | 1296 | .002 Mica |
| C12 | 11625 | .25 x 400 v. |
| C13 | 12912 | .00025 Mica |
| C14 | | Plate Trimmer on Input I.F. Trans. |
| C15 | | Grid Trimmer on Input I.F. Trans. |
| C16 | 10031 | .5 x 120 v. |
| C17 | 10031 | .5 x 120 v. |
| C18 | 1009 | .05 x 200 v. |
| C19 | | Plate Trimmer on Output I.F. Trans. |
| C20 | | Tertiary Trimmer on Output I.F. Trans. |
| C21 | | Grid Trimmer on Output I.F. Trans. |
| C22 | 11625 | .05 x 200 v. |
| C23 | 1295 | .0001 Mica |
| C24 | 10011 | .01 x 400 v. |
| C25 | 1295 | .0001 Mica |
| C26 | 10011 | .01 x 400 v. |
| C27 | 11978 | 20 mfd.—25 w. v. lytic |
| C28 | 11978 | 20 mfd.—25 w. v. lytic |
| C29 | 100101 | .0055 x 1600 |
| C30 | 129114 | .0003 Mica |
| C31 | 10047 | .002 x 600 v. |
| C32 | 11978 | 15 mfd.—450 w. v. lytic |
| C33 | 11978 | 15 mfd.—450 w. v. lytic |
| C34 | 100103 | .004 x 800 v. |
| C35 | 1001 | .1 x 400 volt |
| C36 | 12997 | .00005 Mica—5% |
| C37 | 12967 | .00004 Mica |
| | | **PARTS** |
| T1 | 111118 | P. B. Antenna Coil Assembly Complete |
| T2 | 10949 | P. B. R. F. Coil Assembly Complete |
| T3 | 110109 | P.B. Oscillator Coil |
| T4 | 108120B | Input I.F. Coil—465 kc. |
| T5 | 108115B | Output I.F. Coil—465 kc. |
| T6 | 10584 | Audio Driver Transformer |
| T7 | 10583 | Output Transformer |
| T8 | 114155 | 8" Dynamic Speaker |
| T9 | 104158 | Power Transformer |
| L1 | 10566 | "A" Choke |
| L2 | 10519 | "A' Choke |
| P1 | 10794 | 6-8 v. Pilot Light |
| S1 | | Off-on Switch on volume control |
| | 1269 | Vibrator (130 cycle synchronous) |

MODEL 678, Issue A
Alignment, Notes

# BELMONT RADIO CORP.

Tuner Trimmers

## ALIGNMENT PROCEDURE

### DESCRIPTION:

**Model 678 is a six tube superheterodyne receiver having a** tuning range of 535 K. C. to 1565 K. C.; operates from a six volt storage battery and uses the automotive type 6.3 volt meter having a resistance of 1000 ohms per volt. tubes. The "B" supply is obtained from a synchronous type vibrator. These voltages are clearly indicated on the voltage chart.

The I. F. frequency used is 465 K. C. The output I. F. coil has three tuned circuits giving superior band pass qualities and selectivity as compared to the conventional two tuned circuit coils. Antenna, R. F. and oscillator circuits are permeability tuned, offering automatic tuning applications that are both accurate and stable. The entire coil assembly is mounted in the Remote Tuner control head being connected to the oscillator and R. F. circuits by an R. F. transmission cable.

The R. F. oscillator, I. F. and audio amplifier including the power supply is contained in the speaker case.

### SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a

In order to prevent signal from acting upon A.V.C. and affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating which is known to be good, until the defective unit is located.

Failure to operate, noisy or weak reception is usually due to defective tubes, the tubes making poor contact with sockets or grid clips making poor contact with the caps of the tubes. Tubes may be checked very easily by replacing with other tubes which are known to be good. If fuse blows out frequently, the trouble is probably in the vibrator, it should be replaced. Do not attempt to make any adjustments on the vibrators.

### ALIGNING INSTRUCTIONS:

All of the adjustments have been very carefully set with signal generators at the factory and require no further adjustment, unless it becomes necessary to replace a coil or transformer, or if the adjustments have been tampered with in the field. Under no circumstances attempt any adjustments without first making certain that adjustment is necessary and only after voltages, tubes and condensers have been checked and found to be normal. To properly re-align this receiver, a test oscillator, as well as an output meter, must be used.

The following equipment is required for aligning:

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Connect dummy antenna value in series with generator output lead.
- Output indicating meter.
- Connect output meter across primary of output transformer.
- Non-metallic screwdriver.
- Allow chassis and signal generator to "heat up" for several minutes.
- Dummy antennas—.1 mf., 125 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Remote Tuner Dial Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6SK7 I. F. Tube | Set dial at 1400 Kc. | Trimmers C19, C20 (See Fig. 3) | Output I. F. | See note "A" Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6SK7 | Set dial at 1400 Kc. | Trimmer C21 (See Fig. 3) | Output, I. F. | See note "B" Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6A8 | Set dial at 1400 Kc. | Trimmers C14, C15 (See Fig. 2) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1565 Kc. | 125 mmf. | Antenna lead | Set dial at 1565 Kc. | Trimmer C5 (See Fig. 4) | Oscillator | Adjust to maximum output |
| | 1400 Kc. | 125 mmf. | Antenna lead | Set dial at 1400 Kc. | Trimmers C1, C3 (See Fig. 4) | Antenna and R. F. | Adjust to maximum output |
| | 600 Kc. | 125 mmf. | Antenna lead | Set dial at 600 Kc. | Trimmer C2 (See Fig. 4) | Antenna series adj. | See note "C" |

NOTE "A" IMPORTANT: To align the output I. F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the diode tuned circuit. Connect the resistor as indicated by points "X" and "Y" on the circuit diagram and the bottom view of the radio chassis Fig. 5. A red dot on top of output I. F. can designates location of trimmer "C19."

NOTE "B" Before adjusting trimmer C21 disconnect the 10M ohm resistor. Under no circumstances re-adjust trimmers C19 or C20 after the 10M ohm resistor has been removed.

For alignment of the output I. F. transformer using a cathode ray oscillograph the 10M ohm resistor is not used.

NOTE "C" Maximum gain for this adjustment depends on the capacity of the antenna system of the car in which the radio is installed. For the proper alignment of this adjustment see "Adjusting Antenna Trimmer."

### ALIGNMENT OF THE IRON CORES

The iron cores for the antenna, R. F. and oscillator permeability coils have been very carefully adjusted at the factory and require no further adjustment, unless it becomes necessary to replace a coil, or if the adjustments have been tampered with.

The procedure for aligning the iron cores will be supplied with replacement coils when ordered.

### IMPORTANT—ADJUSTING ANTENNA TRIMMER:

Tune in any weak station between 600 and 800 kc.

Make sure that the antenna shunt trimmer on the **Bottom of the Remote Tuner** is turned all the way out (counter clockwise), (see adjustment "C1," Fig. 4,).

Adjust antenna series trimmer **on the side of the remote Tuner Unit.** For maximum output. (See adjustment "C2," Fig. 4,).

NOTE: If resonance (maximum output) cannot be obtained within the range of the antenna series trimmer "C2," turn the adjustment screw all the way out (counter clockwise) and then adjust the antenna shunt trimmer "C1" on the **bottom of the remote tuner unit** for a peak of maximum output.

The above arrangement will cover any antenna capacity that is now in use.




Fig. 4.—Bottom View of Remote Tuner

### TUBE COMPLEMENT:

The tube complement of this chassis consists of the following metal and octal base glass tubes which are interchangeable with metal tubes.

1—Type No. 6K7 R. F. Amplifier.
1—Type No. 6A8—Pentagrid Converter (composite first detector and oscillator).
1—Type No. 6SK7—Remote Cut-off Pentode as an I. F. Amplifier.
1—Type No. 6Q7—Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type No. 6J5G—Driver Amplifier.
1—Type No. 6N7—Push-Pull Output Amplifier.

MODEL 678, Issue A

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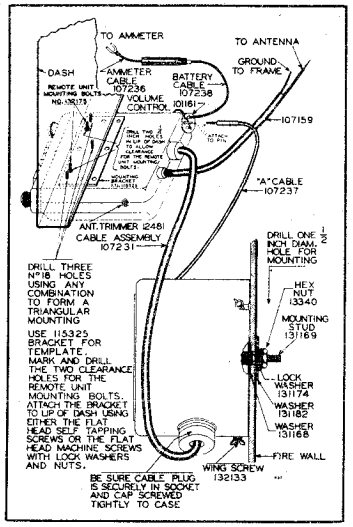
TO AMMETER
TO ANTENNA
GROUND TO FRAME
DASH
AMMETER CABLE 107236
BATTERY CABLE 107238
VOLUME CONTROL 10116
107159
"A" CABLE 107237
ANT-TRIMMER 1248 CABLE ASSEMBLY 107231
DRILL ONE 1/2 INCH DIAM. HOLE FOR MOUNTING
DRILL THREE No 18 HOLES USING ANY COMBINATION TO FORM A TRIANGULAR MOUNTING
USE 115325 BRACKET FOR TEMPLATE. MARK AND DRILL THE TWO CLEARANCE HOLES FOR THE REMOTE UNIT MOUNTING BOLTS. ATTACH THE BRACKET TO LIP OF DASH USING EITHER THE FLAT HEAD SELF TAPPING SCREWS OR THE FLAT HEAD MACHINE SCREWS WITH LOCK WASHERS AND NUTS.
HEX NUT 13340
MOUNTING STUD 131169
LOCK WASHER 131174
WASHER 131182
WASHER 131168
FIRE WALL
WING SCREW 132133
BE SURE CABLE PLUG IS SECURELY IN SOCKET AND CAP SCREWED TIGHTLY TO CASE

Fig. 1A—General Installation View

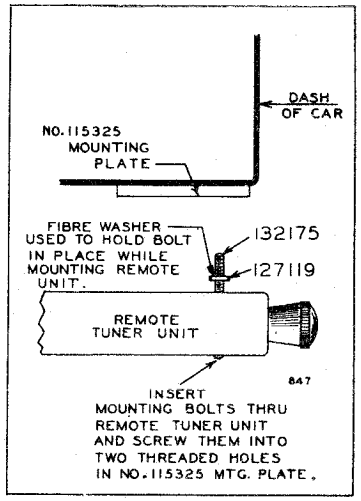
DASH OF CAR
NO. 115325 MOUNTING PLATE
FIBRE WASHER USED TO HOLD BOLT IN PLACE WHILE MOUNTING REMOTE UNIT.
132175
127119
REMOTE TUNER UNIT
847
INSERT MOUNTING BOLTS THRU REMOTE TUNER UNIT AND SCREW THEM INTO TWO THREADED HOLES IN NO. 115325 MTG. PLATE.

Fig. 1B—Remote Mounting

## CONNECTIONS TO BATTERY:

**CAUTION: Before making any battery connections,** check **the polarity** of the **vibrator unit** (contained in radio unit) to **determine** whether it corresponds with the **polarity** of the **storage battery** in **the car.**

The radio is shipped from the factory with the vibrator **inserted** in its socket so that it will operate in **cars in which the positive** (+) post of the **storage battery** is **grounded** to **the frame** of the car.

In cars in which the **negative** (—) post of the **storage battery** is **grounded** to the frame of the car, the vibrator **must be pulled** out of its socket and **rotated** and **reinserted** into its **socket** so that the (—) sign on the top of the vibrator is **opposite** the **red dot** on the top of the **transformer cover;** (see Fig. 3, top view of radio chassis).

Check the polarity of the storage battery in car either by checking the actual wire connections on the battery or by using a voltmeter.

The ammeter cable, number 107236 (red wire with fuse receptacle at one end and terminal lug at other end), must be connected to battery terminal of ammeter. At the same time connect ammeter capacitor, number 10082 to battery terminal of ammeter, other end of capacitor to any convenient grounded screw on back of instrument dash panel.

Make certain the fuse is in the receptacle and the ammeter cable is properly connected to the short cable (number 107238), coming from the Remote Tuner Unit. (See Fig. 1A.)

In some installations it is advisable to connect the ammeter cable to the terminal on the ammeter which will not allow the current drawn by the radio to indicate on the ammeter, as additional motor interference may be encountered.

## GENERATOR INTERFERENCE:

Remove the generator cutout mounting screw and fasten the condenser (10081) bracket on the generator cutout mounting lug. Replace the cutout mounting screw and tighten down securely.

Connect the condenser lead to the battery terminal of the cutout. The generator condenser is absolutely necessary as it used to eliminate a high pitched whining noise which would erwise be heard as the motor is accelerated.

## ANTENNA CONNECTION:

Insert the antenna plug in cable into the back of the remote tuner unit (see Fig. 1A). The wire at the other end of the antenna cable is connected to the lead-in wire from the antenna. Keep the antenna cable as far away from car wiring as possible and ground the pigtail of the antenna cable shield at the antenna end.

A 36 inch shielded antenna cable is regularly supplied. If a roof or door hinge type antenna is used, this cable will be long enough in practically all cases to reach the corner post or column at which the antenna lead comes down. The shielded cable should be pushed up into the column as far as possible. The reason for this is that ignition interference may be picked up by any unshielded portion of the antenna cable.

If an under car or running board antenna is used, the shielding must be extended to the antenna in all cases. The pigtail on the end of the antenna cable shield must be well grounded at the extreme antenna end. If it is necessary to extend the antenna cable, be sure that a pigtail is put on the end of the shielded extension and that it is well grounded at the extreme antenna end.

To extend the antenna cable shielding, the antenna lead wire should be covered with heavy insulation, such as loom, to properly separate the shielding from the wire. Then connect the two wires together and connect the two shields together, care being taken that no strand of the shield touches the antenna wire.

Aerials suitable for steel roof and convertible cars can be purchased from your dealer.

The majority of 1937, 1938 and 1939 cars have steel roofs, and a running board or other car antenna such as the fish pole, door hinge or over the top types must be used. The 1936 Chrysler Motors cars (except Plymouth—but including Chrysler, Dodge and De-Soto) have a steel roof, separated from the body proper, which is used as an antenna.

## PROCEDURE FOR SETTING THE AUTOMATIC PUSHBUTTONS:

There are six pushbuttons on the Remote Tuner Unit by means of which six stations may be set up for automatic tuning (see B, Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the top of each **pushbutton** a slot is provided for inserting the call letter tabs, (see A, Fig. 2).

Insert the call letter tabs.

## NOW, PROCEED AS FOLLOWS:—

1. Push the dial tuning knob in hard enough to make it **latch in.**
2. Rotate the dial tuning knob to the **left** (counter-clockwise), until the knob can not be turned any further **without forcing.**

   You will note that as the knob is rotated it will turn easily until the pointer reaches the end of the dial scale and then a slight amount of force will be required to actually **start unlocking** the tuner mechanism. Beyond this point the knob will turn quite easily again until the tuner mechanism is **completely unlocked.** At this point do not force the knob any further. The tuner mechanism is now **unlocked.**

   (NOTE:—Automatic tuner mechanism is locked tight when radio is shipped from the factory.)
3. Push in **all the way** any one of the pushbuttons and at the same time hold in **firmly** the dial tuning knob. **Both** the dial **tuning knob** and the **pushbutton** should be pushed hard enough to make them **stay latched in.** The reason for holding the dial tuning knob **in firmly** when the **pushbutton** is **pressed** in is due to the latching mechanism in the Remote Tuner unit which is so constructed to release the dial tuning knob entirely when a pushbutton is pressed in. When setting up stations for automatic tuning, however, it is necessary that both **the dial tuning knob** and the **pushbutton** be **latched in together.**
4. Press in on the **pushbutton which is latched in.** Holding it in firmly, tune in by means of the dial tuning knob the station indicated on the station call letter tab on this pushbutton. Turn the dial tuning knob very slowly back and forth (while still pressing in firmly on the pushbutton), until the station is clearest. The station will then be accurately tuned in.
5. Push in **all the way** another pushbutton, at the same time holding **the dial tuning knob** in so that **both the pushbutton** and the **dial tuning knob are latched in together.** Holding the pushbutton in **firmly,** tune in the station indicated on the call letter tab on this pushbutton.
6. Follow this procedure until you have tuned in all of your favorite stations.
7. When the last pushbutton has been properly set up it is necessary to **release** it from the latched-in position before the tuner mechanism can be locked. To **release** this pushbutton, press in very slightly any one of the other pushbuttons. This will trip the latching **mechanism and all** the **pushbuttons** will be **released to out position.**
8. Now, Press on the **dial tuning knob hard enough** to make it latch in. Rotate the dial tuning knob to the right (clockwise) until the knob can not be turned any further without forcing it
   This will **lock the tuner mechanism** and all the stations that have been set up on the pushbuttons will be **locked** in place for automatic tuning.
9. Press in any one of the pushbuttons and—YOUR FAVORITE STATION IS SELECTED.

The **important** steps to remember when setting up stations on the pushbuttons for automatic tuning are:

1. **To unlock** the tuner mechanism press on the dial tuning knob hard enough to make it stay **latched in.** Rotate the dial tuning knob to the left (counterclockwise) until the knob cannot be turned any further without forcing it.
2. **To set a pushbutton,** Push in **all the way** and hold in **firmly both** the **pushbutton** and the **dial tuning knob** so that **both latch in.** Hold in **firmly** the **pushbutton and** tune in the station by means of the dial **tuning knob.** Set all the pushbuttons in the same manner.
3. **To release the last pushbutton** push in very slightly any one of the other pushbuttons. This will trip the latching mechanism.
4. **To lock the tuner mechanism** push on the dial tuning knob hard enough to make it stay latched in. Rotate the dial tuning knob to the right (clockwise) until the knob can not be turned any further without forcing it. (NOTE: All the **pushbuttons must be in out position** when locking the tuner mechanism.)

## RADIO LOCATION AND MOUNTING:

**Determine the most satisfactory mounting position.**

Lift the radio case up and temporarily hold it in the proposed position. The case should be mounted high enough to avoid interference with car controls and the location of the Remote Tuner unit in respect to the radio case should be considered. The limiting factor being the length of special connector cable which connects the Remote Tuner unit to the radio case. **(This cable should not be altered in any manner).**

Mark **location** for the mounting bolt, drill one one-half inch (**½"**) **hole,** making certain that the paint around the hole on the engine side of the fire wall is scraped clean to insure a good ground connection between receiver and the frame of the car.

**CAUTION:** Before fastening the radio unit read **very carefully** the paragraph on "CONNECTIONS TO BATTERY." This concerns the **polarity** of the vibrator **unit** and must be thoroughly understood as the radio **will not** operate unless the **polarity** of the **vibrator unit** corresponds with the **polarity** of the **storage battery** in the car.

**TUNER UNIT MOUNTING:** It may be necessary in some instances to move dash panel light switches or car heater control switches, however, in the majority of cases the Remote Tuner Unit will mount very satisfactorily under the dash panel to the left of the steering column. Mount the unit as close to the steering column as possible to allow clearance for the emergency brake which is mounted on the extreme left hand side of some makes of cars.

Details for mounting are shown in Fig. 1A and Fig. 1B, General Installation view.

The bracket No. 115325 for mounting the Remote Tuner Unit has three rows of **holes** to facilitate the best mounting in all makes of cars.

Use the bracket as a template, marking the lip of the dash for three mounting holes for the bracket and two clearance holes for the Remote Tuner unit mounting bolts. (See Fig. 1A.)

Mount the bracket using either the flat head self-tapping screws or the flat head machine screws, lockwashers and nuts supplied.

Insert the two Remote Tuner Unit mounting bolts through the holes in the unit using the two fibre washers to hold the bolts in place while mounting the unit to the bracket (see Fig. 1B). Screw the mounting bolts into the threaded holes in the mounting bracket (eight threaded holes are provided so that the remote unit can be mounted forward or further back as desired). Fasten the unit securely.

Connect the battery cable, number 107237 coming from the radio case to the pin on the volume control assembly on the rear of the Remote Tuner Unit.

Connect the R. F. cable assembly (cable number 107231) by inserting the plug of the cable into the receptacle socket on the side of the radio unit case. Screw the threaded cap of the cable assembly to the threaded fitting on the radio case **securely.** (See Fig. 1A.)

**Important: This cable should not be altered in any manner.**

**This unit has been carefully designed** to facilitate servicing; the entire case can be removed by loosening three wing head screws, exposing all tubes, vibrator and receiver circuits.

All adjustments are accessible being located on the side and bottom of the Remote Tuner unit (See Fig. 4), a full eight inch electro dynamic speaker is used.

The output of the receiver is 9 watts.

MODEL 751, Series A
MODEL 867, Series A
Tuner Data

BELMONT RADIO CORP.

MODEL 767 Series A
Tuner Data

## Model 751 Series A

**SERVICE NOTES:**

Voltage taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts A.C. line or a fully charged 6 volt storage battery.

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

## SETTING THE AUTOMATIC TUNER LEVERS:

**IMPORTANT**—Read carefully before setting the automatic levers.

There are six levers by means of which six stations may be selected. Make a list of local stations or stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner lever button an opening is provided for inserting the call letter tabs.

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the small celluloid tabs supplied should be inserted into place over each of the station call letter tabs.

**NOW. PROCEED AS FOLLOWS:—**

1. Pull the dial tuning knob **all the way out** (See Illus. "B," Fig 3), and rotate the tuning knob to the **left** (counterclockwise) until it cannot be turned any further (See Illus. "D," Fig. 3). This will unlock the automatic tuner mechanism. (NOTE:—Automatic tuner mechanism is locked tight when radio is shipped from the factory.)

2. Press **down all the way** any one of the automatic tuner levers. Holding it down **firmly,** press in on the dial tuning knob No. 3 and tune in the station indicated on the station call letter tab on this lever. You will note that in order to tune the station, the dial tuning knob will have to be **pressed in** (See Illus. "E," Fig. 3). Turn the dial tuning knob very slowly back and forth **(while still holding the automatic tuner lever in downward position),** noting the width of the shadow on the screen of the cathode-ray tuning indicator. **Minimum** width on the tuning indicator indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in.

3. Press down another automatic tuner lever. Holding it down **firmly, press in** on the dial tuning knob and carefully tune in the station indicated on the call letter tab on this lever.

4. Follow this procedure until you have selected all of your favorite stations.

5. Pull the dial tuning knob **all the way out** (See Illus. "B," Fig. 3) and rotate the tuning knob to the **right** (clockwise) until it cannot be turned any further (See Illus. "C," Fig. 3). This will lock the automatic tuner mechanism and the stations you have set up for automatic tuning will be locked in place. After you have locked the tuner mechanism, push the dial tuning knob **in.**

6. If you should desire to change any station you selected to another, pull the dial tuning knob all the way **out** and rotate the knob to the left (counterclockwise) and unlock the tuner mechanism. Select the new station as explained.

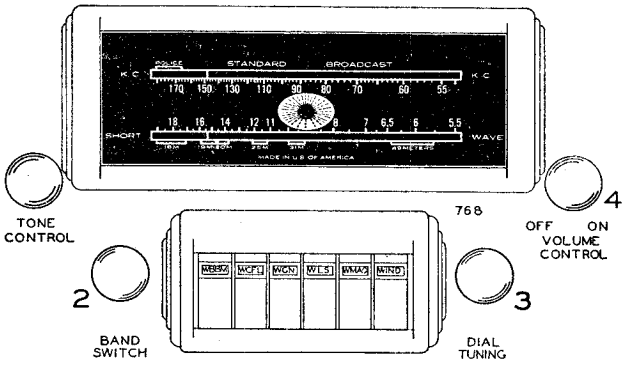


FIG. 2—FRONT VIEW

(NOTE:—If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the tuner mechanism not being unlocked all the way. Pull the dial tuning knob out all the way and rotate the knob to the left (counterclockwise) until it will turn no further. The dial mechanism should work freely with the tuner lever pressed down).

7. After you have selected the new station, pull the dial tuning knob all the way **out** and rotate the knob to the **right** (clockwise) to lock the tuner mechanism. Be sure the knob is turned until it will turn no further, then **press** the dial tuning knob **in.**

8. The automatic tuner levers are now set up for quick tuning. Press down the lever key and—YOUR FAVORITE STATION IS SELECTED!

The **important** steps to remember when setting up stations on the tuner levers for automatic tuning are:

1. **To unlock** the tuner mechanism **pull the dial tuning knob all the way out.** You may find it necessary to rotate the knob slightly when pulling it out to make certain that the gears mesh properly. Rotate the dial tuning knob to the left (counterclockwise) as far as it will turn without forcing.

2. **To set a lever,** press down **all the way** and **hold in this** position while tuning in by means of the dial tuning knob the station you want this lever to be tuned to. (NOTE:—you will notice that it will be necessary to keep pressing in on the dial tuning knob while tuning in the station as a spring tends to push the knob out.) Set all the levers in the same manner before locking the mechanism.

3. **To lock** the tuner mechanism pull the dial tuning knob **all the way out.** Rotate the dial tuning knob to the right as far as it will turn making certain that it is tight, but it is not necessary to use force.

4. After locking or unlocking the tuner mechanism always return the dial tuning knob to its normal position **(pushed in).**

KNOB NO.3 (DIAL TUNING)

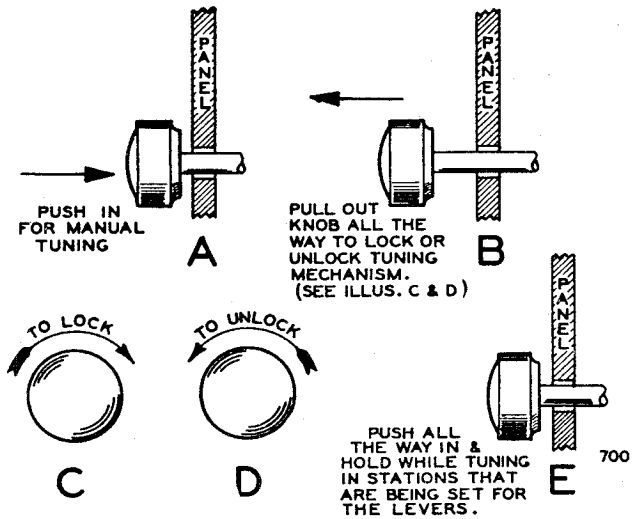
PANEL
PUSH IN FOR MANUAL TUNING
A
PULL OUT KNOB ALL THE WAY TO LOCK OR UNLOCK TUNING MECHANISM. (SEE ILLUS. C & D)
B
TO LOCK
TO UNLOCK
C
D
PUSH ALL THE WAY IN & HOLD WHILE TUNING IN STATIONS THAT ARE BEING SET FOR THE LEVERS.
E
700

FIG. 3

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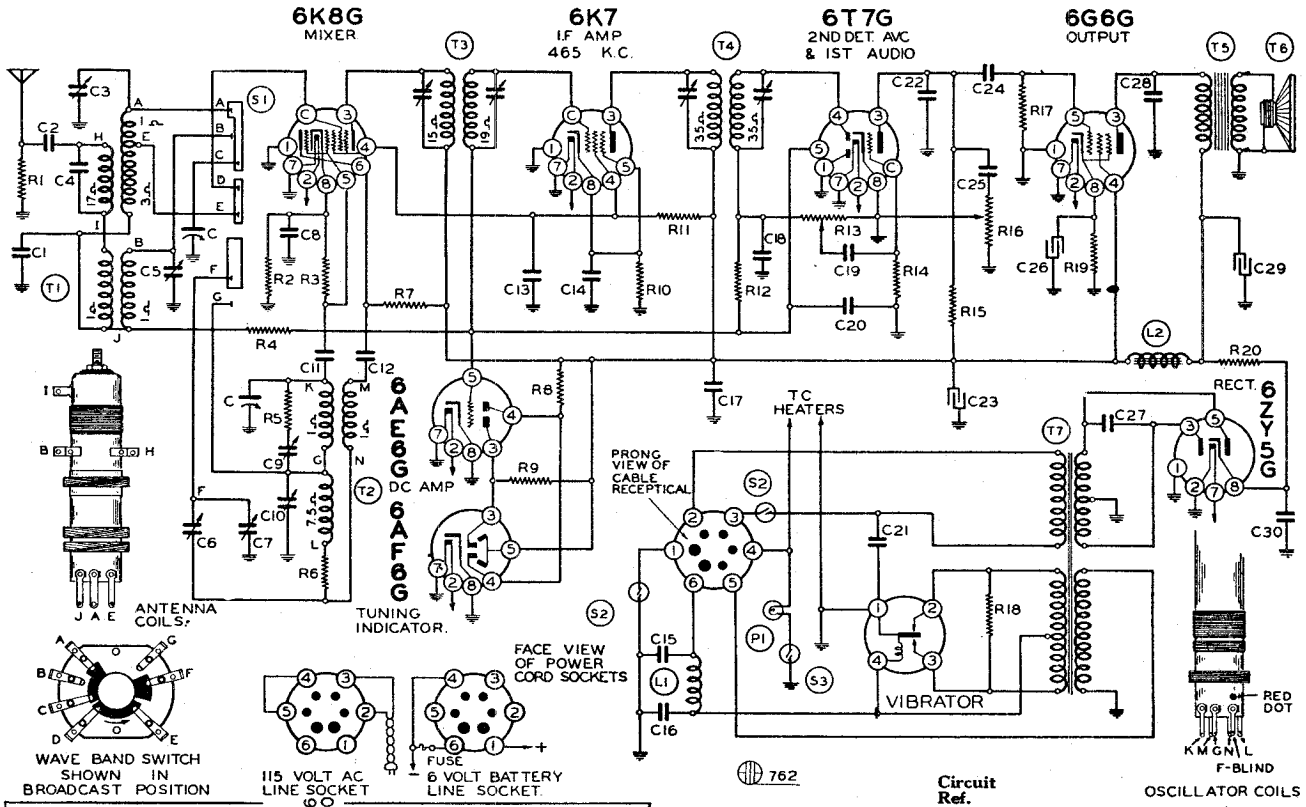
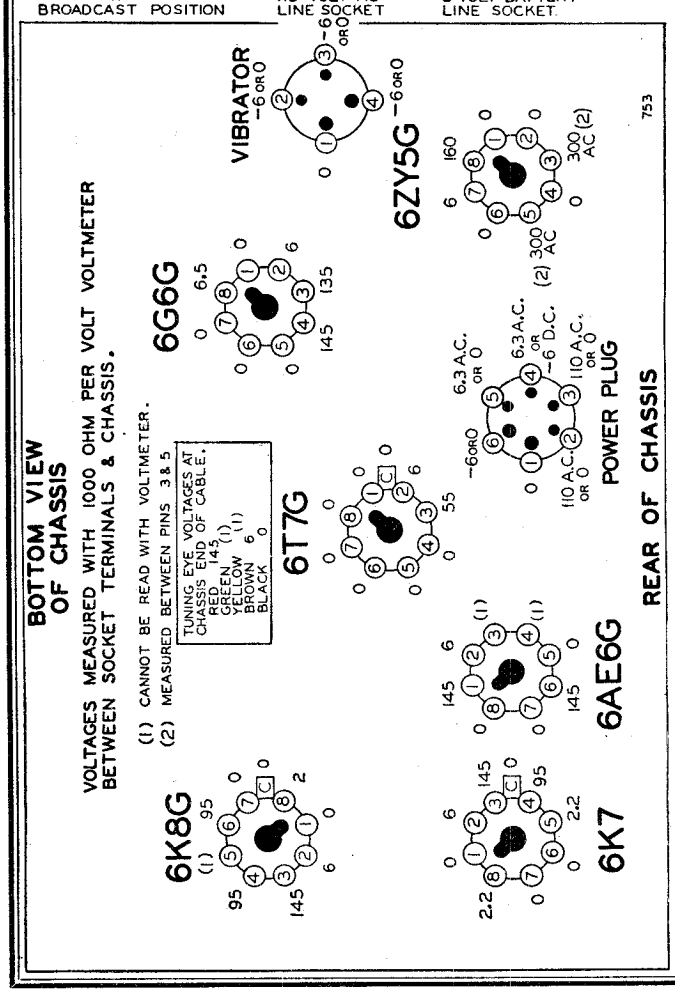
# BELMONT RADIO CORP.

MODEL 751, Series A
Schematic, Voltage




## 7 TUBE INCLUDING CATHODE-RAY TUNING INDICATOR
## 2 Band A. C. and 6-Volt Storage Battery Operated Superheterodyne Receiver

**Model 751**
**Series A**

**FREQUENCY RANGE**

| BAND | |
|---|---|
| Short Wave | 5.6 to 18.1 MC. |
| Broadcast | 535 to 1730 KC. |

**BAND SWITCH**
Extreme Right Rotation
Extreme Left Rotation

Power Consumption.....40 Watts (At 115 volts 50-60 cycles), or 3.3 amperes at 6.3 volts
Power Output.....6 Watts Undistorted, 1 Watt Maximum

| Circuit Ref. No. | Part No. | Description |
|---|---|---|
| **RESISTORS** | | |
| R1 | 13017 | 10M ohm—⅓ w. |
| R2 | 13097 | 200 ohms—⅓ w. |
| R3 | 13094 | 50M ohm—⅓ w. |
| R4 | 13011 | 250M ohm—⅓ w |
| R5 | 130240 | 30 ohms—⅓ w. |
| R6 | 130197 | 20 ohms—⅓ w. |
| R7 | 13048 | 15M ohm—⅓ w. |
| R8 | 13068 | 1 megohm—⅓ w. |
| R9 | 13068 | 1 megohm—⅓ w. |
| R10 | 13079 | 400 ohms—⅓ w. |
| R11 | 13082 | 10M ohms—⅓ w. |
| R12 | 1304 | 3 megohm—⅓ w |
| R13 | 101153 | 1 megohm volume control |
| R14 | 130225 | 15 megohm—⅓ w. |
| R15 | 13011 | 250M ohm—⅓ w |
| R16 | 101154 | 250M ohm tone control |
| R17 | 1303 | 500M ohm—⅓ w. |
| R18 | 13097 | 200 ohms—⅓ w. |
| R19 | 13093 | 450 ohms—⅓ w. |
| R20 | 130168 | 100 ohms—⅓ w. |
| **CONDENSERS** | | |
| C | 10292C | 2 gang variable condenser |
| C1 | 129131 | .002775 mica |
| C2 | 10012 | .003 x 600 v. |
| C3 | 12469 | BC Antenna Trimmer |
| C4 | 129132 | .000125 mica |
| C5 | 12469 | S. W. Antenna Trimmer |
| C6 | 12466 | B. C. Series Pad |
| C7 | 12466 | S. W. Series Pad |
| C8 | 10020 | .1 x 200 v. |
| C9 | 12470 | S. W. Oscillator Trimmer |
| C10 | 12470 | B. C. Oscillator Trimmer |
| C11 | 12938 | .00005 mica |
| C12 | 10025 | .002 x 600 v. |
| C13 | 10020 | .1 x 200 v. |
| C14 | 10020 | .1 x 200 v. |
| C15 | 10040 | .5 x 120 v |
| C16 | 10040 | .5 x 120 v. |
| C17 | 10020 | .1 x 200 v. |
| C18 | 12960 | .00015 mica |
| C19 | 10019 | .006 x 600 v. |
| C20 | 1009 | .05 x 200 v. |
| C21 | 10011 | .01 x 400 v. |
| C22 | 1292 | .0005 mica |
| C23 | 11979B | 16 mfd. lytic—200 w v. |
| C24 | 10026 | .02 x 400 v. |
| C25 | 10019 | .006 x 600 v. |
| C26 | 11979B | 20 mfd.—25 w. v. lytic |
| C27 | 10073 | .008 x 1200 v. |
| C28 | 10019 | .006 x 600 v. |
| C29 | 11979B | 16 mfd. lytic—200 w. v. |
| C30 | 10020 | .1 x 200 v. |

C23, C26 and C29 in same unit

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MODEL 751, Series A
Alignment, Socket
Trimmers, Notes

# BELMONT RADIO CORP.

## ALIGNMENT PROCEDURE

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

| BAND | SIGNAL GENERATOR Frequency Setting | SIGNAL GENERATOR Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6K8G | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROADCAST BAND | 1730 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer C10 (See Fig. 4) | Broadcast oscillator | Adjust to maximum output |
| | 1500 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 1500 Kc. | Trimmer C3 (See Fig. 4) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer C6 (See Fig. 4) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 Mc. | Trimmer C9 (See Fig. 4) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 Mc. | Trimmer C5 (See Fig. 4) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 6 Mc. | Trimmer C7 (See Fig. 4) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "A") |

## ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all possible causes of trouble, such as poor installations, open or grounded antenna systems, low battery voltage, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

**To remove the chassis from the cabinet**, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 1, top view).

**NOTE:**—On the side of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

1. For 6 volt storage battery operation:
   (a) Use cable No. 107128C.
   (b) Connect the lead (containing the fuse receptacle) marked A negative (—) to the negative (—) post of the storage battery.
   (c) Connect the lead marked A positive (+) to the positive (+) post of the storage battery.
2. For 105-125 volts, 50/60 cycle operation:
   (a) Use special cable No. 107129.
   (b) Plug receptacle of cable into power socket on chassis.

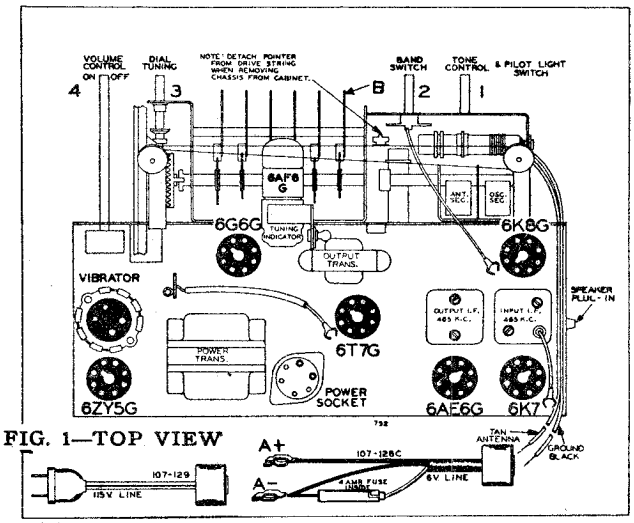
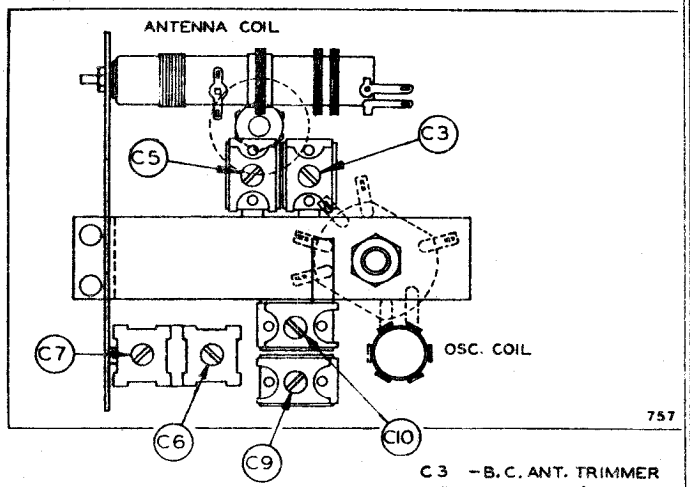



FIG. 1—TOP VIEW




C 3 —B.C. ANT. TRIMMER
C 5 —S.W. ANT. TRIMMER
C 9 —S.W. OSC. TRIMMER
C 10 —B.C. OSC. TRIMMER
C 6 —B.C. OSC. PAD
C 7 —S.W. OSC. PAD

**NOTE "A"** Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attentuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

**Model 751**
**Series A**

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# BELMONT RADIO CORP.

MODEL 767, Series A
Schematic, Socket, Trimmers

FOR SETTING AUTOMATIC TUNER LEVERS, SEE MODEL 751 SER. A.

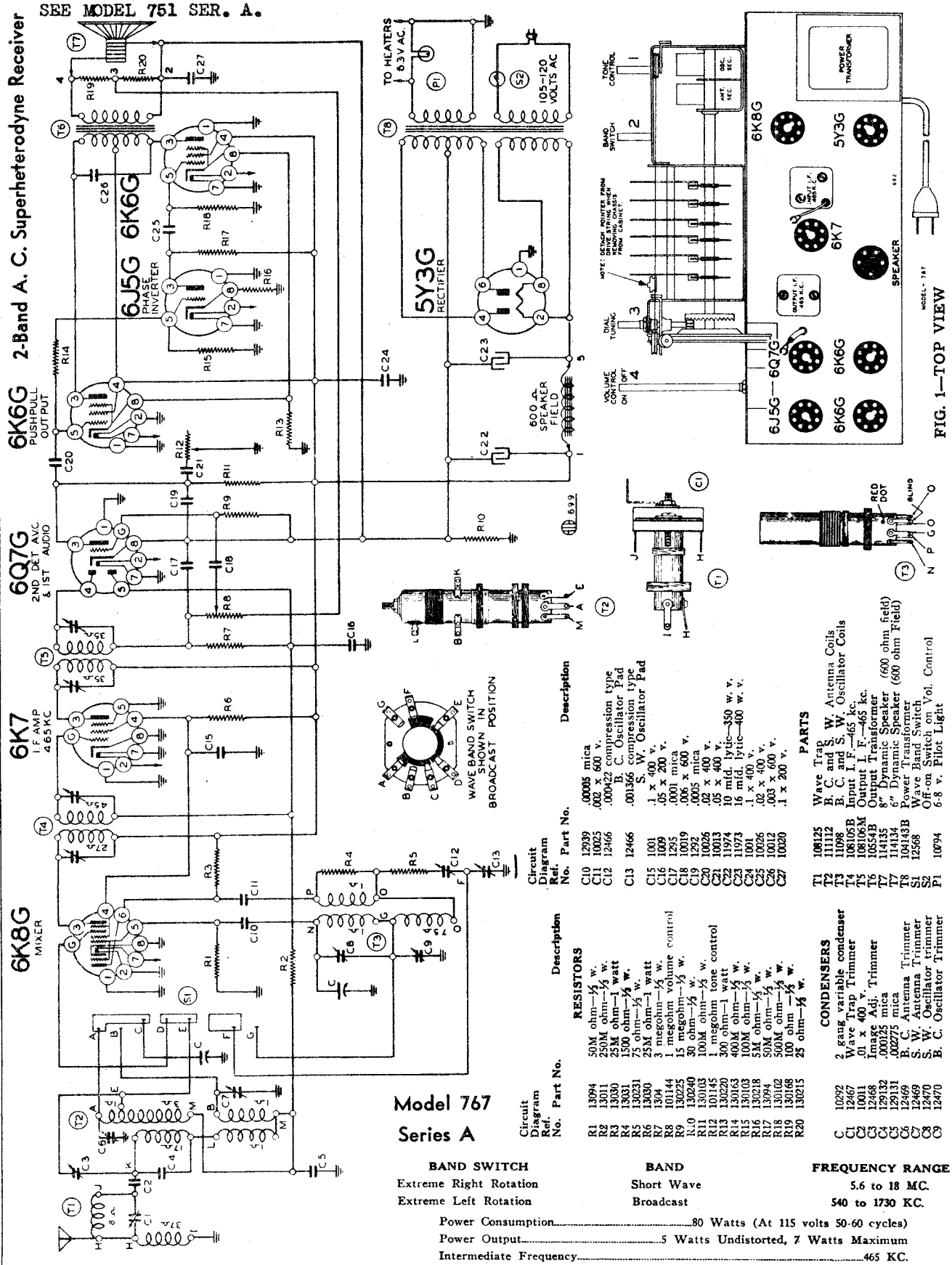


FIG. 1—TOP VIEW

| Circuit Diagram Ref. No. | Part No. | Description |
|---|---|---|
| C10 | 12939 | .00005 mica |
| C11 | 10025 | .002 x 600 v. |
| C12 | 12466 | .000422 compression type B. C. Oscillator Pad |
| C13 | 12466 | .001366 compression type S. W. Oscillator Pad |
| C15 | 1001 | .1 x 400 v. |
| C16 | 1009 | .05 x 200 v. |
| C17 | 1295 | .0001 mica |
| C18 | 10019 | .006 x 600 v. |
| C19 | 1292 | .0005 mica |
| C20 | 10026 | .02 x 400 v. |
| C21 | 10013 | .05 x 400 v. |
| C22 | 11974 | 10 mid. lytic—350 w. v. |
| C23 | 11973 | 16 mid. lytic—400 w. v. |
| C24 | 1001 | .1 x 400 v. |
| C25 | 10026 | .02 x 400 v. |
| C26 | 10012 | .003 x 600 v. |
| C27 | 10020 | .1 x 200 v. |

## PARTS

| Circuit Diagram Ref. No. | Part No. | Description |
|---|---|---|
| T1 | 108125 | Wave Trap |
| T2 | 111112 | B. C. and S. W. Antenna Coils |
| T3 | 11098 | B. C. and S. W. Oscillator Coils |
| T4 | 106105B | Input I. F.—465 kc. |
| T5 | 108106M | Output I. F.—465 kc. |
| T6 | 10554B | Output Transformer |
| T7 | 114135 | 8" Dynamic Speaker (600 ohm field) |
| T7 | 114134 | 6" Dynamic Speaker (600 ohm Field) |
| T8 | 104143B | Power Transformer |
| S1 | 12568 | Wave Band Switch |
| S2 | 10794 | Off-on Switch on Vol. Control |
| P1 | | 6-8 v. Pilot Light |

| Circuit Diagram Ref. No. | Part No. | Description |
|---|---|---|
| R1 | 13094 | 50M ohm—½ w. |
| R2 | 13011 | 250M ohm—½ w. |
| R3 | 13030 | 25M ohm—1 watt |
| R4 | 13031 | 1500 ohm—½ w. |
| R5 | 130231 | 75 ohm—½ w. |
| R6 | 13030 | 25M ohm—1 watt |
| R7 | 1304 | 3 megohm—½ w. |
| R8 | 101144 | 1 megohm volume control |
| R9 | 130225 | 15 megohm—½ w. |
| R10 | 130240 | 30 ohm—½ w. |
| R11 | 130103 | 100M ohm—½ w. |
| R12 | 101145 | 1 megohm tone control |
| R13 | 130220 | 300 ohm—1 watt |
| R14 | 130163 | 400M ohm—½ w. |
| R15 | 130103 | 100M ohm—½ w. |
| R16 | 130218 | 5M ohm—½ w. |
| R17 | 13094 | 50M ohm—½ w. |
| R18 | 130102 | 500M ohm—½ w. |
| R19 | 130168 | 100 ohm —½ w. |
| R20 | 130215 | 25 ohm—½ w. |

## RESISTORS

| Circuit Diagram Ref. No. | Part No. | Description |
|---|---|---|
| C | 10292 | 2 gang variable condenser |
| C1 | 12467 | Wave Trap Trimmer |
| C2 | 10011 | .01 x 400 v. |
| C3 | 12468 | Image Adj. Trimmer |
| C4 | 129132 | .00025 mica |
| C5 | 129131 | .002275 mica |
| C6 | 12469 | B. C. Antenna Trimmer |
| C7 | 12469 | S. W. Antenna Trimmer |
| C8 | 12470 | S. W. Oscillator Trimmer |
| C9 | 12470 | B. C. Oscillator Trimmer |

## CONDENSERS

| BAND SWITCH | BAND | FREQUENCY RANGE |
|---|---|---|
| Extreme Right Rotation | Short Wave | 5.6 to 18 MC. |
| Extreme Left Rotation | Broadcast | 540 to 1730 KC. |

Power Consumption.....80 Watts (At 115 volts 50-60 cycles)
Power Output.....5 Watts Undistorted, 7 Watts Maximum
Intermediate Frequency.....465 KC.

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MODEL 767, Series A
Alignment, Trimmers
Voltage

# BELMONT RADIO CORP.

## ALIGNMENT PROCEDURE

### Model 767 Series A

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

| BAND | SIGNAL GENERATOR Frequency Setting | SIGNAL GENERATOR Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (In Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6K8G | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1730 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer (C9) (See Fig. 4) | Broadcast oscillator | Adjust to maximum output |
| | 1500 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 1500 Kc. | Trimmer (C6) (See Fig. 4) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer (C12C) (See Fig. 4) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| | 465 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer (C1) (See Fig. 4) | I. F. Wave Trap | Adjust for **minimum** output |
| IMAGE REJECTION ADJUST-MENTS | 2330 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Pick up signal at 1400 Kc. on dial | Trimmer (C3) (See Fig. 4) | Image rejection | Adjust for **minimum** output (See note "B") |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 Mc. | Trimmer (C8) (See Fig. 4) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Dial Set at 17 Mc. | Trimmer (C7) (See Fig. 4) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 6 Mc. | Trimmer (C13) (See Fig. 4) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "A") |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

**NOTE "A"** Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

**NOTE "B"** 1400KC is the image frequency of 2330KC. Adjust Trimmer (C3) until a **minimum** output is obtained.




FIG. 4

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# BELMONT RADIO CORP.

MODEL 867, Series A
Schematic, Voltage
Tuner Data

| BAND | DIAL SCALE | FREQUENCY RANGE |
|---|---|---|
| Broadcast ..... | Upper..... | 540 to 1730 KC. (Kilocycles) |
| Short Wave ..... | Lower..... | 5.6 to 18.0 MC. (Megacycles) |

FOR SETTING AUTOMATIC TUNER LEVERS, SEE INDEX.

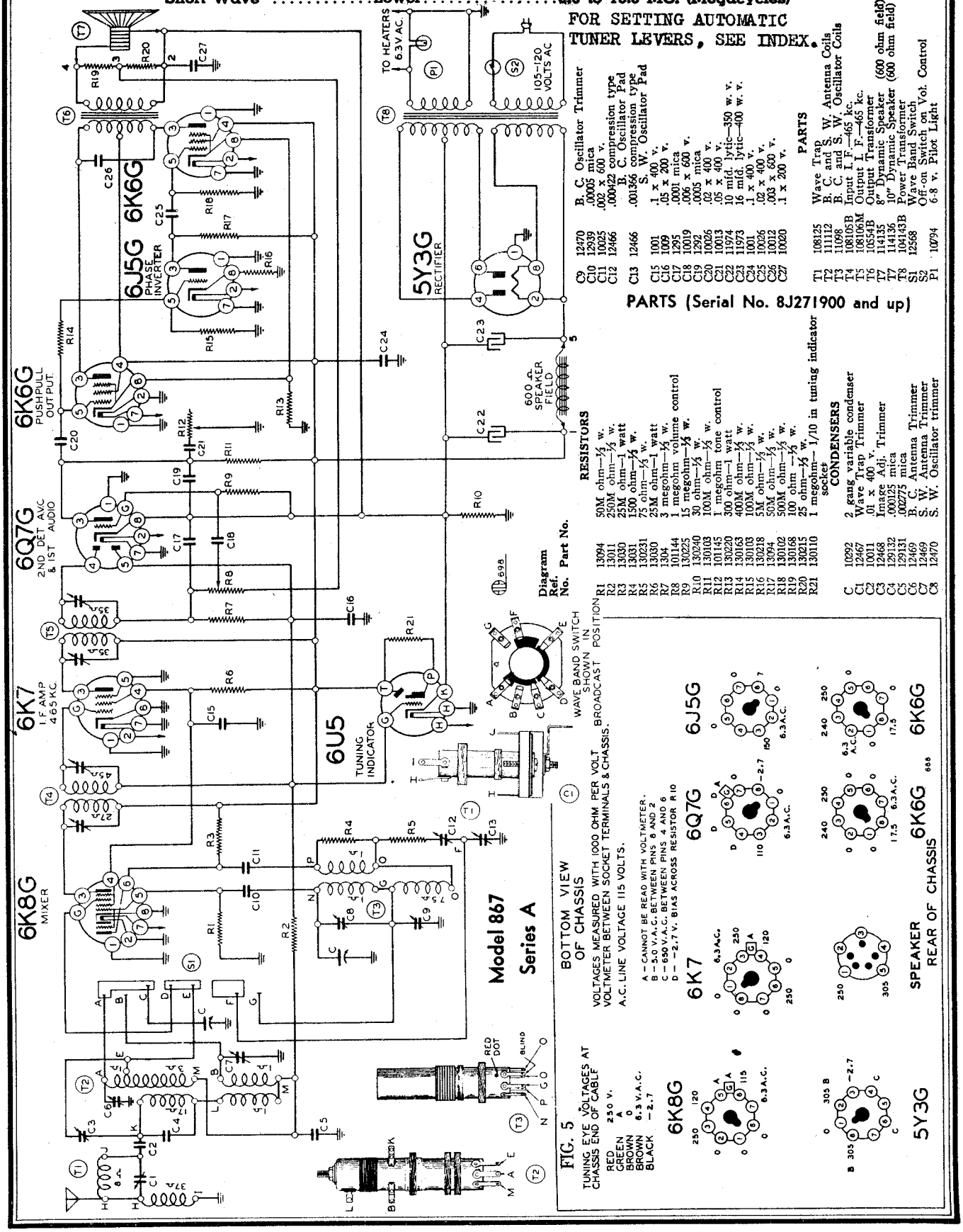


FIG. 5
TUNING EYE VOLTAGES AT CHASSIS END OF CABLE
RED 250 v.
GREEN A
BROWN 6.3 V.A.C.
BROWN 6.3 V.A.C.
BLACK −2.7

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.

A – CANNOT BE READ WITH VOLTMETER.
B – 5.0 V.A.C. BETWEEN PINS 8 AND 2
C – 650 V.A.C. BETWEEN PINS 4 AND 6
D – −2.7 V. BIAS ACROSS RESISTOR R10

## PARTS (Serial No. 8J271900 and up)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C9 | 12470 | B. C. Oscillator Trimmer | T1 | 108125 | Wave Trap | PARTS | |
| C10 | 12939 | .0005 mica | T2 | 111112 | B. C. and S. W. Antenna Coils | | |
| C11 | 10025 | .002 x 600 v. | T3 | 11098 | B. C. and S. W. Oscillator Coils | | |
| C12 | 12466 | .00422 compression type B. C. Oscillator Pad | T4 | 108105B | Input I. F.—465 kc. | | |
| C13 | 12466 | .001366 compression type S. W. Oscillator Pad | T5 | 108106M | Output I. F.—465 kc. | | |
| C15 | 1001 | .1 x 400 v. | T6 | 10554B | Output Transformer | | |
| C16 | 1009 | .05 x 200 v. | T7 | 114135 | 8" Dynamic Speaker (600 ohm field) | | |
| C17 | 1295 | .0001 mica | T7 | 114136 | 10" Dynamic Speaker (600 ohm field) | | |
| C18 | 10019 | .006 x 600 v. | T8 | 104143B | Power Transformer | | |
| C19 | 1292 | .0005 mica | S1 | 12568 | Wave Band Switch | | |
| C20 | 10026 | .02 x 400 v. | S2 | | Off-on Switch on Vol. Control | | |
| C21 | 10013 | .05 x 400 v. | P1 | 10794 | 6.8 v. Pilot Light | | |
| C22 | 11974 | 10 mfd. lytic—350 w. v. | | | | | |
| C23 | 11973 | 16 mfd. lytic—400 w. v. | | | | | |
| C24 | 1001 | .1 x 400 v. | | | | | |
| C25 | 10026 | .02 x 400 v. | | | | | |
| C26 | 10012 | .003 x 600 v. | | | | | |
| C27 | 10020 | .1 x 200 v. | | | | | |

| Diagram Ref. No. | Part No. | RESISTORS | CONDENSERS | | |
|---|---|---|---|---|---|
| R1 | 13094 | 50M ohm—½ w. | C | 10292 | 2 gang variable condenser |
| R2 | 13011 | 250M ohm—½ w. | C1 | 12467 | Wave Trap Trimmer |
| R3 | 13030 | 25M ohm—1 watt | C2 | 10011 | .01 x 400 v. |
| R4 | 13031 | 1500 ohm—½ w. | C3 | 12468 | Image Adj. Trimmer |
| R5 | 130231 | 75 ohm—½ w. | C4 | 129132 | .00025 mica |
| R6 | 13030 | 25M ohm—1 watt | C5 | 129131 | .002275 mica |
| R7 | 1304 | 3 megohm—½ w. | C6 | 12469 | B. C. Antenna Trimmer |
| R8 | 101144 | 1 megohm volume control | C7 | 12469 | S. W. Antenna Trimmer |
| R9 | 130225 | 15 megohm—½ w. | C8 | 12470 | S. W. Oscillator trimmer |
| R10 | 130240 | 30 ohm—½ w. | | | |
| R11 | 130103 | 100M ohm—½ w. | | | |
| R12 | 101145 | 1 megohm tone control | | | |
| R13 | 130220 | 300 ohm—1 watt | | | |
| R14 | 130163 | 400M ohm—½ w. | | | |
| R15 | 130103 | 100M ohm—½ w. | | | |
| R16 | 130218 | 5M ohm—½ w. | | | |
| R17 | 13094 | 50M ohm—½ w. | | | |
| R18 | 130102 | 500M ohm—½ w. | | | |
| R19 | 130168 | 100 ohm —½ w. | | | |
| R20 | 130215 | 25 ohm—½ w. | | | |
| R21 | 130110 | 1 megohm— 1/10 in tuning indicator socket | | | |

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MODEL 867, Series A
Alignment, Socket
Trimmers

# BELMONT RADIO CORP.

| BAND SWITCH | BAND | FREQUENCY RANGE |
|---|---|---|
| Extreme Right Rotation | Short Wave | 5.6 to 18 MC. |
| Extreme Left Rotation | Broadcast | 540 to 1730 KC. |

Power Consumption ..... 80 Watts (At 115 volts 50-60 cycles)
Power Output ..... 5 Watts Undistorted, 7 Watts Maximum
Intermediate Frequency ..... 465 KC.

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | SIGNAL GENERATOR Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (In Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6K8G | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1730 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer (C9) (See Fig. 4) | Broadcast oscillator | Adjust to maximum output |
| | 1500 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 1500 Kc. | Trimmer (C6) (See Fig. 4) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer (C12C) (See Fig. 4) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| | 465 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer (C1) (See Fig. 4) | I. F. Wave Trap | Adjust for **minimum** output (See note "B") |
| IMAGE REJECTION ADJUST-MENTS | 2330 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Pick up signal at 1400 Kc. on dial | Trimmer (C3) (See Fig. 4) | Image rejection | Adjust for **minimum** output (See note "B") |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 Mc. | Trimmer (C8) (See Fig. 4) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Dial Set at 17 Mc. | Trimmer (C7) (See Fig. 4) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 6 Mc. | Trimmer (C13) (See Fig. 4) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "A") |

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.
Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

NOTE "B" 1400KC is the image frequency of 2330KC. Adjust Trimmer (C3) until a **minimum** output is obtained.

After each band is completed, repeat the procedure as a final check.




FIG. 4

C1 – WAVE TRAP TRIMMER 465 K.C.
C3 – IMAGE REJECTION TRIMMER
C6 – B.C. ANT. TRIMMER
C7 – S.W. ANT. TRIMMER
C8 – S.W. OSC. TRIMMER
C9 – B.C. OSC. TRIMMER
C12 – B.C. OSC. PAD
C13 – S.W. OSC. PAD




FIG. 1—TOP VIEW

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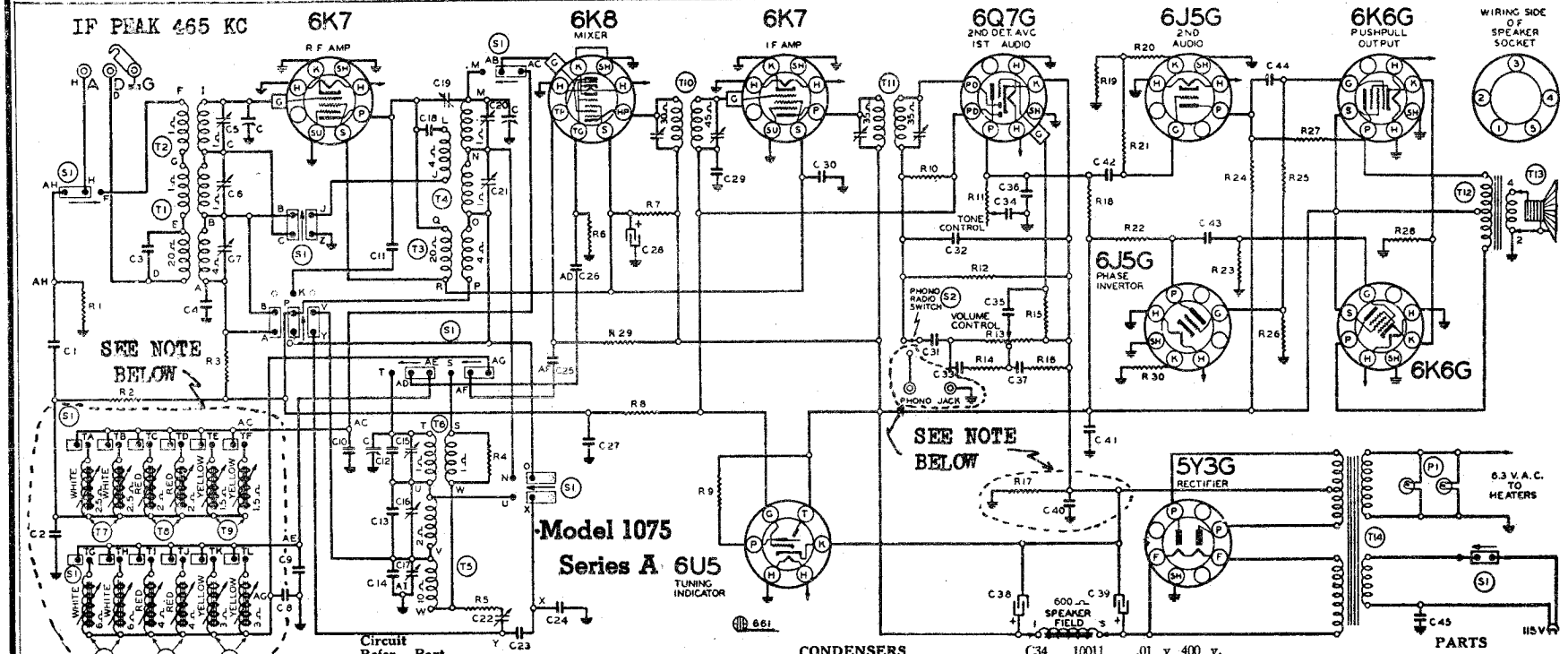


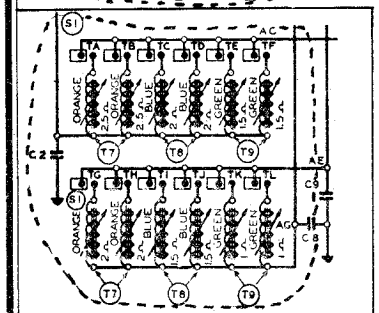

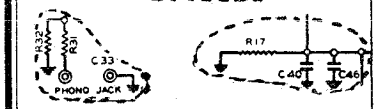

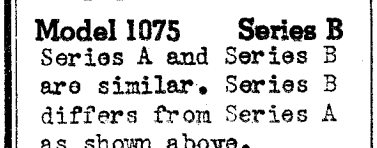

**Model 1075 Series B**

Series A and Series B are similar. Series B differs from Series A as shown above.

| Circuit Reference | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 130179 | 20M ohm |
| R2 | 130241 | 200M ohm |
| R3 | 130205 | 100M ohm |
| R4 | 130235 | 1500 ohm |
| R5 | 130197 | 20 ohm |
| R6 | 13094 | 50M ohm |
| R7 | 130237 | 12,500 ohm |
| R8 | 130103 | 100M ohm |
| R9 | 130110 | 1 megohm (in Tuning Indicator Socket) |
| R10 | 1304 | 3 megohm |
| R11 | 101129 | Tone Control (250M ohm) |
| R12 | 1303 | 500M ohm |
| R13 | 101128 | Volume Control (1 megohm) |
| R14 | 1309 | 200M ohm |
| R15 | 130225 | 15 megohm |
| R16 | 130236 | 30M ohm |
| R17 | 130240 | 30 ohm |
| R18 | 130172 | 250M ohm |
| R19 | 13082 | 10M ohm |
| R20 | 130234 | 6M ohm |
| R21 | 13019 | 1 megohm |
| R22 | 130103 | 100M ohm |
| R23 | 1303 | 500M ohm |
| R24 | 130103 | 100M ohm |
| R25 | 130163 | 400M ohm |
| R26 | 13094 | 50M ohm |
| R27 | 130163 | 400M ohm |
| R28 | 130220 | 300 ohm |
| R29 | 130123 | 15M ohm |
| R30 | 130193 | 3M ohm |
| R31 | 13011 | 250M ohm |
| R32 | 13011 | 250M ohm |
| | | **CONDENSERS** |
| C1 | 10025 | .002 x 600 v. |
| C2 | 12971 | .002 Mica |
| C3 | 12940 | .0001 Mica |
| C4 | 10093 | .05 x 200 v. |
| C5 | | S. W. Antenna Trimmer |
| C6 | | M. W. Antenna Trimmer |
| C7 | | B. C. Antenna Trimmer |
| C8 | 129123 | .0008 Mica (Silver Mica type; 0-Temperature Coefficient) |
| C9 | 129119 | .000329 Mica (Silver Mica type; 0-Temperature Coefficient) |
| C10 | 129111 | .000484 Mica (Silver Mica type; 0-Temperature Coefficient) |
| C11 | 12934 | .0002 Mica |
| C12 | 12981 | .000010 Mica |
| C13 | 129113 | .000015 Mica |
| C14 | 129113 | .000015 Mica |
| C15 | | S. W. Oscillator Trimmer |
| C16 | | M. W. Oscillator Trimmer |
| C17 | | B. C. Oscillator Trimmer |
| C18 | 12938 | .00005 Mica |
| C19 | | B. C. R. F. Trimmer |
| C20 | | S. W. R. F. Trimmer |
| C21 | | M. W. R. F. Trimmer |
| C22 | 12435 | B. C. Series Pad |
| C23 | 129105 | .0035 Compression Type |
| C24 | 129115 | .00232 Compression Type |
| C25 | 10025 | .002 x 600 v. |
| C26 | 12962 | .00003 mica |
| C27 | 10093 | .05 x 200 v. |
| C28 | 11961 | 12 mfd.-350 w.v. lytic condenser |
| C29 | 10026 | .02 x 400 v. |
| C30 | 10053 | .25 x 400 v. |
| C31 | 1009 | .05 x 200 v. |
| C32 | 12921 | .0002 Mica |
| C33 | 12921 | .0002 Mica |
| C34 | 10011 | .01 v 400 v. |
| C35 | 10071 | .004 x 600 v. |
| C36 | 129114 | .0003 Mica |
| C37 | 10078 | .01 x 200 v. |
| C38 | 11964 | 10 mfd.—350 w.v. lytic |
| C39 | 11964 | 16 mfd.—400 w.v. lytic |
| C40 | 10020 | .1 x 200 v. |
| C41 | 10074 | .1 x 400 v. |
| C42 | 10026 | .02 x 400 v. |
| C43 | 10026 | .02 x 400 v. |
| C44 | 10026 | .02 x 400 v. |
| C45 | 10061 | .02 x 600 v. |
| C | 10280 | 3 gang variable |
| | | C38 and C39 in same unit |
| C46 | 11977 | *200 mfd. x 6 v. lytic |
| | | **PARTS** |
| T1 | 111105 | B. C. Antenna Coil |
| T2 | 111106 | B. W. M. W. Antenna Coil |
| T3 | 10945 | B. C. R. F. Coil |
| T4 | 10946 | S. W. M. W. R. F. Coil |
| T5 | 11090 | B. C. Oscillator Coil |
| T6 | 11091 | S. W. M. W. Oscillator Coil |
| T12 | 10556B | Output Transformer |
| T13 | 114126 | Dynamic Speaker (600 ohm field) |
| T14 | 104143 | Power Transformer |
| S1 | 112466 | Push Button Switch |
| S2 | | Phono Radio Switch |
| P1 | | (2) 6-8 volts pilot lights |

| Series A only | | | Series B only | |
|---|---|---|---|---|
| T7 | 11083 and 11083B | Low Frequency Tuner Coils | T7 | 110102 and 110102B Low Frequency Tuner Coils |
| T8 | 11082 | Medium Frequency Tuner Coils | T8 | 110101 Medium Frequency Tuner Coils |
| T9 | 11081 and 11081B | High Frequency Tuner Coils | T9 | 110100 and 110100B High Frequency Tuner Coils |
| T10 | 108105H | Input I. F.—465 kc. | T10 | 108105H Input I. F.—465 kc. |
| T11 | 108106G | Output I. F.—465 kc. | T11 | 108126 Output I. F.—465 kc. |

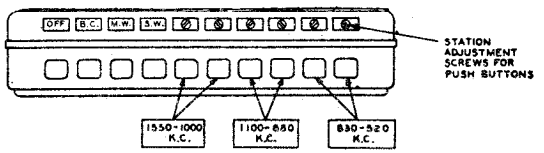


FIG. 4—Showing Station Adjustment Screws.



MODEL 1075, Series A, B Schematic

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- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metalic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Pushbutton Indicated Below Pushed "In" | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 1.F Tube | Broadcast | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 2) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6K8 | Broadcast | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 2) | Input I. F. | Adjust to maximum output |
| BAND BROAD-CAST | 1690 Kc. | 200 mmf | Antenna lead | Broadcast | Rotor full open (Plates out of mesh) | Trimmer (C17) (See Fig. 5) | Broadcast oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Broadcast | Set dial at 1400 Kc. | Trimmer (C7), (C19) (See Fig. 5) | Broadcast antenna and R. F. | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast | Set dial at 600 Kc. | Trimmer (C22) (See Fig. 5) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave | Set dial at 17 MC | Trimmer (C15) (See Fig. 5) | Short wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave | Set dial at 17 MC | Trimmer (C5), (C20) (See Fig. 5) | Short wave antenna and R. F. | Adjust to maximum output |
| MEDIUM WAVE BAND | 5 Mc. | 400 ohms | Antenna lead | Med. Wave | Set dial at 5 MC | Trimmer (C16) (See Fig. 5) | Medium wave oscillator | Adjust to maximum output |
| | 5 Mc. | 400 ohms | Antenna lead | Med. Wave | Dial set at 5 MC | Trimmer (C6), (C21) (See Fig. 5) | Medium wave antenna and R. F. | Adjust to maximum output |

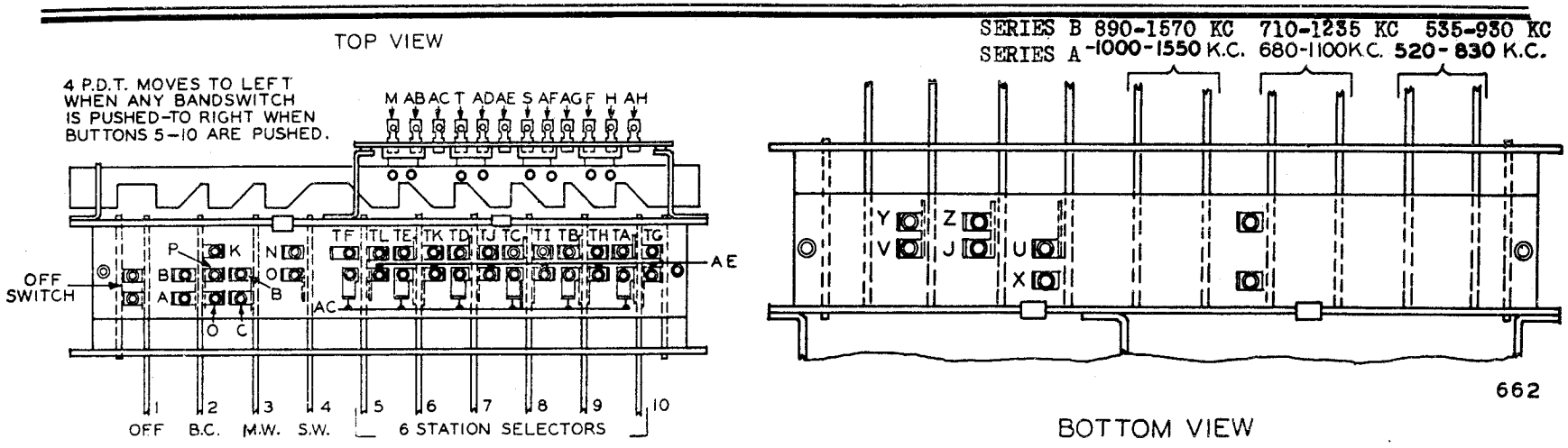
NOTE "A". Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attentuate the signal from the signal generator to prevent the leveling-off action of the AVC.

**After each range is completed, repeat the procedure as a final check.**

| BAND | FREQUENCY RANGE |
|---|---|
| Broadcast | 535 to 1690 Kc. |
| Medium Wave | 1.66 to 5.5 MC. |
| Short Wave | 5.5 to 18.0 MC. |

Power Consumption ..... 100 Watts (At 115 volts 50-60 cycles)
Power Output ..... 5 Watts Undistorted, 7.5 Watts Maximum
Intermediate Frequency ..... 465 KC.


TOP VIEW
4 P.D.T. MOVES TO LEFT WHEN ANY BANDSWITCH IS PUSHED-TO RIGHT WHEN BUTTONS 5—10 ARE PUSHED.
M AB AC T AD AE S AF AG F H AH
TF TL TE TK TD TJ TC TI TB TH TA TG
AE
OFF SWITCH
P K N
B O
A B
AC
O C
1 2 3 4 5 6 7 8 9 10
OFF B.C. M.W. S.W.
6 STATION SELECTORS
SERIES B 890-1570 KC 710-1235 KC 535-930 KC
SERIES A 1000-1550 K.C. 680-1100K.C. 520-830 K.C.
Y Z
V J U
X
662
BOTTOM VIEW

# BELMONT RADIO CORP.

MODEL 1075, Series A,B
Socket, Trimmers, Voltage
Phono, Notes

| BAND | DIAL SCALE | FREQUENCY RANGE |
|---|---|---|
| Broadcast | Upper Scale "BC" | 535 to 1690 KC. (Kilocycles) |
| Medium Wave | Center Scale "MW" | 1.66 to 5.5 MC. (Megacycles) |
| Short Wave | Lower Scale "SW" | 5.5 to 18.0 MC (Megacycles) |

## ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

**To remove the chassis from the cabinet,** remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 2, top view).

**NOTE:**—On the back of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

## DIAL CALIBRATION:

To correct dial calibration rotate the tuning knob to the right until the dial pointer reaches the extreme end of the dial scale; then rotate the tuning knob to the left until the pointer reaches the other extreme end of the dial scale.

Stop clamps on the pointer slider bar make the pointer self aligning thereby correcting dial calibration.

## POWER SUPPLY:

Caution:—This radio, unless otherwise marked, must be operated from 105-115 volts, 50-60 cycle A. C. supply only. If you are in doubt as to the voltage and frequency rating of the power supply, consult your local power company before inserting plug. Do not insert plug unless all tubes and speaker plug are in their proper sockets.

Receivers of this model which are to be used on voltages or frequencies other than 105-115 volts, 50-60 cycles are so marked. The power consumption of this receiver is 100 watts.

## PHONOGRAPH CONNECTIONS:

A phonograph connector and switch are provided on the rear of the chassis. To operate; insert plug on end of phonograph pick-up lead into connector on chassis and move phonograph switch to "Phono" position. Volume and tone may be controlled by using the controls on the front of the radio.

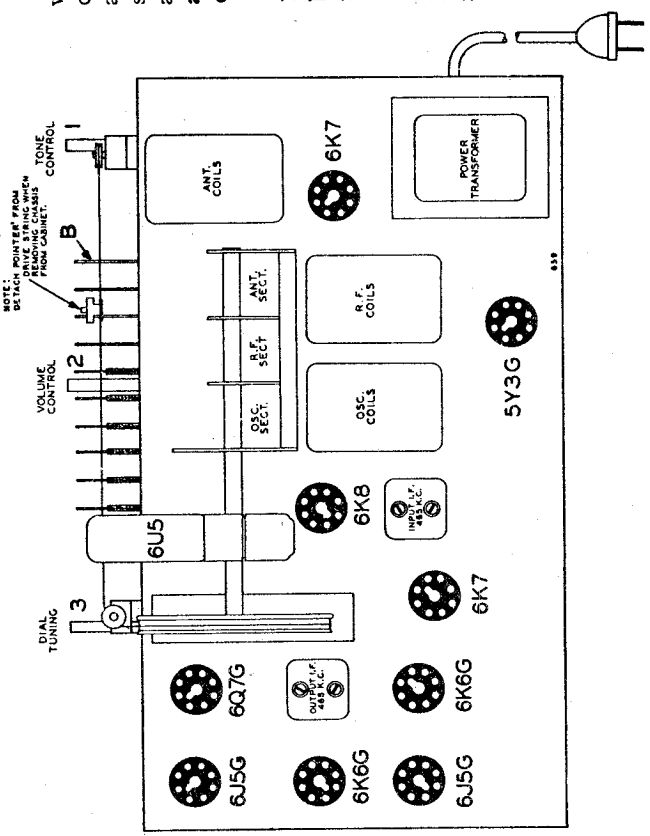



FIG. 2—TOP VIEW

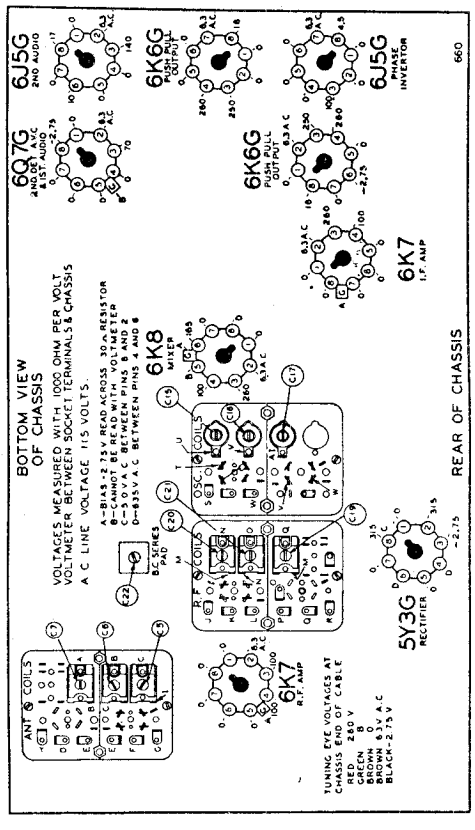



FIG. 5

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MODEL 1075, Series A, B
Tuner Data, Notes, Parts

# BELMONT RADIO CORP.

## PROCEDURE FOR SETTING THE AUTOMATIC STATION PUSHBUTTONS:

**Important: Allow the radio to "warm up" for about 15 minutes before setting the station adjustment screws for the pushbuttons.**

Only a single adjustment for each station is required in setting up your favorite stations for automatic pushbutton operation. These adjustments are located at the front of the chassis shown in Fig. 4 and are accessible through the station call letter tab holes. The only equipment needed is a small screw driver to make the adjustments.

Make a list of your favorite local stations, those which you tune in regularly. Put down the frequency (kilocycle number) of these stations. There may be 2, 3, 5 or any number up to and including six in this list.

If you do not know the broadcasting frequencies, consult your local newspaper or a radio log book. They can also be obtained by pressing the button marked "Broadcast" on the left and tuning in the stations manually, noting the numbers on the dial at which they are received.

The automatic station pushbuttons are grouped to cover specific frequency ranges.

The range of the frequencies covered by each button are given below and are also shown in Fig. 4. Only stations within the frequency ranges given can be obtained on a particular button. Counting the **station buttons** from left to right, looking at the front of the set, the frequency ranges are as follows:

1. 1550 to 1000 Kilocycles.
2. 1550 to 1000 Kilocycles.
3. 1100 to 680 Kilocycles.
4. 1100 to 680 Kilocycles.
5. 830 to 520 Kilocycles.
6. 830 to 520 Kilocycles.

This means that any station which has a kilocycle number lying between 1550 and 1000 K.C. can be set up on either Button 1 or Button 2. Any station which has a kilocycle number lying between 1100 and 680 K.C. can be set on either Button 3 or Button 4. Any station which has a kilocycle number lying between 830 and 520 K.C. can be set on either Button 5 or Button 6.

**After you have made up your list of stations, press button marked "Broadcast" and tune set manually until station selected having the highest frequency is tuned in and the program noted. Press button covering frequency range in which station is located (See Fig. 4). Adjust screw through station tab opening above button pressed until the same station is heard clearly and tuning indicator indicates that it is correctly tuned.**

**Press pushbutton marked "Broadcast" and tune in next station selected. Press button covering frequency range in which station is located. Adjust screw through station tab opening above button pressed until the same station is heard clearly and with maximum volume.**

Follow this procedure for each button until you have selected all of your stations. The automatic buttons are now set up for quick tuning and no further adjustment is necessary.

**NOTE: In setting up the pushbuttons, station identification may require switching back and forth to button marked "Broadcast" until the same program is heard for both. If the same program is heard on more than one station, find the station on dial tuning and select the proper one on the pushbutton by comparing the order or sequence of programs with that on dial tuning.**

Punch out the station call letter tabs of the stations you have set up for the automatic buttons from the set of sheets supplied and insert them into the rectangular openings in the escutcheon. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

## ANTENNA AND GROUND CONNECTIONS:

Antenna connections are made on the terminal board, with terminals marked "A" and "D" on the rear of chassis. When using a conventional antenna connect the lead-in to terminal "A". The ground lead should be connected to Terminal "G". When using a Doublet Antenna, connect one lead-in of the doublet to "A and the other lead-in to "D". Connect a ground wire to Terminal "G". (See Fig. 1).

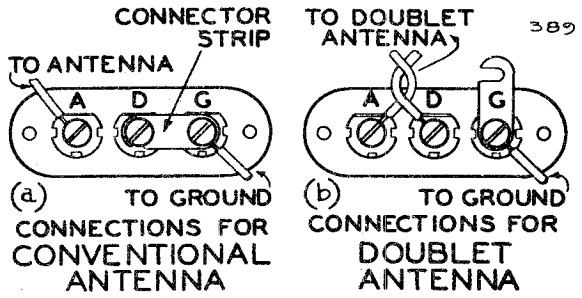


FIG. 1

### TRANSFORMERS

| | | | |
|---|---|---|---|
| 104143 | T14 | 50/60 Cycle Power Transformer 105-115 Volt Primary | 4.00 |
| 104147 | | 25/60 Cycle Power Transformer 105-115 Volt Primary | |
| 104 | | 25/60 Cycle Power Transformer Universal Primary | |
| 104144 | | 40/60 Cycle Power Transformer Universal Primary | |
| 10556B | T12 | Output Transformer for Speaker | 1.50 |

### SPEAKER

| | | | |
|---|---|---|---|
| 114126 | T13 | Twelve Inch Dynamic Speaker (600 Ohm Field) | 7.00 |
| 10556B | T12 | Output Transformer for Speaker | 1.50 |

### MISCELLANEOUS

| | | | |
|---|---|---|---|
| 101128 | R13 | Volume Control (1 Megohm) | 1.00 |
| 101129 | R11 | Tone Control (250M Ohm) | .75 |
| 10280 | C | Three Gang Variable Condenser | 5.00 |
| 10556B | T12 | Output Transformer for Speaker | 1.50 |
| 1075 | | Line Cord and Plug | .50 |
| 11378 | | Antenna and Ground Terminal Strip | .25 |
| 11535 | | Shield for Ant., R.F., Osc., Coils | .15 |
| 115229 | | Tube Shield | .15 |
| 12561 | S2 | Phono-Radio Switch | .25 |
| 13437 | | Rubber Grommet for Variable Condenser Mounting | .02 |
| 13447 | | Rubber Chassis Mounting Cushions | .05 |
| 13244 | | No. 10—32 x 1¼" Chassis Mounting Bolts | .01 |

### AUTOMATIC PUSHBUTTON ASSEMBLY PARTS

| | | | |
|---|---|---|---|
| 112466 | | Pushbutton Tuner Assembly Complete with Coils and Switch Mechanism | 12.00 |
| 12562 | | Switch Assembly for Pushbutton Tuner (Less Coils) | 4.50 |
| 11083 | T7 | Low Frequency Coil | 1.25 |
| 11083B | T7 | Low Frequency Coil | 1.25 |
| 11082 | T8 | Medium Frequency Coil (Two Used) | 1.25 |
| 11081 | T9 | High Frequency Coil | 1.25 |
| 11081B | T9 | High Frequency Coil | 1.25 |
| 112492 | | Moulded Escutcheon for Pushbuttons (10 Hole) | .50 |
| 12199 | | Pushbuttons | .10 |

### COILS FOR PUSHBUTTON TUNER ASSEMBLY

| | | | |
|---|---|---|---|
| 11083 | T7 | Low Frequency Coil | 1.25 |
| 11083B | T7 | Low Frequency Coil | 1.25 |
| 11082 | T8 | Medium Frequency Coils (Two Used) | 1.25 |
| 11081 | T9 | High Frequency Coil | 1.25 |
| 11081B | T9 | High Frequency Coil | 1.25 |

### DIAL PARTS LIST

| | | |
|---|---|---|
| 112509 | Dial Scale (Calibrated) | 1.00 |
| 112495 | Moulded Escutcheon for Dial | .75 |
| 112446 | Set of 2 Sheets Station Call Letters | .15 |
| 112336 | Clear Pyralin Tabs for Station Call Letters, Doz. | .10 |
| 128199 | Pushbuttons | .10 |
| 112492 | Moulded Escutcheon for Pushbuttons (10 Hole) | .50 |
| 128195 | Bakelite Knobs | .15 |
| 112459 | Drive Drum Complete with Bushing and Set Screw | .25 |
| 112468C | Background Diffuser for Dial Complete with 115208 Slider Bar for Pointer | .50 |
| 112436 | Carriage for Pointer (Attach Pointer to String Drive) | .03 |
| 112431 | Pointer | .15 |
| 115234 | Stop Clamps (Attach to Slider Bar; Limit Travel of the Pointer) | .08 |
| 112469 | Manual Tuning Control (Shaft) | .50 |
| 115235 | Bracket Complete with Idler Pulley (for Drive String) | .20 |
| 11774 | Collar for Manual Tuning Control Shaft | .10 |
| 1209 | Linen Drive String | .10 |
| 120145 | Take-Up Spring for Drive String | .05 |
| 10794 | 6-8 Volt Pilot Light Bulb Type 44 | .10 |
| 107178B | Socket and Bracket for Pilot Light | .15 |

### CATHODE-RAY TUNING INDICATOR PARTS

| | | | |
|---|---|---|---|
| 107112 | R9 | Cable and Socket Assembly (with 1 Megohm Resistor in Socket) | .75 |
| 117211 | | Bracket for Tuning Indicator | .15 |
| 11757B | | Clamp for Tuning Indicator | .15 |
| 11757C | | Wing Bolt | .05 |

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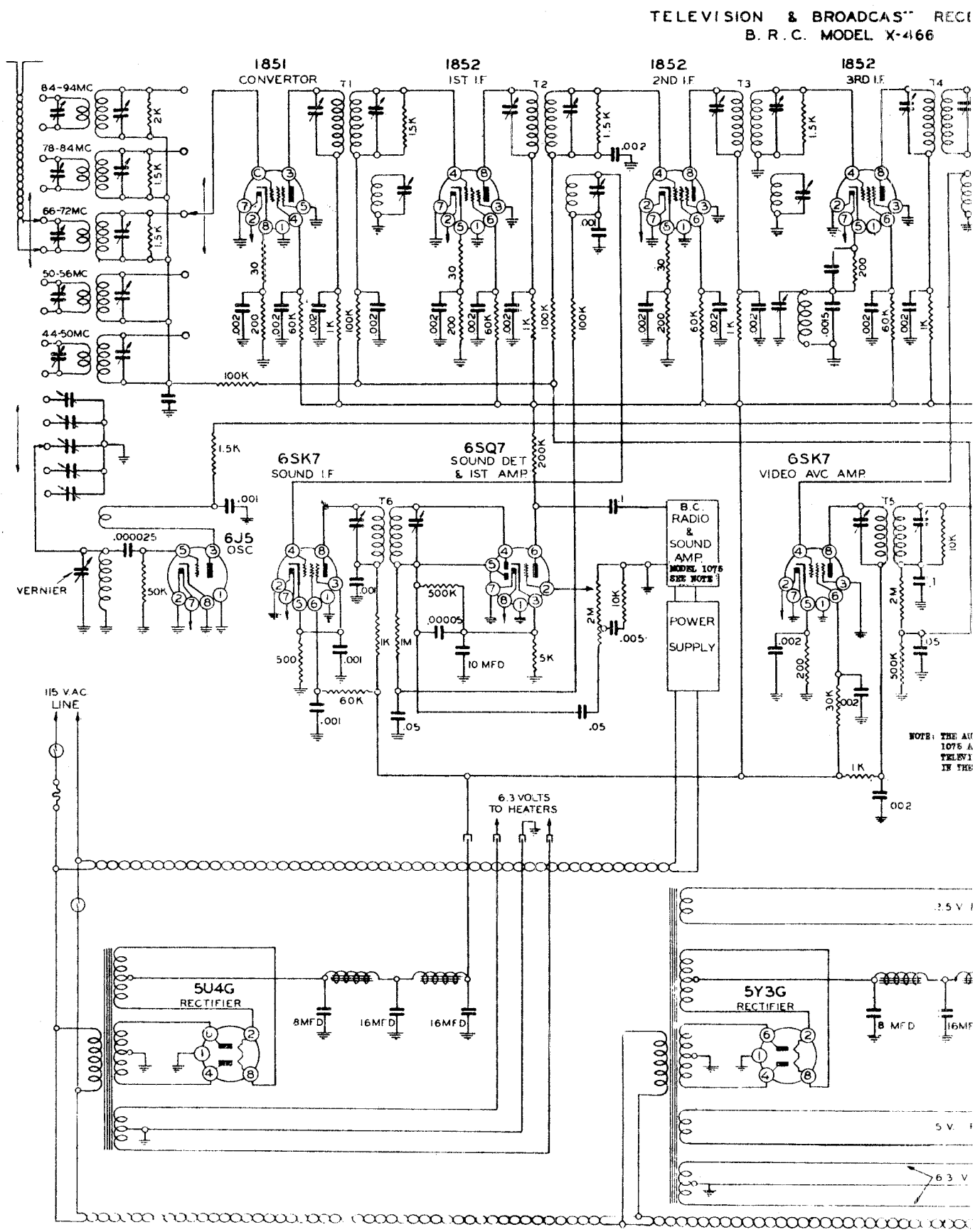


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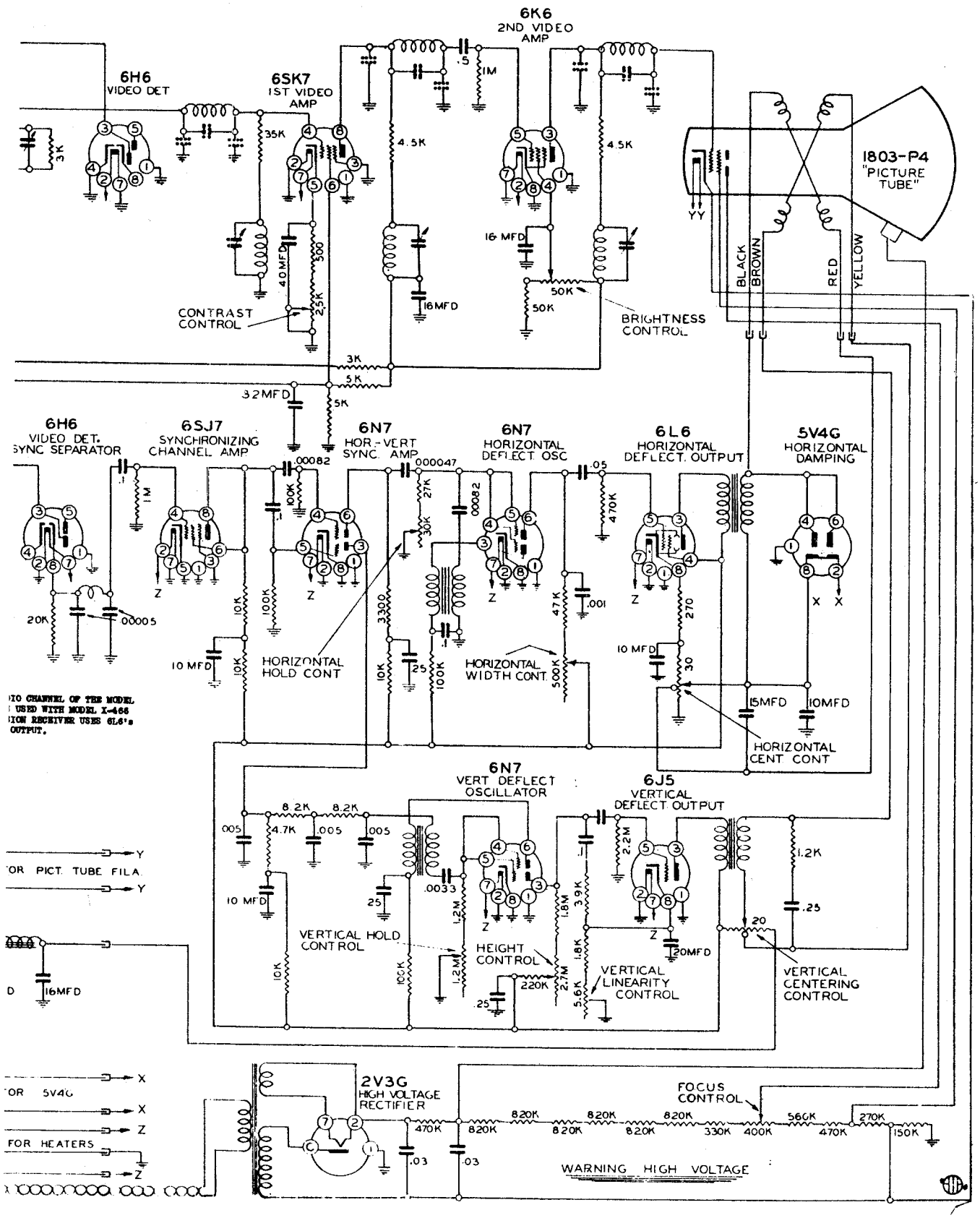
MODEL X-466
Schematic

VER



# BELMONT RADIO CORP.

MODEL X-466
Voltage, Notes

| TUBE DESCRIPTION | | VOLTAGE ON PIN # TO GND. (NO SIGNAL CONDITION) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | CAP |
| 1851 Convertor | 0 | 6.3 AC | 290 | 150 | 0 | | 0 | 2 | 0 |
| 1852 - 1st I.F. | 0 | 6.3 AC | 0 | 0 | 2 | 150 | 0 | 290 | |
| 1852 - 2nd I.F. | 0 | 6.3 AC | 0 | 0 | 2 | 150 | 0 | 290 | |
| 1853 - 3rd I.F. | 0 | 0 | 0 | 0 | 2 | 150 | 6.3 AC | 290 | |
| 6H6 Video | 0 | 6.3 | 0 | 0 | N.C. | | 0 | N.C. | |
| 6SK7 1st video amp. | 0 | 0 | 0 | 0 | 3→10 | 100 v. | 6.3 AC | 180 | |
| 6K6G 2nd video | 0 | 6.3 | 150 | 70-150 | 0 | N.C. | 0 | 0 | |
| 6J5 Osc. | 0 | 0 | 95 v.approx. | N.C. | 0 | N.C. | 6.3 AC | 0 | |
| 6SK7 Sound I.F. amp. | 0 | 0 | 4.5 v. | 0 | 4.5 | 100 | 6.3 AC | 290 | |
| 6SQ7 Sound Det. | 0 | 0 | 1.5 | 0 | 0 | 70 | 0 | 6.3 AC | |
| 6SK7 Video AVC Amp | 0 | 6.3 AC | 0 | 0 | 2 | 110 | 0 | 290 | |
| 6H6 Video Det. Sync. | 0 | 0 | 0 | N.C. | N.C. | | 6.3 AC | 0 | |
| 6SJ7 Sync.Channel Amp. | 0 | | | | | | | | |
| 5U4G Rectifier | 0 | Pin 2-8 5 AC | | 280 AC | | 280 AC | N.C. | N.C. | |
| 5Y3G Rectifier | 0 | Pin 2-8 5 AC | | 280 AC | | 280 AC | N.C. | N.C. | |
| 6SJ7 Sync.Channel Amp. | 0 | Pin 2-7 6.3 AC | 0 | 0 | 0 | 110 | | 110 | |
| 6N7 Hor.Vert. Sync.Amp. | 0 | Pin 2-7 6.3 AC | 195 | 0 | 0 | 205 | | 0 | |
| 6N7 Hor.Osc. | 0 | Pin 2-7 6.3 AC | 105 | -22 | -22 | 200 | | 0 | |
| 6L6 Hor.Output | 0 | Pin 2-7 6.3 AC | Cannot be Checked | 300 | 0 | | | 24 | |
| 5V4 Hor.Damping | 0 | Pin 2-8 5.0 AC | 0 | 0 | | 0 | | 0-13 v. | |
| 6N7 Vert.Osc. | 0 | Pin 2-7 6.3 AC | 290 | -50 | -50 | 20 | | 0 | |
| 6J5 Vert.Output | 0 | Pin 2-7 6.3 AC | 300 | 300 | 0 | 6 | | 13 v.approx. | |
| 2V3G * | 0 | 7000 O | | | | | Pin 2-7 2.5 v. | 0 □ 6000AC | |

* Great caution should be exercised in checking high voltage circuits. It is best never to attempt to measure heater voltage on the 2V3G. If the tube lights brightly, it is sufficient indication that the heater voltage is correct. To measure high voltage, disconnect power supply and insert 0-5 m.a. meter in ground end of bleeder chain. (With protection fuse) current should read about 1 m.a. when power supply is reconnected. If bleeder current is appreciably off measure individual resistors in chain, to see if difficulty is there. Thus by replacing rectifier tubes an appropriate check of transformer the high voltage circuits can be checked without the use of dangerous probes.

□ Electrostatic voltmeter

O Special High resistance voltmeter

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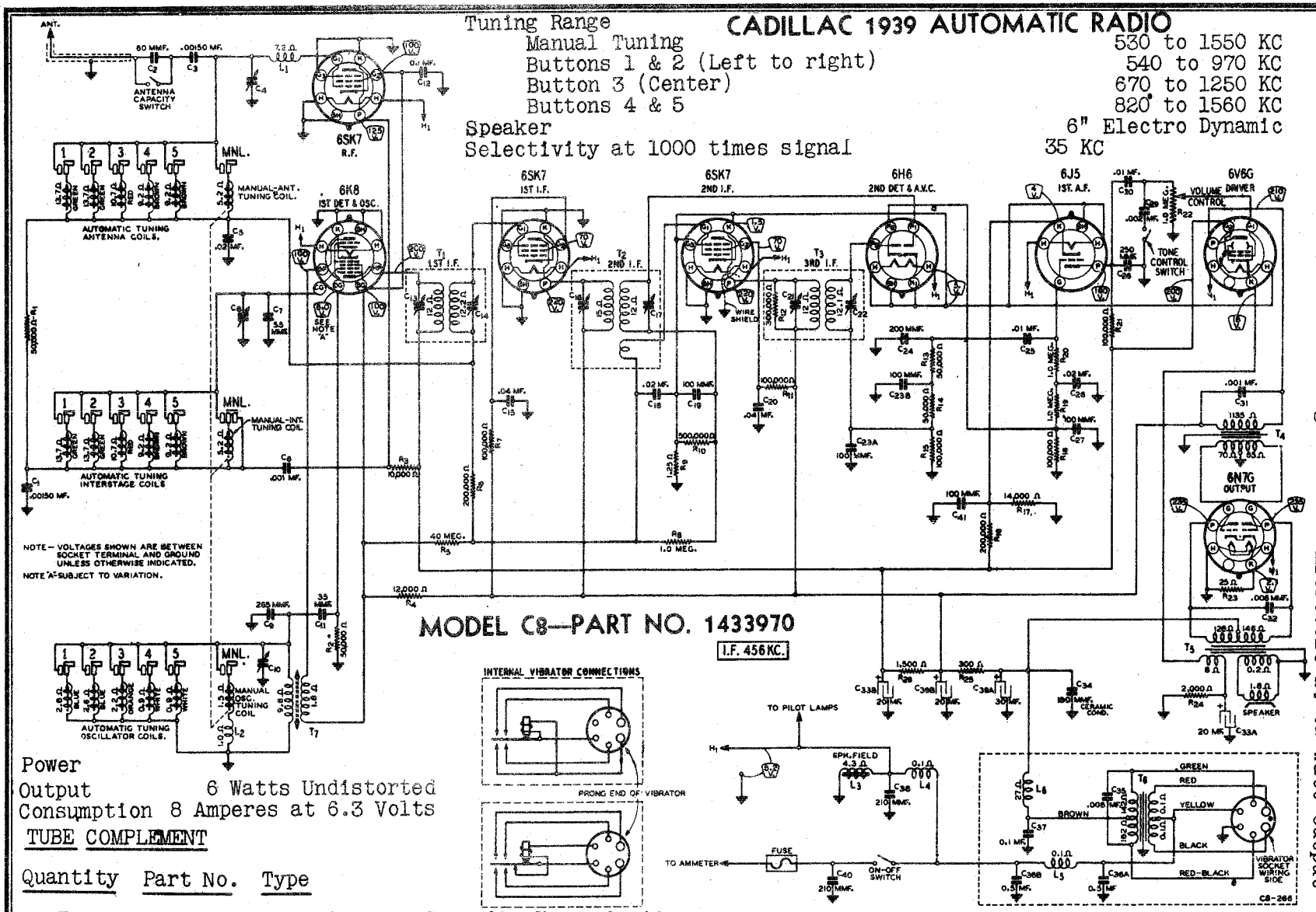
# CADILLAC 1939 AUTOMATIC RADIO

| | |
|---|---|
| Tuning Range | 530 to 1550 KC |
| Manual Tuning | 540 to 970 KC |
| Buttons 1 & 2 (Left to right) | 670 to 1250 KC |
| Button 3 (Center) | 820 to 1560 KC |
| Buttons 4 & 5 | 6" Electro Dynamic |
| Speaker | 35 KC |
| Selectivity at 1000 times signal | |




## MODEL C8—PART NO. 1433970

I.F. 456 KC.

Sensitivity
Manual Tuning 1 Microvolt at .5 Watt Output
Automatic Tuning 1 Microvolt at .5 Watt Output

Power Output 6 Watts Undistorted
Consumption 8 Amperes at 6.3 Volts

TUBE COMPLEMENT

| Quantity | Part No. | Type |
|---|---|---|
| 3 | 1213392 | 6SK7 |
| 1 | 1213393 | 6K8 |
| 1 | 1213395 | 6H6 |
| 1 | 1213394 | 6J5 |
| 1 | 1213396 | 6V6G |
| 1 | 7233587 | 6N7G |

Antenna Capacity Screw Settings

Low Capacity Setting - In tight (clockwise) — 59 mmf. -- Total of antenna and shielded cable.

High Capacity Setting — Out (counter clockwise) -- 193 mmf. -- Total of under car antenna and shielded lead.

Antenna Trimmer Range ±15 mmf. of above antenna capacities

MODEL C-8
Socket, Trimmers
Chassis

# CADILLAC DIV.—GEN. MOTORS

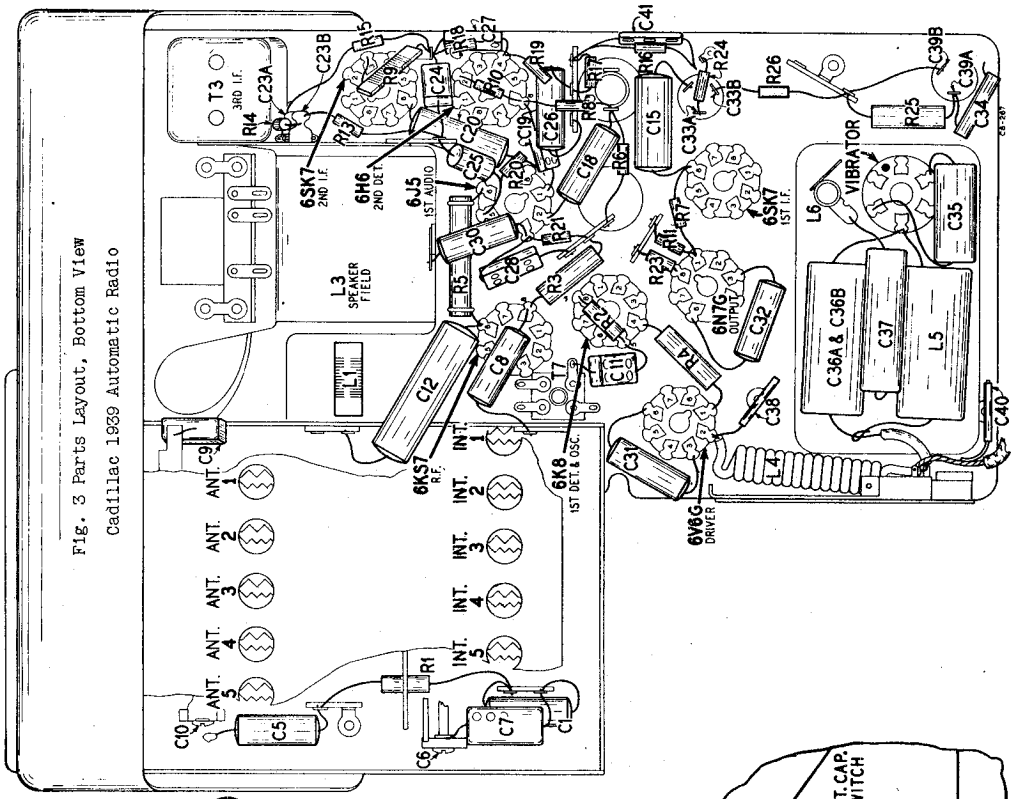
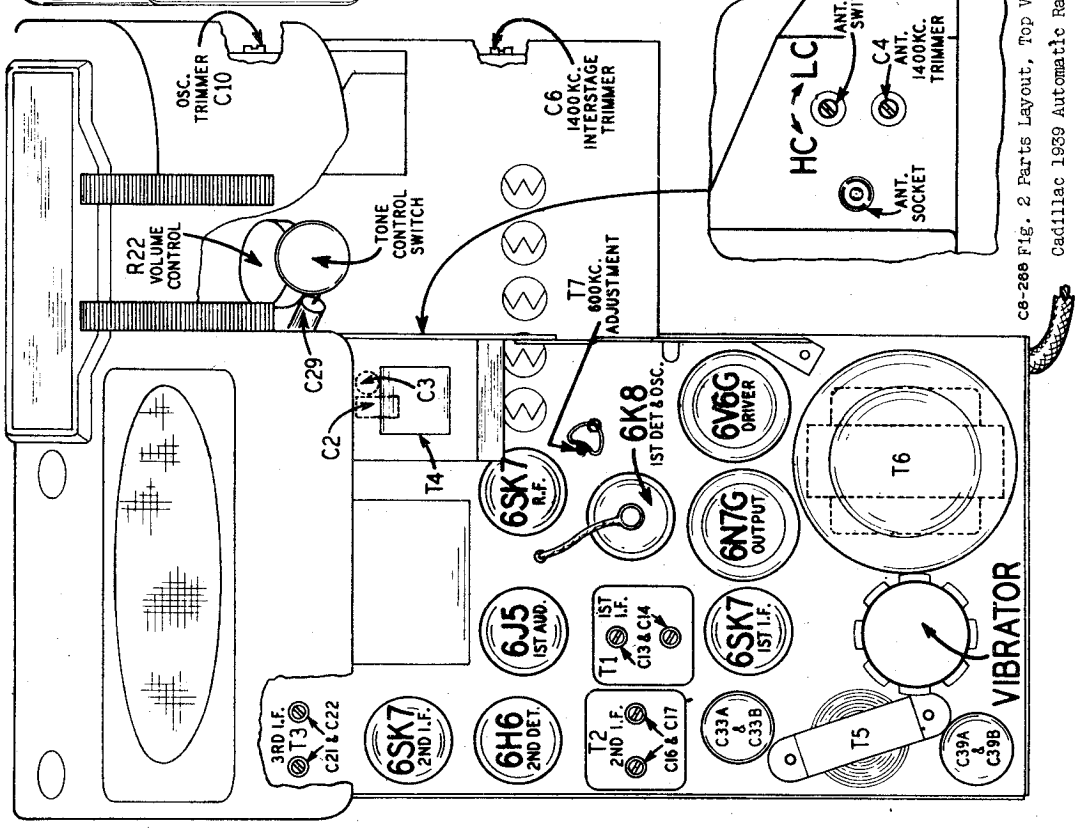



Fig. 3 Parts Layout, Bottom View

Cadillac 1939 Automatic Radio




C8-268 Fig. 2 Parts Layout, Top View

Cadillac 1939 Automatic Radio

| Original Part Number | Replacement Part Number | Quan. | Illus. No. | Description | List Price |
|---|---|---|---|---|---|
| | | | | **Sockets** | |
| 3A267 | 1428011 | 8 | | Tube socket-Octal (8 prong) | - $ .15 |
| 3A276 | 1435452 | 1 | | Vibrator socket (6 prong molded) | - .10 |
| 26A129 | 1435453 | 1 | | Antenna connection socket and bracket assembly | - .15 |
| | 1434972 | 1 | | 6" Dynamic Speaker | - $3.85 |
| | 1435454 | 1 | | Cone & voice coil assembly for above speaker. | - 1.75 |
| | | 1 | | Wire screen to cover front of speaker | - .35 |
| | | 1 | | Cardboard Ring for above wire screen | - .05 |

Speaker

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

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## FEATURES

The 1939 Cadillac Automatic Radio is an 8-tube automobile radio covering the standard wave band incoorporating the very latest developments in automobile radio engineering. The outstanding features are:

1. Permeability tuning, providing a dual input circuit to the 1st detector, one for manual tuning and one for automatic push button tuning, is used.
2. A new noise-limiting circuit in the audio system controlled by signal voltage developed by the 2nd detector and the AVC network, providing for the first time effective noise-limiting action without affecting sensitivity.
3. Two stages of Intermediate Frequency, increasing considerably Automatic Volume Control action.
4. A three-circuit Automatic Tuner, providing the same sensitivity on both manual and automatic tuning sections.
5. An OFF-switch incorporated in the push button operating mechanism to provide practically complete automatic operation, making it necessary to push only one button to select a station, tune and turn on the radio.

## MANUAL TUNING CIRCUIT

When the manual tuning button is depressed, the manual antenna tuning coil is connected to the grid of the 6SK7 R.F. amplifier tube through a series motor noise filter. The plate of the R.F. tube is fed through a resistor and is capacity coupled to the detector grid of the 6K8 tube through the manual intermediate tuning coil. This grid is also controlled by the AVC system through the manual intermediate tuning coil. The manual oscillator tuning coil is capacity coupled to the oscillator grid of the 6K8 tube in parallel with the fixed oscillator coil T7 which also functions as the low frequency adjustment.

All the automatic tuning coils are open circuited when the manual tuning button is depressed.

Manual tuning is accomplished by varying the inductance of the manual tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core of special design in and out of the coil by rotating the manual station selector drum.

The extreme position of the iron cores within the coils has been precision adjusted at the factory and should not be disturbed.

## AUTOMATIC TUNING CIRCUIT

Automatic tuning is accomplished by the use of a new and highly efficient three- circuit push button permeability tuner.

The tuning of the R.F., Interstage and Oscillator semi-fixed tuned circuits, is accomplished by varying the inductance of the coils, by changing the permeability of the intermediate circuit and by moving the iron core in and out of the coil. The iron cores within the coils are rigidly secured to a brass rod. This brass rod moves in and out of the coils as the adjustment screw is turned, changing the inductance of the coils, giving the same result as the variable tuning condenser across the coil except that this method is more precise and stable, and it is not affected by moisture or temperature changes as is the case with a normal tuning condenser.

## ALIGNMENT

Alignment between the Oscillator, Antenna and Interstage automatic tuning coils is obtained by changing the Antenna (center) and Interstage (rear) coil positions while the iron cores are held stationary on the shaft. To describe the connections for automatic tuning, let us assume that button No. 1 is depressed

The automatic tuning antenna coil, No. 1, is connected to the grid of the R.F. tube. The plate of the R.F. tube is fed through a resistance and is capacity coupled to the automatic tuning Interstage coil, No. 2, which is connected to the control grid of the 6K8 tube.

The manual Interstage tuning coil is short-circuited.

The automatic tuning Oscillator coil, No. 1, is capacity coupled to the Oscillator grid of the 6K8 tube.

Two stages of I.F. amplification are employed, using 6SK7 tubes. The primary and secondaries of each of the I.F. transformers are tuned by small trimmer condensers. Directly below the secondary of the 2nd I.F. is a third winding which couples the control grid circuit of the 2nd I.F. tube to the 2nd I.F. transformer.

The signal voltage across the secondary of the 2nd I.F. transformer is used to drive the plate of the AVC section of the 6H6 tube. AVC voltage is applied to the control grid circuits of the R.F., 1st detector and 1st and 2nd I.F. tubes. The rectified output of the 2nd detector section of the 6H6 tube is applied to the control grid of the 6J5 tube.

At no signal, the 6J5 tube is biased to cut off by virtue of the current flowing through resistor network R16 and 17. This gives a constant potential across R17, which keeps the tube biased to cut off when no signal is being received. When a station is being received, a positive voltage is applied to the control grid by both sections of the 6H6 tube through resistor networks R13, 14 and 15, and R18, 19 and 20, causing a very rapid reduction in bias so that the noise gate or noise limiter does not affect the sensitivity of the receiver. This is a very outstanding development in automobile radio circuit design and provides unusually quiet operation.

The 6J5 is resistance coupled to the 6V6G driver tube. The 6V6G is transformer coupled to the 6N7G output tube. This tube is a class "B" power amplifier and combines two triodes in one envelope. A 6" electro dynamic reproducer is employed.

Degeneration, or negative feed-back, is used in the audio amplifier. The voltage developed across the separate small secondary of the output transformer is fed back into the cathode circuit of the driver tube. The voltage fed back is of the proper phase to reduce the amplitude of certain frequencies. This results in a reduction in distortion.

A synchronous type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

## ALIGNMENT AND CALIBRATION PROCEDURE

The following equipment is required for proper alignment:

An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
An Output Indicating Meter.
Non-metallic screwdriver.
Dummy Antennas - .1mf., and 35 mmf.

The Radio Chassis must be removed from the case, but the front cover must remain on the chassis with all screws in place. THIS IS ABSOLUTELY NECESSARY TO ALIGN.

The Volume Control must be at maximum for all adjustments.

The Normal-Quiet Control must be in the Normal position for all adjustments.

The Antenna Capacity Switch (See Fig. 2,) screw should be in the maximum clockwise position for the Low Capacity (Vacuum Type) Antenna. The total capacity of the Low Capacity Antenna and the shielded lead is 59 mmf.

Connect Radio Chassis to Ground Post of Signal Generator with a short heavy lead.

Allow chassis and Signal Generator to "Heat Up" for several minutes.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.
Refer to Alignment Charts

MODEL C-8
Tuner Alignment Data

# CADILLAC DIV.—GEN. MOTORS

## ALIGNMENT CHART NUMBER ONE

| SIGNAL GENERATOR Frequency Setting | Connection at Radio | Dummy Antenna | Button Depressed | Inductive Tuner and Dial Setting | Adjust Trimmers to Maximum |
|---|---|---|---|---|---|
| I.F. ADJUSTMENT | | | | | |
| 456 KC | Control Grid (prong No. 4) 6SK7 2nd I.F. Tube See Note A | .1 mf. | Manual | 1550 KC | 3rd I.F. (C21) & (C22) See Fig. 2 |
| 456 KC | Control Grid (prong No. 4) 6SK7 1st I.F. Tube | .1 mf. | Manual | 1550 KC | 2nd I.F. (C16) & (C17) See Fig. 2 |
| 456 KC | Control Grid (top cap) 6K8 1st Det. Tube | .1 mf. | Manual | 1550 KC | 1st I.F. (C13) & (C14) See Fig. 2 |
| OSCILLATOR ADJUSTMENT | | | | | |
| 1550 KC | Control Grid (top cap) 6K8 1st Det. Tube | .1 mf. | Manual | 1550 KC | Osc. (C10) |
| 1400 KC ADJUSTMENT | | | | | |
| 1400 KC | Antenna Cable - See Note B | 35 mmf. | Manual | Tune to Maximum Output with station selector drum. | Int. 1400 KC (C6) Ant. 1400 KC (C4) See Fig. 2 |
| 600 KC ADJUSTMENT | | | | | |
| 600 KC | Antenna Cable | 35 mmf. | Manual | Tune to Maximum Output with station selector drum. | 600 KC (T7) See Fig. 2 Rocking Adjustment - Note C |
| 1400 KC READJUSTMENT | | | | | |
| 1400 KC | Antenna Cable | 35 mmf. | Manual | Tune to Maximum Output with station selector drum. | Osc. (C10) See Fig. 2 Rocking Adjustment - Note C |

NOTE A - Insert antenna cable at chassis and short circuit open end of cable to cable shield for all I.F. and oscillator adjustments.
NOTE B - Remove antenna cable short circuit and insert 35 mmf. condenser between open end of antenna cable and signal generator.
NOTE C - Rotate station selector drum back and forth and turn the adjusting screw until the peak of greatest intensity is obtained.

## ALIGNMENT CHART NUMBER TWO

CAUTION - DO NOT CHANGE SETTING OF ANY TRIMMERS THAT HAVE BEEN ADJUSTED UP TO THIS POINT.

| SIGNAL GENERATOR Frequency Setting | Connection at Radio | Dummy Antenna | Button Depressed | Automatic Tuner Setting | Adjust Coil Positions to Maximum Output |
|---|---|---|---|---|---|
| AUTOMATIC TUNER ADJUSTMENTS AND ALIGNMENT | | | | WITH BUTTON DEPRESSED, TURN AUTOMATIC TUNER ADJUSTING SCREW TO MAXIMUM OUTPUT. | See Note D |
| 700 KC | Antenna Lead | 35 mmf. | No. 1 | Ajusting Screw No. 1 | Antenna Coil No. 1 Interstage Coil No. 1 |
| 700 KC | Antenna Lead | 35 mmf. | No. 2 | Adjusting Screw No. 2 | Antenna Coil No. 2 Interstage Coil No. 2 |
| 850 KC | Antenna Lead | 35 mmf. | No. 3 | Adjusting Screw No. 3 | Antenna Coil No. 3 Interstage Coil No. 3 |
| 1100 KC | Antenna Lead | 35 mmf. | No. 4 | Adjusting Screw No. 4 | Antenna Coil No. 4 Interstage Coil No. 4 |
| 1100 KC | Antenna Lead | 35 mmf. | No. 5 | Adjusting Screw No. 5 | Antenna Coil No. 5 Interstage Coil No. 5 |

NOTE D - At the top of the automatic tuning unit can be seen ten round openings - See Fig. 3. Through these openings can be seen the ten "W" openings on the other side of the unit. Insert a thin blade screw driver through the round openings and in the "W" opening of the proper button and adjust the position of the coil by twisting the screw driver until maximum output is obtained.

## ADJUSTING ANTENNA 1400 KC TRIMMER

After the radio is installed and the car antenna is connected, it is necessary to readjust the antenna 1400 KC trimmer.

There are two small holes in the chassis case near the antenna connection through which the antenna capacity and antenna trimmer adjustments are to be made. See Fig. 2. With the Cadillac Vacuum Antenna, the screw marked "Capacity" should be set to the extreme clockwise position. With the Cadillac Under Car or Running Board Antenna, the screw marked "Capacity" should be set to the extreme counter clockwise or high capacity position.

To adjust trimmer, tune in a weak signal at approximately 1400 KC with the volume control about three-fourths on, turn the adjusting screw (marked **trim**) in or out until maximum output is obtained. On Vacuum Antenna this adjustment should be made with **antenna fully extended.**

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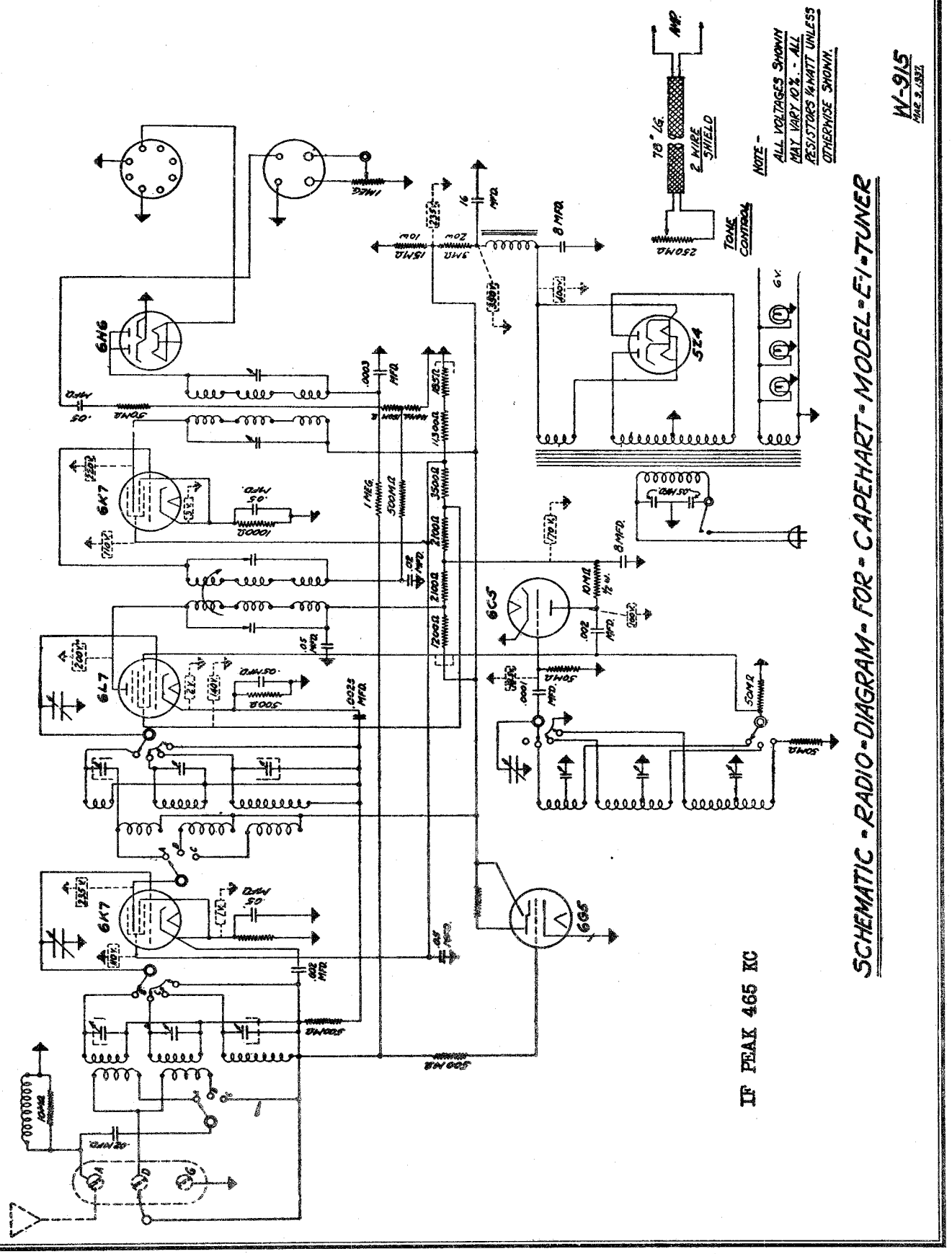
# CAPEHART CORPORATION

MODEL E-1
Tuner Schematic
Voltage

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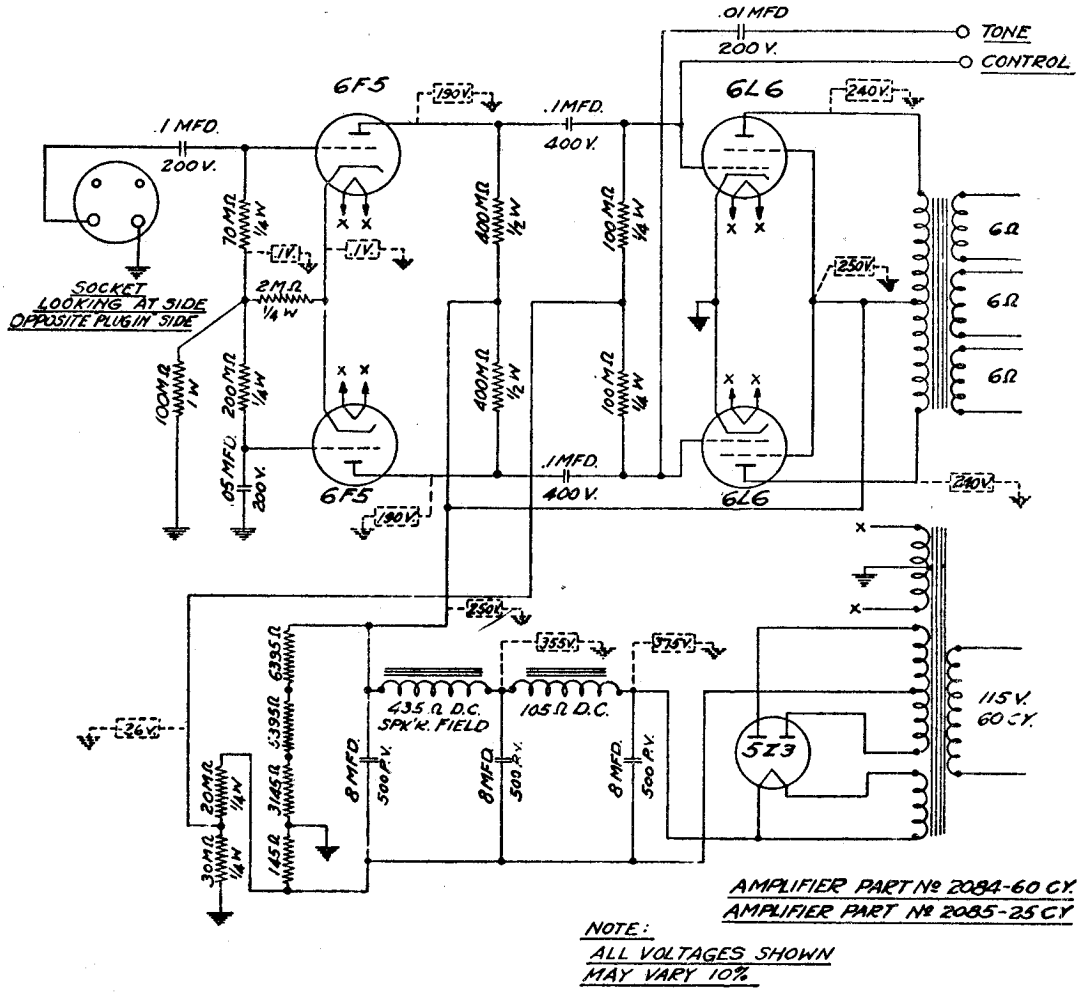
MODEL E-1
Amplifier Schematic
Voltage, Alignment

## CAPEHART CORPORATION




W-912
JAN. 5, 1937
O.F. HOFER

## · SCHEMATIC · CAPEHART · AMPLIFIER · E-1 · SERIES

Align the i-f stages at 465 kc after removing the 6C5 oscillator and with the test oscillator connected to the grid of the 6L7 first detector.

R-F Alignment: Replace the 6C5 and connect the test oscillator to the antenna post of the receiver. Start with the oscillator trimmer with the dial set on the high-frequency end of the band at the frequencies listed below:

Broadcast Band - 1400 kc  1st H-F Band - 5.0 mc  2nd H-F Band - 17 mc

After the oscillator trimmer has been adjusted, align the r-f trimmer of each band. Then set the oscillator padding condensers of the various bands at the following frequencies:

Broadcast Band - 550 kc  1st H-F Band - 2.0 mc  2nd H-F Band - 6.0 mc

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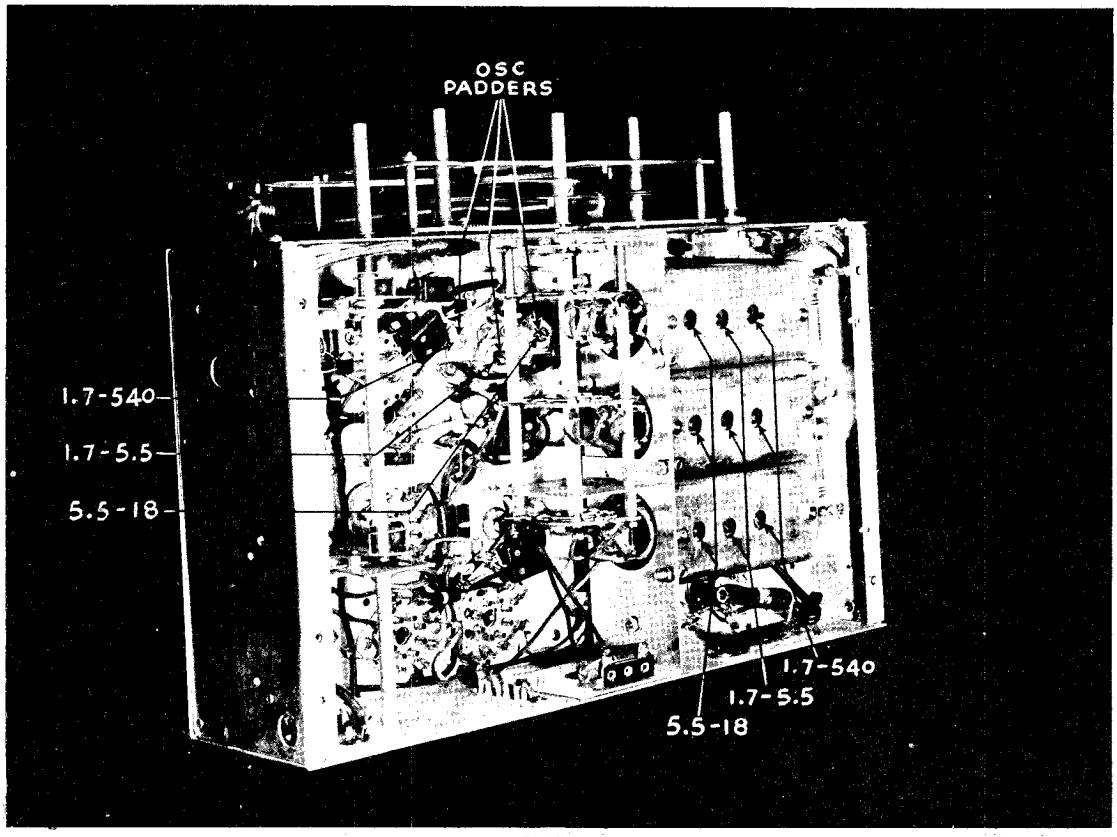
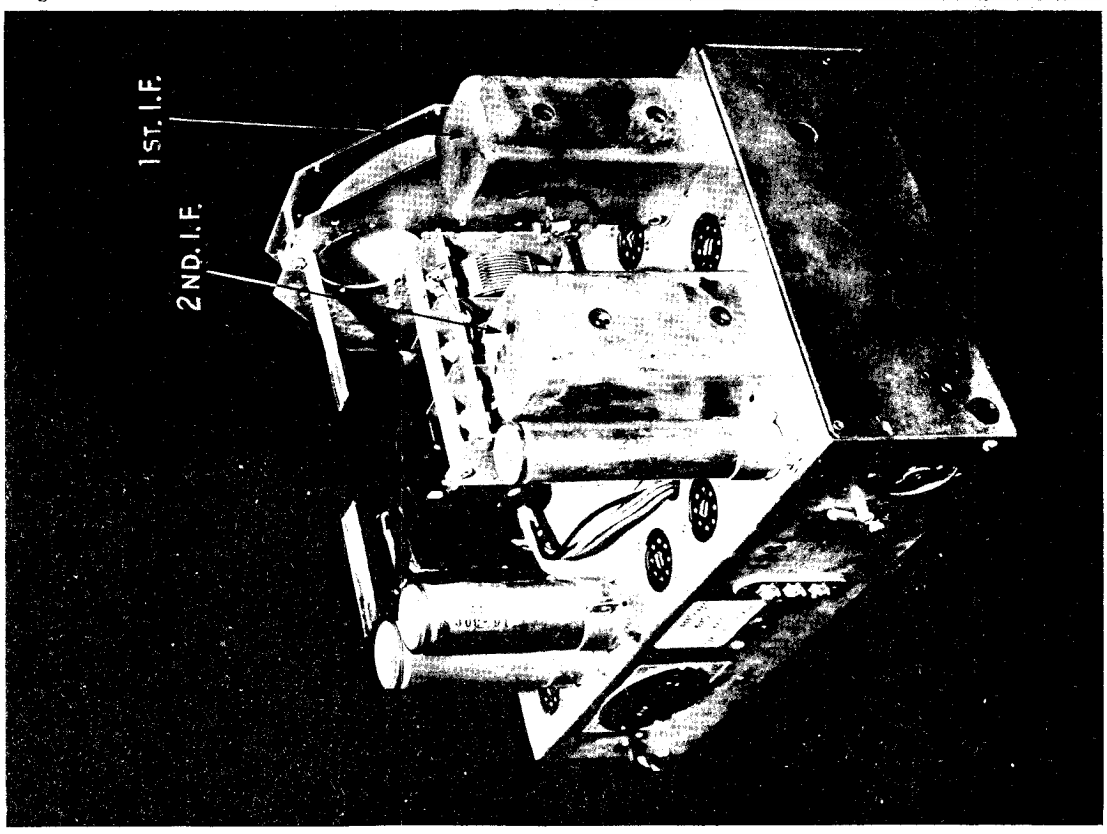
# CAPEHART CORPORATION

MODEL E-1
Trimmers, Chassis

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MODEL 110-G, Panamuse
Trimmers, Chassis
Alignment

# CAPEHART CORPORATION




ALIGNMENT INSTRUCTIONS

When aligning the i-f stages, short the oscillator section of the tuning condenser to ground. Set test oscillator to 465 kc and connect to the grid of the 6A8 first detector. Set the i-f trimmers for maximum reading of the output meter connected across the voice coil.

When aligning the r-f amplifier, connect the test oscillator to the antenna post, after removing ground from the tuning condenser mentioned above. Regardless of which band is being aligned, start with the oscillator coil trimmer with the dial set on the high-frequency end of the band at the following frequencies:

| | |
|---|---|
| Broadcast band | ------ 1400 kc |
| 1st H-F band | ------ 5.0 mc |
| 2nd H-F band | ------ 17 mc |

After the oscillator coil trimmers have been set, align the r-f trimmers. Next set the oscillator padding condensers of the various bands at the following frequencies:

| | |
|---|---|
| Broadcast band | ----- 550 kc |
| 1st H-F band | ----- 2.0 mc |
| 2nd H-F band | ----- 6.0 mc |

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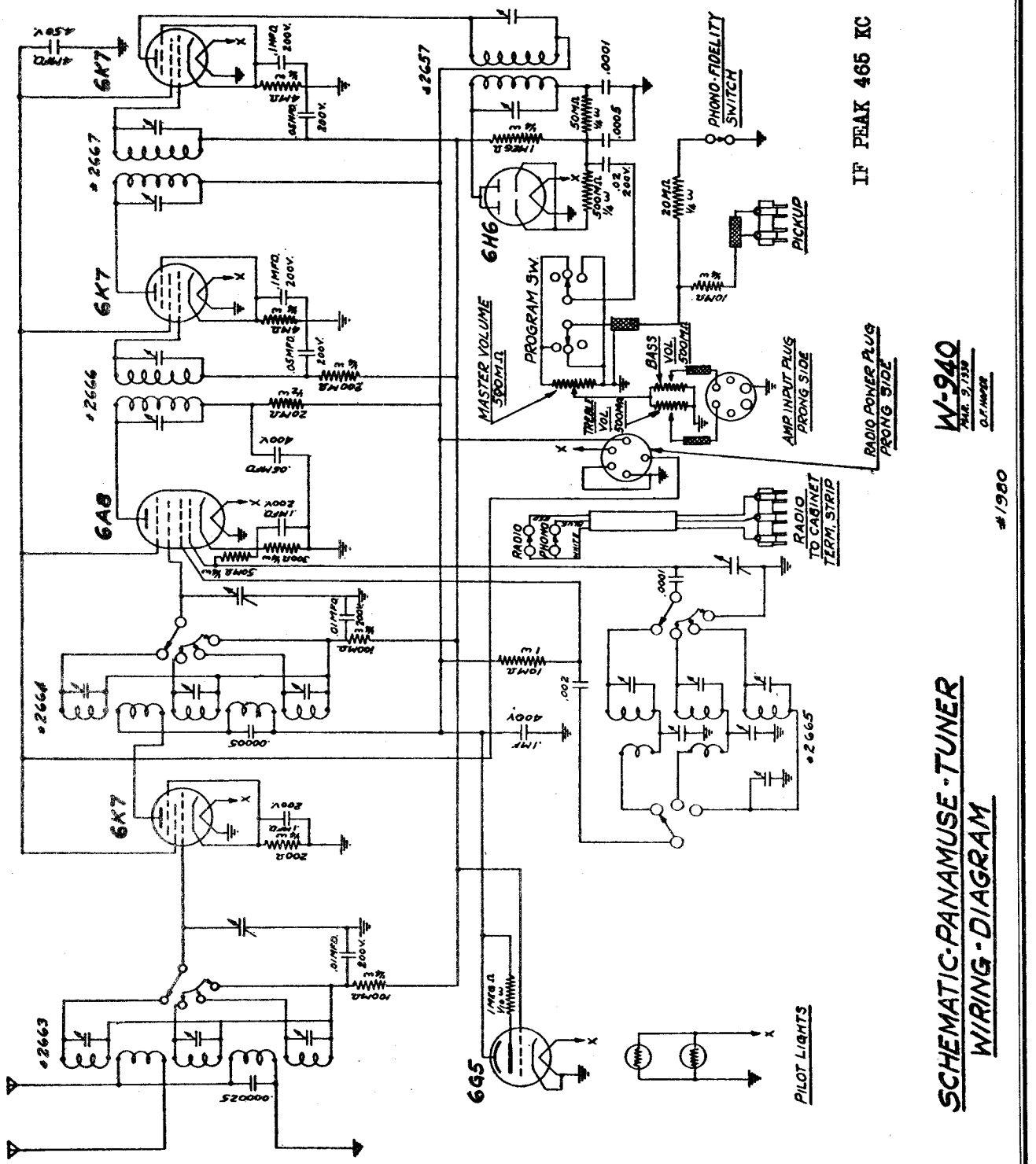
# CAPEHART CORPORATION

MODEL 110-G, Panamuse
Tuner Schematic

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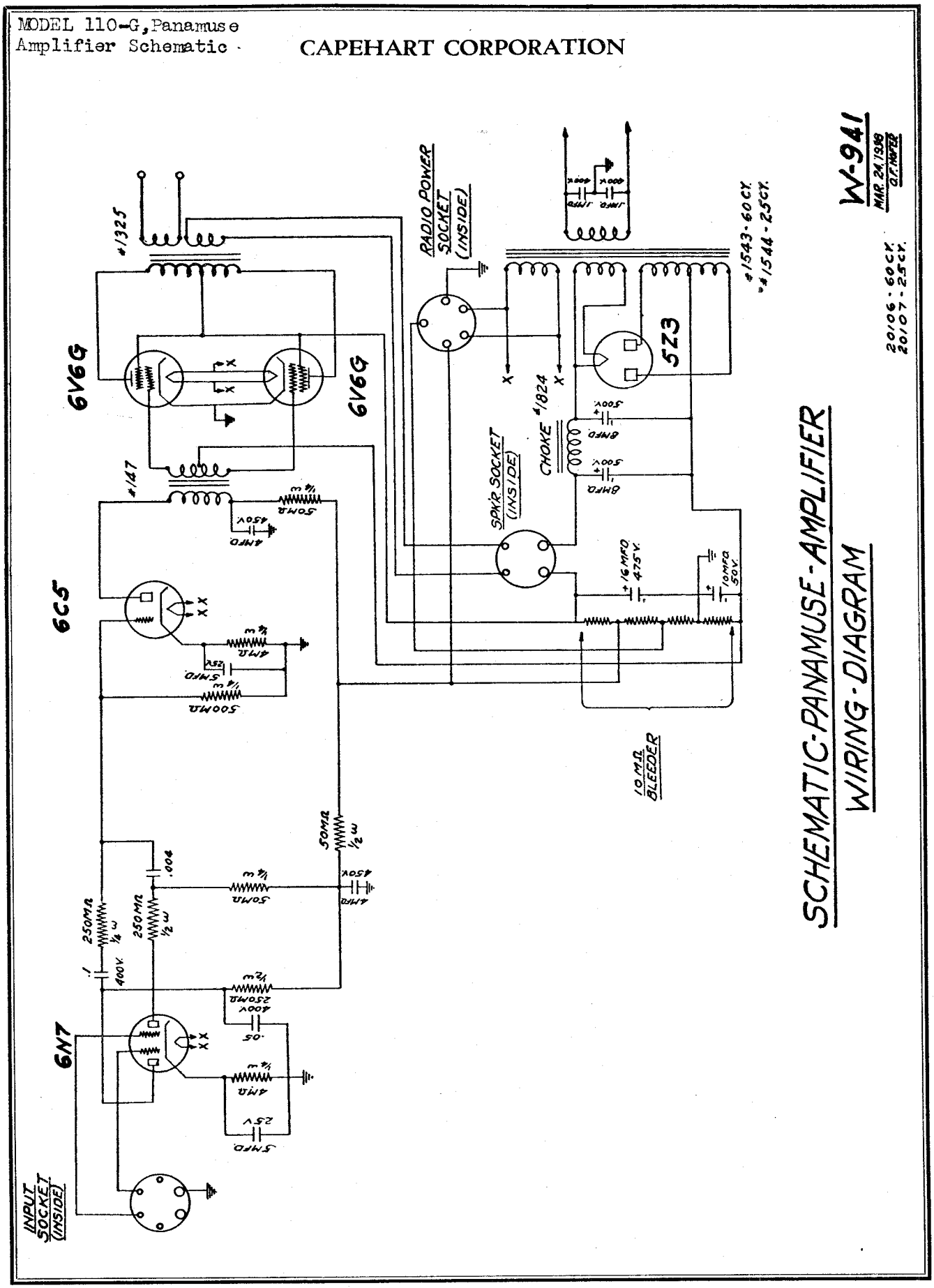
MODEL 110-G, Panamuse
Amplifier Schematic

CAPEHART CORPORATION

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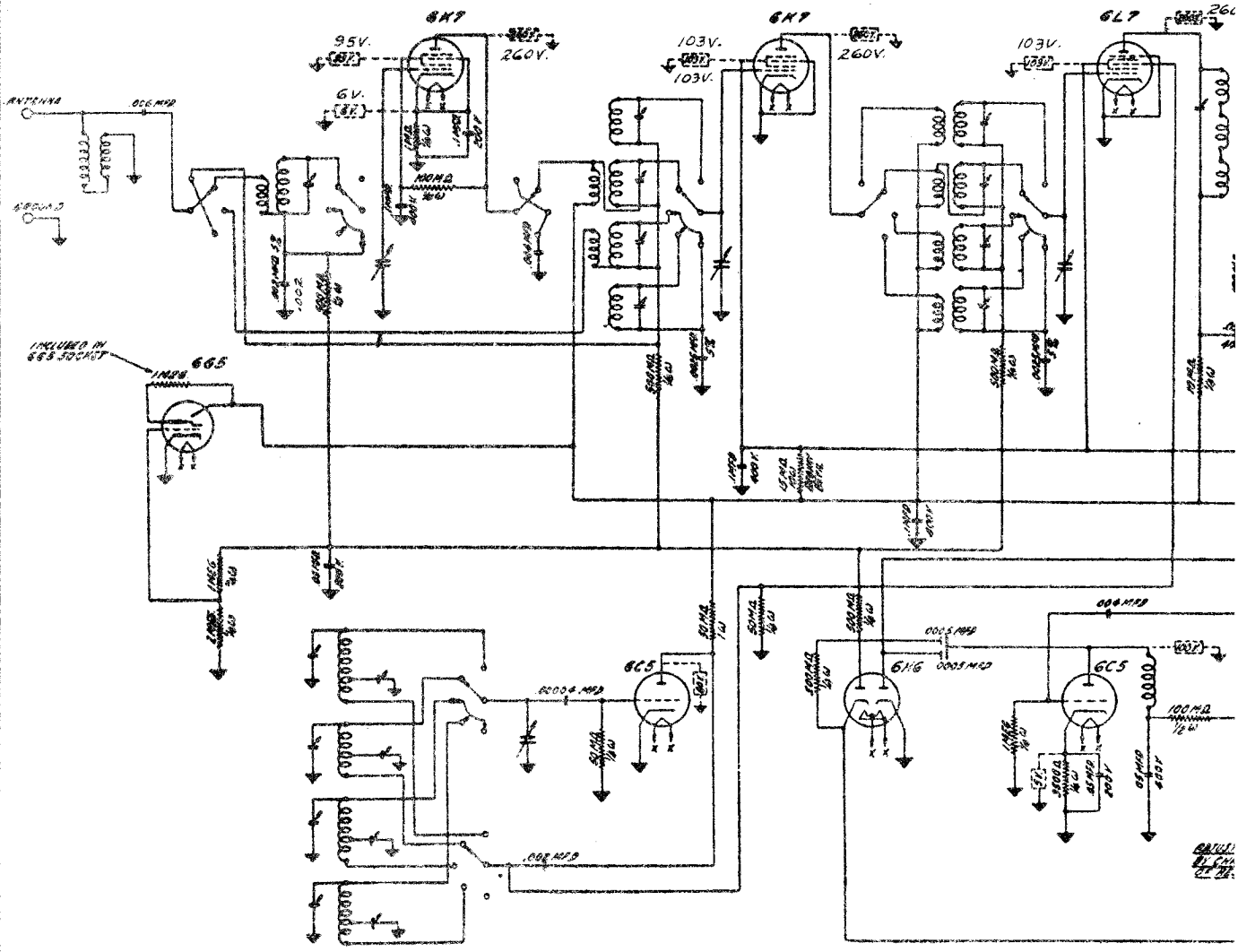


## ALIGNMENT PROCEDURE

When aligning the i-f stages at 465 kc, make certain the Selectivity Control treme counter-clockwise position, i.e. set to "sharp tuning". Remove the 6C5 tube and connect the output of the test oscillator to the grid of the 6L7 fir The bias of this tube is fixed, therefore it will be necessary to leave the g the tube and couple the oscillator through a .001 or .002-mf condenser. Adju mers on the three i-f transformers for maximum readings.

R-F Alignment: Replace the 6C5 oscillator tube. Connect the test oscillator t post with the dial set on the high-frequency end of the band at the following

| | | | |
|---|---|---|---|
| Long-Wave Band ... | 400 kc | First H-F Band ... | 5.0 mc |
| Broadcast Band ... | 1400 kc | Second " " ... | 17.0 mc |

First adjust the oscillator trimmers and then the r-f trimmers. After the ad these trimmers, set the oscillator padding condensers of the various bands at frequencies:

| | | | |
|---|---|---|---|
| Long-Wave Band ... | 200 kc | First H-F Band ... | 2.0 mc |
| Broadcast Band ... | 550 kc | Second " " ... | 6.0 mc |

AMP

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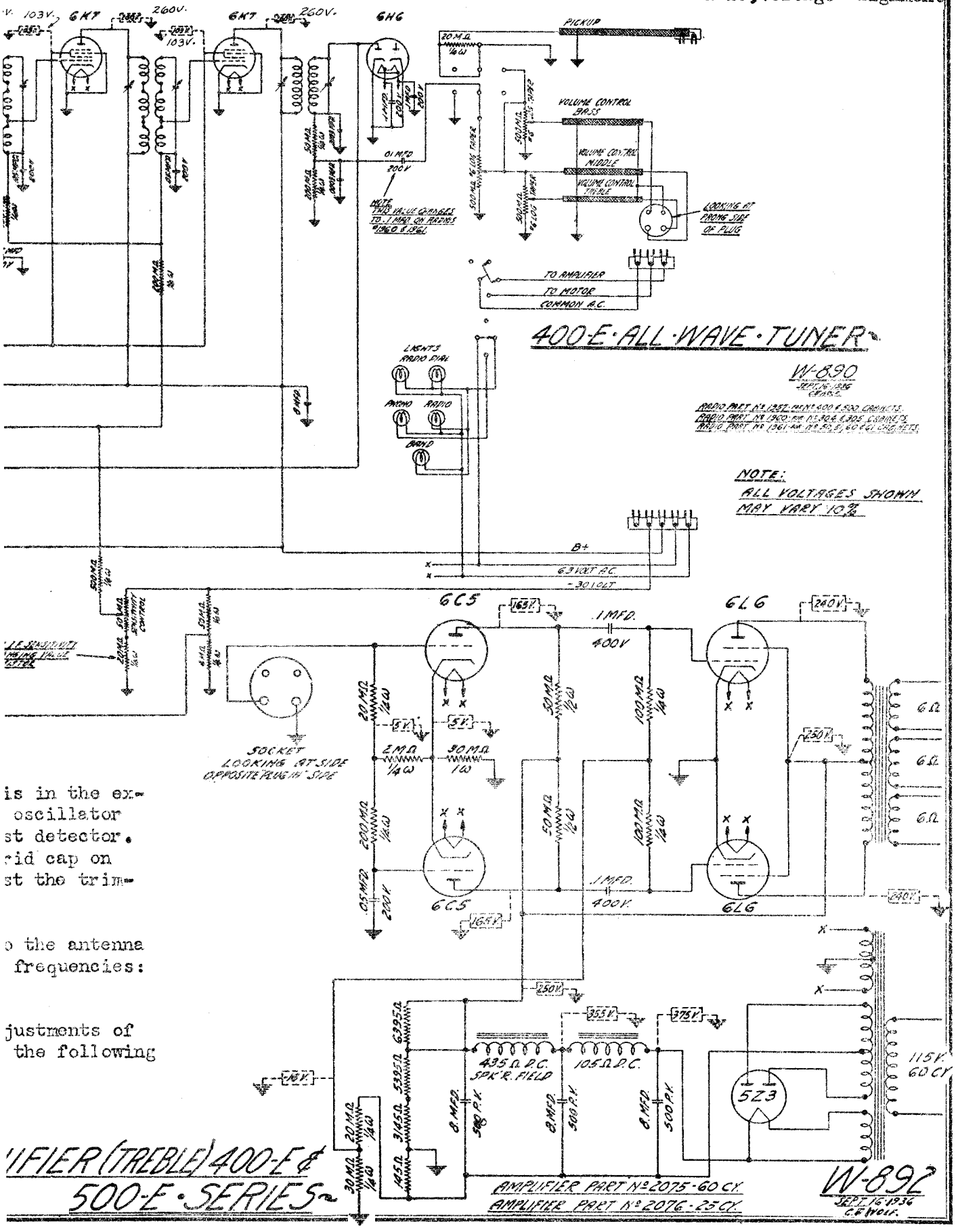
CORPORATION

MODELS 400-E,500-E Series
Schematic, Voltage Alignment

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IFIER (TREBLE) 400-E &
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MODELS 400-G,500-G Series
Remote Control Installation

CAPEHART (

THIS DRAWING SHOWS A CAPEHART REMOTE INSTALLATION OF 5
FOR THESE CONTROL STATIONS HAVE BEEN RUN FROM A SET OF
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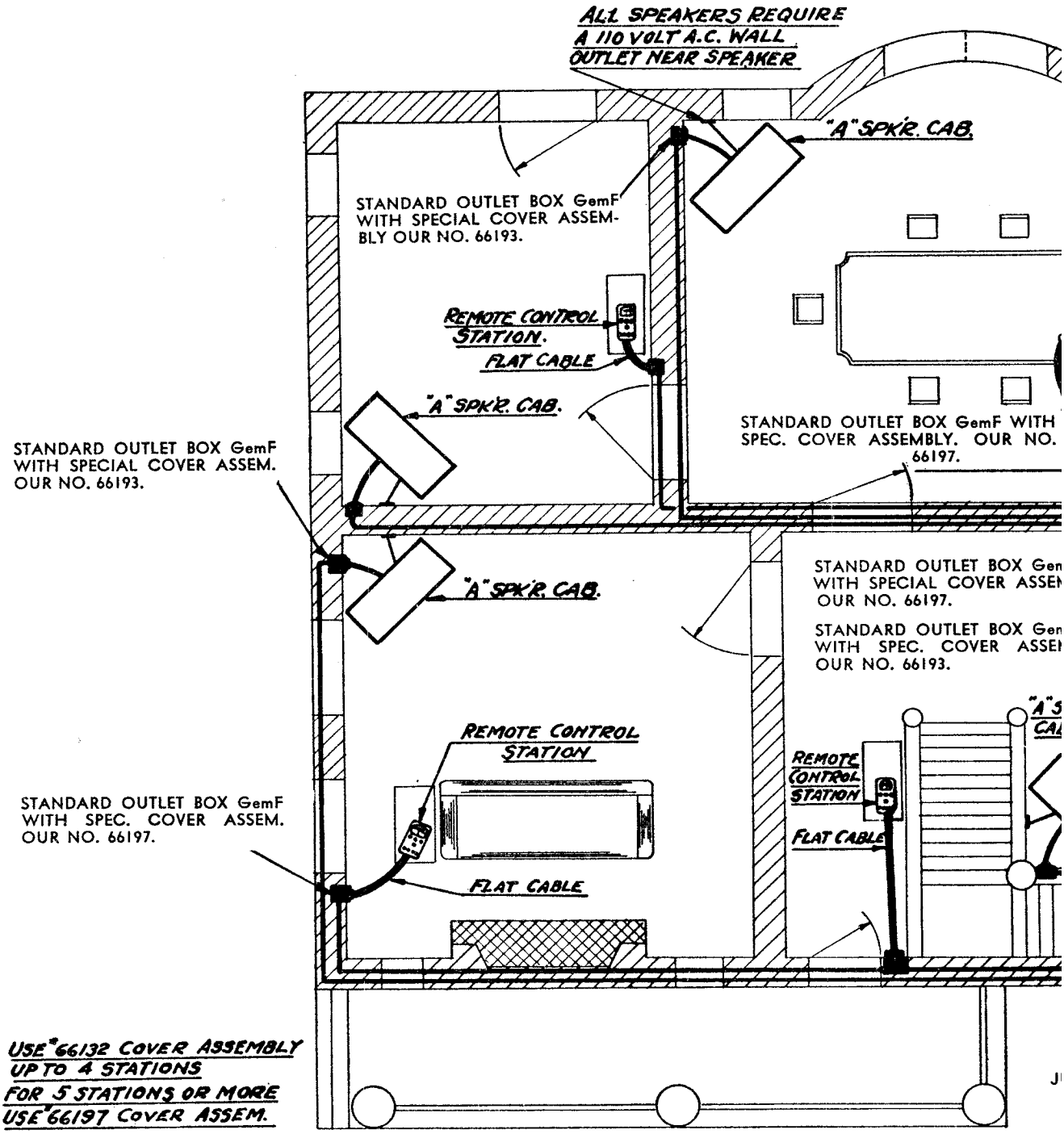
ALL SPEAKERS REQUIRE A 110 VOLT A.C. WALL OUTLET NEAR SPEAKER
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REMOTE CONTROL STATION.
FLAT CABLE
"A" SPK'R. CAB.
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STANDARD OUTLET BOX GemF WITH SPEC. COVER ASSEM. OUR NO. 66197.
FLAT CABLE

USE #66132 COVER ASSEMBLY UP TO 4 STATIONS
FOR 5 STATIONS OR MORE USE #66197 COVER ASSEM.

THE CAPEHART, INCORPORATED
Fort Wayne, Ind., U. S. A.

CAPEHART REMO

AVAILABLE ON MODELS OF THE

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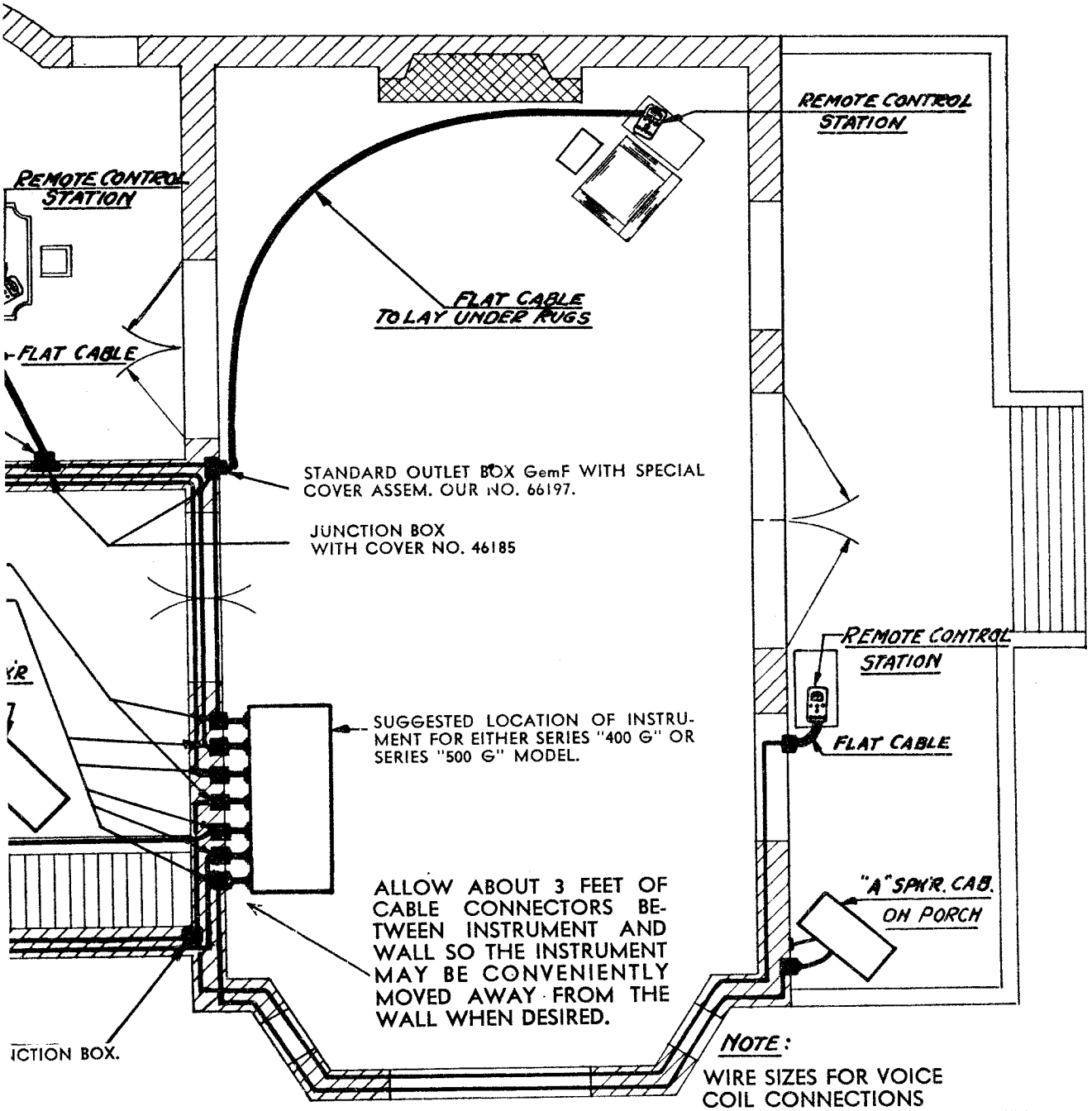

REMOTE CONTROL STATION
REMOTE CONTROL STATION
FLAT CABLE TO LAY UNDER RUGS
FLAT CABLE
STANDARD OUTLET BOX GemF WITH SPECIAL COVER ASSEM. OUR NO. 66197.
JUNCTION BOX WITH COVER NO. 46185
REMOTE CONTROL STATION
FLAT CABLE
SUGGESTED LOCATION OF INSTRUMENT FOR EITHER SERIES "400 G" OR SERIES "500 G" MODEL.
"A" SPK'R. CAB. ON PORCH
ALLOW ABOUT 3 FEET OF CABLE CONNECTORS BETWEEN INSTRUMENT AND WALL SO THE INSTRUMENT MAY BE CONVENIENTLY MOVED AWAY FROM THE WALL WHEN DESIRED.
NOTE:
WIRE SIZES FOR VOICE COIL CONNECTIONS
UP TO 100 FEET, NO. 14 WIRE
100 FT. TO 250 FEET, NO. 12 WIRE
250 FT. AND OVER, NO. 10 WIRE

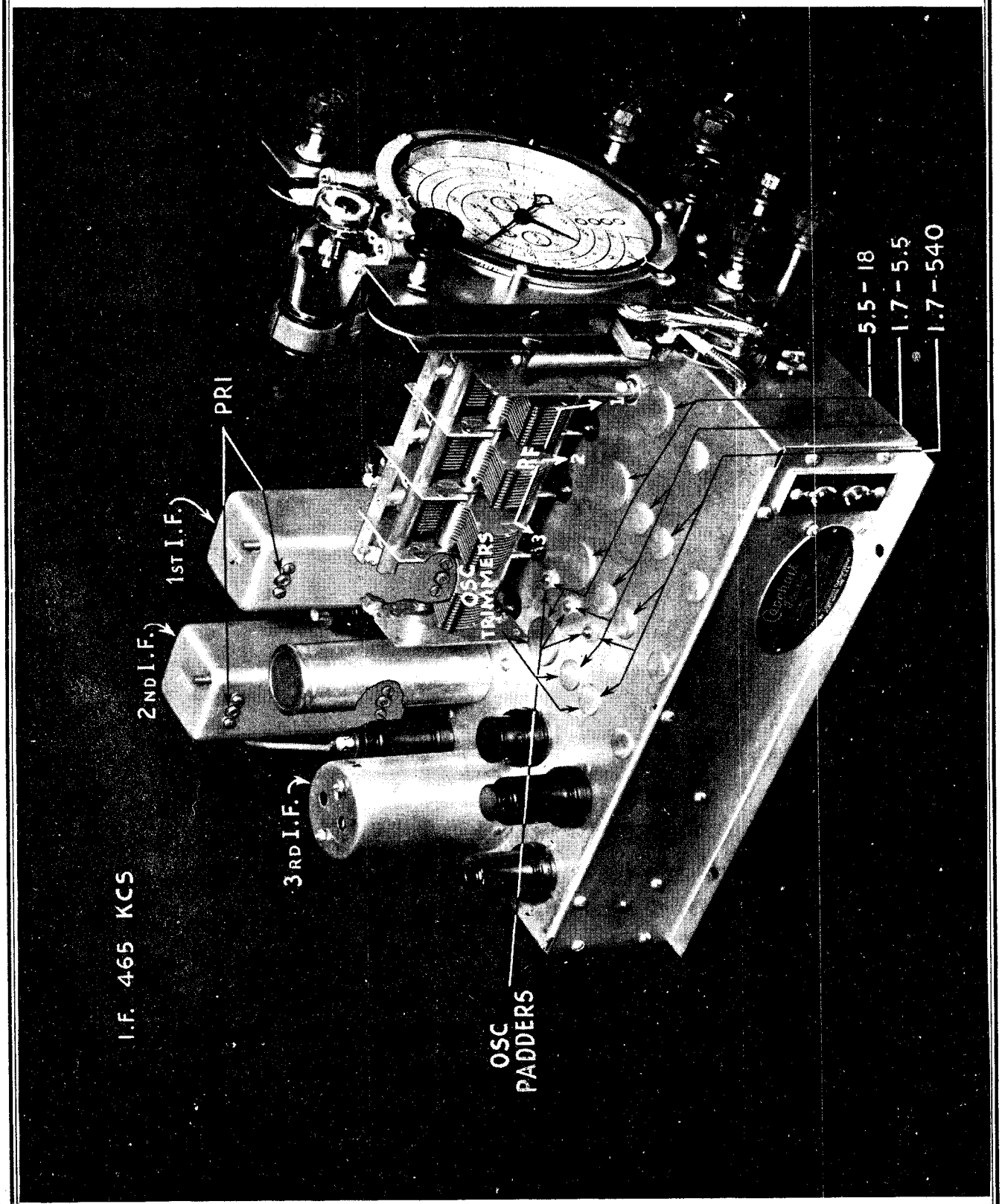
E CONTROL INSTALLATION

ERIES 400G AND SERIES 500G INSTRUMENTS

MODELS 400-E,500-E Series

# CAPEHART CORPORATION

Trimmers,Layout

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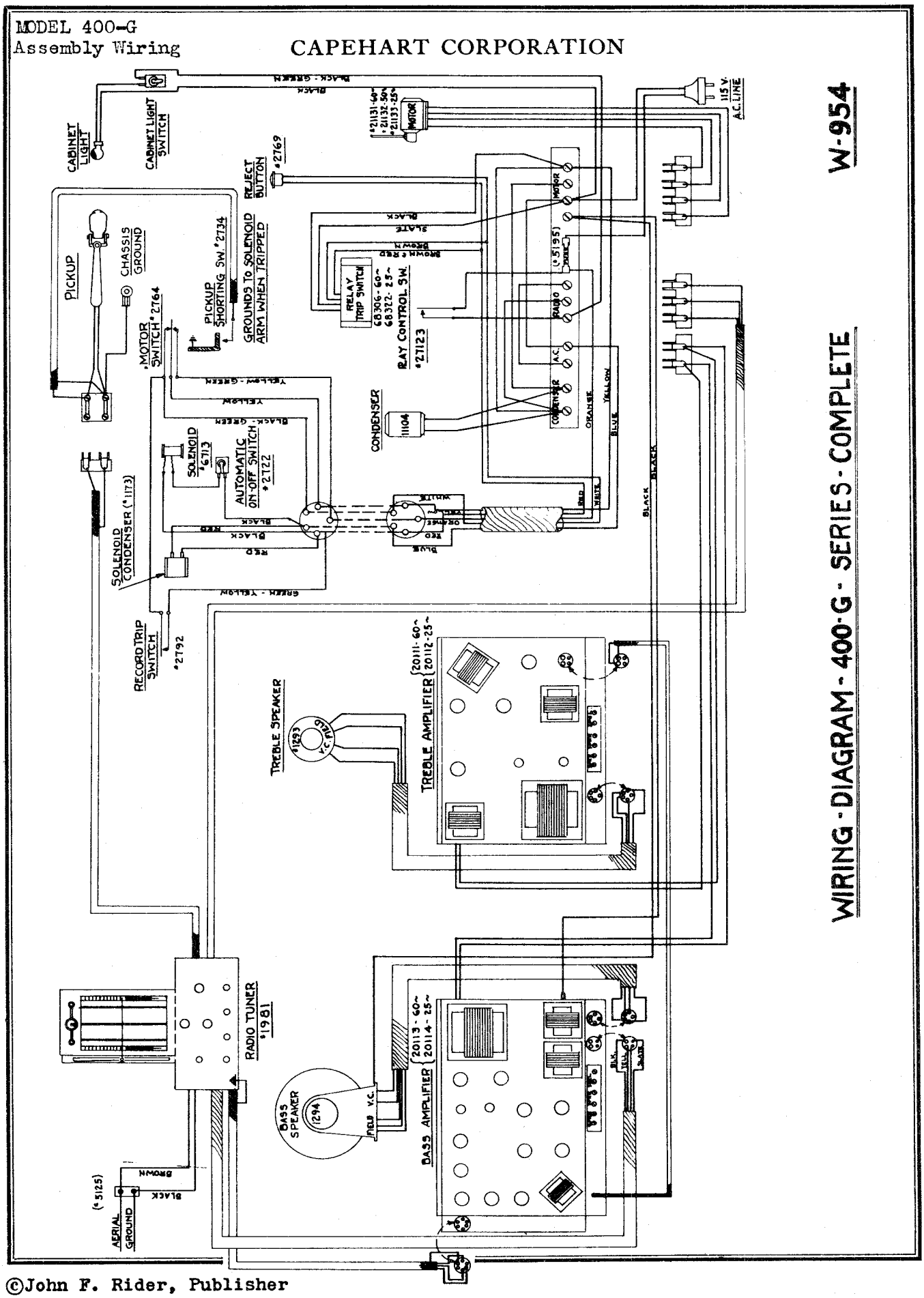
MODEL 400-G
Assembly Wiring

# CAPEHART CORPORATION

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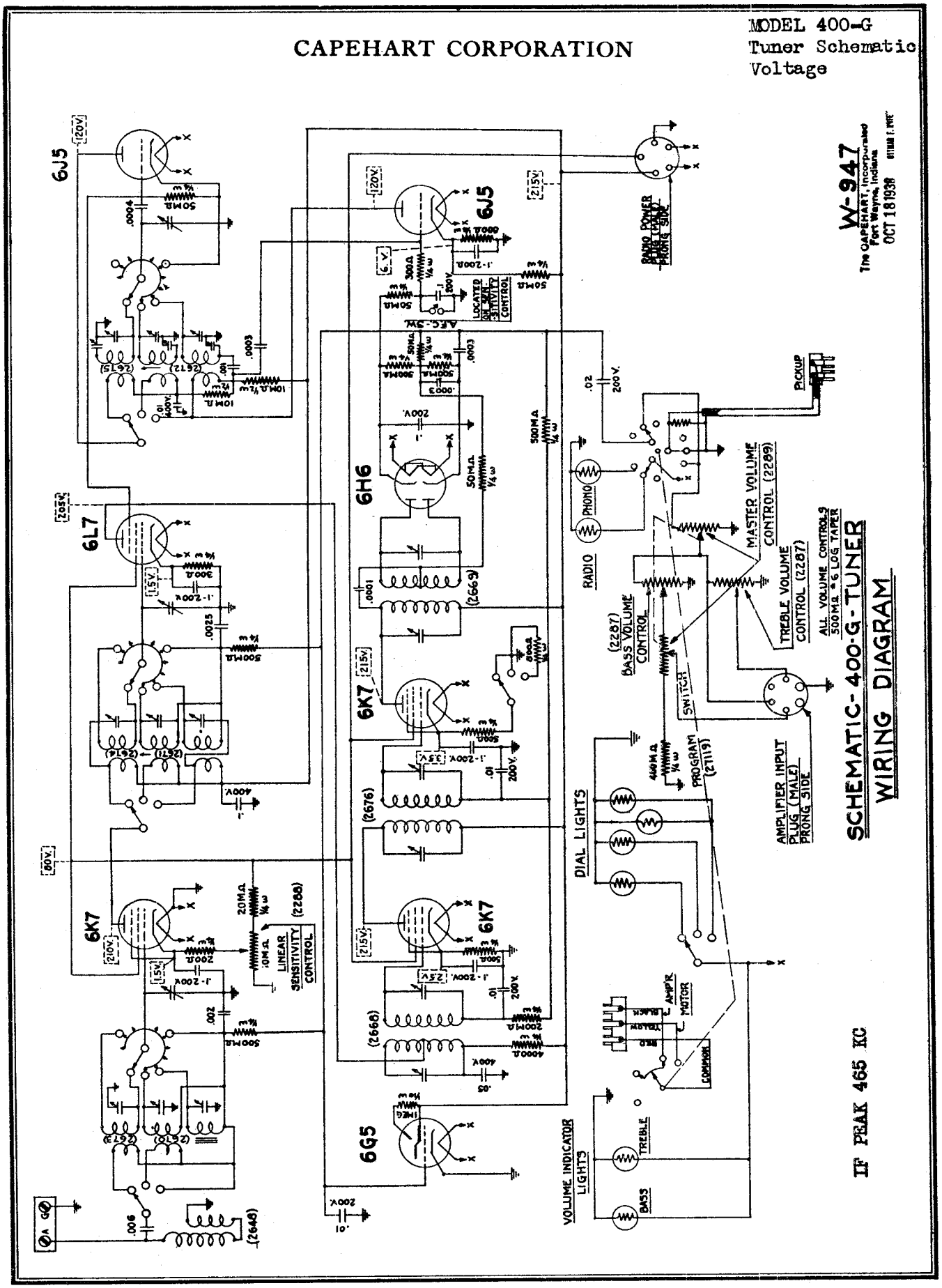


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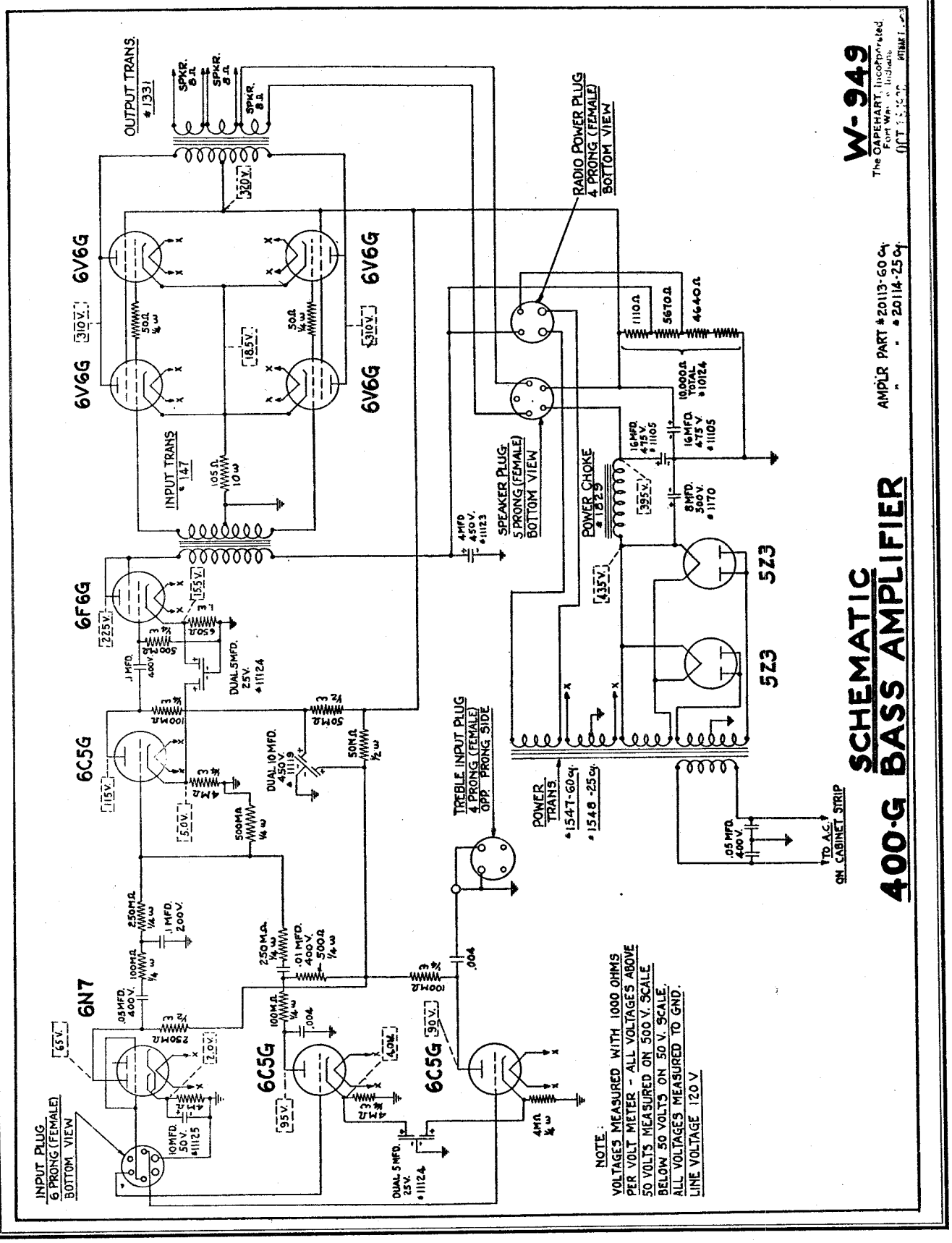
MODEL 400-G
Bass Amplifier Schematic
Voltage

CAPEHART CORPORATION

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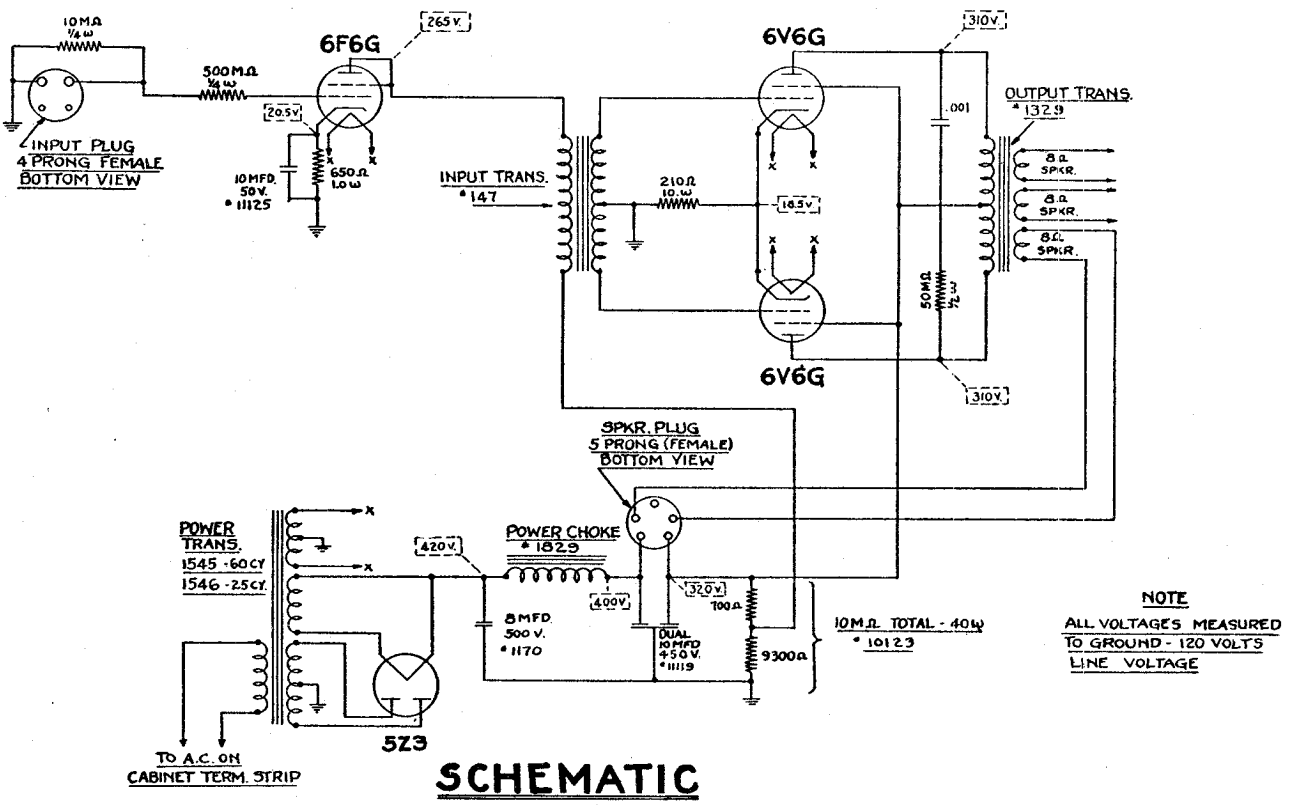
CAPEHART CORPORATION

MODEL 400-G
Treble Amplifier
Schematic, Alignment




# SCHEMATIC
# 400-G TREBLE AMPLIFIER

W-948

AMPLR. PART No. 20111-604
" " 20112-254

CAPEHART, Incorporated
Fort Wayne, Indiana

Alignment: I-F

The i-f stages are peaked at 465 kc. Remove the 6J5 oscillator tube. Set the test oscillator at 465 kc and connect the output to the grid of the 6L7 first detector. Adjust the trimmers for maximum reading of the output meter.

AFC :

The AFC circuit is aligned when aligning the i-f amplifier at 465 kc. The primary of the discriminator transformer, marked DIODE transformer in the layout, is aligned at 465 kc. The secondary is aligned with the AFC switch closed on a broadcast or oscillator signal, using either the electric eye or output meter for checking resonance. The AFC switch should then be opened and the secondary re-aligned. If alignment has been made correctly, turning the AFC switch off and on should make no difference in the cathode-ray tuning tube.

R-F :

Replace the oscillator tube. Connect oscillator to antenna post. No matter what band is being aligned, start with the oscillator trimmer with the dial set to the high-frequency end of the band at the following frequencies:

Broadcast Band ... 1400 kc
First H-F Band ... 5.0 mc
Second " " ... 17.0 mc

After the oscillator trimmer has been set for resonance, align the r-f trimmers. After these have been adjusted properly and checked, set the oscillator padding condensers of the bands at the following frequencies:

Broadcast Band ... 550 kc
First H-F Band ... 2.0 mc
Second " " ... 6.0 mc

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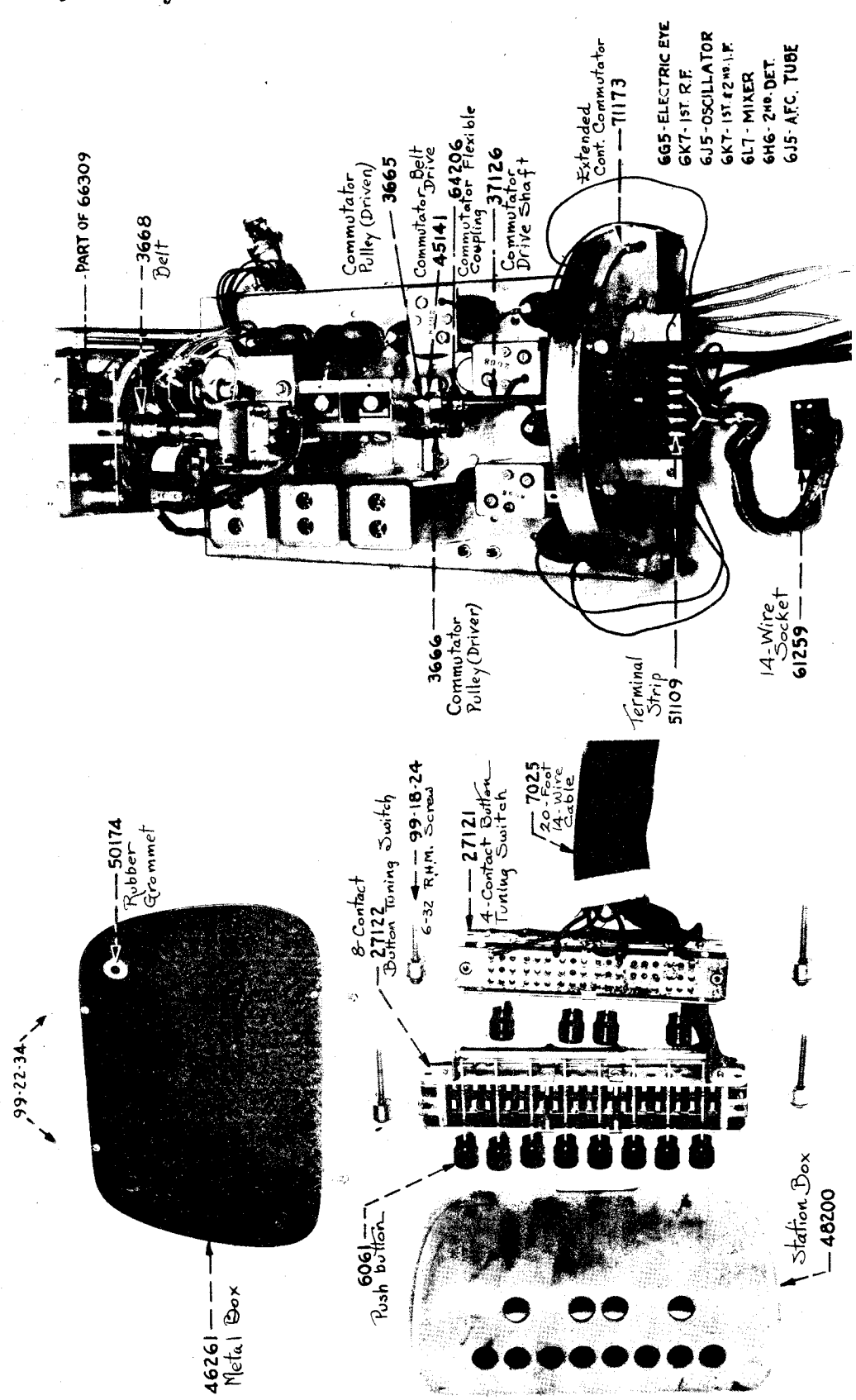
MODEL 400-G

Tuning Meter Adjustments CAPEHART CORPORATION

Chassis, Assembly




**TO ADJUST THE TUNING METERS**

IN ORDER THAT THE CALIBRATION OF THE TUNING METERS, IN THE REMOTE CONTROL STATIONS TO ADJUST A REMOTE CONTROL STATION, TUNE THE SET BY HAND, TO 550 KILOCYCLES, THEN AT EACH STATION BOX, SET THE METER TO THIS FREQUENCY BY THE ZERO ADJUSTING SCREW ON THE FACE OF THE METER. THEN TUNE THE SET, BY HAND TO 1600 KILOCYCLES, AND ADJUST THE MAY BE MADE TO AGREE WITH THE TUNING DIAL, A REHOSTAT IS PROVIDED. THIS REHOSTAT REHOSTAT UNTIL THE METERS INDICATE THIS FREQUENCY. AGAIN CHECK THE LOW FREQUENCY IS MOUNTED ON THE RADIO CHASSIS, DIRECTLY ABOVE THE ANTENNA GROUND TERMINAL STRIP. SETTING, MAKING THE NECESSARY ADJUSTMENTS BY THE ADJUSTING SCREW IN EACH BOX. THIS REHOSTAT IS USED TO COMPENSATE FOR THE VARIOUS LENGTHS OF CABLE REQUIRED IN THE DIFFERENT INSTALLATIONS, AND TO COMPENSATE IN THE DROP IN BATTERY VOLTAGE.

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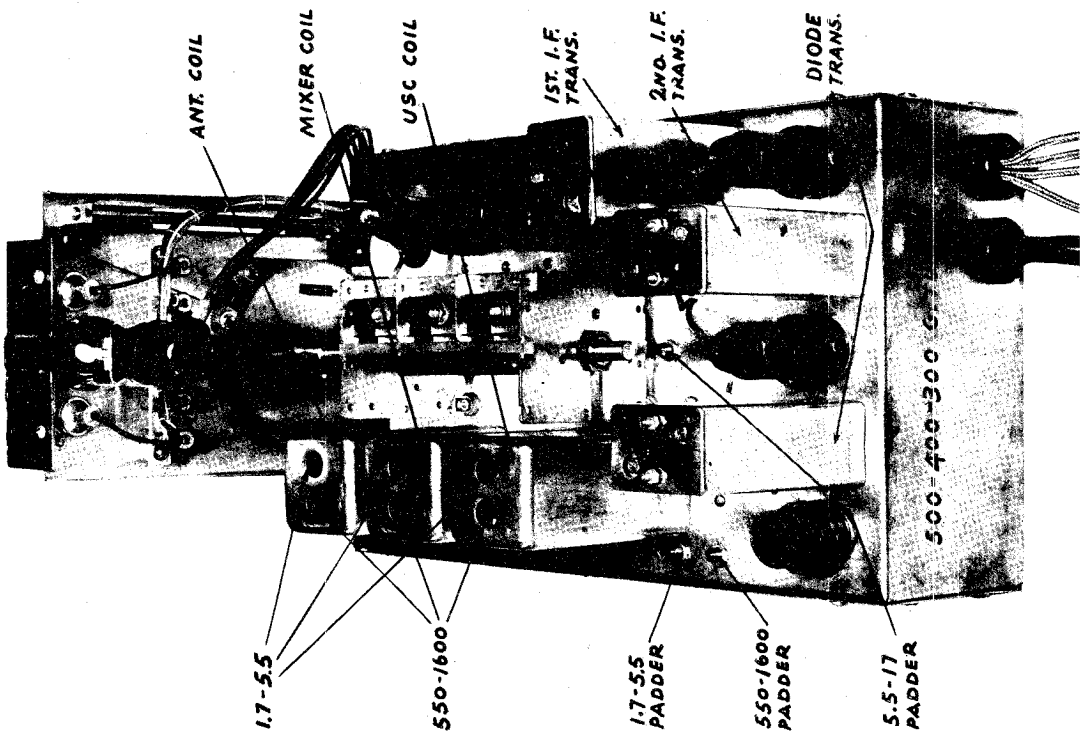
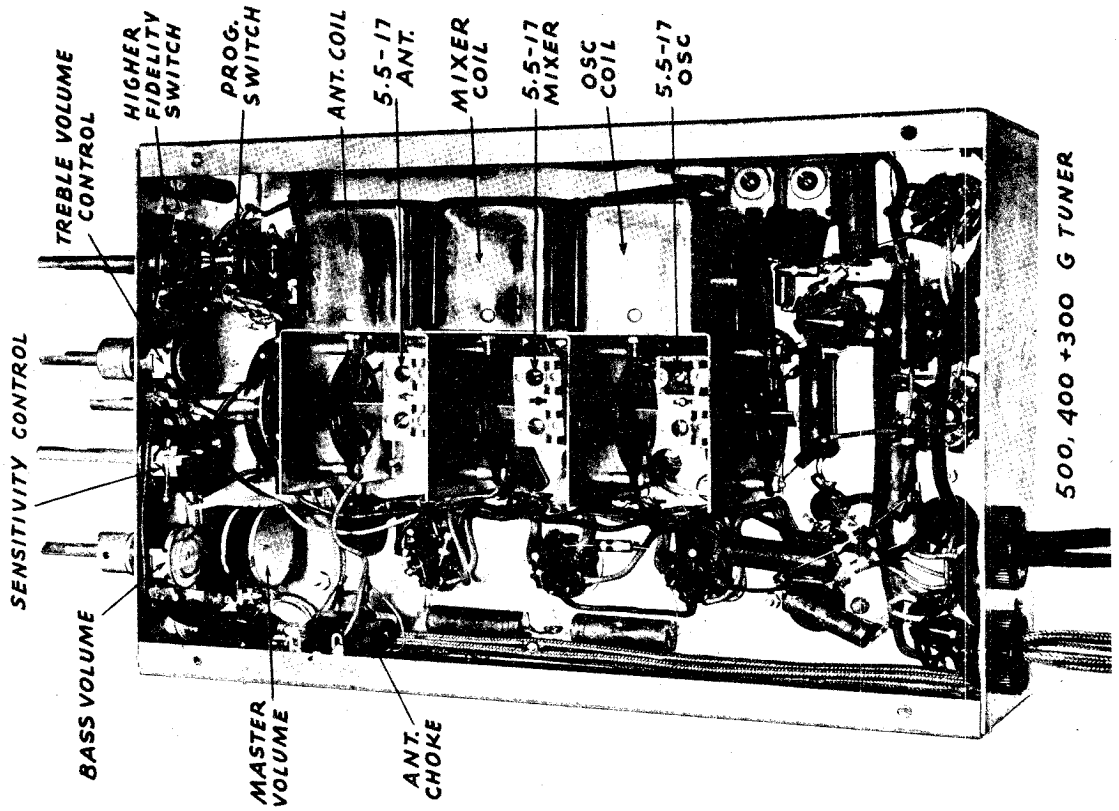
MODEL 400-G,500-G Series

# CAPEHART CORPORATION

Trimmers,Chassis

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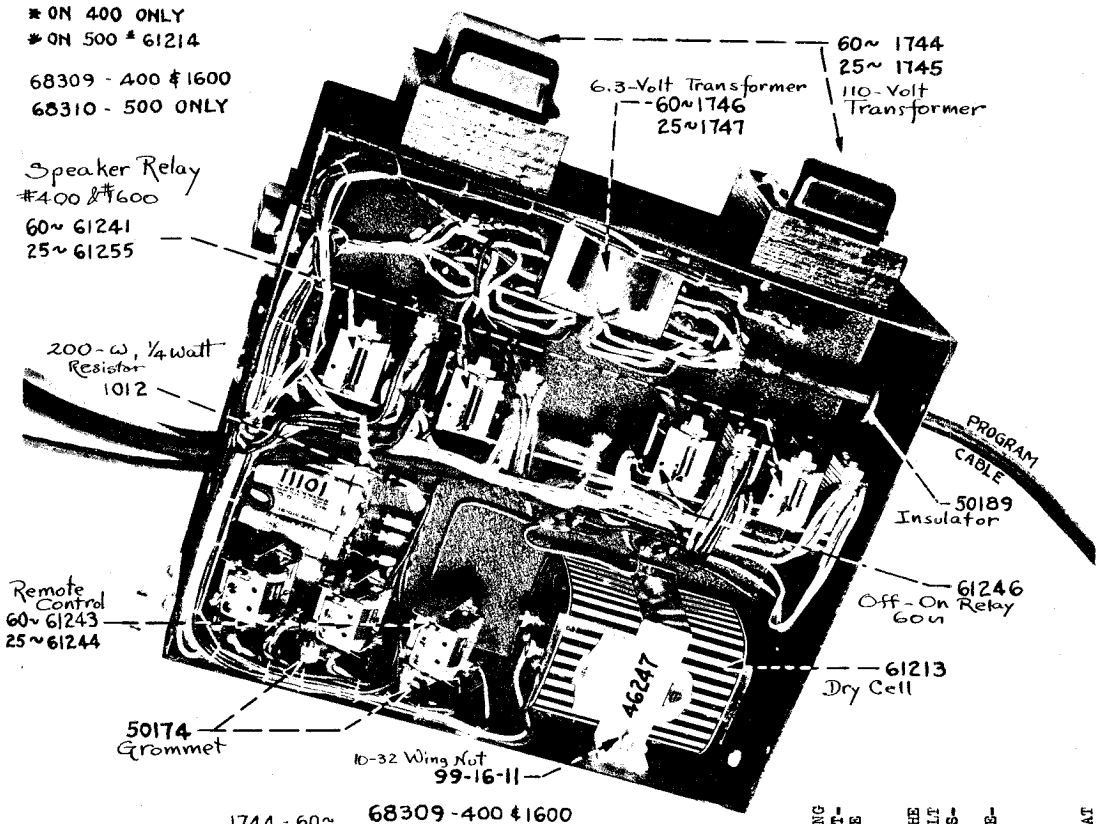
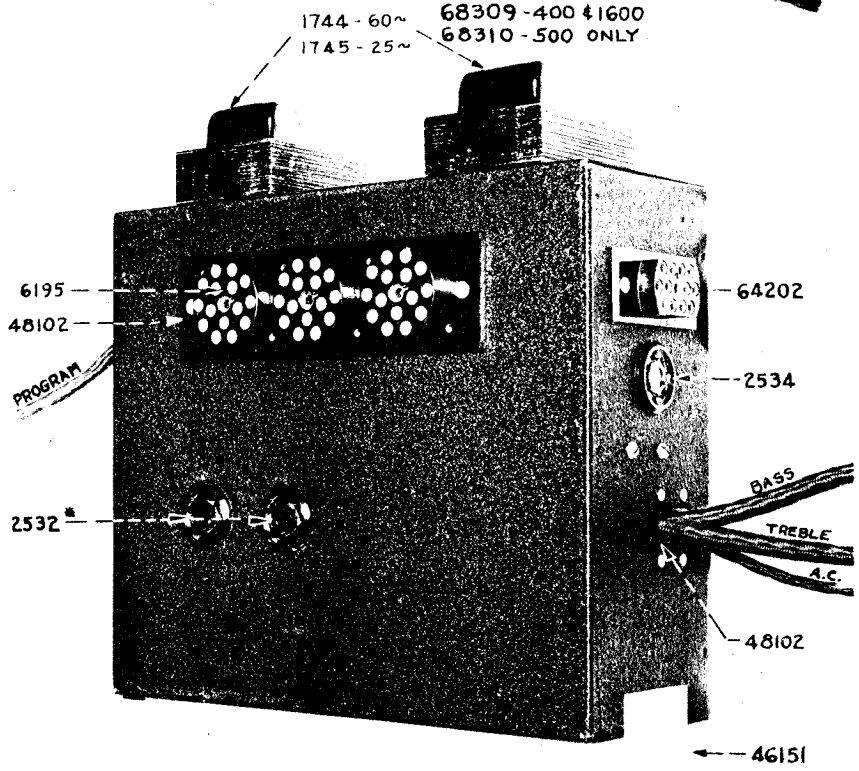
MODEL 400-G,500-G Series
Mixing Panel Chassis
Notes

# CAPEHART CORPORATION




THE #1744 TRANSFORMERS, #1745 IF 25 CYCLE, ARE FOR THE PURPOSE OF ENERGIZING THE VARIOUS RELAYS NEEDED TO PERFORM THE NECESSARY SWITCHING OPERATIONS WHEN CUTTING IN OR OUT A GROUP OF SPEAKERS, CHANGING FROM RADIO TO PHONOGRAPH, ETC. ONE OF THESE TRANSFORMERS IS ALWAYS ON THE LINE, EXCEPT WHEN THE PLAY CONTROL IS AT ZERO, TO PROVIDE VOLTAGE FOR THE OFF-ON RELAY.

TRANSFORMER #1746, #1747 IF 25 CYCLE, IS EMPLOYED FOR THE PILOT LIGHT IN THE REMOTE CONTROL STATIONS. IF TRANSFORMER #1746 OR #1747 FAILS TO WORK, THE RESULT WILL BE NO PILOT LIGHT IN THE REMOTE STATIONS, THE OUTPUT VOLTAGE OF THESE TRANSFORMERS IS 6.3 VOLTS.

THE DRY CELL, #61213, IS TO SUPPLY A STEADY SOURCE OF DIRECT CURRENT TO OPERATE THE TUNING OR KILOCYCLE METERS IN THE REMOTE STATIONS. IF IT BECOMES IMPOSSIBLE TO BRING THE METERS IN THE REMOTE STATIONS INTO SYNCHRONISM WITH THE TUNING DIAL, BY ADJUSTING THE RHEOSTAT ON THE RADIO CHASSIS, A NEW BATTERY IS INDICATED.

IF THE OFF-ON BUTTON DOES NOT TURN THE INSTRUMENT ON AND OFF, IT MAY BE THAT THE COIL IN RELAY #61246, #61257 IF 25 CYCLE, IS OPEN, HOWEVER, IF THE COIL IS NOT OPEN, THE CONTACTS MAY NEED CLEANING, OR THE SPRINGS ADJUSTED.

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MIXING PANEL - G-SERIES

If any speaker button does not switch its associated speaker group on or off, the #61241 relay, #61255 if 25 cycle, #61242 60 cycle or #61256, 25 cycle if a Model-500 instrument, may be open, or the contacts in need of adjustment or cleaning. Low volume from one set of speakers, is probably due to lack of field current, due to defective field supply rectifier tube, or the 110-volt relay not making proper contact.

The 200-Ohm resistors, in series with the 0.1 Mfd. condensers, are across the points of some of the relays as thump filters to reduce the radio interference when the relays open or close.

If either the tuning or volume control knobs are ineffective, the trouble may be located in the #61243, #61244 if 25 cycle relay. In the "G" model remote control, the relays operate from 16-volts, instead of 110-volts, with a large reduction in radio interference.

The covers, for the unused 16-wire sockets of the face of the mixing panel, used to connect the remote cables to the instrument, should be left in place. These covers hold the jumpers in the sockets, which complete the tuning meter circuit. If any cover is removed, see that the tuning meter circuit is completed, as these meters operate in series and if a jumper is removed, all meters will fail to function.

When installing a remote control system, all control stations are wired in parallel, except the tuning meters, these meters are in series. The leads for the meters are coded red for one load, and green for the other. In the event that one, or more station tuning meters read backward, the remedy is, of course, to reverse the polarity of the leads going to the meter.

If extra outlets are provided, it is necessary that some method be provided to close the meter circuit in the unused outlets, otherwise the meters will not function.

TO REPLACE KILOCYCLE METER OR GLASS

Remove the station box rear cover, by removing the six screws from the back, thus exposing the bakelite meter cover. This cover has three solder lugs at the bottom edge, all leads to these lugs should be unsoldered. Extreme care should be used in removing the two leads going into the meter case. After the leads are free, remove the three screws holding the meter cover in the box, lift the meter cover and the pilot light, out. Check the position of the Zero adjuster in the face of the box. This is a bakelite part and its pin, which adjusts the meter hand, should be turned to the large opening, in the slot of the Zero correcting arm. Now remove the two screws holding the meter mounting bracket to the case. Care should be exercised when handling the meter, not to bend the hand or get any foreign bodies, especially steel particles, in its moving parts. The glue used to hold the glass in place, is water soluble, and any broken pieces of glass, remaining in the case, may be removed by soaking.

Linoleum cement may be used to hold the new glass in place. This cement requires a minimum of 36 hours to dry, due to the impervious nature of the box and glass. After the cement has hardened, clean the glass carefully, on the inside before remounting the meter. Also check the Zero adjuster before setting the meter into the box, to see that the pin will enter its slot without striking and bending the correcting arm.

When replacing the pointer, #6062, turn the shaft to the position where the switch is open, then turn the shaft ONE notch or step toward one hundred, at this point, set the indicator on Zero and set up the set screw, checking to see that the pointer does not ride on the dial at any point.

TO SET STATION STOPS ON EXTENDED TUNING CHASSIS

Starting at the high frequency (shortest wave length) end of the broadcast band, with the AFC off, pick the desired station, nearest the end of the dial. Slide station stop #1 on the commutator, meanwhile holding button #1 down, until the station desired comes in best, then lock the station stop, by the thumb screw. The odd numbered stops are in the outer row and the even numbered stops in the inner row, (by having two rows of stops, stations on adjacent channels may be tuned in). Next, adjust stop #2 for the next low frequency station, using button #2 and so on, until all eight stops are adjusted. Always have the AFC switch in circuit when using extended tuning, except during the time the stops are being set. Proper call letter strips should be inserted in the buttons with the celluloid covers over them. These call letter slips and covers are packed in a manila envelope with each extended control instrument.

On the chassis, is a relay #61235, #61245 if 25 cycles, which is used to shift the clutch so that the meter may drive either the gang condenser or the volume control, a set of contacts is mounted on this relay to mute the speakers when the meter is tuned from station to station. If a station button is depressed, this relay should close, muting the speakers and shifting the clutch so as to engage with the condenser drive pulley, in the event of failure of the instrument to tune when a station button is depressed, failure may be traced to an open coil in this relay, if the meter operates properly.

Underneath the chassis is the program relay, #61240, #61258 if 25 cycle. Failure to change from radio to phonograph, or from phonograph to radio, may be due to an open coil or improper contact adjustment here.

In the bottom of the cabinet is the OFF-ON relay, #61246, #61257 if 25 cycle. Failure of the instrument to start or shut off when the corresponding buttons are pushed, may be due to failure of the relay coil or improper adjustment of the contacts.

In case a control button fails to operate from the control box, but the corresponding button on the instrument works, the trouble may be located in the cable.

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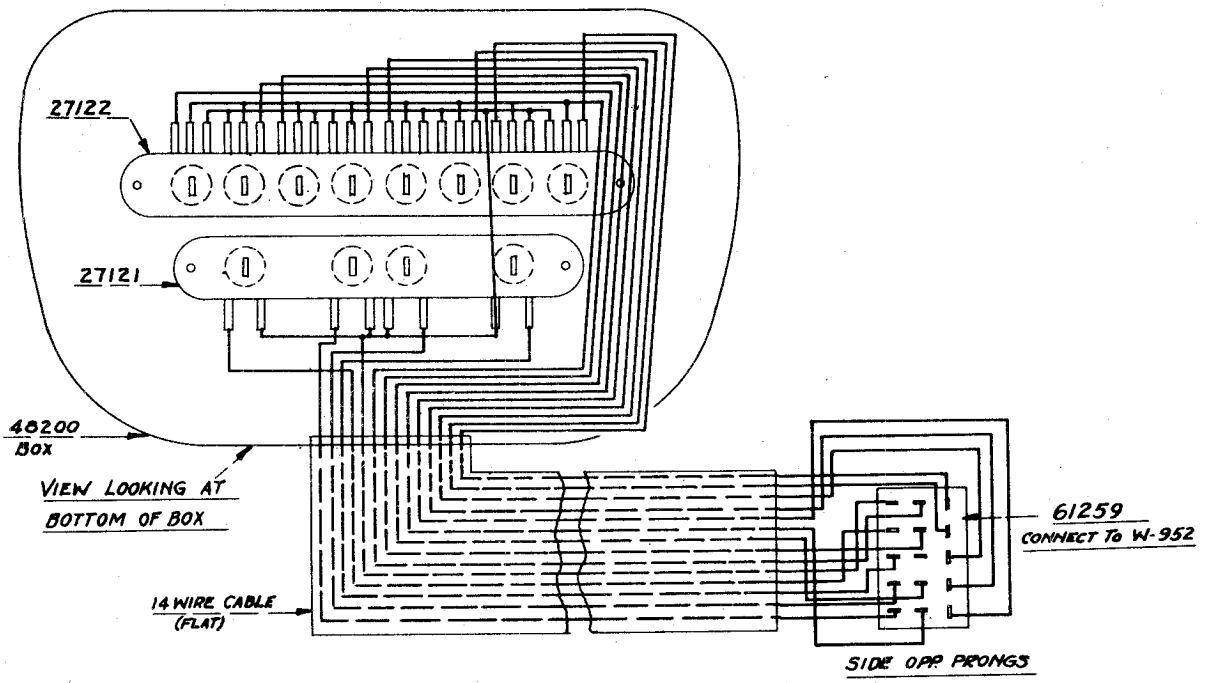
MODEL 400-G,500-G Series
Extended Control Wiring **CAPEHART CORPORATION**




## EXTENDED - CONTROL - BOX WIRING - DIAGRAM

W-951
The CAPEHART, Incorporated
Fort Wayne, Indiana
NOV 2 1938

| RATING | NAME | PART NO. | LOCATION | REGULAR #300-400 #500-#1600 | EXTENDED CONTROL #300-#400-#500 #1600 | REMOTE CONTROL #400-#1600 | REMOTE CONTROL #500 |
|---|---|---|---|---|---|---|---|
| 110-Volt | | | | | | | |
| 60 Cycle | Cabinet | 61228 | Cabinet | 1 | 1 | 1 | 1 |
| 25 Cycle | Cabinet | 61229 | Cabinet | 1 | 1 | 1 | 1 |
| 16-Volt | | | | | | | |
| 60 Cycle | Off-On | 61246 | Cabinet | - | 1 | - | - |
| 60 Cycle | Off-On | 61246 | Mixing Panel | - | - | 1 | 1 |
| 25 Cycle | Off-On | 61257 | Cabinet | - | 1 | - | - |
| 25 Cycle | Off-On | 61257 | Mixing Panel | - | - | 1 | 1 |
| 60 Cycle | Program | 61240 | Chassis | - | 1 | 1 | 1 |
| 25 Cycle | Program | 61258 | Chassis | - | 1 | 1 | 1 |
| 60 Cycle | Motor | 61235 | Chassis | - | 1 | 1 | 1 |
| 25 Cycle | Motor | 61245 | Chassis | - | 1 | 1 | 1 |
| 60 Cycle | Speaker | 61241 | Mixing Panel | - | - | * | - |
| 25 Cycle | Speaker | 61255 | Mixing Panel | - | - | * | - |
| 60 Cycle | Speaker | 61242 | Mixing Panel | - | - | - | * |
| 25 Cycle | Speaker | 61256 | Mixing Panel | - | - | - | * |
| 60 Cycle | Remote | 61243 | Mixing Panel | - | - | 3 | 3 |
| 25 Cycle | Remote | 61244 | Mixing Panel | - | - | 3 | 3 |
| 60 Cycle | Off-On | 61224 | Speaker Cabinet ) These relays used | | | | |
| 25 Cycle | Off-On | 61226 | Speaker Cabinet ) at extension speakers only | | | | |

*One speaker relay is required for each speaker installation, including the speakers in the instrument, in the case of the #400 and #500 Series.

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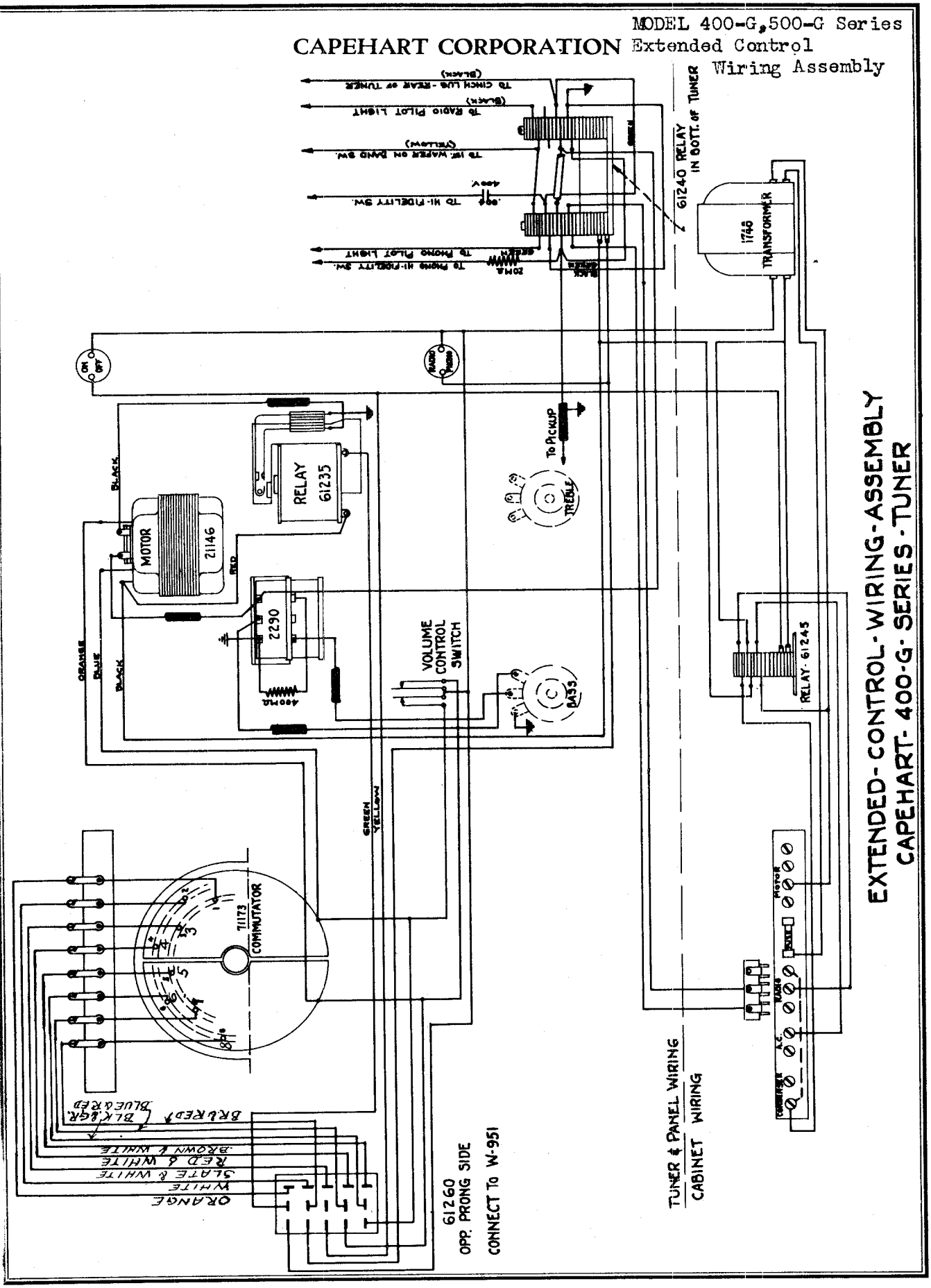
MODEL 400-G, 500-G Series

CAPEHART CORPORATION Extended Control Wiring Assembly

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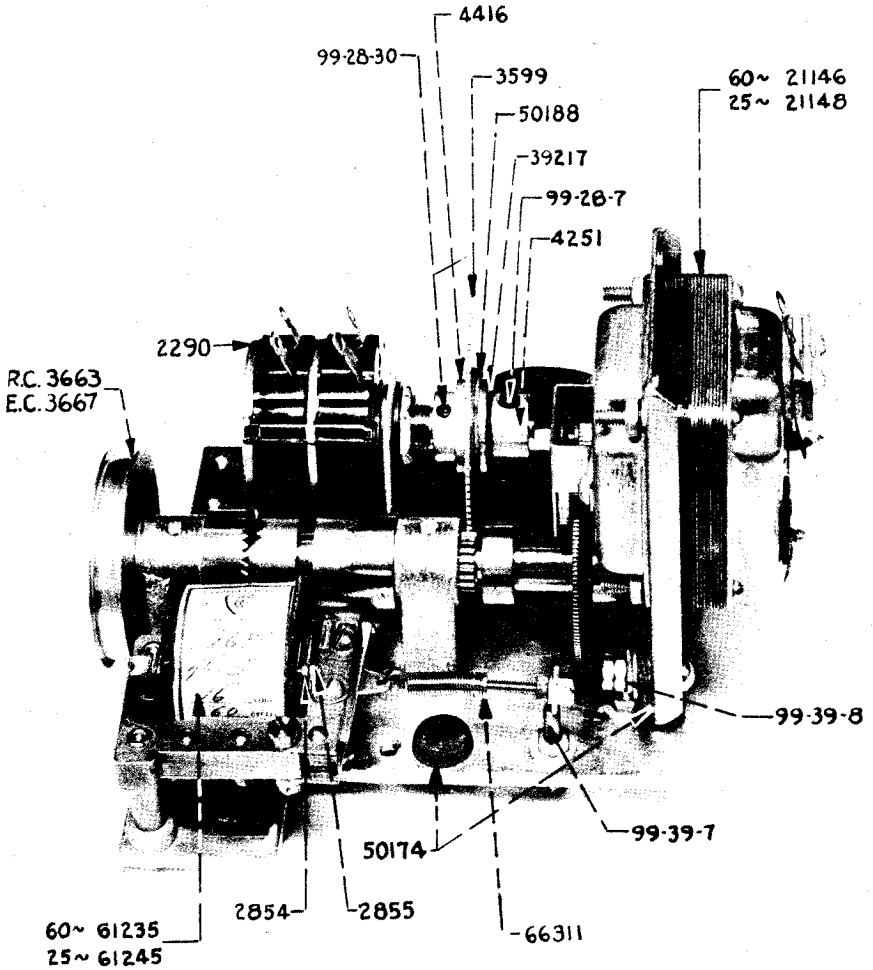



The motor which operates the tuning and volume control mechanism has a thermostat on it. This thermostat will allow the motor to operate continuously for ten minutes before shutting off the motor.

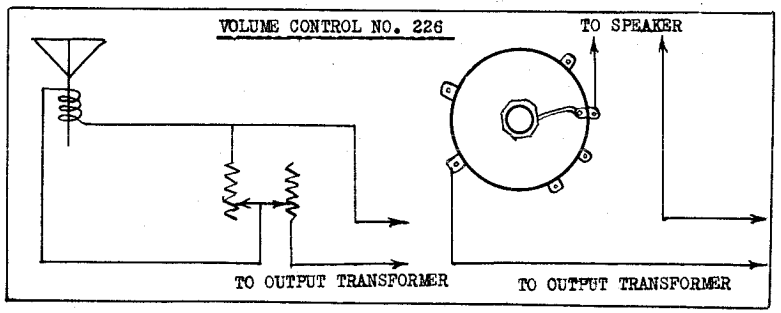
If the motor fails to operate when the proper controls are used, the thermostat has undoubtedly shut off the motor. Allowing the tuning and volume controld to remain unused for three or four minutes, will close the thermostat and the instrument can be used in the regular manner. This thermostat is placed on this motor as a safety device and if the above occurs, it is a normal function of this motor.

| Part No. | Description |
|---|---|
| 2290 | Master Volume Control |
| 2854 | Muting Switch Contact Assembly |
| 2855 | " " " " |
| 3599 | Volume Control Gear |
| 3662 | Clutch (Driver) |
| 3663 | Drive Pulley for Remote Control only |
| 3667 | " " " Extended " " |
| 4251 | Collar |
| 4416 | " |
| 21146 | Motor, 60 cycles |
| 21148 | " 25 " |
| 39217 | Spring Washer, Volume Control |
| 50174 | Grommet |
| 50188 | Friction disc, Volume Control |
| 61235 | Relay, 60 cycles |
| 61245 | " 25 " |
| 66311 | Relay Spring Assembly |
| 99-28-7 | 10-32 x 3/16" setscrew |
| 99-28-30 | 6-32 x 1/4" " |
| 99-37-7 | 6-32 x 7/8" Spade bolt |
| 99-39-8 | 6-32 x 3/4" " " |

VOLUME CONTROL NO. 226 (CONSTANT IMPEDANCE)

THIS DIAGRAM AND VOLUME CONTROL ARE TO BE USED WHEN IT IS NECESSARY TO HAVE VOLUME CONTROL FOR EACH INDIVIDUAL REMOTE SPEAKER. ONE VOLUME CONTROL IS NEEDED FOR EACH SPEAKER TO BE CONTROLLED, THAT IS, TWO FOR EACH 400-G REMOTE SPEAKER INSTALLATION. AND THREE FOR EACH 500-G REMOTE SPEAKER INSTALLATION. THIS VOLUME CONTROL NO. 226, MY ONLY BE USED IN LOW IMPEDANCE CIRCUITS, FROM 6 TO 10 OHMS. IT IS NOT SUITABLE FOR USE WITH HIGH IMPEDANCE SPEAKERS OF THE MAGNETIC TYPE, OR ELECTRODYNAMIC SPEAKERS, HAVING HIGH IMPEDANCE TRANSFORMERS.

THE OUTPUT TRANSFORMERS OF THE CAPEHART AMPLIFIERS MATCH TO 8 OHMS, AT 400 CYCLES.

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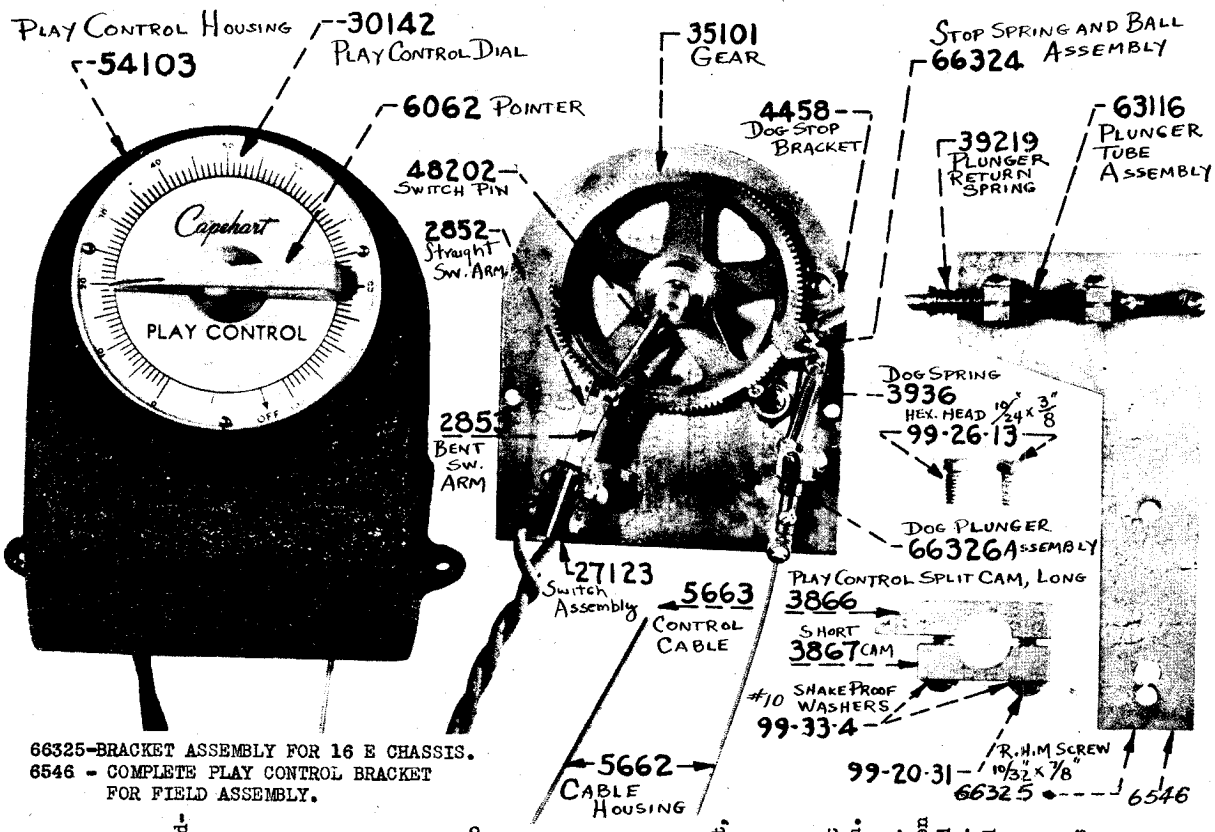
# CAPEHART CORPORATION

MODEL 400-G
Play Control
Assembly, Adjustments




66325-BRACKET ASSEMBLY FOR 16 E CHASSIS.
6546 - COMPLETE PLAY CONTROL BRACKET FOR FIELD ASSEMBLY.

## THE CAPEHART PLAY CONTROL

The play control allows the operator to set the phonograph to play a predetermined number of selections and have the instrument automatically stop when that number of selections have been played.

When the play control is set at Zero, all remote control and extended control stations are rendered ineffective. An off position is provided on the play control, so an indefinite number of selections may be played without the control operating.

In disconnecting the play control from the record changer, the two set screws on the cable and the cable housing, should be loosened and the cable and cable housing carefully removed. When the cable is removed from the plunger, see that the wire is not broken, and the kink, due to the set screw, should be straightened out before reinstalling the cable.

## TO ADJUST THE PLAY CONTROL

When setting up a play control, the counter should be reset at Zero just as the needle touches the record. That is, the play control cam, on the record changer main shaft, should be from 1/4" to 1/2" beyond the plunger after the main clutch has disengaged. The control cable is put in the hole in the plunger and the set screw tightened, then the cable housing should be held in place by the set screw - do not set the screw tight. Turn the pointer back and forth over the play control dial, if the pointer catches or binds, slip the cable housing away from the bracket slightly, until the pointer runs free, then run the changer through a cycle to see that the play control resets properly, then tighten the screw.

When adjusting the play control, which is in the record compartment, after removing the wood screws which mount the control to the shelf, remove the clips holding the 110-volt leads to the switch. Then remove the pointer and the two round head machine screws from the back. The stop spring of the stop spring and ball assembly, #66324, should be tangent to the gear and the ball should be in the space between the last and the next to the last tooth, before the blank space in the gear tooth. With the ball in this position, the set screw in the collar at the rear of the unit should be firmly against the stop pin. To make this adjustment, loosen the set screw, while holding the gear, move the collar, then tighten the set screw. In this position, the switch pin, #48202, should hold the switch open and permit the switch to close when the gear is advanced one tooth. The stop bracket #4450, for the resetting dog, should allow the dog to advance only one tooth at a time, if it picks up more than one tooth, move the step toward the dog until it advances only one tooth at a time.

The resetting dog #3839, should not ride on the gear tooth, as this will prevent turning the pointer toward one hundred. Shift the stud, #4354 until the dog clears the tooth, then check the alignment of the plunger tube and the cable housing stud, for if the cable is bent here, the play control may fail to function.

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## REMOTE CONTROL CABLE BULLETIN

## SERIES-G

TO SPEAKERS - -

Speaker cable of size according to the charts below, must be run from the instrument to each individual speaker.

The 110-volt AC lead for the speaker fields may be run from any 110-volt AC line nearest, or most convenient to each individual speaker The above is all the wiring necessary for remote speakers.

TO REMOTE STATIONS - -

Remote station cable of size according to the chart below, may be run from the instrument to each individual remote station, or extended from one remote station to another in parallel. This one cable is all the wiring required for remote stations.

CABLE SIZES ON #500-GR (REMOTE CONTROL)

| No.of Remote Control Stations and Speakers | Speaker Cable Sizes | Remore Control Cable Sizes |
|---|---|---|
| 4 or less | 8-Wire | 16-Wire To All Stations |
| 5 to 13 | 8-Wire | 24-Wire To All Stations |

CABLE SIZES FOR #400-GR and #1600-GR (REMOTE CONTROL)

| No.of Remote Control Stations and Speakers | Speaker Cable Sizes | Remote Control Cable Sizes |
|---|---|---|
| 4 or less | 6-Wire | 16-Wire To All S tations |
| 5 to 13 | 6-Wire | 24-Wire To All Stations |

Note the Model-1600GR does not include any speakers. All speakers used with this model must be of the AC type, Models G2 or AG2. All remote speakers on the #400-GR Series are AC speakers, Models G2 and AG2. All remote speakers on the #500-GR Series are G3.

Note the Model 1600-GR does not include any speakers; while the Series #400-GR and #500-GR models include one set of DC speakers in the instrument cabinet. No DC speakers are required with the Model-1600GR and all speakers for this model and all remote speakers for the Series #400-GR and #500-GR are of the AC type.

Instruments equipped for four speakers or less (including the speaker in the instrument) contain one set of amplifiers. For five and including eight speakers, two sets of amplifiers are used, and for nine and including twelve speakers, three sets of amplifiers are used. These additional sets of amplifiers are not installed in the instrument cabinet and may be located in a closet or other convenient place, apart from the instrument.

In all models where additional sets of amplifiers are used, all speakers operating from these amplifiers are of the AC type. When ordering equipment calling for additional sets of amplifiers, specify length of cable necessary to connect additional amplifiers to the instrument.

REMOTE CONTROL EQUIPMENT INCLUDES:

Instrument equipped for remote control operation.
One remote control station with 20-ft. flat cable.
Provision for attaching number of additional remote control stations as ordered.
Provision for attaching number of auxiliary speakers as ordered.

Speaker push buttons will be engraved with any lettering desired as specified, maximum limit two lines of six letters each, or one line of seven letters. Unless otherwise specified, speaker push buttons will be engraved "spkr. 1", "spkr. 2", etc.

Plug #61106 and outlet box cover #66132, are used where the 24-wire remote control station cable enters and leaves the wall.

Plug #6194 and outlet box cover #66132, are used where the 16-wire remote control station enters and leaves the wall.

24-wire flat cable is used between each remote control station and the instrument, or between remote station and wall receptacle on instrument, or between remote station and wall receptacle on instruments having more than four remote stations and speakers.

16-wire flat cable is used between each remote control station and the instrument, or between remote station and wall receptacle on instruments having four or less remote stations and speakers.

Round Cable is used whenever the cable is concealed.

Standard Gem "F" Outlet Box is used with #66197, #66264, #66132, #66131, #66104 and #66193 outlet box covers and is obtainable at any local electrical dealer.

Use standard house wire, approved by the Underwriters' Laboratories for connecting AC speaker fields.

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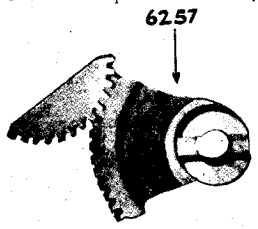
# MECHANICAL INSTRUCTIONS

## No. 16-E De Luxe Record Changer

### 1. TO LOCATE AND ADJUST THE RECORD TRAY (6687) (Fig. 6).

In assembling the record tray to the record changer, the first tooth of the driver quadrant (3551) (Fig. 5) should mesh with the second tooth of the driven quadrant of the tray as shown.




With the two gears properly meshed, loosen the Allen set screws which hold pins No. 34133, Fig. 1, in place. This will allow you to move the record tray sidewise, adjust tray sidewise until the turntable spindle is exactly in the center of the 10" record level of the record tray. (The 10" record level is that part of the tray where the felts No. 4913 are indicated in Fig. 6.)

With the centrol lever in the "one side" position, run the record changer through its cycle until the large hole in the main cam is exactly half way past the upper edge of the record tray cam follower, as shown at No. 5, figure 1. At this position, the points of the ten-inch felts (4913) (Fig. 6) should be level with the top of the turntable felt. If this tray is too low or too high, it may be adjusted to the proper level by loosening the eccentric screw (3237) (Fig. 1) No. 4 and turning this screw until the proper level is obtained. Be sure to tighten the lock nut after adjustment.

If the tray is too high, at this position, the ten-inch records will not be centered over the turntable spindle. If the record tray is too low, the ten-inch records will slide out over the ten-inch tray shoulder and not properly center.

### 2. THE ADJUSTMENTS OF THE RECORD MAGAZINE.

Before attempting to adjust the magazine, be sure that the center of the magazine pivot pins (34132) (Fig. 1) is 8⅜" above the base plate. This height is very important and we recommend checking the height of the right hand pin, when looking at the magazine, before any adjustments are made.

The record magazine is positioned by moving it sideways on its bearing or pivot pins. The two set screws underneath the pivot pins lock the magazine in position. Loosen these set screws, then see that the left hand side of the record reverse assembly fork (part of 6228, Fig. 6) is between $\frac{1}{32}$" and $\frac{1}{16}$" inside the left hand side of the Reverse crank, when looking at the magazine. That is, the left hand edge of the record reverse fork is about $\frac{1}{32}$" or $\frac{1}{16}$" to the right of the left hand edge of the crank. After moving the magazine, lightly set up the set screws. Then with the selector arm in the "Repeat" position swing the record reverse arm around in front of the magazine, to see whether the record guide strikes either of the record support pins (34138) (Fig. 6). If the guide strikes either of the support pins it will be necessary to bend the pin away from the guide so they can not strike. If it is necessary to bend either pin, set the control lever in the "Repeat" position, then raise the record tray by hand, with a 10" record on it, observing the way the record strikes the support pins, the record should hit both pins about $\frac{1}{16}$" from the end of the pin; if it does not it will again be necessary to adjust the pin until the record hits both pins an equal distance from the ends. If it is necessary to bend the pins, check the clearance between the record guide arms and the pins and between the arm carrying the record guide and the right hand pin. Also if the magazine has been shifted it is necessary to see that the two points, which extend downward from the magazine, have ample clearance in the channels, in the record tray, which are provided for their passage. If there is possibility of the points striking it probably means the magazine has been shifted too much.

If the magazine has been adjusted, it is also necessary to see that the record separator hook (6226) (Fig. 1) does not bind in the slot in the end of the record separator arm (6445) (Fig. 6). If it does the section covering these parts give the adjustment.

### 3. MAGAZINE STOP SCREW.

The magazine stop screw No. 2, Fig. 5, should be adjusted so that the crank pin (part of 6230, Fig. 1) is approximately $\frac{1}{16}$" from the edge of the record reverse arm fork (part of 6228, Fig. 6) which is furthest from the magazine, when the record reverse guide is in front of the magazine, that is, in the reversing position.

### 4. MAGAZINE LINK ADJUSTING SCREWS (No. 2) (Fig. 1).

The record magazine should always come back snugly against the magazine stop screw, No. 2, Fig. 5. If it does not, it is necessary to loosen the two set screws (No. 2, Fig. 1) to a sliding tension and run the record changer through a cycle of change. When the magazine has reached the horizantal position, as shown in Fig. 1, press down on the lower end of the magazine; this will lengthen the link assembly. Then when the magazine returns to its normal position, the magazine link will adjust itself so that the magazine is snugly against the stop screw. Then tighten the magazine link screws.

### 5. RECORD REVERSE GUIDE (6444) (Fig. 6).

With a 12" record in the magazine the record reverse guide assembly (6444) (Fig. 6) should be parallel with the record when in the reversing position, in front of the magazine.

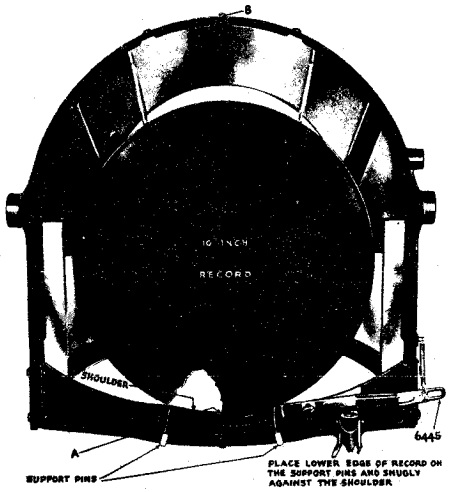
If the record reversing assembly is parallel with a 12" record as above, it should come around and lay against the reverse guide pin tubing (34134) (Fig. 6), if the eccentric cam (3825) (Fig. 8) is properly adjusted. This cam can be adjusted, by loosening the screw through the cam and turning it so that the record reversing assembly returns to the reverse guide pin tubing. Care should be taken when making this adjustment so that the crank pin (part of 6230, Fig. 1) does not hold the reverse guide away from the pin tubing. This cam should be turned so that the reverse guide assembly just touches the pin tubing; if the cam is turned too far it will allow the reverse guide assembly to hit the pin tubing, but in the reversing position the assembly will not be able to assume a position parallel with a 12" record.

### 6. REVERSE ASSEMBLY LINK ROD.

Loosen lock nut No. 9, Fig. 3, while the record changer is in the reversing position, that is, when the reversing assembly (6444) (Fig. 6) is in front of the magazine. Remove the screw (3241) (Fig. 8) holding the reverse segment link (34141) (Fig. 8) to the reverse segment (3550) (Fig. 8) and lengthen or shorten the link, by the link thread until the reversing crank (6230) (Fig. 1) stands with the crank pin just barely touching, but not binding, against the front side of the fork (6228) (Fig. 6). After the adjustment has been made, lock the link in place with the lock nut No. 9, Fig. 3.

### 7. RECORD SEPARATOR ADJUSTMENT.

The separator stop No. 3, Fig. 1, should be adjusted so that a small 10" record will positively clear the knife portion of the separator lever as shown in the following illustration. A standard to use is to make certain that there is approximately $\frac{1}{32}$" clearance between the edge of the small record and the point of the separator lever, as shown at "A" in illustration below. However, it may be necessary to vary one way or the other from this measurement, depending on whether or not the slotted end of the record separator lever goes over the hook (6226) (Fig. 1) without binding.




### 8. RECORD SEPARATOR HOOK ADJUSTMENT.

After adjusting the record separator it will be necessary to check the record separator hook (6226) (Fig. 1) to see that it enters the slot in the record separator without binding. This hook is threaded and by loosen-

ing the locknut the hook can be turned in either direction, to raise or lower it. After the correct adjustment is obtained, tighten the locknut.

It should never be necessary to change these adjustments on record changers unless they have been tampered with by an inexperienced person.

### 9. SEPARATOR HOOK AND ARM (6226) (Fig. 12).

Be sure set screw No. 10 in Fig. 8 is screwed all the way in.

### 10. RECORD MAGAZINE BUSHING (4020) (Fig. 1).

If a ringing noise is heard while the instrument is changing records, i. e., such a noise that might be made by a spring, it will be found that the Durex bushing (4020) (Fig. 1) is too tight, in which case it will be necessary to loosen the lock nut of the holding bolt, and back the bolt out, from a quarter to a half turn, then tighten the lock nut.

### 11. TO ADJUST THE TONE ARM HEIGHT.

To adjust the tone arm height, first place a 12" record on the turntable and adjust the tone arm stop lever (64197) (Fig. 1) so that the record hits the rubber roller (5044) (Fig. 1) in the center. Start the record changer through a cycle and stop it when the tone arm lever hook (5658) (Fig. 1) just touches the stop lever assembly. In this position adjust the tone arm height so that the top of the stop lever is the same height as the center of the hook. This adjustment is made by loosening the two Allen set screws at the rear of the tone arm. These Allen set screws are accessible by raising the tone arm by hand. After making the height adjustment it is necessary to make certain that there is a clearance of approximately $\frac{5}{8}$" between the pickup head and the record tray. This distance may be checked between the bottom of the record tray and the bottom of the pickup when the record tray is approximately parallel with the pickup.

### 12. TO ADJUST THE PICKUP ELEVATION.

When the tone arm swings in towards the record, the pickup arm lever hook (5658) (Fig. 1) comes to rest against the pickup arm stop lever (64197) (Fig. 1) and when the tone arm lowers the pickup toward the record it pauses momentarily before the pickup arm lever hook goes through the stop lever. If the record changer is stopped during this pause, it will be found that the ball in the end of the pickup arm lift shaft (6457) (Fig. 9) is at the point marked "L" in Fig. 9 on the lift cam (6449) (Fig. 9.) Now if the pickup, with a needle in the proper position, is moved beyond the edge of the record, the point of the needle will extend below the top surface of the record a distance equal to half the thickness of the record. The correct elevation of the pickup is made by the screw in the underside of the tone arm fork against which the pickup cover rests. Loosen the locknut, adjust the screw to bring the needle to the position mentioned above, then lock the locknut.

### 13. PICKUP FEED IN ADJUSTMENT.

The collar of the pickup arm swing lever and collar assembly (6232) (Fig. 9) should ride on the leather facing of the friction cam (6691) (Fig. 10) until the pickup arm lever hook (5658) (Fig. 1) has engaged the stop lever (64197) (Fig. 7). Then a slight amount of friction should be maintained after the ball at the end of the pickup lift arm (6457) (Fig. 9) has engaged with the lift cam (6449) (Fig. 9). This friction should be maintained until the needle has touched the record, otherwise the pickup arm may move away from the stop lever and the needle miss the record. If the friction be maintained too long the needle may be forced beyond the first playing groove. To adjust this, the pin locking the friction cam to the main cam shaft should be driven out and the Allen set screw loosened to a sliding tension. The cam is rotated forward, in the direction of rotation of the main cam shaft, to maintain the friction a longer time and backward to maintain it for a shorter time.

### 14. TO ADJUST THE PICKUP.

After removing the pickup cover, it should be noted whether the stylus (5610) (Fig. 10) is centrally located in respect to the pole pieces (569) (Fig. 10). To center the stylus loosen the lock-nuts (99-11-1) (Fig. 10), then loosen the two headless set screws (99-28-3) (Fig. 10). These set screws hold the spool assembly (6711) (Fig. 10). The spool assembly should be shifted until the stylus is centralized with the pole pieces, then tighten the set screws carefully, so as not to crack the spool, then tighten the lock nuts.

If for any reason it is necessary to shift the pole pieces, which are held to the back by two screws, the two set screws holding the spool should be loosened before attempting to move the pole pieces. If any adjustment, of pole pieces, is made carefully check the centering of the stylus before replacing the cover by means of its three screws.

### 15. TO ADJUST THE STOP LEVER HOOK (5658) (Fig. 1).

Always adjust the tone arm position on a 12" record before adjusting for a 10" record. Adjust the tone arm stop lever hook (5658) (Fig. 1) by moving it in or out. This hook is locked in place by a set screw in the stud whose nut is shown in Fig. 1 as No. 43159. This set screw is at the bottom of this stud. Adjust the hook so that it will pass through the notch in the pickup arm lever (64197) (Fig. 1) without binding against the top or bottom of the notch, when in the playing position. With a 12" record on the turntable, the rubber roller (5044) (Fig. 1) against the edge of the record and the stop lever hook (5658) against the blade of the stop lever (64197) the needle should stop on the record exactly $\frac{3}{32}$" from the edge of the record.

With the record changer in exactly the same position as described above, and with a 10" record on the turntable and the hook (5658) (Fig. 1) against the blade, the stop lever should allow the needle to stop on the record $\frac{3}{32}$" from the edge of the 10" record. A 6-32 screw shown in Fig. 1 is provided for making this adjustment, simply by screwing it in or out. A check should be made for clearance between the roller and the tray, this roller should never bind on the record tray. This can be taken care of by slightly bending the tone arm stop lever (64197) (Fig. 1) up or down. If it is necessary to bend the stop lever it will be necessary to readjust for 12" records.

### 16. TO ADJUST THE CLUTCH THROWOUT LEVER AND CAM.

The clutch throwout lever cam is shown at 15 in Fig. 2 and is adjusted by loosening the shoulder screw (3317) (Fig. 2) to a sliding tension after the record changer has been stopped in the playing position. The clutch throwout lever cam should just clear the point of the turntable throwout cam (6448) (Fig. 10) with the clutch disengaged. Unless clearance between the turntable throwout cam and the clutch lever throwout cam is maintained the record changer will jam. If too much clearance is allowed the turntable throwout cam will not disengage the clutch and the record changer will continue to change records without playing them.

### 17. TO ADJUST SOLENOID WEDGE SPRING.

This phosphor bronze spring is located on one of the three spacers used to mount the solenoid plate bracket to the solenoid bracket. It is used to prevent clutch chatter or bounce when the clutch engages. The only adjustment is to bend the spring to a snug fit with a long screw driver so as to increase or decrease its pressure on the solenoid to clutch lever (6455) (Fig. 11).

### 18. TO ADJUST THE REVERSE CAM SHIFT LEVER (5326) (Fig. 5).

This lever is moved by the record control shaft (3724) (Fig. 12) and is held in position by an Allen set screw. It should be positioned on its shaft so that the record reverse cam (6325) (Fig. 4) is firmly engaged with its pin (34144) (Fig. 8) in the "Both Sides" position. In the "One Side" and "Repeat" positions it should have good clearance with the pin. If any adjustment of this lever is made be sure to check the setting of the Reverse Cam Arm and Roller Assembly (6450) (Fig. 8) as instructed in Section 7 of the instructions on replacing a reverse cam.

### 19. TO ADJUST THE RECORD REPEAT LOCK LEVER (5334) (Fig. 12).

The purpose of this lever is to prevent accidental shifting of the Selector Arm while the instrument is not in the playing position. In the "Repeat" position this lever is on the side of the Solenoid to Clutch Lever (6455) (Fig. 11) away from the main cam. In the "One Side" and "Both Sides" positions it is on the main cam side of the solenoid to clutch lever. With the tone arm in the playing position (Main Clutch Disengaged) this lock lever should clear the solenoid to clutch lever by approximately $\frac{3}{16}$" when moved under it.

### 20. TO ADJUST THE REVERSE CAM LOCK LEVER (5339) (Fig. 12).

This lever should be on the main cam side of the solenoid to clutch lever when in the "Both Sides" position. And on the opposite side when in the "One Side" and "Repeat" positions. With the main clutch disengaged the lock lever should clear the solenoid to clutch lever by approximately $\frac{1}{16}$" when moving under it.

### 21. TO ADJUST REVERSE CAM ARM AND ROLLER ASSEMBLY (6450) (Fig. 4).

See Section 7 under Instructions For Replacing a Reverse Cam.

### 22. TO ADJUST RECORD REPEAT THROWOUT LEVER (4663) (Fig. 12).

No adjustment of this part is necessary.

### 23. TO ADJUST RECORD REPEAT CLUTCH LEVER (5332) (Fig. 12).

The adjustment of this lever is made by loosening the Allen set screw to a sliding tension then moving the part along the shaft. The sliding clutch should engage in the "One Side" and "Both Sides" positions, but should be disengaged in the "Repeat" position. The fork of this lever should not bind the sliding clutch in either the "Repeat" or "Both Sides" position.

### 24. LATERAL LOCATION OF THE MAIN CAM SHAFT.

Both end bearings of the main cam shaft are movable, and are used to locate the cam shaft in its proper lateral position, as well as adjust the amount of end play. The main cam shaft is located laterally so that the

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ball in the end of the tone arm lift rod (6457) (Fig. 9) travels in the exact center of the tone arm lift cam (6449) (Fig. 9). As shown at H in Fig. 9.

### 25. TO ADJUST THE STOP TRIP SWITCH (2792) (Fig. 7).

This switch is accessible by removing the turntable, which will expose the switch cover. To remove the switch cover it is necessary to remove the trip arm, which goes through the switch cover and the two flat head screws which hold the cover in place. The clearance between the contact points on the fixed and moveable arms of the switch should be $\frac{1}{32}$". After replacing the trip arm (6510) (Fig. 7) in the switch, after the switch cover has been removed, set the turntable on the spindle, push stop trip arm (4533) (Fig. 7) slowly about $\frac{1}{4}$" toward the magazine and then turn the turntable through one complete revolution. This will insure the fibre cam, on the turntable, resetting the trip switch, the clearance between the trip arm and the moveable arm of the switch should be $\frac{1}{32}$". The distance between the trip arm and the switch trip guard finger should also be $\frac{1}{32}$".

To adjust the clearance between the trip arm hook (6510) (Fig. 7) and the moveable switch arm, loosen the screw in the bakelite switch base, at the end nearest the tone arm. Move the switch until $\frac{1}{32}$" clearance is secured between the trip arm hook and the moveable arm of the switch, then tighten the screw holding the switch. In making this adjustment be sure that the stationary arm of the switch is not bent when tightening this screw.

On some models a headless set screw, near the end of the coil spring, is used to lock the switch in position; loosen this screw, adjust the switch, then tighten the set screw.

### 26. TO ADJUST THE SOLENOID MOTOR SWITCH (2764) (Fig. 3).

After the switch cover has been removed the switch is exposed. The upper switch points should make good electrical contact, while the main clutch is disengaged, in this position the clearance between the bottom points should be approximately $\frac{3}{32}$". While the clutch moves from the disengaged to the engaged position the upper switch points should remain closed until the lower set of points are closed. When the clutch is fully engaged the lower points should make good contact and the clearance between the upper points should be approximately $\frac{3}{32}$".

To adjust the switch loosen the screw through the bakelite switch base at the rear of the switch assembly. After the position is found where proper clearance is secured with the clutch engaged and disengaged, the switch should be locked in position with the screw.

In some machines a headless set screw is used to lock the switch in position. This screw is near the point of the tapered bakelite insulating block. Loosen this screw and adjust switch to get proper clearance then lock the switch in position by the set screw.

The two upper contacts are in series with the auto trip switch and the two lower contacts are shunted across the motor switch. When the clutch is engaged the auto trip switch is out of circuit and the motor switch is shunted by the lower contacts thus insuring the completion of the change cycle even though the instrument is switched to radio or turned off.

### 27. TO ADJUST THE FRICTION JOINT OF AUTOMATIC TRIP SWITCH.

The amount of friction necessary in the friction joint between the auto stop trip lever—long (6510) (Fig. 7) and the auto stop trip lever—short (4533) (Fig. 7) should be just sufficient to close the automatic stop trip switch (2792) (Fig. 7). The friction is regulated by adjusting the screw which tightens the flat spring (3998) (Fig. 7). If the tension is too great the instrument may trip before finishing a record, if not enough tension is had the instrument will not change records when the needle hits the automatic change groove.

### 28. RECORD SIZE LIMIT.

The 16-E Series record changer will play any 10" or 12" record of standard size. The minimum size for 12" records is $11\frac{7}{8}$". The minimum size for 10" records is $9\frac{7}{8}$". Records smaller than these limits are very apt to miss centering over the turntable spindle and in most cases are broken.

These record changers will automatically trip on any record having an automatic stop change groove, either spiral or oscillating, where the blank space in the center of the record is not more than $6\frac{1}{2}$" in diameter.

### 29. RECORDS.

Always inspect the records to see that no rough edges are present. Occasionally you will find a record which has a rough outside edge. This rough edge will greatly interfere with the satisfactory performance of the record changer. A small piece of #00 sandpaper will assist you greatly in removing this rough edge.

### 30. TO ADJUST THE VERTICAL BUMPER GUIDE (6693) (Fig. 6).

This guide is located back of the magazine cross bar (6685) (Fig. 6). After the records are separated from the magazine they are guided in dropping off the separator so they hit the center of the record bumpers (5081) (Fig. 6). This vertical bumper guide also guides the records when the elevating hook, on the rear of the record tray lifts the record. The vertical bumper should be set back just far enough to allow a 12" record to drop onto the record bumpers freely. The lower part of the vertical bumper, which extends into the record well, should extend toward the center of the well rubber bumpers far enough to make sure that the upper edges of the records fall behind the points of the upper record support (5517) (Fig. 6). This adjustment is not critical. In most cases it will be found that the upper end of the vertical bumper will just clear the elevating hook on the rear of the tray. In cases where it is found that 10" records are chipping about the edges, due to bouncing against the points of the upper record support (5517) (Fig. 6) it will be necessary to bend the vertical bumper (6693) (Fig. 6) back at the top to a point where it just barely clears the elevating hook at the rear of the tray. It should never be bent back far enough to raise the front of the tray.

### 31. CLUTCH CLEARANCE.

The clearance between the driven (6326) (Fig. 10) and driving (3630) (Fig. 10) members of the clutch should be approximately .020" (Twenty thousandths), and is adjusted by loosening screw No. 16 Fig. 3 to a sliding tension and adjusting the clutch fork (5333) (Fig. 2) and the solenoid to clutch lever and pin assembly until the proper clearance is obtained. After adjustment is made lock the screw No. 16, Fig. 3.

### 32. MOTOR CONNECTIONS (21131).

The 21131 motor is a synchronous motor and will run equally well in either direction, when properly connected. For this reason, all motors shipped from the factory are equipped with a terminal strip and cable. However, if it should ever be necessary to disconnect the leads from the terminal strip the leads should be replaced in the following order: With the cable extending to the right of the terminal strip and the mounting lugs pointing downward, and the soldering lugs towards you, the leads go on from left to right in the following order—small black, black with yellow tracer, blue and large black. In that order they are ground, one side of 110 volt line, one side of the condenser, and the remaining 110 volt and condenser leads. The motor terminal strip should be mounted to the cabinet terminal strip so that the cable extends to the right, with the soldering lugs towards you.

### 33. OILING INSTRUCTIONS.

Due to its careful design and precise workmanship, the Capehart 16-E record changer requires a minimum of oiling.

About once each year a light coat of vaseline or petroleum jelly should be applied to all moving surfaces which were coated with graphite at the factory.

A very light coat of vaseline should be applied to the surfaces of the magazine, indicated at "A" in Figure 6. It is best to apply this coating every six months. The vaseline should be applied with, and removed by, the fingers, on the magazine faces. DO NOT USE EXCESSIVE AMOUNTS OF LUBRICANT ANYWHERE ON THE RECORD CHANGER.

A good grade of machine oil, not too light, should be used on the sliding clutches, reverse cam shaft and all eccentric and shoulder screws.

NEVER OIL THE "DUREX" BUSHINGS, AS THIS WILL CAUSE THEM TO DISINTEGRATE.

Once each year the motor oil cups should be oiled with a good grade of motor oil. At the same time the gear box should be inspected, and the grease replaced if it has become hard. A good mixture to use here is 75% vaseline and 25% SAE 40 motor oil.

### 34. INSTRUCTIONS FOR REPLACING THE RECORD REVERSE CAM AND ITS ADJUSTMENTS.

1. Set record changer in the playing position. Carefully mark the drive gear (3516) (Fig. 10) on the main shaft and the driven gear shown as part of 6223, Fig. 10, by prick punch marks or scriber, so that the same teeth can be engaged after reassembly, thus insuring proper timing.

2. Remove the two bolts, one (3238) (Fig. 4) securing the magazine slide and roller assembly to the magazine slide arm lever, and one (3237) (Fig. 1) securing the record slide arm and stud assembly to the record tray drive crank.

3. Looking in from the rear of the instrument, remove the Durex bushing from the end of the main cam shaft, nearest the motor drive shaft. This is accomplished by loosening the bolt to the right of the main shaft. Care should be taken when replacing this bushing so as not to tighten the bolt enough to crush the bushing; a snug fit only is required.

4. Remove lower half of bearing and Durex bushing from the other end of the main cam shaft and work the cam shaft out of the record changer. The same precaution against crushing this bushing should be taken with this one as with the one in the preceding section.

5. Remove taper pin from gear and loosen set screw in the collar, both shown as 6233 in Fig. 8, of the reverse cam shaft assembly, as well as the pin (34144) (Fig. 10) over which the reverse cam forks, when in

the reversing position. After removing the collar and sliding the gear to one side, file all burs from the edges of the holes in the reverse cam shaft. Slide the shaft through its Durex bushing toward the rear of the instrument far enough to allow the removal and replacement of the reverse cam (6325) (Fig. 10).

6. Reassemble the reverse cam shaft assembly, making certain that the taper pin holes in the shaft and gear are correctly aligned to permit the taper pins being properly inserted. The set screw in the collar at the end of the shaft should be properly tightened.

7. Remove the reverse cam arm and roller assembly (6450) (Fig. 2) and make sure that the roller pin and arm are not bent, if either of these items are found bent we suggest that you replace the reverse arm and roller assembly.

8. In reassembling the reverse cam arm and roller assembly (6450) (Fig. 2) in its proper position for alignment with the reverse cam, be sure the roller is about $\frac{1}{32}$" inside the ridge on the reverse cam, when the cam is in the reversing position.

9. Remove the taper pin from the gear (3516) (Fig. 10) on the main shaft, which drives the gear on the reverse cam shaft assembly (6233) (Fig. 10) and remount the main shaft to the record changer chassis, pushing the above gear, from which the pin was removed, to one side so that it will not mesh with its driven gear.

10. Locate the main shaft so that the lower end of the pickup arm lift shaft travels in the center of the pickup arm lift cam, as shown at "H" in Fig. 9. With the main shaft in this position, adjust the main shaft Durex bushings so that there is no end play in the main cam shaft assembly.

11. Rotate the main cam shaft to the playing position so that the pickup arm is lowered over the turntable.

12. Set the reverse cam in its lowest position, with the control lever in the "Both Sides" position, so that the fork of the reverse cam is meshed with the driving pin.

13. Mesh the reverse cam assembly driver gear (3516) (Fig. 10) with the reverse cam assembly driven gear so that the identifying punch marks correspond to the original position. The taper pin for the driver gear should be inserted next. If the assembly has been properly made there should be approximately $\frac{1}{32}$" clearance between the roller or the reverse cam arm and the reverse cam. See "A", Fig. 9.

14. Throw the control lever to the "One Side" position and rotate the reverse cam with the fingers until it is in the reversing position. Again throw the control lever to the "Both Sides" position. Now there should be approximately $\frac{1}{32}$" clearance between the reverse cam and the roller. See "B", Fig. 9. If the clearance is not approximately $\frac{1}{32}$" for both positions of the reverse cam it indicates either the gears are not properly meshed or the reverse segment link rod may be bent. A careful check of the latter while the main shaft is out will save time and trouble later.

## 35. INSTRUCTIONS FOR REMOVING THE 16-E RECORD CHANGER.

There is a great possibility, when removing the chassis from the cabinet, to mar or scratch the cabinet. If you will place a piece of cardboard around the record changer it will eliminate, to a great extent, the possibility of marring the finish. A rubber auto mat, with a hole for the record changer, the same size as the one in the cabinet, makes an excellent pad. This pad can be split and is easily put in position and removed.

Remove the backs from the record changer, radio and amplifier compartments.

Remove the screws from the partition between the radio and record changer compartments, so it can be moved back out of the way.

Remove the wood screw, under the turntable, also the three bolts which hold the record changer down.

Remove the two wood screws that mount the play control.

Remove the female chassis plug, from the male chassis plug (6178) (Fig. 1), the pickup lead, which runs from the radio chassis to the terminal block, then dismount the terminal block by removing the wood screw in its center, the straps holding the shielded lead, which runs from the shorting switch, and the 110 volt leads to the Play Control.

Release the play control cable and cable housing from the bracket on the record changer chassis, by loosening the two set screws. Care should be taken to prevent breaking the control cable when removing it. The end which has been kinked by the set screw should be straightened before attempting to reinstall it.

Loosen the two Allen set screws in the flexible coupling and allow it to slide down the motor shaft, so as to clear the record changer shaft.

Move the play control as far into the radio compartment as possible.

Remove the screw marked "B" in the illustration on page 8. This is the middle one of the screws holding the upper record support.

Remove the magazine link shoulder screw (3239) (Fig. 6). This will allow the magazine to be swung out of the way. As soon as the record reverse arm and fork assembly have cleared the reverse crank and pin (6230) (Fig. 1) it should be swung over the magazine and locked with the record reverse arm lock (4659) (Fig. 6), to keep it out of the way.

Lift the record changer up, until the tone arm just touches the top of the cabinet, carry it forward through the doors, tilting it to keep the main cam clear of the shelf.

All parts of the cabinet liable to damage should be protected by soft cloths while removing or installing the record changer.

It is not necessary that the above operations be carried out in the above sequence.

## 36. ALIGNMENT OF TRUE-TANGENT PICKUP.

When adjusting the TRUE-TANGENT pickup, the pickup head and tone arm should form a straight line, when the needle is exactly one and one half inches from the point of the turn table drive shaft cap (4320) (Fig. 6). To adjust the pickup angle, loosen the nut at the rear of the steering arm assembly (66254) (Fig. 1), turn the steering arm either right or left until the correct position for the pickup is found, then set the lock nut up tight. Then see that there still is $\frac{5}{8}$" clearance between the pickup and the record tray per Section 11.

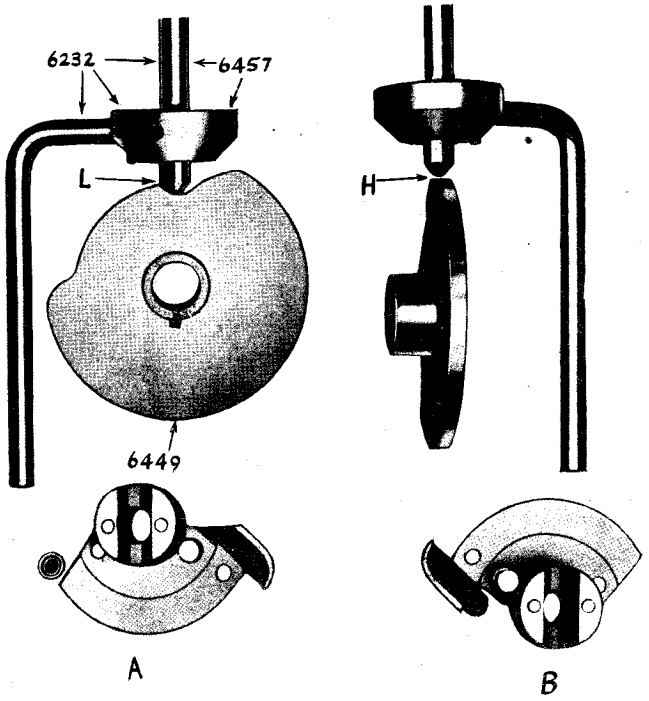


Fig. 9

6232 Pickup Swing Lever and Collar Assembly
6325 Reverse Cam
6449 Pickup Arm Lift Cam
6457 Pickup Arm Lift Shaft

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MODEL 16-E
Complete Assembly

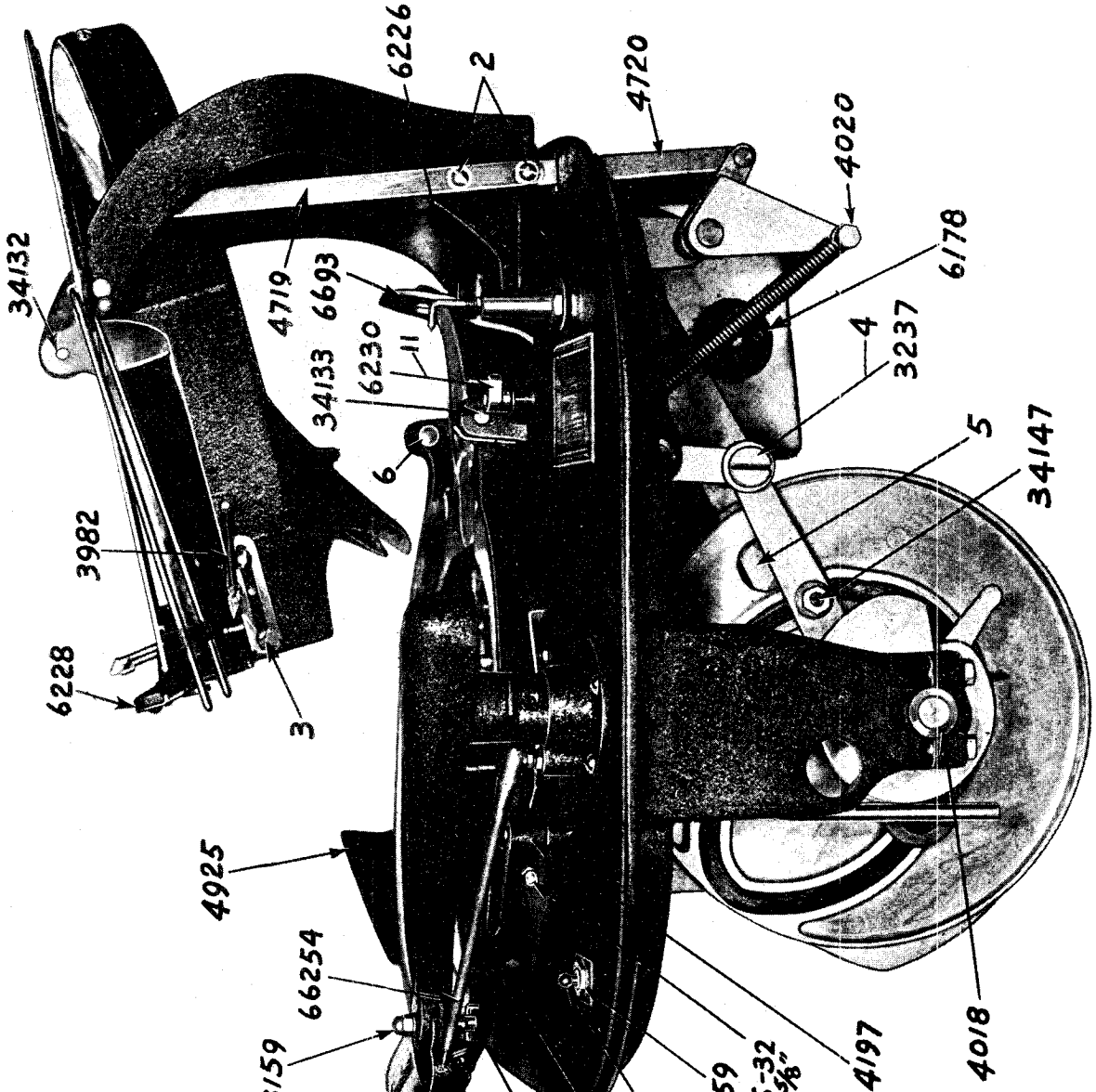


Fig. 1

2722 Switch AC Line
3059 Escutcheon Plate Off-On
3237 Shoulder Screw — Record Tray Slide
3982 Spring—Separator
4018 Main Shaft Bushing
4020 Record Magazine Bushing
4719 Magazine Link Upper
4720 Magazine Link Lower
4925 Record Tray Shield Felt—Outer
5044 Stop Lever Roller Tubing
5658 Pickup Arm Lever Hook
5765 Pickup Cover
6178 Chassis Plug
6226 Separator Hook and Arm Assembly
6228 Record Reverse Arm and Fork Assembly
6230 Reverse Pinion and Crank Assembly
6693 Record Bumper Guide and Felt Assembly
34132 Pin—Magazine Pivot
34133 Pin—Record Tray Pivot
34147 Pin—Record Tray Slide
43159 1/4"—28 Hex. Cap Nut
43160 Lock Nut for Pivot Screw
64197 Pickup Arm Stop Lever Assembly (Specify color).
66254 Steering Arm Ass'y.
6—32x3/8" Pickup Stop Lever Screw

NOTE: In ordering any part that is painted, please specify color wanted.

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MODEL 16-E
Chassis Views

# CAPEHART CORPORATION

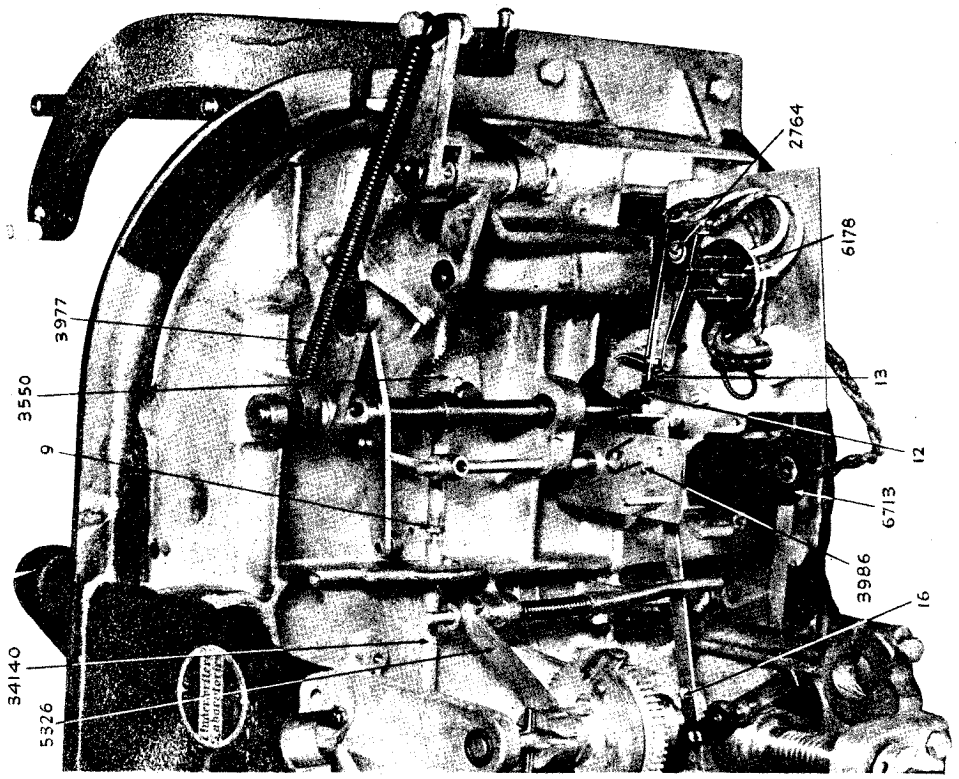


Fig. 3

2764 Switch Assembly—Solenoid and Motor
3550 Record Reverse Pinion Segment
3977 Spring—Magazine Slide Arm
3986 Spring—Solenoid Lever Torsion
5326 Record Reverse Cam Shaft Lever
6178 Chassis Plug 5 Prong
6713 Solenoid Assembly
34140 Pin—Long, Reverse Segment

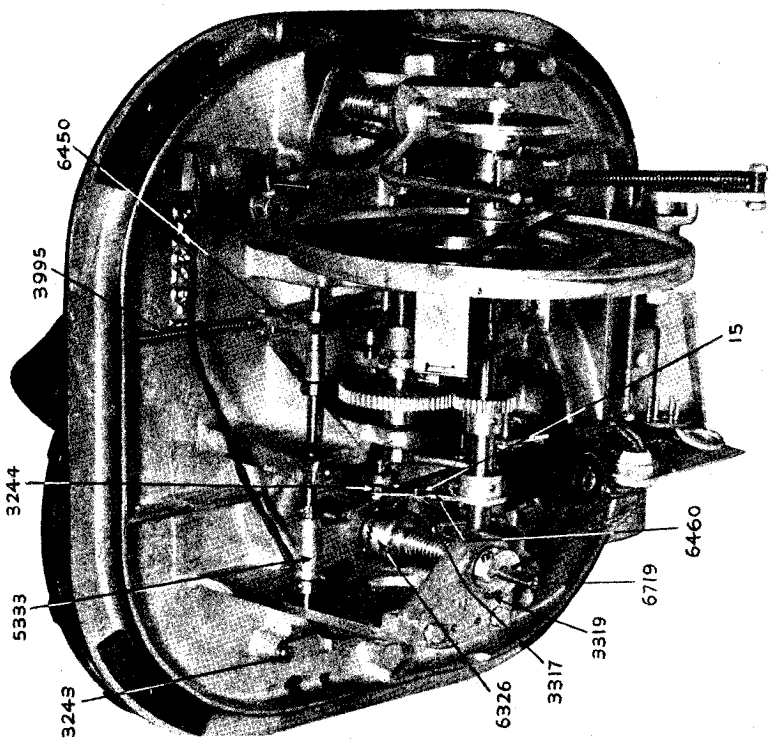


Fig. 2

3243 Shoulder Screw—Repeat Lever
3244 Shoulder Screw—Clutch Throwout Lever
3317 Screw—Clutch Throwout Cam
3319 Screw—Turntable Shaft Collar
3995 Spring—Reverse Arm
5333 Main Clutch Fork Lever
6326 Worm and Bushing Assembly
6450 Reverse Cam Arm and Roller Assembly
6460 Clutch Throwout Lever and Spring Assembly
6719 Turntable Drive Shaft Assembly

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MODEL 16-E
Chassis Views




Fig. 5

3826 Record Repeat Sliding Clutch Cam
3976 Spring—Record Separator Hook Lever
3977 Spring—Magazine Slide Arm
3978 Spring—Record Repeat Clutch
3981 Spring—Record Reverse Cam Control
5326 Record Reverse Cam Shift Lever

3240 Shoulder Screw—Reverse Segment
3243 Shoulder Screw—Repeat Lever
3319 Screw—Turntable Shaft Collar
3539 Worm Gear—Main Drive
3550 Record Reverse Pinion Segment
3551 Record Tray Gear—Driver




Fig. 4

1173 Condenser—0.1 Mfd. 400-Volt (in can)
3238 Shoulder Screw—Magazine Slide Arm
3243 Shoulder Screw—Repeat Lever
3550 Record Reverse Pinion Segment
3826 Record Repeat Sliding Clutch Cam
3976 Spring—Record Separator Hook Lever
3977 Spring—Magazine Slide Arm
3978 Spring—Record Repeat Clutch
3995 Spring—Reverse Arm
6450 Reverse Cam Arm and Roller Assembly

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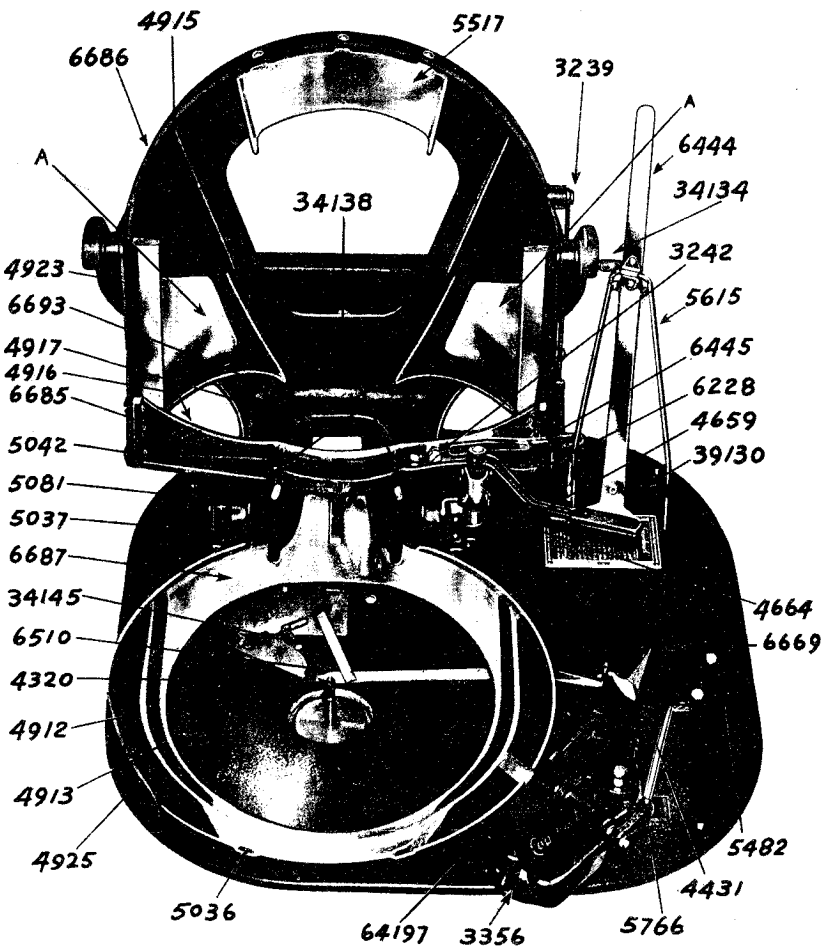


Fig. 6

3239 Shoulder-Screw-Magazine Link
3242 Shoulder Screw—Separator
3356 Pickup Needle Screw (Magnetic)
4320 Turntable Drive Shaft Cap
4431 Automatic Stop Trip Quadrant Bracket
4659 Record Reversing Arm Lock
4664 Record Reverse Arm Lock Stop
4912 Record Tray Felt—Large
4913 Record Tray Felt—Small
4915 Record Magazine Felt
4916 Lower Record Support Felt
4917 Record Bumper Guide Felt
4923 Magazine Side Felt
4925 Record Way Shield Felt Outer
5036 Record Tray Bumper—Front
5037 Record Tray Bumper—Rear
5042 Reverse Arm Bumper
5081 Record Bumper
5482 Pickup Arm Base
5547 Record Support—Upper
5615 Record Reverse Guide
5766 Pickup Arm
6228 Record Reverse Arm and Fork Assembly (Specify color)
6444 Record Reverse Guide Assembly
6445 Record Separator and Hub Assembly
6510 Automatic Stop Trip Lever Assembly
6669 Pickup Arm Assembly complete
6685 Lower Record Support Assembly
6686 Record Magazine Assembly
6687 Record Tray Assembly
6693 Record Bumper Guide and Felt Assem
34134 Pin—Reverse Guide Stop
34138 Pin—Record Support
34145 Pin—Record Control Rod
39130 Record Reverse Guide Spring
64197 Pickup Arm Stop Lever Assembly (specify color)

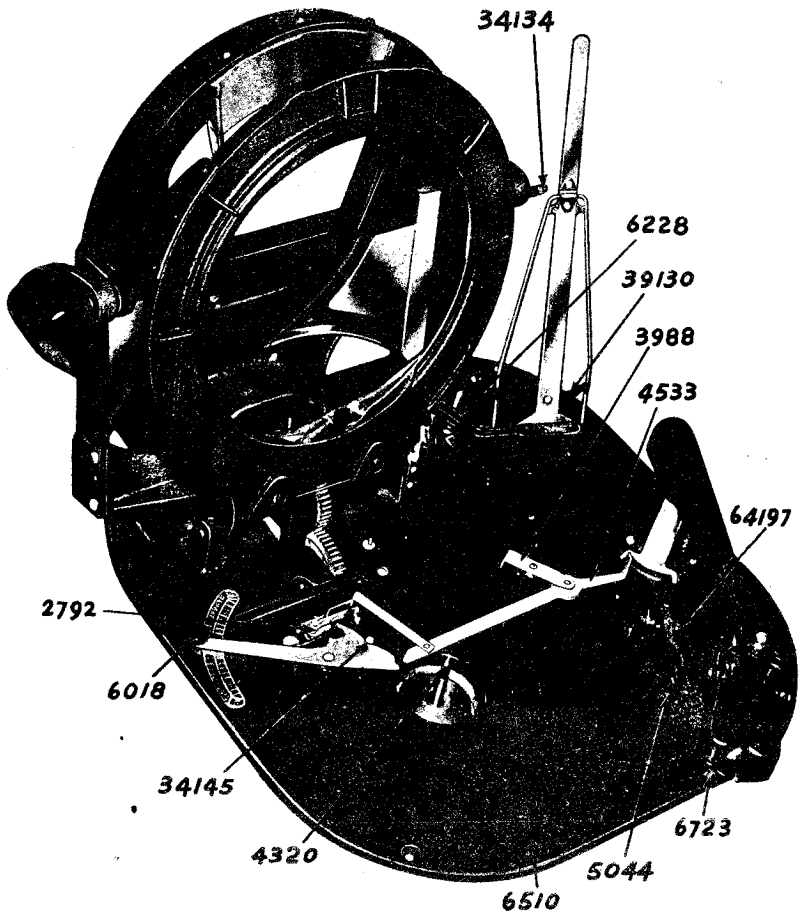


Fig. 7

2792 Record Trip Switch Assembly—complete
3988 Spring—Automatic Trip Lever Pin
4320 Turntable Drive Shaft Cap
4533 Automatic Stop Trip Lever—Short
5044 Stop Lever Roller Tubing
6018 Selector Knob
6228 Record Reverse Arm and Fork Assembly (specify color)
6510 Automatic Stop Trip Lever Assembly
6723 Pickup Brush Assembly
34134 Pin—Reverse Guide Stop
34145 Pin—Record Control Rod
39130 Record Reverse Guide Spring
64197 Pickup Arm Stop Lever Assembly (specify color)

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# CAPEHART CORPORATION

MODEL 16-E
Chassis View, Parts




Fig. 10

61212 Pickup Magnet
6233 Record Reverse Cam Shaft Assembly
6121 Record Reverse Cam and Pin
6326 Worm and Bushing Assembly
6448 Turntable Throwout Cam and Hub Assembly
6449 Pickup Lift Cam and Hub Assembly
64197 Pickup Arm Stop Lever Assembly
6691 Pickup Arm Friction Cam Assembly
6711 Spool Assembly
6719 Turntable Shaft Assembly
6723 Bushing Assembly
34144 Pin—Reverse Cam Shaft
34147 Pin—Record Trip Slide
99-11- 1 6-32 Hex Nut
99-18-21 6-32x3/8" RHMS
99-28- 3 6-32x1/4" Headless Set Screw
99-28-21 6-32x1/8" Headless Set Screw
99-38-2 No. 2 Woodruff Key

4244 Turntable Shaft Collar
4312 Pivot Bushing
4320 Turntable Driveshaft Cap
46213 Magnet Holder
5038 Turntable Driveshaft Cap Tubing
5044 Stop Lever Roller Tubing
5046 Stop Lever Collar Pin Tubing
50173 Tone Arm Insulating Bushing
5139 Terminal Block
569 Pole Piece
5610 Stylus
5765 Pickup Cover
5768 Pickup Back

3319 Screw—Turntable Shaft Collar
3356 Pickup Needle Screw
3516 Gear—Reverse Cam Shaft Driver
3539 Worm Gear
3626 Ball Bearing
3627 Ball Bearing
3630 Turntable Shaft Clutch
3820 Magazine Slide Arm Cam
3822 Pickup Arm Swing Cam
3984 Spring—Tone Arm Stop Lever
4210 Thrust Washer—Worm Shaft
4233 Main Cam Collar
4243 Pickup Arm Stop Lever Collar




Fig. 8

3241 Shoulder Screw—Reverse Segment Link
3243 Shoulder Screw—Repeat Lever
3244 Shoulder Screw—Clutch Throwout Lever
3317 Screw—Clutch Throwout Cam
3550 Record Reverse Pinion Segment
3827 Reverse Segment Stop Cam
3826 Record Repeat Sliding Clutch Cam
3976 Spring—Record Separator Hook Lever
3977 Spring—Magazine Slide Arm
3978 Spring—Record Repeat Clutch
3981 Spring—Record Reverse Cam Control
3984 Spring—Tone Arm Lever
3995 Spring—Reverse Arm
5046 Stop Lever Collar Pin Tubing
5331 Record Repeat Throwout Hook Lever
5332 Record Repeat Clutch Fork Lever
5334 Record Repeat Lock Lever
6230 Reverse Pinion and Crank Assembly
6233 Record Reverse Cam Shaft Assembly
6326 Worm and Bushing Assembly
6410 Reverse Cam Arm and Roller Assembly
6460 Clutch Throwout Lever and Spring Assembly
6719 Turntable Drive Shaft Assembly
34141 Pin—Short—Reverse Segment
34144 Pin—Reverse Cam Shaft

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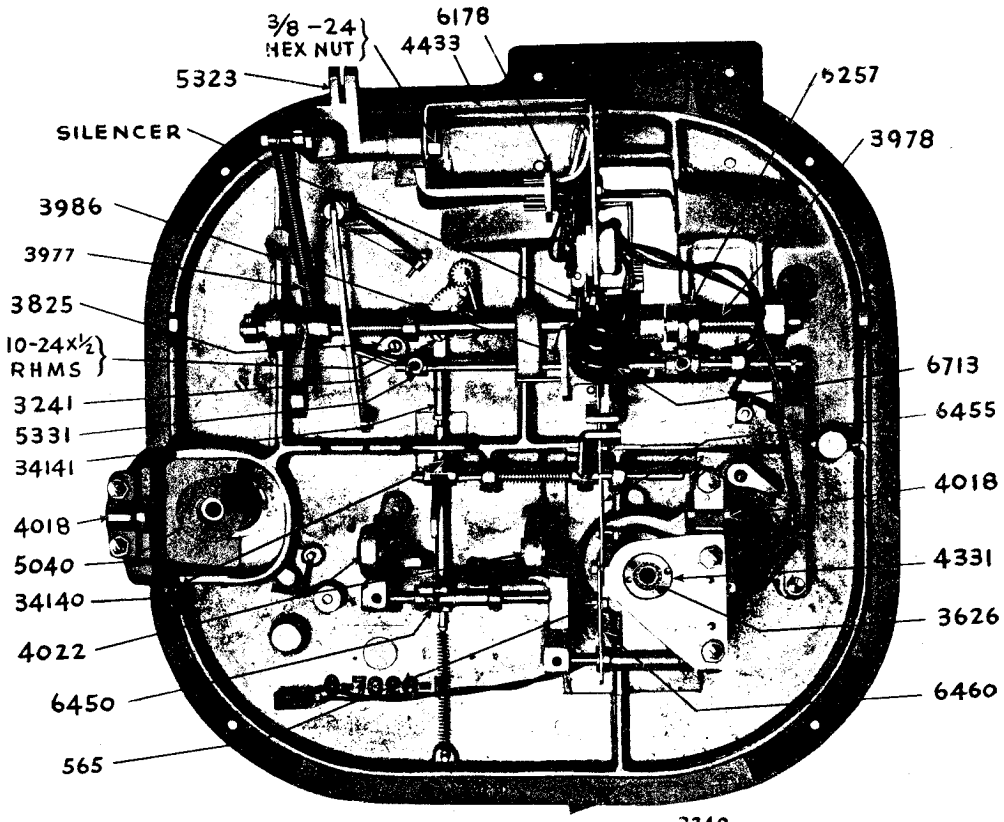
MODEL 16-E
Chassis Views

# CAPEHART CORPORATION

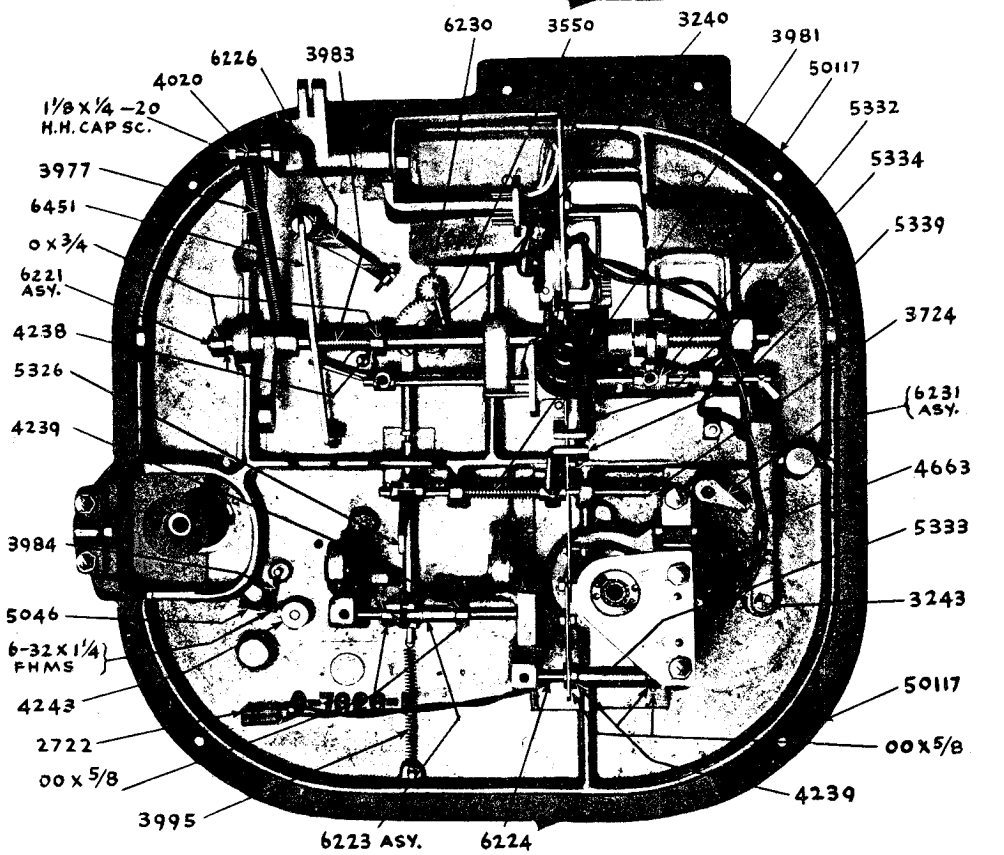
## Fig. 11

565 Clutch Throwout Cam
3241 Reverse Segment Link Shoulder Screw
3626 Ball Bearing
3825 Reverse Segment Stop Cam
3977 Magazine Slide Arm Spring
3978 Record Repeat Clutch Spring
3986 Solenoid Lever Torsion Spring
4018 Main Shaft Bushing
4022 Record Tray Shaft Bushing
4331 Bearing Retainer Plug
4433 Solenoid Plate Bracket
5040 Pickup Arm Brake Facing
5323 Magazine Slide Arm Lever
5331 Record Repeat Throwout Hook Lever
6178 Chassis Plug
6257 Record Tray Gear and Sliding Cam Assembly
6450 Reverse Cam Arm and Roller Assembly
6451 Solenoid to Clutch Lever and Pin Assembly
6460 Clutch Throwout Lever and Spring Assembly
6713 Solenoid Assembly
34140 Reverse Segment Pin, Long
34141 Reverse Segment Pin, Short




## Fig. 12

2722 AC Line Toggle Switch
3240 Reverse Segment Shoulder Screw
3243 Repeat Lever Shoulder Screw
3550 Record Reverse Pinion Segment
3724 Record Control Shaft
3977 Magazine Slide Arm Spring
3981 Record Reverse Cam Control Spring
3983 Separator Hook Spring
3984 Tone Arm Stop Lever Spring
3995 Reverse Arm Spring
4020 Record Magazine Bushing
4238 ⅞" Collar
4239 ⅞" Collar
4243 Pickup Arm Stop Lever Collar
4663 Record Repeat Throwout Lever
5046 Stop Lever Collar Pin Tubing
5326 Record Reverse Cam Shaft Lever
5332 Record Repeat Clutch Fork Lever
5333 Main Clutch Fork Lever
5334 Record Repeat Lock Lever
5339 Reverse Cam Lock Lever
6221 Record Tray Drive Shaft Assembly
6223 Record Reverse Arm Shaft Assem.
6224 Solenoid Lever Shaft Assem.
6226 Separator Hook and Arm Assembly
6230 Reverse Pinion and Crank Assembly
6231 Record Control Lever and Stud Assembly
6451 Separator Hook Lever and Roller Assembly
50117 Main Frame Pad
00x⅛ Taper Pin
0x¾ Taper Pin

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# CASE ELECTRIC CORP.

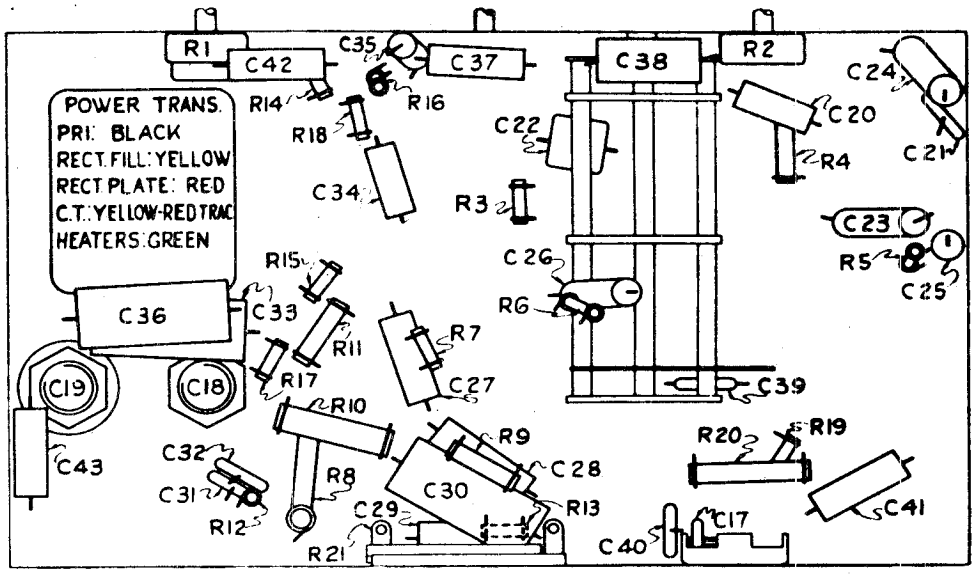
MODELS 710,713,714
715,716,718,719
Chassis 17
Voltage,Chassis,Parts

VOLTAGE CHART

115 VOLT LINE

Measurements taken from elements to chassis--1000 Ohm per volt meter.
*Across Candohm (R-21)
Total "B" Current drain 72 Ma.--speaker field drop--92 volts.

| POSITION | TUBE | $E_f$ | $E_k$ | $E_g$ Screen | $E_g$ Suppressor | $E_p$ Triode | $E_p$ Pentode |
|---|---|---|---|---|---|---|---|
| RF Amplifier | 6K7 | 6.0 | 3.0 | 110.0 | 3.0 | | 250.0 |
| Mixer | 6L7 | 6.0 | 2.0 | 125.0 | 0.0 | | 250.0 |
| IF Amplifier | 6D6 | 6.0 | 3.0 | 120.0 | 3.0 | | 250.0 |
| AVC Detector | 6B7 | 6.0 | 0.0 | 20.0 | 0.0 | | 18.0 |
| Oscillator | 76 | 6.0 | 0.0 | | | 125.0 | |
| Audio Output | 42 | 6.0 | *20.0 | 250.0 | | | 240.0 |
| Rectifier | 80 | 6.0 | | | | | |




## PARTS CHASSIS 17, PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

| | | | |
|---|---|---|---|
| | A15016 | Belt Drive | .21 |
| | B15045 | Bezel | .94 |
| | 15225 | Book Instruction | .27 |
| | 15070 | Clip Grid (Glass Tube) | .01 |
| | 15071 | Clip Grid (Metal Tube) | .01 |
| | 15330 | Clutch Assembly | .26 |
| C4 C5 C6 L1 | 15127 | Coil Antenna in Shield Sold | 3.36 |
| C7 C8 C9 L2 | 15128 | Coil Detector in Shield in | 4.72 |
| C14 C15 C16 L3 | 15126 | Coil Oscillator in Shield of 3 | 3.22 |
| | A15069 | Cord Attachment | .35 |
| C1 C2 C3 | D15076 | Cond. Variable | 5.21 |
| C19 | 15078 | Cond. Electrolytic 16 Mfd 475v | 1.16 |
| C18 | 15079 | Cond. Electrolytic 16 Mfd 300v | .92 |
| C31 C32 | 15900 | Cond. Mica 50 Mmfd | .11 |
| C21 | 15904 | Cond. Mica 2000 Mmfd | .26 |
| C22 | 15911 | Cond. Mica 4500 Mmfd | .37 |
| C39 | 15918 | Cond. Mica 35 Mmfd | .11 |
| C40 | 15908 | Cond. Mica 650 Mmfd | .19 |
| C33 C36 C30 | 15750 | Cond. Tubular .25 Mfd 400v | .19 |
| C27 C26 | 15752 | Cond. Tubular .05 Mfd 200v | .12 |
| C35 | 15753 | Cond. Tubular .002 Mfd 600v | .11 |
| [illegible] C20, C34 | 15754 | Cond. Tubular .01 Mfd 400v | .11 |
| C38 | 15755 | Cond. Tubular .06 Mfd 600v | .14 |
| C28 C23 | 15756 | Cond. Tubular .05 Mfd 400v | .12 |
| C41 C24 | 15757 | Cond. Tubular .1 Mfd 400v | .14 |
| C42 C43 C29 C25 | 15761 | Cond. Tubular .1 Mfd 200v | .12 |
| C37 | 15764 | Cond. Tubular .03 Mfd 400v | .12 |
| R2 | A15116 | Control Tone | .70 |
| R1 | A15113 | Control Volume | .89 |
| | 15301 | Dial & Paper Strip Assembly | 1.96 |
| | B15044 | Glass Convex | .25 |
| A15037 | [illegible] | Knob Drive | .14. |
| | A15098 | Knob Switch | .23 |
| A15039 | [illegible] | Knob Volume & Tone | .15. |
| | 15089 | Lamp Dial 6.3 V. Bayonet Type | .19 |
| | 15129 | Lamp Dial Assembly | .68 |
| | A15082 | Lug Ground Electrolytic | .01 |
| | A15032 | Mounting Chassis Rubbers | .03 |
| | B15168 | Paper Dial Backing | .02 |
| | A15023 | Pointer (Minute) | .04 |
| | A15024 | Pointer (Tuning) | .04 |
| | A15006 | Pulley Idler Assembly | .10 |
| | A15072 | Planetary Assembly | .46 |
| R21 | A15159 | Resistor Candohm 235 Ohm | .23 |
| R13 | 15500 | Resistor Carbon 2 Meg. .25W | .08 |
| R20 R8 | 15501 | Resistor Carbon 25M Ohm 1W | .11 |
| C17 | A15189 | Var. Padder Cond. | .34 |
| R10 | 15502 | Resistor Carbon 16M Ohm 2W | .16 |
| R18 | 15504 | Resistor Carbon 150M Ohm .25W | .08 |
| R4 | 15506 | Resistor Carbon 60M Ohm .5W | .10 |
| R11 | 15507 | Resistor Carbon 300M Ohm .5W | .10 |
| R5 | 15508 | Resistor Carbon 150 Ohm .25W | .10 |
| R15 | 15509 | Resistor Carbon 60M Ohm .25W | .08 |
| R17 | 15510 | Resistor Carbon 20M Ohm .25W | .08 |
| R12 R19 | 15511 | Resistor Carbon 50M Ohm .25W | .08 |
| R3 R6 | 15512 | Resistor Carbon 250M Ohm .25W | .08 |
| R9 | 15513 | Resistor Carbon 20M Ohm .5W | .10 |
| R14 | 15515 | Resistor Carbon 100M Ohm .25W | .08 |
| R16 | 15518 | Resistor Carbon 180M Ohm .25W | .08 |
| R7 | 15527 | Resistor Carbon 500 Ohm .25W | .10 |
| | B15041 | Retaining Spring for Bezel | .18 |
| | B15043 | Retaining Ring for Glass | .16 |
| | A15020 | Shaft Drive | .15 |
| | 15096 | Shield Coat (Long) | .12 |
| | 15094 | Shield Coat (Short) | .11 |
| | 15118 | Shielded Grid Lead | .26 |
| | 15195 | Shielded Plate Lead | .24 |
| | 15196 | Shielded Vol. Control Lead | .25 |
| | A15053 | Socket Dial Lamp (Left Hand) | .11 |
| | A15054 | Socket Dial Lamp (Right Hand) | .11 |
| | 15062 | Socket Speaker | .10 |
| | B15063 | Socket 80 | .09 |
| | B15064 | Socket 42 | .11 |
| | B15065 | Socket 76 | .10 |
| | B15067 | Socket 6B7 | .11 |
| | B15068 | Socket 6D6 | .11 |
| | B15087 | Socket 6L7 | .14 |
| | B15066 | Socket 6K7 | .14 |
| | A15033 | Spacer (For Chassis Rubbers) | .02 |
| B15170 | [illegible] | Speaker 6" | 5.34 |
| | C15172 | Speaker 10" | 6.94 |
| | A15017 | Spring Tension | .02 |
| | C15256 | Switch Range | 2.14 |
| | 15123 | Switch Range Pulley & String | .65 |
| C10 C11 T1 | B15208-4 | Transformer Input IF | 1.42 |
| C12 C13 T2 | B15209-4 | Transformer Output IF | 1.63 |
| | B15060 | Transformer Power 60 cycles 110V | 4.29 |
| | 15242 | Trap Wave | 1.26 |
| | 1950 | Washer Felt (Small Knob) | .01 |
| | 1951 | Washer Felt (Switch Knob) | .01 |
| | A2111 | Washer Extruding Fibre | .02 |
| | A2105 | Washer Plain Fibre | .01 |
| | A2300 | Washer Rubber RP Panel | .02 |

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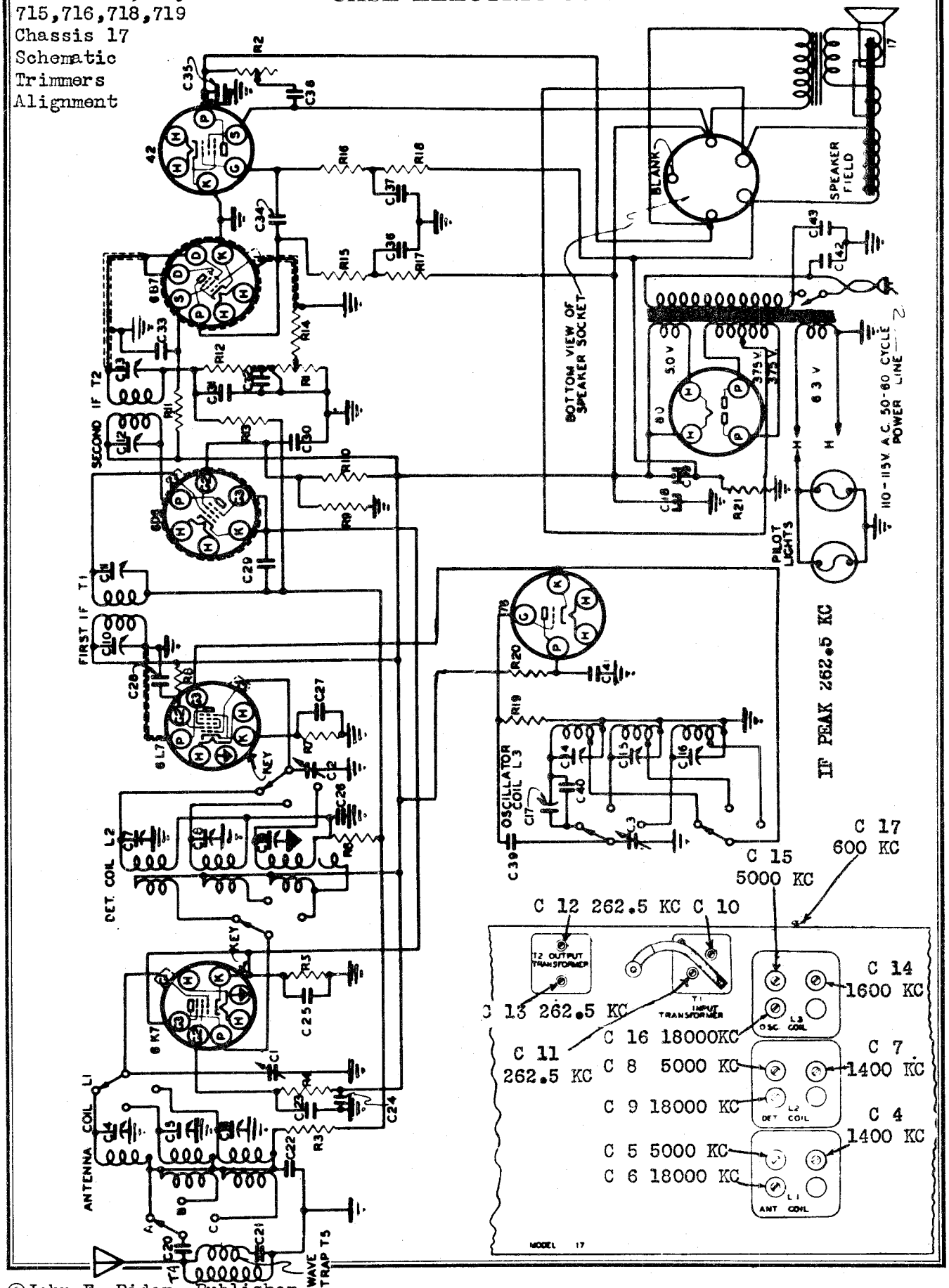
MODELS 710,713,714
715,716,718,719
Chassis 17
Schematic
Trimmers
Alignment

# CASE ELECTRIC CORP.

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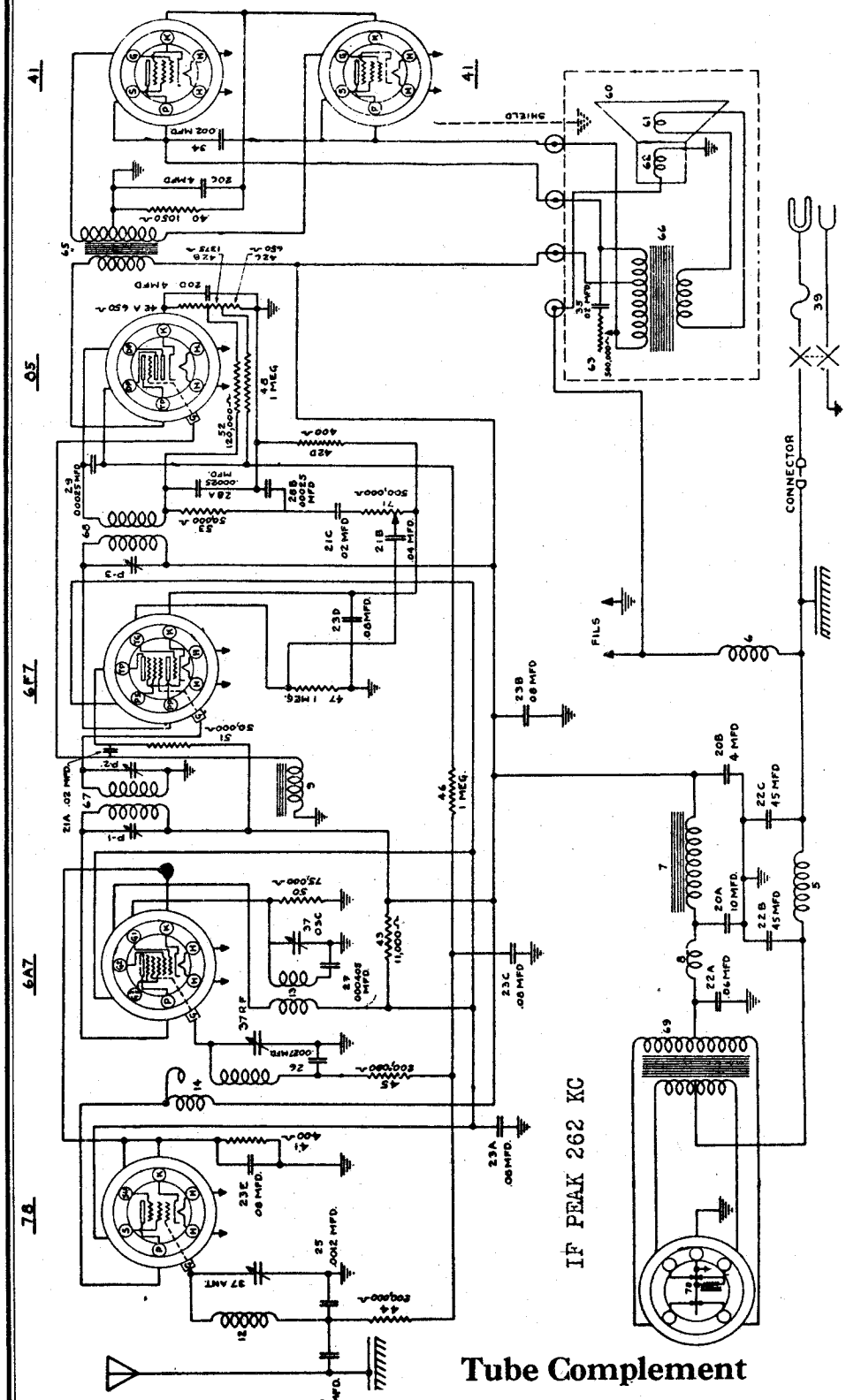
# CHEVROLET DIV.—GEN. MOTORS

MODEL 601525
Schematic
Voltage




## 601525 CIRCUIT DIAGRAM

**Part No. 601525**
**Date 6-1-37**

The voltages shown below are average readings taken from the tube socket contacts to the chassis frame, and will vary 10% when the set is tested on a 6 volt battery due to differences in characteristics of vibrators and tubes.

| Type | Function | H | Pp | S | Tp | Gt | G | G1 | G2 | G3,5 | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 78 | R. F. | 6 | 240 | 130 | — | — | 0 | — | — | — | 8.0 |
| 6A7 | Det. Osc. | 6 | 240 | 130 | — | — | 0 | 0 | 130 | 130 | 8.0 |
| 6F7 | I. F.—AF | 6 | 240 | 130 | 115 | 0 | 0 | — | — | — | 4.5 |
| 85 | Det.—2nd AF | 6 | — | — | 235 | 0 | 0 | — | — | — | 16.5 |
| 41 | Output | 6 | 240 | 240 | — | — | — | — | — | — | 23.0 |
| 41 | Output | 6 | 240 | 240 | — | — | — | — | — | — | 23.0 |

## Tube Complement

| Type | Function | Type | Function |
|---|---|---|---|
| 78 | 1st R. F. Amplifier | 85 | 2nd Detector—A. V. C.—2nd Audio |
| 6A7 | 1st Detector—Oscillator | 41 | Power Output (Class "A Prime") |
| 6F7 | I. F.—1st Audio Amplifier | 41 | Power Output (Class "A Prime") |

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MODEL 601525
Socket, Trimmers
Chassis, Changes
Alignment

# CHEVROLET DIV.—GEN. MOTORS



PARTS LAYOUT—Bottom View




PARTS LAYOUT—Top View

**Peaking I. F. Stages at 262 K. C.**

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a 1 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube leaving the tube's grid clip in place. The 1 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I. F. adjustments.

(b) Set the test oscillator on 262 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak the I. F. trimmer P-3 located on the 2nd I. F. coil shown on Figure 2.

(e) Then peak trimmers P-2 and P-1 located on the first I. F. Coil also shown on Figure 2.

(f) In order to insure accurate settings of the I. F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable deflection of the output meter pointer. Make all adjustments for maximum output.

Part No. 601525
Date 11-1-35

**CODE FOR SYMBOLS**

Gt—Grid-triode
G—Control grid
G1—Osc. Grid
G2—Osc. plate
H—Heater
Pp—Plate-pentode
S—Screen
Tp—Triode-plate
G3,5—Osc. Screen
K—Cathode

**GENERAL: This auto radio is a six tube, two unit (dash speaker) superheterodyne receiver. It is equipped with a remote control and a plug-in vibrator of the full wave self-rectifying type.**

## Circuit Changes

A number of the early receivers have ¼ mfd. tubular condenser mounted above the candohm resistor, illustration #42 of Figure 2 and connected in parallel with the 85 tube cathode by-pass section 20D of the #1209144 electrolytic condenser block. The use of the tubular condenser was necessary in production to reduce the R. F. resistance of the 85 cathode by-pass. A change has been made in the design of the condenser block, making the use of the tubular condenser unnecessary. All of the service parts replacement stock of #1209144 electrolytics are of the new design and it is immaterial whether or not the tubular condenser is left in the receiver when replacing the electrolytic condenser block.

It may be noted on some of the earlier receivers that there is a small condenser in a metal case mounted below the candohm resistor, Illus. #42, Figure 2, with two terminals that are not connected. This condenser was originally placed in the set to filter vibrator interference, but it was found after production started that two small condensers mounted in the vibrator unit were more effective and the external condenser was simply disconnected.

## Peaking Instructions

### Peaking Gang Condenser at 1530 and 1400 K. C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. Do not use the 1 mfd. condenser that was required in aligning the I. F. stages.

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the trimmer condenser for the oscillator section (middle section) of the gang condenser CAREFULLY for maximum output. Then adjust the trimmers for the "R. F." and "ANT" sections of the gang condenser.

(e) Set the test oscillator on 1400 kilocycles.

(f) Turn the condenser rotor plates until the 1400 K. C. signal from the test oscillator is turned in with maximum output. (No calibration blocks should be used as the oscillator circuit is adjusted at 1530 K. C. on this set.)

(g) Readjust the parallel trimmers for the "R. F." and "ANT" section of the gang condenser for maximum output. DO NOT disturb the oscillator trimmer (middle section) as this is adjusted at 1530 K. C. only and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

CAUTION: Always use the lowest possible test oscillator output that will give a reasonable deflection of the output meter pointer in order to prevent the A. V. C. from leveling out the output as the adjustments are made.

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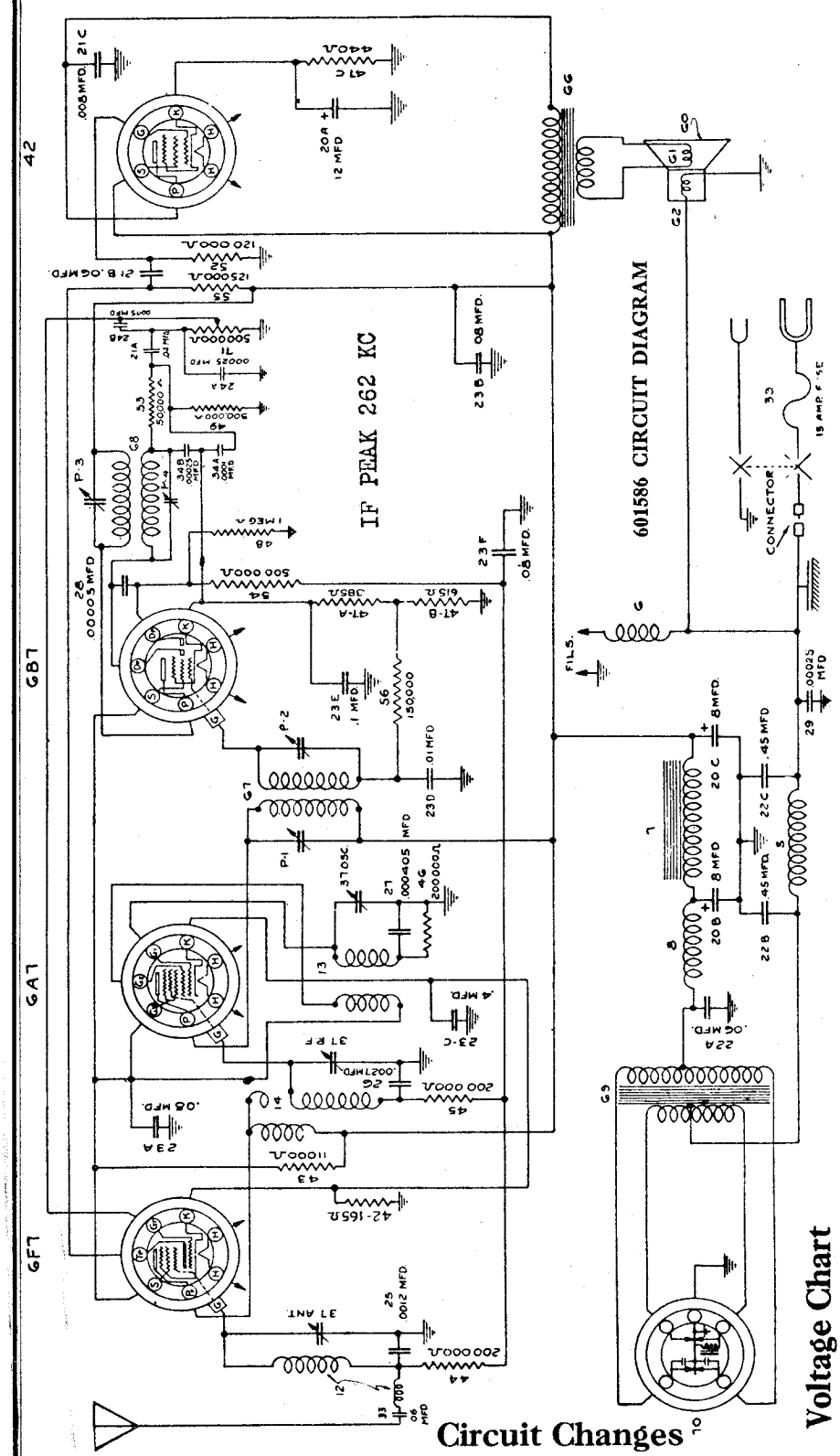
# CHEVROLET DIV.—GEN. MOTORS

MODEL 601586
Schematic, Voltage Changes




## Code for Symbols

H—Heater
Pp—Plate-pentode
S—Screen
Tp—Triode-plate
Gt—Grid-triode
G—Control grid
G1—Osc. grid
G2—Osc. plate
G3,5—Osc. screen
K—Cathode

## Voltage Chart

The voltages shown below are average readings taken from the tube socket contacts to the chassis frame, and will vary 10% when the set is tested on a 6 volt battery due to differences in characteristics of vibrators and tubes. All readings were taken with a 1000 ohm per volt meter.

| Type | Function | H | Pp | S | Tp | Gt | G | G1 | G2 | G3,5 | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6F7 | R. F. | 6 | 250 | 135 | 80 | 0 | 0 | — | — | — | 6.2 |
| 6A7 | Det.-Osc. | 6 | 250 | — | — | — | 0 | 0 | 120 | 135 | 6.2 |
| 6B7 | 2nd Det. AVC | 6 | 250 | 135 | — | — | 0 | — | — | — | 8.5 |
| 42 | Output | 6 | 240 | 250 | — | — | 0 | — | — | — | 16.0 |

NOTE: Ampere drain of set at 6 volts is 6.2 amperes.
Milliampere drain from "B" supply is approximately 55 M. A.

**Part No. 601586**
**Date 11-1-35**

## Circuit Changes

A number of .05 mfd. tubular condensers were used at the factory in place of the .06 mfd. condenser part #1209213 condenser shown on Fig. 2 as Illus. #33. For Service Replacement purposes of any defective .05 mfd. condensers—use part #1209213 condenser.

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MODEL 601586
Socket, Trimmers
Chassis, Alignment
Parts

# CHEVROLET DIV.—GEN. MOTORS

**GENERAL: This auto radio is a four tube, single unit superheterodyne radio. It was designed for the 1935 Standard Model Chevrolets. A tuning control of the type that mounts on the bottom flange of the instrument is used.**

## Peaking Instructions

### Peaking I. F. Stages at 262 K. C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect a .5 mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place. The .5 mfd. condenser is necessary to prevent the oscillator circuit of the receiver from affecting the I. F. adjustments.

(b) Set the test oscillator on 262 kilocycles.

(c) Turn the volume control of the receiver on full.

(d) Peak the I. F. trimmer P-3 for the 2nd I. F. coil shown on Fig. 3.

(e) Then peak trimmers P-2 and P-1 of the first I. F. coil also shown on Fig. 3.

(f) In order to insure accurate settings of the I. F. trimmers the above adjustments should be repeated using the lowest oscillator output that will give a reasonable output meter scale deflection. Make all adjustments for maximum output.

### Peaking Gang Condenser at 1530 and 1400 K. C.

(a) Connect the output of the test oscillator to the antenna connection of the receiver and to the chassis ground. Do not use the .5 mfd. condenser that was required in aligning the I. F. stages.

(b) Turn the rotor plates of the gang condenser until they are COMPLETELY OUT OF MESH.

(c) Set the test oscillator on 1530 kilocycles.

(d) Adjust the oscillator section (middle section) of the gang condenser CAREFULLY for maximum output. Then adjust the trimmers for the "R. F." and "ANT" sections of the gang condenser.

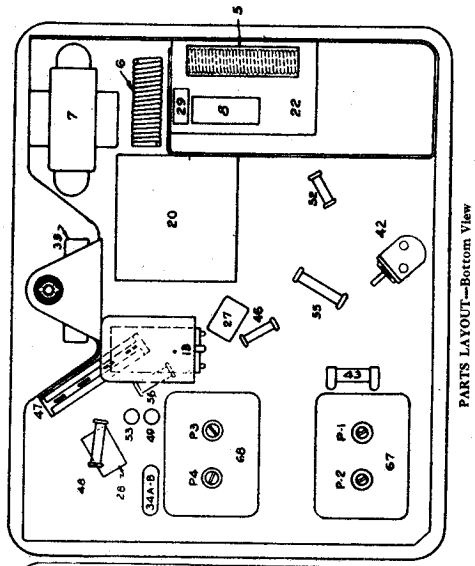
(e) Set the test oscillator on 1400 kilocycles.

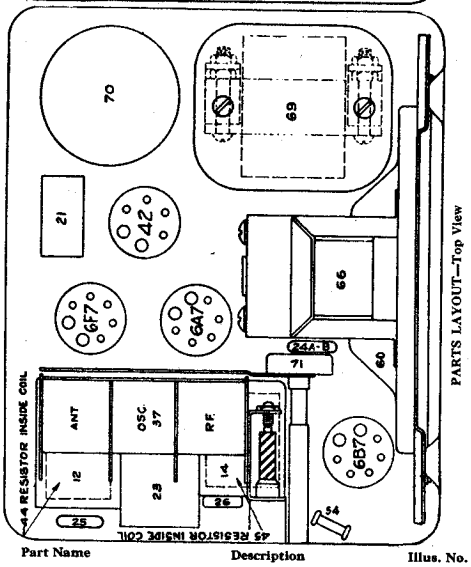
(f) Turn the condenser rotor plates until the 1400 K. C. signal from the test oscillator is tuned in with maximum output. (No calibration blocks should be used as the oscillator circuit is adjusted at 1530 K. C. on this set.)

(g) Readjust the parallel trimmers for the "R. F." and "ANT" sections of the gang condenser (shown on Fig. 2) for maximum output. DO NOT disturb the oscillator trimmer (middle section) as this is adjusted at 1530 K. C. only, and any further adjustments at this point will affect both the tuning range of the receiver and the tracking of its circuits.

(h) The capacity of the output circuit of the test oscillator may be slightly different than that of the under car antenna the receiver is to be used on. Therefore, it is advisable to readjust the "ANT" trimmer to the car antenna when reinstalling the receiver. This may be done by tuning the receiver to a broadcast station around 1400 K. C. and adjusting for maximum volume.

**CAUTION:** Always use the lowest possible test oscillator output that will give a reasonable deflection of the output meter pointer, in order to prevent the A. V. C. from leveling out the output as the adjustments are made.




## PARTS

Part No. 601586
Date 11-1-35

| Part No. | Part Name | Description | Illus. No. |
|---|---|---|---|
| 1209079 | Case | Chassis | |
| 1207683 | Clip | Tube grid connector | |
| 1209039 | Coil | Vibrator "A" choke | 5 |
| 1209209 | Condenser | By-pass block | 23 |
| | Sec. A | .08 Mfd., 400 v. | |
| | Sec. B | .08 Mfd., 400 v. | |
| | Sec. C | .4 Mfd., 100 v. | |
| | Sec. D | .01 Mfd., 100 v. | |
| | Sec. E | .1 Mfd., 100 v. | |
| | Sec. F | .08 Mfd., 100 v. | |
| 1209051 | Condenser | Molded .0012 Mfd. | 25 |
| 1209052 | Condenser | Molded .00027 Mfd. | 26 |
| 1209053 | Condenser | Molded .000405 Mfd. | 27 |
| 1209878 | Condenser | Molded .00005 Mfd. | 28 |
| 1209055 | Condenser | Molded .00025 Mfd. | 29 |
| *1209534 | Condenser | Tubular .06 Mfd., 200 v. | 33 |
| 1209950 | Condenser | 3 gang tuning—incl. coupling | 35 |
| | **Connector Assembly | "A" power on chassis | |
| 1836869 | Cap | Ferrule holder | |
| 1838476 | Ferrule | Contact | |
| | *Connector Assembly | Antenna on chassis | |
| 1836878 | Body | Antenna connector | |
| 1838476 | Ferrule | Contact | |
| 1836876 | Spring | Ferrule tension | |
| 1843713 | Washer | Antenna connector | |
| 1209059 | Coupling | Condenser drive | |
| 1209083 | Cover | Chassis top | |
| 1209084 | Cover | Tube lid | |
| 1209210 | Resistor | Candohm 165 ohms | 42 |
| 1209063 | Resistor | Ohmite 11,000 ohms—1⅓ watt | 43 |
| 1210119 | Resistor | Insulated 200,000 ohms—½ watt | 44, 45, 46 |
| 1209211 | Resistor | Candohm strip | 47 |
| | Sec. A | 385 ohms | |
| | Sec. B | 615 ohms | |
| | Sec. C | 440 ohms | |
| 1210470 | Resistor | Insulated 500,000 ohms—½ watt | 54 |
| 1211157 | Resistor | Insulated 120,000 ohms—½ watt | 55 |
| 1211163 | Resistor | Insulated 150,000 ohms—½ watt | 56 |
| 1208018 | Shield | Tube (without grid shield) | |
| 1207594 | Sleeve | Volume control shaft | |
| 1210759 | Socket | 6 prong tube (42) | |
| 1209065 | Socket | Vibrator | |
| 1209071 | Speaker Assembly | Complete (6-½") | 60 |
| 1209074 | Transformer | 1st I. F. assembly | 67 |
| 1209367 | Transformer | 2nd I. F. assembly | 68 |
| 1209076 | Transformer | Vibrator | 69 |
| 5039661 | Vibrator | Plug-in synchronous | 70 |
| 1209368 | Volume control | Res. 500,000 ohms | 71 |
| 1209130 | Bracket | Dial support | |
| 1208197 | Clip | Ammeter lead | |
| 1209099 | Dial | Chart | |
| 119496 | Dial Light | 6-8 volt | |
| 1209098 | Drive Head | Less flex. shaft assembly | |
| 361656 | Fuse | 15 ampere | |
| 1209132 | Gear | Pointer drive | |
| 1209100 | Knob | Tuning or volume | |
| 1209204 | Lead Assembly | Ammeter | |
| 1209885 | Resistor | Insulated 1 megohm—½ watt | 48 |
| 1210470 | Resistor | Insulated 500,000—½ watt | 49 |
| 1211157 | Resistor | Insulated 120,000 ohms—½ watt | 52 |
| 1210116 | Resistor | Insulated 50,000 ohms—½ watt | 53 |

*See "CIRCUIT CHANGES."
**Complete assembly not available as a service part.

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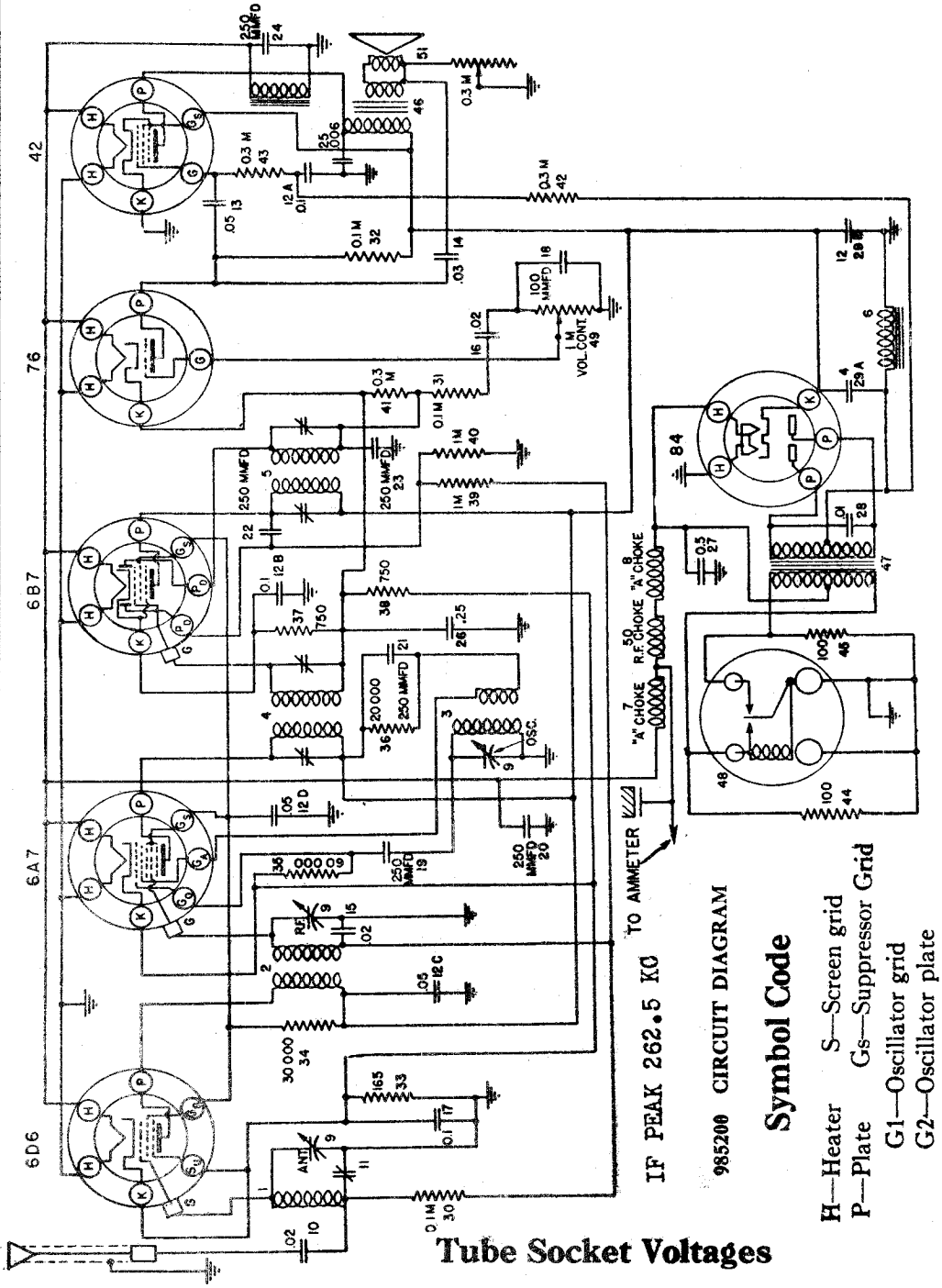
MODEL 985200
Schematic, Voltage

# CHEVROLET DIV.—GEN. MOTORS




985200 CIRCUIT DIAGRAM

## Symbol Code

H—Heater S—Screen grid
P—Plate Gs—Suppressor Grid
G1—Oscillator grid
G2—Oscillator plate
K—Cathode

## Circuit Description

The circuit used is of the conventional superheterodyne type and does not employ regeneration which might affect its stability. A high gain antenna circuit especially designed for use with an under car antenna is used. An antenna compensating condenser is provided in this circuit which can be adjusted so as to bring the antenna circuit of the receiver into resonance with the car antenna.

**Part No. 985200**
**Date 11-1-35**

## Tube Socket Voltages

| Type | Function | H | P | S | Gs | G1 | G2 | K |
|---|---|---|---|---|---|---|---|---|
| 6D6 | R. F. Amplifier | 6 | 240 | 100 | — | — | — | 3.6 |
| 6A7 | 1st Det.-Osc. | 6 | 140 | 100 | — | — | 160 | 3.6 |
| 6B7 | IF Amp.-2nd Det. | 6 | 130 | 100 | — | — | — | 3.6 |
| 76 | 1st A. F. | 6 | 130 | — | — | — | — | 8.0 |
| 42 | Output | 6 | 220 | 240 | — | — | — | 0 |
| 84 | Rectifier | 6 | * | — | — | — | — | 240 |

*A. C.

Note: Above readings taken from tube socket contacts to ground with a D. C. voltmeter having a resistance of 1000 ohms per volt.

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MODEL 985200
Socket, Trimmers
Alignment, Chassis
Parts

# CHEVROLET DIV.—GEN. MOTORS




Fig. 3 PARTS LAYOUT—Top View




Fig. 2 PARTS LAYOUT—Bottom View

Part No. 985200
Date 11-1-35

## Peaking Procedure

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 42 output tube.

BE SURE the meter is protected from D. C. by connecting a condenser (.1 Mfd. or larger—not electrolytic) in series with one of the leads.

### eaking I. F. Stages at 262.5 K. C.

(a) Connect the ground lead of the signal generator to the chassis frame. Connect a .5 Mfd. condenser in series with the other lead and connect this lead to the grid cap of the 6A7 tube, leaving the tube's grid clip in place.

(b) Set the signal generator to 262.5 kilocycles.

(c) Turn the volume control of the receiver on full and turn the tone control to the treble position.

(d) Rotate the station selector until the tuning condenser plates are completely in mesh.

(e) Adjust the trimmer condensers located on top of the 2nd I-F coil (Fig. 00) for maximum reading on the output meter.

(f) Adjust the trimmer condensers located on top of the 1st I-F coil for maximum output.

NOTE: In order to insure accurate settings of the I-F trimmer condensers the above adjustments should be repeated using the lowest signal generator output that will give a reasonable scale deflection on the output meter. Make all adjustments for maximum output.

### eaking R. F. Stages

(a) Remove the .5 Mfd. condenser from the output lead of the signal generator and connect a .00025 Mfd. condenser in its place. Then, connect this lead to the antenna connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Rotate the station selector until the pointer points to 140 on the dial.

NOTE: Special care should be exercised in making the adjustments at this frequency as the correct logging of stations on the dial is dependent upon these adjustments.

(d) Adjust the "Osc" trimmer of the tuning condenser (Fig. 2) for maximum output.

(e) Adjust the "R-F" trimmer for maximum output.

(f) Adjust the "ANT" trimmer for maximum output.

(g) Repeat operations (e) and (f) using the lowest signal generator output that will give a reasonable scale deflection on the output meter.

NOTE: The "Osc," "R-F," and "ANT" trimmers should not be adjusted at any frequency other than 1400 kilocycles.

(h) Set the signal generator to 600 kilocycles.

(i) Tune in the 600 kilocycles from the signal generator with the station selector for maximum output.

(j) Peak the antenna compensating condenser (Fig. 3) for maximum output.

(k) Repeat operation (j) and (k) alternately until no further improvement in output can be obtained.

(l) Set the signal generator to 1400 kilocycles again.

(m) Tune in the 1400 kilocycle with the station selector for maximum output.

(n) Readjust the "ANT" trimmer of the tuning condenser for maximum output.

| Part No. | Part Name | Description | Illus. No. |
|---|---|---|---|
| 1210652 | Coil | Antenna | 1 |
| 1210653 | Coil | R. F. | 2 |
| 7231040 | Coil | Oscillator | 3 |
| 1210654 | Coil Assembly | 1st I. F. | 4 |
| 1210655 | Coil Assembly | 2nd I. F. | 5 |
| 1209803 | Coil | "B" filter choke | 6 |
| 1210656 | Coil | "A" filter choke | 7 |
| 1210656 | Coil | "A" filter choke | 8 |
| 1210657 | Condenser | 3 gang variable | 9 |
| 1210658 | Condenser | Ant. blocking .02 Mfd. | 10 |
| 1210659 | Condenser | Antenna trimmer | 11 |
| 1210660 | Condenser | By-pass block | 12 |
| | Sec. A | .1 Mfd., 200 volt | |
| | Sec. B | .1 Mfd., 200 volt | |
| | Sec. C | .05 Mfd., 400 volt | |
| | Sec. D | .05 Mfd., 400 volt | |
| 7230592 | Condenser | Tubular .05 Mfd., | 13 |
| 1209625 | Condenser | Tubular .03 Mfd., | 14 |
| 1212099 | Condenser | Tubular .02 Mfd., | 15 |
| 1212099 | Condenser | Tubular .02 Mfd., | 16 |
| 1207908 | Condenser | Tubular .1 Mfd., | 17 |
| 1210275 | Condenser | Molded .0001 Mfd. | 18 |
| 1209055 | Condenser | Molded .00025 Mfd. | 19 |
| 1209055 | Condenser | Molded .00025 Mfd. | 20 |
| 1209055 | Condenser | Molded .00025 Mfd. | 21 |
| 1209055 | Condenser | Molded .00025 Mfd. | 22 |
| 1209055 | Condenser | Molded .00025 Mfd. | 23 |
| 1209055 | Condenser | Molded .00025 Mfd. | 24 |
| 7230593 | Condenser | Tubular .006 Mfd., | 25 |
| 7231594 | Condenser | Tubular .25 Mfd., | 26 |
| 1212100 | Condenser | Tubular .5 Mfd., | 27 |
| 1209805 | Condenser | Oil type .01 Mfd., | 28 |
| 1210662 | Condenser | Electrolytic block | 29 |
| | Sec. A | 4. Mfd., 350 volt | |
| | Sec. B | 12. Mfd., 350 volt | |
| 1209883 | Resistor | Insulated 100,000 ohms—½ watt | 30 |
| 1209883 | Resistor | Insulated 100,000 ohms—½ watt | 31 |
| 1209883 | Resistor | Insulated 100,000 ohms—½ watt | 32 |
| 1208140 | Resistor | Flexible 165 ohm—½ watt | 33 |
| 1211102 | Resistor | Insulated 30,000 ohm—1 watt | 34 |
| 1210881 | Resistor | Insulated 60,000 ohm—½ watt | 35 |
| 1210882 | Resistor | Insulated 20,000 ohm—½ watt | 36 |
| 1208800 | Resistor | Flexible 750 ohm—½ watt | 37 |
| 1208800 | Resistor | Flexible 750 ohm—½ watt | 38 |
| 1209885 | Resistor | Insulated 1 Megohm—½ watt | 39 |
| 1209885 | Resistor | Insulated 1 Megohm—½ watt | 40 |
| 1209884 | Resistor | Insulated 300,000 ohm—½ watt | 41 |
| 1208984 | Resistor | Insulated 300,000 ohm—½ watt | 42 |
| 1209884 | Resistor | Insulated 300,000 ohm—½ watt | 43 |
| 1209015 | Resistor | Flexible 100 ohm—½ watt | 44 |
| 1209015 | Resistor | Flexible 100 ohm—½ watt | 45 |
| 1209629 | Transformer | Output | 46 |
| 1210663 | Transformer | Power | 47 |
| 5040000 | Vibrator | Plug-in type | 48 |
| 1210664 | Volume Control | 1 megohm | 49 |
| 1210665 | Coil | Motor noise choke | 50 |

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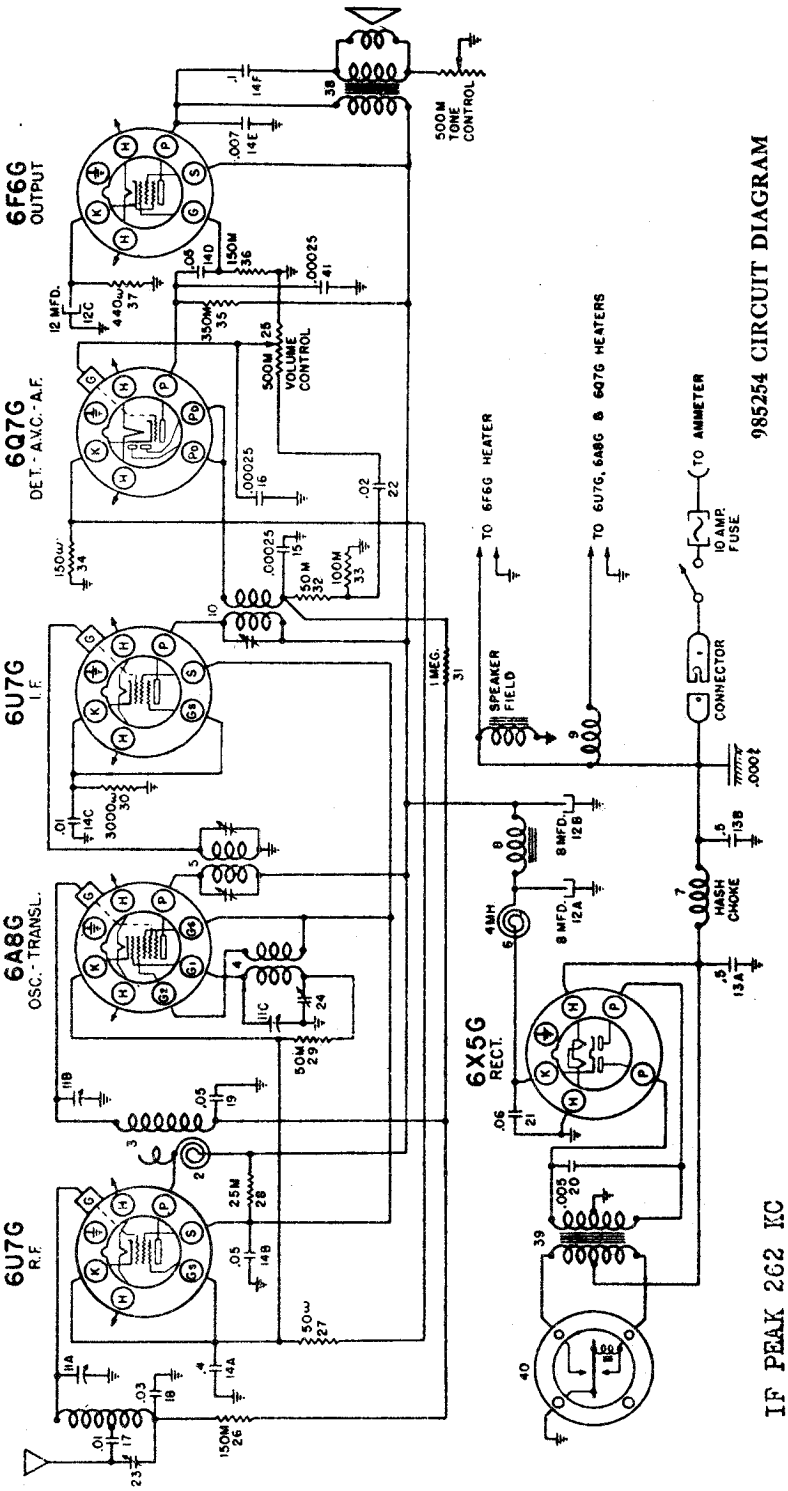
# CHEVROLET DIV.—GEN. MOTORS

MODEL 985254
Schematic, Voltage




IF PEAK 262 KC

**Part No. 985254**
**Date 11-1-36**

## Tube Socket Voltage

### Model 985254

| Symbol | Type | Function | H | P | S | GS | GL | G2 | K |
|---|---|---|---|---|---|---|---|---|---|
| | 6U7G | R.F. Amplifier | 5.75 | 230 | 60 | 2.5 | | | 2.5 |
| | 6A8G | Translator | 5.75 | 230 | | 6.0 | 3.0 | 60 | 2.5 |
| | | Oscillator | | | | | | | |
| | 6U7G | I.F. Amplifier | 5.75 | 230 | 60 | 5.0 | | | 5.0 |
| | 6Q7G | Det-1st I.F. | 5.75 | 80 | | | | | 1.2 |
| | 6F6G | Output | 5.8 | 220 | 230 | | | | 14.0 |
| | 6X5G | Rectifier | 5.75 | * | | | | | 240 |

NOTE: Above readings taken from tube socket contacts to ground with a D.C. voltmeter having a resistance of 1000 ohms per volt; "A" Batt 6 volts.

### Symbol Code

| | |
|---|---|
| H | Heater |
| P | Plate |
| S | Screen Grid |
| GS | Supressor Grid |
| G1 | Oscillator Grid |
| g2 | Oscillator Plate |
| K | Cathode |
| *AC. | |

ANTENNA CIRCUIT: The antenna circuit is directly coupled to the antenna in contrast with the capacity coupled circuit used in some Chevrolet Models. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the dial (1400 K.C.) instead of at the low frequency end as with the capacity coupled sets.

POWER SUPPLY: The power supply in this receiver differs from previous Chevrolet Models in that a rectifier tube (type 6X5G) is used in conjunction with a full wave, plug-in vibrator. The vibrator circuit is permanently connected for operation on negative battery ground as is the case on all Chevrolets.

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MODEL 985254
Socket, Trimmers
Chassis, Alignment
Parts

# CHEVROLET DIV.—GEN. MOTORS




Fig. 2



Fig. 1

| Part No. | Illustration No. | Part Name | Function |
|---|---|---|---|
| 1211585 | 1 | Coil | Antenna Assy. (includes 17) |
| 1210690 | 2 | Coil | Choke (R. F. Primary) |
| 1210501 | 3 | Coil | R. F. |
| 1211583 | 4 | Coil | Oscillator |
| 1211587 | 5 | Coil | 1st I. F. Assy. |
| 1210547 | 8 | Choke | Hum Filter |
| 1211586 | 10 | Coil | 2nd I. F. Assy. |
| 1211591 | 11 | Condenser | Variable 3-gang tuning |
| 1211580 | 12 | Condenser | Electrolytic |
| | | | Sec. A "B" Voltage Filter |
| | | | Sec. B "B" Voltage Filter |
| | | | Sec. C 6F6G Bias Resistor By-Pass |
| 1211581 | 13 | Condenser | Filter Block |
| | | Sec. A. .5 mfd. 160 V. Hash Filter | |
| | | Sec. B. .5 mfd. 160 V. Hash Filter | |
| 1211584 | 14 | Condenser | By-pass Block |
| | | Sec. A. .4 mfd. 160 V-R. F. and translator bias resistor By-Pass | |
| | | Sec. B. .05 mfd. 400 V-Screen By-Pass | |
| | | Sec. C. .01 mfd. 160 V-1. F. Bias Resistor By-Pass | |
| | | Sec. D. .05 mfd. 400 V. Audio Coupling | |
| | | Sec. E. .007 mfd. 400 V. 6F6G Plate By-Pass | |
| | | Sec. F. .1 mfd. 400 V. Tone Control | |
| 1209055 | 15 | Condenser (.00025 mfd.) molded Diode Return | |
| 1209055 | 16 | Condenser (.00025 mfd.) molded R. F. By-Pass | |
| 1208600 | 17 | Condenser .01 mfd. Antenna Coupling | |
| 1209625 | 18 | Condenser .03 mfd. 6U7G Grid Return (Tubular) | |
| 7230592 | 19 | Condenser .05 mfd. 6A8G Grid Return (Tubular) | |
| 7230912 | 20 | Condenser .005 mfd. Buffer | |
| 1209534 | 21 | Condenser .05 mfd. Hash Filter (Tubular) | |
| 1212099 | 22 | Condenser .02 mfd. Audio Coupling (Tubular) | |
| 1210543 | 23 | Condenser (Ant. Padder) (7.5 mfd. to 75 mfd) | |
| 1211592 | 24 | Condenser (Oscillator Padder) | |
| 1210512 | 25 | Control 500,000 ohms Volume | |
| 1210545 | 25 | Control 500,000 ohms (tapped) Volume | |
| 1211163 | 26 | Resistor 150,000 ohms ½ Watt Grid Filter | |
| 1211661 | 27 | 50 ohm Resistor 6U7G and 6A8G Bias Resistor | |
| 1211663 | 28 | Resistor 25,000 ohms 2 Watt Screen Voltage | |
| 1210116 | 29 | Resistor 50,000 ohm ½ watt Oscillator Grid Leak | |
| 1211225 | 30 | Resistor 3,000 ohm ½ Watt 6U7G I. F. Grid Bias | |
| 1209885 | 31 | Resistor 1 meg. ½ Watt Isolation AVC Filter | |
| 1210116 | 32 | Resistor 50,000 ohms ½ Watt AVC | |
| 1209883 | 33 | Resistor 100,000 ohms ½ Watt Diode Load | |
| 1211003 | 34 | Resistor 150 ohm ½ watt | 6Q7G Bias |
| 1211627 | 35 | Resistor 350,000 ohm ½ watt | 6Q7G Plate Load |
| 1211163 | 36 | Resistor 150,000 ohm ½ watt | 6F6G Grid |
| 1211622 | 37 | Resistor WW 440 ohms 1 watt | 6F6G Bias Resistor |
| 1211588 | 38 | Transformer | Output |
| 1211589 | 39 | Transformer | Power |
| 5050673 | 40 | Vibrator | Plug-In |
| 1209055 | 41 | Condenser (.00025 mfd molded) | R. F. By-Pass |
| 1211220 | 42 | Resistor 300 ohm ½ watt | |
| 1210116 | 43 | Resistor 50,000 ohm ½ watt | |

## Circuit Alignment

IMPORTANT: Do not make any adjustments to this receiver with the chassis case removed from the receiver chassis or without the proper equipment. If maximum sensitivity is to be obtained from this receiver after realignment, it is very important that the following procedure be closely observed:

### 1. Aligning I-F Stages at 262 Kilocycles

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.
(b) Connect the ground lead of the test oscillator to the chassis frame.
(c) Connect output meter in plate circuit of 6F6G output tube or across the voice coil of the speaker.
(d) Set the test oscillator to exactly 262 K.C.
(e) Adjust the trimmers on the I-F coils (Illus. 5 and 10) carefully for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining readable indication on the output meter.

### 2. Aligning at 1530 Kilocycles

(a) Leave the test oscillator leads connected the same as for aligning the I-F circuits.
(b) Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.
(c) Set the test oscillator to 1530 kilocycles.
(d) Adjust the parallel trimmer for the oscillator section of the condenser gang (Illus. 11C, Fig. 2) for maximum output. It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.

### 3. Aligning at 540 Kilocycles

(a) Leave the test oscillator leads connected the same as before.
(b) Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.
(c) Set the test oscillator to 540 K.C.
(d) Adjust the oscillator tracking condenser (Illus. 24, Fig. 3) located on the underside of the receiver sub-panel to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

### 4. Aligning at 1400 Kilocycles

(a) Remove the signal lead of the test oscillator from the grid of the 6A8G tube and connect to the antenna terminal of the receiver through a .002 mica condenser connected in place of the .1 mfd. condenser previously used.
(b) Set the test oscillator to 1400 K.C.
(c) Turn the condenser rotor plates until this frequency is tuned in with maximum output.
(d) Adjust the R-F parallel trimmer on the condenser gang (Illus. 11B, Fig. 2) located on the side of the receiver case for maximum output.

### 5. Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C.; however, it is necessary, in most cases, to repeak the oscillator tracking condenser at 600 K.C. In order to make the receiver track properly and to secure full sensitivity.

(a) Set the test oscillator on 600 K.C.
(b) Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.
(c) Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illus. 24, Fig. 3) while rocking the variable condenser gang tuning shaft back and forth through the signal. This operation should be continued until no further increase in output can be obtained.

NOTE: If the entire alignment procedure has been accomplished correctly, the receiver should be very nearly uniformly sensitive over the entire frequency range.

## Visual Alignment

If the visual method of alignment is preferred to the method outlined above, the vertical input terminals of the cathode ray oscillograph should be connected to the second detector output with the high side connected between the junction of the 50,000 ohm resistor (Illus. 32, Fig. 1) and the secondary of the second I.F. transformer (Illus. 10, Fig. 1).

Part No. 985254
Date 11-1-36

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## SUBJECT: Service Hints On Tuning Unit For 985283 Radio

FOR OTHER DATA, SEE VOL. IX

### 1. Motor does not run

(a) Press button down and check motor terminals for voltage. The voltage on the motor must be measured across the terminals because a voltage reading will show at all times from any one of the four motor terminals to ground or chassis. The voltage across the motor terminal should read 5.5 volts with 6 volts on the radio set, and will only show a reading when a button is pressed down and the relay is operating.

(b) If no voltage reading is obtained at the motor terminals to ground, check high "A" wiring from spark plate to motor terminals for open circuit. This check is made with no buttons down.

(c) When there is a voltage reading on some of the motor terminals to ground with no buttons down and not on other terminals, check motor fields and armature for open circuit. This is done with the regular continuity test.

(d) Check all motor terminals for ground with high "A" disconnected from the motor.

(e) Check the brushes on motor to make sure that they are seating properly on the commutator.

(f) Polish commutator with very fine emery paper, then wipe with a clean rag. Be sure that no abrasive is left on the commutator.

### 2. Motor stalls or does not pull condenser gang, but still motor checks okeh under No. 1

(a) Rotate armature of motor with finger to see if motor bearings are not frozen up. If the armature has a slight drag, it may be caused by the following:

1. Tight motor bearings.
2. Improper adjustment of motor worm with respect to the motor worm gear.

(b) Rotate condenser gang coupling if chassis is out of case and make sure that all moving parts rotate freely. Check remote control and be sure that all moving parts rotate freely.

(c) Hold clutch armature from engaging clutch and run motor by pressing button. Motor should run at very high speed with no load on it. This will check the motor and motor worm gear for freeness.

(d) Check remote control for binding either in the control head or in drive cables. Make sure that there are no sharp bends in control cables when installed in the car.

(e) Check motor armature for proper end play.

(f) If any bearings or gears appear to be running tight, oil only with 3 in 1 oil or its equivalent. This is very important, and only a very light grade of oil should be used, otherwise motor unit will not operate properly under low temperature conditions.
**Caution:** Do not oil motor bearings excessively because the motor used on this unit has oil-less bearings and should require very little oil. If an excessive amount of oil is used on the bearings it may get on the commutator or windings and cause damage to the motor. Do not oil the commutator under any circumstances.

### 3. If motor unit runs slow in both directions

(a) The same checks as outlined in Nos. 1 and 2 will apply to a slow running motor.

### 4. Motor unit runs slow in one direction

(a) Check motor brushes for proper fit to commutator.

(b) Check motor worm for proper adjustment. Motor worm should be exactly on a center with motor worm gear, with about .002 inch of backlash to worm gear when motor armature is held rigid.

(c) Check remote control and gang condenser assembly for binding in one direction or both.

## SUBJECT: Service Hints On Tuning Unit For 985283 Radio—Cont'd

### 5. Noisy motor unit mechanically

(a) Check remote control for grinding or squeaking by spinning remote control knob.

(b) Check all gear adjustments for proper backlash and alignment.

(c) Check gears for proper lubrication. Use a light grade of vaseline on gears.

(d) Check gears and bearings for worn parts or poor bearing fits and lack of lubrication. Refer to No. 2 for oiling.

(e) Check motor brushes for noise.

### 6. Set noisy when jarred. This deals only with troubles in the motor unit that may cause the above trouble

(a) Relay armature bouncing on relay contacts. To remedy this condition adjust relay spring if weak and relay spring contacts for a wider gap.

(b) Push button cable plug not pushed in socket far enough.

(c) Weak push button springs in push button box. This will be noticeable only when the button box itself is jarred.

### 7. Motor runs but condenser gang and dial pointer do not move

(a) Check the set screw in rear of gang condenser worm gear that locks the drive shaft to the gang condenser worm. The drive shaft may be turning free and not driving the gang. The drive shaft is adjustable endwise for the clutch armature adjustment only, and not for the motor worm gear. If this set screw has come loose the drive shaft will be out of adjustment and the clutch and motor worm will have to be adjusted in the order named.

(b) Clutch armature not operating. Check voltage across the clutch coil and also check the clutch coil for continuity.

(c) If the clutch armature is operating, the clutch arm on the drive shaft may not be engaging the pin and roller on the motor worm gear. Adjustment can be made by moving the drive shaft endwise, but be sure to adjust motor after moving the drive shaft.

### 8. Motor unit operates and gang condenser oscillates but remote control does not operate

(a) This condition will be caused by the bakelite gang condenser coupling slipping in the gang condenser worm. This coupling is a friction drive and is pushed inside the gang condenser worm with spring pressure exerted outwards on the worm. Do not oil this friction drive. To tighten this friction drive, pull coupling out and spread the split shaft with a small screwdriver. A very small spread is all that is required. Be sure to clean off all grease on split shaft and inside of hole in gang condenser worm gear, then replace the coupling.

(b) Check remote control for any faults.

### 9. Push buttons do not release when one button is pressed at a time

(a) Buttons may be binding on control panel plate. Loosen the nuts holding push button box and adjust box so that buttons are free to move in and out.

(b) Buttons may be binding on top plate of button box. Adjust box plate so that buttons are free

(c) Rubber bands around buttons may be causing the buttons to bind.

(d) Push button box may be defective. Try a new box. Do not repair push button box internally. **Caution:** Remember, the push buttons will not release until the proper station is tuned in and the motor unit has ceased to run.

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SUBJECT: Service Hints On Tuning Unit For 985283 Radio—Cont'd

**10. Push buttons do not release when two or more buttons are pressed at the same time. This is a fault that should seldom be complained about because it is not the correct way to operate the tuning unit, but provision has been made in the design to eliminate continuous oscillation of the tuning unit when two or more buttons are pressed at the same time. Three or four oscillations are permissible before buttons release. If the buttons do not release, proceed as follows:**

(a) Try a new push button box.

(b) Check adjustment of relay spring contacts for proper gap.

(c) Check relay control arm for free operation and also for proper spring tension. Make sure that relay control arm is returning to normal position after relay operates.

(d) Check instrument panel plate and button box as outlined in No. 9.

**11. Dial pointer slides past the proper station or setting and then returns to station when the corresponding button is pressed the second time**

(a) This is a fault of the clutch which is not releasing fast enough or is not releasing at all. If the clutch does not release, the momentum of the locating motor will carry the gang condenser past the required setting. Check the clutch armature for free operation.

(b) Check the clutch arm on drive shaft for free operation.

(c) Check the clutch arm spring on drive shaft for proper tension.

(d) Check the small roller on motor worm gear for free operation on its retaining pin.

(e) Check the motor worm gear for free rotation on drive shaft when clutch arm is disengaged from the clutch pin.

(f) Check the clutch magnet gap clip for proper tension.

(g) Check the clutch arm spring for proper tension.

(h) Check the clutch arm for proper alignment with control shaft.

**12. Stations do not log properly when dial pointer comes towards the station from the high frequency end—in other words, rotating in a counter clockwise direction**

(a) Bakelite control disc for that particular station has not been set accurately. Adjust as per instructions.

(b) This condition may also be caused by fault No. 11. Check as per instructions in No. 11.

**13. Stations do not log properly when dial pointer comes towards station from the low frequency end of dial—in other words, rotating in a clockwise direction. Under this fault, it is assumed that fault No. 12 has been checked**

(a) The contact spring on control switch corresponding to the particular button under question may not be adjusted properly. If dial is over-riding on station it means that the contact spring is too close to the contact arm. To correct this condition it is necessary to loosen the screw on the discriminator switch to give contact spring a wider gap. If dial is under-shooting the station, that is, not dialing entirely to the station, it means that the contact spring is too far from the contact arm. To correct this condition, it is necessary to tighten the adjusting screw on the discriminator switch. Be sure that none of the other adjusting screws are disturbed.

SUBJECT: Service Hints On Tuning Unit For 985283 Radio—Cont'd

(b) Check idler gear between control disc shaft and gang condenser worm gear for proper adjustment and also for being loose.

**Caution:** If the idler gear is moved from its original position for any reason or for any cause, it will be necessary to readjust all eight contact springs on control switch, and also to reset all eight bakelite control discs. Under no condition make any adjustment to any of the spring adjusting screws or to the idler gear unless all other remedies have been tried.

**14. Set very noisy when motor unit is running. This would be electrical noise from the speaker**

(a) Improper adjustment of the silencing contact on the relay. This silencing contact is the back contact, or the one nearest the condenser gang. The lead running from this contact is connected to the tab of the push-pull input choke and hence when the relay is operated to either side, the input choke tab is then grounded, silencing the audio of the set. Check wiring, soldered joints and contact resistance of silencing contact on relay. Polish relay contacts with very fine emery paper to remove dirt and grease. This will assure a good contact.

**15. Set noisy immediately after motor unit has ceased to operate dial pointer**

(a) This noise will only last for one or two seconds after the unit has stopped running and is caused by a voltage being generated in the motor and hence the "A" circuit by the rotation of the armature in a small residual field of the pole pieces. Check motor brushes and commutator for high resistance. Polish commutator as previously outlined.

(b) Check the .01 mfd. condenser across motor terminals for open.

**16. Push buttons do not hold down when pressed**

(a) Check the voltage between the black and yellow leads on push button cable socket.

(b) Make sure that push button cable plug is making good contact to the socket.

(c) Try a new push button box.

**17. Calibrating light inside of case lights when calibrating switch is closed and push button is pressed. Motor will not run when this happens**

(a) This condition is due to a faulty calibrating switch. Bend the switch arm down slightly so that a good contact is assured. This light is in series with relay coils and when light is not shorted out with calibrating switch the relay will not operate.

**18. Calibrating light inside of case does not light when calibrating switch is open and push button is pressed**

(a) Be sure calibrating light is not burned out.

(b) Check the voltage on relay coils.

(c) Check the relay coils for continuity.

(d) Check the calibrating switch contact for grounded connection.

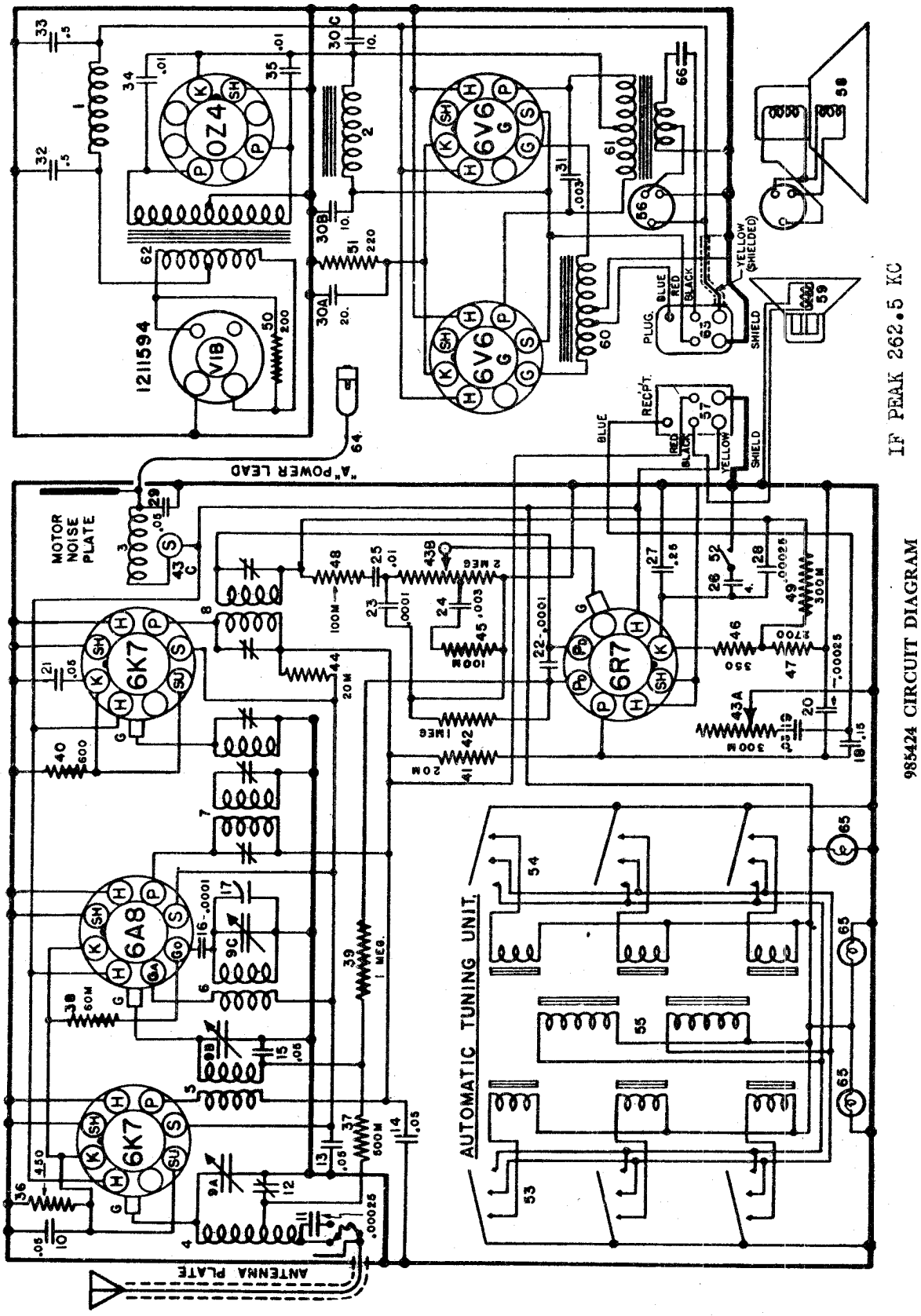
**19. Shift in station logging**

(a) Check bakelite control discs for being loose on shaft. Discs are not supposed to slip when unit operates. This is a friction fit on the control shaft and should never be oiled.

(b) Check the oscillator circuit for shift.

# CHEVROLET DIV.—GEN. MOTORS

MODEL 985424
Schematic

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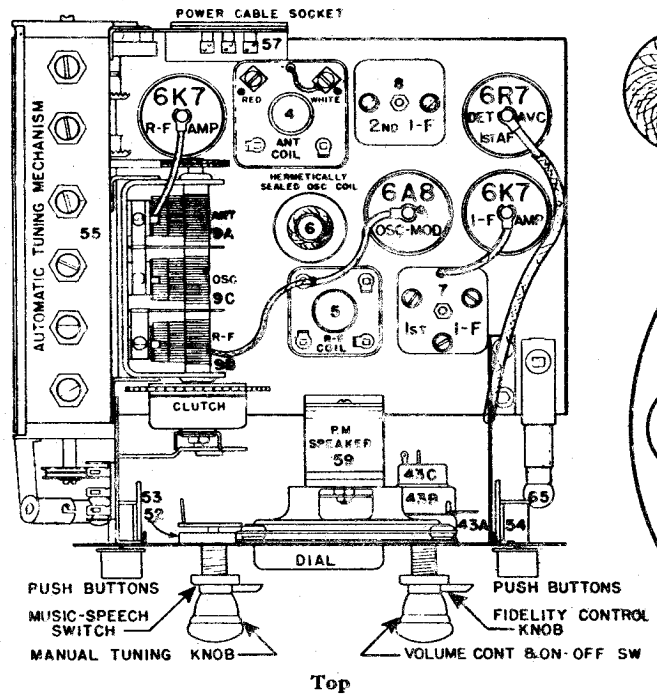
MODEL 985424
Socket, Trimmers
Chassis Views

# CHEVROLET DIV.—GEN. MOTORS

## Tube Complement

| Type | Function | Type | Function |
|---|---|---|---|
| 6K7 | R. F. Amplifier | 6R7 | 2nd Det.—A. V. C.—1st A. F. Amplifier |
| 6A8 | Oscillator-Modulator | 6V6G | Output |
| 6K7 | I. F. Amplifier | 0Z4 | Rectifier |

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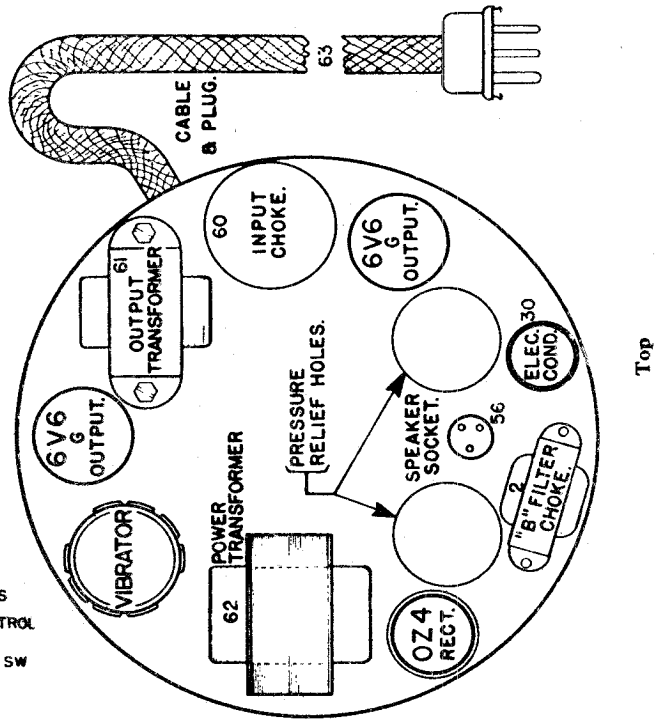


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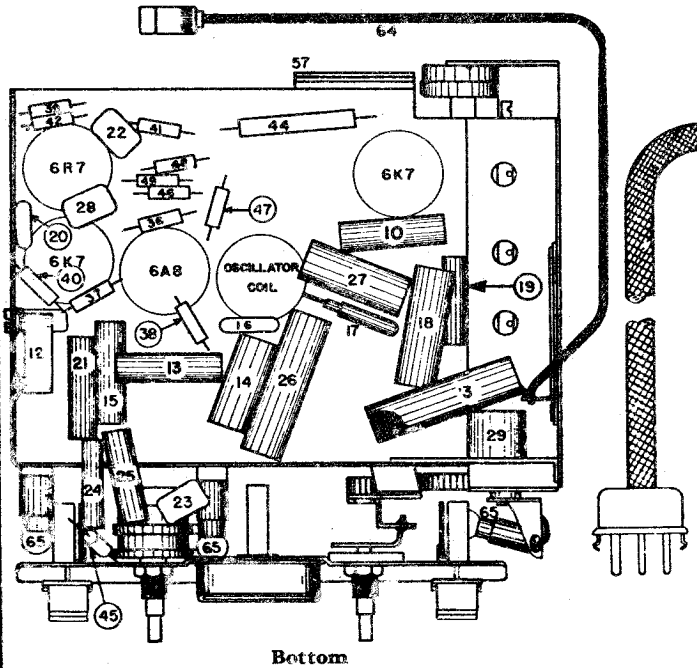


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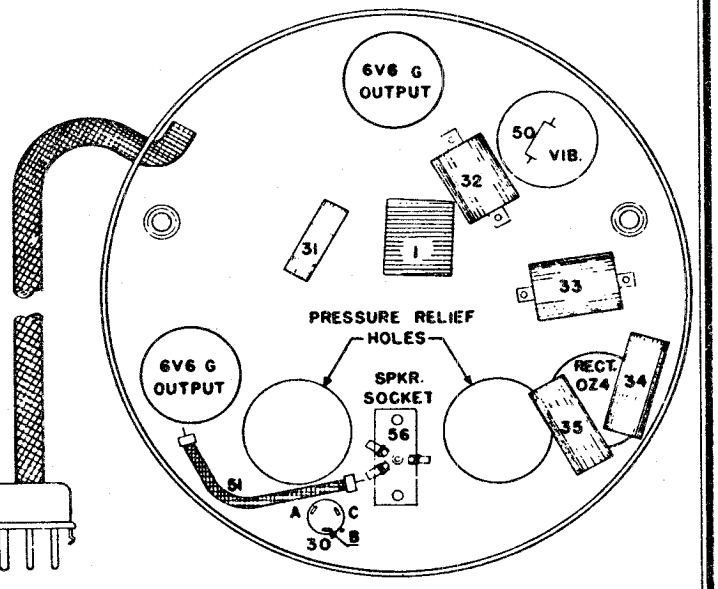
985424 PARTS LOCATING DIAGRAM

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985424 PARTS LOCATING DIAGRAMS

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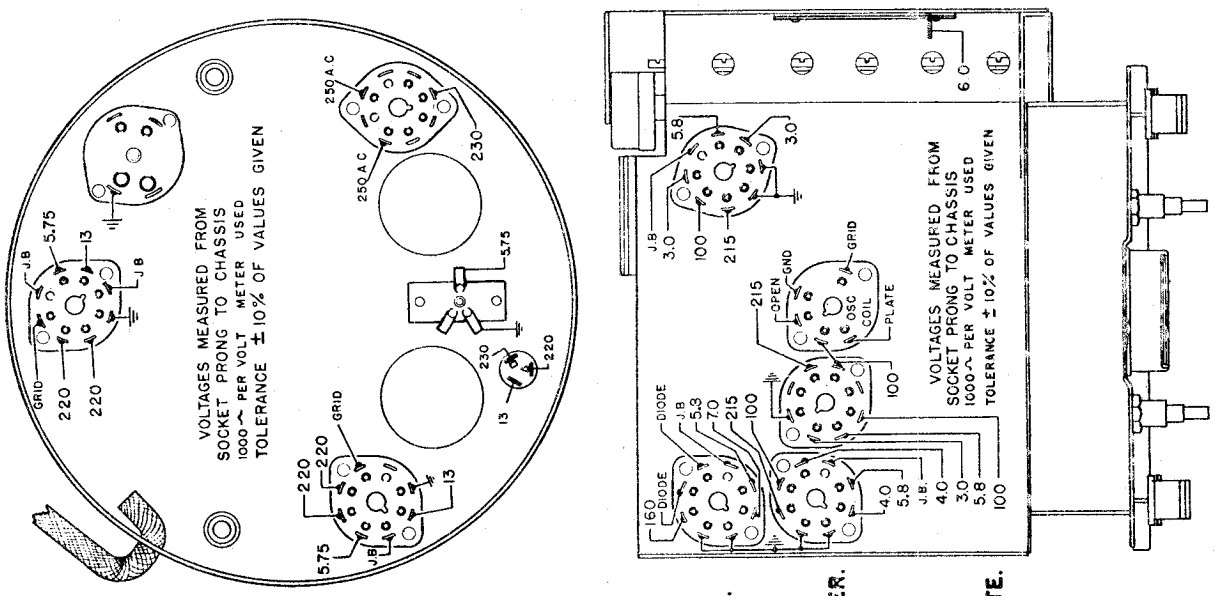
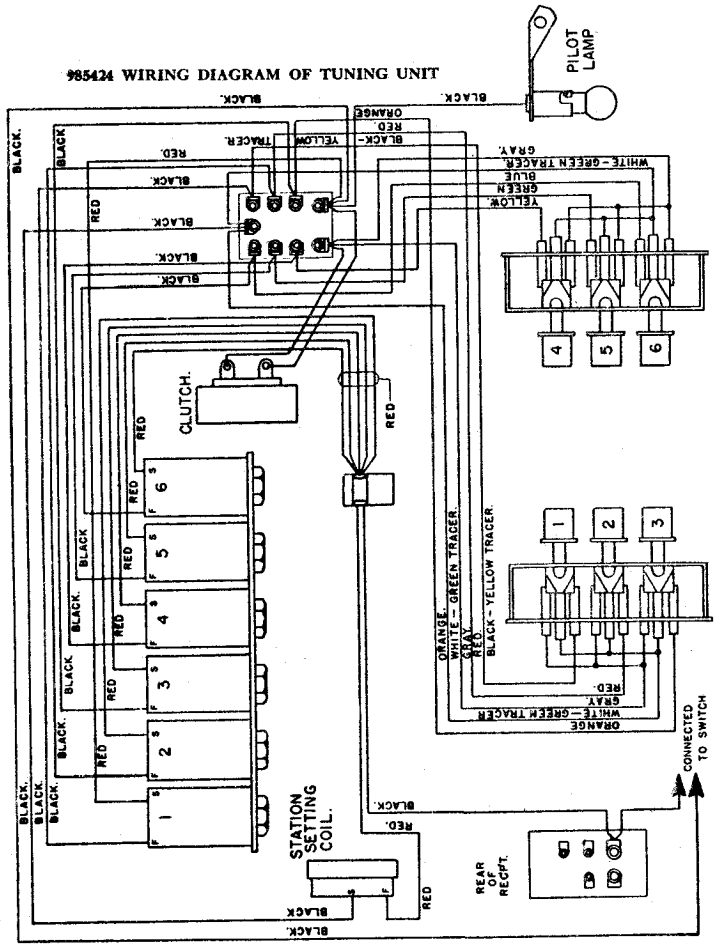
# CHEVROLET DIV.—GEN. MOTORS

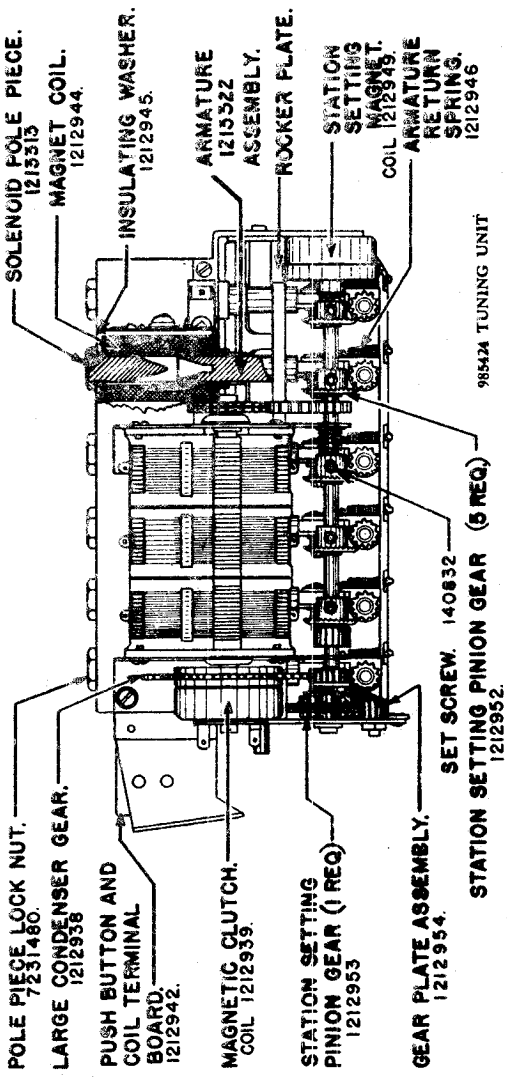
MODEL 985424
Tuning Unit Wiring
Condenser Assembly
Voltage

985424 SOCKET LOCATION and TUBE VOLTAGE


VOLTAGES MEASURED FROM SOCKET PRONG TO CHASSIS
1000 ~ PER VOLT METER USED
TOLERANCE ±10% OF VALUES GIVEN
VOLTAGES MEASURED FROM SOCKET PRONG TO CHASSIS
1000 Ω PER VOLT METER USED
TOLERANCE ±10% OF VALUES GIVEN

985424 WIRING DIAGRAM OF TUNING UNIT





SOLENOID POLE PIECE. 1213313
MAGNET COIL. 1212944.
INSULATING WASHER. 1212945.
ARMATURE 1213322 ASSEMBLY.
ROCKER PLATE.
STATION SETTING MAGNET. COIL 1212943.
ARMATURE RETURN SPRING. 1212946
POLE PIECE LOCK NUT. 7231480.
LARGE CONDENSER GEAR. 1212938
PUSH BUTTON AND COIL TERMINAL BOARD. 1212942.
MAGNETIC CLUTCH. COIL 1212939.
STATION SETTING PINION GEAR (1 REQ.) 1212953
GEAR PLATE ASSEMBLY. 1212954.
SET SCREW. 140632
STATION SETTING PINION GEAR (5 REQ.) 1212952.
985424 TUNING UNIT

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MODEL 985424
Alignment

# CHEVROLET DIV.—GEN. MOTORS

## Circuit Alignment

**If alignment is found necessary the circuits can be adjusted only with the use of a calibrated test oscillator or signal generator and an output meter. The signal generator output should be adjusted to give a reasonable scale deflection on the output meter. Before turning the receiver on or making any adjustments, a speaker similar to the one used with the receiver or a universal test speaker, should be connected to the chassis. It is also possible to use an 8000 ohm load connected across the primary of the output transformer.**

### 1. Aligning I. F. Stages at 262.5 Kilocycles

The I. F. amplifier may best be aligned by first using a modulated signal generator and an output meter in the conventional manner, and then making the final adjustment with a radio frequency modulator signal generator and oscillograph. The accuracy of the push-button tuning system partially depends upon the symmetry of the I. F. wave form. In most cases the symmetry is only approximate without the aid of the oscillograph equipment.

(a) Connect one terminal of the output meter to the plate of one of the 6V6G output tubes and connect the other terminal through a .1 mfd. condenser (not electrolytic) to the plate of the other 6V6G output tube.

(b) Connect the output of the signal generator through a .02 mfd. condenser to the grid of the 6K7 I. F. amplifier tube leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the frame of the receiver chassis.

(c) Turn the volume control on full. Adjust station selector so that the rotor plates of the condenser gang are completely in mesh and turn the audio fidelity control to the treble position. The music-speech control should be in the "music" position.

(d) Adjust the signal generator to 262.5 kilocycles.

(e) Adjust both transformers located on the 2nd I. F. transformer to maximum reading on the output meter.

**Note:** Always use the lowest signal generator output that will give a reasonable reading on the output meter.

(f) Connect the output of the signal generator to the grid of the 6A8 tube leaving the tube's grid clip in place.

(g) Open the middle trimmer on the 1st I. F. transformer two or three turns of the adjustment screw. Care should be taken that the adjustment screw does not become dislodged from the nut.

(h) Adjust the other two trimmers on the 1st I. F. transformer for maximum reading on the output meter.

(i) Adjust the middle trimmer on the I. F. transformers for maximum reading on the output meter.

**Caution:** Do not readjust the trimmers on the 2nd I. F. transformer.

### 2. Oscillograph Alignment

For more accurate adjustment of the I. F. amplifier a cathode ray oscillograph in conjunction with a radio frequency modulated signal generator may be used to obtain a visual alignment. It will allow adjusting for a more symmetrical wave form.

(a) Disconnect the conventional signal generator from the receiver.

(b) Connect the vertical plates of the oscillograph to the receiver connecting the (HI) terminal through a .02 mfd. condenser to the grid cap of the 6R7 tube leaving the tubes grid clip in place. (Condenser is built into most oscillographs.) Connect the ground terminal to the frame of the receiver chassis.

(c) Connect the output of the R. F. modulated signal generator also through a .02 mfd. condenser to the grid cap of the 6A8 tube leaving the tube's grid clip in place. Connect the ground lead to the frame of the receiver chassis.

(d) Adjust the signal generator to 262.5 kilocycles.

(e) With the modulator switch of the signal generator turned off, a horizontal line will appear on the window of the oscillograph by means of the amplitude control on the oscillograph. Adjust the length of this line so that it is equal to the width of the celluloid scale supplied with the oscillograph.

(f) Turn the frequency modulator switch of the signal generator on.

(g) Adjust the vertical control of the oscillograph so that the image is just within the top and bottom lines of the oscillograph scale.

**Note:** Use the lowest signal generator output that will give a stable image on the oscillograph window. If too much signal input is used; the humps desired on the wave form will not be visible even at perfect alignment.

(h) Readjust the middle trimmer on the 1st I. F. transformer for maximum symmetry above the vertical resonance line in the center of the celluloid scale. The hump or shoulder appearing on each side of the wave form will be equal distance from the nose of the curve when maximum symmetry is reached.

### 3. Aligning the R. F. Amplifier

(a) Connect the output of the signal generator through a .00016 mfd. condenser and Chevrolet shielded antenna lead-in to the antenna connection of the receiver. Connect the ground lead to the frame of the receiver chassis.

(b) Adjust the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial logging the dial from the low frequency end.

(d) Adjust the trimmer on the oscillator section of the condenser gang for maximum reading on the output meter.

(e) Adjust the trimmer on the R. F. trimmer gang for maximum reading on the output meter.

(f) Adjust the trimmer on the antenna gang for maximum reading on the output meter.

(g) Readjust the station selector for maximum reading on the output meter.

**Note:** Do not readjust the oscillator trimmer.

(h) Repeat operations (e) and (f) for more accurate adjustments.

### 4. Adjusting Antenna Compensating Condenser

(a) Adjust the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector for maximum reading on the output meter.

(c) Adjust the antenna compensating condenser for maximum reading on the output meter.

(d) Repeat operations (b) and (c) alternately until no further improvement in output can be obtained.

(e) Readjust the signal generator to 1400 kilocycles.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the antenna section of the condenser gang for maximum reading on the output meter.

### 5. Adjusting the Antenna Compensating Condenser When Set Is Installed on Car

(a) After installation is complete, tune-in a weak station between 55 and 65 on the dial that is just audible with volume control on full.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

### 6. Setting the Push-Buttons

The order in which the stations are set-up on the push-buttons will in no way affect the operation of the tuning unit. To set the push-buttons no tools are required, but an understanding of the operation of the push-button switch is essential. There are two definite pressures and movements required to actuate the switch. First, a slight touch and a movement of less than one-eighth of an inch is all that is required to tune the receiver with a push-button after the button has been adjusted. Second, a heavier pressure and a movement of about one-quarter of an inch is required when the push-button is to be set to the station selected. To adjust the button, push the button all the way down (a slight snap will be felt when going past first stop position), and hold it in that position while you tune-in as accurately as possible with the manual tuning knob, the station selected. Release button, the station is set. Follow the same procedure in setting the remaining buttons.

**Note:** The accuracy of the push-buttons depends upon how accurate you tune-in the station while setting them.

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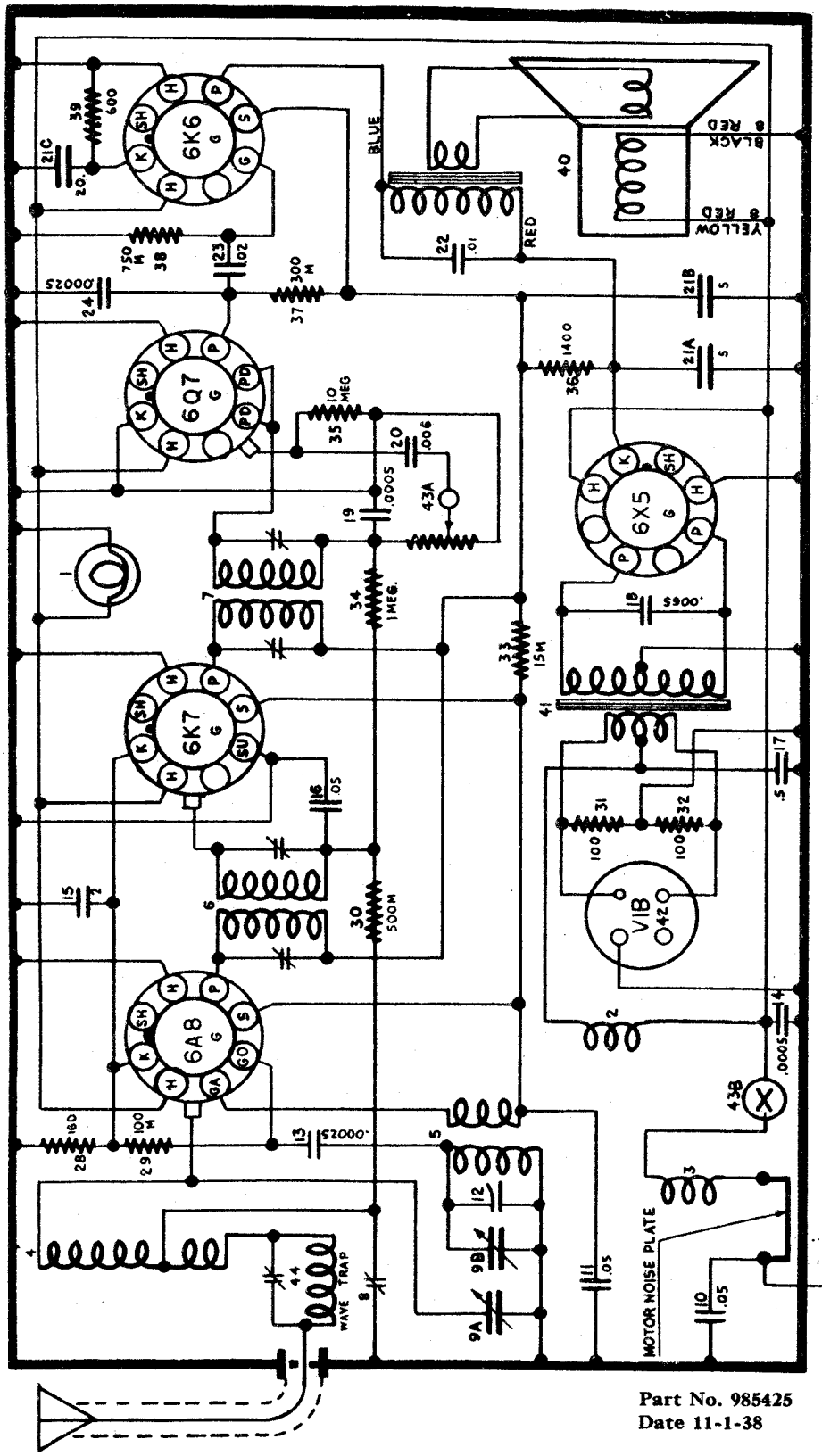
MODEL 985425
Schematic

# CHEVROLET DIV.—GEN. MOTORS




985425 CIRCUIT DIAGRAM

455 K.C. I.F.

## Adjusting Antenna Compensating Condenser After Radio Is Installed

(a) After installation, tune-in a weak station between 55 and 65 on the dial that is just audible with the volume control on full.

(b) Adjust the antenna compensating condenser for maximum volume in the speaker.

**ANTENNA SYSTEM: There are three antenna systems available for use with this receiver: The under-car; the turret top, or the telescopic cowl antenna. Any one of these antennas will operate very efficiently with this receiver.**

## Tube Complement

| Type | Function |
|---|---|
| 6A8G | Oscillator-Modulator |
| 6K7 | I. F. Amplifier |
| 6Q7G | 2nd Det. A. V. C. —1st A. F. Amplifier |
| 6K6G | Power Output |
| 6X5G | Rectifier |

Part No. 985425
Date 11-1-38

A highly efficient superheterodyne circuit is used. Bias for the 6A8G and 6K7 tubes is obtained across the 160 ohm resistor, item No. 28. Bias for the 6K6G tube is obtained across a 600 ohm resistor, item No. 39.

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## Circuit Alignment

### 1. Aligning the I. F. Stage at 455 Kilocycles

(a) Connect the output meter to the plate and screen of the 6K6G output tube. Be sure the meter is protected from D. C. by connecting a .1 mfd. condenser (not electrolytic) in series with one of the leads.

(b) Connect the output of the signal generator through a .02 mfd. condenser to the grid of the 6K7 I. F. tube leaving the tubes grid clip in place. Connect the ground lead from the signal generator to the receiver chassis frame.

**Note:** Keep the generator leads as far as possible from the grid leads of the other screen grid tubes.

(c) Adjust the station selector so that the rotor plates of the tuning condenser are completely disengaged and turn the volume control to the maximum position.

(d) Adjust the signal generator to 455 kilocycles.

(e) Adjust both 2nd I. F. trimmer condensers for maximum output.

(f) Transfer generator lead to the grid of the 6A8G tube leaving the tube's grid clip in place.

(g) Adjust both trimmers located on the 1st I. F. transformer for maximum output.

(h) Repeat operations (e) and (g) for more accurate adjustments.
**Note:** In order to prevent A. V. C. action always use the lowest signal generator output that will give a reasonable output meter reading.

### 2. Aligning the R. F. Amplifier

To obtain the greatest gain from the antenna system, the capacity of the dummy antenna should be accurate to the capacity of the antenna with which the receiver is to be used. The capacities of auto radio antennas range from 65 mmf. to 250 mmf., depending upon the size and type. If the receiver is adjusted for maximum efficiency when used with an antenna having a high capacity, it will not operate at its maximum efficiency on an antenna having a much lower capacity or vice versa.

(a) If the receiver is to be used with a turret-top antenna or a telescopic cowl antenna, the output lead from the signal generator should be connected through a .00005 mfd. condenser, and shielded lead, to the antenna connection of the receiver. If a large antenna such as the running board type is used, a .00016 mfd. condenser should be used and a long shielded lead in place of the .00005 mfd. condenser and short shielded lead.

(b) Adjust the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the oscillator section of the tuning condenser for maximum output.

(e) Adjust the trimmer on the antenna section of the tuning condenser for maximum output.

(f) Readjust the station selector for maximum output.

**Note:** Do not readjust the oscillator trimmer.

(g) Repeat operation (e) for more accurate adjustment.

### Adjusting Antenna Compensating Condenser

(a) Set the signal generator to 600 kilocycles.

(b) Tune-in the 600 kilocycle signal with the station selector for maximum output.

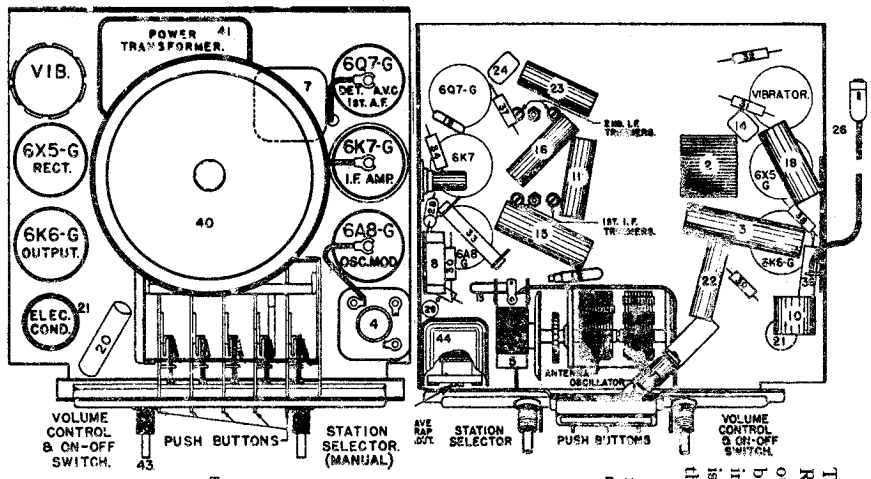
(c) Adjust the antenna compensating condenser for maximum output.

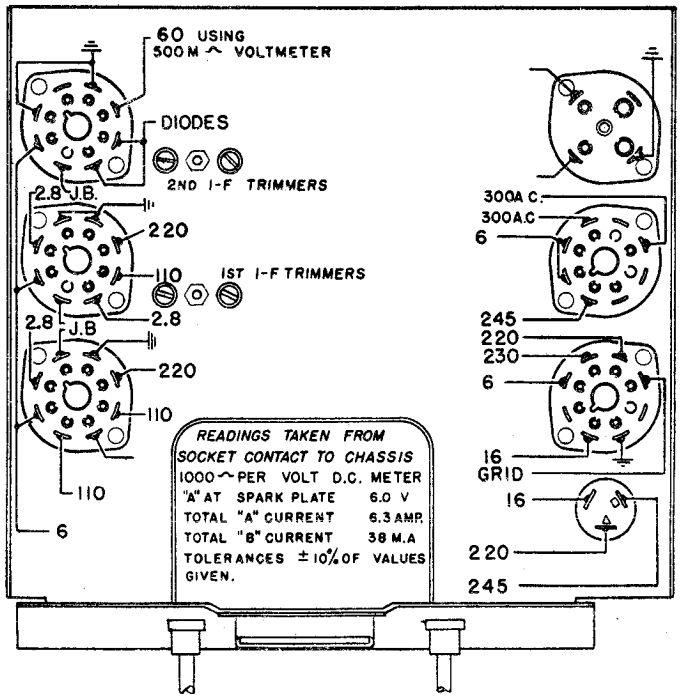
(d) Repeat operations (b) and (c) alternately until no further improvement can be obtained.

(e) Set the signal generator to 1400 kilocycles.

(f) Tune-in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the antenna section of the tuning condenser for maximum output.




985425 TUBE SOCKET LAYOUT and VOLTAGES

**Setting the Push-Buttons**

The push-button can be quickly and accurately set from the front of the receiver. Remove the push-button to be set (clasp between forefinger and thumb and pull straight out) and loosen the set screws that are concealed by the buttons. Determine the five broadcasting stations that are to be set up. By means of a manual tuning knob, tune in as accurately as possible, the station desired. Push the button on which that station is to be set up on and hold in that position, then securely tighten the set screw. Replace the button on that key and adjust the remaining buttons in the same manner.

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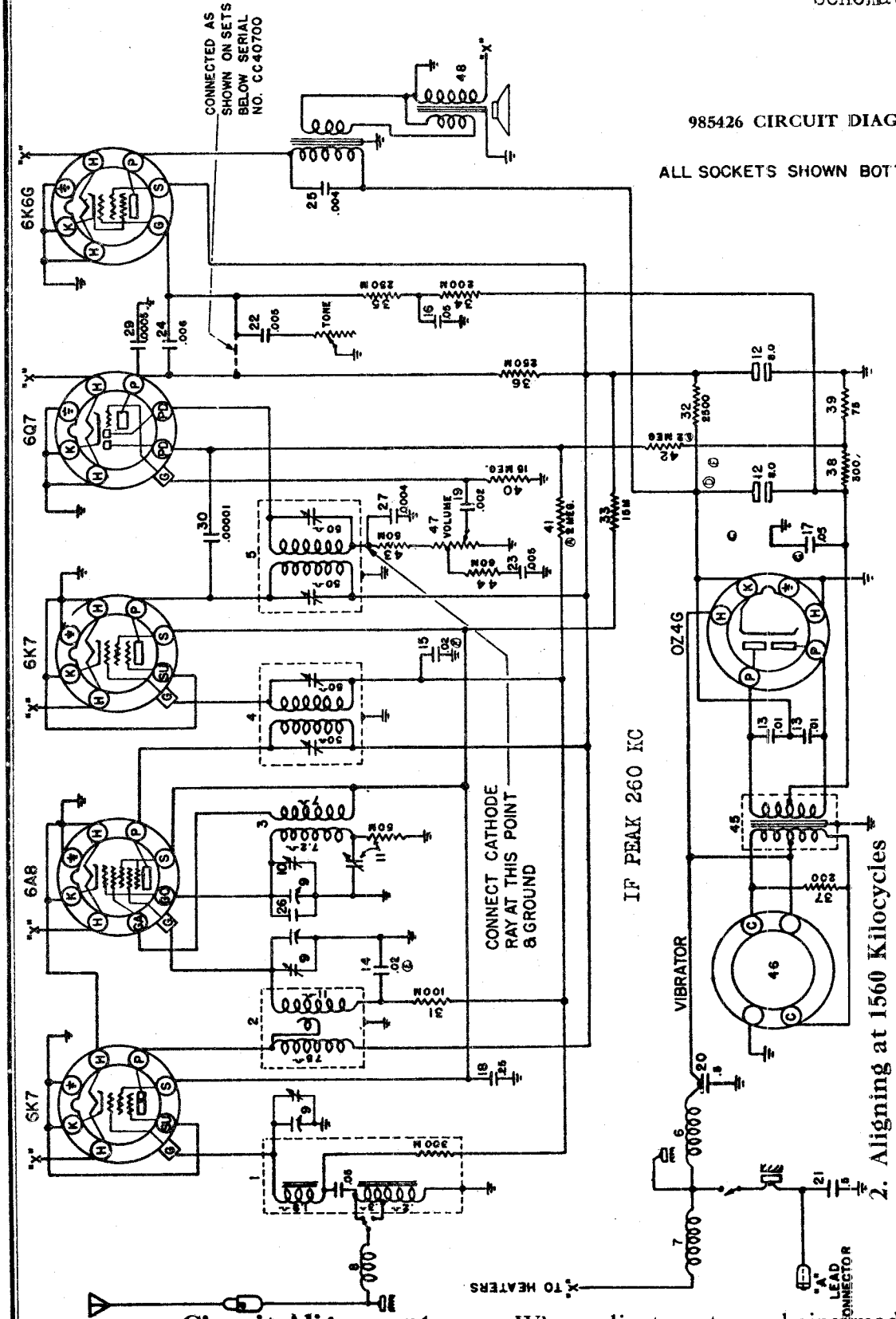
CHEVROLET DIV.—GEN. MOTORS MODEL 985426
Schematic, Alignment




## 2. Aligning at 1560 Kilocycles

(a) Remove the signal lead of the signal generator from the grid of the 6A8 tube and connect to the antenna terminal of the receiver through a .000186 mica condenser connected in place of the .1 mfd. condenser previously used. (It is very important that a .000186 mica condenser be used when aligning the antenna stage of these receivers, and that the antenna coil tap is in the running board position "HC" in order that this circuit can be made to track properly.)

Adjust the oscillator parallel trimmer (e) for maximum output.

Part No. 985426
Date 11-1-38

## Circuit Alignment

When adjustments are being made, the chassis must be in its case to provide proper shielding, and the volume control should be turned full on to the maximum position. The signal generator output should be adjusted to give a reasonable scale deflection on the output meter.

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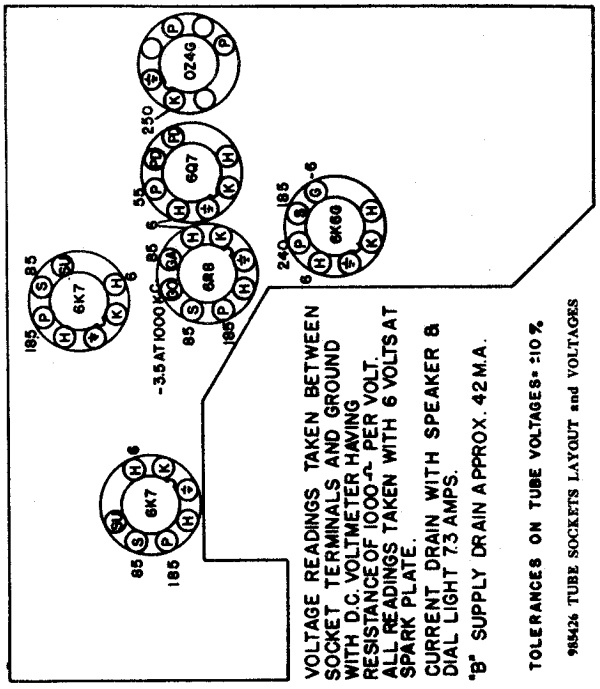
MODEL 985426
Voltage, Socket
Trimmers, Alignment
Chassis

# CHEVROLET DIV.—GEN. MOTORS




FOR CONVENTIONAL ALIGNMENT PROCEDURE, SEE SPECIAL SECTION VOL. VIII.

ALIGNMENT:

1. IF 260 kc. Connect output meter through .25 mfd. condenser to screen grid prongs of 6K6G tube. Signal generator through .1 mfd condenser to grid cap of 6A8 tube. Generator ground lead to chassis. Variable out of mesh. Adjust trimmers A, B, C, D for maximum output. Check IF band spread with oscillograph.
2. At 1560 kc, see "ALIGNING AT 1560 KILOCYCLES" with schematic.
3. With connections as in 2. Generator and variable tuned to 1400 kc Adjust parallel trimmers on top and bottom sections of variable for maximum output.
4. At 600 kc. Tune variable to 600 kc Adjust oscillator padder (f) to maximum output while rocking variable.

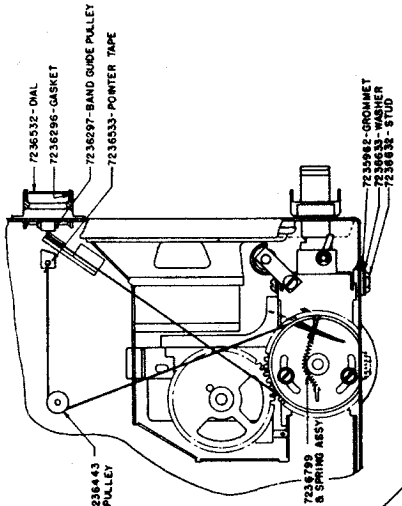
## 5. Adjustment of the Receiver to the Car Antenna

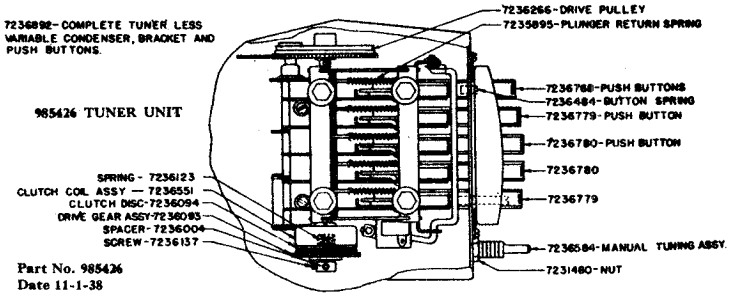
When the receiver leaves the factory the antenna circuit is properly aligned to match the under running board type of antenna. Therefore when the receiver is installed in a car and connected to the standard Chevrolet running board antenna, only a slight adjustment of the antenna circuit is required. If the receiver is connected to a turret top antenna or a telescopic cowl antenna, proceed as follows to properly adjust the receiver:

(a) Tune in a weak station about 1400 kilocycles, which is barely audible, with the volume control full on.

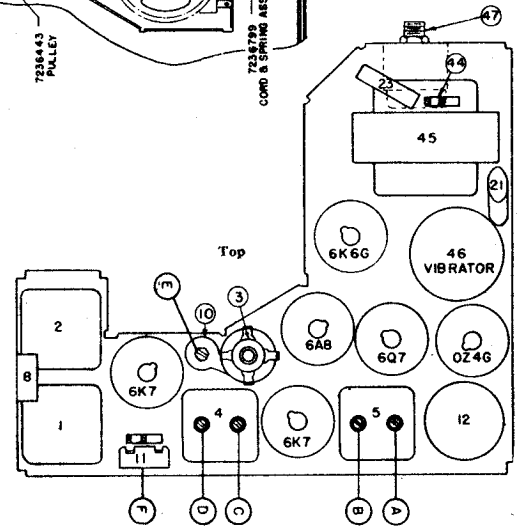
(b) If the turret-top antenna or the telescopic cowl antenna is used, remove the bottom tube cover and change the position of the antenna plug from the hole marked "HC" to the hole marked "LC," and replace the cover.

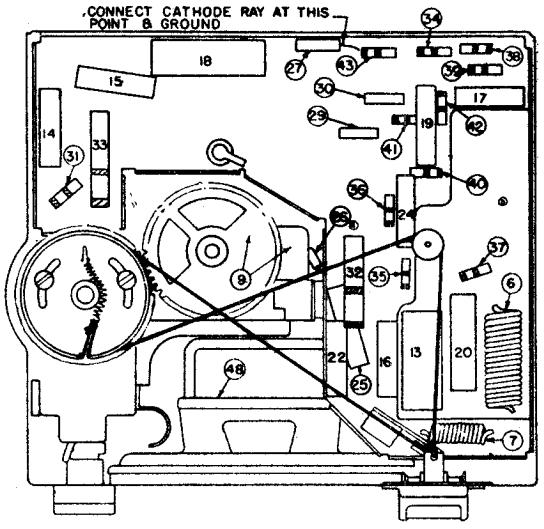
(c) Adjust the antenna trimmer condenser for maximum volume.




Part No. 985426
Date 11-1-38

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Part No. 985400
Date 1-1-36

## Peaking I-F Stages at 262 K.C.

(a) Connect the ground lead of the test oscillator to the chassis frame. Connect the output of the test oscillator through an .02 mfd. condenser to the grid cap of the 6A7 tube (1st detector-oscillator) leaving the tube's grid clip in place. Keep the leads of the test oscillator as far as possible from the grid wires of the other screen grid tubes.

(b) Set the test oscillator to 262 kilocycles.

(c) Adjust the station selector so that the plates of the tuning condenser are completely in mesh.

(d) Turn the volume control on full and turn the tone control to the treble position.

(e) Adjust both trimmer condensers located on top of the second I. F. coil. Illustration No. 10—Fig. 1, for maximum output.

(f) Adjust both trimmer condensers located on top of the first I. F. coil. Illustration No. 9—Fig. 1, for maximum output.

(g) Repeat operations (c) and (f) for more accurate adjustments.

Always use the lowest signal generator output that will give a reasonable output meter reading.

## Peaking R. F. Stages

(a) Remove the .02 mfd. condenser from the output lead of the test oscillator and connect a .00025 mfd. condenser in its place. Then, connect this lead to the antenna connection of the receiver.

(b) Set the signal generator to 1400 kilocycles.

(c) Adjust the station selector to 140 on the dial.

(d) Adjust the trimmer on the "Osc" section of the tuning condenser for maximum output. (Fig. 1.)

(e) Adjust the trimmer on the "R-F" section of the tuning condenser for maximum output. (Fig. 1.)

(f) Adjust the trimmer on the "ant" section of the tuning condenser for maximum output. (Fig. 1.)

(g) Readjust the station selector for maximum output. Do not readjust the "Osc" trimmer.

(h) Repeat operations (e) and (f) for more accurate adjustments.

## Adjusting Antenna Compensating Condenser

(a) Set the signal generator to 600 kilocycles.

(b) Tune in the 600 kilocycle signal with the station selector, for maximum output.

(c) Adjust the antenna compensating condenser, Illustration No. 11, for maximum output.

(d) Repeat operations (b) and (c) alternately until no further improvement in output can be obtained.

(e) Set the signal generator to 1400 kilocycles again.

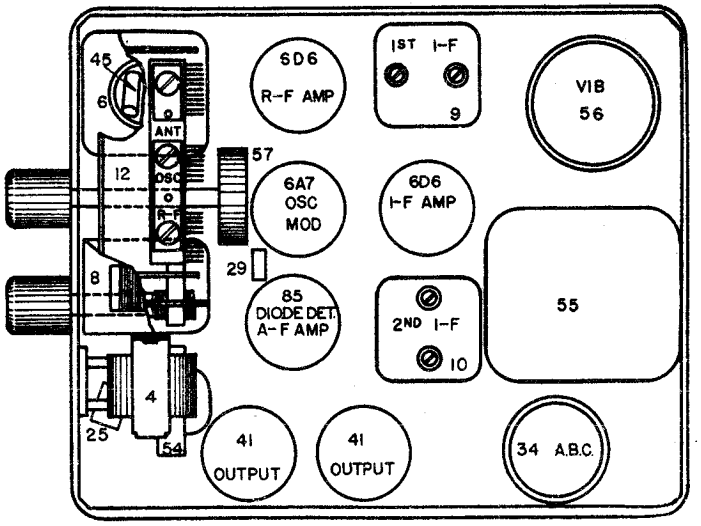
(f) Tune in the 1400 kilocycle signal with the station selector for maximum output.

(g) Readjust the trimmer on the "ant" section of the tuning condenser, for maximum output.

It will be necessary to adjust the antenna compensating condenser to the car antenna after the receiver has been installed in the car.

(a) After the installation is complete, tune in a weak station between 55 and 65 on the dial.

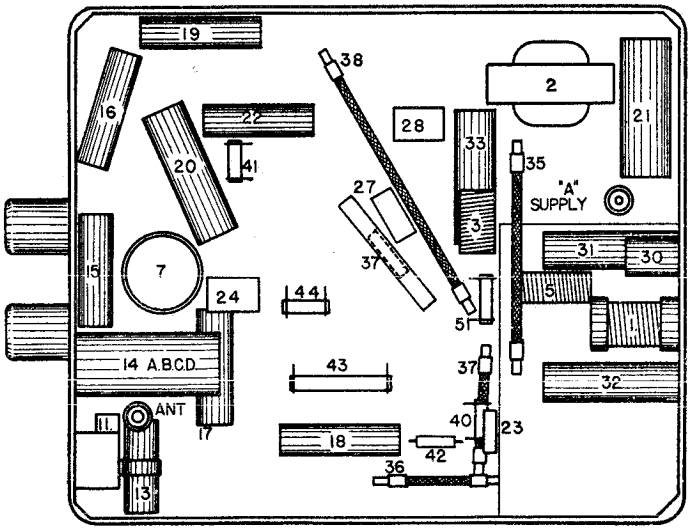
(b) Adjust the antenna compensating condenser for maximum volume in the speaker.




PARTS LAYOUT—Top View (Fig. 1)

## Chevrolet Model 985400

FOR OTHER DATA, SEE VOL. VIII

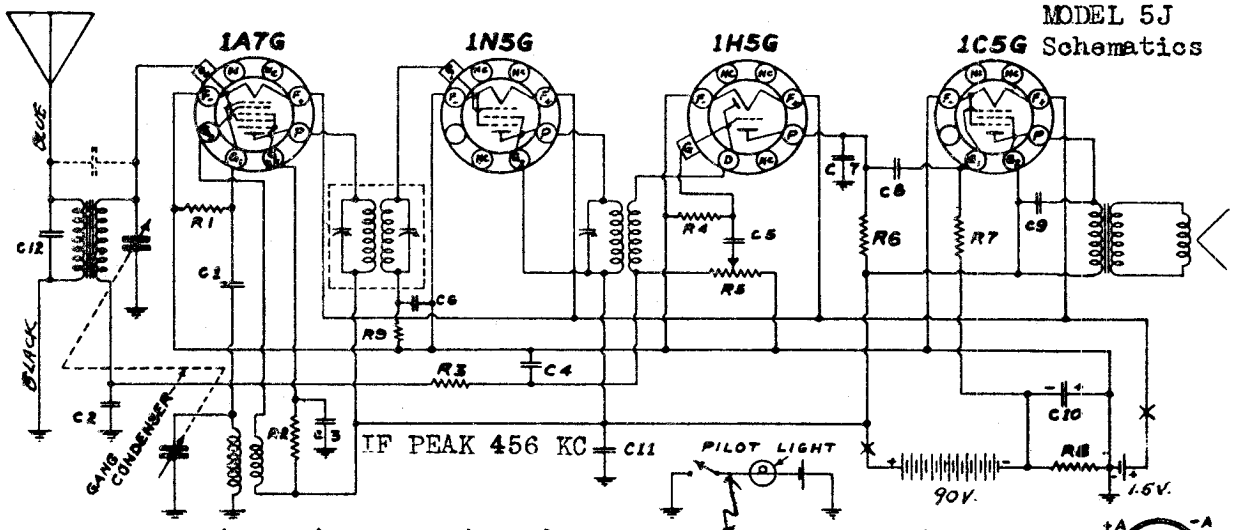



PARTS LAYOUT—Bottom View (Fig. 2)

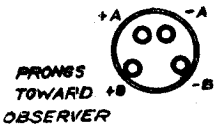
# CONTINENTAL RADIO & TELEV. CO.

MODELS 4A, 4B, Early, Late, 4C
MODEL 5J
Schematics

RANGE 535 - 1730 KILOCYCLES




MODELS 4A, 4B (Early), 4A, 4B (Late) and 4C. ON MODEL 4C ONLY




**CAPACITORS**

| No | CAP.-MFDS | TYPE | No | CAP.-MFDS | TYPE |
|---|---|---|---|---|---|
| C1 | .00025 | MICA | C7 | .00025 | MICA |
| C2 | .05 | 200V. | C8 | .01 | 400V. |
| C3 | .1 | 200V. | C9 | .005 | 400V. |
| C4 | .00025 | MICA | C10 | 20. (ELECT) | 25V. |
| C5 | .01 | 400V. | C11 | .1 | 200V. |
| C6 | .002 | 400V. | C12 | .00008 | MICA |

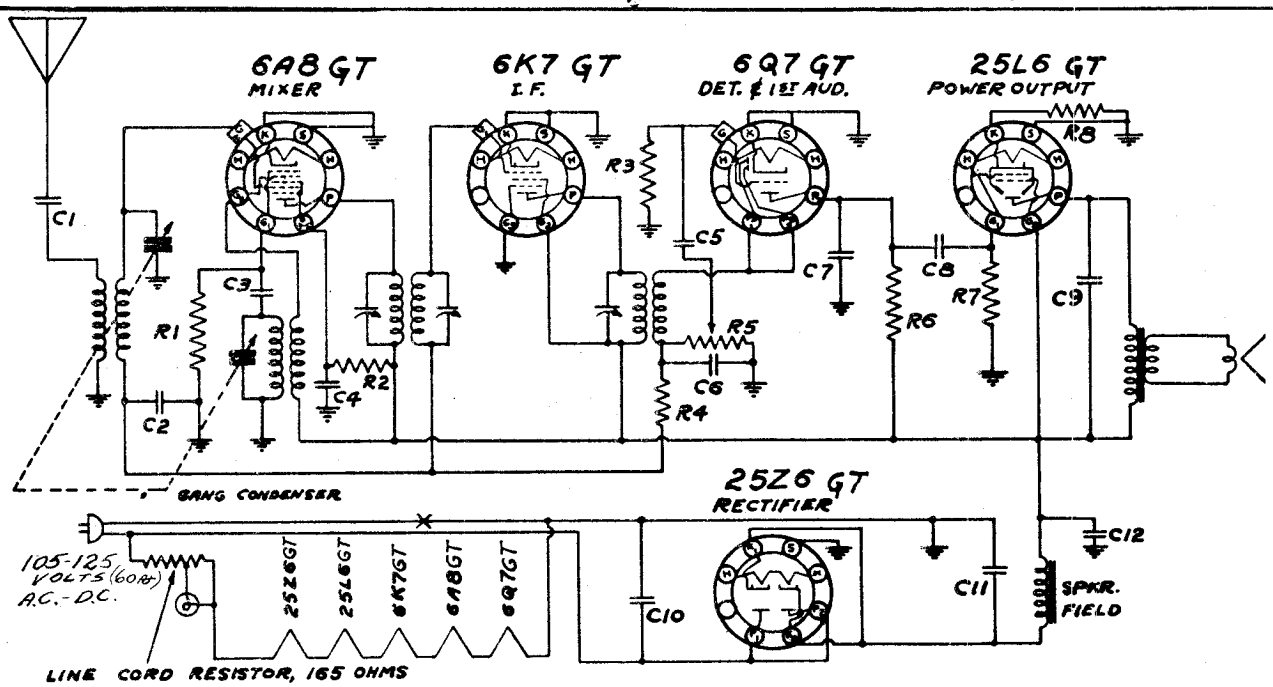
**RESISTORS**

| No | OHMS | WATTS | No | OHMS | WATTS |
|---|---|---|---|---|---|
| R1 | 200,000 | 1/4 | R6 | 250,000 | 1/4 |
| R2 | 70,000 | 1/4 | R7 | 500,000 | 1/4 |
| R3 | 1 MEG. | 1/4 | R8 | 600 | 1/4 |
| R4 | 2 MEG. | 1/4 | R9 | 2 MEG. | 1/4 |
| R5 | 500,000 | VOL. CONTROL | | | |

FOR ALIGNMENT AND LAYOUT SEE INDEX

CHANGES:- LATE MODELS 4A AND 4B DIFFER FROM THE ABOVE DIAGRAM AS FOLLOWS; 1Q5G REPLACES 1C5G OUTPUT TUBE; CONDENSER C1 IS .00005 MICA, INSTEAD OF .00025 MICA AND RESISTOR R8 IS 440 OHMS 1/4 WATT INSTEAD OF THE 600 OHM 1/4 WATT IN EARLY MODELS.

RANGE 535 - 1730 KILOCYCLES




**RESISTORS**

| No | OHMS | WATTS | |
|---|---|---|---|
| R1 | 50,000 | 1/2 | |
| R2 | 40,000 | 1/2 | |
| R3 | 5 MEG | 1/2 | |
| R4 | 2 MEG | 1/2 | |
| R5 | 500,000 | | VOL. CONT. |
| R6 | 250,000 | 1/2 | |
| R7 | 500,000 | 1/2 | |
| R8 | 150 | 1/2 | ±10% |

**CONDENSERS**

| No | MFD. | TYPE |
|---|---|---|
| C1 | .00025 | 600V. |
| C2 | .02 | 400V. |
| C3 | .00005 | MICA |
| C4 | .01 | 400V. |
| C5 | .01 | 400V. |
| C6 | .0002 | MICA |
| C7 | .00025 | MICA |
| C8 | .01 | 300V. |
| C9 | .005 | 600V. |
| C10 | .05 | 400V. |
| C11 | 25. } ELECT. | 150V. |
| C12 | 10. } | 150V. |

I.F. 456 K.C.

FOR ALIGNMENT AND LAYOUT SEE INDEX

MODEL 5J

**A.C.-D.C.**

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MODELS 4A, 4B Early, Late

MODEL 4C

MODEL 4D, Early, Late, 4D-PH

MODEL 4H

MODELS 5D, 5DL

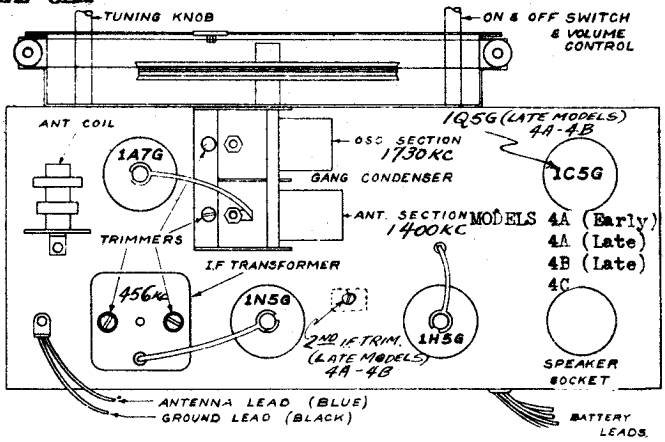
MODEL 5EA

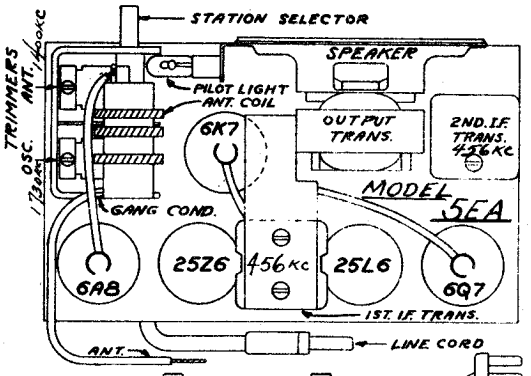
# CONTINENTAL RADIO & TELEV. CO.

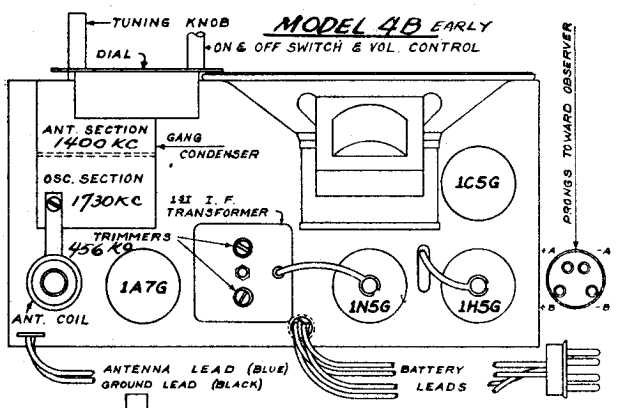
MODEL 5J

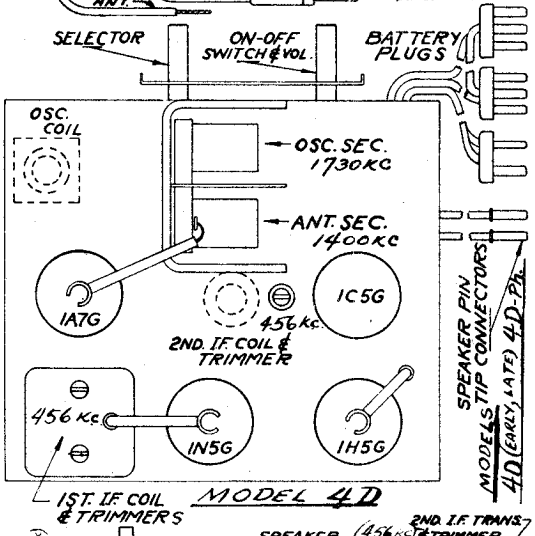
MODELS 5L, 5LL

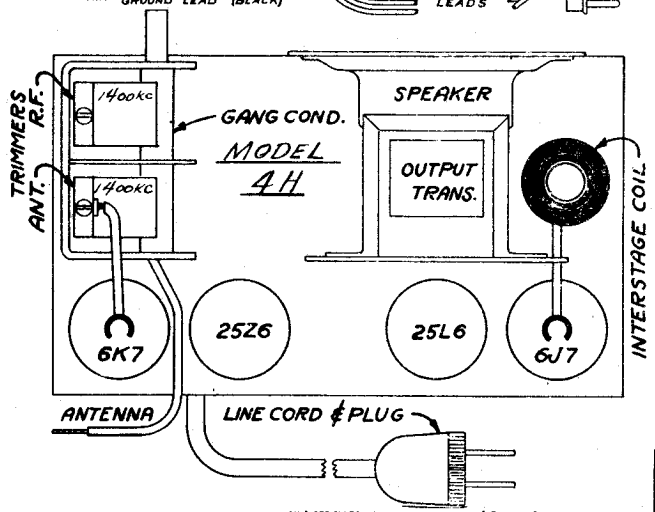
Alignment, Socket Trimmers

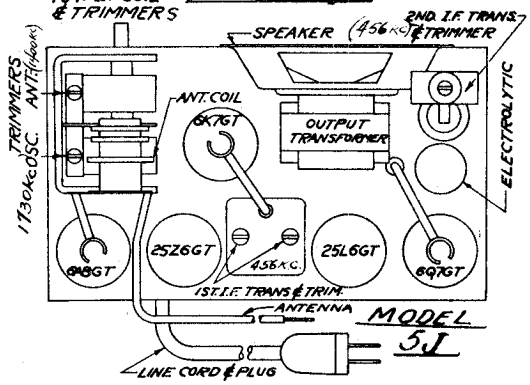


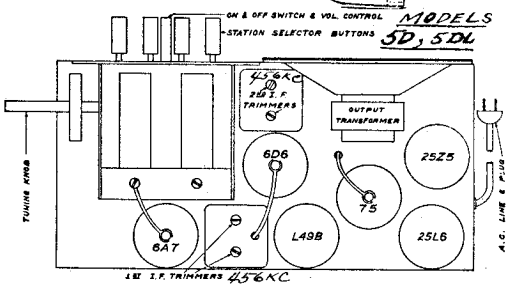



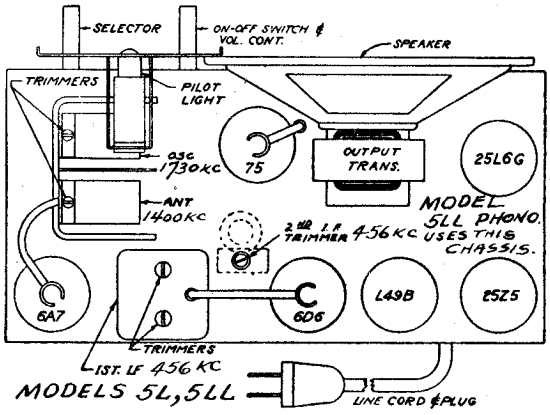

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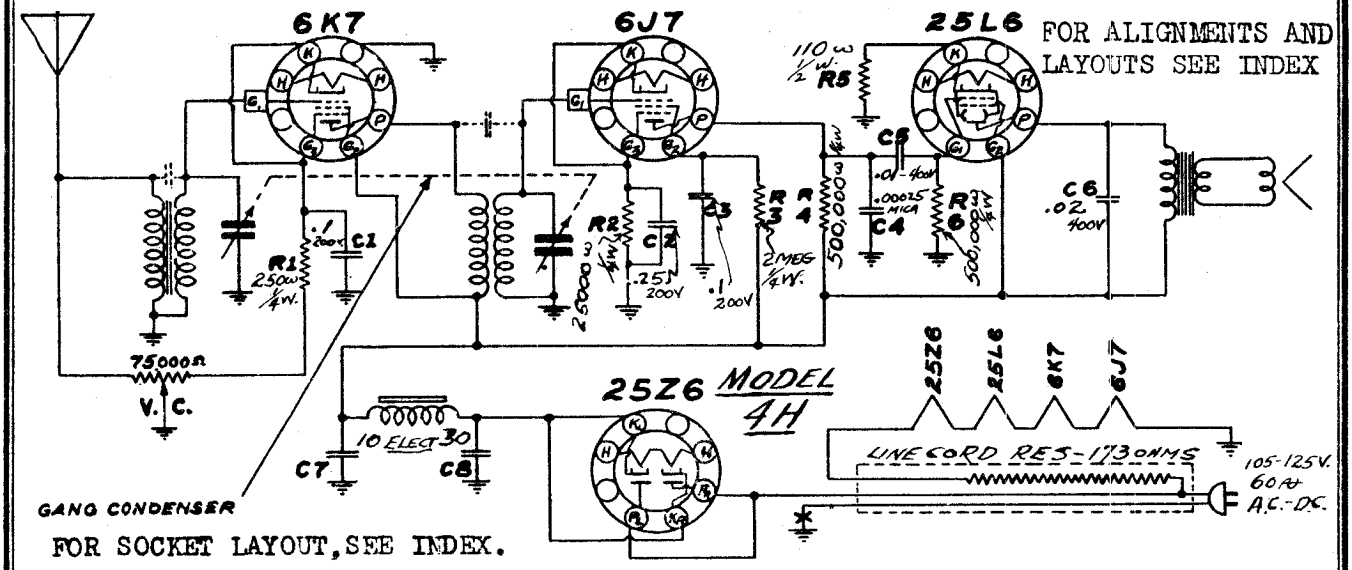
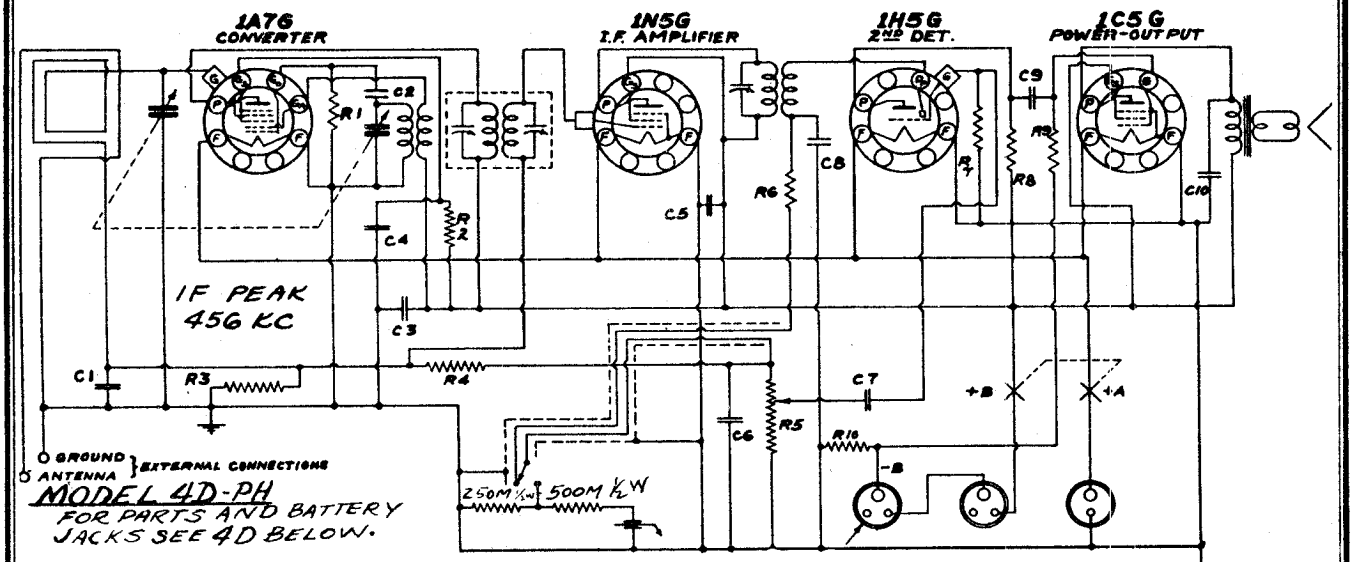
MODEL 4H
Schematics

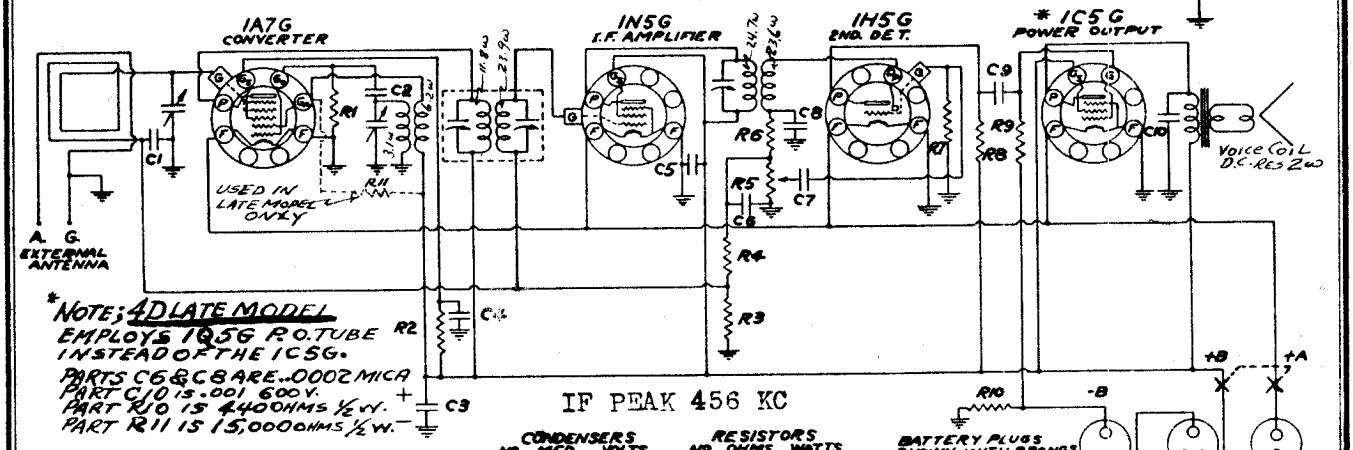
# CONTINENTAL RADIO & TELEV CO

MODELS 4D, Early, Late
MODEL 4D-PH




**MODEL 4D-PH**
FOR PARTS AND BATTERY JACKS SEE 4D BELOW.




*NOTE; 4D LATE MODEL EMPLOYS 1Q5G R.F. TUBE INSTEAD OF THE 1C5G.
PARTS C6 & C8 ARE .0002 MICA
PART C10 IS .001 600 V.
PART R10 IS 400 OHMS 1/2 W.
PART R11 IS 15,000 OHMS 1/2 W.

IF PEAK 456 KC

| CONDENSERS | | | |
|---|---|---|---|
| No | MFD. | VOLTS | |
| C1 | .05 | 200 | |
| C2 | .00005 | MICA | |
| C3 | 4.-150 V. | ELEC. | |
| C4 | .05 | 200 | |
| C5 | .05 | 200 | |
| *C6 | .00025 | MICA | |
| C7 | .01 | 200 | |
| *C8 | .00025 | MICA | |
| C9 | .01 | 200 | |
| *C10 | .005 | 600 | |

| RESISTORS | | | |
|---|---|---|---|
| No | OHMS | WATTS | |
| R1 | 250000 | 1/2 | |
| R2 | 70000 | 1/2 | |
| R3 | 2000000 | 1/2 | |
| R4 | 2000000 | 1/2 | |
| R5 | 500000 | 1/2 | VOL. |
| R6 | 70000 | 1/2 | |
| R7 | 2000000 | 1/2 | |
| R8 | 500000 | 1/2 | |
| R9 | 1000000 | 1/2 | |
| *R10 | 750 | 1/2 | |

BATTERY PLUGS SHOWN WITH PRONGS AWAY FROM OBSERVER

BATTERY JACKS OR SOCKETS

-B +22.5 V. +45 V. +22.5 V. +45 V. +A 1.5 V. -A

SCHEMATIC DIAGRAM
MODEL 4D EARLY
" 4D LATE

**RANGE 535 - 1730 KC**

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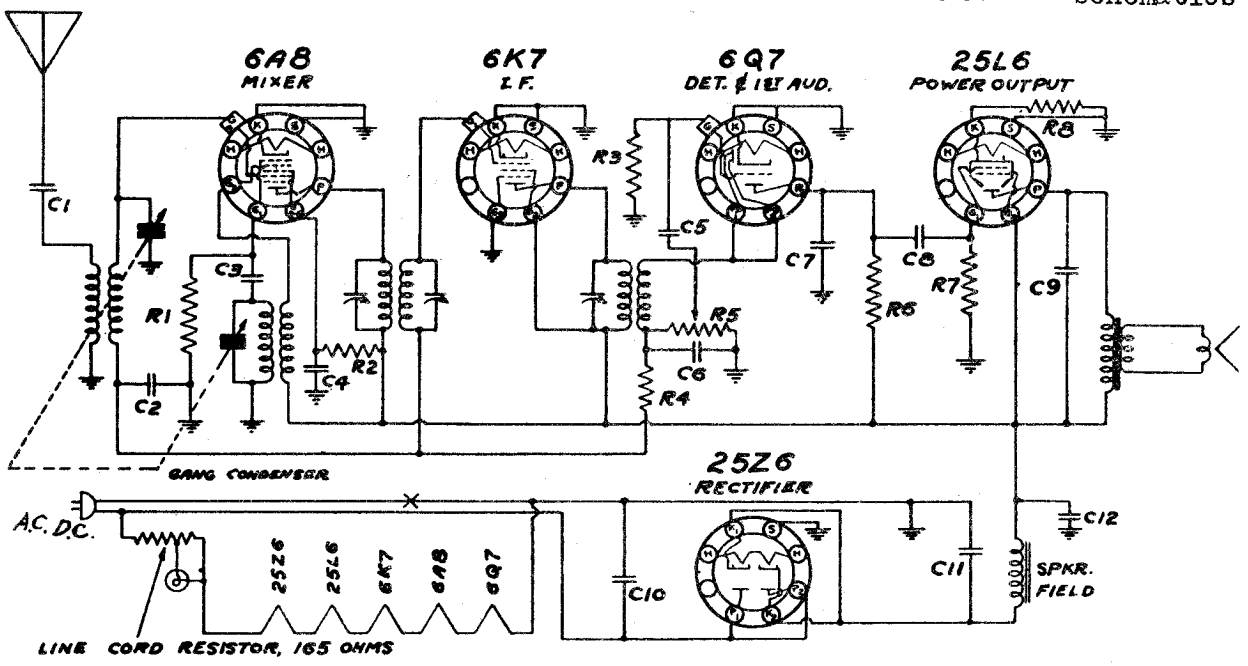
MODELS 5D, 5DL
MODEL 5EA

# CONTINENTAL RADIO & TELEV. CO.

Schematics




## RESISTORS

| No. | OHMS | WATTS | |
|---|---|---|---|
| R1 | 50,000 | ½ | |
| R2 | 40,000 | ½ | |
| R3 | 15 MEG | ½ | |
| R4 | 2 MEG | ½ | |
| R5 | 500,000 | | VOL. CONT. |
| R6 | 250,000 | ½ | |
| R7 | 500,000 | ½ | |
| R8 | 110 | ½ | ±10% |

## CONDENSERS

| No. | MFD. | TYPE |
|---|---|---|
| C1 | .005 | 600 V. |
| C2 | .02 | 400 V. |
| C3 | .00025 | MICA |
| C4 | .01 | 400 V. |
| C5 | .01 | 400 V. |
| C6 | .00025 | MICA |
| C7 | .00025 | MICA |
| C8 | .01 | 400 V. |
| C9 | .005 | 600 V. |
| C10 | .05 | 400 V. |
| C11 | 25. } ELECT. | 150 V. |
| C12 | 10. } | 150 V. |

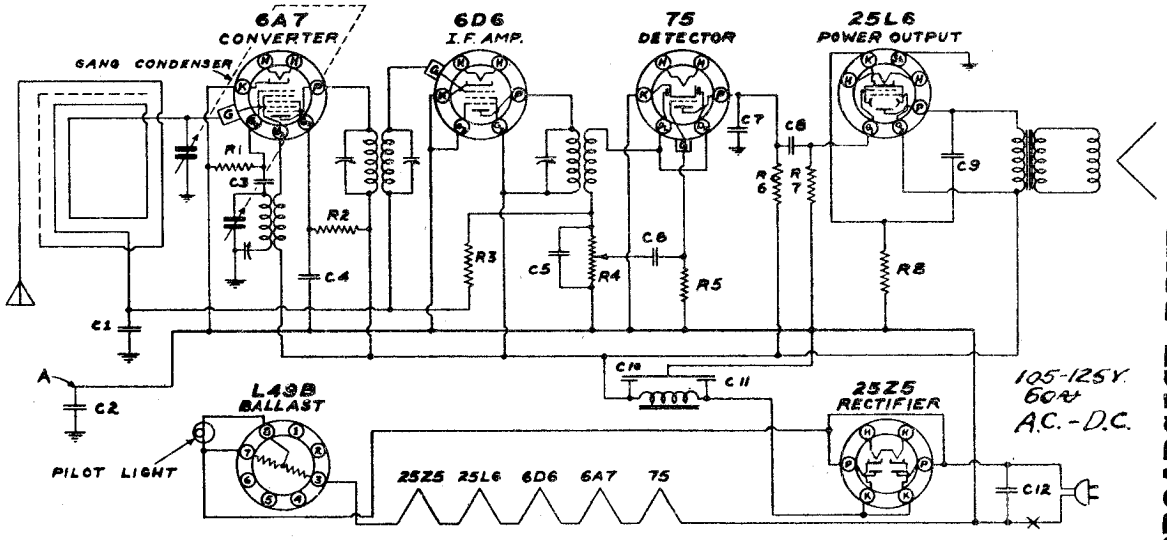
FOR ALIGNMENT AND LAYOUTS SEE INDEX

IF PEAK 456 KC

MODEL 5EA

**A.C.-D.C.**

**RANGE 535 - 1730 KILOCYCLES**




## RESISTORS

| No. | OHMS | WATTS | |
|---|---|---|---|
| R1 | 50,000 | ½ | |
| R2 | 30,000 | ½ | |
| R3 | 2,000,000 | ½ | |
| R4 | 500,000 | | VOL. CONT. |
| R5 | 5,000,000 | ½ | |
| R6 | 250,000 | ½ | |
| R7 | 500,000 | ½ | |
| R8 | 150 ± 10% | ½ | |

## CONDENSERS

| No. | MFDS. | VOLTS |
|---|---|---|
| C1 | .02 | 400 |
| C2 | .25 | 200 |
| C3 | .00005 | MICA |
| C4 | .05 | 400 |
| C5 | .00025 | MICA |
| C6 | .01 | 400 |
| C7 | .00025 | MICA |
| C8 | .01 | 400 |
| C9 | .005 | 600 |
| C10 | 20. | 150 |
| C11 | 20. | 150 |
| C12 | 0.05 | 400 |

NOTE:- C2 USED ON MODEL 5DL ONLY. ON MODEL 5D POINT "A" IS CONNECTED TO CHASSIS

IF PEAK 456 KC

+ INDICATES CHASSIS GROUND

FOR SOCKET LAYOUT SEE INDEX

SCHEMATIC DIAGRAM
MODEL 5DL
MODEL 5D

**BROADCAST BAND**

**A.C.-D.C.**

**RANGE 545 - 1630 KILOCYCLES**

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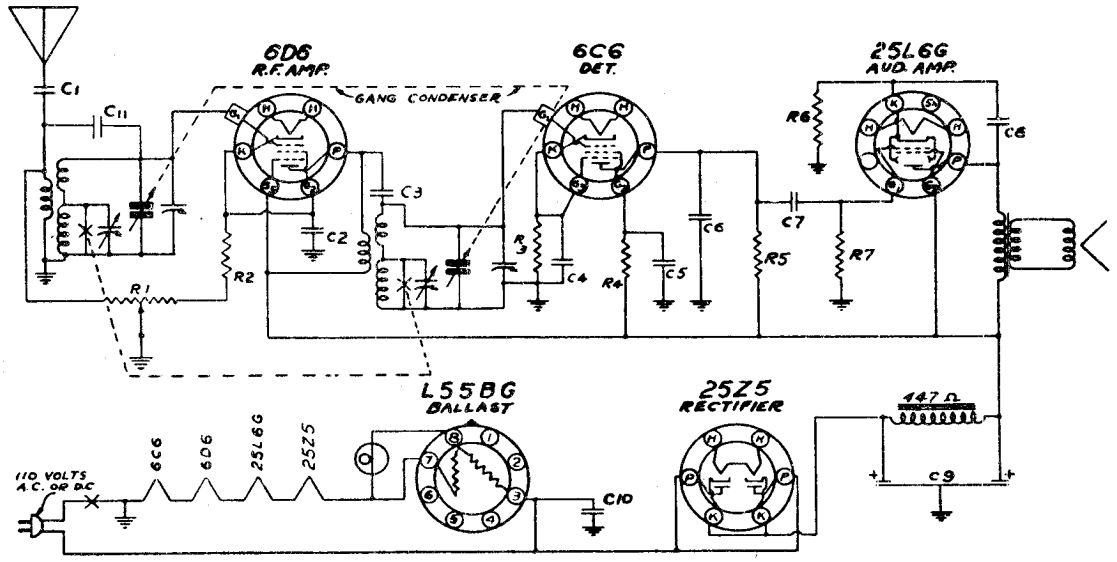
# CONTINENTAL RADIO & TELEV. CO.

MODEL 5B
MODEL 5CU
Schematics



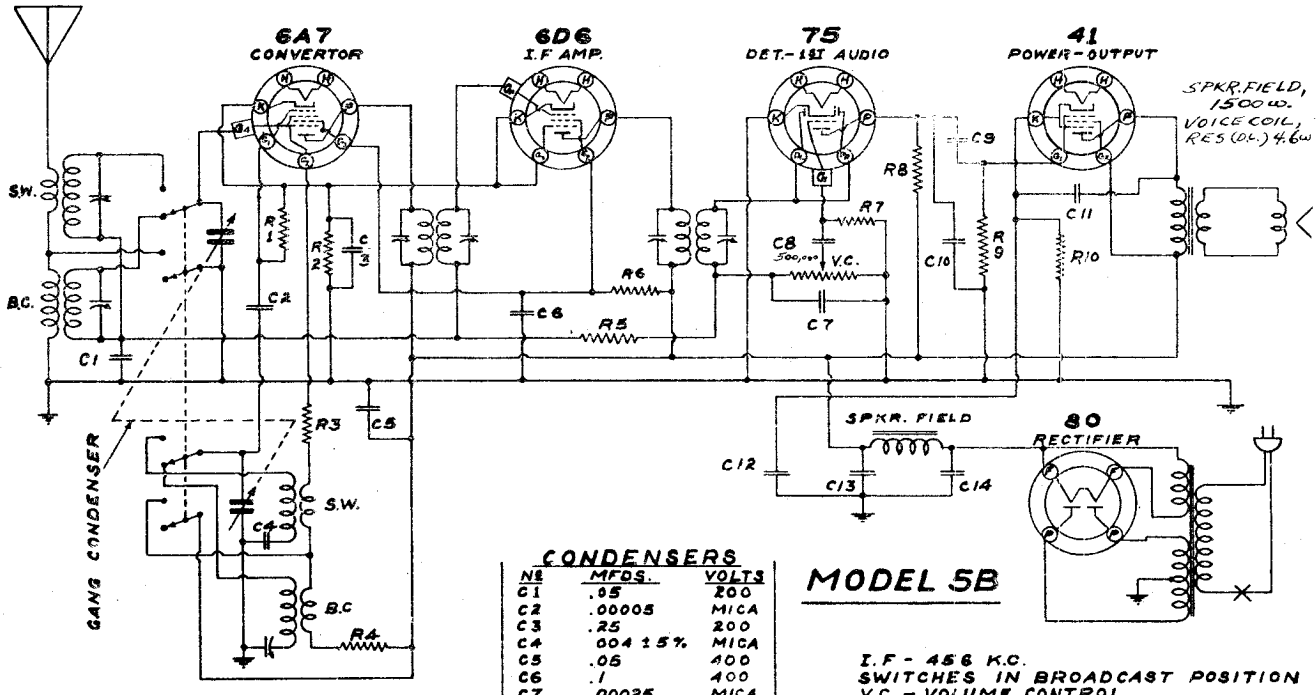

RANGES:-
535 - 1730 KC
350 - 135 KC

| CONDENSERS | | |
|---|---|---|
| № | CAPACITY | TYPE |
| C1 | .002 MFD. | 400 V. |
| C2 | .1 " | 200 V. |
| C3 | 5. mmf. | GIMMIK |
| C4 | .25 Mfd. | 200 V. |
| C5 | .1 " | 200 V. |
| C6 | .0002 " | 600 V. |
| C7 | .01 " | 400 V. |
| C8 | .02 " | 400 V. |
| C9 | 16.0-16.0" | 150 V. ELECT. |

| RESISTORS | | | |
|---|---|---|---|
| № | OHMS R. | WATTS | |
| R1 | 75,000 | | VOL. CONT. |
| R2 | 250 | ¼ | |
| R3 | 25,000 | ½ | |
| R4 | 2,000,000 | ¼ | |
| R5 | 500,000 | ¼ | |
| R6 | 110 | ½ | WIRE WOUND |
| R7 | 500,000 | ¼ | |

| | | |
|---|---|---|
| C10 | .1 Mfd. | 400 V. |
| C11 | 2.5 mmf. | GIMMIK |

**SCHEMATIC DIAGRAM**
**MODEL 5CU**




| RESISTORS | | | | | |
|---|---|---|---|---|---|
| № | OHMS | WATTS | № | OHMS | WATTS |
| R1 | 50,000 | ½ | R6 | 30,000 ± 10% | ½ |
| R2 | 170 ± 10% | ½ | R7 | 5 MEG. | ½ |
| R3 | 30 | ½ | R8 | 250,000 | ½ |
| R4 | 1000 | ½ | R9 | 500,000 | ½ |
| R5 | 1 MEG. | ½ | R10 | 750 ± 10% | ½ |

| CONDENSERS | | | |
|---|---|---|---|
| № | MFDS. | VOLTS | |
| C1 | .05 | 200 | |
| C2 | .00005 | MICA | |
| C3 | .25 | 200 | |
| C4 | .004 ± 5% | MICA | |
| C5 | .05 | 400 | |
| C6 | .1 | 400 | |
| C7 | .00025 | MICA | |
| C8 | .01 | 400 | |
| C9 | .01 | 400 | |
| C10 | .0005 | MICA | |
| C11 | .005 | 600 | |
| C12 | 20 | 25 | |
| C13 | 10 | 350 | ELECT |
| C14 | 10 | 350 | |

**MODEL 5B**

I.F. - 456 K.C.
SWITCHES IN BROADCAST POSITION
V.C. - VOLUME CONTROL

**535-1730 KILOCYCLES**
**16.57-52.63 METERS**

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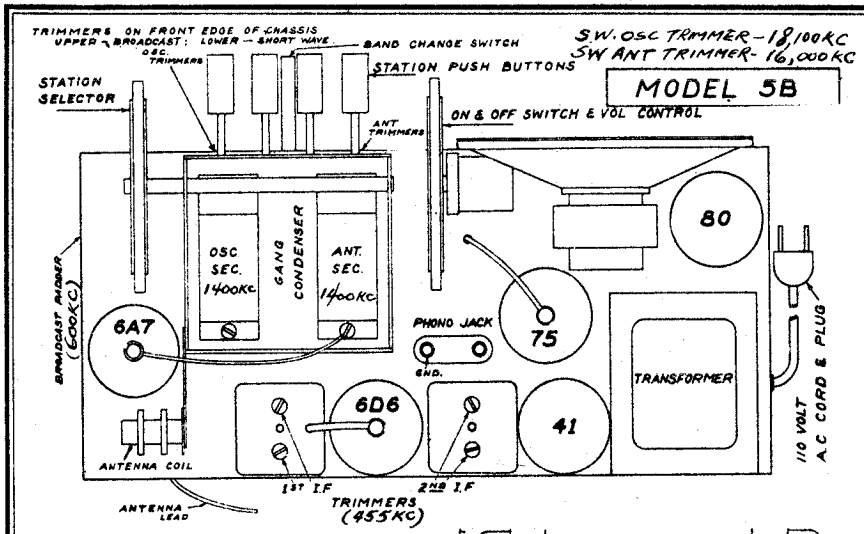


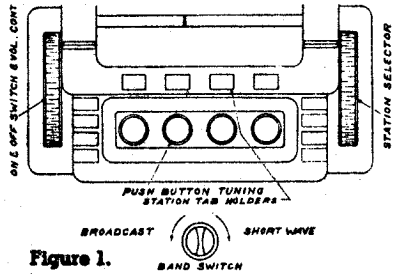




Figure 1.

# PROCEDURE FOR SETTING UP PUSH BUTTONS

MODEL 5B

There are four push buttons by means of which four stations may be selected (see Fig. 1). Make a list of four stations tuned in regularly. Loosen any of the push buttons by turning the push botton proper, counter clockwise a few turns. Holding it in, tune in any one of your favorite stations by means of the station selector. Turn the selector very slowly back and forth until the signal is clearest. Now tighten the push button knob by turning clockwise.

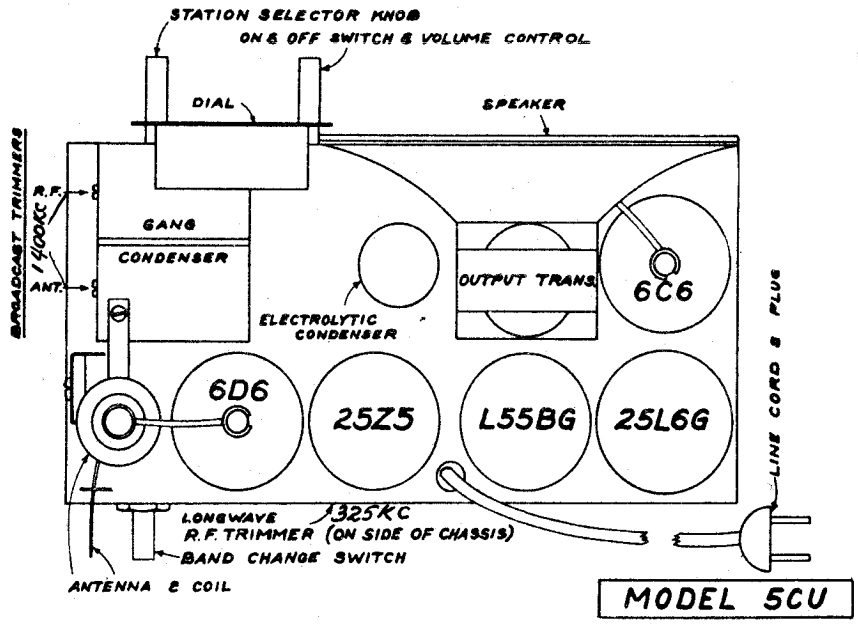
Release the push button and loosen another push button. Holding it in, tune in another favorite station using the station selector. Turn the selector wheel very slowly back and forth until the signal is clearest. Now tighten the push button by turning it clockwise.

Repeat this operation for the remaining two buttons, tightening each button securely as it is set.

If it is desired to change a station, simply loosen the push button and re-set.

Punch the correct station call letter tabs from the set of sheets supplied and insert them into the windows above the push buttons.

The dial is now set up for quick tuning.




**PHONOGRAPH CONNECTIONS** MODEL 5B This receiver is provided with a phono jack (see chassis layout) and connection may be made from the phonograph to this jack by means of phone tips. It is necessary that the phonograph be equipped with a volume control and a switch to break connection between the phonograph and the set as the radio will not operate properly if a permanent connection is made. When the phonograph is in use the volume control of the set will act to some extent as a tone control. Best results will be obtained with the volume control of the set near maximum and no station tuned in.

## MODEL 5B VOLTAGE READINGS—LINE VOLTAGE 115

Volume control minimum, antenna shorted to ground and band switch in broadcast position. Meter 1,000 ohms per volt.

| Voltage | Phono |
|---|---|
| Filament of 80 tube to ground | 253 Volts |
| Screen of 41 tube to ground | 196 Volts |
| Screens of 6A7 and 6D6 tubes to ground | 87 Volts |
| Cathode of 41 tube to ground | 13 Volts |
| Cathode of 6A7 tube to ground | 2.75 Volts |



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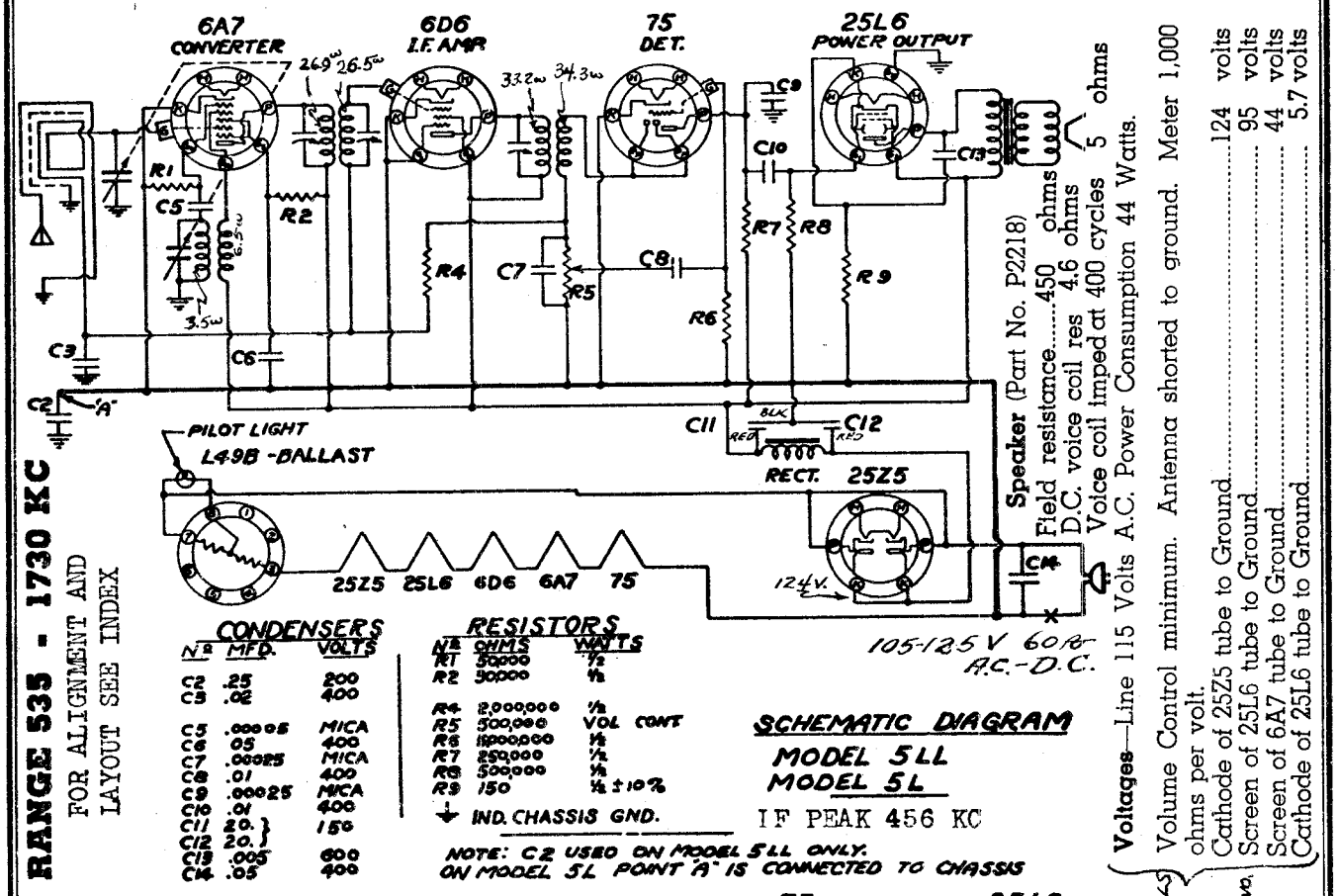
# CONTINENTAL RADIO & TELEV. CO.

MODEL 5L, 5LL
MODEL 5LL Phono.
Schematics




**RANGE 535 - 1730 KC**

FOR ALIGNMENT AND LAYOUT SEE INDEX

## CONDENSERS

| Nº | MFD. | VOLTS |
|---|---|---|
| C2 | .25 | 200 |
| C3 | .02 | 400 |
| C5 | .000005 | MICA |
| C6 | .05 | 400 |
| C7 | .00025 | MICA |
| C8 | .01 | 400 |
| C9 | .00025 | MICA |
| C10 | .01 | 400 |
| C11 | 20. } | 150 |
| C12 | 20. } | |
| C13 | .005 | 600 |
| C14 | .05 | 400 |

## RESISTORS

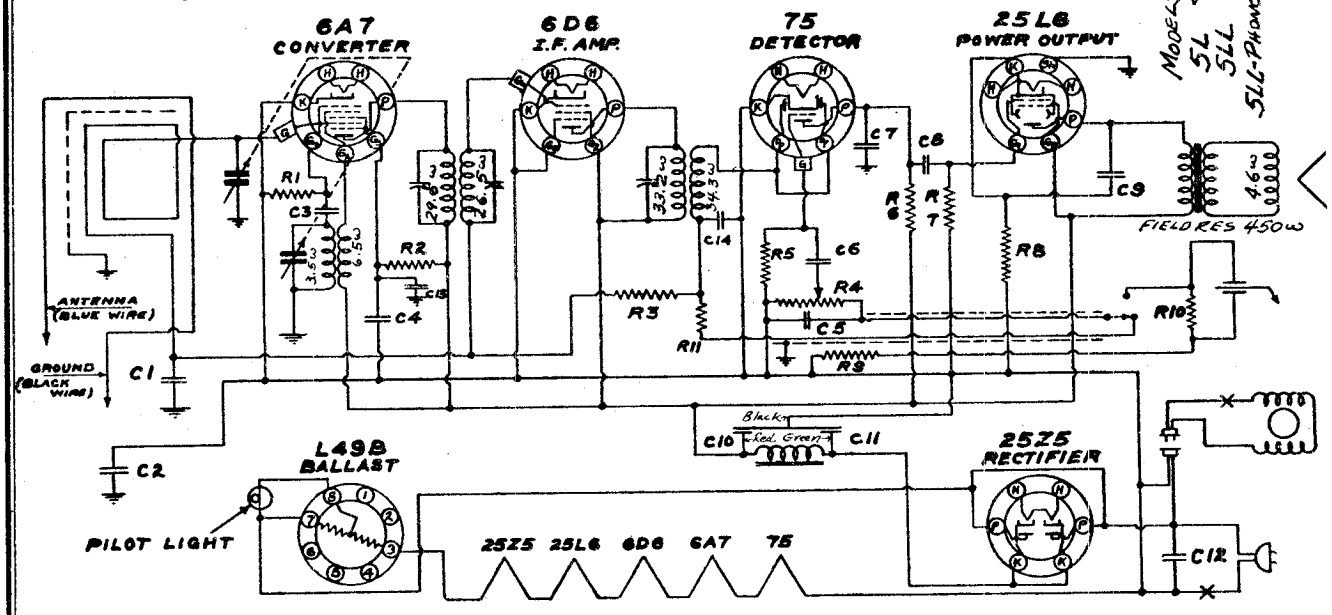
| Nº | OHMS | WATTS |
|---|---|---|
| R1 | 50000 | ½ |
| R2 | 30000 | ½ |
| R4 | 2,000,000 | ½ |
| R5 | 500,000 | VOL CONT |
| R6 | 1,000,000 | ½ |
| R7 | 250,000 | ½ |
| R8 | 500,000 | ½ |
| R9 | 150 | ½ ± 10% |

IND. CHASSIS GND.

NOTE: C2 USED ON MODEL 5LL ONLY. ON MODEL 5L POINT "A" IS CONNECTED TO CHASSIS

## SCHEMATIC DIAGRAM
## MODEL 5LL
## MODEL 5L

IF PEAK 456 KC




## RESISTORS

| Nº | OHMS | WATTS |
|---|---|---|
| R1 | 50,000 | ½ |
| R2 | 30,000 | ½ |
| R3 | 2,000,000 | ½ |
| R4 | 500,000 | VOL. CONT. |
| R5 | 5,000,000 | ½ |
| R6 | 250,000 | ½ |
| R7 | 500,000 | ½ |
| R8 | 150 ± 10% | ½ |
| R9 | 500,000 | ½ |
| R10 | 500,000 | ½ |
| R11 | 50,000 | ½ |

## CONDENSERS

| Nº | MFDS. | VOLTS |
|---|---|---|
| C1 | .02 | 400 |
| C2 | .1 | 200 |
| C3 | .00003 | MICA |
| C4 | .05 | 400 |
| C5 | .00025 | MICA |
| C6 | .01 | 400 |
| C7 | .00025 | MICA |
| C8 | .01 | 400 |
| C9 | .005 | 600 |
| C10 | 20. | 150 |
| C11 | 20. | 150 |
| C12 | 0.05 | 400 |
| C13 | .05 | 400 |
| C14 | .0001 | MICA |

I.F. 455 K.C.
INDICATES CHASSIS GROUND

## SCHEMATIC DIAGRAM
## MODEL 5LL
## PHONO

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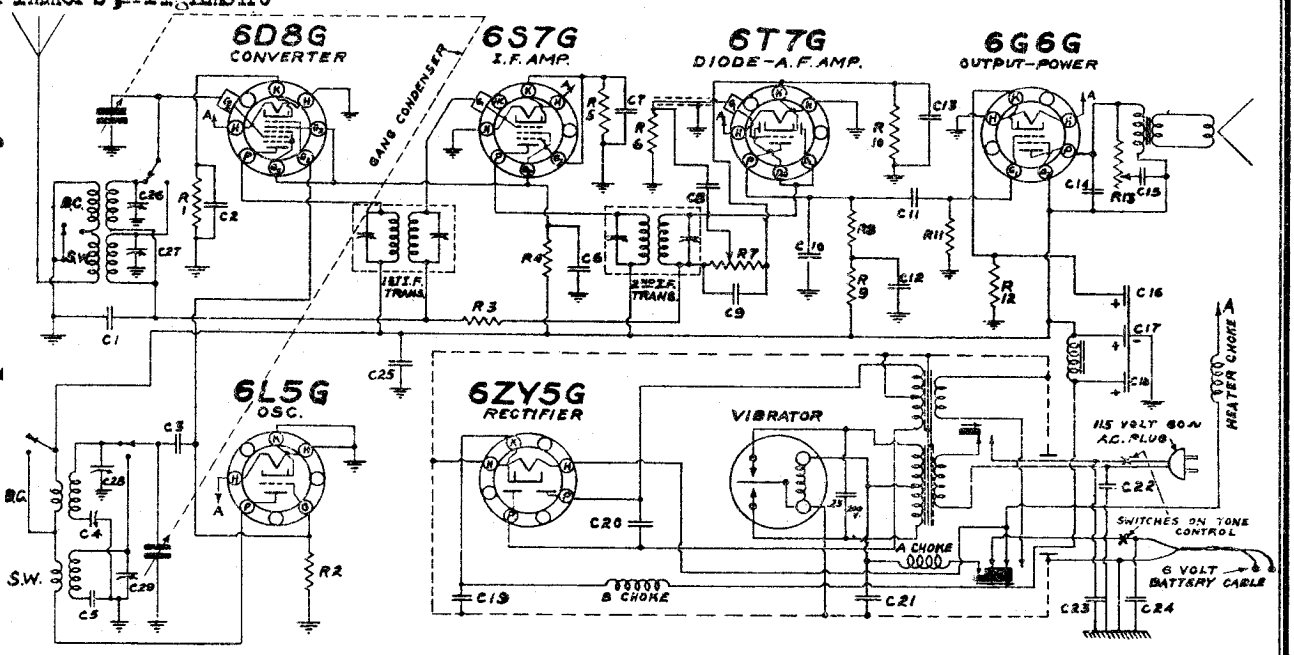
MODEL 6A
Schematic, Socket Trimmers, Alignment

CONTINENTAL RADIO & TELEV. CO.

# Six Tube 6 Volt Battery 110-120 Volt AC Superheterodyne




IF PEAK 456 KC

## CONDENSERS

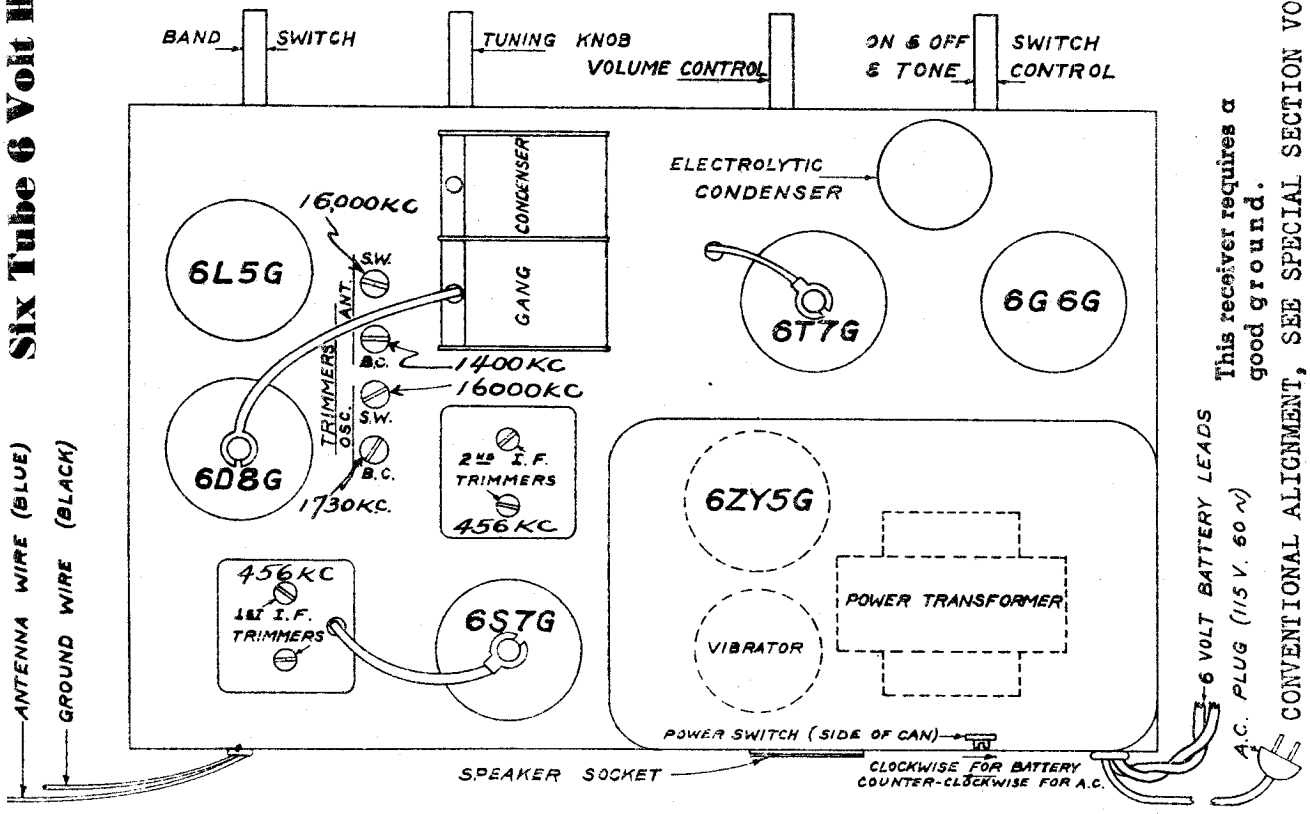
| NO | CAPACITY | TYPE | NO | CAPACITY | TYPE |
|---|---|---|---|---|---|
| 1 | .05 Mfd. | 200 V. | 13 | .5 Mfd. | 200 V. |
| 2 | .05 Mfd. | 200 V. | 14 | .005 " | 600 V. |
| 3 | 100 mmf. | MICA | 15 | .05 " | 400 V. |
| 4 | 300-600 mmf | " | 16 | 5. " | 25 V. |
| 5 | 4000 mmf | M. ± 5% | 17 | 8. " | 200 V. |
| 6 | .1 Mfd | 200 V. | 18 | 8. " | 200 V. |
| 7 | .05 " | 200 V. | 19 | .01 " | 600 V. |
| 8 | .01 " | 400 V. | 20 | .015 " | 600 V. |
| 9 | 250 mmf. | MICA | 21 | .5 " | 10 V. |
| 10 | 250 " | " | 22 | .05 " | 400 V. |
| 11 | .01 Mfd. | 400 V. | 23 | .01 " | 600 V. |
| 12 | .1 " | 200 V. | 24 | .5 " | 10 V. |
| | | | 25 | .1 " | 200 V. |

## RESISTORS

| NO | OHMS | WATTS | SPL. TOL. |
|---|---|---|---|
| 1 | 1500 | ½ | ± 10% |
| 2 | 50,000 | ½ | |
| 3 | 1,000,000 | ½ | |
| 4 | 38,000 | ½ | |
| 5 | 1,000 | ½ | ± 10% |
| 6 | 1,000,000 | ½ | |
| 7 | 500,000 | ½ | (VOL. CONT) |
| 8 | 500,000 | ½ | |
| 9 | 200,000 | ½ | |
| 10 | 10,000 | ½ | ± 10% |
| 11 | 800,000 | ½ | |
| 12 | 450 | ½ | ± 10% |
| 13 | 100,000 | ½ | (TONE CONT.) |

BAND SWITCH IN BROADCAST POSITION.
POWER SWITCH IN BATTERY POSITION.
I.F. — 456 K.C.
C26 TO C29 - 2 TO 20 mmf. TRIMMERS

## SCHEMATIC DIAGRAM MODEL 6A




This receiver requires a good ground.

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

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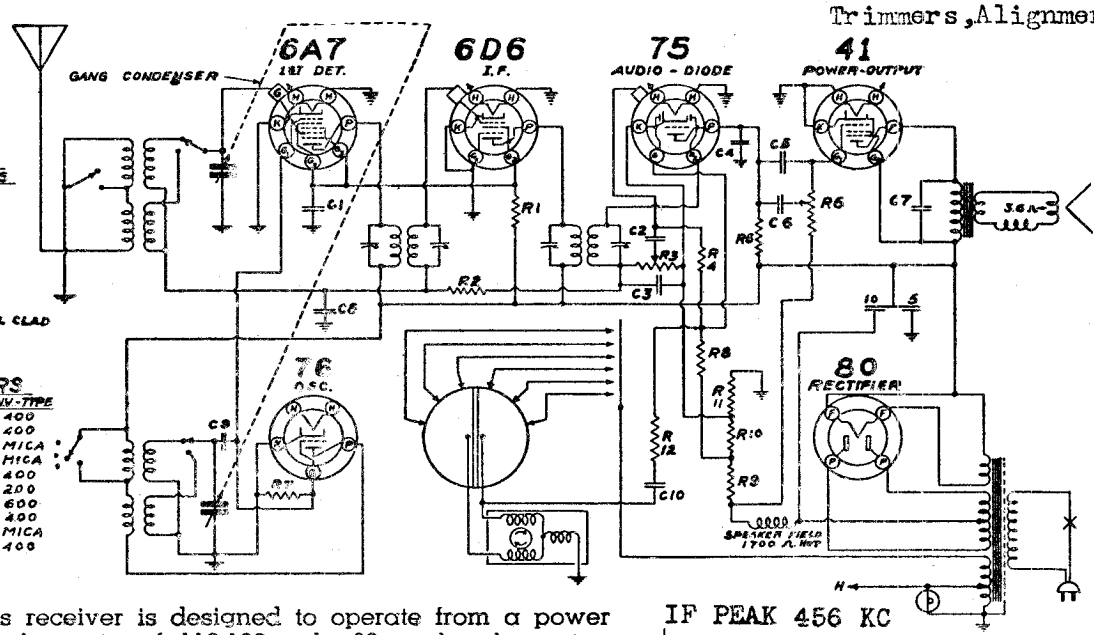
MODEL 6B

# CONTINENTAL RADIO & TELEV. CO. Schematic, Socket Trimmers, Alignment




**RESISTORS**

| NO. | OHMS | WATTS |
|---|---|---|
| 1 | 10,000 | ½ |
| 2 | 1 MEG. | ½ |
| 3 | 500,000 | V.C. |
| 4 | 2 MEG. | ½ |
| 5 | 200,000 | ½ |
| 6 | 500,000 | T.C. |
| 7 | 50,000 | ½ |
| 8 | 1 MEG. | ½ |
| 9 | 200 | METAL CLAD |
| 10 | 33 | |
| 11 | 100 | |
| 12 | 1 MEG. | ½ |

**CONDENSERS**

| NO. | CAP-MFD. | WV-TYPE |
|---|---|---|
| 1 | .05 | 400 |
| 2 | .01 | 400 |
| 3 | .00025 | MICA |
| 4 | .00025 | MICA |
| 5 | .01 | 400 |
| 6 | .05 | 200 |
| 7 | .005 | 600 |
| 8 | .05 | 400 |
| 9 | .0001 | MICA |
| 10 | .002 | 400 |

IF PEAK 456 KC

BAND SWITCH IN BROADCAST POSITION
I.F. - 456 K.C.
V.C. - VOLUME CONTROL
T.C. - TONE CONTROL

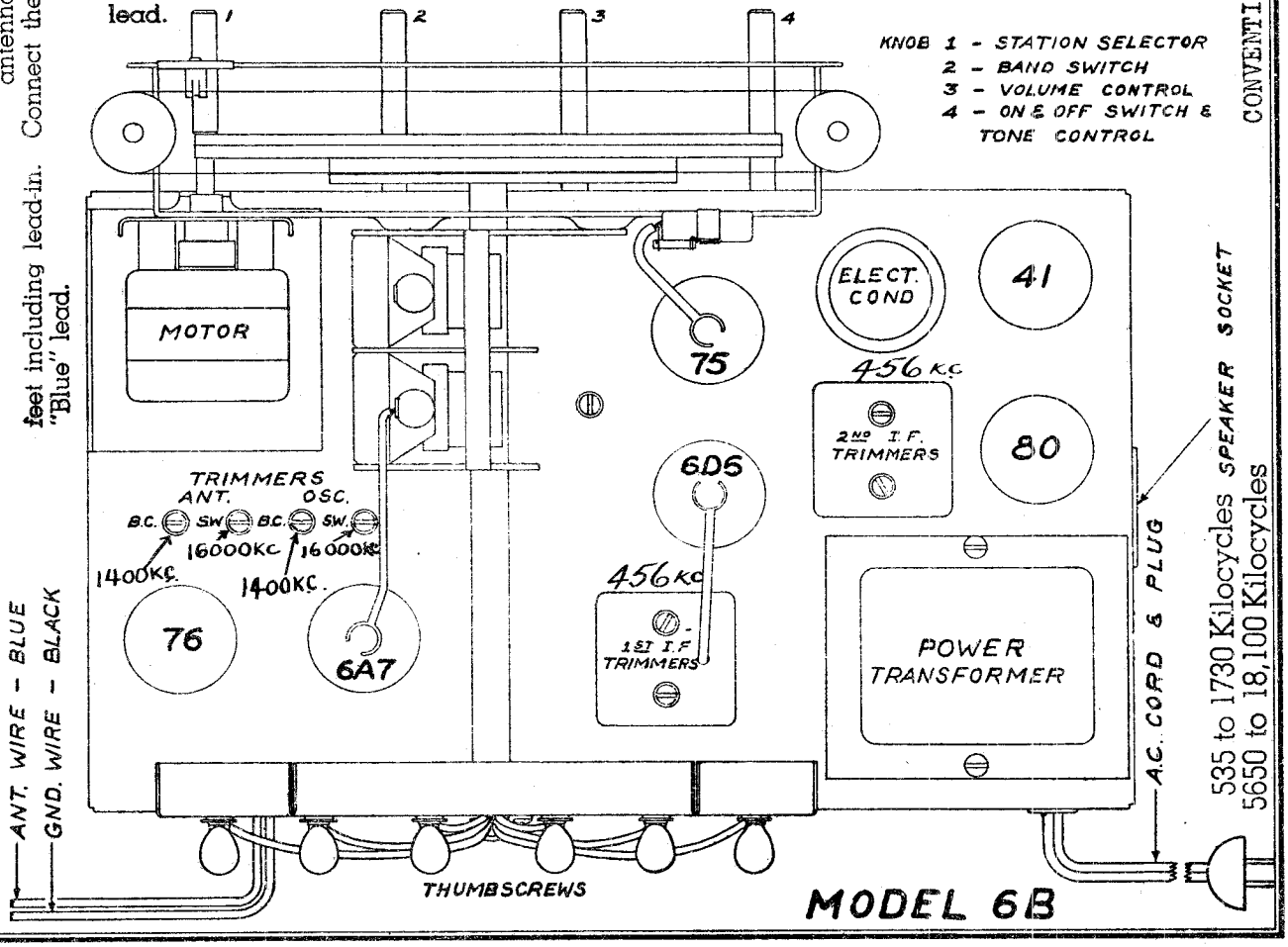
This receiver is designed to operate from a power supply main of 110-120 volt, 60 cycle alternating current AC). **Never plug into a DC outlet.**

**GROUND** Where ever possible, a good ground should be employed. Water pipes and steam or hot water radiators make a very desirable ground connection. The ground wire should be connected to the "Black" lead.

**ANTENNA** Use a standard outside antenna of at least 50 feet including lead-in. Connect the antenna to the "Blue" lead.

## SCHEMATIC DIAGRAM MODEL 6B

KNOB 1 - STATION SELECTOR
2 - BAND SWITCH
3 - VOLUME CONTROL
4 - ON & OFF SWITCH & TONE CONTROL




535 to 1730 Kilocycles
5650 to 18,100 Kilocycles

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

MODEL 6B

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MODEL 6B
MODEL 6C
MODEL 6G

# CONTINENTAL RADIO & TELEV. CO.

Tuner Data MODEL 6B

**ELECTRIC MOTOR** The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch and a silent gear train. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

**SETTING UP SELECTOR MECHANISM** List six (6) strong local stations which are free from excess fading. The station on your list that comes in nearest the left hand end of the dial should be called station No. 1 and should be set up on button No. 1. (See Figure 1.) Located on the back of the receiver is the thumb screw bracket and six (6) thumb screws whose positioning determines the points at which the pointer will stop when the buttons are being used. Figure 2 shows a detail of the thumb screws numbered for reference to the push buttons.

Located on the rotating selector plate is a fibre dead spot which locates the position at which station selector contacts should be set in order to have the selector plate stop for a certain station. Follow closely the steps listed below:

1. Using the manual selector knob, tune in station No. 1, the station near the left hand end of the dial—the 170 K.C. end. Make certain that the station is properly tuned in.

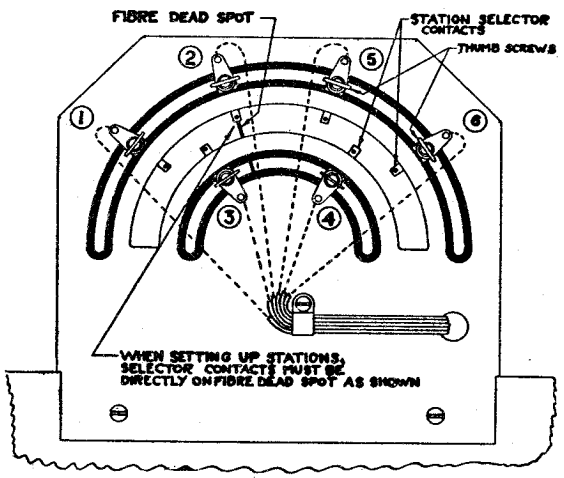
2. From the back of the receiver loosen thumb screw No. 1 (See Figure 2) just enough to allow it to slide freely in the groove.

3. Now adjust the thumb screw until the contact is resting directly on the fibre dead spot.

4. Tighten thumb screw securely, making sure that in tightening you do not move the contact off the fibre dead spot.

5. Check the above operation by pressing button No. 1 and note if there is any pointer movement. If there is no pointer movement, the contact is properly set. If the pointer moves, the contact was not set directly on fibre dead spot. In this case, the station should be re-tuned manually, and procedure No. 3 should be repeated.

Fig. 2


FIBRE DEAD SPOT
STATION SELECTOR CONTACTS
THUMB SCREWS
WHEN SETTING UP STATIONS, SELECTOR CONTACTS MUST BE DIRECTLY ON FIBRE DEAD SPOT AS SHOWN

6. Using the same procedure, set up the remaining five stations, in each case using the station of the next highest frequency and the thumb screw having the same number as the corresponding button. Never skip buttons, always set up in numerical order from button 1 to 6 from left to right.

7. After all the stations have been set up, insert the proper station call tabs (found with the instructions) into the recesses of their respective buttons.

8. To receive any of the six stations set up as described above turn receiver "ON" by rotating the left hand knob to the right until the switch clicks. Allow the tubes to heat up, press the buttons designated by the call letter of the station desired and hold the button in until the pointer stops moving and the station comes in. Adjust tone and volume. IMPORTANT: Be sure the band switch is in the position for Standard Broadcast Reception.

## AUTOMATIC PUSH BUTTONS
### MODELS 6C and 6G

A glance at Fig. 1 will show that there are eight (8) push buttons, six (6) of which are for automatic use; the adjusting screws are located directly below these push buttons. Fig. 1 also shows the tuning range or frequencies covered by each button.

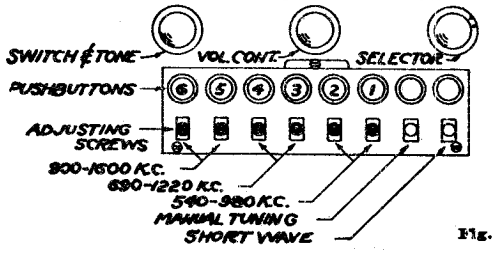



Fig. 1

The remaining two (2) push buttons located at the extreme right hand end of the push button plate are for short wave and manual tuning. See Fig. 1. Short wave tuning is accomplished by pressing "short wave" button and tuning with the selector knob. By pressing "manual tuning" button, the automatic disconnects and the selector knob becomes active for the broadcast band.

1. Choose a station havng a frequency within the range of button No. 1 (540 to 980 kc).

2. Press "Manual Tuning" button and tune this station conventionally by using the selector knob.

3. Now press button No. 1 and turn adjusting screw in either direction until the previously selected station is heard. Adjust the screw until the station is received with maximum volume.

4. Remove the call letters of the station from the call letter sheet furnished and insert in the window of the adjusting screw.

5. Repeat the above procedure for the remaining five (5) stations.

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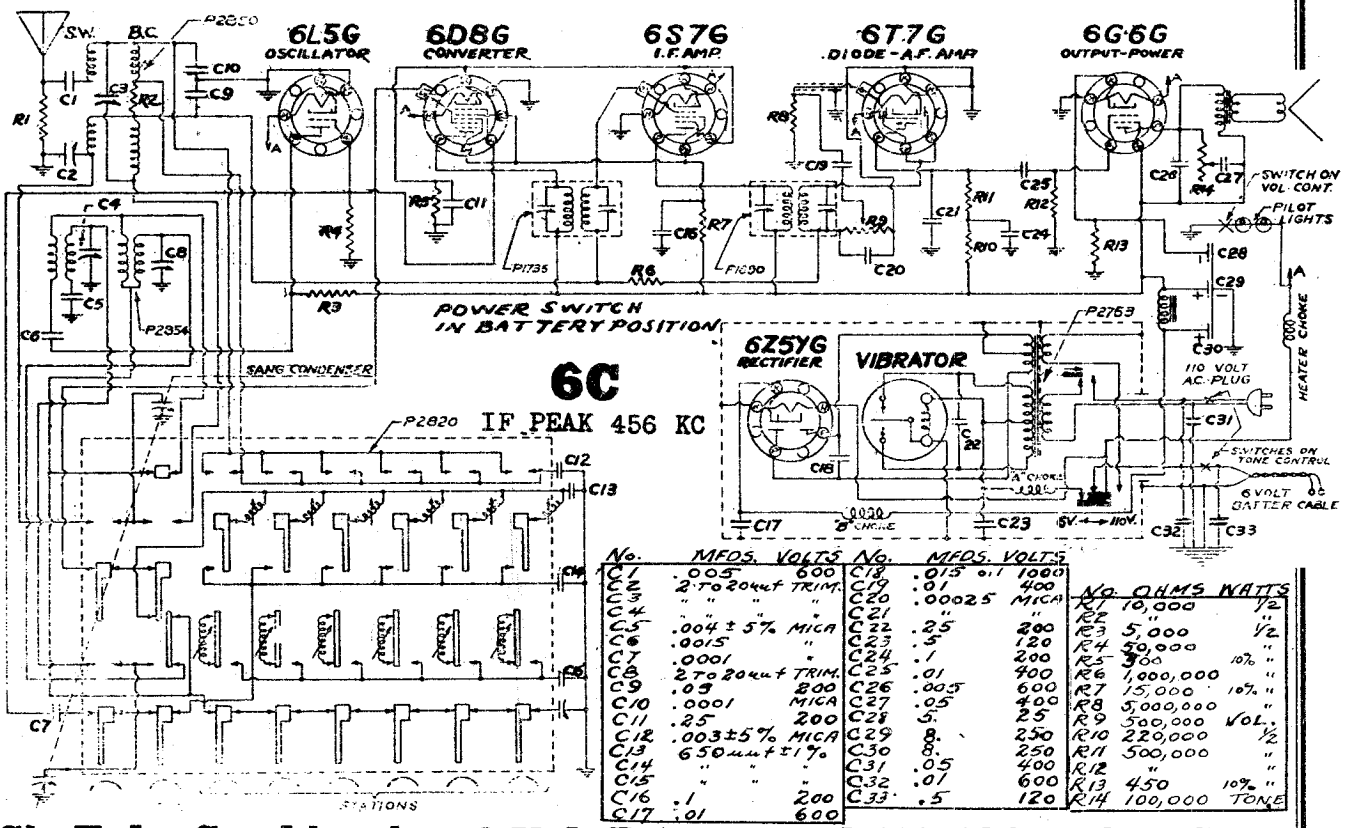
MODEL 6C

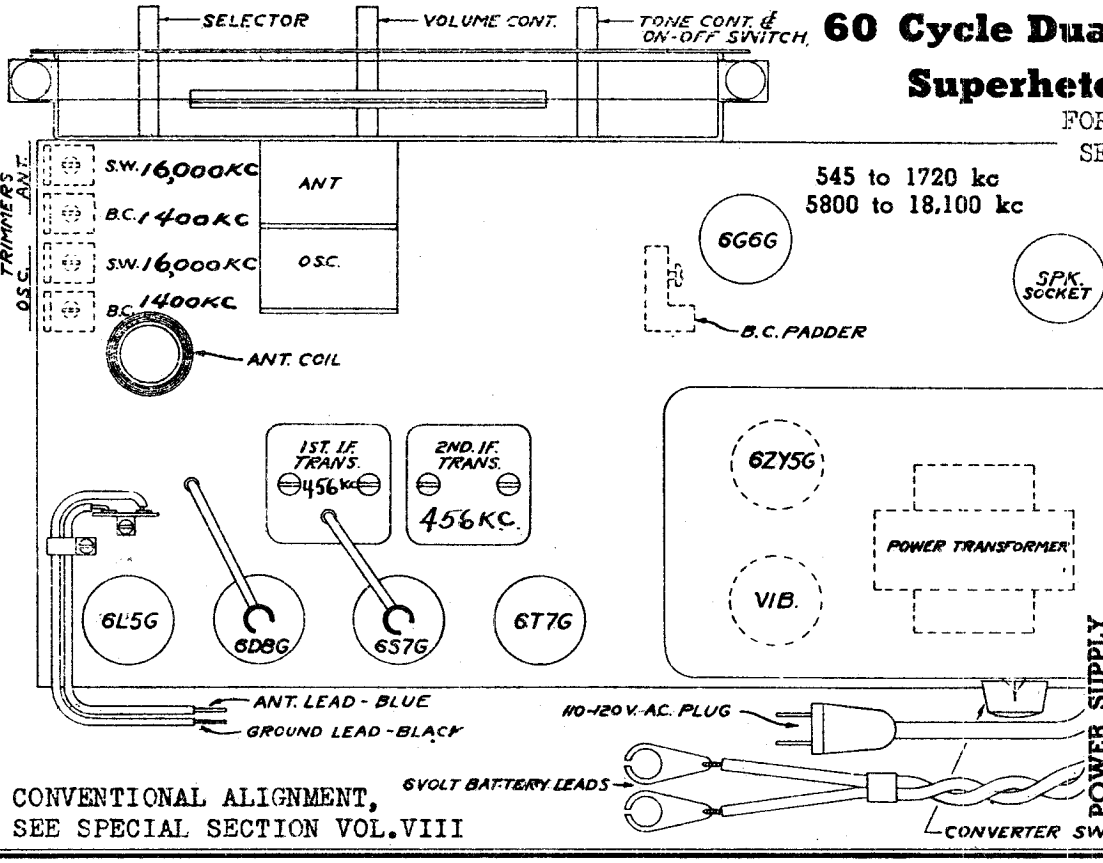
CONTINENTAL RADIO & TELEV. CO. Schematic, Socket Trimmers, Alignment




| No. | MFDS. | VOLTS | No. | MFDS. | VOLTS |
|---|---|---|---|---|---|
| C1 | .005 | 600 | C19 | .015 & .1 | 1000 |
| C2 | 2 TO 20 mmf | TRIM. | C19 | .01 | 400 |
| C3 | " " " | " | C20 | .00025 | MICA |
| C4 | " " " | " | C21 | " | |
| C5 | .004 ± 5% | MICA | C22 | .25 | 200 |
| C6 | .0015 | " | C23 | .5 | 120 |
| C7 | .0001 | " | C24 | .1 | 200 |
| C8 | 2 TO 20 mmf | TRIM. | C25 | .01 | 400 |
| C9 | .03 | 800 | C26 | .005 | 600 |
| C10 | .0001 | MICA | C27 | .05 | 400 |
| C11 | .25 | 200 | C28 | 8. | 25 |
| C12 | .003 ± 5% | MICA | C29 | 8. | 250 |
| C13 | 650 mmf ± 1% | | C30 | 8. | 250 |
| C14 | " " " | | C31 | .05 | 400 |
| C15 | " " " | | C32 | .01 | 600 |
| C16 | .1 | 200 | C33 | .5 | 120 |
| C17 | .01 | 600 | | | |

| No. | OHMS | WATTS |
|---|---|---|
| R1 | 10,000 | 1/2 |
| R2 | " | |
| R3 | 5,000 | 1/2 |
| R4 | 50,000 | |
| R5 | 300 | 10% |
| R6 | 1,000,000 | |
| R7 | 15,000 | 10% |
| R8 | 5,000,000 | |
| R9 | 500,000 | VOL. |
| R10 | 220,000 | 1/2 |
| R11 | 500,000 | |
| R12 | " | |
| R13 | 450 | 10% |
| R14 | 100,000 | TONE |

# Six Tube Combination 6 Volt Battery, and 110-120 Volt AC 60 Cycle Dual Wave Superheterodyne




FOR TUNER DATA SEE INDEX

**POWER SUPPLY**

**Never plug into a D.C. outlet.** In order to adapt the receiver to either type of current (6 volt or 110-120 volt—A.C.) simply insert a screw driver into the slot in the hole located on the back of the can, which is mounted on the chassis, and turn to the left or counter-clockwise for 110-120 volt A.C. 60 cycle current; turn to the right or clockwise for 6 volt battery operation.

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

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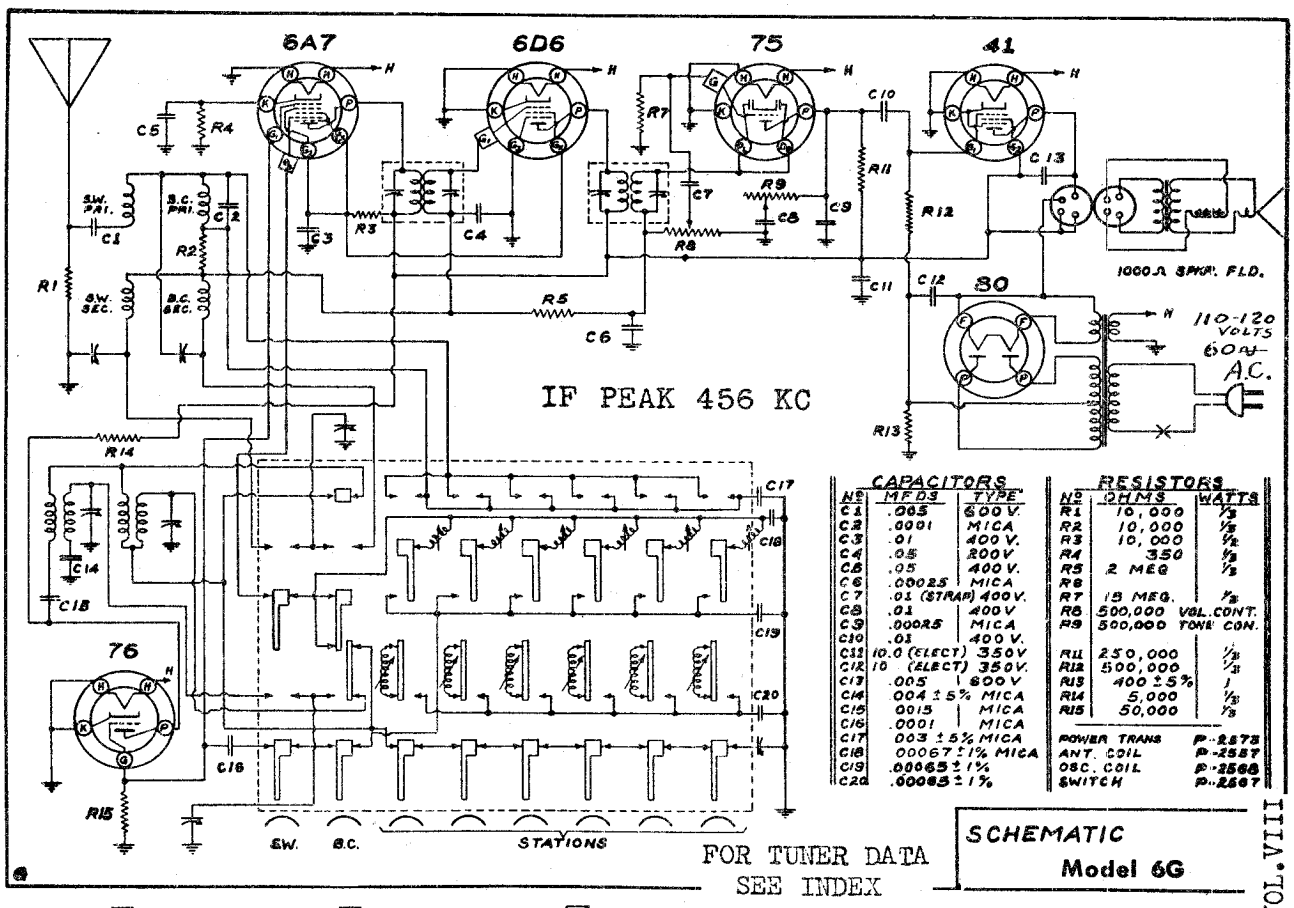
MODEL 6G
Schematic, Socket Trimmers, Alignment

# CONTINENTAL RADIO & TELEV. CO.

**This receiver is designed to operate over two tuning ranges: the broadcast range which extends from 545 to 1720 kc (174.4 to 550.4 meters) and the international short wave band which extends from 5800 to 18,100 kc (16.5 to 51.7 meters). This latter range is the one which includes the 5 internationally assigned bands—the 16, 19, 25, 31 and 49 meter bands.**



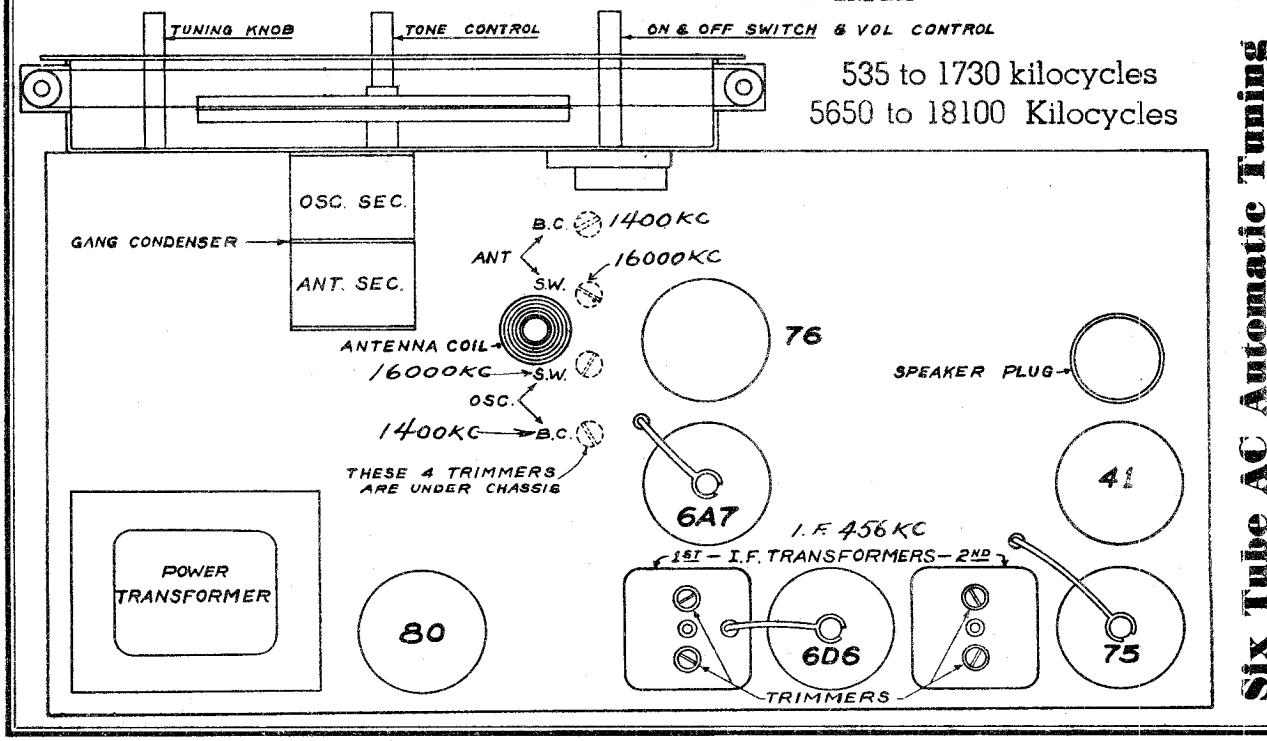

| CAPACITORS | | |
|---|---|---|
| No. | MFDS | TYPE |
| C1 | .005 | 600 V. |
| C2 | .0001 | MICA |
| C3 | .01 | 400 V. |
| C4 | .05 | 200 V |
| C5 | .05 | 400 V. |
| C6 | .00025 | MICA |
| C7 | .01 (STRAP) | 400 V. |
| C8 | .01 | 400 V |
| C9 | .00025 | MICA |
| C10 | .01 | 400 V. |
| C11 | 10.0 (ELECT) | 350 V |
| C12 | 10 (ELECT) | 350 V. |
| C13 | .005 | 600 V. |
| C14 | .004 ± 5% | MICA |
| C15 | .0015 | MICA |
| C16 | .0001 | MICA |
| C17 | .003 ± 5% | MICA |
| C18 | .00067 ± 1% | MICA |
| C19 | .00065 ± 1% | |
| C20 | .00063 ± 1% | |

| RESISTORS | | |
|---|---|---|
| No. | OHMS | WATTS |
| R1 | 10,000 | 1/2 |
| R2 | 10,000 | 1/2 |
| R3 | 10,000 | 1/2 |
| R4 | 350 | 1/2 |
| R5 | .2 MEG | 1/2 |
| R6 | | |
| R7 | 1.8 MEG. | 1/2 |
| R8 | 500,000 | VOL. CONT. |
| R9 | 500,000 | TONE CON. |
| R11 | 250,000 | 1/2 |
| R12 | 500,000 | 1/2 |
| R13 | 400 ± 5% | 1 |
| R14 | 5,000 | 1/2 |
| R15 | 50,000 | 1/2 |

| | |
|---|---|
| POWER TRANS | P-2573 |
| ANT. COIL | P-2557 |
| OSC. COIL | P-2566 |
| SWITCH | P-2567 |

FOR TUNER DATA SEE INDEX

**SCHEMATIC Model 6G**




**Six Tube AC Automatic Tuning**

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

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CONTINENTAL RADIO & TELEV. CO.

MODEL 6K
Schematic, Socket
Trimmers, Voltage
Alignment

# 6 TUBE AC SUPERHETERODYNE BROADCAST BAND




IF PEAK 456 KC

| CONDENSERS | | | RESISTORS | | | |
|---|---|---|---|---|---|---|
| № | MFD. | VOLTS | № | OHMS | WATTS | |
| C1 | .05 | 200 | R1 | 50000 | 1/2 | |
| C2 | .0001 | MICA | R2 | 3000 | 1/2 | |
| C3 | .1 | 400 | R3 | 15000 | 1/2 | ± 10% |
| C4 | .25 | 200 | R4 | 250 | 1/2 | ± 10% |
| C5 | .00025 | MICA | R5 | 1,000,000 | 1/2 | |
| C6 | .01 | 400 | R6 | 500,000 | VOL. | |
| C7 | .00025 | MICA | R7 | 5,000,000 | 1/2 | |
| C8 | .01 | 400 | R8 | 250,000 | 1/2 | |
| C9 | 25. | 25 | R9 | 500,000 | 1/2 | |
| C10 | 10. | 350 | R10 | 750 | 1/2 | ± 10% |
| C11 | 10. | 350 | | | | |
| C12 | .005 | 600 | | | | |

SCHEMATIC DIAGRAM
MODEL 6K




MODEL 6K

**Speaker** (Part No. P3087)
Field resistance.....1,500 ohms
DC voice coil resistance.....4.6 ohms
Voice coil impedance at 400 cycles.....5 ohms

**Voltages**—Line 115 Volts AC.
Volume control minimum. Antenna shorted to ground. Meter 1,000 ohms per volt.
Filament of 80 tube to ground.....250 volts
Screen of 41 tube to ground.....187 volts
Screens of 6A7 and 6D6 tubes to ground.....84 volts
Cathode of 41 tube to ground.....13.2 volts
Cathode of 6A7 tube to ground.....3.1 volts

## 6K PARTS LIST

| | | |
|---|---|---|
| | **PAPER CONDENSERS** | |
| P148 | .05 mfd. 200 volt | |
| P141 | .25 mfd. 200 volt | |
| P276 | .10 mfd. 400 volt | |
| P1322 | .005 mfd. 600 volt | |
| P164 | .01 mfd. 400 volt | |
| P1313 | .01 mfd. 400 volt with strap | |
| | **RESISTORS** | |
| P137A | 500,000 ohm ½ watt | |
| P2344 | 250,000 ohm ½ watt | |
| P162A | 1,000,000 ohm ½ watt | |
| P1729 | 750 ohm ½ watt 10% | |
| P2578 | 15,000 ohm ½ watt 10% | |
| P1942 | 250 ohm ½ watt 10% | |
| P1952 | 50,000 ohm ½ watt | |
| P2735 | 5,000,000 ohm ½ watt | |
| P481 | 3,000 ohm ½ watt | |
| | **MICA CONDENSERS** | |
| P817 | .00025 mfd. | |
| P480 | .0001 mfd. | |
| | **ELECTROLYTIC CONDENSERS** | |
| P3086 | 10 mfd. 350 w. v. | |
| | 10 mfd. 350 w. v. | |
| | 20 mfd. 25 w. v. | |
| | **ADJUSTABLE CONDENSERS** | |
| P3072 | Gang Condenser and Tuner | |
| P2560 | Padding Condenser | |
| | **TRANSFORMERS AND COILS** | |
| P3083 | 1st I.F. Transformer | |
| P2606 | 2nd I.F. Transformer | |
| P3084 | Oscillator Coil | |
| | **MISCELLANEOUS** | |
| P3082 | Volume Control and Switch | |
| P3074 | 4 Prong Socket | |
| P3075 | 5 Prong Socket | |
| P3076 | 6 Prong Socket | |
| P3077 | 7 Prong Socket | |
| P533 | Tube Shield Base | |
| P530 | Tube Shield | |
| P531 | Tube Shield Cap | |
| P1504 | Pilot Light Bulb | |
| P3085 | Pilot Light, Socket and Bracket | |
| G5891 | Antenna Loop Assembly | |
| G5892 | Static Shield Assembly | |
| P929 | Line Cord | |
| P3087 | 6" Dynamic Speaker and Output Transformer | |
| P3139 | Pressed Paper Back | |
| P3096 | Call Letter Sheet | |
| P2965 | Pointer | |
| P3066 | Dial Scale—Order by Name and Model Number | |
| P3073 | Push Button | |
| P2867 | Bakelite Thumb Wheels | |

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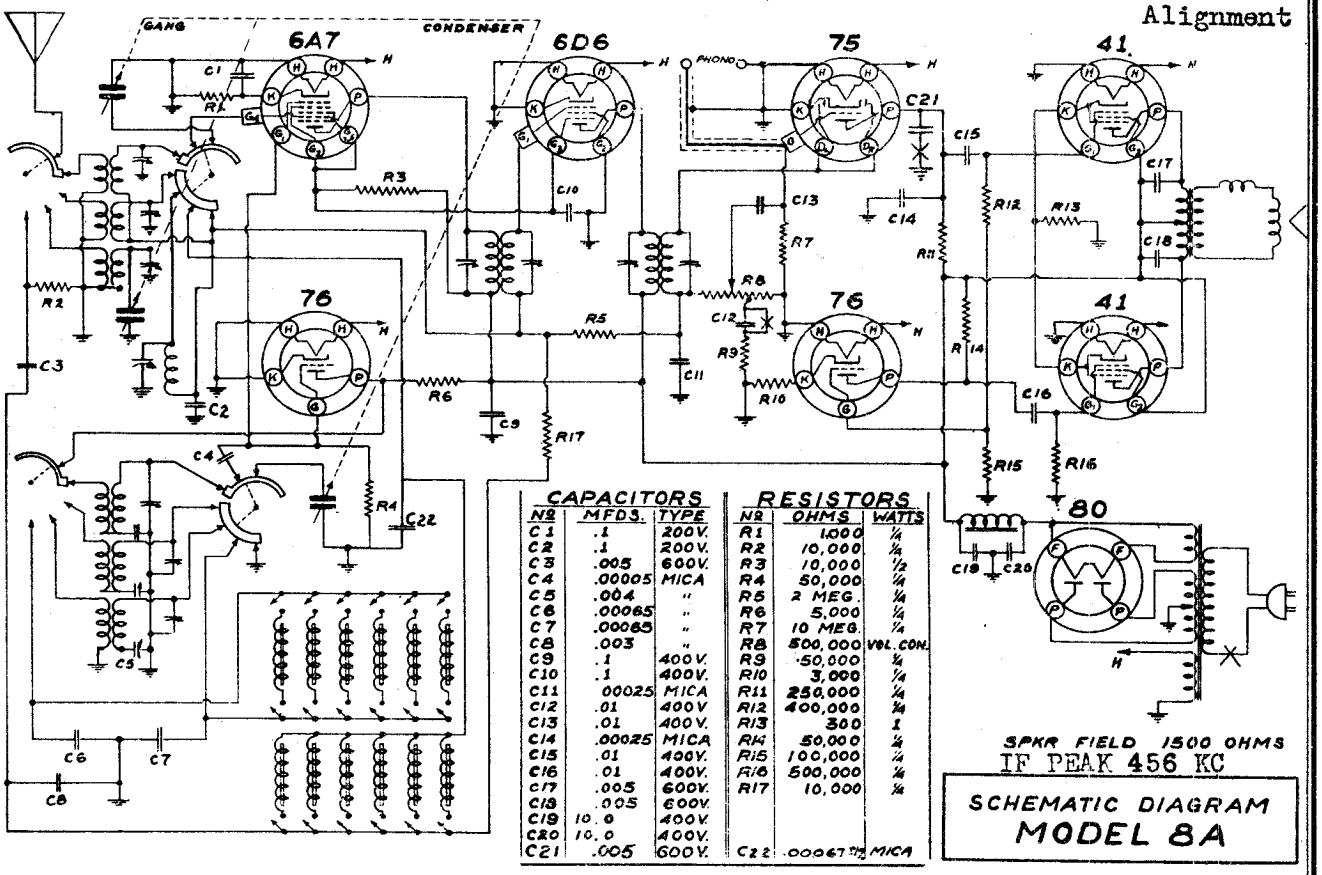
MODEL 8A
Schematic, Alignment

# CONTINENTAL RADIO & TELEV. CO.

MODEL 8AU
MODEL 11A
Alignment




| CAPACITORS | | |
|---|---|---|
| NO | MFDS. | TYPE |
| C1 | .1 | 200V. |
| C2 | .1 | 200V. |
| C3 | .005 | 600V. |
| C4 | .00005 | MICA |
| C5 | .004 | " |
| C6 | .00065 | " |
| C7 | .00065 | " |
| C8 | .003 | " |
| C9 | .1 | 400V. |
| C10 | .1 | 400V. |
| C11 | .00025 | MICA |
| C12 | .01 | 400V |
| C13 | .01 | 400V. |
| C14 | .00025 | MICA |
| C15 | .01 | 400V. |
| C16 | .01 | 400V. |
| C17 | .005 | 600V. |
| C18 | .005 | 600V. |
| C19 | 10. 0 | 400V. |
| C20 | 10. 0 | 400V. |
| C21 | .005 | 600V. |
| C22 | .00067 | MICA |

| RESISTORS | | |
|---|---|---|
| NO | OHMS | WATTS |
| R1 | 1,000 | ½ |
| R2 | 10,000 | ½ |
| R3 | 10,000 | ½ |
| R4 | 50,000 | ¼ |
| R5 | 2 MEG. | ¼ |
| R6 | 5,000 | ½ |
| R7 | 10 MEG. | ¼ |
| R8 | 500,000 | VOL. CON. |
| R9 | 50,000 | ½ |
| R10 | 3,000 | ½ |
| R11 | 250,000 | ½ |
| R12 | 400,000 | ½ |
| R13 | 300 | 1 |
| R14 | 50,000 | ½ |
| R15 | 100,000 | ½ |
| R16 | 500,000 | ½ |
| R17 | 10,000 | ½ |

SPKR FIELD 1500 OHMS
IF PEAK 456 KC

SCHEMATIC DIAGRAM
MODEL 8A

**POWER SUPPLY** This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycles alternating current (AC). Never plug into a DC outlet.

## ALIGNMENT DATA AND SERVICING

**GENERAL DATA** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600, 1400, 1730, 1800, 4000, 5600, 6000, 16,000 and 18,100 KC and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE** The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure, after which, either or both of the Short Wave Bands may be aligned.

**I.F. ALIGNMENT** With the wave switch in the Broadcast Band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6A7) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground if the test oscillator is not grounded to one side of the power line. In case one side is connected to ground, connect a large condenser from ground on the test oscillator to ground of the chassis. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT** Connect the output of the signal generator to the antenna lead (blue) through at .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the "preselector" and "antenna" trimmer to maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver. **Note:** approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the preselector of the R.F. section. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

**POLICE BAND ALIGNMENT** The police band is adjusted by first replacing the .0002 dummy with a 400 ohm resistor and setting the generator to 5600 KC. With the gang set at minimum, adjust the "police oscillator trimmer" to receive this signal, then set the signal generator to 4000 KC and adjust "police antenna trimmer" to give maximum output. Next, set the oscillator to 1800 KC and "pad" the circuit of this frequency as described in the instructions for padding the broadcast circuits.

**SHORT WAVE BAND ALIGNMENT** The short wave band is adjusted by setting the generator to 18,100 KC and with the gang at minimum, adjust the "short wave oscillator trimmer" to receive the signal. Set the generator at 16,000 KC, tune in the signal and adjust the "short wave antenna" trimmer to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and the oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

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MODEL 8A
MODEL 8AU
Parts Socket
Trimmers, Tuner,

CONTINENTAL RADIO & TELEV. CO.

# 8A Eight Tube AC Automatic Tuning 8AU

This receiver is designed to operate over three tuning ranges; the broadcast range which extends from 535 to 1730 K.C. (173 to 560 meters), police and aviation band which extends from 1700 to 5600 K.C. (53 to 176 meters) and the international short wave band which extends from 5600 to 18,100 K.C. (16.5 to 53 meters). This latter range is the one which includes the five internationally assigned bands — the 16, 19, 25, 31, and 49 meter bands.

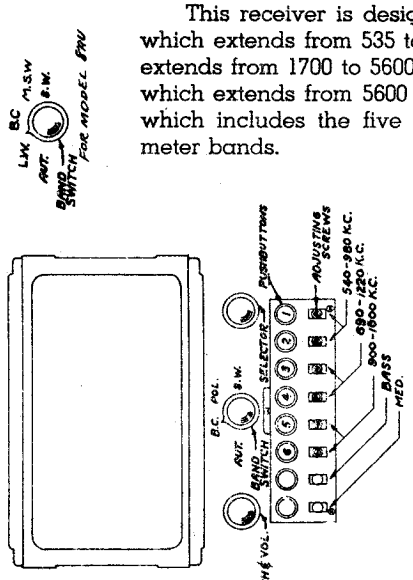



Fig. 1

## PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS

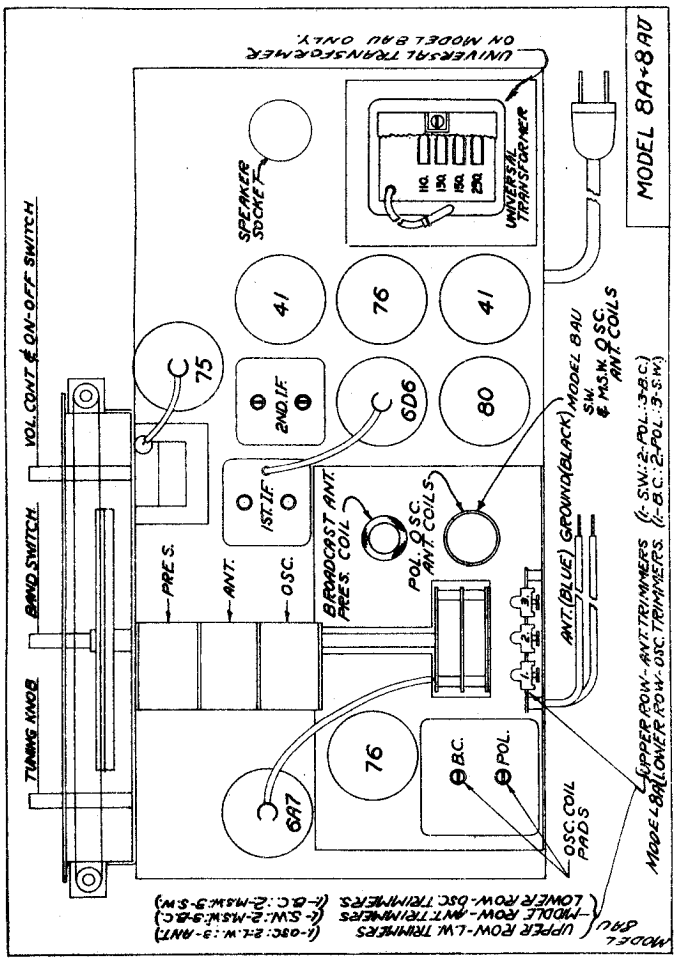
A glance at Fig. 1 will show that there are eight (8) push buttons, six (6) of which are for automatic use; the adjusting screws are located directly below these.

Fig. 1 also shows the tuning range or frequencies covered by each button.

The remaining two (2) push buttons, located at the extreme left hand end of the push button plate are for tone control.

1. Choose a station having a frequency within the range of button No. 1 (540 K.C. to 930 K.C.)
2. With the middle knob in the "broadcast" position, tune this station conventionally by using the selector knob.
3. Now turn the middle knob to the "automatic" position and press button No. 1 and turn the adjusting screw in either direction until the previously selected station is heard. Adjust the screw for maximum volume and sensitivity.
4. Remove the call letters of the station from the call letter sheet furnished and insert in the window of the adjusting screw. Insert "Med" and "Bass" tabs in windows as shown in Fig. 1.
5. Repeat the above procedure for the remaining five (5) stations.

**NOTE:** It is advisable to retain the call letter sheet in case of station change later on.




## REPLACEMENT PARTS LIST
### MODEL 8A

| | | | | | | |
|---|---|---|---|---|---|---|
| | RESISTORS—CARBON | | P480 | .0001 Mfd. | P537 | 76 Tube Socket |
| | 50,000 Ohm ¼ Watt | | P336 | .0005 Mfd. | P536 | 6D6 Tube Socket |
| P417 | 10,000 Ohm ¼ Watt | | | ELECTROLYTIC CONDENSERS | P506 | 6A7 Tube Socket |
| P187 | 250,000 Ohm ¼ Watt | | P2631 | Dual 10 Mfd., 400 W.V. | P521 | 75 Tube Socket |
| P139 | 15,000 Ohm ½ Watt | | | | P945 | Speaker Socket |
| P297 | 3,000 Ohm ¼ Watt | | | ADJUSTABLE CONDENSERS | P2837 | 8" Dynamic Speaker (Mantel) |
| P481 | 400,000 Ohm ¼ Watt 10% | | P2823 | Gang Condenser | P2838 | 10" Dynamic Speaker (Console and Phono.) |
| P2684 | 500,000 Ohm ¼ Watt | | P2656 | Trimmer Strip | | |
| P137 | 300 Ohm 1 Watt 10% | | P2657 | Trimmer Strip | P2659 | Volume Control and Switch |
| P2665 | 1,000 Ohm ¼ Watt 20% | | | | P929 | A.C. Line Cord and Plug |
| P278 | 10,000,000 Ohm ¼ Watt | | | TRANSFORMERS AND COILS | P1455 | Tube Shield |
| P2684 | 100,000 Ohm ¼ Watt 10% | | P2628 | Power Transformer | P1456 | Tube Shield Base |
| P2685 | | | P2630 | 230 Volt Power Transformer | P1503 | Pilot Light Socket |
| | CONDENSERS—PAPER | | P2633 | 1st I.F. Transformer Coil | P1504 | Pilot Light Bulb |
| P164 | .01 Mfd. 400 Volt | | P1756 | 2nd I.F. Transformer Coil | P2836 | Band Switch |
| P1322 | .005 Mfd. 600 Volt | | P1751 | Broadcast Antenna Coil | P897 | Phono. Socket |
| P276 | .10 Mfd. 400 Volt | | G5310 | Police and Short Wave Antenna Coil | P2632 | Dial Scale (Specify Name) |
| P334 | .05 Mfd. 400 Volt | | G5307 | Oscillator Coil, Trimmer and Shield Assembly | P2585 | Walnut Push Buttons |
| P1313 | .01 Mfd. 400 Volt with Strap | | | | P2586 | Ivory Push Buttons |
| P142 | .10 Mfd. 200 Volt | | | | G5762 | Permeability Tuner Assembly |
| | | | | | P2533 | Automatic Record Changer |
| | MICA CONDENSERS | | | MISCELLANEOUS | | |
| P817 | .00025 Mfd. | | | | | |
| P1883 | .004 Mfd. | | P492 | 80 Tube Socket | | |
| P1382 | .00005 Mfd. | | P1277 | 41 Tube Socket | | |
| P336 | .0005 | | | | | |

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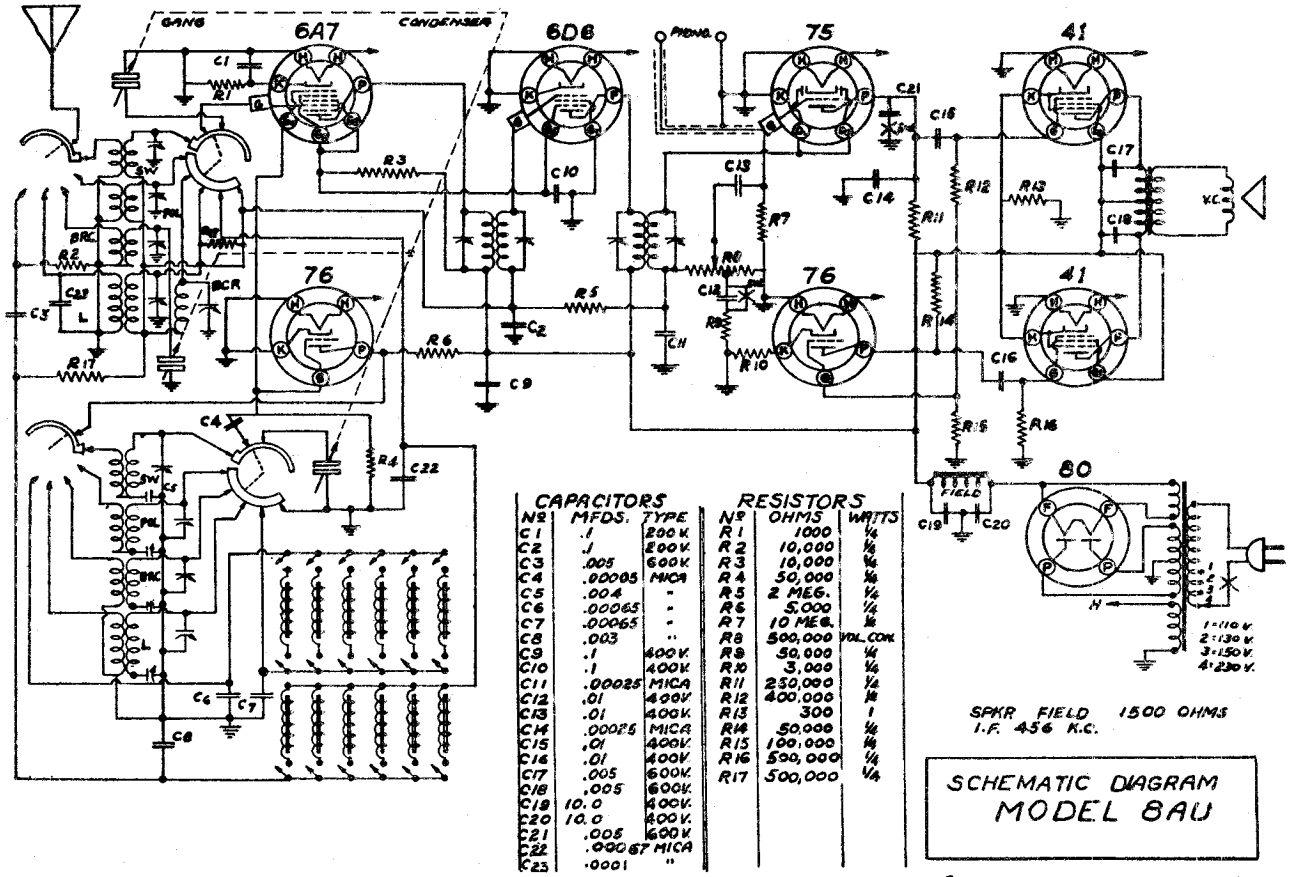
MODEL 8AU
Schematic, Alignment

# CONTINENTAL RADIO & TELEV. CO.




| CAPACITORS | | |
|---|---|---|
| № | MFDS. | TYPE |
| C1 | .1 | 200 V. |
| C2 | .1 | 200 V. |
| C3 | .005 | 600 V. |
| C4 | .00005 | MICA |
| C5 | .004 | " |
| C6 | .00065 | " |
| C7 | .00065 | " |
| C8 | .003 | " |
| C9 | .1 | 400 V. |
| C10 | .1 | 400 V. |
| C11 | .00025 | MICA |
| C12 | .01 | 400 V. |
| C13 | .01 | 400 V. |
| C14 | .00025 | MICA |
| C15 | .01 | 400 V. |
| C16 | .01 | 400 V. |
| C17 | .005 | 600 V. |
| C18 | .005 | 600 V. |
| C19 | 10.0 | 400 V. |
| C20 | 10.0 | 400 V. |
| C21 | .005 | 600 V. |
| C22 | .00067 | MICA |
| C23 | .0001 | " |

| RESISTORS | | |
|---|---|---|
| № | OHMS | WATTS |
| R1 | 1000 | ¼ |
| R2 | 10,000 | ½ |
| R3 | 10,000 | ¼ |
| R4 | 50,000 | ½ |
| R5 | 2 MEG. | ¼ |
| R6 | 5,000 | ¼ |
| R7 | 10 MEG. | ½ |
| R8 | 500,000 | VOL. CONT. |
| R9 | 50,000 | ¼ |
| R10 | 3,000 | ¼ |
| R11 | 250,000 | ½ |
| R12 | 400,000 | ½ |
| R13 | 300 | 1 |
| R14 | 50,000 | ½ |
| R15 | 100,000 | ½ |
| R16 | 500,000 | ¼ |
| R17 | 500,000 | ¼ |

SPKR FIELD 1500 OHMS
I.F. 456 K.C.

SCHEMATIC DIAGRAM
MODEL 8AU

This receiver is designed to operate over four tuning ranges; **long wave** 150 to 350 K.C. (2000 to 857 meters); **broadcast** 535 to 1730 K.C. (173 to 561 meters); **medium short wave band** 2350 to 7100 K.C. (127.6 to 42 meters); **international short wave** 7000 to 22,000 K.C. (13.6 to 42.8 meters), which includes five—5 internationally assigned bands—16, 19, 25, 31 and 49 meter bands.

## PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS

See Model 8A.

## ALIGNMENT

Align I F and Broadcast Bands using the procedure for Model 8A. Using this procedure align Med. S.W. and S.W. Band likewise, using the following frequencies; Med. S.W.,7000 KC Osc. Trimmer,6000Kc Ant. Trimmer,2500 Kc"pad". S.W., 22000 KC S.W.Osc Trimmer, 18000 KC S.W.Ant Trimmer,8000 KC "pad". Align L.W. Band as below;

### LONG WAVE BAND ALIGNMENT

The long wave band is adjusted by connecting the output of the signal generator through a .0002 Mfd. mica condenser to the blue antenna lead. Then set the gang to minimum and the generator to 360 KC and adjust the long wave oscillator trimmer to receive this signal. Then set the generator to 325 KC and adjust the long wave antenna trimmer to give maximum output. Next set generator to 160 KC and pad the circuits to maximum output. Owing to the nature of the long wave band, the trimmer and padding condensers react upon each other to quite a degree; consequently, several re-adjustments at the trimming and padding positions are required before the circuits are adjusted properly.

## PARTS LIST MODEL 8AU

For parts not listed below see Parts List Model 8A.

P2727 6" Dynamic Speaker (Mantel)

TRANSFORMERS AND COILS

P2663 Universal Transformer

MISCELLANEOUS

P2661 Band Switch
P2660 Dial Scale
G5775 Medium Short Wave and Short Wave Antenna Coil
G5774 Oscillator Coil, Trimmer and Shield Assembly
G5777 Long Wave Antenna Coil Assembly

RESISTORS—CARBON

P1114 2,000,000 Ohm ¼ Watt
P2735 5,000,000 Ohm ¼ Watt

MICA CONDENSERS

2701 .005 5%
2702 .0018 3%

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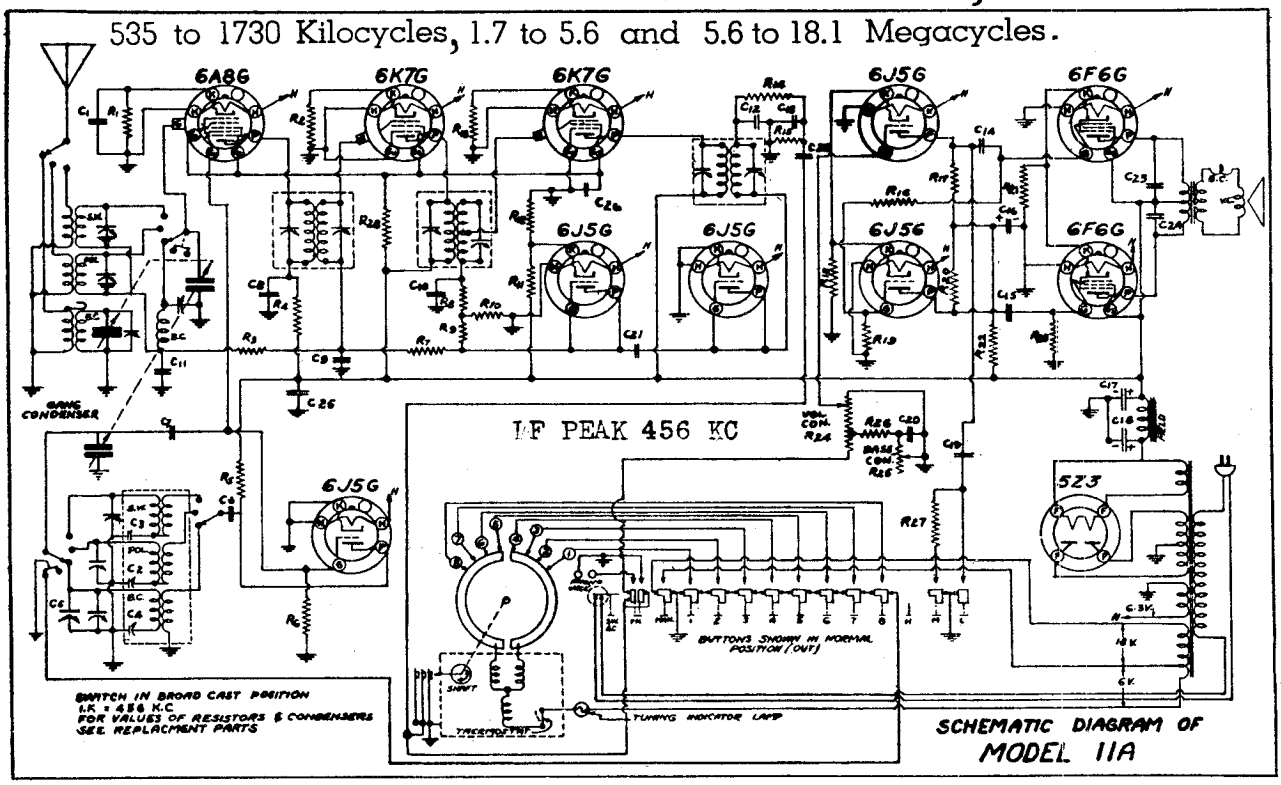
MODEL 11A
Schematic, Socket
Trimmers
Alignment

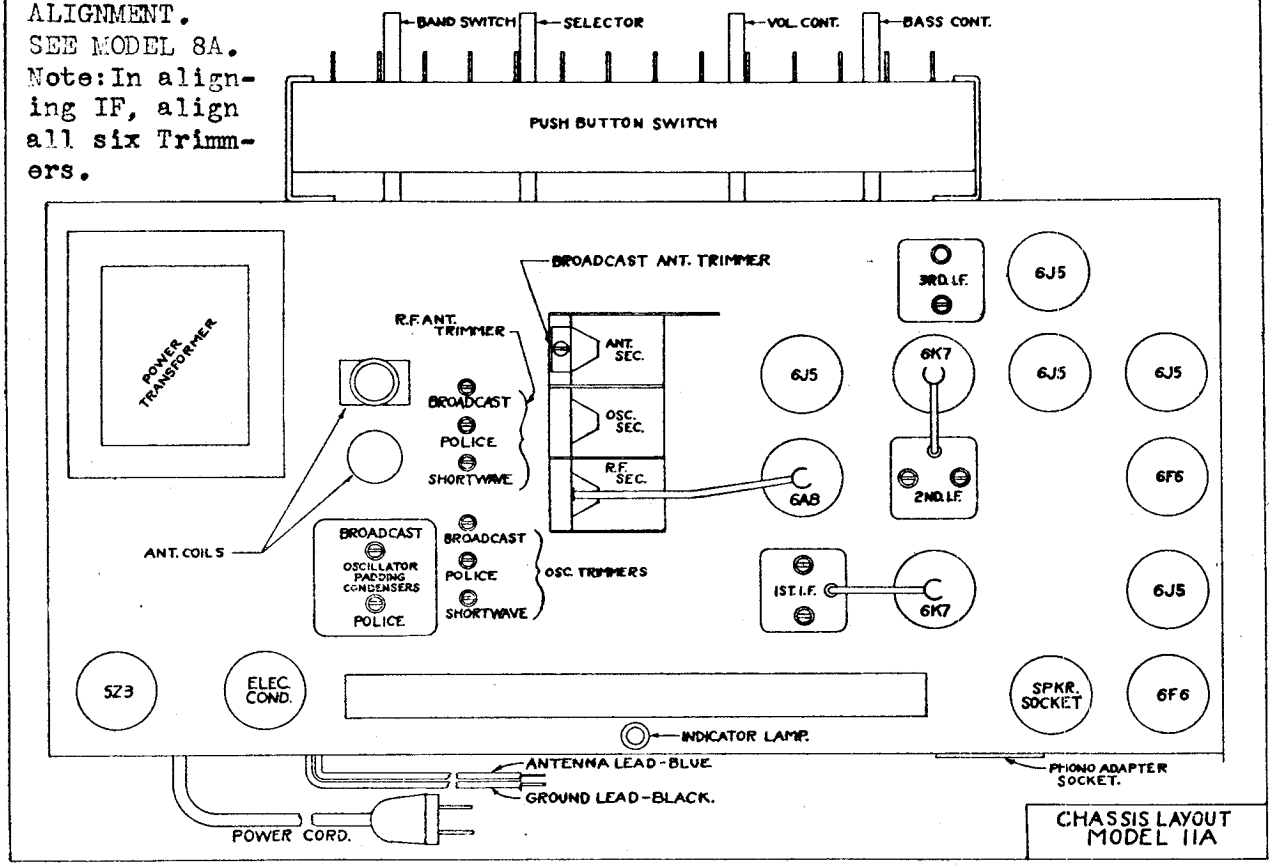
## CONTINENTAL RADIO & TELEV. CO.

This receiver is designed to operate over three tuning ranges; 535 to 1730 Kilocycles, 1.7 to 5.6 and 5.6 to 18.1 Megacycles.




SCHEMATIC DIAGRAM OF MODEL 11A

ALIGNMENT.
SEE MODEL 8A.
Note: In aligning IF, align all six Trimmers.




CHASSIS LAYOUT
MODEL 11A

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MODEL 11A
MODEL 16S
Tuner Data
Parts

CONTINENTAL RADIO & TELEV. CO.

# INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNER

It is very important to read the following instructions carefully before attempting to adjust the electric tuner.
The electric tuner is made up of three integral units:

**PUSH BUTTON SWITCH:** The push button switch consists of eight (8) brown push buttons flanked on either side by three (3) white push buttons.

**SELECTOR MECHANISM:** The selector mechanism is made up of the selector plate, eight (8) thumb screws, and the adjustment light bulb.

**ELECTRIC MOTOR:** The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

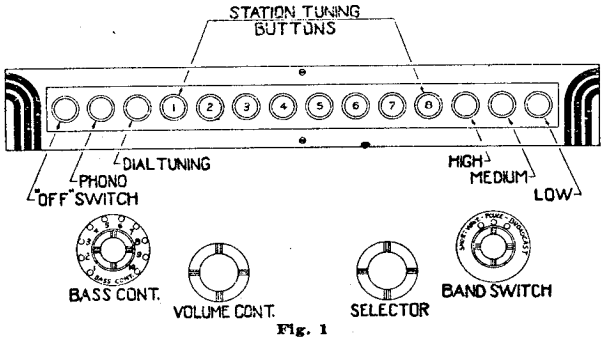


Fig. 1

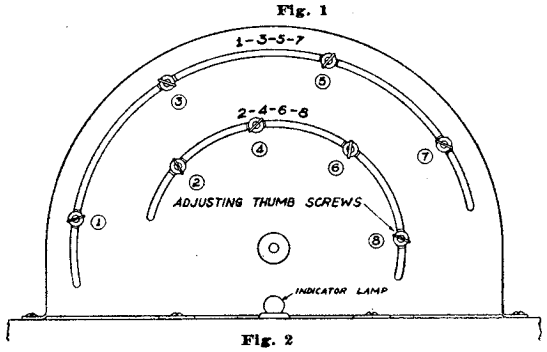


Fig. 2

**SETTING UP STATIONS** The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excess fading. Turn on the receiver (broadcast band) and press in the dial tuning button; tune in the station of the **lowest frequency,** using the station selector knob. Now hold the dial tuning button in and press in button number one (1). (See Figure 1). Both buttons are now locked into place; a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidently happens to be correctly set. Loosen thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station call disc and insert into the recess of button number one. Push one of the clear celluloid discs into the recess also, over the station call disc. Now release button number one by pressing the dial tuning button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two. Both buttons are now locked into place. Loosen thumb screw number two (see Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call disc and celluloid disc into the window of button number two.

Follow this same procedure for the remaining stations, always choosing the station with the next highest frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. Note: In the window above the white button, insert the word "OFF" found in the call letter sheet.

**NOTE:** In the recesses of the white push buttons insert the words found in the call letter sheet as shown in Figure 1.

## HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily—using the electric push button tuner, the dial tuning button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. **Note:** Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above.

To change from electric tuning to manual selecting, simply press in the dial tuning button. When the dial tuning button is in, the set may be tuned as a conventional receiver.

### RESISTORS

| | | |
|---|---|---|
| R 1—P140 | 500 Ohm | ¼ Watt |
| R 2—P1950 | 350 Ohm | ¼ Watt 10% |
| R 3—P139 | 250,000 Ohm | ¼ Watt |
| R 4—P481 | 3,000 Ohm | ¼ Watt |
| R 5—P673 | 10,000 Ohm | ½ Watt |
| R 6—P417 | 50,000 Ohm | ¼ Watt |
| R 7—P137 | 500,000 Ohm | ¼ Watt |
| R 9—P137 | 1,000,000 Ohm | ¼ Watt |
| R11—P2731 | 25,000 Ohm | 1 Watt |
| R12—P278 | 600 Ohm | ¼ Watt |
| R13—P1950 | 350 Ohm | ¼ Watt |
| R14—P417 | 50,000 Ohm | ¼ Watt |
| R15—P139 | 250,000 Ohm | ¼ Watt |
| R16—P1220 | 200,000 Ohm | ¼ Watt |
| R17—P166 | 25,000 Ohm | ¼ Watt |
| R18—P376 | 750 Ohm | ¼ Watt |
| R19—P258 | 15,000 Ohm | ¼ Watt |
| R20—P166 | 25,000 Ohm | ¼ Watt |
| R21—P2732 | 220 Ohm | 2 Watt |
| R22—P167 | 10,000 Ohm | ¼ Watt |
| R23—P139 | 250,000 Ohm | ¼ Watt |
| R24 | Volume Control—2,000,000 Ohms | |
| R25 | Bass Control—1,000,000 Ohms | |
| R26—P1217 | 60,000 Ohm | ¼ Watt |
| R27—P167 | 10,000 Ohm | ¼ Watt |
| R28—P165 | 25,000 Ohm | ¼ Watt |
| R29 | Speaker Field—600 Ohm | |

### TRANSFORMERS AND COILS

| | |
|---|---|
| P2710 | Power Transformer |
| P1930 | 1st I.F. Transformer |
| P2704 | 2nd I.F. Transformer |
| P2711 | 3rd I.F. Transformer |
| G5794 | Oscillator Coil Assembly |
| G5310 | Police and Short Wave Antenna Coil |
| G5347 | Broadcast Antenna Coil |

### PAPER CONDENSERS

| | | | |
|---|---|---|---|
| C 1—P148 | .05 | Mfd. | 200 V. |
| C 2 | Police Band Padder—(.0008—.0016 Mfd.) | | |
| C 4 | Broadcast Band Padder—(.003—.0006 Mfd.) | | |
| C 6—P1322 | .005 | Mfd. | 600 V. |
| C 8—P276 | .1 | Mfd. | 400 V. |
| C 9—P148 | .05 | Mfd. | 200 V. |
| C11—P142 | .1 | Mfd. | 200 V. |
| C14—P334 | .05 | Mfd. | 400 V. |
| C15—P334 | .05 | Mfd. | 400 V. |
| C19—P334 | .05 | Mfd. | 400 V. |
| C20—P1322 | .005 | Mfd. | 600 V. |
| C22—P148 | .05 | Mfd. | 200 V. |
| C23—P1322 | .005 | Mfd. | 600 V. |
| C24—P1322 | .005 | Mfd. | 600 V. |
| C25—P276 | .1 | Mfd. | 400 V. |
| C26—P276 | .1 | Mfd. | 400 V. |
| C28—P148 | .05 | Mfd. | 200 V. |

### MISCELLANEOUS

| | |
|---|---|
| P1928 | Tube Socket |
| P1153 | 5Z3 Socket |
| P945 | Speaker Socket |
| P2705 | Volume Control |
| P2706 | Bass Control |
| G5788 | Band Switch and Lead Assembly |
| P929 | A.C. Line Cord |
| P1455 | Tube Shield |
| P1456 | Tube Shield Base |
| P2716 | 12" Dynamic Speaker |

### MICA CONDENSERS

| | | |
|---|---|---|
| C 3—P1683 | .004 | Mfd. |
| C 7—P480 | .0001 | Mfd. |
| C12—P480 | .0001 | Mfd. |
| C13—P480 | .0001 | Mfd. |
| C21—P1382 | .00025 | Mfd. |
| C27—P480 | .0001 | Mfd. |

### ELECTROLYTIC CONDENSERS

| | | |
|---|---|---|
| C16, C17 | P1939 | Dual Electrolytic |
| C18—P1937 | Electrolytic | |

### ADJUSTABLE CONDENSERS

| | |
|---|---|
| P1918A | Variable Condenser |
| P2743 | Gang Trimmer Strip |
| P1682 | Oscillator Padder Condensers |
| P2694 | Push Button Switch |
| P1503 | Pilot Light Socket |
| P1504 | Pilot Light Bulb |
| P2690 | Electric Motor |
| P2689 | Rubber Drive Belt |
| P2688 | Dial Scale |
| P2644 | Dial Pointer |
| G5462 | Lower Segment Adjustment Bracket and Contact |
| G5463 | Upper Segment Adjustment Bracket and Contact |

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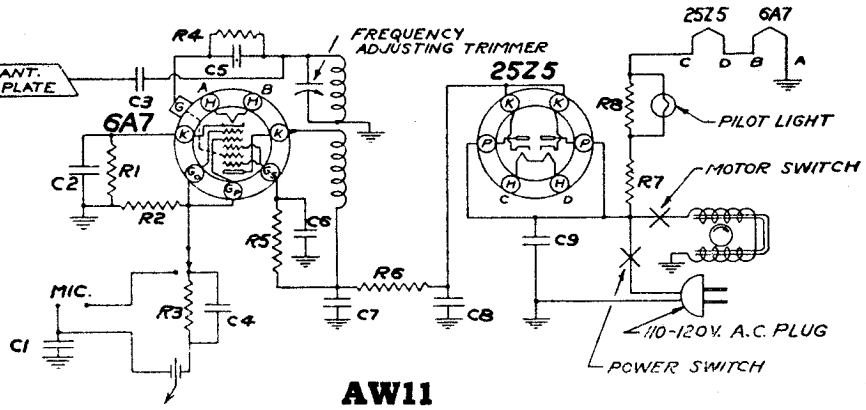
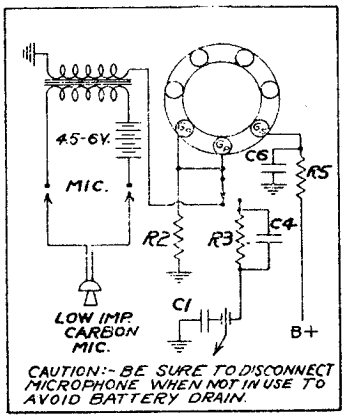
Schematic, Layout Notes

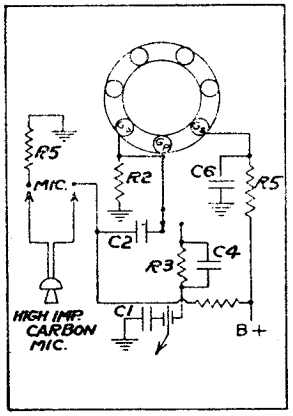
# CONTINENTAL RADIO & TELEV. CO.

MODEL AW11
Wireless Record Player




**AW11**




CONDENSERS

| NO. | MFD. | VOLTS |
|---|---|---|
| C1 | .05 | 200 |
| C2 | .05 | 200 |
| C3 | .00005 | MICA |
| C4 | .0006 | MICA |
| C5 | .0001 | MICA |
| C6 | .05 | 200 |
| C7 | 20. | 110 |
| C8 | 20. | 150 |
| C9 | 1 | 400 |

RESISTORS

| NO. | OHMS | WATTS |
|---|---|---|
| R1 | 700 | 1/4 |
| R2 | 250,000 | 1/4 |
| R3 | 250,000 | 1/4 |
| R4 | 50,000 | 1/2 |
| R5 | 10,000 | 1/4 |
| R6 | 5,000 | 1/4 |
| R7 | 40. COLD | METAL CLAD |
| R8 | 250. | |

## RESISTORS

| | |
|---|---|
| P1952 | 50,000 Ohm ½ Watt Ins. |
| P2344 | 250,000 Ohm ½ Watt Ins. |
| P1381 | 1,000 Ohm ½ Watt Ins. |
| P673 | 10,000 Ohm ½ Watt Ins. |
| P1304 | 5,000 Ohm ½ Watt Ins. |
| P2833 | Candohm Resistor |

## CONDENSERS

| | |
|---|---|
| P276 | .10 Mfd. 400 V. Paper |
| P148 | .05 Mfd. 200 V. Paper |
| P2821 | Electrolytic Condenser |
| P480 | .0001 Moulded Mica |
| P1382 | .00005 Moulded Mica |
| P336 | .0005 Moulded Mica |
| P2826 | Trimmer Condenser |

## MISCELLANEOUS

| | |
|---|---|
| P506 | 6A7 Tube Socket |
| P559 | 25Z5 Tube Socket |
| P2827 | Oscillator Coil |
| P2798 | Motor and Turntable |
| P2828 | Pickup Arm |
| P2800 | Automatic Stop Switch |
| P2615 | Needle Cup |
| P897 | Phono Jack |
| P2829 | Slide Switch |
| P2825 | Power Switch |
| P2831 | Power Switch Knob |
| P2215 | Line Cord |
| P1923 | Pilot Light Socket |
| P1504 | Pilot Light Bulb |
| P2844 | Pickup Rest |

## MICROPHONE

It will be noticed that the unit is provided with a sliding switch to change from phono pickup to microphone. Before attempting to use the **Mic** the switch should be set in the proper position.

The wireless record player unit is shipped from the factory, connected for use with a **Brush** type SM-37 crystal microphone, and **Quam Permanic** microphone. Insert pin tip connectors into microphone jacks. For use with other types of microphones, schematic diagrams are enclosed wherein the necessary wiring changes are shown.

The high impedance carbon microphone is the type usually recommended for home use and is connected in the plate circuit of the audio tube. Such microphones as the Philmore, I.R.C. and others fall into this group.

The low impedance microphones include the single and double button types and are as a rule the most satisfactory for use with the wireless unit. These are usually of a higher grade and are recommended for use when maximum output and tone quality is required. With such a microphone and a receiver having sufficient power output, a very simply installed and effective P.A. system may be had.

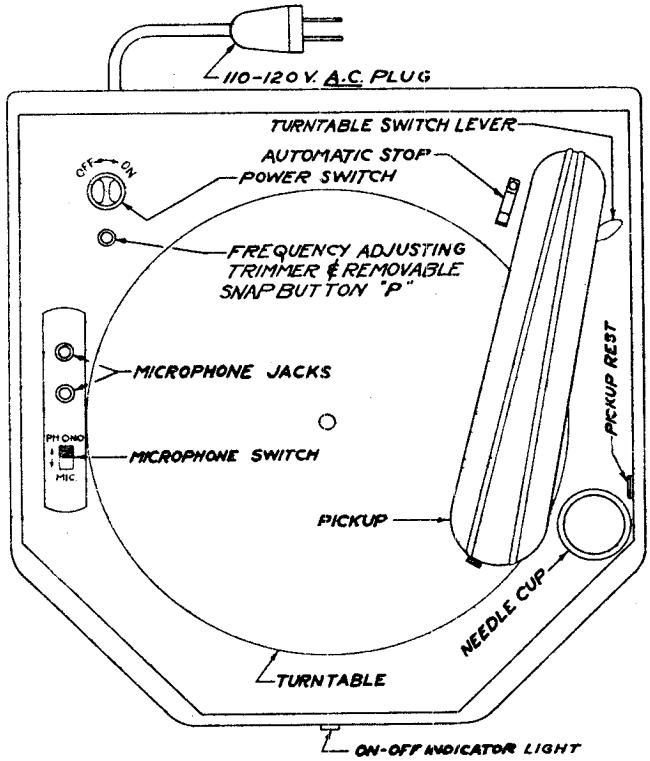



Fig. 1

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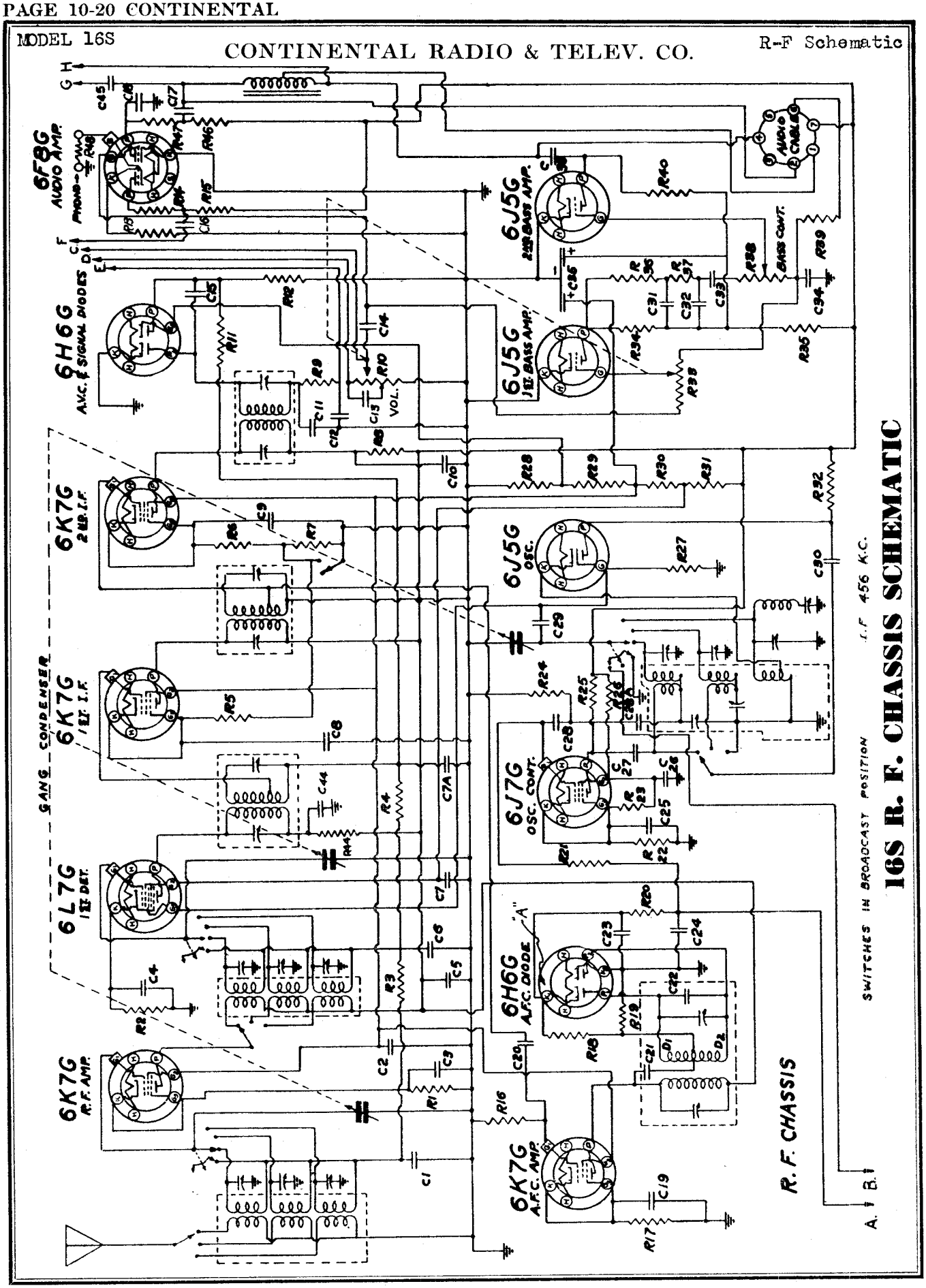
MODEL 16S

CONTINENTAL RADIO & TELEV. CO.

R-F Schematic

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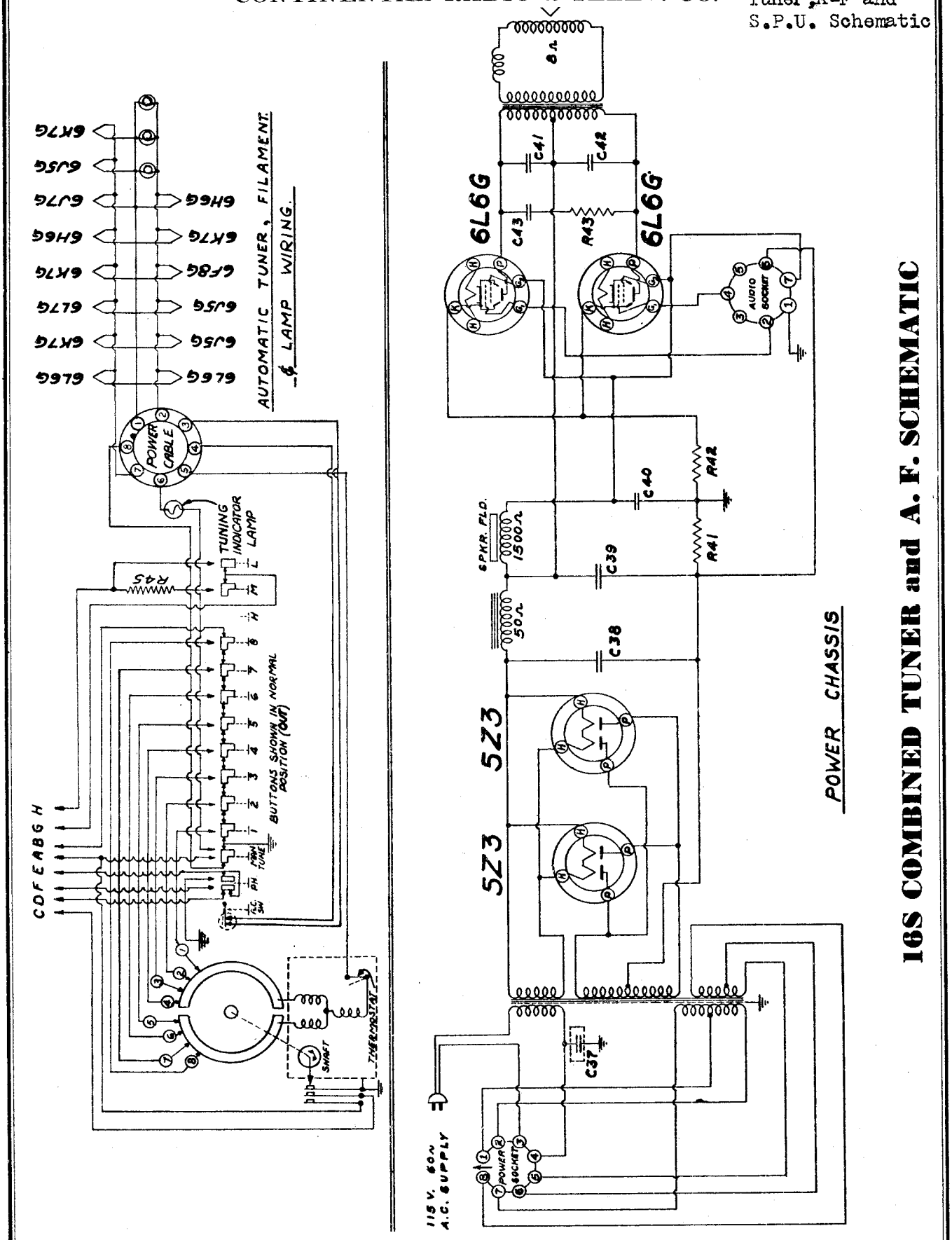
CONTINENTAL RADIO & TELEV. CO.

MODEL 16S
Tuner, A-F and
S.P.U. Schematic

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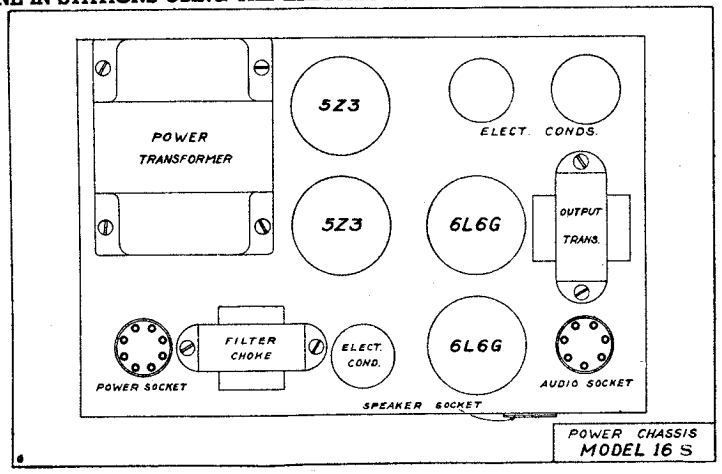
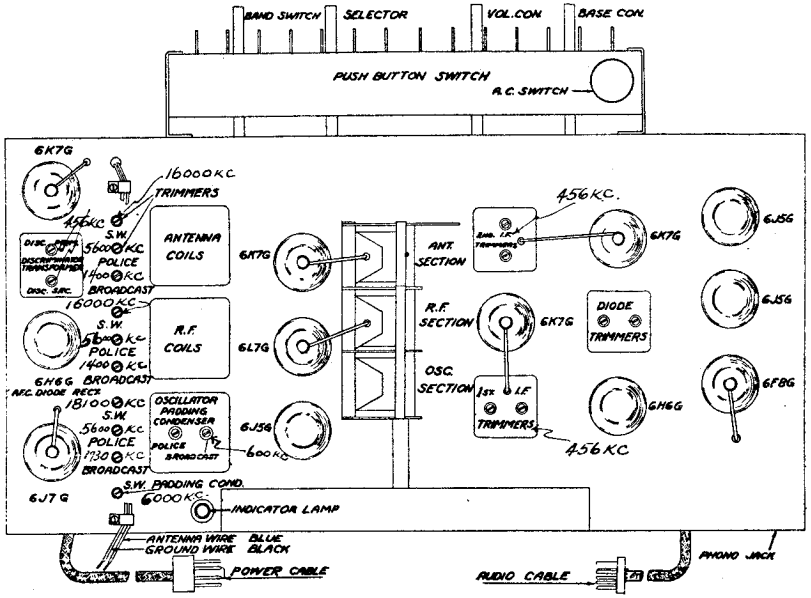
**FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNER AND HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER** SEE MODEL 11A.




## 16S CHASSIS LAYOUT DIAGRAMS




**This receiver** is designed to operate over three tuning ranges with a Horizontal Pointer movement; the broadcast band which extends from 535 to 1730 Kilocycles (KC) (173 to 560 Meters), Police and Aviation Band which extends from 1.7 to 5.6 Megacycles (MC) (53 to 176 Meters) and the International Short Wave Band which extends from 5.6 to 18.1 Megacycles (MC) (16.5 to 53 Meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

This receiver is designed to operate from a power supply main of 110-120 volts, 60 cycle alternating current (AC). **Never plug into a DC outlet.**

**FLOATING CHASSIS (IMPORTANT)** **Loosen the four (4) mounting screws) and two (2) hook bolts that secure the chassis to the cabinet and remove the two (2) wooden strips that are underneath the chassis. This allows the chassis to float and rest on the rubber pads used for this purpose. After the strips have been removed, adjust the chassis in the cabinet so that the dial will be in the center of the front escutcheon plate. Do not retighten the mounting screws. NOTE: Save the mounting screws and wooden strips to use in case the set is reshipped or moved, otherwise damage may be done to the instrument, cabinet or tubes.**

**GROUND** Wherever possible, a good ground should be employed. Water pipes and steam or hot water radiators make a very desirable ground connection. The ground wire should be connected to the ground lead (Black).

Where the above mentioned ground facilities are not available, a good outside ground may be had by sinking a metal pipe or ground rod about six feet into moist earth. An excellent bed can be prepared by digging a hole and filling with charcoal, in which the ground rod is placed. The charcoal bed surrounding the ground rod will maintain a moist condition throughout the year.

## REPLACEMENT PARTS LIST 16S

CARBON RESISTORS

| | | |
|---|---|---|
| R 1-P1729 | 750 Ohm | ¼ Watt 10% |
| R 2-P2020 | 700 Ohm | ¼ Watt 10% |
| R 3-P280 | 100,000 Ohm | ¼ Watt |
| R 4-P280 | 100,000 Ohm | ¼ Watt |
| R 5-P376 | 750 Ohm | ¼ Watt |
| R 6-P1729 | 750 Ohm | ¼ Watt 10% |
| R 7-P2019 | 600 Ohm | ¼ Watt 10% |
| R 8-P1216 | 5,000 Ohm | ¼ Watt |
| R 9-P419 | 20,000 Ohm | ¼ Watt |
| R10-P1989 | 250,000 Ohm | Volume Control |
| R11-P137 | 500,000 Ohm | ¼ Watt |
| R12-P137 | 500,000 Ohm | ¼ Watt |
| R13-P756 | 2,000 Ohm | ¼ Watt |
| R14-P167 | 10,000 Ohm | ¼ Watt |
| R15-P419 | 20,000 Ohm | ¼ Watt |
| R16-P1114 | 2,000,000 Ohm | ¼ Watt |
| R17-P1729 | 750 Ohm | ¼ Watt 10% |
| R18-P137 | 500,000 Ohm | ¼ Watt |
| R19-P137 | 500,000 Ohm | ¼ Watt |
| R20-P1114 | 2,000,000 Ohm | ¼ Watt |
| R21-P137 | 500,000 Ohm | ¼ Watt |
| R22-P2024 | 1,100 Ohm | ¼ Watt 5% |
| R23-P2021 | 25,000 Ohm | ½ Watt 10% |
| R24-P1950 | 350 Ohm | ¼ Watt 10% |
| R25-P166 | 25,000 Ohm | ¼ Watt |
| R26-P1215 | 35,000 Ohm | 1 Watt |
| R27-P417 | 50,000 Ohm | ¼ Watt |
| R28-P2022 | 450 Ohm | ¼ Watt 10% |
| R32-P165 | 25,000 Ohm | 1 Watt |
| R33-P1989 | 500,000 Ohm | Bass Boost on Volume Control |
| R34-P166 | 25,000 Ohm | ¼ Watt |
| R35-P673 | 10,000 Ohm | ½ Watt |
| R36-P167 | 10,000 Ohm | ¼ Watt |
| R37-P419 | 20,000 Ohm | ¼ Watt |
| R38-P1991 | 500,000 Ohm | Bass Control |
| R39-P137 | 500,000 Ohm | ¼ Watt |
| R40-P166 | 25,000 Ohm | ¼ Watt |
| R43-P1944 | 15,000 Ohm | 2 Watt |
| R44-P278 | 1,000 Ohm | ¼ Watt |
| R45-P167 | 10,000 Ohm | ¼ Watt |
| R46-P166 | 25,000 Ohm | ¼ Watt |
| R47-P2018 | 7,000 Ohm | ¼ Watt 10% |
| R48-P137 | 500,000 Ohm | ¼ Watt |

PAPER CONDENSERS

| | | |
|---|---|---|
| C 1-P334 | .05 Mfd. | 400 V. |
| C 2-P141 | .25 Mfd. | 200 V. |
| C 3-P142 | .1 Mfd. | 200 V. |
| C 4-P142 | .1 Mfd. | 200 V. |
| C 5-P1789 | .25 Mfd. | 400 V. |
| C 6-P334 | .05 Mfd. | 400 V. |
| C 7-P142 | .1 Mfd. | 200 V. |
| C7A-P334 | .05 Mfd. | 400 V. |
| C 8-P142 | .1 Mfd. | 200 V. |
| C 9-P142 | .1 Mfd. | 200 V. |
| C10-P334 | .05 Mfd. | 400 V. |
| C14-P334 | .05 Mfd. | 400 V. |
| C16-P334 | .05 Mfd. | 400 V. |
| C17-P1789 | .25 Mfd. | 400 V. |
| C19-P142 | .1 Mfd. | 200 V. |
| C23-P142 | .1 Mfd. | 200 V. |
| C24-P142 | .1 Mfd. | 200 V. |
| C25-P142 | .1 Mfd. | 200 V. |
| C26-P276 | .1 Mfd. | 400 V. |
| C27-P904 | .002 Mfd. | 600 V. |
| C31-P334 | .05 Mfd. | 400 V. |
| C32-P276 | .1 Mfd. | 400 V. |
| C33-P276 | .1 Mfd. | 400 V. |
| C34-P141 | .25 Mfd. | 200 V. |
| C36-P1789 | .25 Mfd. | 400 V. |
| C37-P2030 | .02 Mfd. | 600 V. Metal Clad |
| C41-P904 | .002 Mfd. | 600 V. |
| C42-P904 | .002 Mfd. | 600 V. |
| C43-P1079 | .01 Mfd. | 1000 V. |
| C44-P334 | .05 Mfd. | 400 V. |
| C45-P334 | .05 Mfd. | 400 V. |

MICA CONDENSERS

| | | |
|---|---|---|
| C11-P480 | .0001 | Mfd. |
| C12-P480 | .0001 | Mfd. |
| C13-P817 | .00025 | Mfd. |
| C15-P1382 | .00005 | Mfd. |
| C18-P336 | .0005 | Mfd. |
| C20-P672 | .001 | Mfd. |
| C21-P480 | .0001 | Mfd. |
| C28-P672 | .001 | Mfd. |
| C28A-P1044 | .0002 | Mfd. |
| C29-P480 | .0001 | Mfd. |
| C30-P818 | .002 | Mfd. |

CANDOHM RESISTORS

| | | |
|---|---|---|
| R29 | | 2400 Ohms |
| R30 | P2013 | 2250 Ohms |
| R31 | | 2260 Ohms |
| R41 | P2010 | 150 Ohms |
| R42 | | 31 Ohms |

ELECTROLYTIC CONDENSERS

| | | | | |
|---|---|---|---|---|
| C35 | 4 | 100 W. V. | Dry |
| | 4 | 250 W. V. | |
| C38 | 25 | 450 W. V. | |
| C39 | 12 | 450 W. V. | Wet |
| C40 | 25 | 300 W. V. | |

ADJUSTABLE CONDENSERS

| | |
|---|---|
| P1980A | Variable Condensers |
| P1682 | Trimmer Condenser (Osc.) |
| P2009 | 4 Gang Trimmer Strip |
| P2008 | 3 Gang Trimmer Strip |

TRANSFORMERS AND COILS

| | |
|---|---|
| P2000 | Power Transformer |
| P2001 | 1st I.F. Transformer |
| P2002 | 2nd I.F. Transformer |
| P2003 | 3rd I.F. Transformer |
| P1940 | Discriminator Coil |
| G5494 | Oscillator Coil Assembly |
| G5497 | R.F. Coil Assembly |
| G5499 | Antenna Coil Assembly |
| P2005 | Iron Core Filter Choke |
| P2006 | Iron Core Audio Choke |
| P2007 | Output Transformer |
| G5501 | Tracking Coil |

MISCELLANEOUS

| | |
|---|---|
| P1928 | Tube Socket |
| P1153 | 5Z3 Tube Socket |
| P945 | Speaker Socket |
| P2014 | Cable Socket |
| P929 | A.C. Line Cord |
| P1988 | Power Cable |
| P1987 | Audio Cable |
| P1989 | Volume Control |
| P1991 | Bass Control |
| P1986 | Band Change Switch |
| G5793 | Electric Tuner Cable |
| P2017 | 12" Dynamic Speaker |
| P1504 | Pilot Light Bulb |
| P1503 | Pilot Light Socket |
| P1455 | Tube Shield |
| P1456 | Tube Shield Base |
| P2694 | Push Button Switch |
| P2689 | Rubber Drive Belt |
| P2688 | Dial Scale |
| P2644 | Dial Pointer |
| P2532 | Tilt Escutcheon |
| P2619 | Push Button Escutcheon |
| P2698 | Bass Control Escutcheon |
| P2699 | Band Switch Escutcheon |
| G5462 | Lower Segment Adjustment Bracket and Contact |
| G5463 | Upper Segment Adjustment Bracket and Contact |
| P2690 | Electric Motor |
| P2677 | Ivory Push Button Knob |
| P2678 | Walnut Push Button Knob |
| P2720 | Band Switch Knob and Bass Control Knob |
| P2721 | Selector Knob |
| P2722 | Volume Control Knob |

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# CROSLEY CORP.

MODEL 438,438M,486 Phono.
Chassis,Voltage,Alignment
Drive Data,Phono.Data,Tuner

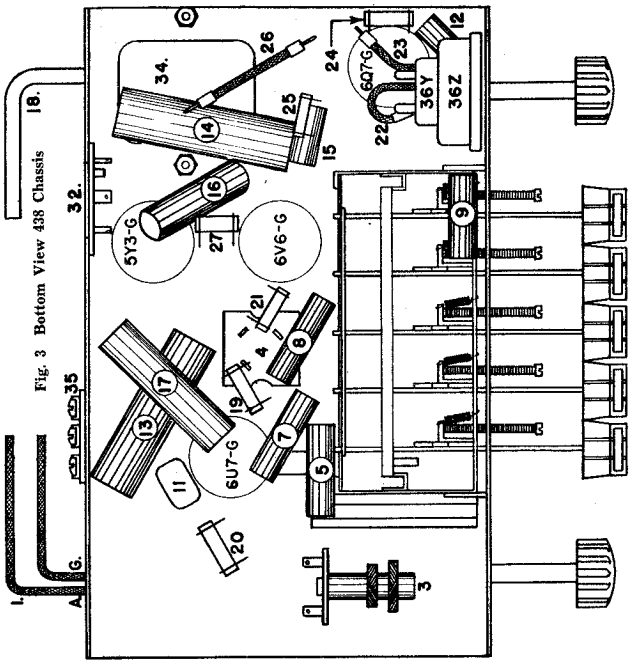


Fig. 3 Bottom View 438 Chassis

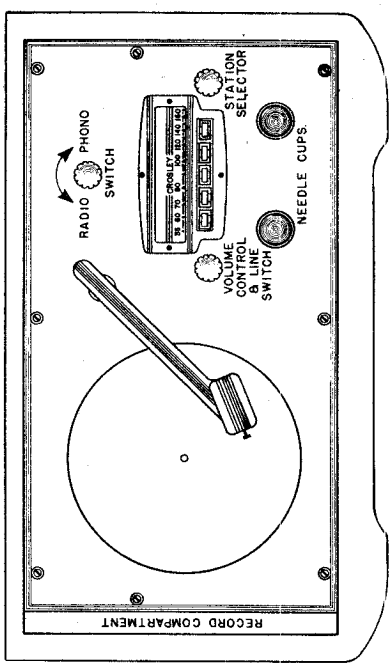


Fig. 4 Top View — Combination

TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | K | G | Su |
|---|---|---|---|---|---|---|---|
| 6U7G | Amplifier | 6.7 | 175 | 100 | — | -3 | — |
| 6Q7G | Det., A. V. C., 1st. A-F | 6.7 | 78 | — | -3 | -1.5 | — |
| 6V6G | Output | 6.7 | 172 | 178 | — | -10. | — |
| 5Y3G | Rectifier | 4.1 | negative end of spk. field to No. 8 pin 225 volts | | | | |

Voltage drop across speaker field 40 volts.
Maximum power output approximately 3. Watts
Power consumption at 117.5 line approx. 36 watts. Phono—15 watts additional.

| Item No. | | |
|---|---|---|
| 10 | Deleted | Was Capacity Coupling (Twisted Leads) |

**MODEL 438-M**
**Chassis 438 — Phono Assy. 486**

FOR SCHEMATIC SEE INDEX

**OCTOBER, 1938**

## SPECIFICATIONS

This model combination consists of a four-tube T. R. F. radio receiver and Record Player in a console cabinet, designed for operation on electric circuits as specified on the Model and License Notice Label.

Incorporated in the receiver design is, a mechanical Push Button tuning system, an iron cored antenna coil with antenna to match, A.V.C., beam power output and dynamic speaker.

The frequency range of the receiver is from 1725 to 540 kilocycles. The tubes used and their function are as follows: one 6U7G as R-F amplifier, one 6Q7G as detector, A.V.C. and 1st audio amplifier, one 6V6G as beam power and one 5Y3G as rectifier.

The bias for the 6U7G is obtained from the voltage drop across a 60 ohm resistor (item 22) and is measured from the chassis to the Cathode of the 6Q7G. The bias for the 6Q7G is obtained from the drop across a 32 ohm resistor (item 23) and is measured from the cathode of the 6Q7G to the junction of items 23 (32 ohm)—24 (3 meg) and 26 (140 ohm). The 6V6G bias is obtained from the total drop across items 22 (60 ohm., 23 (32 ohm) and 26 (140 ohm) resistors which are in series with the speaker field that is in the negative leg of the power supply. The bias is measured from chassis to the junction of items 26, 27 and speaker field.

## CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 6V6G output tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd., or larger—not electrolytic) in series with one of the leads.

## ALIGNMENT PROCEDURE

The signal generator high side should be connected to the antenna through a .0001 Mf. condenser, after the antenna has been completely uncoiled. The low side of the signal generator is connected to chassis.

(a) First check to see that the pointer makes a complete trip both ways.
(b) Set the signal generator to 1400 kilocycles.
(c) Set the pointer of receiver to 140 on the dial.
(d) Adjust trimmer condensers on the gang for maximum output.
(e) Check to see that set will tune to 1725 kilocycles, it does not have to tune through a peak at this frequency.

Any large discrepency in tracking may be compensated for by slight adjustments of the split end plates of the condenser gang.

Check Push Buttons to see if they need resetting.

## SETTING THE PUSH BUTTONS

The push buttons may be quickly and accurately set from the front of the receiver. Insert a small screw driver in the whole in the front of each push button to be set and loosen (DO NOT REMOVE) the set screw at the bottom of the hole.

Determine the favorite broadcasting stations whose call letters are to be placed in the push buttons. By means of the station selector knob, tune-in AS ACCURATELY AS POSSIBLE the station having the highest frequency (kilocycles), that is the one nearest the 150 marking on the knob. Completely depress and hold the right hand push button in that position, while you SECURELY TIGHTEN THE SET SCREW.

The push button system is now set for the first station. Follow through with this same procedure, setting the other stations in the order of their frequency (kilocycles.)

Cut the call letters of the stations selected, from the list supplied with your receiver and press them into the openings in the front of the push buttons. Four pieces of clear celluloid are supplied in a small envelope and should be snapped into place over the call letters to protect and hold them in place.

## REPLACING DRIVE CORD

1.—Remove the chassis from the cabinet.

2.—Remove the broken drive cord, first from the pointer then from the pulleys. Remove the cord tension spring.

3.—Remove the dial (glass and mask) and the manual tuning shaft bracket.

4.—Cut a piece of drive cord 44 inches in length (G2-41582).

5.—Tie the cord tension spring approximately 1½ inches from the one end of the cord. Open gang condenser, this should place the eyelet in the pulley up. Insert the end of the cord through eyelet, from the inside of pulley. Hook end of the tension spring on the catch in pulley, opposite the eyelet.

6.—Bring the cord forward and down, then around lower idler pulley, (on gang bracket) on the underside, continue over to the left hand idler pulley. Bring around and over in a clockwise direction. Continue on over to top of right hand idler pulley, then straight down to and around pulley on drive shaft. Make two complete turns around drive shaft pulley in a clockwise direction. Then bring cord up and over top idler pulley on gang bracket, making ½ turn in a counter clockwise direction. Continue cord straight down then back and around large pulley on the gang, in a counter clockwise direction to eyelet. Insert end of cord through eyelet (top down). Pull cord until tension spring is stretched to about ¾ inches in length. Loop cord in tension spring and tie in knot. Clamp cords together with cord clamp (W-46290) **approximately** ⅛ inch from inside rim of large pulley.

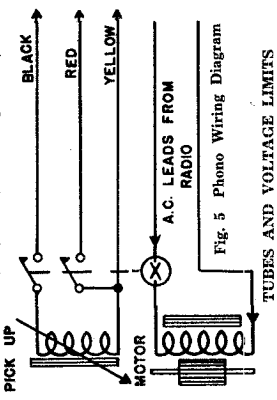


Fig. 5 Phono Wiring Diagram

## TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

7.—Replace manual drive shaft bracket, dial mask and dial.

8.—Close condenser gang, place pointer at 540 on dial and then insert drive cord in pointer. Check pointer travel before cementing the cord to pointer.

## PHONO

The motor is mounted in such a manner that it will swing up and down a short distance. The reason for this is, that when the turntable is in operating position the weight of the motor is applied to the friction drive and against the inside surface of the turn-table rim. The amount of friction obtained is just right for proper operation. When placing the turn-table in position, first hook the rim over the friction drive on the motor shaft then carefully place the center hole in the turn-table on the record guide (spindle). During this operation you should be very careful to see that the friction drive is completely under the rim and that the turn-table is all the way down on the record guide (spindle).

The Radio-Phono Switch (Fig. 4) when turned to the left is for radio broadcast reception and when turned to the right cuts off the radio signals and starts the phonograph motor.

The Volume Control and Line Switch of the receiver must be turned on before the motor will operate. This volume control also controls the output level of the phonograph.

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MODEL 448 Combination
Socket, Trimmers, Voltage
Alignment, Phono. Data, Tuner

# CROSLEY CORP.

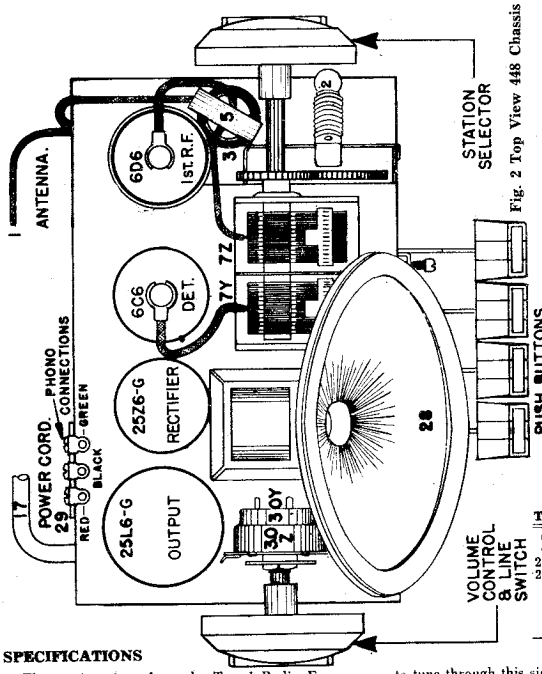


Fig. 2 Top View 448 Chassis

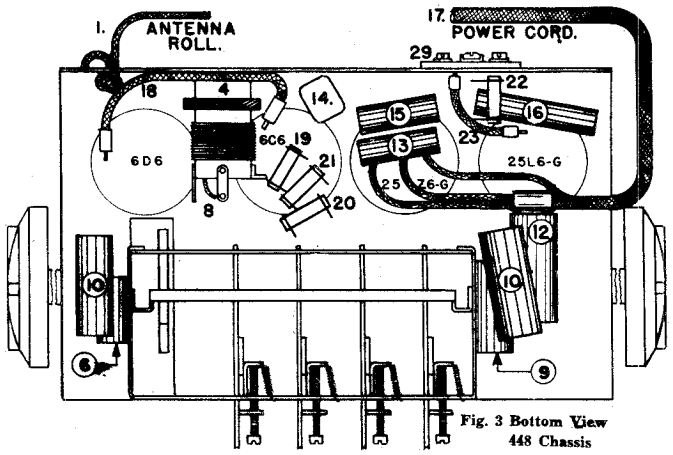


Fig. 3 Bottom View 448 Chassis

**TUBE SOCKET VOLTAGE READINGS**

| Tube | Function | H | P | S | K | Su | G |
|---|---|---|---|---|---|---|---|
| 6D6 | R-F Amplifier | 6.3 | 97 | 98 | 2.5-25 | 2.5-25 | — |
| 6C6 | Detector | 6.3 | 20 | 10 | 7 | — | — |
| 25L6-G | Output | 25 | 85 | 98 | 6 | — | — |
| 25Z6-G | Rectifier | 25 | — | — | 126 | — | — |

Power output approximately 2 watts.
Power consumption at 117.5 volts line 45 watts. Phono. Motor 15 watts additional.
Drop across field 28 volts.

## SPECIFICATIONS

The receiver is a four-tube Tuned Radio Frequency receiver designed for operation on A. C. circuits as specified on Model Sticker. Push Button tuning, Beam power output, Dynamic Speaker are a few of the features incorporated in this receiver. The frequency range is from 1725 to 540 Kc. The tubes used and their functions are as follows: one 6D6 as R-F amplifier, one 6C6 as biased detector, one 25L6G as beam power output and one 25Z6G as rectifier. The volume control varies the bias on the 6D6 and at the same time the amount of signal fed to the antenna coil primary. The bias for the 6C6 is obtained from the voltage drop across item 19 (25000 ohm resistor) and for the 25L6G from the drop across item 23 (110 ohm resistor).

This receiver incorporates a certain amount of fixed regeneration to improve selectivity and sensitivity. With a normal antenna the receiver is stable and the performance approaches that of a three gang T. R. F. receiver in spite of the fact that only a two gang condenser is used. However with no antenna or a very small antenna the receiver will oscillate but this oscillation can readily be controlled by the volume control.

## TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

NOTE: The RED and BLACK terminals on the phono terminal board supply the current for the phono motor, therefore HAVE 110 VOLTS ACROSS THEM WHEN THE RECEIVER IS IN OPERATING POSITION. BE CAREFUL NOT TO TOUCH OR SHORT CIRCUIT THEM WHILE WORKING ON THE CHASSIS.

## CONNECTING OUTPUT METER

Connect the one terminal of the output meter to the plate and the other terminal to the screen of the 25L6G Output tube. Be sure the output meter is protected from D. C. by connecting a condenser (.1 mfd. or larger —NOT electrolytic) in series with one of the leads.

## ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power line, therefore when using an A. C. operated signal generator for alignment the following precaution should be taken.

(a) Connect the output lead of the signal generator through a .0001 Mf. condenser to the antenna lead on the receiver (after the antenna has been completely unrolled. The ground lead of the generator should be connected through a .001 Mf. condenser to the chassis.
(b) Open the gang condenser all the way.
(c) Set the generator to 1725 Kilocycles.
(d) Adjust the trimmer condensers on the gang until the 1725 Kc signal is heard. The gang does not have to tune through this signal.
(e) Set the generator to 1400 Kc.
(f) Tune the set to the 1400 Kc. signal, then alternately adjust the trimmers on the gang until no further improvement can be noticed on the output meter.

NOTE: Always use the lowest signal generator output that will give a reasonable indication on the output meter.

Keep the two grid leads as far as possible from each other.

If the receiver has been re-aligned it may be necessary to readjust the setting of the push buttons.

## SETTING THE PUSH BUTTONS

The push buttons may be quickly and accurately set from the front of the receiver. Insert a small screw driver in the hole in the front of each push button to be set and loosen (DO NOT REMOVE) the set screw at the bottom of the hole.

Determine the favorite broadcasting stations whose call letters are to be placed in the push buttons. By means of the station selector knob, tune-in AS ACCURATELY AS POSSIBLE the station having the highest frequency (kilocycles), that is the one nearest the 150 marking on the knob. Completely depress and hold the right hand push button in that position, while you SECURELY TIGHTEN THE SET SCREW.

The push button system is now set for the first station. Follow through with this same procedure, setting the other stations in the order of their frequency (kilocycles).

Cut the call letters of the stations selected, from the list supplied with your receiver and press them into the openings in the front of the push buttons. Four pieces of clear celluloid are supplied in a small envelope and should be snapped into place over the call letters to protect and hold them in place.

## RECORD PLAYER ASSEMBLY

The record player assembly consists of a small self-starting motor, Phono-Radio switch, magnetic pickup and a separate volume control mounted on a metal base plate.

**Connections—**

A three lead cable is used for connecting the Phono Unit to the Radio receiver. The green lead is the high side of the magnetic pickup and is connected to the 6C6 cathode through a .25 Mf. 160 V. condenser. The red lead is the high side of the 110 volt circuit for the motor. The black lead is connected to the receiver chassis and is the low side of the pickup and motor.

**Operation—**

Place turn table in position by hooking the rim over the rubber friction drive on the motor shaft, then carefully placing center hole over record guide spindle. Be sure that the table is all the way down on the spindle and that the friction drive is riding full on the inside surface of the rim.

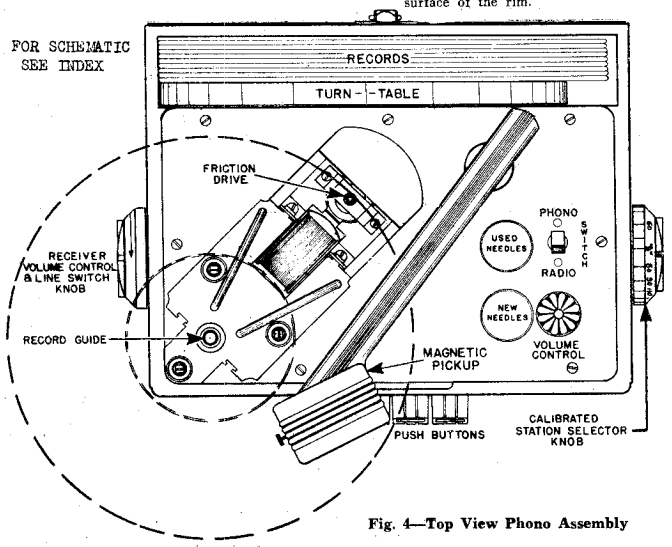


Fig. 4—Top View Phono Assembly

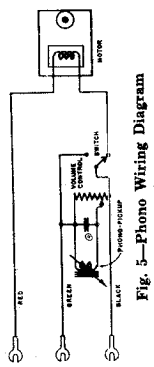


Fig. 5—Phono Wiring Diagram

MODEL 448 COMBINATION
OCTOBER, 1936

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# CROSLEY CORP.

MODEL 458, Battery Vanity
Schematic, Socket, Trimmers
Voltage, Chassis

| Tube | Function | H | P | S | G | Ga | Go |
|---|---|---|---|---|---|---|---|
| 1A7-G | Oscillator-Modulator | 1.5 | 82 | 43 | 0 | 82 | –6 |
| 1N5-G | I-F Amplifier | 1.5 | 82 | 82 | 0 | — | — |
| 1H5-G | Detector & 1st A-F Amp. | 1.5 | 17 | — | 0 | — | — |
| 1C5-G | Output | 1.5 | 78 | 82 | 8* | — | — |

Power Output approximately .5 Watt.
"A" Battery Drain approximately .25 Ampere at 1.5 Volts.
"B" Battery Drain approximately 9 Milliamperes at 90 Volts.
*Measured at No. 8 Socket Lug and Chassis.

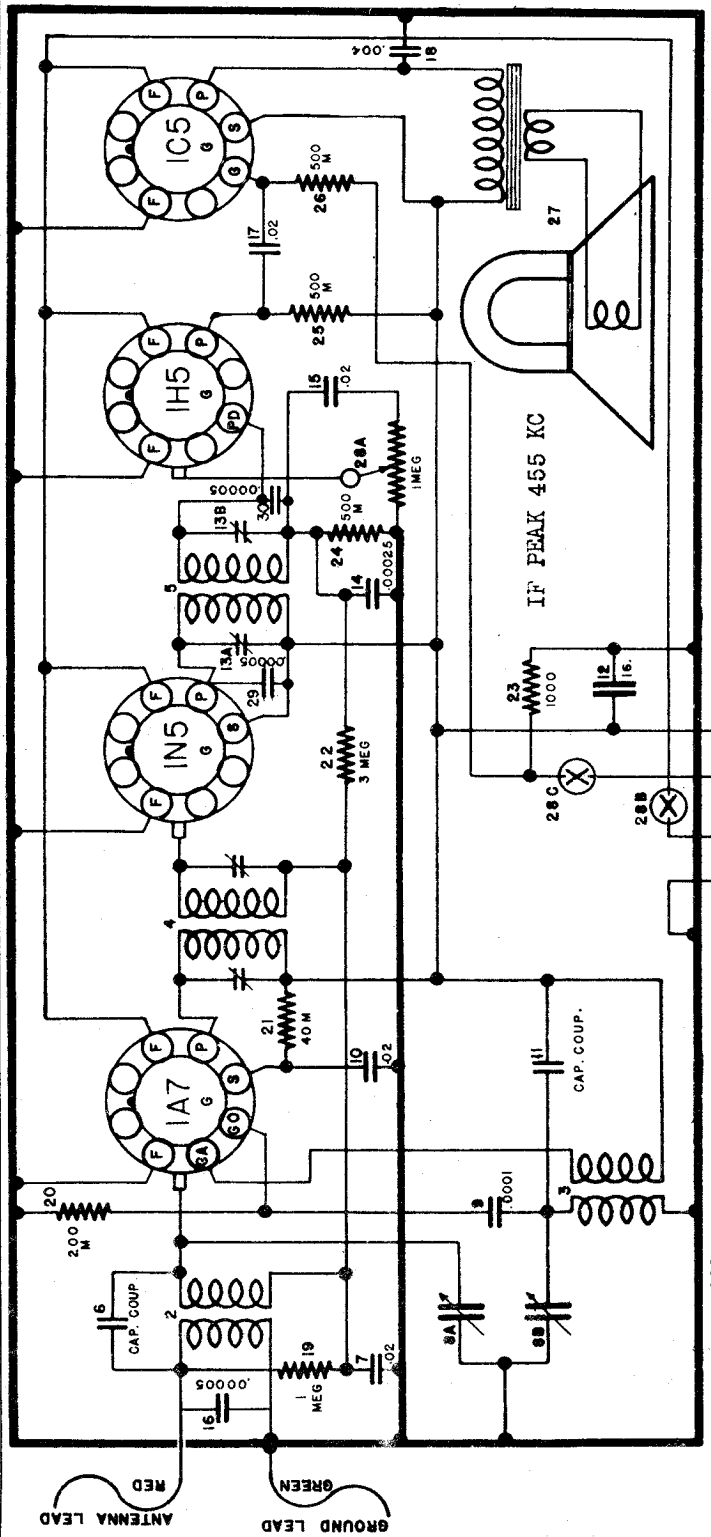


FIG. 1—WIRING DIAGRAM—MODEL 458

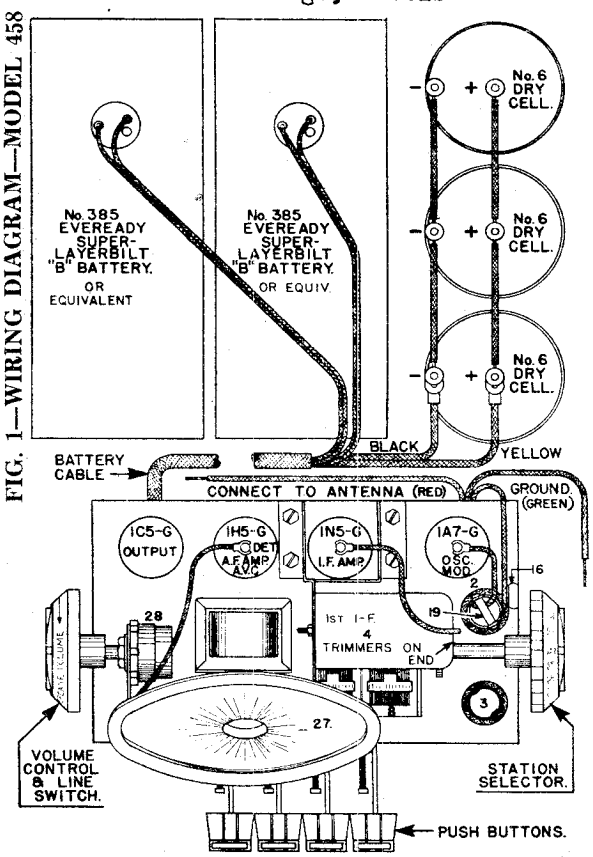


Fig. 2—Top View 458

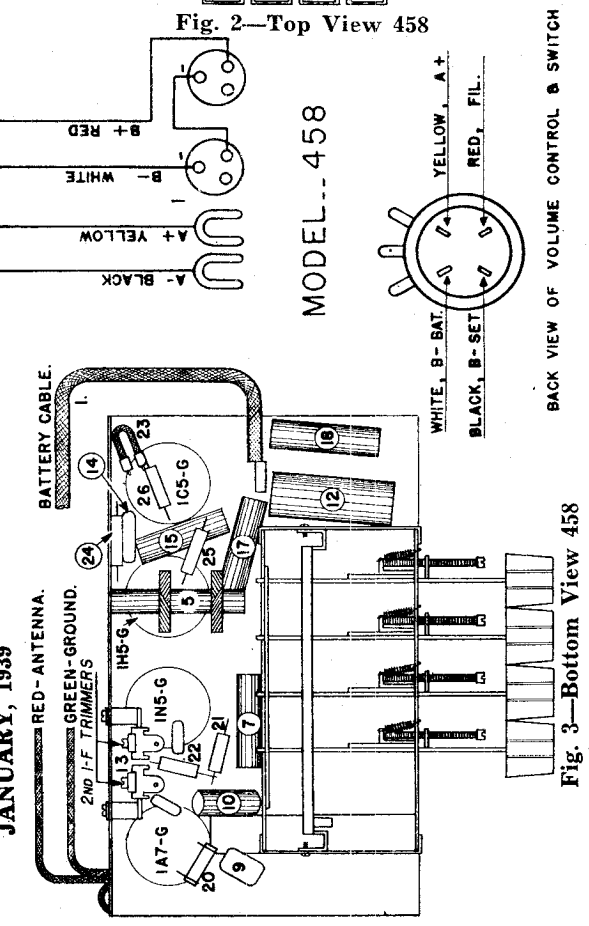


Fig. 3—Bottom View 458

JANUARY, 1939

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MODEL 458,Battery Vanity
Alignment,Tuner,Notes
Parts

CROSLEY CORP.

## MODEL 458 (Battery Vanity)

### SPECIFICATIONS

The Crosley Model 458 radio is a four-tube superheterodyne receiver designed for operation from batteries. The method of connecting the battery cable to the batteries is shown on the Wiring Diagram. The batteries required are: one 1.5 volt "A" (EVEREADY NO. 740 or equivalent) or 3 or 4 No. 6 DRY CELLS in parallel, and two plug-in type 45 volt "B" batteries.

### TUBES AND VOLTAGE LIMITS

The table gives the function of the tubes used, together with the voltage readings between the tube socket contacts and the negative side of the "A" battery circuit. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with receiver in operating condition and the volume control full on and no signal input. The filament voltages should be measured with an accurate low range DC voltmeter (approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

### ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary, the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

### CONNECTING OUTPUT METER

Connect the output meter across the "P" and "S" terminals of the 1C5G output tube. Be certain that the meter is protected from DC by connecting a condenser (.1 mfd. or larger---not electrolytic) in series with one of the leads.

**1. Tuning I-F Amplifier To 455 Kilocycles.**

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 1A7G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely in mesh and turn the volume control knob to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust both 2nd I-F trimmers (located through rear of chassis flange) for maximum reading on the output meter. (Fig. 3).

(e) Adjust both trimmers located on the 1st I-F transformer (right end) for maximum output. (Fig. 2).

(f) Check operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

**2. Aligning R-F Amplifier.**

When aligning the R-F amplifier the output lead from the signal generator should be connected through a .0002 mfd. condenser to the "ANT" terminal of the receiver.

(a) Set the signal generator to 1725 kilocycles.

(b) Open the condenser gang all the way.

(c) Adjust the "OSC" trimmer condenser on gang for maximum output.

(d) Set the signal generator to 1400 kilocycles.

(e) Tune the receiver to the generator signal for maximum output (approximately 140 on the dial).

(f) Adjust the "ANT" trimmer condenser on gang for maximum output. DO NOT READJUST THE "OSC" TRIMMER AT 1400 KILOCYCLES.

(g) Repeat operations (e) and (f) alternately until no further improvement in output can be obtained.

If any of the circuits have been re-adjusted it may be necessary to reset the push buttons.

### SETTING THE PUSH BUTTONS

With a small screw driver or pen knife remove celluloid cover and the call letters. Insert screw driver in the hole in the front of the button and loosen the set screw a turn or two. With the manual tuning knob tune-in as ACCURATELY AS POSSIBLE the station for which the button is to be set. Then push the button all the way down and while you hold it in that position SECURELY TIGHTEN the set screw. Replace the call letter and call letter cover. Use same procedure in resetting or adjusting the rest of the push buttons.

Figures in first column refer to parts in Diagrams.

| Item No. | Part No. | Description |
|---|---|---|
| 1 | C —46433A | Battery Cable |
| 2 | G176—32000 | Antenna Coil |
| 3 | G177—32002 | Oscillator Coil |
| 4 | G194—32004 | 1st I.F. Transformer |
| 5 | G204—32004 | 2nd I.F. Transformer |
| 6 | G6 —50640 | Condenser Capacity Coupling |
| 7 | W —28621 | Condenser, .02 Mf. 200 V. Paper |
| 8A | G65 —33001 | Var. Condenser, Antenna Section |
| 8B | | Var. Condenser, Oscillator Section |
| 9 | G2 —34002 | Condenser, .0001 Mf. Molded |
| 10 | W —28621 | Condenser, .02 Mf. 200 V. Paper |
| 11 | G3 —50640 | Capacity Condenser Coupling |
| 12 | W —45783 | Condenser, 16 Mf. 125 V. Elect. |
| 13A | W —44882 | Trimmer Condenser |
| 13B | | Trimmer Condenser |
| 14 | G1 —34002 | Condenser, .00025 Mf. Molded |
| 15 | W —28621 | Condenser, .02 Mf. 200 V. Paper |
| 16 | G5 —34002 | Condenser, .00005 Mf. Molded |
| 17 | W —28621 | Condenser, .02 Mf. 200 V. Paper |
| 18 | W —28904 | Condenser, .004 Mf. 200 V. Paper |
| 19 | —21454 | Resistor, 1 Megohm ⅓W. Carbon |
| 20 | —34018 | Resistor, 200,000 Ohm ⅓W. Carbon |
| 21 | —36761 | Resistor, 40,000 Ohm ⅓W. Carbon |
| 22 | —36688 | Resistor, 3 Megohm ¼W. Carbon |
| 23 | W —35581 | Resistor, 1,000 Ohm ⅜W. Flexible |
| 24 | —36322 | Resistor, 500,000 Ohm ¼W. Carbon |
| 25 | —36322 | Resistor, 500,000 Ohm ¼W. Carbon |
| 26 | —36322 | Resistor, 500,000 Ohm ¼W. Carbon |
| 27 | 274-PL-5-"B" | Speaker, Spec. 55PWS1 (P. M.) |
| | —47083 | Cone and V. C. Assy. |
| | —47084 | Output Transformer |
| | —46685 | Cardboard Ring |
| 28A | —46435 | Volume Control, 1 Megohm |
| 28B | | "A" Supply Switch |
| 28C | | "B" Supply Switch |
| | —46259 | Cabinet 8BB |
| | —45825A | Knob, Volume Control |
| | —45822 | Knob, Dial |
| W | —45931A | Rubber Foot and Screw |
| | —45553B | Push Button |
| W | —45852A | Baffle Board |
| W | —45852 | Grille Cloth |
| | —50841 | Call Letter Sheet |
| W | —50551A | Call Letter Cover |
| W | —45930C | Rubber Foot |
| | —46450 | Instructions |
| G26 | —45683 | Riveted Key Assy. |
| G27 | —45683 | Rocker Plate Assy. |
| W | —50542C | Key Clip (Lock Clamp) |
| W | —50561 | No. 6 x 40 x ⅛" Fil. Hd. Screw, Rocker Plate Bearing |
| W | —50547 | Key Plate |
| W | —50607C | Push Button Spring |
| | —45717 | No. 6 x 32 x 1 7/16" Fil. Hd. Screw, Clamp Adjusting |
| | —31388 | No. 8 x 32 x 3/16" H. H. Mach. Screw, Key Plate Mounting Screw |
| | —2046 | No. 8 Shakeproof Washer, Key Plate Screw |

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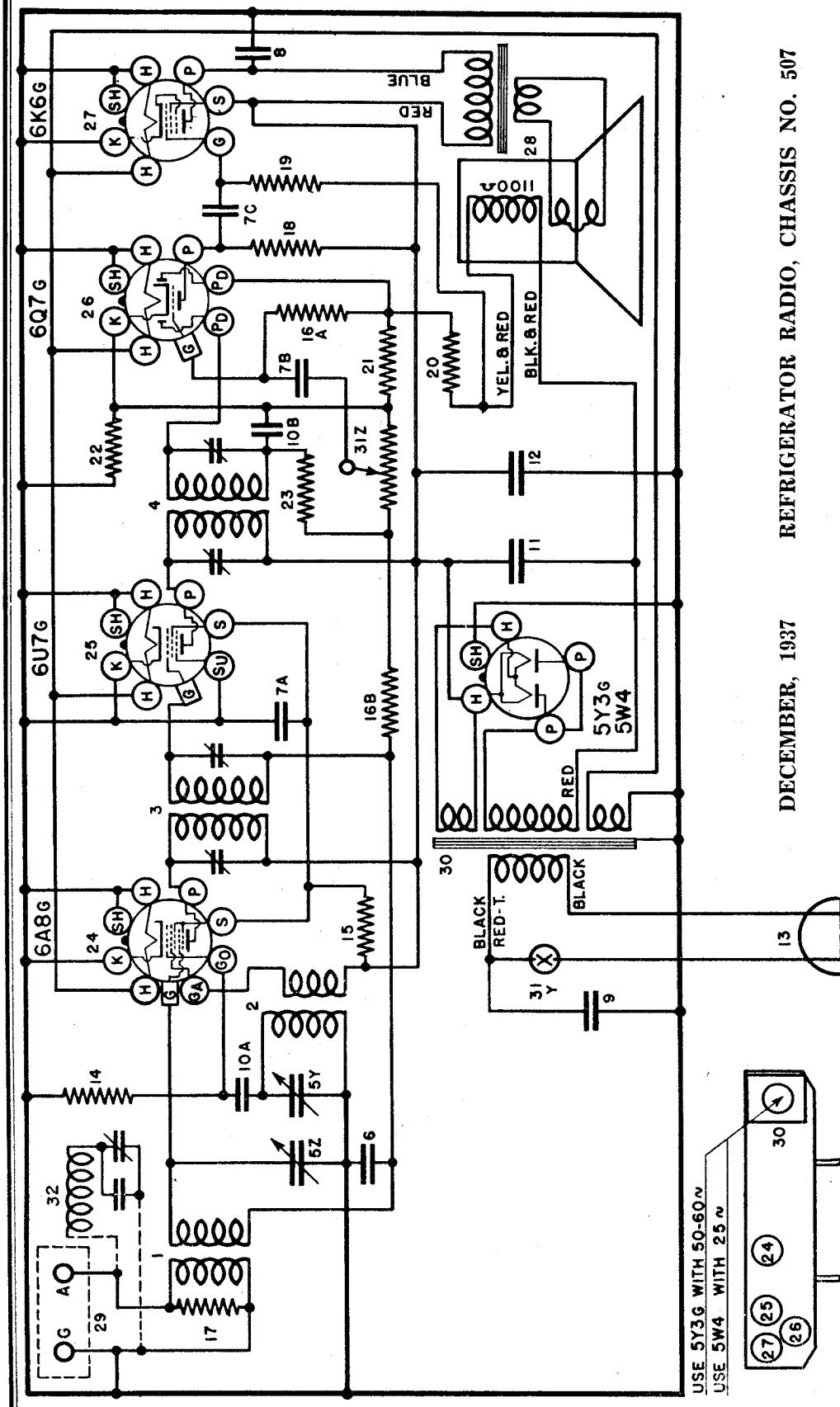
CROSLEY CORP.

MODEL 507
Schematic
Voltage
Socket




DECEMBER, 1937 REFRIGERATOR RADIO, CHASSIS NO. 507

TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | K | G | Ga |
|---|---|---|---|---|---|---|---|
| 6A8G | Oscillator-Modulator | 6.3 | 160 | 115 | 0 | -1.2 | 160 |
| 6U7G | 1-F Amplifier | 6.3 | 160 | 115 | 0 | -1.2 | — |
| 6Q7G | Diode Det & A-F Amplifier | 6.3 | 80 | — | 2.5 | -2.5 | — |
| 6K6G | Output | 6.3 | 160 | 160 | 0 | -5.0 | — |
| 5Y3 | Rectifier | 5.0 | — | — | 225 | — | — |

Power output approximately 2 watts.
Power consumption approximately 40 watts at 117.5 volts.
Voltage drop across speaker field 36 volts.

MODEL 507-20-40 455 Kc. I.F.

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MODEL 507
Trimmers, Chassis
Alignment, Parts

# CROSLEY CORP.

## SPECIFICATIONS

This model Crosley radio chassis is especially designed for installation in Crosley Shelvador electric refrigerators. It should be operated only from an ALTERNATING CURRENT power supply as specified on the rear of the receiver.

The tuning range of the receiver is from 540 to 1725 kilocycles or 555 to 173 metres.

## TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between tube socket contacts and chassis. Voltage readings taken with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Voltage limits may vary plus or minus 10% of values given.

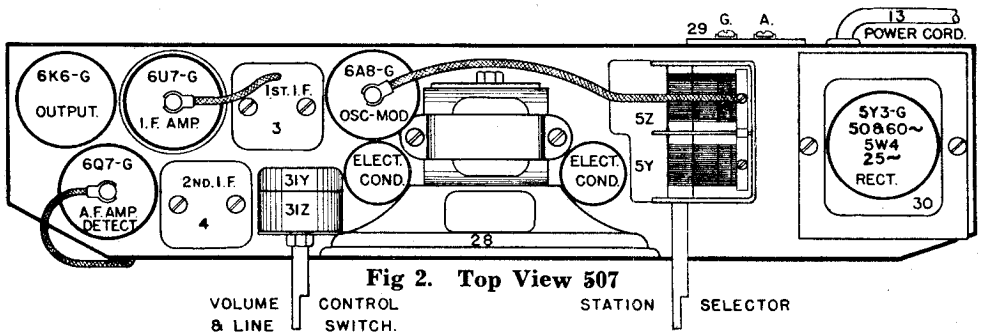


Fig 2. Top View 507

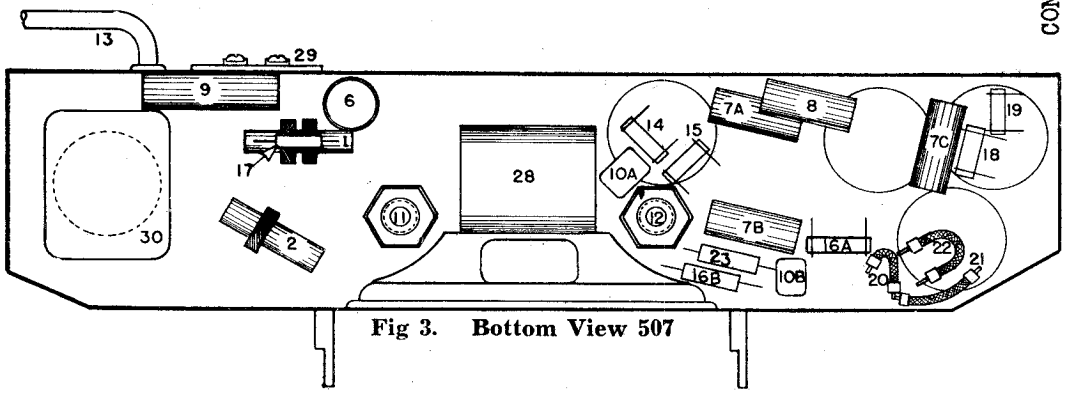


Fig 3. Bottom View 507

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.
Connect output meter across "P" and "S" of 6K6G tube.
IF Generator 455 kc through .02 cond. to 6A8Grid cap. Gen. gnd. to receiver gnd. Variable out of mesh. Vol. control (ON).
Adjust 2nd and 1st IF trimmers to maximum output.
RF Gen. at 1725 kc through .0002 cond to Ant. terminal. Variable out of mesh. Adjust osc trimmer (33Y) for max. out.
Gen. 1400 kc. Dial 1400 kc. Adjust ant trimmer(33Z) max. out.

## PARTS LIST—MODEL 507

Figures in first column refer to parts in Diagrams.

| Item No. | Part No. | Description |
|---|---|---|
| 1 | G132—32000 | Ant. Coil |
| 2 | G132—32002 | Osc. Coil |
| 3 | G177—32004 | 1st I-F. |
| 4 | G178—32004 | 2nd I-F. |
| 5 | G48 —33001 | 2 Section Gang Cond. |
| | W —45368B | Pointer Shaft |
| | W —45367 | Pointer Shaft Bracket |
| | —41582 | Drive Cord (9-inch) |
| | W —44635 | Tension Spring |
| | W —45155B | Pointer |
| 6 | W —36541 | Condenser, .02 Mf. 160 V. |
| 7A | W —28621 | Condenser, .02 Mf. 200 V. |
| 7B | W —28621 | Condenser, .02 Mf. 200 V. |
| 7C | W —28621 | Condenser, .02 Mf. 200 V. |
| 8 | W —34647 | Condenser, .006 Mf. 400 V. |
| 9 | W —30805 | Condenser, .01 Mf. 400 V. |
| 10A | G1 —34002 | Condenser, .00025 Mf. Molded |
| 10B | G1 —34002 | Condenser, .00025 Mf. Molded |
| 11 | W —44012 | Condenser, 16 Mf. 250 V. |
| 12 | W —43450 | Condenser, 16 Mf. 200 V. |
| 13 | B —44867 | Power Cord and Plug |
| 14 | —21237A | Resistor, 60,000 Ohm ⅓W. Carb. |
| 15 | —24990 | Resistor, 25,000 Ohm ⅓W. Carb. |
| 16A | —26577 | Resistor, 3 Megohm ⅓W. Carb. |
| 16B | —26577 | Resistor, 3 Megohm ⅓W. Carb. |
| 17 | —22196 | Resistor, 20,000 Ohm ⅓W. Carb. |
| 18 | —35601 | Resistor, 300,000 Ohm ¼W. Insu. |
| 19 | —23785 | Resistor, 500,000 Ohm ⅓W. Carb. |
| 20 | W —25937 | Resistor, 275 Ohm ½W. Flex. |
| 21 | W —23012A | Resistor, 40 Ohm ¾W. Flex. |
| 22 | W —24357 | Resistor, 75 Ohm ¾W. Flex. |
| 23 | —36761 | Resistor, 40,000 Ohm ¼W. Insu. |
| 24 | G156—36400 | Socket, Type 6A8 |
| 25 | G171—36400 | Socket, Type 6U7 |
| 26 | G160—36400 | Socket, Type 6Q7 |
| 27 | G172—36400 | Socket, Type 6K6 |
| | W —40911 | Tube Shield (6U7-G) |
| 28 | 275BL7"B" | Speaker |
| | —45467 | V. C. and Cone Assy. |
| 29 | G1 —26719 | Ant. and Gnd. Terminal Assy. |
| 30 | —45149 | Power Trans., 50-60 Cy.—110 V. |
| | —45148 | Power Trans., 25 Cy.—110 V. |
| 31 | —45162 | Vol. Cont. (1 Meg.) and Line Switch |
| 32 | G165—32004 | Wave Trap |
| | W —45198A | Speaker Screen |
| | C —45173A | Escutcheon |
| | W —45380 | Knob (2 Req.) |
| | W —45157 | Chassis Mtg. Brkt. |
| | C —45158B | Chassis Bottom Cover |
| | W —45401 | Support Angle—to Brkt. on Spkr. |
| | W —45402B | Support Brkt.—to Spkr. Stud |
| | W —23880 | Thumb Screw—Sup. Angle Mtg. |

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CROSLEY CORP.

MODEL 568, Trouper
Schematic, Voltage, Chassis
Socket, Trimmers

## TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | K | Su | G |
|---|---|---|---|---|---|---|---|
| 6K7GT | R-F Amplifier | 6.3 | 97 | 98 | 2.5–25 | 2.5–25 | — |
| 6 J7GT | Detector | 6.3 | 20 | 10 | 7 | — | — |
| 25 L6GT | Output | 25 | 85 | 98 | 6 | — | — |
| 25 Z6GT | Rectifier | 25 | — | — | 126 | — | — |
| W-46416 | Ballast | 55 Volts A. C. | | | | | |

Power output approximately 2 watts.
Power consumption at 117.5 volts line 45 watts (A.C.).
All readings except filaments will be approximately 10% lower on 117.5 D. C.

Drop across field 28 volts.

## TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

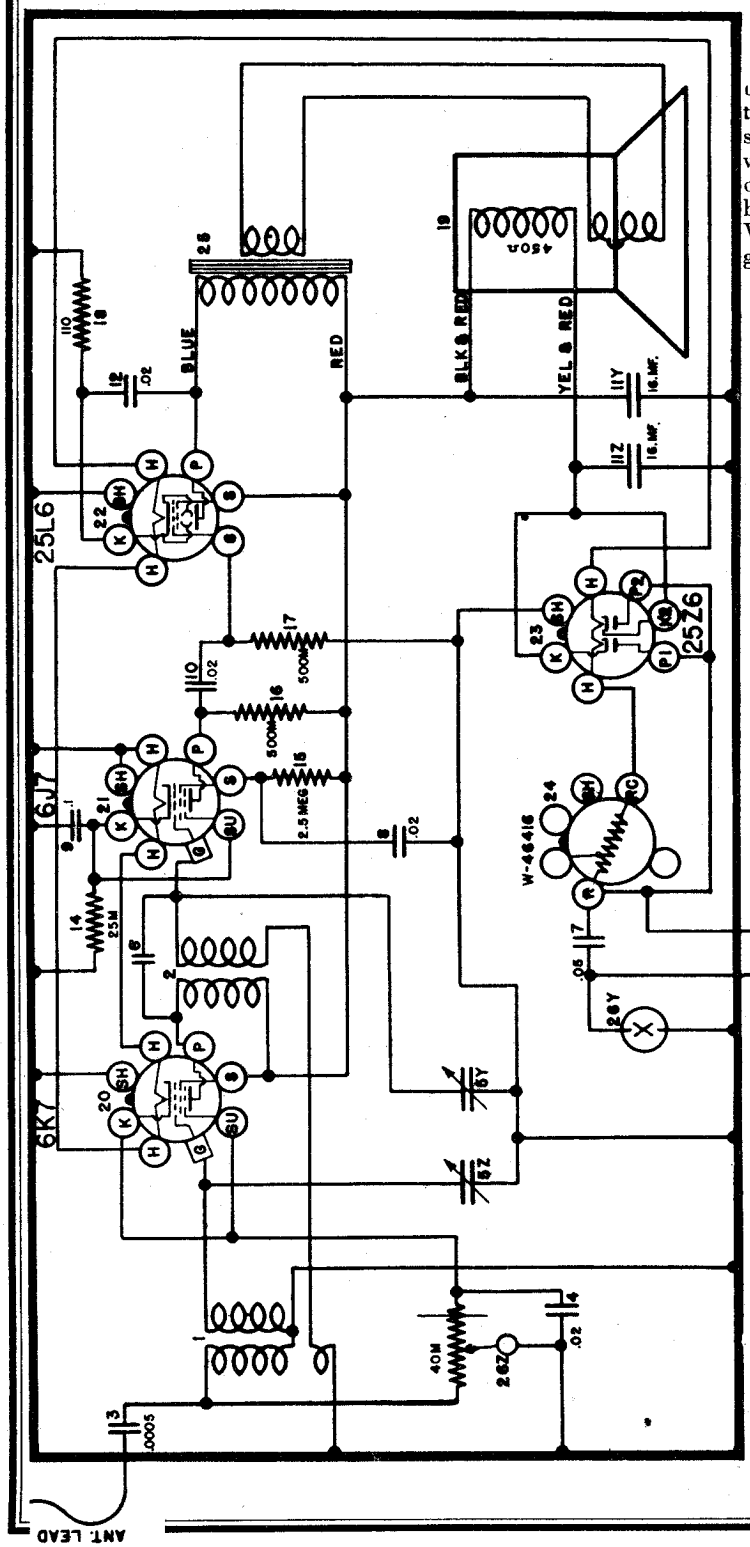


FIG. 1—WIRING DIAGRAM—MODEL 568

DECEMBER, 1938

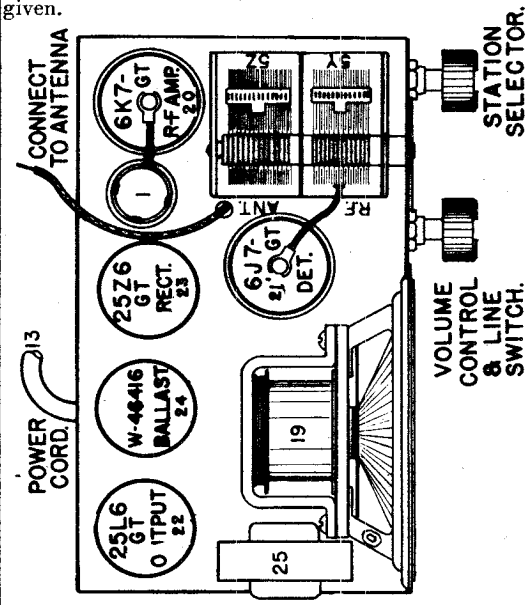


Fig. 2 Top View No. 568

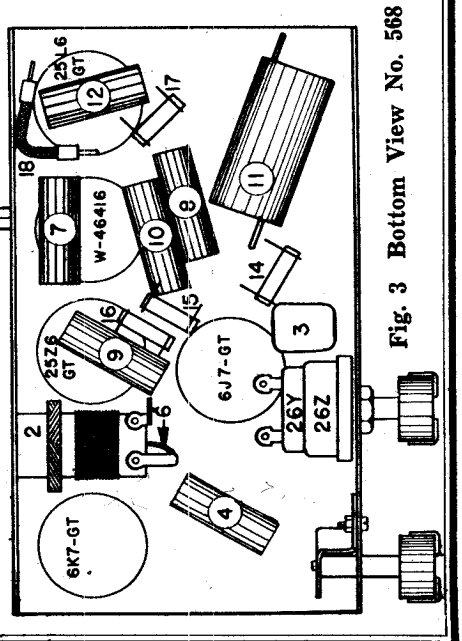


Fig. 3 Bottom View No. 568

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MODEL 568,Trouper
Alignment,Notes
Parts

# CROSLEY CORP.

## CHASSIS NO. 568 (TROUPER)

### SPECIFICATIONS

This model Crosley employs four tubes in a highly efficient T. R. F. circuit and on Ballast tube for dropping the line voltage instead of resistance in the power cord.

The frequency range is from 1725 to 540 kilocycles.

The tubes used are of the new Bantam type. Their functions are as follows, one 6K7-GT as R-F amplifier, one 6J7-GT as detector, one 25L6-GT as beam power output, one 25Z6-GT as rectifier. The all metal ballast tube has approximately 200 ohms resistance when cold.

The volume control varies the bias on the 6K7-GT and at the same time the amount of signal fed to the primary of the antenna coil. The bias for the 6J7-GT is obtained from the drop across item 14, a 25,000 ohm resistance and for the 25L6-GT, the drop across item 18, a 110 ohm resistance. The speaker field (450 ohms), is used for filtering in the high side of the "B" supply.

This receiver incorporates a certain amount of fixed regeneration to improve selectivity and sensitivity. With a normmal antenna the receiver is stable and the performance approaches that of a three gang T. R. F. receiver in spite of the fact that only a two gang condenser is used. However with no antenna or a very small antenna the receiver will oscillate but this oscillation can readily be controlled by the volume control.

### CONNECTING OUTPUT METER

Connect the one terminal of the output meter to the plate and the other terminal to the screen of the 25L6-G Output tube. Be sure the output meter is protected from D. C. by connecting a condenser (.1 mfd. or larger —NOT electrolytic) in series with one of the leads.

### ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power line, therefore when using an A. C. operated signal generator for alignment the following precaution should be taken.

(a) Connect the output lead of the signal generator through a .0001 Mf. condenser to the antenna lead on the receiver. The ground lead of the generator should be connected through a .001 Mf. condenser to the chassis.

(b) Open the gang condenser all the way.

(c) Set the generator to 1725 Kilocycles.

(d) Adjust the trimmer condensers on the gang until the 1725 Kc signal is heard. The gang does not have to tune through this signal.

(e) Set the generator to 1400 Kc.

(f) Tune the set to the 1400 Kc. signal, then alternately adjust the trimmers on the gang until no further improvement can be noticed on the output meter.

NOTE: Always use the lowest signal generator output that will give a reasonable indication on the output meter.

Keep the two grid leads as far as possible from each other.

## PARTS LIST — MODEL 568

Figures in first column refer to parts in Diagrams.

| Item No. | Part No. | Description |
|---|---|---|
| 1 | G182—32000 | Antenna Coil |
| 2 | G102—32001 | R-F. Coil |
| 3 | G3 —34002 | Condenser, .0005 Mf. Molded |
| 4 | W —45708B | Condenser, .02 Mf. 160 V. |
| 5 | G60 —33001 | 2 Section Gang Condenser |
| | D —46418 | Dial Face |
| | W —46425 | Pointer |
| | —41587 | Pointer Mtg. Screw |
| | W —44809C | Drive Shaft |
| | W —44808B | Bracket—Shaft Mtg. |
| | W —43549 | "C" Washer—Shaft Mtg. |
| | G10 —41582 | Drive Cord—8¼ Inches |
| | W —44989 | Spring—Cord Tension |
| | W —46854A | Dial Support Brkt. |
| 6 | G3 —50640 | Twisted Lead—Cap. Coupling Assy. |
| 7 | W —45782B | Condenser, .05 Mf. 120 V. |
| 8 | W —45780B | Condenser, .02 Mf. 160 V. |
| 9 | W —50105 | Condenser, .1 Mf. 160 V. |
| 10 | W —45708B | Condenser, .02 Mf. 160 V. |
| 11Z, 11Y | W —46398 | Condenser, 16 Mf. 125 V. |
| 12 | W —45780B | Condenser, .02 Mf. 160 V. |
| 13 | B —45784 | Power Cord and Plug |
| 14 | —24990 | Resistor, 25,000 Ohm ⅜W. |
| 15 | —37583 | Resistor, 2.5 Megohm ⅜W. |
| 16 | —23785 | Resistor, 500,000 Ohm ⅜W. |
| 17 | —23785 | Resistor, 500,000 Ohm ⅜W. |
| 18 | W —45965 | Resistor, 110 Ohm ½W. |
| 19 | 284-BL-4"B" | Speaker—Spec. No. 40WA3 |
| | —46691 | Field Coil—450 Ohm 60 M. A. |
| | 284-BL-4"H" | Speaker—Spec. No. S5330M4 |
| | —46901 | Field Coil—450 Ohm 60 M. A. |
| 20 to 24 | G178—36400 | Socket—8 Prong Octal |
| | W —46477 | Tube Shield |
| 25 | G25 —29535 | Output Transformer |
| 26Z, 26Y | —46411 | Volume Control—Line Switch— |
| | W —46416 | Ballast Tube |
| | B —46880 | Power Cable for 220 V. (Resistor) |
| | 8FC | Cabinet—Mottled Brown |
| | —45242 | Knob—2 Req. |
| | —45505A | Cabinet Back |
| | 8FD | Cabinet—Ivory |
| | W —45324 | Knob—2 Req. |
| | —45506A | Cabinet Back |
| | G3 —45281 | Baffle and Grille Cloth Assy. |
| | W —46421 | Celluloid Dial Lens |
| | —46437 | Instruction Booklet |
| | W —46454 | Cabinet Assy.—8FC—Mottled Brown |
| | W —46866 | Cabinet Assy.—8FD—Ivory |
| | —44763 | Single Shipping Carton |

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# CROSLEY CORP.

MODELS 587,5587
Schematic, Voltage
Socket, Parts

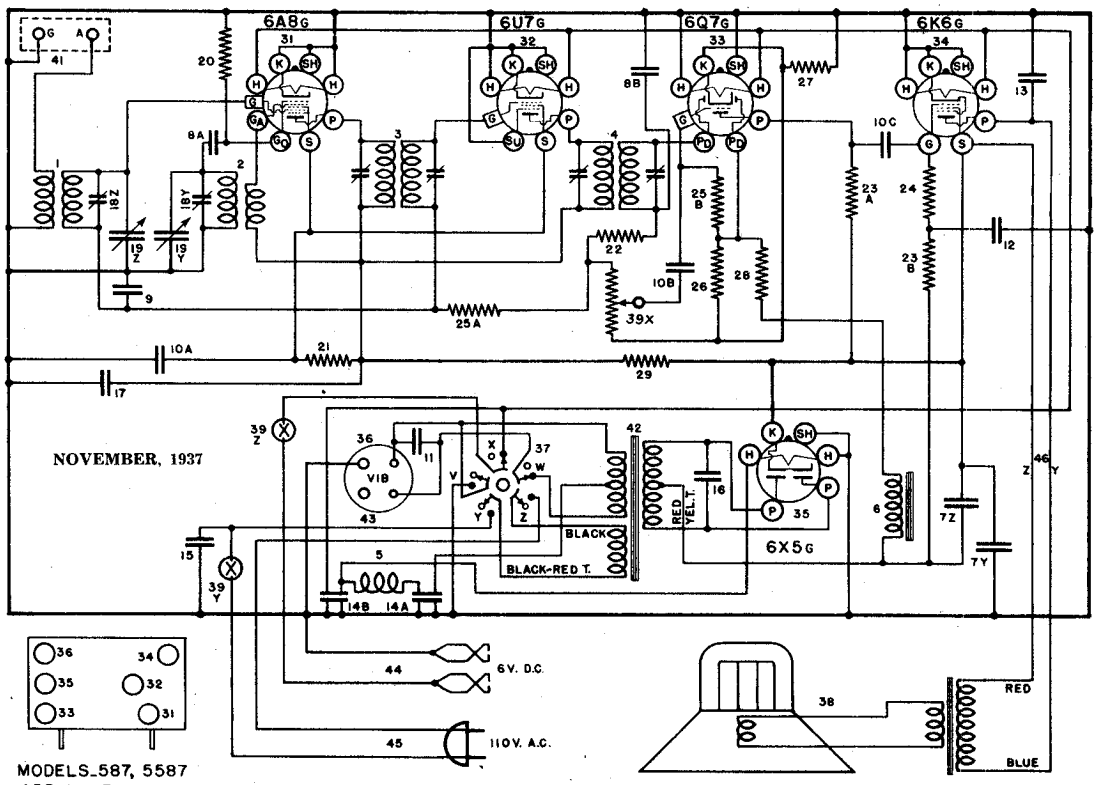


FIG. 1—WIRING DIAGRAM—MODELS 587 and 5587

Figures in first column refer to parts in Diagrams.

| Item No. | Part No. | Description | Item No. | Part No. | Description |
|---|---|---|---|---|---|
| 1 | G154—32000 | Ant. Coil, 1725-540 Kc. | 23A | —35F01 | Resistor, 300,000 Ohm ¼W. Ins. |
| 2 | G156—32002 | Osc. Coil, 1725-540 Kc. | 23B | —35F01 | Resistor, 300,000 Ohm ¼W. Ins. |
| 3 | G173—32004 | 1st I-F., 455 Kc. | 24 | —36322 | Resistor, 500,000 Ohm ¼W. Ins. |
| 4 | G174—32004 | 2nd I-F., 455 Kc. | 25A | —36688 | Resistor, 3 Megohm ¼W. Ins. |
| 5 | G26 —28067 | "A" Filter Choke | 25B | —36688 | Resistor, 3 Megohm ¼W. Ins. |
| 6 | G23 —29535 | "B" Filter Choke | 26 | —23012A | Resistor, 40 Ohm ¾W. Flex. |
| 7 | W —41769A | Condenser, Dual 6 Mf. 250 V. (587 only) | 27 | W —25357 | Resistor, 75 Ohm ¾W. Flex. |
| 7 | W —41868A | Condenser, Dual 8 Mf. 250 V. (5587 only) | 28 | W —27501 | Resistor, 100 Ohm ½W. Flex. |
| | | | 29 | W —23907 | Resistor, 750 Ohm 1½W. Flex. |
| | W —34002 | Condenser, .00025 Mf. Molded | 31 | G156—36400 | Socket, 6A8 Type |
| 8A | G1 —31002 | Condenser, .00025 Mf. Molded | 32 | G171—36400 | Socket, 6U7 Type |
| 8B | G1 —31002 | Condenser, .02 Mf. 160 V. | 33 | G190—36400 | Socket, 6Q7 Type |
| 9 | W —36541 | Condenser, .02 Mf. 200 V. | 34 | G172—36400 | Socket, 6K6 Type |
| 10A | W —28621 | Condenser, .02 Mf. 200 V. | 35 | G168—36400 | Socket, 6X5 Type |
| 10B | W —28621 | Condenser, .02 Mf. 200 V. | 36 | G165—40917 | Socket, Vibrator |
| 10C | W —28621 | Condenser, .02 Mf. 200 V. | | W —45028 | Tube Shield |
| 11 | W —24621 | Condenser, .05 Mf. 200 V. | 37 | W —45028 | A. C.-D. C. Switch (Change Over) |
| 12 | W —35936 | Condenser, .1 Mf. 200 V. | 38 | 274—PL—18"U" | Speaker, Spec. 5-PA-4 (587 only) |
| 13 | W —24039C | Condenser, .008 Mf. 400 V. | | —44537 | V. C. and Cone Assy. (274—PL—18"U") |
| 14A | W —35738 | Condenser, 1 Mf. 400 V. | | —45295 | Output Transformer (274—PL—18"U") |
| 14B | W —30161 | Condenser, 5 Mf. 120 V. | 38 | 474—PJ—2"M" | Speaker, Spec. 1-D-1282 |
| 15 | W —30161 | Condenser, .01 Mf. 400 V. | | —45551 | Cone Assembly (474—PJ—2"M") |
| 16 | W —30176 | Condenser, .01 Mf. 1,000 V. | | —45552 | Output Trans. (474—PJ—2"M") |
| 17 | W —37173 | Condenser, .25 Mf. 300 V. | | —43676 | Ring, Cone Mtg. (474—PJ—2"M") |
| 18 | W —37986A | 2 Section Shunt Trimmer Cond. Assy. | 39Z | —43861A | (6 V. D. C. Switch (On-Off) |
| 19 | G46 —33001 | 2 Section Var. Tuning Condenser (587 only) | 39Y | | (110 V. A. C. Switch (On-Off) |
| | | | 39X | | Volume Control |
| | B —41981A | Dial Face (587 only) | 41 | —26719 | Ant. and Gnd. Terminal Assy. |
| | —41285 | Dial Mask, Paper (587 only) | 42 | G19 —32769 | Power Transformer |
| | W —44001A | Ring—Dial Support (587 only) | | W —50130 | Trans. Shield |
| | —44267 | Dial Mask (587 only) | 43 | —45110 | Vibrator, 6 Volt |
| | B —43033 | Support—Dial Face (587 only) | 44 | G3 —44948 | Battery Cable Assy. |
| | B —43550A | Dial Hand (587 only) | | —34903 | Battery Clip (Pos.) |
| | W —40486 | Screw—Hand Mtg. | | —34904 | Battery Clip (Neg.) |
| | W —44989 | Spring—Cord Tension (587 only) | 45 | B —44001 | Power Cord and Plug (A. C.) |
| | —41582 | Drive Cord | 46Z | G1 —45078 | Red Speaker Lead (5587 only) |
| | W —45030 | Bracket—Drive Shaft Mtg. | 46Y | G2 —45078 | Blue Speaker Lead (5587 only) |
| | W —45031 | Drive Shaft (587 only) | | | |
| | W —43549 | Ring—Shaft Retaining | | G20 —45022 | Vib. Shield Assy. |
| 19 | G47 —33001 | 2 Section Var. Tuning Condenser (5587 only) | | G19 —45022 | Switch Shield Assy. |
| | | | | —7MD | Cabinet (587 only) |
| | B —44994A | Dial Face (5587 only) | | —7AP | Cabinet (5587 only) |
| | W —44085B | Dial Mask (5587 only) | | W —44332 | Knob (1) |
| | W —44094 | Ring—Dial Support (5587 only) | | W —44381B | Knob (2) |
| | C —44082E | Support Bracket—Dial (5587 only) | | —44228A | Escutcheon (587 only) |
| | W —41299 | Dial Hand (Hub Assy.) (5587 only) | | B —44226B | Escutcheon (5587 only) |
| | G1 —43549 | Pulley—Drive Shaft (5587 only) | | W —45056 | Rubber Mtg. Foot (5587 only) |
| | W —44134B | Drive Shaft (5587 only) | | W —43553 | Rubber Mtg. Foot (587 only) |
| | W —44134A | Spring—Cord Tension (5587 only) | | B —45231 | Bottom Mtg. Plate (5587 only) |
| | W —43561 | Resistor, 60,000 Ohm ½W. Ins. | | | |
| 20 | —35928 | Resistor, 25,000 Ohm ½W. Carb. | | | |
| 21 | —24990 | Resistor, 100,000 Ohm ¼W. Ins. | | | |
| 22 | —35600 | | | | |

**SOCKET VOLTAGE READINGS TAKEN ON 117.5 VOLT A. C. POWER SUPPLY**

| Tube | Function | H | P | S | Su | K | G | Ga |
|---|---|---|---|---|---|---|---|---|
| 6A8G | Oscillator-Modulator | 6.3 | 192 | 94 | 0 | 0 | - | 192 |
| 6U7G | 1-F. Amplifier | 6.3 | 192 | 94 | 0 | 0 | - | - |
| 6Q7G | Det., AVC, 1st A. F. | 6.3 | 72 | - | - | 2.3 | -1.0* | - |
| 6K6G | Output | 6.3 | 195 | 205 | - | 0 | 20 ** | - |
| 6X5G | Rectifier | 6.3 | - | - | - | 205 | - | - |

**SOCKET VOLTAGE READINGS TAKEN ON 6 VOLT STORAGE BATTERY**

| Tube | Function | H | P | S | Su | K | G | Ga |
|---|---|---|---|---|---|---|---|---|
| 6A8G | Oscillator-Modulator | 6.0 | 131 | 62 | 0 | 0 | - | 131 |
| 6U7G | 1-F. Amplifier | 6.0 | 131 | 62 | 0 | 0 | - | - |
| 6Q7G | Det., AVC, 1st A. F. | 6.0 | 47 | - | - | 1.9 | -2.7* | - |
| 6K6G | Output | 6.0 | 132 | 139 | - | 0 | -12.** | - |
| 6X5G | Rectifier | 6.0 | - | - | - | 131 | - | - |

* Measured across item 26.
** Measured from junction of items 6 and 23B to chassis.
Power output approximately 2.5 watts on 117.5 volts A. C. and 1.1 watts on 6 volt storage battery.
Power consumption approximately 28 watts on 117.5 volts A. C. and 2.9 amperes on 6 volt storage battery.

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MODELS 587,5587
Socket,Trimmers
Chassis,Alignment,Notes

# CROSLEY CORP.

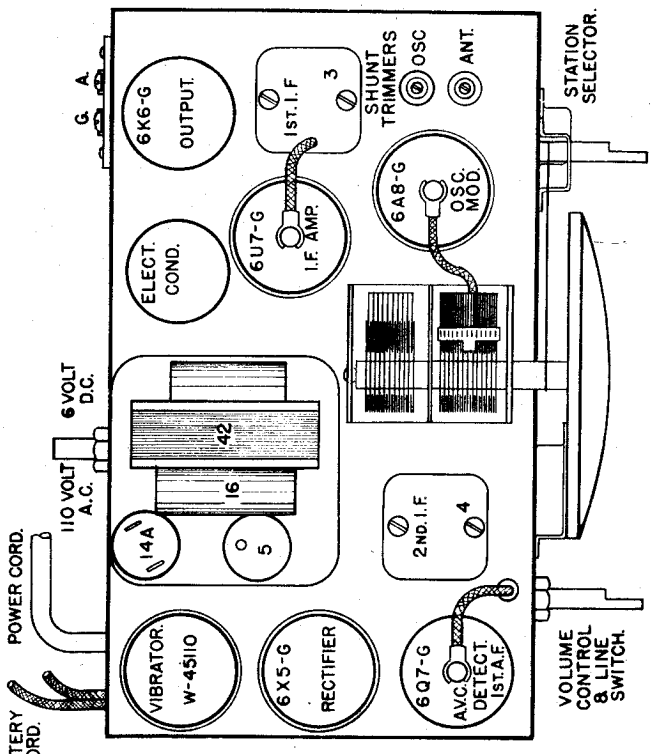


Fig. 2—Top View Models 587 and 5587

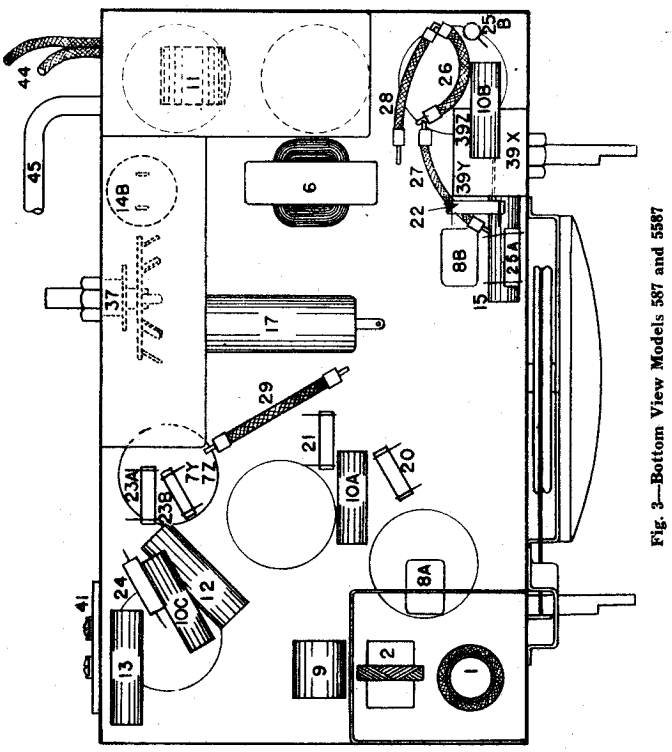


Fig. 3—Bottom View Models 587 and 5587

## ALIGNMENT PROCEDURE

All the circuits in this receiver were very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

### CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 6K6G output tube. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

**Tuning The I-F Amplifier To 455 Kilocycles.**

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead of the signal generator to the ground terminal of the receiver. (KEEP THE SIGNAL GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES).

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the trimmer condensers located on the 2nd I. F. transformer, item 4—fig. 2, for maximum reading on the output meter.

(e) Adjust the trimmer condensers located on the 1st I. F. transformer, item 3—fig. 2, for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

**Aligning The R-F Amplifier.**

(a) Connect the output of the signal generator through a .00025 mfd. condenser to the antenna terminal of the receiver.

(b) Set the signal generator to 1725 kilocycles.

(c) With the condenser gang rotated to the minimum capacity position, adjust the "OSC" SHUNT TRIMMER so that the 1725 kilocycle signal is heard. It is not necessary that the receiver tune through this signal.

(d) Set the signal generator to 1400 kilocycles.

(e) Tune-in the 1400 kilocycle signal, in the region of 140 on the dial, for maximum output.

(f) Adjust the "ANT" SHUNT TRIMMER for maximum output. NOTE: Do not readjust the "OSC" SHUNT TRIMMER.

(g) Repeat operations (e) and (f) for more accurate adjustments.

## TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with the volume control full "ON" and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

## SPECIFICATIONS

These model Crosley radios are designed for operation on 110-volt, 60 cycle A.C. power lines or on a six-volt storage battery. No "B" or "C" batteries are required. The tuning range is from 535 to 1725 kilocycles (560 to 173 Metres). Model 5587 is identical with Model 587 except that it has a larger dial assembly, an 8" speaker, larger electrolytic condenser, and is mounted in a console cabinet.

## CIRCUIT DESCRIPTION

Five octal base glass tubes are employed in a superheterodyne circuit which consists of an oscillator-modulator tube, 455 kilocycle I. F. amplifier, composite detector—AVC and A. F. amplifier tube, pentode output and power supply. An AC-DC switch is located on the rear of the chassis and must be set according to the power supply the receiver is to be used on. The 6Q7G tube supplies AVC voltage to the grids of the 6A8G and 6U7G tubes through items 22 and 25A. The initial bias for the 6A8G and 6U7G tubes is developed across a 75 ohm resistor, item 27. The bias for the 6Q7G tube is developed across a 40 ohm resistor, item 26. The bias for the output tube is obtained by the combined voltage drop across items 6 ("B" filter choke), 26 (40 ohms), 27 (75 ohms) and 28 (100 ohms). The speaker is a permanent magnet type dynamic.

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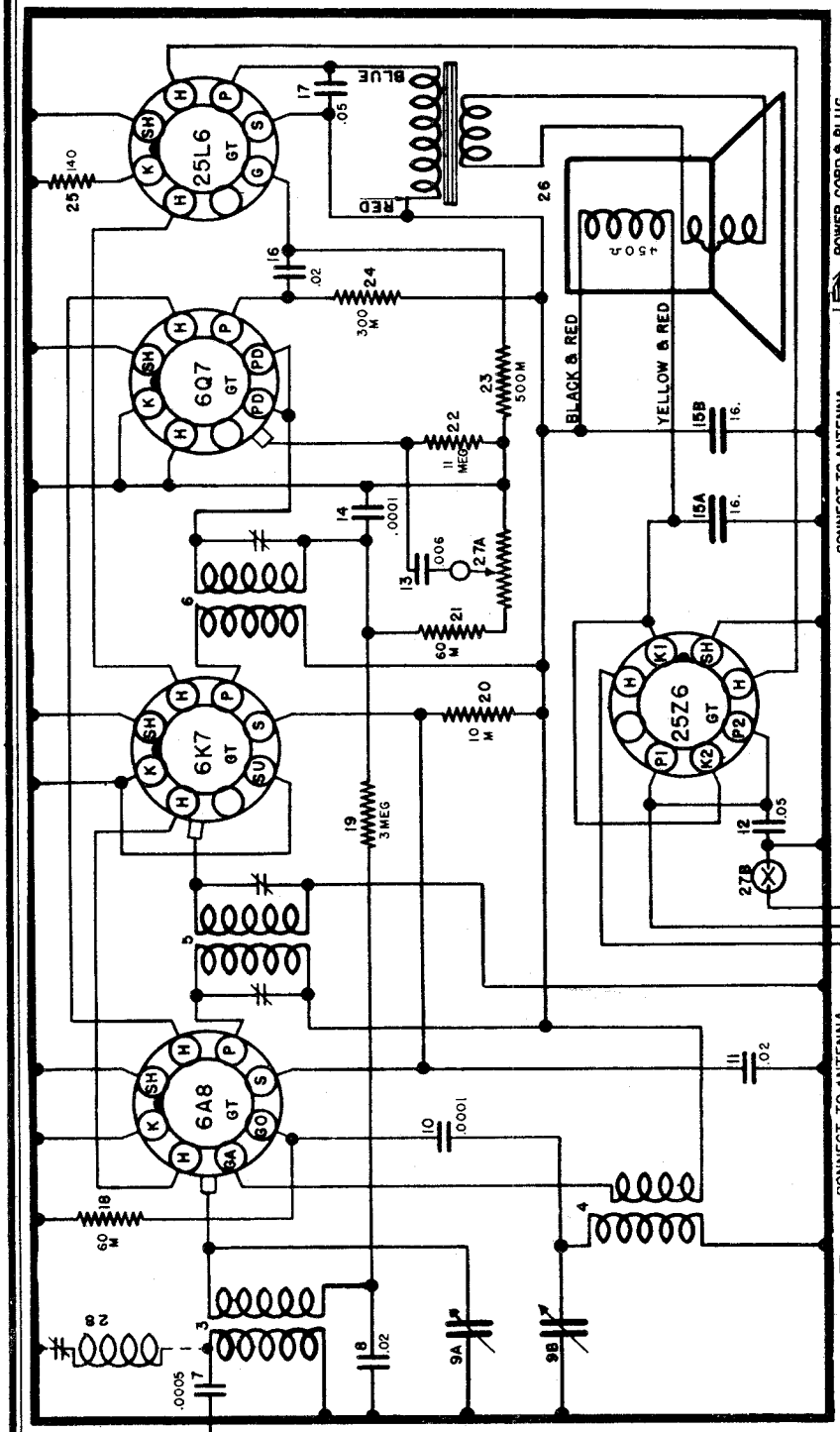
# CROSLEY CORP.

MODEL 588, Super Vanity Fiver
588BC, 588BD, 588BE
Schematic, Socket, Trimmers
Alignment, Voltage, Chassis

## TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | Su | K | Go | Ga |
|---|---|---|---|---|---|---|---|---|
| 6A8-GT | Oscillator-Modulator | 6.3 | 105 | 65 | — | — | -10 | 105 |
| 6K7-GT | I-F Amplifier | 6.3 | 105 | 65 | — | — | — | — |
| 6Q7-GT | Det, AVC, A-F Amplifier | 6.3 | 42 | — | — | — | — | — |
| 25L6-GT | Output | 25.1 | 95 | 105 | — | — | — | — |
| 25Z6-GT | Rectifier | 25.1 | 117.5 A.C. | — | — | 132 | — | — |

Power output approximately 2 watts. Power consumption approximately 47 watts. Voltage drop across speaker field 27 volts.
All voltages except filaments will be approximately 10% lower if measured on 117.5 volts DC power supply.



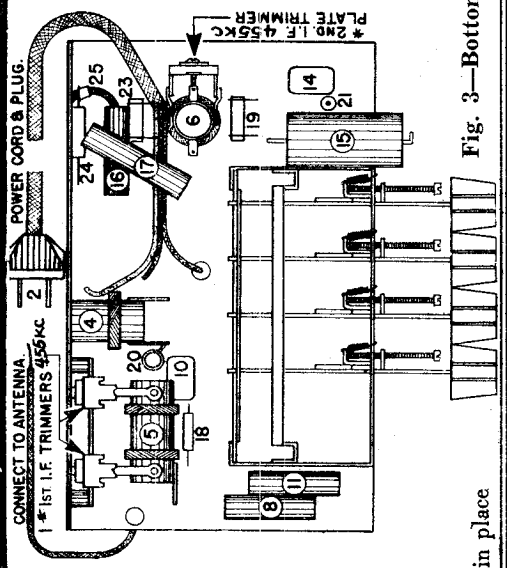




Fig. 3—Bottom View

MODEL--588
456 K.C. I.F.
CHASSIS NO. 588
(Super Vanity Fiver)
JANUARY, 1939

*Leave grid cap of 6A8GT in place

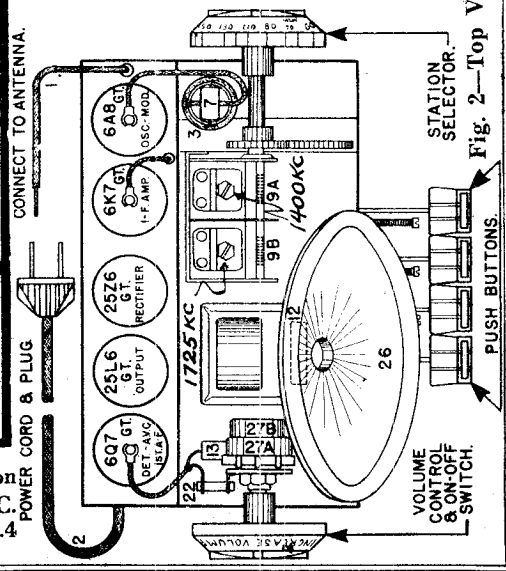



Fig. 2—Top View

**SPECIFICATIONS** This model Crosley radio is designed for operation on 100 to 125 volt electric circuits, either AC or DC. The tuning range is from 540 to 1725 kilocycles (555.4 to 173 metres).

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MODEL 598, Vanity, 598BB, 598BD
Schematic, Socket, Trimmers
Alignment, Voltage, Chassis

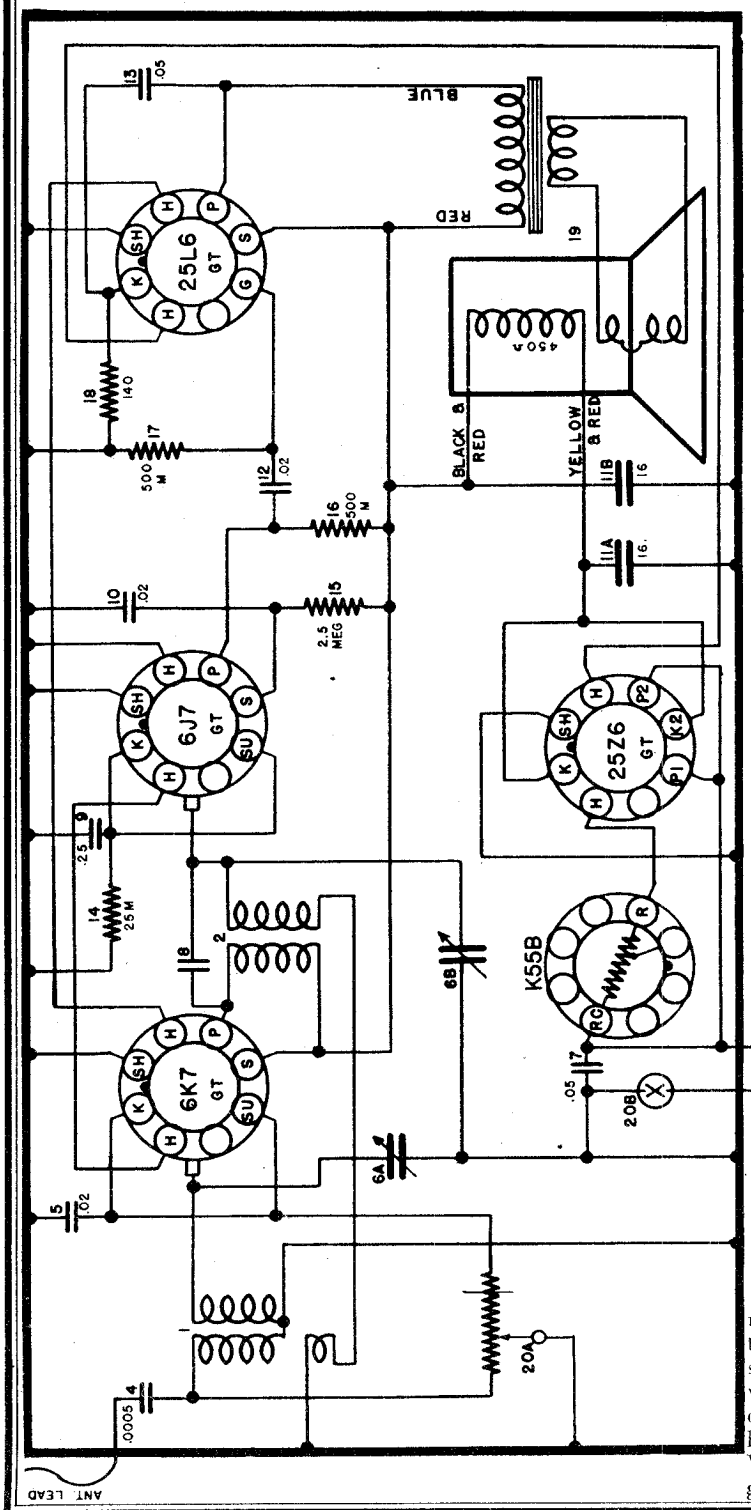
# CROSLEY CORP.

## TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | K | Su | G |
|---|---|---|---|---|---|---|---|
| 6K7-GT | R-F Amplifier | 6.3 | 110 | 110 | 2.5-25 | 2.5-25 | — |
| 6 J7-GT | Detector | 6.3 | 20 | 7 | 6 | — | — |
| 25 L6-GT | Output | 25.1 | 98 | 110 | 6 | — | — |
| 25 Z6-GT | Rectifier | 25.1 | 117 A.C. | — | 135 | — | — |
| W-46416 | Ballast | Approx. 54.7 Drop A.C. | | | | | |

Power output approximately 2 watts.
Power consumption at 117.5 volts line 47 watts (A.C.).
All readings except filaments will be approximately 15% lower on 117.5 D. C.
Drop across field 25 volts.

**FIG. 1—WIRING DIAGRAM**



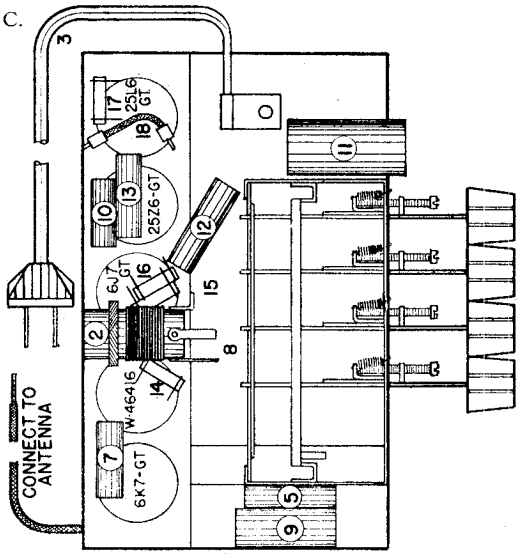




Fig. 3—Bottom View 598

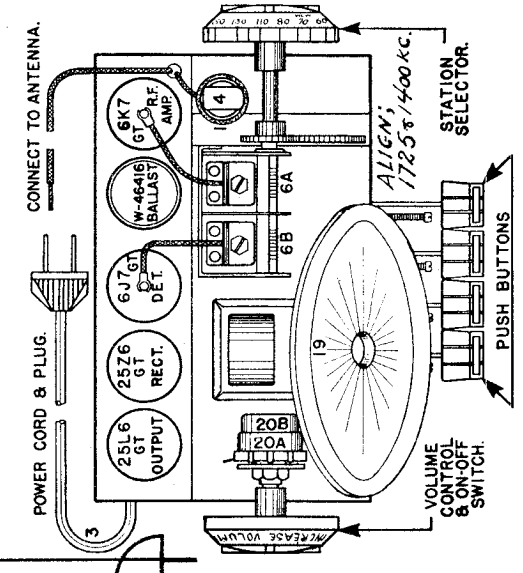



Fig. 2—Top View 598

**MODEL 598 VANITY**

**JANUARY, 1939**

**MODEL--598**

## TUBES AND VOLTAGE LIMITS

The table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with volume control full on and no signal input. The filament voltages should be measured with an accurate low range voltmeter. Voltage limits may vary plus or minus 10% of values given.

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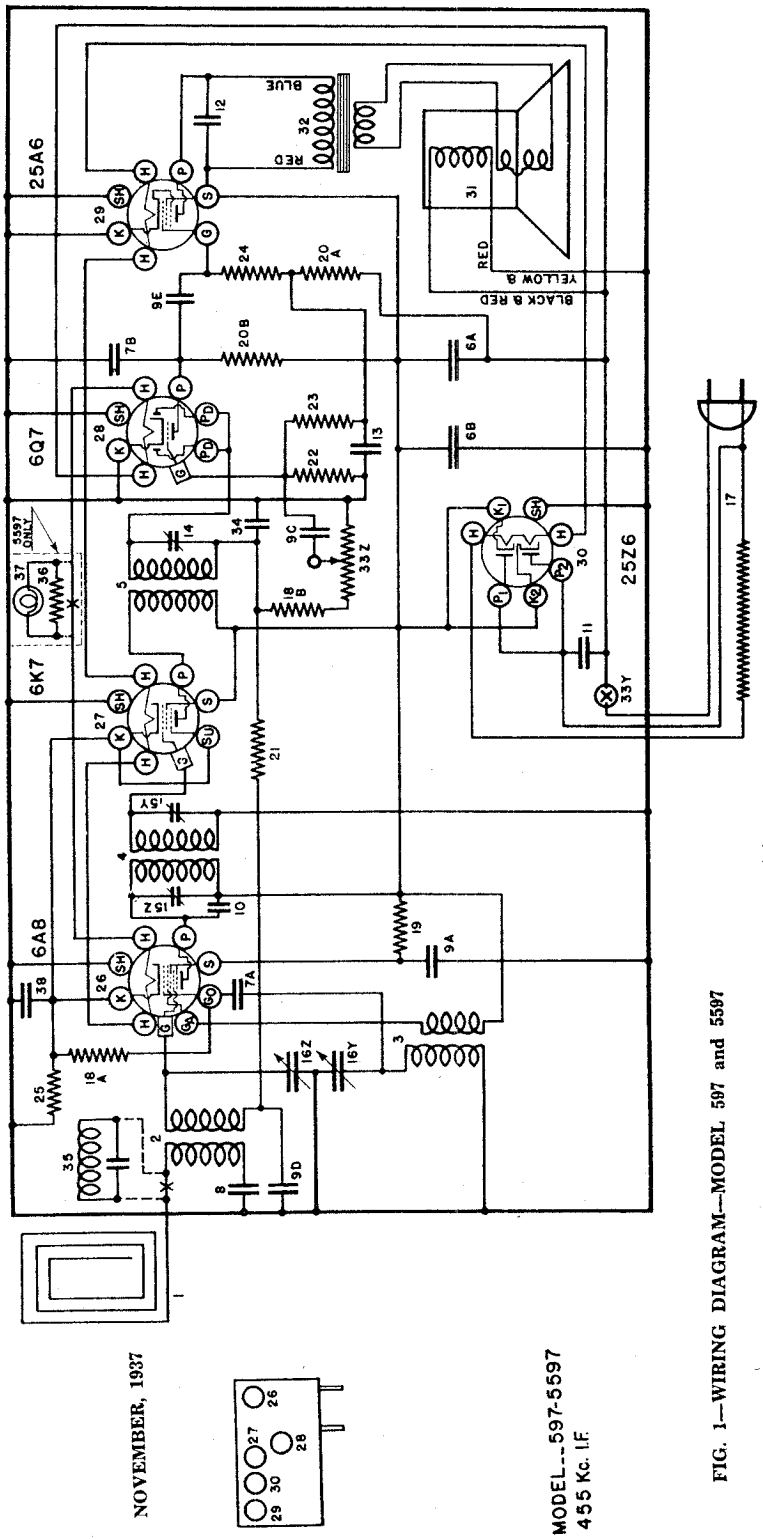
MODELS 597,5597
Schematic,Parts

# CROSLEY CORP.




NOVEMBER, 1937

MODEL--597-5597
455 Kc. I.F.

FIG. 1—WIRING DIAGRAM—MODEL 597 and 5597

Figures in first column refer to parts in Diagrams.

| Item | Part No. | Description |
|---|---|---|
| 1 | W —31765C | Ant. Coil |
| 2 | G163—32000 | Ant. Coil |
| 3 | G155—32002 | Osc. Coil |
| 4 | G168—32004 | 1st I-F |
| 5 | G167—32004 | 2nd I-F |
| 6A | W —44935 | Condenser, 30 Mf. 125 V. |
| 6B | W —44935 | Condenser, 30 Mf. 125 V. |
| 7A | G 2—34002 | Condenser, .0001 Mf. Molded |
| 7B | G 2—34002 | Condenser, .0001 Mf. Molded |
| 8 | W —26571 | Condenser, .0005 Mf. 200 V. |
| 9A | W —28621 | Condenser, .02 Mf. 200 V. |
| 9C | W —28621 | Condenser, .02 Mf. 200 V. |
| 9D | W —28621 | Condenser, .02 Mf. 200 V. |
| 9E | W —28621 | Condenser, .02 Mf. 200 V. |
| 10 | G 5—34002 | Condenser, .00005 Mf. Molded |
| 11 | W —23615 | Condenser, .05 Mf. 400 V. |
| 12 | W —28619 | Condenser, 006 Mf. 200 V. |
| 13 | W —24049C | Condenser, .1 Mf. 200 V. |
| 14 | W —44142 | Condenser, 2nd I-F Plate Trimmer. |
| 15 | W —44882 | Condenser, 1st I-F-Trimmer Assy. |
| 16 | G 45—33001 | 2 Sect. Var. Tuning Cond. |
| | B —44801A | Dial Face (Glass) |
| | W —50173A | Pointer |
| | W — 2045 | Washer (Pointer Lock) |
| | W —40486 | Screw (Pointer Mtg.) |
| | W —44810C | Dial Support |
| | W —44811 | Ring (Dial Glass Support) 597 |
| | W —45342 | Ring (Dial Glass Support) 5597 |
| | W —44809C | Drive Shaft |
| | W —44808A | Bracket Drive Shaft |
| | —41582 | Drive Cord |
| | W —43561 | Spring—Cord Tension |
| | W —43549 | Ring—Drive Shaft Retaining |
| 17 | B —44917B | Power Cord & Plug (160 Ohm) 597 Only |
| | B —45491B | Power Cord & Plug (140 Ohm) 5597 Only |
| 18A | —35928 | Resistor, 60,000 Ohm ¼ W. Ins. |
| 18B | —35928 | Resistor, 60,000 Ohm ¼ W. Ins. |
| 19 | —22831 | Resistor, 15,000 Ohm 1/3 W. Ins. |

| Item | Part No. | Description |
|---|---|---|
| 20A | —21455 | Resistor, 300,000 Ohm 1/3 W. Carb. |
| 20B | | See Item 39 |
| 21 | —26577 | Resistor, 3. Megohm 1/3 W. Carb. |
| 22 | —21454 | Resistor, 1. Megohm 1/3 W. Carb. |
| 23 | —37584 | Resistor, 11. Megohm 1/3 W. Carb. |
| 24 | —34020 | Resistor, 250,000 Ohm 1/3 W. Carb. |
| 25 | W —25357 | Resistor, 75 Ohm ¾ W. Flex. |
| 26 | G156—36400 | Socket Type 6A8 |
| 27 | G151—36400 | Socket Type 6K7 |
| 28 | G160—36400 | Socket Type 6Q7 |
| 29 | G161—36400 | Socket Type 25A6 |
| 30 | G162—36400 | Socket Type 25Z6 |
| 31 | —270BL6"O" | Speaker Spec. No. 3-101 |
| | —45174 | Cone & V.C. Assy. {For Above |
| | —45175 | Ring (Cone Mtg.) {Speaker |
| 32 | G 21—29535 | Output Transformer |
| 33 | —44920A | Vol. Cont. (1 Meg.) & Line Switch |
| 34 | G 1—34002 | Condenser .00025 Mf. Molded |
| 35 | G182—32004 | Wave Trap |
| 36 | W —44396 | Resistor 40 Ohm 3½ W. Flex 5597 |
| 37 | W —44337 | Bulb 6-8 V. Dial Light 5597 |
| | G 6—27134 | Dial Light Socket Assy. 5597 |
| | W —45313 | D. L. Socket Mtg. Brkt. 5597 |
| 38 | W —27216 | Condenser .05 Mf. 200 V. |
| | —7F | Cabinet (Black) 597 |
| | W —44934 | Knob—Black 597 |
| | G 1—45281 | Grille & Baffle Assy. 597 |
| | —7FB | Cabinet (Brown) 597 |
| | W —45242 | Knob—Brown 597 |
| | G 1—45281 | Grille & Baffle Assy. 597 |
| | —7FA | Cabinet (Ivory) 5597 |
| | W —45324 | Knob 5597 |
| | G 1—45281 | Grille & Baffle Assy. 5597 |
| | W —45282 | Shield—Heat Reflector |
| | B —45505 | Back—7FB Cab. |
| | B —44885A | Back—7F Cab. |
| | B —45506 | Back—7FA Cab. |
| 39 | —23403 | Resistor, 150,000 Ohm 1/3 W. Carb. |

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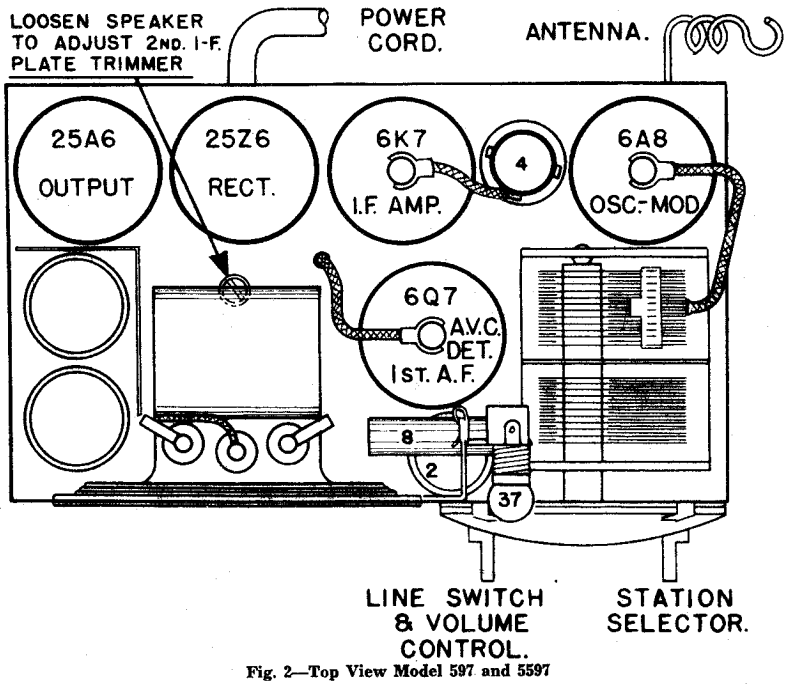


Fig. 2—Top View Model 597 and 5597

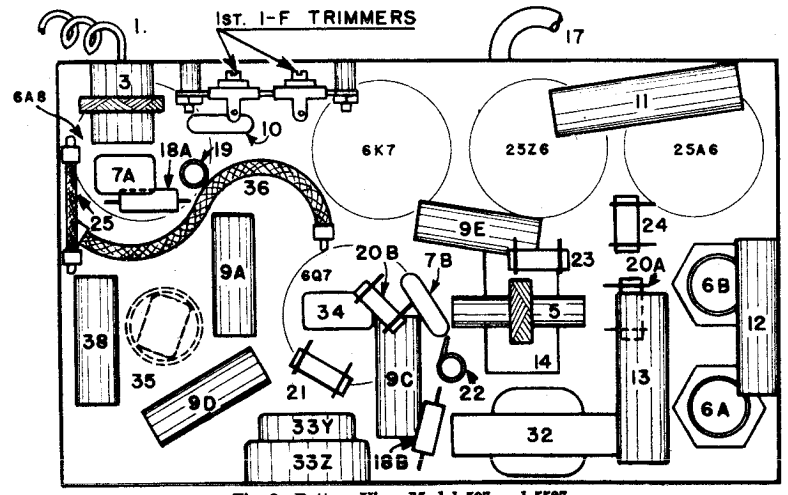


Fig. 3—Bottom View Model 597 and 5597

## SPECIFICATIONS

These model Crosley radios are designed for operation on 100 to 125 volt electric circuits, either AC or DC. The tuning range is from 535 to 1725 kilocycles (550 to 173 metres). Model 5597 is identical with Model 597 except that it has an illuminated dial and a different cabinet.

## CIRCUIT DESCRIPTION

Five metal tubes are employed in a superheterodyne circuit which consists of a combination oscillator-modulator tube, 455 kilocycle I-F amplifier, pentode output and power supply. The 6Q7 tube serves as the detector and 1st A-F amplifier and supplies AVC voltage to the grid of the 6A8 tube. The bias voltage for the 6A8 and 6K7 tubes is obtained across a 75 ohm resistor, item 25. The bias for the 6Q7 and 25A6 tubes is obtained across the speaker field. A resistance type power supply cord is used to provide the proper heater voltage to the tubes. The filaments of the tubes are wired in series. A .05 mfd. condenser, item 11, is connected across the power supply leads to reduce electrical interference from that source.

## TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with the volume control full "ON" and no signal input. The filament voltages should be measured with an accurate low range voltmeter. When measured on a 117.5 volt AC line voltage limits may vary plus or minus 10% of the values given.

**TUBE SOCKET VOLTAGE READINGS**

| Tube | Function | H | P | S | Su | K | Go | Ga |
|---|---|---|---|---|---|---|---|---|
| 6A8 | Oscillator-Modulator | 6.3 | 105 | 65 | — | 3 | -10 | 105 |
| 6K7 | I-F Amplifier | 6.3 | 105 | 105 | 0 | 3 | — | — |
| 6Q7 | Det, AVC, A-F Amplifier | 6.3 | 50 | — | — | 0 | — | — |
| 25A6 | Output | 25.1 | 100 | 105 | — | 0 | — | — |
| 25Z6 | Rectifier | 25.1 | 117.5 | — | — | 110 | — | — |

Power output approximately 1 watt.
Power consumption approximately 55 watts.
Voltage drop across speaker field 18 volts.
All voltages except filaments will be approximately 10% lower if measured on 117.5 volts DC power supply.

## ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power supply and for this reason all test equipment should be thoroughly insulated in order that the power supply will not become short circuited while aligning the receiver.

## CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25A6 output tube. Be certain that the meter is protected from DC by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

### Tuning The I-F Amplifier To 455 Kilocycles.

(a) Disconnect the antenna roll from the receiver and connect the output of the signal generator through a 50 mmf. condenser to the antenna connection on the receiver. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If it is found to be necessary, a small condenser (approximately .001 mfd.) should be connected in series with the ground terminal of the signal generator and the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the 2nd I-F trimmer condenser, Item 14, located beneath the edge of speaker field, for maximum reading on the output meter.

(e) Adjust the 1st I-F trimmer condensers, located on back flange of the chassis, for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

### Aligning The R-F Amplifier.

(a) Set the signal generator to 1725 kilocycles.

(b) With the condenser gang turned to the minimum capacity position, adjust the trimmer condenser on the "OSC" section of the gang so that the 1725 kilocycle signal is heard. It is not necessary that the receiver tune through this signal.

(c) Set the signal generator to 1400 kilocycles.

(d) Tune-in the 1400 kilocycle signal in the region of 140 on the dial for maximum output.

(e) Adjust the trimmer condenser located on the "ANT" section of the gang for maximum output.

Note: Do not readjust the "OSC" trimmer.

(f) Repeat operations (d) and (e) for more accurate adjustments.

## WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil and a fixed condenser as illustrated by dotted lines in the Wiring Diagram.

# CROSLEY CORP.

## TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | Su | K | Go | Ga |
|---|---|---|---|---|---|---|---|---|
| 6A8G | Oscillator-Modulator | 6.3 | 105 | 70 | — | — | -10 | 105 |
| 6U7G | I-F Amplifier | 6.3 | 105 | 70 | — | — | — | — |
| 6Q7G | Det, AVC, A-F Amplifier | 6.3 | 35 | — | — | — | — | — |
| 25A6G | Output | 25.1 | 100 | 105 | — | 6 | — | — |
| 25Z6G | Rectifier | 25.1 | 117.5 A.C. | — | — | 132 | — | — |
| W-46773 | Ballast Tube | Approx. 48.4 A.C. Drop | | | | | | |

Power output approximately 2 watts.
Power consumption approximately 48 watts.
Voltage drop across speaker field 27 volts.
All voltages except filaments will be approximately 10% lower if measured on 117.5 volts DC power supply.

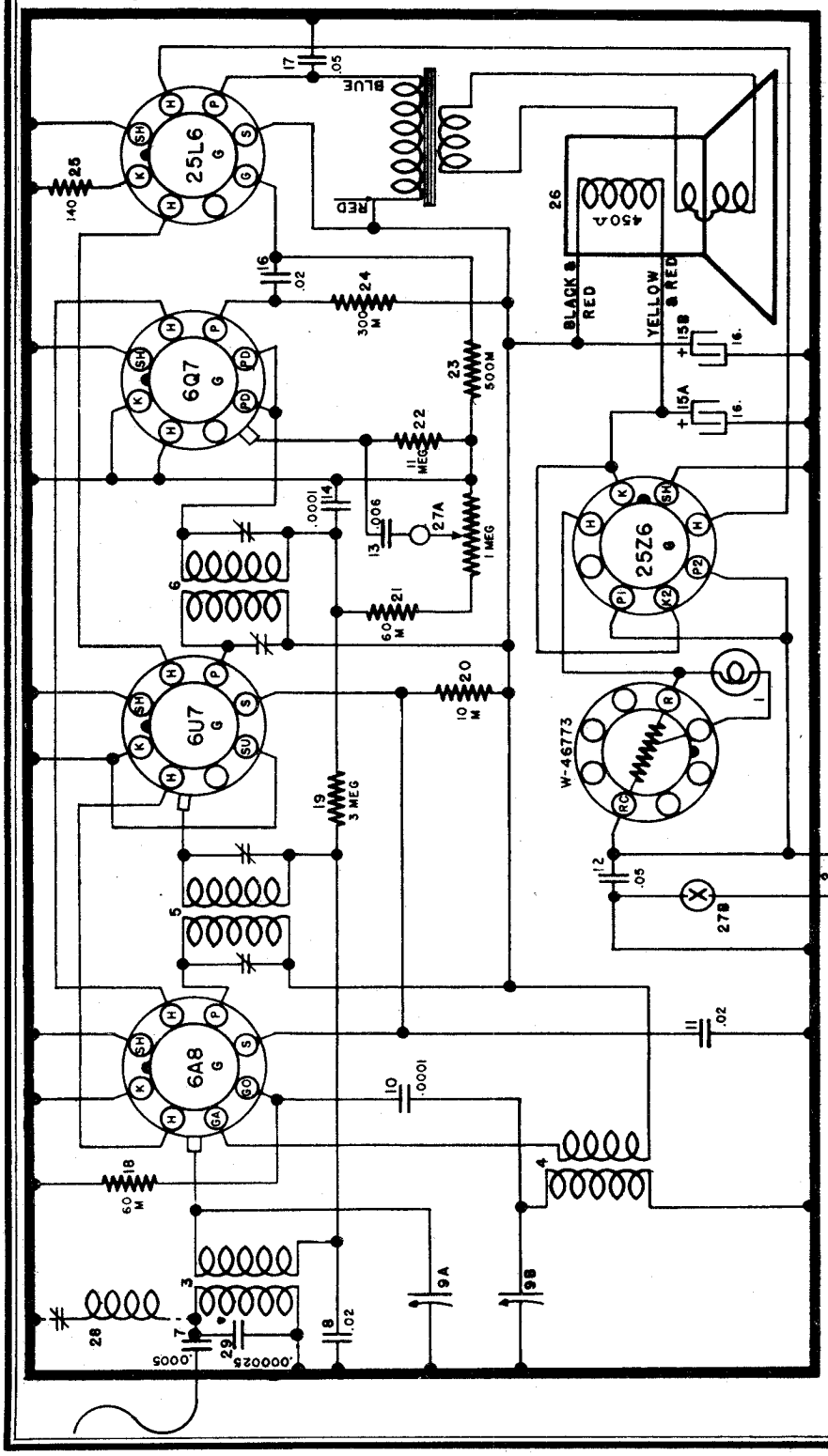


FIG. 1—WIRING DIAGRAM

Ballast tube is used to provide the proper heater voltage to the tubes. The filaments of the tubes are wired in series. A .05 mfd. condenser, item 12, is connected across the power supply leads to reduce electrical interference from that source.

## MODEL--648

## 455 K.C. I.F.

## CHASSIS NO. 648
## (Super Sextette)

## JANUARY, 1939

### SPECIFICATIONS

This model Crosley radio is designed for operation on 100 to 125 volt electric circuits, either AC or DC. The tuning range is from 540 to 1725 kilocycles (555 to 173 metres).

### CIRCUIT DESCRIPTION

Five Octal Glass tubes and one metal Ballast tube are employed in a superheterodyne circuit which consists of a combination oscillator-modulator tube, 455 kilocycle I-F amplifier, Beam Power output and power supply. The 6Q7 tube serves as the detector and 1st A-F amplifier and supplies AVC voltage to the grid of the 6A8-G and 6U7-G tubes. The bias for the 25L6-G tube is obtained from item 25 a 140 ohm resistor. A

### TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between the tube socket contacts and chassis. Voltage readings should be taken with a 1000 ohm per volt, 250 volt voltmeter (except filaments) with the volume control full "ON" and no signal input. The filament voltages should be measured with an accurate low range voltmeter. When measured on a 117.5 volt AC line voltage limits may vary plus or minus 10% of the values given.

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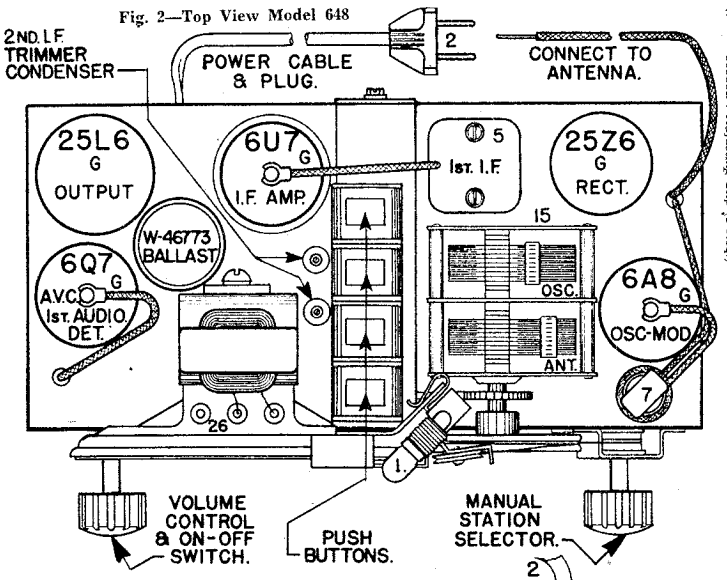
Fig. 2—Top View Model 648



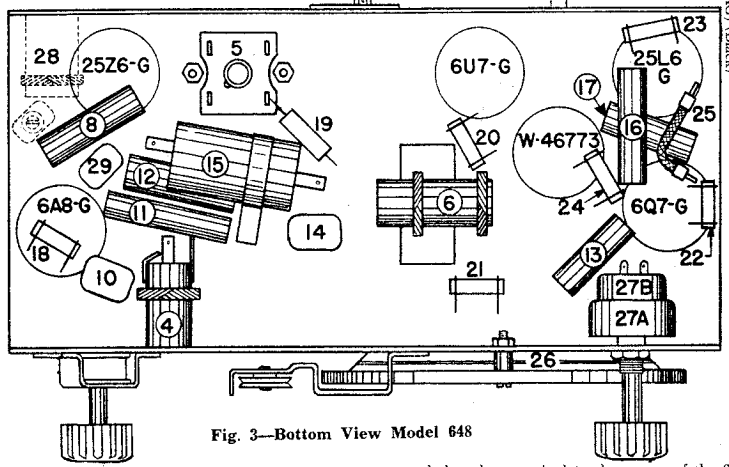




Fig. 3—Bottom View Model 648

| | | | |
|---|---|---|---|
| W | —45683 | G33 | |
| G26 | —45683 | W | |
| W | —50542C | W | |
| W | —45646B | W | |
| W | —50547 | W | |
| —50588B | Adjusting Clip (1 Req.) | | |

**PUSH BUTTON PARTS**

| | | | |
|---|---|---|---|
| W | —50607C | W | Push Button Unit Complete |
| W | —50561 | | Key Assembly |
| | | | Key Clip (Lock Clamp) |
| | | | Adjusting Clip (3 Req.) |
| G62 | —2046 | | Key Plate |
| | —45693 | | Adjusting Clip (1 Req.) |
| | —45841A | | |
| | —45879A | | |

| | | | |
|---|---|---|---|
| | | W | Spring (Key Return) |
| | | W | No. 6—40 x 3/8" Bearing Screw (Rocker Plate) |
| | | | No. 8 Shakeproof Washer |
| | | | Rocker Plate Assembly |
| | | | Push Button (8AH) (Brown) |
| | | | Push Button (8AH and 8AG) (Black) |

| | | | |
|---|---|---|---|
| | —46887 | | Call Letter Sheet (8AH and 8AG) |
| | —50841 | | Call Letter Sheet (8AK) |
| | —50551 | | Call Letter Cover (5 in Envelope) |
| | —46840A | | Instructions |
| | —46953 | | Knob (8AK) (Brown) |
| | —44532 | | Knob (8AH and 8AG) (Black) |

## ALIGNMENT PROCEDURE

The chassis of this receiver is connected to one side of the power supply **and** for this reason all test equipment should be thoroughly insulated in order that the power supply will not become short circuited while aligning the receiver.

### CONNECTING OUTPUT METER

Connect one terminal of the output meter to the plate and the other terminal to the screen of the 25L6G output tube. Be certain that the meter is protected from DC by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

### Tuning The I-F Amplifier To 455 Kilocycles

(a) Connect the output of the signal generator through a .02 mf. condenser to the grid cap of 6A8-G, leaving grid cap in place. Do not use a ground return from the signal generator unless it is found to be absolutely necessary. If it is found to be necessary, a small condenser (approximately .001 mfd.) should be connected in series with the ground terminal of the signal generator and the receiver chassis. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the plates of the condenser gang are completely out of mesh and turn the volume control to the right (ON).

(c) Set the signal generator to 455 kilocycles.

(d) Adjust the 2nd I-F trimmer condensers, Fig. 2, located between Push Button Assembly and speaker field, for maximum reading on the output meter.

(e) Adjust the 1st I-F trimmer condensers for maximum output.

(f) Repeat operations (d) and (e) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

### Aligning The R-F Amplifier.

Connect output of signal generator through a .0001 condenser to the antenna lead of receiver.

(a) Set the signal generator to 1725 kilocycles.

(b) With the condenser gang turned to the minimum capacity position, adjust the trimmer condenser on the "OSC" section of the gang so that the 1725 kilocycle signal is heard. It is not necessary that the receiver tune through this signal.

(c) Set the generator to 1400 kilocycles.

(d) Tune-in the 1400 kilocycle signal in the region of 140 on the dial for maximum output.

(e) Adjust the trimmer condenser located on the "ANT" section of the gang for maximum output.

NOTE: Do not readjust the "OSC" trimmer.

(f) Repeat operations (d) and (e) for more accurate adjustments.

## WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil and a fixed condenser as illustrated by dotted lines in the Wiring Diagram.

If any of the circuits have been re-aligned, check push buttons to see if they need resetting.

## SETTING THE PUSH BUTTONS

The push buttons are easily and accurately set from the top of the receiver. It is not necessary that all the buttons be set at the same time. Remove the push buttons to be set by grasping the button between the forefinger and thumb and pulling straight up. **Loosen** the set screws on the keys but do not remove them.

Determine the favorite broadcasting stations **whose** call letters are to be placed in the buttons. By **means** of the manual tuning knob, tune-in AS ACCURATELY AS POSSIBLE the station having the highest frequency —that is the station that is tuned-in nearest the 1500 Kc. end of the dial. Then push the front key all the way down, and while you hold it in that position SECURELY TIGHTEN THE SET-SCREW. Replace push button on key.

The push button tuning system is now correctly set for the 1st station. Follow through with this same procedure, setting the other stations in the order of their frequency (kilocycles). Detach the call letters of the favorite stations from the list supplied with your receiver and press them into the openings in the front of the push buttons. Thin pieces of clear celluloid are supplied in a small envelope and should be snapped in place over the call letters to protect and hold them in place.

## PARTS LIST — MODEL 648

Figures in first column refer to parts in Diagrams.

| Item No. | Part No. | Description |
|---|---|---|
| 1 | W —4099B | Dial Light, 6-8 Volt |
| | G6 —27134 | Dial Light Bracket Assembly |
| 2 | B —45784 | Power Cable and Plug |
| 3 | G185—32000 | Antenna Coil |
| 4 | G182—32002 | Oscillator Coil |
| 5 | G208—32004 | 1st I.F. Transformer |
| 6 | G209—32004 | 2nd I.F. Transformer |
| 7 | G3 —34002 | Condenser, .0005 Mf. Molded |
| 8 | W —45780B | Condenser, .02 Mf. 160 V. Paper |
| 9A | G66 —33001 | 2 Section Gang (Antenna Section / Oscillator Section) |
| 9B | | |
| | W —46753 | Var. Con. Mtg. Plate |
| | —6416 | No. 8—32 x 5/16" W. H. M. Screw |
| | C —46815A | Dial Glass |
| | W —46921 | Speed Nut (2 Req.) |
| | MG12—46750 | Dial Back Plate Assembly |
| | W —46831A | Dial Pointer |
| | G13 —41582 | Drive Cord (30 Inches) |
| | G4 —41582 | Guide Cord (9 Inches) |
| | W —46848 | Guide Cord Spring |
| | W —46087 | Drive Cord Spring |
| | G15 —43564 | Pulley and Hub Assembly |
| | W —23877 | Set Screw for Drive Pulley (2 Req.) |
| | W —46290 | Cord Clamp |
| | W —43542B | Drive Shaft Bracket |
| | —45746 | Drive Shaft |
| | —45808 | P. K. Screw for Bracket (2 Req.) |
| | O-8 | Flat Washer |
| 10 | G2 —34002 | Condenser, .0001 Mf. Molded |
| 11 | W —45780B | Condenser, .02 Mf. 160 V. Paper |
| 12 | W —45782B | Condenser, .05 Mf. 120 V. Paper |
| 13 | W —45810B | Condenser, .006 Mf. 160 V. Paper |
| 14 | G2 —34002 | Condenser, .0001 Mf. Molded |
| 15A | W —46398 | Condenser, 16 Mf. 125 V. Elect. (Condenser, 16 Mf. 125 V. Elect. |
| 15B | | |
| 16 | W —45780B | Condenser, .02 Mf. 160 V. Paper |
| 17 | W —45817B | Condenser, .05 Mf. 160 V. Paper |
| 18 | —21237A | Resistor, 60,000 Ohm 1/3W. Carbon |
| 19 | —36688 | Resistor, 3 Megohm 1/3W. Carbon |
| 20 | —21876 | Resistor, 10,000 Ohm 1/3W. Carbon |
| 21 | —21237A | Resistor, 60,000 Ohm 1/3W. Carbon |
| 22 | —46497 | Resistor, 11 Megohm 1/3W. Carbon |
| 23 | —23785 | Resistor, 500,000 Ohm 1/3W. Carbon |
| 24 | —21455 | Resistor, 300,000 Ohm 1/3W. Carbon |
| 25 | W —41759 | Resistor, 140 Ohm 1/2W. Flex. |
| 26 | 281-BL-7-"B" | Speaker, Spec. 55WA43 (450 Ohm) |
| | —47290 | Speaker Cone and V. C. Assembly |
| | —46686 | Field Coil (450 Ohm 60 M. A.) |
| | —46687 | Output Transformer |
| | —46685 | Cardboard Ring, Cone Mtg. |
| | W —46967A | Speaker Support Bracket |
| | —6876 | No. 6—32 x 1/4" Washer H. M. Screw |
| | N —5062 | No. 6—32 H. H. Nut |
| | W —20800 | No. 6 Shakeproof Washer |
| | L —10 | Lock Washer |
| | R —181 | No. 10—32 x 7/16" Ro. H. M. Screw |
| | W —4318B | Spacer |
| 27A | —46847 | (Volume Control (1 Meg.) |
| 27B | | (Power Switch |
| 28 | W —46668 | 3/16" Palnut |
| 29 | G178—36400 | 8 Prong Socket (No Marking) |
| | W —46773 | Ballast Tube |
| | W —40911 | Tube Shield |
| | G184—32004 | Wave Trap |
| | G6 —34002 | Condenser, .000025 Mf. 200 V. Molded |
| | —46894 | 8AK Cabinet (Brown) |
| | —46909 | 8AH Cabinet (Ivory) |
| | —47081 | 8AG Cabinet (Red) |
| | —46842A | 8AK Cabinet Back |
| | —46876A | 8AH Cabinet Back |
| | —46990A | 8AG Cabinet Back |
| | B —128 | Screws for Mounting Back (4 Req.) |
| | —46816 | Rubber Bottom Mtg. Screw (4 Req.) |

# CROSLEY CORP.

MODELS 628, 638 (Late)
5628
Socket, Trimmers, Chassis
Alignment, Data, Late Parts

## OCTOBER, 1938 CHASSIS MODEL 628—638—5628

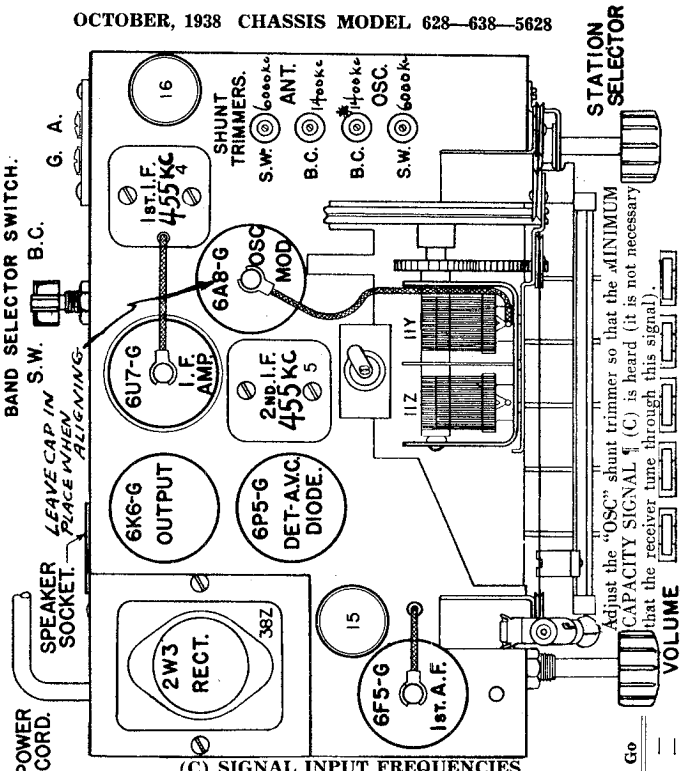
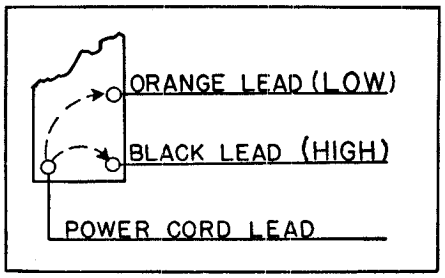



Fig. 2 Top View—Model 628—638—5628

### 50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts.




The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

### (C) SIGNAL INPUT FREQUENCIES

| | Minimum Capacity Signal | Shunt Alignment Signal |
|---|---|---|
| American Broadcast Band | 1,725 Kilocycles | 1,400 Kilocycles |
| Short-Wave Band | 7,000 Kilocycles | 6,000 Kilocycles |

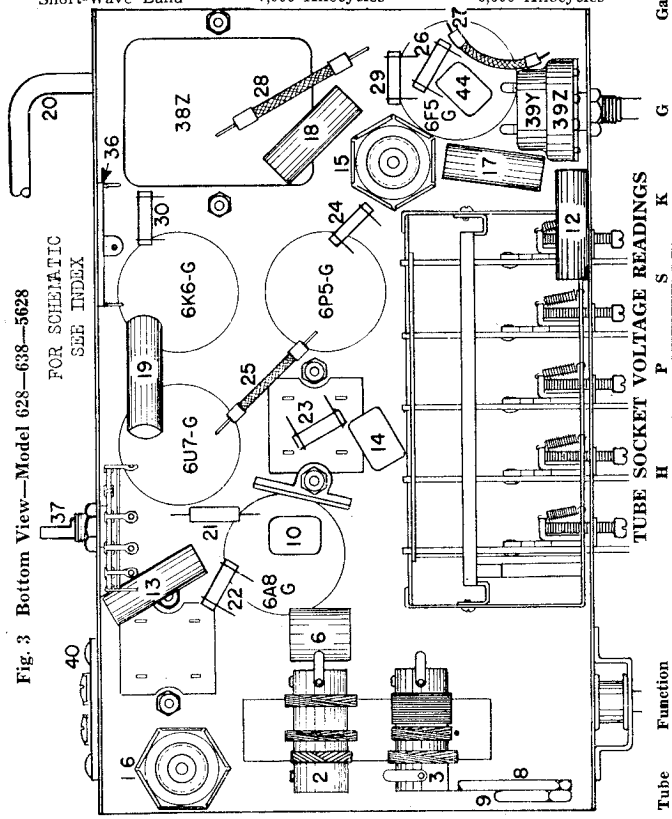



Fig. 3 Bottom View—Model 628—638—5628

### TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | K | G | Ga | Go |
|---|---|---|---|---|---|---|---|---|
| 6A8G | Oscillator-Modulator | 6.3 | 175 | 80 | — | — | 175 | — |
| 6U7G | I-F Amplifier | 6.3 | 175 | 80 | — | — | — | — |
| 6P5G | Detector—A. V. C. | 6.3 | — | — | — | — | — | — |
| 6F5G | 1st. A-F Amplifier | 6.3 | 105 | — | — | — | — | — |
| 6K6G | Power Output | 6.3 | 160 | 170 | — | -14.5 | — | — |
| 2W3 | Rectifier | 2.2 | — | — | 230 | | | |

Voltage drop across speaker field 45 volts.
Maximum power output approximately 2 watts.
Power consumption at 117.5 volts approx. 37 watts.

### (LATE) PARTS LIST—MODEL 628, 638—5628 (FOR OTHER PARTS SEE SCHEMATIC DIAGRAM)

| Item No. | Part No. | Description | | | |
|---|---|---|---|---|---|
| | | **Model 628** | | | |
| 39Z, 39Y, 39Z, 39Y | —45940 | Power Trans., 50 Cycle, 220 V. | | 8AB | Cabinet (Red) |
| | —45864 | Vol. Cont., 1 Meg. (628-5628) | | 8AC | Cabinet (Ivory) |
| | | Line Switch | | —44552 | Knob, V. C. & Tuning |
| | —46314 | Vol. Cont., 1 Meg. (638) | | —44934 | Knob, Band Switch |
| | | Line Switch | W | —46867 | Station Call List |
| 17 | —28619 | Condenser, .006 Mf., 200 V. | | —50551A | Call Letter Cover |
| 22 | —33390 | Resistor, 30,000 Ohm, 1/3 W. | | —50617 | Push Button |
| 26 | —37564 | Resistor, 11 Megohm, 1/3 W. | | —45910 | Instructions (628) |
| 28 | —21965 | Resistor, 375 Ohm, 1 W (was 275 Ohm) | W | —46326 | Instructions (638) |
| | | | | —46897 | Instructions (5628) |
| | | **Model 628** | | | **Model 638** |
| | 8AA | Cabinet (Brown) | | 8G | Cabinet (Wood Has Inlays) |
| | —43552 | Clamp, Speaker Plug | W | 8K | Cabinet (Wood) |
| | —45957 | Knob, Band Switch | | —46399C | Escutcheon |
| | —45771 | Station Call List | | D—30 | Screws, Escutcheon Mtg. |
| | —50841 | Push Button | | —46407 | Knob, Band Switch |
| | —45553B | Celluloid Call Letter Cover | | —46408 | Knob, V. C. & Tuning |
| | —50551A | | W | —50841 | Station Call List |
| | | | | —50551A | Celluloid Cover |
| | | | | —46417 | Push Button |

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MODEL 667
Socket, Trimmers, Chassis
Voltage

CROSLEY CORP.

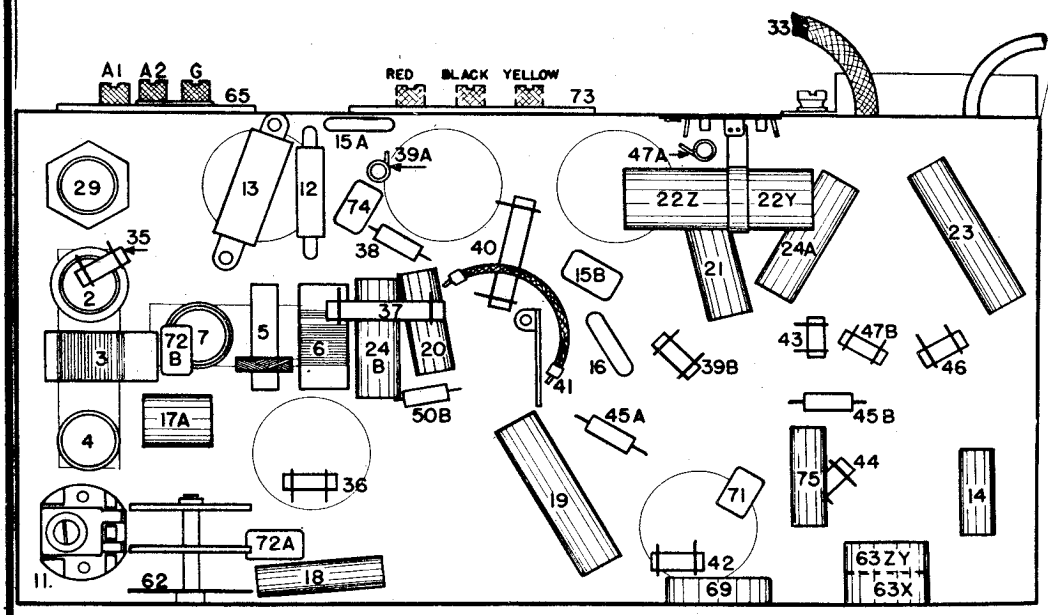


Fig. 3—Bottom View Model 667

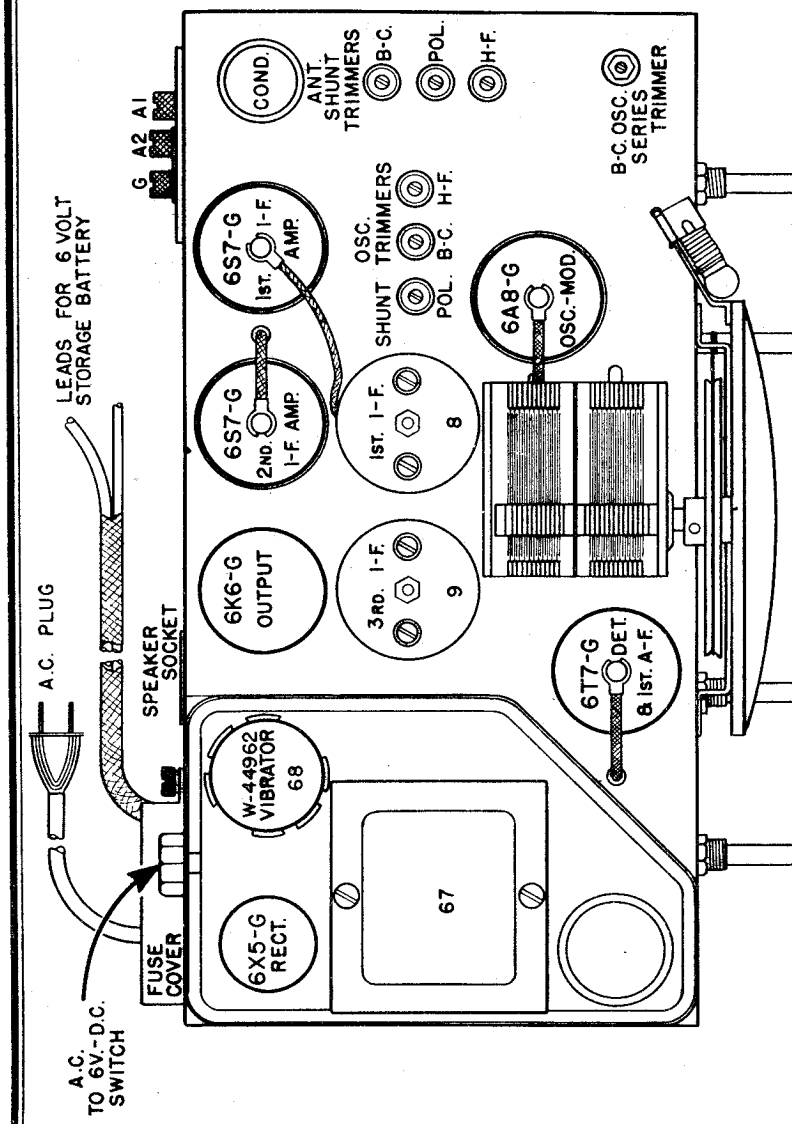


Fig. 2—Top View Model 667

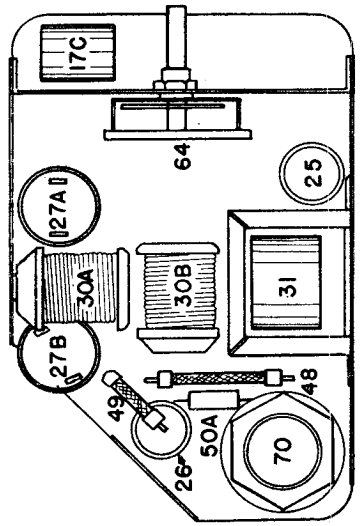


Fig. 4—Power Unit—Model 667

TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | G | Go | Ga |
|---|---|---|---|---|---|---|---|
| 6A8G | Oscillator-Modulator | 6.2 | 170 | 92 | -3* | -6 to -9** | 125 |
| 6S7G | 1st I-F. Amplifier | 6.2 | 150 | 92 | -3* | — | — |
| 6S7G | 2nd I-F. Amplifier | 6.2 | 198 | 92 | -2 | — | — |
| 6T7G | Det. AVC & 1st A. F. | 6.2 | 100 | — | -2 | — | — |
| 6K6G | Output | 6.2 | 193 | 198 | -18.5* | — | — |
| 6X5G | | | | | | | |

Power consumption approximately 25 watts at 117.5 volts or 5 amperes at 6 volts.
Power output approximately 3 watts at 117.5 volts or 2.5 watts at 6 volts D. C.
When using a 6 volt storage battery, all voltages will be approximately as given except "H" which will be 6 volts.
*See CIRCUIT DESCRIPTION.
**100 to 150 microamperes measured between 60,000 ohm grid lead (item 36) and chassis.

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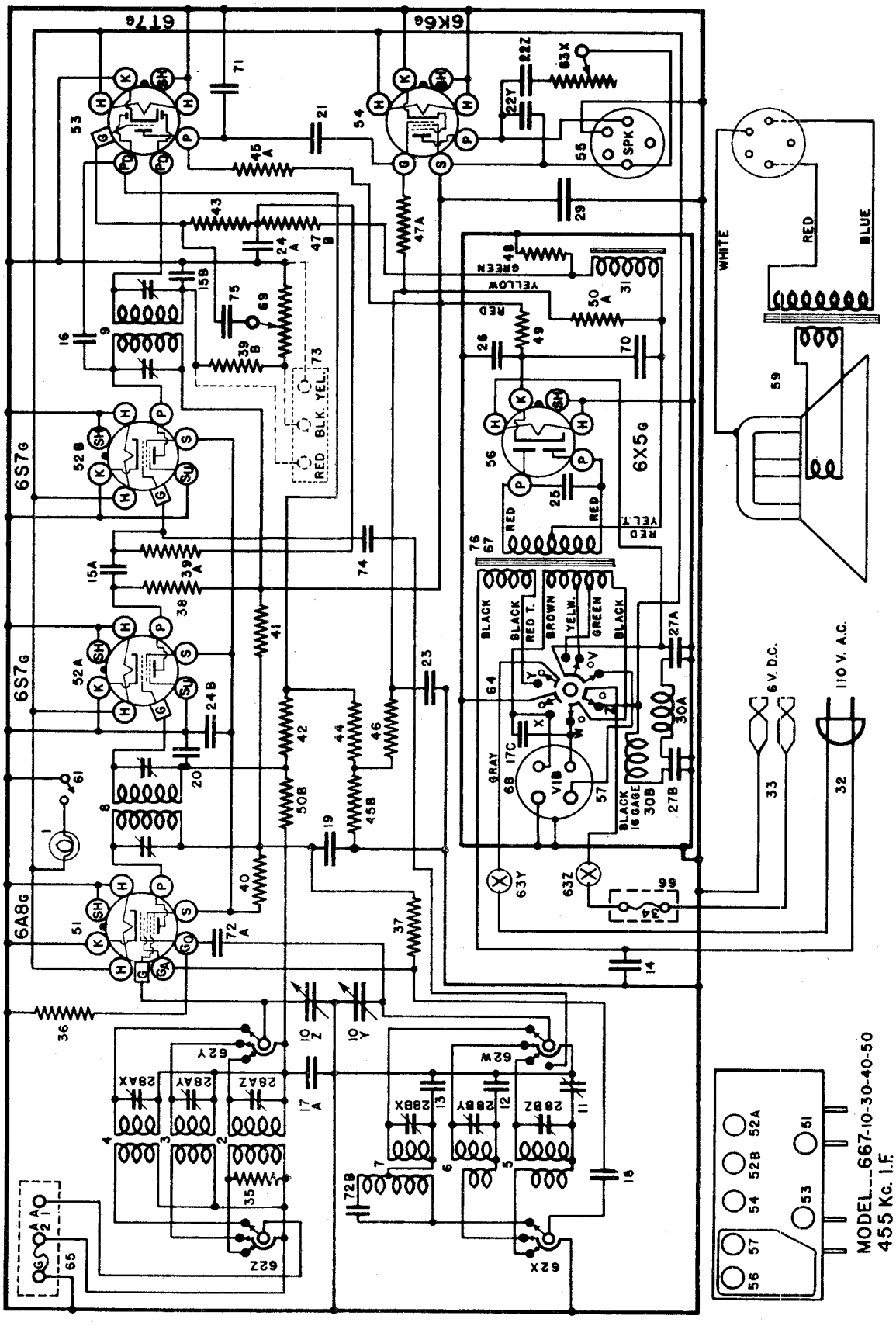
CROSLEY CORP.

MODEL 667
Schematic

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## CIRCUIT DESCRIPTION

Six octal base glass tubes are employed in a superheterodyne circuit which consists of an oscillator-modulator tube, two-stage 455 kilocycle I-F amplifier, composite detector, AVC and 1st A-F amplifier tube, pentode output and power supply. Items 45B, 46 and 50 serve as a voltage divider. The initial bias for the 6A8G and 6S7G 1st I-F tubes is obtained by the voltage drop across item 45B, measured with a vacuum tube voltmeter or 20,000 ohms per volt voltmeter. The bias for the 6S7G 2nd I-F and 6T7G tubes is developed across item 48. The bias for the output tube is obtained by the voltage drop across items 45B and 46, also measured with a vacuum tube voltmeter or 20,000 ohms per volt voltmeter.

When the AC-DC change-over switch is turned to the "6 volt" position as shown in the wiring diagram, the BROWN to BLACK winding of the power transformer serves as the primary and the filament voltage is taken direct from the storage battery. When the switch is thrown to the "AC" position, the BLACK to BLACK with RED tracer winding serves as the primary and the filament voltage is obtained across the GREEN and BROWN leads.

## SOCKET VOLTAGES

The tube socket voltages are measured from the tube prongs to the chassis with a 1000 ohm per volt, 500 volt voltmeter (except filaments) with the receiver in operating condition and the volume control full on but with no signal input. The filament voltages should be measured with a low range voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

## ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

## CONNECTING OUTPUT METER

Connect the output meter to the plate and screen of the 6K6G output tube. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

**Tuning the I-F Amplifier to 455 Kilocycles.**

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the ground terminal (G) of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right, (ON).

(c) Turn the band selector switch to the Standard Broadcast Band.

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 3rd I-F transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I-F transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

**Aligning the R-F Amplifier.**

When aligning the R-F amplifier, the output lead from the signal generator is connected to the antenna (A1) terminal of the receiver. For the Broadcast Band, a 200 mmf. condenser should be connected in series with the output lead of the signal generator and for the Police and Short Wave Bands, a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated for each adjustment, paragraph (D) below.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "OSC" shunt trimmer so that the MINIMUM CAPACITY SIGNAL (D) is heard. (It is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (D) is tuned-in wih maximum output. Then, adjust the "ANT" shunt trimmer for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "ANT" trimmer. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Police and Short Wave bands, care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times or more and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(c) To align the series trimmer (See Fig. 2), set the signal generator to the frequency indicated below (D) and then tune-in this signal with the station selector maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

### (D) SIGNAL INPUT FREQUENCIES

| | Min. Cap. Signal | Shunt Align. | Series Align. |
|---|---|---|---|
| Standard Broadcast Band | 1725 Kilocycles | 1400 Kilocycles | 600 Kilocycles |
| Police Band | 6.6 Megacycles | 6.0 Megacycles | |
| Short Wave Band | 22.5 Megacycles | 18 Megacycles | |

## SPECIFICATIONS

This model Crosley radio is a six-tube superheterodyne receiver designed for operation either from a 6-volt storage battery or commercial A. C. power supply. No "B" or "C" batteries are required when the receiver is operated from a storage battery. The tuning range is divided into three bands as follows:

535-1725 Kilocycles or 550-173 Metres (Standard Broadcast)
1.9- 6.6 Megacycles or 158-45.5 Metres (Police and Amateurs)
6.4- 22 Megacycles or 47-13.5 Metres (Short Wave).

## PARTS LIST—MODEL 667

Figures in first column refer to parts in Diagrams.

| Item No. | Part No. | Description |
|---|---|---|
| 1 | W —44337 | Dial Light Bulb, 6-8 V. |
| | G6 —27134 | Dial Light Socket Assy. |
| 2 | G157—32000 | Ant. Coil, B-C. |
| 3 | G158—32000 | Ant. Coil, Pol. |
| 4 | G153—32000 | Ant. Coil, H-F. |
| 5 | G159—32002 | Osc. Coil, B-C. |
| 6 | G157—32002 | Osc. Coil, Pol. |
| 7 | G162—32002 | Osc. Coil, H-F. |
| 8 | G153—32004 | 1st I-F.—455 Kc. |
| 9 | G179—32004 | 3rd I-F.—455 Kc. |
| 10 | G41 —33001 | 2 Section Gang Condenser |
| | B —45009A | Dial Face (6 V.-110 V.) |
| | B —45009 | Dial Face (Export Only) |
| | C —44964A | Support Brkt.—Dial Glass |
| | W —44085B | Metal Mask—Dial |
| | W —44084B | Ring—Glass Support |
| | W —44299 | Pointer |
| | W —40486 | Screw—Pointer Mtg. |
| | W —43622 | Felt Washer |
| | G1 —43564 | Pulley and Hub Assy. |
| | —41582 | Drive Cord (18 in.) |
| | W —43561 | Drive Spring (Tension) |
| | W —44130A | Drive Shaft |
| | W —43549 | Ring—Shaft Retaining |
| 11 | —40769 | B-C. Osc. Series Trimmer (Variable) |
| 12 | G23 —34000 | Pol. Osc. Series Trimmer (Fixed 1,560 Mmf.) |
| 13 | G20 —34000 | H-F. Osc. Series Trimmer (Fixed 4,910 Mmf.) |
| 14 | W —30805 | Condenser, .01 Mf. 400 V. |
| 15A | G2 —34002 | Condenser, .0001 Mf. Molded |
| 15B | G2 —34002 | Condenser, .0001 Mf. Molded |
| 16 | G3 —34002 | Condenser, .0005 Mf. Molded |
| 17A | W —35936 | Condenser, .05 Mf. 200 V. |
| 17C | W —35936 | Condenser, .05 Mf. 200 V. |
| 18 | W —35139 | Condenser, .004 Mf. 400 V. |
| 19 | W —22688 | Condenser, .1 Mf. 400 V. |
| 20 | W —28621 | Condenser, .02 Mf. 200 V. |
| 21 | W —30488 | Condenser, .02 Mf. 400 V. |
| 22Z | | Condenser, .05 Mf. 400 V. |
| 22Y | W —31052 | Condenser, .004 Mf. 400 V. |
| 23 | W —34712 | Condenser, .25 Mf. 160 V. |
| 24A | W —24049C | Condenser, .1 Mf. 200 V. |
| 24B | W —24049C | Condenser, .1 Mf. 200 V. |
| 25 | W —50068A | Condenser, .006 Mf. 1,000 V. (60 Cy.) |
| 25 | W —45473 | Condenser, .003 Mf. 1,000 V. (25 Cy.) |
| 26 | W —37173 | Condenser, .25 Mf. 300 V. |
| 27A | W —50161 | Condenser, .5 Mf. 120 V. |
| 27B | W —50161 | Condenser, .5 Mf. 120 V. |
| 28 | W —35951A | 3 Section Shunt Trimmer Assy. |
| 29 | W —44012 | Condenser, 16 Mf. 250 V. |
| 30A | G25 —28067 | Choke "A" Filter |
| 30B | G25 —28067 | Choke "A" Filter |
| 31 | G22 —29535 | Choke "B" Filter |
| 32 | B —44004 | A-C Power Cord and Plug |
| 33 | G2 —44948 | Battery Cable and Clips |
| | —34903 | Battery Clip (Pos.) |
| | —34904 | Battery Clip (Neg.) |
| 34 | W —31103 | Fuse, 10 Amp. |
| 35 | —22196 | Resistor, 20,000 Ohm ½W. Carb. |
| 36 | —21237A | Resistor, 60,000 Ohm ½W. Carb. |
| 37 | —4921C | Resistor, 10,000 Ohm 1W. Carb. |
| 38 | —36316 | Resistor, 2,700 Ohm ¼W. Ins. |
| 39A | —21875 | Resistor, 100,000 Ohm ½W. Carb. |
| 39B | —21875 | Resistor, 100,000 Ohm ½W. Carb. |
| 40 | —23616 | Resistor, 15,000 Ohm 1W. Carb. |
| 41 | W —23013 | Resistor, 2,000 Ohm 1½W. Flex. |
| 42 | —34883 | Resistor, 2 Megohm ½W. Carb. |
| 43 | —26577 | Resistor, 3 Megohm ½W. Carb. |
| 44 | —37590 | Resistor, 750,000 Ohm ½W. Carb. |
| 45A | —35601 | Resistor, 300,000 Ohm ¼W. Ins. |
| 45B | —35601 | Resistor, 300,000 Ohm ¼W. Ins. |
| 46 | —37245 | Resistor, 1.5 Megohm ½W. Carb. |
| 47A | —23785 | Resistor, 500,000 Ohm ½W. Carb. |
| 47B | —23785 | Resistor, 500,000 Ohm ½W. Carb. |
| 48 | W —23012A | Resistor, 40 Ohm ¾W. Flex. |
| 49 | W —27504 | Resistor, 100 Ohm ½W. Flex. |
| 50A | —35600 | Resistor, 100,000 Ohm ¼W. Ins. |
| 50B | —35600 | Resistor, 100,000 Ohm ¼W. Ins. |
| 51 | G156—36400 | Socket, Type 6A8 |
| 52 | G182—36400 | Socket, Type 6S7 |
| 53 | G183—36400 | Socket, Type 6T7 |
| 54 | G172—36400 | Socket, Type 6K6 |
| 55 | G103—28807 | Socket Snkr. |
| 56 | G168—36400 | Socket, Type 6X5 |
| 57 | G105—28807 | Socket Vib. |
| | W —40911 | Tube Shield |
| 59 | 51PP18"B" | Speaker, Spec. No. 100-PG-4 (Console) |
| 59 | 31PP18"A" | Speaker, Spec. No. R-6000, M-16 (Table Model) |
| | —44218 | V. C. and Cone Assy. |
| | —44220 | Cone Mtg. Ring (Cardboard) } 31PP18"A" only |
| | —45071 | Output Transformer } |
| 60 | | |
| 61 | G1 —44950 | Switch—Dial Light |
| 62 | —44019A | Band Switch |
| 63 | —44946 | Switch—On-Off and Tone Control (100,000 Ohm) |
| 64 | W —44951 | Switch—A. C.-D. C. |
| 65 | G27 —26719 | Ant. and Gnd. Terminal Assy. |
| 66 | G2 —33339 | Fuse Panel |
| | W —33310A | Fuse Cover |
| | W —34223 | Insulator—Fuse Cover |
| | W —4072 | Thumb Screw—Fuse Cover |
| 67 | —44961 | Power Trans., 50-60 Cy.—110 V. |
| 68 | W —44962A | Vibrator (6 V.) |
| 69 | —44081 | Volume Control (1 Megohm) |
| 70 | W —44990 | Condenser, 30 Mf. 250 V. |
| 71 | G1 —34002 | Condenser, .00025 Mf. Molded |
| 72A | G5 —34002 | Condenser, .00005 Mf. Molded |
| 72B | G5 —34002 | Condenser, .00005 Mf. Molded |
| 73 | G37 —26719 | Phono. Terminal Assy. |
| 74 | G13 —34002 | Condenser, .000035 Mf. Molded |
| 75 | W —41461 | Condenser, .0014 Mf. 200 V. |
| 76 | —45454 | Power Trans., 25 Cy.—125 V. |
| | —45497 | Power Trans., 25 Cy.—220 V. |
| | —45498 | Power Trans., 50 Cy.—220 V. |
| | 7G | Cabinet—Table |
| | 7WD | Cabinet—Console |
| | B —44226B | Escutcheon |
| | W —43553 | Rubber Mtg. Foot |
| | W —41221 | Knob—Station Selector } |
| | W —41222 | Knob—Dial Light } |
| | W —41605 | Knob—Vol. Cont. |
| | W —41224 | Knob—Tone Cont. |
| | W —45037 | Knob—Band Sw. |
| | W —28601 | Knob—A. C.-D. C. Sw. |

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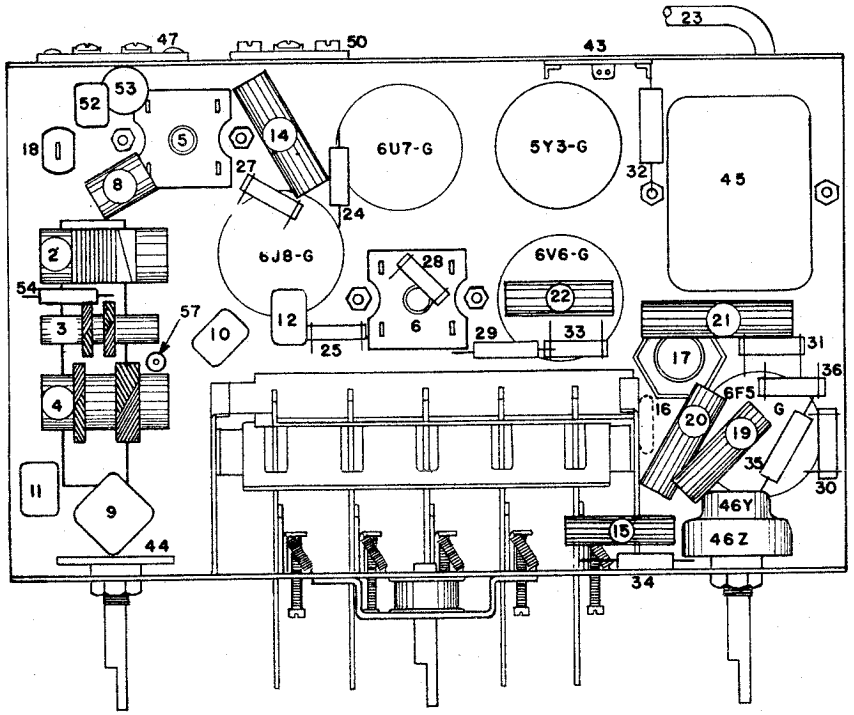


Fig. 3 Bottom View Model 718

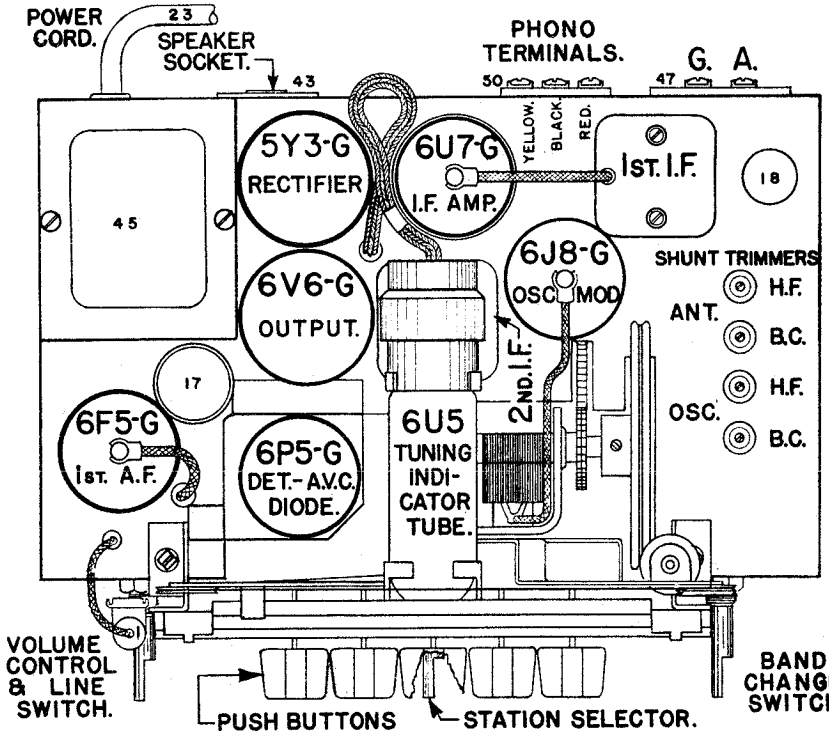


FIG. 2 Top View Model 718

## SPECIFICATIONS

This model Crosley is a compact seven-tube superheterodyne receiver designed for operation on ALTERNATING CURRENT as specified on the Model and License sticker.

The features included in its design consist of a Mechanical Push Button Tuning System, Beam Power Output Tube, Radio-Log Dial, Tuning Indicator Tube, Bass Compensation and a moving coil dynamic speaker.

The Tuning Range is divided into two bands as follows:

540-1725 Kilocycles or 555-173 Meters (American and some Police)
5.7- 18.3 Megacycles or 52.6-16.4 Meters (Foreign)

The tubes used and their functions are as follows: one 6J8G as Oscillator-Modulator, one 6U7G as I-F amplifier, one 6P5G as Detector, A. V. C. diode, one 6F5G as first Audio amplifier, one 6V6G as Beam Power output, one 5Y3G as Rectifier and one 6U5 as eye Tuning Indicator.

The initial bias for the 6J8G and 6U7G (drop across item 34 a 60 ohm resistor) is measured from chassis to the low end of the volume control. For the 6F5G, (drop across item 35 a 32 ohm resistor) is measured from the low end of the 10 megohm resistor to the cathode of the 6F5G. The bias for the 6V6G is obtained from the drop across items 34, 35, 32, 60 ohms, 32 ohms, 100 ohms respectively, measured from the junction of item 32 and speaker field to chassis. The speaker field is in the negative leg of the power supply. Item 51Y is a 1 megohm resistor assembled in the socket of the 6U5.

## TUBES AND VOLTAGE LIMITS

The following table gives the functions of the tubes used, together with the voltage readings between tube socket contacts and chassis. Voltage readings taken with a 1,000 ohm per volt, 500 volt voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A-C voltmeter (Approximately 0 to 10 volts). Voltage limits may vary plus or minus 10% of values given.

**TUBE SOCKET VOLTAGE READINGS**

| Tube | Function | H | P | S | G | Ga | K |
|---|---|---|---|---|---|---|---|
| 6J8G | Oscillator-Modulator | 6.3 | 172 | 88 | -3 | 120 | 0 |
| 6U7G | I-F Amplifier | 6.3 | 172 | 88 | -3 | 0 | 0 |
| 6P5G | Detector A.V.C. Diode | 6.3 | 0 | 0 | 0 | 0 | -3 |
| 6F5G | 1st A-F Amplifier | 6.3 | 100 | 0 | -2 | 0 | -3 |
| 6V6G | Output | 6.3 | 160 | 172 | -10 | 0 | 0 |
| 5Y3G | Rectifier | 3.9 | A.C. | | | | 217 |
| 6U5 | Tuning Indicator | 6.3 | 170 | | | | |

Maximum power output approximately 5 watts.
Voltage across speaker field 37 volts.
Power consumption approximately 52 watts at 117.5 line.

**OCTOBER, 1938** FOR SCHEMATIC SEE INDEX **CHASSIS MODEL 718**

## ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits can best be properly aligned with the use of a modulated signal generator and an output meter.

## SETTING THE PUSH BUTTONS

Should it become necessary to realign the various circuits of this receiver, it may be necessary to reset the Push Button Tuning System.

The buttons are set by means of a set screw that is accessible through the front of the push button.

Loosen set screw, tune-in with the manual tuning knob the station whose call letters are to be placed in that button.

PUSH THAT BUTTON ALL THE WAY DOWN, AND WHILE YOU HOLD IT IN THAT POSITION, SECURELY TIGHTEN THE SET SCREW.

The first button is now set, follow the same procedure with the rest of the push buttons.

The accuracy of the buttons depends on how accurate the station is tuned-in while setting them.

## CONNECTING OUTPUT METER

Connect the output meter to P and S of the 6V6G Output Tube. Be sure the meter is protected from D.C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

### 1. Tuning I-F Amplifier To 455 Kilocycles

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6J8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the "GND" terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh and turn the volume control to the right (ON).

(c) Turn the band selector switch to the left (American Broadcast Band).

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F Transformer for maximum output. (Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F Transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustments.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

### 2. Aligning R-F Amplifier

When aligning the R-F amplifier the output of the modulated signal generator should be fed through a dummy antenna and connected to the "ANT" terminal of the receiver.

For the "Foreign" band use a 250 ohm carbon resistor for dummy and for the "American" band use a .0002 Mf. condenser.

Align the "Foreign" band first.

(a) Set Band selector to "Foreign" band, right.

(b) Set signal generator to 18.3 Megacycles.

(c) Open gang all the way. Minimum capacity.

(d) Tune-in with H-F Osc. shunt trimmer 18.3 signal. This signal will be heard at two settings of this trimmer always choose the setting furthest open.

(e) Set signal generator to 18.0 Megacycles.

(f) Tune-in 18.0 Mc. signal with station selector, then align the H-F ANT. trimmer condenser for maximum output. DO NOT ADJUST OSC. TRIMMER AT THIS FREQUENCY.

(g) Repeat operations (d), (e) and (f) until no further improvement can be obtained.

(h) Set the band selector to the American Broadcast band.

(i) Set the signal generator to 1725 Kilocycles.

(j) Open the gang all the way. Minimum capacity.

(k) Adjust B-C OSC. trimmer for maximum output.

(l) Set signal generator to 1400 Kc.

(m) Tune receiver for maximum general signal (approx. 140 on the dial).

(n) Adjust B-C ANT. trimmmer for maximum output. DO NOT RE-ADJUST OSC. TRIMMER AT 1400 Kc.

(o) REPEAT operations (m) and (n) alternately until no further improvement in output can be obtained.

NOTE: If at any time the H-F coils in this receiver are replaced, it may be necessary to vary the inductance of the "OSC" coil by moving the cross-over turn of wire at the gap to make the set track at the 6 megacycle end. Moving the turn toward the short end of the coil will decrease the inductance and moving it toward the long end will increase the inductance. If the signal is weak at 6 megacycles, a similar slight change in the inductance at the "ANT" coil should bring up the signal strength. THIS IS A CRITICAL OPERATION AND SHOULD NOT BE DONE ON ANY SET UNLESS CHANGING COILS MAKES IT NECESSARY.

NOTE: When aligning the high frequency band care should be exercised so that the circuits will be aligned on the fundamental frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator approximately 10 times and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles below the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct dial setting.

## WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 Kc. This assembly is located on the underneath side of the chassis and consists of a coil and a trimmer condenser as indicated by item 48 in the wiring diagram.

The wave trap should not be adjusted until all other adjustments have been made. To adjust, feed a 455 Kc. signal through a .0002 Mf. condenser to the antenna terminal of the receiver. With the band selector turned to the broadcast band and the condenser gang closed and the volume control on full, adjust the trimmer condenser on the wave-trap for MINIMUM SIGNAL.

Should the interfering station be operating on a frequency of slightly more or less than 455 Kc., the exact frequency should be determined with the aid of a signal general by the beat note method. Then instead of feeding a 455 Kc. signal through, the exact frequency of the interfering station should be used. If it is not possible to determine the exact frequency of the interfering signal, the antenna may be attached to the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave-trap for minimum interference.

## REPLACING DIAL DRIVE CORD

To replace a broken drive cord proceed as follows:

1—Remove broken cord from dial pointer and the cord tension spring from the large pulley on the condenser gang.

2—Remove complete dial assembly, fastened with two P. K. screws to top of chassis.

3—Remove screw and washer that fastens felt key mask to chassis and fold felt to one side.

4—Remove manual drive shaft bracket, fastened with two P. K. screws.

5—Place ends of replacement drive cord (G3-41582) together and tie a knot about 1¼ inches from the end. Slip tension spring through knot. Fasten the other end of spring on hook in large pulley on gang.

6—Close the gang then thread loop through the eyelet in pulley rim.

7—Bring one side of drive cord loop forward over pulley and around (¼ turn) horizontal idler pulley, then under and over the righ hand idler pulley (counter-clockwise).

8—Loop the other side of drive cord over large pulley on gang in a clockwise direction, continue around and up and over the small idler pulley.

9—Then remove drive shaft from chassis, wrap two complete turns around pulley on the shaft, taking the cord coming over the small idler pulley and wrapping in a clockwise direction while holding shaft in right hand.

10—Replace drive shaft in position, taking care that the drive cord coming down to the pulley goes between the 4th and 5th keys and the cord going up from the pulley goes between the 1st and 2nd keys.

11—Hook drive cord over left hand idler pulley. Mount drive shaft bracket in position. Check to see that cord is running on all pulleys, and tension spring is stretched to approx. one inch in length.

12—Place drive cord clamp (W-46290) on drive cord approx. ⅛ inch from inside edge of large pulley rim.

13—Replace key felt, rubber bands and dial assembly.

14—Close gang, set the pointer at 540 Kc., place cord in pointer, check pointer travel from end to end before gluing cord to pointer.

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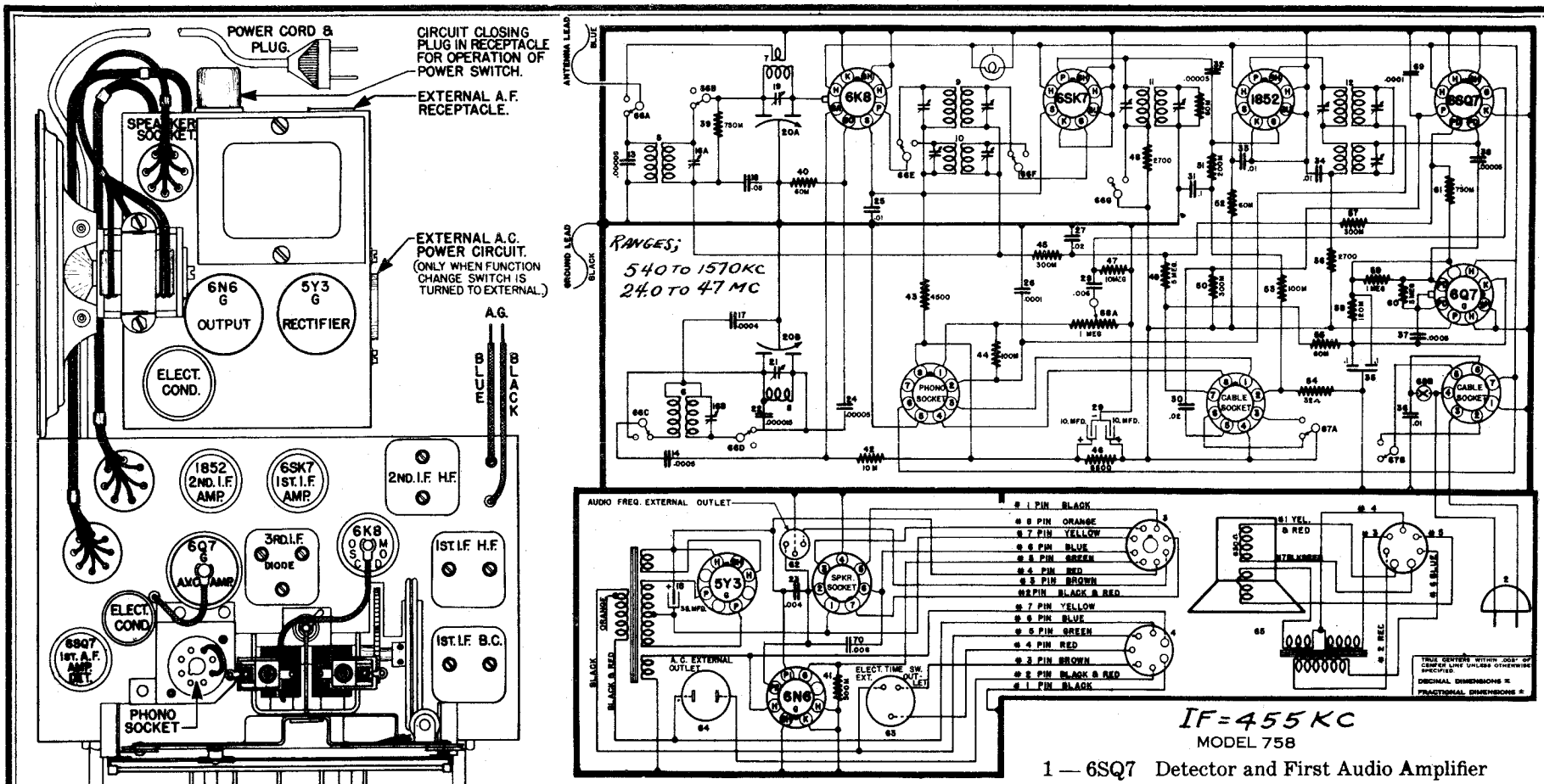


MODEL 758

1 — 6K8 Oscillator and Mixer or Modulator

1 — 6SK7 1st Intermediate Frequency Amplifier

1 — 1852 2nd Intermediate Frequency Amplifier

1 — 6SQ7 Detector and First Audio Amplifier

1 — 6Q7-G Automatic Volume Control Amplifier

1 — 6N6-G Triple Twin Output

1 — 5Y3-G Rectifier

| | | |
|---|---|---|
| 1 | W-37922 | Bulb, Dial Light 6-8V |
| 2 | B-45769-A | Cable & Plug A.C. |
| 3 | B-47154 | Cable & Plug 8-Lead |
| 4 | B-47153 | Cable & Plug 7-Lead |
| 5 | G192-32000 | Coil B.C. Ant. |
| 6 | G190-32002 | Coil B.C. Osc. |
| 7 | G191-32000 | Coil Ultra H.F.Ant. |
| 8 | G189-32002 | Coil Ultra H.F. Osc. |
| 9 | G214-32004 | 1st I.F. Trans. B.C. |
| 10 | G213-32004 | 1st I.F. Trans. H.F. |
| 11 | G215-32004 | 2nd I.F. Trans. |
| 12 | G212-32004 | Dual I.F.Trans. |
| 13 | G5-34002 | Cond. 50 MMF Mica |
| 14 | G3-34002 | Cond. 500 MMF Mica |
| 15 | W-36055-B | Cond. 35 MF 400V(Elec.) |
| 16A | W-47147 | Trimmer Cond.(B.C.Ant.) |
| 16B | | Trimmer Cond.(B.C.Osc.) |
| 17 | G18-34002 | Cond. 400 MMF Mica |
| 18 | W-35936 | Cond. .05 MF 200V Paper |
| 19 | W-45979 | Trimmer Cond.(U.H.F.Ant.) |
| 20A | G70-33001 | Var.Cond. (Ant.Sect.) |
| 20B | | Var.Cond. (Osc.Sect.) |
| 21 | W-47126 | Trimmer Cond.(U.H.F.Osc.) |
| 22 | G1-34009 | Cond.15 MMF Temp.Comp. |
| 23 | W-35139 | Cond. .004 MF 400V Paper |
| 24 | G2-34009 | Cond.50 MMF Temp.Comp. |
| 25 | W-23191-A | Cond..01 MF 400V Paper |
| 26 | G2-34002 | Cond. 100 MMF Mica |
| 27 | W-28621 | Cond. .02 MF 200V Paper |
| 28 | W-34713 | Cond. .006 MF 160V Paper |
| 29 | W-47256 | Cond. 10-10 MF 300V(Elec) |
| 30 | W-30488 | Cond. .02 MF 400V Paper |
| 31 | W-24049-C | Cond. .1 MF 200V Paper |
| 32 | G5-34002 | Cond. 50 MMF Mica |
| 33 | W-23191-A | Cond. .01 MF 400V Paper |
| 34 | W-23191-A | Cond. .01 MF 400V Paper |
| 35 | W-28622 | Cond. .1 MF 200V Paper |
| 36 | W-30805 | Cond. .01 MF 400V Paper |
| 37 | G3-34002 | Cond. 500 MMF Mica |
| 38 | G5-34002 | Cond. 50 MMF Mica |
| 39 | 38623 | Res.750,000 Ohm 1/2W.Ins. |
| 40 | 36928 | Res. 60,000 Ohm 1/2 W.Ins. |
| 41 | 36322 | Res.500,000 Ohm 1/2 W.Ins. |
| 42 | 36317 | Res. 10,000 Ohm 1/2 W. Ins. |
| 43 | 31094 | Res.4500 Ohm 1/3 W.Carb. |
| 44 | 35600 | Res.100,000 Ohm 1/2 W.Ins. |
| 45 | 35601 | Res.300,000 Ohm 1/2 W.Ins. |
| 46 | 47101 | Res.6500 Ohm 2 1/2 W.Ins.Wire Wd. |
| 47 | 50956 | Res.10 Meg. 1/2 W Ins. |
| 48 | 36316 | Res.2700 Ohm 1/2 W Ins. |
| 49 | 47131 | Res. 5 Meg. 1/2 W Ins. |
| 50 | 35601 | Res.300,000 Ohm 1/2 W Ins. |
| 51 | 35930 | Res.200,000 Ohm 1/2 W Ins. |
| 52 | 35928 | Res.60,000 Ohm 1/2 W Ins. |
| 53 | 35600 | Res.100,000 Ohm 1/2 W Ins. |
| 54 | 45981 | Res.32 Ohm 1/2 W.Ins.Wire Wd |
| 55 | 35928 | Res.60,000 1/2 W Ins. |
| 56 | 36316 | Res.2700 Ohm 1/2 W. Ins. |
| 57 | 35601 | Res.300,000 Ohm 1/2 W Ins. |
| 58 | 36320 | Res.120,000 Ohm 1/2 W. Ins. |
| 59 | 35602 | Res.1 Meg 1/2 W. Ins. |
| 60 | 47131 | Res. 5 Meg 1/2 W. Ins. |
| 61 | 38623 | Res.750,000 Ohm 1/2 W Ins. |
| 62 | W-47133 | Socket A.F.Ext.Outlet |
| 63 | W-50243 | Socket Elec.Time S.W. |
| 64 | W-47163 | Socket A.C.Ext.Outlet |
| 65 | B-47073 | Spkr. 388 B.P. 6 |
| 66A | B-47157 | Switch-Band Chg. |
| 66B | | Switch-Band Chg. |
| 66C | | Switch-Band Chg. |
| 66D | | Switch-Band Chg. |
| 66E | B-47157 | Switch-Band Chg. |
| 66F | | Switch-Band Chg. |
| 66G | | Switch-Band Chg. |
| 67A | 47155-A | Switch-Function Chg. |
| 67B | | Switch-Function Chg. |
| 68A | 47138-A | Volume Control |
| 69 | G2-34002 | Cond.100 MMF Mica |
| 70 | W-35768 | Cond. .008 MF 400V.Paper |

MISCELLANEOUS

| | |
|---|---|
| 8GE | Cabinet |
| 46408 | Knob (4) |
| 46417 | Push Button |
| 47190 | Instructions |

MODEL 818
Socket,Trimmers,Chassis
Voltage,Phono.

# CROSLEY CORP.

## TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | G | K | Go | Ga |
|---|---|---|---|---|---|---|---|---|
| 6A8G | Modulator | 6.3 | 240 | 85 | Neg | 0 | Neg | 85 |
| 6K6G | Oscillator | 6.3 | 145 | 145 | Neg | 0 | — | — |
| 6U7G | 1st I-F Amp | 6.3 | 240 | 85 | Neg | 0 | — | — |
| 6U7G | 2nd I-F Amp | 6.3 | 210 | 85 | Neg | 0 | — | — |
| 6Q7G | Det., AVC & 1st A-F Amp | 6.3 | 120 | — | Neg | 0 | — | — |
| 6K6G | Output | 6.3 | 235 | 230 | 0 | 18.5 | — | — |
| 6K6G | Output | 6.3 | 235 | 230 | 0 | 18.5 | — | — |
| 5Y3G | Rectifier | 5.0 | — | — | — | 240 | — | — |

Power output approximately 5.5 watts.

Power consumption approximately 70 watts at 117.5 volts.
Voltage drop across speaker field 80 volts.

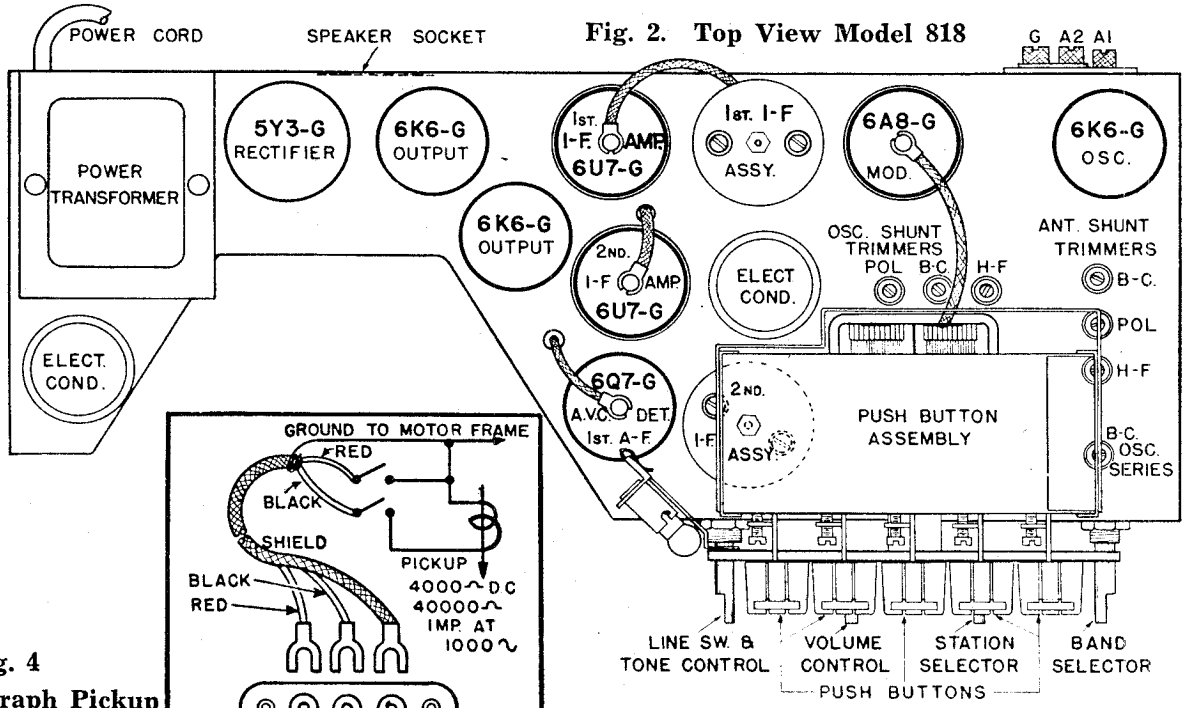


Fig. 2. Top View Model 818

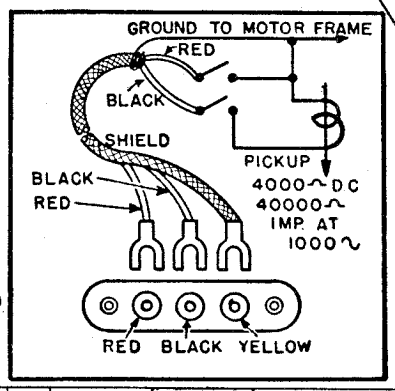


Fig. 4
Phonograph Pickup

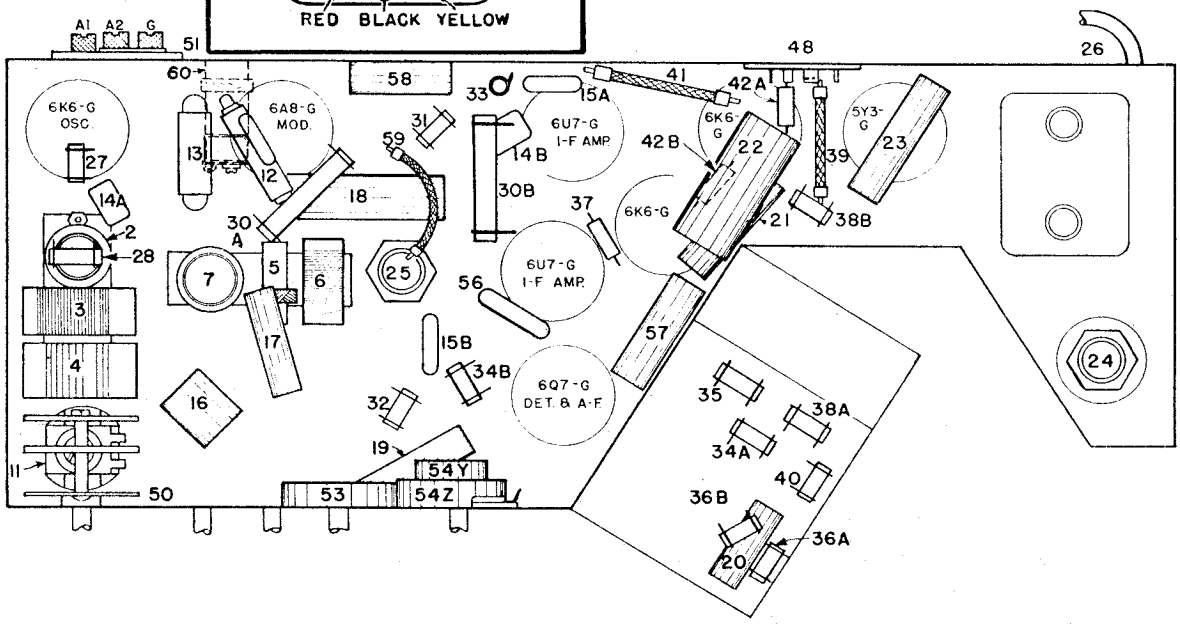


Fig. 3. Bottom View Model 818

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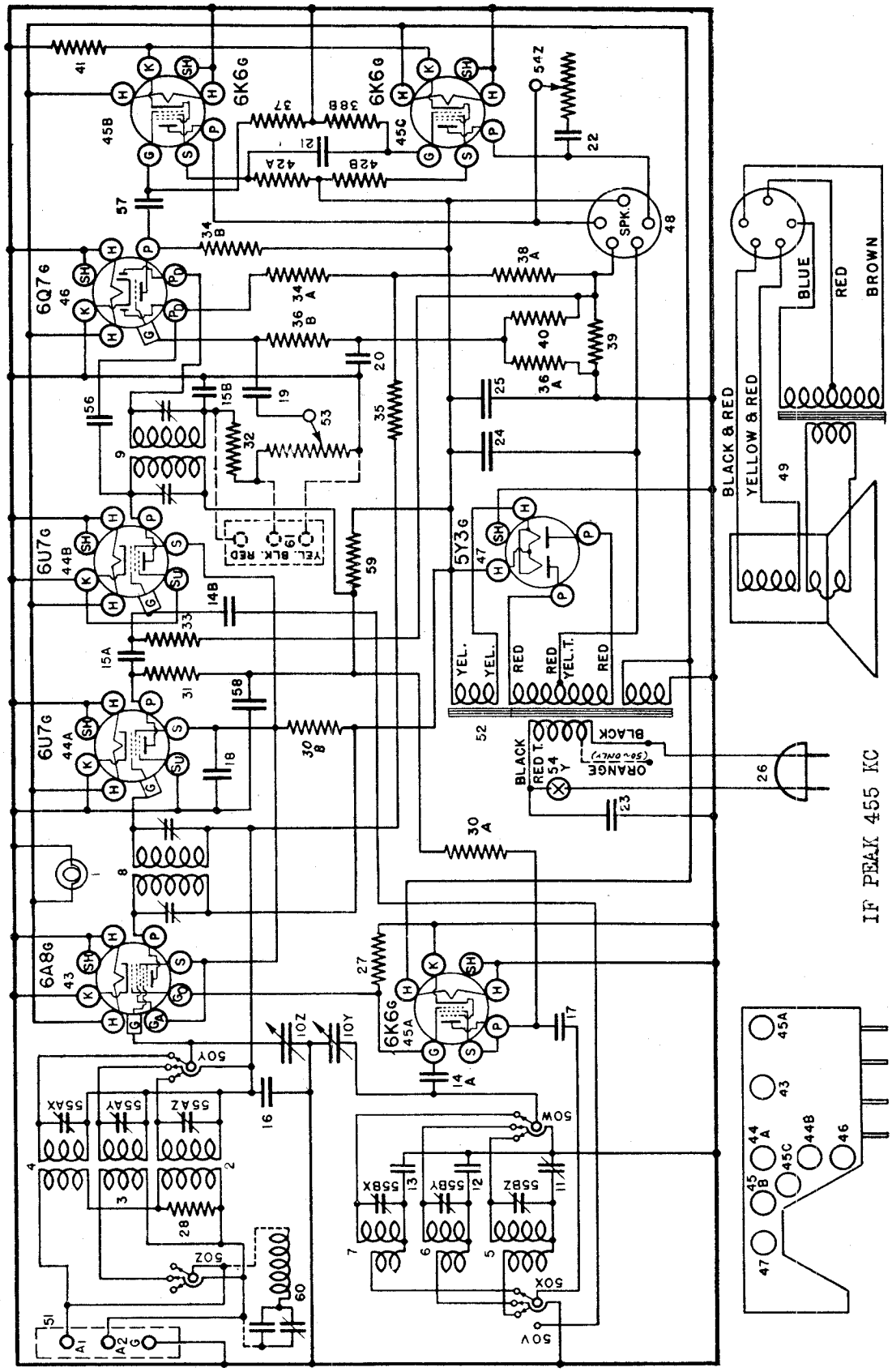
CROSLEY CORP.

MODEL 818
Schematic




540-1850 Kilocycles or 555-162 Metres (American Broadcast Band)
1.9- 6.6 Megacycles or 158-45.5 Metres (Police & Amateur Band)
6.4- 22 Megacycles or 47-13.5 Metres (High Frequency or Foreign Band)

IF PEAK 455 KC

MARCH, 1938

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## ALIGNMENT PROCEDURE

### Tuning I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

tube, leaving the tube's grid lead in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the High Frequency Band.

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F assm. for maximum output. (Item 9, Fig. 2).

(f) Adjust both trimmers located on top of the 1st I-F assm. for maximum output. (Item 8, Fig. 2).

(g) Check operations (e) and (f) for more accurate adjustment.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE READING ON THE OUTPUT METER.

### Aligning The R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast and Police Bands a .00025 mfd. condenser should be connected in series with the output lead of the signal generator and for the High Frequenty band a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated for each adjustment, ¶ (C) below.

(a) Adjust the "OSC" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustment of the "ANT" trimmer. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this increase the output of the signal generator ten times, or more, to try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(b) To align the B. C. OSC. series trimmer (Fig 2), set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

### (C) SIGNAL INPUT FREQUENCIES

| | Shunt Align. | Series Align. |
|---|---|---|
| American Broadcast Band | 1700 Kilocycles | 600 Kilocycles |
| Police & Amateur Band | 6000 Kilocycles | |
| Foreign Band | 18 Megacycles | |

## WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram (item 60).

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .00025 mfd. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for MINIMUM output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver turned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

## SETTING PUSH BUTTONS

The push buttons may be quickly and accurately set from the front of the receiver. It is not necessary that all the push buttons be set at the same time. Insert a small screw driver in the hole in the front of each push button and loosen (DO NOT REMOVE) the screw that is located in the bottom of each hole.

Determine the favorite broadcasting stations whose call letters are to be placed in the push buttons. By means of the conventional tuning knob, tune-in AS ACCURATELY AS POSSIBLE the station having the highest frequency—that is, the station nearest the 1500 kilocycle end of the dial. COMPLETELY DEPRESS AND HOLD No. 1 push button and SECURELY TIGHTEN THE SET SCREW. No. 1 push button is the one toward the high frequency end of the dial.

The push button system is now set for the first station. Follow through with this same procedure, setting the other stations in the order of their frequency (kilocycles).

If the receiver has been re-aligned it may be necessary to reset the push button system.

## REPLACING DIAL DRIVE CORD

To replace the dial drive cord, the following procedure should be carefully followed.

(1) Remove the chassis from the cabinet.

(2) Remove the dial glass, pointer and dial mounting bracket.

(3) Remove the broken cord and the tension spring.

(4) Double a 48" length of drive cord. Insert the doubled end through the eyelet (from the outside) in the pulley on the end of the tuning condenser gang. Tie a knot in the cord so as to form a loop about ¾" long. Close the gang so that the eyelet in the pulley will be "down." Hook the looped cord over the catch provided in the pulley opposite the eyelet.

(5) Bring one end of the cord forward and over the top idler pulley. Continue the cord under and around to the top of the pulley on the pointed shaft (¾ turn). With the pointer shaft pulley set so that its eyelet is in the "up" position, thread the cord through the eyelet.

(6) Bring the other end of the cord back and over the condenser gang pulley. Continue it down and over the lower idler pulley to the left-hand side of the rubber grommet and then over the top of the pointer shaft pulley. This lead should cross behind the down lead to the rubber grommet. Make one complete loop around the pointer shaft pulley and back to the eyelet. Thread the lead through the eyelet and tie a knot in the two ends of the cord so that it will be about ½" from the eyelet when the cord is drawn taught. Hook one end of the tension spring over the knot and hook the other end to the catch provided opposite the eyelet. Cut off the excess cord and if bees' wax is available, apply a small amount to the knot as an added protection against slipping.

## PARTS LIST—MODEL 818

Figures in first column refer to parts in Diagrams.

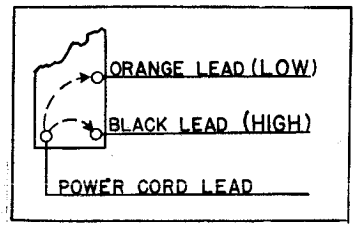
| Item No. | Part No. | Description |
|---|---|---|
| 1 | W —43567 | Bulb, Dial Light, 6-8 V. |
| | G4 —45398 | Bracket, for Dial Light |
| 2 | G138—32000 | Ant. Coil, 535-1850 Kc. |
| 3 | G139—32000 | Ant. Coil, 1900-6600 Kc. |
| 4 | G140—32000 | Ant. Coil, 6.5-22 Mc. |
| 5 | G139—32002 | Osc. Coil, 535-1850 Kc. |
| 6 | G171—32002 | Osc. Coil, 1900-6600 Kc. |
| 7 | G172—32002 | Osc. Coil, 6.5-22 Mc. |
| 8 | G153—32004 | 1st I.F. Assy. |
| 9 | G154—32004 | 2nd I-F. Assy. |
| 10ZY | G41 —33001 | 2 Section Gang Cond. |
| | D —44080C | Glass Dial Face |
| | W —44085B | Dial Mask (Paper) |
| | W —44084A | Dial Support Ring |
| | C —44082E | Support Brkt., Dial Glass |
| | G10 —43564 | Pulley and Hub Assy. (Pointer Shaft) |
| | G11 —43564 | Pulley and Hub. Assy. (Cond. Gang) |
| | —41582 | Drive Cord |
| | MG29—45607 | Drive Mtg. Bracket and Pulley Assy. |
| | W —45644 | Pointer Shaft |
| | W —50325A | Retaining Ring (Pointer Shaft) |
| | W —44299 | Dial Pointer |
| | W —40486 | Screw (Pointer Mtg.) |
| | W —43561 | Cord Tension Spring |
| | W —45716 | Drive Shaft (Manual) |
| | W —43549 | Retaining Ring (Drive Shaft) |
| | W —43542B | Drive Shaft Mtg. Bracket |
| | W —44701C | Grommet for Drive Shaft |
| 11 | —40769 | B-C. Osc. Series Trimmer |
| 12 | G23 —34000 | Condenser, 1560 Mmf. |
| 13 | G20 —34000 | Condenser, 4910 Mmf. |
| 14AB | G13 —34002 | Condenser, 35 Mmf. |
| 15AB | G2 —34002 | Condenser, 100 Mmf. |
| 16 | W —35936 | Condenser, .05 Mf. 200 V. |
| 17 | W —35139 | Condenser, .004 Mf. 400 V. |
| 18 | W —22688 | Condenser, .1 Mf. 400 V. |
| 19 | W —27652 | Condenser, .003 Mf. 200 V. |
| 20 | W —28621 | Condenser, .02 Mf. 200 V. |
| 21 | W —30488 | Condenser, .02 Mf. 400 V. |
| 22 | W —23615 | Condenser, .05 Mf. 400 V. |
| 23 | W —30805 | Condenser, .01 Mf. 400 V. |
| 24 | W —44054 | Condenser, 30 Mf. 350 V. |
| 25 | W —36057 | Condenser, 40 Mf. 300 V. |
| 26 | B —33906A | Power Cord and Plug |
| 27 | —21237A | Resistor, 60,000 Ohm ½W. |
| 28 | —22196 | Resistor, 20,000 Ohm ½W. |
| 30A | —23616 | Resistor, 15,000 Ohm 1W. |
| 30B | —23616 | Resistor, 15,000 Ohm 1W. |
| 31 | —24814 | Resistor, 7,000 Ohm ¼W. |
| 32 | —35600 | Resistor, 100,000 Ohm ½W. |
| 33 | —21875 | Resistor, 100,000 Ohm ¼W. |
| 34AB | —21455C | Resistor, 300,000 Ohm ½W. |
| 35 | —21454 | Resistor, 1 Megohm ¼W. |
| 36AB | —26577 | Resistor, 3 Megohm ¼W. |
| 37 | —36322C | Resistor, 500,000 Ohm ¼W. |
| 38AB | —23785 | Resistor, 500,000 Ohm ½W. |
| 39 | W —23012A | Resistor, 40 Ohm ¾W. Flex. |
| 40 | —34883 | Resistor, 2 Megohm ¼W. |
| 41 | W. —21965 | Resistor, 375 Ohm 1W. Flex |
| 42AB | —44009 | Resistor, 3,000 Ohm ¼W. |
| 43 | G156—36400 | Socket, Type 6A8 |
| 44AB | G171—36400 | Socket, Type 6U7 |
| 45ABC | G172—36400 | Socket, Type 6K6 |
| 46 | G160—36400 | Socket, Type 6Q7 |
| 47 | G173—36400 | Socket, Type 5Y3 |
| 48 | G103—28807 | Socket, Type Speaker |
| | W —40911 | Tube Shield |
| | W —27981A | Base, Tube Shield |
| 49 | 465BP—12"M" | Speaker Spec., 1-D-1049 "M" |
| | —44272 | V. C. and Cone Assy. for 465BP12"M" Spkr. |
| | —44273 | Field Coil for 465BP12"M" Spkr. |
| | —44274 | Output Trans. for 465BP12"M" Spkr. |
| | W —43552 | Spk. Plug Clamp |
| 50 | —44049 | Band Selector Switch |
| 51 | G27 —26719 | A1-A2-G. Terminal Assy. |
| 52 | —44057 | Power Trans., 100 V. 60 Cy. |
| | —44058 | Power Trans., 110 V. 50 Cy. |
| | —44059 | Power Trans., 220 V. 50 Cy. |
| | —44060 | Power Trans., 110 V. 25 Cy. |
| | —44061 | Power Trans., 220 V. 25 Cy. |
| 53 | —44081 | Volume Control, 1 Meg. |
| 54Z | —44024B | Tone Control, 100,000 Ohm |
| 54Y | | Line Switch |
| 55 | W —35951A | 3 Sect. Ant. Shunt Trimmer Assy. |
| | W —45714 | 3 Sect. Osc. Shunt Trimmer Assy. |
| 56 | W —32741 | Condenser, 500 Mmf. |
| 57 | W —34647 | Condenser, .006 Mf. 400 V. |
| 58 | W —32378 | Condenser, .01 Mf. 400 V. |
| 59 | W —23013 | Resistor, 2,000 Ohm 1¼W. Flex. |
| | | **PUSH BUTTON PARTS** |
| | G4 —45683 | Push Button Unit Assy. Complete |
| | G30 —45683 | Key and Toggle Assy. |
| | W —50542A | Key Clip (Lock Clamp) |
| | —45718 | Adjusting Screw |
| | G31 —45683 | Rocker Plate Assy. |
| | W —50561 | ⅛"—6 x 40 Screw (Rocker Plate Bearing) |
| | W —50547 | Key Plate (Rear Guide) |
| | W —45646A | Adjust. Clip (Hooked Tear Drop) |
| | W —50588 | Adjust. Clip (Plain Tear Drop) |
| | —43882 | ¼" No. 8 P. K. Screw (Clip Mtg.) |
| | W —50607 | Spring (Key Return) |
| | W —45711 | Felt |
| | W —45658 | Push Button |
| | W —45668 | P. B. Support Bracket |
| | S —132 | Screw (P. B. Brkt. Mtg.) |
| | W —44088 | Knob, Vol. and Tuning |
| | W —50164A | Knob, Tone and Band Change |
| | W —43553 | Rubber Mtg. Foot |
| | W —44225 | Grille Bar (2) |
| | —44092 | Grille Cloth |
| | —7CA | Cabinet |
| | B —44226B | Escutcheon |
| | B —45626A | Push Button Escutcheon |
| | —50549 | Call Letter Sheet |
| | W —50551A | Celluloid Cover |
| 60 | G165—32004 | Wave Trap |

## 50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal stripe near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections



CROSLEY CORP.

MODEL 828
Schematic
Phono.

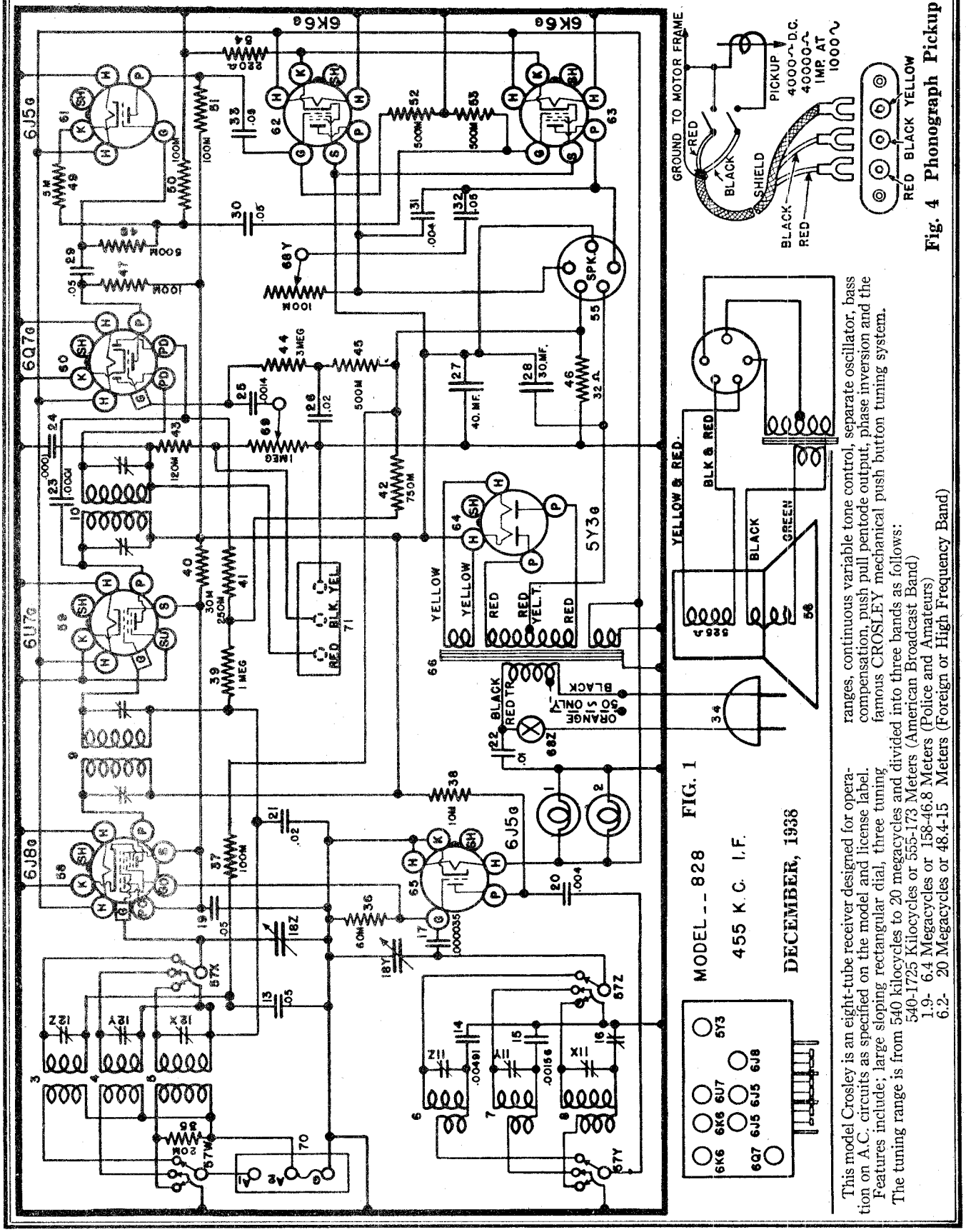



FIG. 1

Fig. 4 Phonograph Pickup

This model Crosley is an eight-tube receiver designed for operation on A.C. circuits as specified on the model and license label.

Features include; large sloping rectangular dial, three tuning ranges, continuous variable tone control, separate oscillator, bass compensation, push pull pentode output, phase inversion and the famous CROSLEY mechanical push button tuning system.

The tuning range is from 540 kilocycles to 20 megacycles and divided into three bands as follows:

540-1725 Kilocycles or 555-173 Meters (American Broadcast Band)
1.9- 6.4 Megacycles or 158-46.8 Meters (Police and Amateurs)
6.2- 20 Megacycles or 48.4-15 Meters (Foreign or High Frequency Band)

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MODEL 828

Chassis Parts

# CROSLEY CORP.

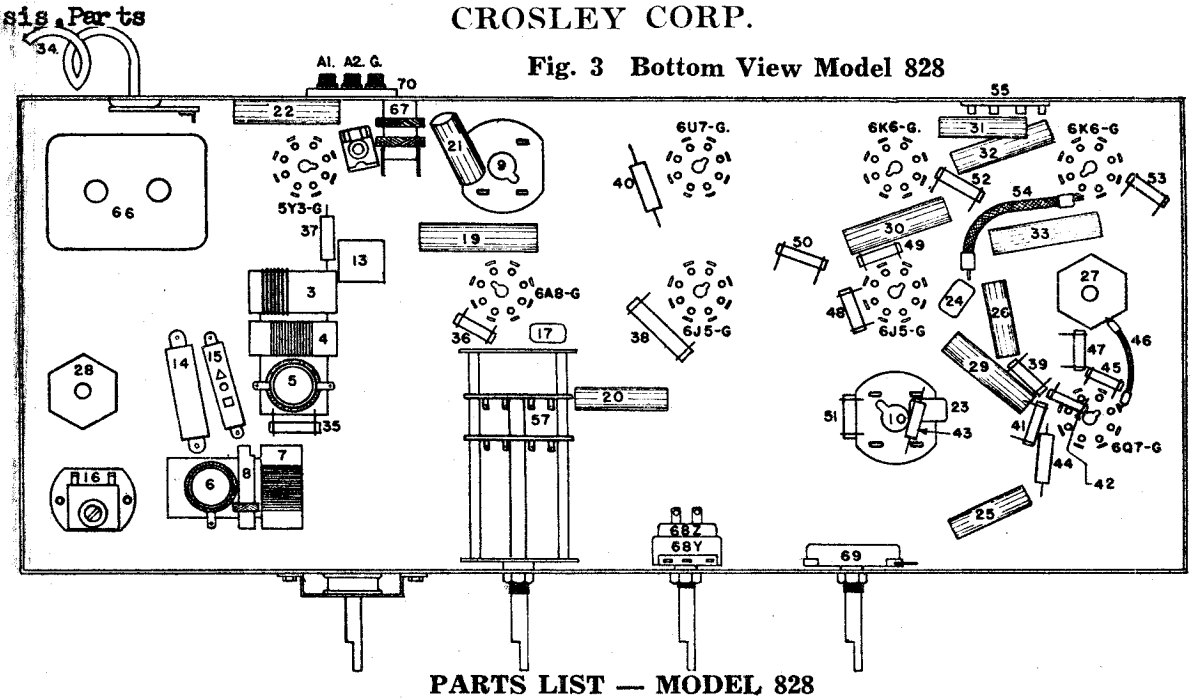


Fig. 3 Bottom View Model 828

## PARTS LIST — MODEL 828

Figures in first column refer to parts in Diagrams.

| Item No. | Part No. | Description |
|---|---|---|
| 1 | W —37922 | Dial Light—6-8 Volt |
| 2 | W —37922 | Dial Light—6-8 Volt |
| | G16 —45398 | Socket and Brkt. Assy., Dial Light |
| 3 | G170—32000 | Antenna Coil—H-F. |
| 4 | G168—32000 | Antenna Coil—Pol. |
| 5 | G169—32000 | Antenna Coil—B-C. |
| 6 | G170—32002 | Oscillator Coil—H-F. |
| 7 | G168—32002 | Oscillator Coil—Pol. |
| 8 | G169—32002 | Oscillator Coil—B-C. |
| 9 | G175—32004 | 1st I-F. Assy., 455 Kc. |
| 10 | G176—32004 | 2nd I-F. Assy., 455 Kc. |
| 11 | W —45713 | 3 Section Trimmer (Osc. Shunt) |
| 12 | W —35951A | 3 Section Trimmer (Ant. Shunt) |
| 13 | W —35936 | Condenser, .05 Mf. 200 V. |
| 14 | G20 —34000 | Condenser, .004910 Mf. Mica |
| 15 | G23 —34000 | Condenser, .001560 Mf. Mica |
| 16 | —40769 | B-C. Osc. Series Trimmer |
| 17 | G13 —34002 | Condenser, .000035 Mf. Molded |
| 18 | G59 —33001 | 2 Section Gang Condenser |
| | D —46317 | Calibrated Dial Glass—Domestic |
| | D —46749 | Calibrated Dial Glass—International |
| | C —46275B | Dial Support—Flocked Mask |
| | W —46941 | Rubber Cushion—Dial Glass |
| | W —46099 | Dial Class Clip—(2 Req.) Mtg. |
| | W —46096 | Dial Class Clip—(R. H.) Mtg. |
| | W —46095 | Dial Class Clip—(L. H.) Mtg. |
| | —46203 | Dial Pointer |
| | W —46097 | Guide—Pointer |
| | G13 —43564 | Pulley and Hub Assy. on Gang |
| | MG17—46287 | Small Brass Idler Pulley and Brkt. Assy. |
| | MG20—46287 | Idler Pulley Assy. (2 Pulleys) |
| | —45877B | Drive Shaft and Pulley (Manual) |
| | W —45878 | Bracket—Drive Shaft Mounting |
| | —46087 | Tension Spring—Drive Cord |
| | G9 —41582 | Drive Cord (61 Inches) |
| | W —46290 | Clamp—Drive Cord |
| 19 | W —23615 | Condenser, .05 Mf. 400 V. |
| 20 | W —35139 | Condenser, .004 Mf. 400 V. |
| 21 | W —28621 | Condenser, .02 Mf. 200 V. |
| 22 | W —30805 | Condenser, .01 Mf. 400 V. |
| 23 | G2 —34002 | Condenser, .0001 Mf. Molded |
| 24 | G2 —34002 | Condenser, .0001 Mf. Molded |
| 25 | W —41461 | Condenser, .0014 Mf. 200 V. |
| 26 | W —28621 | Condenser, .02 Mf. 200 V. |
| 27 | W —36057B | Condenser, 40 Mf. 300 V. |
| 28 | W —44054 | Condenser, 30 Mf. 350 V. |
| 29 | W —23615 | Condenser, .05 Mf. 400 V. |
| 30 | W —23615 | Condenser, .05 Mf. 400 V. |
| 31 | W —35139 | Condenser, .004 Mf. 400 V. |
| 32 | W —23615 | Condenser, .05 Mf. 400 V. |
| 33 | W —23615 | Condenser, .05 Mf. 400 V. |
| 34 | B —33906A | Power Cord and Plug |
| 35 | —22196 | Resistor, 20,000 Ohm ½W. |
| 36 | —21237A | Resistor, 60,000 Ohm ⅓W. |
| 37 | —35600 | Resistor, 100,000 Ohm ¼W. |
| 38 | —4921C | Resistor, 10,000 Ohm 1W. |
| 39 | —21454 | Resistor, 1 Megohm ½W. |
| 40 | —36952 | Resistor, 30,000 Ohm 1W. |
| 41 | —34020 | Resistor, 250,000 Ohm ½W. |
| 42 | —37590 | Resistor, 750,000 Ohm ½W. |
| 43 | —36320 | Resistor, 120,000 Ohm ¼W. |
| 44 | —36688 | Resistor, 3 Megohm ¼W. |
| 45 | —23785 | Resistor, 500,000 Ohm ½W. |
| 46 | W —37631 | Resistor, 32 Ohm ½W. |
| 47 | —21875 | Resistor, 100,000 Ohm ½W. |
| 48 | —23785 | Resistor, 500,000 Ohm ½W. |
| 49 | —27121 | Resistor, 5,000 Ohm ½W. |
| 50 | —21875 | Resistor, 100,000 Ohm ½W. |
| 51 | —21875 | Resistor, 100,000 Ohm ½W. |
| 52 | —23785 | Resistor, 500,000 Ohm ½W. |
| 53 | —23785 | Resistor, 500,000 Ohm ½W. |
| 54 | W —22873 | Resistor, 220 Ohm 2½W. |
| 55 | G103—28807 | Socket—(5 Prong Spkr.) |
| | W —43552 | Spkr. Plug Clamp |
| 56 | 583-CP-18"K" | Speaker, Spec. No. |
| | | V. C. and Cone Assy. |
| | | Field Coil—(525 Ohm) |
| | | Output Transformer |
| | | Cardboard Ring |
| | 583-CP-18"H" | Speaker, Spec. No. S-4893N3 |
| | —46786 | V. C. and Cone Assy. |
| | —46787 | Field Coil (525 Ohm) |
| | —46788 | Output Transformer |
| | —46789 | Cardboard Ring |
| | 583-CP-18"Z" | Speaker, Spec. No. E10K326 |
| | —46758 | V. C. and Cone Assy. |
| | —46759 | Field Coil (525 Ohm) |
| | —46760 | Output Transformer |
| | —46761 | Cardboard Ring |
| 57 | B —46276 | Band Selector Switch |
| 58 to 65 | G178—36400 | 8 Prong Socket |
| 66 | —46318 | Power Transformer, 60 Cy.—110 V. |
| | —46307 | Power Transformer, 50 Cy.—110 V. |
| | —46308 | Power Transformer, 50 Cy.—220 V. |
| | —46309 | Power Transformer, 25 Cy.—110 V. |
| | —46310 | Power Transformer, 25 Cy.—220 V. |
| | —46311 | Power Transformer, 40-100 Cy.—95-267 V |
| 67 | MG41—46287 | Wave Trap—455 Kc. |
| | G188—32000 | Coil—Only—Wave Trap |
| 68Y | —44024B | Tone Control |
| 68Z | | Line Switch |
| 69 | —44773 | Volume Control |
| 70 | G27 —26719 | Ant. and Gnd. Terminal Assy. |
| 71 | G41 —26719 | Phono Terminal Assy. |
| | G10 —45683 | Push Button Unit Assy. |
| | G29 —45683 | Key and Toggle Assy. |
| | —45717 | Screw—Key Adjusting |
| | W —50607C | Spring—Key Return |
| | W —50542C | Clamp—Toggle Lock |
| | W —50588B | Adjusting Clip—(Heart Shaped) |
| | W —45646B | Adjusting Clip—(Hooked) |
| | W —46278 | Guide Plate—Key |
| | G18 —45683 | Rocker Plate and Gear Sector Assy. |
| | W —50561 | Screw—Rocker Plate Bearing |
| | W —45976 | Bronze Spring—Bearing Thrust |
| | W —50273 | Rubber Band—Used on Keys |
| | 8R | Cabinet |
| | —46360A | Knob—4 Req. |
| | 8T | Cabinet (Lowboy Style) |
| | —46360A | Knob—Tuning—Volume |
| | —46784A | Knob—Tone Control—Band Sw. |
| | C —46228C | Escutcheon |
| | —46417 | Push Button |
| | —50841 | Station Call List |
| | W —50551A | Celluloid Call Letter Cover |
| | —46329 | Instruction Booklet |
| | —46306 | Carton for 8R Cabinet |
| | —46640 | Carton for 8T Cabinet |

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# CROSLEY CORP.

## MODEL 828
Socket, Trimmers, Voltage
Alignment, Drive Data

### CHASSIS MODEL 828

| Tube | Function | TUBE SOCKET VOLTAGE READINGS H | P | S | G | K | Go | Po |
|---|---|---|---|---|---|---|---|---|
| 6 J5G | Oscillator | 6.3 | 145 | — | — | 0A | — | — |
| 6 A8G | Modulator | 6.3 | 265 | 82 | -3 | 0 | — | 82 |
| 6U7G | I-F Amplifier | 6.3 | 265 | 82 | -3 | 0 | — | — |
| 6Q7G | Detector A.V.C. 1st A-F | 6.3 | 200 | — | -3 | 0 | — | — |
| 6 J5G | Phase Inverter | 6.3 | 165 | — | -4 | 78 | — | — |
| 6K6G(2) | Output | 6.3 | 260 | 265 | — | 17 | — | — |
| 5Y3G | Rectifier | 5.0 | A. C. | | | | | |

Max. power output approx. 10 watts.
Power consumption at 117.5 line 85 watts.
Voltage across speaker field 62 volts.

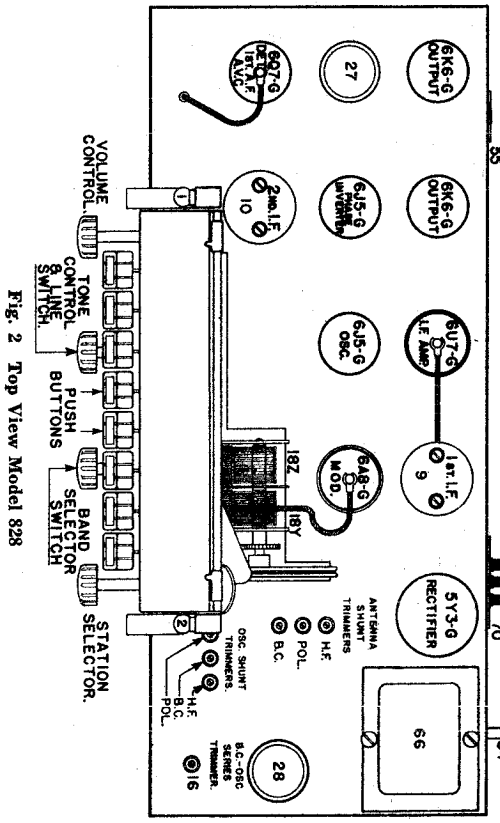



Fig. 2 Top View Model 828

### SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1,000 ohm per volt, 500-volt D. C. voltmeter (except filaments) with receiver in operating condition and no signal input. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

### CIRCUIT DESCRIPTION

The tubes used and their functions are as follows; one 6J5 G as oscillator, one 6A8 G (early models have a 6J8 G) as modulator, one 6U7 G as I-F amplifier, one 6Q7 G as diode detector, A.V.C. and first A-F amplifier, one 6J5 G as phase inverter, two 6K6 G's as push pull pentode output and one 5Y3 G as rectifier.

The fixed bias for the 6A8 G, 6U7 G and 6Q7 G is obtained from the drop across item No. 46 a 32 ohm resistor. The voltage is measured from the chassis to the low side of the speaker field. Bias for the 6J5 G phase inverter is measured across item No. 49 a 5,000 ohm resistor. The bias for the output tubes is measured across item No. 54 a 220 ohm resistor.

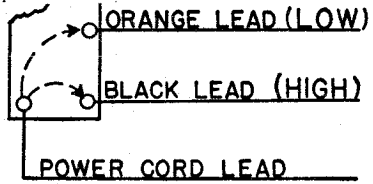
The speaker field (525 ohm) is in the negative leg of the power supply.

### 50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one




side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

**NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.**

### ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

### CONNECTING OUTPUT METER

Connect the output meter to the plates of the two 6K6G Output tubes. Be certain that the meter is protected from D. C. by connecting a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

**Tuning I-F Amplifier to 455 Kilocycles.**

(a) Connected the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid lead in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Turn the band selector switch to the Broadcast Band. Right.

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F assm. for maximum output. (Item 10, Fig. 2)

(f) Adjust both trimmers located on top of the 1st I-F assm. for maximum output. (Item 9, Fig. 2)

(g) Check operations (e) and (f) for more accurate adjustment. ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

**Aligning R-F Amplifier.**

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast and Police Bands a .00025 mfd. condenser should be connected in series with the output lead of the signal generator and for the High Frequency band a 250 ohm carbon resistor should be used in place of the condenser.

Each band should first be shunt aligned and then series aligned where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the station selector and signal generator should be set to the frequency indicated for each adjustment, paragraph (c) below.

(a) Adjust the "OSC" and "ANT" shunt trimmers in the order given for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and then check the adjustment of the "ANT" trimmer. DO NOT READJUST THE "OSC" TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, to try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(b) To align the B. C. OSC. series trimmer (Fig. 2), set the signal generator to the frequency indicated below and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output.

### (C) SIGNAL INPUT FREQUENCIES

| | Shunt Alignment | Series Align. |
|---|---|---|
| American Broadcast Band | 1400 Kilocycles | 600 Kilocycles |
| Police and Amateur Band | 6000 " | —— |
| Foreign Band | 18 Megacycles | —— |

### WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram (item 60).

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .00025 mfd. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for minimum output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

### REPLACING THE DIAL DRIVE CORD

1—Remove the chassis from the cabinet.

2—Remove the broken drive cord, first from the pointer then from the pulleys. Remove the cord tension spring and cable clamp.

3—Remove the dial (glass and mask) and the manual tuning shaft bracket.

4—Cut a piece of dial cord 58 inches in length (G9-41582)

5—Tie the cord tension spring approximately 1½ inches from one end of the cord. Open the gang condenser, this should place the eyelet in the pulley up. Insert the cord through the eyelet, from the inside of pulley. Hook end of tension spring on the catch in the pulley opposite eyelet.

6—Bring the cord forward and down, over small brass idler pulley to the manual shaft pulley, wrap two turns around the manual shaft pulley in a counter clockwise direction. Continue cord up and over small brass idler pulley to the top idler pulley (bracket mounted on the gang) then over to the left hand idler, around idler and over to lower right hand idler pulley, over pulley and down and around (counter clockwise) the large pulley on the gang. Insert end of cord through eyelet. Stretch tension spring until it is approximately one inch in length, tie ends of cord securely. Place cable clamp (W-46290) on the cable approximately ⅛ inch from the inside of the pulley rim.

7—Replace manual drive shaft bracket, dial mask and dial.

8—Close the gang condenser, place pointer at 540 on dial then insert drive cord in pointer. Check pointer travel before cementing cord to pointer.

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### Circuit Description

The circuit consists of separate oscillator and modulator tubes, two stages of I-F amplification—the second of which is resistance coupled, separate AVC and detector diodes, two stages of audio amplification and power supply. The speaker field is located in the negative leg of the power supply. The bias for all tubes except the output is developed across a 32 ohm resistor, item 40, located between the speaker field and ground. Phase inversion is obtained in the output circuit by the voltage developed across a 3000 ohm resistor, item 27A, located in the screen circuit of one of the output tubes, item 42B.

### SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with 1000 ohm per volt, 500 volt D. C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The volume control should be turned full on, the tone control should be turned to the TREBLE position (counter-clockwise) and the tuning condenser should be turned to the minimum capacity position. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

### TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | G | K | Go | Ga |
|---|---|---|---|---|---|---|---|---|
| 6K6G | Oscillator | 6.3 | 147 | 147 | -36 | 0 | — | — |
| 6A8G | Modulator | 6.3 | 224 | 110 | — | 0 | -36 | 110 |
| 6U7G | 1st I-F Amplifier | 6.3 | 174 | 110 | — | 0 | — | — |
| 6U7G | 2nd I-F Amplifier | 6.3 | 270 | 110 | — | 0 | — | — |
| 6C5G | Diode Detector | 6.3 | 0 | — | — | 0 | — | — |
| 6C5G | AVC Diode | 6.3 | 0 | — | — | 0 | — | — |
| 6K5G | 1st A-F Amplifier | 6.3 | 190 | — | — | 0 | — | — |
| 6K6G | Output | 6.3 | 263 | 250 | 0 | 22 | — | — |
| 6K6G | Output | 6.3 | 263 | 270 | 0 | 22 | — | — |
| 5Y3G | Rectifier | 5.0 | — | — | — | 270 | — | — |

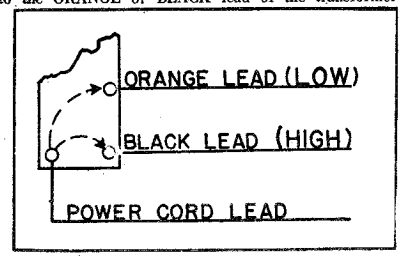
Power consumption approximately 85 watts at 117.5 volts.
Power output approximately 10 watts.
Voltage drop across speaker field 60 volts.

### 50 CYCLE POWER TRANSFORMER ADJUSTMENT

Receivers equipped with a 50 cycle power transformer have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer




primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

### ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

### CONNECTING OUTPUT METER

Connect the output meter to the plates of the two 6K6G output tubes. Be certain that the meter is protected from D. C. by a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

### Tuning I-F Amplifier To 455 Kilocycles

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6A8G tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Set the band selector switch on the Broadcast Band.

(d) Set the signal generator to 455 kilocycles.

(e) Adjust both trimmers located on top of the 2nd I-F transformer for maximum output.

(f) Adjust both trimmers located on top of the 1st I-F transformer for maximum output.

(g) Check operations (e) and (f) for more accurate adjustment.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

### Aligning R. F. Amplifier

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast Band a .00025 mfd. condenser should be connected in series with the output lead of the signal generator and for the High Frequency and Police Bands a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment, ¶ (d) below.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "OSC" shunt trimmer until the MINIMUM CAPACITY SIGNAL (d) is heard (it is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (d) is tuned-in- with maximum output. Then adjust the "ANT" shunt trimmer for maximum output. Readjust the station selector slightly so that the generaator signal is tuned-in with maximum output and check the adjustment of the "ANT" trimmer. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(c) To align the series trimmer (See Fig. 2), set the signal generator to the frequency indicated below (d) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output. Minor tolerance variations in series alignment at 2500 kilocycles in the Police Band and a 6000 kilocycles in the High Frequency Band may be compensated for by slight repositioning of the grid lead of the antenna coil in the Band affected.

If the various circuits of this receiver have to be adjusted it may be necessary to reset the push button tuning system, after the adjustments have been made.

The push buttons are set from the front of the receiver. To reset a push button remove the call letter and celluloid protector from the front of the button.

Loosen the set screw at the bottom of the hole.

Tune-in with the manual tuning knob AS ACCURATELY AS POSSIBLE the station whose call letters were in that button.

Push the button all the way down and while you hold it in that position securely tighten the set screw.

Replace station call letter and celluloid protector in button.

Repeat the above procedure for the rest of the push buttons that have to be set.

Remember—The accuracy of the push buttons depend entirely upon HOW ACCURATE YOU TUNE-IN THE STATION WHILE SETTING THEM.

### WAVE TRAP

Some chassis of this model are equipped with a wave trap for the purpose of eliminating interference from code stations which operate on a frequency of approximately 455 kilocycles. This assembly is located on the underneath side of the chassis and consists of a coil, a fixed condenser and a trimmer condenser as illustrated by dotted lines in the Wiring Diagram. Item 63, Fig. 1.

The wave trap should not be adjusted until all other adjustments have been made. To make the adjustment, feed a 455 kilocycle signal from the signal generator through a .00025 mfd. condenser into the antenna terminal of the receiver. With the band selector switch turned to the Broadcast Band position, the gang condenser open and the volume control full on, adjust the trimmer condenser on the wave trap for minimum output.

Should the interfering station be operating on a frequency of slightly more or less than 455 kilocycles, the exact frequency should be determined with the aid of the signal generator. Then, instead of feeding a 455 kilocycle signal into the receiver the exact frequency of the interfering signal should be used. If it is not possible to determine the exact frequency of the interfering signal the antenna may be attached to the receiver and the receiver tuned to the position where the interfering signal is most noticeable. Then adjust the wave trap for minimum interference.

### REPLACING DIAL DRIVE CORD

To replace the dial drive cord the following procedure should be carefully followed:

1—Remove the chassis from the cabinet.

2—Remove the dial glass, the pointer, then the dial mounting bracket.

3—Remove the broken cord and the tension spring.

4—Double a 48" length of drive cord. Tie a knot in the cord to form a loop about ¾" long. Insert the two ends through the eyelet in the pulley on the gang from the inside. Hook the small loop over the catch in the pulley opposite the eyelet, then close the gang.

5—Bring one end of the cord forward and down over the top of the lower idler pulley. Continue the cord on down to the left of the manual drive shaft. then under and around to the top of the pointer shaft pulley, crossing in front of cord to manual drive shaft. Make one and one half turns around pulley in a counter-clockwise direction. Insert end of cord through eyelet in pulley rim, eyelet should be to the left and in line with the pointer shaft.

6—Bring the other end of drive cord back and under pulley on the gang, then up and over the top idler pulley. Continue down and under pointer drive pulley for ½ turn, insert end through eyelet. Tie ends in a secure knot, then hook one end of tension spring through knot and hook the other end on catch in pulley. The tension spring should be stretched to approximately ¾" length. Retie knot if necessary to give proper tension on drive cord.

Cut off excess cord and if any bees wax is available apply a small amount to the knot as an added precaution against slipping.

**MODEL 1018**

### (D) SIGNAL INPUT FREQUENCIES

| | Min. Cap. Signal | Shunt Align. | Series Align. |
|---|---|---|---|
| American Broadcast Band | 1725 Kilocycles | 1400 Kilocycles | 600 Kilocycles |
| Police & Amateur Band | 6400 " | 6000 " | |
| High Frequency Band | 20 Megacycles | 18 Megacycles | |

CROSLEY CORP.

MODEL 1018
Schematic, Notes

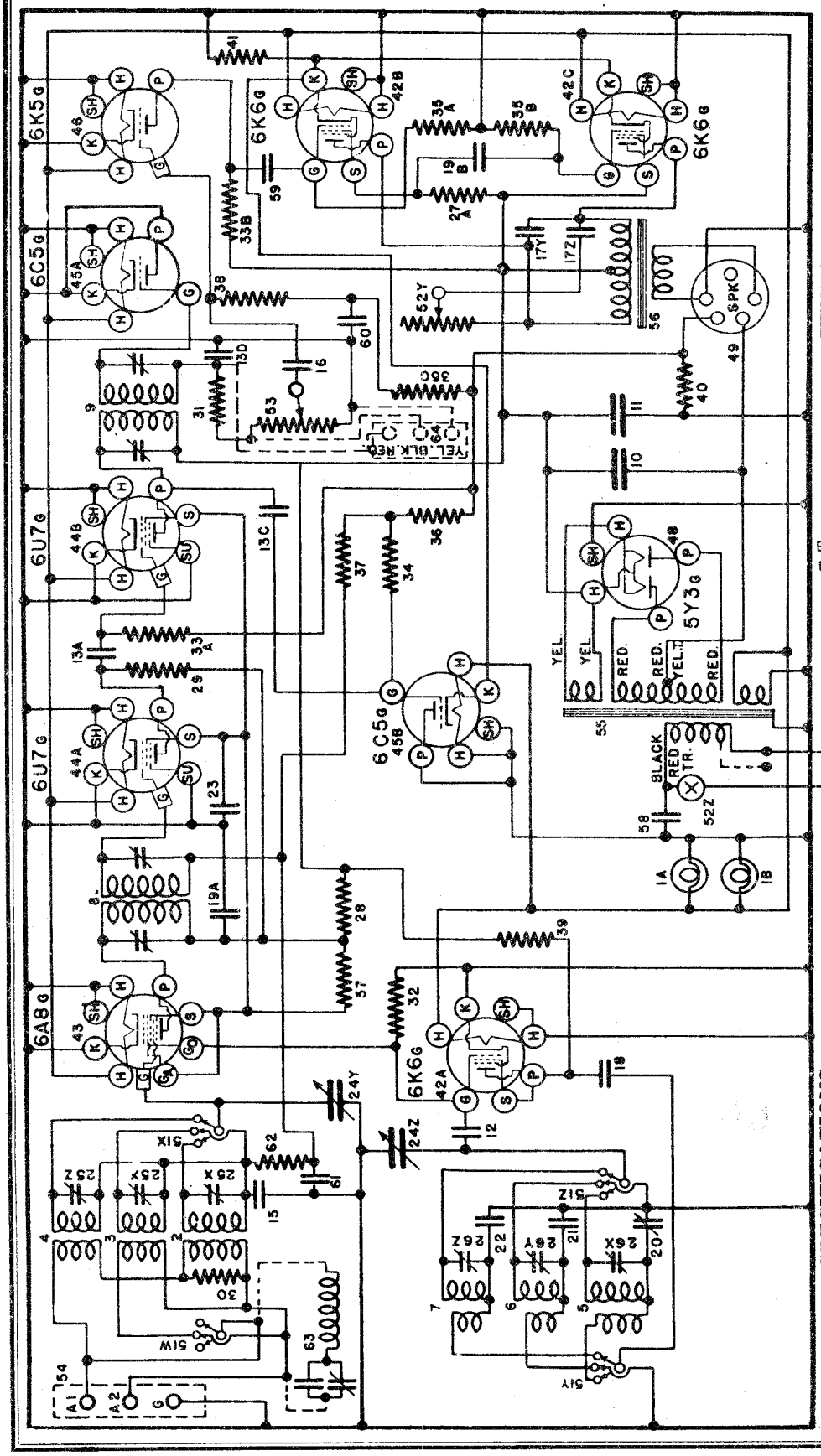



FIG. 1—WIRING DIAGRAM

OCTOBER, 1938

Fig. 4 Phonograph Pickup

## SPECIFICATIONS

MODEL 1018

This model Crosley is a ten-tube superheterodyne receiver featuring Push Button Tuning, temperature compensated R-C oscillator, (to prevent station drift) push pull output and many of the latest improvements in circuit design. It is designed for operation on A. C. circuits as specified on the model label.

The tuning range is from 535 to 20,000 kilocycles and 455 K.C. I.F. is divided into three bands as follows:

535-1725 Kilocycles or 560-174 Meters (American Broadcast Band)
1900-6400 Kilocycles or 158-46.8 Meters (Police & Amateur Band)
6.2- 20.0 Megacycles or 48.8-15.0 Meters (Foreign Band)

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MODEL 1018
Socket, Trimmers, Parts

# CROSLEY CORP.

| Item No. | Part No. | Description | Item No. | Part No. | Description | 50 | 566BP18 "M" | Speaker, Spec. No. 1-D-1052 |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | —44275 | V. C. and Cone Assy. for 566BP18 "M" Spkr. |
| 1AB | W —43567 | Dial Light Bulb | W | —45632 | Gear—Take-up Spring | | —44276 | Field Coil Assy. for 566BP18 "M" Spkr. |
| | G6 —45398 | Dial Light Socket Assy. | W | —44500A | Bearing Plate (Drive Shaft) | 51 | —44049A | Band Selector Switch |
| 2 | G169—32000 | Ant. Coil—535—1850 Kc. | W | —43542B | Bracket—Drive Shaft | 52Z | | (Line Switch |
| 3 | G168—32000 | Ant. Coil—1850—6600 Kc. | W | —45716 | Drive Shaft | 52Y | —44024B | (Tone Control (100,000 Ohm) |
| 4 | G170—32000 | Ant. Coil—6.2—22 Mc. | W | —43549 | Retaining Ring (Drive Shaft) | 53 | —44081 | Volume Control—1 Meg. |
| 5 | G169—32002 | Osc. Coil—535—1850 Kc. | W | —44701C | Rubber Grommet | 54 | —26719 | Ant. and Gnd. Term. Assy. |
| 6 | G168—32002 | Osc. Coil—1850—6600 Kc. | G16 | —41582 | Drive Cord (38 Inches) | 55 | —44101 | Power Trans., 110 V. 60 Cy. |
| 7 | G170—32002 | Osc. Coil—6.2—22 Mc. | W | —50573A | Tension Spring (D. Cord) | | —44104 | Power Trans., 110 V. 50 Cy. |
| 8 | G162—32004 | 1st I-F Assembly—455 Kc. | MG34 | —45584 | Bracket and Pulley Assy. (Cond. Mtg.) | | —44105 | Power Trans., 220 V. 50 Cy. |
| 9 | G155—32004 | 2nd I-F Assembly—455 Kc. | W | —46290 | Cord Clamp | | —44102 | Power Trans., 220 V. 25 Cy. |
| 10 | —44054 | Condenser, 30 Mf. 350 V. | W | —35951A | 3 Sect. Ant. Shunt Trimmer Assy. | | —44103 | Power Trans., 220 V. 25 Cy. |
| 11 | W —36057B | Condenser, 40 Mf. 300 V. | 25 | | H-F. Osc. Shunt Trimmer | | —44103 | |
| 12 | G13 —34002 | Condenser, .000035 Mf. Molded | 26Z | W —45713 | Pol. Osc. Shunt Trimmer | 56 | —24628 | Output Transformer |
| 13ACD | G2 —34002 | Condenser, .0001 Mf. Molded | 26Y | | B-C Osc. Shunt Trimmer (Temp. | 57 | —4921C | Resistor, 10,000 Ohm 1W. |
| 14 | | NONE | 26X | | Compensated) | 58 | —30805 | Condenser, .01 Mf. 400 V. |
| 15 | W —35936 | Condenser, .05 Mf. 200 V. | 27A | —44009 | Resistor, 3,000 Ohm ¼W. Carb. | 59 | —30488 | Condenser, .02 Mf. 400 V. |
| 16 | W —41461 | Condenser, .0014 Mf. 200 V. | 28 | —23013 | Resistor, 2,000 Ohm 1¼W. Flex. | 60 | —34712 | Condenser, .25 Mf. 150 V. |
| 17Z | W —31052 | Condenser, .05 Mf. 400 V. | 29 | —44165 | Resistor, 5,000 Ohm 1½W. Carb. | 61 | —28621 | Condenser, .02 Mf. 200 V. |
| 17Y | | Condenser, .004 Mf. 400 V. | 30 | —22196 | Resistor, 20,000 Ohm 1W. Carb. | 62 | —35600 | Resistor, 100,000 Ohm ¼W. |
| 18 | W —35139 | Condenser, .004 Mf. 400 V. | 31 | —36320 | Resistor, 120,000 Ohm ¼W. Carb. | 63 | G164—32004 | Wave Trap |
| 19AB | W —22615 | Condenser, .05 Mf. 400 V. | 32 | —21237A | Resistor, 60,000 Ohm ¼W. Carb. | | | **PUSH BUTTON PARTS** |
| 20 | —40769 | B-C. Osc. Series Trimmer (520 Mmf.) | 33AB | —21875 | Resistor, 100,000 Ohm ¼W. Carb. | G1 | —45683 | Push Button Unit Assy. |
| 21 | G23 —34000 | Pol. Osc. Series Cond. (1560 Mmf.) | 34 | —34020 | Resistor, 250,000 Ohm ¼W. Carb. | G32 | —45683 | Key and Toggle Assy. |
| 22 | G20 —34000 | H-F. Osc. Series Cond. (4910 Mmf.) | 35ABC | —23785 | Resistor, 500,000 Ohm ¼W. Carb. | W | —50542A | Key Clip (Lock Clamp) |
| 23 | W —22688 | Condenser, .1 Mf. 400 V. | 36 | —37590 | Resistor, 750,000 Ohm ¼W. Carb. | W | —50607 | Spring (Key Return) |
| 24 | G51 —33001 | 2 Sect. Gang Cond. | 37 | —21454 | Resistor, 1 Megohm ¼W. Carb. | | —45717 | Adj. Screw (Lock Clamp) |
| | —45593A | Dial Face (Glass) | 38 | —26577 | Resistor, 3 Megohm ¼W. Carb. | W | —50547 | Key Plate (Rear Guide) |
| | W —44262 | Ring—Dial Support (Cardboard) | 39 | —44008 | Resistor, 10,000 Ohm 2W. Carb. | W | —45646A | Clip (Front Guide) 1 Req. |
| | W —44263 | Arc—Dial Support (Cardboard) | 40 | —37631 | Resistor, 32 Ohm ½W. Flex. | W | —45683 | Rocker Plate Assy. |
| | W —45387A | Mask—Dial (Metal) | 41 | W —22873 | Resistor, 220 Ohm 2½W. Flex. | G31 | —50661 | Station Call List |
| | C —44110C | Dial Mtg. Bracket | 42ABC | G172—36400 | Socket, Type 6K6 | W | —45711 | Felt Strip (Unit Front) |
| | W —44127 | Pointer (Dial Hand) | 43 | G156—36400 | Socket, Type 6A8 | W | —45689A | Push Button |
| | —2045 | Shake Proof Washer (Pointer) | 44AB | G171—36400 | Socket, Type 6U7 | W | —43763 | Celluloid Covers |
| | W —40486 | Screw—Pointer Mtg. | 45AB | G152—36400 | Socket, Type 6C5 | W | —43882 | Screw P.K. (Adj. Clip Mtg.) |
| | W —45630 | Shaft—Pointer | 46 | G9 —43900 | Socket, Type 6K5 | W | —50588 | Clip (Front Guide) 4 Req. |
| | W —50325A | Retaining Ring (Pointer Shaft) | 47 | | NONE | | —50841 | Station Call List |
| | G10 —43564 | Pulley and Hub Assy. (Pointer Shaft) | 48 | G173—36400 | Socket, Type 5Y3 | | —45605 | Instructions (60 Cycle) |
| | G11 —43564 | Pulley, Gear and Hub Assy. | 49 | G103—28807 | Socket for Speaker | W | —43553 | Rubber Mtg. Foot |
| | | | | W —27981A | Tube Shield Base | W | —44380B | Knob (2) |
| | | | | W —40911 | Tube Shield | W | —44426A | Knob (2) (Pointer) |
| | | | | | | W | —43552 | Spkr. Plug Clamp |
| | | | | | | B | —44207B | Escutcheon—Dial |
| | | | | | | | —7WB | Cabinet |
| | | | | | | B | —45626C | Push Button Escutcheon |
| | | | | | | W | —45623A | P. B. Support Brkt. |
| | | | | | | W | —45580 | Grommet (P. B. Sup. Brkt.) |
| | | | | | | | —45620 | Headed Bushing (P. B. Sup. Brkt.) |
| | | | | | | W | —23080A | Thumb Screw |

## PARTS LIST — MODEL 1018

Figures in first column refer to parts in Diagrams.

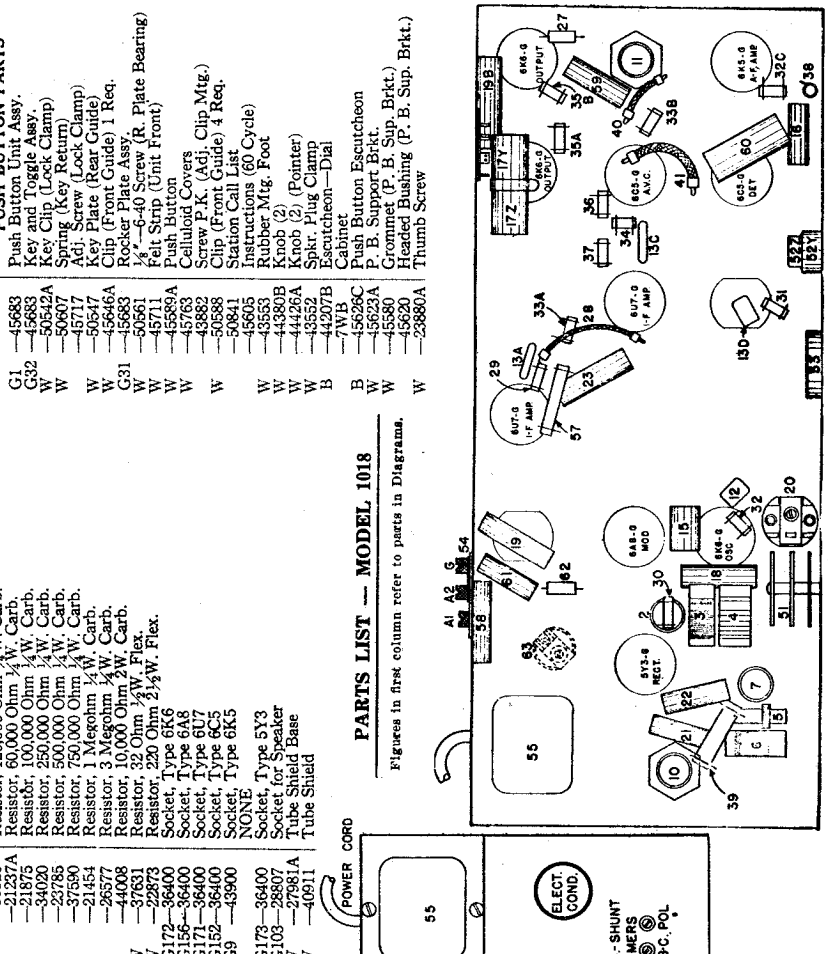


Fig. 2 Top View Model 1018

Fig. 3 Bottom View Model 1018

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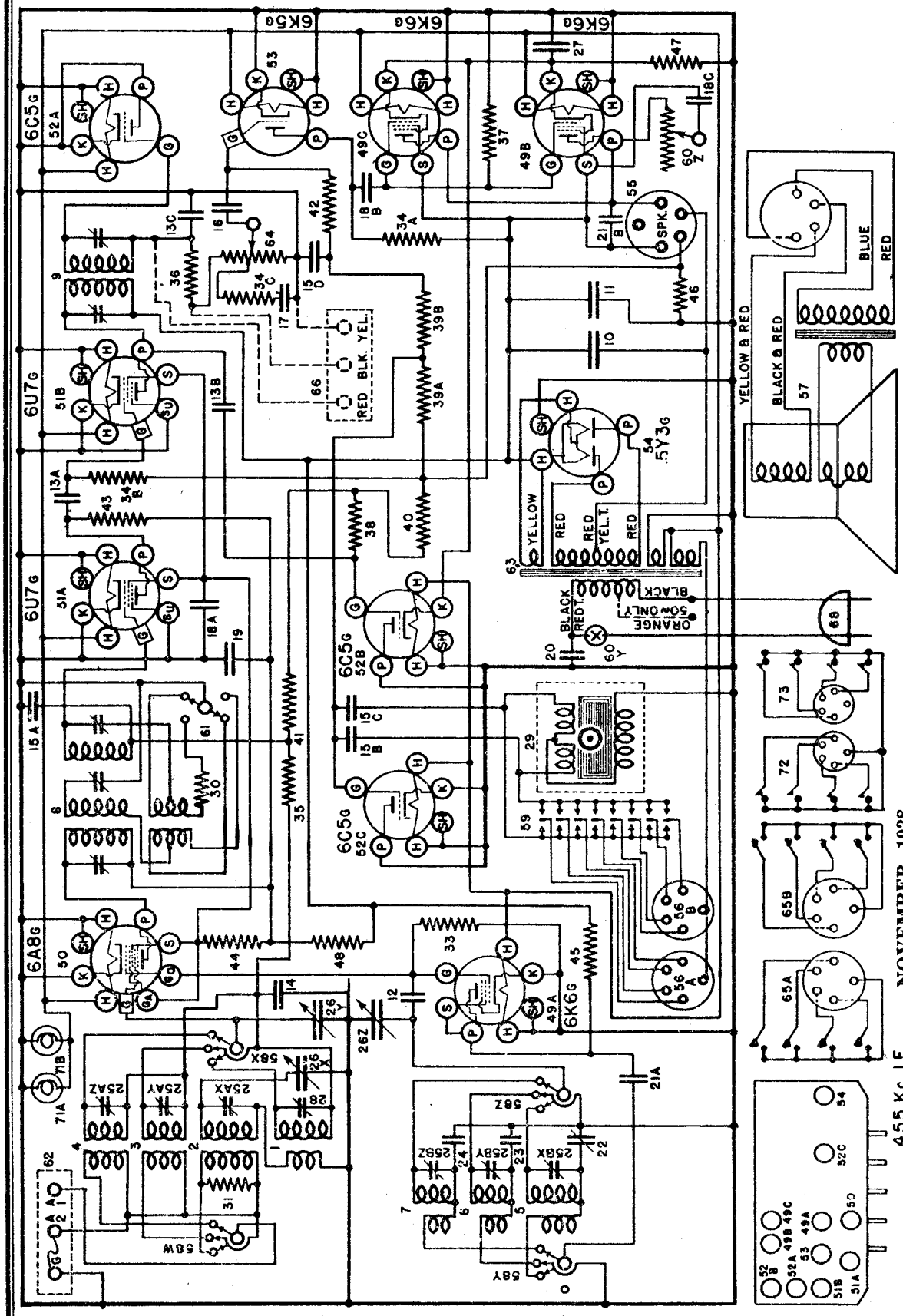
MODELS 1118, 1128
Schematic




## CHASSIS MODEL 1118 AND 1128

**SPECIFICATIONS** NOVEMBER, 1938

455 Kc. I.F.

This model Crosley radio is an 11-tube AC receiver and parallel pentode output. The tuning range is from 540-1850 Kilocycles or 555-162 Metres designed for American and Foreign broadcast reception. 540 kilocycles to 22 megacycles and is divided into 1.9- 6.6 Megacycles or 158-45.5 Metres 6.4- 22 Megacycles or 47-13.5 Metres It incorporates such features as push-button electric tuning, three bands as follows:

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MODELS 1118,1128
Parts List

CROSLEY CORP.

## PARTS LIST — MODEL 1118

Figures in first column refer to parts in Diagrams.

| Item | Part No. | Description |
|---|---|---|
| 1 | G97 —32001 | Pre-Selector Coil, B.C. |
| 2 | G138—32000 | Antenna Coil, B.C. |
| 3 | G151—32000 | Antenna Coil, Police |
| 4 | G150—32000 | Antenna Coil, H.F.. |
| 5 | G139—32002 | Oscillator Coil, B.C. |
| 6 | G154—32002 | Oscillator Coil, Police |
| 7 | G153—32002 | Oscillator Coil, H.F. |
| 8 | G161—32004 | 1st I-F., 455 Kc. Assy. |
| 9 | G154—32004 | 2nd I-F., 455 Kc. Assy. |
| 10 | W —44054 | Condenser, 30 Mf. 350 V. |
| 11 | W —36057B | Condenser, 40 Mf. 300 V. |
| 12 | G1 —44886 | Condenser, Bimetal Temp. Control |
| 13A | G2 —34002 | Condenser, .0001 Mf. Molded |
| 13B | G2 —34002 | Condenser, .0001 Mf. Molded |
| 13C | G2 —34002 | Condenser, .0001 Mf. Molded |
| 14 | W —35936 | Condenser, .05 Mf. 200 V. |
| 15A | W —28621 | Condenser, .02 Mf. 200 V. |
| 15B | W —28621 | Condenser, .02 Mf. 200 V. |
| 15C | W —28621 | Condenser, .02 Mf. 200 V. |
| 15D | W —28621 | Condenser, .02 Mf. 200 V. |
| 16 | W —41461 | Condenser, .0014 Mf. 200 V. |
| 17 | W —28619 | Condenser, .006 Mf. 200 V. |
| 18A | W —22688 | Condenser, .1 Mf. 400 V. |
| 18B | W —22688 | Condenser, .1 Mf. 400 V. |
| 18C | W —22688 | Condenser, .1 Mf. 400 V. |
| 19 | W —23615 | Condenser, .05 Mf. 400 V. |
| 20 | W —30805 | Condenser, .01 Mf. 400 V. |
| 21A | W —35139 | Condenser, .004 Mf. 400 V. |
| 21B | W —35139 | Condenser, .004 Mf. 400 V. |
| 22 | —40769 | Condenser, B.C. Osc. Series Trimmer |
| 23 | G23 —34000 | Condenser, .001560 Mf. Pol. Osc. Fixed Trimmer |
| 24 | G20 —34000 | Condenser |
| 25 | W —35951A | 3 Section Shunt Trimmer Assy. |
| 26 | G60 —33002 | 3 Section Var. Tuning Cond. (1118) |
| 26 | G62 —33002 | 3 Section Var. Tuning Cond. (1128) |
| | —44891B | Dial Face (Glass) (1118) |
| | W —45587A | Mask (Polished Metal) (1118) |
| | C —44110C | Support Bracket (Dial Glass) (1118) |
| | W —44262 | Ring (Glass Support) (1118) |
| | W —44263 | Arc (Glass Support) (1118) |
| | W —44127 | Pointer (1118) |
| | W —40486 | Screw—Pointer Mtg. (1118) |
| | G5 —43564 | Pulley and Hub Assy. (1118) |
| | —41582 | Drive Cord (1118) |
| | W —45448 | Drive Belt (1118) |
| | W —44907A | Idler Pulley (1118) |
| | W —44908 | Idler Mtg. Stud (1118) |
| | D —46239 | Dial Face (Glass) (1128) |
| | C —46094 | Dial Glass Support (1128) |
| | W —46099 | Dial Glass Clip (2) (1128) |
| | W —46096 | Dial Glass Clip, R.H. (1128) |
| | W —46095 | Dial Glass Clip, L.H. (1128) |
| | —46203 | Dial Pointer (1128) |
| | W —46097 | Dial Pointer Guide (1128) |
| | G —41582 | Drive Cord (50-Inch) (1128) |
| | W —46941 | Dial Glass Cushion (1128) |
| | G13 —43564 | Pulley and Hub Assy. (1128) |
| | MG44—46080 | Idler Pulley and Brkt. Assy. (1128) |
| | W —44989 | Cord Tension Spring (1128) |
| | W —46477 | Tubing—Drive Shaft (1128) |
| | W —45448 | Drive Belt (1128) |
| | W —44907B | Idler Pulley (Dual) (1128) |
| | W —44908 | Idler Stud (1128) |
| | D —46949 | Dial Glass (Foreign Only) (1128) |
| | W —46290 | Drive Cord Clamp (1128) |
| 27 | W —41598 | Condenser, 50 Mf. 25 V. |
| 28 | —44516 | Condenser, Pre-Select Shunt |
| 29 | MG105—44879 | Motor Assembly (50-60 Cycle) |
| | —45168 | Motor |
| | W —45165 | Motor Foot |
| | W —45164 | Motor Mounting Bracket |
| | W —20800 | Shakeproof Washer |
| | —6875 | W. H. Machine Screw, $\frac{3}{16}$" Long |
| | —6876 | W. H. Machine Screw, $\frac{1}{4}$" Long |
| | —44497 | Headed Bushing—Brkt. Mtg. |
| | W —36180 | Rubber Sleeve—Brkt. Mtg. |
| 30 | —42401A | Resistor, 99 Ohm ¼W. Ins. |
| 31 | —22196 | Resistor, 20,000 Ohm ⅓W. Carb. |
| 33 | —21237A | Resistor, 60,000 Ohm ⅓W. Carb. |
| 34A | —21875 | Resistor, 100,000 Ohm ⅓W. Carb. |
| 34B | —21875 | Resistor, 100,000 Ohm ⅓W. Carb. |
| 34C | —21875 | Resistor, 100,000 Ohm ⅓W. Carb. |
| 35 | —35600 | Resistor, 100,000 Ohm ¼W. Carb. |
| 36 | —36320 | Resistor, 120,000 Ohm ¼W. Carb. |
| 37 | —34018 | Resistor, 200,000 Ohm ⅓W. Carb. |
| 38 | —34020 | Resistor, 250,000 Ohm ⅓W. Carb. |
| 39A | —23785 | Resistor, 500,000 Ohm ⅓W. Carb. |
| 39B | —23785 | Resistor, 500,000 Ohm ⅓W. Carb. |
| 40 | —37590 | Resistor, 750,000 Ohm ⅓W. Carb. |
| 41 | —21454 | Resistor, 1 Megohm ⅓W. Carb. |
| 42 | —26577 | Resistor, 3 Megohm ⅓W. Carb. |
| 43 | —44165 | Resistor, 5,000 Ohm ½W. Carb. |
| 44 | —4921C | Resistor, 10,000 Ohm 1W. Carb. |
| 45 | —44008 | Resistor, 10,000 Ohm 2W. Carb. |
| 46 | W —37631 | Resistor, 32 Ohm ⅛W. Flex. |
| 47 | W —45381 | Resistor, 300 Ohm 2W. Flex. |
| 48 | W —23013 | Resistor, 2,000 Ohm 1¼W. Flex. |
| 49 to 54 | G178—36400 | Socket, 8 Prong Octal. |
| 55 | G103—28807 | Socket, Speaker |
| 56 | G16 —28807 | Socket, Push Button Cable |
| | W —41007 | Cable Clamp, P. B. Cable |
| | W —40911 | Tube Shield |
| 57 | 671BP-18-"M" | Speaker, Spec. No. 1-D-1180 |
| | —45184 | V. C. and Cone Assembly |
| | —45185 | Field Coil (515 Ohm) |
| | —44678 | Output Transformer |
| | —43680 | Cone Mounting Ring |
| | W —24715 | Elastic Mounting Nuts |
| | W —22985 | Rubber Washer |
| | W —46804 | Spacer |
| | W —24865 | Steel Washer |
| 58 | —44049 | Band Selector Switch |
| 59 | G1 —44628 | Switch, Discriminator, Assy. Complete |
| | G2 —44628 | Flexible Coupling |
| 60 | —44024B | Tone Control (300,000 Ohm) and Line Switch |
| 61 | —46086 | Switch, Local Distance (1128) |
| 61 | —44665A | Switch, Local Distance (1118) |
| 62 | G27 —26719 | Ant. and Gnd. Terminal Assy. |
| 63 | —44910 | Power Transformer, 110 V. 60 Cycle |
| | —44915 | Power Transformer, 110 V. 50 Cycle |
| | —44916 | Power Transformer, 220 V. 50 Cycle |
| | —45527 | Power Transformer, Universal |
| 64 | —44702 | Volume Control, 1 Megohm Tapped |
| 65A | G8 —45228 | Push Button—Cable and Plug Assy. (R.H.) (1118) |
| 65B | G9 —45228 | Push Button—Cable and Plug Assy. (L.H.) (1118) |
| | W —45478 | Trip Bar and Connecting Link (P. B. Switch) (1118) |
| 66 | G37 —26719 | Phono Terminal Assy. |
| 68 | B —33960A | Line Cord and Plug |
| 71 | W —43567 | Dial Light Bulb, 6-8 Volt (1118) |
| 71 | W —37922 | Dial Light Bulb, 6-8 Volt (1128) |
| | G9 —44363 | Dial Light Socket Assy. |
| 72 | MG45—46081 | Push Button—Cable and Plug Assy. (1128) |
| 73 | 7P | Cabinet (1118) |
| | B —45652A | Escutcheon (Dial) (1118) |
| | —45667 | Escutcheon (Push Button) L.H. (1118) |
| | —45666 | Escutcheon (Push Button) R.H. (1118) |
| | W —44380B | Knob, Vol. Cont. and Tuning (2) (1118) |
| | W —44426A | Knob, T. C.—L. D. Sw. and B. C. Sw. (3) (1118) |
| | W —44871A | Push Button (Bakelite) (1118) |
| | B —44876A | Switch (Push Button) Only (1118) |
| | 8Q | Cabinet (1128) |
| | 8QA | Cabinet (1128) |
| | C —46228C | Escutcheon (1128) |
| | —46360A | Knob, Vol. Cont. and Tuning (2) (1128) |
| | —46362A | Knob, T. C.—L. D. Sw. and B. C. Sw. (3) (1128) |
| | W —45171 | Push Button (Bakelite) (1128) |
| | B —46221 | Switch (Push Button) Only (1128) |
| | W —44876A | Celluloid Cover (Button) |
| | —44902 | Call Letter Sheet |
| | W —43553 | Rubber Mounting Foot |
| | W —43552 | Clamp (Speaker Plug) |
| | —45604 | Instructions (1118) |
| | —43093 | Instructions (1128) |

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# CROSLEY CORP.

MODELS 1118,1128
Alignment,Tuner
Notes

## MODEL 1118 AND 1128

### CIRCUIT DESCRIPTION

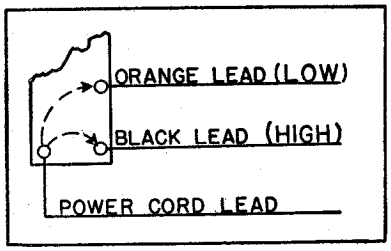
Eleven tubes are employed in a superheterodyne circuit which consists of separate oscillator and modulator tubes, 455 kilocycle I-F amplifier—one stage of which is resistance coupled, separate AVC and detector diodes, two stages of audio amplification and power supply. The 1st I-F transformer is a triple-tuned unit, which in conjunction with the Local-Distance switch, controls the selectivity of the receiver. Inter-station noise suppression is accomplished while tuning by means of the push buttons due to the action of the 6C5-G "squelch" tube. When a push button is depressed, this tube supplies sufficient voltage to the cathodes of the output tubes to bias them beyond "cut-off." It also supplies voltage to the AVC circuit through a 250,000 ohm resistor, item 38. The speaker field is located in the negative leg of the power supply. The bias for all tubes except the three type 6C5-G and the two output tubes is developed across a 32 ohm resistor, item 46, located between the speaker field and ground. The bias for the output tubes is developed across a 220 ohm resistor, item 47.

### SPECIAL POWER TRANSFORMER ADJUSTMENT

In localities where the voltage variation on 50 or 60 cycle power supply lines is greater than customary commercial limits, special 50-60 cycle power transformers are available. These transformers have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the




terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

### ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

#### Connecting Output Meter

Connect the output meter to the plate and screen of one of the 6K6G output tubes. Be certain that the meter is protected from D.C. by a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

#### Tuning The I-F Amplifier To 455 Kilocycles

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6U7G 1st I-F Amp. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Set the band selector switch on the Broadcast Band.

((d) Turn the Local-Distance Switch to the "Distance" position.

(e) Set the signal generator to 455 kilocycles.

(f) Adjust both trimmer condensers located on top of the 2nd I-F transformer for maximum output. DO NOT ADJUST THE TRIMMER CONDENSERS LOCATED ON THE 2ND I-F TRANSFORMER WITH THE SIGNAL GENERATOR LEAD CONNECTED TO THE 6A8G TUBE.

(g) Transfer the signal generator lead to the top cap of the 6A8G tube, leaving the tube's grid clip in place.

(h) Close the middle trimmer of the 1st I-F transformer. (Do not force adjustment screw).

(i) Adjust the top and then the bottom trimmers of the 1st I-F transformer for maximum output.

(j) Adjust the middle trimmer of the 1st I-F transformer for maximum output.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

#### Aligning The R-F Amplifier

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast Band a 200 mmf. condenser should be connected in series with the output lead of the signal generator and for the High Frequency and Police Bands a 400 ohm carbon resistor should be used in placed of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment, ¶ (D) below.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "OSC" shunt trimmer until the MINIMUM CAPACITY SIGNAL (D) is heard (it is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (D) is tuned-in with maximum output. Then adjust the "R-F" and "ANT" shunt trimmers for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "R-F" and "ANT" trimmers. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

(c) To align the series trimmer (See Fig. 2), set the signal generator to the frequency indicated below (D) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output. Minor tolerance variations in series alignment at 2500 kilocycles in the Police Band and at 7000 kilocycles in the High Frequency Band may be compensated for by slight reposition of the grid lead of the antenna coil in the Band affected.

### PUSH BUTTON TUNING SYSTEM

The push button electric tuning system employed in this receiver incorporates eight push buttons on the Model 1118 and nine on the Model 1128, a selector switch and a motor. The discriminator switch, item 59—also Figs. 5 and 6, incorporates eight metallic discs, each of which operates in conjunction with a different push button to tune-in some favorite station. That is, the 1st push button on the left as you face the front of the cabinet works with No. 1 disc, and the 2nd push button works with No. 2 disc, etc.

### SETTING PUSH BUTTONS

To set the electric tuning system, turn the receiver "ON" and depress No. 1 push button. When the dial pointer stops rotating, the key slot in No. 1 disc on the selector switch will be in the "UP" position. Remove the key from its mounting and place it (knob up) through No. 1 hole in the disc identification bracket. If it does not drop into the slot in the disc, push it in with the fingers.

Turn the Local-Distance switch to the "Distance" position. By means of the station selector knob, tune-in AS ACCURATELY AS POSSIBLE, the station whose call letters have been placed in No. 1 push button. Then remove the key.

NOTE: On Model 1128 the push button on the extreme right (manual) serves as a release for all other push buttons and should be depressed before operating the manual tuning control.

NOTE: On Model 1118 the push button which will ordinarily be used for Police calls does not lock in the depressed position. It serves as a release for all other buttons and should be depressed before operating the manual tuning control.

By means of the manual tuning knob, turn the dial pointer to some other position. Then check the setting by pressing the button which has been set. If the pointer stops too soon or goes too far, a second setting will be necessary.

To make the second setting, observe how far the pointer stops from the correct position for that station. Replace the key in the disc and tune far enough to one side of the correct position to make allowance for the difference noted in the first setting.

The electric tuning system is now correctly set for the 1st station. Follow through with this same procedure until the proper adjustments have been made for all eight of the favorite stations. When tuning the receiver by means of the push buttons, the Local-Distance switch should be turned to the "Local" position.

#### Selector Switch

Should the selector switch become inoperative in the field, it should not be dissembled for repair, but should be returned to the factory via an authorized Crosley Distributor.

### REPLACING DRIVE CORD ON THE 1128

To replace the dial drive cord, the following procedure should be carefully followed.

1.—Remove the knobs, plugs, and hold down screws from the chassis then remove the chassis from the cabinet.

2.—Remove the drive cord from the pointer, the dial light sockets from the dial bracket, then the complete dial assembly.

3.—Remove the broken cord and tension spring.

4.—Cut a piece of drive cord exactly 50 inches in length. Fold double then tie the tension spring approximately one inch from the end, this gives you a loop 24 inches long.

5.—Close the condenser gang, this should place the eyelet in the pulley on top.

6.—Insert the cord through the eyelet in the large pulley from the inside. Hook the loose end of tension spring on catch in pulley.

7.—Remove double brass pulley from front of chassis.

8.—Take one side of drive cord and make one half turn in a counter-clockwise direction around large pulley.

9.—Hold brass pulley in left hand and make two complete turns in a clockwise direction around small end. While keeping tension on cord mount pulley to chassis. Then continue cord up and over the right hand idler pulley in a counter clockwise direction (¼ turn). Continue across to left hand idler pulley and on around and down to bottom of large pulley. Stretch tension spring and snap cord over pulley rim. Place cord clamp (W-46290) on drive cord approximately ⅛ inch from inside edge of pulley rim.

10.—Replace drive belt, dial assembly and dial lights.

11.—Place pointer at extreme left end of dial, close condenser gang. Hook drive cord in pointer, check pointer travel before cementing cord to pointer.

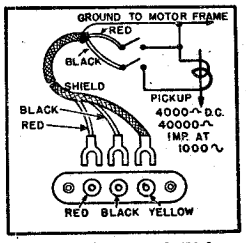



Fig. 4 Phonograph Pickup

### SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D. C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The volume control should be turned full "ON," the tone control should be turned to the "TREBLE" position (counter-clockwise), the Local-Distance switch should be turned to the "Distance" position and the condenser gang should be rotated to the minimum capacity position. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

1938

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MODELS 1118,1128
Voltage,Socket,Trimmers
Chassis,Drive Data

# CROSLEY CORP.

**(D) SIGNAL INPUT FREQUENCIES**

| | Min. Cap. Signal | Shunt Align. | Series Align. |
|---|---|---|---|
| American Broadcast Band | 1850 Kilocycles | 1700 Kilocycles | 600 Kilocycles |
| Police & Amateur Band | 6600 Kilocycles | 6000 Kilocycles | |
| High Frequency Band | 22 Megacycles | 18 Megacycles | |

**TUBE SOCKET VOLTAGE READINGS**

| Tube | Function | H | P | S | G | K | Go | Ga |
|---|---|---|---|---|---|---|---|---|
| 6K6G | Oscillator | 6.3 | 147 | 147 | -36 | 0 | -36 | 110 |
| 6A8G | Modulator | 6.3 | 224 | 110 | | 0 | | |
| 6U7G | 1st I-F Amplifier | 6.3 | 174 | 110 | | 0 | | |
| 6U7G | 2nd I-F Amplifier | 6.3 | 270 | 110 | | 0 | | |
| 6C5G | Diode Detector | 6.3 | 0 | | | 0 | | |
| 6C5G | AVC Diode | 6.3 | 0 | | | 0 | | |
| 6K5G | 1st A-F Amplifier | 6.3 | 190 | | | 22 | | |
| 6K6G | Output | 6.3 | 263 | 270 | 0 | 22 | | |
| 6K6G | Output | 6.3 | 263 | 270 | | 22 | | |
| 6C5G | "Squelch" | 6.3 | 0 | | | 0 | | |
| 5Y3G | Rectifier | 5.0 | — | | | 270 | | |

Power consumption approximately 90 watts at 117.5 volts.
Power output approximately 10 watts.
Voltage drop across speaker field 60 volts.

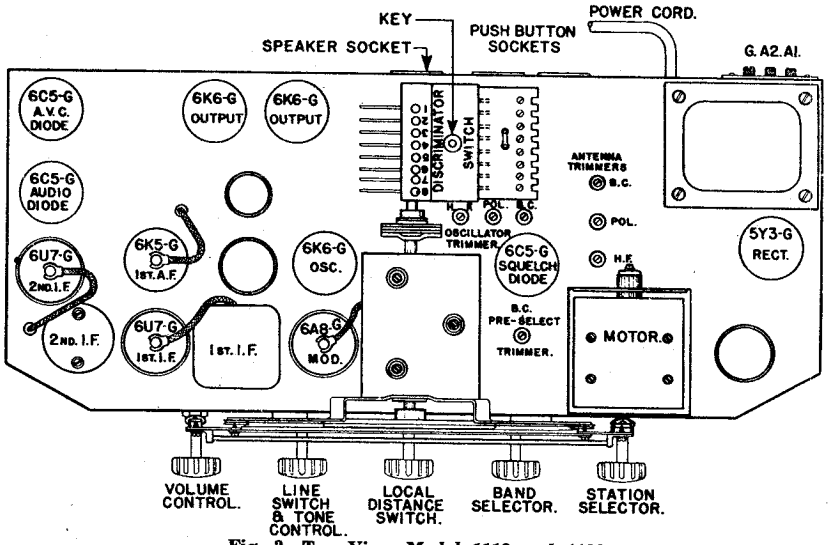


Fig. 2 Top View Model 1118 and 1128

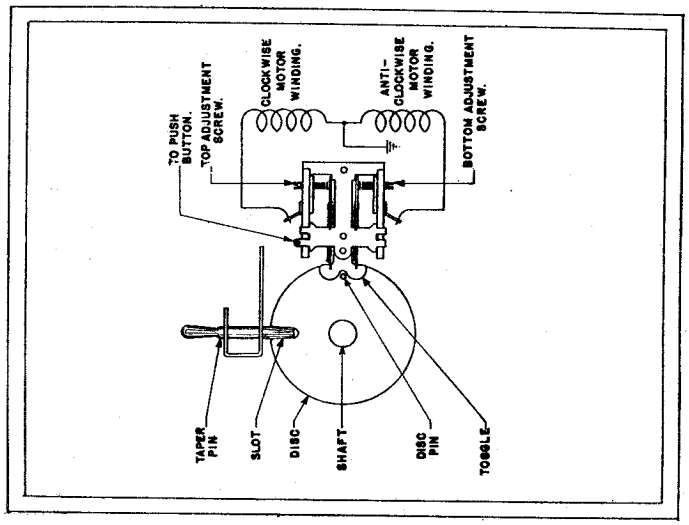


Fig. 5

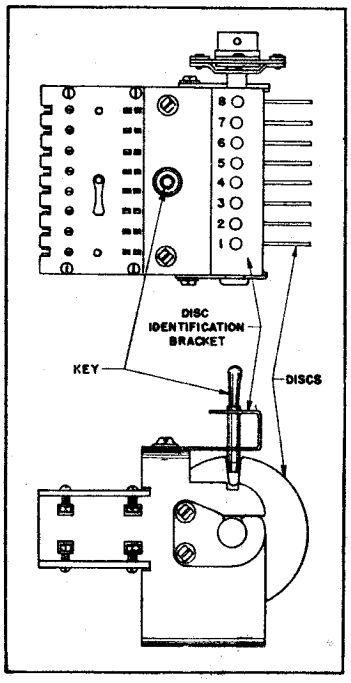


Fig. 6

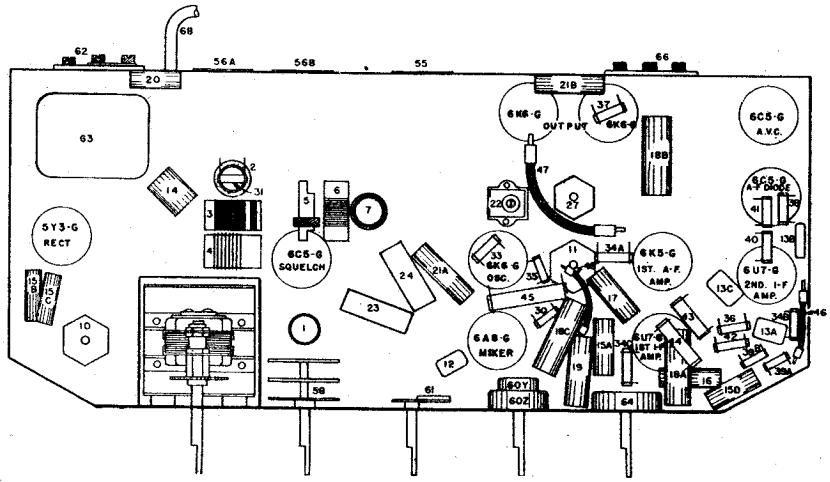


Fig. 3 Bottom View Model 1118 and 1128

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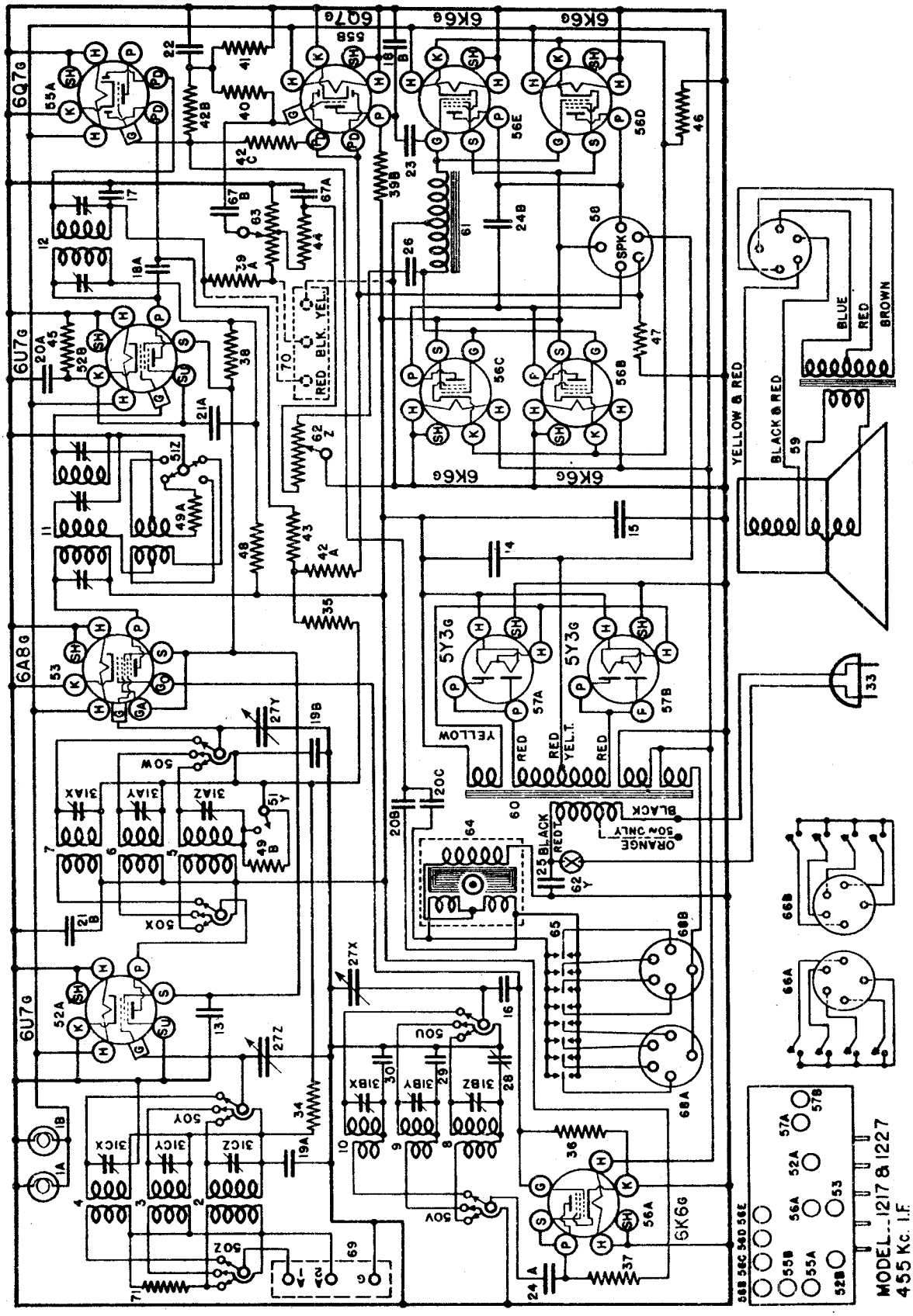
CROSLEY CORP.

MODELS 1217,1227
Schematic

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MODELS 1217,1227
Tuner,Parts List

# CROSLEY CORP.

## INTERLOCKING PUSH BUTTONS

| Part No. | | Description |
|---|---|---|
| G4 | —45228 | R. H. Push Button Assy. (1) (1217) |
| B | —45177 | Push Button Escutcheon R. H. |
| G5 | —45228 | L. H. Push Button Assy. (1) (1217) |
| W | —44873B | Push Button Escutcheon L. H. |
| W | —45478 | Trip Bar Connecting Link (1) (1217, 1227) |
| R | —77 | Screw—Trip Bar Mtg. (1217 and 1227) |
| W | —44877A | P. B. Cable and Plug (1217 and 1227) |
| B | —45475 | R.H. Push Button Switch only (1217, 1227) |
| B | —45476 | L.H. Push Button Switch only (1217, 1227) |
| W | —45171A | Push Button only (8) (1217) |
| G6 | —45228 | R. H. Push Button Assy. (1) (1227) |
| G7 | —45228 | L. H. Push Button Assy. (1) (1227) |
| W | —44871A | Push Button only (8) (1227) |
| W | —44875 | Celluloid Covers (8) (1217 and 1227) |
| W | —45483 | Shock Pad—P. B. Sw. (8) (1217 and 1227) |

## PUSH BUTTON TUNING SYSTEM

The push button electric tuning system employed in this receiver incorporates eight push buttons, a selector switch and an electric motor. The discriminator switch, item 65 — also Fig. 5, incorporates eight metallic discs, each of which operates in conjunction with a different push button to tune-in some favorite station. That is, the 1st push button on the left as you face the front of the cabinet work with No. 1 disc, and the 2nd push button works with No. 2 disc, etc.

### SETTING PUSH BUTTONS

To set the electric tuning system, turn the receiver "ON" and depress No. 1 push button. When the dial pointer stops rotating, the key slot in No. 1 disc on the selector switch will be in the "UP" position. Remove the key from its mounting and place it (knob up) through No. 1 hole in the disc identification bracket. If it does not drop into the slot in the disc, push it in with the fingers.

Turn the Local-Distance switch to the "Distance" position. By means of the station selector knob, tune-in AS ACCURATELY AS POSSIBLE, the station whose call-letters have been placed in No. 1 push button. Then remove the key.

NOTE: The push button which will ordinarily be used for POLICE calls does not look in the depressed position. It serves as a release for all other push buttons and should be depressed before operating the manual tuning control. (The first sets of this model were built with non-lock type push buttons).

By means of the manual tuning knob, turn the dial pointer to some other position. Then check the setting by pressing the button which has been set. If the pointer stops too soon or goes too far, a second setting will be necessary.

To make the second setting, observe how far the pointer stops from the second position for that station. Replace the key in the disc and tune far enough to one side of the correct position to make allowance for the difference noted in the first setting.

The electric tuning system is now correctly set for the 1st station. Follow through with this same procedure until the proper adjustments have been made for all eight of the favorite stations. When tuning the receiver by means of the push buttons, the Local-Distance switch should be turned to the "Local" position.

### Tuning Motor

Should the clutch on the tuning motor fail to operate satisfactorily, either by not engaging or not releasing when it should, the two tension springs located on the back of the motor should be readjusted.

With the receiver sitting in its normal operating position, bend both tension springs until the clutch will not engage. Slowly decrease the tension on both springs until the clutch engages and releases satisfactorily. Check the operation of the motor several times to be certain that the tension is correct.

### Selector Switch

Should the selector switch become inoperative in the field, it should not be dissembled for repair, but should be returned to the factory via an authorized Crosley distributor.

## PARTS LIST—MODELS 1217 and 1227

| Item No. | Part No. | Figures in first column refer to parts in Diagrams. Description |
|---|---|---|
| 1AB | W —43567 | Dial Light Bulb |
| | G8 —45398 | Dial Light Socket Assy. |
| 2 | G145—32000 | Ant. Coil, B-C. |
| 3 | G146—32000 | Ant. Coil, Pol. |
| 4 | G147—32000 | Ant. Coil, H-F. |
| 5 | G94 —32001 | R-F. Coil, B-C. |
| 6 | G95 —32001 | R-F. Coil, Pol. |
| 7 | G96 —32001 | R-F. Coil, H-F. |
| 8 | G148—32002 | Osc. Coil, B-C. |
| 9 | G149—32002 | Osc. Coil, Pol. |
| 10 | G150—32002 | Osc. Coil, H-F. |
| 11 | G161—32004 | 1st I-F. Assy. |
| 12 | G166—32004 | 2nd I-F. Assy. |
| 13 | W —44672 | Condenser, .40 Mf. 125 V. |
| 14 | W —44054 | Condenser, .30 Mf. 350 V. |
| 15 | W —36057B | Condenser, .40 Mf. 300 V. (1217 only) |
| 16 | W —44438A | Condenser, .40 Mf. 300 V. (1227 only) |
| 17 | G5 —44866 | Condenser, Temp. Compensating |
| 18A | G1 —34002 | Condenser, .00005 Mf. Molded |
| 18B | G1 —34002 | Condenser, .00025 Mf. Molded |
| 19A | W —35936 | Condenser, .00025 Mf. Molded |
| 19B | W —35936 | Condenser, .05 Mf. 200 V. |
| 20A | W —28621 | Condenser, .05 Mf. 200 V. |
| 20B | W —28621 | Condenser, .02 Mf. 200 V. |
| 20C | W —28621 | Condenser, .02 Mf. 200 V. |
| 21A | W —32378 | Condenser, .01 Mf. 400 V. |
| 21B | W —32378 | Condenser, .01 Mf. 400 V. |
| 22 | W —29910A | Condenser, .25 Mf. 200 V. |
| 23 | W —24049C | Condenser, .1 Mf. 200 V. |
| 24A | W —35139 | Condenser, .004 Mf. 400 V. |
| 24B | W —35139 | Condenser, .004 Mf. 400 V. |
| 25 | W —30805 | Condenser, .01 Mf. 400 V. |
| 26 | W —37988 | Condenser, .017 Mf. 400 V. |
| 27 | G58 —33002 | 3 Section Var. Tun. Condenser |
| | B —44815R | Dial Face (Glass) |
| | W —44146B | Dial Mask (Metal) |
| | C —44814A | Dial Support Bracket |
| | W —45417 | Ring—Dial Glass Support |
| | W —44127 | Dial Hand (Pointer) |
| | W —40486 | Screw (Hand Mtg.) |
| | G1 —43564 | Pulley and Hub Assy. (Drive Cord) |
| | W —41582 | Drive Cord (23 in.) |
| | W —44908 | Idler Stud |
| | W —44969 | Spring—Drive Cord Tension |
| | W —44907A | Idler Pulley |
| | W —45448 | Drive Belt |
| | —45449 | Friction Tubing—Motor Shaft |
| 28 | —40769 | B-C Osc. Series Trimmer (.00052 Mf.) Variable |
| 29 | G23 —34000 | Pol. Osc. Fixed Series Condenser (.00156 Mf.) |
| 30 | G24 —34000 | H-F. Osc. Fixed Series Condenser (.000525 Mf.) |
| 31 | W —35951A | 3 Section Shunt Trimmer Assy. |
| 32 | | |
| 33 | B —33906A | Power Cord and Plug |
| 34 | —35930 | Resistor, 200,000 Ohm ½W. Ins. |
| 35 | —34883 | Resistor, 2 Megohm ½W. Carb. |
| 36 | —21237A | Resistor, 60,000 Ohm ½W. Carb. |
| 37 | —44008 | Resistor, 10,000 Ohm 2W. Carb. |
| 38 | —23616 | Resistor, 15,000 Ohm 1W. Carb. |
| 39A | —35600 | Resistor, 100,000 Ohm ½W. Ins. |
| 39B | —35600 | Resistor, 100,000 Ohm ½W. Ins. |
| 40 | —37583 | Resistor, 2.5 Megohm ½W. Carb. |
| 41 | —37245 | Resistor, 1.5 Megohm ½W. Carb. |
| 42A | —23785 | Resistor, 500,000 Ohm ½W. Carb. |
| 42B | —23785 | Resistor, 500,000 Ohm ½W. Carb. |
| 42C | —23785 | Resistor, 500,000 Ohm ½W. Carb. |
| 43 | —21455 | Resistor, 300,000 Ohm ½W. Carb. |
| 44 | —37472 | Resistor, 50,000 Ohm ½W. Carb. |
| 45 | W —28589 | Resistor, 350 Ohm ½W. Flex. |
| 46 | W —44455 | Resistor, 250 Ohm 3W. Flex. |
| 47 | W —37630 | Resistor, 21 Ohm ½W. Flex. |
| 48 | W —23013 | Resistor, 2,000 Ohm 1½W. Flex. |

| Item No. | Part No. | Description |
|---|---|---|
| | —42401B | Resistor, 99 Ohm ¼W. W. Ins. |
| | —42401B | Resistor, 99 Ohm ¼W. W. Ins. |
| | —44532A | Band Selector Switch |
| | —44771 | Local-Distance Switch |
| 52AB | G171—36400 | Socket, Type 6U7 |
| 53 | G156—36400 | Socket, Type 6A8 |
| 55AB | G160—36100 | Socket, Type 6Q7 |
| 56A BCDE | G172—36400 | Socket, Type 6K6 |
| 57AB | G173—36400 | Socket, Type 5Y3 |
| 58 | G103—28807 | Socket Speaker |
| | W —40911 | Tube Shield |
| 59 | 668P18"M" | Speaker, Mfg. Spec. 1-D-1134 |
| | —45180 | V. C. and Cone Assy. |
| | —45181 | Field Coil (450 Ohms—125 M. A.) |
| | —45182 | Output Trans. |
| | —43682 | Speaker Plug. |
| 60 | —44706 | Cardboard Ring—Cone Mtg. |
| | —44793 | Power Trans., 110 V. 60 Cy. |
| | —44791 | Power Trans., 110 V. 50 Cy. |
| | —44794 | Power Trans., 220 V. 25 Cy. |
| | —44792 | Power Trans., 220 V. 50 Cy. |
| 61 G20 | —28535 | Audio Input Choke |
| 62 | —44704A | Tone Control (1 Meg.) and Line Switch |
| 63 | —44773 | VolumeCtl (1 Meg. Tap—275,000 Ohm) |
| 64 | —45168 | Motor—1217 only (50–60 Cy.) |
| | —45169 | Motor—1227 only (50–60 Cy.) |
| W | —45165 | Mtg. Foot—Motor |
| W | —45164 | Bracket—Motor Mtg. |
| 65 G1 | —44628 | Discriminator Switch Assy. |
| W | —44898 | Pin, Switch Adjust. |
| 66AB W | —44877 | Cable and Plug—Push Button |
| 67A W | —28619 | Condenser, .006 Mf. 200 V. |
| 67B W | —28619 | Condenser, .006 Mf. 200 V. |
| 68AB G16 | —28807 | Socket—Push Button Plug |
| 69 G27 | —26719 | Ant. and Gnd. Terminal Assy. |
| 70 G37 | —26719 | Phono Terminal Assy. |
| 71 | —22196 | Resistor, 20,000 Ohm ¼W. Carb. |
| | 7R | Cabinet (1227 only) |
| | 7PF | Cabinet (1217 only) |
| W | —43552 | Spk. Plug Clamp |
| W | —43553 | Rubber Mtg. Foot (5–1217) (2–1227) |
| B | —44207B | Escutcheon (Dial) |
| W | —44724 | Extruded Rub. Spacer—Brkt. Mtg. 1227 |
| B | —45477 | Escutcheon (2 Req.) Push Button |
| B | —44876A | Push Button Switch only |
| W | —44877A | Push Button Cable |
| W | —44871A | Push Button (1227) |
| W | —45171 | Push Button (1217) |
| W | —44380B | Knob—V. Cont.—Tuning (1227) |
| W | —44426A | Knob—T. Cont.—Loc. Dist. (1227) |
| W | —44751A | Knob—Band Sel. (1227) |
| W | —45105 | Knob—V. Cont.—Tuning (1217) |
| W | —45104 | Knob—T. Cont.—Loc. Dist. (1217) |
| W | —45103A | Knob—Band Sel. (1217) |
| W | —44875 | Celluloid Cover |
| | —44902 | Station Call Letter Sheet |
| C | —44404 | Chassis Mtg. Bracket (1227) |
| | —7662 | Screws—Brkt. Mtg. (1227) |

### NON-INTERLOCKING PUSH BUTTONS

| Part No. | | Description |
|---|---|---|
| G2 | —45228 | Push Button Assy. Complete (2) (1217) |
| B | —44876A | Push Button Switch only (1217) |
| W | —44877A | Push Button Cable and Plug only (1217) |
| W | —45171 | Push Button only (1217) |
| G1 | —45228 | Push Button Assy. Complete (1227) |
| B | —44876H | Push Button Switch only (1227) |
| W | —44871A | Push Button Cable and Plug only (1227) |
| W | —44875 | Push Button only (1227) |
| W | —44873B | Push Button Escutcheon (2) (1217 and 1227) |

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CROSLEY CORP.

MODELS 1217,1227
Socket,Trimmers,Chassis
Drive Data,Phono.

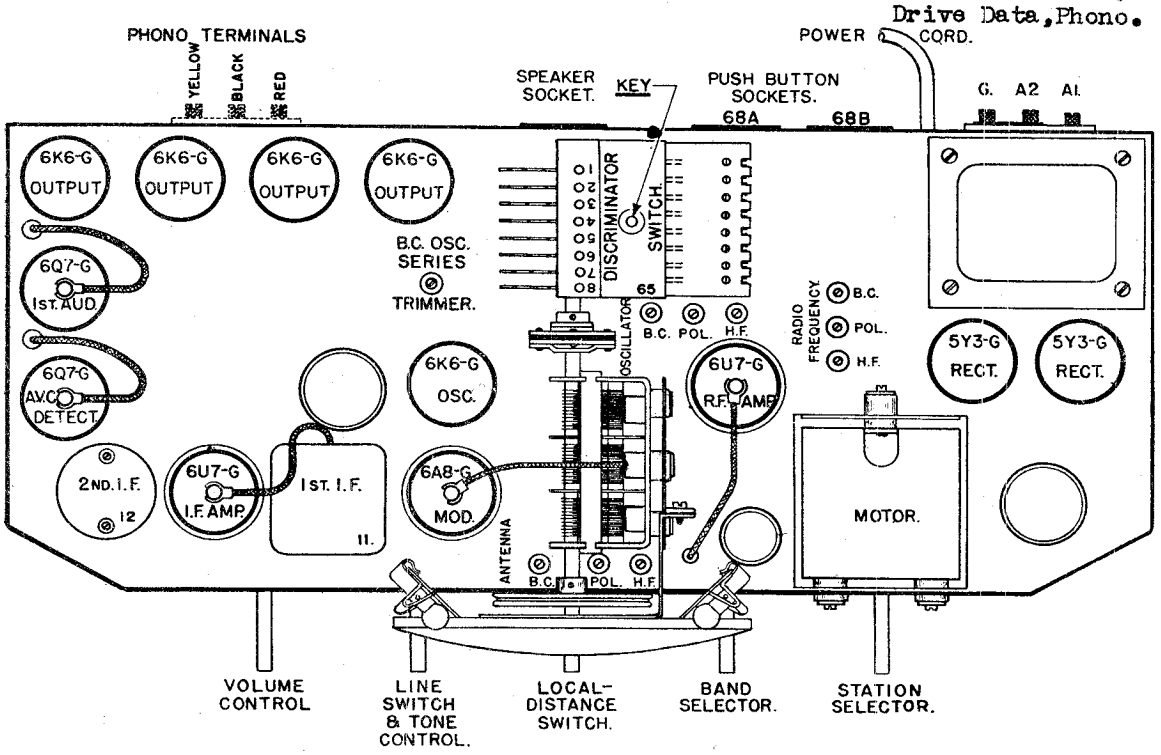


**Fig. 2. Top View Models 1217 and 1227**

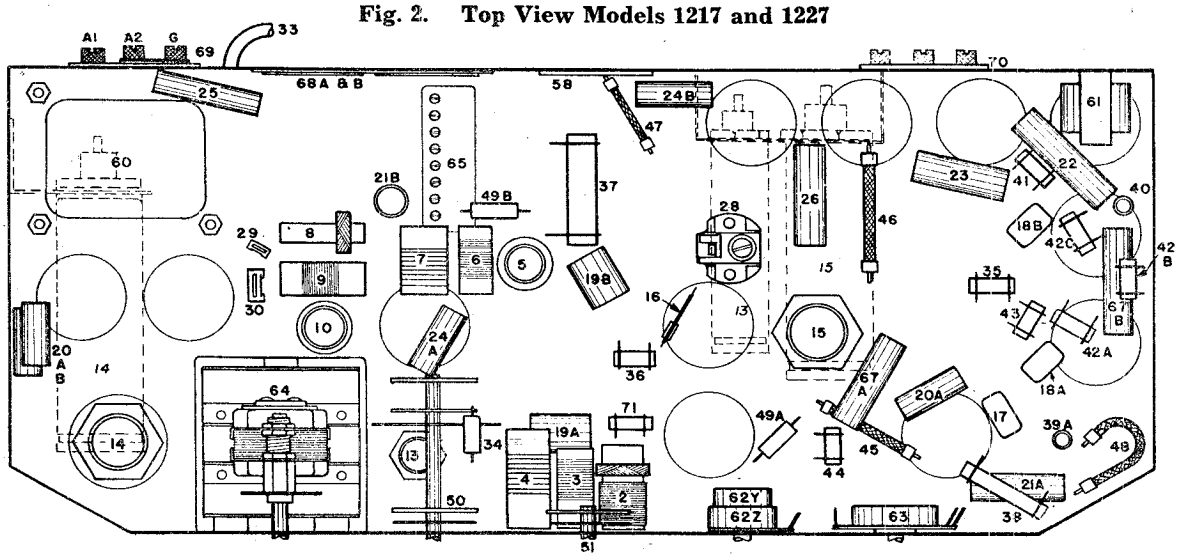


**Fig. 3. Bottom View Models 1217 and 1227**

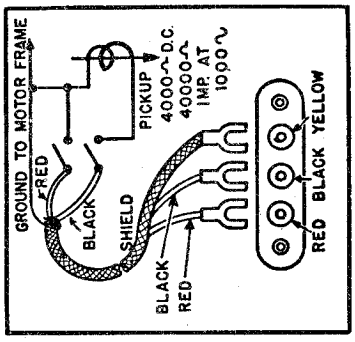


**Fig. 4. Phonograph Pickup**

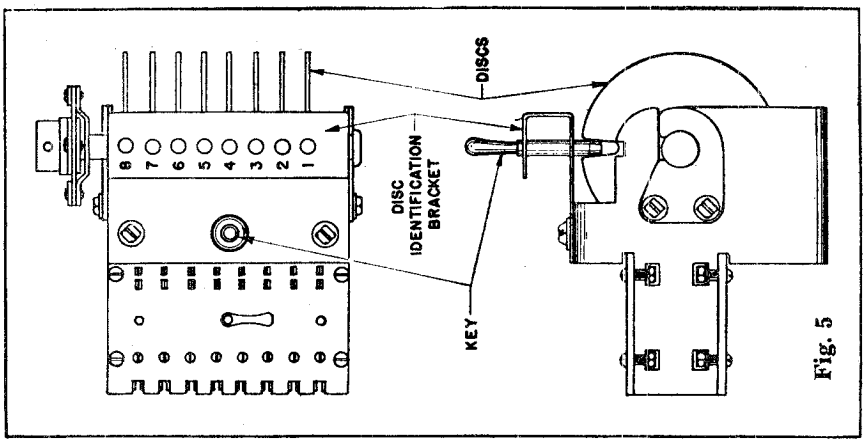


**Fig. 5**

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These model Crosley radios are 12-tube AC receivers designed for Standard Broadcast and Short Wave reception. They incorporate such features as push button electric tuning, automatic volume control, Local-Distance switch and push pull parallel output. The tuning range is divided into three bands as follows:

535-1725 Kilocycles or 555-173 Metres (American Broadcast Band)
2.0- 6.8 Megacycles or 150-44.5 Metres (Police & Amateur Band)
6.6- 22 Megacycles or 45.5-13.5 Metres (High Frequency or Foreign Band)

## CIRCUIT DESCRIPTION

Twelve tubes are employed in a superheterodyne circuit which consists of an R. F. amplifier, separate oscillator and modulator tubes, 455 kilocycle I. F. amplifier, a composite detector, AVC and quiet or "squelch" tube, two stage audio amplifier—the output of which uses four pentode tubes in push pull parallel and power supply.

The 1st I. F. transformer is a triple-tuned unit, which in conjunction with the Local-Distance switch, controls the selectivity of the receiver. Quiet tuning is accomplished while tuning by means of the push buttons due to the action of the 6Q7G tube, item 55A, on the audio amplifier. When any push button is depressed, A. C. voltage is impressed upon the control grid of this tube through one or the other of condensers 20B or 20C. A portion of this voltage is rectified and passed on to the control grid of the 6Q7G A. F. tube through resistors 42B and 40, the effect being to bias the tube beyond cutoff.

The diode plates of the 6Q7G A. F. tube have no effect upon the circuit and the socket terminals for these two elements are only used for junction blocks. The 450 ohm field of the speaker is located in the negative leg of the power supply.

The bias voltage for the 6U7G I. F. amplifier tube is obtained across a 250 ohm resistor, item 47, located between the speaker field and ground.

## SOCKET VOLTAGES

The tube socket voltages are measured from the tube socket contacts to the chassis with a 1000 ohm per volt, 500 volt D. C. voltmeter (except filaments) with the receiver in operating condition and no signal input. The volume control should be turned full "ON," the tone control should be turned to the "TREBLE" position (counter-clockwise), the Local-Distance switch should be turned to the "Distance" position and the condenser gang should be rotated to the minimum capacity position. The filament voltages should be measured with an accurate low range A. C. voltmeter (approximately 0-10 volts). Readings may vary plus or minus 10% of values given.

### TUBE SOCKET VOLTAGE READINGS

| Tube | Function | H | P | S | Su | K | Go | Ga |
|---|---|---|---|---|---|---|---|---|
| 6U7G | R. F. Amplifier | 6.3 | 255 | 95 | 0 | 0 | — | — |
| 6A8G | Modulator | 6.3 | 255 | 95 | — | 0 | 95 | 95 |
| 6K6G | Oscillator | 6.3 | 125 | 125 | — | 0 | — | — |
| 6U7G | I. F. Amplifier | 6.3 | 255 | 95 | 3 | 3 | — | — |
| 6Q7G | Det., AVC & "Squelch" | 6.3 | 0 | — | — | 0 | — | — |
| 6Q7G | 1st A. F. Amplifier | 6.3 | 185 | — | — | 0 | — | — |
| 6K6G | (4) Output | 6.3 | 245 | 255 | — | 22 | — | — |
| 5Y3G | (2) Rectifier | 5.0 | — | — | — | 255 | — | — |

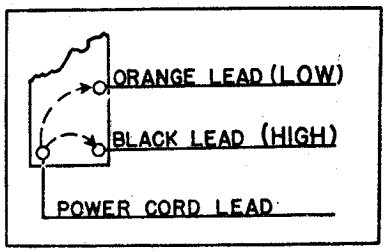
Power consumption approximately 120 watts at 117.5 volts.
Power output approximately 12 watts.
Voltage drop across speaker field 72 volts.

## SPECIAL POWER TRANSFORMER ADJUSTMENT

In localities where the voltage variation on 50 or 60 cycle power supply lines is greater than customary commercial limits, special 50-60 cycle power transformers are available. These transformers have a "high" and "low" voltage tap on the under side of the chassis. The "high" voltage lead (BLACK) and the "low" voltage lead (ORANGE) are connected to a terminal strip near the transformer.

The voltage range of the "low" tap of the 95-130 volt transformer is from 95 to 112½ volts and of the "high" tap is from 112½ to 130 volts. The range of the "low" tap of the 190-260 volt transformer is from 190 to 225 volts and of the "high" tap is from 225 to 260 volts.

The accompanying illustration shows the connections for changing from high to low or low to high line voltage. Note the "jumper" wire which is attached to the




terminal at which one side of the power cord is attached. The other end of this jumper wire should be connected to the ORANGE or BLACK lead of the transformer primary, according to the line voltage the receiver is to be used on.

NOTE: Any change made in the power supply circuit of the receiver should be plainly stamped or otherwise permanently recorded on the rear of the chassis.

## ALIGNMENT PROCEDURE

All the circuits in this receiver are very accurately adjusted at the factory and normally should need no further adjustment. However, if it is definitely known that an adjustment is necessary the circuits may be properly aligned with the use of a modulated signal generator and an output meter.

### Connecting Output Meter.

Connect the output meter to the plates of the two 6K6G output tubes. Be certain that the meter is protected from D. C. by a condenser (.1 mfd. or larger—not electrolytic) in series with one of the leads.

### Tuning The I-F Amplifier To 455 Kilocycles.

(a) Connect the output of the signal generator through a .02 mfd. condenser to the top cap of the 6U7G 1st I-F Amp. tube, leaving the tube's grid clip in place. Connect the ground lead from the signal generator to the ground terminal of the receiver. KEEP THE GENERATOR LEADS AS FAR AS POSSIBLE FROM THE GRID LEADS OF THE OTHER SCREEN GRID TUBES.

(b) Set the station selector so that the tuning condenser plates are completely out of mesh. Turn the volume control knob to the right (ON) and turn the tone control knob to the left (TREBLE).

(c) Set the band selector switch on the Broadcast Band.

(d) Turn the Local-Distance Switch to the "Distance" position (Right).

(e) Set the signal generator to 455 kilocycles.

(f) Adjust both trimmer condensers located on top of the 2nd I-F transformer for maximum output.

(g) Transfer the signal generator lead to the top cap of the 6A8G tube, leaving the tube's grid clip in place.

(h) Close the middle trimmer of the 1st I-F transformer. (Do not force adjustment screw).

(i) Adjust the top and then the bottom trimmers of the 1st I-F transformer for maximum output.

(j) Adjust the middle trimmer of the 1st I-F transformer for maximum output.

DO NOT ADJUST THE TRIMMER CONDENSERS LOCATED ON THE 2ND I-F TRANSFORMER WITH THE SIGNAL GENERATOR LEAD CONNECTED TO THE 6A8G TUBE.

ALWAYS USE THE LOWEST SIGNAL GENERATOR OUTPUT THAT WILL GIVE A REASONABLE OUTPUT METER READING.

### Aligning The R-F Amplifier.

When aligning the R-F amplifier the output lead from the signal generator is connected to the "ANT" terminal of the receiver. For the Broadcast Band a 200 mmf. condenser should be connected in series with the output lead of the signal generator and for the High Frequency and Police Bands a 400 ohm carbon resistor should be used in place of the condenser.

Each band should first be SHUNT ALIGNED and then SERIES ALIGNED where provision is made for series alignment (Broadcast Band). The band selector switch should be set for the band being aligned and the signal generator should be set to the frequency indicated for each adjustment, ¶ (D) below.

(a) With the station selector adjusted so that the tuning condenser plates are completely out of mesh, adjust the "OSC" shunt trimmer until the MINIMUM CAPACITY SIGNAL (D) is heard (it is not necessary that the receiver tune through this signal).

(b) Adjust the station selector so that the SHUNT ALIGNMENT SIGNAL (D) is tuned-in with maximum output. Then adjust the "R-F" and "ANT" shunt trimmers for maximum output. Readjust the station selector slightly so that the generator signal is tuned-in with maximum output and check the adjustment of the "R-F" and "ANT" trimmers. DO NOT READJUST THE OSCILLATOR TRIMMER.

NOTE: When shunt aligning the Police and High Frequency Bands care must be exercised so that the circuits will be aligned on the correct frequency rather than on the image frequency which is approximately 910 kilocycles less than the fundamental. To check on this, increase the output of the signal generator ten times, or more, and try to tune-in the signal both at the generator frequency as indicated on the station selector dial and at approximately 910 kilocycles less than the correct frequency. If the circuits have been properly aligned the signal can be tuned-in at both positions but much stronger at the correct frequency.

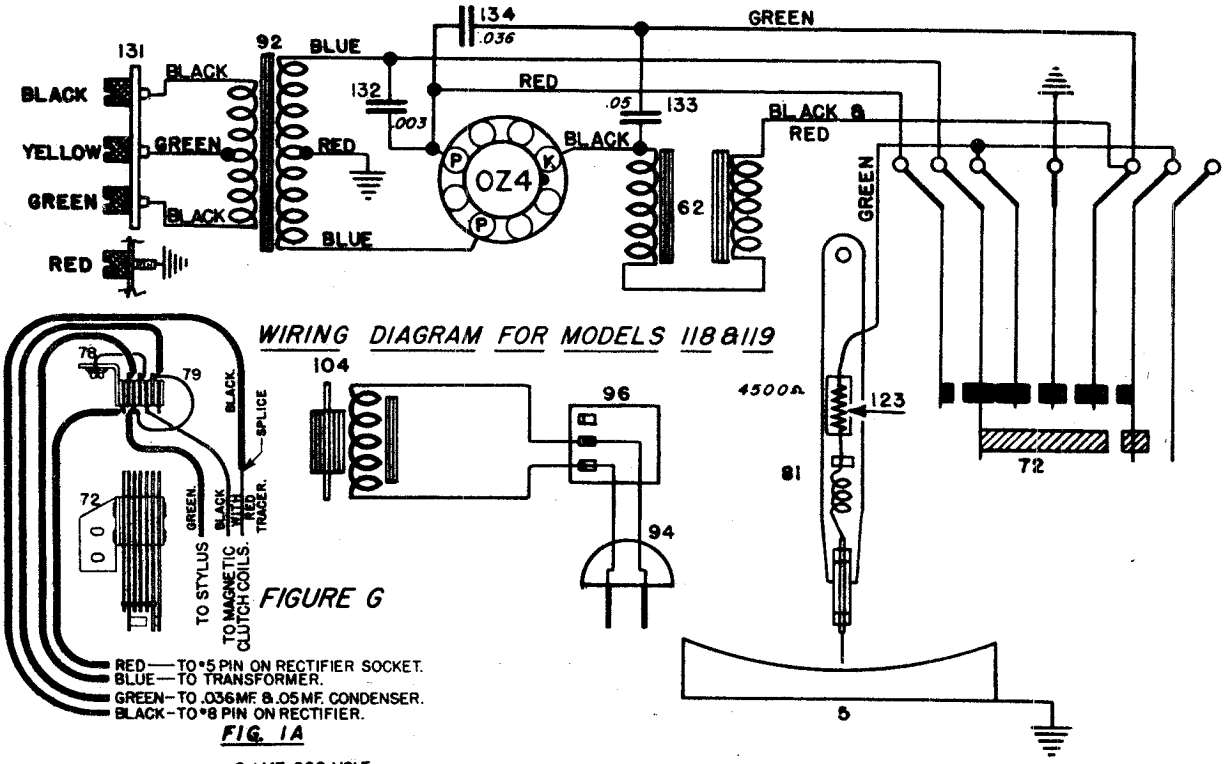
(c) To align the series trimmer (See Fig. 2), set the signal generator to the frequency indicated below (D) and then tune-in this signal with the station selector for maximum output. To obtain the best adjustment for the series trimmer, it will be necessary to rotate the station selector back and forth slightly while adjusting the trimmer for maximum output. Minor tolerance variations in series alignment at 2500 kilocycles in the Police Band and at 7000 kilocycles in the High Frequency Band may be compensated for by slight repositioning of the grid lead of the antenna coil in the Band affected.

### (D) SIGNAL INPUT FREQUENCIES

| | Min. Cap. Signal | Shunt Align. | Series Align. |
|---|---|---|---|
| American Broadcast Band | 1360 Kilocycles | 1700 Kilocycles | 600 Kilocycles |
| Police & Amateur Band | 6800 Kilocycles | 6000 Kilocycles | |
| High Frequency Band | 22 Megacycles | 18 Megacycles | |

# CROSLEY CORP.

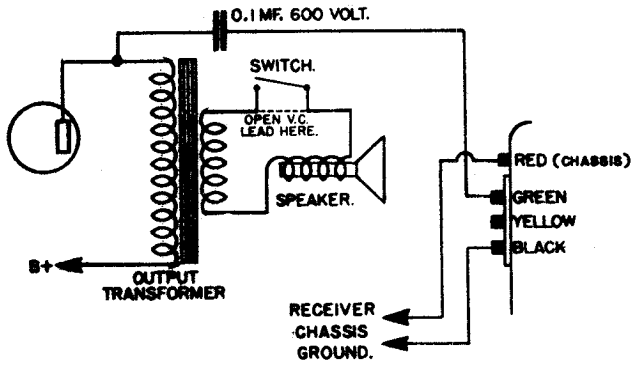
MODELS 118,119
Reado Printers
Schematic, Connections
Stylus Details




WIRING DIAGRAM FOR MODELS 118 & 119

FIGURE G

FIG. 1A



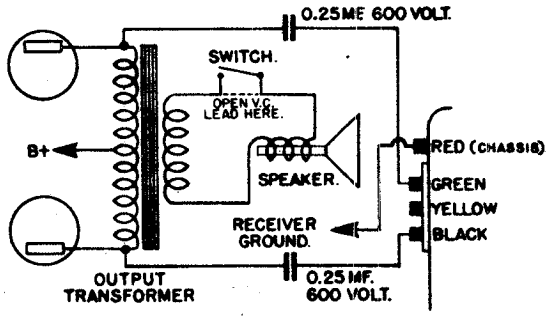




FIG. 2A

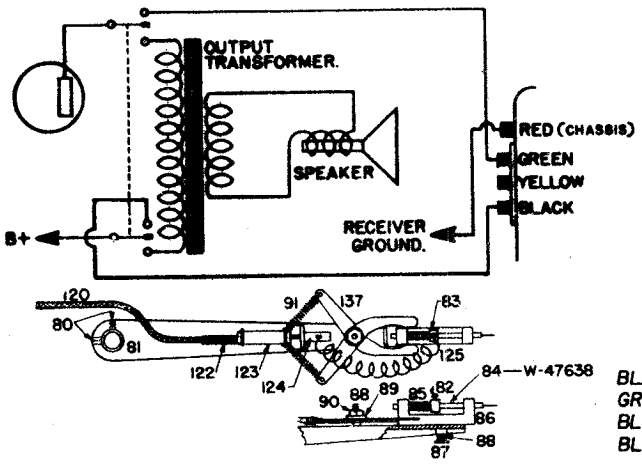
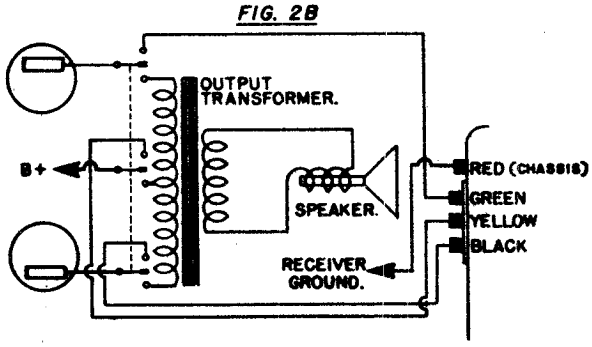



FIG. 2B




MATCHING

| | |
|---|---|
| BLACK & YELLOW | APPROX. 5,000 OHMS. |
| GREEN & YELLOW | APPROX. 5,000 OHMS. |
| BLACK & GREEN | APPROX. 10,000 OHMS. |
| BLACK, YELLOW, GREEN | APPROX. 10,000 OHMS, PUSH-PULL. |

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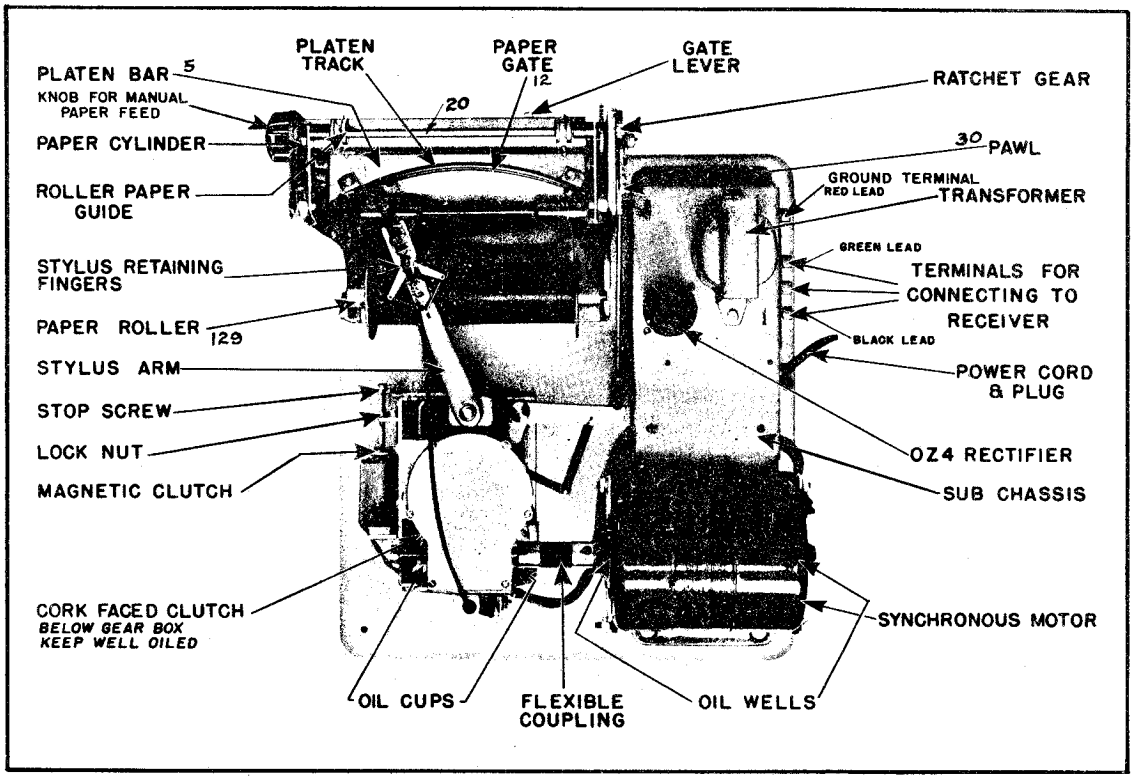
MODELS 118,119
Reado Printers
Assembly,Chassis Views

# CROSLEY CORP.



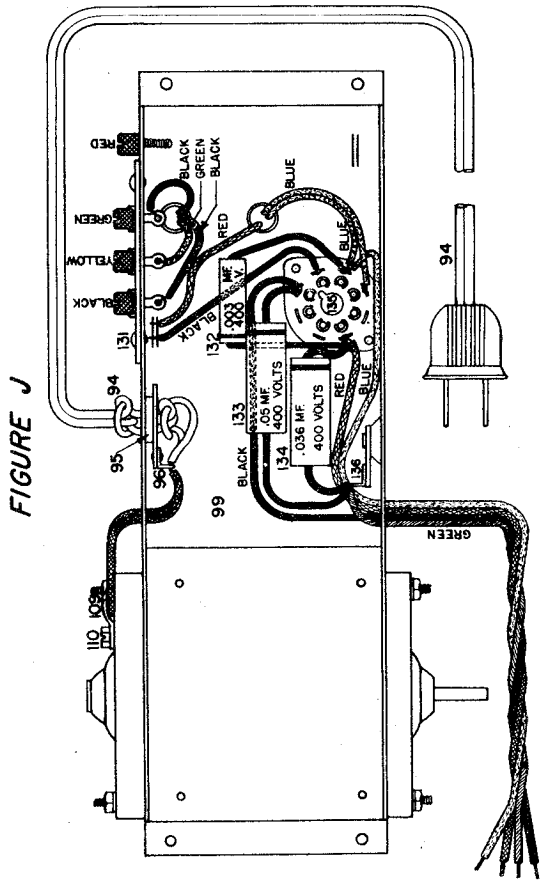




FIGURE J

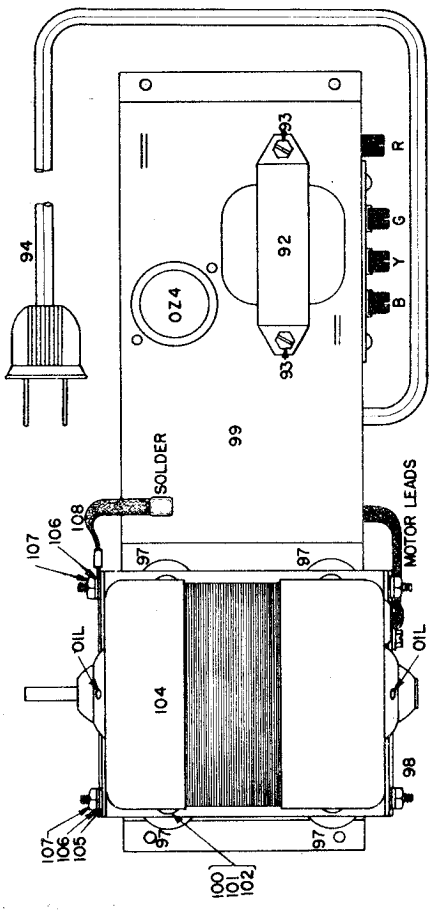



FIGURE K.

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# CROSLEY CORP.

MODELS 118,119
Readio Printers
Operating and
Service Data

INSTRUCTIONS FOR ELECTRICALLY CHECKING
MODELS 118 AND 119 CROSLEY READO PRINTERS.

To electrically check the operation of the 118 and 119 printer, it should be connected to a receiver as shown in attached bulletin. Connect a signal generator modulated with any audio frequency less than 500 cycles to the antenna of the receiver and switching the output from the receiver to the printer, with the motor running, turn up the level control on the receiver slowly until sufficient voltage appears across the synchronizing coils on printer to actuate the clutch release. This will release the stylus arm at this same level setting and the modulation should mark lightly on the paper. Increasing the level setting should bring up the blackness of printing to the point just below where the paper begins to smoke which is the desirable printing level. As the level of the receiver is reduced the printing should become lighter and lighter and as the level is further reduced the clutch pawl will hold in and the arm should stop over at the left side of the paper.

Measuring across the relay solenoid with a 1000 ohm per volt D.C. meter synchronization should occur between 45 and 55 volts. In cases where this does not hold true the 024 rectifier should be checked as it will be noted from circuit diagram this tube is switched in the circuit only for synchronization, that is, to rectify the 500 cycle pulse for the relay coils If the trouble is not found in the tube, the circuit should be checked for opens or shorts and the switch points inspected and cleaned. If circuit and voltages are found okay and printer still refuses to operate properly, the clutch arm should be adjusted according to instructions.

To measure the printing signal, connect a 1000 ohm per volt A.C. meter across the stylus to ground at the switch and advance the level control of the receiver until the stylus is sweeping back and forth across the paper. When printing at desired level on average paper, the voltage reading should pick up to between 200 and 250 volts. If the paper is in doubt, turn the stylus so that it does not touch the paper and connect 18000 ohms from stylus to ground, turn motor off and rotate shaft by hand until stylus arm is half way across on its way from left to right and measure the voltage across this resistor. The voltage should read between 200 and 250 volts as above.

Wherever possible it is advisable to check the operation with a phonograph and a record containing facsimile copy. Such a record may be obtained from The Crosley Corporation for operation on a 33-1/3 R.P.M. turntable.

1. INSERTING PAPER

TO PREPARE FOR OPERATION

(a) The roll of paper should be placed on the roller (129) so that if you were to pull on the end, it would unroll toward you.

(b) Insert paper between the lower roller and the base (white surface up).

(c) Push lever, on back of platen bar (5), to the left. (Platen is the center bar that supports paper for the stylus.) This springs open the paper gate (12) Pull paper up between gate and platen.

(d) Lift bar (20) with the roller paper guides.

(e) Place paper over paper cylinder. Be sure the paper is lined up and fits over pins in cylinder.

(f) Release catch holding lever on platen bar, then push roller guides down on the paper.

(g) Place cleaning brush so that the bristles just bear lightly on the paper, with the bristles toward the stylus.

2. STYLUS

VERY CAREFULLY, spread metal fingers (137) and turn the stylus assembly (86) so that the point is toward the paper (BE SURE NOT TO BEND POINT) then release fingers (137). The metal fingers should hold the stylus assembly in line with the stylus arm.

(a) Turn the motor over by hand. To do this, turn the rubber coupling away from you (clockwise direction) until stylus comes to rest at the left hand side of the paper.

(b) While turning the motor by hand, depress the magnetic clutch. The stylus will move across the paper. Check the stylus pressure against paper by listening for a slight rub as stylus crosses paper. The correct pressure is indicated by a slight rub but not sufficient to leave a mark on the paper.

3. RATCHET AND PAWL

By turning the motor over by hand the operation of the ratchet and pawl (which moves the paper cylinder) can be checked.

(a) While turning motor by hand and depressing the magnetic clutch as before; turn motor until the stylus arm is at the right hand side of the paper. While the arm is traveling back to the left side of paper, the ratchet moves up ONE tooth and is locked by the pawl (30). This movement of one tooth acts through the gear train and turns the paper cylinder, so that the paper moves up 1/100 of an inch.
If everything checks normal up to this point, plug the power cord into a convenient receptacle (110 volts, 60 cycles).

With motor running, listen carefully for any excessive mechanical vibrations. If present they may be minimized by adjusting the four bolts that mount the motor bracket and the four bolts that mount the sub-chassis to the base.

CONNECTING TO RECEIVER

For best results from the READO, (Model 119), the receiver or source of A-F supply should be designed to give the required electrical characteristics that are necessary for the correct operation of the READO, namely:

1. At least 5 watts output (clean audio).

2. A very good A.V.C. circuit.

3. Good sensitivity and selectivity.

4. A well filtered power supply (NO HUM).

Figures 1 A & B and 2 A & B show how to connect 119 Printer to Receiver. The switching arrangement is up to the individual, likewise the connection may be varied as in Figure 1 or 2, use the connection that gives the best results.

CAUTION: NEVER WORK ON PRINTER CONNECTIONS WITH RECEIVER TURNED ON.

We recommend the Crosley Model 758 Receiver as an exceptional radio receiver, in that the circuit incorporates many new developments that are essential for producing the excellent job of printing of which this READO is capable.

OPERATION

If the preceding instructions have been carefully followed, the operation of the READO is practically automatic with the exception of turning ON and OFF

TUNING-IN FACSIMILE SIGNAL

The IMPORTANCE OF ACCURATE tuning of the radio receiver to the station broadcasting Facsimile signal cannot be emphasized enough. Good copy cannot be realized unless the station is tuned-in right on the nose, as the form of printing depends almost entirely on the READO being synchronized with the transmitting equipment.

The procedure for accurate tuning is as follows: Locate desired station on the dial, then tune to each side, then bring pointer back to the exact center of that portion of the dial that the station covers. It will be found much easier to tune-in accurately (Facsimile signals) by tuning to the station that is to broadcast Facsimile signals, WHILE THE STATION IS BROADCASTING A REGULAR RADIO PROGRAM.

ADJUSTING THE DENSITY OF PRINTING (Blackness)

First, the receiver must have sufficient output (5 watts or more). The blackness of the printing is regulated by increasing or decreasing the setting of the volume or level control.

MAINTENANCE

1. Care of the Stylus.
The stylus may tend to bind in the bakelite block after considerable service due to small particles of carbon collecting on shaft. If this occurs, loosen collar and remove shaft and clean. Replace and adjust as stated in paragraph under "Stylus"

2. Care of the Platen Track.
The platen track is a strip of spring steel that is back of paper gate and is between paper and the platen bar. Due to the method of printing this track collects deposits of carbon after quite a few hours of service and will cause the stylus to stick or the printing density to vary in shade for one sweep. To clean, carefully turn stylus assembly at right angles with the stylus arm. This is done so as to prevent possible damage to the stylus point when removing paper gate. Then push lever back on platen bar and carefully remove paper gate. With a VERY fine sand paper using a wiping motion from one side to the other, polish the platen track. Replace paper gate. Replace stylus to printing position.

MOTOR

The motor should be oiled (each bearing) about once in every three hundred hours of service with a high grade of light lubricating oil.
Motor will not run properly on less than 105V.

CLUTCH

It is essential that the clutch plate be thoroughly lubricated at all times, check at least once a week. Use a high grade of machine oil for this purpose.

SERVICE HINTS

Variations in density or blackness of printing may be due to:
(a) Receiver may not have the A.V.C. circuit capable of keeping the output constant over wide variations of incoming signal strength.
(b) Receiver may not have sufficient output.
(c) Stylus may be stuck in bakelite bracket.
(d) Stylus may be worn.
(e) Platen track may have small deposits of carbon on it.

WOBBLY PRINTING --
(a) Receiver not tuned properly (Printer not synchronized with transmitter).
(b) Bent or loose stylus point.
Definite vertical light streaks uniformly spaced across the printer matter is an indication of insufficient filtering in the receiver, permitting hum voltage to reach printer.

NOT PRINTING --
(a) Power off.
(b) Loose or open connection between receiver and printer.
(c) Stylus stuck.

STYLUS ARM KEEPS MOVING --
The stylus arm should come to rest at the left hand side of paper when the volume or level control is reduced appreciably. If it keeps moving back and forth, the end of the magnetic clutch arm that engages the dog on the clutch plate may be slightly worn. If this is the case it may be compensated for by a slight adjustment of the magnetic clutch stop screw. (See illustration) Loosen the stop screw lock nut, then turn screw to the left (counter-clockwise) about a quarter turn or just enough to cause the magnetic clutch arm to engage dog on clutch plate.

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MODELS 118,119
Reado Printers
Trouble Chart

# CROSLEY CORP.

## MODEL 118 READO TROUBLE CHART

| TROUBLE | CAUSE | REMEDY |
|---|---|---|
| A. Uneven density of print. Light streaks through copy, particularly noticeable on solid black areas. | A1. Gate not holding paper against platen properly. | A1.(a) Check gate latch making sure gate is closed. |
| | | A1(b) Check gate hold-down lugs on left and right side of platen holder which should prevent gate from crawling up as paper goes through machine. |
| | | A1(c) Gate should not be kinked or twisted. |
| | A2. Stylus pressure too light. | A2.Adjust collar on stylus holder. |
| | A3. Platen carbonized. | A3. Clean with light emery paper. To prevent carbonizing do not print too black. |
| | A4.Stylus does not move freely in holder. | A4. Burnish stylus lengthwise with fine emery paper. |
| | A5.Paper | A5.Try new paper. |
| B. Fuzzy printing. Characters lined up straight and of correct height, but with staggered outline. | B1. Carbonized stylus. | B1. Clean stylus; lighten pressure, adjust blackness. |
| | B2. Platen carbonized. | B2. See A3. |
| | B3.Not synchronizing closely. | B3(a) Adjust clutch arm and air gap. B3(b)Check clutch arm point for squareness. |
| | B4. See A4. | B4. See A4. |
| C. Height of characters varies from line to line. | C1.Paper not feeding through gate and platen properly. | C1.See A1(a) and A1(b) |
| | C2.Ratchet not working properly. | C2(a.) Check ratchet assembly for binding. |
| | | C2(b) Adjust ratchet push rod so that pawl has from 1 to 1 1/2 tooth movement each stroke. |
| D. Stylus sticks in holes in side of paper. | D1.Stylus arm not centered. | D1.Re-center stylus arm by adjusting arm on shaft by two set screws. |
| | F.Light or no printing with horizontal lines or streaks, usually accompanied by a black vertical line on one or both sides. | F.Weak signal or interference from local sources or other stations. |
| | F. Wavy characters; some leaning to the right, others to the left. | F1. Poor synchronizing. |
| | | F2.Weak 0Z4 tube. |
| | G.Short dash lines of increasing and then decreasing length appear across paper accompanied by stylus arm not stopping when volume control is turned down. | G1.Clutch arm not stopping stylus. |
| | H.Paper tears. | H1.Paper not set up properly. |
| | | H2.Paper creased or torn at edges. |
| | | H3.Too much pressure on gate. |
| | I. Paper burns. | I.Printing too black due to volume being too high. |

E1.Use better antenna remove local interference.

F1.Adjust clutch arm and air gap.Tighten clutch.

F2. Replace tube.

G1.Adjust clutch arm and air gap.

H1.Reset paper.

H2.Remove creased or torn portion.

H3.See that gate is free to reset lightly but firmly on paper.

I.Decrease volume control.

## MODEL 494 RECORD PLAYER TROUBLE CHART

| | | |
|---|---|---|
| | A.Prints light on records, but O.K. on air. | A1.Needle too soft. |
| | | A2.Record worn out. |
| | | A3.Paper |
| | B.Prints uneven on record, but O.K. on air. | B1.Uneven velocity of turntable. |
| | C.Motor will not start. | C.Motor mounted too rigidly. |

A1.Use new hard needle.

A2.Use new record.

A3.Change paper.

B1.Lap thrust bearing washer with a rotary motion until all radial marks are erased.Lap thrust bearing on turntable same as thrust washer.

C.Loosen mounting nuts under turntable one turn.

### TO ADJUST CLUTCH AND AIR GAP

Turn motor coupling by hand in direction of normal rotation while holding clutch arm against magnet pole pieces, until stop on lower clutch plate is just completely under clutch arm. Loosen mounting screws for magnet bracket and slide bracket and coils forward until the pole pieces come within the thickness of a piece of writing paper of touching the magnetic armature on clutch arm.Tighten bracket screws.

Plug motor in and adjust armature adjustment screw until clutch arm just stops lower clutch plate. Repeat to make sure that clutch arm engages just enough to stop clutch, as more movement of armature than is necessary only requires more power to synchronize. Tighten lock nut, being careful not to change adjustment while so doing.

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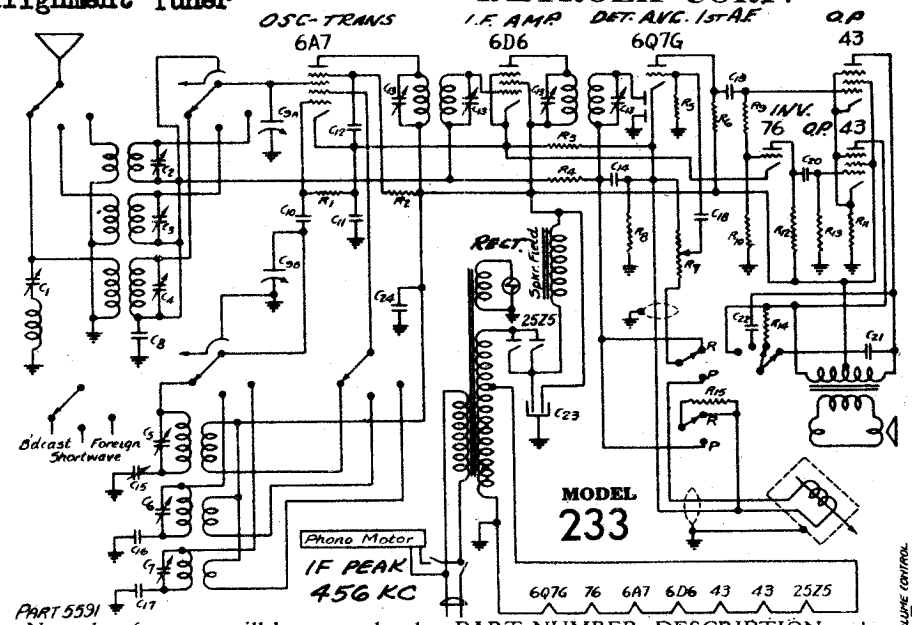
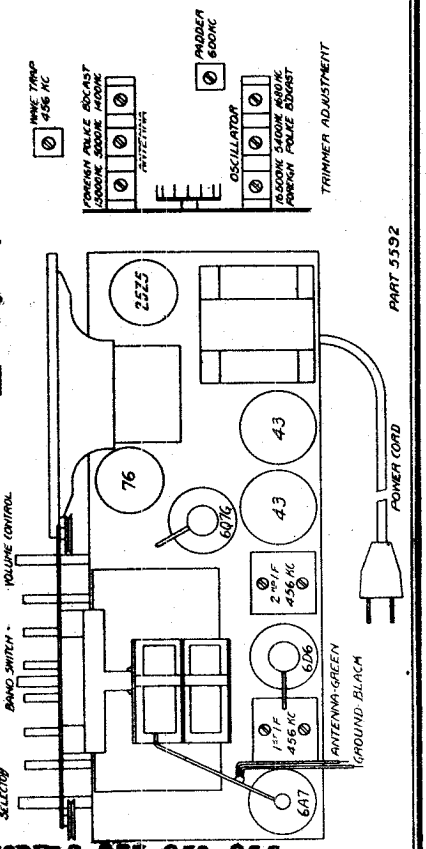
**MODELS 251,256**
**Alignment Tuner**

# DETROLA CORP.

**MODEL 233**
**Schematic, Socket Trimmers, Alignment**




No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

| *Symbol* | *Part No.* | *Description* |
|---|---|---|
| C-1 | 3272 | 30-140 mmf Trimmer |
| C-2, 5, 7 | 1611 | 3-35 mmf Trimmer |
| C-3, 4, 6 | 2597 | 1-10 mmf Trimmer |
| C-8, 11 | 572 | .1 200 V. |
| C-9a, b | 5377 | Tuning Condenser |
| C-10 | 2780 | 50 mmf Mica |
| C-12 | 580 | .05 200 V. |
| C-13 | | IF Trimmer |
| C-14 | 4810 | .0005 400 V. |
| C-15 | 2560 | 220-500 mmf Padder |
| C-16 | 2741 | 1330 mmf 5% |
| C-17 | 3871 | .006 600 V. 5% |
| C-18 | 568 | .01 400 V. |
| C-19, 20 | | .02 400 V. |
| C-21 | 581 | .005 600 V. |
| C-22, 23 | 2600 | .02 600 V. Electrolytic |
| C-24 | 5272 | 8 MF. 150 V. Electrolytic |
| C-25 | 5420 | 8 MF. 150 V. Electrolytic |
| C-26 | 5419 | 8/8 MF. 250 V. Electrolytic |
| R-1, 10 | 631 | 50M ⅓ W. |
| R-2 | 617 | 20M ⅓ W. |
| R-3 | 2605 | 200 ohm ⅓ W. 10% |
| R-4, 5 | 624 | 1 Meg. ⅓ W. |
| R-6 | 598 | 200M ⅓ W. |
| R-7 | 5332 | 500M Volume Control |
| R-8 | 2698 | 100 ohm ⅓ W. 10% |
| R-9 | 2881 | 400M ⅓ W. 10% |
| R-11 | 5395 | 500 ohm wire wound 10% |
| R-12, 15 | 603 | 100M. ⅓ W. |
| R-13 | 615 | 500M ⅓ W. |
| R-14 | 4529 | 10M ⅓ W. 10% |
| R-15A, B, C | 5421 | 30 ohm, 10 ohm, 20 ohm Wire Wound |
| | 3463-10 | 1st IF Transformer |
| | 3463-4 | 2nd IF Transformer |
| | 5096 | Oscillator Coil |
| | 5392 | Antenna Coil |
| | 5390 | Band Switch |
| | 5394 | Tone Control Switch |
| | 5390 | Band Switch |
| | 5394 | Tone Control Switch |
| | 5422 | AC-DC Switch |
| | 5397 | Button escutcheon |
| | 5353 | Tuning Buttons |
| | 5357 | Call Letter Sheets |
| | 5388 | Speaker |
| | 3904 | Knobs |
| | 5234 | Phono Pick Up |
| | 5233 | Turn Table |
| | 5240 | Radio-Phono Switch |
| | 5232 | Phono Motor |
| | 530 | Pilot Light Bulb |
| | 5387 | Dial Chart |
| | 5396 | Escutcheon |

## ALINEMENT PROCEDURE MODELS 233, 251, 256.

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

I.F.: Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6D6 I.F. amplifier tube, and aline transformer No. 2. Connect generator to grid of 6A7 tube and aline transformer No. 1.

RF. (See above diagram for location of trimmers.)

Using a 200 MMF. condenser in series with the high side of the generator, turn band selector switch to left hand position and the tuning condenser to about 600 kc. Feed a 456 kc. signal to the antenna and adjust wave trap trimmer for minimum response. With the tuning condenser at minimum capacity feed 1660 kc. signal to the antenna and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at about 1400 kc. Adjust broadcast antenna trimmer. Set generator for 600 kc. tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in center position, set generator to 5400 kc and adjust oscillator trimmer for top frenquency. Set generator to 5000 kc, tune receiver to signal and adjust antenna trimmer.

Turn band selector to extreme clockwise position. Using 400 ohm resistor in series with generator, set oscillator top frequency for 16,500 kc—screw trimmer down tight, then unscrew to *second* peak. Set generator to 15,000 kc, tune receiver to signal and adjust antenna trimmer—Screw trimmer down tight, then unscrew to *first* peak, rocking the tuning condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.**

### Adjustment of Mechanical Automatic Tuning System

Any of your favorite stations may be set up on any button, but it is recommended that they be set up in the same sequence as they are received on the dial. Loosen one of the buttons by turning it to the LEFT. A slot is provided in the button into which a coin may be inserted to facilitate turning. After turning the button a few turns to the LEFT, press it in as far as it will go. While holding the button in this position, tune in the station desired very carefully in the usual manner with the manual tuning knob. While still holding the button if, fix the adjustment by turning the button to the RIGHT until tight. Thereafter the station set up on this button will be received whenever this button is pressed in AS FAR AS IT WILL GO.

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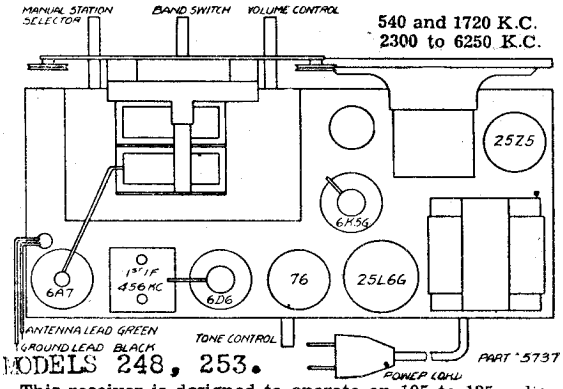
MODELS 248,253
MODELS 249,254
MODEL 250 MODEL 257

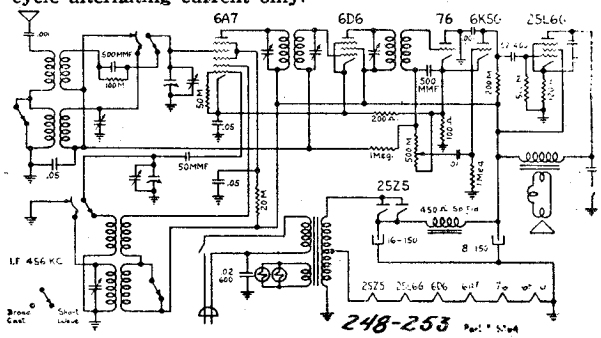
# DETROLA CORP.

Schematics, Socket Trimmers

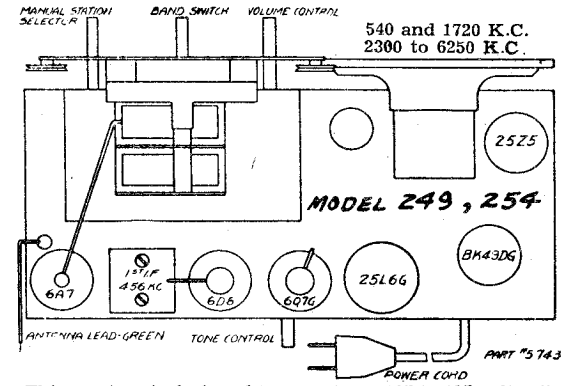



## MODELS 248, 253.

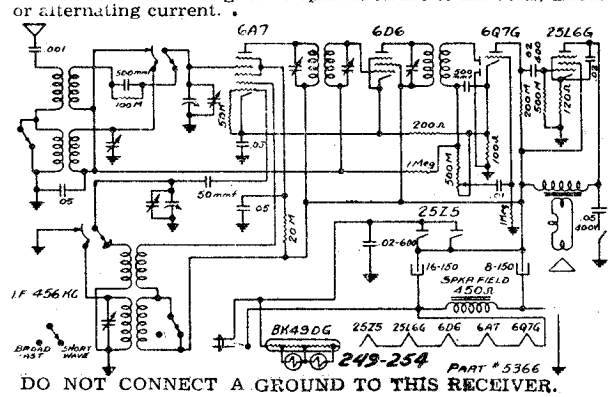
This receiver is designed to operate on 105 to 125 volts, 60 cycle alternating current only.




**6A7—Oscillator, Translator**
**6D6—I.F. Amplifier**
**76—Detector**
**6K5G—Audio Amplifier**
**25L6G—Power Output**
**25Z5—Rectifier**



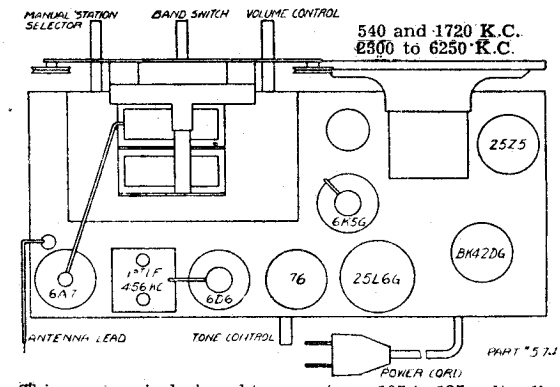

This receiver is designed to operate on 105 to 125 volts, direct or alternating current.



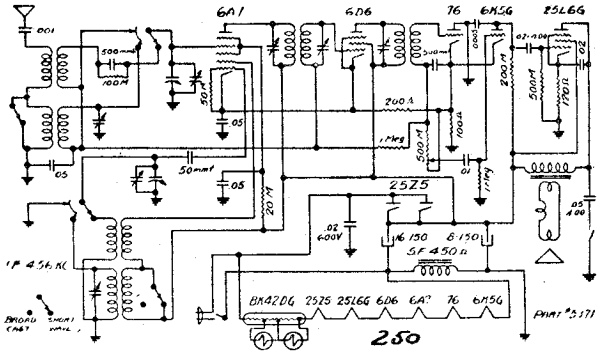

DO NOT CONNECT A GROUND TO THIS RECEIVER.

**6A7—Oscillator, Translator**
**6D6—I.F. Amplifier**
**6Q7G—Detector, Audio Amplifier**
**25L6G—Power Output**
**25Z5—Rectifier**
**BK49DG—Ballast**

## MODEL 250



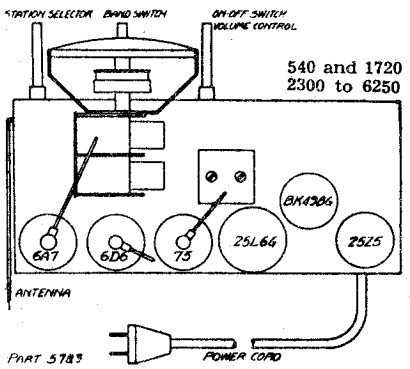

This receiver is designed to operate on 105 to 125 volts, direct or alternating current.



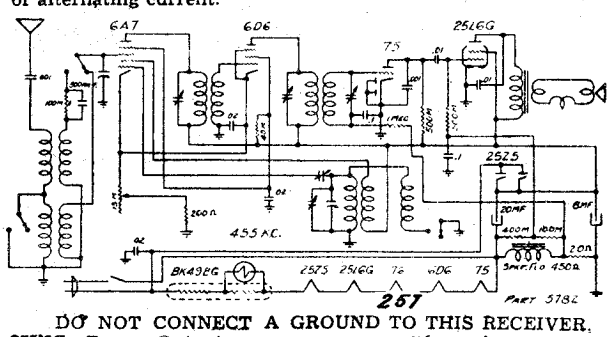

DO NOT CONNECT A GROUND TO THIS RECEIVER.

**6A7—Oscillator, Translator**
**6D6—I.F. Amplifier**
**76—Detector**
**6K5G—Audio Amplifier**
**25L6G—Power Output**
**25Z5—Rectifier**
**BK42DG—Ballast**

## MODEL 257.




This receiver is designed to operate on 105 to 125 volts, direct or alternating current.




DO NOT CONNECT A GROUND TO THIS RECEIVER.

**25L6G—Power Output**
**25Z5—Rectifier**
**BK49BG—Ballast**
**6A7—Oscillator Translator**
**6D6—I.F.**
**75—Detector**

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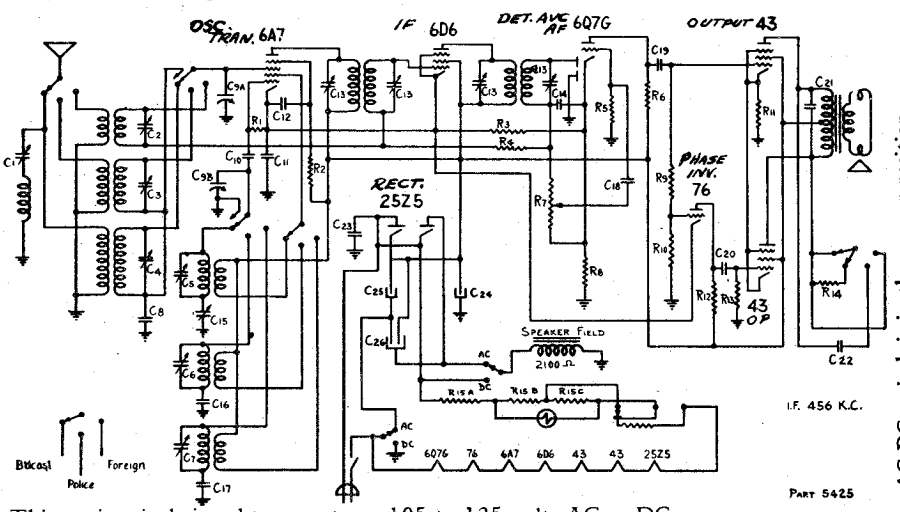
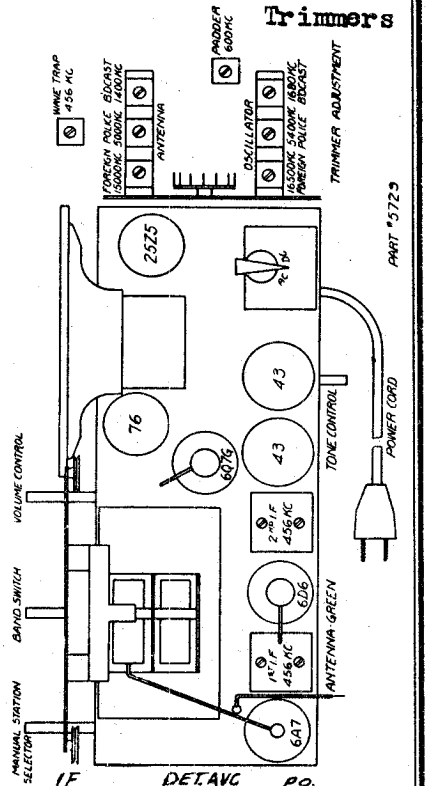
MODEL 262 Schematic, Socket Trimmers, Alignment

# DETROLA CORP.

MODELS 251, 256 Schematic, Socket Trimmers




This receiver is designed to operate on 105 to 125 volts AC or DC.

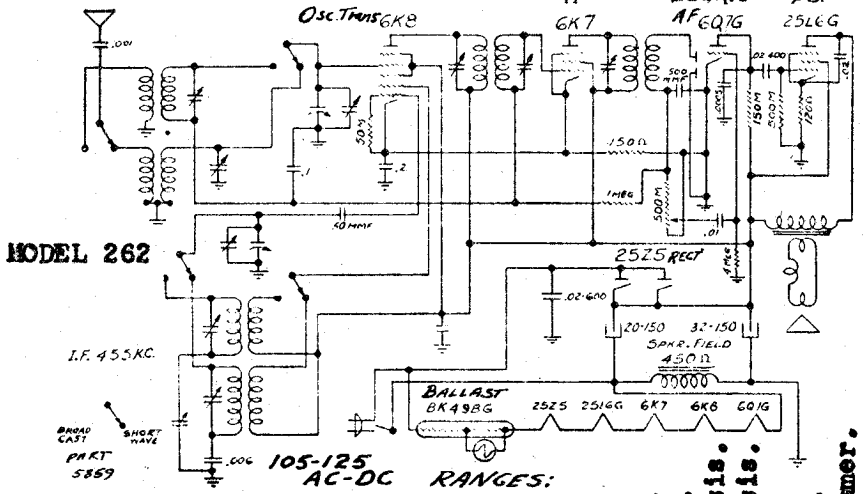
No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

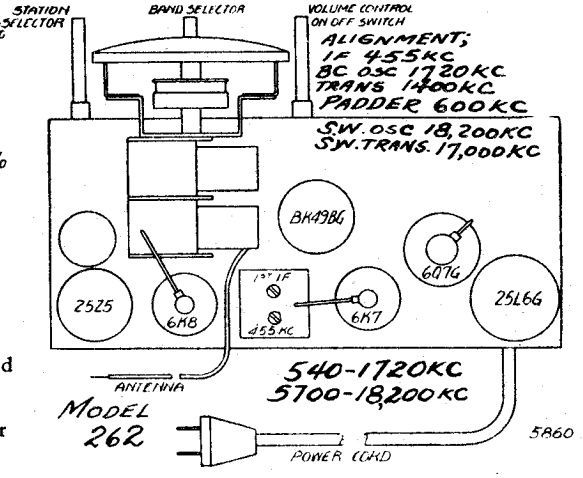
| Symbol | Part No. | Description |
|---|---|---|
| C-1 | 3272 | 30-140 mmf Trimmer |
| C-2, 5, 7 | 1611 | 3-35 mmf Trimmer |
| C-3, 4, 6 | 2597 | 1-10 mmf Trimmer |
| C-8, 11 | 572 | .1 200 V. |
| C-9a, b | 5724 | Tuning Condenser |
| C-10 | 2780 | 50 mmf Mica |
| C-12 | 580 | .05 200 V. |
| C-13 | | IF Trimmer |
| C-14 | 4810 | .0005 400 V. |
| C-15 | 2560 | 220-500 mmf Padder |
| C-16 | 2741 | 1330 mmf 5% |
| C-17 | 3871 | .006 600 V. 5% |
| C-18 | 568 | .01 400 V. |
| C-19, 20 | | .02 400 V. |
| C-21 | 581 | .005 600 V. |
| C-22, 23 | 2600 | .02 600 V. Electrolytic |
| C-24 | 5272 | 8 MF. 150 V. Electrolytic |
| C-25 | 5420 | 8 MF. 150 V. Electrolytic |
| C-26 | 5419 | 8/8 MF. 250 V. Electrolytic |
| R-1, 10 | 631 | 50M ⅓ W. |
| R-2 | 617 | 20M ⅓ W. |
| R-3 | 2605 | 200 ohm ⅓ W. 10% |
| R-4, 5 | 624 | 1 Meg. ⅓ W. |
| R-6 | 598 | 200M ⅓ W. |
| R-7 | 5332 | 500M Volume Control |
| R-8 | 2698 | 100 ohm ⅓ W. 10% |
| R-9 | 2881 | 400M ⅓ W. 10% |
| R-11 | 5395 | 500 ohm wire wound 10% |
| R-12 | 603 | 100M. ⅓ W. |
| R-13 | 615 | 500M ⅓ W. |
| R-14 | 4529 | 10M ⅓ W. 10% |
| R-15A, B, C | 5421 | 30 ohm, 10 ohm, 20 ohm — Wire Wound |
| | 3463-10 | 1st IF Transformer |
| | 3463-4 | 2nd IF Transformer |
| | 5096 | Oscillator Coil |
| | 5392 | Antenna Coil |
| | 5390 | Band Switch |
| | 5394 | Tone Control Switch |
| | 5422 | AC-DC Switch |
| | 530 | Pilot Light Bulb |
| | 5728 | Dial Chart |
| | 5739 | Escutcheon |
| | 5388 | Speaker |
| | 2663 | Knobs |

**Model 251-256**

FOR ALIGNMENT SEE INDEX

Be sure the AC-DC switch is in the proper position.




LOCATION OF TRIMMERS MODEL 262.
2nd. IF Trans. beneath chassis.
BC osc., osc. coil beneath chassis.
BC trans., trans coil top chassis.
BC padder on the chassis.
SW osc, next to BC osc trimmer.
SW trans. next to BC trans trimmer.

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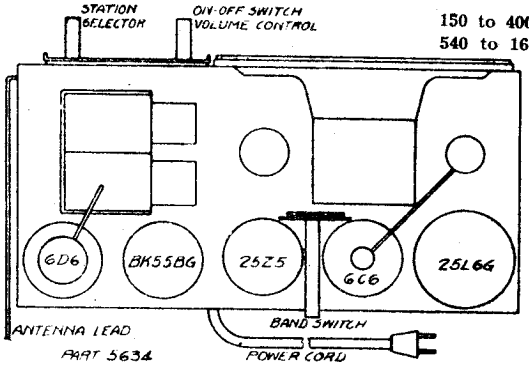
MODEL 260
MODEL 266
MODEL 268
MODEL 272

# DETROLA CORP.

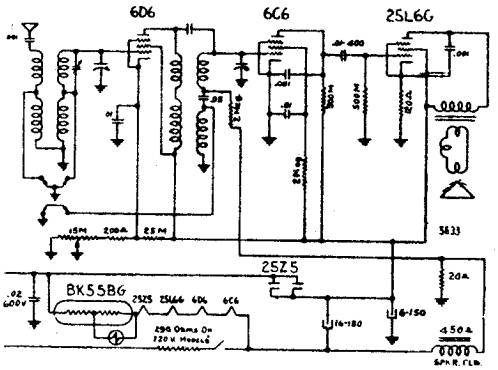
Schematics, Socket Trimmers

## MODEL 260




150 to 400 KC
540 to 1680 KC

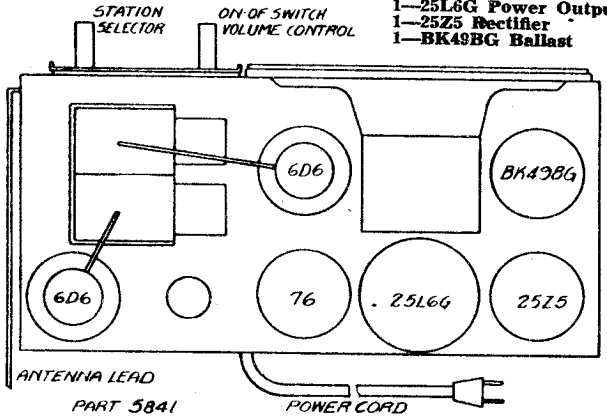
DO NOT CONNECT A GROUND TO THIS RECEIVER.
6D6—RF Amplifier
6C6—Detector
25L6G—Power Output
25Z5—Rectifier
BK55BG—Ballast

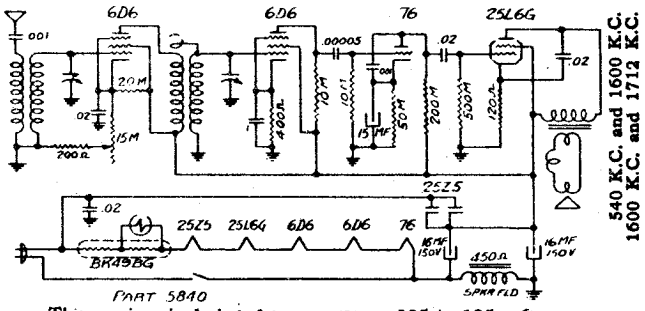



This receiver is designed to operate on 220 volts, direct or alternating current.

## MODEL 266

2—6D6 R. F. Amplifiers
1—76 Detector
1—25L6G Power Output
1—25Z5 Rectifier
1—BK49BG Ballast



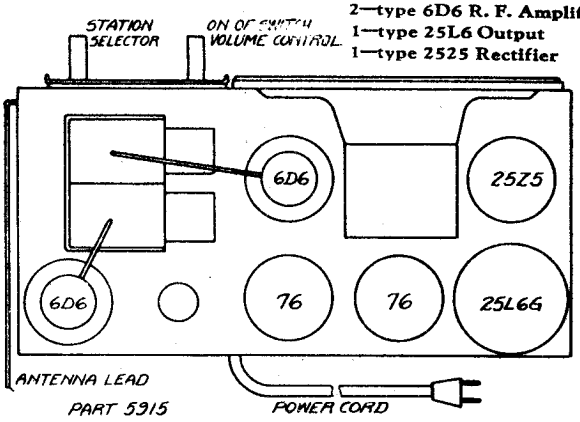




540 K.C. and 1600 K.C.
1600 K.C. and 1712 K.C.

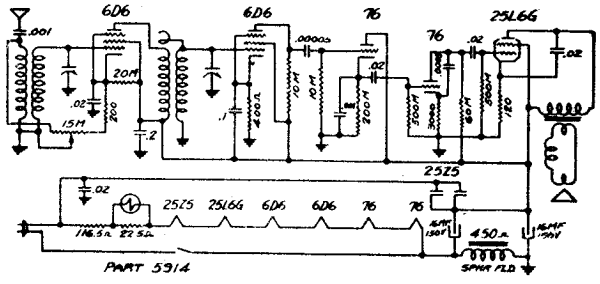
This receiver is designed to operate on 105 to 125 volts, or alternating current.

## MODEL 268

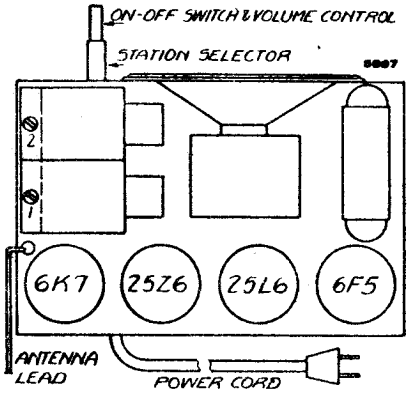
1—type 76 Detector
1—type 76 1st. Audio
2—type 6D6 R. F. Amplifiers
1—type 25L6 Output
1—type 2525 Rectifier



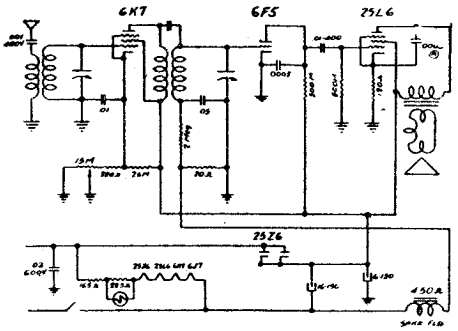

This receiver is designed to operate on 105 to 125 volts, direct or alternating current.




## Model 272




1—25Z6 Rectifier
1—25L6 Output




1—6K7 R. F. Amplifier
1—6F5 Detector

This receiver is designed to operate on 105 to 125 volts direct or alternating current

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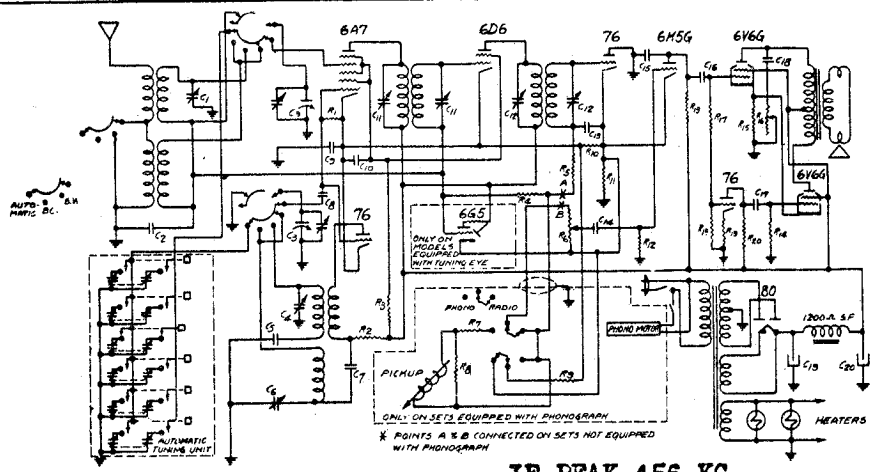



**Tubes required are:**

1—76 Oscillator
1—6A7 Translator
1—6D6 I.F. Amplifier
1—76 Detector, A.V.C.

**Model 259**

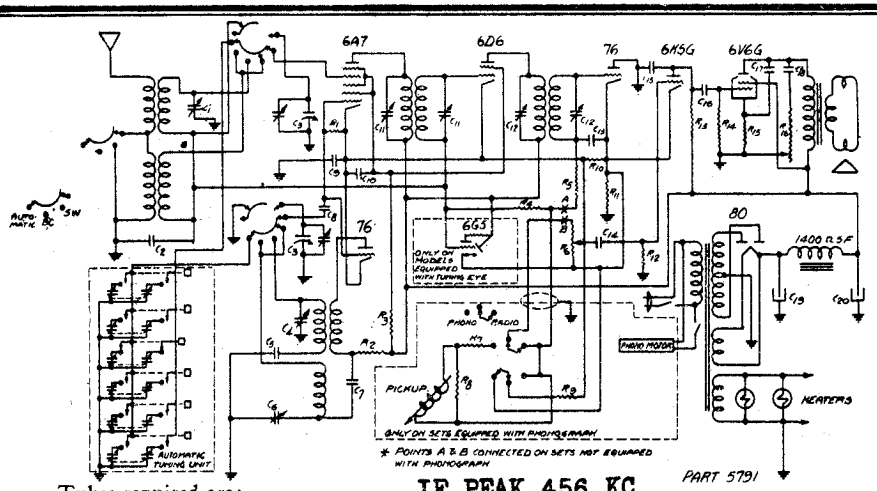
**IF PEAK 456 KC**

1—6K5G Audio Amplifier
1—76 Phase Invertor, driver
2—6V6G Power Output
1—80 Rectifier

No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

| *Symbol* | *Part No.* | *Description* | *Symbol* | *Part No.* | *Description* |
|---|---|---|---|---|---|
| C-1 | 1611 | 5-35 mmf Trimmer | R-15 | 3353 | 250 ohm 2W |
| C-2, 7, 10 | 580 | .05-200V | R-16 | 5511 | 100M T. C. |
| C-3 | 5654 | Tuning Condenser | R-17 | 2881 | 400M 10% ⅓W |
| C-4 | 2597 | 1-10 mmf Trimmer | R-18 | 2880 | 100M 10% ⅓W |
| C-5 | 2741 | 1330 mmf Mica +5% | R-19 | 2883 | 5M 10% ⅓W |
| C-6 | 2560 | 300-500 mmf padder | | 5802 | Power Transformer |
| C-8 | 2780 | 50 mmf mica | | 5656 | Dial Chart |
| C-9 | 2792 | .2-200V | | 5447 | Pointer |
| C-11 12 | | IF Trimmers | | 5657 | 1st I.F. Transformer |
| C-13 | 4810 | .0005-400V | | 5658 | 2nd I.F. Transformer |
| C-14 | 565 | .01-200V | | 5659 | Antenna Coil |
| C-15 | 1285 | 100 mmf mica | | 5660 | Oscillator Coil |
| C-16, 17 | 576 | .02-400V | | 5789 | Band Switch |
| C-18 | 563 | .05-400V | | 5790 | Automatic Tuning Unit |
| C-19 | 3375 | 16MF 400V | | 5240 | Radio-Phono Switch |
| C-20 | 3113 | 16MF Reg. | | 5232 | Phono Motor |
| R-1, 5, 20 | 631 | 50M ⅓W | | 5233 | Turn Table 10" |
| R-2, 3 | 617 | 20M ⅓W | | 5234 | Phono Pickup |
| R-4, 12 | 624 | 1 Meg ⅓W | | 5798 | Automatic Tuning Buttons |
| R-6 | 5100 | 5 meg V.C. | | | |
| R-7 | 2106 | 3 Meg ⅓ W | | 5672 | Dial Escutcheon |
| R-8 | 615 | 5 Meg. ⅓ W | | 5797 | Button Escutcheon |
| R-9, 11 | 2689 | 100 ohm 10% ⅓W | | 5800 | Tuning Eye Escutcheon |
| R-10 | 600 | 10M ⅓W | | 5799 | Call Letter Sheets |
| R-13 | 598 | 200M ⅓W | | 5912 | Speaker. |
| R-14 | 615 | .5 Meg ⅓W | | | |

Note: R-7, 8, 9 omitted and R-10 changed to 100 ohm 10% ⅓W on sets not equipped with phonograph.




**Tubes required are:**

1—76 Oscillator
1—6A7 Translator
1—6D6 I.F. Amplifier
1—76 Detector. A.V.C.

**Model 258**

**IF PEAK 456 KC**

1—6K5G Audio Amplifier
1—6V6G Power Output
1—80 Rectifier
*1—6G5 Tuning Tube

*Only on those sets equipped with tuning eye.

Do not use tubes of types different from those shown above.

No orders for parts will be accepted unless PART NUMBER, DESCRIPTION and CHASSIS MODEL NUMBER are given.

| *Symbol* | *Part No.* | *Description* | *Symbol* | *Part No.* | *Description* |
|---|---|---|---|---|---|
| C-1 | 1611 | 5-35 mmf Trimmer | C-6 | 2560 | 300-500 mmf padder |
| C-2, 7, 10 | 580 | .05-200V | C-8 | 2780 | 50 mmf mica |
| C-3 | 5654 | Tuning Condenser | C-9 | 2792 | .2-200V |
| C-4 | 2597 | 1-10 mmf Trimmer | C-11, 12 | | IF Trimmers |
| C-5 | 2741 | 1330 mmf Mica +5% | C-13 | 4810 | .0005-400V |
| | 5447 | Pointer | C-14 | 565 | .01-200V |
| | 5657 | 1st I.F. Transformer | C-15 | 1285 | 100 mmf mica |
| | 5658 | 2nd I.F. Transformer | C-16, 17 | 576 | .02-400V |
| | 5659 | Antenna Coil | C-18 | 563 | .05-400V |
| | 5660 | Oscillator Coil | C-19 | 3375 | 16MF 400V |
| | 5789 | Band Switch | C-20 | 3113 | 16MF Reg. |
| | 5790 | Automatic Tuning Unit | R-1, 5 | 631 | 50M ⅓W |
| | 5240 | Radio-Phono Switch | R-2, 3 | 617 | 20M ⅓W |
| | 5232 | Phono Motor | R-4, 12 | 624 | 1 Meg ⅓W |
| | 5233 | Turn Table 10" | R-6 | 5100 | .5 Meg V.C. |
| | 5234 | Phono Pickup | R-7 | 2106 | 3 Meg ⅓ W |
| | 5798 | Automatic Tuning Buttons | R-8 | 615 | .5 Meg ⅓ W |
| | | | R-9, 11 | 2689 | 100 ohm 10% ⅓W |
| | 5672 | Dial Escutcheon | R-10 | 600 | 10M ⅓W |
| | 5797 | Button Escutcheon | R-13 | 598 | 200M ⅓W |
| | 5800 | Tuning Eye Escutcheon | R-14 | 615 | .5 Meg ⅓W |
| | 5799 | Call Letter Sheets | R-15 | 3353 | 250 ohm 2W |
| | 5668 | Speaker | R-16 | 5511 | 100M T. C. |
| | | | | 5091 | Power Transformer |
| | | | | 5656 | Dial Chart |

Note: R-7, 8, 9 omitted and R-10 changed to 100 ohm 10% ⅓W on sets not equipped with phonograph.

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MODELS 258, 259, 270.

# ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

I.F.: Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6D6 I.F. amplifier tube, and aline transformer No. 2. Connect generator to grid of 6A7 tube and aline transformer No. 1.

RF. (See above diagram for location of trimmers.)

Using a 200 MMF. condenser in series with the high side of the generator, turn band selector switch to center (B) position and the tuning condenser at minimum capacity feed 1720 kc. signal to the antenna and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at about 1400 kc. Adjust broadcast antenna trimmer. Set generator for 600 kc. tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in right hand (F) position, set generator to 6300 kc. and adjust oscillator trimmer for top frequency. Set generator to 5000 kc., tune receiver to signal and adjust antenna trimmer.

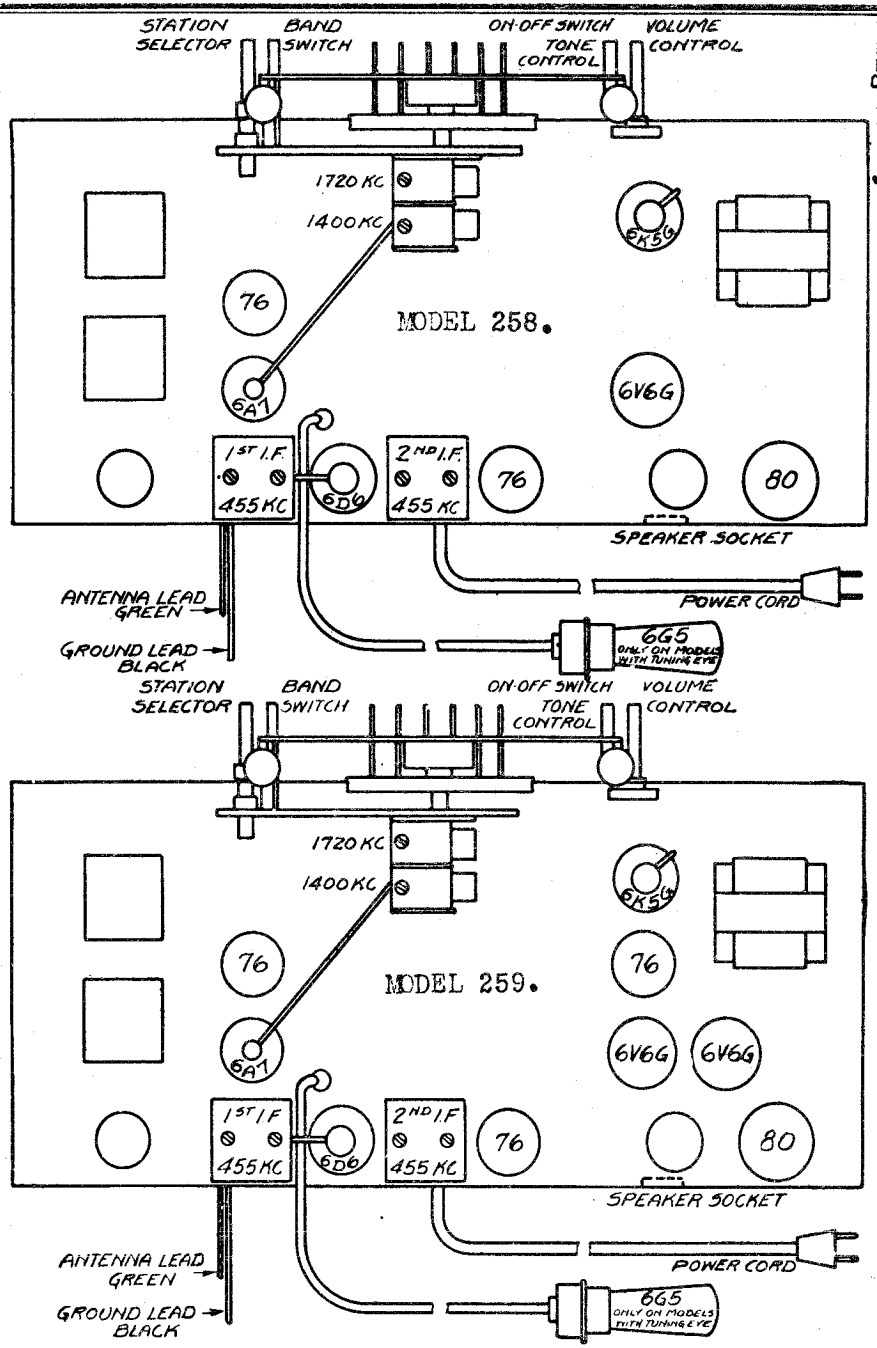
## Setting Up the Push Button Station Selector

First select six favorite local or strong nearby stations, listing them according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left hand end of the dial (nearest 1600 kc.) the No. 1 station and number the other five stations consecutively as they are tuned in on the dial, tuning from left to right. For example assume your selected stations operate on frequencies of 1500 kc., 1300 kc., 1100 kc., 900 kc., 700 kc., and 600 kc. The 1500 kc. station should be listed as No. 1, the 1300 kc. station would be No. 2, and so on through the list with the 600 kc. station becoming No. 6. In setting up the buttons, the 1500 kc. station should be set up on No. 1 button, or the first button from the left, the 1300 kc. station on the second button from the left, and so on until the 600 kc. station is finally set up on the button farthest to the right.

With the band selector set at "B," or the second position from the left, tune in station No. 1. Observe the program in progress, then turn the band selector knob to the extreme left position (A). Push the No. 1 button in as far as it will go; when the proper operating position is reached the button will lock in. Then insert the screw driver through the opening directly above the No. 1 button and turn the larger headed screw until the same program is heard. ***Do not force this screw. It should turn very easily and if the station is not heard when the screw is turned all the way in one direction, reverse the direction of rotation until the station is found.*** When the station is located, turn the screw back and forth through the station slowly and observe when the station is accurately tuned in, indicated by a minimum of noise or hiss, or by watching the tuning eye on the models so equipped. Inserted in one side of the larger screw head is a smaller screw. This screw is for fine adjustment, and should be turned in and out until position of least hiss is found, or until the tuning eye, on models so equipped, shows the least shadow. It will not be necessary to turn this small screw more than one full turn from the factory adjusted position. As a definite check that the desired station has been tuned in, listen for the station announcement. Set up the remaining buttons in the same manner, and after all stations have been set up, locate the call letters of the stations on the printed sheets supplied with the receiver. Remove the desired call letter blocks from the sheets and insert them in the escutcheon according to the directions on the envelope.

## On Sets Equipped with Phonograph

**Phono Radio Switch:** The *Left Hand Position is for Radio Only.* The *Right Hand Position* connects the pick-up and turns on the power for the phonograph motor.

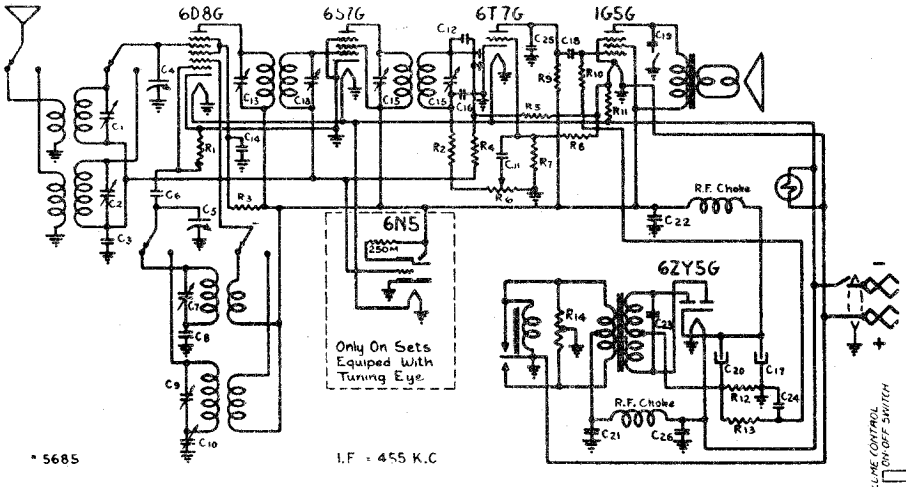


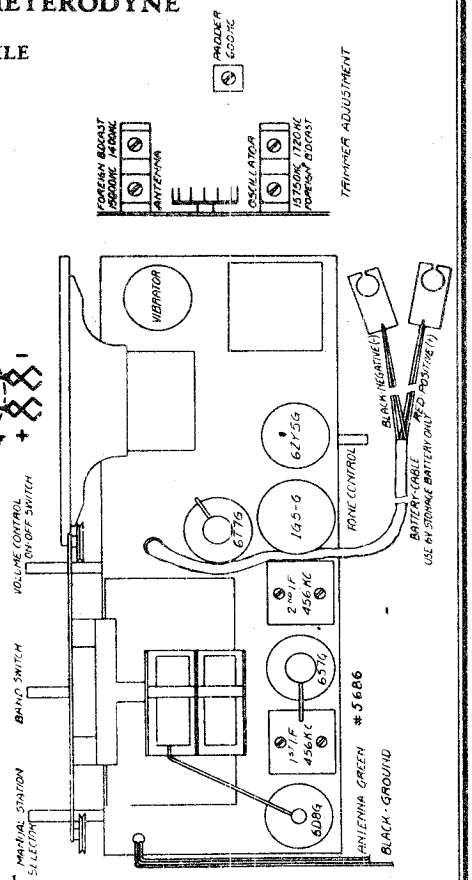
# DETROLA CORP.

MODEL 267
Schematic, Socket
Trimmers, Alignment

## 5-TUBE STORAGE BATTERY POWERED SUPERHETERODYNE

**WARNING! DO NOT CONNECT A CHARGER TO THE BATTERY WHILE THE SET IS IN USE. DO NOT GROUND EITHER SIDE OF THE BATTERY.**




| Symbol | Part No. | Description | Symbol | Part No. | Description |
|---|---|---|---|---|---|
| C1 | 1611 | 3—35 mmf Trimmer | R3 | 609 | 15 M 1/3 W |
| C2, 7, 9 | 2597 | 1—10 mmf Trimmer | R4, 5 | 624 | 1 Meg 1/3 W |
| C3, 14 | 572 | .1—200 v. | R6 | 5690 | 500 M Volume |
| C4, 5 | 5724 | 350 mmf Variable | | control | and switch |
| C6 | 2780 | 50 mmf Mica | R7, 8 | 630 | 2 Meg 1/3 W |
| C8 | 2740 | 3850 mmf padder | R9, 13 | 603 | 100 M 1/3 W |
| C10 | 2560 | 350 mmf padder | R10 | 615 | 500 M 1/3 W |
| C11 | 565 | .01—200 v. | R11 | 4474 | 35 ohm 1 W |
| C12 | 1285 | 100 mmf Mica | R12 | 2881 | 400 ohm .1/3 W |
| C13, 15 | | I. F. Trimmers | R14 | 4475 | 200 ohm center tapped |
| C16 | 4810 | .0005—400 v. | | 3412 | No. 1 IF Transformer |
| C17, 20 | 5273 | 16mf 150 v. | | 4457 | No. 2 IF Transformer |
| C18, 19, 22 | 576 | .02—400 v. | | 5682 | Power transformer |
| C21 | 3003 | .5—160 v. | | 5333 | Band switch |
| C23 | 5684 | .03—1000 v. | | 5679 | Antenna Coil |
| C24 | 580 | .05—200 v. | | 5678 | Oscillator Coil |
| C25 | 3190 | 1000 mmf Mica | | 5766 | Vibrator |
| C26 | 4171 | .2—160 v. | | 5680 | Battery cable |
| R1, 2 | 631 | 50 M 1/3 W | | 4463 | 6" Speaker |

## ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across loud-speaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from generator, strong signals tend to cause improper adjustments.

IF. Connect generator ground to receiver ground. Using .1 mfd condenser in series with "high" side of generator, apply 456 kc signal to grid of 6S7G and adjust second IF transformer; same for first IF, applying signal to grid of 6D8G. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using 200 mmf condenser in series with generator, feed 1725 kc signal to antenna lead and adjust oscillator top frequency. Set generator at 1400 kc, tune receiver to signal and adjust broadcast antenna trimmer. Set generator to 600 kc. tune receiver and adjust padder. The tuning condenser should be rocked back and forth through the signal while the padder is being adjusted in order to obtain perfect alinement.

Using 400 ohm resistor in series with generator, set band selector in short wave (right) position, feed 15,600 kc signal to antenna and adjust oscillator trimmer—screw trimmer down tight and unscrew to SECOND peak. Set generator to 15,000 kc, tune receiver and adjust antenna trimmer—screw trimmer down tight and unscrew to FIRST peak, rocking the condenser back and forth through the signal while the adjustment is being made. **Above procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A 'dead spot" at about 12,000 kc will result if antenna and oscillator are not set in proper relation to each other.**

540 KC and 1725 KC
5.5 to 15.5 megacycles

**MODEL 267**

**Tubes**

Tubes required are:
1—6D8G Oscillator-Translator.
1—6S7G Intermediate frequency amplifier.
1—6T7G Detector—automatic volume control—first audio amplifier.
1—1G5G Power output
1—6ZY5G Rectifier

Do not use tubes of types different from those shown above.

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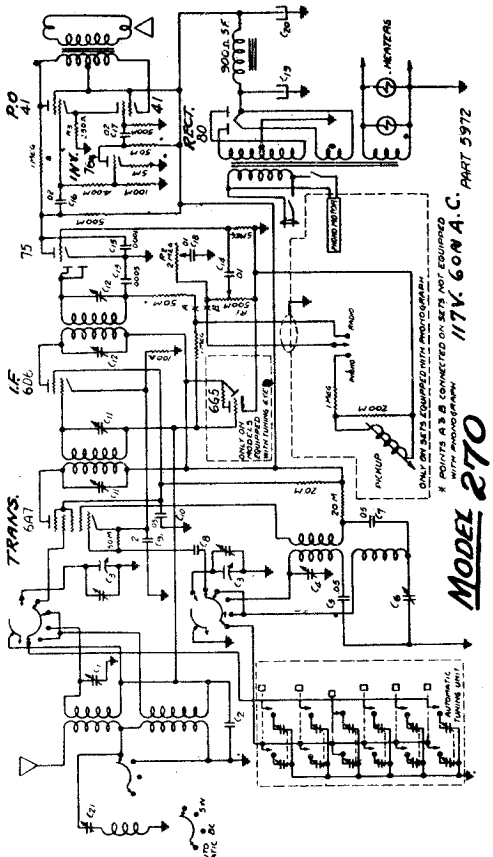
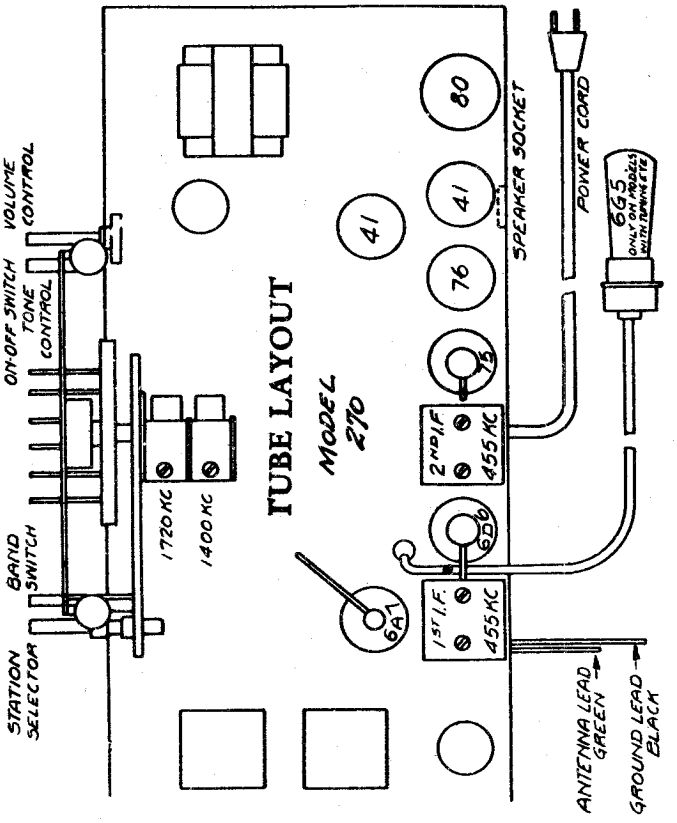
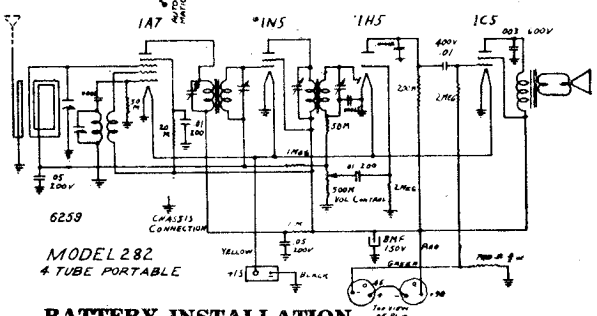
MODEL 270
MODELS 282,288
MODEL 286

# DETROLA CORP.

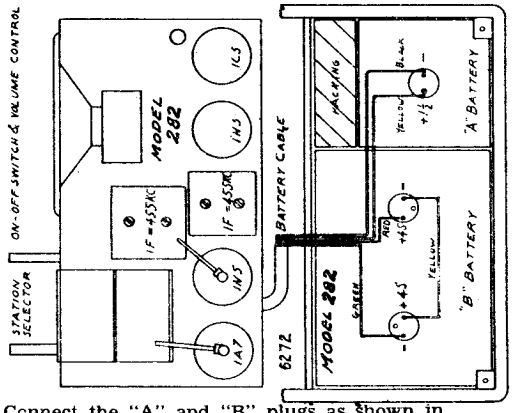
Schematics, Socket Trimmers, Alignment



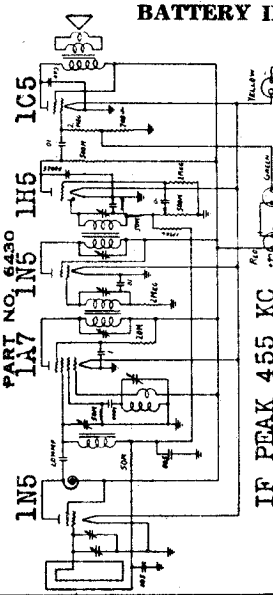

**Models 282 — 288**
550 to 1600 kilocycles.

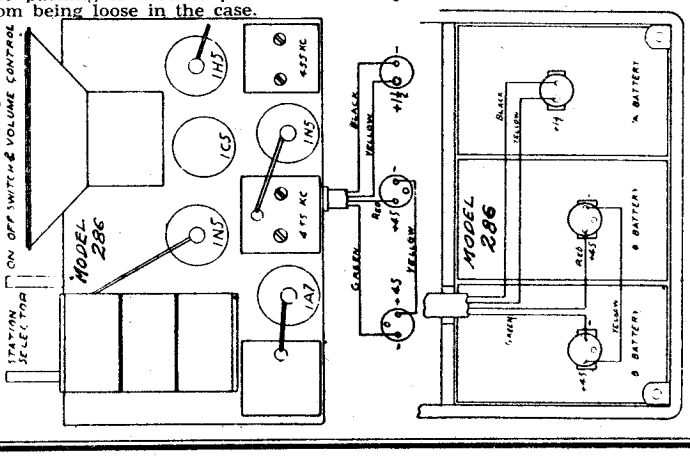



## BATTERY INSTALLATION

Remove the batteries from the shipping carton, save the small piece of cardboard packing. Place the "B" pack in the cabinet as shown in the illustration. Then put in the "A" pack. Take the small piece of cardboard packing and fold to a size that will wedge the "A" pack between the shelf and bottom of case. (See illustration.) The packing is used to prevent the "A" pack from being loose in the case.

Connect the "A" and "B" plugs as shown in the illustration. It makes no difference which socket on the "B" pack, the three prong "B" plugs are inserted.




## MODELS 282, 286, 288. ALIGNMENT PROCEDURE

I.F. Frequency 455 KC. Set Range 540-1580 KC.

Connect the test oscillator, or signal generator, to the set as follows: Connect the "hot" side of the signal generator to the grid of the 1A7 tube, and the ground side to the terminal on the back of the chassis. An output meter should be connected across the voice coil leads of the speaker to indicate resonance. Align the I.F. trimmers at 455 KC for maximum meter reading.

Adjust the trimmer on the back of the variable condenser at or near 1400 KC at full volume on a weak broadcast signal. When aligning the set do not set the receiver on or near a metal work bench or other large metal object, as it will affect the tracking of the receiver.

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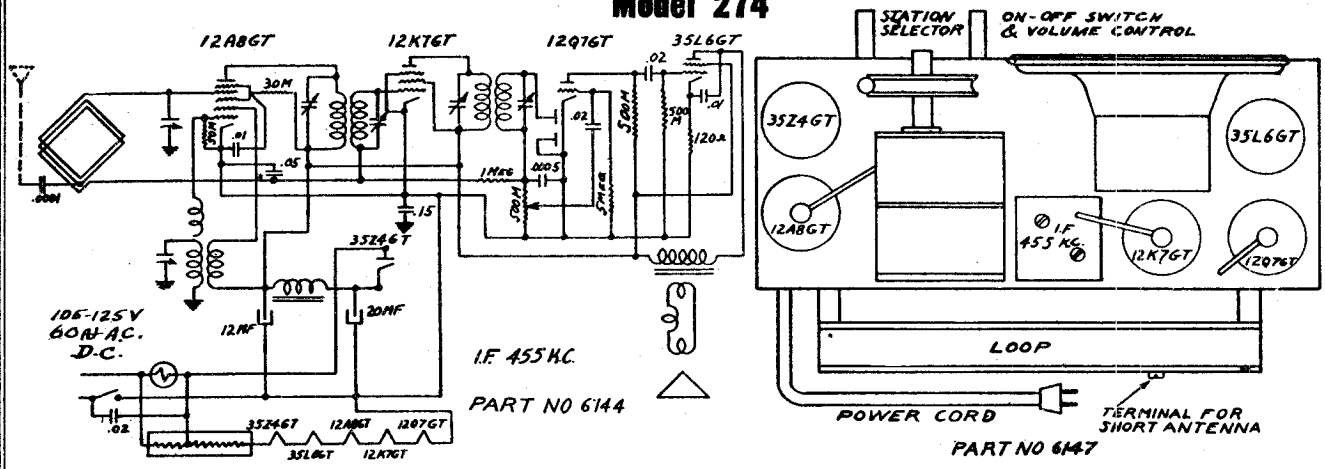
Schematics, Socket Trimmers, Alignment

DETROLA CORP.

MODEL 274
MODEL 276U, Super Pee Wee
MODEL 2742

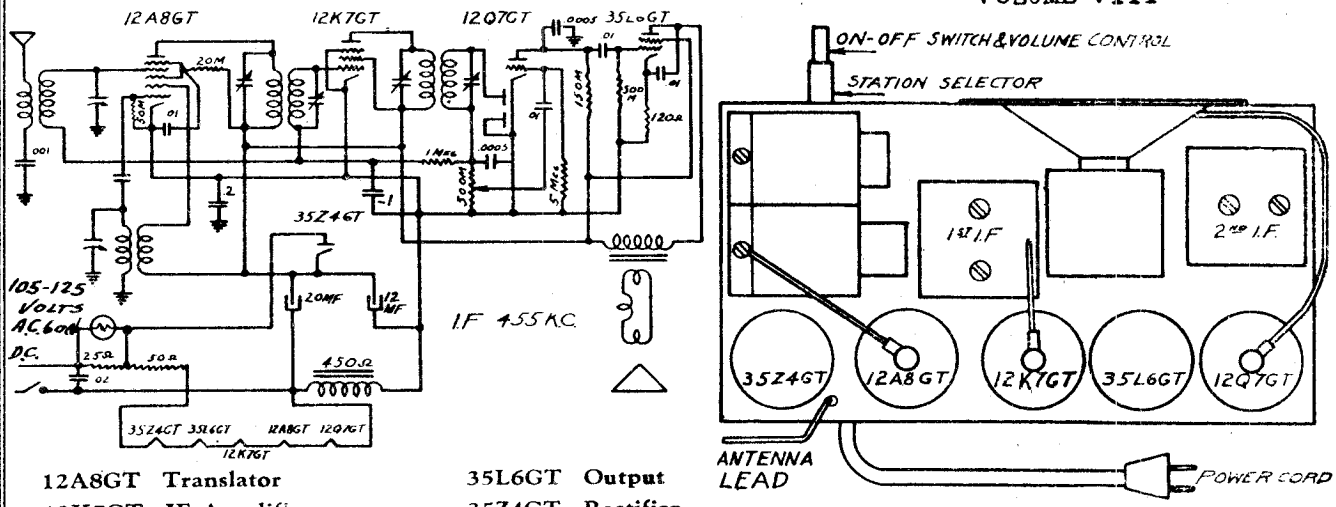
## Model 274




**12A8GT** Translator
**12K7GT** IF Amplifier
**12Q7GT** Detector AVC
**35L6GT** Output
**35Z4GT** Rectifier

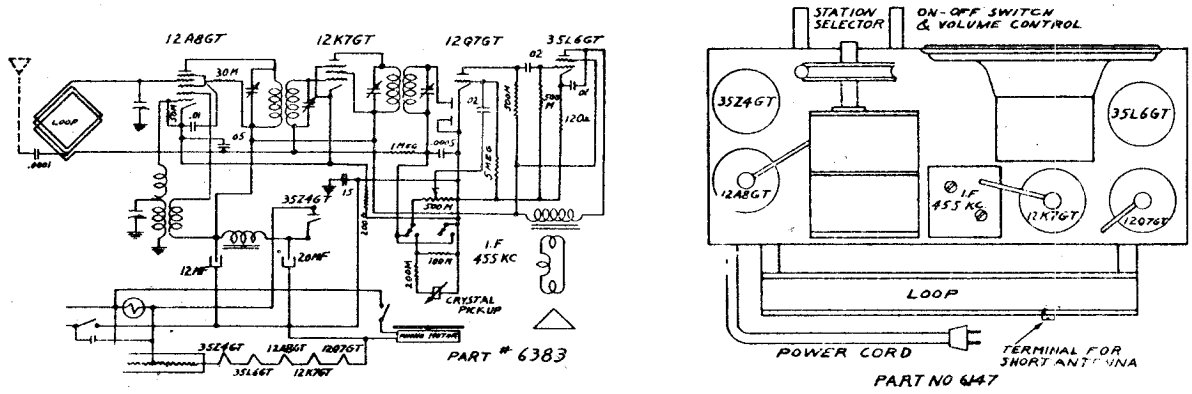
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME V111

## Super Pee-Wee Model 276-U




**12A8GT** Translator
**12K7GT** IF Amplifier
**12Q7GT** Detector AVC
**35L6GT** Output
**35Z4GT** Rectifier

### MODEL 2742—A.C.-D.C.—PHONOGRAPH




This receiver is designed to operate on 105 to 125 volts, 60 cycle, alternating or direct current. Do not connect to any other source.

For phonograph operation turn the Radio Phono switch to the Phono position. THE A.C.-D.C. SWITCH MUST BE SET IN THE PROPER POSITION. (This switch is on the phonograph panel.) The radio volume control also serves as the phonograph volume control.

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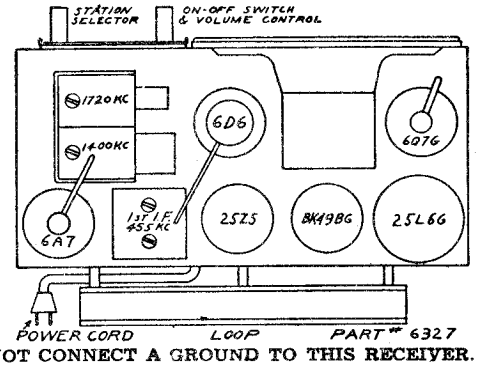
MODEL 280, Jr. PeeWee
MODEL 283
MODEL 284, Super Pee-Wee
MODEL 2741

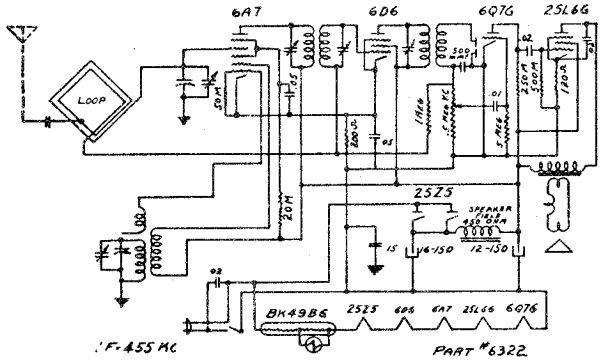
# DETROLA CORP.

Schematics, Socket
Trimmers Alignment

MODEL 283



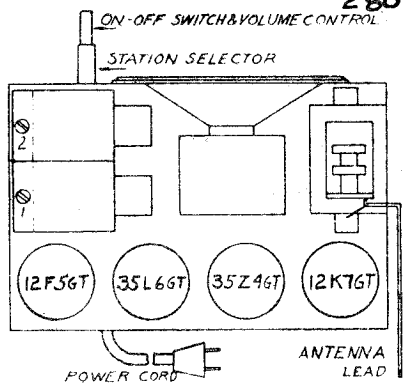

DO NOT CONNECT A GROUND TO THIS RECEIVER.




Part No. 6337

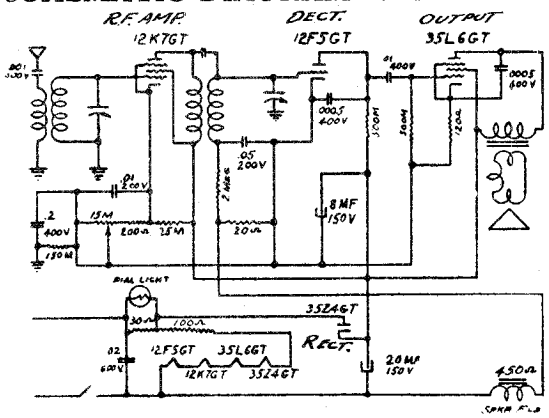
This receiver is designed to operate on 105 to 125 volts, direct or alternating current.

## TUBE LOCATION CHART—MODEL 280



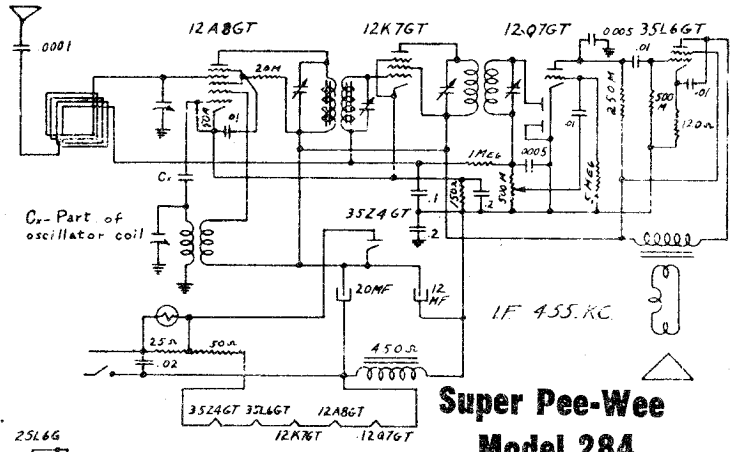

DETROLA JR. PEE-WEE

## SCHEMATIC DIAGRAM—MODEL 280



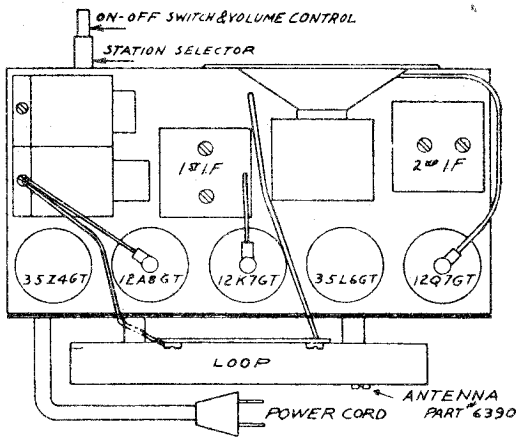

This receiver is designed to operate on 105 to 125 volts, direct or alternating current. Do not connect to any other source.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

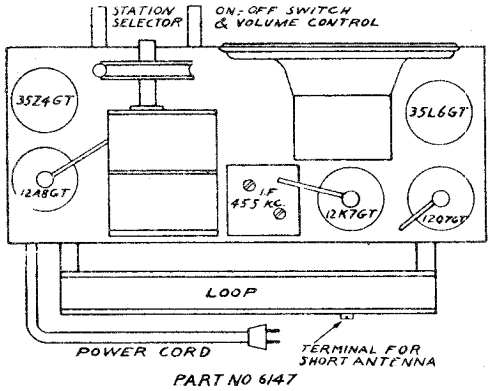



12A8GT Translator
12K7GT IF Amplifier
12Q7GT Detector AVC
35L6GT Output
35Z4GT Rectifier

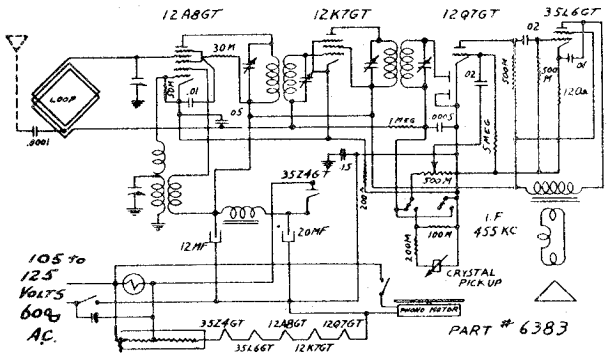
## Super Pee-Wee Model 284




## MODEL 2741 PHONOGRAPH




PART NO 6147




PART # 6383

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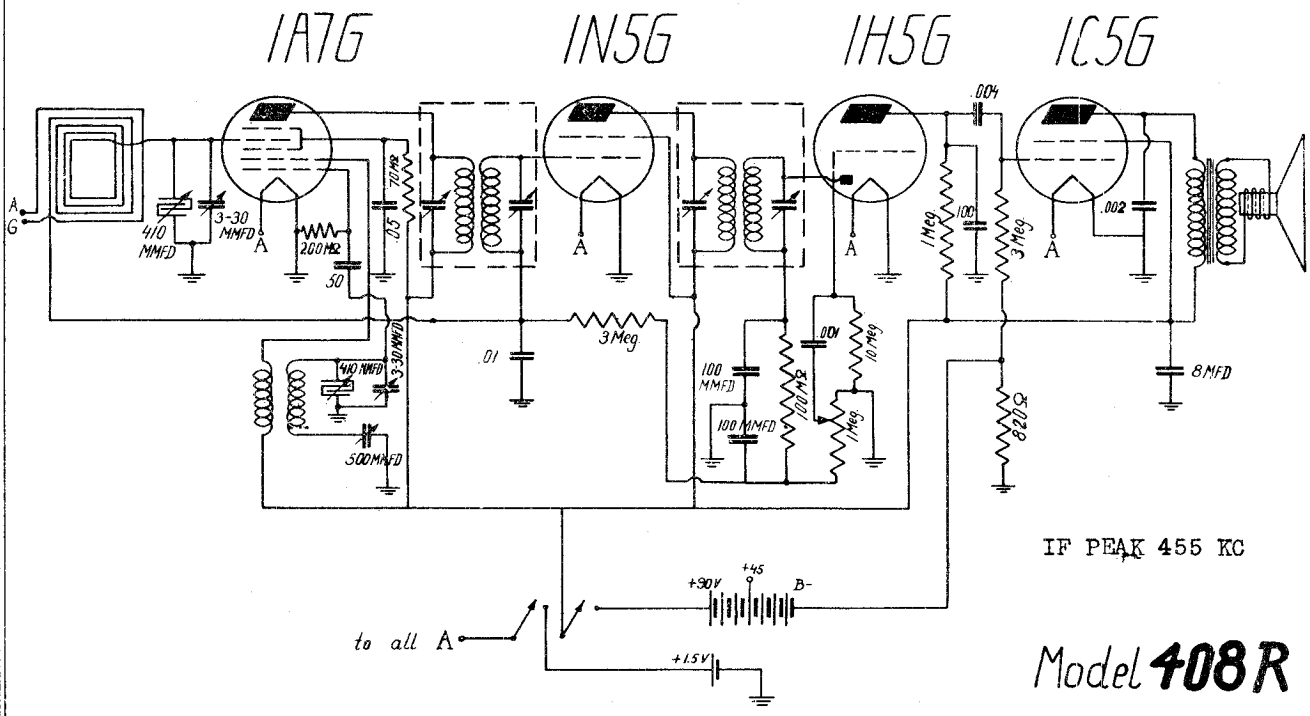
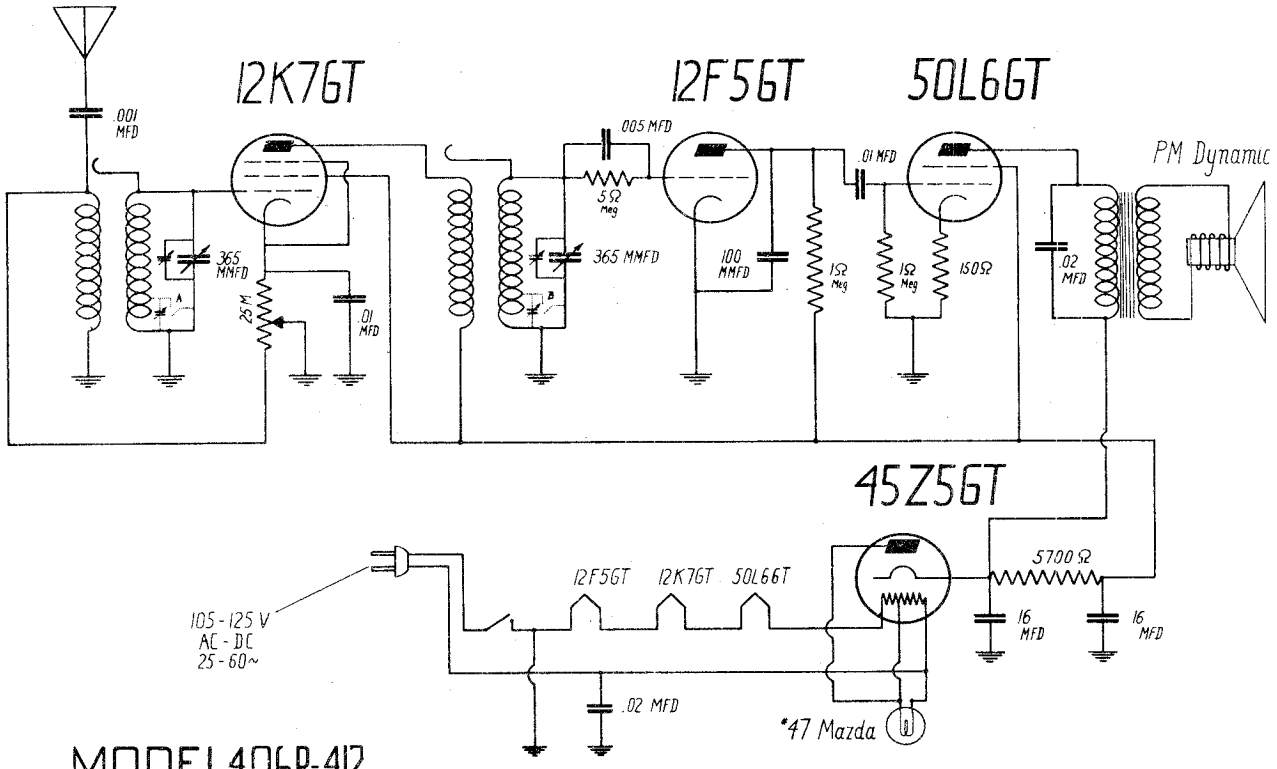
# DEWALD RADIO MFG. CORP.

MODELS 406R,412
MODEL 408R
Schematics

This is a battery operated superheterodyne receiver with full automatic volume control. A self-contained loop is incorporated which makes the use of an antenna unnecessary. It is designed to function with an "A" supply of 1.5 volts and a "B" supply of 90 volts. The broadcast range coverage is 540-1600 kilocycles.




Model 408R




MODEL 406R-412

When used as LW model see "AB"

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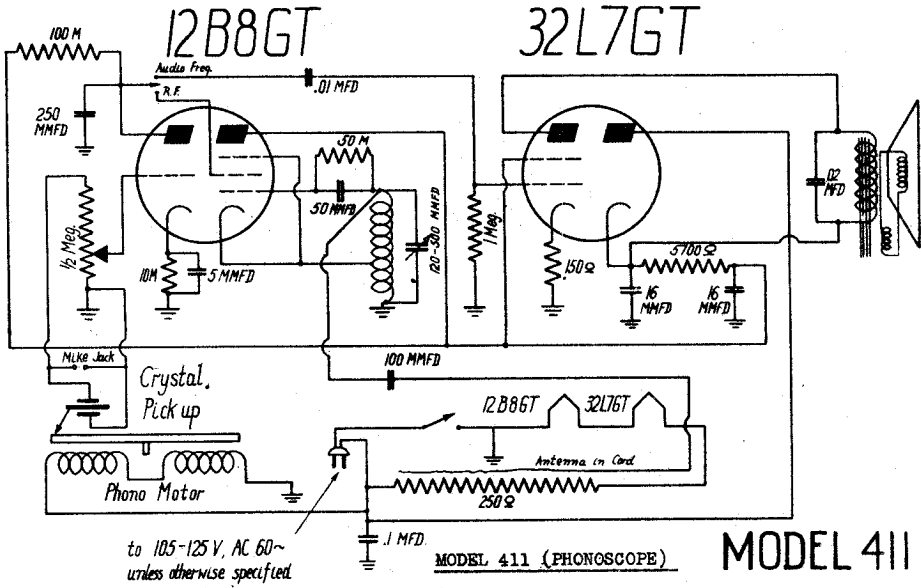
MODEL A Phono.Converter
MODEL 411 Phonoscope DEWALD RADIO MFG. CORP.
Schematics, Data




MODEL 411 (PHONOSCOPE)

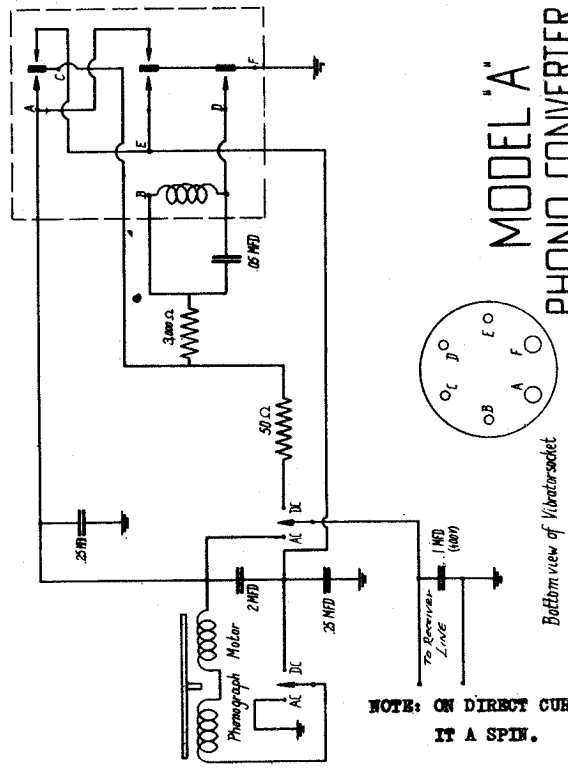
MODEL 411

The "PHONOSCOPE" is a combination audio and wireless playback. Disc recordings may be played directly through this unit, or may be reproduced through a remote radio receiver. A microphone may also be used instead of disc recordings. The unit has been designed to operate on 105-125 volts 60 cycles A.C. unless otherwise specified.

PHONOGRAPH OPERATION The phonograph motor and unit is turned "on" by rotating the knob on the right in a clockwise direction. Further rotation in this direction increases the volume. Turn the knob on the left side to the clockwise position. Allow about a minute for the tubes to become sufficiently heated. Disc recordings may now be played through the speaker in the PHONOSCOPE.

MICROPHONE OPERATION A high impedance magnetic or crystal microphone may be used in place of phonograph recordings. The two pin tips should be inserted in the microphone jack in the rear of the cabinet. The microphone may be used as a means of speaking or entertaining through the unit.

WIRELESS REPRODUCTION Wireless reproduction is a method by which signals from the PHONOSCOPE may be picked up in a remote radio receiver. This is accomplished by rotating the knob on the left in the counterclockwise position. The receiver through which the recordings or microphone reproduction is to be heard must be turned "on". The volume control should be turned to nearly maximum position; and the dial should be adjusted for approximately 550 K.C. The tuning trimmer which is located under the motor board of the cabinet of the PHONOSCOPE should be adjusted until the loudest "swish" or "hiss" noise is heard through the remote radio receiver speaker. After this adjustment has been made any form of reproduction in the PHONOSCOPE will be heard in the remote unit. Once the trimmer has been adjusted it is advisable to tune the remote receiver in order to pick-up the signals being reproduced. This unit when reproducing through the radio receiver will operate at a distance of fifty feet.




MODEL "A" PHONO. CONVERTER

Bottom view of Vibrator socket




This converter is used with radio and phonograph combinations. The purpose of the unit is to enable the phonograph motor to operate on direct current. Although the radio receiver will operate A.C or D.C., care must be taken when operating the phonograph, that the converter switch is in the proper position.

ALTERNATING CURRENT Operation

Push the slide button switch to the position marked A.C. The phonograph turn table will spin when the phonograph switch is turned to the phonograph position.

DIRECT CURRENT Operation

Push the slide button switch to the position marked D.C. The phonograph turn table will spin when the phonograph switch is turned to the phonograph position.

NOTE

When operating the receiver on D.C. and no signals are heard after it has been "on" for about a minute, reverse the line plug in the outlet.

WARNING

ALWAYS BE SURE THAT THE POSITION OF THE CONVERTER SLIDE SWITCH IS IN THE POSITION CORRESPONDING TO THE LINE CURRENT AT THE OUTLET. FOR INSTANCE, IF THE OUTLET IS A.C. THE SLIDE SWITCH MUST BE ON THE A.C. SIDE. FAILURE TO OBSERVE THIS WHILE OPERATING THE PHONOGRAPH MOTOR, MAY RESULT IN DAMAGE TO THE UNIT.

NOTE: ON DIRECT CURRENT IT MAY BE NECESSARY TO START THE MOTOR BY GIVING IT A SPIN.

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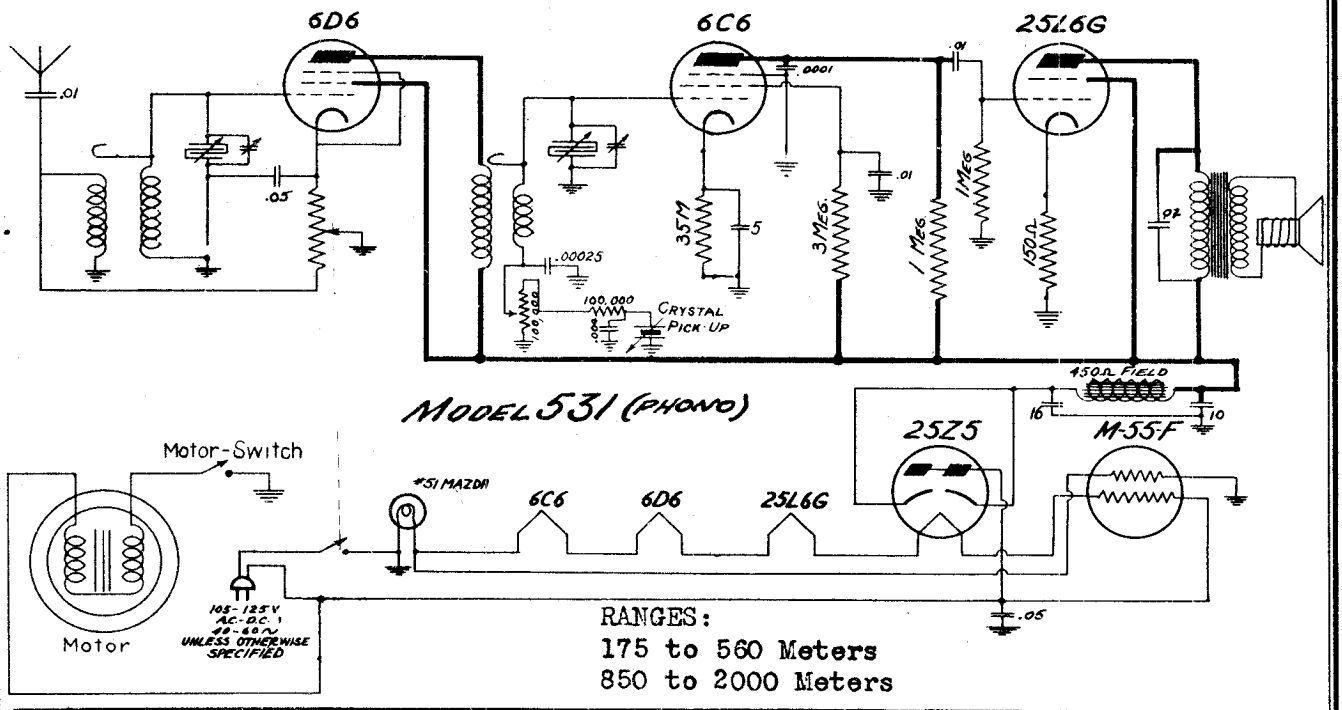
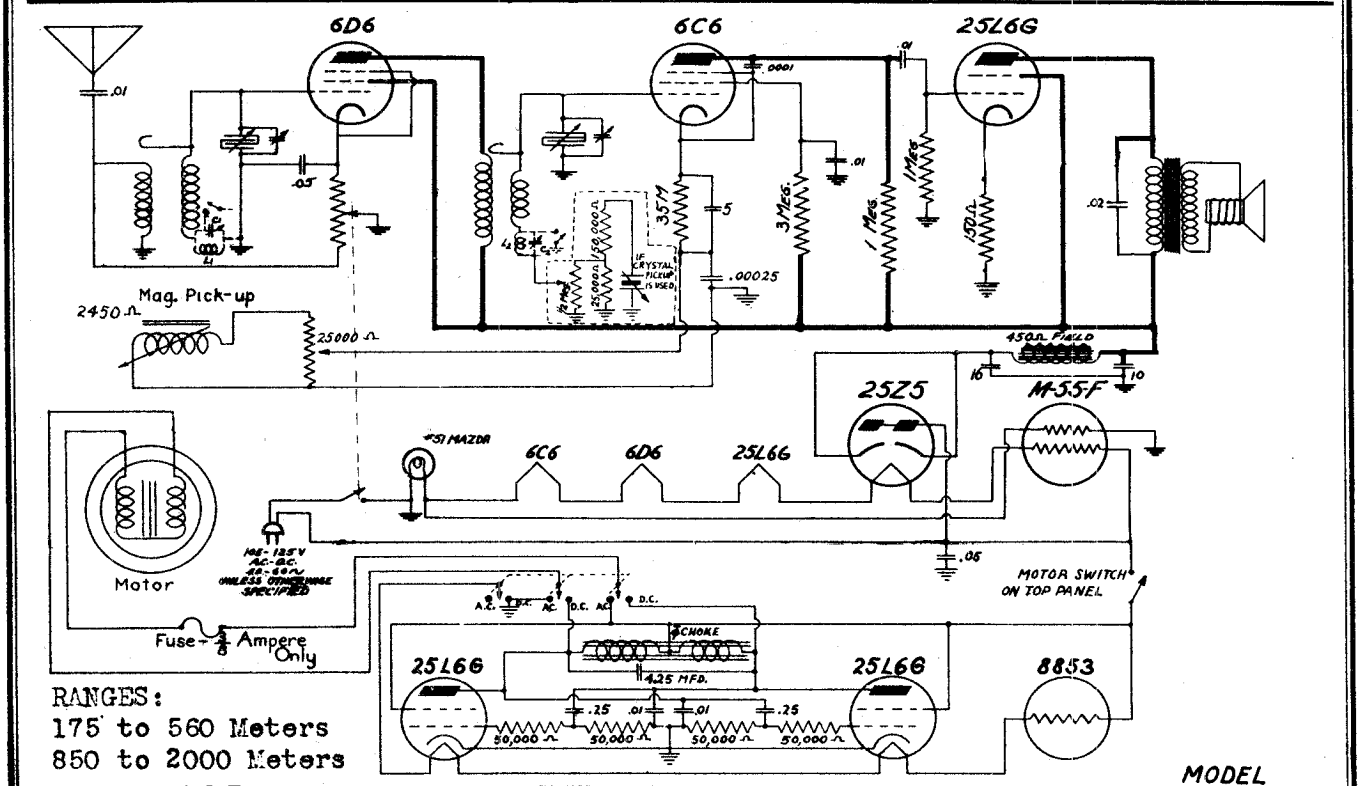
# DEWALD RADIO MFG. CORP.

MODEL 531 Phono.
MODELS 532, 532LW
Schematics




RANGES:
175 to 560 Meters
850 to 2000 Meters




RANGES:
175 to 560 Meters
850 to 2000 Meters

MODEL 532-532 L.W. LIST PRICES OF REPLACEMENT PARTS

| | | | | | |
|---|---|---|---|---|---|
| 1481 | antenna coil | .50 | 8542 | pilot lamp | .15 |
| 1482 | detector coil | .50 | 8777 | knob | .10 |
| 1488 | cent. tap choke | 1.50 | 8852 | AC-DC switch | .75 |
| 2422 | 2 gang var. cond. | 2.00 | 8854 | pointer knob | .15 |
| 2423 | comb. electrolytic | 1.00 | 9799 | drum | .15 |
| 2433 | 4.25 mfd. cond. | 2.00 | 9914 | drive shaft | .10 |
| 3420 | comb. vol. cont. | 1.00 | 9911 | pointer | .10 |
| 6079 | scale- | .10 | | cabinet | 12.50 |
| 6080 | crystal | .25 | | phono. vol. cont. | 1.00 |
| 7233 | speaker | 3.50 | | phono. pickup | 11.50 |
| | | | | phono. motor | 17.50 |

## MODEL 532 - 532 L.W.

RADIO-PHONOGRAPH COMBINATION

In Model 532 L.W.
L1, C1, L2 & C2 are in circuit.

In Model 532
L1, L2, C1, & C2 are omitted.

TO CALIBRATE

Connect external Oscillator's hot lead to rest antenna of receiver. Connect oscillator cold lead in series with a .1 or .1 MFD condenser to receiver chassis. Set oscillator at 1500 KC and peak Variable Condenser trimmers for Maximum signal with condenser set approximately where 1500 comes in on scale.

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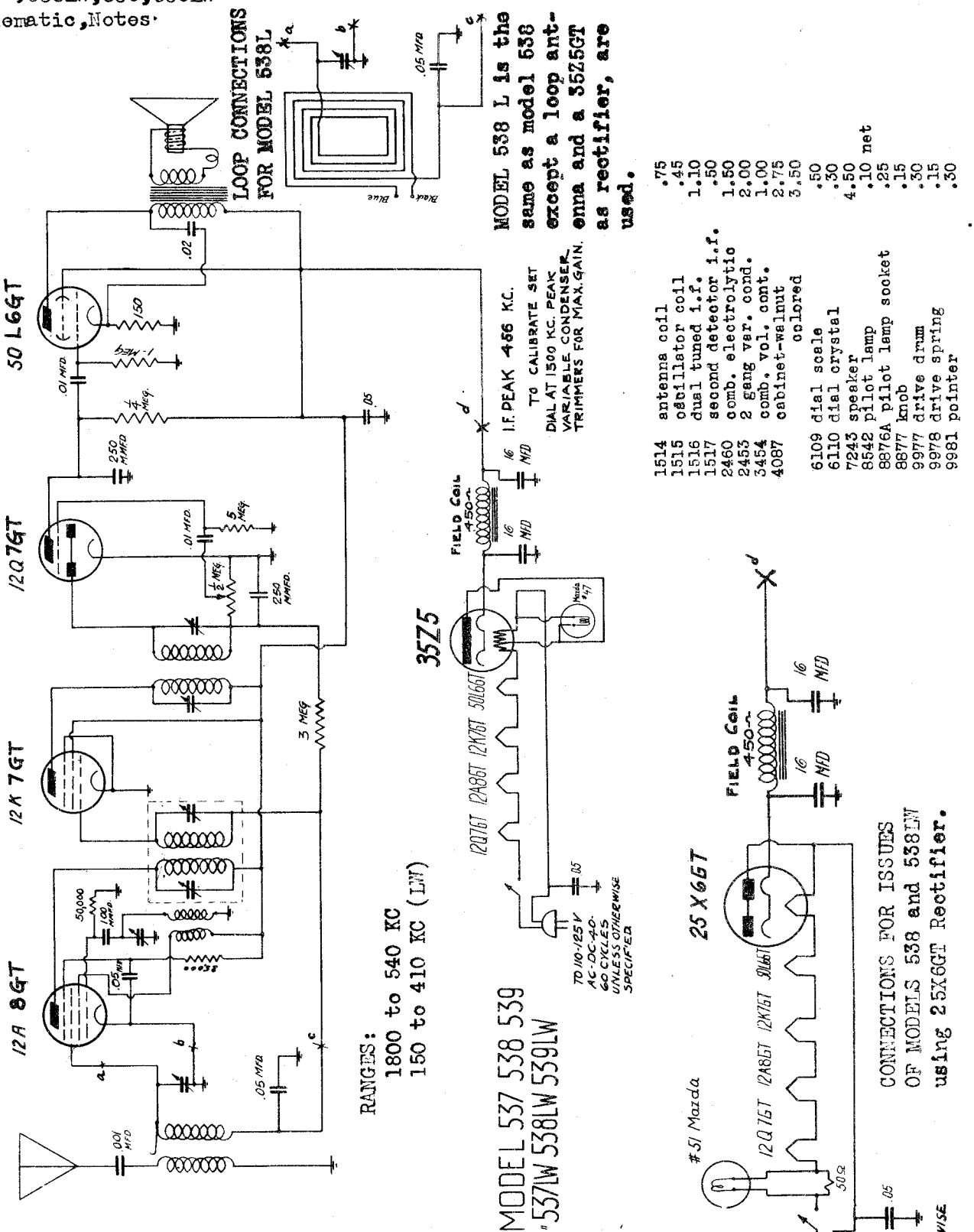
MODELS 537,537LW,538, 538L,538LW,539,539LW Schematic,Notes·

# DeWALD RADIO MFG. CORP.


LOOP CONNECTIONS FOR MODEL 538L
MODEL 538 L is the same as model 538 except a loop antenna and a 35Z5GT as rectifier, are used.
50L6GT
12Q7GT
12K7GT
12A8GT
3575
I.F. PEAK 456 K.C.
TO CALIBRATE SET DIAL AT 1500 KC. PEAK VARIABLE CONDENSER TRIMMERS FOR MAX. GAIN.
FIELD Coil 450~
RANGES:
1800 to 540 KC
150 to 410 KC (LW)
MODEL 537 538 539
"537LW 538LW 539LW
TO 110-125 V AC-DC-40-60 CYCLES UNLESS OTHERWISE SPECIFIED
#51 Mazda
25X6GT
CONNECTIONS FOR ISSUES OF MODELS 538 and 538LW using 25X6GT Rectifier.

| | | |
|---|---|---|
| 1514 | antenna coil | .75 |
| 1515 | oscillator coil | .45 |
| 1516 | dual tuned i.f. | 1.10 |
| 1517 | second detector i.f. | .50 |
| 2460 | comb. electrolytic | 1.50 |
| 2453 | 2 gang var. cond. | 2.00 |
| 3454 | comb. vol. cont. | 1.00 |
| 4087 | cabinet-walnut colored | 2.75 |
| | | 3.50 |
| 6109 | dial scale | .50 |
| 6110 | dial crystal | .30 |
| 7243 | speaker | 4.50 |
| 8542 | pilot lamp | .10 net |
| 8876A | pilot lamp socket | .25 |
| 8877 | knob | .15 |
| 9977 | drive drum | .30 |
| 9978 | drive spring | .15 |
| 9981 | pointer | .30 |

These models are five tube superheterodyne receivers with full automatic volume control. The range coverage of the model 538 is 1800 l.c. to 540 k.c. The model 538 L.W. has a long wave band added (150 k.c.-410 k.c.) They have been designed to operate on 105-125 volts, 40-60 cycles AC or DC unless otherwise specified.

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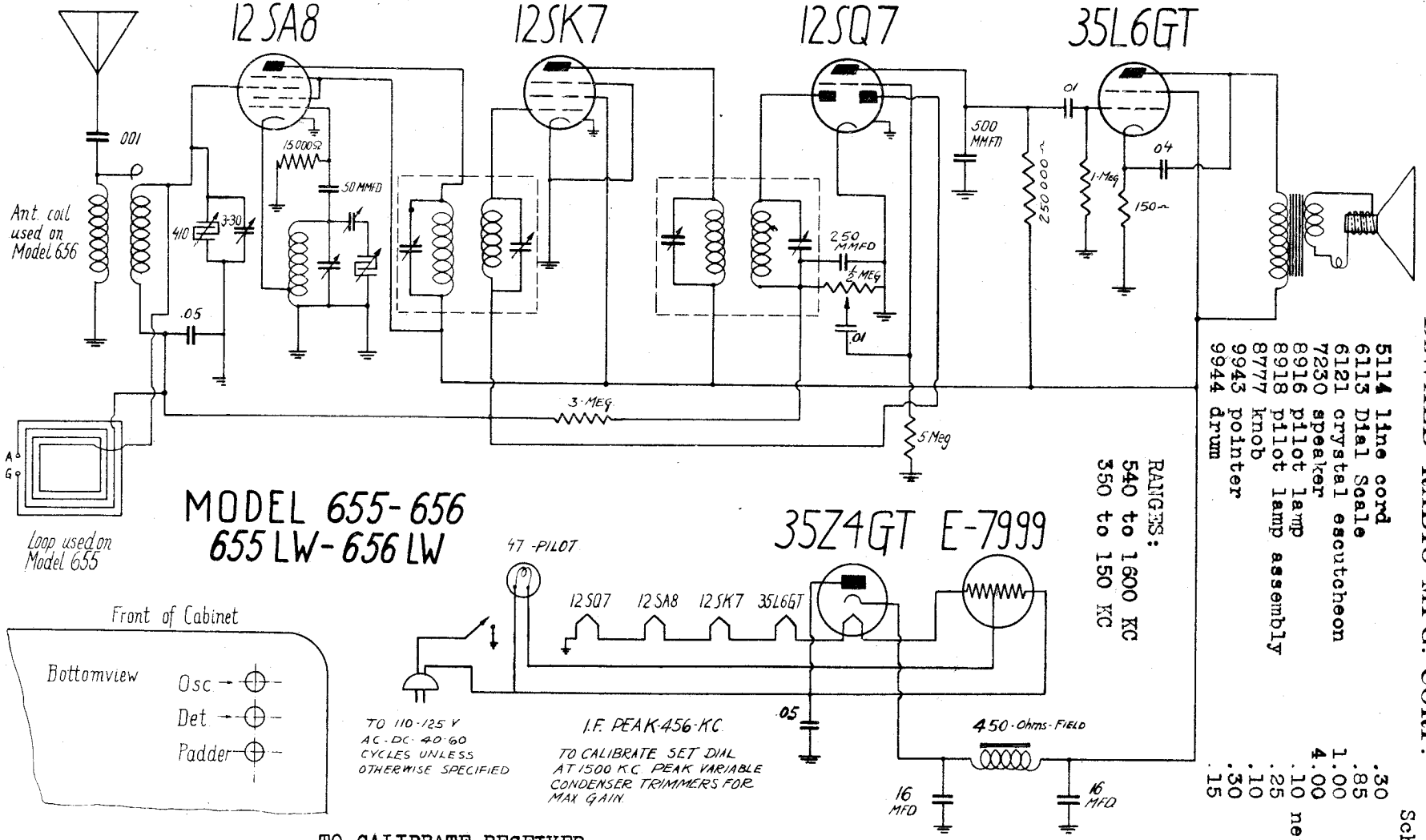



DEWALD RADIO MFG. CORP.

MODELS 655, 655LW, 656, 656LW

Schematic, Alignment

RANGES:
540 to 1600 KC
350 to 150 KC

| | | |
|---|---|---|
| 5114 | line cord | .30 |
| 6113 | Dial Scale | .85 |
| 6121 | crystal escutcheon | 1.00 |
| 7230 | speaker | 4.00 |
| 8916 | pilot lamp | .10 net |
| 8918 | pilot lamp assembly | .25 |
| 8777 | knob | .10 |
| 9943 | pointer | .30 |
| 9944 | drum | .15 |

| | | |
|---|---|---|
| 1520 | osc. coil | .50 |
| 1521 | ant. loop | 1.50 |
| 1531 | dual tuned I.F. | 1.25 |
| 1532 | ant. coil | .65 |
| 2443A | 2 gang var. cond. | 2.00 |
| 2460 | comb. elect | 1.50 |
| 2466 | trimmer assembly | .75 |
| 3439 | comb. vol cont. | 1.00 |
| | cabinet | 5.25 |

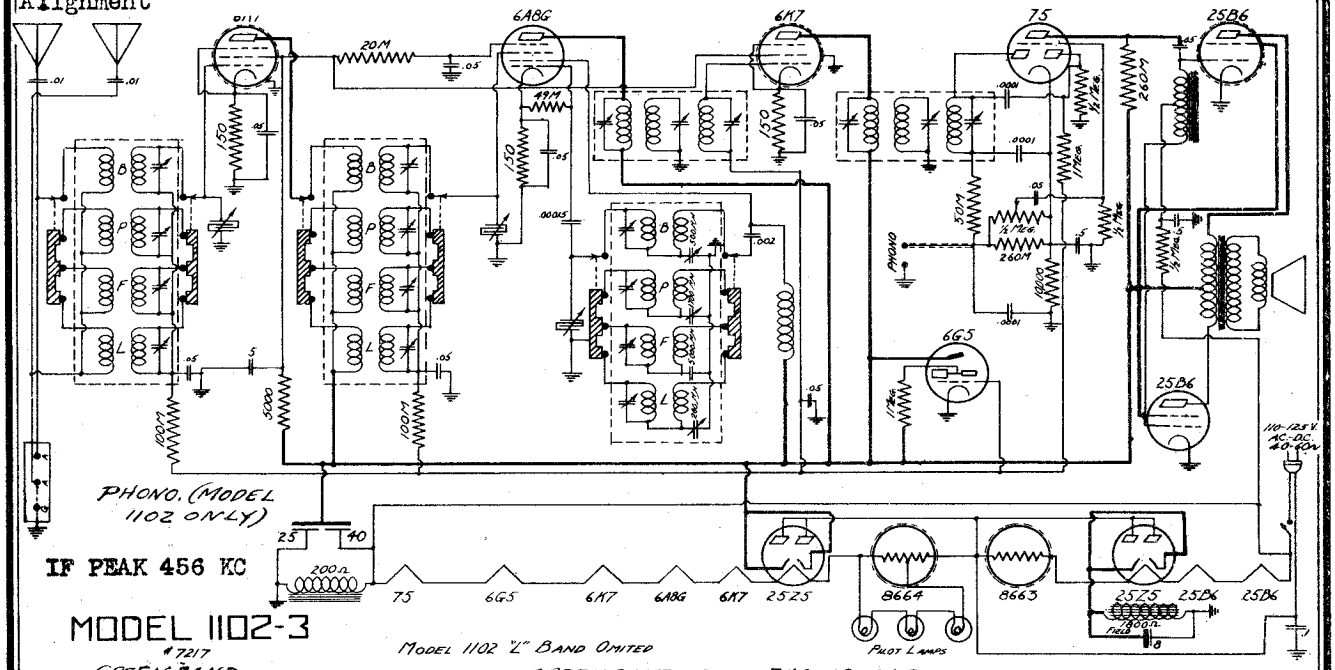
## TO CALIBRATE RECEIVER

Adjust the signal generator at 456 K.C. and peak the I.F. trimmers for maximum signal. Connect the "hot" lead from the signal generator to antenna of receiver and ground to ground of receiver. Adjust the generator and receiver to 1500 K C. and peak the trimmers for maximum signal. Adjust generator and receiver to 600 K.C. and peak the padder for maximum signal. The model 655 should have the back attached to the cabinet when peaking 1500 K.C. and 600 K.C. The trimmers and padder on these models are shown in a sketch on the wiring diagram.

MODEL 1102-3
Schematic, Socket, Trimmers
Alignment

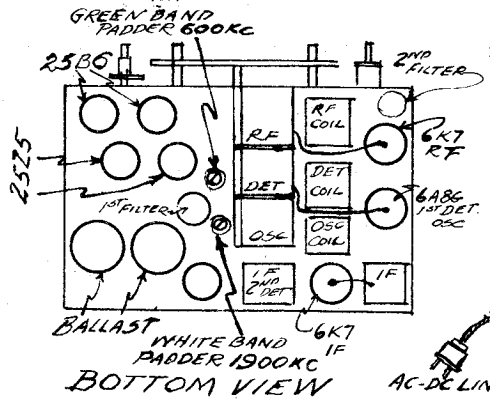
# DEWALD RADIO MFG. CORP.

MODEL Radio-Phono. Combin.
Schematic, Alignment



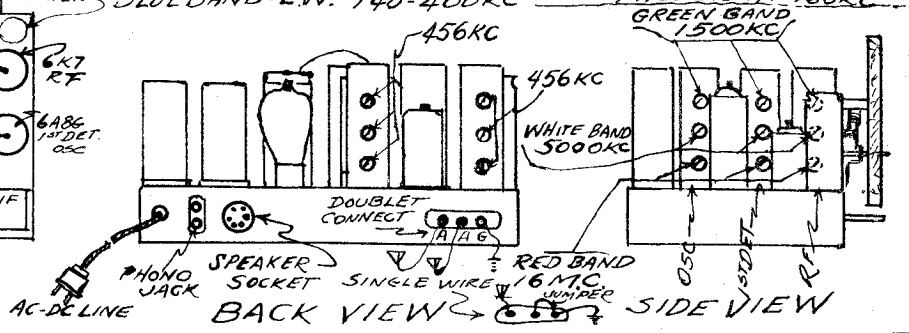

MODEL 1102-3
#7217

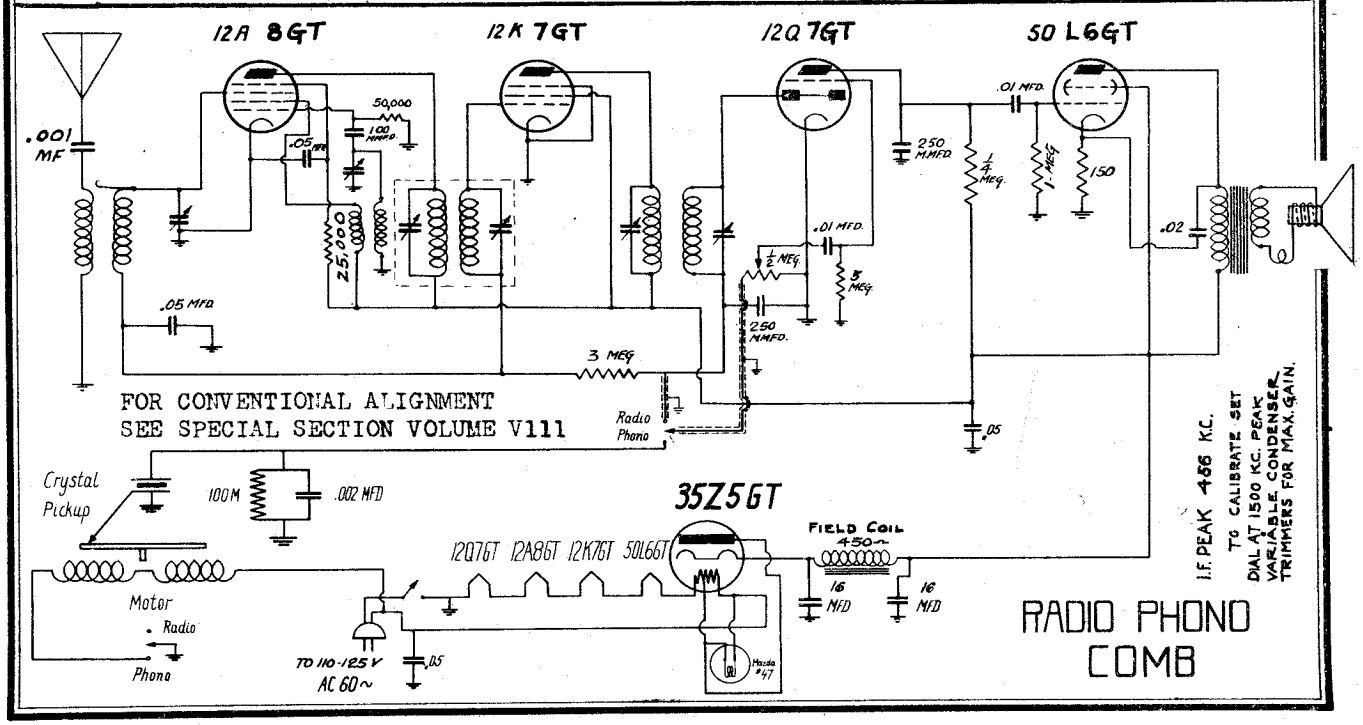
Model 1102 "L" Band Omited




GREEN BAND - B.C. - 540-1800KC
WHITE BAND - INT. - 1600-5500KC
RED BAND - S.W. - 5.4 - 18.8MC
BLUE BAND - L.W. - 140-400KC

NOTE: BLUE (L.W.) BAND ON MODEL 1103 ONLY
ALIGN COIL TRIMMERS AT 375KC
PADDER AT 160KC




I.F. PEAK 456 K.C.
TO CALIBRATE SET DIAL AT 1500 KC. PEAK VARIABLE CONDENSER TRIMMERS FOR MAX. GAIN.

RADIO PHONO COMB

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# ALLEN B. DUMONT LABS., INC.

MODELS 180,181,182,183
Circuit Data,Controls
Trouble Chart

## GENERAL FEATURES

These receivers are classed as "Electrostatic and Direct Vision." Electrostatic indicates that the entire deflection system is electrostatic and since the picture is viewed direct, without the use of a mirror, lens or other device, it is referred to as Direct Vision. The latter ensures clarity, brilliance and the widest angle of vision. Steady, clear cut, black and white pictures that are large enough for all the family to enjoy at one time are secured by the use of a fourteen inch cathode-ray tube which furnishes a picture eight by ten inches. A separate high fidelity section brings superb reproduction of the sound channel which is associated with the picture. A single control tunes both the sight and the sound channels so the receiver is no more difficult to operate than an ordinary broadcast receiver. To the above features add its compact size, minimum number of controls and simple straight forward layout and you will have an idea of the first commercial television receiver which we believe you will find easy to install and service in spite of the apparent complexity of the subject Television.

## CIRCUIT ARRANGEMENT

A simple straight line layout is used in these receivers that should prove extremely helpful to the serviceman. Viewed from the front the video receiver is on the left side of the chassis and the sound receiver is on the right. Fig. No. 1 shows the front controls and the sound receiver while Fig. No. 2 shows the rear adjustments and the video receiver. The top portion of the chassis contains both sweep circuits along with the modulating circuits of the cathode-ray tube. To prevent confusion each side is considered separately, half appearing in Fig. No. 1 and the remainder in Fig. No. 2. The seven auxiliary controls shown in Fig. No. 2 are provided for the use of the installer and serviceman. These controls are necessary to make the final alignment of picture size and positioning when the receiver is installed under the operating conditions imposed by the earth's magnetic field and the power supply line voltages. Once properly set these controls do not need adjustment and since they were not provided for the owner's use we suggest that the dealer or serviceman seal the back of the cabinet as it is not possible to tamper with the controls when the back is in place. The use of the parts and tubes shown in Fig. No. 1 and Fig. No. 2 can be checked by comparing the "V" numbers, etc., with the schematic drawings

**Operating Controls of the Receiver (Front)**

First, become familiar with the controls on the front of the receiver. Since the receiver has been tested before shipment, probably only a few minor adjustments will be necessary. Therefore before touching the adjustments in the rear attempt to operate the set according to the instruction sheet supplied the purchaser and make only the adjustments required. These instructions are repeated here to cover the possible loss of this sheet. Figure No. 1 shows the front of the receiver with the controls numbered and the use and the purpose of these controls is as follows.

1. Marked CONTRAST, ON and OFF

This is a power switch for starting and stopping a set. It also is the volume control of the picture signal. It should be adjusted in conjunction with the intensity control (No. 4) to produce a picture of pleasing contrast to the user. If the location is such that the signal received is very small, it may be necessary to use the full gain of this control, while in a good location it may have to be retarded considerably. If the picture is not satisfactory the rear controls must be adjusted as covered in a following section.

2. Marked SELECTOR

This control is a four position switch provided for covering four television channels.

3. Marked TUNING

Only one control is necessary to properly tune both the sight and sound channels. Simply adjust this control until the best reception of the sound is secured and at this point the picture signal will be correctly tuned.

4. Marked INTENSITY

The intensity or brightness of the picture is controlled by this knob. It should be adjusted in conjunction with Control No. 1 to get the best picture. Note: It is a good plan to retard (turn to the left) this control when starting the set. If about 15 seconds is allowed to elapse before advancing this control it will prevent a small bright spot from appearing on the screen which might eventually darken the screen.

5. Marked FOCUS

This control is used to sharpen the individual lines of the pattern and once set seldom requires further adjustment.

6. Marked VOLUME

This volume control adjusts the audio volume and has no effect whatever upon the picture.

**Rear Controls of the Receiver**

As previously stated, the adjustment of these controls is necessary for the final alignment of picture size and positioning, as the earth's magnetic field and power supply line voltages vary with locations. The location of these controls is shown in Figure No. 2 and their use will be covered in numerical order. Proceed as follows: remove the wood screws holding in the back of the cabinet and pull out the back. The safety switch will open, turning the set off and since it is necessary to have the set in operation while making these adjustments the switch can be made temporarily inoperative. (A large battery clip is convenient for this purpose.) Do not reach into the set with the voltages on. (See Cautions and Warning.) There is one adjustment that cannot be made by these controls, that of rotating the Cathode-ray tube to cause the picture to properly line up with the viewing opening. To remedy this, turn the set off, remove the elastic band that grips the rear support and rotate the tube by hand in the correct direction.

The function of the seven rear controls are as follows:

1. Vertical Frequency Control

This controls the frequency of the vertical sweep. If the picture is not steady and slips past at intervals, vertically, this control should be adjusted until a steady picture is secured.

2. Vertical Size Control

If the picture is too narrow and out of proportion vertically this control will remedy the trouble.

3. Vertical Positioning Control

As its name indicates, this control will move the pattern vertically, allowing the picture to be placed directly in the center of the opening.

4. Astigmatic Positioning Control

This is adjusted in conjunction with Control No. 5 to give the best possible focus on the corners of the picture.

5. Horizontal Positioning Control

This control positions the picture horizontally.

6. Horizontal Size Control

The width of the picture is adjusted by this control.

7. Horizontal Frequency Control

If no picture can be secured but modulation (dark and light spaces) can be seen on the screen, the setting of the horizontal frequency control is probably incorrect. Adjust this control until the picture forms.

With the adjustment of these controls the installation should be satisfactory. However, if the signal is weak or if ghosts or noise is present, return to the dipole antenna and make changes as previously suggested until the best position for it is secured.

## LOCATION OF TROUBLE

| FAULT | POSSIBLE CAUSES |
|---|---|
| **No picture.** | 1. Power supply trouble in any or all three sources.<br>2. Too much bias on modulator electrode.<br>3. Defective cathode-ray tube. |
| **No scanning.** | 1. Trouble in 1500 volt power source.<br>2. Poor connections to deflection plates.<br>3. Defective scanning circuits.<br>4. Defective cathode-ray tube. |
| **No modulation.** | 1. Defective or shorted antenna.<br>2. Defect in video receiver.<br>3. Too much bias on modulator electrode.<br>4. Defective cathode-ray tube. |
| **Poor focus.** | 1. Improper voltages supplied cathode-ray tube. (check entire divider circuit)<br>2. Defective video receiver.<br>3. Poor adjustments.<br>4. Defective cathode-ray tube. |
| **Uneven brilliance.** | 1. Hum from power source.<br>2. Defective scanning circuits.<br>3. Scanning picked up by modulator circuits.<br>4. Screen burnt or discolored. |
| **Distorted picture.** | 1. Poor synchronizing (circuit or adjustment).<br>2. Overloading (contrast control advanced too far)<br>3. Defective video receiver.<br>4. A.C. hum.<br>5. External interference. |
| **Unsteady picture or flickers.** | 1. Poor synchronizing action.<br>2. Leakage.<br>3. Varying voltages to cathode-ray tube or receiver.<br>4. Unsteady receiver.<br>5. Antenna loose or shorting. |
| **Double image.** | 1. Scanning circuits incorrectly adjusted.<br>2. Ghost images due to reflection of signals. |
| **Cathode-ray tube controls effect the picture and scanning.** | 1. Cathode-ray tube defective, probably leaking and going soft. |
| **Superimposed pattern on the picture.** | 1. Oscillation probably in the receiver. |
| **Streaks across picture.** | 1. Usually local interference such as ignition or diathermy. |

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MODELS 180,181,182,183
Chassis Views

# ALLEN B. DUMONT LABS., INC.

## MECHANICAL SPECIFICATIONS

**Cabinet Dimensions**

| | |
|---|---|
| Height | 24 inches |
| Width | 15¾ inches |
| Depth | 25 inches |

**Chassis Dimensions**

| | |
|---|---|
| Height | 20¾ inches |
| Width | 13¼ inches |
| Depth | 24¼ inches |

## CONTROLS

Operating Controls ..... 6
Adjustment Controls ..... 7

**Types 181, 182, 183**

These receivers have the same operating controls as the type 180 and therefore will not be covered separately.

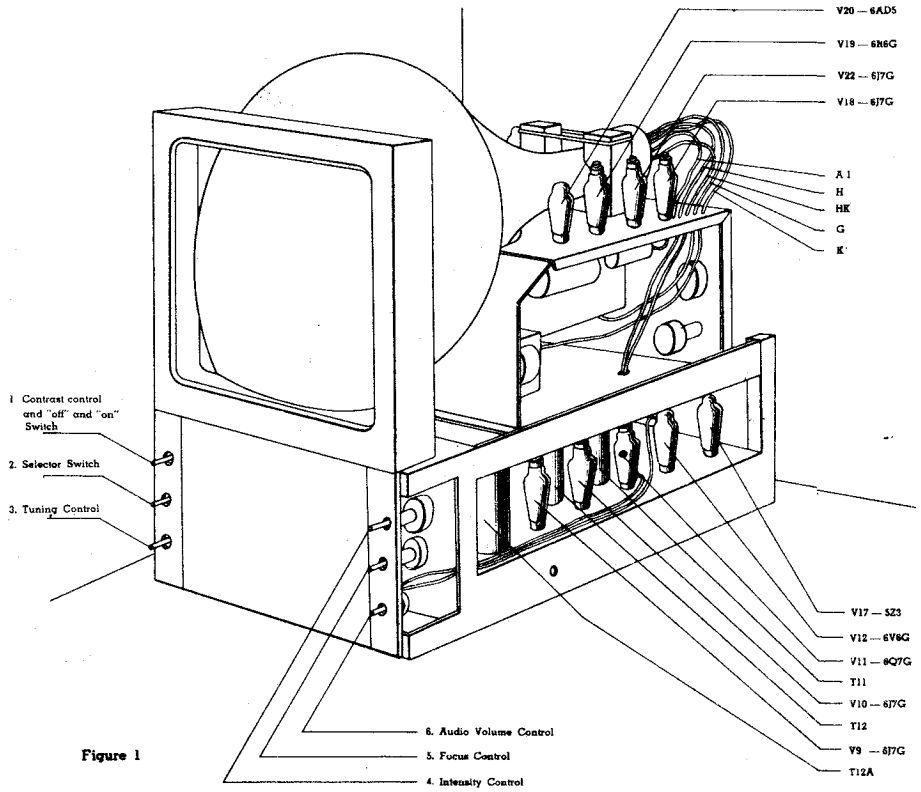


Figure 1

## TUBE COMPLEMENT

| Type | Purpose |
|---|---|
| 1853 | R.F. Amplifier |
| 6J5M | R.F. Oscillator |
| 1852 | First Detector |
| 1853 | 1st Video I.F. Amplifier |
| 1852 | 2nd Video I.F. Amplifier |
| 6H6M | Video 2nd Detector |
| 1851 | 1st Video Amplifier |
| 6V6G | Video Power Amplifier |
| 6J7G | 1st Sound I.F. Amplifier |
| 6J7G | 2nd Sound I.F. Amplifier |
| 6Q7G | Sound 2nd Detector and Amplifier |
| 6V6G | Sound Power Amplifier |
| 6J7G | Horizontal Synch Separator |
| 6AD5G | Horizontal Sweep Oscillator |
| 6R6G | Horizontal Sweep Amplifier |
| 6J7G | Vertical Synch Separator |
| 6AD5G | Vertical Sweep Oscillator |
| 6R6G | Vertical Sweep Amplifier |
| 2Y2 | 4100 Volt Rectifier |
| 5X3 | 1600 Volt Rectifier |
| 5Z3 | 350 Volt Rectifier |
| 114-9-T | Cathode-ray Tube (14") |

Frequency Ranges — Four Television Channels provided, present alignment as follows:

| STEP | STATION | SIDE BAND | AUDIO CARRIER | VIDEO CARRIER |
|---|---|---|---|---|
| A | NBC | Single | 49.75 | 45.25 |
| B | CBS | Single | 55.75 | 51.25 |
| C | ..... | ..... | ..... | ..... |
| D | NBC | Double | 49.75 | 46.5 |

**Power Ratings**

Power supply 110 to 120 volts, 50 to 60 cycles, 250 watts.
Audio output, maximum 4.25 watts.

Twenty-two Tube, AC, Superhetrodyne, Television Receiver

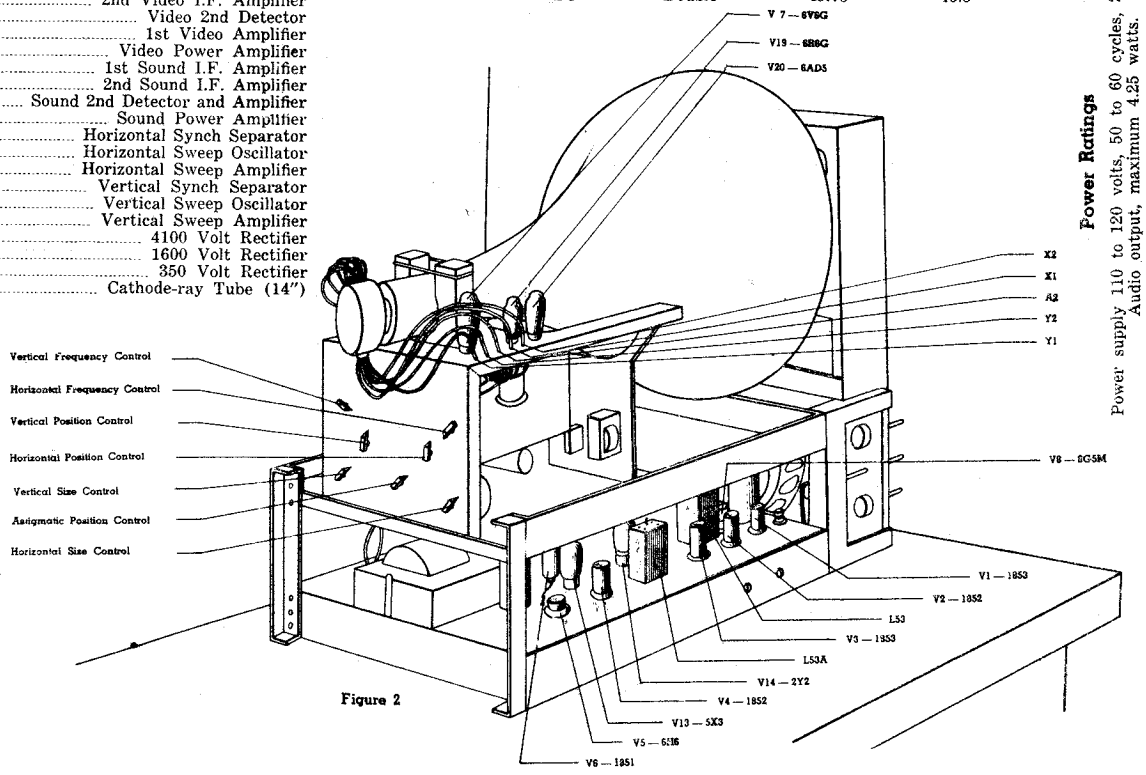


Figure 2

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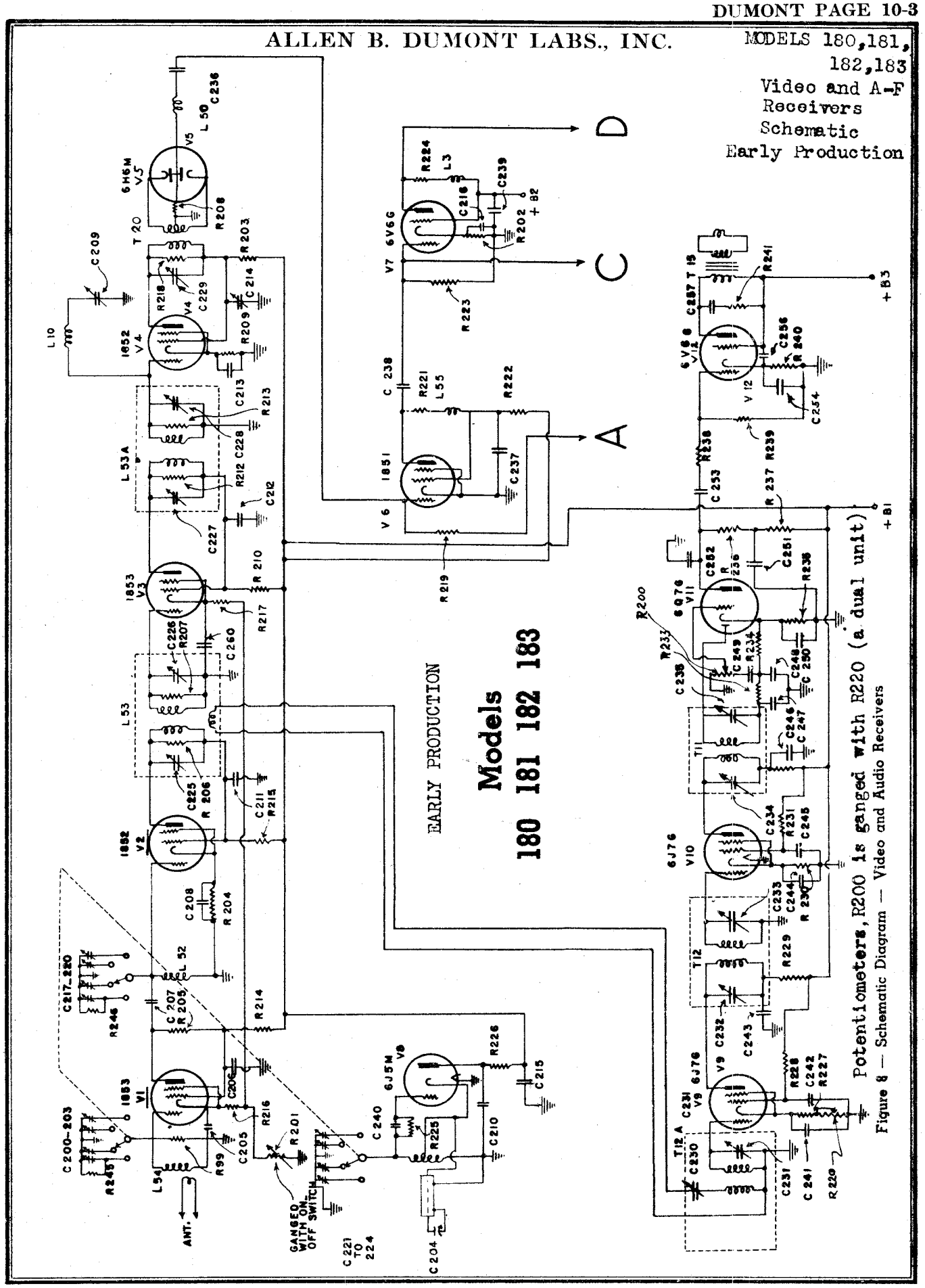


Figure 8 — Schematic Diagram — Video and Audio Receivers

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MODELS 180,181,182,183
Separator and Sweep
Voltage Divider
Schematics,Notes

ALLEN B. DUMONT LABS., INC.

Early Production

EARLY PRODUCTION **Models 180 181 182 183**

It is better to shut the set completely off between adjustments than to suffer a painful or even a dangerous burn. The set is equipped with a safety switch which automatically opens upon the removal of the back of the cabinet. This protects the operator from dangerous high voltages which would otherwise be exposed.

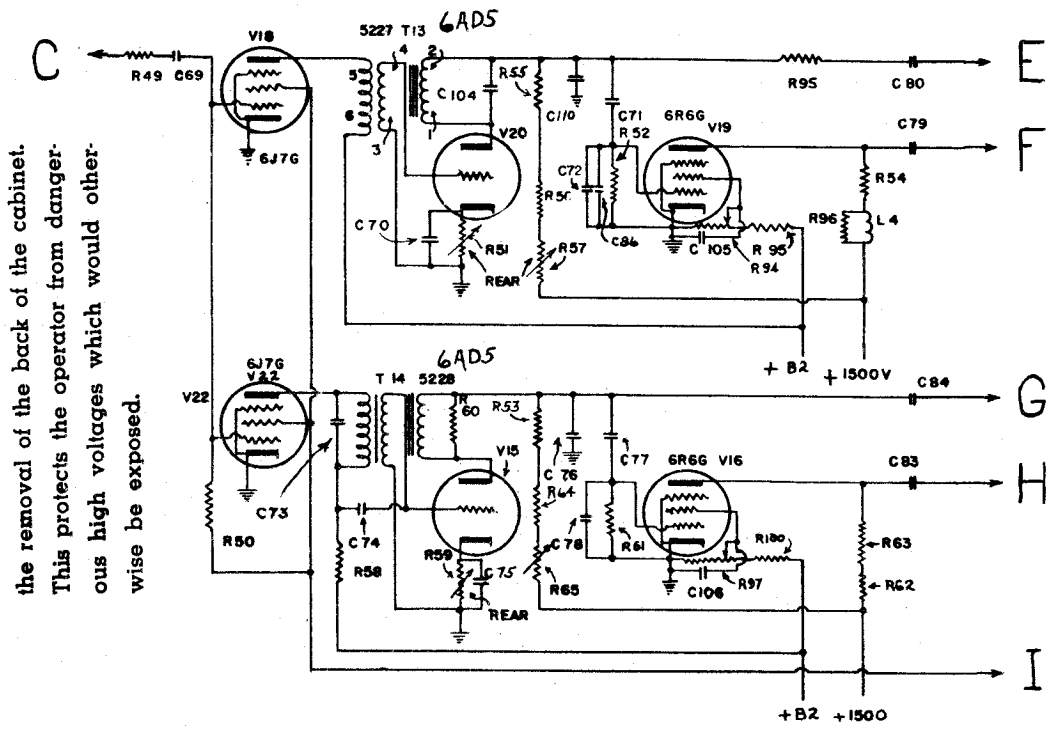


Figure 5 — Schematic Diagram, Separator and Sweep Circuits

The high voltages that are necessary in this type of equipment are very dangerous and should not be approached in a careless manner.

The serviceman that is engaged in installing or servicing television receivers is urged to take all precautions and run no unnecessary risks.

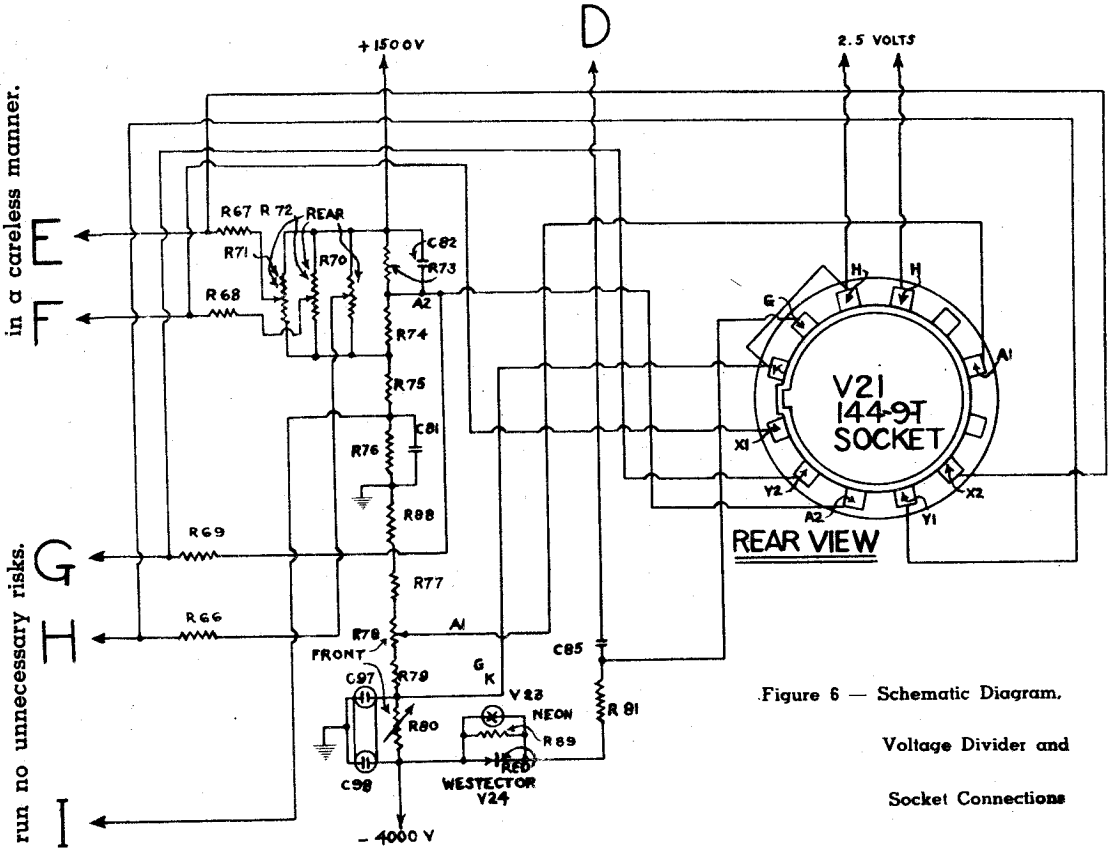


Figure 6 — Schematic Diagram, Voltage Divider and Socket Connections

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MODELS 180,181,182,183
S.P.U. Schematic
Voltage,Notes

# ALLEN B. DUMONT LABS., INC.

## CAUTION AND WARNING

Large cathode-ray tubes operate at high voltages and hence are evacuated to a very high degree of vacuum. Therefore the atmospheric pressure on the glass can run into tons depending on the size of the tube. A collapse therefore is as bad as an explosion and all cathode-ray tubes should be handled with care. The Du Mont Laboratories have gone to great expense to provide a cathode-ray tube that is safe for the home and the structural design results in its ability to stand tests nearly twice as severe as usually employed. The serviceman, however, should observe the following rules as he will probably be the only one to handle the average tube.

1. Be careful in handling the tube.
2. Watch the use of tools near the tube.
3. Don't scratch the surface of the glass.
4. Don't stand the tube on a metal surface or in any other way cause certain parts to be quickly heated or cooled.

## TERMINAL VOLTAGES

Using Weston Model 772 20,000 Ohms per Voltmeter
(with Televerter)

| Tube | Plate | Screen | Grid (Control) | Notes |
|---|---|---|---|---|
| V9 | 240 | 150 | — 4.3 | |
| V10 | 240 | 155 | — 4.3 | |
| V11 | 190 | ..... | — 2.2 | |
| V12 | 275 | 290 | —11.5 | Cathode to ground. |
| V8 | 115 | ..... | ..... | |
| V1 | 140 | 190 | — 2. | Contrast on full. |
| V2 | 190 | 190 | — 3.5 | |
| V3 | 180 | 180 | — 2.25 | |
| V4 | 170 | 170 | — 2.25 | |
| V6 | 170 | 185 | — 2.0 Cannot be measured at the grid of V6. Should read —4 volts at center tap of 5Z3 high voltage winding to ground. | |
| V7 | 140 | 225 | — 7.5 | |

V17 5Z3 filament to ground = 310 volts
V13 5X3 filament to ground = 1600 volts
(output after L7 = 1550)
V14 2Y2 output = 3950 to 4200 (ground is positive)
(output after R83 = 3800 to 4100 volts)
The above measurements were taken with respect to ground, the following are point to point.
V21 From cathode to grid —60 to —160
From cathode to first anode +800 to +1600
From cathode to second anode +5000

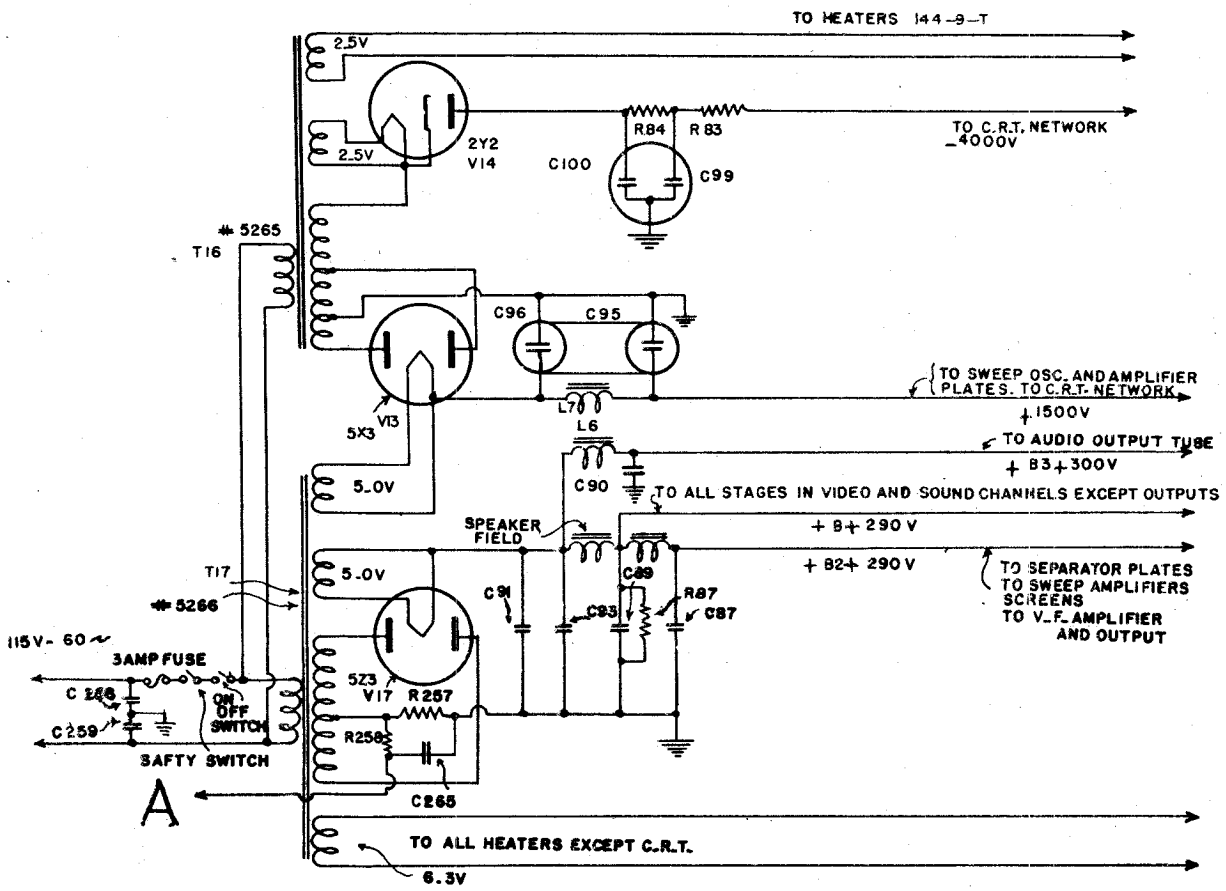


Figure 7 — Schematic Diagram, Power Supplies

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MODELS 180,181,182,183
Service Data, Parts ALLEN B. DUMONT LABS., INC.

## RESISTOR VALUES

EARLY PRODUCTION

R — Regular
S — Special
W — Wire

| R | Ohms | Watt | Class | R | Ohms | Watt | Class |
|---|---|---|---|---|---|---|---|
| 49 | 10,000 | ½ | R | 200 | 500,000 | pot | S |
| 50 | 10 meg | ½ | R | 201 | 2,000 | pot. | R |
| 51 | 6,000 | pot | W | 202 | 150 | ½ | R |
| 52 | 1 meg | ½ | R | 203 | 5,000 | 1 | R |
| 53 | 200,000 | 2 | S | 204 | 400 | ½ | R |
| 54 | 80,000 | 20 | W | 205 | 3,000 | ½ | R |
| 55 | 100,000 | 2 | S | 206 | 3,000 | ½ | R |
| 56 | 100,000 | 2 | S | 207 | 3,000 | ½ | R |
| 57 | 500,000 | pot | S | 208 | 3,000 | ½ | R |
| 58 | 15,000 | ½ | R | 209 | 150 | ½ | R |
| 59 | 6,000 | pot | W | 210 | 5,000 | 1 | R |
| 60 | 50,000 | ½ | R | 212 | 3,000 | ½ | R |
| 61 | 25 meg | 1 | R | 213 | 3,000 | ½ | R |
| 62 | 1.5 meg | 1 | R | 214 | 5,000 | 1 | R |
| 63 | 1.5 meg | 1 | R | 215 | 5,000 | 1 | R |
| 64 | 200,000 | 2 | S | 216 | 150 | ½ | R |
| 65 | 1 meg | pot | S | 217 | 150 | ½ | R |
| 66 | 5 meg | ½ | R | 218 | 5,000 | ½ | R |
| 67 | 5 meg | ½ | R | 219 | 1 meg | ½ | R |
| 68 | 5 meg | ½ | R | 220 | 100,000 | pot | S |
| 69 | 5 meg | ½ | R | 221 | 1,500 | 1 | R |
| 70 | 2 meg | pot | R | 222 | 5,000 | 1 | R |
| 71 | 2 meg | pot | R | 223 | 1 meg | ½ | R |
| 72 | 2 meg | pot | R | 224 | 1,000 | 2 | R |
| 73 | 300,000 | ½ | R | 225 | 25,000 | ½ | R |
| 74 | 300,000 | ½ | R | 226 | 25,000 | ½ | R |
| 75 | 750,000 | 2 | R | 227 | 400 | ½ | R |
| 76 | 15,000 | ½ | R | 228 | 100,000 | ½ | R |
| 77 | 1 meg | 2 | S | 229 | 4,000 | ½ | R |
| 78 | 1 meg | pot | S | 230 | 1,000 | ½ | R |
| 79 | 750,000 | 2 | R | 231 | 100,000 | ½ | R |
| 80 | 100,000 | pot | R | 232 | 4,000 | ½ | R |
| 81 | 10,000 | ½ | R | 233 | 50,000 | ½ | R |
| 82 | 35,000 | 10 | W | 234 | 1.5 meg | ½ | R |
| 83 | 100,000 | 1 | R | 235 | 2,000 | ½ | R |
| 84 | 100,000 | 1 | R | 236 | 50,000 | ½ | R |
| 87 | 100,000 | 2 | R | 237 | 10,000 | ½ | R |
| 88 | 1 meg | 2 | S | 238 | 50,000 | ½ | R |
| 89 | 1 meg | ½ | R | 239 | 250,000 | ½ | R |
| 90 | 50,000 | ½ | R | 240 | 160 | 1 | R |
| 94 | 250,000 | pot | S | 241 | 10,000 | 1 | R |
| 95 | 40,000 | ½ | R | 245 | 10,000 | ½ | R |
| 96 | 50,000 | ½ | R | 246 | 10,000 | ½ | R |
| 97 | 50,000 | pot | R | 257 | 20 | 1 | R |
| 99 | 3,000 | ½ | R | 258 | 500,000 | ½ | R |
| 100 | 200,000 | ½ | R | | | | |

## CONDENSER VALUES

| C. | Mfd. | Volts | C. | Mfd. | Volts |
|---|---|---|---|---|---|
| 69 | .1 | 400 | 214 | .01 | 400 |
| 70 | .05 | 400 | 215 | .01 | 400 |
| 71 | .000075 | 1500 | 216 | .001 | 400 |
| 72 | .0025 | 400 | 217 | 3-30 | trimmer |
| 73 | .0025 | 400 | 218 | 3-30 | trimmer |
| 74 | .005 | 500 | 219 | 3-30 | trimmer |
| 75 | 25. | 50 | 220 | 3-30 | trimmer |
| 76 | .04 | 1600 | 221 | 3-30 | trimmer |
| 77 | .0005 | 1500 | 222 | 3-30 | trimmer |
| 78 | .25 | 400 | 223 | 3-30 | trimmer |
| 79 | .01 | 1200 | 224 | 3-30 | trimmer |
| 80 | .04 | 1600 | 225 | L53 | |
| 81 | .1 | 400 | 226 | L53 | |
| 82 | .25 | 600 | 227 | L53A | |
| 83 | .1 | 1000 | 228 | L53A | |
| 84 | .1 | 1000 | 229 | T-20 | |
| 85 | .05 | 4500 | 230 | T12A | |
| 86 | .0005 | 400 | 231 | T12A | |
| 87 | 16. | 450 | 232 | T12 | |
| 89 | 8. | 450 | 233 | T12 | |
| 90 | 8. | 450 | 234 | T11 | |
| 91 | 16. | 450 | 235 | T11 | |
| 93 | 16. | 450 | 236 | .04 | 400 |
| 95 | 4. | 1500 | 237 | 8. | 450 |
| 96 | 4. | 1500 | 238 | .04 | 400 |
| 97 | .2 | 4000 | 239 | .01 | 400 |
| 98 | .2 | 4000 | 240 | .000050 | 400 |
| 99 | .2 | 4000 | 241 | .02 | 400 |
| 100 | .2 | 4000 | 242 | .10 | 400 |
| 104 | .0003 | 400 | 243 | .25 | 400 |
| 105 | .02 | 400 | 244 | .02 | 400 |
| 106 | 25. | 50 | 245 | .10 | 400 |
| 110 | .0002 | 1500 | 246 | .25 | 400 |
| 200 | 3-30 mmf. | trimmer | 247 | .0002 | 400 |
| 201 | 3-30 mmf. | trimmer | 248 | .000050 | 400 |
| 202 | 3-30 mmf. | trimmer | 249 | .01 | 400 |
| 203 | 3-30 mmf. | trimmer | 250 | 25. | 25 |
| 204 | 3-5 | variable | 251 | 4. | 450 |
| 205 | .0006 | 400 | 252 | .0006 | 400 |
| 206 | .0006 | 400 | 253 | .1 | 400 |
| 207 | .0006 | 400 | 254 | 50. | 25 |
| 208 | .01 | 400 | 256 | .0005 | 400 |
| 209 | 3-30 mmf. | trimmer | 257 | .01 | 400 |
| 210 | .0006 | 400 | 258 | .0006 | 400 |
| 211 | .01 | 400 | 259 | .0006 | 400 |
| 212 | .01 | 400 | 260 | .01 | 400 |
| 213 | .01 | 400 | 265 | 25. | 25 |

## SERVICE

While the technique employed in servicing television receivers is similar to ordinary radio practice, there is a greater need for basic knowledge and the time will be well spent that is used to study the fundamental principles of television before attempting actual service work. For obvious reasons it will be impossible to include fundamental theory in this manual, however, since very little data concerning the form of sweeps used in these receivers is available, the following description may be helpful.

Fig. 5 is a schematic diagram showing synchronizing signal separation and sweep circuits used in this receiver. The two 6J7G tubes (V18 & V22) function as the synchronizing signal separators. The outputs of the two plates are fed their respective synchronizing windings of the horizontal and vertical oscillation transformers. Linear sawtooth deflection is effected using a 6AD5G triode as an oscillator and a 6R6G pentode as an amplifier. Oscillations are generated as follows:

Let us consider first the low frequency vertical circuit. Condenser C76 is charged from the power supply through the resistor consisting of R64 R65 and R66. R65 functions mainly as an amplitude or size control, although it has some effect upon the frequency of operation. Condenser C76 charges to practically full power supply potential. As a result of previous oscillations, a charge on condenser C75 is held on the cathode, which gradually decreases to zero through R59 as C76 is charging. This charge on C75 is high enough to hold the tube at cutoff. The grid of the tube is at D.C. ground potential. As the cathode approaches ground potential due to the discharge of C75 the 6AD5G triode becomes conducting. As plate current flows C76 is discharged producing the return trace of the sawtooth. The surge of plate current through the winding of the oscillation transformer induces a voltage in the grid winding, of proper polarity to drive the grid more positive, thereby reducing the plate circuit impedance and therefore the return trace time. At the same time that C76 is discharging, C75 is charging to its initial value to cut off the flow of plate current. As this action takes place, the plate current surge decreases, thereby applying less positive voltage to the grid and increasing its cutoff action. Ultimately, the tube is completely cut off, the cathode is at its full positive potential, and the charging cycle again begins. Resistance R59 functions as both an amplitude and a frequency control since it determines the breakdown potential and the frequency of recurrence of the oscillations in the plate circuit of the triode. Synchronizing pulses are injected into the grid of the oscillator tube through the winding of the oscillation transformer. These synchronizing pulses are polarized so that they drive the grid in a positive direction with respect to the cathode and therefore hasten the "breaking down" of the oscillator tube and effect synchronization. Since condenser C76 is charged to nearly full power supply voltage, the signal which is taken from the plate circuit of the triode is extremely non-linear. It is applied, however, to one plate of the defecting pair in the cathode-ray tube. At the same time it is divided by a capacity-resistance network and is applied to the grid of the 6R6G pentode. This triode section is so operated that its output is distorted in a manner opposite to that distortion introduced by the non-linear operation of the oscillator triode. The output of the 6R6G is applied to the other deflection plate of the pair and the deflection from this signal is such that the resultant deflection is linear.

Since the high frequency or horizontal sweep operates in the same manner it will be unnecessary to repeat the above description. The horizontal circuit is, however, a little more critical than the vertical and it is absolutely essential to keep the stray circuit capacities of the horizontal oscillator and amplifier at a minimum in order to keep the return trace time at a minimum. Therefore, if repairs are ever necessary on this circuit care must be taken not to increase the capacity of the circuit.

In Fig. 6 the use of a copper oxide rectifier and neon lamp can be explained as follows. The D.C. component necessary for background level, is introduced by the action of the copper oxide (Westector) V24. The neon lamp V23 is provided to protect the rectifier from high voltage surges when the equipment is first turned on.

Assuming that the controls are properly set and handled, the first step will be to determine the location of the trouble and isolate the defective portion. In this you will be aided by the design of the receiver, for, as previously pointed out, the various sections are separately located.

The following brief outline, while by no means complete, will serve to point out possible causes and location.

While no fast rule can be laid down, once the section failing has been decided on it will generally be found that a systematic check correctly interpreted will locate the fault. A voltage check of the suspected circuit along with the checking of the tubes employed will probably be the next step. Then, if the voltages are correct and a cathode-ray oscillograph is available it can be used to trace the source of the trouble.

It is quite probable that the majority of service problems will fall within this range in spite of this limitation, as the correct adjustment of the regular control knobs along with the replacement of tubes and parts will provide the answer to nearly all troubles.

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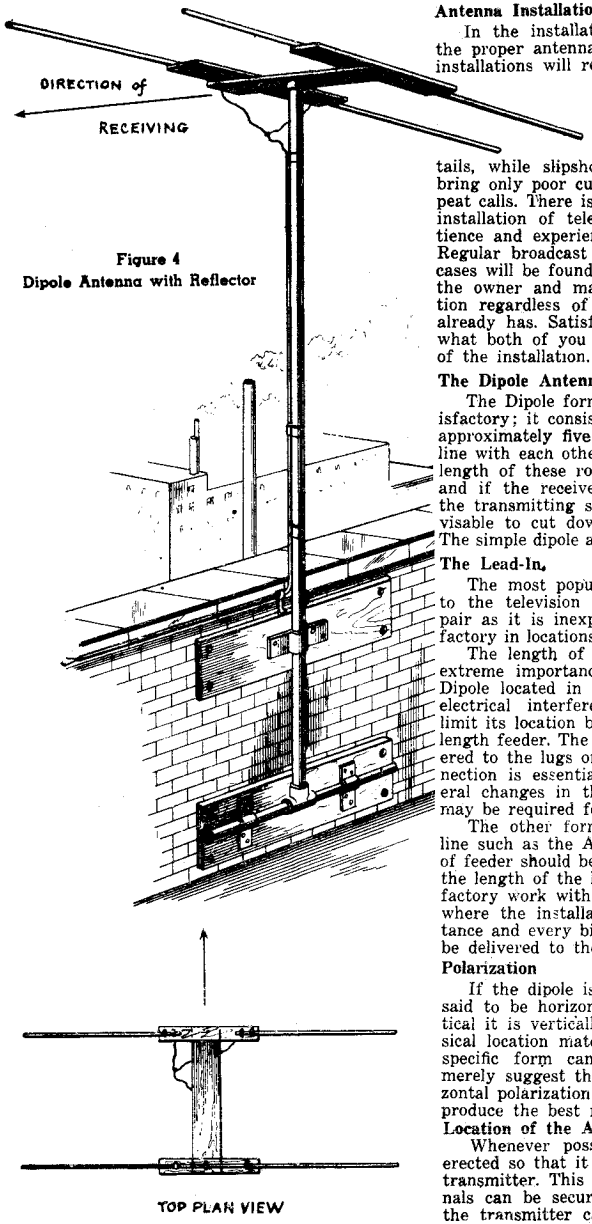


**Figure 4**
**Dipole Antenna with Reflector**

**Antenna Installation**

In the installation of television receivers the proper antenna is a necessity. Successful installations will result from attention to details, while slipshod and careless work will bring only poor customer satisfaction and repeat calls. There is nothing difficult about the installation of television aerials, a little patience and experience is all that is required. Regular broadcast aerials in the majority of cases will be found useless. Impress this upon the owner and make a satisfactory installation regardless of what other equipment he already has. Satisfactory picture reception is what both of you require for the completion of the installation.

**The Dipole Antenna**

The Dipole form of aerial is generally satisfactory; it consists of two metal rods, each approximately five feet long and placed on a line with each other. Extreme accuracy in the length of these rods is usually not necessary and if the receiver is located very close to the transmitting station it may be found advisable to cut down the length of each rod. The simple dipole aerial is shown in Fig. No. 3.

**The Lead-In.**

The most popular lead-in from the dipole to the television receiver will be a twisted pair as it is inexpensive and generally satisfactory in locations where the signal is strong.

The length of this lead is usually not of extreme importance. It is better to get the Dipole located in the clear and as far from electrical interference as possible than to limit its location by using a theoretical, exact length feeder. The twisted pair should be soldered to the lugs on the Dipole as a good connection is essential and necessary since several changes in the position of the antenna may be required for best results.

The other form of lead-in is the coaxial line such as the Amphenol No. 72. This form of feeder should be used in installations where the length of the lead-in is too long for satisfactory work with the twisted pair and again where the installation is at an extreme distance and every bit of energy picked up must be delivered to the receiver.

**Polarization**

If the dipole is mounted horizontally it is said to be horizontally polarized, and if vertical it is vertically polarized. Since the physical location materially affects the aerial no specific form can be advised and we can merely suggest that you start by using horizontal polarization and change if necessary to produce the best results.

**Location of the Antenna**

Whenever possible the Dipole should be erected so that it is in line of sight with the transmitter. This does not mean that no signals can be secured where a direct view of the transmitter cannot be obtained. Surprising results are often secured on these high frequencies and no concise rules can be assigned to this work. If the location is on a street having heavy traffic there may be considerable noise level due to automobile ignition systems. In this case, locate the Dipole to the rear of the building and away from the source of the noise as far as possible. In the case of electrical machinery over which you have no control, the same method can be employed along with the utilization of the directional effects of the aerial which will be covered later.

**Room Illumination**

Wherever possible the receiver should be so placed in the home that a direct glare from either natural or artificial light does not fall upon the face of the cathode-ray tube. The received pictures may be viewed under a variety of conditions where it is not always convenient to darken the room completely. Adjustments made to meet these conditions will not cause damage to the receiver. Viewing the pictures in as dark a room as possible is always at an advantage as it permits the setting of the Intensity and Contrast controls in a manner that will give picture tone values more correctly relating to those actually used in the studio from which the picture is transmitted.

**Installation Process**

It is a good plan to proceed as follows with the installation.

1. Erect the Dipole antenna in the clear. Start by using horizontal polarization (mount the rods horizontally) and turn them until their plane is at right angles with the location of the transmitter.
2. Adjust the receiver to produce a picture.
3. Return to the antenna and make final adjustments for best signal strength and removal of ghosts, etc.

**Ghost Effects**

Where the picture appears to be duplicated and slightly displaced, the additional picture is referred to as a ghost. This effect is usually due to the reflection of the signals and can be cured by the slanting or rotating of the Dipole or the use of a reflector or reflectors. If, after all possible positions have been tried, the ghost still exists it will be necessary to change the location of the antenna and try again.

**Directional Effects**

In the simple Dipole, directional effects are not very pronounced, but it does have a rather sharp no-signal radius and it is possible in some instances to materially reduce interference by placing the offending source in this area. If the installation of the receiver is being made at quite a distance from the transmitter or if the signal level is very low due to local conditions, it is well to consider the use of a reflector. This is done by placing a rod, about ten feet long, parallel with the Dipole and about five feet in back of it. The directional effect of the Dipole remains the same, namely at right angles to the plane. Signals coming from the front will be greatly increased. In using reflectors it is well to bear in mind, however, that any signal approaching from the rear (where the reflector is located) will be greatly attenuated. Fig. No. 4 shows the reflector added to the simple Dipole.

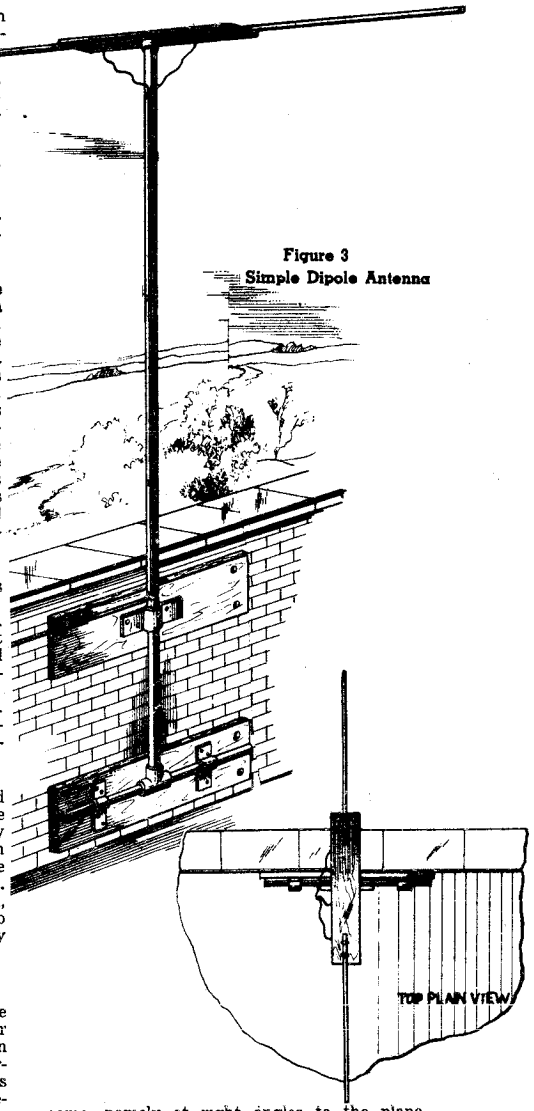


**Figure 3**
**Simple Dipole Antenna**

EMERSON RADIO & PHONOGRAPH CORP.

MODELS CD206, CD215
Chassis CD
Schematic, Voltage
Alignment, Parts

# A.C.-D.C. Long and Medium-Wave T.R.F. Receiver




**Voltage rating** ..... 105 to 125 volts
**Power consumption** .. 45 watts
**Frequency range** .... 535 to 1650 kc
366 to 143 kc

MODEL CD-206
CD-215

CHASSIS MODEL CD

## Tube Data

The tube complement is as follows:
1—6D6, r-f amplifier.
1—6C6, biased detector.
1—25L6G, beam power output.
1—25Z5, dual half-wave rectifier.
1—L55BG, ballast tube.
Note: Octal-base tubes may be replaced with either metal tubes or equivalent octal-base glass tubes.

## When ordering replacement parts specify part number

*Item number locates the article on the schematic diagram. (Subject to change without notice.) List Price ea. Effective as of Nov. 1st, 1938

| *Item | Part No. | DESCRIPTION | PRICE |
|---|---|---|---|
| T1 | 3TT-409 | Two-band antenna coil | $ .65 |
| T2 | 3TT-410 | Two-band detector coil | .65 |
| R1 | 2VR-219E | Volume control, 75,000 ohms, with line switch | .90 |
| R2 | 3CR-294 | 240 ohm, ½ watt wire-wound resistor | .16 |
| | L55-BG | Plug-in ballast tube | .55 |
| R4 | KR-63U | 15,000 ohm, ¼ watt carbon resistor | .16 |
| R5 | HR-42U | 2 megohm, ¼ watt carbon resistor | .16 |
| R6, R7 | KR-56U | 500,000 ohm, ¼ watt carbon resistor | .16 |
| R8 | 3QR-297 | 110 ohm, ½ watt wire-wound resistor | .16 |
| C1 | KC-58 | 0.01 mf, 400 volt tubular condenser | .20 |
| C2, C3 | 5MC-399 | Two-gang variable condenser | 3.55 |
| C4, C5 | | Trimmers, part of variable condenser, not supplied separately. | |
| C6, C9 | AC-6 | 0.1 mf, 200 volt tubular condenser | .20 |
| C7 | 5AC-384 | 0.0002 mf, 600 volt tubular or mica condenser | .20 |
| C8 | 5AC-388 | 0.25 mf, 100 volt tubular condenser | .20 |
| C10 | LC-65 | 0.02 mf, 400 volt tubular condenser | .20 |
| C11 | 3AC-278 | Trimmer for long-wave interstage coil | .15 |
| C12 | LC-64 | 0.05 mf, 400 volt tubular condenser | .20 |
| C13, C14 | 4DC-345A | Dual 16 mf, 150 volt dry electrolytic condenser | 1.20 |
| C15 | EEC-132 | 0.1 mf, 400 volt tubular condenser | .20 |
| C16 | NC-70A | 0.0002 mf mica condenser | .20 |
| | 5BS-333 | 5" dynamic speaker | 3.90 |
| | 3TS-228A | Wave-band switch | .55 |
| | 4BL-94 | Pilot light, 6.3 volt, .25 amp., Mazda No. 44 | .20 |
| | 4XM-367 | Drive pulley | .10 |
| | 5MZ-829 | Dial crystal | .10 |
| | 5MZ-830 | Drive shaft and pulley | .10 |
| | 4MZ-588B | Dial pointer | .20 |
| | 4YZ-772 | Drive cord | .02 |
| | 5JZ-824 | Drive cord spring | .05 |
| | 6DD-63 | Dial face | .15 |

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Fil.* |
|---|---|---|---|---|
| 6D6 | 100 | 100 | 2.3 | 6.3 |
| 6C6 | 20 | 15 | 2.1 | 6.3 |
| 25L6G | 93 | 100 | 6 | 25.0 |

Voltage across speaker field—26 volts.

25Z5 cathode to ground—126 volts.

## ALIGNMENT PROCEDURE

An oscillator with frequencies of 1500 kc and 350 kc is required.

Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark beyond 550. Rotate band-switch clockwise to broadcast (medium-wave) position. Then rotate the variable condenser until the pointer is at 200 and feed 1500 kc to the antenna through a .0001 mf mica condenser and adjust both trimmer condensers on the variable condenser for maximum response.

Turn wave-band switch counter-clockwise to long-wave position. Rotate variable condenser until pointer is at 350 and feed 350 kc to antenna. Adjust the long-wave interstage coil trimmer for maximum output. Return to broadcast and repeat entire procedure. The long-wave trimmer is located beneath the chassis and is reached from the right end of the chassis.

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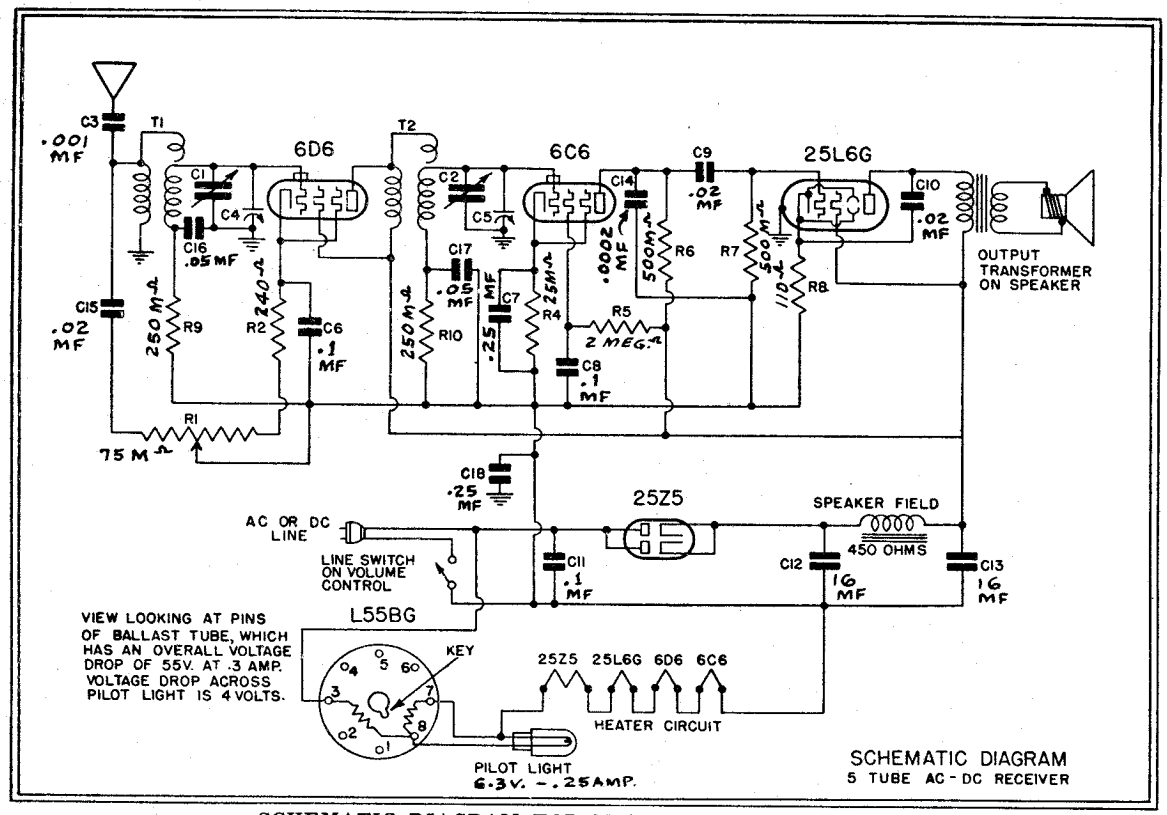
MODELS BX208, BX209
Chassis BX
Schematic, Voltage
Alignment

# EMERSON RADIO & PHONOGRAPH CORP.




SCHEMATIC DIAGRAM FOR MODELS BX-208 and BX-209

PREADJUSTMENT OF STATION BUTTONS

For complete instruction for "Preadjustment of Station Buttons" see MODEL CA-203

## TUBE DATA

The tube complement is as follows:

1—6D6, r-f amplifier.
1—6C6, biased detector.
1—25L6G, beam power output.
1—25Z5, dual half-wave rectifier.
1—L55BG, ballast tube.

Voltage rating .....105 to 125 volts, a.c. or d.c.
Power consumption ..... 45 watts.
Frequency range .....540 to 1730 kc.

Note: Octal-base tubes may be replaced with either metal tubes or equivalent octal-base glass tubes.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Fil.* |
|---|---|---|---|---|
| 6D6 ..... | 100 | 100 | 2.3 | 6.3 |
| 6C6 ..... | 20 | 15 | 2.1 | 6.3 |
| 25L6G ..... | 93 | 100 | 6.0 | 25.0 |

Voltage across speaker field—26 volts.
25Z5 cathode to ground—126 volts.
Voltage across ballast tube (pins 3, 7)—55 volts.
Voltage across pilot light section (pins 7, 8)—4 volts.

The ballast resistor (L55BG on schematic) is in a special tube at the rear of the chassis. In normal operation this tube will become quite hot. For voltage drop specifications, see "Voltage Analysis" above.

## ALIGNMENT PROCEDURE

An oscillator with a frequency of 1400 kc is required.

Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

Rotate variable condenser to the maximum capacity position and set the pointer at the next calibration mark beyond 55. Then rotate the variable condenser until the pointer is at 140 and feed 1400 kc to the antenna through a .0001 mf mica condenser and adjust both trimmer condensers on the variable condenser for maximum response.

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Schematic, Voltage
Alignment, Notes

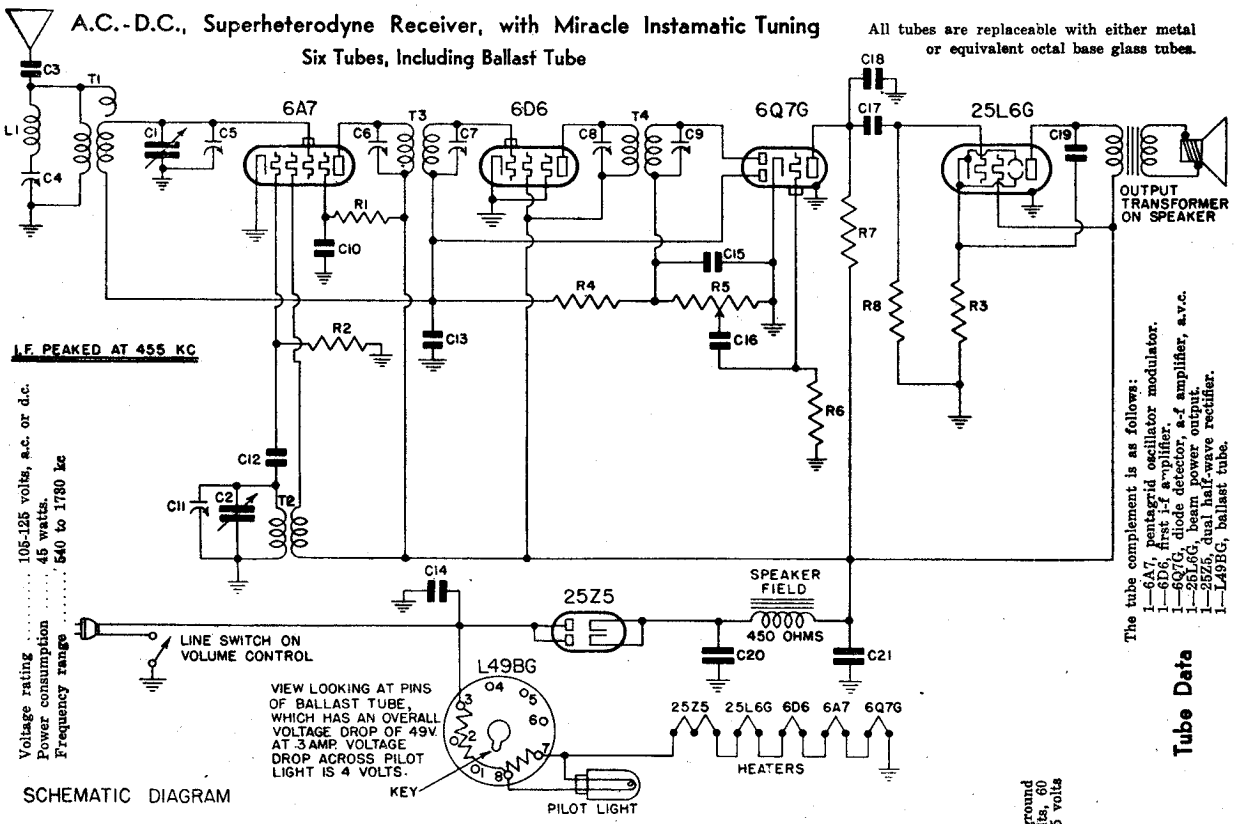
# EMERSON RADIO & PHONOGRAPH CORP.

MODELS CA208
CA209, CA234
Chassis CA

## A.C.-D.C., Superheterodyne Receiver, with Miracle Instamatic Tuning

Six Tubes, Including Ballast Tube

All tubes are replaceable with either metal or equivalent octal base glass tubes.




SCHEMATIC DIAGRAM

The tube complement is as follows:
1—6A7, pentagrid oscillator modulator.
1—6D6, first i-f amplifier.
1—6Q7G, diode detector, a-f amplifier, a.v.c.
1—25L6G, beam power output.
1—25Z5, dual half-wave rectifier.
1—L49BG, ballast tube.

**Tube Data**

# MODELS CA-208, CA-209 and CA-234

CHASSIS MODEL CA

## GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
4. The color coding of the i-f transformer leads is as follows:
   Grid—green — Plate—blue
   Grid return—black — B plus—red.
5. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
   Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.
6. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

## ADJUSTMENTS

**An oscillator with frequencies of 455 and 1400 kc is required.**
**An output meter should be used across the voice coil or output transformer for observing maximum response.**
**Always use as weak a test signal as possible when aligning the receiver.**

### Location of Coils and Trimmer Adjustments

The two i-f transformers are in oblong coil cans located on top of the chassis deck. The first i-f transformer is the one behind the variable condenser. The trimmers for these transformers are accessible through holes in the tops of the cans.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil on the top of the chassis beside the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the side of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

### I-f and Wave-Trap Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid cap of the 6A7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes, paragraph No. 6.)

### R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathode and heaters were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Osc. Plate* | *Fil.* |
|---|---|---|---|---|---|
| 6A7 | 100 | -55 | 0 | 100 | 6.3 |
| 6D6 | 100 | 100 | 0 | | 6.3 |
| 6Q7G | 43 | | 0 | | 6.3 |
| 25L6G | 92 | 100 | 5.5 | | 25.0 |

Voltage at 25Z5 cathode—128 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast tube L49BG (pins 3, 7)—49 volts.
Voltage drop across pilot light section of ballast tube (pins 7, 8)—4 volts.

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MODELS CA208, CA209
CA234 Chassis CA
Tuner Data, Parts

EMERSON RADIO & PHONOGRAPH CORP.

## REPLACEMENT PARTS

List Price as of Sept. 15th, 1938 (Subject to change without notice)

| *Item | Part No. | DESCRIPTION | PRICE |
|---|---|---|---|
| L1, T1 | 5YT-444 | Antenna coil with adjustable 455 kc wave-trap | $ .90 |
| T2 | 4XT-433 | Oscillator coil | .35 |
| T3 | 3RT-320C | Double-tuned 455 kc first i-f transformer | 1.10 |
| T4 | 3RT-321C | Double-tuned 455 kc second i-f transformer | 1.10 |
| R1 | ZZR-196 | 30,000 ohm ¼ watt carbon resistor | .16 |
| R2 | KR-53 | 50,000 ohm ¼ watt carbon resistor | .16 |
| R3 | 3FR-293 | 140 ohm ½ watt wire-wound resistor | .16 |
| R4 | KR-57 | 1 megohm ¼ watt carbon resistor | .16 |
| R5 | 2NR-214F | Volume control .25 megohm with line switch | .90 |
| R6 | 4XR-327 | 15 megohm ¼ watt carbon resistor | .16 |
| R7 | KR-55 | 250,000 ohm ¼ watt carbon resistor | .16 |
| R8 | KR-56 | 500,000 ohm ¼ watt carbon resistor | .16 |
| | L49-BG | Ballast resistor tube. (Interchangeable with L-49B) | .55 |
| C1, C2 | 6AC-407 | Two-gang variable condenser | 2.35 |
| C3 | NNC-199 | 0.001 mf, 600 volt tubular condenser | .20 |
| †C4 | | Trimmer, part of wave-trap assembly. | |
| †C5, C11 | | Trimmers, part of variable condenser. | |
| †C6, C7, C8, C9 | | Trimmers, part of i-f transformers. | |
| C10 | BC-12 | 0.05 mf, 200 volt tubular condenser | .20 |
| C12 | 4XC-393A | 0.00006 mf mica condenser | .20 |
| C13 | AC-6 | 0.1 mf, 200 volt tubular condenser | .20 |
| C14 | EEC-132 | 0.1 mf, 400 volt tubular condenser | .20 |
| C15, C18 | 5AC-384 | 0.0002 mf, 600 volt tubular or mica condenser | .20 |
| C16 | 3HC-274 | 0.002 mf, 600 volt tubular condenser | .20 |
| C17 | LC-65 | 0.02 mf, 400 volt tubular condenser | .20 |
| C19 | 3FC-336 | 0.025 mf, 400 volt tubular condenser | .20 |
| C20, C21 | 4HC-348A | Dual 20 mf, 150 volt dry electrolytic condenser | 1.00 |
| | 5BS-333 | 5" dynamic speaker | 3.90 |

| | | |
|---|---|---|
| 4BL-94 | Pilot light, 6.3 volt, .25 amp., Mazda No. 44 | .20 |
| 6AD-59 | Dial face | .70 |
| 4YZ-772 | Drive cord | .02 |
| 5JZ-824 | Drive cord spring | .05 |
| 4MZ-588A | Dial pointer | .20 |
| 3CZ-350B | Escutcheon with crystal | 1.25 |
| 6AM-414 | Four-button mechanical tuning unit (complete with variable condenser) | 6.15 |
| 5BZ-835 | Push-buttons | .05 |
| 4VZ-763B | Celluloid push-button caps (set of 4) | .05 |
| 4VZ-725 | Station name-tab cards (complete set) | .65 |

*Item number locates the article on the schematic diagram.

†These condensers cannot be supplied separately.

**When ordering replacement parts specify part number**

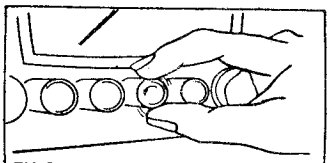

FIG.2 Loosen button by rotating counter-clockwise from ¼ to ½ turn.

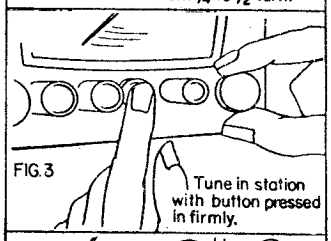


FIG.3

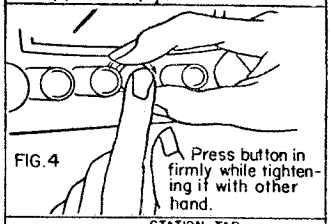


FIG.4

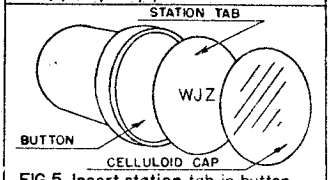


FIG.5 Insert station tab in button with celluloid cap over tab.

## PREADJUSTMENT OF STATION BUTTONS

Select four nearby stations desired for automatic tuning. Choose one of these stations and any button to be adjusted for it. Follow the procedure outlined below.

1. Loosen the push-button to be adjusted by rotating it counter-clockwise from ¼ to ½ turn. See Fig. 2.

2. Push the button in as far as it will go and, holding it in firmly, tune in the desired station by means of the selector knob. See Fig. 3.

3. Hold button in with finger of one hand and tighten securely with the other hand. Release the button and tighten it further if possible. See Fig. 4.

4. Remove the tab bearing the station call letters from one of the cards supplied in a separate envelope with the receiver. Insert the tab in the button, pressing it in firmly. Four celluloid caps are supplied in a separate envelope with the receiver. Snap one of these caps into the button over the station tab.

Check the adjustment of the button by detuning the station by means of the selector knob and then pressing the push-button in as far as it will go. The station should come back in clearly and with maximum volume.

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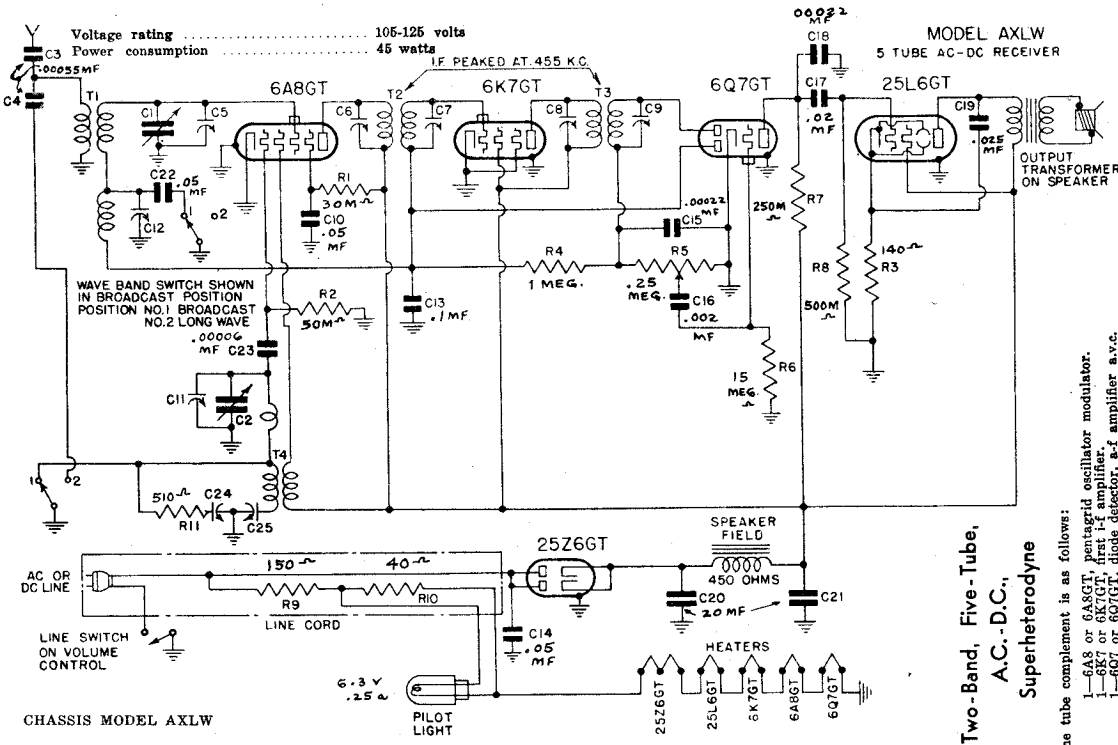
Schematic, Voltage Alignment, Notes

EMERSON RADIO & PHONOGRAPH CORP

MODELS AXLW211 -212, -217, -235 -237, -238, -239 -257. Chas. AXLW




# Models AXLW-211, AXLW-212, AXLW-217, AXLW-235, AXLW-237, AXLW-238, AXLW-239 and AXLW-257

Frequency range
540 to 1650 kc (555 to 182 meters)
157 to 370 kc (1910 to 810 meters)

Two-Band, Five-Tube, A.C.-D.C., Superheterodyne

The tube complement is as follows:
1—6A8 or 6A8GT, pentagrid oscillator modulator.
1—6K7 or 6K7GT, first i-f amplifier.
1—6Q7 or 6Q7GT, diode detector, a-f amplifier a.v.c.
1—25L6 or 25L6GT, beam power output.
1—25Z6 or 25Z6GT, dual half-wave rectifier.

## GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R-9—see schematic is a resistance wire in the special line cord. The cord will, therefore, become warm under normal operating conditions. To insure good heat radiation stretch out the line cord to its full length. Do not attempt to shorten it by cutting.
4. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
5. The color coding of the i-f transformer leads is as follows:
   Plate—blue
   B plus—red.
   Grid—green
   Grid return—black
6. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
   Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.
7. To remove the 6A8 tube from its socket, push up on itscenter pin from beneath the chassis.

## TUBE DATA

All tubes are replaceable with either metal or equivalent bantam glass tubes. The letters "GT" at the end of the tube number indicate that the tube has a bantam size glass envelope. In all other respects it is the same as the metal tube bearing the same number without the "GT."

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

| Tube | Plate | Screen | Cathode | Osc. Plate | Fil. |
|---|---|---|---|---|---|
| 6A8 | 100 | 55 | 0 | 100 | 6.3 |
| 6K7 | 100 | 100 | 0 | — | 6.3 |
| 6Q7 | 43 | — | 0 | — | 6.3 |
| 25L6 | 92 | 100 | 5.5 | — | 25.0 |

Voltage at 25Z6 cathode—125 volts.

**Voltage across speaker field—28 volts.**

## ADJUSTMENTS

An oscillator with frequencies of 455, 1500, 350 and 172 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

### Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The two-band antenna coil is located directly behind the speaker. The trimmer for the broadcast antenna coil is located on the front section of the variable condenser. The trimmer for the long wave antenna coil is mounted on the top of the antenna coil form. The two-band oscillator coil is located underneath the chassis below the first i-f transformer. The trimmer for the broadcast oscillator coil is located on the rear section of the variable condenser. The trimmer and series padder (condensers C24 and C25 resp.) for the long wave oscillator coil are located beneath the chassis and can be reached from the bottom only. The section toward the rear of the chassis is C24, the shunt trimmer. The section toward the front of the chassis is C25, the series padding condenser.

### I-f Alignment

Turn the band switch clockwise to broadcast position and swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

### Broadcast Alignment

With the band switch in broadcast position set the dial pointer at 200. Feed 1500 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

### Long Wave Alignment

Turn the band switch counter-clockwise to the long wave position. With the dial pointer set at 850, feed 350 kc through a .0001 mf condenser to the antenna and adjust first the oscillator trimmer (rear trimmer beneath the chassis), then the antenna trimmer (on antenna coil form) for maximum response. Move the pointer to 1750, feed 172 kc, and adjust the series padder (front trimmer beneath the chassis) rocking the variable condenser back and forth while adjusting **for maximum** response. Return to 350 kc and repeat alignment.

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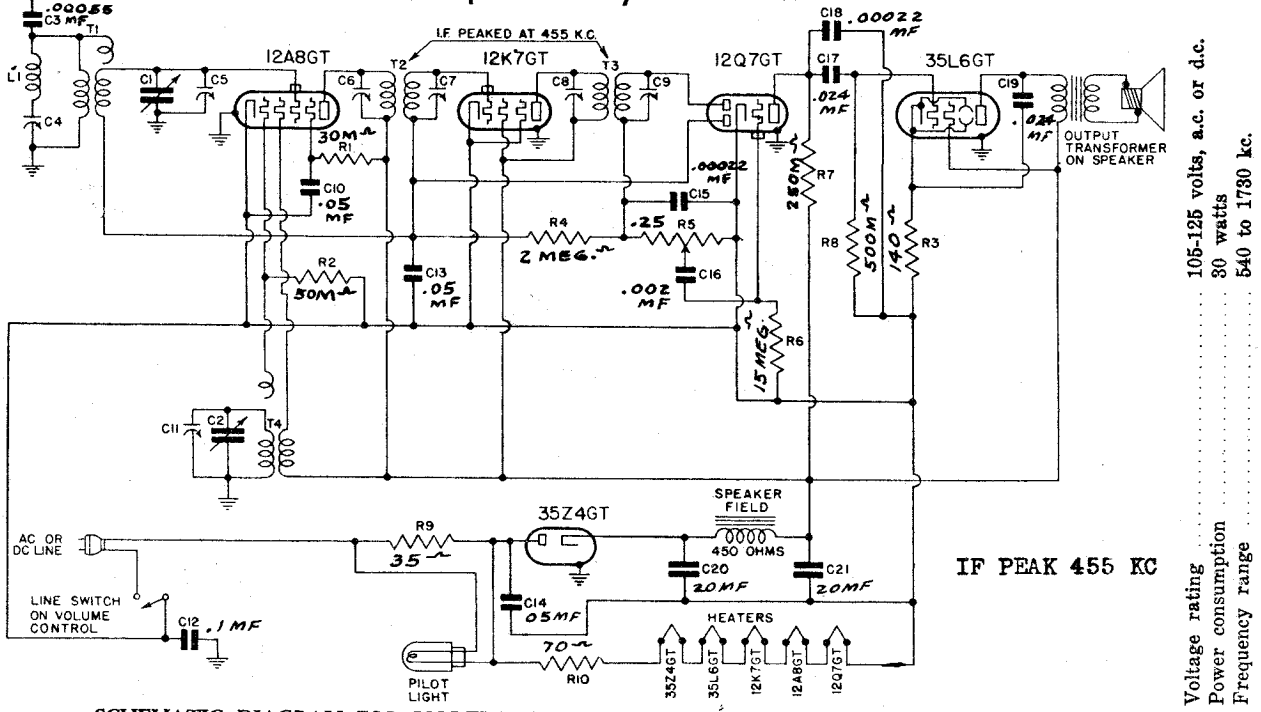
MODELS CJ211, CJ217, CJ235
CJ257 Chassis CJ EMERSON RADIO & PHONOGRAPH CORP. Alignment. Schematic, Voltage

## Five-Tube, A.C.-D.C., Superheterodyne Receiver




IF PEAK 455 KC

Voltage rating ..... 105-125 volts, a.c. or d.c.
Power consumption ..... 30 watts
Frequency range ..... 540 to 1730 kc.

SCHEMATIC DIAGRAM FOR MODELS CJ-211, CJ-217, CJ-235 AND CJ-257 CHASSIS MODEL CJ

The tube complement is as follows:

1—12A8 or 12A8GT, pentagrid oscillator modulator.
1—12K7 or 12K7GT, first i-f amplifier.
1—12Q7 or 12Q7GT, diode detector, a-f amplifier a.v.c.
1—35L6 or 35L6GT, beam power output.
1—35Z4 or 35Z4GT, half-wave rectifier.

The color coding of the i-f transformer leads is as follows:

Grid—green
Grid return—black
Plate—blue
B plus—red.

### Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

### I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 12A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes)

### R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Osc. Plate* | *Fil.* |
|---|---|---|---|---|---|
| 12A8 | 94 | 50 | 0 | 94 | 12 |
| 12K7 | 94 | 94 | 0 | — | 12 |
| 12Q7 | 40 | — | 0 | — | 12 |
| 35L6 | 87 | 94 | 5.2 | — | 35 |

Voltage at 35Z4 cathode—121 volts.
Voltage across speaker field—27 volts.
Voltage across pilot light section of ballast resistor (R9)—3.5.
Voltage drop across entire ballast resistor (R9 and R10)—13.5.

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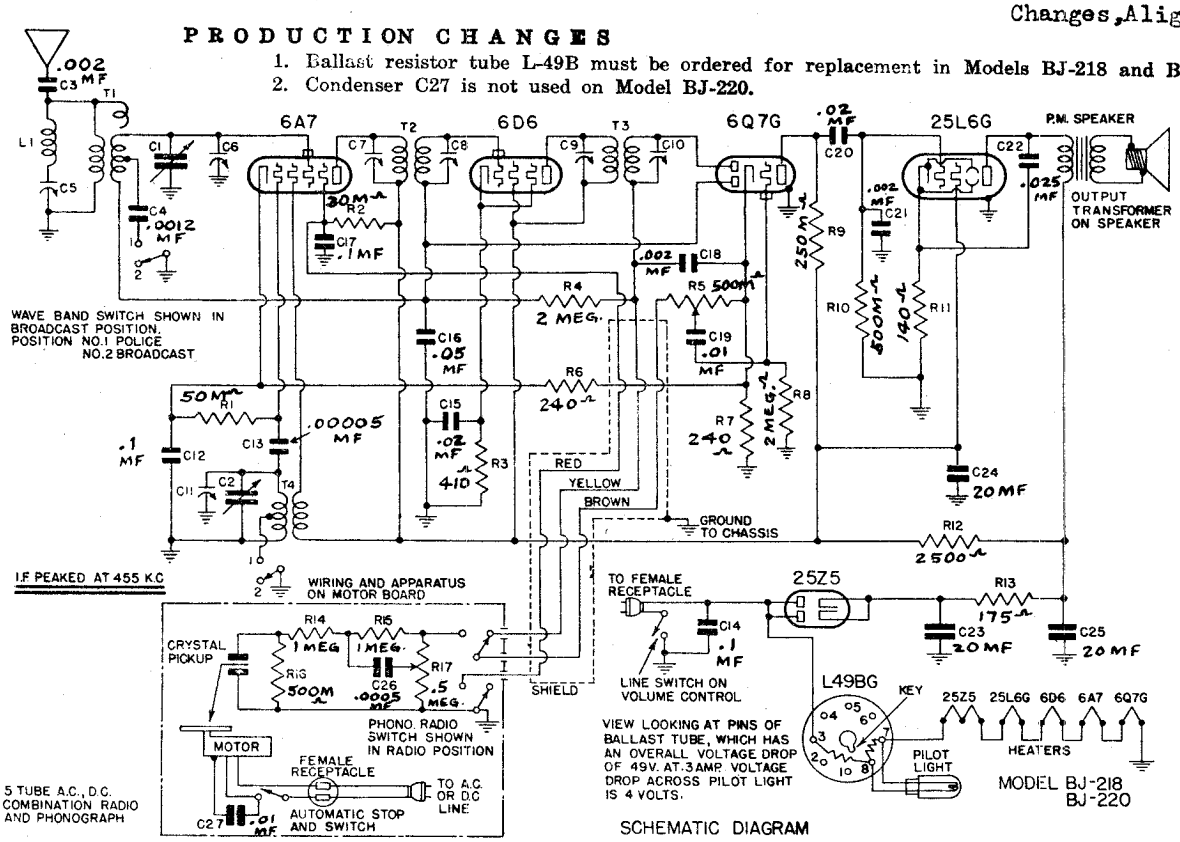
# EMERSON RADIO & PHONOGRAPH CORP.

MODELS BJ218, BJ220
Chassis BJ
Schematic, Voltage Changes, Alignment

## PRODUCTION CHANGES

1. Ballast resistor tube L-49B must be ordered for replacement in Models BJ-218 and BJ-220.
2. Condenser C27 is not used on Model BJ-220.




SCHEMATIC DIAGRAM

Voltage rating ..... 105 to 125 volts, a.c. or d.c.
Power consumption ..... 43 watts for receiver.
30 watts for phonograph motor.
Frequency ranges ..... 540 to 1580 kc and 1580 to 4200 kc.

## Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the variable condenser. The trimmers for the two i-f transformers are available through holes in the tops of the cans.

The trimmers for the antenna and oscillator are located on the variable condenser. The trimmer on the front section is for the antenna.

The 455 kc wave-trap is mounted on the front chassis wall beneath the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

The color coding of the i-f transformer leads is as follows:

Grid—green
Grid return—black
Plate—blue
B plus—red

## I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) and adjust the wave-trap trimmer for *minimum* response. (See General Note No. 7.)

## R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

The police band is self-tracking and does not require any adjustment.

NOTE: The Model BJ-200 should be aligned with the chassis bottom plate in place.

The tube complement is as follows:
1—6A7 pentagrid oscillator-modulator.
1—6D6 first i-f amplifier.
1—6Q7G diode detector, a-f amplifier, a.v.c.
1—25L6G beam power output.
1—25Z5 dual half-wave rectifier.
1—L-49B

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathodes and heaters were taken on 250 volt scale.

MODELS BJ-218 and 220

| *Plate* | *Screen* | *Cathode* | *Osc. Plate* | *Heaters* | |
|---|---|---|---|---|---|
| 84 | 46 | 2.0 | 84 | 6.3 | Voltage at 25Z5 cathode—130 volts. |
| 84 | 84 | 2.8 | — | 6.3 | Voltage across speaker field (Models BJ-200, 210 and 214)—28 volts. |
| 35 | — | 1.0 | — | 6.3 | Voltage drop across ballast tube L-49BG (pins nos. 3, 7)—49 volts. |
| 115 | 84 | 5.5 | — | 25 | Voltage drop across pilot light section (pins nos. 7, 8)—4 volts. |

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MODELS BL218, BL220
Chassis BL
Schematic, Voltage

# EMERSON RADIO & PHONOGRAPH CORP.

Changes, Alignment

## PRODUCTION CHANGES

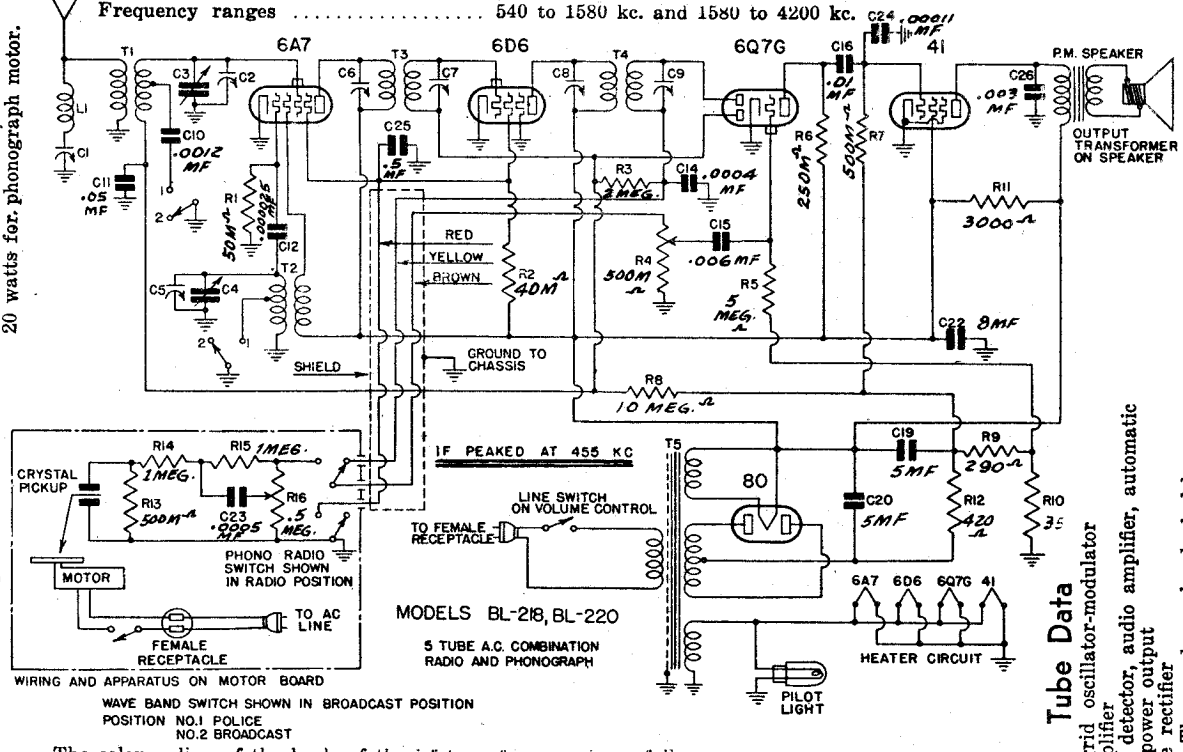
1. In receivers used in phonograph combinations: R2 is 40,000 ohms 1 watt, part No. 2NR-217
2. Receivers bearing serial numbers below 1,802,875 used a 0.00006 mf mica condenser, part No. 4XC-393A, at C12.
3. Receivers bearing serial numbers below 1,800,200 used dial drive shaft and pulley, part No. 5JZ-822.

Frequency ranges ..... 540 to 1580 kc. and 1580 to 4200 kc.

45 watts for receiver, 20 watts for phonograph motor.

Power consumption

Voltage rating 105-125 volts, 60 cycles, a.c.




## Tube Data

1—6A7 pentagrid oscillator-modulator
1—6D6 i-f amplifier
1—6Q7G diode detector, audio amplifier, automatic
1—41 pentode power output
1—80 full-wave rectifier

The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. To readjust the speed remove the turntable and turn the speed adjusting screw (located near the turn-table shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position. The stroboscope method will work only when the neon lamp is connected to a 60 cycle, a.c. supply.

The color coding of the leads of the i-f transformers, is as follows:

| | |
|---|---|
| Grid—green | Plate—blue |
| Grid return—black | B plus—red |

The color coding of the power transformer leads is as follows:

| | |
|---|---|
| Primary—two black leads | 6.3 v. sec.—two heavy green leads |
| High voltage sec.—two red leads | 5 v. sec.—two heavy yellow leads |
| High voltage sec. center tap—red and yellow lead | |

With a few exceptions, the color coding of the general wiring is as follows:

| | |
|---|---|
| Plate—blue | A.v.c. and cathode—white or yellow |
| B plus—red | Grid—green |
| Screen—brown | Filament and ground—black |

## Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The first i-f transformer is the one directly behind the variable condenser. The trimmers for the two i-f transformers are available through holes in the tops of the cans.

The trimmers for the antenna and oscillator are located on the variable condenser. The trimmer on the front section is for the antenna.

The 455 kc wave-trap is mounted on the front chassis wall beneath the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the bottom of the chassis.

## I-f and Wave-trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid cap of the 6A7 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) and adjust the wave-trap trimmer for *minimum* response. (See General Note No. 1.)

## R-f Alignment

With the wave-band switch in the broadcast position, clockwise, set the dial pointer at 140. Feed 1400 kc through a standard dummy antenna (a .0002 mf condenser may be used as a substitute) to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

The police band is self-tracking and does not require any adjustment.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters were taken on 250 volt scale.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Osc. Plate* | *Fil.* |
|---|---|---|---|---|---|
| 6A7 | 182 | 70 | 0 | 182 | 6.3 a.c. |
| 6D6 | 182 | 70 | 0 | — | 6.3 a.c. |
| 6Q7 | 87 | — | 0 | — | 6.3 a.c. |
| 41 | *165 | 182 | 0 | — | 6.3 a.c. |

Voltage across speaker field (Models 200, 210 and 214)—70 volts.
Voltage from B minus to chassis (Models 200, 210 and 214)—80 v
Voltage from B minus to chassis (Models 218 and 220)—54 volts.
B plus at 80 tube filament (Models 200, 210 and 214)—182 v
B plus at 80 tube filament (Models 218 and 220)—232 volts.
*Voltage at 41 tube plate in Models 218 and 220 is 220 volts

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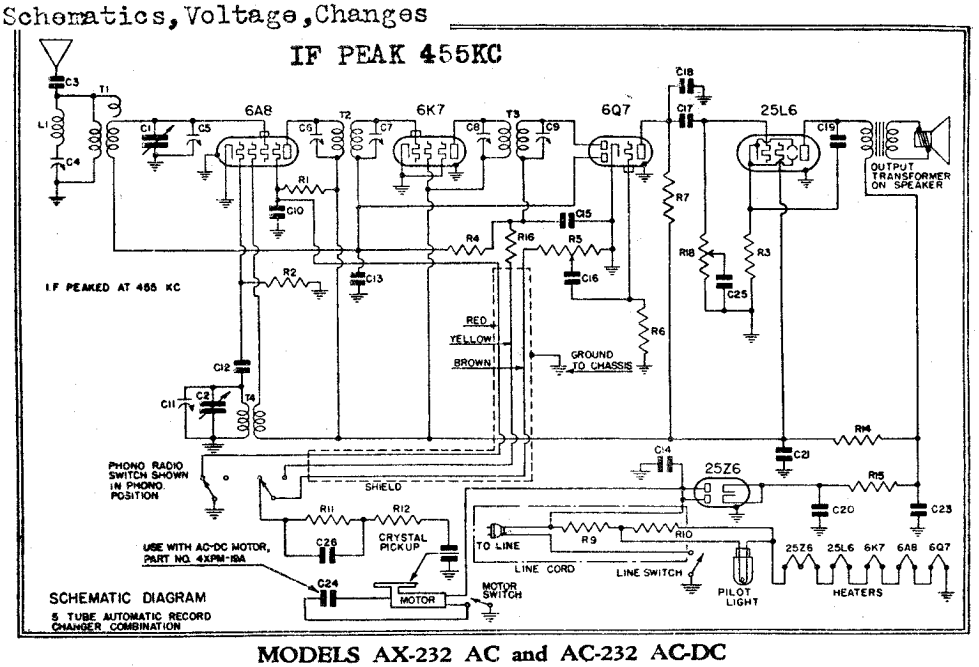
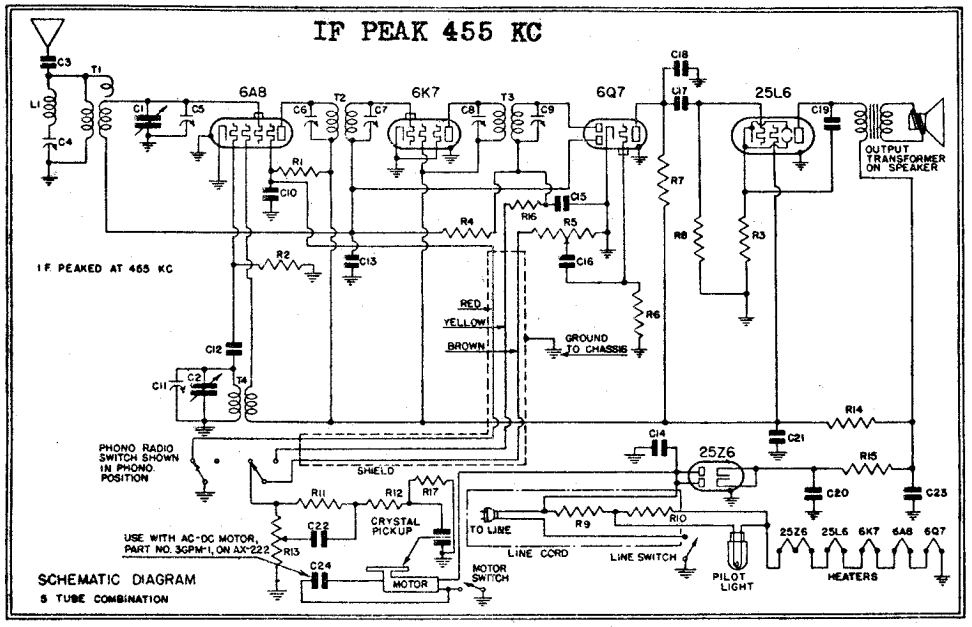
Chassis AX — EMERSON RADIO & PHONOGRAPH CORP. — MODELS AX221 AC
Schematics, Voltage, Changes — AX221 AC-DC
AX222, AX232 AC
AX232 AC-DC




**MODELS AX-232 AC and AC-232 AC-DC**

CHASSIS MODEL AX

FOR RECORD CHANGER DATA SEE INDEX




**MODELS AX-221 AC, AX221 AC-DC and AX-222**

CHASSIS MODEL AX

## Tube Data

The tube complement is as follows:

1—6A8 or 6A8GT, pentagrid oscillator modulator.
1—6K7 or 6K7GT, first i-f amplifier.
1—6Q7 or 6Q7GT, diode detector, a-f amplifier, a.v.c.
1—25L6 or 25L6GT, beam power output.
1—25Z6 or 25Z6GT, dual half-wave rectifier.

All tubes are replaceable with either metal or equivalent bantam glass tubes.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. Measurements made with 117.5 volts d.c. will be lower than those given below.

MODELS AX-221, AX-222, and AX-232

| | *Plate* | *Screen* | *Osc.* | *Cathode* | *Heaters* |
|---|---|---|---|---|---|
| Voltage rating | | | | | 105-125 volts |
| Power consumption | 82 | 44 | 82 | 0 | 45 watts for receiver |
| | 82 | 82 | — | 0 | 10 watts for 219 motor |
| | 35 | | — | 0 | 20 watts for 221 a.c. or 232 a.c. motors |
| | 115 | 82 | — | 5.5 | 30 watts for 221 a.c.-d.c., 222, and 232 a.c.-d.c. motors |
| Frequency range | | | | | 540-1730 kc. |

Voltage at 25Z6 cathode—135.

## PRODUCTION CHANGES

AX-221 and AX-222 chasses bearing serial numbers below 1,890,976 do not have R16, 100,000 ohm resistor, connected in series with the yellow lead to phono-radio switch.

AX-221 and AX-222 chasses bearing serial numbers below 1,914,451 do not contain resistor R17.

On model AX-222 a 0.01 mf, 400 volt condenser is connected from B plus to the speaker frame. Another 0.01 mf condenser is connected from the motor mounting plate to ground.

AX-221 and AX-222 chasses below serial number 1,921,165 have a 210 ohm, ½ watt wire-wound resistor at R15.

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MODELS AX221 AC
AX221 AC-DC
AX222, AX232 AC
AX232 AC-DC

# EMERSON RADIO & PHONOGRAPH CORP.

Chassis AX
Alignment, Notes
Parts

## Combination Phonograph and Five-Tube Superheterodyne

MODEL AX-221AC (For Operation on AC Only)
MODEL AX-221AC-DC (For Operation on Either AC or DC)
MODEL AX-222 (AC-DC Portable)
MODEL AX-232AC (Automatic Record Changer—For AC Only)
MODEL AX-232AC-DC (Automatic Record Changer—For AC or DC)

When ordering replacement parts specify part numbers.

*Item number locates the article on the schematic diagram.
†Not supplied separately.

## REPLACEMENT PARTS

| *Item | Part No. | DESCRIPTION | List Price eff. Aug. 1st, 1938 (Subject to change without notice) PRICE |
|---|---|---|---|
| L1, T1 | 4XT-432 | Antenna coil with adjustable 455 kc wave-trap | $ .90 |
| T2 | 4XT-434 | Double-tuned 455 kc first i-f transformer | 1.10 |
| T3 | 4XT-435 | Double-tuned 455 kc second i-f transformer | .85 |
| T4 | 4XT-433 | Oscillator coil | .85 |
| R1 | 2CR-193 | 30,000 ohm ½ watt carbon resistor | .16 |
| R2 | KR-53 | 50,000 ohm ¼ watt carbon resistor | .16 |
| R3 | 3FR-293 | 140 ohm ½ watt wire-wound resistor | .16 |
| R4, R17 | KR-57 | 1 megohm ¼ watt carbon resistor | .16 |
| R5 | 4XR-335 | Volume control .25 megohm with line switch | .90 |
| R6 | 4XR-327 | 15 megohm ¼ watt carbon resistor | .16 |
| R7 | KR-55 | 250,000 ohm ¼ watt carbon resistor | .16 |
| R8 | KR-56 | 500,000 ohm ¼ watt carbon resistor | .16 |
| R9, R10 | 4XW-112 | Resistance line cord with pilot light ballast section. R9—150 ohms; R10—40 ohms | .85 |
| R13 | 4LR-312B | Tone control .5 megohm with motor line switch | 1.05 |
| R14 | 4XR-334 | 2,500 ohm 1 watt carbon resistor | .16 |
| R15 | 4ZR-325 | 175 ohm 1 watt metallized resistor. (See prod. change No. 4.) | .16 |
| R16 | KR-54 | 100,000 ohm ¼ watt carbon resistor. (See prod. change No. 1.) | .16 |
| R18 | 4XR-342 | Tone control .5 megohm | .70 |
| C1, C2 | 4XC-391A | Two-gang variable condenser (for 219 and 221) | 2.40 |
| C1, C2 | 4XC-412 | Two-gang variable condenser (for 222 and 232) | 2.75 |
| C3 | 4XC-401 | 0.00055 mf mica condenser | .20 |
| †C4 | | Trimmer, part of wave-trap assembly. | |
| †C5, C11 | | Trimmers, part of variable condenser. | |
| †C6, C7, C8, C9 | | Trimmers, part of i-f transformers. | |
| C10 | BC-12 | 0.05 mf, 200 volt tubular condenser | .20 |
| C12 | 4XC-393A | 0.00096 mf mica condenser | .20 |
| C13 | AC-6 | 0.1 mf, 200 volt tubular condenser | .20 |
| C14 | EEC-132 | 0.1 mf, 400 volt tubular condenser | .20 |
| C15, C18 | 4XC-394A | 0.00022 mf mica condenser | .20 |
| C16 | 3HC-274 | 0.002 mf, 600 volt tubular condenser | .20 |
| C17 | LC-65 | 0.02 mf, 400 volt tubular condenser | .20 |
| C19 | 3FC-336 | 0.025 mf, 400 volt tubular condenser | .20 |
| C20, C21 | 4HC-348B | Dual 20 mf, 150 volt dry electrolytic condenser | .90 |
| C22 | IC-47A | 0.0005 mf mica condenser | .20 |
| C23 | 4XC-404 | 20 mf, 135 volt dry electrolytic condenser | .55 |
| C24 | 3LC-297A | 0.01 mf, 400 volt molded condenser (used only with ac-dc motors) | .20 |
| C25 | HC-34 | 0.006 mf, 600 volt tubular condenser | .20 |
| C26 | 4VC-371A | 0.0003 mf mica condenser | .20 |
| | TTS-111S | Phono-radio switch | .55 |
| | 4BL-94 | Pilot light, 6.3 volt, .25 amp., Mazda No. 44 | .20 |
| | 4YZ-772 | Drive cord | .02 |
| | 5JZ-824 | Drive cord spring | .05 |
| | 4XZ-811A | Drive shaft | .05 |
| | 4XZ-816 | Dial face fasteners | .01 |
| | 3LM-263 | Needle cup (for 219 and 221) | .20 |
| | 3GM-251 | Needle cup (for 222) | .75 |
| | 4MZ-588B | Dial pointer (for 221, 222 and 232) | .20 |
| | 4XE-3 | Dial crystal (for 221, 222 and 232) | .20 |
| | 4XD-51 | Dial face (for 221, 222 and 232) | .55 |
| | 4PS-303A | 6½" permanent magnet dynamic speaker (used on 221, 222 and 232) | 6.70 |

ADDITIONAL PARTS USED ON AX-219

| | | |
|---|---|---|
| | 500,000 ohm ¼ watt carbon resistor | .16 |
| | A.C. synchronous motor | 12.20 |
| | A.C. self-starting motor | 12.65 |
| | Crystal pick-up (metal tone arm) | 9.85 |
| | Crystal pick-up (wooden tone arm) | 9.30 |
| | 4" dynamic speaker | 8.70 |
| | Dial crystal | .10 |
| | Dial face | .20 |
| | Dial pointer | .02 |

ADDITIONAL PARTS USED ON AX-221 and AX-222

| | | |
|---|---|---|
| | 1 megohm ¼ watt carbon resistor | .16 |
| R11, R12 | 110 volt, a.c. motor (for 221-AC) | 21.35 |
| | AC-DC motor (for 221AC-DC and 222) | 18.20 |
| | Crystal pick-up | 11.35 |

ADDITIONAL PARTS USED ON MODEL AX-232

| | | |
|---|---|---|
| | .5 megohm ¼ watt carbon resistor | .16 |
| R11, R12 | 117 volt, ac-dc phonograph motor (for AX-232 AC-DC) | 66.00 |
| | 117 volt, ac phonograph motor (for AX-232 AC) | 42.60 |
| | Record holder block | .60 |

## GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. The filament dropping resistor (R-9—see schematic) is a resistance wire in the special line cord. The cord will, therefore, become warm under normal operating conditions. To insure good heat radiation stretch out the line cord to its full length. Do not attempt to shorten it by cutting.
4. In operating the a.c.-d.c. combinations on d.c. it may be necessary to reverse the line plug for correct polarity.
5. The color coding of the i-f transformer leads is as follows:
   Grid—green — Plate—blue
   Grid return—black — B plus—red.
6. In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.
   Where the Flexible Mast is installed permanently, it is urgently recommended that the receiver antenna wire be cut. Leave just enough of this wire to reach from the receiver to the window strip connector.
7. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.
8. The receivers in these combinations are of the a.c.-d.c. type. The motors, however, in models 219, 221AC and 232AC are of the AC ONLY type and will be damaged if the combination is used on direct current.
9. To remove the 6A8 tube from its socket, push up on its center pin from beneath the chassis.

## ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

### Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same from as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

### I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes, paragraph No. 7.)

### R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

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# EMERSON RADIO & PHONOGRAPH CORP

## MODEL BQ223 Chassis BQ

### Schematic, Voltage Changes, Alignment

## PRODUCTION CHANGE

The colors of leads in the cable to the phono-radio switch on chasses bearing serial numbers below 1876210 are as follows:

blue to diode; red to high side of volume control; green to arm of volume control; black to B minus. These changes are easily distinguishable by the presence of a blue lead in the cable.

The color coding of the i-f transformers is as follows:

| | |
|---|---|
| Grid—green | Grid return—black |
| B plus—red | Plate—blue. |

The color coding of the power transformer is as follows:

Primary—two black leads
High-voltage secondary—two red leads
High-voltage secondary center tap—red and yellow lead
6.3 volt secondary—two green leads
5 volt secondary—two yellow leads.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in the corner near the wave-band switch) with the screw adjustment accessible through a hole in the top of the chassis. The short-wave band has a fixed padder, C13 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.

The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. To readjust the speed remove the turntable and turn the speed adjusting screw (located near the turntable shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Osc. Plate* | *Fil.* |
|---|---|---|---|---|---|
| 6K8 | 215 | 100 | 0 | 75 | 6.3 a.c. |
| 6K7 | 215 | 100 | 0 | — | 6.3 a.c. |
| 6Q7G | 100 | — | 0 | — | 6.3 a.c. |
| 76 | 215 | — | 11 | — | 6.3 a.c. |
| 6AC5G | 195 | — | 0 | — | 6.3 a.c. |

Voltage at 80 filament to B minus (center tap of high voltage winding on power transformer)—300 volts.
Voltage across speaker field—70 volts.
The grid bias for all tubes is developed across resistors R-9 and R-10 (see schematic). The total voltage measured across R-9 and R-10 should be 12 volts.

### Location of Coils and Trimmer Adjustments

The two i-f transformers are located on top of the chassis deck. The second i-f is the one directly behind the variable condenser. The four trimmers, two for each transformer, are accessible through holes in the tops of the cans.

The adjustable padding condenser for the broadcast band is mounted underneath the chassis (in front of the 76 tube) with the screw adjustment accessible through a hole in the top of the chassis.

The antenna coils for the broadcast and short-wave bands and the 455 kc wave-trap are wound on one form and mounted underneath the chassis deck near the 76 tube socket. The trimmers for these coils are accessible through holes in the top of the chassis. The trimmer nearest the front of the chassis is the short-wave antenna trimmer. The central trimmer is the broadcast antenna trimmer. The trimmer nearest the rear of the chassis is the 455 kc wave-trap.

The oscillator coils for the broadcast and short-wave bands are wound on one form and are mounted on the inside of the rear chassis wall. The trimmers for these coils are accessible through holes in the rear of the chassis. The trimmer farthest from the end of the chassis is for short-wave and trimmer closest to the end of the chassis is for broadcast.

### I-f and Wave-Trap Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid cap of the 6K8 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response. Feed 455 kc to the antenna through a standard dummy antenna (a 0.0002 mica condenser may be substituted) and adjust the wave-trap trimmer (farthest from front on right side of the chassis) for *minimum* response. (See General Note No. 6.)

### Short-wave Alignment (Alignment of the short-wave band should precede broadcast alignment.)

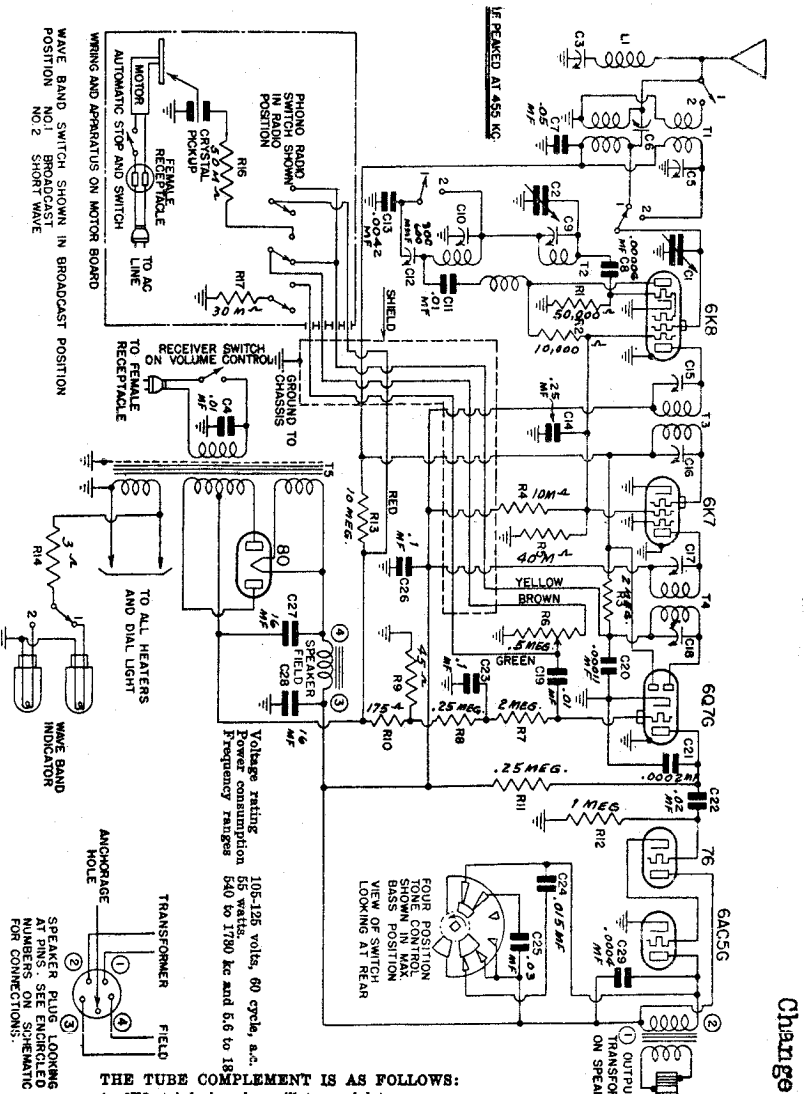
Since the dial indicator is fastened to the cabinet, a piece of stiff wire should be fastened to the dial assembly plate and bent over to form a dial pointer when the chassis is removed from the cabinet. Set pointer at extreme low-frequency end of dial with condenser closed.

Use a 400 ohm dummy antenna (a 400 ohm non-inductive resistor in series with the test oscillator antenna lead) when aligning the short-wave coils. Rotate the wave-band switch to the short-wave (counter-clockwise) position, and set the dial exactly at 16 megacycles. Feed 16,000 kc to the antenna and adjust the short-wave oscillator trimmer (farthest from end on rear chassis wall) for maximum response, and then adjust the short-wave antenna trimmer (nearest the front on the right side of the chassis) for maximum response. Be very careful to choose the minimum capacity peak on the oscillator trimmer.

### Broadcast Alignment

By adding a cipher to each figure on the broadcast band calibration, this scale can be made to read directly in kilocycles.

Use a standard dummy antenna in aligning the broadcast coils. (A .0002 condenser may be substituted.) Rotate the wave-band switch to the broadcast (clockwise) position. Set the dial at 60 and feed 600 kc. Adjust the broadcast series padder (in corner near 76 tube) for maximum response. Move the dial to 160 and feed 1600 kc. Adjust the broadcast oscillator trimmer (closest to end on rear chassis wall) for maximum response and then adjust the broadcast antenna trimmer (central trimmer at right side of chassis). Return dial to 60, feed 600 kc and readjust the broadcast series padder, rocking the variable condenser (rotate the variable condenser shaft back and forth through a small arc) for maximum response.




**THE TUBE COMPLEMENT IS AS FOLLOWS:**

1—6K8, triode hexode oscillator-modulator.
1—6K7, i-f amplifier.
1—6Q7G, diode detector, audio amplifier and a.v.c.
1—76, audio amplifier.
1—6AC5G, power output.
1—80, full-wave rectifier.

FOR PREADJUSTMENT OF STATION PUSHBUTTONS SEE MODEL BR 224.

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## VOLTAGE ANALYSIS

CHASSIS BR

†Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control full on, band-switch in short-wave position (counter-clockwise) and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings below 250 volts, except heaters and cathodes, were taken on 250 volt scale.

| *Tube* | *Plate* | *Screen* | *Osc. Plate* | *Cathode* | *Fil.* |
|---|---|---|---|---|---|
| 6K7 r-f amplifier | 230 | ‡100 | — | 5 | 6.3 a.c. |
| 6K8 oscillator-modulator | 225 | ‡100 | 100 | 4.2 | 6.3 a.c. |
| 6K7 i-f amplifier | 215 | ‡100 | — | 4.5 | 6.3 a.c. |
| 6Q7 diode detector, a.v.c. first audio | 170 | — | — | 2.1 | 6.3 a.c. |
| 6J5 phase inverter | 130 | — | — | 4.2 | 6.3 a.c. |
| 6J5 first audio driver | 280 | — | — | 9 | 6.3 a.c. |
| 6J5 inverted audio driver | 280 | — | — | 9 | 6.3 a.c. |
| 4—6AC5G's output | 275 | — | — | 0 | 6.3 a.c. |

Voltage across speaker field—65 volts.
Voltage at 80 filament—350.

†Model BR chasses using 3XS-237 speaker will have voltages approximately 10 percent lower. Voltage across this speaker field is 80 volts.

‡When band-switch is in broadcast and police positions the screen voltages will read 65 volts. Bias readings on these tubes will be slightly lower.

### Location of Coils and Trimmer Adjustments

The i-f transformers are located at the back of the chassis. The first i-f transformer is the one near the electrolytic condenser. The six trimmers for i-f alignment are available through holes in the tops of the cans.

The antenna coils for the three bands are wound on one form located on the front wall of the chassis with the trimmers accessible through holes in the chassis. The right-hand trimmer is for the broadcast band, the left-hand trimmer is for the short-wave band and the central trimmer is for the police band.

The r-f interstage coils are wound on one form and are mounted underneath the chassis to the left of the wave-band switch. The trimmers are available through holes in the top of the chassis. The trimmer closest to the front of the chassis is for the broadcast band. The trimmer farthest from the front is for the short-wave band. The central trimmer is for compensating the short-wave band at 6 mc.

The oscillator coils are wound on one form and mounted underneath the chassis directly behind the wave-band switch. The trimmers are accessible through holes in the top of the chassis. The trimmer closest to the band-switch is for the broadcast band, the trimmer farthest from the band-switch is for the short-wave band and the central trimmer is for the police band.

The oscillator series padder for the broadcast and police bands are mounted underneath the chassis near the interstage coils. The adjusting screws are available through holes in the top of the chassis. The padder nearest the front of chassis is for the police band. The padder for the short-wave band is a fixed mica condenser, C9 on the schematic diagram. If this condenser is to be replaced use a condenser with a value within 2% of that specified.

### I-f Alignment

Set the wave-band switch at the broadcast (clockwise) position, and the variable condenser at minimum capacity. Feed 455 kc to the grid of the 6K7 i-f amplifier tube through a .02 mf condenser. (Do not remove the grid clip from the tube.) Examine the trimmer screws and locate the screw which is painted red. Screw this trimmer down as far as it will go. Adjust the other two trimmers for maximum response and then adjust the red trimmer for maximum response. Do not readjust the other two trimmers. Now feed 455 kc to the grid of the 6K8 tube and repeat same procedure on the first i-f transformer. Do not touch the adjustment of the second i-f transformer. Failure to follow this procedure may result in impairment of the fidelity of the receiver.

### Broadcast Alignment

Since the indicator is fastened to the cabinet, a piece of stiff wire should be fastened to the dial drive assembly-plate and bent over to form an indicator when the chassis is removed from the cabinet. Set indicator at extreme low frequency end of dial with condenser closed.

Set the wave-band switch at the broadcast (clockwise) position, and the dial at 60. Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the dial to 160, feed 1600 kc and adjust the oscillator coil trimmer for maximum response, then adjust the interstage and antenna coil trimmers for maximum response. Reset the dial at 60, feed 600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

### Police Alignment

Set the wave-band switch at the police-band (central) position and the dial at 1.8. Feed 1800 kc to the antenna (using a .0001 mf dummy antenna) and adjust the police-band series padder for maximum response. Move the dial to 6.0, feed 6000 kc and adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response. Note the interstage coil on this band has no trimmer adjustment. Return the dial to 1.8, feed 1800 kc to the antenna and rock the variable condenser while readjusting the series padder for maximum response. Return to 6000 kc and check alignment. If readjustment is necessary return to 1800 kc and repeat entire procedure.

### Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the dial to 20 and feed 20,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the interstage and antenna coil trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak. Move the dial to 6 mc, feed 6000 kc to the antenna and adjust the r-f interstage trimmer (central trimmer at left of band-switch) for maximum response.

## MIRACLE INSTAMATIC TUNING

### Preadjustment of Station Push-buttons

FOR CHASSIS BQ

The six push-buttons provide a choice of six favorite broadcast stations for Miracle Instamatic Tuning. Adjustments for any particular station must be made by means of the small cross-slotted button immediately below the chosen push-button. The following procedure must be carefully observed in making these adjustments:

1. Insert the line plug in the electrical outlet. Turn the receiver on by rotating the tone control knob clockwise until the switch is heard to click and then rotate this knob to the extreme clockwise position. Wait about a minute for the tubes to warm up. Turn the wave-band switch to the broadcast position, clockwise. Turn the volume control clockwise to about half of its full rotation.

2. Select six nearby stations desired for automatic tuning. Choose one of these stations and any button to be adjusted for it. Find the station call letters on one of the four cards supplied in an envelope with the receiver. Push out the circular tab bearing the station call letters from the card and press it in the depression in the front face of the push-button. Insert one of the clear celluloid discs, which are supplied in a separate envelope, over the station tab in the push-button. Press this disc in firmly. See Fig. 4.

3. Push in the manual selector knob (second from right). When pushing in the selector knob or one of the push-buttons best results are obtained by using a firm rapid action.

4. With the selector knob depressed tune in the desired station. Rotate the selector knob until the mark on the dial face corresponding approximately to the frequency of the station appears at the black indicator line on the conical escutcheon window. Identify the station and note the approximate position of the dial face.

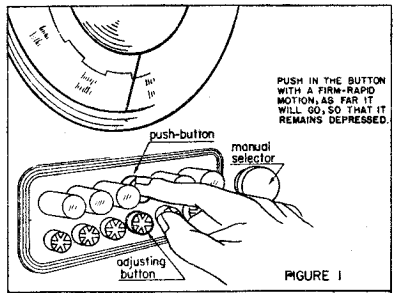
5. Push in the button to be adjusted for this station. See Fig. 1.

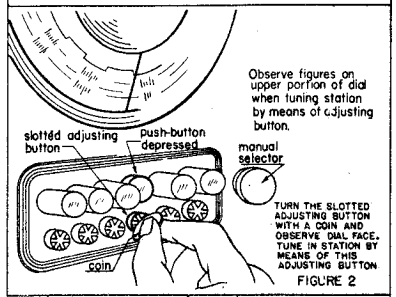
6. Insert a small thin coin in one of the slots of the adjusting button immediately below the push-button. Turn the adjusting button until the mark on the dial face corresponding approximately to the frequency of the station again appears at the black indicator line on the conical escutcheon window. Once the station is heard, tune it in carefully by turning the adjusting button back and forth slowly. From the standpoint of performance it is of paramount importance to tune in the station accurately. See Fig. 2.

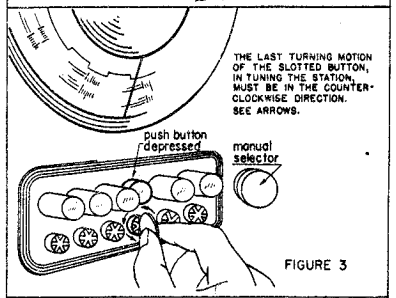
7. It is very important, when tuning in a station by means of the adjusting button, that the last turning motion of the adjusting button be in the counter-clockwise direction, as indicated in Fig. 3.

8. Check the results by moving the dial face, using the selector knob, to a different position and then pushing in the button. The station should be received clearly and with maximum volume.

9. Adjust the remaining buttons, one at a time, following the procedure outlined above.


PUSH IN THE BUTTON WITH A FIRM-RAPID MOTION, AS FAR IT WILL GO, SO THAT IT REMAINS DEPRESSED.
push-button
manual selector
adjusting button
FIGURE 1


Observe figures on upper portion of dial when tuning station by means of adjusting button.
slotted adjusting button
push-button depressed
manual selector
TURN THE SLOTTED ADJUSTING BUTTON WITH A COIN AND OBSERVE DIAL FACE. TUNE IN STATION BY MEANS OF THIS ADJUSTING BUTTON
coin
FIGURE 2


THE LAST TURNING MOTION OF THE SLOTTED BUTTON, IN TUNING THE STATION, MUST BE IN THE COUNTER-CLOCKWISE DIRECTION. SEE ARROWS.
push button depressed
manual selector
FIGURE 3

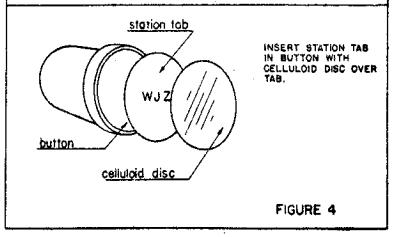
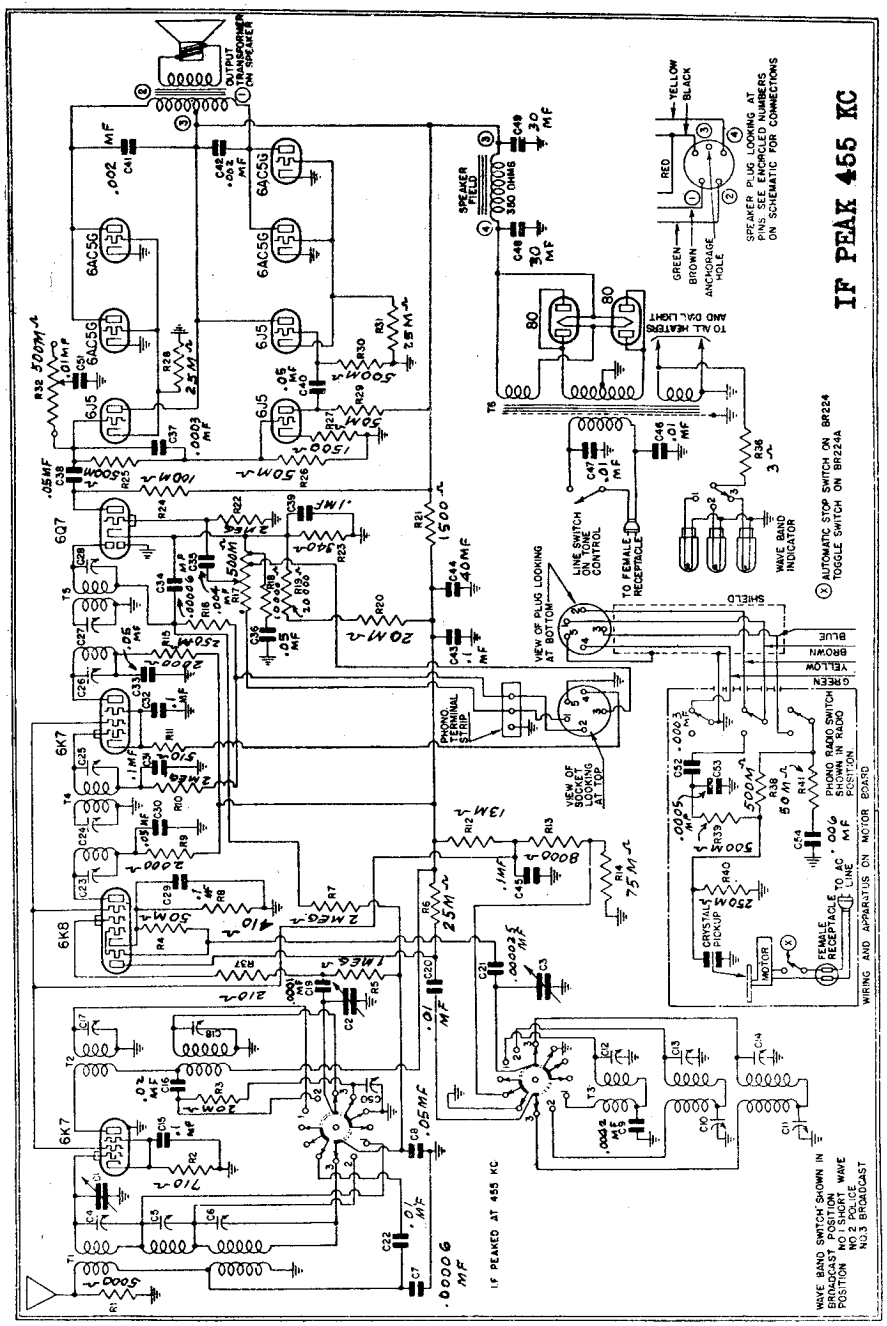


FIGURE 4

MODELS BR224
BR224A
Chassis BR
Schematic, Notes

# EMERSON RADIO & PHONOGRAPH CORP.




## GENERAL NOTES

1. In replacing chassis in cabinet do not tighten mounting screws so much that chassis will not float freely, and do not allow any part of the dial assembly to touch the cabinet. Do not push control knobs on so far that they touch the cabinet front panel. If these precautions are not observed the receiver may become microphonic.
2. The color coding of the power transformer leads is as follows:

| | |
|---|---|
| Primary—two black leads | 6.3v sec.—two heavy green leads |
| High voltage sec.—two red leads | 5v sec.—two heavy yellow leads |
| High voltage secondary center tap—red and yellow leead | |

3. The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. The stroboscope method will work only when the neon bulb is lighted from a 60 cycle a.c. supply. To readjust the speed on Model BR-224, remove the turntable and turn the speed adjusting screw (located near the turntable shaft). A clockwise rotation of the screw decreases the speed. The speed should be checked with the pick-up and record in playing position.

   To readjust the speed on Model BR-224A, remove the record and set the turntable by turning it slowly to give access to the speed regulator screw through a hole in the turntable. Adjust in same manner as BR-224.

| | |
|---|---|
| Voltage rating | 105-125 volts, 60 cycles, a.c. |
| Power consumption | 135 watts at 117.5 volts. 20 watts for phonograph motor. |
| Frequency ranges | 540 to 1800 kc, 1800 to 6,250 kc and 5.8 to 22.0 megacycles. |

## TUBE DATA

1—6K7, R-f amplifier (behind right-hand section of variable condenser).
1—6K8, Triode-hexode, oscillator-modulator (behind left-hand section of variable condenser).
1—6K7, I-f amplifier (between the two i-f transformers).
1—6Q7, Diode detector, audio amplifier, a.v.c. (left rear corner of chassis).
1—6J5, Phase inverter (left side of chassis, third from rear).
2—6J5, Second audio amplifiers (left side of chassis, second from rear, and right side of chassis beside electrolytic condensers).
4—6AC5G, Dynamic coupled, power output (two are in front of power transformer; other two are alongside power transformer near variable condenser).
2—80, Rectifiers (beside power transformer, at rear of chassis).

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MODEL BR224A EMERSON RADIO & PHONOGRAPH CORP.
MODELS AX232 AC, AX232 AC-DC
Record Changer Data

Part No. 4XPM-18A used with

## MODEL AX-232, A.C.-D.C.

Five-tube A.C.-D.C. Portable Combination

## MODEL AX-232, A.C.

Five-tube A.C. Portable Combination

Part No. 4XPM-18 used with

## MODEL BR-224A

Thirteen-tube A.C. Radio-Phonograph Combination

## AUTOMATIC OPERATION

1. Turn the receiver "on" in the usual way.
2. Rotate the phono-radio switch knob counter-clockwise to the phonograph position. Wait about a half-minute for the tubes in the receiver to warm up.
3. See that the pick-up is over the needle gauge plate with needle properly in place. If not, complete a *cycle* as follows: Throw the turntable switch "on." The turntable will start to revolve and the cycle of motion on the pick-up arm will follow through. When the pick-up arm comes down (and it can be moved by hand) the cycle is completed. Turn off the turntable switch.
4. The Index and Record Reject Lever are located near the right front corner of the motor board. With this lever at "Manual" position place the records on the record holder shelves. The records should be arranged in the desired order with the desired selection face up and the last selection on top. The first record to be played will rest directly on the shelves. The turntable should be empty.
5. Throw the turntable switch to the "on" position. The turntable should start to revolve.
6. While the turntable is revolving, push the Index and Record Reject Lever to the "Reject" position and let go. When the lever is released, after it has been pushed to "Reject," it will return automatically to the "10" position. If all the records to be played are 12 inch, return the lever to the "12" position. The changer will then begin to go through its cycle and the first record will drop on the turntable. The entire series of records will then be played automatically in sequence.
7. Adjust to the desired volume by means of the regular receiver volume control.
8. Close the cabinet lid to eliminate normal mechanical noises due to needle vibration.

The whole series of records will now play without further attention, and the last record will repeat until the turntable switch is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped. Then lift the pick-up, swing the arm to the right beyond the edge of the record and lower it onto the pick-up rest with pick-up over needle gauge plate. The record player is then ready for reloading, or for manual operation.

## MANUAL OPERATION

1. Proceed as in steps 1, 2 and 3 under Automatic Operation.
2. Place record on turntable with desired selection upwards.
3. Set Index and Record Reject Lever to "Manual" position. The lever should be kept in this position when not actually playing records automatically.
4. Throw the turntable switch on and when turntable has attained speed, lift pick-up and gently lower onto the record, so that the needle point enters the outside groove.
5. Proceed as in steps 7 and 8 under Automatic Operation.

## SPECIAL PRECAUTIONS

1. This instrument is not recommended for playing 10 inch and 12 inch records in mixed sequence. If the user desires this service he must be positive that all records are perfectly flat and free from warp. The Index and Record Reject Lever must be set at "10" and after playing the last selection the pick-up will come down in position for a 10 inch record and repeat the playing of the record on a 10 inch diameter unless the turntable switch is turned off. Any jamming of the mechanism under these conditions indicates that the records used are not perfectly flat or that their edges are not sufficiently smooth to permit normal operation of the separators in dropping each record in sequence onto the turntable.
2. Do not handle or move manually the pick-up or any part of the mechanism while it is going through the record-changing operation.
3. Do not use force in handling the mechanism at any time.
4. Warped or thick records should not be used for automatic operation.
5. Do not leave records on record holder posts except when needed for immediate operation, as they will warp and sag if left in this manner for a long period of time. Records can be straightened, however, by placing them on a flat surface and resting heavy flat articles, such as books, over them.
6. During automatic operation, the needle is fed automatically into the starting groove of the next record. If the needle fails to enter the starting groove, this is an indication that the cabinet is not level. Raise the right hand side of the cabinet, by inserting several thin spacers beneath it on that side. If the needle slides over a few grooves, raise the left hand side of the cabinet in a similar manner.
7. Never leave pick-up with needle resting on a record or on the turntable. When finished playing, be sure that the turntable has stopped and the pick-up is in the rest position over needle gauge plate.

Replacements should be made with genuine Emerson parts for best results.

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Record Changer Adjustments

EMERSON RADIO & PHONOGRAPH CORP

MODEL BR224A
MODELS AX232 AC, AX232 AC-DC

## Automatic Record Changer

### GENERAL INFORMATION

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

### ADJUSTMENTS

**A. Main Lever.**—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch

**B. Friction Clutch.**—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

**C. Pickup Lift Cable Screw.**—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

**D. & E. Needle Landing on Record.** — The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17". Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

**F. & G. Record Separating Knife.** — The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained The spacing for the 10 inch record is nominally .055 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .052—.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

**H. Record Support Shelf.**—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

*If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.*

**J. Tone Arm Rest Support (not shown).**—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

**K. Trip Pawl Stop Pin.**—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

**Lubrication.**—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

### MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E".
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C".
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F)
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H"
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "30"

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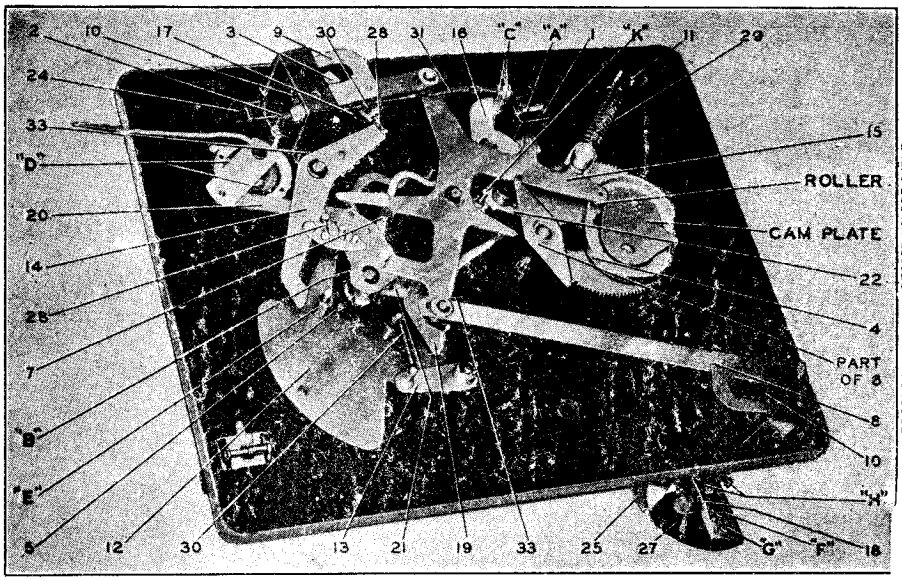
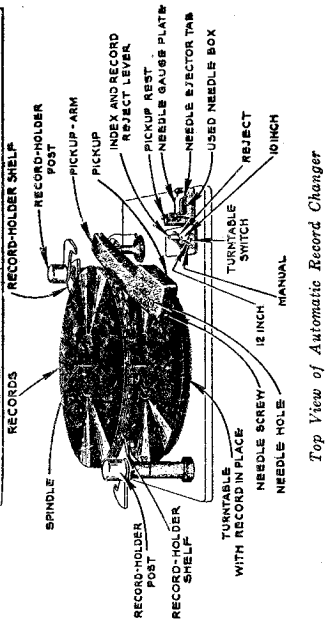
MODEL BR224A
MODELS AX232 AC, AX232 AC-DC
Record Changer, Diagrams, Notes

# EMERSON RADIO & PHONOGRAPH CORP.




*Bottom View of Automatic Record Changer*




*Top View of Automatic Record Changer*

# AUTOMATIC RECORD CHANGER

## GENERAL NOTES

1. The pick-up must be over the needle gauge plate to insert or change needles. To insert a needle initially, loosen the needle screw on the front of the pick-up, place needle in hole at the top so that it drops down against the needle gauge plate and then tighten up the needle screw.
2. The phonograph motor has been adjusted at the factory to turn at a speed of 78 r.p.m. The speed may be checked by counting the turns per minute or by using a stroboscope disc and a neon light. (The stroboscope method will only work when neon bulb is lighted from a 60 cycle a.c. supply.) To readjust the speed lift off the record and set the turntable by turning it slowly to give access to the speed regulator screw through one of the three holes in the turntable. Insert a screw-driver through the hole in the turntable into the groove in the speed regulator screw and turn to right (clockwise) to decrease speed, or to the left (counter-clockwise) to increase speed. Replace and replay record and adjust until speed is checked at 78 r.p.m.
3. A few drops of good quality light machine oil should be applied in the oil holes at regular intervals, about once every six months. The three holes in the top of the turntable give access to the oil holes in the motor mechanism beneath. Revolve the turntable slowly until the oil holes can be seen through the turntable, then apply the oil.
4. Model AX-232, AC-DC portable automatic combination carries an a.c.-d.c. switch at the left of the turntable to switch the motor for a.c. or d.c. supply. It is important that this switch be in the proper position for the power-supply available.

## CONTROLS AND MOVING MECHANISM

INDEX and RECORD REJECT LEVER.—This lever is located near the right front corner of the motorboard with its index plate marked for four positions—"*Manual*," "12," "10," and "*Reject*." When you desire to change record selections manually, this lever should be set in the "*Manual*" position. With the lever in the "12" position, the mechanism is set to play a series of 12-inch records automatically. To play either a series of 10-inch records, or 10- and 12-inch records mixed, the lever should be set at the "10" position.

To reject a record being played, or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "*Reject*" position and let go. The pick-up will raise up and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If you are playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "*Manual*" position when not actually playing records automatically.

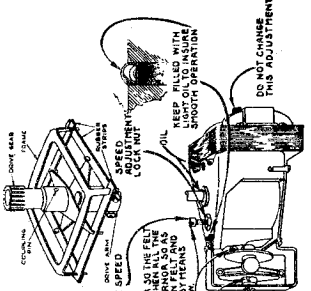
TURNTABLE SWITCH.—The toggle switch located just in front of the Index and Record Reject Lever controls the current to the turntable motor. To start the turntable, throw the switch to the "ON" position. To stop the turntable throw the switch to the "OFF" position.

PICK-UP and TOP-LOADING NEEDLE SOCKET.—The pick-up is the new crystal type, with a hole in the top for insertion of needles. When not playing records, the pick-up arm should be moved out to the right beyond the turntable and placed at rest on the support with the edge of the pick-up arm in the groove and the pick-up over the needle gauge plate. The pick-up must be in this position to change needles.

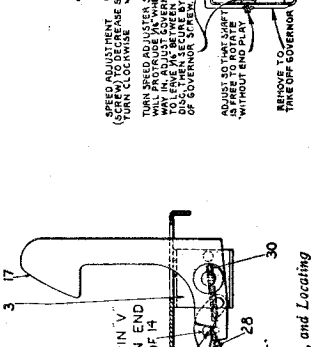
To insert a needle initially, loosen the needle screw on the front of the pick-up, place needle in hole at top so that it drops down against the needle gauge plate and then tighten up the needle screw.

NEEDLE EJECTOR.—The extending tab on the needle gauge plate of the needle box operates the needle ejector. To change a needle, place pick-up in rest position, loosen needle screw and press the extending tab on the needle gauge plate to drop the used needle into the box below. Release tab, allowing the needle gauge plate to swing back, and then insert a new needle in the pick-up as described above.

RECORD HOLDER SHELVES.—To place a record on the turntable or to remove records, raise the record holder shelves, by lifting with the fingers under the shelf, and swing clear of outer edge of record. Also push back vertical lever adjacent to the rear record holder post. You now have clear access to the turntable. Before loading the magazine for Automatic Operation swing the record holder shelves back into position.


SPEED ADJUSTMENT (LOOSEN BEFORE TURN CLOCKWISE)
SPEED ADJUSTMENT LOCK NUT
OIL
KEEP LUBRICATED WITH LIGHT OIL TO INSURE SMOOTH OPERATION
TURN SPEED ADJUSTER SO THE FELT WILL PROTRUDE ¼" WHEN ALL THE WAY IN. ADJUST GOVERNOR SO AS TO TIME AS DESCRIBED BELOW AND THEN SECURE BY MEANS OF GOVERNOR SCREW
ADJUST SO THAT SHAFT IS FREE TO ROTATE WITHOUT END PLAY
DO NOT CHANGE THIS ADJUSTMENT
REMOVE TO TAKE OFF GOVERNOR

*Motor Data and Coupling*




*Details of Record Shelf Posts, and Locating Lever Assemblies*

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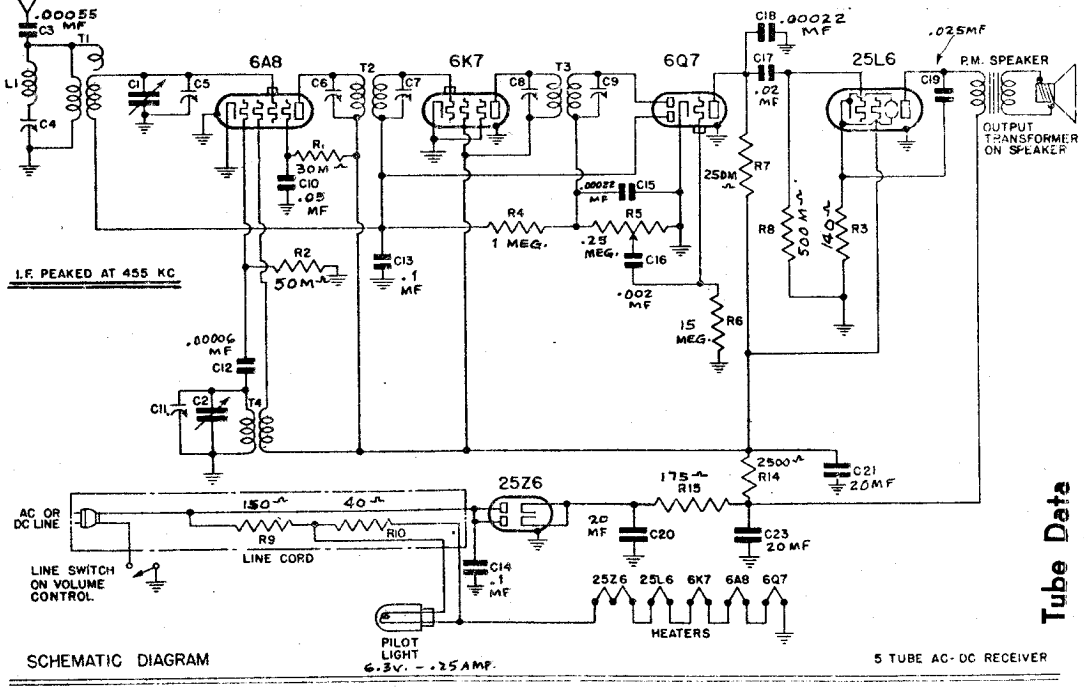
EMERSON RADIO & PHONOGRAPH CORP.

MODEL AX240
Chassis AX
Schematic, Voltage
Alignment, Changes

## Five-Tube, A.C.-D.C., Superheterodyne Receiver

Voltage rating ..... 105-125 volts
Power consumption ..... 45 watts
Frequency range ..... 540 to 1730 kc.




SCHEMATIC DIAGRAM FOR MODEL AX-240
*(See Production Change, No. 1)*

### Tube Data

The tube complement is as follows:
1—6A8 or 6A8GT, pentagrid oscillator modulator.
1—6K7 or 6K7GT, first i-f amplifier.
1—6Q7 or 6Q7GT, diode detector, a-f amplifier, a.v.c.
1—25L6 or 25L6GT, beam power output.
1—25Z6 or 25Z6GT, dual half-wave rectifier.

All tubes are replaceable with either metal or equivalent bantam glass tubes. The letters "GT" at the end of the tube number indicate that the tube has a bantam size glass envelope. In all other respects it is exactly the same as the metal tube bearing the same number without the "GT."

### PRODUCTION CHANGE

1. A resistor 100,000 ohms, part no. KR-54, (not shown in schematic for AX-240) is connected in series with the high side of the volume control.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Osc. Plate* | *Fil.* |
|---|---|---|---|---|---|
| 6A8 | 100 | 55 | 0 | 100 | 6.3 |
| 6K7 | 100 | 100 | 0 | — | 6.3 |
| 6Q7 | 43 | — | 0 | — | 6.3 |
| 25L6 | 92 | 100 | 5.5 | — | 25.0 |

Voltage at 25Z6 cathode—128 volts.
Voltage across speaker field—28 volts.

The color coding of the i-f transformer leads is as follows:
Grid—green
Grid return—black
Plate—blue
B plus—red.

## Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

## I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes, paragraph No. 7.)

## R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

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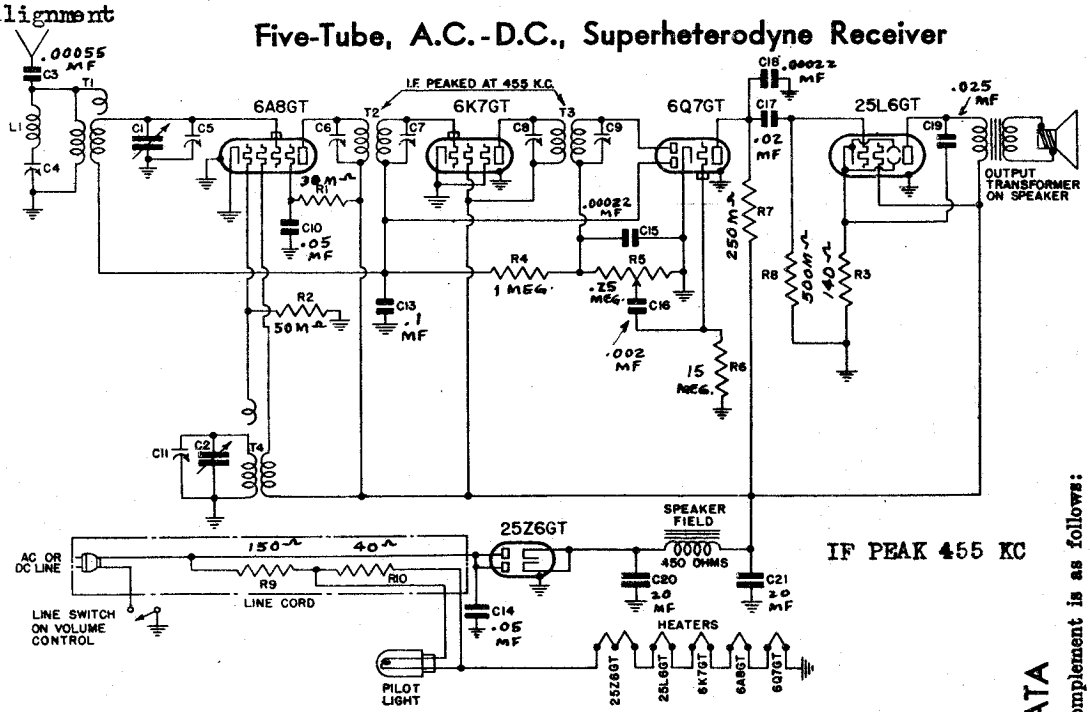
MODELS CH243,CH246,CH256
Chassis CH
Schematic,Voltage
Alignment

EMERSON RADIO & PHONOGRAPH CORP.

## Five-Tube, A.C.-D.C., Superheterodyne Receiver




IF PEAK 455 KC

# MODELS CH-243, CH-246 and CH-256

CHASSIS MODEL CH

**Voltage rating** ..... 105-125 volts, a.c. or d.c.
**Power consumption** ..... **45 watts**
Frequency **range** ..... **540 to 1730 kc.**

## TUBE DATA

The tube complement is as follows:

1—6A8 or 6A8GT, pentagrid oscillator modulator.
1—6K7 or 6K7GT, first i-f amplifier.
1—6Q7 or 6Q7GT, diode detector, a-f amplifier a.v.c.
1—25L6 or 25L6GT, beam power output.
1—25Z6 or 25Z6GT, dual half-wave rectifier.

All tubes are replaceable with either metal or equivalent bantam glass tubes. The letters "GT" at the end of the tube number indicate that the tube has a bantam size glass envelope. In all other respects it is the same as the metal tube bearing the same number without the "GT."

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Osc. Plate* | *Fil.* |
|---|---|---|---|---|---|
| 6A8 ..... | 100 | 55 | 0 | 100 | 6.3 |
| 6K7 ..... | 100 | 100 | 0 | — | 6.3 |
| 6Q7 ..... | 43 | — | 0 | — | 6.3 |
| 25L6 ..... | 92 | 100 | 5.5 | — | 25.0 |

Voltage at 25Z6 cathode—125 volts.

**Voltage across speaker field—28 volts.**

## ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

**Always use as weak a test signal as possible when aligning the receiver.**

### Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

### I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 6A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes, paragraph No. 7.)

### R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

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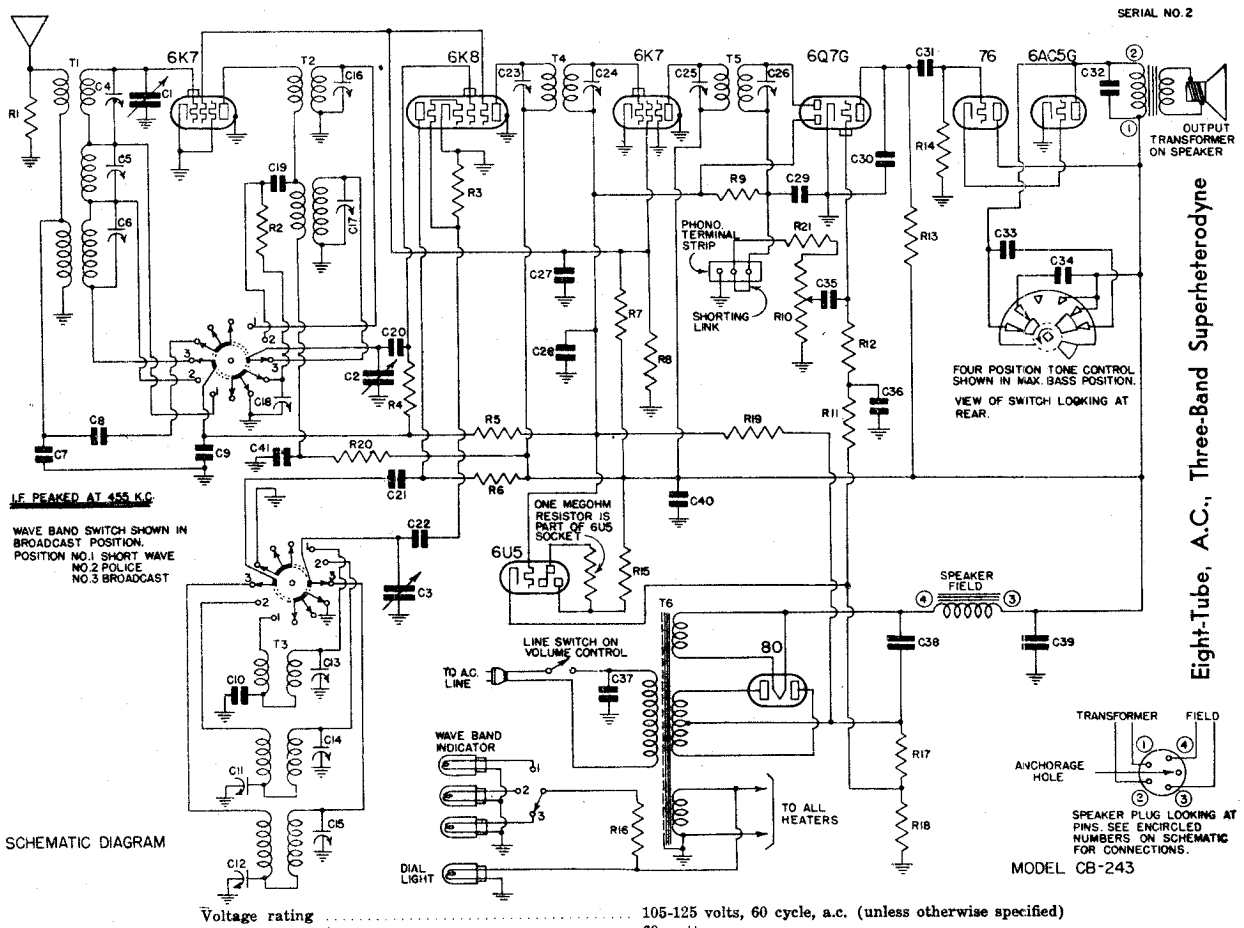
# EMERSON RADIO & PHONOGRAPH CORP

MODEL CB243
Chassis CB
Schematic, Voltage
Notes




| | |
|---|---|
| Voltage rating | 105-125 volts, 60 cycle, a.c. (unless otherwise specified) |
| Power consumption | 60 watts |
| Frequency ranges | 540 to 1800 kc, 1800 to 6250 kc and 5.8 to 22 megacycles |

## GENERAL NOTES

1. The receiver should never be turned on with either the speaker plug or the 6AC5G tube out of their respective sockets, since the rapid rise in rectifier voltage will damage the electrolytic condenser.
2. When replacing the chassis in the cabinet take precautions to keep any part of the dial and condenser assembly from touching the cabinet, otherwise microphonism will result.
3. The color coding of the i-f transformers is as follows:
   Grid—green — Grid return—black
   B plus—red — Plate—blue.
4. The color coding of the power transformer is as follows:
   Primary—two black leads
   High-voltage secondary—two red leads
   High-voltage secondary center tap—red and yellow lead
   6.3 volt secondary—two green leads
   5 volt secondary—two yellow leads.
5. The adjustable padding condensers for the broadcast and police bands are mounted on the rear chassis wall with the screw adjustment accessible through holes in the rear of the chassis. The short-wave band has a fixed padder, C10 on schematic. When replacing this fixed padder be careful to use a condenser which has a capacity within 2% of the specified value, otherwise the short-wave coils may not track.
6. An efficient antenna system is necessary to enable a full realization of the merits of the receiver. For reduction of noise and achievement of high efficiency on all frequency ranges the Emerson All-Wave High-Fidelity Antenna, Model W-78, and the Emerson All-Wave Antenna System, Model W-89, are recommended. Instructions for the installation of these antennas are supplied with each kit.

   In congested areas where the installation of a large antenna is not desirable we recommend the use of the Emerson Flexible Mast Antenna, Model W-82. Instructions for the installation of this compact and efficient antenna are supplied with each kit.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 110 volts, 60 cycles, a.c. All readings except B plus at rectifier, heaters, and cathode voltages were taken on 250 volt scale.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Osc. Plate* | *Fil.* |
|---|---|---|---|---|---|
| 6K7 (r-f) | 170 | 85 | 0 | — | 6.3 a.c. |
| 6K8 | 206 | 85 | 0 | 77 | 6.3 a.c. |
| 6K7 (i-f) | 206 | 85 | 0 | — | 6.3 a.c. |
| 6Q7G | 100 | — | 0 | — | 6.3 a.c. |
| 76 | 206 | — | 10.3 | — | 6.3 a.c. |
| 6AC5G | 195 | — | 0 | — | 6.3 a.c. |

Voltage at 80 filament to B minus (center tap on high voltage winding)—300 volts.
Voltage across speaker field—86 volts.
The grid bias for all tubes is developed across resistors R17 and R18. This voltage should measure 10.8 volts.

## Tube Data

The tube complement is as follows:

1—6K7, r-f amplifier (to left of variable condenser)
1—6K8, triode-hexode oscillator-modulator
1—6K7, i-f amplifier (behind variable condenser)
1—6Q7G, diode detector, audio amplifier and a.v.c.
1—76, audio amplifier
1—6AC5G, power output
1—6U5, electron-ray tuning indicator
1—80, full-wave rectifier.

Note: The following special voltage transformers are also available:
6BT-455 Universal power transformer: 110, 130, 210 and 225 volts, 40-60 cycles.
6BT-466 Power transformer: 110 and 127 volts, 50 cycles.

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MODEL CB243
Alignment, Socket Trimmers, Parts

EMERSON RADIO & PHONOGRAPH CORP.

| * Item | Part No. | DESCRIPTION | List Price Ea. Effective as of Oct. 15th, 1938 PRICE |
|---|---|---|---|
| T1 | 4BT-396 | Three-band antenna coil | $2.05 |
| T2 | 4BT-397 | Three-band interstage coil | 1.80 |
| T3 | 5RT-447 | Three-band oscillator coil | 1.75 |
| T4 | 4ZT-425A | 455 kc first i-f transformer | 1.20 |
| T5 | 3RT-321C | 455 kc second i-f transformer | 1.10 |
| T6 | 6BT-451 | Power transformer, 117.5 V, 50-60 cycle (See note below) | 4.50 |
| R1 | LR-64 | 5000 ohm ¼ watt carbon resistor | .16 |
| R2 | LR-60 | 20,000 ohm ¼ watt carbon resistor | .16 |
| R3, R5, R21 | KR-53 | 50,000 ohm ¼ watt carbon resistor | .16 |
| R4, R14 | KR-57 | 1 megohm ¼ watt carbon resistor | .16 |
| R6, R8 | 3LR-265 | 40,000 ohm ½ watt carbon resistor | .16 |
| R7 | 3BR-246 | 10,000 ohm 2 watt carbon resistor | .28 |
| R9, R12 | HR-42 | 2 megohm ¼ watt carbon resistor | .16 |
| R10 | 3XR-277 | Volume control 500,000 ohm, with line switch | 1.00 |
| R11, R13 | KR-55 | 250,000 ohm 1 watt carbon resistor | .16 |
| R15 | GR-31 | 20,000 ohm 1 watt carbon resistor | .16 |
| R16 | 4ZR-326 | 3 ohm ½ watt wire wound resistor | .16 |
| R17 | 6BR-344 | 145 ohm 1 watt metallized resistor | .16 |
| R18 | 4CR-320 | 35 ohm ½ watt wire wound resistor | .16 |
| R19 | 3RR-275 | 10 megohm ¼ watt carbon resistor | .16 |
| R20 | 6BR-345 | 5000 ohm ½ watt carbon resistor | .16 |




## ADJUSTMENTS

**An oscillator with frequencies of 455, 600, 1600, 1800, 6000 and 20,000 kc should be used.**
**An output meter should be used across the voice coil or speaker output transformer for observing maximum response.**

Use a dummy antenna for aligning any of the three bands. A .0002 mf condenser may be used for broadcast band dummy antenna, a .0001 mf condenser for the police band dummy antenna and a 400 ohm non-inductive resistor for the short-wave band dummy antenna.

Always use as weak a test signal as possible during alignment.

The set's oscillator is higher in frequency than the signal on *all three bands*, so images should be observed on the low frequency side of the signals.

Always choose the minimum capacity peak on oscillator trimmers and maximum capacity peaks on antenna trimmers. The last motion in adjusting trimmers should always be a tightening one, *not* a loosening one.

Never leave a trimmer with the outside plate so loose that there is no tension on the screw. Either bend the plate up or remove the screw entirely. Loose screws are a sure source of noise, drifting, and microphonism.

In aligning antenna trimmers on the high-frequency signals there is always a tendency for the oscillator to drift, due to interlocking. To compensate for this always keep tuning the variable condenser as the trimmers are being adjusted.

### I-f Alignment

Rotate the wave-band switch to the broadcast (clockwise) position. Set the variable condenser at the minimum capacity position and feed 455 kc, through a 0.02 mf paper condenser, to the grid cap of the 6K8 tube (do not remove the grid clip from the tube). Adjust the four i-f trimmers for maximum response.

### Broadcast Alignment

Since the indicator is fastened to the cabinet, a piece of stiff wire should be fastened to the variable condenser and bent over to form an indicator when the chassis is removed from the cabinet. Set indicator at extreme low frequency end of dial with condenser closed.

Set the wave-band switch at the broadcast (clockwise) position, and the dial at 60. Feed 600 kc to the antenna (using a standard dummy antenna) and adjust the broadcast-band series padder for maximum response. Move the dial to 160, feed 1600 kc and adjust the oscillator coil trimmer for maximum response, then adjust the interstage and antenna coil trimmers for maximum response. Reset the dial at 60, feed 600 kc and rock the variable condenser while adjusting the series padder for maximum response. Return to 1600 and check alignment. If readjustment is necessary return to 600 and repeat entire procedure.

### Police Alignment

Set the wave-band switch at the police-band (central) position and the dial at 1.8. Feed 1800 kc to the antenna (using a .0001 mf dummy antenna) and adjust the police-band series padder for maximum response. Move the dial to 6.0, feed 6000 kc and adjust the oscillator trimmer for maximum response. Then adjust the antenna trimmer for maximum response. Note the interstage coil on this band has no trimmer adjustment. Return the dial to 1.8, feed 1800 kc to the antenna and rock the variable condenser while readjusting the series padder for maximum response. Return to 6000 kc and check alignment. If readjustment is necessary return to 1800 kc and repeat entire procedure.

### Short-Wave Alignment

Set the wave-band switch at the short-wave (counter-clockwise) position. Move the dial to 20 and feed 20,000 kc to the antenna (using a 400 ohm dummy antenna) and adjust the short-wave oscillator trimmer for maximum response. If two peaks are obtained choose the minimum capacity peak. Then adjust the interstage and antenna coil trimmers for maximum response. If two peaks are obtained choose the maximum capacity peak. Move the dial to 6 mc, feed 6000 kc to the antenna and adjust the r-f interstage trimmer for maximum response.

### Replacements should be made with genuine Emerson parts for best results.

| | | | |
|---|---|---|---|
| C1, C2, C3 | 6BC-413 | Three-gang variable condenser | 5.55 |
| †C4, C5, C6 | | Trimmers, part of antenna coil assembly | .20 |
| C7, C20 | 4XC-398A | 0.00006 mf mica condenser | .20 |
| C8, C21, C35 | KC-58 | 0.01 mf, 400 volt tubular condenser | .20 |
| C9 | BC-12 | 0.05 mf, 200 volt tubular condenser | .20 |
| C10 | 3EC-267 | 0.0042 mf mica condenser | .40 |
| C11 | 2NC-231B | Single adjustable padding condenser, range: 750-1500 mmf | .45 |
| C12 | 2NC-231A | Single adjustable padding condenser, range: 300-600 mmf | .30 |
| | | (If dual padding condenser is used, order 5SC-409) | |
| | 5SC-409 | Dual adjustable padding condenser | .95 |
| †C13, C14, C15 | | Trimmers, part of oscillator coil assembly | |
| †C16, C17, C18 | | Trimmers, part of interstage coil assembly | .20 |
| C19, C31 | LC-65 | 0.02 mf, 400 volt tubular condenser | .20 |
| C22 | 4HC-395A | 0.000026 mf mica condenser | .20 |
| †C23, C24 | | Trimmers, part of first i-f transformer | |
| †C25, C26 | | Trimmers, part of second i-f transformer | |
| C27 | BC-13 | 0.25 mf, 200 volt tubular condenser | .20 |
| C28 | FC-29 | 0.02 mf, 200 volt tubular condenser | .20 |
| C29 | 5LC-410A | 0.00011 mf mica condenser | .20 |
| C30 | 5AC-384 | 0.0002 mf, 600 volt tubular or mica condenser | .20 |
| C32 | 3RC-373 | 0.0004 mf, 600 volt tubular or mica condenser | .20 |
| C33 | 3XC-331 | 0.015 mf, 400 volt tubular condenser | .20 |
| C34 | EC-23 | 0.03 mf, 400 volt tubular condenser | .20 |
| C36 | AC-6 | 0.1 mf, 200 volt tubular condenser | .20 |
| C37 | 3LC-297A | 0.01 mf, 400 volt molded condenser | .20 |
| C38 | 4ZC-379 | 16 mf, 375 volt wet electrolytic condenser | .95 |
| C39 | 4ZC-380 | 16 mf, 285 volt wet (regulating type) electrolytic condenser | .80 |
| C40, C41 | EEC-132 | 0.1 mf, 400 volt tubular condenser | .20 |

## REPLACEMENT PARTS LIST

## MODEL CB-243

CHASSIS MODEL CB

| | | |
|---|---|---|
| | 8" dynamic speaker | 7.50 |
| 5WS-352 | Wave-band switch | 1.95 |
| 6BS-356 | Tone-control switch | .80 |
| 4ZS-317 | Pilot light 6.3 volt .25 amp Mazda No. 44 | .20 |
| 4BL-94 | Conical dial face | 1.70 |
| 6BD-62 | Conical crystal and escutcheon | 1.50 |
| 4YZ-844A | Molded escutcheon for electron ray indicator tube | .05 |
| 5SE-4 | Electron ray tube socket and cable assembly | .30 |
| 3XZ-684 | Dial drive cord | .30 |
| 4YZ-772 | Dial drive cord spring | .02 |
| 5JZ-824 | Dial drive pulley | .05 |
| 4XM-367 | | .10 |

*Item number locates the article on the schematic diagram.

†These trimmer condensers are part of the coil assemblies and cannot be supplied separately.

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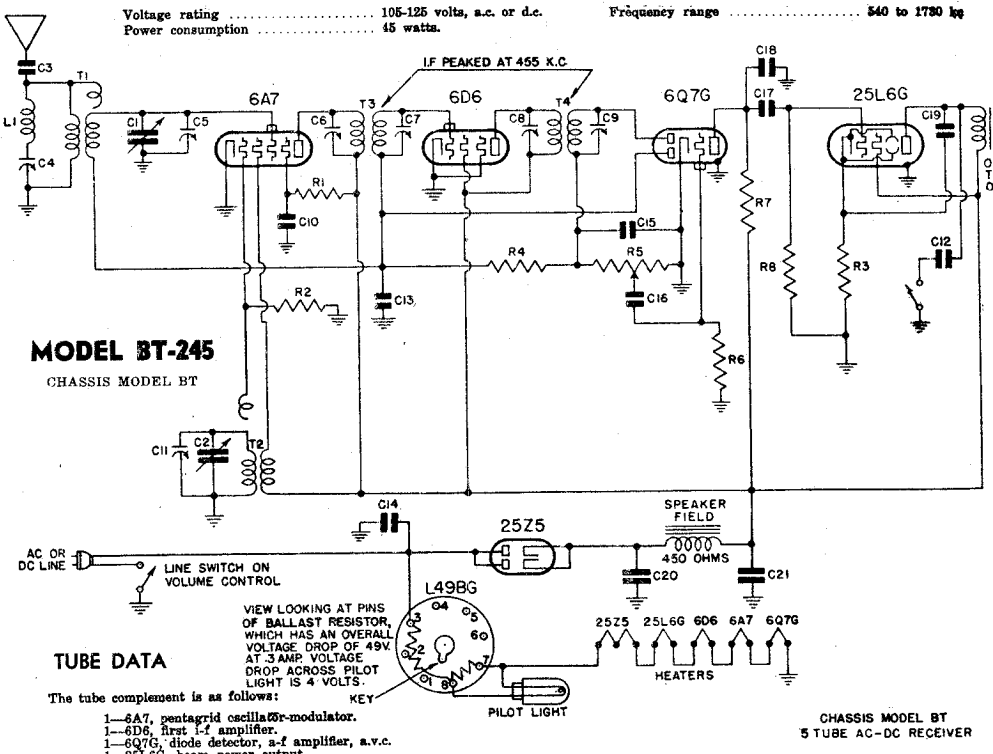
MODEL BT245

# EMERSON RADIO & PHONOGRAPH CORP Chassis BT

Schematic, Voltage Alignment, Parts

Voltage rating ..... 105-125 volts, a.c. or d.c.
Power consumption ..... 45 watts.

Frequency range ..... 540 to 1730 kc




## TUBE DATA

The tube complement is as follows:

1—6A7, pentagrid oscillator-modulator.
1—6D6, first i-f amplifier.
1—6Q7G, diode detector, a-f amplifier, a.v.c.
1—25L6G, beam power output.
1—25Z5, dual half-wave rectifier.

All octal-base tubes are replaceable with either metal or equivalent octal-base glass tubes. The letter "G" at the end of the tube number indicates that the tube has a glass envelope. In all other respects it is exactly the same as the metal tube bearing the same number without the "G."

## VOLTAGE ANALYSIS

CHASSIS MODEL BT
5 TUBE AC-DC RECEIVER

| Tube | Plate | Screen | Cathode | Osc. Plate | Pri. |
|---|---|---|---|---|---|
| 6A7 | 100 | 55 | 0 | 100 | 6.3 |
| 6D6 | 100 | 100 | 0 | | 6.3 |
| 6Q7G | 43 | | 0 | | 6.3 |
| 25L6G | 92 | 100 | 5.5 | | 25.0 |

Voltage at 25Z5 cathode—128 volts.
Voltage across speaker field—28 volts.
Voltage drop across ballast resistor L49BG (pins 3, 7)—49 volts.
Voltage drop across pilot light section of ballast resistor (pins 7, 8)—4 volts.

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. Measurements made with 117.5 volts d.c. will be lower than those given below.

## GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully realigned.
2. One side of the power line is directly grounded to the chassis base. Under no circumstances, therefore, should a ground wire be permitted to come in contact with any metal part of the receiver.
3. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
4. The color coding of the i-f transformer leads is as follows:
   Plate—blue
   B plus—red.
   Grid—green
   Grid return—black

## ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

### Location of Coils and Trimmer Adjustments

The first and second i-f transformers are mounted on the left hand inside wall of the chassis. The trimmers for the first i-f transformer are accessible through the lower pair of holes in the side of the chassis. The trimmers for the second i-f transformer are accessible through the upper pair of holes in the chassis.

The trimmer on the front section is for the antenna coil.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer for the 455 kc wave-trap is mounted on the same form as the antenna coil.

The 455 kc wave-trap is mounted on the left hand inside wall of the chassis. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible through a hole in the right side of the chassis.

### I-f and Wave-Trap Alignment

Rotate the variable condenser to the minimum capacity position. Feed 455 kc to the grid-cap of the 6A7 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap trimmer for *minimum* response. (See General Notes, paragraph No. 6.)

### R-f Alignment

Set the dial pointer at 140, feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

## REPLACEMENT PARTS LIST

List Price as Effective as of Mar. 1st, 1939 (Subject to change without notice)

| Item | Part No. | DESCRIPTION | Price |
|---|---|---|---|
| L1, T1 | 5YT-444 | Antenna coil with adjustable 455 kc wave-trap | $ .90 |
| T2 | 4XT-458 | Oscillator coil | .35 |
| T3 | 5TT-463 | Double-tuned 455 kc first i-f transformer | .90 |
| T4 | 4XT-435A | Double-tuned 455 kc second i-f transformer | .80 |
| R1 | ZZR-196 | 30,000 ohm ¼ watt carbon resistor | .16 |
| R2 | KR-53 | 50,000 ohm ¼ watt carbon resistor | .16 |
| R3 | 3FR-293 | 140 ohm ½ watt wire-wound resistor | .16 |
| R4 | KR-57 | 1 megohm ¼ watt carbon resistor | .16 |
| R5 | 2NR-214 | Volume control .25 megohm with line switch | 1.20 |
| R6 | 4XR-327 | 15 megohm ¼ watt carbon resistor | .16 |
| R7 | KR-55 | 250,000 ohm ¼ watt carbon resistor | .16 |
| R8 | KR-56 | 500,000 ohm ¼ watt carbon resistor | .16 |
| | L-49BG | Plug-in ballast resistor. (Interchangeable with L-49B) | .55 |
| C1, C2 | 5TC-423 | Two-gang variable condenser | 2.40 |
| C3 | 4XC-401 | 0.00055 mf mica condenser | .20 |
| C4 | | Trimmer, part of wave-trap assembly. | |
| C5, C11 | | Trimmers, part of variable condenser. | |
| C6, C7, C8, C9 | | Trimmers, part of i-f transformers. | |
| C10 | BC-12 | 0.05 mf, 200 volt tubular condenser | .20 |
| C13 | AC-6 | 0.1 mf, 200 volt tubular condenser | .20 |
| C12, C14 | LC-64 | 0.05 mf, 400 volt tubular condenser | .20 |
| C15, C18 | 4XC-394A | 0.00022 mf mica condenser | .20 |
| C16 | 3HC-274 | 0.002 mf, 600 volt tubular condenser | .20 |
| C17 | LC-65 | 0.02 mf, 400 volt tubular condenser | .20 |
| C19 | 3FC-836 | 0.025 mf, 400 volt tubular condenser | .20 |
| C20, C21 | 4HC-348D | Dual 20 mf, 150 volt dry electrolytic condenser | .90 |
| | 3QS-257B | 5" dynamic speaker | 4.45 |
| | 4DS-264A | Tone control switch | .25 |
| | 4BL-94 | Pilot light, 6.3 volt, .25 amp., Mazda No. 44 | .20 |
| | 5TD-68 | Dial face | .20 |
| | 3RZ-484 | Drive cord | .02 |
| | 3RZ-519 | Drive cord spring | .02 |
| | 4UZ-700A | Dial pointer | .15 |
| | 4UZ-842 | Dial crystal | .10 |

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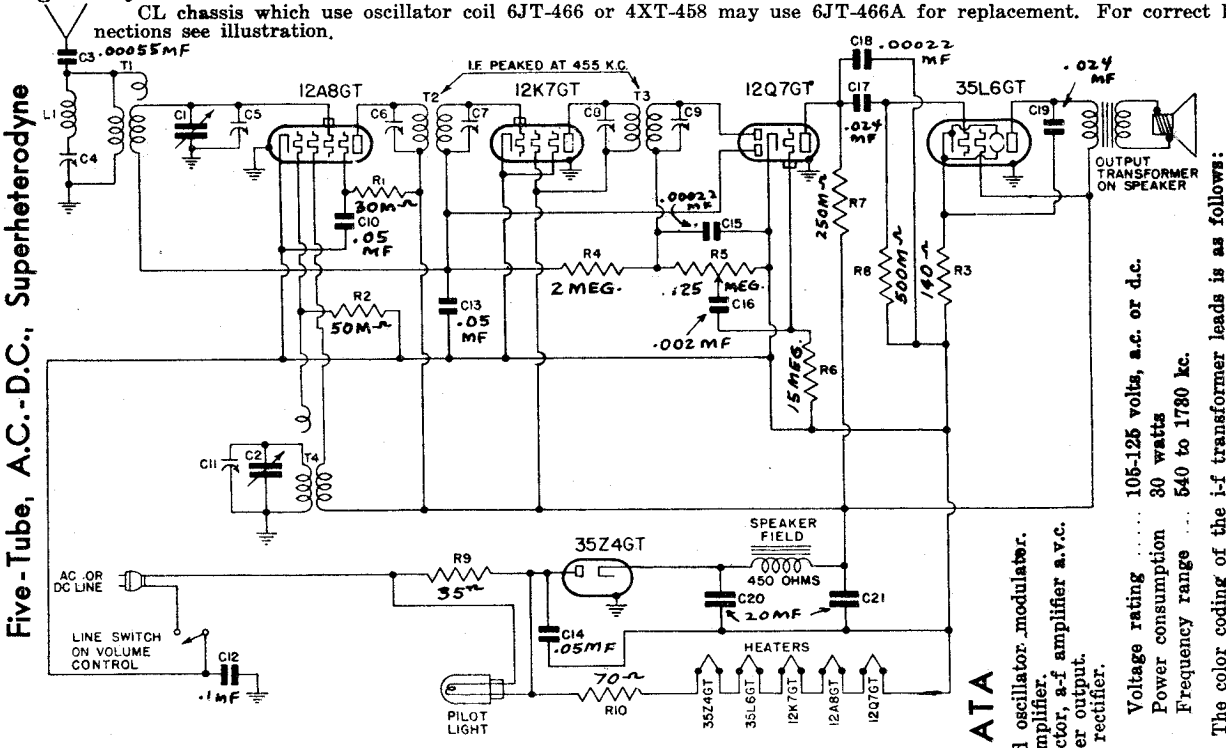
MODELS CL246,CL253
CL256 Chassis CL
Schematic,Voltage
Alignment,Data

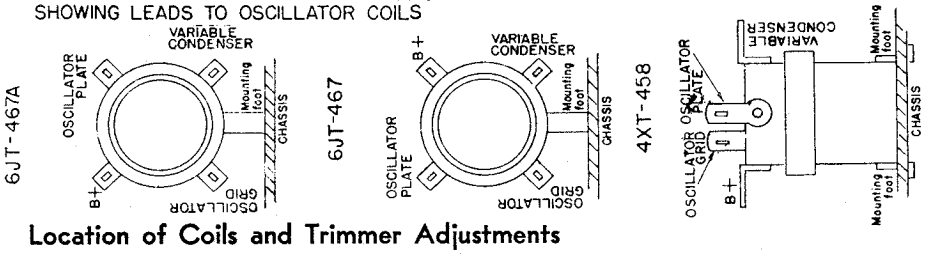
## PRODUCTION CHANGE

CL chassis which use oscillator coil 6JT-466 or 4XT-458 may use 6JT-466A for replacement. For correct lug connections see illustration.




VIEW LOOKING AT BOTTOM OF CHASSIS SHOWING LEADS TO OSCILLATOR COILS

MOUNTING FOOT IS GROUND CONNECTION FOR ALL COILS




## TUBE DATA

12A8 or 12A8GT, pentagrid oscillator-modulator.
12K7 or 12K7GT, first i-f amplifier.
12Q7 or 12Q7GT, diode detector, a-f amplifier a.v.c.
35L6 or 35L6GT, beam power output.
35Z4 or 35Z4GT, half-wave rectifier.

Voltage rating ..... 105-125 volts, a.c. or d.c.
Power consumption 30 watts
Frequency range ... 540 to 1730 kc.

The color coding of the i-f transformer leads is as follows:

Plate—blue
B plus—red
Grid—green
Grid return—black

## Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck beside the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted underneath the chassis beneath the variable condenser. The trimmers are accessible through holes in the top of the chassis directly beneath the variable condenser.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The 455 kc wave-trap is mounted on the same form as the antenna coil directly behind the speaker. The trimmer for the 455 kc wave-trap is mounted on the coil and is accessible from the rear of the chassis. The oscillator coil is located underneath the chassis, beneath the first i-f transformer.

## I-f and Wave-Trap Alignment

Swing the variable condenser to the maximum capacity position. Feed 455 kc to the grid-cap of the 12A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response. Feed 455 kc through a .0001 mf condenser to the antenna lead and adjust the wave-trap for *minimum* response. (See General Notes, paragraph No. 5.)

## R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna lead and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Osc. Plate* | *Fil.* |
|---|---|---|---|---|---|
| 12A8 ..... | 94 | 50 | 0 | 94 | 12 |
| 12K7 ..... | 94 | 94 | 0 | — | 12 |
| 12Q7 ..... | 40 | — | 0 | — | 12 |
| 35L6 ..... | 87 | 94 | 5.2 | — | 35 |

Voltage at 35Z4 cathode—121 volts.
Voltage across speaker field—27 volts.
Voltage across pilot light section of ballast resistor (R9)—3.5.
Voltage drop across entire ballast resistor (R9 and R10)—13.5.

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| *Item | Part No. | DESCRIPTION | Effective as of March 1st, 1939 (Subject to change without notice) |
|---|---|---|---|
| T1 | 6FT-461 | Broadcast antenna coil | $ .50 |
| T2 | 6FT-462 | Broadcast detector coil | .50 |
| R1 | 6FR-346 | Volume control 75,000 ohms with 200 ohm bias stop and line switch | .90 |
| R2 | 3RR-275 | 10 megohm ¼ watt resistor | .16 |
| R3, R4 | KR-56 | 500,000 ohm ¼ watt carbon resistor | .16 |
| R5 | 3FR-293 | 140 ohm ½ watt wire-wound resistor | .16 |
| R6 | 6FR-348 | 2,400 ohm ½ watt carbon resistor | .16 |
| R7, R8 | 6FW-142 | Resistance line cord with pilot light section | .80 |
| C1, C2 | 6FC-422 | Two-gang variable condenser | 2.30 |
| †C3, C4 | | Trimmers, part of variable condenser. | |
| C5 | 4XC-401 | 0.00055 mf mica condenser | .20 |
| C6 | BC-12 | 0.05 mf, 200 volt tubular condenser | .20 |
| C7 | CCC-127 | 0.01 mf, 200 volt tubular condenser | .20 |
| C8 | 4XC-394A | 0.00022 mf mica condenser | .20 |
| C9 | LC-65 | 0.02 mf, 400 volt tubular condenser | .20 |
| C10 | XXC-207 | 0.005 mf, 400 volt tubular condenser | .20 |
| C11 | LC-64 | 0.05 mf, 400 volt tubular condenser | .20 |
| C12, C13 | 4HC-348B | Dual 20 mf, 150 volt dry electrolytic condenser | .90 |
| | 6FS-364 | 4" magnetic speaker | 2.80 |
| | 6FD-67 | Dial pointer | .05 |
| | 4BL-94 | Pilot light, 6.3 volt, .25 amp., Mazda No. 44 | .20 |
| | 3RZ-519 | Drive cord spring | .02 |
| | 4YZ-772 | Dial drive cord | .02 |

**When ordering replacement parts specify part numbers.**

*Item number locates the article on the schematic diagram. †These condensers cannot be supplied separately.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to ground (chassis) with volume control turned on full and no signal. The line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except cathodes and heaters were taken on 250 volt scale. Readings taken on d.c. will be slightly lower.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Fil.* |
|---|---|---|---|---|
| 12B8GT { Pentode | 95 (pin no. 3) | 95 (pin no. 4) | 2.1 (pin no. 1) | 12 |
| 12B8GT { Triode | 40 (pin no. 5) | | 0.0 (pin no. 6) | |
| 32L7GT Output | 125 (pin no. 3) | 95 (pin no. 4) | 4.5 (pin no. 8) | 32 |

Voltage at rectifier cathode—130 (pin no. 1)

The socket connections of the tubes used in the CF chassis are as follows, the numbering following standard designation R.M.A.

Tube 12B8GT: pin 1—r-f amplifier cathode
pin 2—heater
pin 3—r-f amplifier plate
pin 4—r-f amplifier screen grid
pin 5—detector plate
pin 6—detector cathode
pin 7—heater
pin 8—detector grid

R-f amplifier grid connection is made to grid cap.

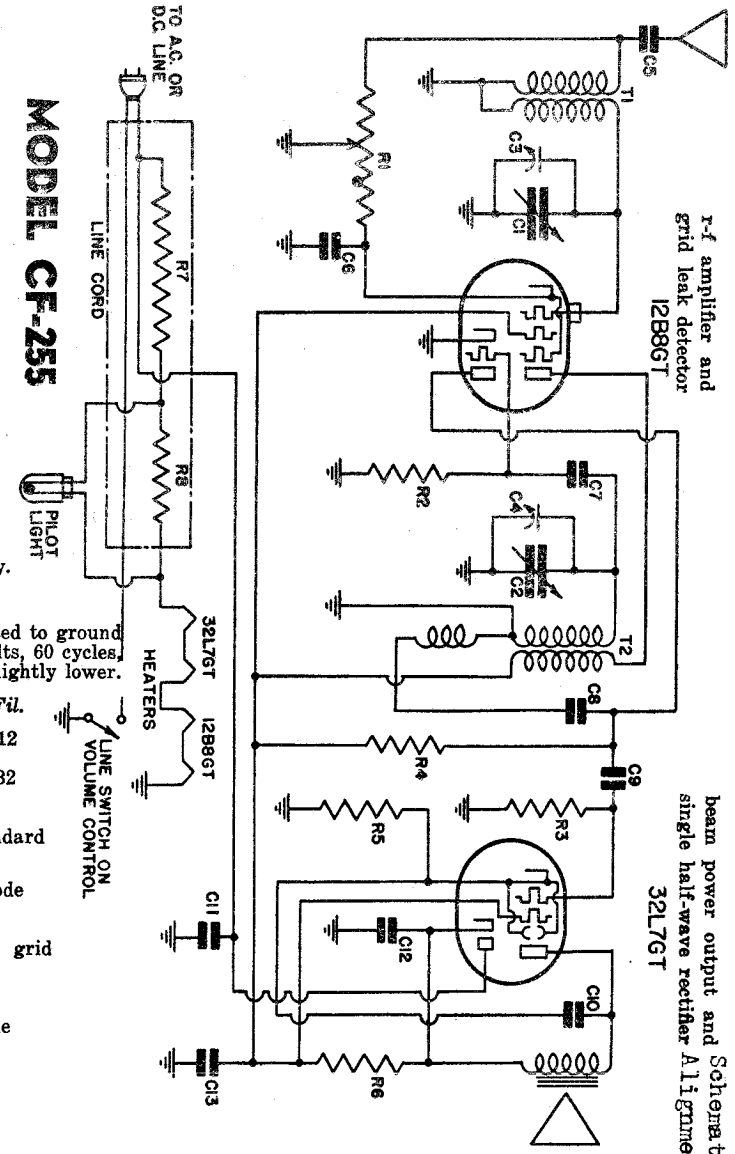
Tube 32L7GT: pin 1—rectifier cathode
pin 2—heater
pin 3—output plate
pin 4—output screen grid
pin 5—output grid
pin 6—rectifier plate
pin 7—heater
pin 8—output cathode

## ALIGNMENT PROCEDURE

An oscillator with a frequency of 1600 kc is required.

Use as weak a test signal as possible. An output meter should be used across the voice coil or output transformer for observing maximum response.

Examine the condenser drive assembly bracket and locate five dots embossed along the front. Rotate the variable condenser to maximum capacity and set the pointer just below the bottom dot. Then rotate the condenser until the pointer is just below the second dot from the top. Feed 1600 kc to the antenna through a .0001 mf condenser and adjust both trimming condensers for maximum response.

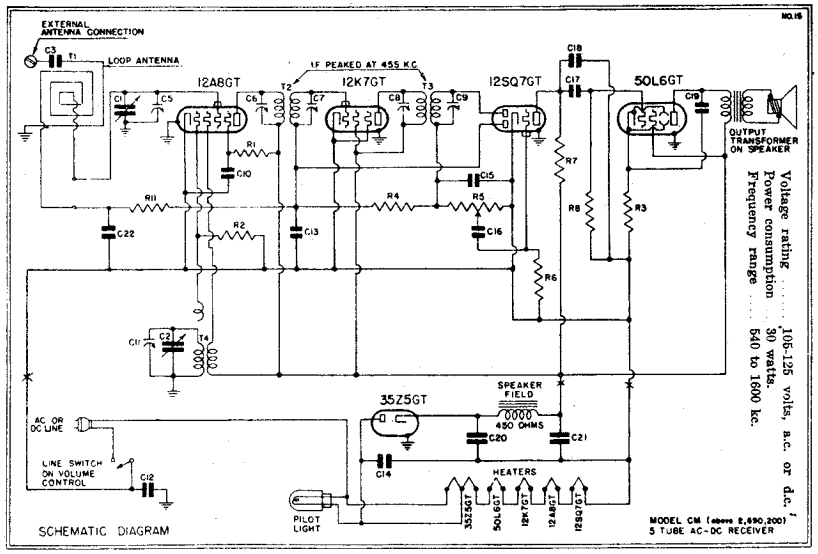



EMERSON RADIO & PHONOGRAPH CORP. Chassis CF

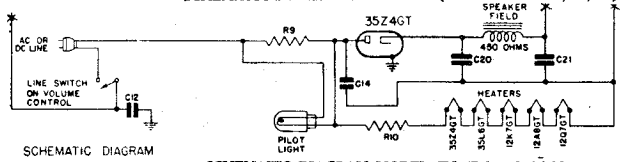
Schematic, Voltage Alignment, Parts

## A.C.-D.C. T.R.F. Receiver—Two Tubes

Voltage rating ..... 105 to 125 volts, a.c. or d.c.
Power consumption 40 watts.
Frequency range ... 540 to 1730 kc.




SCHEMATIC DIAGRAM MODEL CM (Above Serial No. 2,690,200)




**NOTE: A 35L6GT output tube is used for sets of lower serial numbers.**

SCHEMATIC DIAGRAM MODEL CM (Below Serial No. 2,690,200)

THE TUBE COMPLEMENT IS AS FOLLOWS:

| *For serial numbers below* 2,690,200: | | *For serial numbers above* 2,690,200: |
|---|---|---|
| 1—12A8 or 12A8GT | pentagrid oscillator modulator | 1—12A8 or 12A8GT |
| 1—12K7 or 12K7GT | first i-f amplifier | 1—12K7 or 12K7GT |
| 1—12Q7 or 12Q7GT | diode detector, a-f amplifier, a.v.c. | 1—12SQ7 or 12SQ7GT |
| 1—35L6 or 35L6GT | beam power output | 1—50L6 or 50L6GT |
| 1—35Z4 or 35Z4GT | half-wave rectifier | 1—35Z5 or 35Z5GT |

All tubes are replaceable with either metal or equivalent bantam glass tubes. The letters "GT" at the end of the tube number indicate that the tube has a bantam size glass envelope. In all other respects it is the same as tl metal tube bearing the same number without the "GT."

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

*For serial numbers below* 2,690,200:

| Tube | Plate | Screen | Cathode | Osc. Plate | Fil. |
|---|---|---|---|---|---|
| 12A8 | 94 | 50 | 0 | 94 | 12 |
| 12K7 | 94 | 94 | 0 | — | 12 |
| 12Q7 | 40 | — | 0 | — | 12 |
| 35L6 | 87 | 94 | 5.2 | — | 35 |

Voltage at 35Z4 cathode—121 volts.
Voltage across speaker field—27 volts.
Voltage across pilot light section of ballast resistor (R9)—3.5.
Voltage drop across entire ballast resistor (R9 and R10)—13.5.

*For serial numbers above* 2,690,200:

| Tube | Plate | Screen | Cathode | Osc. Plate | Fil. |
|---|---|---|---|---|---|
| 12A8 | 88 | 45 | 0 | 88 | 12 |
| 12K7 | 88 | 88 | 0 | — | 12 |
| 12SQ7 | 40 | — | 0 | — | 12 |
| 50L6 | 82 | 88 | 5.7 | — | 50 |

Voltage at 35Z5 cathode—115 volts.
Voltage across speaker field—27 volts.
Voltage across pilot light—4.5 volts.

PRODUCTION CHANGES

1. Chassis bearing serial numbers below 2,690,200 use R7—250,000 ohm ¼ watt carbon resistor.
2. Resistor R9—R10, part no. 6JR-353, is not used on chassis bearing serial numbers above 2,690,200.

## GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
3. The color coding of the i-f transformer leads is as follows:
   Grid—green — Plate—blue
   Grid return—black — B plus—red
4. Models CM-260, 266 and 267 have self-contained antennas and do not require additional antenna connections. For permanent home installations of either model, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a terminal screw is provided in the cabinet for antenna connection. It is not necessary to remove the chassis from the cabinet to make this connection. The screw is easily reached through a hole in the bottom of the cabinet.
5. The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcasting source. *It is important, therefore, once the station is tuned in, rotate the cabinet back and forth through a quarter of a circle* (90 *degrees*), *leaving it at the position where the station is received with maximum volume.*
6. On some models the bottom of the chassis is covered with a metal bottom plate. To reach the internal chassis parts, this plate must be unsoldered and removed.

## ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.

An output meter should be used across the voice coil or output transformer for observing maximum response.

Always use as weak a test signal as possible when aligning the receiver.

### Location of Coils and Trimmer Adjustments

The first i-f transformer is mounted on top of the chassis deck to the right of the speaker. The trimmers are accessible through holes in the top of the can.

The second i-f transformer is mounted on top of the chassis behind the speaker. The trimmers are accessible through holes in the top of the can.

The trimmers for the antenna and oscillator coils are located on the variable condenser. The trimmer on the front section is for the antenna coil.

The oscillator coil is located underneath the chassis, beneath the speaker. The loop antenna acts as the antenna coil.

### I-f and Wave-Trap Alignment

Swing the variable condenser to the minimum capacity position. Feed 455 kc to the grid-cap of the 12A8 tube through a .01 mf condenser and adjust the four i-f trimmers for maximum response.

### R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna connection and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

| *Item | Part No. | DESCRIPTION | PRICE (Subject to change without notice) |
|---|---|---|---|
| T1 | 6MW-155 | Loop antenna assembly | $1.45 |
| T4 | 6JT-467A | Oscillator coil | .35 |
| T2 | 6JT-466U | Double-tuned 455 kc first i-f transformer | 1.10 |
| T3 | 6MT-472U | Double-tuned 455 kc second i-f transformer | 1.05 |
| R1 | 2CR-193 | 30,000 ohm ½ watt carbon resistor | .16 |
| R2 | KR-53 | 50,000 ohm ¼ watt carbon resistor | .16 |
| R3 | 3FR-293 | 140 ohm ½ watt wire-wound resistor | .16 |
| R4 | HR-42 | 2 megohm ¼ watt carbon resistor | .16 |
| R5 | 4XR-335 | Volume control .25 megohm with line switch (for CM-266) | .90 |
| R5 | 4XR-335A | Volume control .25 megohm with line switch (for CM-260 and CM-267) | .85 |
| R6 | 4XR-327 | 15 megohm ¼ watt carbon resistor | .16 |
| R7, R8 | KR-56 | 500,000 ohm ¼ watt carbon resistor (see production change no. 1) | .16 |
| R9, R10 | 6JR-353 | Tapped metal-clad wire-wound resistor (see production change no. 2) R9—35 ohms; R10—70 ohms (Each section—2 watts). | .25 |
| R11 | KR-54 | 100,000 ohm ¼ watt carbon resistor | .16 |
| C1, C2 | 4XC-391C | Two-gang variable condenser | 2.40 |
| †C5, C11 | | Trimmers, part of variable condenser. | |
| †C6, C7, C8, C9 | | Trimmers, part of i-f transformers. | |
| C10, C13, C22 | BC-12 | 0.05 mf, 200 volt tubular condenser | .20 |
| C12 | AC-6 | 0.1 mf, 200 volt tubular condenser | .20 |
| C14 | LC-64 | 0.05 mf, 400 volt tubular condenser | .20 |
| C15, C18 | 4XC-394A | 0.00022 mf mica condenser | .20 |
| C16, C3 | 3HC-274 | 0.002 mf, 600 volt tubular condenser | .20 |
| C17, C19 | 6JC-425 | 0.024 mf, 400 volt tubular condenser | .20 |
| C20, C21 | 6JC-426 | Dual 20 mf, 150 volt dry electrolytic condenser | .90 |
| 6JS-368U | | 4" dynamic speaker (for CM-266) | 3.85 |
| 6MS-384 | | 4" dynamic speaker (for CM-267) | 4.15 |
| 6MS-395 | | 5" dynamic speaker (for CM-260) | 4.45 |
| 6JL-104 | | Pilot light, 6.3 volt, .15 amp., Mazda No. 47 | .20 |
| 6ED-73 | | Dial face (for CM-260 and CM-267) | .25 |
| 6MD-75 | | Dial face (for CM-266) | .20 |
| 4YZ-772 | | Drive cord | .02 |
| 5JZ-824 | | Drive cord spring | .05 |
| 6JH-24 | | Drive shaft (for CM-266) | .05 |
| 6JH-24A | | Drive shaft (for CM-260 and CM-267) | .05 |
| 4XZ-812B | | Dial pointer (for CM-266) | .02 |
| 4MZ-588B | | Dial pointer (for CM-260 and CM-267) | .20 |
| 4XZ-815A | | Dial crystal (for CM-266) | .10 |
| 4XE-3 | | Dial crystal (for CM-260 and CM-267) | .20 |
| 4XM-367 | | Drive pulley | .10 |

* Item number locates the article on the schematic diagram.
† Not supplied separately.

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Schematic, Voltage
Batt, Wiring, Changes

EMERSON RADIO & PHONOGRAPH CORP.

MODELS CE259, CE260
Chassis CE




## TUBE DATA

The tube complement is as follows:

1—1A7G, oscillator-modulator
1—1N5G, 1st i-f amplifier
1—1N5G, 2nd i-f amplifier
1—1H5G, 2nd detector, a.v.c., a-f amplifier
1—1C5G, pentode output

## Five-Tube Battery-Operated Superheterodyne

# MODELS CE-259 and CE-260

CHASSIS MODEL CE

Current drain .... "A" battery—0.3 amps.
"B" battery—0.010 amps. with no signal

Frequency range 540 to 1730 kc on early Model CE-259
530 to 1600 kc on all Model CE-260
and later Model CE-259


TERMINAL STRIP (for outside antenna only)
Removable cleat holds two "B" batteries in place at bottom
Do not remove wire from clip.
Hole for outside antenna lead
Two wires fastened to terminal strip on speaker
ANTENNA LOOP
Two-prong plug inserted in "A" battery
"B" BATTERY
"A" BATTERY
Three-prong plugs inserted in two "B" batteries
Two rails hold "B" batteries in place at top.
"A" battery is held in place at top and bottom by rails.
OFF-ON SWITCH AND VOLUME CONTROL
OFF-ON INDICATOR (white-off, red-on)
STATION SELECTOR
RED & WHITE
BLUE & WHITE
RED
YELLOW
BLACK
GREY

MODEL CE-259
CUT-AWAY VIEW SHOWING BATTERY LOCATIONS AND WIRE CONNECTIONS

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 90 volts.

| *Tube* | | *Plate* | *Screen* | *Osc. Plate* | *Fil.* |
|---|---|---|---|---|---|
| 1A7G | | 82 | 52 | 82 | 1.5 |
| 1N5G | 1st i-f | 70 | 70 | — | 1.5 |
| 1N5G | 2nd i-f | 82 | 82 | — | 1.5 |
| 1H5G | | 25 | — | — | 1.5 |
| 1C5G | | 77 | 82 | — | 1.5 |

Bias for the 1C5G tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.8 volts.

## PRODUCTION CHANGES

1. Chassis bearing serial numbers below 2,319,650 use:
   (a) Double-tuned 455 kc first i-f transformer, part no. 4XT-434A ..... 1.00
   (b) Double tuned 455 kc diode i-f transformer, part no. 4XT-435B ..... .80
   (c) Oscillator coil, Part No. 4XT-433 ..... .35
   (d) The low side of the volume control (R12) is connected to A plus instead of A minus (chassis) as shown in the schematic.
   (e) Condenser C19 is connected from plate to B plus instead of from plate to ground as shown in the schematic.
   (f) Resistor R2 is 50,000 ohms, Part No. KR53, instead of 30,000 ohms.
2. Chassis bearing serial numbers below 2,408,049 use dial face, part no. 4XD-51 ..... .55
3. On Model CE-260 the antenna trimming condenser (C4) is mounted on the loop antenna frame instead of on the variable condenser.
4. In chassis bearing serial numbers above 2,319,650 condenser C15 is connected from the high side of the volume control to ground instead of to A plus as shown in the schematic.

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MODELS CE259,CE260
Chassis CE
Socket,Trimmers
Alignment,Parts

# EMERSON RADIO & PHONOGRAPH CORP.

MODELS CE-259 AND CE-260

## GENERAL NOTES

1. Batteries: The Models CE-259 and CE-260 are designed to house the complete set of batteries within the cabinet.

The battery complement should be as follows:

FOR MODEL CE-259 (Portable)

| *Type Battery* | *No. Req.* | *Eveready Part No.* | *Ray-o-vac Part No.* |
|---|---|---|---|
| 1½ volt "A" | 1 | 742 (plug-in type) | P-94A (plug-in type) |
| 45 volt "B" | 2 | 762 (plug-in type) | P-5303 (plug-in type) |

FOR MODEL CE-260

| | | | | |
|---|---|---|---|---|
| Combined "A" and "B" Pack | 1 | 748 (plug-in type) | AB82 (plug-in type) | (Also Burgess No. 17G-D60) |

2. The color coding of the i-f transformer leads is as follows:

Grid—green — Plate—blue
Grid return—black — B plus—red

3. The color coding of the battery cable is as follows:

Red—B plus, 90 volts — Yellow—A plus, 1.5 volts
Blue—B minus — Black—A minus

4. If replacements are made in the r-f section of the circuit, the receiver should be carefully re-aligned.

5. Models CE-259 and CE-260 have self-contained antennas and do not require additional antenna or ground connections. For permanent home installations of either model, however, if it is desired to improve reception of weak stations, an additional outdoor antenna should be used. For this purpose a terminal strip is provided in the cabinet for antenna and ground connections. (*See diagram on next page.*)

6. The self-contained loop antenna operates at maximum efficiency when its position is at right angles to the broadcasting source. *It is important, therefore, once the station is tuned in, rotate the cabinet back and forth through a quarter of a circle* (90 *degrees*), *leaving it at the position where the station is received with maximum volume.* This procedure is not necessary for receivers with outside antennas.

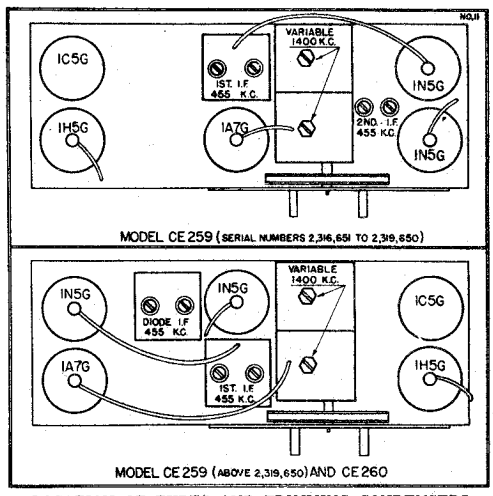
## ADJUSTMENTS

An oscillator with frequencies of 455 and 1400 kc is required.
An output meter should be used across the voice coil or output transformer for observing maximum response.
Always use as weak a test signal as possible when aligning the receiver.

### Location of Coils and Trimmer Adjustments

The oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the rear section of the variable condenser.

The loop antenna acts as the antenna coil. The trimmer for the loop, when provided, is on the front section of the variable condenser.
(See Production Change No. 3)




LOCATION OF TUBES AND TRIMMING CONDENSERS
MODELS CE-259 AND CE-260
(See Production Change No. 3)

### I-f Alignment

Model CE-259 (below serial number 2,319,650). Swing variable condenser to maximum capacity position.

Model CE-259 (above serial number 2,319,650) and CE-260. Swing variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1A7G tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

### R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna connection and adjust first the oscillator trimmer (on rear section of variable condenser) then the antenna trimmer (on front section of variable condenser) for maximum response.

### Battery Installation for Model CE-259
(*See diagram on inside page*)

To install and connect the batteries in the portable cabinet observe the following procedure:

1. Open the end side of the cabinet (side with speaker grille) by removing the two wood screws in the top corners of the panel. The panel is hinged at the bottom. Open the panel by pulling the small leather tab at the top edge.
2. A small wood cleat is fastened to the bottom of the cabinet directly below the two large wood rails. Remove this cleat by taking out the small wood screws.
3. The three-prong plugs on the battery cable from the receiver should be plugged into the two "B" batteries.
4. Slide the "B" batteries, one at a time, in an upright position between the two wood rails in the cabinet, as indicated in the diagram.
5. Replace the small wood cleat in front of the second battery and fasten it securely with the wood screws.
6. The small two-prong plug in the battery cable should be plugged into the "A" battery. Place the "A" battery in the front corner of the cabinet, as shown in the diagram.
7. Be sure that all of the cable wires are free and clear of the receiver. Care should be taken also to keep the wires from jamming between the wood rails and the batteries.
8. Close the end panel and replace the wood screws, fastening them securely.

### Battery Installation for Model CE-260

The cabinet for this model is designed to house completely the combined "A" and "B" pack. Place the battery pack in the cabinet at the rear of the receiver and insert the four-prong plug of the battery cable into the socket on the top of the battery.

If it is desired to use separate "A" and "B" plug-in type batteries, a special cable harness is available for connecting the batteries together. The receiver battery cable then may be plugged into the socket on the special cable harness.

**When ordering replacement parts specify part numbers.**

| *Item | Part No. | DESCRIPTION (Subject to change without notice) | List Price Ea. Effective as of Feb. 15th, 1939 | |
|---|---|---|---|---|
| | | Two-gang variable condenser | 2.50 | C1, C2 |
| | | Trimmer, part of variable condenser (see Production Change No. 3) | | †C4, C5 |
| L2 | 6EW-146 | Loop antenna assembly (for CE-259 only) | $1.45 | C6, C7 |
| L2 | 6EW-152 | Loop antenna assembly (for CE-260 only) | 1.60 | C9, C18 |
| T2 | 6JT-467A | Oscillator coil (see Production Change No. 1c) | .85 | †C10, C11, C12, C13 |
| T3 | 6JT-466B | Double-tuned 455 kc first i-f transformer (see production change no. 1a) | 1.10 | C14 |
| T4 | 6ET-470 | Double tuned 455 kc diode i-f transformer (see production change no. 1b) | 1.10 | C15, C17 |
| R1 | LR-61 | 200,000 ohm ½ watt carbon resistor | .16 | C16 |
| R2 | ZZR-196 | 30,000 ohm ¼ watt carbon resistor (see Production Change No. 1f) | .16 | C19 |
| R3, R6 | KR-54 | 100,000 ohm ¼ watt carbon resistor | .16 | C20 |
| R4, R8, R13 | HR-42 | 2 megohm ¼ watt carbon resistor | .16 | 6ES-367 |
| R5 | LR-65 | 10,000 ohm ¼ watt carbon resistor | .16 | 6ED-73 |
| R9, R10 | KR-56 | .5 megohm ¼ watt carbon resistor | .16 | 6ED-69 |
| R11 | 6ER-360 | 740 ohm ½ watt wire wound resistor | .16 | 4MZ-5883 |
| R12 | 3HR-240B | Volume control 500,000 ohms with double pole line switch (for CE-259) | 1.05 | 4XE-8 |
| R12 | 3HR-240C | Volume control 500,000 ohms with double pole line switch (for CE-260) | 1.05 | 4XE-8 |
| | | Two-gang variable condenser | 2.50 | |
| | | Trimmer, part of variable condenser (see Production Change No. 3) | | |
| | | 0.05 mf, 200 volt tubular condenser | .20 | |
| | | 0.02 mf, 400 volt tubular condenser | .20 | |
| | | Trimmer, part of i-f transformer | | |
| | | 0.0002 mf, 600 volt tubular or mica condenser | .20 | |
| | | 0.00022 mf mica condenser (see Production Change No. 4) | .20 | |
| | | 0.01 mf, 400 volt tubular condenser | .20 | |
| | | 0.001 mf, 600 volt tubular condenser | .20 | |
| | | 8 mf, 100 volt dry electrolytic condenser | .60 | |
| | | 5" permanent magnet dynamic speaker | 6.25 | 5JZ-824 |
| | | Dial face (see production change no. 2) | .25 | 4YZ-772 |
| | | Indicator dial | .10 | 6EW-135 |
| | | Dial pointer | .20 | 6EW-148 |
| | | Dial crystal | .20 | |

Drive cord spring .05
Dial drive cord .02
Battery cable (for CE-259) .65
Battery cable (for CE-260) .75

† Not supplied separately.
* Item number locates the article on the schematic diagram.

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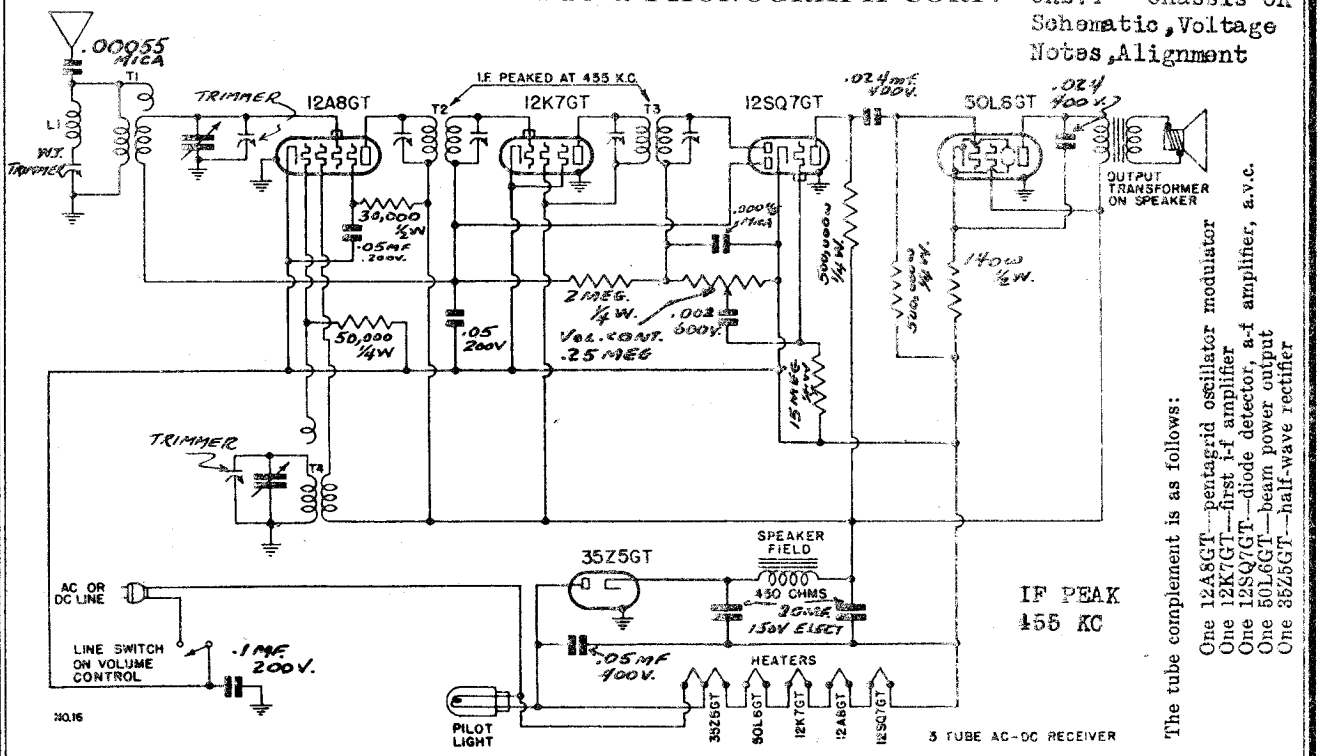
EMERSON RADIO & PHONOGRAPH CORP.

MODELS CR261,CR262 CR274 Chassis CR Schematic,Voltage Notes,Alignment




# MODELS CR-261, CR-262 and CR-274

Voltage rating ..... 105-125 volts, a.c. or d.c.
Power consumption .... 30 watts.
Frequency range ..... 540 to 1730 kc.

CHASSIS MODEL CR

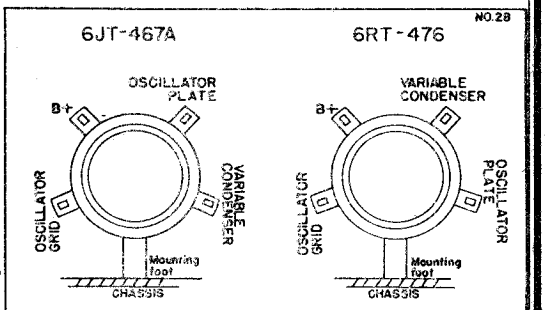
## ALIGNMENT AND LOCATION OF TRIMMERS

**IF. 455kc through .01 mf. cond. to grid of 12A8G 1st IF, top of chassis right of speaker;2nd IF under chassis beneath variable, holes provided in top of chassis.-Variable max. cap. Adjust trimmers to max. response.**

**Wave Trap(see GENERAL NOTES) Feed 455kc through .0001 mf. cond. to ant. lead. Adjust for minimum response.**

**RF. Dial at 140. Feed 1400kc through .0001 mf. cond. to ant. lead. Adjust osc. trimmer(rear section of variable), then ant. trimmer (front section of variable) for maximum response.**

NO.28




MOUNTING FOOT IS GROUND CONNECTION FOR BOTH COILS

CR chassis may use either oscillator coil

VIEW LOOKING AT LUG END OF COILS SHOWING LEADS TO OSCILLATOR COILS

## GENERAL NOTES

1. If replacements are made or the wiring disturbed in the r-f section of the circuit, the receiver should be carefully re-aligned.
2. In operating the receiver on d.c. it may be necessary to reverse the line plug for correct polarity.
3. The color coding of the i-f transformer leads is as follows:

| | |
|---|---|
| Grid—green | Plate—blue |
| Grid return—black | B plus—red |

4. The wave-trap in the receiver has been adjusted for maximum signal rejection at 455 kc. If, however, persistent interference is experienced from some particular telegraphic station, readjust the wave-trap trimmer until the response from the interfering station is at a minimum.

## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed below are from point indicated to B minus (switch) with the volume control turned on full and no signal. Line voltage for these readings was 117.5 volts, 60 cycles, a.c. All readings except heaters and cathodes were taken on 250 volt scale. Measurements made with 117.5 volts d.c. will be lower than those given below.

| *Tube* | *Plate* | *Screen* | *Cathode* | *Osc. Plate* | *Fil.* |
|---|---|---|---|---|---|
| 12A8GT ..... | 88 | 45 | 0 | 88 | 12 |
| 12K7GT ..... | 88 | 88 | 0 | — | 12 |
| 12SQ7GT ..... | 40 | — | 0 | — | 12 |
| 50L6GT ..... | 82 | 88 | 5.7 | — | 50 |

Voltage at 35Z5 cathode—115 volts. Voltage across speaker field—27 volts. Voltage across pilot light—4.5 volts.

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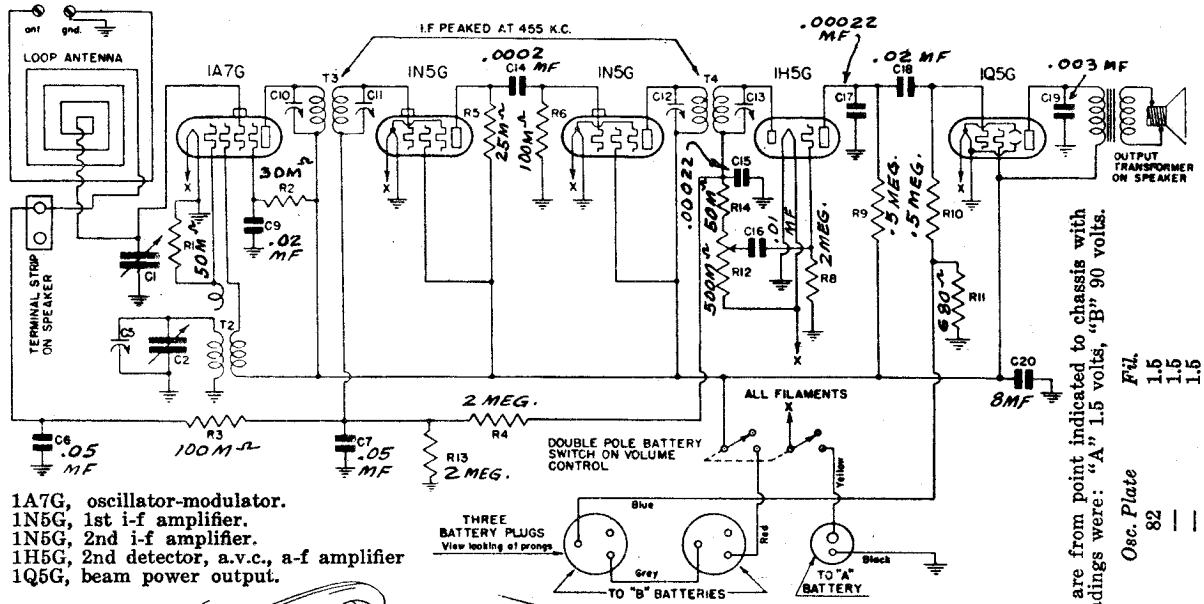
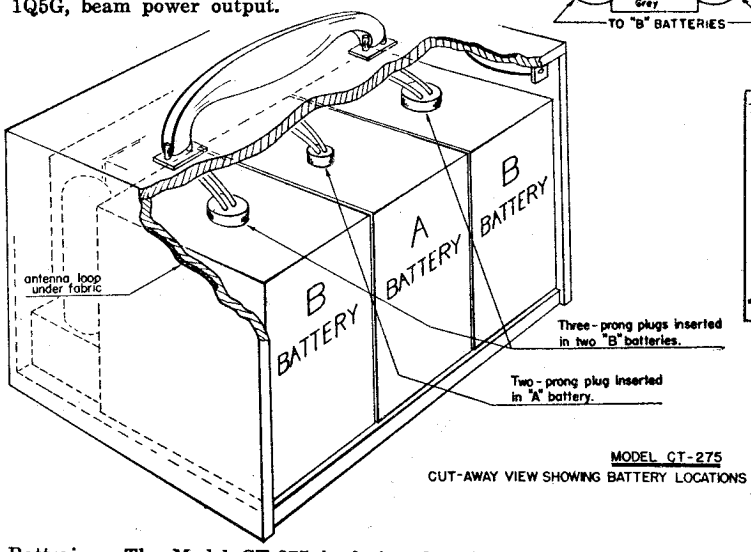
MODEL CT275
Chassis CT
Schematic, Voltage Alignment

# EMERSON RADIO & PHONOGRAPH CORP.

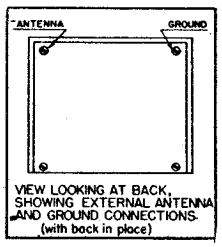
Current drain .... "A" battery—0.3 amps.
"B" battery—0.010 amps. with no signal
Frequency range .. 530 to 1600 kc




1A7G, oscillator-modulator.
1N5G, 1st i-f amplifier.
1N5G, 2nd i-f amplifier.
1H5G, 2nd detector, a.v.c., a-f amplifier
1Q5G, beam power output.




MODEL CT-275
CUT-AWAY VIEW SHOWING BATTERY LOCATIONS AND WIRE CONNECTIONS




## VOLTAGE ANALYSIS

Readings should be taken with a 1000 ohms-per-volt meter. Voltages listed are from point indicated to chassis with volume control turned on full and no signal. The battery voltages for these readings were: "A" 1.5 volts, "B" 90 volts.

| Tube | Plate | Screen | Osc. Plate | Fil. |
|---|---|---|---|---|
| 1A7G | 82 | 52 | 82 | 1.5 |
| 1N5G 1st i-f | 48 | 82 | | 1.5 |
| 1N5G 2nd i-f | 82 | 82 | | 1.5 |
| 1H5G | 25 | — | | 1.5 |
| 1Q5G | 77 | 82 | | 1.5 |

Bias for the 1Q5G tube is obtained across the resistor R11. The voltage drop across this resistor should be 7.0 volts.

Batteries: The Model CT-275 is designed to house the complete set of batteries within the cabinet.

The battery complement should be as follows:

| Type Battery | No. Req. | Eveready Part No. | Rayovac Part No. | Burgess Part No. |
|---|---|---|---|---|
| 1½ volt "A" | 1 | 741 (plug-in type) | — | 8F (plug-in type) |
| 45 volt "B" | 2 | 762 (plug-in type) | P-5303 (plug-in type) | B30-P1 (plug-in type) |

The color coding of the i-f transformer leads is as follows:

Grid—green
Grid return—black
Plate—blue
B plus—red

The color coding of the battery cable is as follows:

Red—B plus, 90 volts
Blue—B minus
Yellow—A plus, 1.5 volts
Black—A minus

## Location of Coils and Trimmer Adjustments

The i-f transformers are located in cans mounted on top of the chassis. The first i-f transformer is the one between the speaker and the variable condenser. The diode i-f transformer is the one behind the speaker. The trimming condensers for both transformers can be reached through holes in the tops of the cans.

## I-f Alignment

The oscillator coil is located beneath the chassis. The trimmer for the oscillator is on the rear section of the variable condenser.

Swing variable condenser to minimum capacity position.

Feed 455 kc to the grid of the 1A7G tube through a 0.01 mf condenser. Adjust the four i-f trimmers for maximum response.

## R-f Alignment

Set the dial pointer at 140. Feed 1400 kc through a .0001 mf condenser to the antenna connection and adjust the oscillator trimmer (on rear section of variable condenser) for maximum response. No alignment necessary on antenna circuit.

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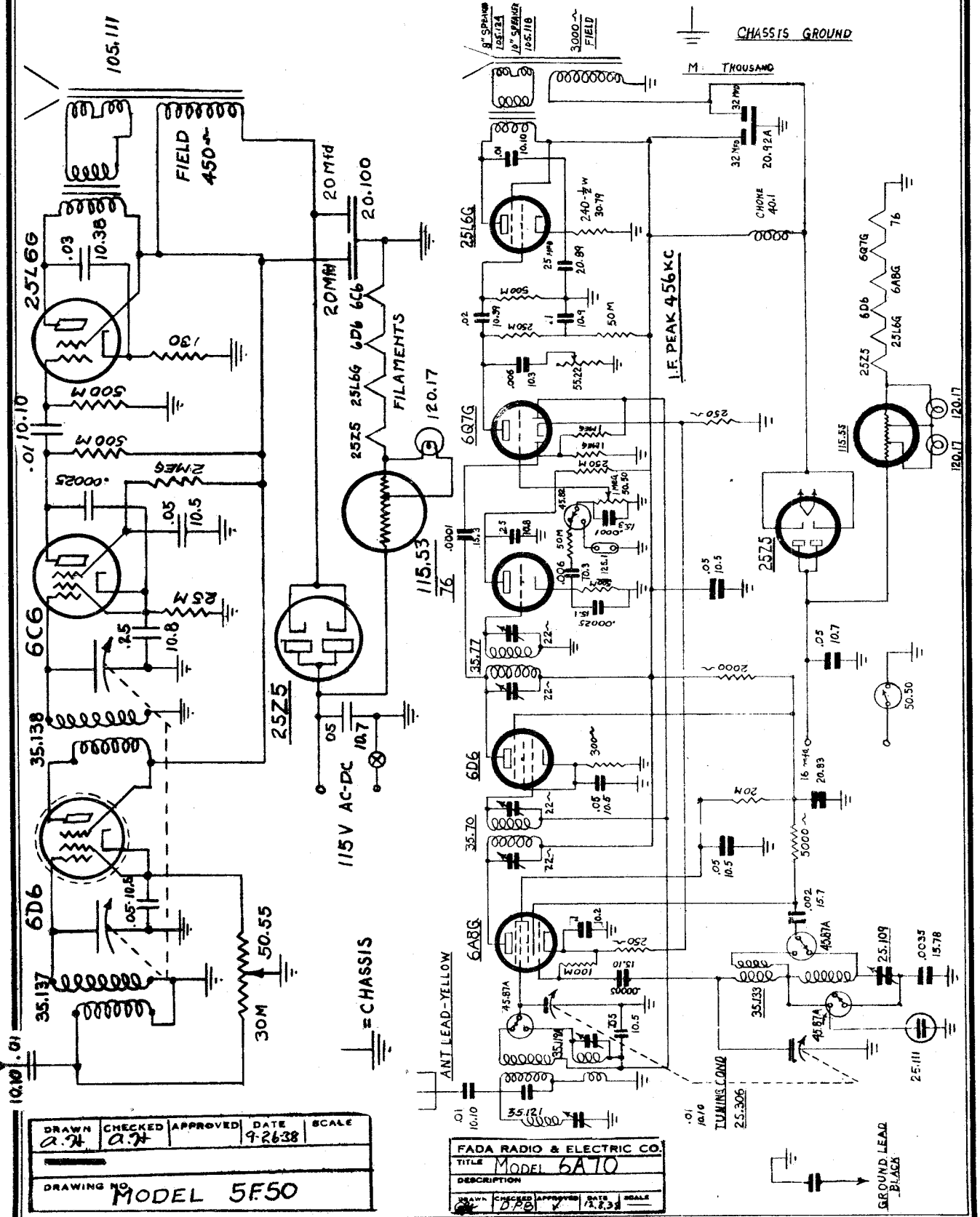
FADA RADIO & ELECTRIC CO

MODEL 5F50
MODEL 6A70
Schematics

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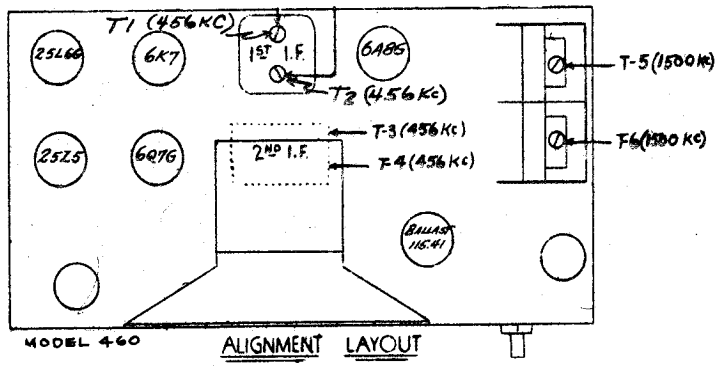
FOR OTHER DATA SEE INDEX

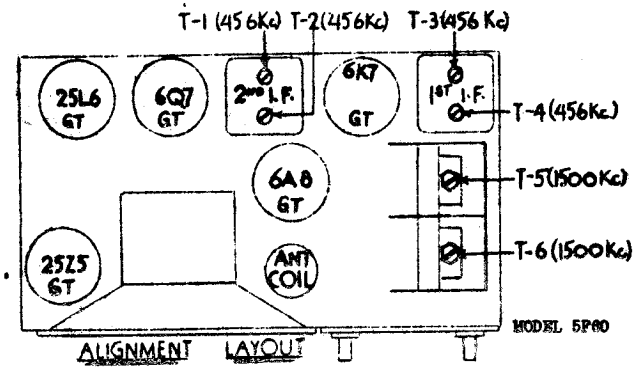
MODEL 5F60 MODEL 460 - 115 VOLTS AC-DC - Tuning Range 540-1720 K.C. - 6 Tube Superheterodyne. Tubes required - 6A8G-6K7-6Q7G-25L6G-25Z5-115.41.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked then proceed as follows:---Remove chassis from case and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6A8G tube in series with a.1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. with magic wand.

MODEL 460 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

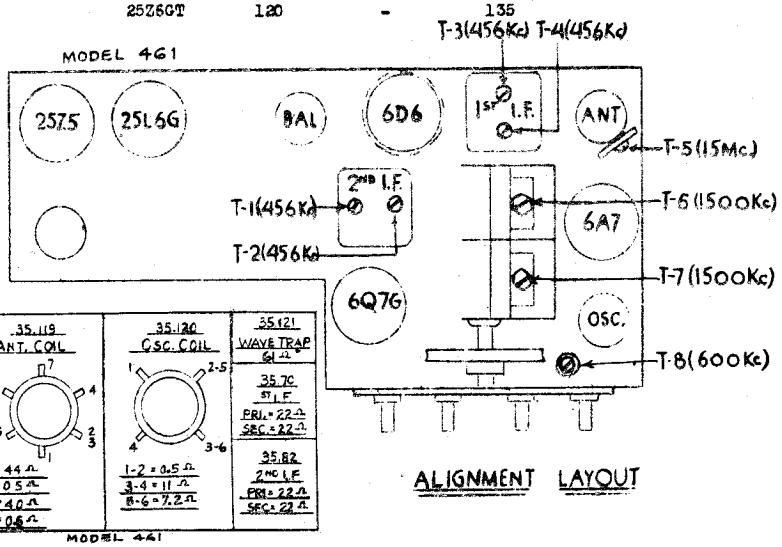
| | Plate | Screen | Cathode | Anode |
|---|---|---|---|---|
| 6A8G | 110 | 50 | 2.5 | 105 |
| 6K7 | 110 | 110 | 2.5 | - |
| 6Q7G | 45 | - | 1.1 | - |
| 25L6G | 110 | 110 | 7. | - |
| 25Z5 | 120 AC | - | | 133 |




MODEL 5F60 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

| | Plate | Screen | Cathode | Anode |
|---|---|---|---|---|
| 6A8GT | 103 | 60 | 0 | 103 |
| 6K7GT | 102 | 104 | 0 | |
| 6Q7GT | 45 | - | 0 | |
| 25L6GT | 95 | 104 | 7 | |
| 25Z6GT | 120 | - | 135 | |




FADA RADIO MODEL 461 - 115 VOLTS - AC-DC - Tuning Range 545-1720 K.C. and 5.8-18.4 Megacycles-6 Tube Superheterodyne. Tubes required-6A7-6D6-6Q7G-25L6G-25Z5-115.41. Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:---Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

MODEL 461 THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

| | Plate | Screen | Cathode | Anode |
|---|---|---|---|---|
| 6A7 | 104 | 52 | 2.1 | 75 |
| 6D6 | 104 | 104 | 3.0 | - |
| 6Q7G | 45 | - | 1.1 | - |
| 25L6 | 98 | 104 | 6.7 | - |
| 25Z5 | 120 A.C. | | 133 | - |

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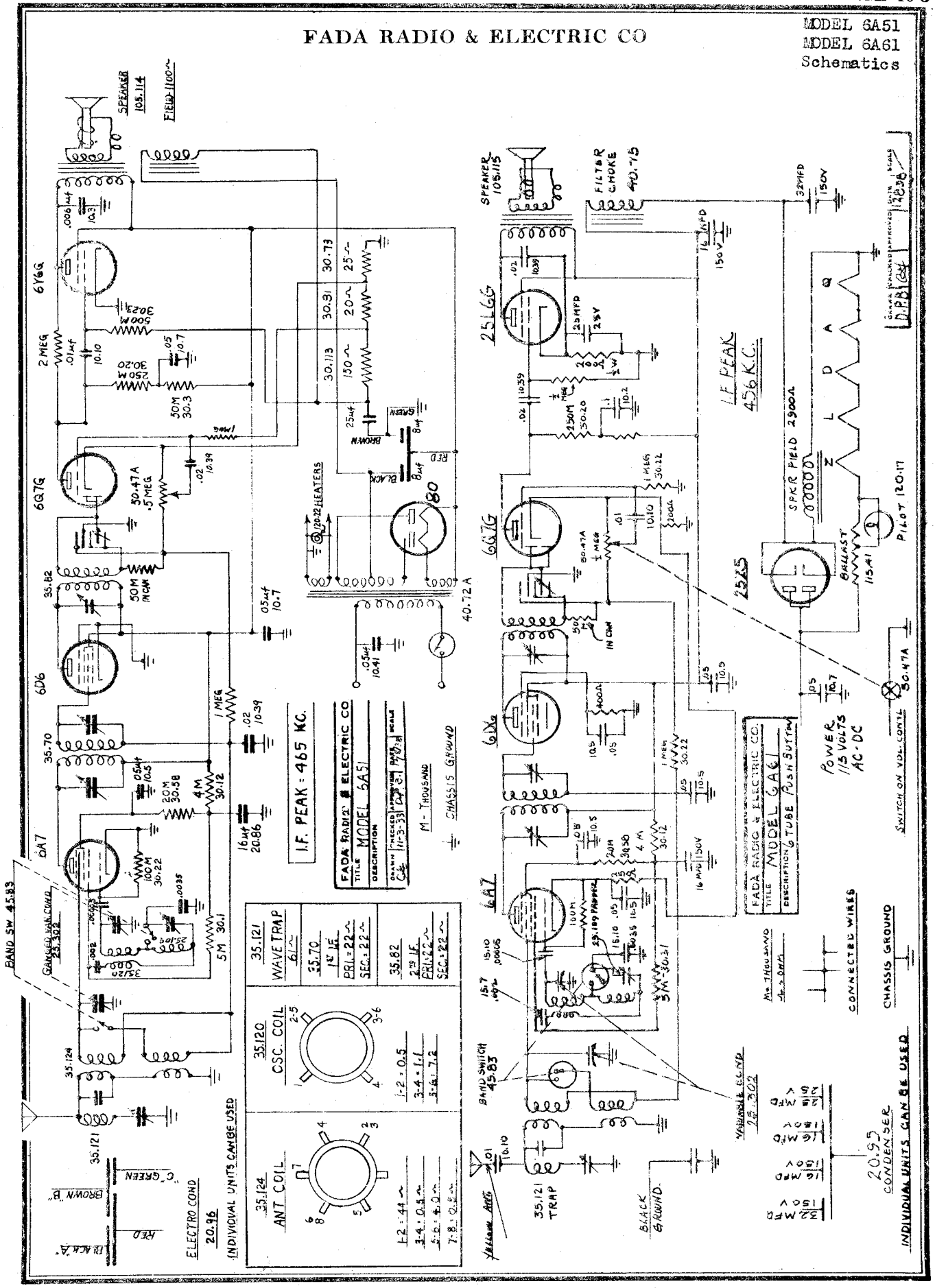
# FADA RADIO & ELECTRIC CO

MODEL 6A51
MODEL 6A61
Schematics

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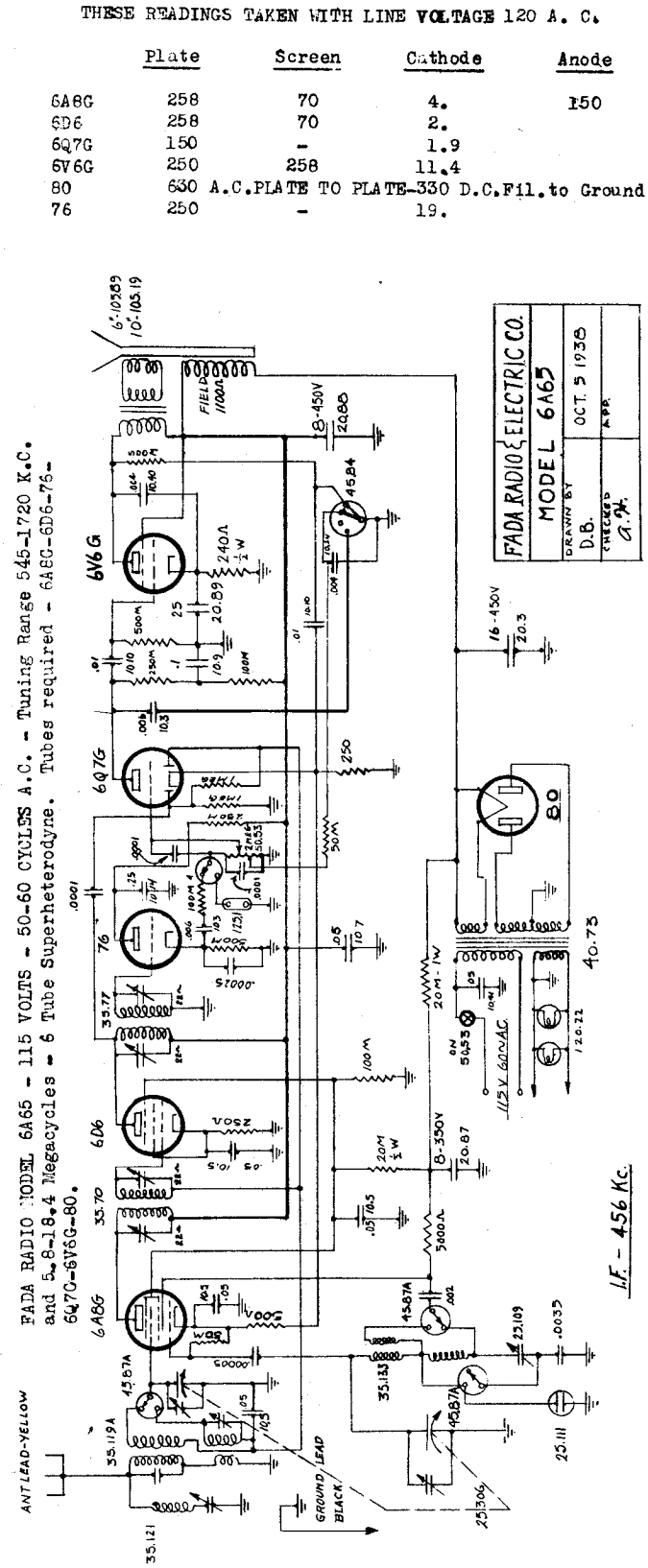
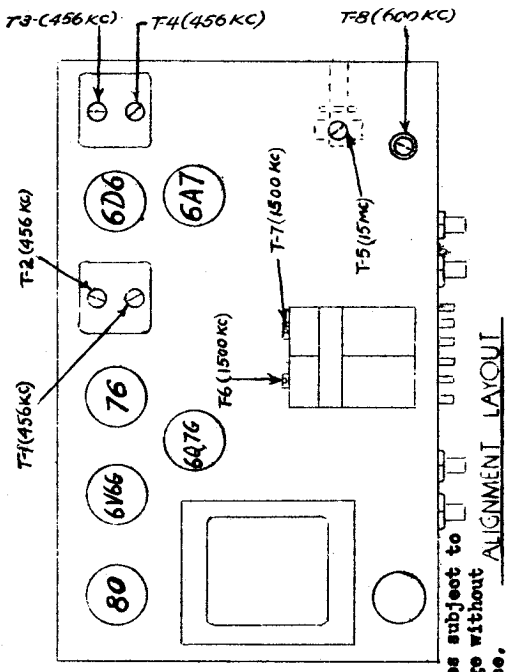
MODEL 6A65
Schematic, Voltage
Alignment, Socket
Trimmers

# FADA RADIO & ELECTRIC CO

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A. C.

| | Plate | Screen | Cathode | Anode |
|---|---|---|---|---|
| 6A8G | 258 | 70 | 4. | 150 |
| 6D6 | 258 | 70 | 2. | |
| 6Q7G | 150 | - | 1.9 | |
| 6V6G | 250 | 258 | 11.4 | |
| 80 | 630 A.C.PLATE TO PLATE-330 D.C.Fil.to Ground | | | |
| 76 | 250 | - | 19. | |


FADA RADIO MODEL 6A65 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range 545-1720 K.C. and 5.8-18.4 Megacycles - 6 Tube Superheterodyne. Tubes required - 6A8G-6D6-76-6Q7G-6V6G-80.
I.F. - 456 Kc.
ANT LEAD-YELLOW
GROUND LEAD BLACK
FADA RADIO & ELECTRIC CO.
MODEL 6A65
DRAWN BY D.B.
OCT. 5 1936
CHECKED C.M.
APP.




Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:---Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A8G tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

| | | List |
|---|---|---|
| 50.53 | Volume Control | .85 |
| 45.84 | Tone Switch | .65 |
| 45.87A | Band Switch | .70 |
| 40.73 | Power Transformer | 3.60 |
| 35.119A | Antenna Coil | 1.35 |
| 35.133 | Oscillator Coil | .60 |
| 35.70 | I.F. Input | 1.20 |
| 35.77 | I.F. Output | 1.20 |
| 35.121 | I.F. Trap | .45 |
| 25.306 | Variable Cond. | 2.60 |
| 105.123 | Speaker (8") | 6.30 |
| 105.119 | " (10") | 7.75 |

Prices subject to change without notice.

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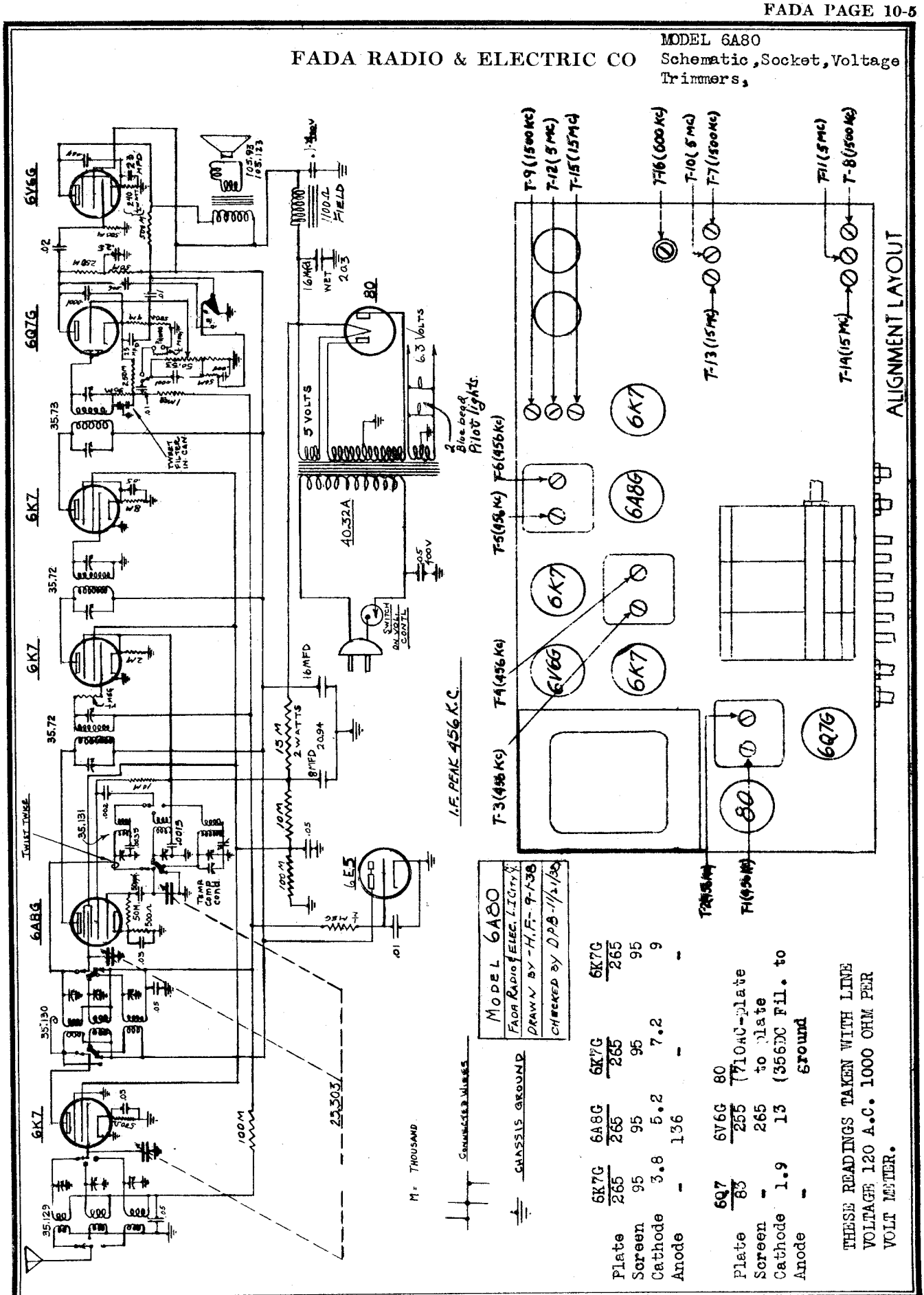
FADA RADIO & ELECTRIC CO

MODEL 6A80
Schematic, Socket, Voltage
Trimmers,




| | 6K7G | 6A8G | 6K7G | 6K7G |
|---|---|---|---|---|
| Plate | 265 | 265 | 265 | 265 |
| Screen | 95 | 95 | 95 | 95 |
| Cathode | 3.8 | 6.2 | 7.2 | 9 |
| Anode | - | 136 | - | - |

| | 6Q7 | 6V6G | 80 | |
|---|---|---|---|---|
| Plate | 83 | 255 | (Total Plate | |
| Screen | - | 265 | to Plate | |
| Cathode | 1.9 | 13 | (356DC Fil. to | |
| Anode | - | | ground | |

THESE READINGS TAKEN WITH LINE
VOLTAGE 120 A.C. 1000 OHM PER
VOLT METER.

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MODEL 6A80
Alignment
MODELS 366,366PT
Flash-O-Matic Data

# FADA RADIO & ELECTRIC CO

## FADA FLASH-O-MATIC SIX

**INTRODUCTION:** FADA Flash-o-Matic Six is an electrical type automatic tuning system that, once adjusted, will automatically "tune in" any one of six local broadcast stations operating between 540 and 1500 kilocycles (K. C.). While the Flash-o-Matic is not confined to local reception, it should be adjusted for stations affording the best reception and most frequently "tuned in."

**ALIGNING PROCEDURE:** It is advisable that the receiver remain in operation for fifteen minutes or more before attempting any adjustments. Now that the receiver has reached constant temperature the following adjustments are to be made to the trimmer condenser set screws located on the Flash-o-Matic tuning panel at the rear of the receiver.

(a) Select six local broadcast stations whose programs are preferred; then, detach the station call letters from the station call letter tab sheets, which are supplied with each receiver.

(b) The six Flash-o-Matic positions are numbered and arranged according to frequency limits.

There are number tabs (1 to 6) in the Flash-o-Matic escutcheon as shipped from the factory. These tabs show the relation between the Flash-o-Matic escutcheon and the Flash-o-Matic tuning panel positions and are to be removed, one at a time (with the aid of a pin) when inserting the station call letters.

The six call letter tabs corresponding to the six broadcast stations which have been chosen, must be arranged in the Flash-o-Matic escutcheon so that the frequency in kilocycles of each station will fall within the frequency limits of the proper group.
If one of the chosen stations has an operating frequency of 550 K.C., it should be placed in the No. 1 (530 to 710 K.C.) group, a station of 600 K.C. should be placed in the No. 2 group, etc.

Each group has considerable overlap to allow for the selection of six stations which may have frequency assignments comparatively close together.

Having inserted the call letter tabs, cover each tab with a celluloid disc furnished with your receiver.

(c) Two trimmer condenser set screws are provided for each one of the six station positions and are accessible at the rear of the receiver. All trimmer condenser set screw adjustments are marked as to their group number and frequency range coverage.

(d) Tune in the station in the usual manner, using manual tuning, and determine the program.

(e) Turn the wave band switch completely to the right (clockwise).

(f) Turn the Flash-o-Matic selector switch to the position that corresponds to the group in which the desired station falls. This can be readily determined, for as the Flash-o-Matic selector switch is turned the various call letters will light up.

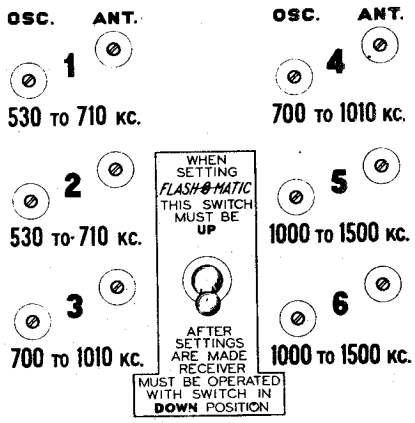
(g) The toggle switch *(SEE ILLUSTRATION)* near the center of the Flash-o-Matic tuning panel should be thrown to the "UP" position during the following adjustments.

(h) With the aid of a screwdriver adjust (by turning clockwise or counter-clockwise) the OSC. trimmer condenser set screw *(SEE ILLUSTRATION)* corresponding to the proper station, until the same station that was tuned in manually is heard. Turn the volume control down so that any variation in sound output can be noted and readjust set screw for maximum sound output. *TAKE PARTICULAR CARE WHILE MAKING THIS ADJUSTMENT THAT THE SAME STATION IS HEARD AND NOT A NETWORK STATION BROADCASTING THE SAME PROGRAM.*

(i) Now adjust the ANT. trimmer condenser set screw *(SEE ILLUSTRATION)* having the same position number, for maximum sound output.

(J) Repeat the same procedure as outlined above for each of the remaining five stations.

(k) To insure accurate adjustment, it may be found advisable to repeat the operations outlined in paragraphs (h), (i) and (J).




(l) Having completed the adjustments for the desired stations throw the toggle switch *(SEE ILLUSTRATION)* to "DOWN" position. The receiver is now ready for Flash-o-Matic operation and any one of the six stations to which the Flash-o-Matic has been adjusted, may be instantly "tuned in" by merely rotating the Flash-o-Matic selector knob to the desired station position.

(m) In order to reset one or more positions of the Flash-o-Matic tuning to other stations, it is merely necessary to follow the instructions outlined above; additional celluloid discs are supplied for this purpose.

**OPERATING PROCEDURE:** For Flash-o-Matic tuning turn the wave band switch completely to the right (clockwise): this will reduce the illumination of the station selector dial. Then, turn the Flash-o-Matic selector switch until the call letters of the desired station are illuminated. To return to standard or manual tuning simply turn the wave band selector switch toward the left (counter-clockwise) to the desired wave band.

ALIGNMENT MODEL 6A80

Tuning ranges 533-1730 K.C., 1.71-5.7 M.C. and 5.67 and 18.1 M.C. Tubes 3-6K7G-6A8G-6E5-6V6G-80.

Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. Turn volume control to maximum. Tone switch to high end. Band switch to broadcast. Connect modulated oscillator to grid of 6A8G in series with a .1 condenser and adjust trimmers 1-2-3-4-5-6 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 signal adjust trimmers 7-8-9 for maximum output, reducing input signal as required. Turn pointer to 600 K.C. Shift oscillator to 600 K.C. and adjust padder 16 for maximum while rocking gang condenser. Check alignment at 1000 K.C. Turn band switch to position 2- turn pointer to 5 M.C. Use a 400 ohm carbon resistor for dummy antenna. Adjust trimmers 10-11-12 for maximum output. Check output at .8 and 2.4. Make sure 5 M.C. was aligned on fundamental and not image. Turn band switch to position 3 - turn pointer to 15 M.C. Adjust trimmers 13-14-15 for maximum. Check image at 14.1. Check sensitivity at 6 M.C.

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Alignment, Voltage
Socket, Trimmers

# FADA RADIO & ELECTRIC CO

MODELS 20, 20A,
20B, 20T (Late)
MODEL 450
MODEL 451
MODELS 454, 454T

FOR OTHER DATA ON THESE MODELS, SEE INDEX




MODEL 451 (TAKEN WITH LINE VOLTAGE 120 A.C.)

| | Plate | Screen | Cathode | Anode |
|---|---|---|---|---|
| 6A8 | 107 | 52 | 1.4 | 78 |
| 6D6 | 107 | 107 | 1.4 | |
| 6Q7G | 55 | - | 1.2 | |
| 6Y6G | 100 | 107 | 11 | |
| 80 | 414 A.C. Plate to Plate | | | |

MODELS 20,20A,20B,20T. VOLTAGE DATA
THESE READINGS TAKEN WITH LINE VOLTAGE 120 AC

| | PLATE | SCREEN | CATHODE | ANODE |
|---|---|---|---|---|
| 6A7 | 110 | 50 | 2.5 | 105 |
| 6D6 | 110 | 110 | 2.5 | |
| 6Q7G | 45 | - | 1.1 | |
| 25L6G | 110 | 110 | 7 | |
| 25Z5 | 120 AC | - | 133 | |

MODEL 451 ALIGNMENT LAYOUT

MODEL 454, 454T

MODELS 20, 20A 20B and 20T.

NOTE:-MODEL 20T DIFFERS FROM MODEL 20A IN THAT IT HAS A SEPERATE SPEAKER AND A LONGER VOLUME CONTROL SHAFT
MODEL 20B DIFFERS IN THAT A 76 TUBE IS SUBSTITUTED FOR THE 6Q7G TO ACCOMMODATE AUTOMATIC VOLUME CONTROL.

FADA RADIO MODEL 450 - 115 AC-DC - Tuning Range 545-1720 K.C. - 5 Tube Tuned Radio Frequency. Tubes required-6D6-6C6-25L6G-25Z5-115.53.

Alignment Instructions

--Turn volume control to maximum position. Connect a modulated oscillator to antenna lead using a .0001 condenser as a dummy antenna. Turn condenser to minimum position. Roughly adjust to 1720 K.C. Set oscillator at 1500 K.C. Turn condenser until signal is loudest, then adjust trimmers 1 & 2 for maximum signal reducing output of oscillator as required. Check alignment at 600 & 1000 K.C. using magic wand. Slight adjustments can be made at 600 K.C. by adjusting rotor plates.

MODEL 450

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.
1000 OHM PER VOLT METER

| | Plate | Screen |
|---|---|---|
| 6D6 | 103 | 104 |
| 6C6 | 15 | 10 |
| 25L6G | 96 | 104 |
| 25Z5 | 120 A.C. | - |

MODEL 454, 454T. READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

| | Plate | Screen | Cathode | Anode |
|---|---|---|---|---|
| 6A8G | 112 | 62 | 2.7 | 112 |
| 6K7 | 112 | 62 | 2.7 | - |
| 6Q7G | 50 | - | 1.1 | - |
| 6Y6G | 105 | 112 | 11.5 | - |
| 80 | 414 AC Plate to Plate | | | - |




FADA RADIO MODEL 451 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range 545-1720 K.C. and 5.8-18.4 Megacycles - 5 Tube Superheterodyne. Tubes required-6A7-6D6-6Q7G-6Y6G-80. Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:--Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder TB rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. Increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.

FADA RADIO MODELS 454, 454T

FADA MODELS 20, 20A, 20B, 20T. - 115 VOLTS AD-DC - Tuning Range 540-1720 K.C. - 6 Tube Superheterodyne.

---Remove chassis from case and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. with magic wand.

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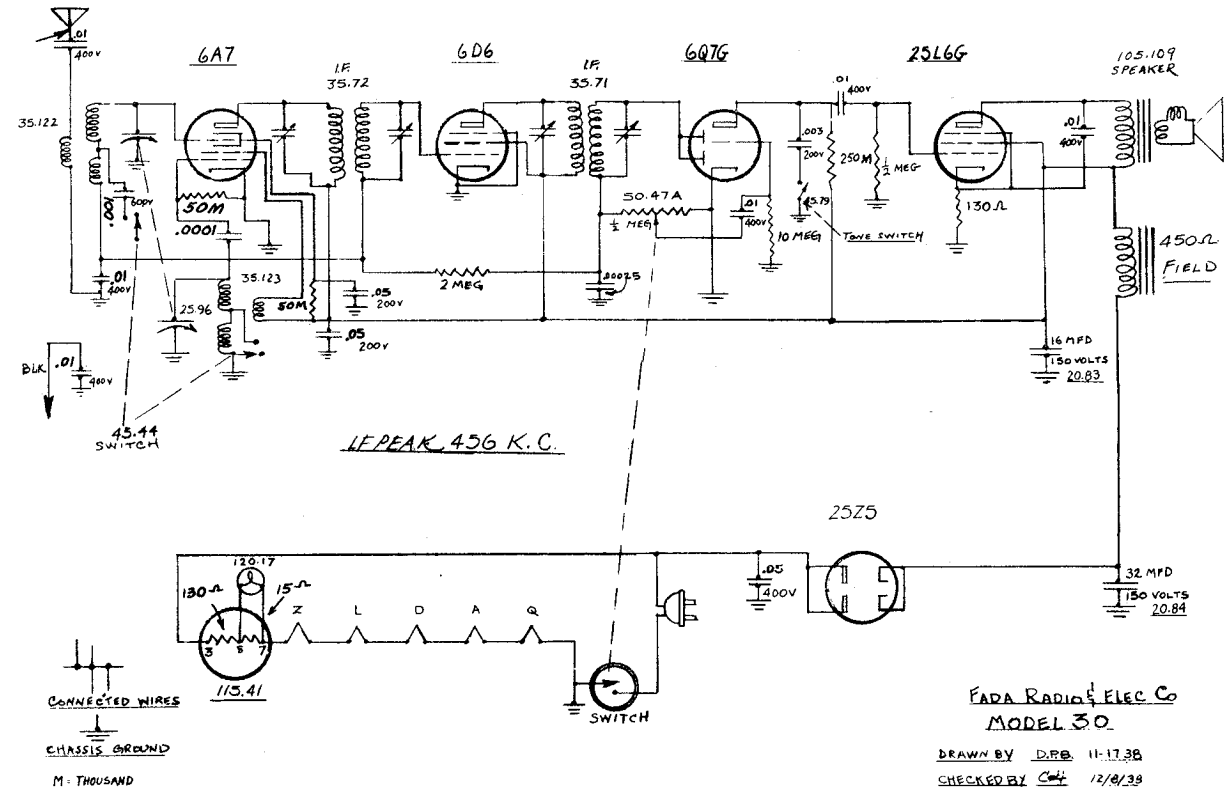
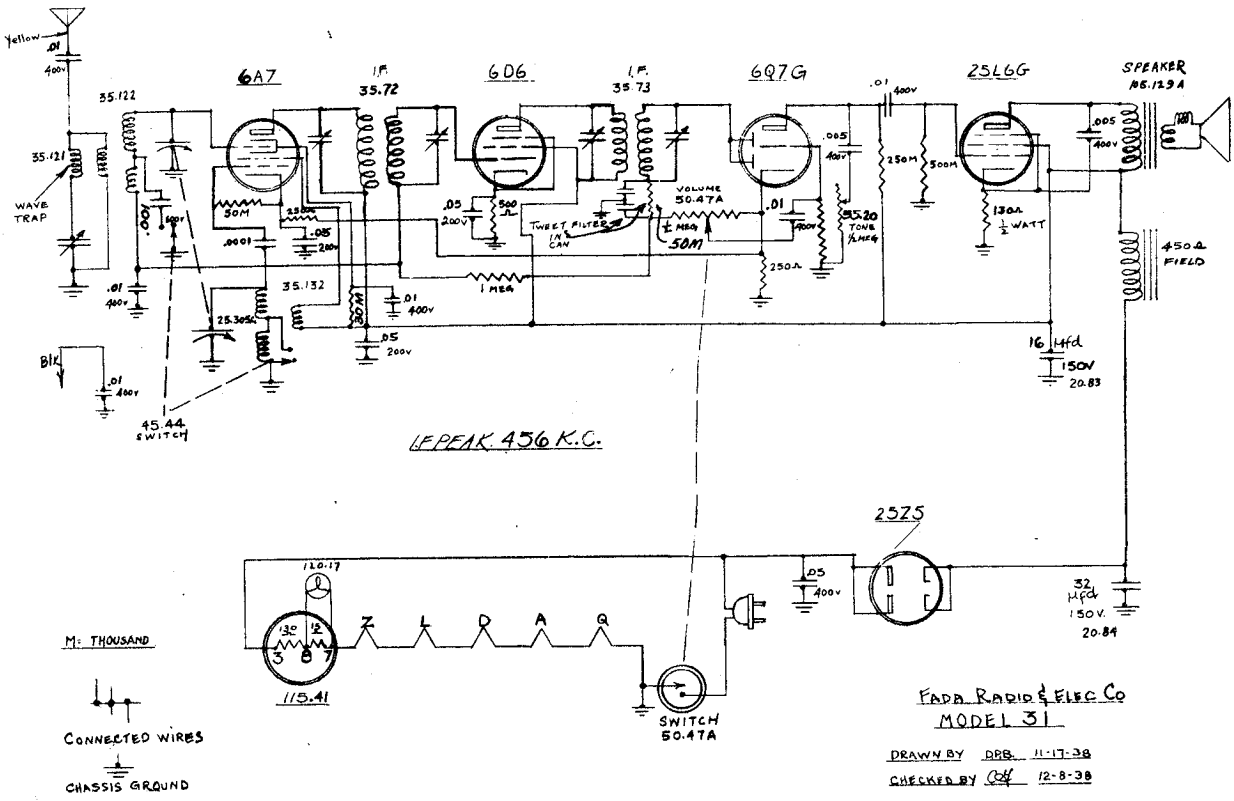
MODEL 30 Late
MODEL 31 Late
Schematics

# FADA RADIO & ELECTRIC CORP.

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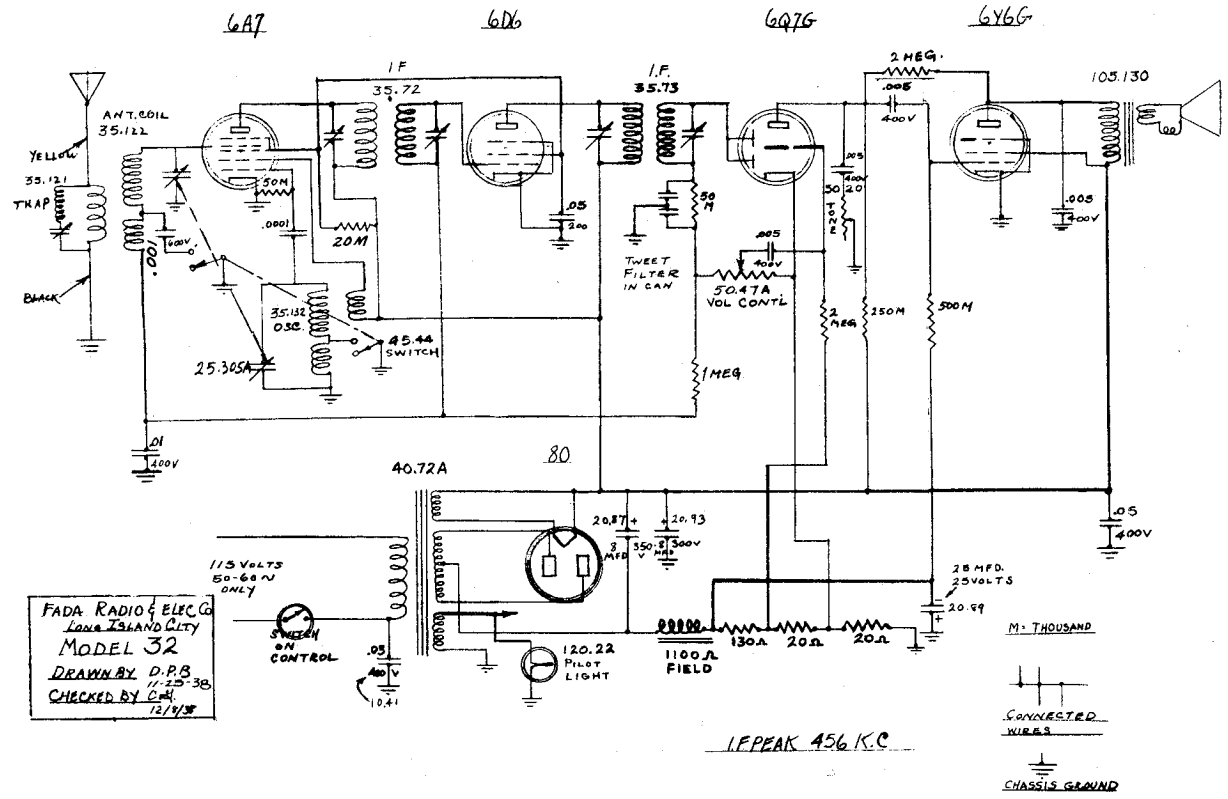
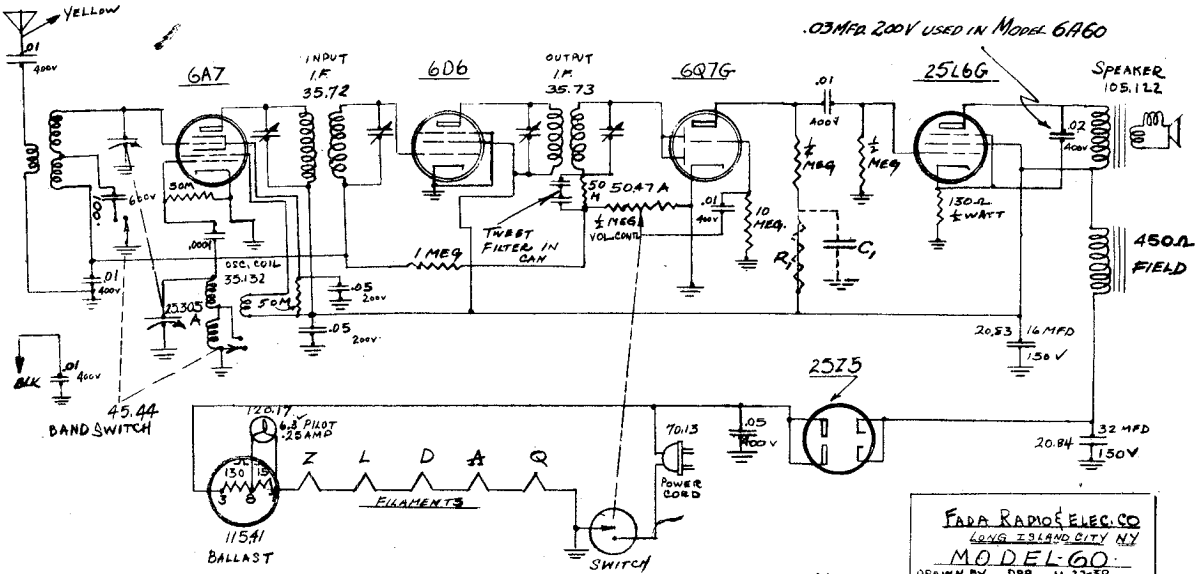
# FADA RADIO & ELECTRIC CORP.

MODEL 32 Late
MODEL 6A60
MODEL 60
Schematics




USED ONLY IN MODEL 6A60
$R_1$ 50M.
$C_1$ .1MFD 200V.
GANG CONDENSER #25.304 (REPLACES #25.305A SHOWN ABOVE).
BAND SWITCH #45.83 (REPLACES #45.44 SHOWN ABOVE).

FADA RADIO & ELEC. CO
LICITY N.Y.
MODEL 6A60
DRAWN BY D.P.B. 11-22-38
CHECKED BY C.H. 12-6-38

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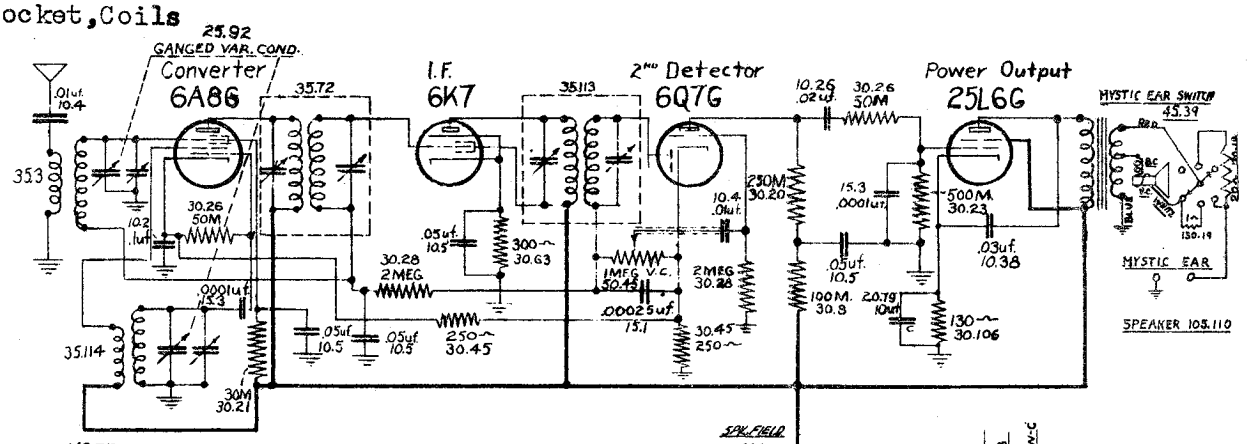
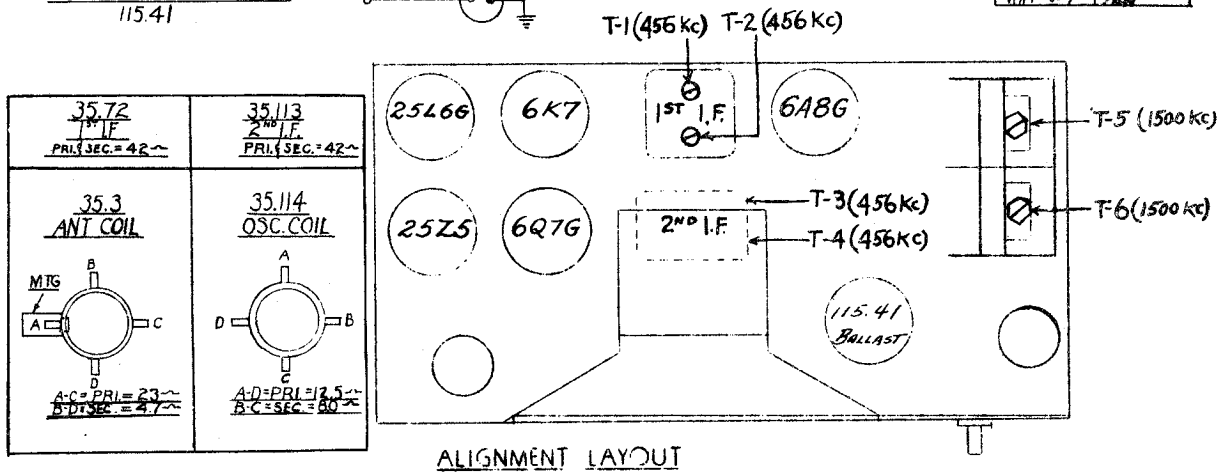
MODEL S46
Schematic, Voltage
Alignment, Trimmers
Socket, Coils

# FADA RADIO & ELECTRIC CO




| | |
|---|---|
| FADA RADIO & ELECTRIC CO. | LONG ISLAND CITY N.Y. |
| MODEL-S46 - SILENT RADIO | |
| DRAWN BY BH | DATE 4-27-36 |
| CHECKED BY RHF 6-7 | APPROVED BY |




ALIGNMENT LAYOUT

FADA RADIO MODEL S46 - 115 VOLTS AC-DC - Tuning Range 540-1720 K.C. - 6 Tube Superheterodyne. Tubes required - 6A8G-6K7-6Q7G-25L6G-25Z5-115.41.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked then proceed as follows:—Remove chassis from case and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Connect modulated oscillator to grid of 6A8G tube in series with a.1 condenser. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. with magic wand.

*** USE ONLY GENUINE FACTORY REPLACEMENT PARTS ***

| | | List |
|---|---|---|
| 75.207 | Dial Assembly | 1.75 |
| 50.45 | Volume Control | .80 |
| 35.3 | Antenna Coil | .60 |
| 35.114 | Oscillator Coil | .45 |
| 35.72 | Input I.F. | 1.00 |
| 35.113 | Output I.F. | .90 |
| 25.92A | Variable Condenser | 2.15 |
| 20.79 | Electrolytic Condenser | 1.25 |
| 105.110 | Speaker | 3.85 |
| 120.27 | Pilot Light Socket | .10 |
| 140.37 | Knobs (walnut) | .10 |
| | (ivory) | .20 |
| 75.245 | Crystal | .25 |

**Prices subject to change without notice.**

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

| | Plate | Screen | Cathode | Anode |
|---|---|---|---|---|
| 6A8G | 110 | 50 | 2.5 | 105 |
| 6K7 | 110 | 110 | 2.5 | - |
| 6Q7G | 45 | - | 1.1 | - |
| 25L6G | 110 | 110 | 7. | - |
| 25Z5 | 120 AC | | | 135 |

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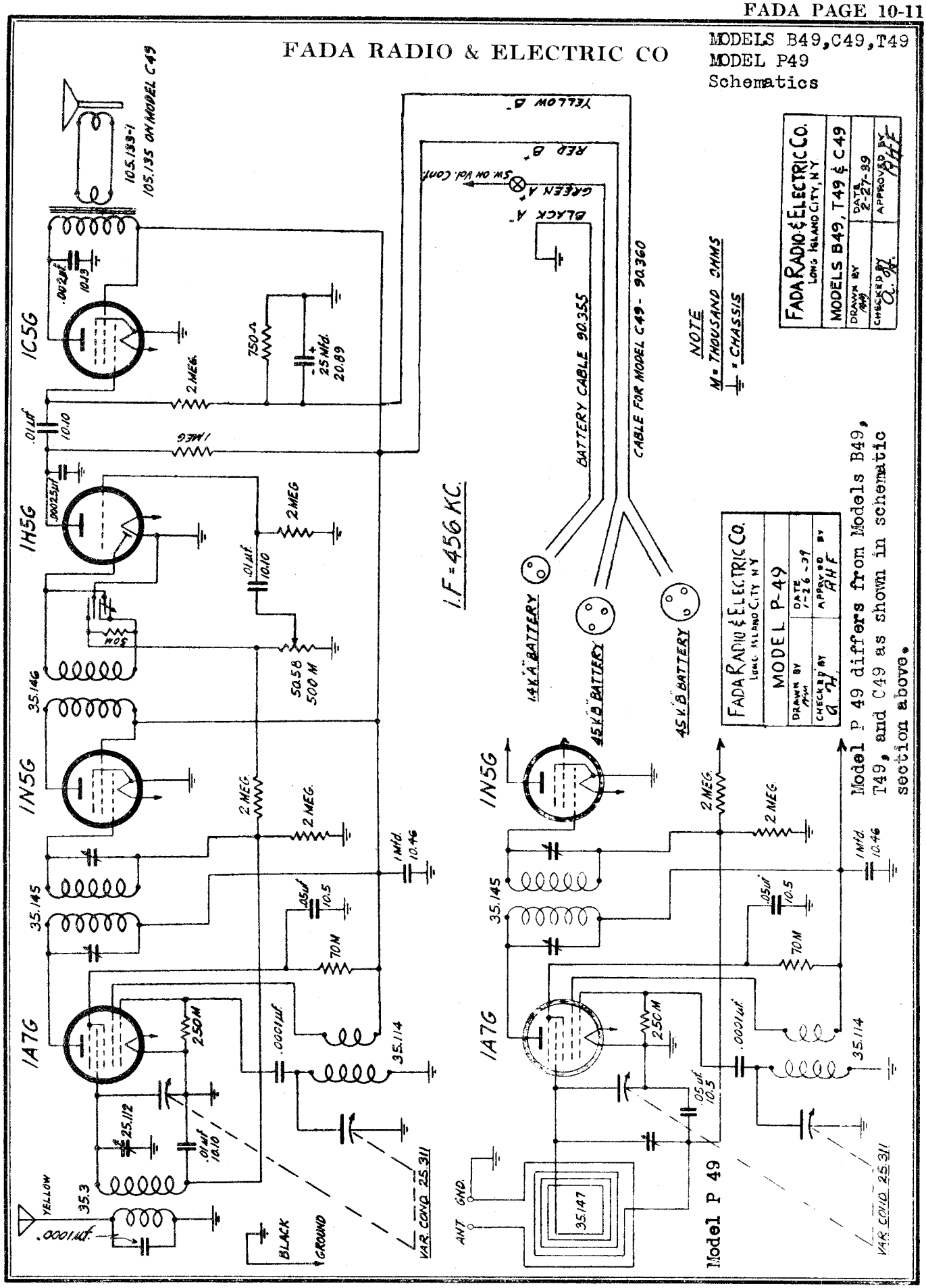
# FADA RADIO & ELECTRIC CO

MODELS B49, C49, T49
MODEL P49
Schematics

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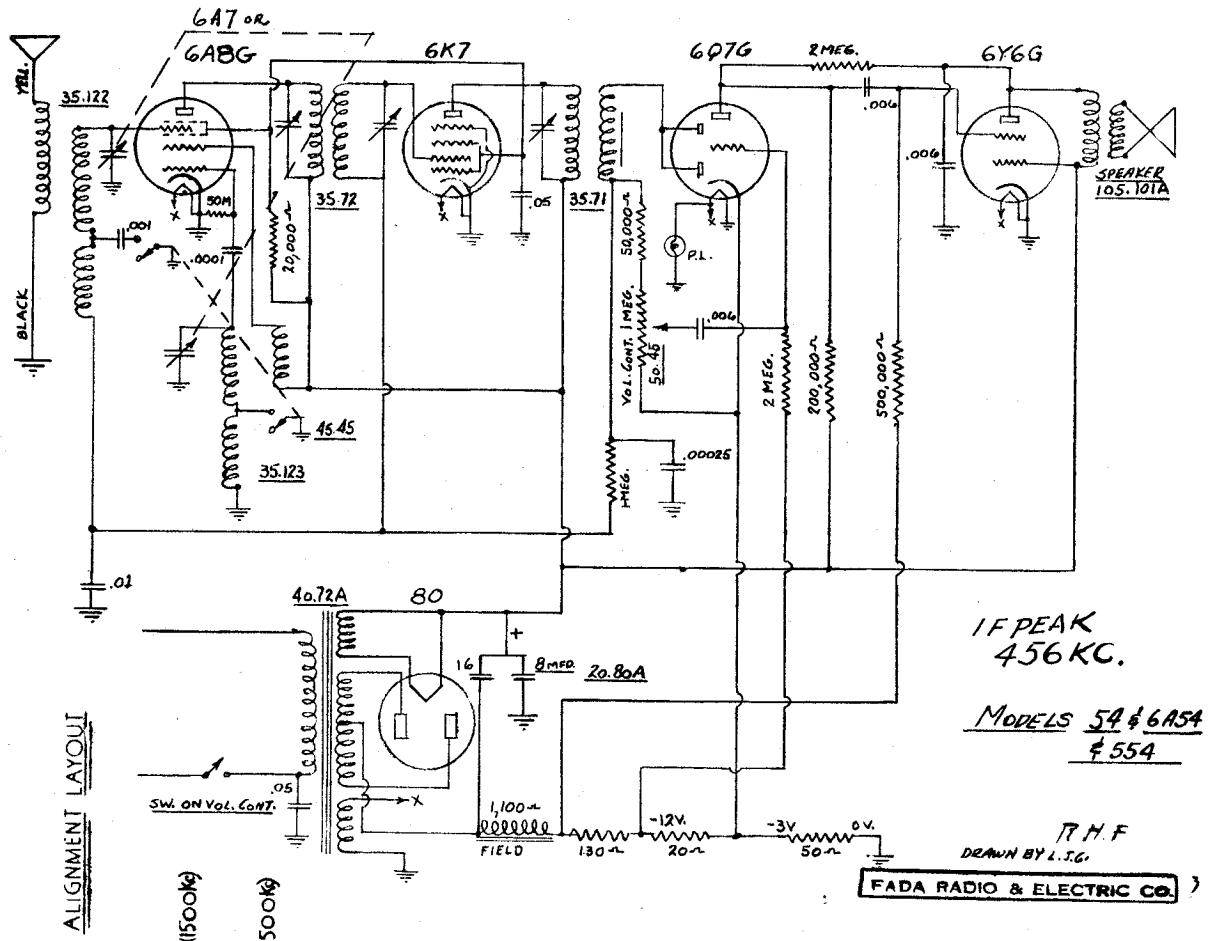
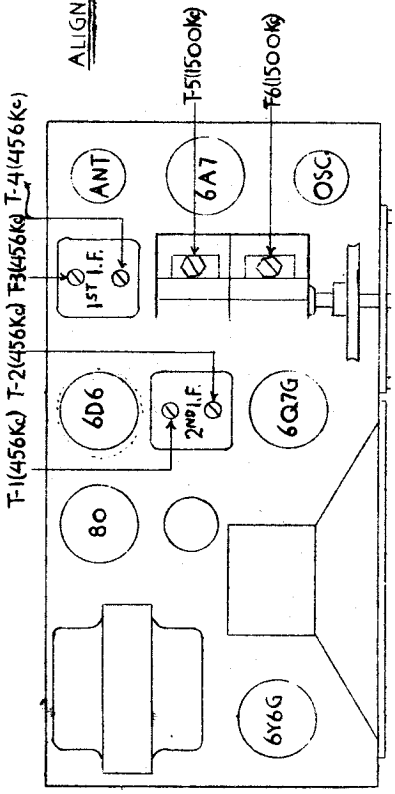
MODELS 54, 6A54, 554
Schematic, Voltage
Alignment, Trimmers
Socket

# FADA RADIO & ELECTRIC CO




FADA RADIO MODEL 54 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range 540-1720 and 1550-4000 K.C. - 5 Tube Superheterodyne. Tubes required-6A7-6D6-6Q7G-6Y6G-80. Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:---Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Band switch in broadcast position. Connect modulated oscillator to grid of 6A7 tube in series with a .1 condensor. Adjust trimmers 1-2-3-4 for maximum reading at 456 K.C. reducing input signal of oscillator as required. Check pointer with condensor fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condensor as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 to give maximum output. Check sensitivity at 1000 and 600 K.C. using magic wand. Set band switch in police band position and check sensitivity at 2800 K.C. Do not disturb trimmers for this operation.

**Prices subject to change without notice.**

| | | List |
|---|---|---|
| 50.47A | Volume Control | .85 |
| 45.44 | Band Switch | .50 |
| 75.229 | Vernier Drive | .25 |
| 35.122 | Antenna Coil | .75 |
| 35.132 | Oscillator Coil | .60 |
| 35.72 | Input I.F. | 1.00 |
| 35.73 | Output I.F. | 1.25 |
| 40.72A | Power Transformer | 3.25 |
| 25.305A | Variable Condenser | 2.10 |
| 20.81A | Electrolytic " | 1.35 |
| 75.267 | Pulley | .20 |
| 75.290 | Dial Plate | .20 |
| 75.223 | Dial Pointer | .15 |
| 75.291 | Dial Scale | .15 |
| 105.114 | Speaker | 4.25 |
| 75.230 | Crystal | .40 |

THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

| | Plate | Screen | Cathode | Anode |
|---|---|---|---|---|
| 6A7 | 112 | 62 | 2.7 | 112 |
| 6D6 | 112 | 62 | 2.7 | - |
| 6Q7G | 50 | - | 1.1 | - |
| 6Y6G | 105 | 112 | 11.5 | - |
| 80 | 414 A.C. Plate to Plate | | | |

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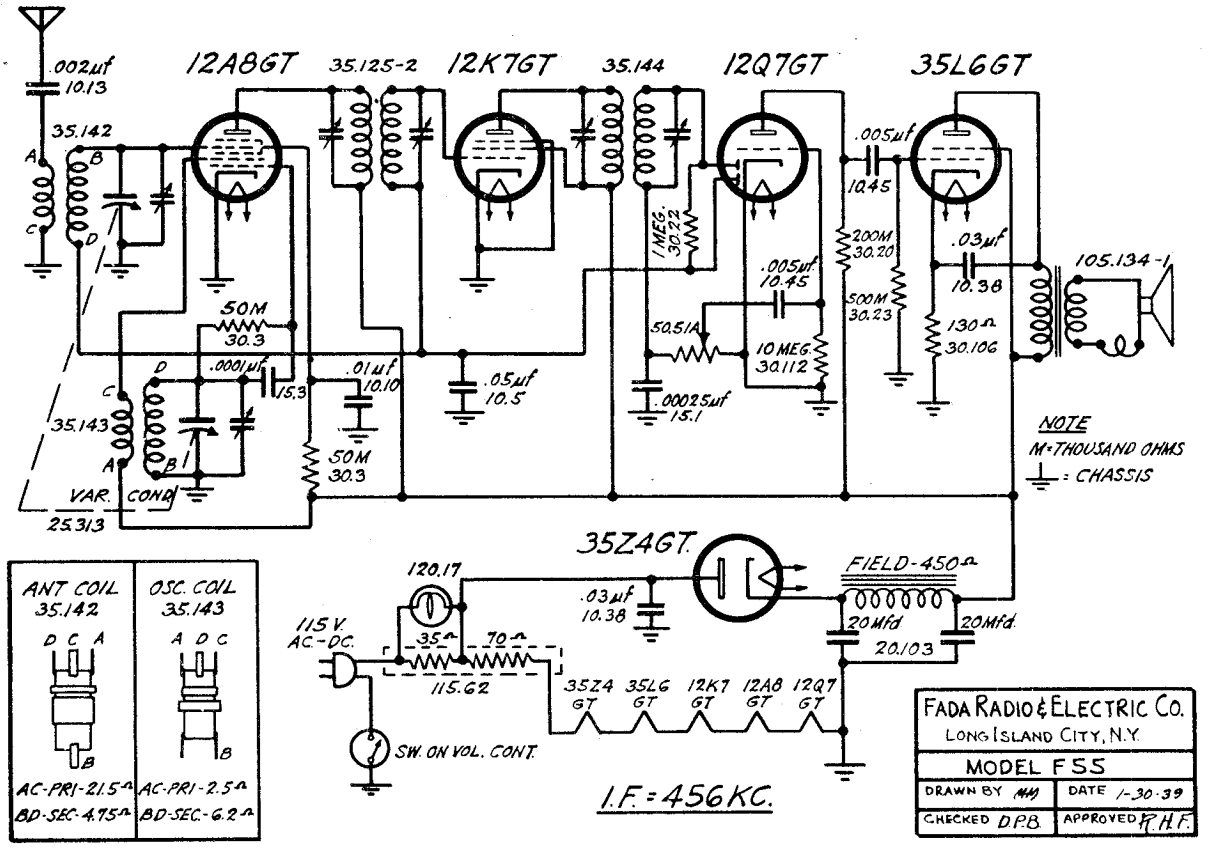
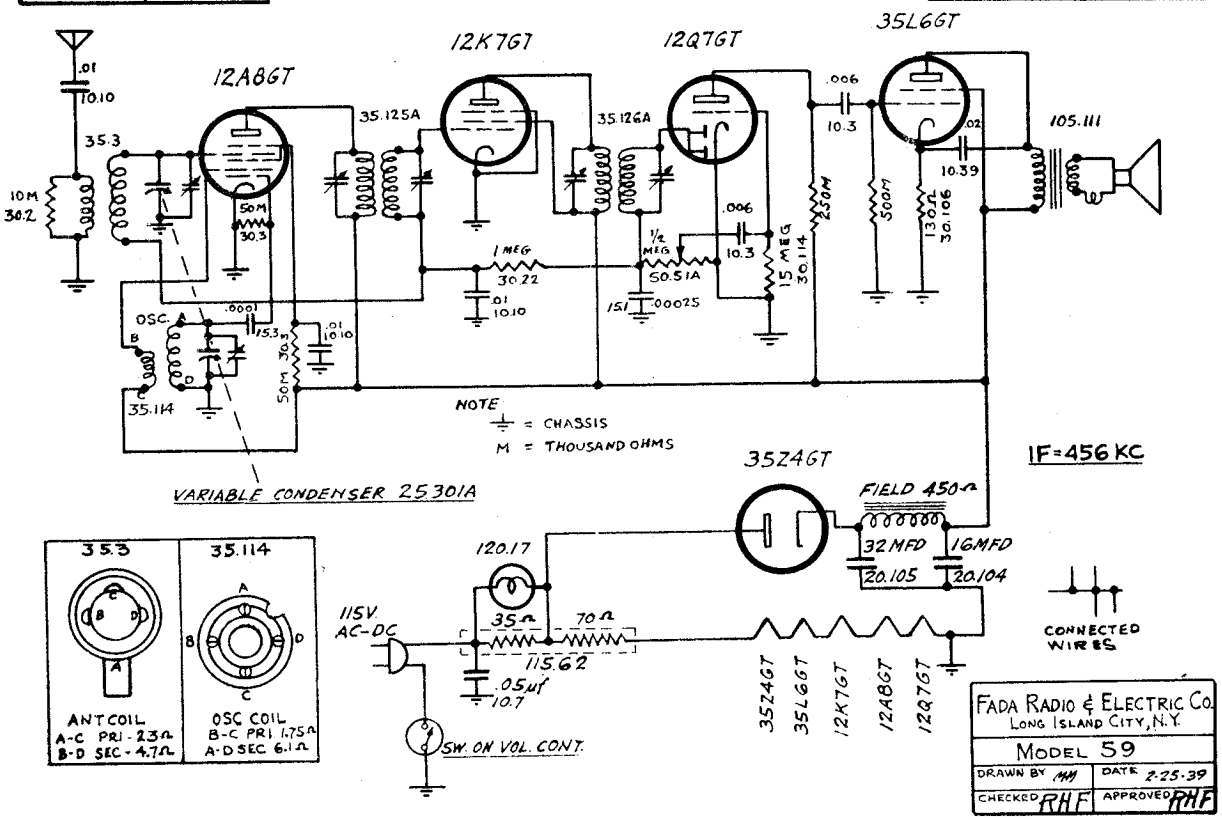
# FADA RADIO & ELECTRIC CO

MODEL F55
MODEL 59
Schematics

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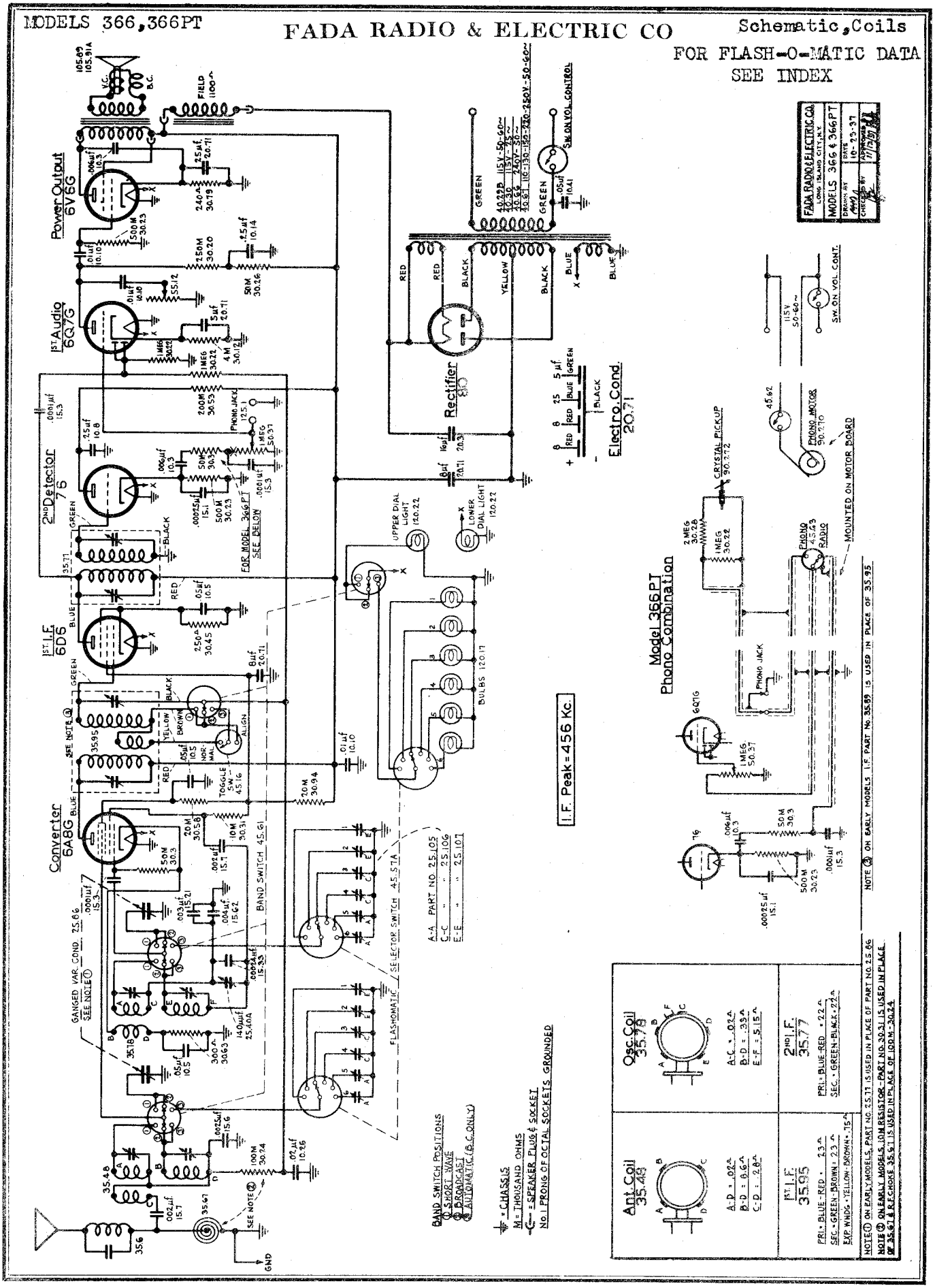
MODELS 366, 366PT
FADA RADIO & ELECTRIC CO
Schematic, Coils
FOR FLASH-O-MATIC DATA SEE INDEX
Converter 6A8G
1ST I.F. 6D6
2ND Detector 75
1ST Audio 6Q7G
Power Output 6V6G
Rectifier 80
Electro. Cond. 20.71
Model 366PT Phone Combination
I. F. Peak = 456 Kc.
Ant. Coil 35.48
Osc. Coil 35.78
1ST I.F. 35.95
2ND I.F. 35.77
FADA RADIO & ELECTRIC CO.
LONG ISLAND CITY, N.Y.
MODELS 366 & 366PT
DRAWN BY
DATE 10-29-37
CHECKED BY
APPROVED
NOTE ① ON EARLY MODELS, PART NO. 25.71 IS USED IN PLACE OF PART NO. 25.86
NOTE ② ON EARLY MODELS, ION RESISTOR - PART NO. 30.31 IS USED IN PLACE OF 35.67 & R.F. CHOKE 35.67 IS USED IN PLACE OF 100M - 30.24
NOTE ③ ON EARLY MODELS I.F. PART NO. 35.89 IS USED IN PLACE OF 35.95
CHASSIS
M = THOUSAND OHMS
SPEAKER PLUG & SOCKET
NO. 1 PRONG OF OCTAL SOCKETS GROUNDED
BAND SWITCH POSITIONS
S-SHORT WAVE
B-BROADCAST
A-AUTOMATIC (B.C. ONLY)
FLASHOMATIC
SELECTOR SWITCH 45.STA
BAND SWITCH 45.61
GANGED VAR. COND. 25.86
SEE NOTE ①
SEE NOTE ②
SEE NOTE ③
FOR MODEL 366PT SEE BELOW
MOUNTED ON MOTOR BOARD
SW. ON VOL. CONT.
PHONO JACK
PHONO 45.63 RADIO
CRYSTAL PICKUP 90.372
PHONO MOTOR 90.270
UPPER DIAL LIGHT 120.22
LOWER DIAL LIGHT 120.22
BULBS 120.17
GND

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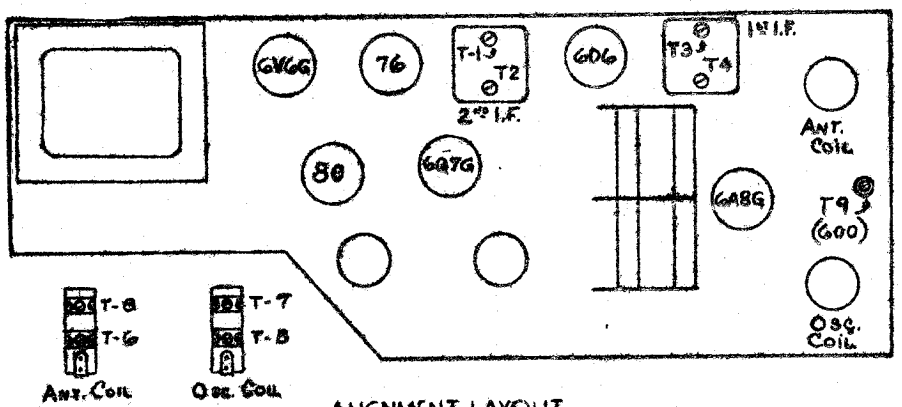
## ALIGNMENT

1. VOLUME CONTROL ..... MAXIMUM.
2. ATTENUATE SIGNAL TO CONTROL SIGNAL OUTPUT.
3. CONNECT PROPER DUMMY ANTENNA, FOR EACH ADJUSTMENT, IN SERIES WITH HIGH POTENTIAL SIDE OF SIGNAL GENERATOR. FOR .001 MFD. CONDENSER, USE PAPER TUBULAR TYPE (400V); FOR 200 MFD., MICA; 400 and 50,000 ohm resistors, CARBON 1/3 WATT.
4. GROUND LOW POTENTIAL SIDE OF SIGNAL GENERATOR.
5. FOR ADJUSTING THE I.F. TRIMMER CONDENSERS, THE CONTROL GRID SHOULD BE REMOVED AND A 50,000 OHM RESISTOR INSERTED IN SERIES WITH SAME. THEN CONNECT THE HIGH POTENTIAL LEAD OG THE SIGNAL GENERATOR THROUGH THE .001 MFD. CONDENSER DIRECTLY TO THE CONTROL GRID CAP OF THE TUBE.
6. REPEAT ALL ADJUSTMENTS.
7. TO DETERMINE THAT THE SHORT WAVE BAND SHUNT TRIMMER HAS NOT BEEN ADJUSTED TO THE IMAGE FREQUENCY, TURN THE DIAL TO THE FREQUENCY LISTED UNDER IMAGE FREQUENCY WHERE A SIGNAL WEAKER THAT THE FUNDEMENTAL SHOULD BE NOTED, HOWEVER, IF NO SIGNAL CAN BE HEARD AT THIS SETTING EVEN WITH GREATER SIGNAL GENERATOR OUTPUT, THE TRIMMER HAS BEEN IMPROPERLY ADJUSTED AND IT WILL BE NECESSARY TO READJUST TO THE PROPER PEAK.




## ALIGNMENT LAYOUT

### ALIGNMENT TABLE

| WAVE BAND | DIAL FREQUENCY | GENERATOR FREQUENCY | IMAGE FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTED TO | ADJUST TRIMMER |
|---|---|---|---|---|---|---|
| B.C. | 1000 KC | 456 KC | --- | .001 mfd. 50,000 ohms | Control grid of 6D6 tube | T-1,T-2 |
| B.C. | 1000 KC | 456 KC | --- | .001 mfd. 50,000 ohms | Control grid of 6A8G tube | T-3,T-4 |
| S.W. | 15.0 MC | 15.0 MC | 15.9 MC | 400 ohm resistor | Yellow antenna lead | T-5,T-6 |
| S.W. | 6.0 MC | 6.0 MC | --- | 400 ohm resistor | Yellow antenna lead | Check Tracking |
| B.C. | 1500 KC | 1500 KC | --- | 200 mmfd. condenser | Yellow antenna lead | T-7,T-8 |
| B.C. | 600 KC | 600 KC | --- | 200 mmfd. condenser | Yellow antenna lead | T-9* |

*To insure perfect alignment it is necessary to "rock" the ganged variable condenser in order to follow the maximum signal output.

VOLTAGE ACROSS ELECTROLYTIC CONDENSERS

| 1st Section | 2nd Section | 3rd Section |
|---|---|---|
| 312 | 240 | 105 |

Voltage across speaker field - - - - - - - - - - - - - - - - - - - - - - - - 73 volts

CONTINUITY AND VOLTAGE READINGS ON

MODEL 365 & 366 SERIES

SEE INDEX FOR MODEL 365 SCHEMATIC

Line voltage 115 A.C. - Input watts - 58

(No signal input)

| TYPE OF TUBE | POSITION OF TUBE | PLATE VOLTS | PLATE MA CURRENT | CATHODE VOLTS | SCREEN GRID VOLTS |
|---|---|---|---|---|---|
| 6A8G | 1st Detector | 235 | 1.9 | 1.8 | 65 |
| | Oscillator | 86 | 2.2 | --- | --- |
| 6D6 | Int. Freq. | 235 | 9.4 | 3.0 | 105 |
| 76 | 2nd Detector | 127 | .1 | 13.0 | --- |
| 6Q7G | A.V.C. | --- | --- | --- | --- |
| | 1st Audio | 67 | .1 | 1.3 | --- |
| 6V6G | Pwr. Pentode | 220 | 41.0 | 10.5 | 229 |
| 80 | Rectifier | --- | 66.0 TOTAL | --- | --- |

These readings were taken with a 1,000 ohm per volt meter and are not indicative of effective voltages. Above readings taken with a 105.89 speaker in circuit.

SPEAKER D.C. RESISTANCE VALUES

| PART NO. | FIELD COIL | AUDIO TRANS. PRI. | AUDIO TRANS. SEC. | V.C. |
|---|---|---|---|---|
| 105.89 | 1,100* | 210* | .5** | 3.0 |
| 105.91A | 1,100* | 220* | .8** | 3.0 |

* These are cold D.C. resistance values.

**This reading includes resistance of hum bucking coil.

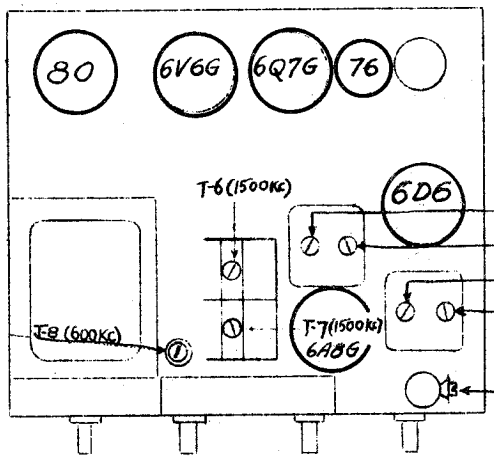
MODEL 365
MODELS 366,366PT
Alignment, Voltage
Socket, Trimmers

MODEL 465
Schematic, Voltage
Alignment, Trimmers
Socket

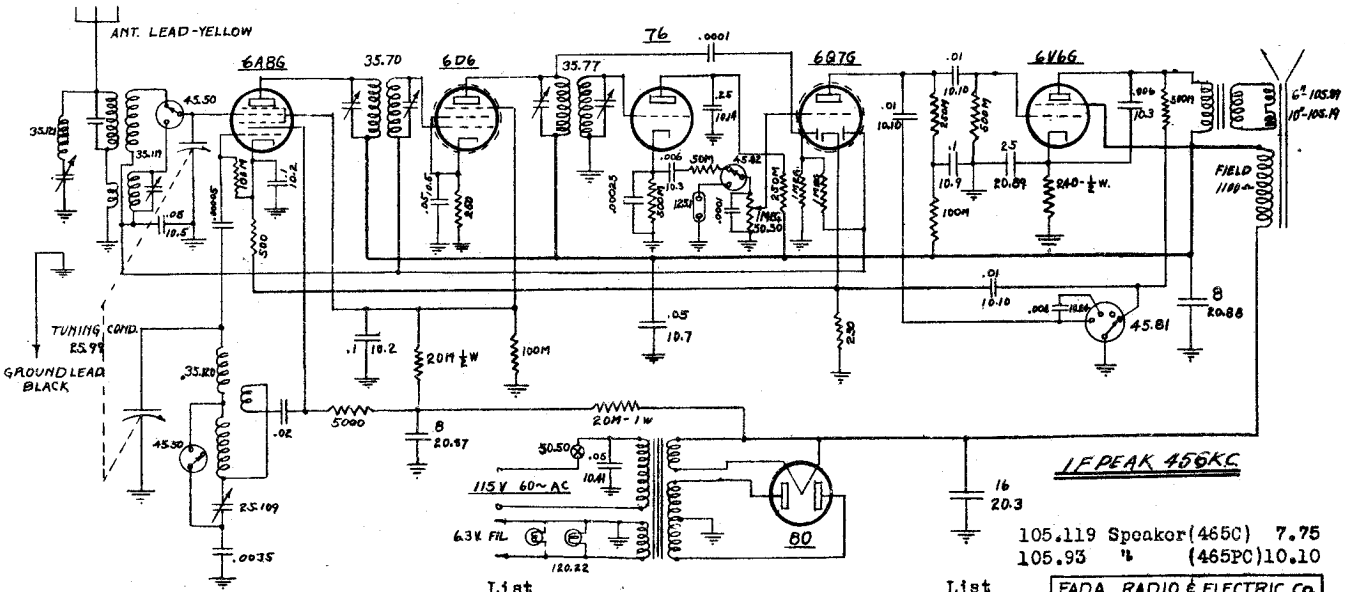
# FADA RADIO & ELECTRIC CO

FADA RADIO MODEL 465 - 115 VOLTS - 50-60 CYCLES A.C. - Tuning Range - 545-1720 K.C. and 5.8-18.4 Megacycles - 6 Tube Superheterodyne. Tubes required-6A8G-6D6-76-6Q7G-6V6G-80.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are checked, then proceed as follows:---Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A8G tube in series with a.1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for **minimum** signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M. C.




ALIGNMENT LAYOUT




THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

| | Plate | Screen | Cathode | Anode |
|---|---|---|---|---|
| 6A8G | 258 | 70 | 4 | 150 |
| 6D6 | 258 | 70 | 2 | |
| 6Q7G | 150 | - | 2 | |
| 6V6G | 250 | 258 | 11.4 | |
| 80 | 630 A.C. Plate to Plate | | 19 | |
| 76 | 250 | - | | |

| | | List | | | List |
|---|---|---|---|---|---|
| 50.50 | Volume Control | .85 | 35.70 | I.F. Input | 1.20 |
| 45.81 | Tone Switch | .65 | 35.77 | I.F. Output | 1.20 |
| 45.50 | Band Switch | .60 | 35.121 | I.F. Trap | .45 |
| 40.73 | Power Transformer | 3.60 | 25.99 | Variable Cond. | 2.00 |
| 35.119 | Antenna Coil | 1.35 | 25.109 | Padding Cond. | .25 |
| 35.120 | Oscillator Coil | .75 | 105.89 | Speaker(465T) | 4.25 |

**Prices subject to change without notice.**

105.119 Speaker(465C) 7.75
105.93 " (465PC)10.10

| FADA RADIO & ELECTRIC Co. LONG ISLAND CITY, N.Y. | |
|---|---|
| MODEL 465 | |
| DRAWN BY A. H. | SEPT. 29, 1938 |
| CHECKED R. H. | APP. |

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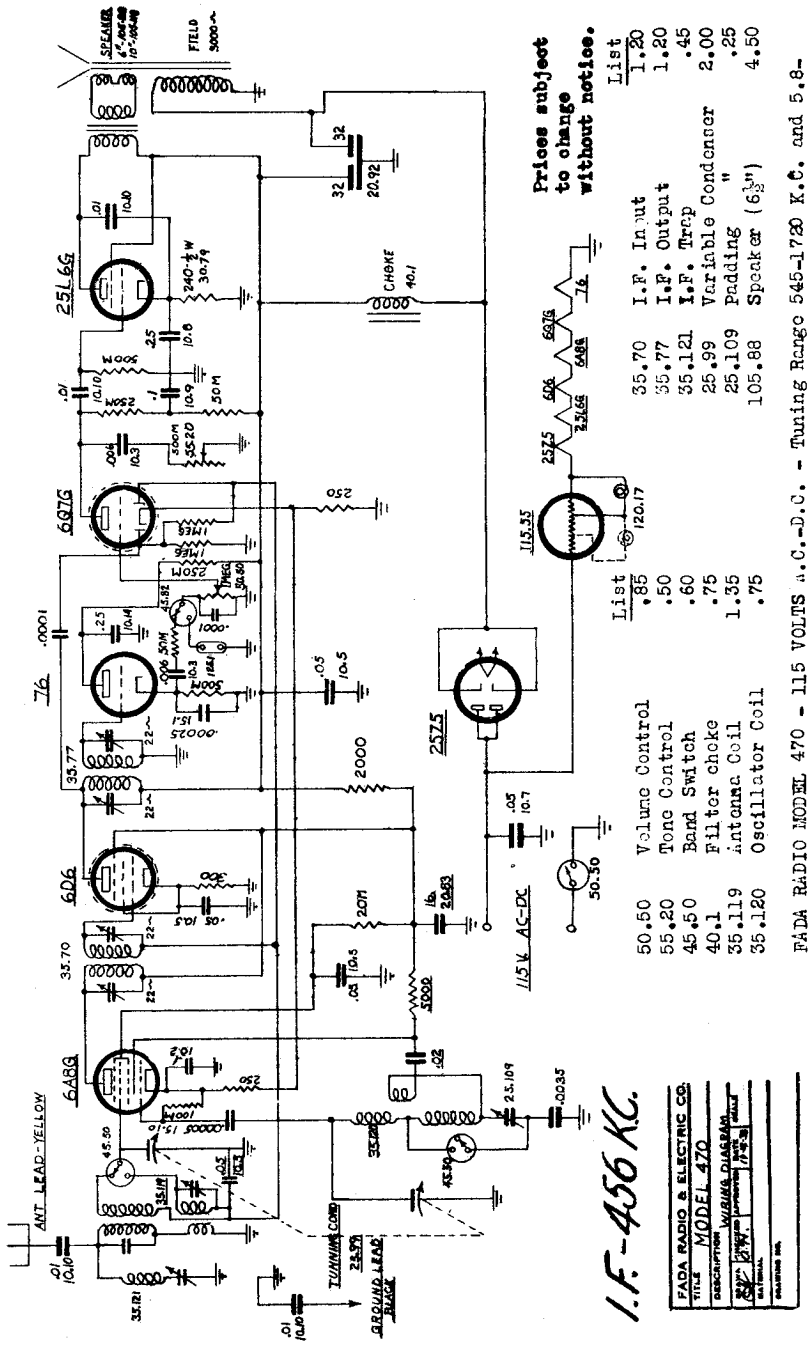
# FADA RADIO & ELECTRIC CO

MODEL 470
Schematic, Voltage
Alignment, Trimmers
Socket



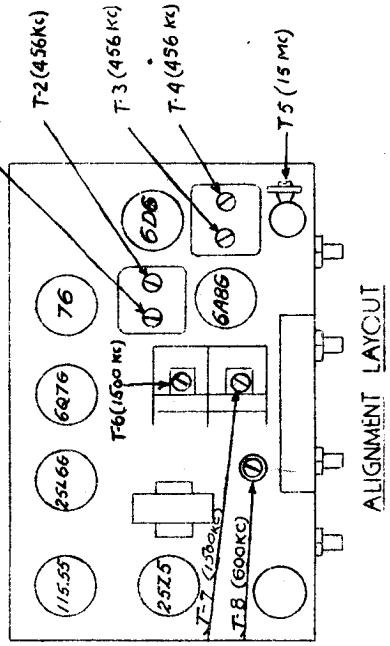

**Prices subject to change without notice.**

| | | List |
|---|---|---|
| 35.70 | I.F. Input | 1.20 |
| 35.77 | I.F. Output | 1.20 |
| 35.121 | I.F. Trap | .45 |
| 25.99 | Variable Condenser | 2.00 |
| 25.109 | Padding " | .25 |
| 105.88 | Speaker (6½") | 4.50 |

| | | List |
|---|---|---|
| 50.50 | Volume Control | .85 |
| 55.20 | Tone Control | .50 |
| 45.50 | Band Switch | .60 |
| 40.1 | Filter choke | .75 |
| 35.119 | Antenna Coil | 1.35 |
| 35.120 | Oscillator Coil | .75 |

FADA RADIO MODEL 470 - 115 VOLTS A.C.-D.C. - Tuning Range 545-1720 K.C. and 5.8-18.4 Megacycles - 7 Tube Superheterodyne. Tubes required -6A8G-6D6-76-6Q7G-25L6G-2525-115.55.

Alignment Instructions: Do not attempt to align receiver until all other causes of trouble are-checked, then proceed as follows:--Remove chassis and connect output meter across voice coil of speaker. Set dial pointer at 1000 K.C. and turn volume control to maximum position. Tone control to high end. Band switch to broadcast position. Connect modulated oscillator to grid of 6A8G tube in series with a .1 condenser and adjust trimmers 1-2-3-4 for maximum output at 456 K.C. reducing input signal of oscillator as required. Check pointer with condenser fully meshed. Turn pointer to 1500 K.C. Connect oscillator to antenna lead using a .0002 condenser as dummy antenna. With a 1500 K.C. signal adjust trimmers 5 & 6 for maximum output. Turn dial pointer to 600 K.C. Adjust padder T8 rocking gang condenser for maximum output. Recheck alignment at 1500 K.C. Shift oscillator to 456 K.C. and set trimmer on wave trap for minimum signal. Check sensitivity at 1000 K.C. using magic wand. Turn band switch to Short Wave position. Set dial at 15 M.C. Use a 400 ohm carbon resistor for dummy antenna. With a 15 M.C. signal adjust T-5 for maximum output. Check image at 14.1 M.C. Increasing input signal if necessary. Check sensitivity at 10 M.C. and 6 M.C.




THESE READINGS TAKEN WITH LINE VOLTAGE 120 A.C.

| | Plate | Screen | Cathode | Anode |
|---|---|---|---|---|
| 6A8G | 92 | 54 | 2.4 | 75 |
| 6D6 | 107 | 96 | 2.4 | |
| 76 | 101 | - | 8.6 | |
| 6Q7G | 75 | - | 1.2 | |
| 25L6G | 105 | 109 | 8.4 | |
| 2525 | 120 A.C. | | 120 D.C. | |

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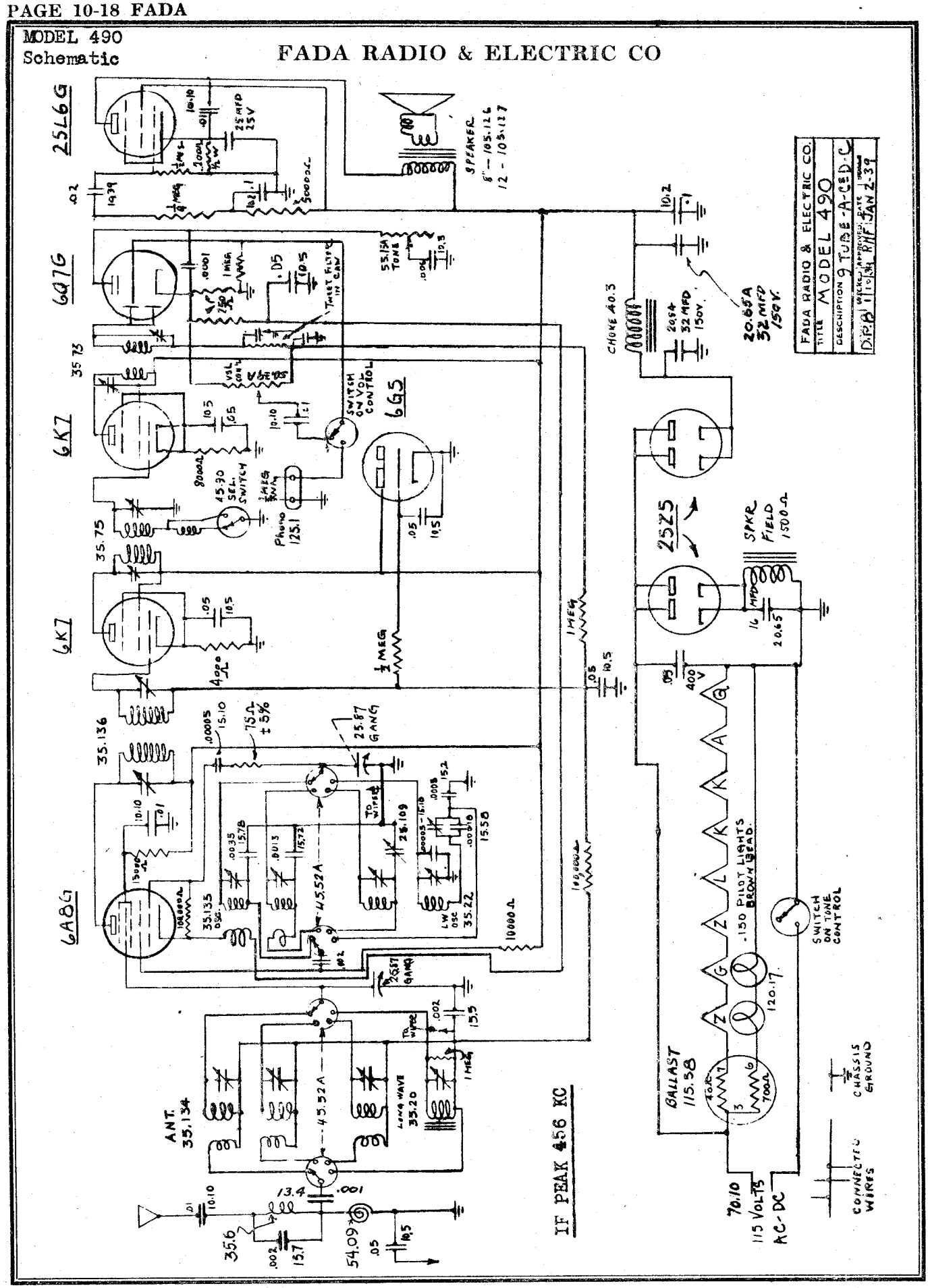
MODEL 490
Schematic

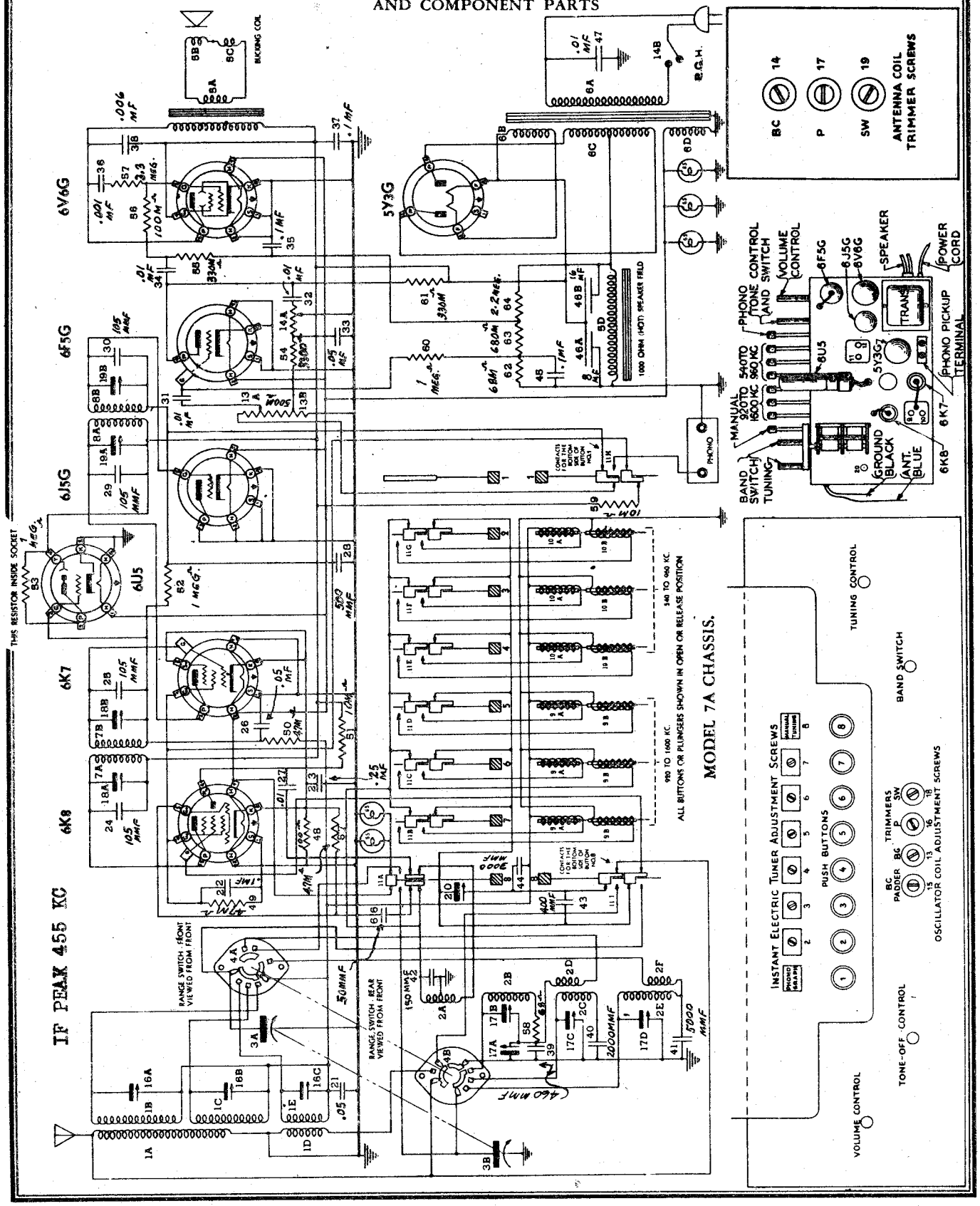
# FADA RADIO & ELECTRIC CO


25L6G
6Q7G
6K7
6K7
6A8G
6K7
6G5
2525
SPEAKER
5" — 105.116
12 - 105.117
SWITCH ON VOL CONTROL
TWEET FILTER IN CAN
45.30 SEL. SWITCH
Phono 125.1
55.134 TONE
CHOKE 40.3
20.65A 32 MFD 150 V.
SPKR FIELD 1500Ω
FADA RADIO & ELECTRIC CO.
TITLE MODEL 490
DESCRIPTION 9 TUBE-A-C-B-C
DRAWN RHF JAN 2-39
1 MEG
.25 MFD 15V
.05
.1
.002
.001
.0001
.0005
.00035
.0013
.00016
.0003-15.18
.0005-15.18
.0005
.01
.02
.1
.5
.25
.15
.2
.4
.6
.8
1.0
1.5
2.0
3.0
4.0
5.0
7.5
10.0
10.5
15.5
15.7
15.72
15.78
15.2
15.58
15.10
16 MFD 400 V
20.65
10.2
10.3
10.5
10.10
10.17
10.19
10.10
10.10
10.10

# FAIRBANKS, MORSE & CO.

MODEL 7A
Schematic, Socket
Trimmers

SCHEMATIC WIRING DIAGRAM OF THE MODEL 7A CHASSIS.
FRONT, SIDE, AND TOP VIEWS OF THE CHASSIS SHOWING TRIMMER LOCATIONS, TUBE LOCATIONS AND COMPONENT PARTS

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MODEL 7A
Alignment, Voltage
Tuner, Phono

# FAIRBANKS, MORSE & CO.

The model 7A chassis is an AC operated superheterodyne with automatic volume control, audio inverse feedback, permeability push button tuning and tuning eye. It incorporates three wave bands, broadcast, police-amateur and short wave. It is also equipped with a phono connection which permits the use of an external phonograph pickup.

### THE PUSH BUTTON TUNER

It will be noted that only one operation is required for the setting of each push button. This simplicity of operation is made possible by the use of permeability tuned coils which have been accurately tracked at the factory so that it is not necessary to adjust external trimmer condensers in order to "set" a station. Tracking is accomplished by the careful spacing of the iron cores on their common shaft so that for all settings of the adjusting screws the coils are in perfect alignment. The capacitance in the oscillator circuit is fixed and may not be adjusted. This condenser (corresponding to the tuning condenser in a manually tuned receiver) is shown as number 42 on the schematic diagram and has a value of 150 micro-microfarads. The capacitance in the antenna circuit consists of two condensers, number 30 and number 43. Condenser number 20 must be adjusted when the initial alignment is made, but does not have to be touched at the time the buttons are "set" for their individual stations. Its use is covered in the alignment instructions. Instructions for "setting-up" the push buttons are covered in detail in the instruction book which accompanies each receiver.

### THE AUDIO CIRCUIT

The audio circuit is of conventional design with the exception of the inverse feedback circuit consisting of resistors number 56 and number 57 and condenser number 36. By means of this network a certain amount of the voltage present at the plate of the 6V6G tube is fed back to the grid circuit of that tube. This voltage is, of course, out of phase with the input voltage and degeneration is the result.

Any audio amplifier employing a loud speaker as the load will have a certain amount of distortion introduced due to the fact that the impedance varies with the audio frequency changes in the plate circuit of the output tube. This condition is more pronounced in amplifiers using an output tube of the high impedance type such as the beam pentodes. Inverse feedback effectively reduces the plate impedance of the tube and helps to smooth out these variations thus reducing distortion to a marked degree.

The subject cannot be treated more fully here due to space limitations and has been mentioned merely to give the serviceman a brief explanation of the feedback circuit.

### PHONO CONNECTIONS

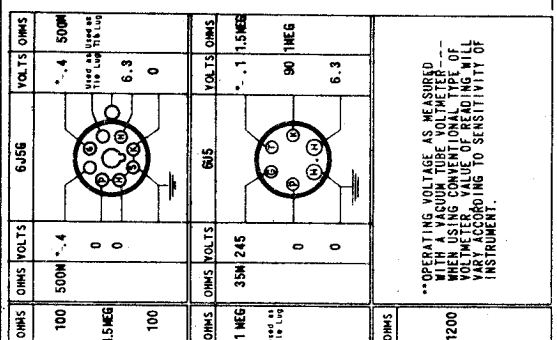
The input circuit for the phonograph section of this receiver is designed for the use of a pickup of the high impedance type, although fair success may be obtained by the use of a unit of fairly low impedance. Should any difficulty be encountered with hum in the set when a pickup is being used, it is probably due to the fact that the shield side of the lead is not connected to the ground side of the terminal strip. Reversing the leads (after making sure that one side of the phono lead is a shield) should remedy complaints of this kind.

### ALIGNMENT PROCEDURE

Alignment procedure is given in diagrammatic and chart form. Any reliable low range AC voltmeter, preferably about 0-5 volts may be used as an output meter. It should be connected across the speaker voice coil for best results. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter pointer tends to go off scale. If too strong a signal is used and the volume control is used to keep the pointer on scale, the AVC will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The image falls 910 kilocycles below the fundamental signal, so at 20 megacycles the image should be heard at 20 megacycles minus .910 megacycle or 19.1 megacycles approximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When you can hear one signal at the frequency to which your generator is set, and one at about 1 megacycle below it, you are ready to finish the alignment. Go back to the fundamental frequency and start peaking the antenna trimmer, rocking the tuning condenser slightly as you do so. When you reach a peak, compare the strength of the fundamental signal and the image. If the image is the stronger, you have the wrong peak on the antenna trimmer. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator output greatly in order to hear the image when you have found the right peak.


6K8
6F5G
6K7
6V6G
6U5
6J5G
5Y3G
*OPERATING VOLTAGE AS MEASURED WITH A VACUUM TUBE VOLTMETER -- WHEN USING CONVENTIONAL TYPE OF VOLTMETER, VALUE OF READING WILL VARY ACCORDING TO SENSITIVITY OF INSTRUMENT.
MEASURED ON TRIPLETT VOLT-OHM METER, MODEL 1200A---2000 OHMS VOLT --LINE VOLTAGE = 117 VOLTS
*10 VOLT SCALE

VOLTAGE AND RESISTANCE DATA

| Step No. | Connect Signal Generator To | Signal Generator Frequency | Dummy Antenna | Range Switch Position | Dial Setting | Section | Adjusting Screw No. | Peak For |
|---|---|---|---|---|---|---|---|---|
| 1 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 2nd IF Trans. | 9 | Maximum |
| 2 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 2nd IF Trans. | 10 | Maximum |
| 3 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 1st IF Trans. | 11 | Maximum |
| 4 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 1st IF Trans. | 12 | Maximum |
| 5 | Antenna | 1500 KC | 200 Mmfd. Condenser | Broadcast (A) | 1500 KC | B.C. Osc. | 13 | Maximum |
| 6 | Antenna | 1500 KC | 200 Mmfd. Condenser | Broadcast (A) | 1500 KC | B.C. Det. | 14 | Maximum |
| 7 | Antenna | 600 KC | 200 Mmfd. Condenser | Broadcast (A) | 600 KC | B.C. Padder | 15 | Max.(1) |
| 8 | Antenna | 1500 KC | 200 Mmfd. Condenser | Broadcast (A) | Depress #7 Button | Instant Electric Tuner | 7 | Maximum |
| 9 | Antenna | 1500 KC | 200 Mmfd. Condenser | Broadcast (A) | Depress #7 Button | Instant Electric Tuner | 20 | Maximum (2) |
| 10 | Antenna | 6.0 MC | 400 Ohm Resistor | Police-Amateur (B) | 6.0 MC | Police Oscillator | 16 | Maximum |
| 11 | Antenna | 6.0 MC | 400 Ohm Resistor | Police-Amateur (B) | 6.0 MC | Police Detector | 17 | Maximum |
| 12 | Antenna | 2.5 MC | 400 Ohm Resistor | Police-Amateur (B) | 2.5 MC | Police Padder | (3) | |
| 13 | Antenna | 20.0 MC | 400 Ohm Resistor | Short Wave (C) | 20.0 MC | Short Wave Oscillator | 18 | Maximum (4) |
| 14 | Antenna | 20.0 MC | 400 Ohm Resistor | Short Wave (C) | 20.0 MC | Short Wave Detector | 19 | Maximum (5) |
| 15 | Antenna | 8.0 MC | 400 Ohm Resistor | Short Wave (C) | 8.0 MC | Short Wave Padder | (6) | |

(1) While rocking, repeat 13, 14 and 15 until no change is noticed.
(2) The performance obtained with this adjustment when push button tuning is employed is suitable, as a rule, only when a conventional antenna system is used. The use of extremely long or short antennae may necessitate a minor change in this adjustment for best results.
(3) Check calibration at 2.5 MC. Padder is fixed.
(4) Check for image at 19.1 MC approximately.
(5) Check for image response.
(6) Check calibration at 8.0 MC. Padder is fixed.

ALIGNMENT PROCEDURE CHART

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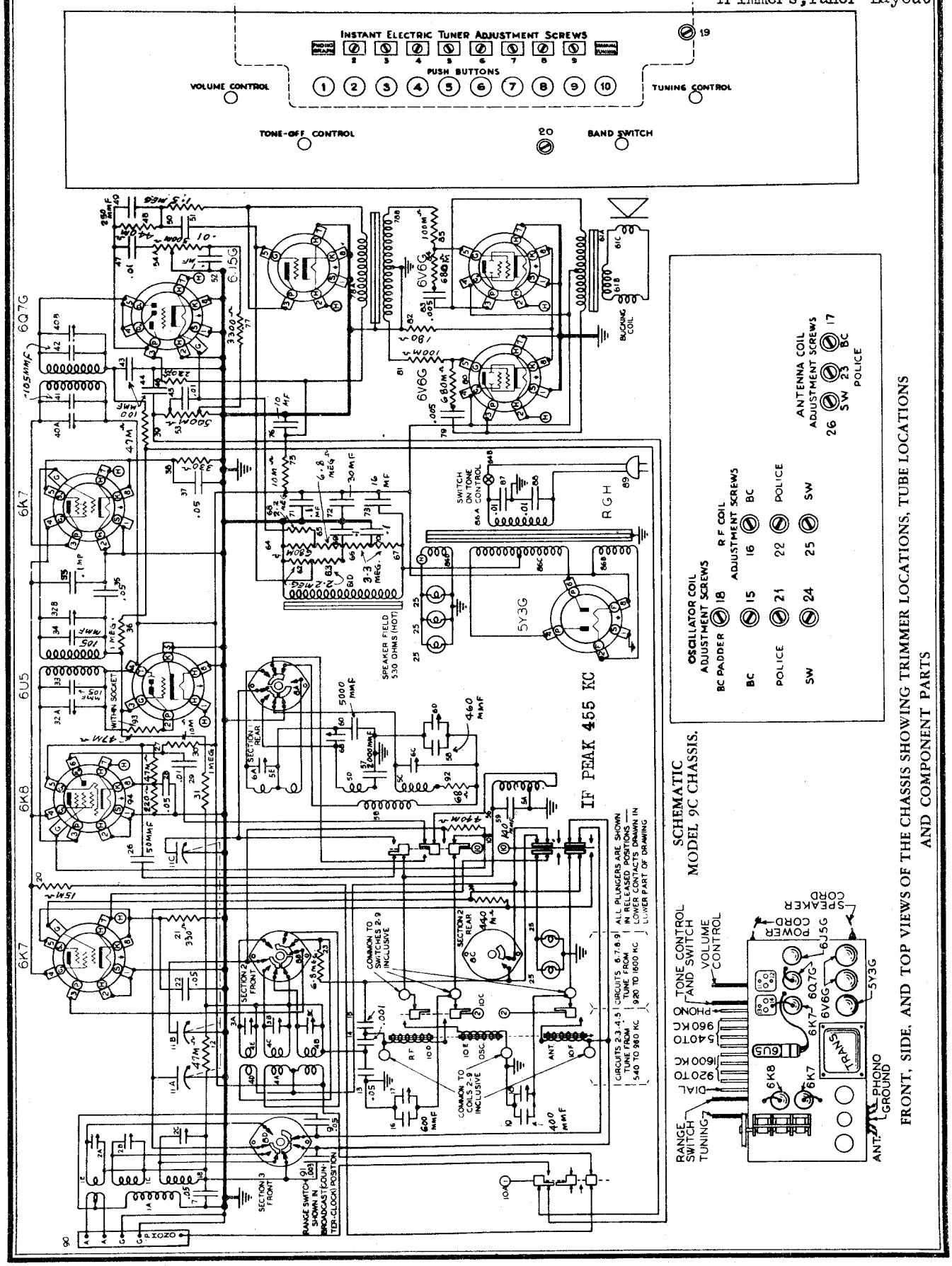
FAIRBANKS, MORSE & CO.

MODEL 9C
Schematic, Socket
Trimmers, Tuner Layout

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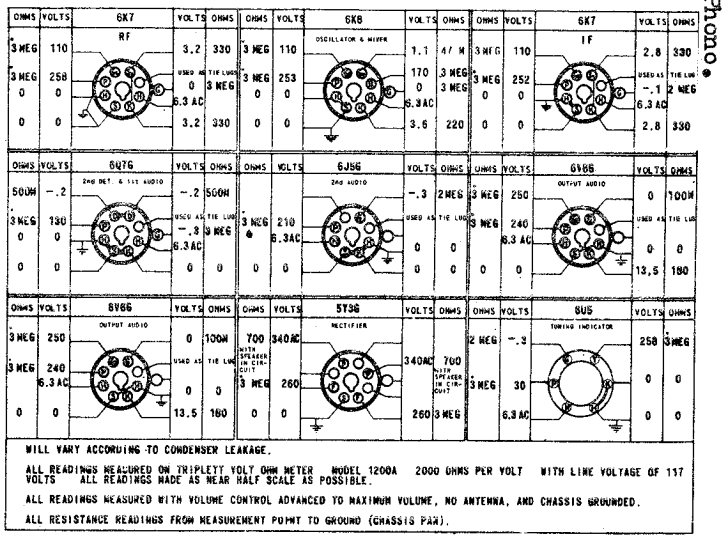
## ALIGNMENT PROCEDURE CHART

| Step No. | Connect Signal Generator To | Signal Generator Frequency | Dummy Antenna | Range Switch Position | Dial Setting | Section | Adjusting Screw No. | Peak For |
|---|---|---|---|---|---|---|---|---|
| 1 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 2nd IF Trans. | 11 | Maximum |
| 2 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 2nd IF Trans. | 12 | Maximum |
| 3 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 1st IF Trans. | 13 | Maximum |
| 4 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 1st IF Trans. | 14 | Maximum |
| 5 | Antenna | 1500 KC | 200 Mmfd.Condenser | Broadcast (A) | 1500 KC | B.C. Osc. | 15 | Maximum |
| 6 | Antenna | 1500 KC | 200 Mmfd.Condenser | Broadcast (A) | 1500 KC | B.C. RF | 16 | Maximum |
| 7 | Antenna | 1500 KC | 200 Mmfd.Condenser | Broadcast (A) | 1500 KC | B.C. Antenna | 17 | Maximum |
| 8 | Antenna | 600 KC | 200 Mmfd.Condenser | Broadcast (A) | 600 KC | B.C. Padder | 18 | Max.(1) |
| 9 | Antenna | 1500 KC | 200 Mmfd.Condenser | Broadcast (A) | Depress #9 Button | Instant Electric Tuner | 9 | Maximum |
| 10 | Antenna | 1500 KC | 200 Mmfd.Condenser | Broadcast (A) | Depress #9 Button | Instant Electric Tuner | 19 | Maximum (2) |
| 11 | Antenna | 1500 KC | 200 Mmfd.Condenser | Broadcast (A) | Depress #9 Button | Instant Electric Tuner | 20 | Maximum (2) |
| 12 | Antenna | 6.0 MC | 400 Ohm Resistor | Police-Amateur (B) | 6.0 MC | Police Oscillator | 21 | Maximum |
| 13 | Antenna | 6.0 MC | 400 Ohm Resistor | Police-Amateur (B) | 6.0 MC | Police RF | 22 | Maximum |
| 14 | Antenna | 6.0 MC | 400 Ohm Resistor | Police-Amateur (B) | 6.0 MC | Police Antenna | 23 | Maximum |
| 15 | Antenna | 2.5 MC | 400 Ohm Resistor | Police-Amateur (B) | 2.5 MC | Police Padder | | (3) |
| 16 | Antenna | 20.0 MC | 400 Ohm Resistor | Short Wave (C) | 20.0 MC | Short Wave Oscillator | 24 | Maximum (4) |
| 17 | Antenna | 20.0 MC | 400 Ohm Resistor | Short Wave (C) | 20.0 MC | Short Wave RF | 25 | Maximum (5) |
| 18 | Antenna | 20.0 MC | 400 Ohm Resistor | Short Wave (C) | 20.0 MC | Short Wave Antenna | 26 | Maximum (5) |
| 19 | Antenna | 8.0 MC | 400 Ohm Resistor | Short Wave (C) | 8.0 MC | Short Wave Padder | | (6) |

(1) While rocking, Repeat 5, 6, 7 and 8 until no change is noted.
(2) The performance obtained with this adjustment when push button tuning is employed is suitable, as a rule, only when a conventional antenna system is used. The use of extremely long or short antennae, may necessitate a minor change in this adjustment for best results.
(3) Check calibration at 2.5 MC. Padder is fixed.
(4) Check for image at 19.1 MC on dial approximately.
(5) Check for image response.
(6) Check calibration at 8.0 MC. Padder is fixed.

## VOLTAGE AND RESISTANCE DATA




WILL VARY ACCORDING TO CONDENSER LEAKAGE.

ALL READINGS MEASURED ON TRIPLETT VOLT OHM METER MODEL 1200A 2000 OHMS PER VOLT WITH LINE VOLTAGE OF 117 VOLTS ALL READINGS MADE AS NEAR HALF SCALE AS POSSIBLE.

ALL READINGS MEASURED WITH VOLUME CONTROL ADVANCED TO MAXIMUM VOLUME, NO ANTENNA, AND CHASSIS GROUNDED.

ALL RESISTANCE READINGS FROM MEASUREMENT POINT TO GROUND (CHASSIS PART).

The model 9C chassis is an AC operated superheterodyne with automatic volume control, push-pull output with inverse feedback, permeability push button tuning, and tuning eye. It incorporates three wave bands, broadcast, police-amateur, and short wave. It is also equipped with a phono connection which permits the use of an external phonograph pickup.

### THE PUSH BUTTON TUNER

It will be noted that only one operation is required for the setting of each push button. This simplicity of operation is made possible by the use of permeability tuned coils which have been accurately tracked at the factory so that it is not necessary to adjust external trimmer condensers in order to "set" a station. Tracking is accomplished by the careful spacing of the iron cores on their common shaft so that for all settings of the adjusting screws the coils are in perfect alignment. The capacitance in the oscillator circuit is fixed and may not be adjusted. This condenser (corresponding to the tuning condenser in a manually tuned receiver) is shown as number 59 on the schematic diagram and has a value of 140 micro-microfarads. The capacitance in the antenna and RF circuits consists in each case of two condensers, number 18 and 19 for the antenna, and number 16 and 17 for the RF. Condensers 17 and 18 must be adjusted when the initial alignment is made, but do not have to be touched at the time the buttons are "set" for their individual stations. Their use is covered in the alignment instructions. Instructions for setting-up the push buttons are covered in detail in the instruction book which accompanies each receiver.

### THE AUDIO CIRCUIT

The audio circuit is of conventional design with the exception of the inverse feedback circuit consisting of resistors number 80 and 84, and condensers 79 and 83. By means of this network a certain amount of the voltage present at the plate of each 6V6G tube is fed back to the grid circuit of that tube. This voltage is, of course, out of phase with the input voltage and degeneration is the result.

Any audio amplifier employing a loud speaker as the load will have a certain amount of distortion introduced due to the fact that the impedance varies with the audio frequency changes in the plate circuit of the output tube or tubes. This condition is more pronounced in amplifiers using an output tube of the high impedance type such as the beam pentodes. Inverse feedback effectively reduces the plate impedance of the tube and helps to smooth out these variations thus reducing distortion to a marked degree.
The subject cannot be treated more fully here due to space limitations and has been mentioned merely to give the serviceman a brief explanation of the feedback circuit.

### PHONO CONNECTIONS

The input circuit for the phonograph section of this receiver is designed for the use of a pickup of the high impedance type, although fair success may be obtained by the use of a unit of fairly low impedance. Should any difficulty be encountered with hum in the set when a pickup is being used, it is probably due to the fact that the shield side of the lead is not connected to the ground side of the terminal strip. Reversing the leads (after making sure that one side of the phono lead is a shield) should remedy complaints of this kind.

### ALIGNMENT PROCEDURE

Alignment procedure is given in diagrammatic and chart form
Make adjustments in the order given. Any reliable low range AC voltmeter, preferably about 0-5 volts may be used as an output meter. It should be connected across the speaker voice coil for best results. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter pointer tends to go off scale. If too strong a signal is used and the volume control is used to keep the pointer on scale, the AVC will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The image falls 910 kilocycles below the fundamental signal on the dial, so at 20 megacycles the image should be heard at 20 megacycles minus .910 megacycle or 19.1 megacycles approximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When you can hear one signal at the frequency to which your generator is set, and one at about 1 megacycle below it, you are ready to finish the alignment. Go back to the fundamental frequency and start peaking the RF trimmer, rocking the tuning condenser slightly as you do so. When you reach a peak, compare the strength of the fundamental signal and the image. If the image is the stronger, you have the wrong peak on the RF trimmer. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator output greatly in order even to hear the image when you have found the right peak.

Repeat this operation for the antenna trimmer.

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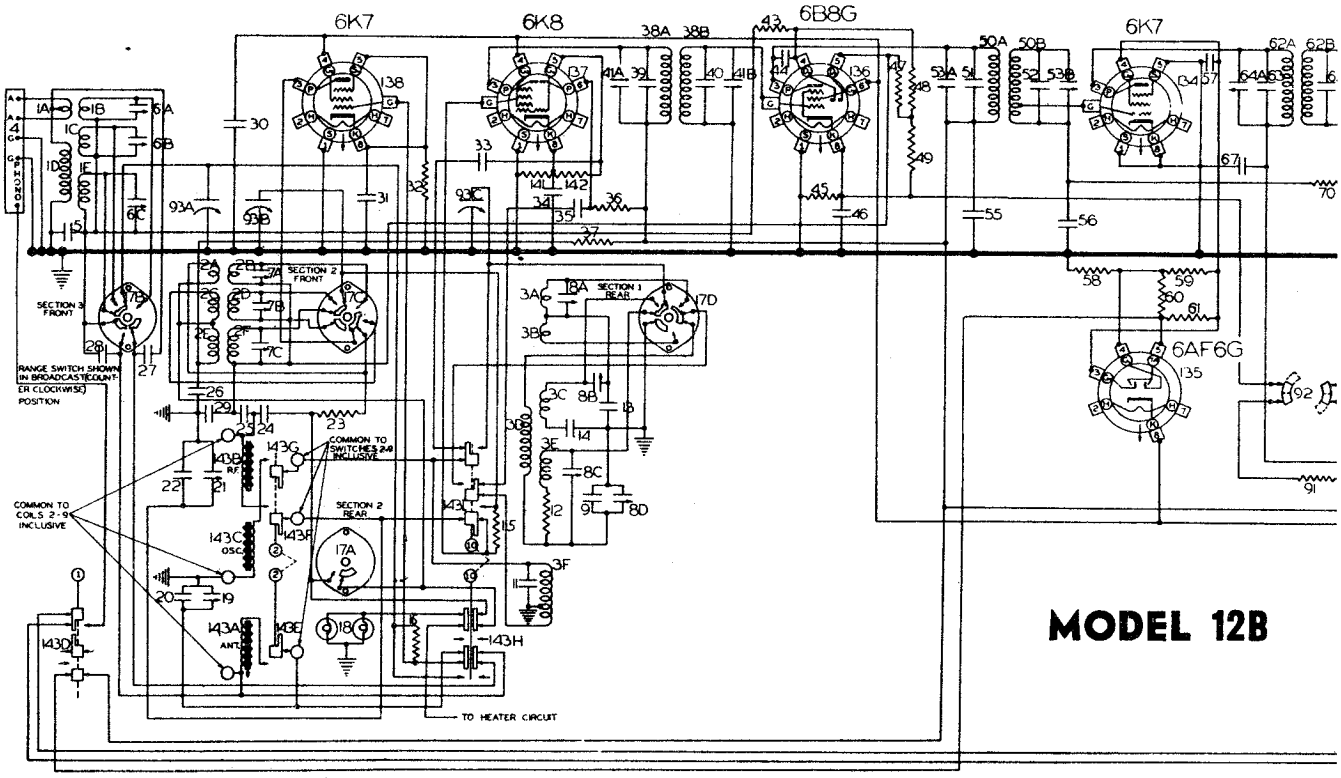



| OHMS | VOLTS | 6K7 RF | VOLTS | OHMS |
|---|---|---|---|---|
| 7M | 120 | | 9.0 | 1200 |
| 11500 | 250 | | USED AS TIE LUG | |
| 0 | 0 | | 0 | 3MEG |
| | | | 6.3AC | |
| 0 | 0 | | 9.0 | 1200 |

| OHMS | VOLTS | 6K8 Oscillator & Mixer | VOLTS | OHMS |
|---|---|---|---|---|
| 7M | 120 | | 6.0 | 46M |
| | | | 170 | 20M |
| 10M | 257 | | 0 | 3MEG |
| 0 | 0 | | 6.3AC | |
| 0 | 0 | | 7.2 | 500 |

| OHMS | VOLTS | 6B8G 1st IF & 1st AVC Diode | VOLTS | OHMS |
|---|---|---|---|---|
| 750M | +.3 | | +.1 | 3MEG |
| | | | 120 | 7M |
| 10M | 258 | | 0 | 14.0 |
| 0 | 0 | | 6.3AC | |
| | | | 5.4 | 820 |

| OHMS | VOLTS | 6K7 2nd IF and tuning eye Control | VOLTS | OHMS |
|---|---|---|---|---|
| 55M | 110 | | 0 | 0 |
| | | | USED AS TIE LUG | |
| 16500 | 260 | | -.3 | 3MEG |
| | 6.3AC | | 0 | 0 |
| 0 | 0 | | 0 | 0 |

| OHMS | VOLTS | 6Q7G 2nd AVC and 2nd diode detector, volume naturalizer diode and driver | VOLTS | OHMS |
|---|---|---|---|---|
| 1.5 MEG | -.3 | | -.2 | 250M |
| | | | USED AS TIE LUG | |
| 230 | 80 | | -.4 | 1 MEG |
| 0 | 0 | | 6.3AC | |
| 0 | 0 | | 0 | 0 |

| OHMS | VOLTS | 6J5 1st Audio | VOLTS | OHMS |
|---|---|---|---|---|
| USED AS TIE LUG | | | -.5 | 3MEG |
| | | | USED AS TIE LUG | |
| 120M | 100 | | 0 | 0 |
| | 6.3AC | | | |
| 0 | 0 | | 0 | 0 |

| OHMS | VOLTS | 6J5G 2nd Audio | VOLTS | OHMS |
|---|---|---|---|---|
| USED AS TIE LUG | | | -.4 | 1.5MEG |
| | | | USED AS TIE LUG | |
| 16500 | 190 | | 0 | 0 |
| | 6.3AC | | | |
| 0 | 0 | | 0 | 0 |

| OHMS | VOLTS | 6V6G Output Audio | VOLTS | OHMS |
|---|---|---|---|---|
| 11300 | 320 | | 0 | 90M |
| | | | USED AS TIE LUG | |
| 11500 | 310 | | 0 | 0 |
| 0 | 0 | | 6.3AC | |
| 0 | 0 | | 18 | 200 |

| OHMS | VOLTS | 6V6G Output Audio | VOLTS | OHMS |
|---|---|---|---|---|
| 11300 | 320 | | 0 | 90M |
| | | | USED AS TIE LUG | |
| 11500 | 310 | | 0 | 0 |
| 0 | 0 | | 6.3AC | |
| 0 | 0 | | 18 | 200 |

| OHMS | VOLTS | 5V4G Rectifier | VOLTS | OHMS |
|---|---|---|---|---|
| 440 | 350AC | | | |
| | | | 350AC | 440 |
| 11500 | 320 | | | |
| 0 | 0 | | 320 | 11500 |

| OHMS | VOLTS | 6K7 Volume Naturalizer Feed Back | VOLTS | OHMS |
|---|---|---|---|---|
| 7M | 120 | | 0 | 0 |
| | | | USED AS TIE LUG | |
| 38M | 100 | | -.5 | 4MEG |
| | 6.3AC | | 0 | 0 |
| 0 | 0 | | 0 | 0 |

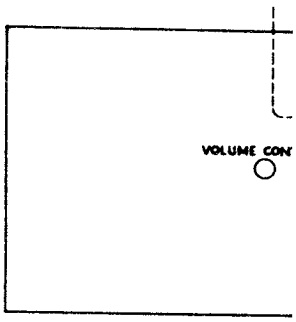
| OHMS | VOLTS | 6AF6G Tuning Eye | VOLTS | OHMS |
|---|---|---|---|---|
| 1.5MEG | 48 | | 245 | 11M |
| | | | | |
| 50M | 108 | | | |
| | 6.3AC | | 0 | 0 |
| | | | 120 | 7M |

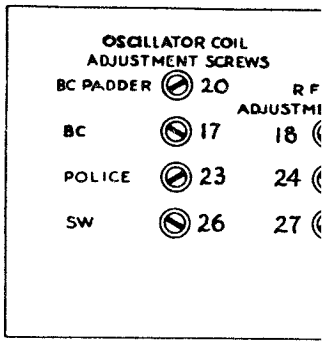
ALL READINGS MEASURED ON MODEL 1200A, 2000 OHMS PER VOLT, TRIPLETT VOLT OHMMETER, AS NEAR HALF SCALE AS POSSIBLE AND WITH 117 VOLTS, LINE VOLTAGE.

ALL READINGS FROM SPECIFIED POINT TO GROUND (CHASSIS PAN) WITH VOLUME AND TONE CONTROL ADVANCED TO MAXIMUM, VOLUME NATURALIZER "IN", RANGE SWITCH ON BC POSITION, GANG CONDENSOR IN FULL MESH, NO ANTENNA AND CHASSIS GROUNDED.

VOLTAGE AND RESISTANCE DATA

Figure 1




FRONT, SIDE, AND TO

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MODEL 12B
Schematic, Socket, Tuner
Trimmers, Voltage, Phono.

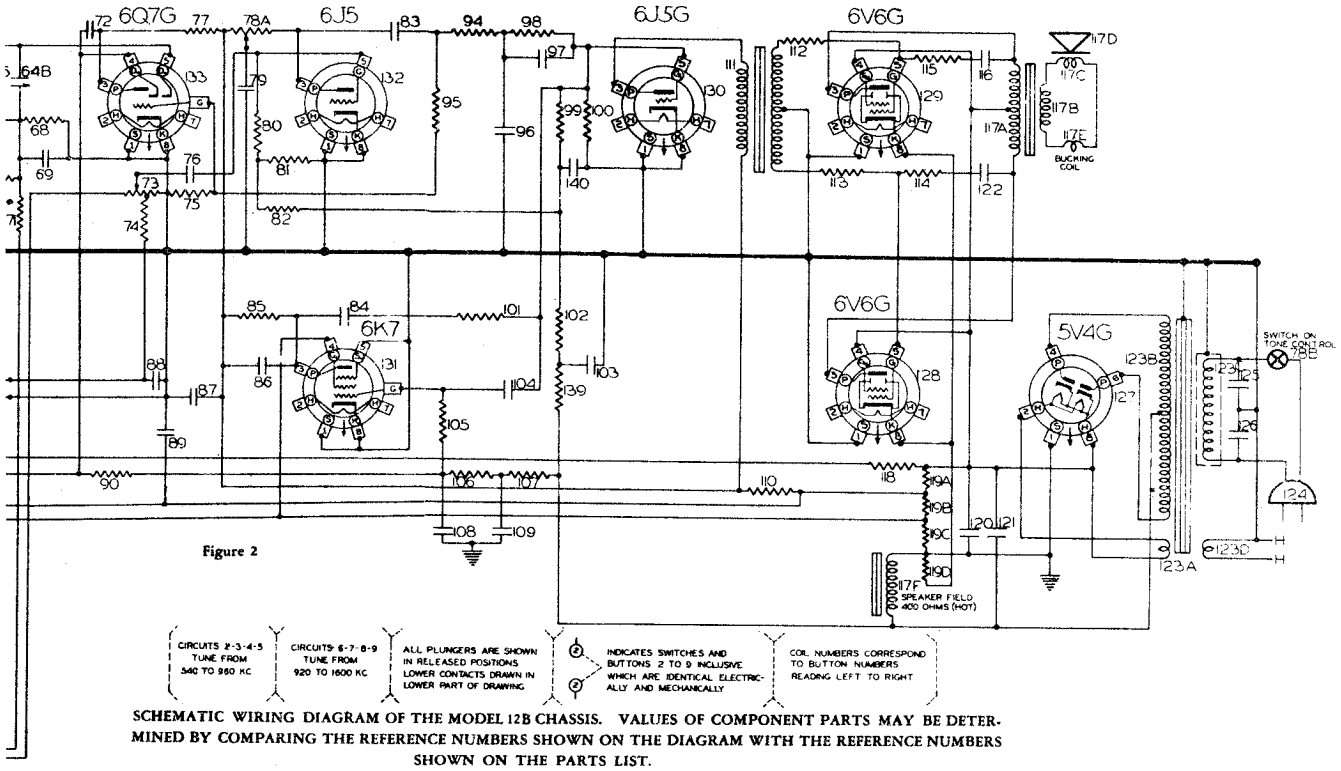
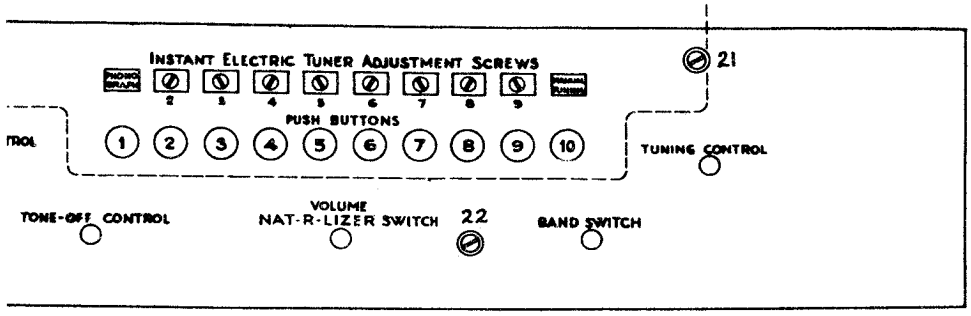
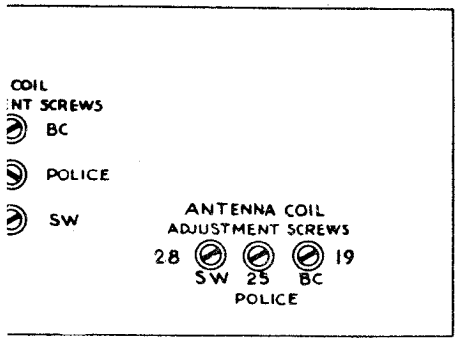

6Q7G
6J5
6J5G
6V6G
6K7
6V6G
5V4G
CIRCUITS 2-3-4-5 TUNE FROM 540 TO 960 KC
CIRCUITS 6-7-8-9 TUNE FROM 920 TO 1600 KC
ALL PLUNGERS ARE SHOWN IN RELEASED POSITIONS LOWER CONTACTS DRAWN IN LOWER PART OF DRAWING
INDICATES SWITCHES AND BUTTONS 2 TO 9 INCLUSIVE WHICH ARE IDENTICAL ELECTRICALLY AND MECHANICALLY
COIL NUMBERS CORRESPOND TO BUTTON NUMBERS READING LEFT TO RIGHT
117F SPEAKER FIELD 400 OHMS (HOT)

Figure 2

SCHEMATIC WIRING DIAGRAM OF THE MODEL 12B CHASSIS. VALUES OF COMPONENT PARTS MAY BE DETERMINED BY COMPARING THE REFERENCE NUMBERS SHOWN ON THE DIAGRAM WITH THE REFERENCE NUMBERS SHOWN ON THE PARTS LIST.



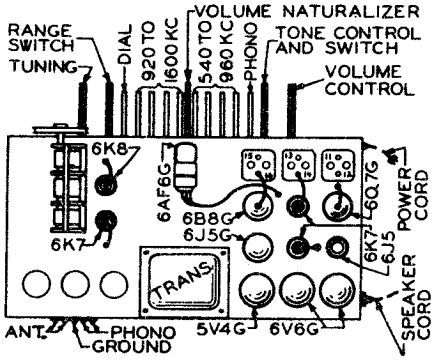




Figure 3

P VIEWS OF THE CHASSIS SHOWING TRIMMER LOCATIONS, TUBE LOCATIONS AND COMPONENT PARTS

IF PEAK 455 KC

The model 12B chassis is an AC operated superheterodyne with automatic volume control, push-pull output with inverse feedback, permeability push button tuning, volume naturalizer, and tuning eye. It incorporates three wave bands, broadcast, police-amateur, and short wave. It is also equipped with a phono connection which permits the use of an external phonograph pickup.

PHONO CONNECTIONS

The input circuit for the phonograph section of this receiver is designed for the use of a pickup of the high impedance type, although fair success may be obtained by the use of a unit of fairly low impedance. Should any difficulty be encountered with hum in the set when a pickup is being used, it is probably due to the fact that the shield side of the lead is not connected to the ground side of the terminal strip. Reversing the leads (after making sure that one side of the phono lead is a shield) should remedy complaints of this kind.

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## ALIGNMENT PROCEDURE

Alignment procedure is given in diagrammatic and chart form (see figure 3 and 4). Make adjustments in the order given. Any reliable low range AC voltmeter, preferably about 0-5 volts may be used as an output meter. It should be connected across the speaker voice coil for best results. The volume control should be set at maximum during the alignment and the output from the signal generator should be decreased as the meter pointer tends to go off scale. If too strong a signal is used and the volume control is used to keep the pointer on scale, the AVC will operate and inaccurate alignment will result.

When aligning the police and short wave bands, care must be taken to see that the trimmers are set on the proper frequency and not on the image. The image falls 910 kilocycles below the fundamental signal on the dial, so at 20 megacycles the image should be heard at 20 megacycles minus .910 megacycle or 19.1 megacycles approximately.

After setting the oscillator trimmer, increase the input from the signal generator and make sure that the image comes in at the proper point. When you can hear one signal at the frequency to which your generator is set, and one at about 1 megacycle below it, you are ready to finish the alignment. Go back to the fundamental frequency and start peaking the RF trimmer, rocking the tuning condenser slightly as you do so. When you reach a peak, compare the strength of the fundamental signal and the image. If the image is the stronger, you have the wrong peak on the RF trimmer. Find the other peak and again compare the two signals. You will probably find it necessary to increase the generator output greatly in order even to hear the image when you have found the right peak.

Repeat this operation for the antenna trimmer.

| Step No. | Connect Signal Generator To | Signal Generator Frequency | Dummy Antenna | Range Switch Position | Dial Setting | Section | Adjusting Screw No. | Peak For | Volume Nat-R-L Switch |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 3rd IF Trans. | 11 | Maximum | Off |
| 2 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 3rd IF Trans. | 12 | Maximum | Off |
| 3 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 2nd IF Trans. | 13 | Maximum | Off |
| 4 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 2nd IF Trans. | 14 | Maximum | Off |
| 5 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 1st IF Trans. | 15 | Maximum | Off |
| 6 | 6K8 Grid | 455 KC | .1 Mfd. Condenser | Broadcast (A) | 540 KC | 1st IF Trans. | 16 | Maximun | Off |
| 7 | Antenna | 1500 KC | 200 Mmfd. Condenser | Broadcast (A) | 1500 KC | B.C. Osc. | 17 | Maximum | Off |
| 8 | Antenna | 1500 KC | 200 Mmfd. Condenser | Broadcast (A) | 1500 KC | B.C. R.F. | 18 | Maximum | Off |
| 9 | Antenna | 1500 KC | 200 Mmfd. Condenser | Broadcast (A) | 1500 KC | B.C. Antenna | 19 | Maximum | Off |
| 10 | Antenna | 600 KC | 200 Mmfd. Condenser | Broadcast (A) | 600 KC | B.C. Padder | 20 | Maximum (1) | (2) |
| 11 | Antenna | 1500 KC | 200 Mmfd. Condenser | Broadcast (A) | Depress #9 Button | Instant Electric Tuning | 9 | Maximum | Off |
| 12 | Antenna | 1500 KC | 200 Mmfd. Condenser | Broadcast (A) | Depress #9 Button | Instant Electric Tuning | 21 | Maximum (3) | Off |
| 13 | Antenna | 1500 KC | 200 Mmfd. Condenser | Broadcast (A) | Depress #9 Button | Instant Electric Tuning | 22 | Maximum (3) | Off |
| 14 | Antenna | 6.0 MC | 400 Ohm Resistor | Police Amateur (B) | 6.0 MC | Police Oscillator | 23 | Maximum (3) | Off |
| 15 | Antenna | 6.0 MC | 400 Ohm Resistor | Police Amateur (B) | 6.0 MC | Police RF | 24 | Maximum (3) | Off |
| 16 | Antenna | 6.0 MC | 400 Ohm Resistor | Police Amateur (B) | 6.0 MC | Police Ant Antenna | 25 | Maximum | Off |
| 17 | Antenna | 2.5 MC | 400 Ohm Resistor | Police Amateur (B) | 2.5 MC | Police Padder | | (4) | Off |
| 18 | Antenna | 20.0 MC | 400 Ohm Resistor | Short Wave (C) | 20.0 MC | Short Wave Oscillator | 26 | Maximum (5) | Off |
| 19 | Antenna | 20.0 MC | 400 Ohm Resistor | Short Wave (C) | 20.0 MC | Short Wave RF | 27 | Maximum (6) | Off |
| 20 | Antenna | 20.0 MC | 400 Ohm Resistor | Short Wave (C) | 20.0 MC | Short Wave Antenna | 28 | Maximum (6) | Off |
| 21 | Antenna | 8.0 MC | 400 Ohm Resistor | Short Wave (C) | 8.0 MC | Short Wave Padder | | (7) | Off |

(1) While rocking. Repeat 7, 8, 9 and 10 until no change is noted.

(2) To check volume naturalizer operation, turn to "On" or "In" position. If functioning normally, volume level will drop quite noticeably, under normal output volume.

(3) The performance obtained with this adjustment when push button tuning is employed is suitable, as a rule, only when a conventional antenna system is used. The use of extremely long or short antennae, may necessitate a minor change in this adjustment per best results.

(4) Check calibration at 2.5 MC. Padder is fixed.

(5) Check for image at 19.1 MC on dial approximately.

(6) Check for image response.

(7) Check calibration at 8.0 M.C. Padder is fixed.

Figure 4

ALIGNMENT PROCEDURE CHART

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MODEL 12B
Tuner Data, Parts
Naturalizer Notes

# FAIRBANKS, MORSE & CO.

### THE PUSH BUTTON TUNER

It will be noted that only one operation is required for the setting of each push button. This simplicity of operation is made possible by the use of permeability tuned coils which have been accurately tracked at the factory so that it is not necessary to adjust external trimmer condensers in order to "set" a station. Tracking is accomplished by the careful spacing of the iron cores on their common shaft so that for all settings of the adjusting screws the coils are in perfect alignment. The capacitance in the oscillator circuit is fixed and may not be adjusted. This condenser (corresponding to the tuning condenser in a manually tuned receiver) is shown as number 11 on the schematic diagram and has a value of 140 micro-microfarads. The capacitance in the antenna and RF circuits consists in each case of two condensers, number 19 and 20 for the antenna, and number 21 and 22 for the RF. Condensers 19 and 21 must be adjusted when the initial alignment is made, but do not have to be touched at the time the buttons are "set" for their individual stations. Their use is covered in the alignment instructions in Figure 4. Instructions for setting-up the push buttons are covered in detail in the instruction book which accompanies each receiver.

### THE AUDIO CIRCUIT

The audio circuit is of conventional design with the exception of the inverse feedback circuit consisting of resistors number 114 and 115, and condensers 116 and 122. By means of this network a certain amount of the voltage present at the plate of each 6V6G tube is fed back to the grid circuit of that tube. This voltage is, of course, out of phase with the input voltage and degeneration is the result.

Any audio amplifier employing a loud speaker as the load will have a certain amount of distortion introduced due to the fact that the impedance varies with the audio frequency changes in the plate circuit of the output tube or tubes. This condition is more pronounced in amplifiers using an output tube of the high impedance type such as the beam pentodes. Inverse feedback effectively reduces the plate impedance of the tube and helps to smooth out these variations thus reducing distortion to a marked degree.

The subject cannot be treated more fully here due to space limitations and has been mentioned merely to give the serviceman a brief explanation of the feedback circuit.

### PURPOSE AND OPERATION OF VOLUME NATURALIZER

In most transmitting stations, the operators attempt to keep the modulation percentage high at all times in order to increase the area in which acceptable reception of their programs is possible. In so doing, a considerable portion of the volume range present in the studio program may be lost due to the fact that the lower volume portions of the program are raised to maintain coverage and thus require that the higher volume portions be relatively attenuated to prevent over-modulation of the transmitter.

The volume naturalizer is designed to compensate, in part, for this evil that often exists under present broadcasting conditions but should not be used indiscriminately. In general, its use is not justified on oral programs although occasionally a listener may prefer it. On some popular musical selections, the volume range is so restricted that no appreciable difference will be noticed except as the frequency response is influenced by the naturalizer circuit. Of course the volume control should be reset, each time the naturalizer is switched in and out, to keep the reference volume approximately the same for more accurate comparison. This will not be necessary at relatively high volume, because the volume will not change appreciably as the naturalizer is switched in or out, under these conditions.

On modern phonograph records, its use is not often desirable as the volume range is generally acceptable. On older records, no definite recommendation can be made because great variations will be found, especially between recordings by different manufacturers.

The method by which the volume naturalizer operates, can be simply described as controlled degeneration, whereby a portion of the audio signal from the plate circuit of the 6J5 first audio tube, is used to vary the bias voltage of preceding and interconnected tubes, in such a manner as to increase the volume level on signals that were originally, suppressed at the transmitting station, and to decrease the volume level on signals that were increased in intensity at the transmitter, thus restoring in part, the original volume range present, for example, during a symphonic orchestra broadcast.

## PARTS AND PRICE LIST MODEL 12B

ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE

| Part Number | Schematic Reference Number | Description | List Price |
|---|---|---|---|
| 8506-40 | | Booklet - Instruction | .01 |
| 103-15 | | Bracket - Shipping | .01 |
| 103-12 | | Bracket - Gang Condenser Mtg.-Front | .02 |
| 103-14 | | Bracket - Gang Condenser Mtg.-Rear | .02 |
| 103-11 | | Bracket - Dial Drive Shaft | .04 |
| 805-3 | 18 | Bulb - Dial Light - 6.8 V. - Bayonet Base | .15 |
| 72-1 | | Button - Push | .05 |
| 1171-1 | | Cable - Line Cord Plug | .05 |
| 44-3 | | Cabinet - Console Brand - 63 | 60.90 |
| 901-69 | | Carton - 63 Cabinet | 2.95 |
| 108-12 | | Chassis End Plate Assembly - Left | 1.75 |
| 108-11 | | Chassis End Plate Assembly - Right | 1.60 |
| 502-8 | 11A,B,C,D,E,F | Coil Assembly - AF - Yellow Dot Color Code | 3.00 |
| 503-10 | 3A,B,C,D,E,F | Coil Assembly - Oscillator - Green Dot Color Code | 3.00 |
| 801-6 | | Clip - Grid - Octal - Small (Dozen .06) | .01 |
| 340-21 | 78A,B | Control - Tone and Switch | .10 |
| 340-20 | 124 | Cord and Plug - AC Line | .35 |
| 203-4 | 93A,B,C | Condenser - Variable Tuning - 3 Gang | 3.85 |
| 293-2 | 6,7A,B,C | Condenser - Variable Trimmer- 3 Gang | .30 |
| 294-2 | 8A,B,C | Condenser - Variable Trimmer- 4 Gang | .40 |
| 215-2 | 5A,B,C | Condenser - Variable Trimmer- 3 Gang | .30 |
| 215-11 | 41,53,64 AAB | Condenser - Variable Trimmer- 2 Gang | .25 |
| 211-5 | 121 | Condenser - Electrolytic - 1Gmfd.-500 Volt | .75 |
| 214-4 | 120 | Condenser - Electrolytic - 30 mfd.-375 Volt | .75 |
| 235-1 | 57,89 | Condenser - Electrolytic - Dual - 20 mfd.-300 Volt | .90 |
| 256-1 | 23,45, 51,52, 95,96 | Condenser - Mouided Mica - 100 mmfd.- 5% | .15 |
| 255-3 | g | Condenser - Mouided Mica - 460 mmfd.- 5% | .25 |
| 255-4 | 11 | Condenser - Mouided Mica - 140 mmfd.- 5% | .25 |
| 255-5 | 33 | Condenser - Mouided Mica - 90 mmfd. | .15 |
| 260-7 | 34,69 | Condenser - Mouided Mica - 400 mmfd. | .15 |
| 260-13 | 96 | Condenser - Mouided Mica - 500 mmfd. | .20 |
| 252-4 | 22 | Condenser - Mouided Mica - 600 mmfd.- 5% | .30 |
| 262-4 | 14 | Condenser - Mouided Mica - 2000 mmfd.- 5% | .18 |
| 252-1 | 125,126 | Condenser - Mouided Paper - .002 mfd. - 600 V. | .18 |
| 252-4 | 24,25,97 | Condenser - Mouided Paper - .001 mfd. - 600 V. | .18 |
| 252-5 | 84,86,104 | Condenser - Tubular Paper - .002 mfd. - 600 V.-10% | .20 |
| 250-8 | 76 | Condenser - Tubular Paper - .003 mfd. - 600 V. | .18 |
| 252-6 | 28 | Condenser - Tubular Paper - .01 mfd. - 400 V.-10% | .18 |
| 252-12 | 116,122 | Condenser - Tubular Paper - .01 mfd. - 400 V.-10% | .18 |
| 250-12 | 25,35,57,67, 72 | Condenser - Tubular Paper - .01 mfd. - 400 V. | .15 |
| 250-14 | 19 | Condenser - Tubular Paper - .02 mfd. - 400 V. | .18 |
| 250-39 | 5,27,29,31, 34,46,54,63 | Condenser - Tubular Paper - .05 mf. - 200 V. | .15 |
| 250-21 | 30,103,109, 140 | Condenser - Tubular Paper - .1 mfd. - 200 V. | .15 |
| 250-22 | 55 | Condenser - Tubular Paper - .25 mfd. - 200 V. | .15 |
| 250-23 | 88,100 | Condenser - Tubular Paper - .25 mfd. - 200 V.-10% | .15 |
| 64-13 | | Crystal - Station Tab - Plain - (8 to one sheet) | .05 |
| 64-8 | | Crystal - Station Chain Indicator - Red - (8 to one sheet) | .05 |
| 64-9 | | Crystal - Station Chain Indicator -Green- (8 to one sheet) | .05 |
| 64-10 | | Crystal - Station Chain Indicator -Yellow (8 to one sheet) | .05 |
| 64-11 | | Crystal - Station Chain Indicator -Blue - (8 to one sheet) | .05 |
| 152-2 | | Drive Shaft and Flywheel Assy. | .65 |
| 60-2 | | Escutcheon Assembly | 2.00 |
| 700-8 | | Grommet - Rubber-Tuning Condenser Mtg. | .02 |
| 70-15 | | Knob - Band | .15 |
| 70-16 | | Knob - Tone - "Off" | .15 |
| 70-17 | | Knob - Volume | .15 |
| 70-18 | | Knob - Volume Nat-Re-Lizr | .40 |
| 70-19 | | Knob - Combination Tone-Volume | .40 |
| 1444-3 | | Nut - HH - 6/32 x 1/4" x 3/32" (Doz. .05) | .01 |
| 1428-3 | | Nut - Pal - 6/32 (Doz. .05) | .01 |
| 1444-8 | | Nut - Pal - 10/32 (Doz. .05) | .01 |
| 1429-1 | | Nut - Pal - 3/8" x 32 | .01 |
| 138-3 | | Pulley - Tubular Drive Asy. | .35 |
| 1530-2 | | Rivet - Tubular - 1/8" x 1/4" (Doz. .05) | .01 |
| 1530-3 | | Rivet - Tubular - 1/8" x 3/16" (Doz. .05) | .01 |
| 112-3 | 119A to D | Ring - Electrolytic Mtg. | .03 |
| 330-3 | | Resistor - Carbon - 68 ohms - 1/2 watt - 10% | .15 |
| 330-21 | 12 | Resistor - Carbon - 100 ohms - 1/2 watt - 10% | .15 |
| 330-22 | 45 | Resistor - Carbon - 470 ohms - 1/2 watt - 10% | .15 |
| 306-26 | 32,37 | Resistor - Carbon - 1200 ohms - 1/2 watt - 10% | .15 |
| 306-29 | 74 | Resistor - Carbon - 2200 ohms - 1/2 watt - 10% | .15 |
| 306-34 | 110,118 | Resistor - Carbon - 4700 ohms - 1/2 watt - 10% | .15 |
| 330-37 | 15 | Resistor - Carbon - 10M ohms - 1 watt - 10% | .20 |
| 330-38 | 36,94 | Resistor - Carbon - 22M ohms - 1/2 watt - 10% | .15 |
| 306-47 | 61,142 | Resistor - Carbon - 47M ohms - 1/2 watt - 10% | .15 |
| 306-49 | 98,101,112, 113 | Resistor - Carbon - 100M ohms - 1/2 watt - 10% | .15 |
| 306-53 | 48,77 | Resistor - Carbon - 220M ohms - 1/2 watt - 10% | .15 |
| 306-54 | 49,68 | Resistor - Carbon - 330M ohms - 1/2 watt - 10% | .15 |
| 306-57 | 71 | Resistor - Carbon - 470M ohms - 1/2 watt - 10% | .15 |
| 301-29 | 15,16 | Resistor - Carbon - 470M ohms - 1/2 watt - 10% | .15 |
| 306-59 | 114,115 | Resistor - Carbon - 680M ohms - 1/2 watt - 10% | .15 |
| 306-63 | 4,8 | Resistor - Carbon - 1 Megohm - 1/2 watt - 10% | .15 |
| 306-64 | 1,18 | Resistor - Carbon - 1.3 Megohm - 1/2 watt - 10% | .15 |
| 306-65 | 80 | Resistor - Carbon - 1.5 Megohm - 1/2 watt - 10% | .15 |
| 306-66 | 90 | Resistor - Carbon - 1.6 Megohm - 1/2 watt - 10% | .15 |
| 306-67 | 43,47,59,70, 83,102,139 | Resistor - Carbon - 2.2 Megohm - 1/2 watt - 10% | .15 |
| 306-69 | 58,102,139 | Resistor - Carbon - 3.3 Megohm - 1/2 watt - 10% | .15 |
| 306-37 | 106,107 | Resistor - Carbon - 4.7 Megohm - 1/2 watt - 10% | .15 |
| 311-141 | 23,60,82,96 | Resistor - Carbon - 6.8 Megohm - 1/2 watt - 10% | .15 |
| 306-11 | | Resistor - Carbon - 6.8 Megohm - 1/2 watt - 10% | .15 |
| 7368-5 | | Screw - Slab Head - Set - 8/32 x 3/16" (Doz. .05) | .03 |
| 7368-37 | | Screw - Binder Head - 6/32 x 3/4" (Doz. .10) | .02 |
| 7123-5 | | Screw - R H M - 8/32 x 1/4" (Doz. .05) | .01 |
| 7123-19 | | Screw - R H M - 8/32 x 3/4" (Doz. .05) | .01 |
| 7123-9 | | Screw - R H M - 6/32 x 1/4" (Doz. .05) | .01 |
| 7113-7 | | Screw - Fillister Hd. M-10/32 x 3/8" (Doz. .06) | .01 |
| 7113-1 | | Screw - Fillister Hd. M-10/32 x 1/2" (Doz. .06) | .01 |
| 7115-2 | | Screw - Fillister Hd. M-10/32 x 5/8" (Doz. .06) | .01 |
| 7375-2 | | Screw - Oval C'sunk Hd. - #8 x 7/16" | .01 |
| 7223-1 | | Screw - Flat Wing Hd. - #8/32 x 1-1/8" | .01 |
| 151-4 | | Sheet - Station Letter Tabs (2 sheets to set) | .30 |
| 151-3 | | Sheets - Station Letter Tabs (1 sheet of 10 tabs) | .30 |
| 664-8 | | Sheets - Phono and Tuning Tab | 11.45 |
| 20-18 | 117A to E | Speaker - Electro-Dynamic - 12" | 4.00 |
| 1180-19 | 117A | Cone and Voice Coil Assy. | 3.00 |
| 1180-18 | 117A | Output Transformer | .10 |
| 1180-17 | 128 to 138 | Field Coil | .10 |
| 456-1 | | Socket - Octal Base - 8 Contact | .10 |
| 456-2 | 121 | Socket - Octal Base - 5 Contact | .10 |
| 451-3 | | Socket - Speaker Base- 6 Contact | .75 |
| 465-13 | | Socket - Pilot Lamp - Bayonet Type | .10 |
| 465-1 | | Socket - With Bracket and Mtg. Bracket-Eyetube | .03 |
| 111-2 | | Shield Asst. - for tubes | 1.65 |
| 113-1 | | Shield Asst. - Half | .02 |
| 113-3 | | Shield Base Ring | .10 |
| 113-4 | | Shield Grounding Clip (Doz. .06) | .01 |
| 113-5 | | Shield Plate | .20 |
| 137-2 | | Shield Assy. for Coils | .02 |
| 7349-1 | | Snap - Condenser Mtg. | .20 |
| 470-18 | 4 | Strip - Antenna - Phono Gnd. | .10 |
| 470-2 | | Strip - Terminal - 2 Lug | .08 |
| 470-19 | 92 | Strip - Terminal - 3 Lug | .40 |
| 380-8 | 117A,B,C,D | Switch - Volume Nat-Re-Lizer | 1.65 |
| 375-3 | | Switch - Range | |
| 400-23 | | Transformer - Power - 25 cycle-universal | 9.25 |
| 400-20 | 123A to D | Transformer - Power Coupling | 1.75 |
| 400-21 | 143A | Transformer - IF Input | 1.60 |
| 550-24 | 384,B | Transformer - IF Intermediate | 2.25 |
| 550-25 | 504,B | Transformer - IF Output | 2.25 |
| 550-26 | 624,B | Tube - Electrolytic | 2.00 |
| 8625-3 | | Tube - Eye Cover | .05 |
| 8625-4 | | Terminal - Cathode - For Electrolytic | .05 |
| 221-1 | | Tuner - Push Button Asst. (Complete) | 20.00 |
| 525-2 | 143A to I | Washer - Lock - #6 - Internal (Doz. .05) | .01 |
| 7491-3 | | Washer - Lock - #6 - External (Doz. .05) | .01 |
| 7496-1 | | Washer - Lock - #8 - Internal (Doz. .05) | .01 |
| 7496-5 | | Washer - Lock - #6 - External (Doz. .05) | .01 |
| 7496-2 | | Washer - Lock - #10 - External (Doz. .05) | .01 |
| 7496-4 | | Washer - Flat - .250 x 11/16" x .051 (Doz. .05) | .01 |
| 7471-2 | | Washer - Flat - 7/32" x 1/2" x .051 (Doz. .05) | .01 |
| 7471-16 | | Washer - Flat - .138" I.D. (Doz. .05) | .01 |
| 7471-7 | | Washer - Felt - (Doz. .05) | .01 |
| 8004-9 | | Washer - Fibre - .140 I.D. (Doz. .05) | .01 |
| 7471-1 | | Washer - Spring (Doz. .05) | .01 |
| 7476-1 | | Washer - Spring | .01 |
| 7475-3 | | Washer - Tuner Adjusting Screw | .20 |
| 8545-2 | | Wrench - Tuner 3/16 | |
| | | DIAL PARTS | |
| 690-7 | | Dial Assembly - Complete | 5.50 |
| 690-1 | | Dial Mtg. Bracket | .90 |
| 8036-1 | | Cord - Dial Drive - Specify 108" length | .16 |
| 157-1 | | Crank Lever - Band Indicator | .75 |
| 157-2 | | Crank Assembly - For Shifter Link & Range Sw. | .25 |
| 1441-3 | | Dial Shifter Link - To Indicator | .20 |
| 1441-2 | | Dial Shifter Link - To Range Switch | .20 |
| 709-1 | | Mast - Push Button Arm | .05 |
| 602-8 | | Pointer - Slider | .10 |
| 130-3 | | Pulley - Idler | .05 |
| 1535-1 | | Rod - Dial Scale Glass - Slide | .01 |
| 1532-1 | | Rivet - FH - 1/8" x 1/8" (Doz. .05) | .01 |
| | | Rivet - FH - 1/8" x 1/8" (Doz. .05) | |
| 601-13 | | Scale - Dial - Glass | .75 |
| 631-3 | | Slider Bar Assembly | .45 |
| 1641-2 | | Shifter Link - To Range Switch (Doz. .10) | .01 |
| 1641-1 | | Shifter Link - To Tuner .75"/4" | .01 |
| 1713-31 | | Shifter Linkage Asby. (2 levers, link, spring) | .45 |
| 727-6 | | Spring - Shifter Linkage | .10 |
| 1121-1 | | Spring - Cord Tension | .02 |
| 1141-1 | | Strip - Dial Scale Retainer | .01 |
| 1141-2 | | Washer - Felt (Doz. .05) | .01 |
| #4175-4 | | Washer - 1/2" I/D (Doz. .06) | |
| 615-1 | | Washer - Dial Spacer | .01 |

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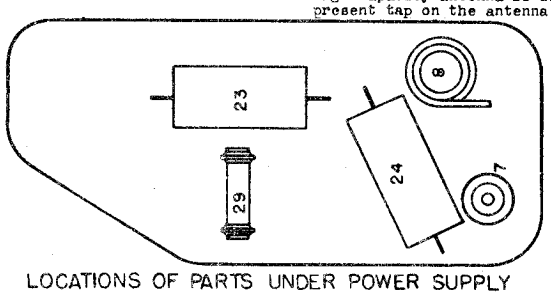
Schematic, Voltage
Socket, Trimmers
Chassis, Alignment

# FIRESTONE TIRE & RUBBER CO.

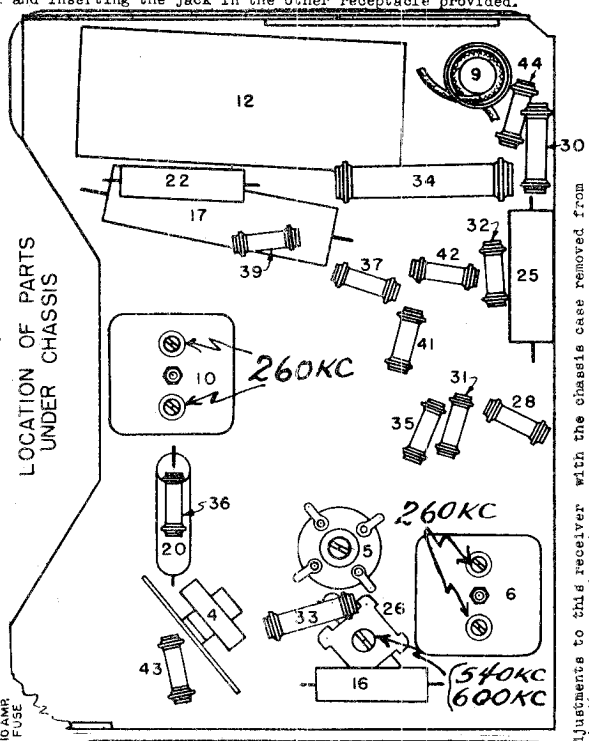
MODEL 7407-3
Chassis 536

NOTE: VOLTAGE READING TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT. "A" BATTERY = 6 VOLTS. CURRENT DRAIN = 7.4 AMPERES

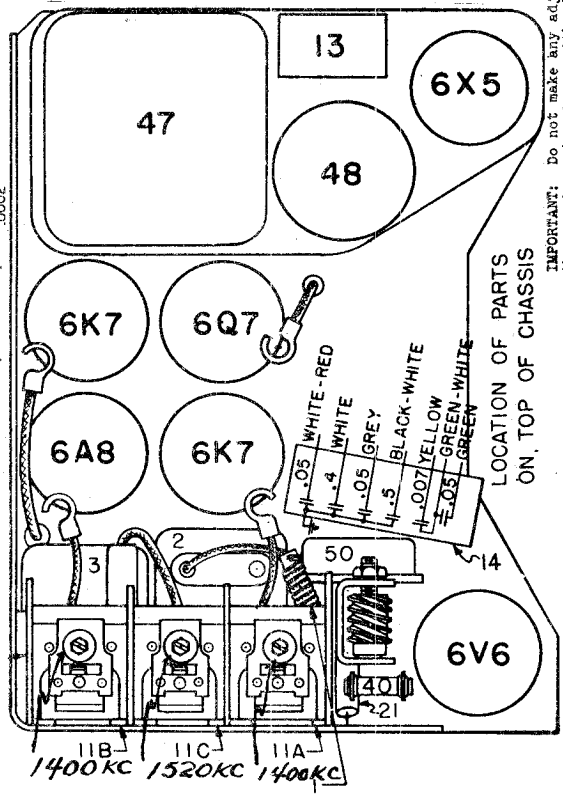
ANTENNA CIRCUIT: The antenna circuit is directly coupled to the antenna in contrast with the capacity coupled circuit used in some previous Firestone auto receivers. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the dial (1400 K.C.) instead of at the low frequency end, as with the capacity coupled sets. There are two taps provided on the antenna coil. One for use with whip or low capacity type antenna, and the other for running board or high capacity type antenna. The antenna coil is set at the low capacity tap at the factory and must be changed (by means of the small tip jack located in the receiver at the antenna coil) if a high capacity antenna is used. This is done by merely removing the small tip jack from its present tap on the antenna coil and inserting the jack in the other receptacle provided.




LOCATIONS OF PARTS UNDER POWER SUPPLY

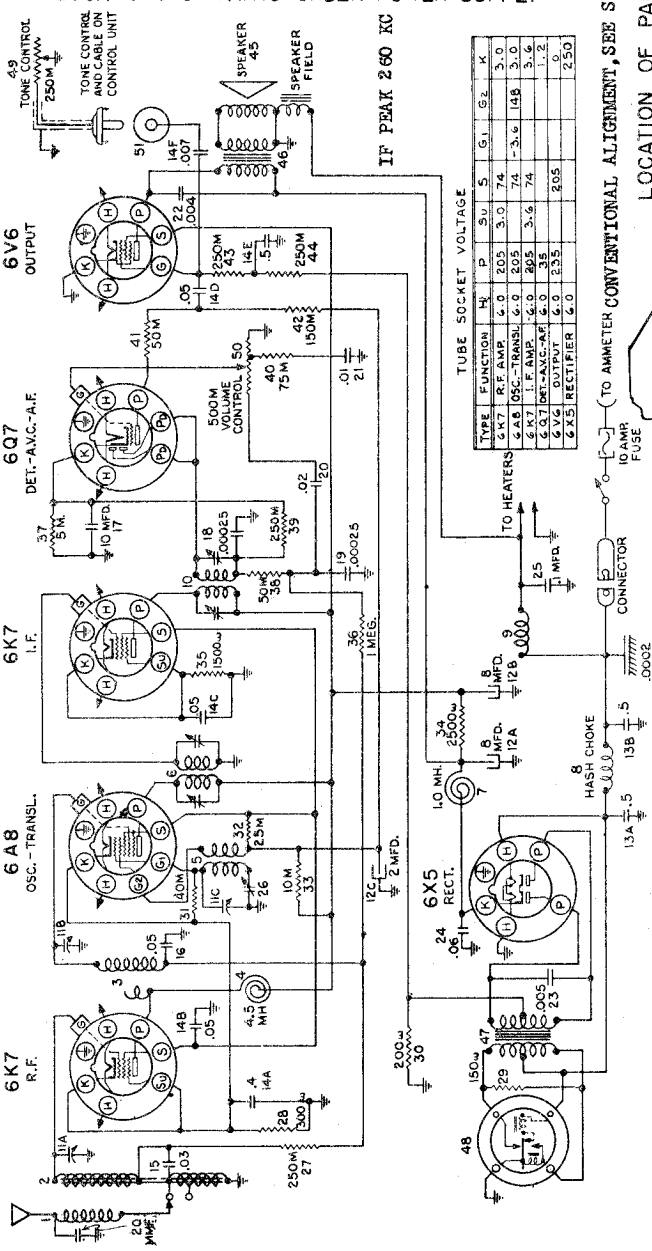



LOCATION OF PARTS UNDER CHASSIS




LOCATION OF PARTS ON TOP OF CHASSIS

IMPORTANT: Do not make any adjustments to this receiver with the chassis case removed from the receiver chassis or without the proper equipment.




TUBE SOCKET VOLTAGE

| Type | Function | Hi | P | Su | S | G1 | G2 | K |
|---|---|---|---|---|---|---|---|---|
| 6K7 | R.F. AMP. | 6.0 | 205 | 3.0 | 74 | | | 3.0 |
| 6A8 | OSC.-TRANSL. | 6.0 | 205 | 3.0 | 74 | -3.6 | 148 | 3.6 |
| 6K7 | I.F. AMP. | 6.0 | 205 | 3.0 | 74 | | | .2 |
| 6Q7 | DET.-A.V.C.-A.F. | 6.0 | 85 | | | | | 0 |
| 6V6 | OUTPUT | 6.0 | 235 | | 205 | | | 250 |
| 6X5 | RECTIFIER | 6.0 | | | | | | |

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.

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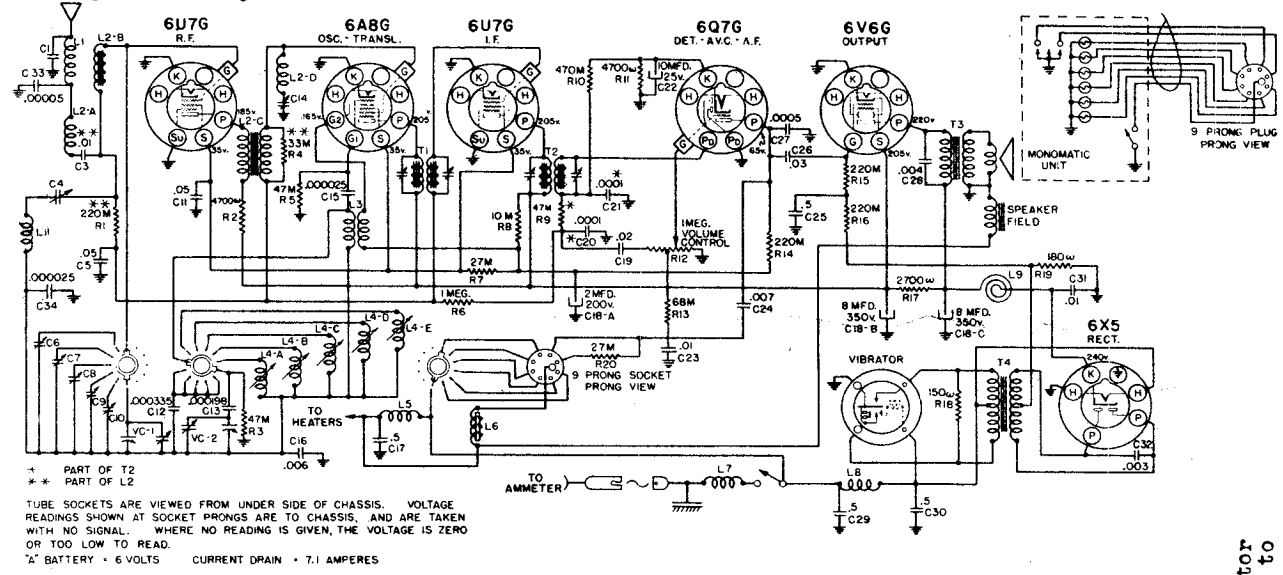
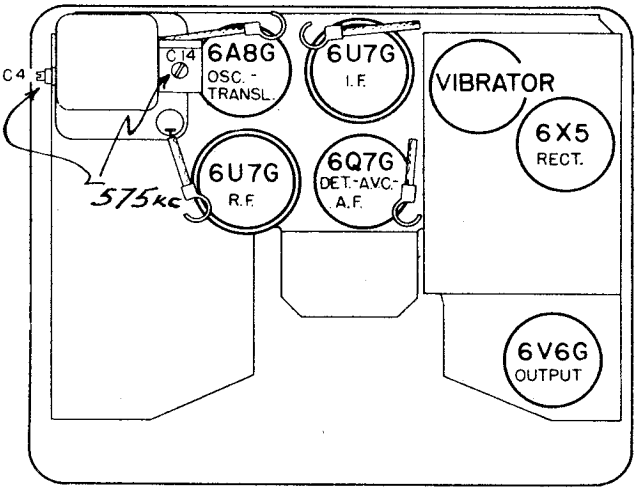
MODEL S7407-5
Schematic, Voltage, Socket, Trimmers,

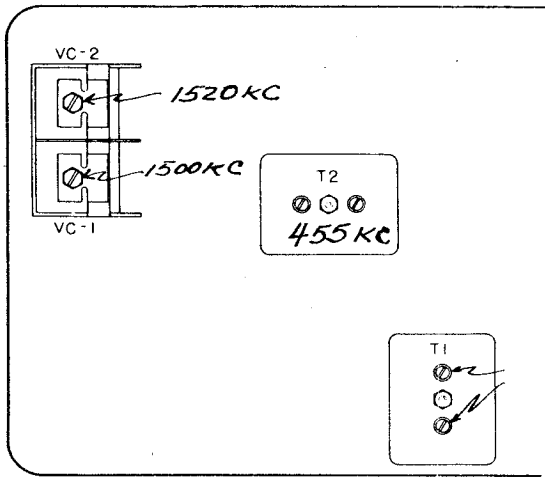
Alignment, Tuner

# FIRESTONE TIRE & RUBBER CO.


6U7G R.F.
6A8G OSC.-TRANSL.
6U7G I.F.
6Q7G DET.-A.V.C.-A.F.
6V6G OUTPUT
6X5 RECT.
VIBRATOR
MONOMATIC UNIT
9 PRONG PLUG PRONG VIEW
9 PRONG SOCKET PRONG VIEW
SPEAKER FIELD
IMEG. VOLUME CONTROL
TO HEATERS
TO AMMETER
* PART OF T2
** PART OF L2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
"A" BATTERY - 6 VOLTS CURRENT DRAIN - 7.1 AMPERES




LOCATIONS OF TUBES & TRIMMERS - BOTTOM COVER REMOVED




LOCATIONS OF TRIMMERS - TOP COVER REMOVED

## SETTING UP THE MONOMATIC TUNING MECHANISM:

Remove the plate that covers the Monomatic tuning adjustments on the receiver case.

Operate the Monomatic button (marked "Push") until the dial becomes illuminated, indicating that the receiver is adjusted for Dial Tuning. Then tune in your #1 station, using the Station Selector knob.

Operate the Monomatic button until the #1 station indicator (furthest left of the five indicators) becomes illuminated.

Turn the #1 station screw marked "OSC" (see Fig. 3) until your #1 station is tuned in. Other stations may be heard during this operation. If in doubt whether you have your desired #1 station, compare it with the original station by operating the Monomatic button until the Dial Tuning position is reached.

After adjusting the "OSC" screw as carefully as possible, adjust the "ANT" screw for maximum volume and best reproduction. After having done so, it is advisable to re-check the adjustment of the "OSC" screw and then the "ANT" one again to insure greatest accuracy.

Tune in your #2 station and operate the Monomatic button until the #2 indicator becomes illuminated. Then proceed to adjust the two screws for this station in the same manner as was just done for the #1 station. Always adjust the "OSC" screw before adjusting the "ANT" one, and then repeat the adjustments for greater accuracy.

Proceed in the same manner for the remaining stations on your list. Then replace the cover in the receiver case. Insert the proper call letters, cut from the sheets supplied, in the indicator button slots.

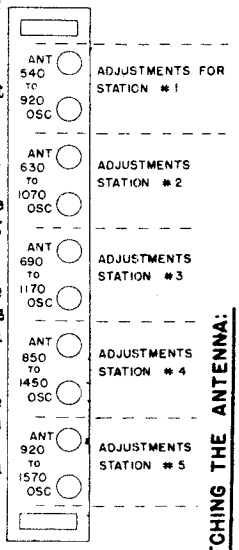

ANT 540 TO 920 OSC
ADJUSTMENTS FOR STATION #1
ANT 630 TO 1070 OSC
ADJUSTMENTS STATION #2
ANT 690 TO 1170 OSC
ADJUSTMENTS STATION #3
ANT 850 TO 1450 OSC
ADJUSTMENTS STATION #4
ANT 920 TO 1570 OSC
ADJUSTMENTS STATION #5

Fig. 3

**MATCHING THE ANTENNA:**

An adjusting screw, accessible to a screw-driver through a hole in the side of the case is provided to match the receiver to the car antenna. Using the Station Selector knob, tune in a very weak station at about 600 kilocycles. Then turn the adjusting screw to the point affording maximum volume.

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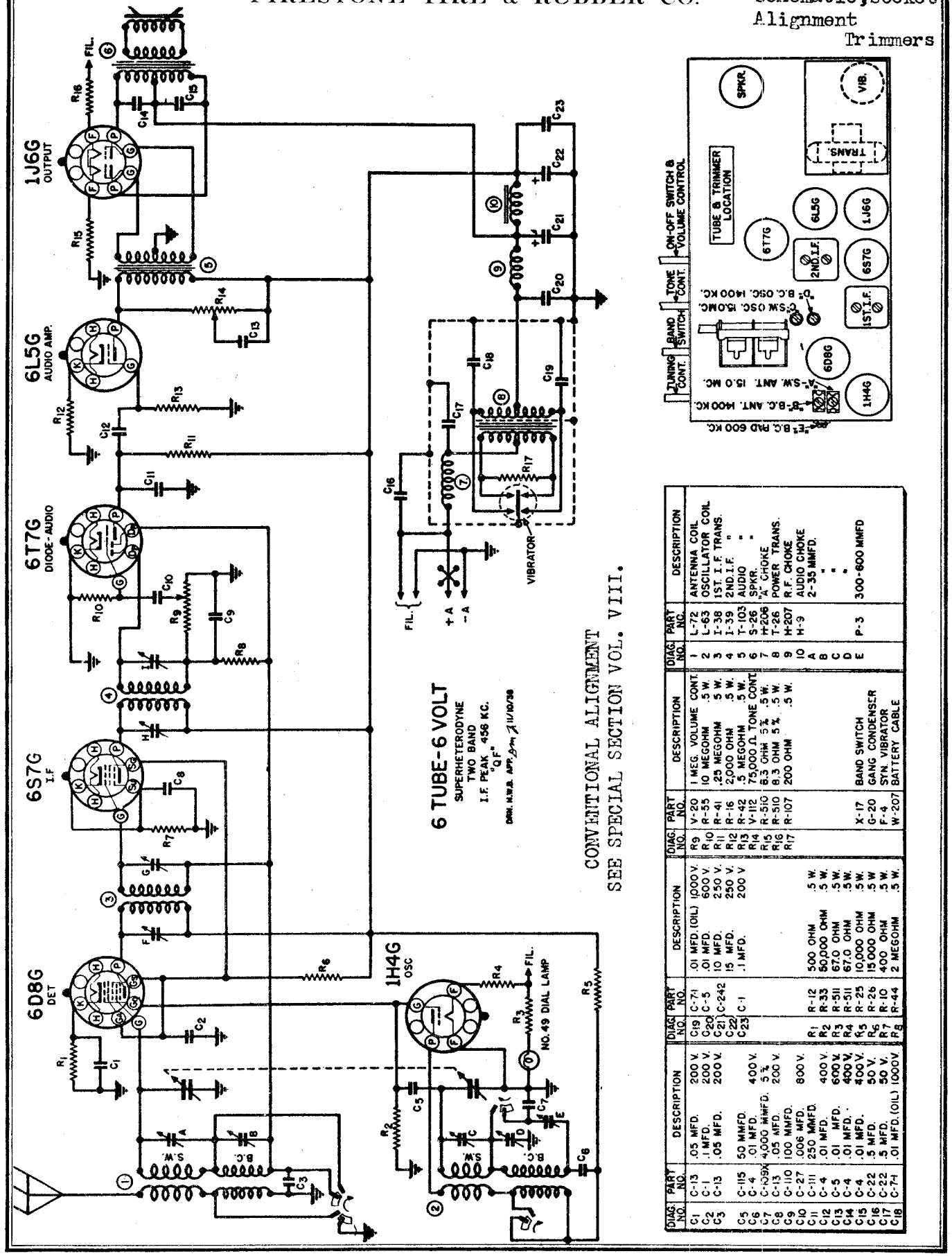
FIRESTONE TIRE & RUBBER CO.

MODEL S7424-3
Schematic, Socket
Alignment
Trimmers




| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | C-13 | .05 MFD. 200 V. |
| C2 | C-1 | .1 MFD. 200 V. |
| C3 | C-13 | .05 MFD. 200 V. |
| C5 | C-115 | 50 MMFD. |
| C6 | C-4 | .01 MFD. 400 V. |
| C7 | C-109X | 4,000 MMFD. 5% |
| C8 | C-13 | .05 MFD. 200 V. |
| C9 | C-110 | 100 MMFD. |
| C10 | C-27 | .006 MFD. 800 V. |
| C11 | C-111 | 250 MMFD. |
| C12 | C-4 | .01 MFD. 400 V. |
| C13 | C-5 | .01 MFD. 600 V. |
| C14 | C-4 | .01 MFD. 400 V. |
| C15 | C-4 | .01 MFD. 400 V. |
| C16 | C-22 | .5 MFD. 50 V. |
| C17 | C-22 | .5 MFD. 50 V. |
| C18 | C-74 | .01 MFD. (OIL) 1000V |
| C19 | C-74 | .01 MFD. (OIL) 1000 V. |
| C20 | C-5 | .01 MFD. 600 V. |
| C21 | C-242 | .10 MFD. 250 V. |
| C22 | | .15 MFD. 250 V. |
| C23 | C-1 | .1 MFD. 200 V |
| R1 | R-12 | 500 OHM .5 W. |
| R2 | R-33 | 50,000 OHM .5 W. |
| R3 | R-511 | 67.0 OHM .5 W. |
| R4 | R-511 | 67.0 OHM .5 W. |
| R5 | R-25 | 10,000 OHM .5 W. |
| R6 | R-26 | 15,000 OHM .5 W. |
| R7 | R-10 | 400 OHM .5 W. |
| R8 | R-44 | 2 MEGOHM .5 W. |
| R9 | V-20 | 1 MEG. VOLUME CONT. |
| R10 | R-55 | 10 MEGOHM .5 W. |
| R11 | R-41 | .25 MEGOHM .5 W. |
| R12 | R-16 | 2,000 OHM .5 W. |
| R13 | R-42 | .5 MEGOHM .5 W. |
| R14 | V-112 | 75,000 Ω TONE CONT. |
| R15 | R-510 | 8.3 OHM 5% .5 W. |
| R16 | R-510 | 8.3 OHM 5% .5 W. |
| R17 | R-107 | 200 OHM .5 W. |
| X-17 | | BAND SWITCH |
| G-20 | | GANG CONDENSER |
| F-4 | | SYN. VIBRATOR |
| W-207 | | BATTERY CABLE |

| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| 1 | L-72 | ANTENNA COIL |
| 2 | L-63 | OSCILLATOR COIL |
| 3 | I-38 | 1ST. I.F. TRANS. |
| 4 | I-39 | 2ND. I.F. " |
| 5 | T-103 | AUDIO " |
| 6 | S-26 | SPKR. " |
| 7 | H-206 | "A" CHOKE |
| 8 | T-26 | POWER TRANS. |
| 9 | H-207 | R.F. CHOKE |
| 10 | H-9 | AUDIO CHOKE |
| A | | 2-35 MMFD. |
| B | | " |
| C | | " |
| D | | " |
| E | P-3 | 300-600 MMFD |

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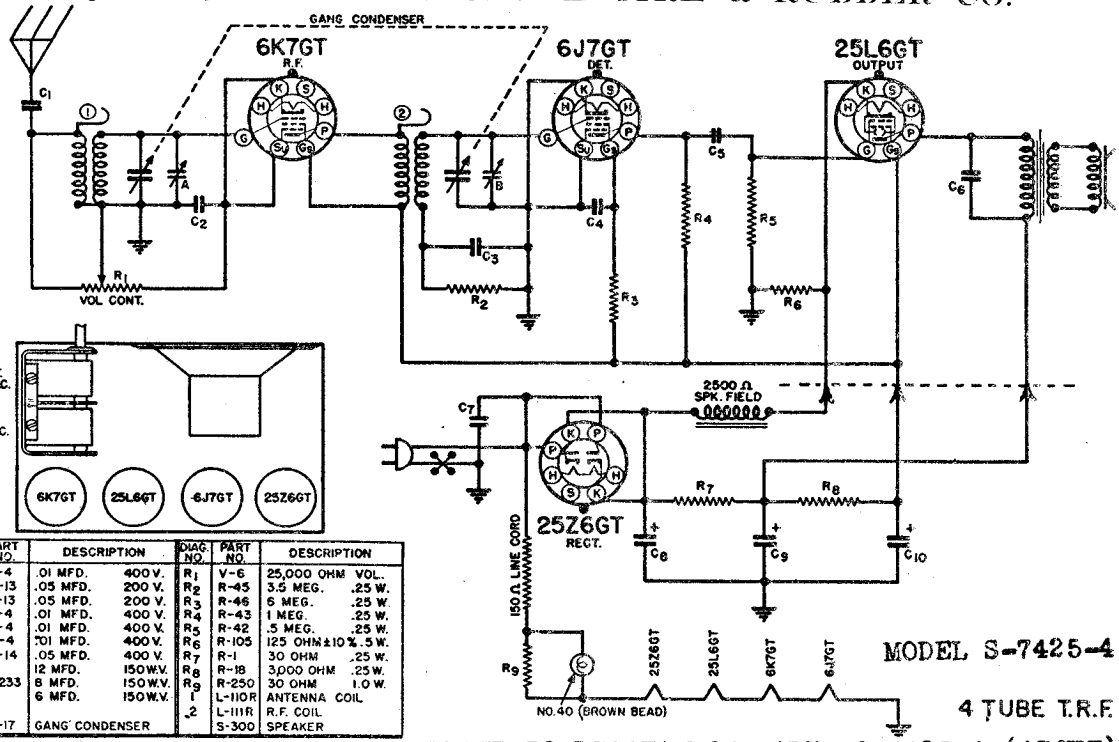
MODELS S7425-4, S7425-5, S7426-5

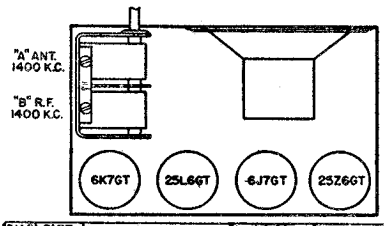
Alignment

Schematics, Socket, Trimmers FIRESTONE TIRE & RUBBER CO.




MODEL S-7425-4

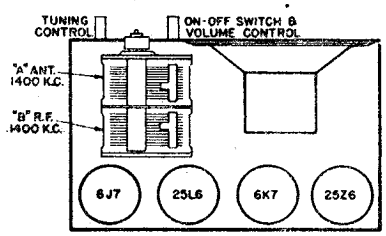
4 TUBE T.R.F.

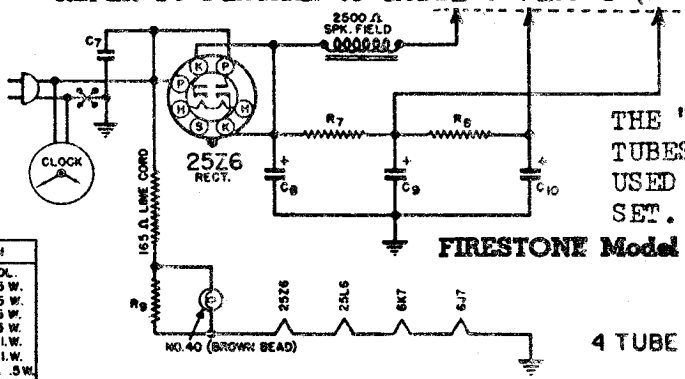



| DIAG NO. | PART NO. | DESCRIPTION | | DIAG NO. | PART NO. | DESCRIPTION | |
|---|---|---|---|---|---|---|---|
| $C_1$ | C-4 | .01 MFD. | 400 V. | $R_1$ | V-6 | 25,000 OHM VOL. | |
| $C_2$ | C-13 | .05 MFD. | 200 V. | $R_2$ | R-45 | 3.5 MEG. | .25 W. |
| $C_3$ | C-13 | .05 MFD. | 200 V. | $R_3$ | R-46 | 6 MEG. | .25 W. |
| $C_4$ | C-4 | .01 MFD. | 400 V. | $R_4$ | R-43 | 1 MEG. | .25 W. |
| $C_5$ | C-4 | .01 MFD. | 400 V. | $R_5$ | R-42 | .5 MEG. | .25 W. |
| $C_6$ | C-4 | .01 MFD. | 400 V. | $R_6$ | R-105 | 125 OHM ±10% | .5 W. |
| $C_7$ | C-14 | .05 MFD. | 400 V. | $R_7$ | R-1 | 30 OHM | .25 W. |
| $C_8$ | | 12 MFD. | 150 W.V. | $R_8$ | R-18 | 3,000 OHM | .25 W. |
| $C_9$ | C-233 | 8 MFD. | 150 W.V. | $R_9$ | R-250 | 30 OHM | 1.0 W. |
| $C_{10}$ | | 6 MFD. | 150 W.V. | 1 | L-110R | ANTENNA COIL | |
| | | | | 2 | L-111R | R.F. COIL | |
| | G-17 | GANG CONDENSER | | | S-300 | SPEAKER | |

**POWER SUPPLY.** This receiver is designed to operate on any alternating current supply (A.C.) ranging from 110 to 120 volts, 50 to 60 cycles; or on any direct current supply (D.C.) ranging from 110 to 120 volts.

REFER TO DIAGRAM OF MODEL S-7425-4 (ABOVE)




THE "GT" TYPE TUBES ARE NOT USED IN THIS SET.

**FIRESTONE Model S-7425-5**

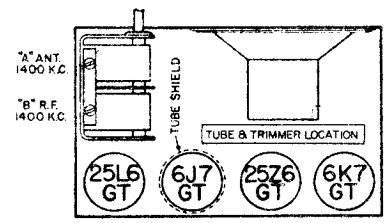
4 TUBE T.R.F.

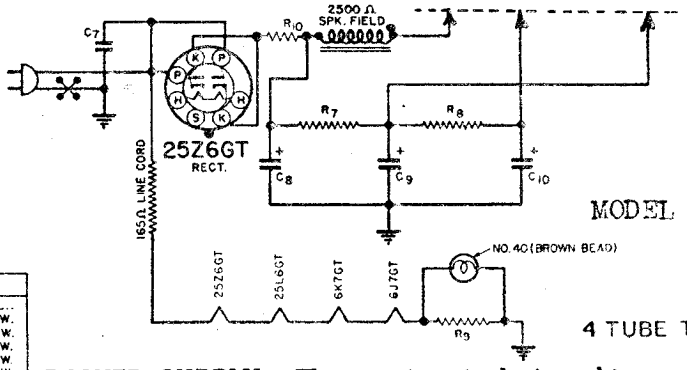
| DIAG NO. | PART NO. | DESCRIPTION | | DIAG NO. | PART NO. | DESCRIPTION | |
|---|---|---|---|---|---|---|---|
| $C_1$ | C-4 | .01 MFD. | 400 V. | $R_1$ | V-24 | 25,000 OHM VOL. | |
| $C_2$ | C-13 | .05 MFD. | 200 V. | $R_2$ | R-45 | 3.5 MEG. | .5 W. |
| $C_3$ | C-13 | .05 MFD. | 200 V. | $R_3$ | R-46 | 6 MEG. | .5 W. |
| $C_4$ | C-4 | .01 MFD. | 400 V. | $R_4$ | R-43 | 1 MEG. | .5 W. |
| $C_5$ | C-4 | .01 MFD. | 400 V. | $R_5$ | R-42 | .5 MEG. | .5 W. |
| $C_6$ | C-4 | .01 MFD. | 400 V. | $R_6$ | R-105X | 125 OHM ±10% | 1 W. |
| $C_7$ | C-14 | .05 MFD. | 400 V. | $R_7$ | R-105X | 125 OHM ±10% | 1 W. |
| $C_8$ | | 16 MFD. | 150 W.V. | $R_8$ | R-18X | 3,000 OHM ±10% | .5 W. |
| $C_9$ | C-233 | 8 MFD. | 150 W.V. | $R_9$ | R-100 | 30 OHM | 1 W. |
| $C_{10}$ | | 6 MFD. | 150 W.V. | 1 | L-110 | ANTENNA COIL | |
| | W-3 | POWER CORD | | 2 | L-111 | R.F. COIL | |
| | G-26 | GANG CONDENSER | | | S-300A | SPEAKER & TRANS. | |

The clock will keep correct time only when connected to a 60 cycle, 110 to 120 volt A.C. power supply. **Never plug into a direct current circuit.**

## 4 Tube AC Tuned Radio Frequency Receiver With Electric Clock

REFER TO DIAGRAM OF MODEL S-7425-4 (ABOVE)




MODEL S-7426-5

4 TUBE T.R.F.

| DIAG NO. | PART NO. | DESCRIPTION | | DIAG NO. | PART NO. | DESCRIPTION | |
|---|---|---|---|---|---|---|---|
| $C_1$ | N-1344 | .01 MFD. | 400 V. | $R_1$ | V-23 | 25,000 OHM VOL. | |
| $C_2$ | N-1345 | .05 MFD. | 200 V. | $R_2$ | N-1418 | 3.5 MEG. | .5 W. |
| $C_3$ | N-1345 | .05 MFD. | 200 V. | $R_3$ | N-1419 | 6 MEG. | .5 W. |
| $C_4$ | N-1344 | .01 MFD. | 400 V. | $R_4$ | N-1262 | 1 MEG. | .5 W. |
| $C_5$ | N-1344 | .01 MFD. | 400 V. | $R_5$ | N-1264 | .5 MEG. | .5 W. |
| $C_6$ | N-1344 | .01 MFD. | 400 V. | $R_6$ | N-1416 | 125 OHM ±10% | .5 W. |
| $C_7$ | N-1346 | .05 MFD. | 400 V. | $R_7$ | N-1420 | 125 OHM | 1 W. |
| $C_8$ | | 16 MFD. | 150 W.V. | $R_8$ | N-1417 | 3,000 OHM | .5 W. |
| $C_9$ | C-233 | 8 MFD. | 150 W.V. | $R_9$ | N-1415 | 30 OHM | 1.0 W. |
| $C_{10}$ | | 6 MFD. | 150 W.V. | $R_{10}$ | N-1251 | 25 OHM | 1 W. |
| | S-300 | SPEAKER | | 1 | L-110 | ANTENNA COIL | |
| | G-25 | GANG CONDENSER | | 2 | L-111 | R.F. COIL | |

**POWER SUPPLY.** This receiver is designed to operate on any alternating current supply (A.C.) ranging from 110 to 120 volts, 50 to 60 cycles; or on any direct current supply (D.C.) ranging from 110 to 120 volts.

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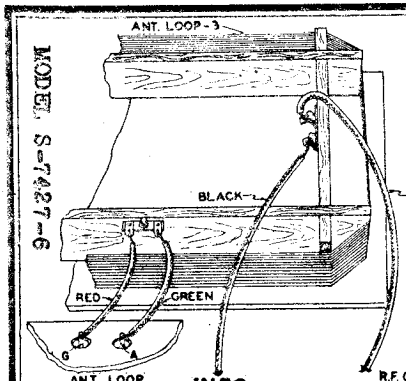
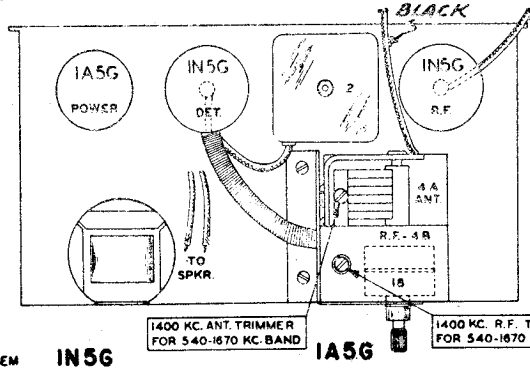
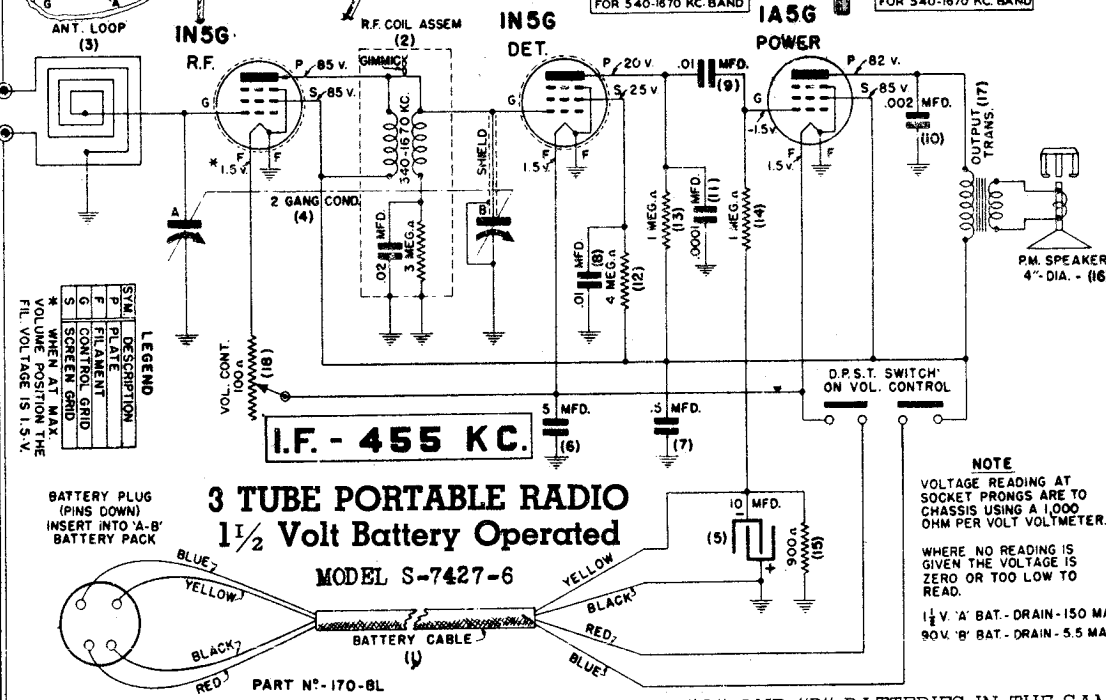
Schematics, Socket Voltage Trimmers, Alignment

# FIRESTONE TIRE & RUBBER CO.

MODEL S7426-6
MODEL S7427-6







## 3 TUBE PORTABLE RADIO
## 1½ Volt Battery Operated
## MODEL S-7427-6

NOTE
VOLTAGE READING AT SOCKET PRONGS ARE TO CHASSIS USING A 1,000 OHM PER VOLT VOLTMETER.

WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.

1½ V. 'A' BAT. - DRAIN - 150 MA.
90 V. 'B' BAT. - DRAIN - 5.5 MA.

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

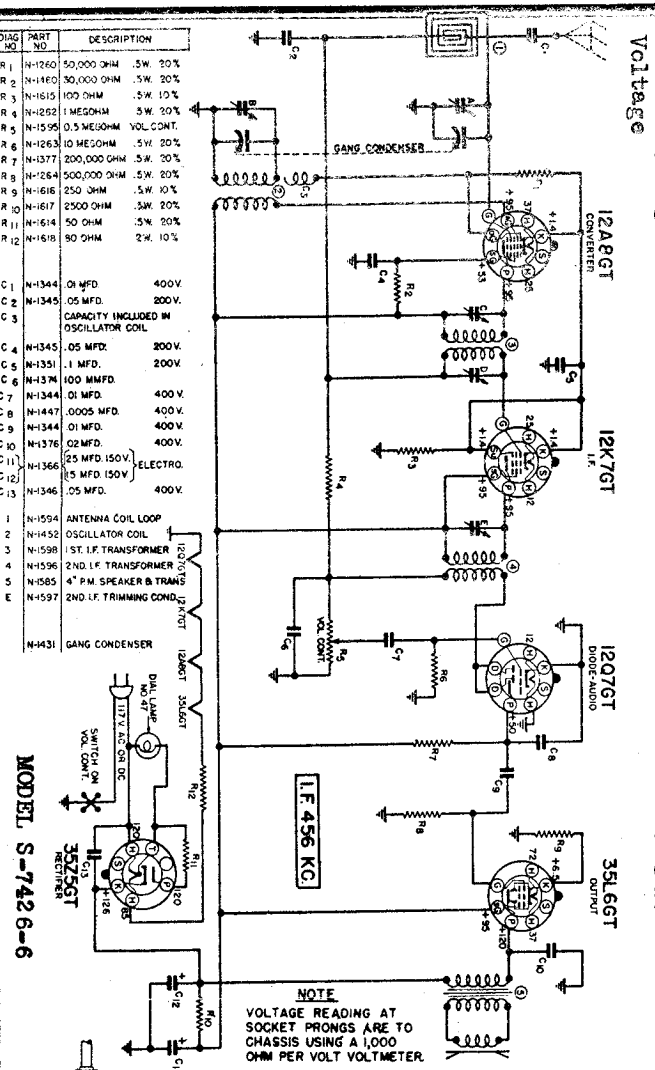
**When adjusting 1400 kilocycle antenna and R. F. trimmer, do not connect test oscillator to terminals on bottom of cabinet back.**

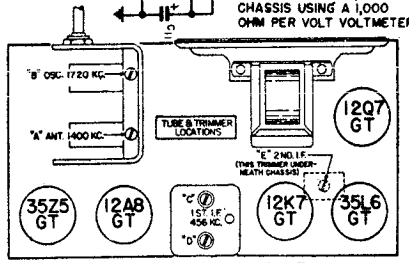
Couple test oscillator to receiver loop by:

a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

| DIAG NO | PART NO | DESCRIPTION | |
|---|---|---|---|
| R 1 | N-1260 | 50,000 OHM | .5W. 20% |
| R 2 | N-1460 | 30,000 OHM | .5W. 20% |
| R 3 | N-1615 | 100 OHM | .5W. 10% |
| R 4 | N-1262 | 1 MEGOHM | .5W. 20% |
| R 5 | N-1595 | 0.5 MEGOHM | VOL. CONT. |
| R 6 | N-1263 | 10 MEGOHM | .5W. 20% |
| R 7 | N-1377 | 200,000 OHM | .5W. 20% |
| R 8 | N-1264 | 500,000 OHM | .5W. 20% |
| R 9 | N-1616 | 250 OHM | .5W. 10% |
| R 10 | N-1617 | 2500 OHM | .5W. 20% |
| R 11 | N-1614 | 50 OHM | .5W. 20% |
| R 12 | N-1618 | 80 OHM | 2W. 10% |
| C 1 | N-1344 | .01 MFD. | 400 V. |
| C 2 | N-1345 | .05 MFD. | 200 V. |
| C 3 | | CAPACITY INCLUDED IN OSCILLATOR COIL | |
| C 4 | N-1345 | .05 MFD. | 200 V. |
| C 5 | N-1351 | .1 MFD. | 200 V. |
| C 6 | N-1374 | 100 MMFD. | |
| C 7 | N-1344 | .01 MFD. | 400 V. |
| C 8 | N-1447 | .0005 MFD. | 400 V. |
| C 9 | N-1344 | .01 MFD. | 400 V. |
| C 10 | N-1376 | .02 MFD. | 400 V. |
| C 11 | N-1366 | 25 MFD. 150 V. | ELECTRO. |
| C 12 | | 15 MFD. 150 V. | |
| C 13 | N-1346 | .05 MFD. | 400 V. |
| 1 | N-1594 | ANTENNA COIL LOOP | |
| 2 | N-1452 | OSCILLATOR COIL | |
| 3 | N-1598 | 1ST. I.F. TRANSFORMER | |
| 4 | N-1596 | 2ND. I.F. TRANSFORMER | |
| 5 | N-1585 | 4" P.M. SPEAKER & TRANS | |
| E | N-1597 | 2ND. I.F. TRIMMING COND. | |
| | N-1431 | GANG CONDENSER | |




NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO CHASSIS. ALL HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.

5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

DRN. J.B. APP. 12-23-39

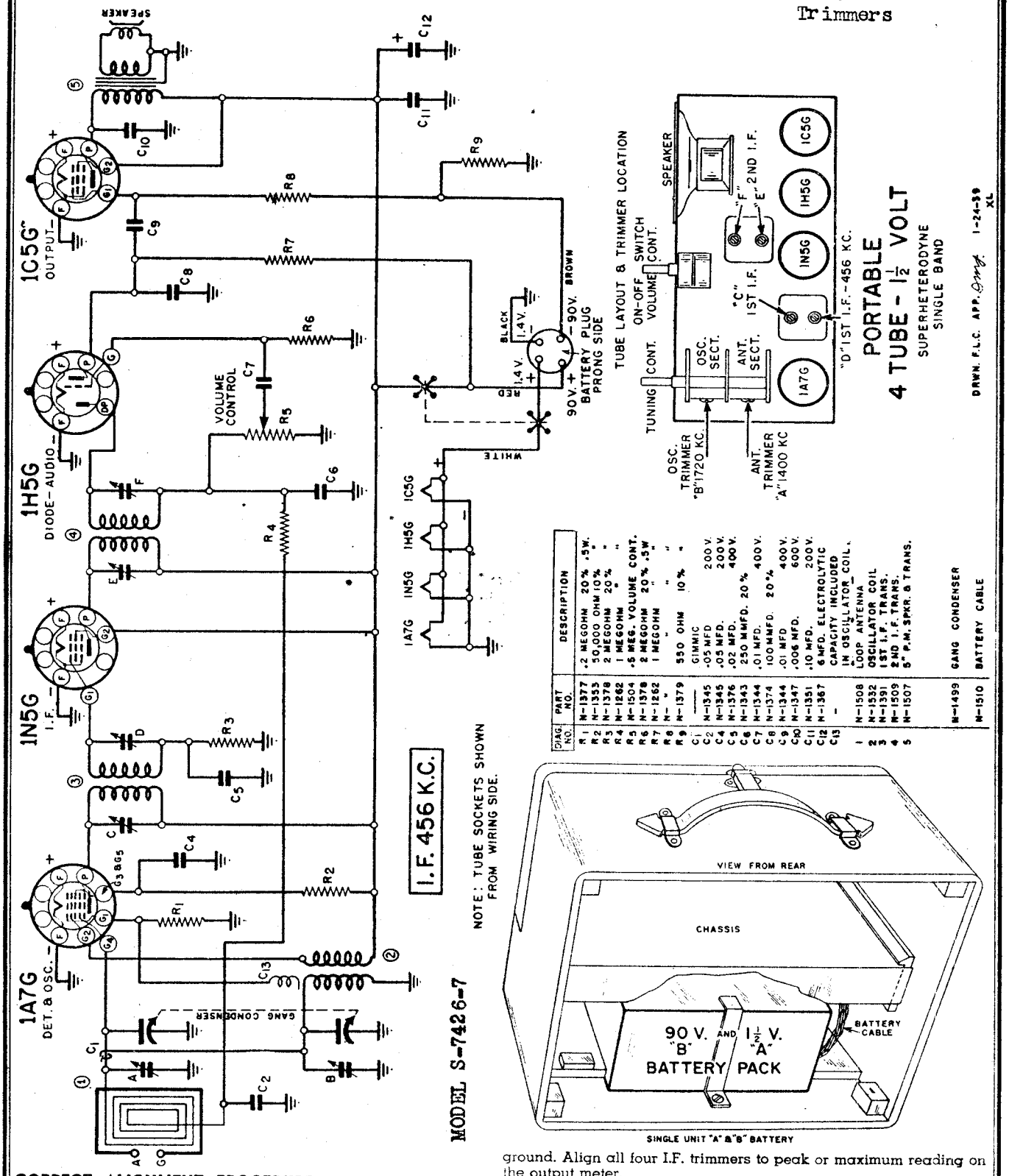
check alignment of coils at 600 KC

535 to 1720 Kilocycles

MODEL S7426-7, Roamer
(Jan. 1939)

# FIRESTONE TIRE & RUBBER CO.

Schematic, Socket Alignment Trimmers







PORTABLE
4 TUBE - 1½ VOLT
SUPERHETERODYNE
SINGLE BAND

DRWN. F.L.C. APP. 1-24-39 XL

| DIAG. NO. | PART NO. | DESCRIPTION | |
|---|---|---|---|
| R 1 | N-1377 | .2 MEGOHM | 20% .5W. |
| R 2 | N-1355 | 50,000 OHM | 10% " |
| R 3 | N-1378 | 2 MEGOHM | 20% " |
| R 4 | N-1262 | 1 MEGOHM | " " |
| R 5 | M-1504 | .5 MEG. VOLUME CONT. | |
| R 6 | N-1378 | 2 MEGOHM | 20% .5W |
| R 7 | N-1262 | 1 MEGOHM | " " |
| R 8 | N- " | " | " " |
| R 9 | N-1379 | 550 OHM | 10% " |
| C 1 | —— | GIMMIC | |
| C 2 | N-1345 | .05 MFD | 200 V. |
| C 4 | N-1345 | .05 MFD. | 200 V. |
| C 5 | N-1376 | .02 MFD. | 400 V. |
| C 6 | N-1343 | 250 MMFD. | 20 % |
| C 7 | N-1344 | .01 MFD. | 400 V. |
| C 8 | N-1374 | 100 MMFD. | 20 % |
| C 9 | N-1344 | .01 MFD | 400 V. |
| C 10 | N-1347 | .006 MFD. | 600 V. |
| C 11 | N-1351 | .10 MFD. | 200 V. |
| C 12 | M-1367 | 6 MFD. | ELECTROLYTIC |
| C 13 | - | CAPACITY INCLUDED IN OSCILLATOR COIL. | |
| 1 | N-1508 | LOOP ANTENNA | |
| 2 | N-1532 | OSCILLATOR COIL | |
| 3 | N-1391 | 1ST I.F. TRANS. | |
| 4 | N-1509 | 2ND I.F. TRANS. | |
| 5 | N-1507 | 5" P.M. SPKR. & TRANS. | |
| | N-1499 | GANG CONDENSER | |
| | N-1510 | BATTERY CABLE | |




SINGLE UNIT "A" & "B" BATTERY

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the broadcast band should be adjusted.

**I. F. ALIGNMENT.** With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1A7G) through a .05 or .1 mfd. condenser. The ground on the test oscillator should be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT.** Connect the antenna terminal to the generator through a 200 MMF dummy and the ground terminal to the generator ground. Set the dial and generator at 1720 KC (gang at minimum capacity). Align the BC oscillator trimmer for maximum output. Set the test oscillator at 1400 KC and tune in the signal with the dial and adjust the antenna trimmer for maximum output. Check the sensitivity at 600 to determine if the gang or the coils have been damaged.

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Schematics, Socket, Trimmers
Alignment, Voltage

MODEL S7426-7 (Mar. 1939)
MODEL S7428-2

# FIRESTONE TIRE & RUBBER CO.

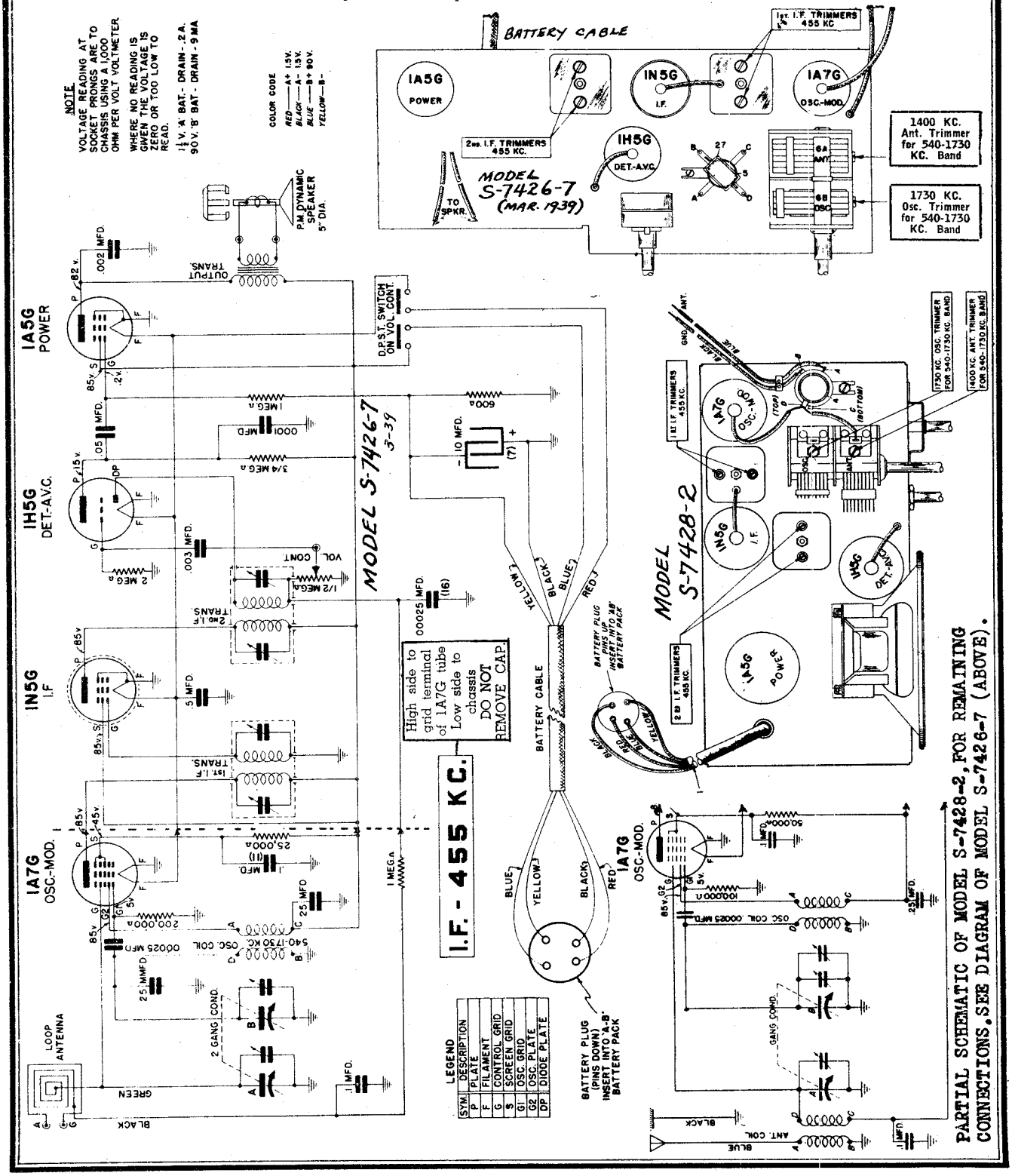
BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

**When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.**

Couple test oscillator to receiver loop by:

a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.


NOTE
VOLTAGE READING AT SOCKET PRONGS ARE TO CHASSIS USING A 1,000 OHM PER VOLT VOLTMETER
WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.
1½ V. 'A' BAT. - DRAIN - .2 A.
90 V. 'B' BAT. - DRAIN - 9 MA
COLOR CODE
RED — A+ 1.5V.
BLACK — A- 1.5V.
BLUE — B+ 90V.
YELLOW — B-
BATTERY CABLE
1st I.F. TRIMMERS 455 KC
2nd I.F. TRIMMERS 455 KC.
1400 KC. Ant. Trimmer for 540-1730 KC. Band
1730 KC. Osc. Trimmer for 540-1730 KC. Band
IA5G POWER
IN5G I.F.
IA7G OSC.-MOD.
IH5G DET.-A.V.C.
MODEL S-7426-7 (MAR. 1939)
MODEL S-7428-2
P.M. DYNAMIC SPEAKER 5" DIA.
OUTPUT TRANS.
D.P.S.T. SWITCH ON VOL. CONT.
VOL. CONT.
2nd I.F. TRANS.
1st I.F. TRANS.
High side to grid terminal of 1A7G tube
Low side to chassis
DO NOT REMOVE CAP.
I.F. - 455 KC.
BATTERY CABLE
BATTERY PLUG (PINS DOWN) INSERT INTO "A-B" BATTERY PACK
LOOP ANTENNA
2 GANG COND.
GANG COND.
OSC. COIL
ANT. COIL
GREEN
BLACK
BLUE
LEGEND
SYM. DESCRIPTION
P PLATE
F FILAMENT
G CONTROL GRID
S SCREEN GRID
G1 OSC. GRID
G2 OSC. PLATE
DP DIODE PLATE
PARTIAL SCHEMATIC OF MODEL S-7428-2, FOR REMAINING CONNECTIONS, SEE DIAGRAM OF MODEL S-7426-7 (ABOVE).

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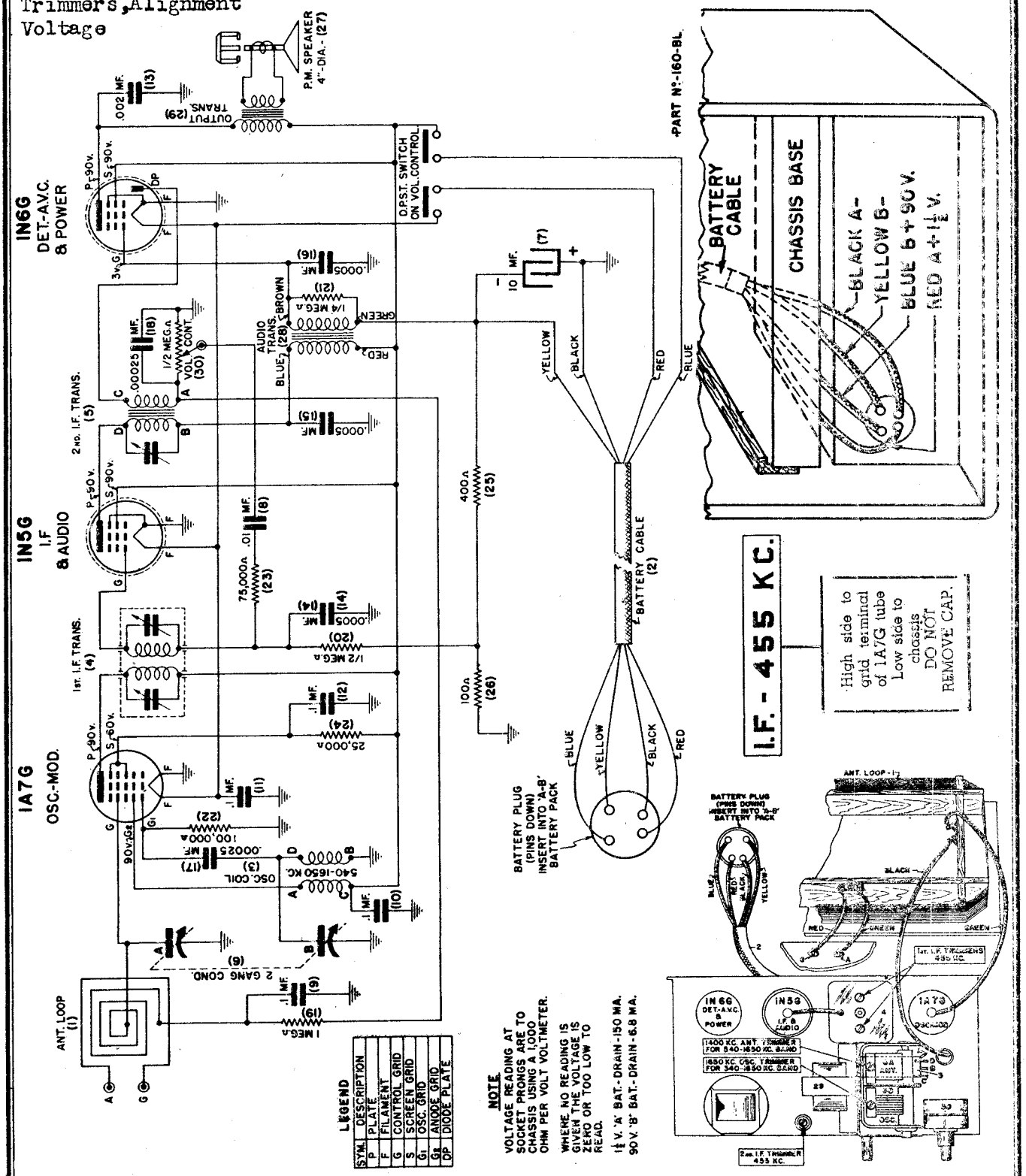
MODEL S7426-9
Schematic, Socket
Trimmers, Alignment
Voltage

# FIRESTONE TIRE & RUBBER CO.




| LEGEND | |
|---|---|
| SYM. | DESCRIPTION |
| P | PLATE |
| F | FILAMENT |
| G | CONTROL GRID |
| S | SCREEN GRID |
| G1 | OSC. GRID |
| G2 | ANODE GRID |
| DP | DIODE PLATE |

**NOTE**
VOLTAGE READING AT SOCKET PRONGS ARE TO CHASSIS USING A 1,000 OHM PER VOLT VOLTMETER.
WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.
1½ V. 'A' BAT.-DRAIN-150 MA.
90 V. 'B' BAT.-DRAIN-6.8 MA.

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERY-PACK IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

**When adjusting 1650 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.**

Couple test oscillator to receiver loop by:

a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

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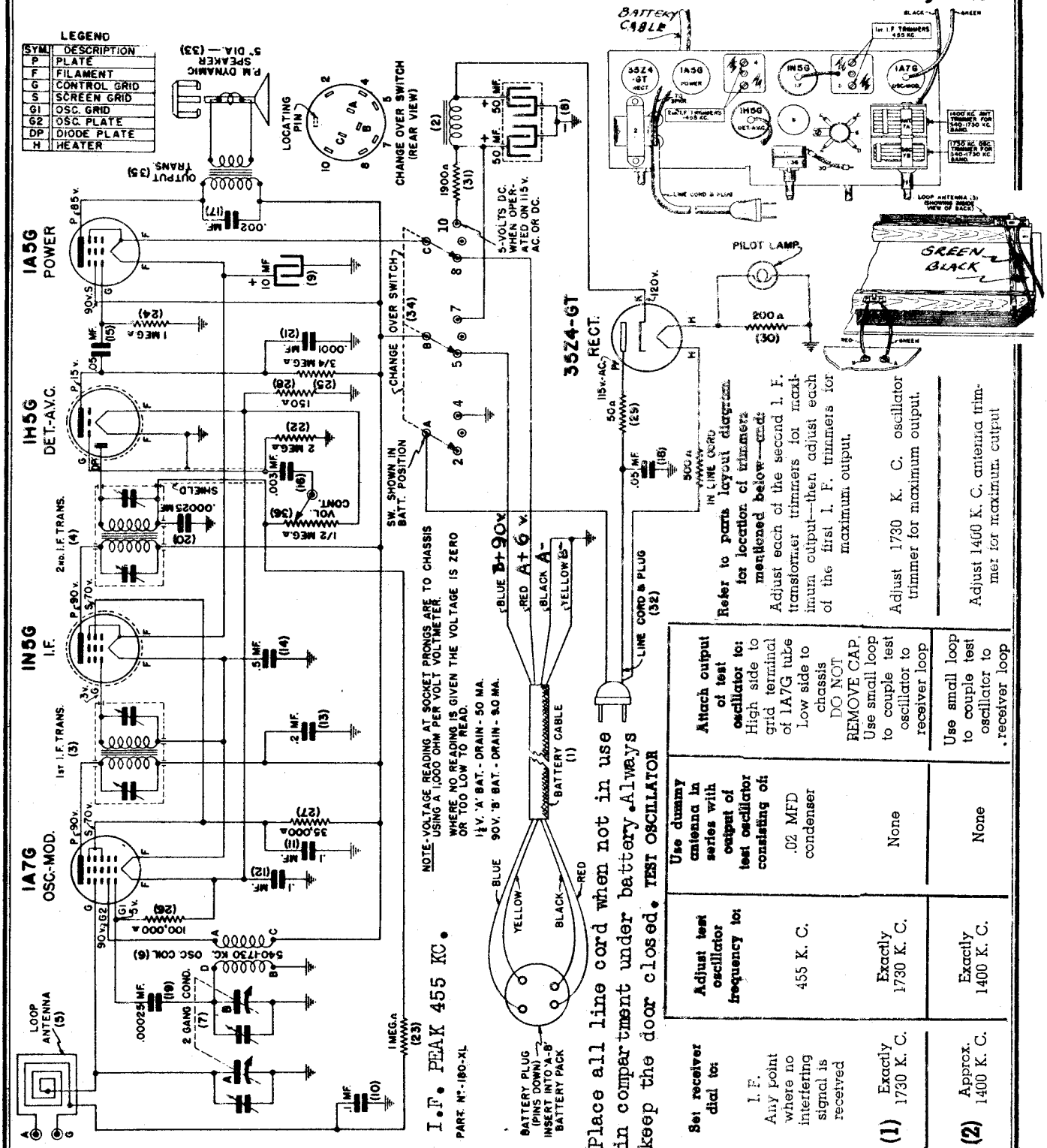
Alignment, Voltage Trimmers

# FIRESTONE TIRE & RUBBER CO.

MODEL S7427-5
Schematic, Socket


LEGEND
SYM | DESCRIPTION
P | PLATE
F | FILAMENT
G | CONTROL GRID
S | SCREEN GRID
G1 | OSC. GRID
G2 | OSC. PLATE
DP | DIODE PLATE
H | HEATER
1A5G POWER
1H5G DET.-A.V.C.
1N5G I.F.
1A7G OSC.-MOD.
35Z4-GT RECT.
BATTERY CABLE
PILOT LAMP
GREEN
BLACK
LOOP ANTENNA (5)
2 GANG COND. (7)
BATTERY PLUG (PINS DOWN) INSERT INTO 1A-8 BATTERY PACK
BATTERY CABLE (1)
LINE CORD & PLUG (32)
I.F. PEAK 455 KC.
PART No. 180-XL
NOTE-VOLTAGE READING AT SOCKET PRONGS ARE TO CHASSIS USING A 1,000 OHM PER VOLT VOLTMETER. WHERE NO READING IS GIVEN THE VOLTAGE IS ZERO OR TOO LOW TO READ.
1½ V. 'A' BAT. - DRAIN - 50 MA.
90 V. 'B' BAT. - DRAIN - 8.0 MA.
Place all line cord when not in use in compartment under battery. Always keep the door closed. TEST OSCILLATOR

| Set receiver dial to: | Adjust test oscillator frequency to: | Use dummy antenna in series with output of test oscillator consisting of: | Attach output of test oscillator to: | |
|---|---|---|---|---|
| I. F. Any point where no interfering signal is received | 455 K. C. | .02 MFD condenser | High side to grid terminal of 1A7G tube<br>Low side to chassis<br>DO NOT REMOVE CAP. Use small loop to couple test oscillator to receiver loop | Refer to parts layout diagram for location of trimmers mentioned below—and: |
| (1) Exactly 1730 K. C. | Exactly 1730 K. C. | None | Use small loop to couple test oscillator to receiver loop | Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. Adjust 1730 K. C. oscillator trimmer for maximum output. |
| (2) Approx. 1400 K. C. | Exactly 1400 K. C. | None | | Adjust 1400 K. C. antenna trimmer for maximum output |

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE BATTERY IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

**When adjusting 1730 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, do not connect test oscillator to terminals on bottom of cabinet back.**

Couple test oscillator to receiver loop by:

a) Make a loop consisting of five to ten turns of No. 20 to 30 size wire wound on a three inch form and attach across output of test oscillator.

b) Place test oscillator loop near set loop—BE SURE THAT NEITHER MOVES WHILE ALIGNING.

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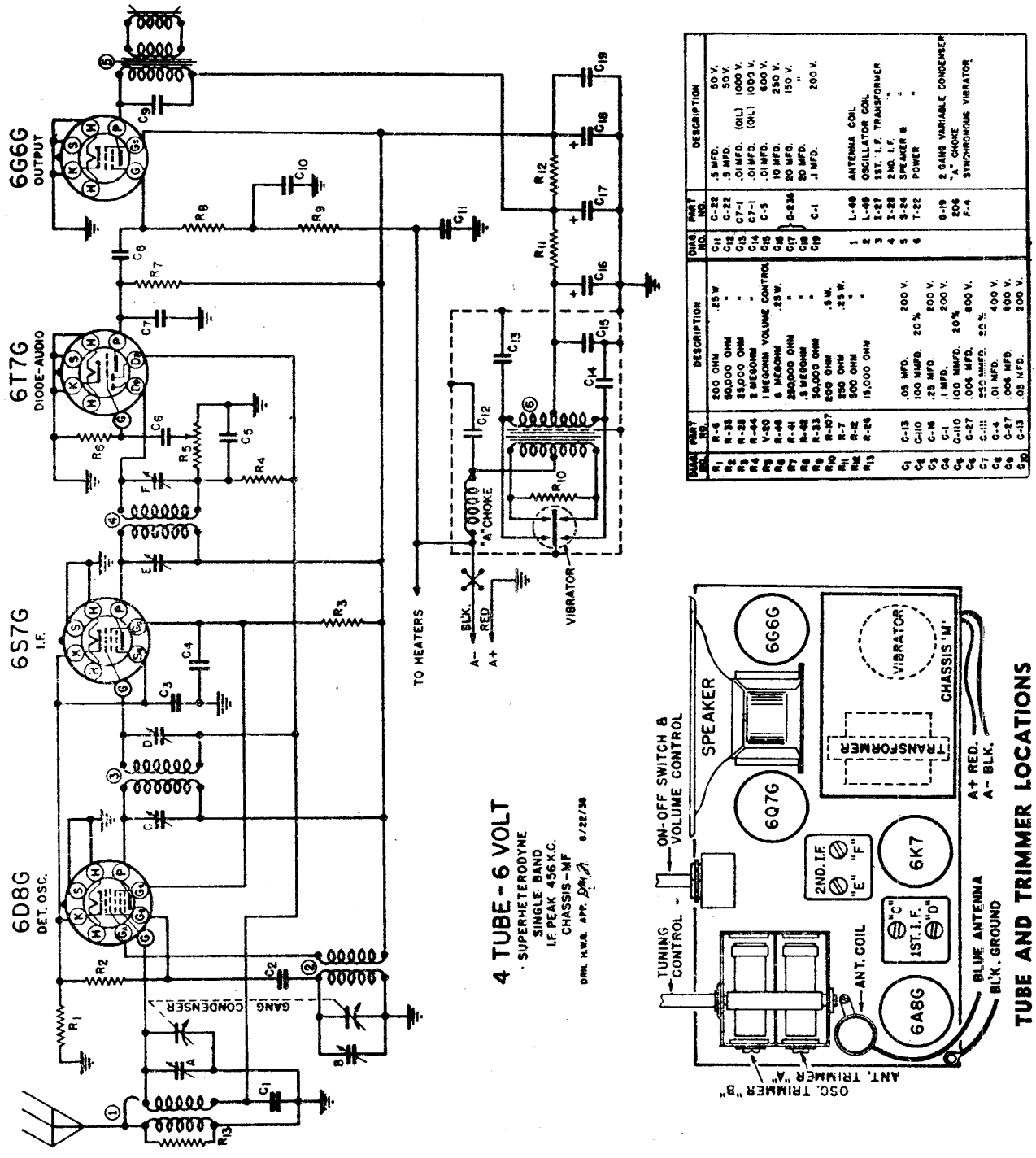
MODEL S7428-1

# FIRESTONE TIRE & RUBBER CO.

Schematic, Socket, Trimmers
Alignment




| DIAG. NO. | PART NO. | DESCRIPTION | |
|---|---|---|---|
| R1 | R-6 | 200 OHM | .25 W. |
| R2 | R-33 | 50,000 OHM | " |
| R3 | R-28 | 25,000 OHM | " |
| R4 | R-44 | 2 MEGOHM | " |
| R5 | V-20 | 1 MEGOHM VOLUME CONTROL | .25 W. |
| R6 | R-46 | 6 MEGOHM | " |
| R7 | R-41 | 250,000 OHM | " |
| R8 | R-42 | .5 MEGOHM | " |
| R9 | R-33 | 50,000 OHM | " |
| R10 | R-107 | 800 OHM | .5 W. |
| R11 | R-7 | 250 OHM | .25 W. |
| R12 | R-2 | 500 OHM | " |
| R13 | R-26 | 15,000 OHM | " |
| C1 | C-13 | .05 MFD. | 200 V. |
| C2 | C-10 | 100 MMFD. | 20% |
| C3 | C-16 | .25 MFD. | 200 V. |
| C4 | C-1 | 1 MFD. | 200 V. |
| C5 | C-110 | 100 MMFD. | 20% |
| C6 | C-27 | .006 MFD. | 600 V. |
| C7 | C-111 | 250 MMFD. | 20% |
| C8 | C-4 | .01 MFD. | 400 V. |
| C9 | C-27 | .006 MFD. | 600 V. |
| C10 | C-13 | .05 MFD. | 200 V. |
| C11 | C-22 | .5 MFD. | 50 V. |
| C12 | C-22 | .5 MFD. | 50 V. |
| C13 | C7-1 | .01 MFD. (OIL) | 1000 V. |
| C14 | C7-1 | .01 MFD. (OIL) | 1000 V. |
| C15 | C-5 | .01 MFD. | 600 V. |
| C16 | C-236 | 10 MFD. | 250 V. |
| C17 | C-236 | 20 MFD. | 150 V. |
| C18 | C-236 | 20 MFD. | " |
| C19 | C-1 | .1 MFD. | 200 V. |
| 1 | L-48 | ANTENNA COIL | |
| 2 | L-49 | OSCILLATOR COIL | |
| 3 | I-27 | 1ST. I.F. TRANSFORMER | |
| 4 | I-28 | 2ND. I.F. " | |
| 5 | S-24 | SPEAKER # " | |
| 6 | T-22 | POWER " | |
| G-19 | | 2 GANG VARIABLE CONDENSER | |
| 206 | | "A" CHOKE | |
| F-4 | | SYNCHRONOUS VIBRATOR | |




**GENERAL DATA.** The alignment of this receiver requires the use of a test oscillator that will cover the frequencies of 456, 600 and 1400 KC. and an output meter to be connected across the primary or secondary of the output transformers. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

**CORRECT ALIGNMENT PROCEDURE.** The intermediate frequency (I.F.) stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should be aligned.

**I.F. ALIGNMENT.** With the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (6D8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT.** Connect the antenna to the generator through a 200 MMF dummy and set the dial and generator at 1400 KC. Align the BC oscillator trimmer and BC antenna trimmer. Set the generator at 600 KC and tune in the signal to check sensitivity at this point to determine if coils or gang condenser have not been damaged.

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Elec.Automatic Tuner
Data,Procedure,Assembly

GALVIN MFG. CORP.

MODEL 9-49 (E5T)
MODEL 9-69 (E5T)
MODEL 15-F (E6T)
MODELS 20-P,21-L,24-K
MODELS 22-S,25-N (E6T)

# ELECTRIC AUTOMATIC TUNER

## Types E5T, E6T and E7T

NOTE: All three tuners are identical in construction, except for the condenser gang.

E5T has a 3-gang condenser and is used in Models 9-49 and 9-69.

E6T has a 2-gang condenser and is used in Models 15-F, 20-P, 21-L, 22-S, 24-K, and 25-N.

E7T has a special high frequency condenser gang and is used in Police Cruiser Model P-69-14.

### SERVICE SUGGESTIONS

**MOTOR DOES NOT RUN**

1. MOTOR CONTACTS IN CONTROL HEAD NOT CLOSING. Open the control head and inspect the motor contacts. If the gap is too great, contact will not be made when the button is pressed. Adjust by bending carefully.
2. POOR CONTACT AT PUSH-BUTTON PLUG. Inspect the contacts between the plug and the receptacle on the chassis.
3. OPEN CIRCUIT IN MOTOR. Check all connections to motor and check motor winding for continuity.
4. MOTOR BRUSHES NOT MAKING CONTACT. Check contact between brushes and commutator. Clean dirty commutator with carbon tetrachloride.
5. LOW BATTERY VOLTAGE. A weak or defective battery in the car would not deliver sufficient voltage to run the motor.
6. FLEXIBLE TUNING SHAFT BINDS. Binding in the flexible tuning shaft places an additional load on the motor. If this load is too great, it will prevent the motor from turning the mechanism.
7. MAGNET FAILS TO RELEASE. If the magnet which has previously been energized, fails to release the latch bar for any reason, the motor cannot turn the mechanism.

**MECHANISM RUNS SLUGGISHLY**

1. LOW BATTERY VOLTAGE. A weak or defective battery will not deliver sufficient voltage to turn the motor at normal speed.
2. HIGH RESISTANCE CONTACT IN CONTROL HEAD. High resistance at the push-button contacts will cause a voltage drop which will prevent the motor from turning at normal speed.
3. POOR CONTACT BETWEEN PUSH-BUTTON PLUG AND RECEPTACLE. This will also result in voltage drop, and lessened motor power.
4. BINDING IN TUNING SHAFT. Binding in the flexible tuning shaft will place an additional load on the motor which can slow it down considerably. Install new tuning shaft with minimum amount of bending and check alignment where the tuning shaft enters the receiver housing.
5. GEARS NOT PROPERLY MESHED. Check all gears in assembly for binding due to improper meshing.
6. DEFECTIVE MOTOR. - Replace.

**MOTOR FAILS TO REVERSE**

1. REVERSING SWITCH NOT PROPERLY ADJUSTED. See instructions elsewhere in this book.
2. OPEN CIRCUIT IN MOTOR. If one side of motor circuit is open, motor will run in one direction only.
3. OPEN MAGNET WINDING. An open magnet will not pull latch down; consequently will not cause motor switch to reverse.
4. LATCH BAR SPRING TOO TIGHT. If the latch bars operate under too much tension the magnet may not be able to pull the latch down.




Figure 1.

press hard against one side of the notch and may prevent it from releasing as the magnet is de-energized.

2. LATCH BAR SPRING WEAK. Check latch bar tension spring to make sure it is pulling away from the magnet with sufficient force. Spring tension is adjustable.
3. MAGNET CONTACT IN CONTROL HEAD STUCK. Check the magnet switch in the control head to make sure it breaks contact when pressure is released on the bottom. Check for frozen contact points, or for sticking button.
4. ARMATURE RIVET WORN. There is a brass rivet at the tip of the armature, to prevent the armature freezing to the magnet. If this rivet is worn down, permitting the steel armature to actually touch the magnet pole, it may freeze in that position.
5. BURR ON TIP OF LATCH. Latch tip should be smooth and shiny.
6. BINDING IN LATCH BEARINGS. Latch must move freely but not sloppy.
7. LATCH TIPS NOT CENTERED ON LATCH RINGS. Latch tips must not rub bakelite guide rings. The latch bar bearing shaft is adjustable.
8. FRICTION CLUTCH TOO TIGHT. A tension washer between the motor pinion and the brass pinion gear acts as a friction clutch to absorb the shock when starting the motor quickly when a station is tuned in. If the tension is too tight, the torque of the stopped motor will hold the latch bar tip in the notch.
9. MOTOR BRUSHES TOO TIGHT. Too much friction between the motor brushes and the commutator will cause the same thing.

**TO SET AUTOMATIC TUNER**

NOTE: Before setting any station, let the set warm up for not less than ten minutes. If you wish to operate the automatic tuner on the car's power, before installing the radio in the car, use a short aerial and tune the antenna trimmer to it. Then readjust the antenna trimmer after the installation in the car.

IMPORTANT—You will note that the 9-contact plug on the end of the control head cable has one pin that is shorter than the others. For the "setting up" procedure, this plug should be inserted in its receptacle on the receiver only half way. This will cause all of the magnet terminals to be connected, but will not permit the tuning motor to run during the adjustment, since the short pin will not make contact, thereby holding the motor circuit open. Use the "setting up" procedure at any time during the "setting up" procedure.

1. From the set of call letter tabs provided, detach the proper ones for the six stations. The station tabs should then be inserted in the space provided in the face of station tuning buttons. Cover the tab with a small rectangular piece of celluloid. Both tabs and celluloide snap into position.
2. Loosen the AUTOMATIC LOCKING SCREW. This screw should be turned counter-clockwise four or five revolutions—far enough to assure plenty of looseness.
3. Turn the dial all the way to the low frequency end (550 K.C.)
4. Press the first button and hold it down. A faint "click" should be heard, indicating that the tuning magnet has attracted the latch bar.
5. Holding the magnet energized, turn the dial manually all the way to the high frequency end (1650 K.C.) and then all the way back to the low frequency end (550 K.C.)
6. Still pressing on the button, tune in the station to be set on that button.
7. Proceed to set the remaining five stations. For each station, follow steps 4, 5 and 6 as outlined above. AT NO TIME DURING THE SETTING UP PROCEDURE SHOULD THE TUNING MOTOR BE PERMITTED TO RUN.
8. Tighten the automatic locking screw very securely. Do not hold the tuning knob while locking the automatic, but allow the mechanism to turn to its natural stop.
9. Push the plug all the way into the receptacle on the receiver housing so the short motor pin will also make contact.

**REVERSING SWITCH AND MUTING RELAY ADJUSTMENT**

NOTE: Four adjusting screws extend upward through the switch mounting plate, three of them in line, and one set off by itself. (See Fig. 1).

1. Turn the rotor assembly until the HIGH sides of all latch rings rest opposite the latch tips.
2. Turn screw "A" in until all latch bar tips touch HIGH side of ring and then turn the screw back one half turn. (Spacing between latch tip and high side of ring at point "x" should be 9 to 12 thousandths of an inch.)

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MODEL 9-49
MODEL 9-69
MODEL 15-F
MODELS 20P,21L,24K

# GALVIN MFG. CORP.

Procedure,Part 2
Schematic of Tuner
Assembly,Parts List

**AUTOMATIC SERVICE PROCEDURE--Continued**

3. Hold any latch bar tip down on HIGH side of ring and adjust screw "C" (center screw) until the bakelite insulator on the center switch leaf just barely misses touching the heel of the latch bar at point "Y". (Check adjustment by pressing other latch bars. The depressed latch bar must not lift the center contact even slightly.)

4. With latch bar at rest position adjust screw "B" (front screw) until top motor contact is lifted from center contact by 12 to 15 thousandths of an inch at point "Z". (15 thousandths = 1/64").

5. Turn rotor until LOW side of ring rests under latch tip. Press any latch bar down and make sure switch actually reverses. (Bottom contact must break and top contact make sufficiently to lift the top switch leaf slightly from the bakelite spacer.)

6. Turn screw "D" (rear screw) until muting relay armature rests 15 to 20 thousandths of an inch from the magnet pole. (Too close spacing will cause intermittent muting due to vibration.) (15 thousandths = 1/64").

**TO REMOVE LATCH BAR ASSEMBLY**

1. Back up on front switch adjustment screw (A) until latch tips rest outside the diameter of the bakelite ring separators.

2. Remove comb shaped latch tension spring. (E)

3. Remove the hex-head machine screw which extends through the small angle bracket into the brass latch bar bearing shaft underneath the tuner. (Screw not visible in photo.)

4. Pull out latch and shaft assembly. (F)

NOTE: To re-assemble, reverse the above procedure, and take particular care that:

1. Latch bar tips center on letch rings. They should not rub bakelite ring separators. (Spacing is adjustable through elongated hole in small bracket under tuner.)

2. When readjusting screw (A), turn it all the way in until latch tips touch high side of rings; then back screw up one-half turn (See reversing switch adjustment on Page .)

**TO REMOVE LATCH RING ASSEMBLY**

1. Back up on switch adjustment screw (A) until latch tips rest outside the diameter of the bakelite ring separators.

2. Remove locking screw. (G)

3. Remove the three locking levers. (H)

4. Lift the locking nut off the end of the rotor shaft.

5. Carefully loosen the three screws (J) which hold the ring assembly to the rotor hub, and remove all rings and separators as a unit, being careful to keep the three screws in position through the assembly.

NOTE: To reassemble, reverse the above procedure. Work carefully - do not let the rings and separators get off the screws.

**TO REPLACE DEFECTIVE LATCH RING**

1. Remove the entire latch ring assembly from the rotor hub. (See instructions above.)

2. Lay assembly on flat surface with screw heads down.

3. Remove rings, separators and brass spacing collars, one at a time, until the defective ring is exposed.

NOTE: Reassemble parts one at a time, being careful that rings, separators, and spacers are in the correct position.

CAUTION: Be careful to replace rings in original position. Turning the ring over will reverse the position of the notch and will result in faulty tuning.

**TO REMOVE DEFECTIVE HUB AND GEAR**

1. Remove the entire latch ring assembly from the rotor hub. (See instructions above.)

2. Loosen the four Bristo set screws in the rotor hub.

3. Loosen the one Bristo set screw in the bakelite flexible shaft coupling.

4. Pull the rotor hub off the gang shaft. The manual tuning gear and coupling will have to be removed at the same time. The brass collar on the motor shaft may also need to be removed.

NOTE: When installing a new hub, turn the gang to full mesh and the hub gear against its stop before tightening set screws.

| | | |
|---|---|---|
| 3S7111 | Set Screw (8-32x3/16 Brl. Hd.) Blk. . . . . .DOZ. | $0.85 |
| 3S7114 | Set Screw (8-32x1/4 Slab Hd.) . . . . . PERC. | 1.50 |
| 3S7243 | Screw (5-40x7/8 Sl. Hdls. MS) CP. . . . . PERC. | 1.05 |
| 3S7244 | Screw (5-40x5/8 Sl. Hdls. MS) CP. . . . . PERC. | 1.00 |
| 3S7245 | Screw (5-40x3/8 Sl. Hdls. MS) CP. . . . . PERC. | 1.00 |
| 4S7616 | Washer (5/16-.171-.016) Brass . . . . . .DOZ. | .10 |
| 8A10306 | Tub. Cond. & Strap (.03-100V.). . . . . | .15 |
| 64A11245 | Switch Holding Plate. . . . . .DOZ. | .25 |
| 8K11624 | Muting Magnet Assembly (Black). . . . . | .45 |
| 4X11633 | Spring Washer (.562-.190-.008). . . . . .DOZ. | .10 |
| 9A13298 | Plug Receptacle (9 Prong) . . . . . | .30 |
| 62B13302 | Rotor Hub . . . . . | .40 |
| 43B13303 | Station Ring. . . . . | .25 |
| 32A13310 | Spacer Ring (.015). . . . . .DOZ. | .70 |
| 43A13311 | Latch Collar. . . . . | .10 |
| 49A13312 | Clamping Screw Disc . . . . . .DOZ. | .15 |
| 1X13313 | E5T Tuner Assembly Complete with Gang . . . . . | 18.00 |
| 2A13314 | Clamping Lever Nut. . . . . .DOZ. | .75 |
| 41A13315 | Latch Spring (6 Finger) . . . . . | .05 |
| 45A13318 | Clamping Lever. . . . . .DOZ. | .35 |
| 45B13319 | Latch Arm (No. 1) . . . . . | .20 |
| 45K13320 | Latch Arm (No. 6) . . . . . | .20 |
| 45B13321 | Latch Arm (No. 3) . . . . . | .20 |
| 45K13322 | Latch Arm (No. 4) . . . . . | .20 |
| 45B13323 | Latch Arm (No. 2) . . . . . | .20 |
| 45K13324 | Latch Arm (No. 5) . . . . . | .20 |
| 32K13325 | Spacer Ring (.031). . . . . | .10 |
| 4K13328 | Idler Gear Assembly . . . . . | .75 |
| 59B13330 | Tuner Motor (6-8V.D.C.) . . . . . | 3.90 |
| 47A13331 | Latch Shaft . . . . . | .30 |
| 47A13332 | Idler Shaft . . . . . | .10 |
| 7A13334 | Shaft Retainer Bracket. . . . . | .05 |
| 44A13335 | Motor Pinion (1/2" PD). . . . . | .20 |
| 43A13336 | Clutch Collar . . . . . | .10 |
| 41A13338 | Clamp Tension Spring. . . . . .DOZ. | .20 |
| 7K13341 | Idler Shaft Support (.062). . . . . | .05 |
| 7A13342 | Idler Shaft Support (.109). . . . . | .10 |
| 4A13343 | Clutch Washer (.562-.189-.019). . . . . .DOZ. | .10 |
| 4A13344 | Spacer Washer (.312-.169-.090). . . . . .DOZ. | .25 |
| 19B13348 | Variable Condenser (3 Gang) For E5T . . . . . | 4.00 |
| 1X13350 | Rotor Assembly Complete . . . . . | 3.00 |
| 1K13353 | Tuner Magnet Assembly (Black) . . . . . | .45 |
| 1X13356 | Latch Assembly Complete . . . . . | 1.50 |
| 1X13357 | Tuner Switch Assembly . . . . . | .90 |
| 7A13362 | Relay Bracket . . . . . | .05 |
| 1X13413 | E6T Tuner Assembly Complete with Gang . . . . . | 17.50 |
| 3A13731 | Screw (8-32x7/8 Spec. MS) CP. . . . . .DOZ. | .10 |
| 3A13732 | Screw (8-32x3/4 Spec. MS) CP. . . . . .DOZ. | .10 |
| 19B14154 | Variable Condenser (2 Gang) for E6T . . . . . | 3.50 |
| 1X14214 | E7T Tuner Assembly Complete with Gang . . . . . | 21.50 |
| 19B14653 | Variable Condenser (Hi-Frequency) P-69-14 . . . . . | 7.50 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

A. Switch adjustment screw
B. Switch adjustment screw
C. Switch adjustment screw
D. Switch adjustment screw
E. Latch tension spring
F. Latch and shaft assembly
J. Latch ring assembly screw
K. Manual tuning gear and coupling
L. Motor pinion
M. Pinion collar
N. Tuning Motor
P. Muting relay coil
R. Reversing switch
G. Locking Screw
H. Locking lever

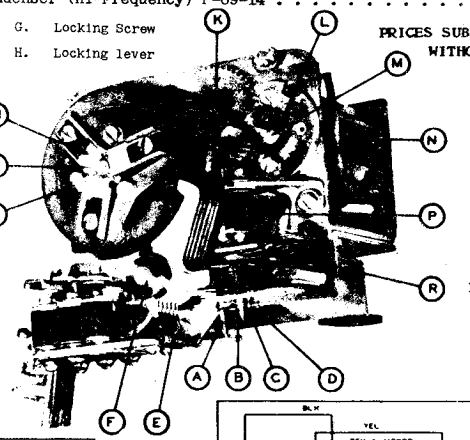


Figure 2.

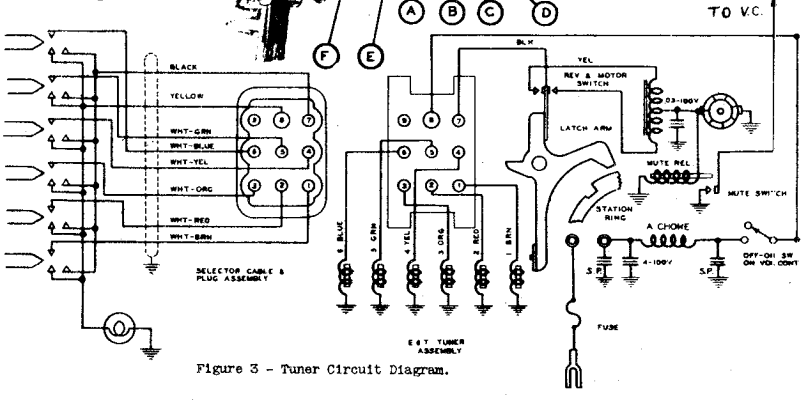


Figure 3 - Tuner Circuit Diagram.

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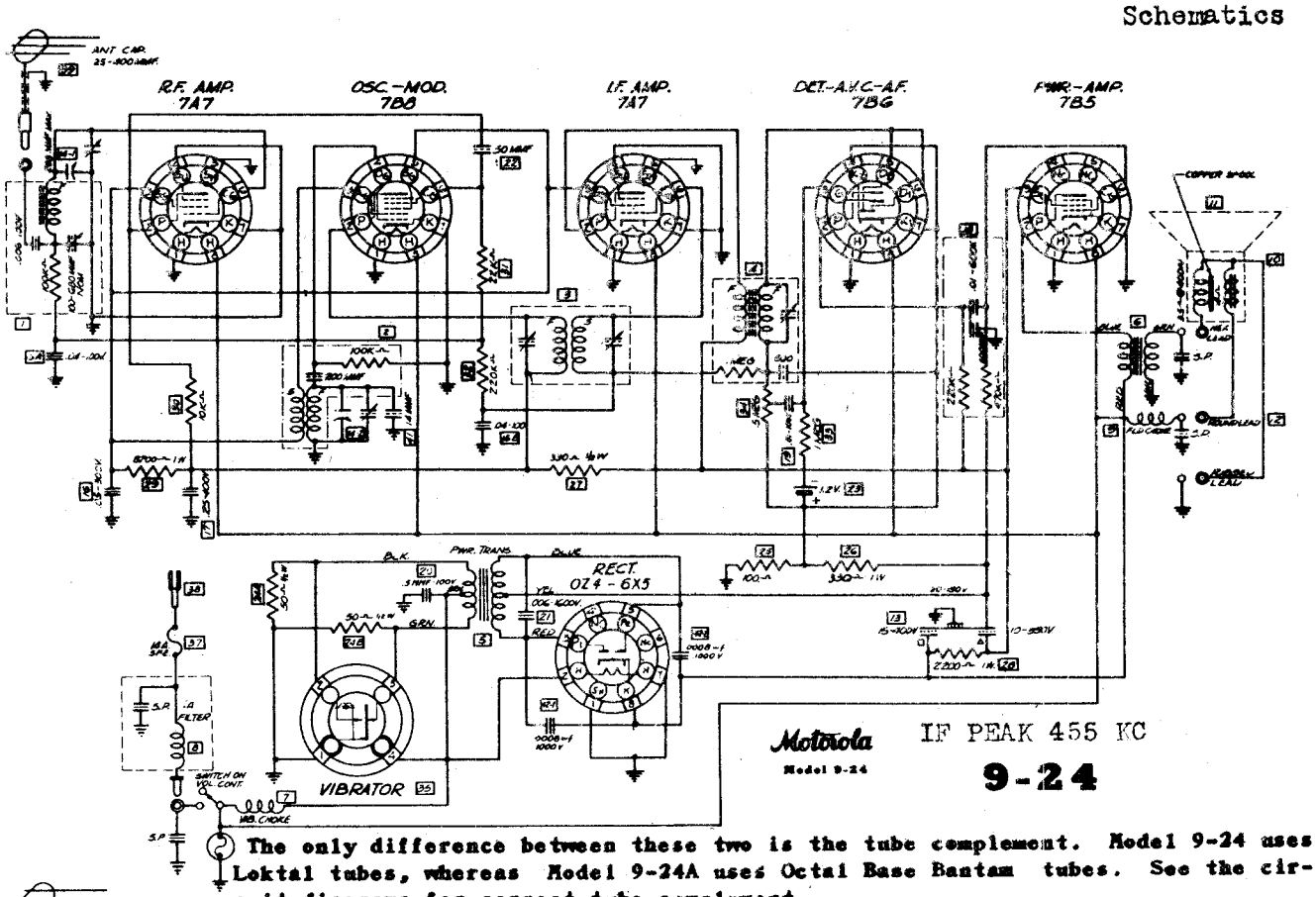
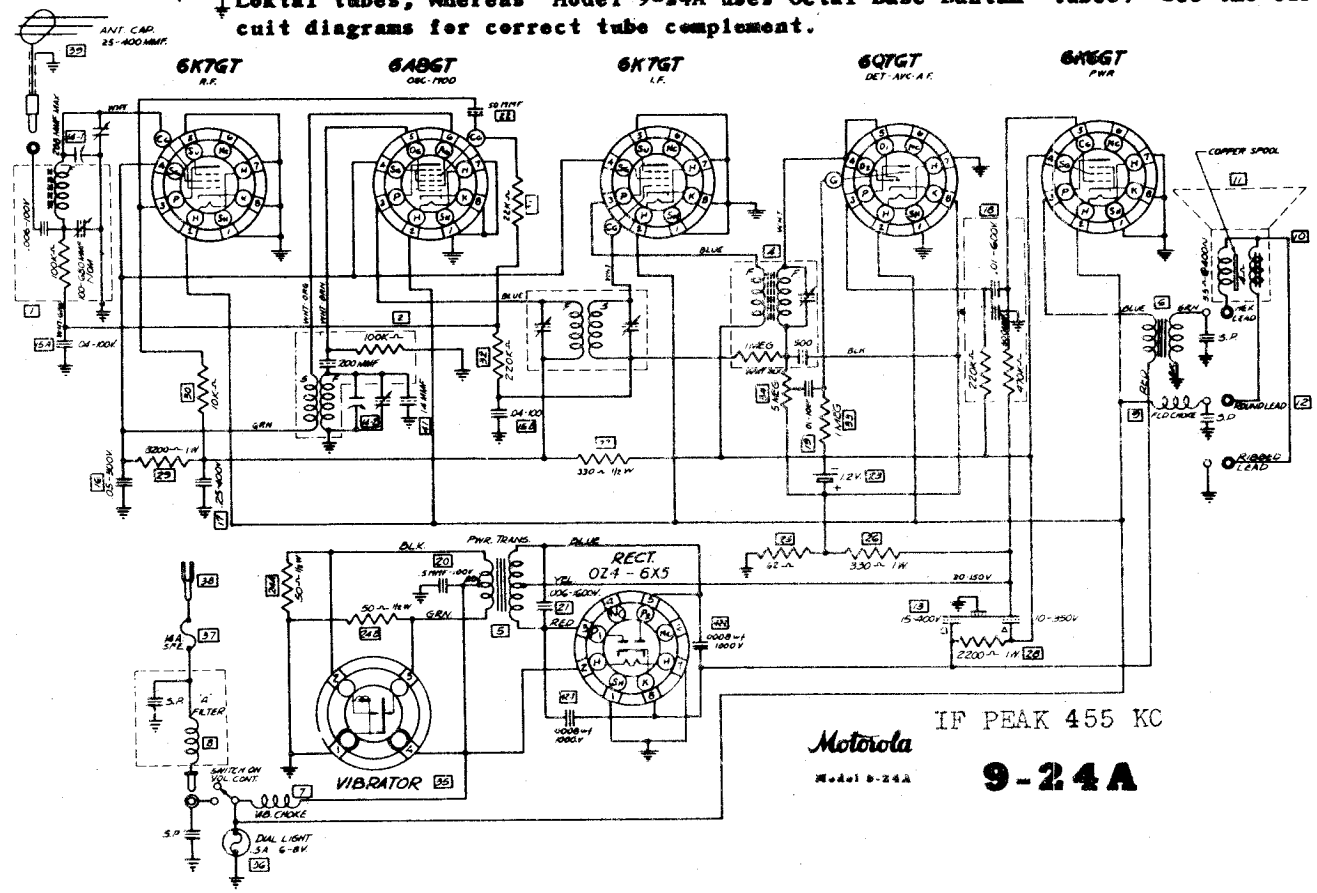
# GALVIN MFG. CORP.

MODEL 9-24
MODEL 9-24A
Schematics




**The only difference between these two is the tube complement. Model 9-24 uses Loktal tubes, whereas Model 9-24A uses Octal Base Bantam tubes. See the circuit diagrams for correct tube complement.**

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## ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

### I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the pount showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

### R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

NOTE: The antenna padder is reached through a hole in the bottom of the chassis base, directly under the antenna coil can.)

### SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| 20,000 | 455 K.C. | IF Grid | .1 MF | .5 Meg | 1.87 Volts |
| 200 | 455 K.C. | Mod. Grid | .1 MF | .5 Meg | 1.87 Volts |
| 250 | 600 K.C. | Mod. Grid | .1 MF | .5 Meg | 1.87 Volts |
| 125 | 600 K.C. | RF Grid | .1 MF | .5 Meg | 1.87 Volts |
| 10 | 600 K.C. | Ant. Lead | 40 MMF | None | 1.87 Volts |

* For one watt output. V.C. Resistance -3.5 ohms at 400 cycles.
** Meter connected across voice coil. 1.87 Volts equals 1 watt output.

### VOLTAGE CHART

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 7A7 or 6K7GT | RF | 120 | 95 | 0 | - |
| 7B8 or 6A8GT | Osc.-Mod. | 175 | 95 | 0 | 95 |
| 7A7 or 6K7GT | IF | 175 | 95 | 0 | - |
| 7B6 or 6Q7GT | Det.Avc. | 65 | - | -2.5 | - |
| 7B5 or 6K6GT | Output | 225 | 180 | 0 | - |
| 0Z4 or 6X5 | Rect. | AC | - | 230 | - |

All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.
Current Consumption 6.5 Amps.
Battery voltage 6.3 V.
Maximum Power Output 5 Watts.

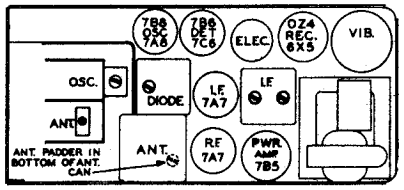


Figure 1 - Trimmer Locations

### DIAL DRIVE CORD ASSEMBLY - PART NO. 1X14731

1. Remove broken cord, dial scale and dial pointer.

2. If exact Motorola assembly is not available, cut a piece of 30 lb. silk fish cord 32 inches long. CONDENSER GANG MUST BE MESHED.

3. Double the cord at a point 11 inches from one end and thread the loop through the hole in the drive raceway. See Fig.

4. Tie a large knot in the cord or use an eyelet large enough to prevent the cord from passing through the hole in the raceway. You will now have cord (A) 21 inches long, and cord (B) 11 inches long extending from the raceway as in Fig. 3.

5. Loop cord (A) under and over idler pulley No. 1, as shown in Fig. 4 and holding the end of the cord tight, turn the raceway 2½ turns to the right (clockwise), thereby winding 2½ turns of cord (A) on the raceway.

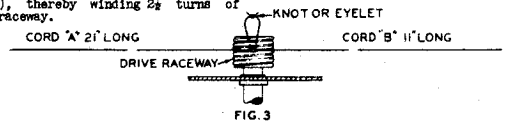


FIG. 3

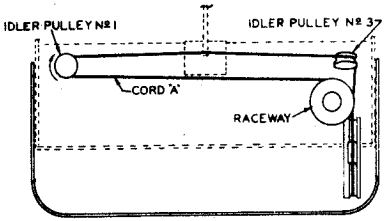


FIG. 4

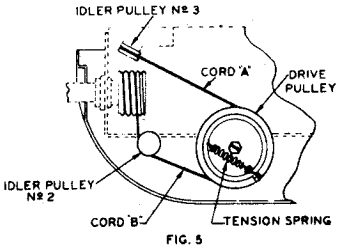


FIG. 5

6. Use a common ordinary paper clip to clip the loose end of cord (A) to the front plate of the chassis, so you can work on cord (B) for a while.

7. Take cord (B) and bring it over the raceway and under idler pulley No.2 as shown in Fig.5.

8. Make one complete turn around drive pulley as shown in Fig. 5 and clip the end of cord (B) to the edge of the chassis with a paper clip.

9. Remove the paper clip holding cord (A) and continue its routing from idler pulley No. 1 over idler pulley No. 3 and 1/2 turn around the drive pulley as shown in Fig. 5.

10. Bring both loose ends of cord through the slot in the drive pulley and tie them together tightly inside the slot.

11. Then tie in one end of the tension spring, Part No. 41A12854 and hook the other end of the spring on the ear stamped out of the washer. Cut off surplus cord.

12. Replace pointer and dial scale.

13. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.

14. Secure pointer to string with a drop of shellac.

### DIAL CORD INSTRUCTIONS

### BACKLASH CORD AND SPRING ASSEMBLY - PART NO. 1X14730

NOTE: If exact Motorola assembly is not available, use original spring and 30 lb. silk fish cord to make up assembly to dimensions as shown at the top of Fig. 2.

1. Turn gang to fully meshed position.

2. Loop long end of cord around set screw (A) in condenser gear and hook around third tooth of gear ahead of set screw.

3. Make one complete turn around condenser rotor shaft.

4. Stretch spring and loop other end around set screw (B) in tuner gear.

NOTE: Spring tension must be sufficient to take up all backlash in gear train. To increase tension, hook cord around fourth tooth in Step 2. To decrease tension, hook around second tooth.

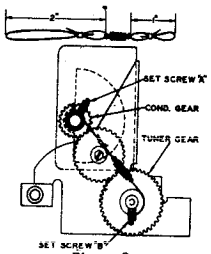


Figure 2.

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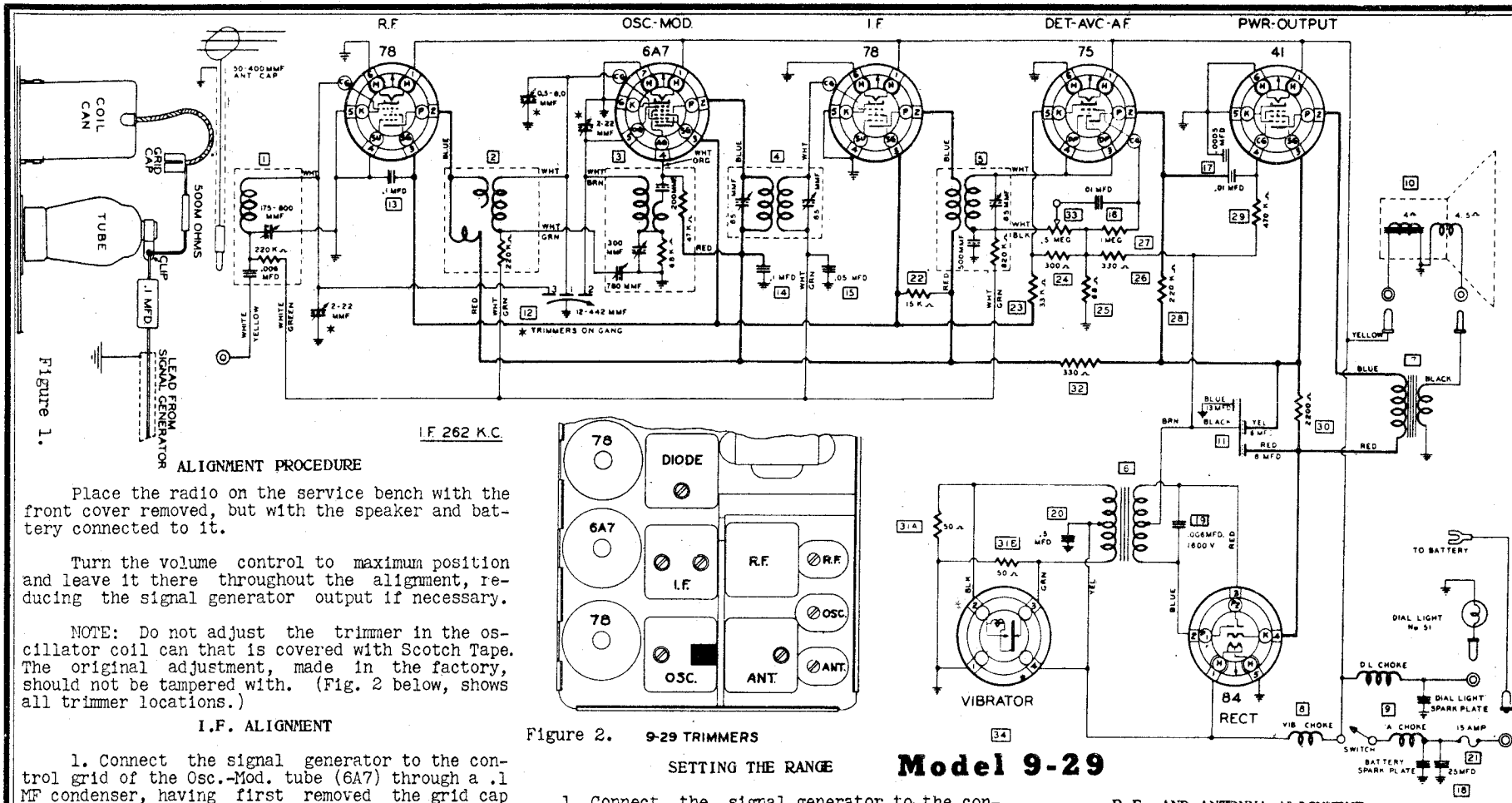


Figure 1.




Figure 2. 9-29 TRIMMERS

# Model 9-29

## ALIGNMENT PROCEDURE

Place the radio on the service bench with the front cover removed, but with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

NOTE: Do not adjust the trimmer in the oscillator coil can that is covered with Scotch Tape. The original adjustment, made in the factory, should not be tampered with. (Fig. 2 below, shows all trimmer locations.)

### I.F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A7) through a .1 MF condenser, having first removed the grid cap from the top of the tube. Connect a 500,000 ohm leak resistor from the grid of the tube to the grid cap just removed from the tube. (See Fig. 1.) Turn the condenser gang completely out of mesh. Connect an output meter across speaker voice coil.

2. Set the signal generator at 262 K.C. and carefully adjust the single trimmer in the Diode coil can to he point showing the highest reading on the output meter.

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

### SETTING THE RANGE

1. Connect the signal generator to the control grid of the R.F. tube (78) using the same .1 MF condenser and the same 500,000 ohm leak resistance.

2. Set the signal generator at 1560 K.C. and with the condenser gang completely out of mesh adjust the trimmer on the oscillator section of the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 535 K.C. Turn the condenser gang completely in mesh and adjust the 600 K.C. trimmer in the Oscillator coil can for the highest output reading.

NOTE: The adjustments above set the range so the receiver will track with the calibrations in the control head.

### R.F. AND ANTENNA ALIGNMENT

1. Connect the signal generator to the antenna lead through a 40 MMF condenser and to chassis ground. Set the signal generator at 600 K.C. and turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna coil can for the maximum output reading.

2. Set the signal generator at 1400 K.C. Turn the condenser gang until the signal is heard. Adjust the trimmer on the antenna section of the condenser gang for maximum output reading.

3. Adjust the trimmer on the R.F. section of the condenser gang for maximum output reading.

4. Recheck steps 1, 2, and 3, for accuracy.

MODEL 9-29
Voltage, Sensitivity, Gain
MODEL 9-49
Alignment, Sensitivity
Socket Trimmers, Gain

GALVIN MFG. CORP.

# AUTOMOBILE RECEIVER

## Model 9-49

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| .25 Volts | 400 cycles | 7B6 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 25,000 | 262 K.C. | 7A7 Grid(I.F.) | .1 MF | .5 Meg. | 1.74 Volts |
| 700 | 262 K.C. | 7B8 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 800 | 600 K.C. | 7B8 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 45 | 600 K.C. | 7A7 Grid(R.F. | .1 MF | .5 Meg | 1.74 Volts |
| 2 | 600 K.C. | Ant. Lead | 40 MMF | None | 1.74 Volts |

* For one watt output.

** Meter connected across voice coil.

V.C. impedance - 3 ohms at 400 cycles.

1.74 volts equals 1 watt output.

CAUTION

If you use a screw driver to pry out Loktal tubes, be careful that you do not crack the glass bead around the tube pins.

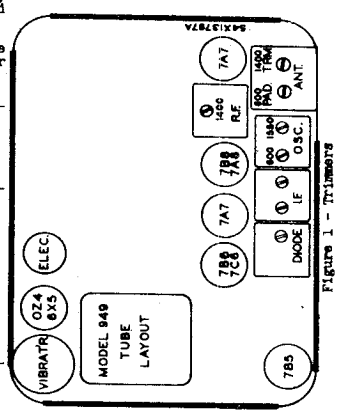


Figure 1 - Trimmers

ALIGNMENT:
For alignment, follow procedure as for Model 9-44.

# AUTOMOBILE RECEIVER

## Model 9-29

SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the top grid terminal of the tube through a .1 MF condenser, with a 500M Ohm resistor connected as a leak resistance between the grid of the tube and the grid cap which has been removed. (See Fig. 1 on Page 1.)

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| .25 Volts | 400 Cycles | 7B Grid | .1 MF | .5 Meg | 2.2 Volts |
| 25,000 | 262 K.C. | 7B Grid (I.F.) | .1 MF | .5 Meg | 2.2 Volts |
| 700 | 262 K.C. | 6A7 Grid | .1 MF | .5 Meg | 2.2 Volts |
| 800 | 600 K.C. | 6A7 Grid | .1 MF | .5 Meg | 2.2 Volts |
| 45 | 600 K.C. | 7B Grid (R.F.) | .1 MF | .5 Meg | 2.2 Volts |
| 3 | 600 K.C. | Ant. Lead | 40 MMF | None | 2.2 Volts |

* For one watt output.

** Meter connected across voice coil.

V.C. Resistance - 5 ohms at 400 cycles.

2.2 Volts equals 1 watt output.

VOLTAGE CHART - MODEL 9-29

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 7B * | RF | 185 | 85 | - | - |
| 6A7 * | Osc.-Mod. | 185 | 85 | - | 100 |
| 7B * | IF | 185 | 85 | - | - |
| 75 | Det.-Avc. | 150 | - | -2 | - |
| 41 ** | Output | 235 | 200 | - | - |
| 84 | Rect. | AC | - | 250 | - |

Current - 6.5 Amps. at 6.3 Volts

* Bias -3 V from B stick  Maximum power output - 3.5 Watts

** Bias -17 V from B stick  All readings from chassis ground with 1000 ohms per volt meter.

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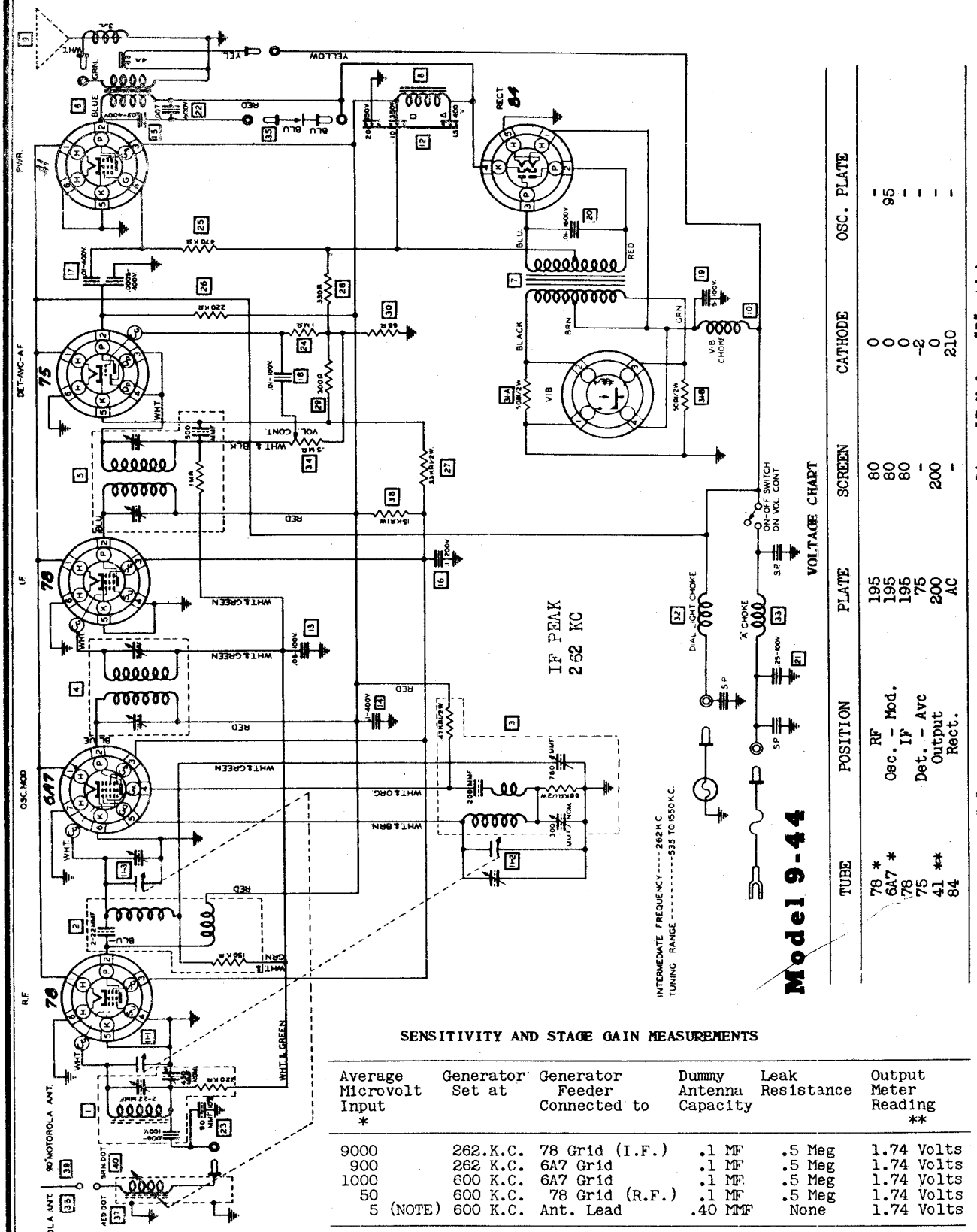
# GALVIN MFG. CORP.

MODEL 9-44
Schematic, Voltage, Gain
Sensitivity


Model 9-44
IF PEAK
262 KC
INTERMEDIATE FREQUENCY ---- 262 K.C.
TUNING RANGE ---- 535 TO 1550 K.C.
VOLTAGE CHART
TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE
78 * | RF | 195 | 80 | 0 | -
6A7 * | Osc. - Mod. | 195 | 80 | 0 | 95
78 | IF | 195 | 80 | 0 | -
75 | Det. - Avc | 75 | - | -2 | -
41 ** | Output | 200 | 200 | 0 | -
84 | Rect. | AC | - | 210 | -
* Bias -3. V from "B" stick.
** Bias -17.V from "B" stick.

**SENSITIVITY AND STAGE GAIN MEASUREMENTS**

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| 9000 | 262.K.C. | 78 Grid (I.F.) | .1 MF | .5 Meg | 1.74 Volts |
| 900 | 262 K.C. | 6A7 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 1000 | 600 K.C. | 6A7 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 50 | 600 K.C. | 78 Grid (R.F.) | .1 MF | .5 Meg | 1.74 Volts |
| 5 (NOTE) | 600 K.C. | Ant. Lead | .40 MMF | None | 1.74 Volts |

* For 1 Watt output.
** Output meter connected across voice coil.

1.74 Volts equals 1 Watt output.
V.C. resistance - 3 ohms.
(NOTE:) Without Booster

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MODEL 9-44
Socket, Trimmers, Drive
Alignment
MODEL 9-49
Alignment

# GALVIN MFG. CORP.

MODEL 9-69
Sensitivity, Gain, Socket
Trimmers, Alignment, Voltage

## SENSITIVITY AND STAGE GAIN MEASUREMENTS
MODEL 9-69

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the tables.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500 M Ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF.

It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| 20,000 | 262 K.C. | 7A7 Grid (IF) | .1 MF | .8 Meg | 1.74 Volts |
| 400 | 262 K.C. | 7B8 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 500 | 600 K.C. | 7B8 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 30 | 600 K.C. | 7A7 Grid(RF) | .1 MF | .5 Meg | 1.74 Volts |
| 1 | 600 K.C. | Ant. Lead | 40 MMF | None | 1.74 Volts |

1.74 Volts equals 1 Watt output.

* For 1 Watt output.

V.C. resistance - 3 ohms.

** Output meter connected across voice coil.

**VOLTAGE CHART - MODEL 9-69**

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 7A7 | RF | 240 | 85 | 4 | - |
| 7B8 | Osc.-Mod. | 240 | 85 | 4 | 110 |
| 7A7 | I.F. | 240 | 85 | 4 | - |
| 7A6 | Det.Avc. | 0 | 0 | 0 | - |
| 7B6 | A.F. | 140 | - | 0 | - |
| 7C5 | Output | 250 | 250 | 15 | - |
| 7C5 | Output | 250 | 250 | 15 | - |
| 0Z4 | Rect. | AC | - | 260 | - |

All voltages measured from socket terminal to chassis ground using 1000 Ohms per volt meter.

**CAUTION**

**If you use a screw driver to pry out Loktal tubes, be careful that you do not crack the glass bead around the tube pins.**

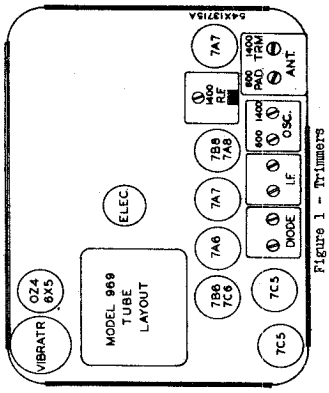


Figure 1 - Trimmers

ALIGNMENT: To align, follow procedure of Model 9-44.

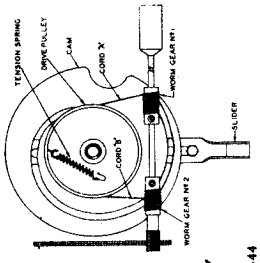


Figure 2

MODEL 9-44

ALIGNMENT FOR MODELS 9-44, 9-49 & 9-69

Place the radio on the service bench with the front cover removed, but with the speaker and battery connected to it.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output, if necessary.

NOTE: Do not adjust trimmer in the oscillator coil can that is covered with Scotch Tape. The original adjustment made in the factory should not be tampered with.

Fig. 1 shows all trimmer locations.

### I.F. ALIGNMENT

1. Connect the signal generator to the control grid of the Osc.-Mod. tube (6A7). Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 262 K.C. and carefully adjust the two trimmers in the Diode coil can to the point showing the highest reading on the output meter.

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustments several times for maximum accuracy.

### SETTING THE RANGE

1. Connect the signal generator to the control grid of the R.F. tube (7B), using the same .1 MF condenser.

2. Set the signal generator at 1550 K.C. and with the condenser gang completely out of mesh adjust the oscillator trimmer on the middle section of the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 535 K.C. Turn the condenser gang completely in mesh and adjust the 600 K.C. padder in the oscillator coil can for the highest output reading.

NOTE: Adjustments above set the range so the receiver will track with the calibrations in the control head.

### RF AND ANTENNA ALIGNMENT

1. Connect the signal generator to the antenna lead through a 40 MMF condenser and to chassis ground. Set the signal generator at 600 K.C. and turn the condenser gang until the signal is heard. Adjust the 600 K.C. padder in the antenna coil can for maximum output reading, while slightly rocking the condenser gang.

2. Set the signal generator at 1400 K.C. Turn the condenser gang until the signal is heard. Adjust the 1400 K.C. trimmer in the antenna coil can for maximum output reading.

3. Adjust the 1400 K.C. R.F. trimmer on the inside section of the condenser gang for maximum output reading.

4. Recheck steps 1, 2, and 3, for accuracy.

### TO RESTRING BOOST-O-MATIC DRIVE
### MODEL 9-44

timing downward to worm gear #1.

7. Loosen the set screws in worm gear #1 and hook the knot in Cord "A" in the slot in the end of the worm drive.

8. Turn the worm drive towards you just enough to take up the slack in Cord "A" and tighten the set screws.

9. Hold Cord "B" in your left hand and turn the tuning shaft manually until the condenser gang is closed. This will wind Cord "A" on worm drive #1.

10. Loosen the set screws in worm drive #2 and hook the knot in Cord "B" in the slot in the end of worm drive #2.

11. Turn worm drive #2 away from you just enough to take up the slack in Cord "B" and tighten the set screws.

12. Hook the end of the cord tension spring under the ear stamped out of the pulley.
NOTE: You can see by studying Fig. 2 how Cord "A" passes over worm drive #1, whereas, Cord "B" passes under worm drive #2.

1. Turn the condenser gang to the fully open position.

2. Turn the booster pulley and cam assembly until the forked slider has been drawn all the way in and the hole in the rim of the drive pulley is at the top, lining up with the pulley stud and the slider, as indicated in Fig. 2.

3. If the old string is broken, cut a new piece of 30 pound test silk fish cord 31" long, and tie knots or eyelets in both ends so the length between the knots is exactly 29½".

4. Double the cord at its exact center and push the loop through the hole in the rim of the drive pulley.

5. Tie the tension spring in the loop thus formed, but do not hook it under the ear stamped out of the pulley. You will now have two equal lengths of string extending from the hole in the pulley which we shall call Cord "A" and Cord "B", as indicated in Fig. 2.

6. Take Cord "A" and wind it clockwise one complete revolution around the drive pulley, con-

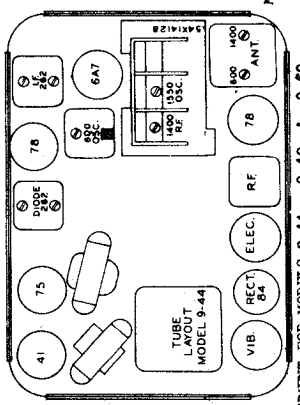


Figure 1 — Trimmers

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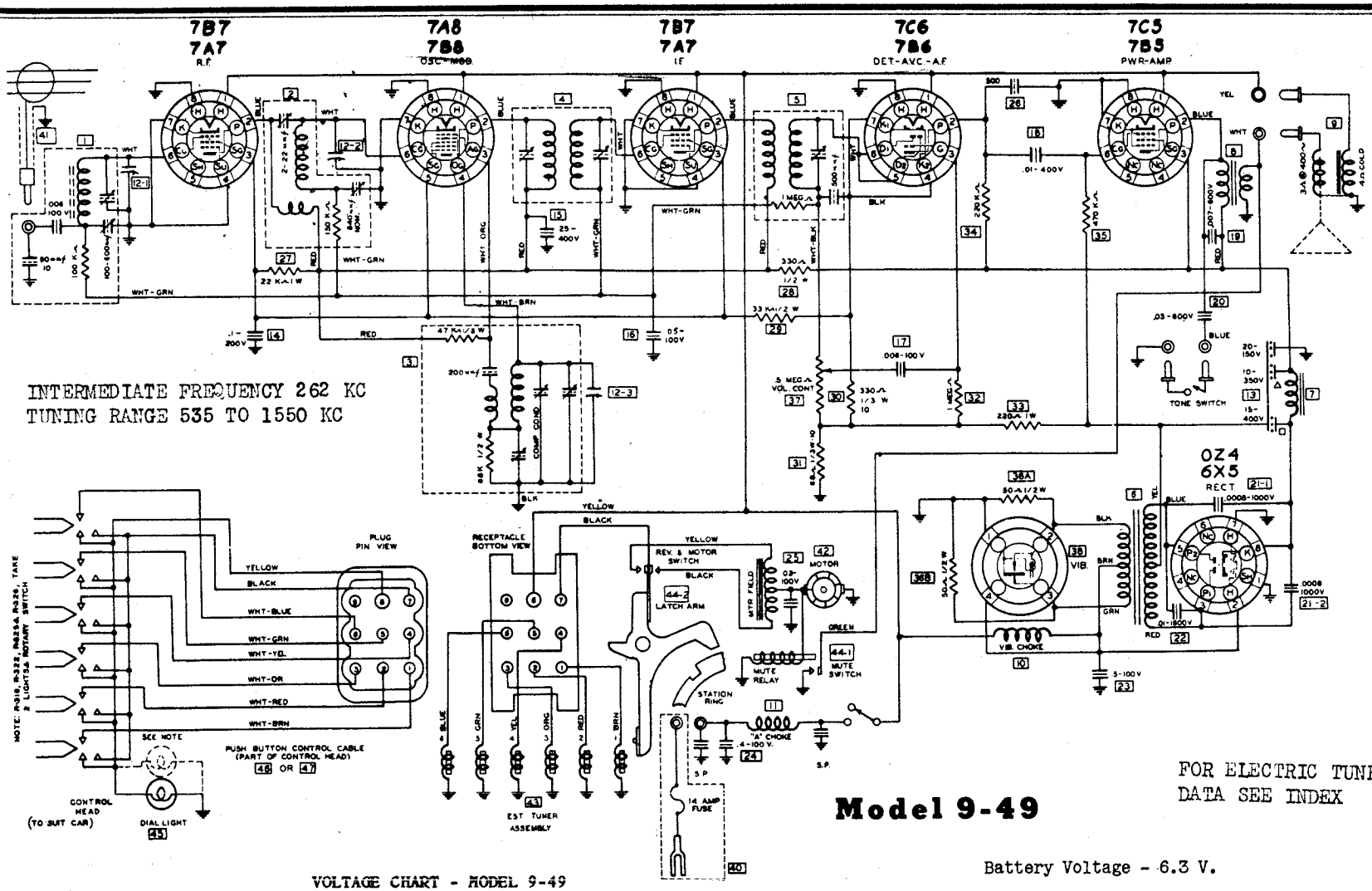



# Model 9-49

FOR ELECTRIC TUNER DATA SEE INDEX

VOLTAGE CHART - MODEL 9-49

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 7A7 or 7B7 * | R.F. | 200 | 60 | 0 | - |
| 7B8 or 7A8 * | Osc.-Mod. | 200 | 60 | 0 | 95 |
| 7A7 or 7B7 * | I.F. | 200 | 60 | 0 | - |
| 7B6 or 7C6 ** | Det.-Avc. | 70 | - | -2 | - |
| 7B5 *** | Output | 200 | 205 | 0 | - |
| 0Z4 or 6X5 | Rect. | AC | - | 210 | - |

Battery Voltage - 6.3 V.

Current consumption - 6.2 Amps.

Maximum power output - 4.5 Watts

* Bias - -3.V Measured from "B" stick.

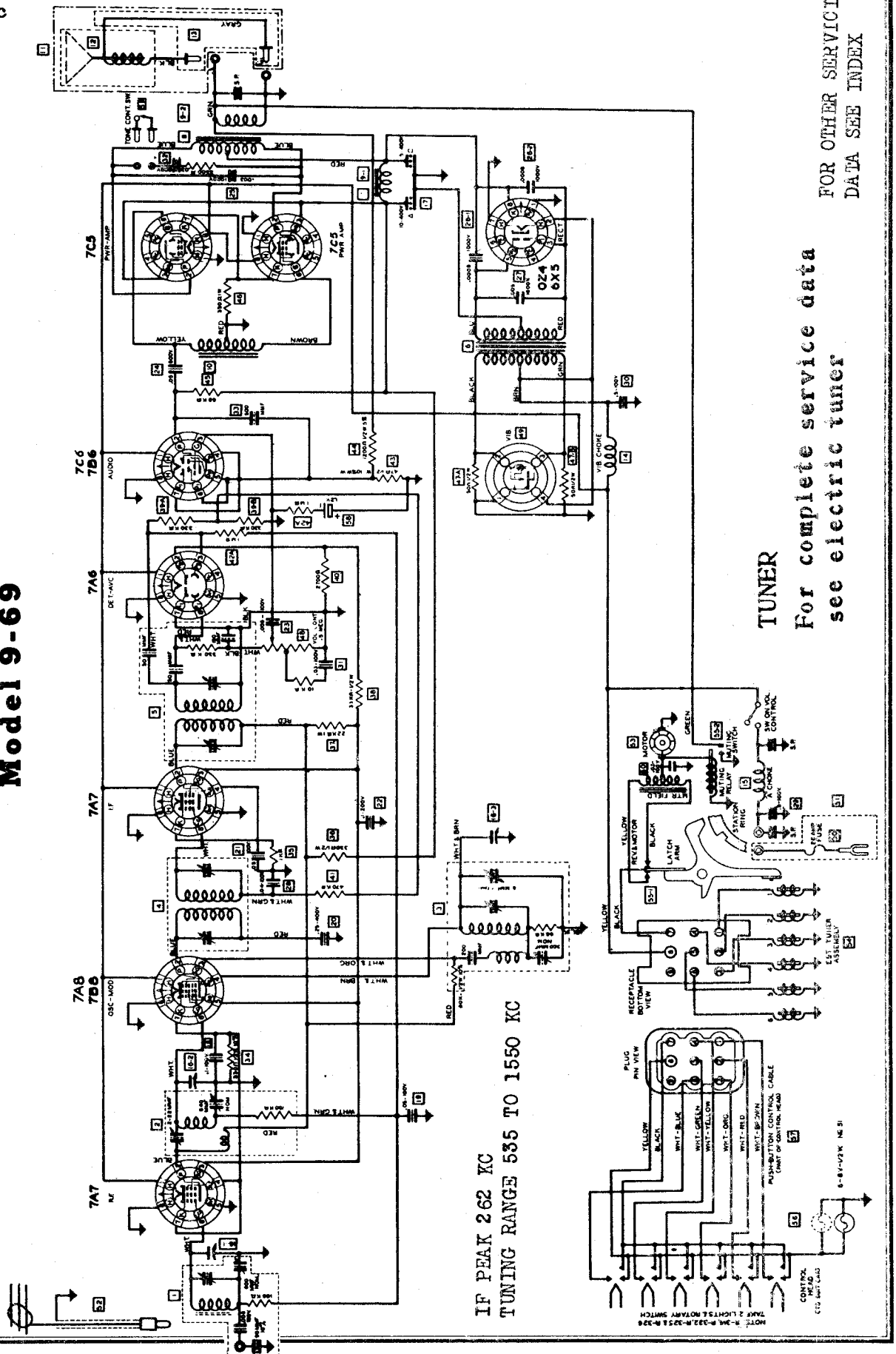
** Bias - -2.V Measured from "B" stick.

*** Bias - -15.V Measured from "B" stick.

All measurements from socket terminal to chassis ground, using 1000 ohms per volt meter.

MODEL 9-69
Schematic

GALVIN MFG. CORP.

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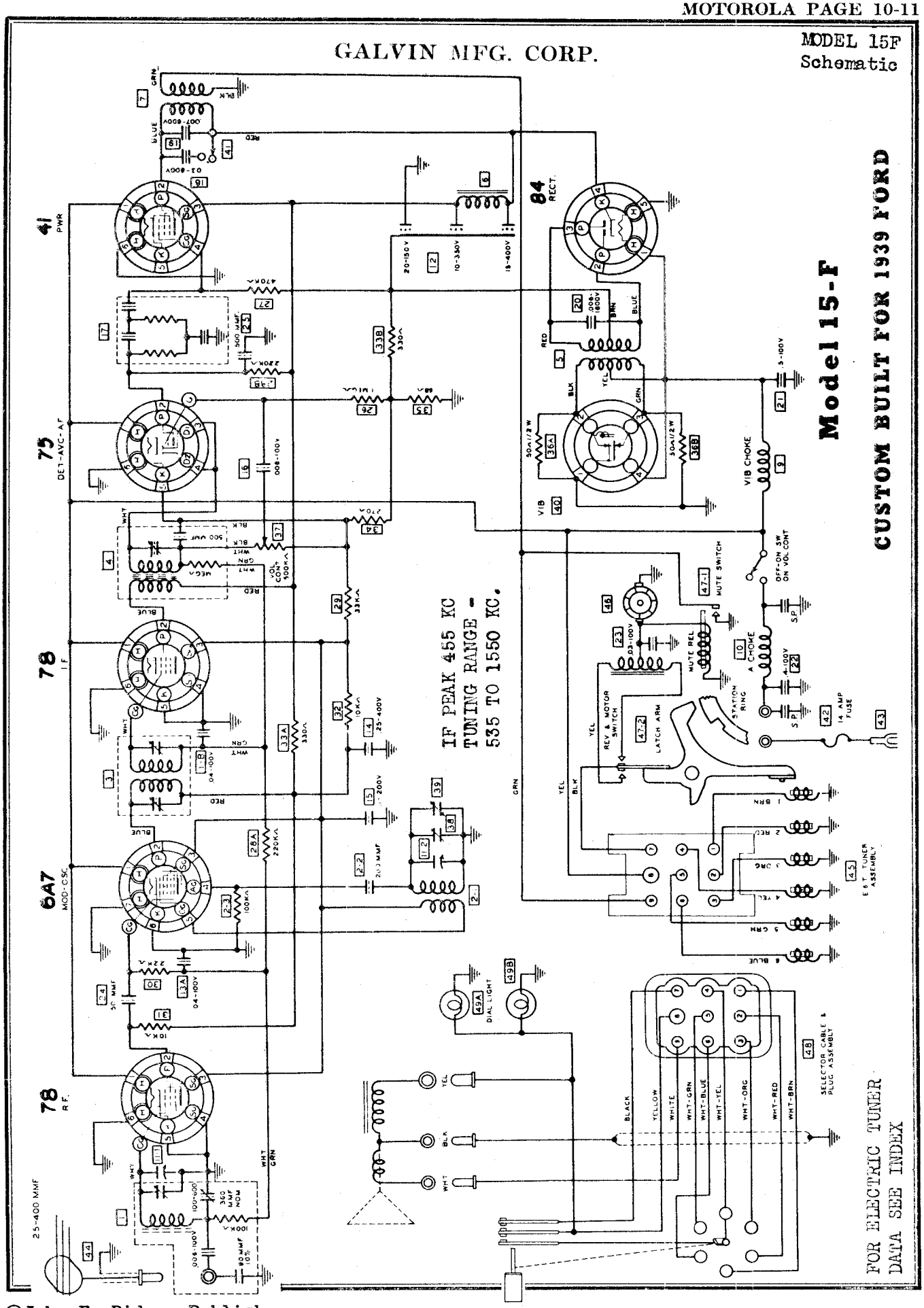


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MODEL 15F
Sensitivity, Gain, Voltage
Alignment, Socket, Trimmers

# GALVIN MFG. CORP.

## ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

### I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

### R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

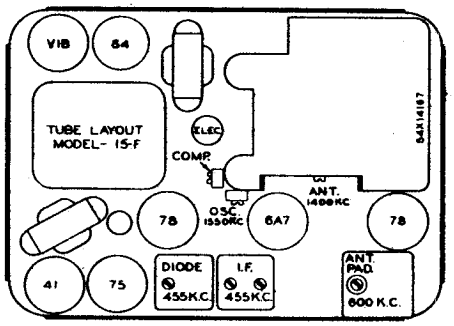


Figure 1 - Trimmers

### SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| 20,000 | 455 K.C. | IF Grid | .1 MF | .5 Meg | 1.74 Volts |
| 200 | 455 K.C. | Mod. Grid | .1 MF | .5 Meg | 1.74 Volts |
| 250 | 600 K.C. | Mod. Grid | .1 MF | .5 Meg | 1.74 Volts |
| 125 | 600 K.C. | RF Grid | .1 MF | .5 Meg | 1.74 Volts |
| 10 | 600 K.C. | Ant. Lead | 40 MMF | None | 1.74 Volts |

* For 1 Watt output. 1.74 Volts equals 1 watt output.

** Output meter connected across voice coil. V.C. resistance - 3 ohms.

### VOLTAGE CHART

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 78* | RF | 145 | 85 | 0 | - |
| 6A7 | Osc.-Mod. | 200 | 85 | 0 | 90 |
| 78 | IF | 205 | 85 | 0 | - |
| 75** | Det.Avc. | 85 | - | -2.5 | - |
| 41*** | Output | 200 | 205 | 0 | - |
| 84 | Rect. | AC | - | 215 | - |

All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.

Battery voltage 6.3 V. * Bias- -3.V from "B" Stick.

Current Consumption 6.5 Amps. ** Bias- -2.V from "B" Stick.

Maximum Power Output 5 Watts. *** Bias- -17.V from "B" Stick.

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GALVIN MFG. CORP.

MODEL 16C
Schematic, Socket
Trimmers

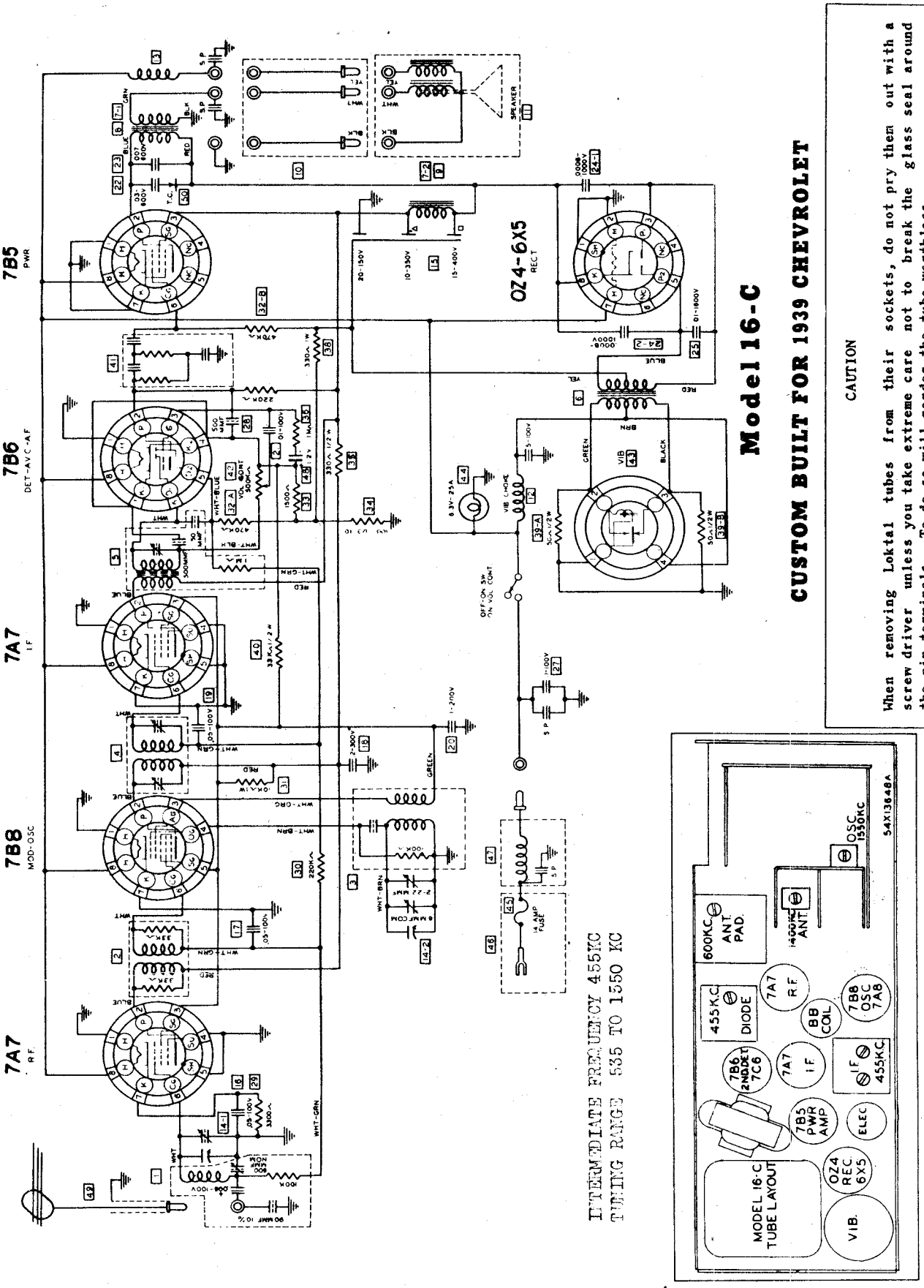


Figure 1 - Trimmers

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## ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

### I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

### R. F. ALIGNMENT

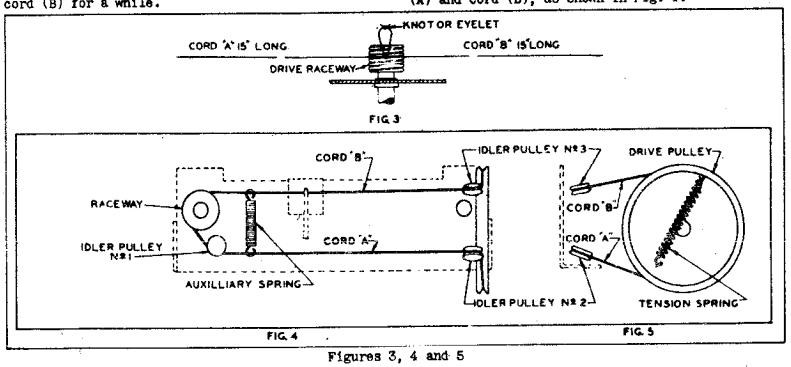
1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

## DIAL DRIVE CORD ASSEMBLY

1. Remove broken cord.
2. If exact Motorola assembly is not available, cut a piece of 30 lb. silk fish cord 30 inches long. CONDENSER GANG MUST BE MESHED.
3. Double the cord in the middle and thread the loop through the hole in the drive raceway. See Fig. 3.
4. Tie a large knot in the cord or use an eyelet large enough to prevent the cord from passing through the hole in the raceway. You will now have cord (A) and cord (B) each 15 inches long extending from the raceway as in Fig. 3.
5. Loop cord (A) under idler pulley No. 1, and across the chassis to idler pulley No. 2.
6. Holding the end of cord (A) tight, turn the raceway two and one half turns to the right clockwise), thereby winding two and one half turns of cord (A) on the raceway. (Stop when the hole is at the top.)
7. Use a common paper clip to clip the loose end of cord (A) to the chassis, so you can work on cord (B) for a while.
8. Take cord (B) and bring it over to idler pulley No. 3, as shown in Fig. 4.
9. Continue cord (B) around the drove pulley to the hole and thread the end of the cord through the hole, after which it should be clipped to the chassis.
10. Remove the paper clip holding cord (A) and continue its routing around idler pulley No. 2 to the hole in the drive pulley. Thread the end of the cord through the hole.
11. Tie the loose ends of both cords tightly together inside the hole in the pulley. Then tie in the tension spring and hook the other end around the ear stamped out of the pulley. Cut off surplus cord.
12. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
13. Secure pointer to string with a drop of shellac.
14. Add auxiliary tension spring between cord (A) and cord (B), as shown in Fig. 4.




Figures 3, 4 and 5

## SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| 10,000 | 455 K.C. | IF Grid | .1 MF | .5 Meg | 1.74 Volts |
| 150 | 455 K.C. | Mod. Grid | .1 MF | .5 Meg | 1.74 Volts |
| 200 | 600 K.C. | Mod. Grid | .1 MF | .5 Meg | 1.74 Volts |
| 50 | 600 K.C. | RF Grid | .1 MF | .5 Meg | 1.74 Volts |
| 5 | 600 K.C. | Ant. Lead | 40 MMF | None | 1.74 Volts |

* For 1 Watt output. 1.74 Volts equals 1 Watt output.

** Output meter connected across voice coil. V.C. resistance - 3 ohms.

### VOLTAGE CHART — MODEL 16-C

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 7A7 | RF | 210 | 95 | 0 | - |
| 7B8 | Osc.-Mod. | 200 | 95 | 0 | 95 |
| 7A7 | IF | 210 | 95 | 0 | - |
| 7B6 | Det.-Avc. | 100 | - | 6 | - |
| 7B5 | Output | 210 | 205 | 0 | - |
| 0Z4 or 6X5 | Rect. | AC | - | 215 | - |

All measurements from chassis ground to socket terminal using 1000 ohms per vole meter.

Battery voltage 6.3 V. Current Consumption 6.8 Amps. Maximum Power Output 5 Watts.

## DIAL CORD INSTRUCTIONS

### BACKLASH CORD AND SPRING ASSEMBLY

NOTE: If exact Motorola assembly is not available, use original spring and 30 lb. silk fish cord to make up assembly to dimensions as shown at the top of Fig. 2.

1. Turn gang to fully meshed position.
2. Loop short end of cord around set screw (A) in condenser gear.
3. Make one complete turn clockwise around condenser gear hub.
4. Stretch spring and make one complete turn around the tuner gear hub with the long end of the backlash cord.
5. Loop the end of the cord around drive pin "B".

NOTE: Spring tension must be sufficient to take up all backlash in gear train.

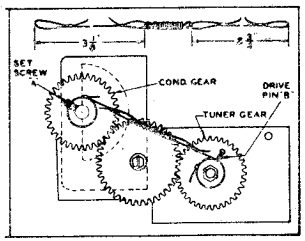
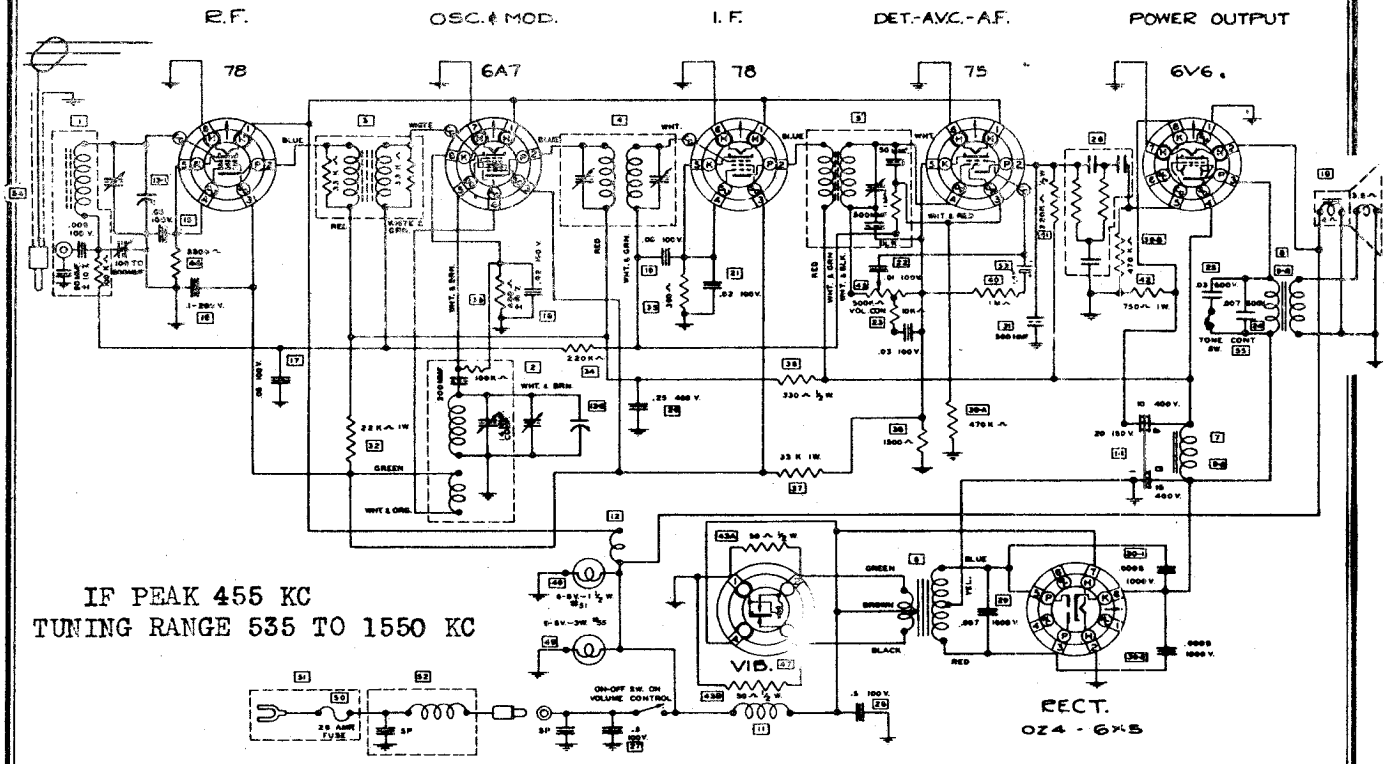


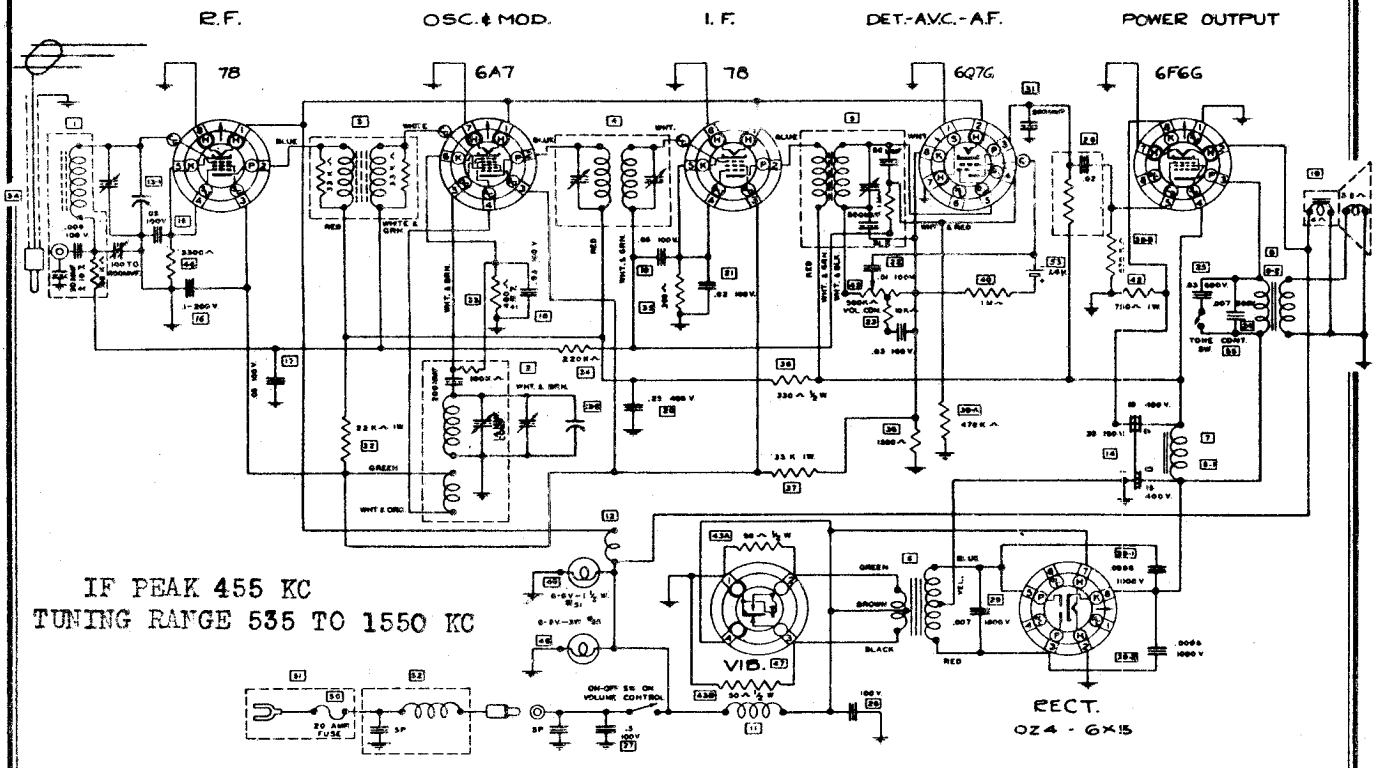

Figure 2

# GALVIN MFG. CORP.

MODEL 17-D
MODEL 17-D-A
Schematics




MODEL 17-D




MODEL 17-D-A

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## ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

### I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

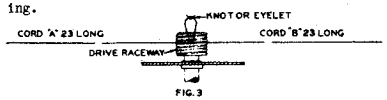

FIG. 3

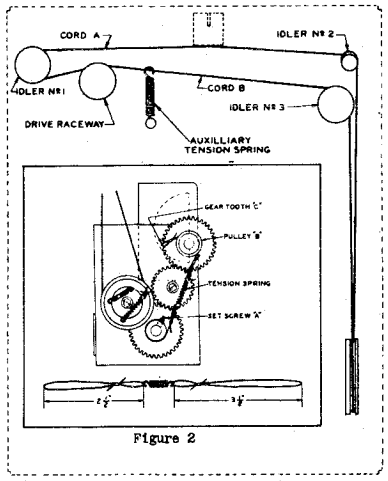

Figure 2

FIG. 4

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

### R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

NOTE: The antenna padder is reached through a hole in the side of the chassis base, directly under the antenna coil can.

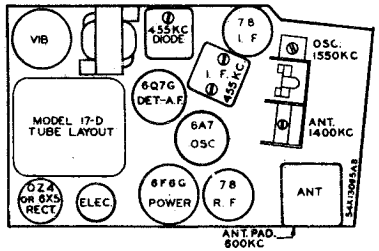

Figure 1 - Trimmers

**DIAL DRIVE CORD ASSEMBLY - PART NO. 1X14744**

1. Remove broken cord.

2. If exact Motorola assembly is not available, cut a piece of 30 lb. silk fish cord 46 inches long. CONDENSER GANG MUST BE MESHED.

3. Double the cord in the middle and thread the loop through the hole in the drive raceway. See Fig.

4. Tie a large knot in the cord or use an eyelet large enough to prevent the cord from passing through the hole in the raceway. You will now have cord "A" 23 inches long, and cord "B" 23 inches long extending from the raceway as in Fig. 3.

5. Loop cord "A" under and over idler pulley No. 1 and across the chassis to small idler pulley No. 2. (See Fig. 4).

6. Continue cord "A" around idler pulley No. 2, and use a paper clip to clip the cord to the chassis while you work on cord "B" for a while.

7. Wind three turns of cord "B" on the raceway, winding from the hole to the outside rim.

8. Continue cord "B" to idler pulley No. 3 and down to the drive pulley, making one-half turn around the pulley to the slot.

9. Clip cord "B" to the chassis and continue cord "A" around the drive pulley one complete turn to the slot.

10. Bring cord "A" and cord "B" both inside the slot and tie them together securely.

11. Then tie in the tension spring and hook it on the stud in the drive pulley as shown in Fig. 5.

12. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.

13. Secure pointer to string with a drop of shellac.

14. Connect auxilliary tension spring as shown in Fig. 4.

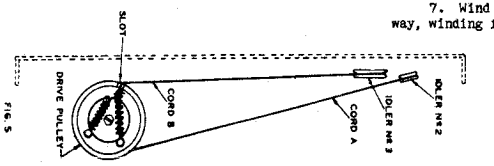

FIG. 5

## SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| 25,000 | 455 K.C. | IF Grid | .1 MF | .5 Meg | 1.87 Volts |
| 200 | 455 K.C. | Mod. Grid | .1 MF | .5 Meg | 1.87 Volts |
| 250 | 600 K.C. | Mod. Grid | .1 MF | .5 Meg | 1.87 Volts |
| 75 | 600 K.C. | RF Grid | .1 MF | .5 Meg | 1.87 Volts |
| 5 | 600 K.C. | Ant. Lead | 40 MMF | None | 1.87 Volts |

* For one watt output.
** Meter connected across voice coil.
V.C. Resistance -3.5 ohms at 400 cycles.
1.87 Volts equals 1 watt output.

**VOLTAGE CHART - MODEL 17-D**

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 78 | RF | 300 | 100 | 8.5 | - |
| 6A7 | Osc.-Mod. | 290 | 100 | 3 | 100 |
| 78 | IF | 300 | 100 | 3.5 | - |
| 75 or 6Q7G | Det.-Avc. | 120 | - | 5 | - |
| 6V6 or 6F6G | Output | 290 | 180 | 18 | - |
| 0Z4 or 6X5 | Rect. | AC | - | 300 | - |

All measurements from chassis ground to socket terminal using 1000 ohms per volt meter.
Battery voltage 6.3 V. Current Consumption 7.5 Amps.
Maximum Power Output 8 Watts.

**DIAL CORD INSTRUCTIONS - MODEL 17-D**
**BACKLASH CORD AND SPRING ASSEMBLY - PART NO. 1X14743**

NOTE: If exact Motorola assembly is not available, use original spring and 30 lb. silk fish cord to make up assembly to dimensions as shown at the bottom of Fig. 2.

1. Turn gang to open position.
2. Loop short end of cord around set screw "A" in tuner gear.
3. Make one complete turn counter-clockwise around tuner gear hub.
4. Stretch spring and make one complete turn counter-clockwise around pulley "B"
5. Hook the loop in the end of the cord on gear tooth "C" of condenser gear.

NOTE: Spring tension must be sufficient to take up all backlash in gear train. Regulate tension through selection of gear tooth in Step 5 above.

**Model 17-D**

**CUSTOM BUILT FOR 1939**

**CHRYSLER** **DESOTO** **DODGE** **PLYMOUTH**

GALVIN MFG. CORP.

MODEL 18-0
Schematic, Socket
Trimmers

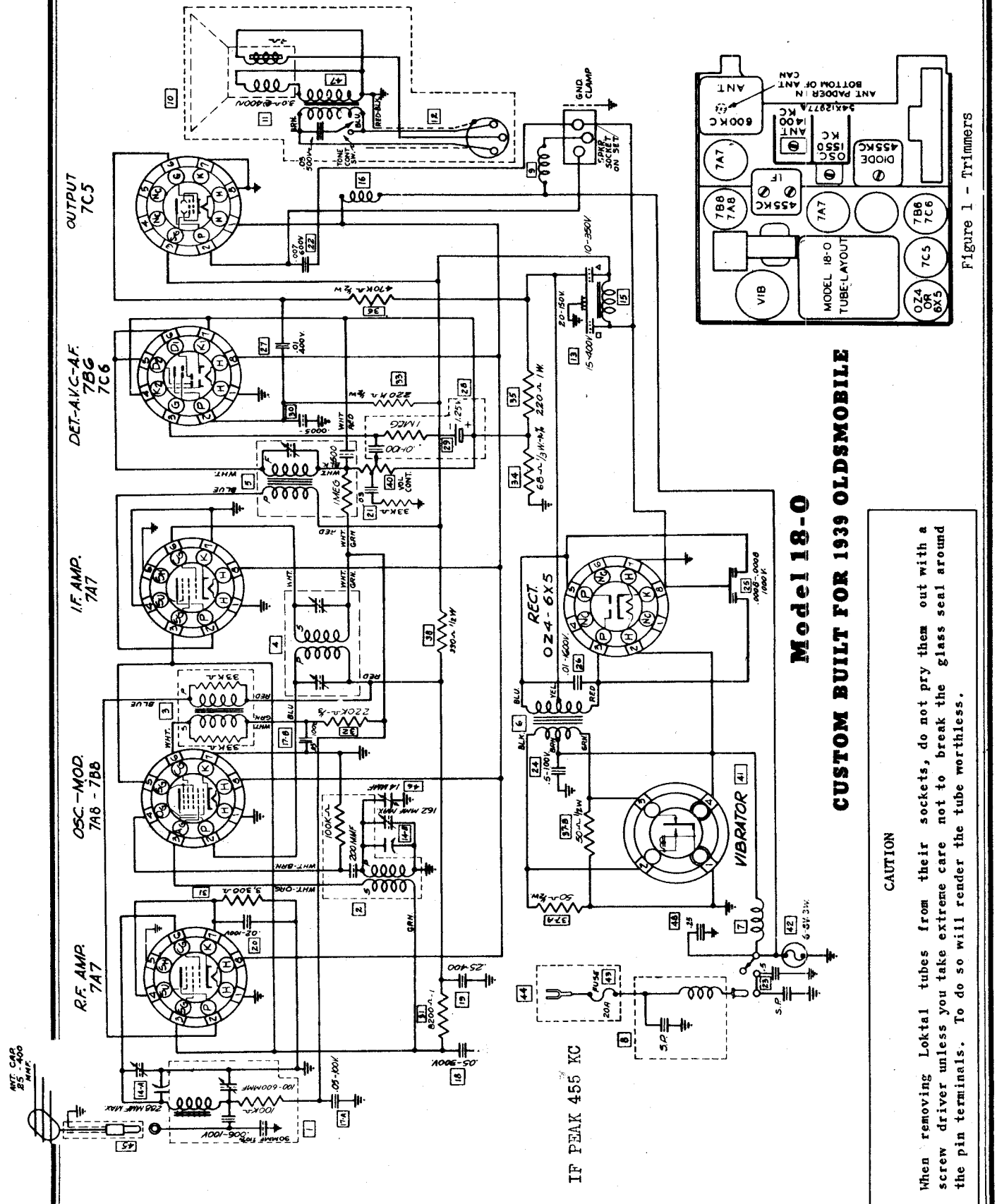
OUTPUT 7C5
DET-AVC-AF. 7BG 7C6
I.F. AMP. 7A7
OSC.-MOD. 7A8 - 7B8
R.F. AMP. 7A7
RECT. 0Z4 - 6X5
VIBRATOR
Model 18-0
CUSTOM BUILT FOR 1939 OLDSMOBILE
IF PEAK 455 KC
ANT. CAP. 25 MMF.
CAUTION
When removing Loktal tubes from their sockets, do not pry them out with a screw driver unless you take extreme care not to break the glass seal around the pin terminals. To do so will render the tube worthless.




Figure 1 - Trimmers

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## ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

### I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

### R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

NOTE: The antenna padder is reached through a hole in the bottom of the chassis base, directly under the antenna coil can.)

## DIAL DRIVE CORD ASSEMBLY - PART NO. 1X14746

1. While not essential, you will find it easier to work if you remove the front plate from the chassis. This requires removal of the dial light bracket, the broad band coil bracket, the volume control, and the unsoldering of the ground connection of 8X14120 condenser.

2. If the exact Motorola assembly is not available, cut a piece of 30 lb. test silk fish cord 43 inches long.

3. The condenser gang must be open.

4. Double the cord in the middle and thread the loop through the hole in the drive raceway. See Fig. 3.

5. Tie a large knot in the cord or use an eyelet large enough to prevent the cord from passing through the hole. You will now have cord "A" and cord "B", each approximately 21 inches long, extending from the raceway as in Fig. 3.

6. Loop cord "A" over idler pulley No. 1 and across the chassis to idler pulley No. 2 and holding the end of the cord tight, turn the raceway 2½ turns to the right (clockwise), thereby winding 2½ turns of cord "A" on the raceway.

7. Use a paper clip to clip the loose end of cord "A" to the front plate so you can work on cord "B" for a while.

8. Loop cord "B" over idler pulley No. 3, and across the chassis to idler pulley No. 4.

9. Both cords should now be clipped to the front plate while the plate is reinstalled on the chassis.

10. Continue cord "B" down to the drive pulley and make 1½ turns around the pulley to the slot in the rim.

11. Continue cord "A" down to the slot in the rim of the drive pulley.

12. Bring both loose ends of cord through the slot in the drive pulley and tie them together tightly inside the slot.

13. Then tie in one end of the tension spring and hook the other end over the stud as shown in Fig. 4.

14. To set the pointer to correct frequency, tune in a station of known frequency and adjust the position of the pointer on the string, securing it with a drop of shellac.

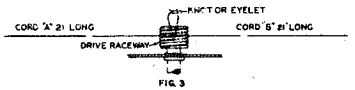

FIG. 3

## DIAL CORD INSTRUCTIONS

### BACKLASH CORD AND SPRING ASSEMBLY - PART NO. 1X14745

NOTE: If exact Motorola assembly is not available, use original spring and 30 lb. silk fish cord to make up assembly to dimensions as shown at the top of Fig. 2.

1. Turn gang to fully meshed position.

2. Loop long end of cord around set screw (A) in tuner gear.

3. Make one complete turn around tuner gear hub.

4. Stretch spring and loop other end around set screw (B) in condenser gear.

NOTE: Spring tension must be sufficient to take up all backlash in gear train.

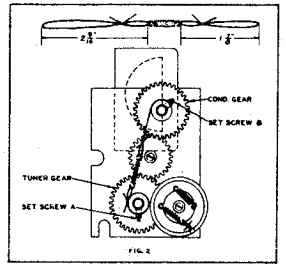

FIG. 2

Figure 2

## VOLTAGE CHART — MODEL 18-O

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 7A7 or 7B7* | R.F. | 185 | 100 | 7.7 | - |
| 7B8 or 7A8* | Osc.-Mod. | 185 | 100 | 0 | 100 |
| 7A7 or 7B7* | I.F. | 185 | 100 | 0 | - |
| 7B6 or 7C6 | Det.-Avc. | 75 | - | 0 | - |
| 7C5** | Output | 195 | 190 | 0 | - |
| 0Z4 or 6X5 | Rect. | AC | - | 200 | - |

* Bias - -2.8 V. Measured from "B" stick. ** Bias - -13.V. Measured from "B" stick.

All measurements from socket terminal to chassis ground, using 1000 ohms per volt meter.

Battery Voltage - 6.3 V. Current Consumption - 6.5 Amps.

Maximum Power Output - 7.5 Watts.

## SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characterisitcs, etc.

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| .25 Volts | 400 cycles | 7B6 Grid | .1 MF | .5 Meg. | 1.74 Volts |
| 10,000 | 455 K.C. | 7A7 Grid(I.F.) | .1 MF | .5 Meg. | 1.74 Volts |
| 150 | 455 K.C. | 7B8 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 200 | 600 K.C. | 7B8 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 50 | 600 K.C. | 7A7 Grid (R.F.) | .1 MF | .5 Meg | 1.74 Volts |
| 4 | 600 K.C. | Ant. Lead | 40 MMF | None | 1.74 Volts |

* For one watt output. V.C. impedance - 3 ohms at 400 cycles.

** Meter connected across voice coil. 1.74 volts equals 1 watt output.

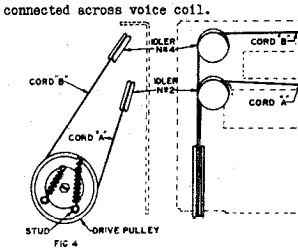

FIG. 4

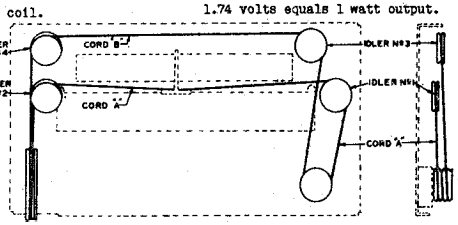

FIG. 5

FIG. 6

GALVIN MFG. CORP.

MODEL 19B
Schematic, Socket
Trimmers

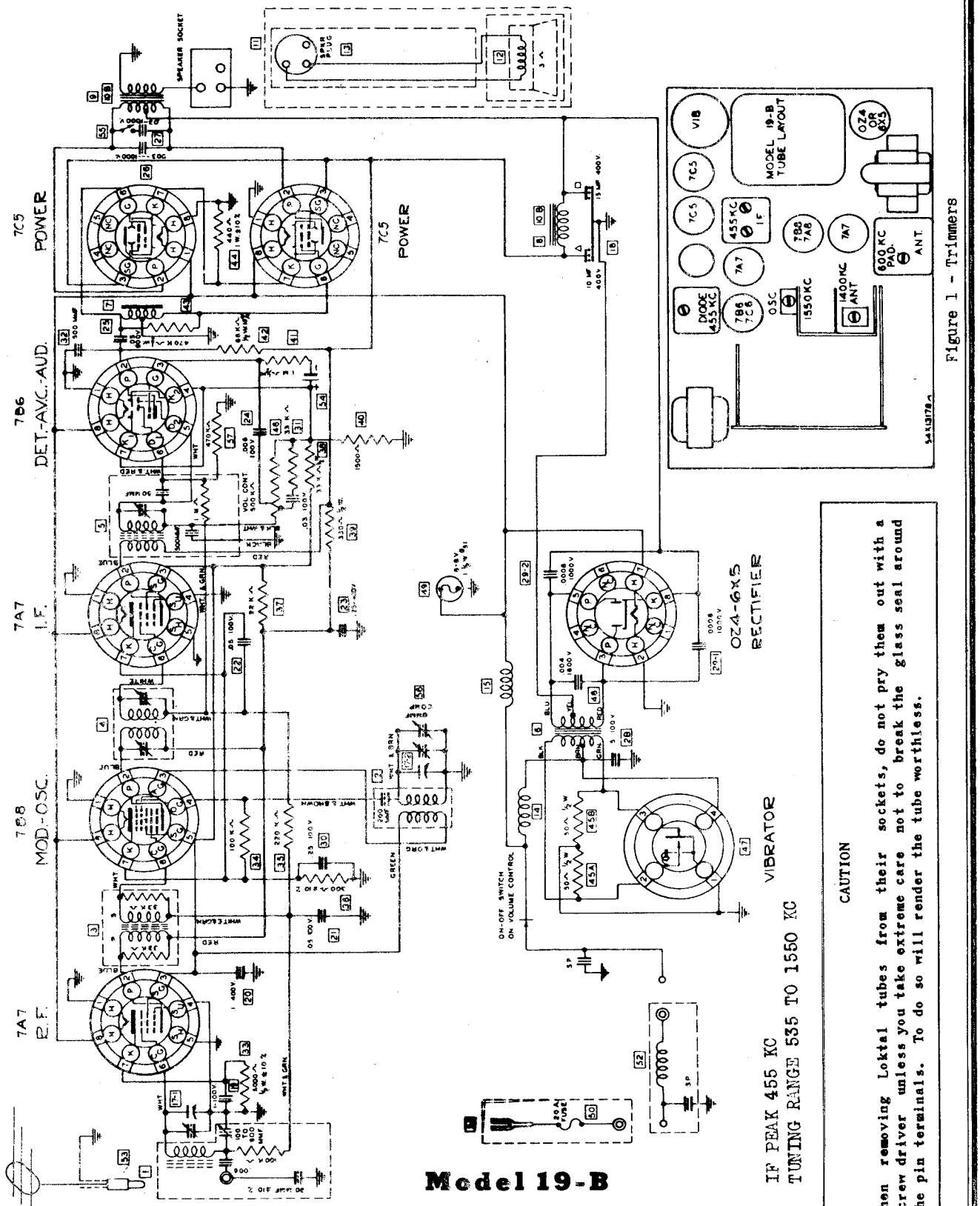


Figure 1 - Trimmers

**CAUTION**

When removing Loktal tubes from their sockets, do not pry them out with a screw driver unless you take extreme care not to break the glass seal around the pin terminals. To do so will render the tube worthless.

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## ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

### I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

### R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

## DIAL DRIVE CORD ASSEMBLY - PART NO. 1X14731

1. Remove broken cord, and dial pointer.
2. If exact Motorola assembly is not available, cut a piece of 30 lb. silk fish cord 44 long. CONDENSER GANG MUST BE MESHED.
3. Double the cord in the middle and thread the loop through the hole in the drive raceway. See Fig.
4. Tie a large knot in the cord or use an eyelet large enough to prevent the cord from passing through the hole in the raceway. You will now have cord(A) 22 inches long, and cord(B) 22 inches long, extending from the raceway as in Fig. 3.
5. Loop cord (A) under idler pulley No. 1, as shown in Fig. 5 and holding the end of the cord tight, turn the raceway 2½ turns to the right (clockwise), thereby winding 2½ turns of cord (A) on the raceway.
6. Continue cord (A) across the front of the receiver, around idler pulley No. 2, and fasten the loose end of the cord to the edge of the chassis with a common paper clip, so you can work on cord (B) for a while.
7. Take cord (B) and bring it over the raceway and under idler pulley No. 3, as shown in Fig.
8. Continue cord (B) across the front of the chassis, around idler pulley No. 4, and make one complete turn around the drive pulley, after which the end of the cord should be clipped to the chassis.
9. Remove the paper clip holding cord (A) and continue its routing to the drive pulley, making 1/2 turn around it to the slot.
10. Bring both loose ends of cord through the slot in the drive pulley and tie them together tightly inside the slot.
11. Then tie in one end of the tension spring, Part No. 41A12968 and hook the other end of the spring on the small stud as shown in Fig. 6.
12. Replace dial pointer.
13. To set pointer to correct frequency, tune in a station of known frequency and adjust position of pointer on string.
14. Secure pointer to string with a drop of shellac.

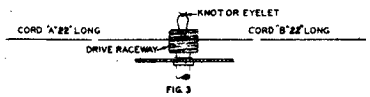


FIG. 3

## DIAL CORD INSTRUCTIONS

### BACKLASH CORD AND SPRING ASSEMBLY - PART NO. 1X14730

NOTE: If exact Motorola assembly is not available, use original spring and 30 lb. silk fish cord to make up assembly to dimensions as shown at the top of Fig. 2.

1. Turn gang to fully meshed position.
2. Loop long end of cord around set screw (A) in tuning unit.
3. Make one complete turn around gear hub.
4. Stretch spring and loop other end around set screw (B) in condenser gear.

NOTE: Spring tension must be sufficient to take up all backlash in gear train.

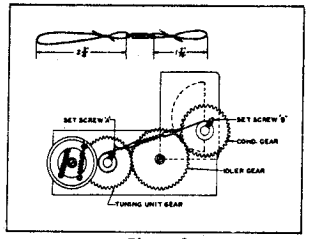


Figure 2.

## SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc.-Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the tables.

All stage-gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500 M Ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF.

It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| 7,000 | 455 K.C. | 7A7 Grid (IF) | .1 MF | .5 Meg | 1.74 Volts |
| 100 | 455 K.C. | 7B8 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 150 | 600 K.C. | 7B8 Grid | .1 MF | .5 Meg | 1.74 Volts |
| 15 | 600 K.C. | 7A7 Grid (RF) | .1 MF | .5 Meg | 1.74 Volts |
| 1 | 600 K.C. | Ant. Lead | 40 MMF | None | 1.74 Volts |

* For 1 Watt output. 1.74 Volts equals 1 Watt output.

** Output meter connected across voice coil. V.C. resistance - 3 ohms.

## VOLTAGE CHART - MODEL 19-B

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 7A7 | RF | 250 | 75 | 7.5 | - |
| 7B8 | Osc.-Mod. | 250 | 75 | 3.5 | 75 |
| 7A7 | IF | 250 | 75 | 3.5 | - |
| 7B6 | Det.-Avc. | 150 | - | 4.5 | - |
| 7C5 | Output | 250 | 250 | 18 | - |
| 7C5 | Output | 250 | 250 | 18 | - |
| 0Z4 | Rect. | AC | - | 280 | - |

All voltages measured from socket terminal to chassis ground using 1000 Ohms per volt meter.

Current - 7.0 Amps. at 6.3 Volts. Maximum power output - 12 Watts.

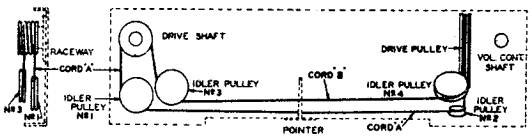


FIG. 4 FIG. 5

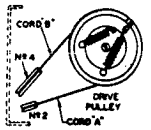
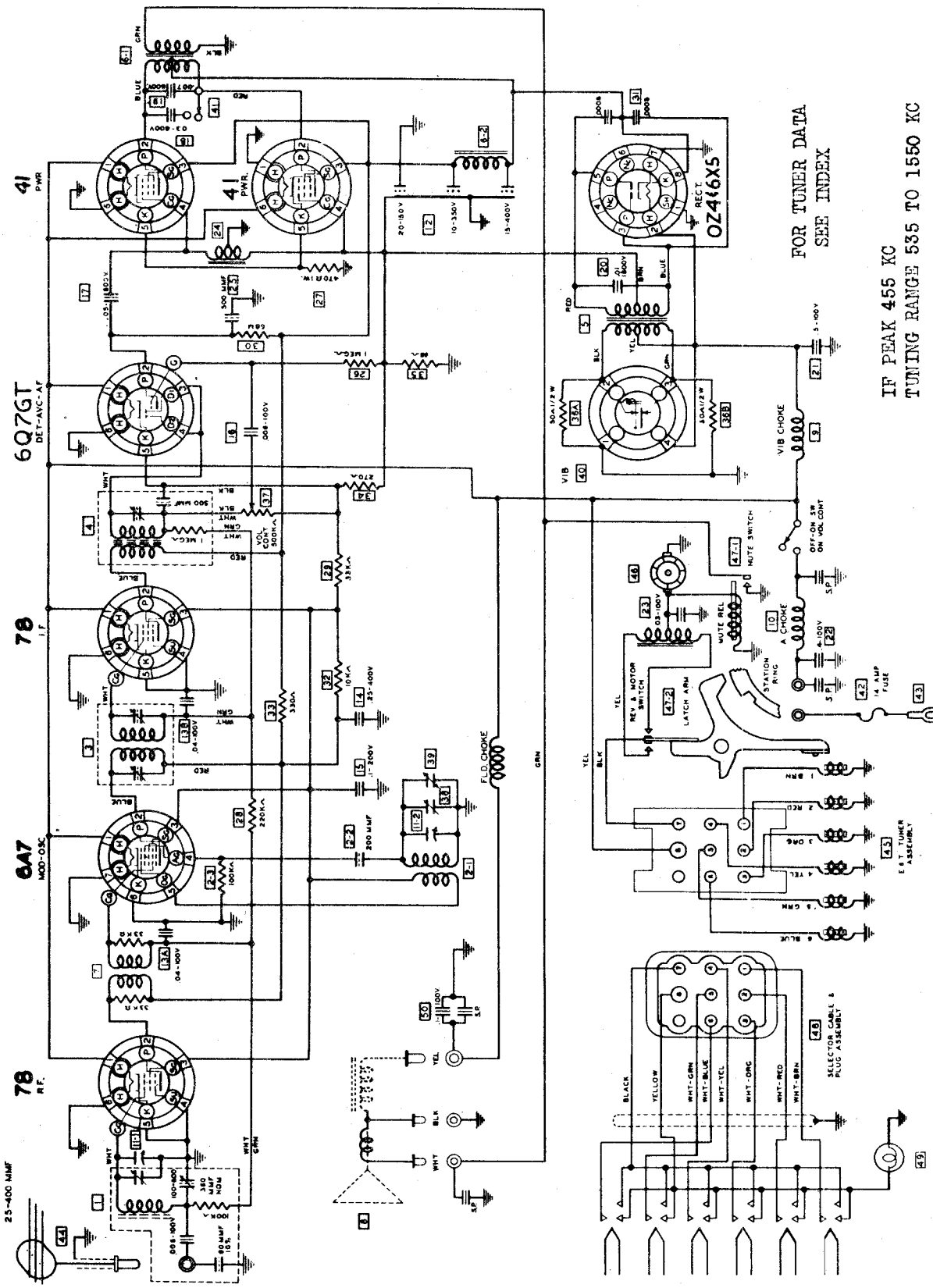


FIG. 6

GALVIN MFG. CORP.

MODELS 20P, 21L, 24K
Schematic

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MODELS 20P,21L,24K
Alignment,Socket,Trimmers
Gain,Sensitivity

# GALVIN MFG CORP.

## SENSITIVITY AND STAGE GAIN MEASUREMENTS

These stage gain measurements will, if properly used, enable you to localize trouble quickly. They are intended for use with a signal generator that is accurately calibrated in microvolts.

Starting with the second detector - first audio stage, and working back step by step to I.F., Osc. - Mod., R.F. and finally to the antenna terminal, the circuit in which the trouble exists will quickly be determined by evidence of low gain, when signal generator attenuation readings are compared to the normal values as shown in the table.

All stage gain measurements must be made with the volume control set for full volume. The shielded lead from the signal generator is connected to the grid terminal of the tube through a .1 MF condenser, with a 500M ohm resistor connected as a leak resistance between the grid of the tube and the grid lead which has been removed.

When measuring over-all sensitivity at the antenna terminal, use a 40 MMF condenser in place of the .1 MF. It must be remembered that the figures in the table are average and allowance must be made for variations between two sets of the same general type, due to difference of tube characteristics, etc.

| Average Microvolt Input * | Generator Set at | Generator Feeder Connected to | Dummy Antenna Capacity | Leak Resistance | Output Meter Reading ** |
|---|---|---|---|---|---|
| 15,000 | 455 K.C. | IF Grid | .1 MF | .5 Meg | 1.74 Volts |
| 400 | 455 K.C. | Mod. Grid | .1 MF | .5 Meg | 1.74 Volts |
| 450 | 600 K.C. | Mod. Grid | .1 MF | .5 Meg | 1.74 Volts |
| 25 | 600 K.C. | RF Grid | .1 MF | .5 Meg | 1.74 Volts |
| 2 | 600 K.C. | Ant. Lead | 40 MMF | None | 1.74 Volts |

* For one watt output. V.C. impedance - 3 ohms at 400 cycles.
** Meter connected across voice coil. 1.74 volts equal 1 watt output.

VOLTAGE CHART - MODELS 20-P, 21-L, AND 24-K

| TUBE | POSITION | PLATE | SCREEN | CATHODE | OSC. PLATE |
|---|---|---|---|---|---|
| 78* | RF | 180 | 80 | 0 | - |
| 6A7* | Osc.-Mod. | 180 | 80 | 0 | 80 |
| 78 * | IF | 180 | 80 | 0 | - |
| 6Q7GT** | Det.-Avc. | 80 | - | -2.6 | - |
| 41 | Output | 190 | 180 | 15 | - |
| 41 | Output | 190 | 180 | 15 | - |
| 0Z4 | Rect. | AC | - | 190 | - |

* Bias -2.6 V. from B stick
** Bias -3.5 V. from B stick
Current - 6.5 Amps. at 6.3 Volts
Maximum power output 4.5 Watts
All readings from chassis ground with 1000 ohms per volt meter.

### ALIGNMENT PROCEDURE

Remove the chassis from its housing and place it on the service bench. Connect the speaker and battery.

Turn the volume control to maximum position and leave it there throughout the alignment, reducing the signal generator output if necessary.

### I. F. ALIGNMENT

1. Connect the signal generator to the antenna lead through a .1 MF condenser and to chassis ground. Turn the condenser gang completely out of mesh. Connect an output meter across the speaker voice coil.

2. Set the signal generator at 455 K.C. and carefully adjust the single trimmer in the Diode coil can to the point showing the highest reading on the output meter. (Advance the signal generator attenuator if necessary to pick up signal.)

3. Adjust the two trimmers in the I.F. coil can to the point showing the highest output reading.

4. Repeat the I.F. and Diode adjustment several times for maximum accuracy.

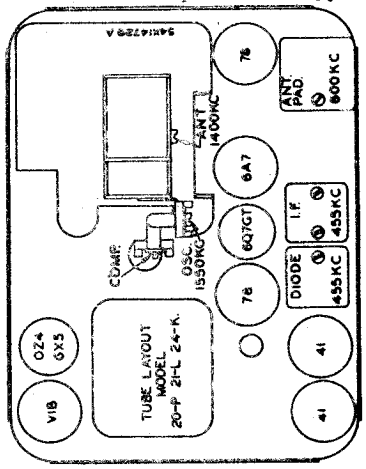


FIGURE 1. TRIMMERS

### R. F. ALIGNMENT

1. Change to 40 MMF condenser in signal generator lead. Set signal generator at 1550 K.C. and with the condenser gang still completely out of mesh, adjust the oscillator trimmer to the point showing the highest output reading.

2. Set the signal generator at 1400 K.C. and turn the condenser gang to the signal at 1400 K.C. Adjust the antenna trimmer on the condenser gang to the point showing the highest output reading.

3. Set the signal generator at 600 K.C. and rock the pointer at the 600 K.C. position on the dial scale, while adjusting the antenna padder, until a combination is found which gives highest output reading.

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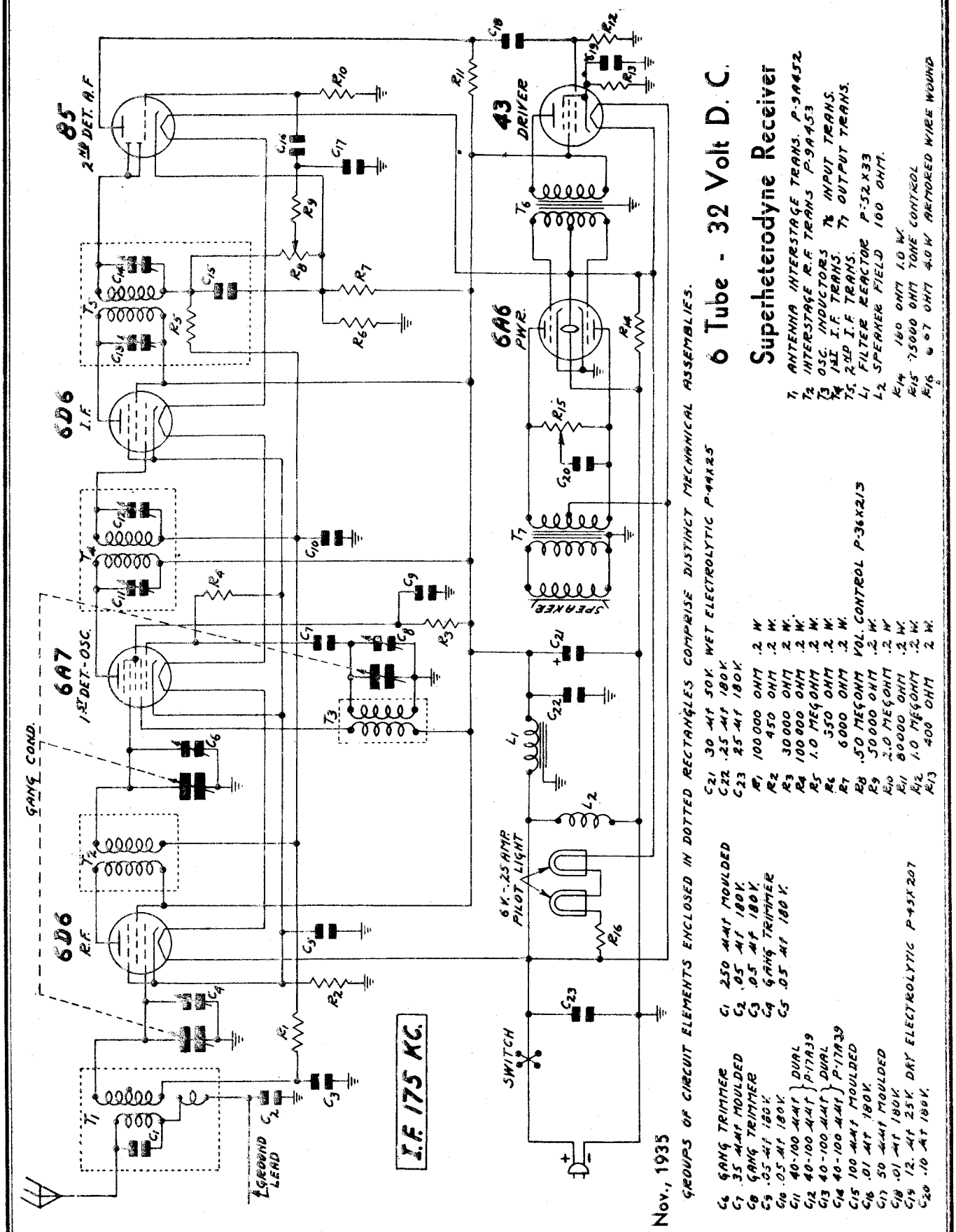
# GAMBLE SKOGMO, INC.

MODEL 6D
Schematic




## 6 Tube - 32 Volt D. C.

## Superheterodyne Receiver

T1 ANTENNA INTERSTAGE TRANS. P-94452
T2 INTERSTAGE R.F. TRANS P-94453
T3 OSC. INDUCTORS
T4 1ST I.F. TRANS.
T5, 2ND I.F. TRANS.
L1 FILTER REACTOR P-52X33
L2 SPEAKER FIELD 100 OHM.

T6 INPUT TRANS.
T7 OUTPUT TRANS.

R14 160 OHM 1.0 W.
R15 75000 OHM TONE CONTROL
R16 @ 67 OHM 4.0 W. ARMORED WIRE WOUND

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

C1 250 MMF MOULDED
C2 .05 MF 180 V.
C3 .05 MF 180 V.
C4 GANG TRIMMER
C5 .05 MF 180 V.
C6 GANG TRIMMER
C7 .35 MMF MOULDED
C8 GANG TRIMMER
C9 .05 MF 180 V.
C10 .05 MF 180 V.
C11 40-100 MMF } DUAL P-17A39
C12 40-100 MMF }
C13 40-100 MMF } DUAL P-17A39
C14 40-100 MMF }
C15 100 MMF MOULDED
C16 .01 MF 180 V.
C17 50 MMF MOULDED
C18 .01 MF 180 V.
C19 12. MF 25 V. DRY ELECTROLYTIC P-45X207
C20 .10 MF 180 V.
C21 30 MF 50 V. WET ELECTROLYTIC P-44X25
C22 .25 MF 180 V.
C23 25 MF 180 V.

R1 100 000 OHM .2 W.
R2 450 OHM .2 W.
R3 30 000 OHM .2 W.
R4 100 000 OHM .2 W.
R5 1.0 MEGOHM .2 W.
R6 350 OHM .2 W.
R7 6000 OHM .2 W.
R8 .50 MEGOHM VOL. CONTROL P-36X213
R9 50 000 OHM .2 W.
R10 2.0 MEGOHM .2 W.
R11 80000 OHM .2 W.
R12 1.0 MEGOHM .2 W.
R13 400 OHM 2 W.

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MODEL 6D
Alignment, Voltage
Trimmers, Voltage

# GAMBLE SKOGMO, INC.

## SPECIFICATIONS

Socket
Resistance
Coil Data

**Power Consumption - 1.2 Amperes at 32 Volts DC**
**Power Output - - - - - .25 Watts Undistorted**
**Selectivity - - 29 KC Broad at 1000 times Signal**
**Sensitivity - - - - - 10 Microvolts Absolute**

**Tuning Range - - - - - - - 530 to 1750 KC**
**Intermediate Frequency - - - - - - - 175 KC**
**Speaker - - - - - - - - - - 6" Dynamic**

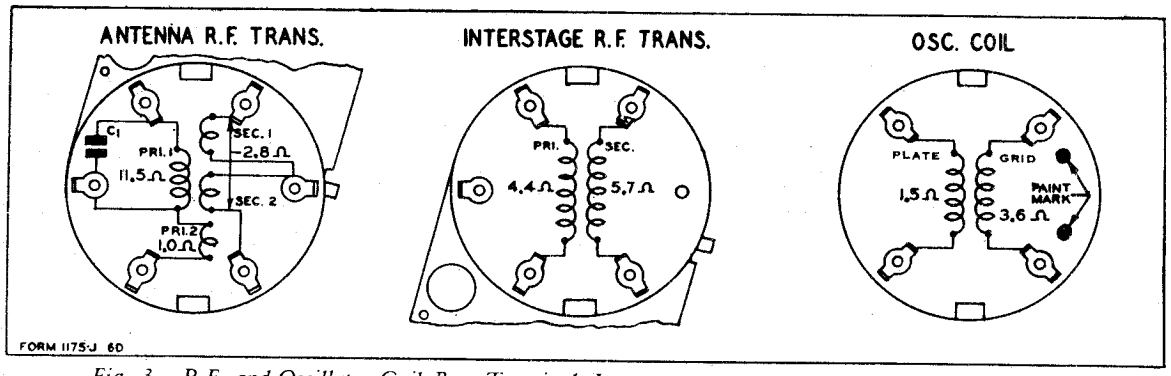


*Fig. 3—R.F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings*

## D. C. Resistance of Windings

### Refer to Fig. 3

**Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.**

| Part No. | Winding | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| P-9A452 | Antenna R.F. Transformer | T1 | |
| | Primary No. 1 | | 11.5 |
| | Primary No. 2 | | 1.0 |
| | Secondary Windings in Series | | 2.8 |
| P-9A453 | Interstage R.F. Transformer | T2 | |
| | Primary Winding | | 4.4 |
| | Secondary Winding | | 5.7 |
| P-9A454 | Oscillator Coil | T3 | |
| | Grid Coil | | 3.6 |
| | Plate Coil | | 1.5 |
| P-9A455 | 1st I.F. Transformer | T4 | |
| | Primary Winding | | 102.0 |
| | Secondary Winding | | 99. |
| P-9A456 | 2nd I.F. Transformer | T5 | |
| | Primary Winding | | 101. |
| | Secondary Winding | | 102. |
| P-50X22 | Audio Input Transformer | T6 | |
| | Primary Winding | | 380. |
| | Secondary Winding | | |
| | Center Tap to Inside | | 85. |
| | Center Tap to Outside | | 95. |
| P-12A219 | Dynamic Speaker | | |
| | Speaker Field | L2 | 100. |
| | Speaker Voice Coil | | 3.1 |
| | Audio Output Transformer (51X23) | T7 | |
| | Primary Winding | | |
| | Center Tap to Inside | | 152. |
| | Center Tap to Outside | | 176. |
| | Secondary Winding | | 1.4 |
| P-52X33 | Filter Choke | L1 | 50. |

### I. F. Adjustment 175 KC.

Connect the output lead of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

### 1750 KC Adjustment

Connect the antenna lead of the signal generator to the antenna lead of the receiver through a 200 mmf. condenser. Adjust the trimmer of the oscillator section

### 1500 KC Adjustment

Loosen the pointer screw and set the pointer at the 1500 KC mark on the dial scale. Retighten the pointer screw.

Adjust the 1st detector and antenna trimmers for maximum output.

**VOLTAGES AT SOCKETS**
**Volume Control at Maximum —**
**Antenna Connected to Ground LEAD**

| Type of Tube | Function | Across Heater | Plate to Ground | Screen to Ground | Cathode to Ground | Normal Plate MA. |
|---|---|---|---|---|---|---|
| 6D6 | R.F. | 6.4 | 81 | 31 | 2 | 1.5 |
| 6A7 | 1st Det. & Osc. | 6.4 | 31<br>31(1) | 18 | 2 | .2<br>.65(1) |
| 6D6 | I.F. | 6.4 | 31 | 31 | 2 | 1.5 |
| 85 | 2nd Det. | 6.4 | 12.5 | | 1.8 | .20 |
| 43 | 1st Audio | 25.6 | 28 | 31 | 3.5 | 7. |
| 6A6 | Output | 6.4 | 31 | | 0 | 11 (per plate) |

(1) Anode Grid

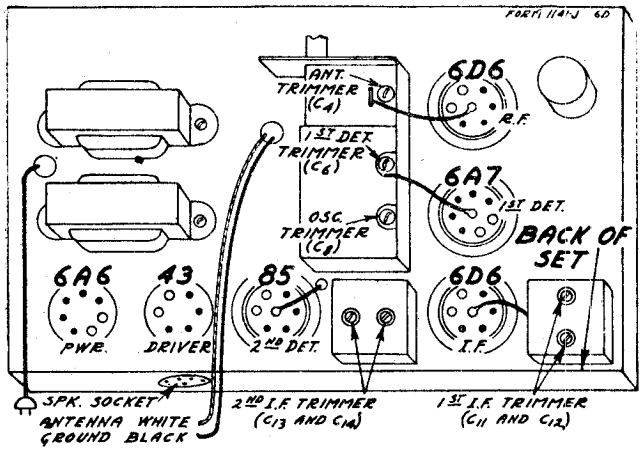


*Fig. 4—Tube Arrangement*

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GAMBLE-SKOGMO, INC.

MODEL 15C6
Schematic
Voltage, Data

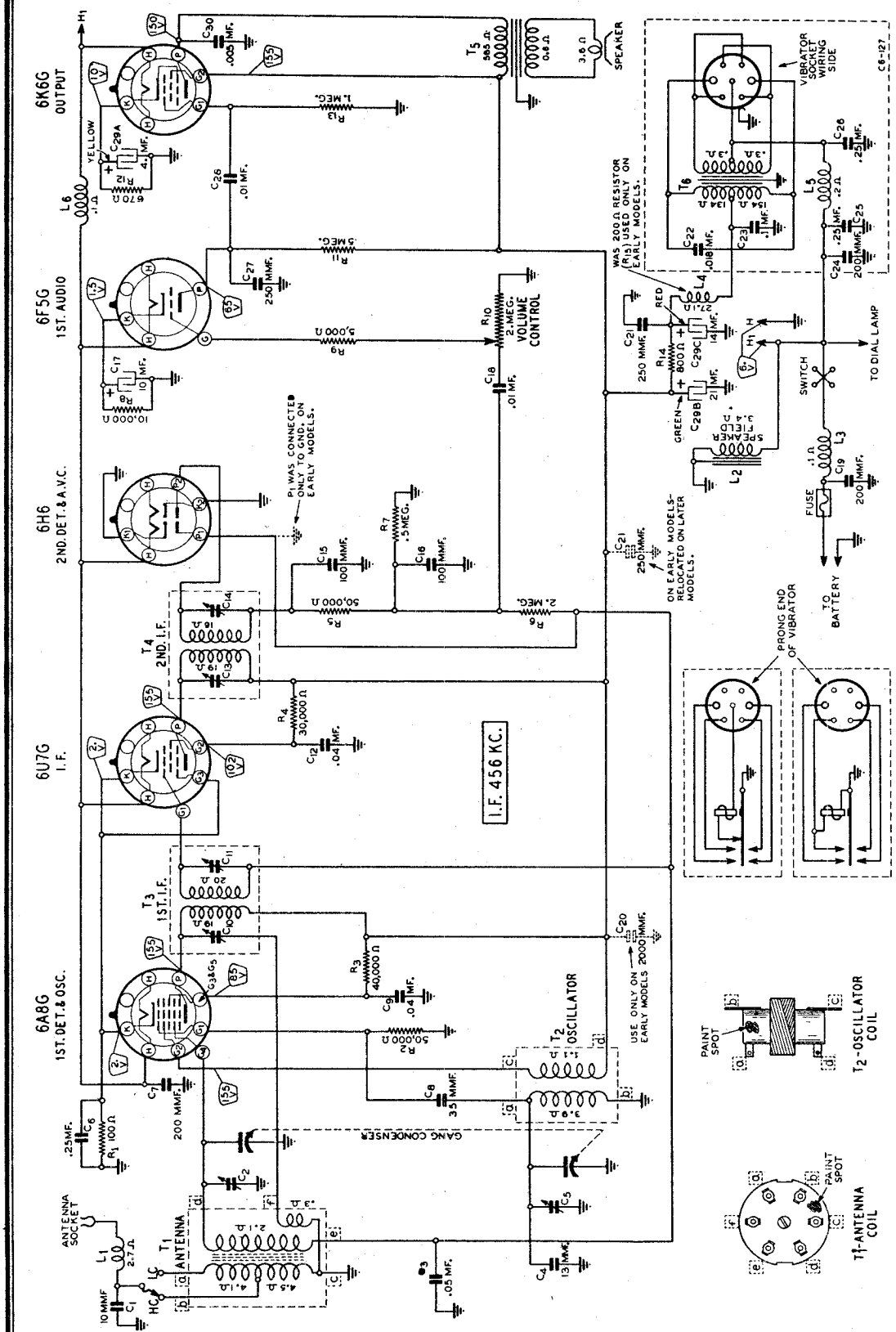


*Fig. 1—Schematic Circuit Diagram*

**15C6**

**APRIL, 1938**

| | |
|---|---|
| Tuning Frequency Range | 528 to 1550 KC |
| Intermediate Frequency | 456 KC |
| Speaker | 6" Dynamic |
| Power Consumption | 5.5 Amperes at 6.3 Volts |
| Power Output | .8 Watt Undistorted |
| Sensitivity | 10 Microvolts at .5 Watt Output |
| Selectivity | 42.5 KC Broad at 1000 Times Signal |

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MODEL 15C6
Alignment, Drive Data
Changes, Notes, Socket

# GAMBLE SKOGMO, INC.

## Alignment Procedure

Remove the bottom and front chassis covers. Directions for removing the bottom cover are in the instruction book.

To remove the front cover, first pull the knobs and buttons off the shafts. Remove the 2 screws at the top and the 2 screws at the sides of the front cover. Press in the sides of the chassis case to release the lugs at the sides of the front cover. Pull outward on the bottom of the front cover and then push the cover up until the lugs at the top are released.

Do not remove the back of the chassis case. This back can be taken off of the No. 2 and later issue sets.

Set the signal generator for 456 KC and connect the output of the signal generator through a .05 mf. condenser to the control grid of the 1st Detector. Connect the ground lead of the signal generator to the chassis. Set the volume control at maximum. Attenuate the signal from the signal generator to prevent the leveling off action of the AVC.

Then adjust the 4 I.F. trimmers until maximum output is obtained. These trimmers can be reached through the 4 holes in the back wall of the chassis case. It will be necessary to pull out the fiber insulating sheet a slight amount.

Insert the antenna cable plug in the antenna socket on the chassis.

**Rotating Pointer Models**—If the antenna is connected at the HC terminal and the entire 60-inch shielded cable (70 mmf.) is being used, connect the antenna wire at the other end through a 120 mmf. condenser to the antenna post of the signal generator.

If the antenna is connected at the LC terminal, the antenna cable has been cut as explained in the instructions. If cut in half (30-inch length), the capacity of the antenna cable is approximately 35 mmf. Connect the antenna wire, in this case, through a 25 mmf. condenser to the antenna post of the signal generator.

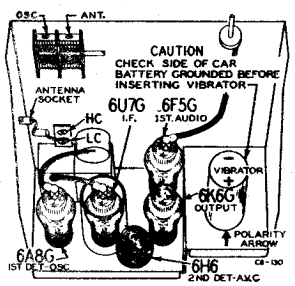


*Fig. 4—Location of Tubes*

**Sliding Pointer Models**—If the antenna is connected at the HC terminal and the 60-inch shielded cable (70 mmf.) is being used, connect the antenna wire at the other end through a 230 mmf. condenser to the antenna post of the signal generator.

If the antenna is connected at the LC terminal and the short shielded cable (19 mmf.) is being used, connect the antenna wire, in this case, through a 20 mmf. condenser to the antenna post of the signal generator. If the long cable has been cut to length and is being used, the total capacity of the cable and the series condenser should be 38 to 40 mmf.

**Both Models**—Set the signal generator for 1550 KC. Turn the rotor of the tuning condenser to the full open position. Adjust the trimmer of the oscillator section of the gang condenser until maximum output is obtained. See Fig. 4 for location of this trimmer.

Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the trimmer of the antenna section of the gang condenser for maximum output.

**Calibration—Rotating Pointer Models**—To obtain dial scale calibration, tune in an 800 KC signal. Hold the tuning shaft and turn the pointer disc until the pointer is at the correct position when the chassis front cover is put back in place.

**Calibration—Sliding Pointer Models**—The pointer assembly is clamped to the drive cord and it is seldom necessary to reset it to obtain proper dial calibration. If re-calibration is required, loosen the clamps with a screw driver, bringing the pointer assembly first down to one end of the dial scale and then down to the other end. Tune in a signal of known frequency near one end of the dial scale. Move the pointer assembly to this frequency on the scale and tighten the clamps with long nose pliers.

## Drive Cord Replacement—Rotating Pointer Models

Tie a knot with a small loop at one end of the new drive cord. The free end of the drive cord is tied to the tension spring. The distance between knots should be 23⅛ inches.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2 (Shown with gang condenser half open). Bring the cord up through the slot in the drum rim and wind one-half turn to the rear (from front of chassis) around the drive drum. Pass cord around the pulley B as shown. Wind one turn clockwise (from front of chassis) around pointer disc pulley C. Loop cord through the notches on the outside rim of the pointer disc pulley as shown. Wind 2½ turns clockwise, progressing from a point midway between the bracket arms toward the chassis, on tuning control shaft D. Bring cord to the left under pointer disc pulley C and around pulley E as shown. Pass cord to top of drive drum A and wind one turn to the rear around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum rim. Place free end of spring over the hook on the condenser drive drum.

**Setting Pointer Disc**—Tune in an 800 KC signal. Hold the tuning shaft and turn the pointer disc until the pointer is at the correct position when the chassis front cover is put back in place.

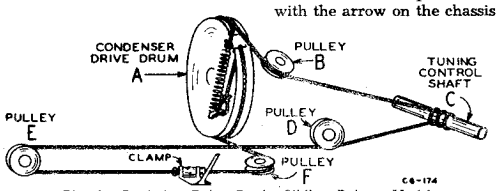


*Fig. 3—Replacing Drive Cord—Sliding Pointer Models*

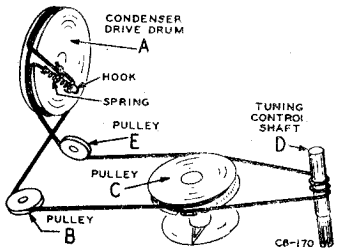


*Fig. 2—Replacing Drive Cord—Rotating Pointer Models*

## Drive Cord Replacement—Sliding Pointer Models

Remove the celluloid dial scale. Open the clamps on the back of the dial pointer in order to remove the old drive cord.

It is not necessary to remove the dial and drive bracket assembly in order to replace the drive cord.

Tie a knot with a small loop at one end of the new drive cord. Slide a ½ inch length of fabric tubing on the cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 28⅝ inches.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 3. Bring the cord up through the slot in the drum rim.

Turn the drive drum to the position shown in Fig. 3.

Wind one turn down and around drive drum A and around pulley B as shown. Wind 3½ turns on tuning control shaft C, progressing from a point midway between the two bracket arms toward the chassis. Bring cord under pulley D and around pulleys E and F as shown. See that the fabric tubing is now between pulleys E and F. Bring the drive cord to the rear around drive drum A and through the slot in the drum rim as shown.

Turn the gang condenser to full open position and place the free end of the tension spring over the hook on drive drum A.

**Dial Pointer Adjustment**—Mount the celluloid dial scale on the dial bracket. Tune in a signal of known frequency near one end of the dial scale. Move the pointer assembly to this frequency on the dial scale and tighten the clamps with long nose pliers.

## Inserting Vibrator Unit

**IMPORTANT**—The vibrator unit can be inserted in two ways. The proper method of insertion will depend on which terminal of the car battery is grounded. If the POSITIVE (+) terminal of the car battery is grounded, line up the + mark on the top of the vibrator with the arrow on the chassis base. If the NEGATIVE (—) terminal of the car battery is grounded, line up the — mark on the top of the vibrator with the arrow on the chassis base.

## Antenna Capacity

**Rotating Pointer Models**—The antenna coil is designed for car antennas with a capacity of 190 mmf. for the HC connection and 60 mmf. for the LC connection. This capacity is the total capacity of the antenna and the shielded lead.

Complete information regarding car antenna installation will be found in the instruction book packed with the radio.

**Sliding Pointer Models**—The information for this type of radio is the same as above except that the HC capacity is 300 mmf. and the LC capacity is 38 mmf.

## Two Models

One model has a rectangular dial scale with a sliding pointer.

The other model has a circular dial scale with a rotating pointer disc.

The 2 models also differ in the capacities of the antennas which may be used. The values are shown in article "Antenna Capacity."

## Issue No. 1

Mechanical Assembly—The 2 front mounting studs are attached to the top of the chassis case.

The I.F. coil cans have a spring clip by means of which they are secured to the chassis.

The back of the chassis case is not removable.

Electrical Assembly—See electrical changes under "Issue No. 2."

## Issue No. 2

Mechanical Changes—The chassis case is supplied with a front mounting bracket and this bracket is secured to the instrument panel of the car by means of 2 seperate bolts.

The I.F. cans use a threaded spade lug which extends through the chassis base and is secured in place with nuts and lock washers.

The back of the chassis case can be removed.

Electrical Changes—The following changes are all illustrated in the schematic—Fig. 1.

The 6H6 tube plate No. 1, which was connected originally to ground is removed from ground and connected as shown in the schematic.

Condenser C20 is removed.

The position of condenser C21 is changed as shown.

Resistor R15 (200 ohms) is removed and replaced by choke L4.

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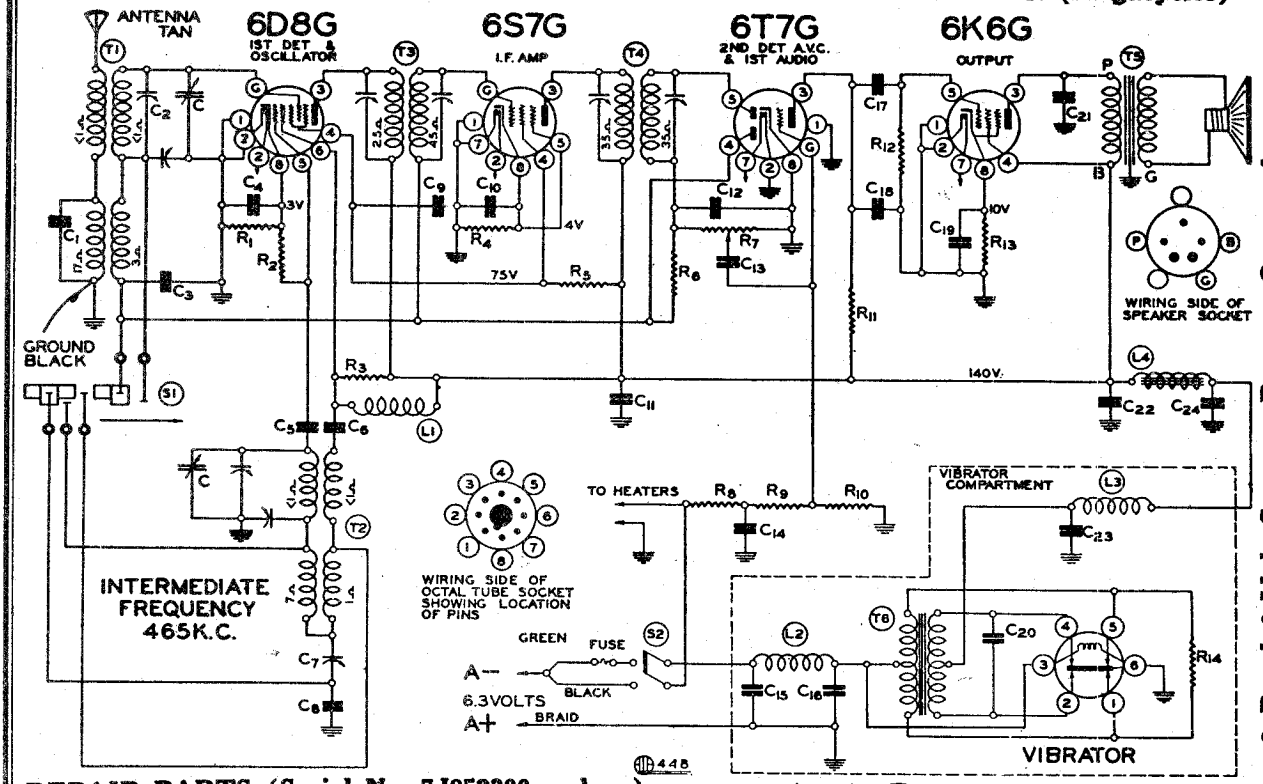
Trimmers, Voltage

MODEL 489
Schematic, Socket

GAMBLE-SKOGMO, INC.

| BAND | DIAL SCALE | FREQUENCY RANGE |
|---|---|---|
| Broadcast | Upper | 535 to 1720 K.C. (Kilocycles) |
| Short Wave | Lower | 5.5 to 18.1 M.C. (Megacycles) |




2 Band 6-Volt Storage Battery Operated Superheterodyne Receiver

# MODEL 489

## REPAIR PARTS (Serial No. 7J852300 and up)

| No. | Part No. | Description |
|---|---|---|
| | | RESISTORS |
| R1 | 130-54 | 500 ohm - 1/3 w. |
| R2 | 130-12 | 50M ohm - 1/3 w. |
| R3 | 130-12 | 50M ohm - 1/3 w. |
| R4 | 130-26 | 1000 ohm - 1/3 w. |
| R5 | 130-149 | 15M ohm - 1/3 w. |
| R6 | 130-4 | 3 megohm - 1/3 w. |
| R7 | 101-91 | 1 meg volume control |
| R8 | 130-191 | 1.5 megohm - 1/3 w. |
| R9 | 130-4 | 3 megohm - 1/3 w. |
| R11 | 130-9 | 200M ohm - 1/3 w. |
| R12 | 130-3 | 500M ohm - 1/3 w. |
| R13 | 130-153 | 700 ohm - 1/3 w. |
| R14 | 130-84 | 200 ohm - 1/3 w. |
| R10 | 130-191 | 1.5 meg - 1/3 w. |
| | | CONDENSERS |
| C | 102-43 | 2 gang variable |
| C1 | 129-5 | .0001 Mica |
| C2 | 124-39B | Adj. Cond. 2-25 mmf. |
| C3 | 100-22 | .05 x 200 |
| C4 | 100-20 | .1 x 200 |
| C5 | 129-39 | .00005 Mica |
| C6 | 100-25 | .002 x 600 |
| C7 | 124-38 | Series pad 600 mmf. W. C. |
| C8 | 129-54 | .003 Mica |
| C9 | 100-20 | .1 x 200 |
| C10 | 100-20 | .1 x 200 |
| C11 | 100-11 | .01 x 400 |
| C12 | 129-5 | .0001 Mica |
| C13 | 100-11 | .01 x 400 |
| C14 | 100-11 | .01 x 400 |
| C15 | 100-40 | .5 x 200 |
| C16 | 100-40 | .5 x 200 |
| C17 | 100-26 | .02 x 400 |
| C18 | 129-2 | .0005 Mica |
| C19 | 119-22 | 10.0 mfd. 25 v. lytic |
| C20 | 100-34 | .005 x 1200 |
| C21 | 100-19 | .006 x 600 |
| C22 | 119-28B | 5.0 mfd. lytic |
| C23 | 100-20 | .1 x 200 |
| C24 | 119-28B | 5.0 mfd. lytic<br>C22 C24 in same unit |
| | | PARTS |
| T1 | 111-83 | Antenna coil complete |
| T2 | 110-66B | Oscillator coil complete |
| T3 | 108-105B | Input I.F. complete 465 kc. |
| T4 | 108-106B | Output I.F. complete 465 kc. |
| T5 | 114-96 | 6" speaker (P.M.) |
| T6 | 104-62E | Power Transformer |
| L1 | 123-4 | R. F. "B" Choke |
| L2 | 105-19 | A Choke |
| L3 | 123-3 | R. F. "B" Choke |
| L4 | 105-30E | "B" Filter Choke (400 ohms) |
| S1 | 125-39 | Wave Band Switch |
| S2 | | Switch on volume control |

## BATTERY CONNECTIONS:

Referring to Fig. 1, connect the battery cable to the storage battery in the following manner:

(a) The storage battery should be located as far from the receiver as the battery cable will permit.

(b) Connect the lead (containing the fuse receptacle) marked A negative ( — ) to the negative ( — ) post of the storage battery.

(c) Connect the lead marked A positive ( + ) to the positive ( + ) post of the storage battery.

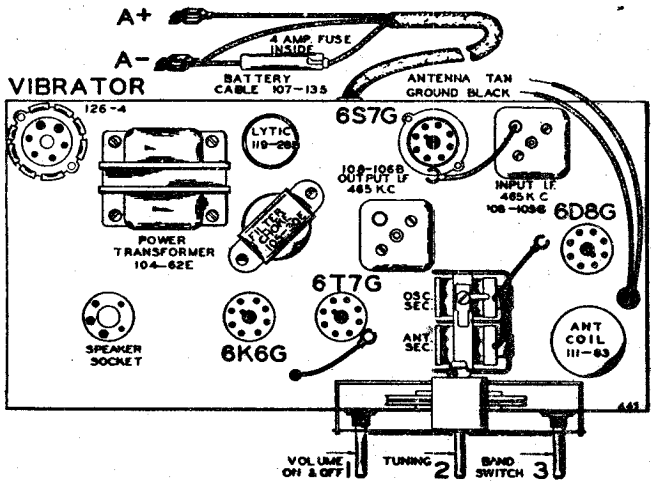



FIG. 1—TOP VIEW

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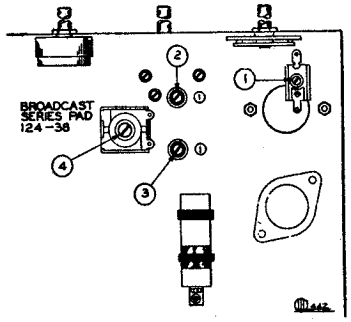
## MODEL 489




**SERVICE NOTES:**

Voltages taken from different points of circuit to chassis are measured with volume control full on all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

---

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

**ALIGNING INSTRUCTIONS:**

CAUTION: No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as defective tubes, poor installations, open or ground antenna systems, defective condensers and resistors

In order to properly align this chassis, an oscillator (generator) is necessary.

All adjustments should be made with a non-metallic screw driver.

**RESONANCE INDICATOR:**

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 6K6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

**DUMMY ANTENNAS:**

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

**ALIGNING I.F. TRANSFORMERS: (465 K. C.):**

Part No. 108-106B Output I.F. Transformer
Part No. 108-105B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-106B) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-105B) to resonance.

**SHORT WAVE BAND ALIGNMENT:**
**5.5 to 18.1 Megacycles**

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer to resonance.
   This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).
   (b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

**BROADCAST BAND ALIGNMENT:**
**535 to 1720 Kilocycles**

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

## MODEL 761A

**DUMMY ANTENNAS:**

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

**ALIGNING I.F. TRANSFORMERS: (465 K.C.):**

Part No. 108-106E Output I.F. Transformer
Part No. 108-105 Input I.F. Transformer

These I. F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view, Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106E) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8 and adjust input I.F. transformer (No. 108-105) to resonance.

**BROADCAST BAND ALIGNMENT:**
**540 to 1750 Kilocycles**

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1750 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment E'; see top view, Fig. 1).
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment A') to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (Adjustment F') to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained.
   (d) Repeat adjustments "a" and "c" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

**SHORT WAVE BAND ALIGNMENT:**
**5.5 to 18.1 Megacycles**

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment G') and short wave antenna (Adjustment C') to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.5 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 17 megacycle signal appears near 16.1 megacycles.

**MIDDLE WAVE BAND ALIGNMENT:**
**1730 to 5800 Kilocycles**

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment D') and middle wave antenna (Adjustment B') to resonance.
   (b) Re-set external oscillator to 1900 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-check broadcast band alignment.

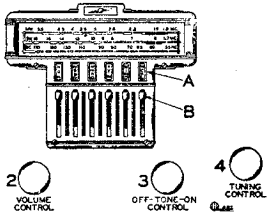



**FIG. 2—FRONT VIEW**

**PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:**

There are six levers on the dial by means of which six stations may be selected, (See "B", Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including 6.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs, (See "A" Fig. 2). Any order of grouping may be used, however, it is recommended that the left hand three automatic levers be used for high frequency stations (1750 to 1000 K.C.) and the right hand three automatic levers for low frequency stations (1000 to 540 K.C.).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 4) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Rotate the tuning knob (No. 4) to the right (clockwise) as far as it will turn. Now remove from the right side of the cabinet the metal button, and, with a screw driver inserted through the hole, tighten the locking adjustment screw "C". It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

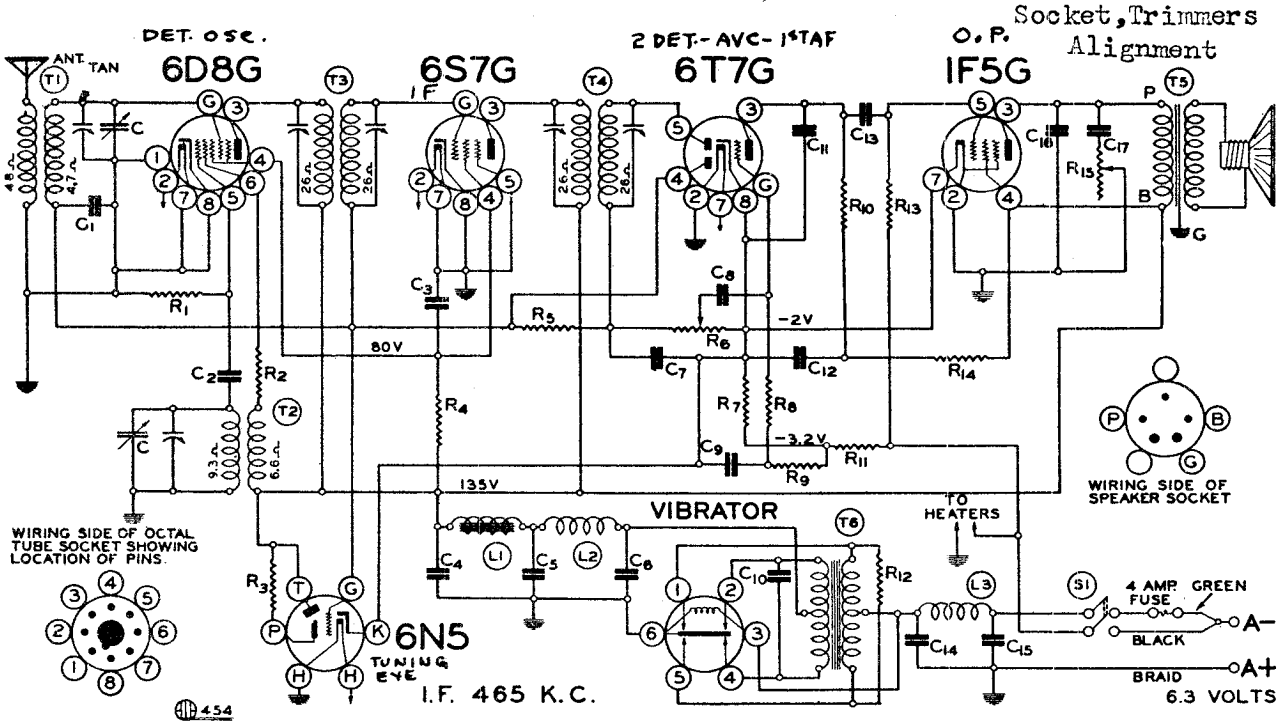
If you should desire to change any station you selected to another, loosen the locking screw "C" four or five complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the locking screw being too tight. Loosen the locking screw "C" until the dial mechanism works freely with the tuner lever pressed down.)

BE SURE TO RETIGHTEN the LOCKING SCREW; otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and—Presto!—your favorite station is selected.

# GAMBLE SKOGMO, INC.

MODEL 504
Schematic, Voltage, Socket, Trimmers Alignment




CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME V111

Sensitivity Check at
600 KC and 1000 KC

IF ALIGNMENT

ADJ. at 465 KC thru .1 mf cond.

RF ALIGNMENT

THRU 200 mmf cond. :
Adj. osc. trim. at 1720 KC -
Adj. Ant. trim. at 1400 KC -

**Frequency Range — 535-1720 Kilocycles**

**REPAIR PARTS (Serial No. 7J852900 and up)**

| No. | Part No. | Description |
|---|---|---|
| | | RESISTORS |
| R1 | 130-76 | 30M ohm - 1/3 w. |
| R2 | 130-23 | 2M ohm - 1/3 w. |
| R3 | 130-186 | 250M ohm - 1/10 w. - in tuning indicator |
| R4 | 130-123 | 15M ohm - 1/2 w. |
| R5 | 130-121 | 3.2 megohm - 1/3 w. |
| R6 | 101-56 | 1 megohm volume control |
| R7 | 106-36 | 10 ohms - resistor strip |
| R8 | 130-19 | 1 megohm - 1/3 w. |
| R9 | 130-19 | 1 megohm - 1/3 w. |
| R10 | 130-100 | 150M ohm - 1/3 w. |
| R11 | 106-36 | 25 ohms - resistor strip |
| R12 | 130-84 | 200 ohms - 1/3 w. |
| R13 | 130-19 | 1 megohm - 1/3 w. |
| R14 | 130-20 | 100M ohm - tone control |
| R15 | 101-72 | 300M ohm - tone control R7 and R11 in same unit |
| | | CONDENSERS |
| C | 102-38 | 2 gang variable |
| C1 | 100-9 | .05 x 200 v. |
| C2 | 129-39 | .00005 Mica |
| C3 | 100-33 | .1 x 200 v. |
| C4 | 119-28 | 5.0 mfd. - 200 w. v. lytic |
| C5 | 119-28 | 5.0 mfd. - 200 w. v. lytic |
| C6 | 100-33 | .1 x 200 v. |
| C7 | 129-5 | .0001 Mica |
| C8 | 100-11 | .01 x 400 v. |
| C9 | 100-11 | .01 x 400 v. |
| C10 | 100-34 | .005 x 1200 v. |
| C11 | 129-12 | .00025 Mica |
| C12 | 100-33 | .1 x 200 v. |
| C13 | 100-11 | .01 x 400 v. |
| C14 | 100-40 | .5 x 200 v. |
| C15 | 100-40 | .5 x 200 v. |
| C16 | 100-37 | .003 x 600 v. |
| C17 | 100-11 | .01 x 400 v. C4 and C5 in same unit |
| | | PARTS |
| T1 | 111-66 | Antenna coil complete |
| T2 | 110-45 | Oscillator coil complete |
| T3 | 108-84 | Input I.F. coil complete - 465 kc. |
| T4 | 108-85 | Output I.F. coil complete - 465 kc. |
| T5 | 114-63 | P.M. Speaker |
| T6 | 104-62 | Power Transformer |
| L1 | 105-30 | Filter Choke |
| L2 | 123-3 | R. F. "B" Choke |
| L3 | 105-19 | "A" Choke |
| S1 | | Switch on volume control |
| | 126-4 | Vibrator |

**BATTERY CONNECTIONS:**

Referring to Fig. 1, connect the battery cable to the storage battery in the following manner:

(a) The storage battery should be located as far from the receiver as the battery cable will permit.

(b) Connect the lead (containing the fuse receptacle) marked A negative ( — ) to the negative ( — ) post of the storage battery.

(c) Connect the lead marked A positive ( + ) to the positive ( + ) post of the storage battery.

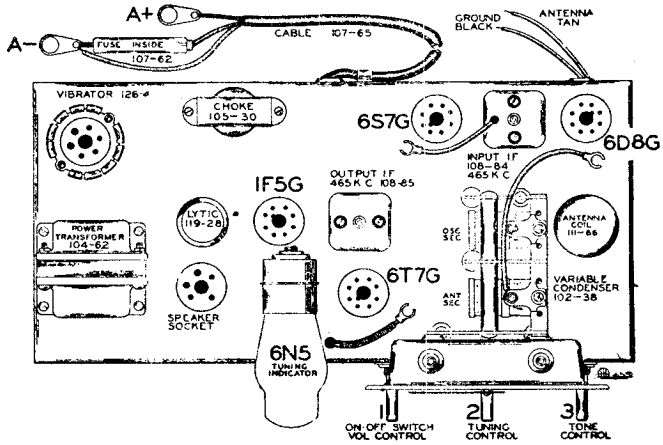



FIG. 1—TOP VIEW

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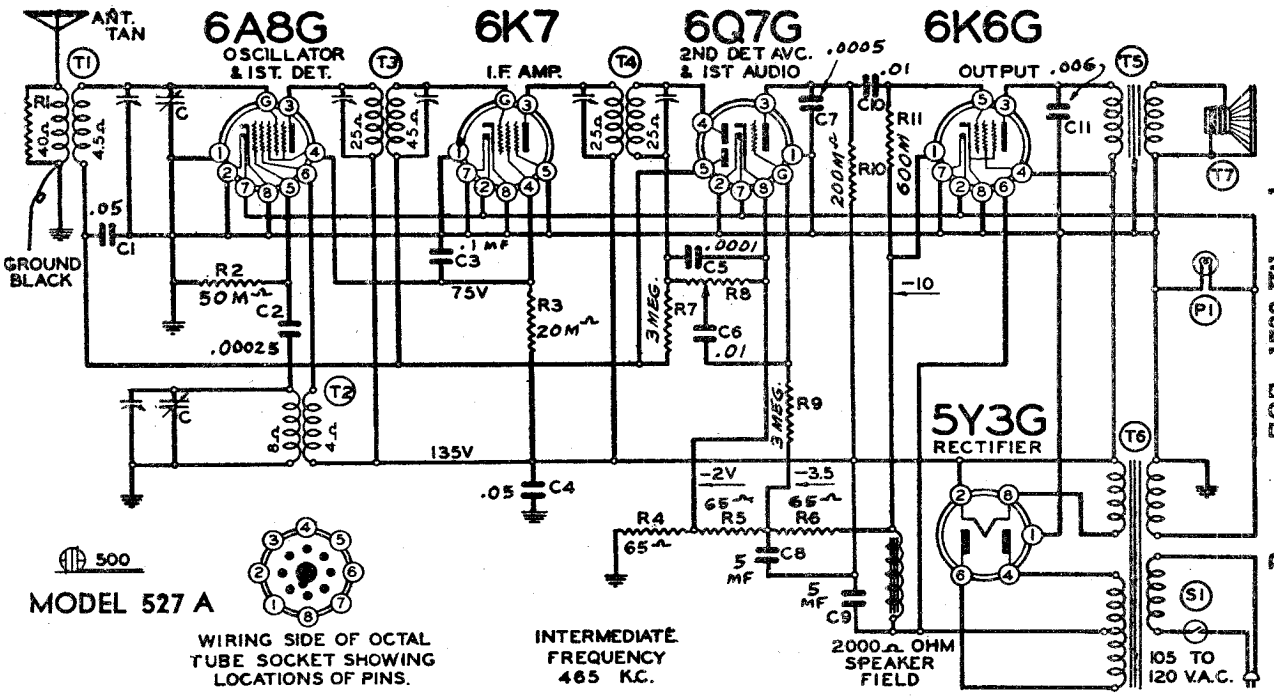
MODEL 527A
Schematic, Voltage, Alignment
Socket, Trimmers,

GAMBLE SKOGMO, INC.







WIRING SIDE OF OCTAL TUBE SOCKET SHOWING LOCATIONS OF PINS.

INTERMEDIATE FREQUENCY 465 K.C.

**ALIGNING I.F. TRANSFORMERS: (465 K.C.):**

Part No. 108-95B Output I.F. Transformer
Part No. 108-96 Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condensor, to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-95B) to resonance.
   (b) Move oscillator output clip from grid of 6K7 to grid of 6A8G and adjust input I.F. transformer (No. 108-96) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-95B) if necessary.

1. **R.F. ALIGNMENT: (535-1720 K.C.)**

1. With the gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mmf. condensor to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

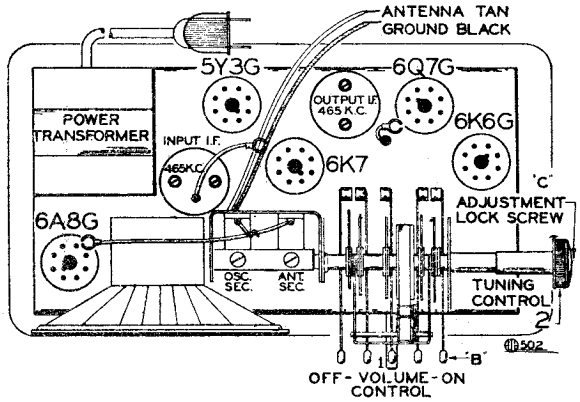



FIG. 1—TOP VIEW

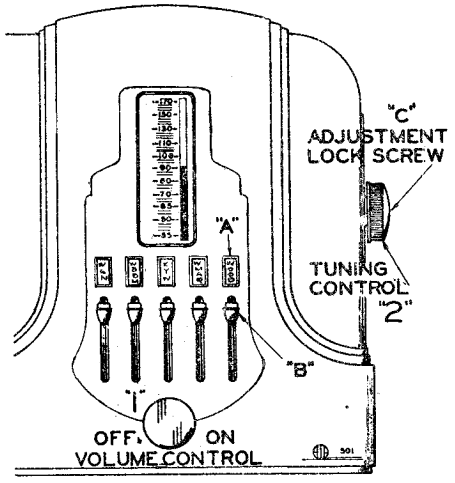



FIG. 2—FRONT VIEW

FOR TUNER PROCEDURE, SEE DATA ON MODEL 677A

**SERVICE NOTES:**

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 115 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

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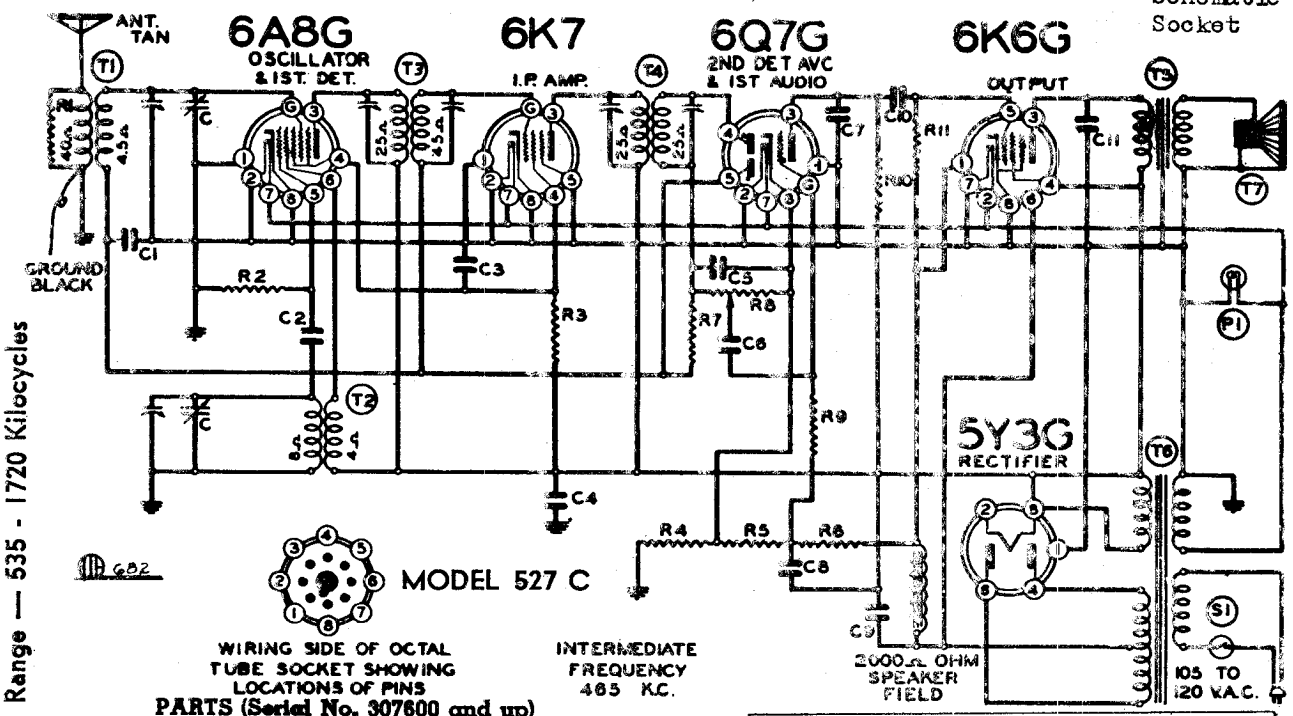
Voltage, Alignment

GAMBLE-SKOGMO, INC.

MODEL 527C
Schematic
Socket




MODEL 527 C



WIRING SIDE OF OCTAL TUBE SOCKET SHOWING LOCATIONS OF PINS

INTERMEDIATE FREQUENCY 465 K.C.

**PARTS (Serial No. 307600 and up)**

| Code No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 13021 | 20M ohm—½ w. |
| R2 | 13012 | 50M ohm—½ w. |
| R3 | 13021 | 20M ohm—½ w. |
| R4 | 10635 | Resistor Strip—65 ohm |
| R5 | 10635 | 45 ohm—resistor strip |
| R6 | 10635 | 220 ohm—resistor strip |
| R7 | 130170 | 3 megohm—½ w. |
| R8 | 101141 | 500M ohm volume control |
| R9 | 130170 | 3 megohm—½ w. |
| R10 | 1309 | 200M ohm—½ w. |
| R11 | 130118 | 600M ohm—½ w. |
| | | **CONDENSERS** |
| C | 10290 | 2 gang variable condenser |
| C1 | 1009 | .05 x 200 v. |
| C2 | 12912 | .00025 Mica |
| C3 | 1001 | .1 x 400 v. |
| C4 | 10013 | .05 x 400 v. |
| C5 | 1295 | .0001 Mica |
| C6 | 10011 | .01 x 400 v. |
| C7 | 1292 | .0005 Mica |
| C8 | 11947E | 5.0 mfd.—250 w. v. lytic |
| C9 | 11947E | 5.0 mfd.—250 w. v. lytic |
| C10 | 10011 | .01 x 400 v. |
| C11 | 10019 | .006 x 600 v. |
| | | **PARTS** |
| T1 | 11192 | Antenna coil complete |
| T2 | 11073 | Oscillator coil complete |
| T3 | 10896F | Input I. F.—465 kc. complete |
| T4 | 10895E | Output I. F.—465 kc. complete |
| T5 | 10555D | Output Transformer |
| T6 | 104149 | Power Transformer |
| T7 | 114113 | 5" Dynamic Speaker (2000 ohm Field) |
| S1 | | Off-on switch on volume control |
| P1 | 10794 | 6-8 v. pilot light |

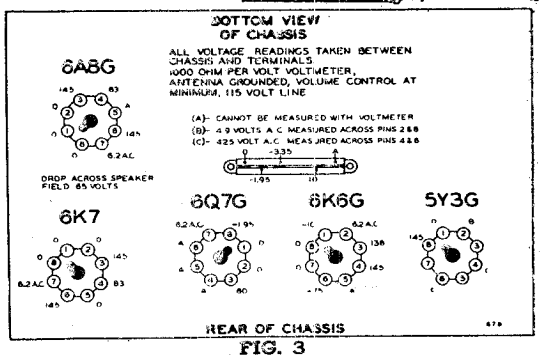

BOTTOM VIEW OF CHASSIS
ALL VOLTAGE READINGS TAKEN BETWEEN CHASSIS AND TERMINALS
1000 OHM PER VOLT VOLTMETER, ANTENNA GROUNDED, VOLUME CONTROL AT MINIMUM, 115 VOLT LINE
(A)- CANNOT BE MEASURED WITH VOLTMETER
(B)- 4.9 VOLTS A.C. MEASURED ACROSS PINS 2 & 8
(C)- 425 VOLT A.C. MEASURED ACROSS PINS 4 & 8
6A8G
DROP ACROSS SPEAKER FIELD 65 VOLTS
6K7
6Q7G
6K6G
5Y3G
REAR OF CHASSIS

FIG. 3

**TUBES:**

1—Type 6A8G Pentagrid Mixer, First Detector-oscillator.
1—Type 6K7 Remote Cut-off Pentode, I.F. Amplifier (465 K.C.)
1—Type 6Q7G Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type 6K6G Pentode Output Amplifier.
1—Type 5Y3G High Vacuum Rectifier.

**DESCRIPTION:**

The tube complement of this chassis consists of the following octal base glass and metal tubes.

The type and function of each tube is as follows:

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 100 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6A8G | Rotor full open (Plates out of mesh) | Four trimmers (See Fig. 1) | Input I. F. and Output I. F. | Adjust to maximum output |
| BROADCAST BAND | 1720 Kc. | 100 mmf. | Antenna Lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 100 mmf. | Antenna Lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Broadcast Antenna | Adjust to maximum output |

FREQUENCY RANGE 535 to 1720 K.C.

Power Consumption ..... 50 Watts
Power Output ..... .1 Watt Undistorted, 1.7 Watts Maximum
Intermediate Frequency ..... 465 K.C.

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# MODEL 587 - Series A

## DUMMY ANTENNAS:

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

## ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-76A Output I.F. Transformer
Part No. 108-75A Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-76A) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6A8 and adjust input I.F. transformer (No. 108-75A) to resonance.
   (c) With oscillator still connected to 6A8, readjust output I.F. transformer (108-76A) if necessary.

## BROADCAST AND SHORT WAVE BAND ALIGNMENT

**Broadcast Band:**—535 to 1720 Kilocycles.
**Short Wave Band:**—2280 to 6600 Kilocycles.

**Important:**—These adjustments must be made in the following order:

## SHORT WAVE OSCILLATOR ADJUSTMENT:

1. With band switch in the short wave band position, extreme right of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with the external oscillator connected in series with "Dummy 1" to grid cap of the 6A8 tube, make the following adjustment:
   (a) Set external oscillator to 6.6 megacycles and adjust short wave oscillator trimmer to resonance. This adjustment is marked "S.W. Osc." (see top view of chassis, Fig. 1, for location of this adjustment).

NOTE: Make certain that the fundamental 6.6 megacycles signal has been tuned in and not the image frequency, noting that the image appears when the tuning knob is moved to approximately 5.7 megacycles.

## BROADCAST BAND OSCILLATOR ADJUSTMENT:

1. With band switch in the broadcast position, extreme left of its rotation, and with the gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 1" to grid cap of the 6A8 tube, make the following adjustment:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. This adjustment is the trimmer mounted on the front section of the variable gang condenser.

## BROADCAST BAND ANTENNA ADJUSTMENT:

1. With the band switch still in the broadcast position, move the external oscillator from the grid cap of the 6A8 tube to the tan antenna lead and black ground lead, in series with "Dummy 2" and make the following adjustments:
   (a) Set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer to resonance. This adjustment is marked "B.C. Ant." (See top view of chassis, Fig. 1, for location of this adjustment.)
   (b) Re-set external oscillator to 600 K.C. and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until, by adjusting series pad, maximum output is attained. This adjustment is located on the top of the chassis directly in front of the antenna coil. (See top view of chassis, Fig. 1).
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

## SHORT WAVE BAND ANTENNA ADJUSTMENT:

1. With the band switch in the short wave position, and with external oscillator connected in series with "Dummy 3," to the tan antenna lead and black ground lead, make following adjustment:
   (a) Set external oscillator to 6 megacycles and adjust the short-wave antenna trimmer to resonance. This adjustment is the trimmer mounted on the rear section of the variable gang condenser.

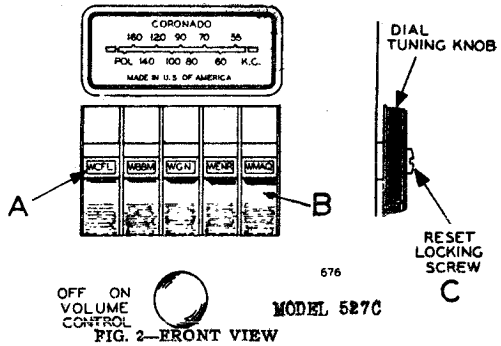



FIG. 2—FRONT VIEW

# MODEL 527C

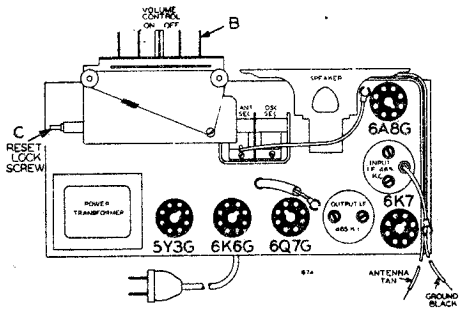



FIG. 1—TOP VIEW

## PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected, (See "B" Fig. 2)

Make a list of local stations you tune in regularly; any number up to and including five.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner button an opening is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner lever buttons. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab on this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever button. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab on this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

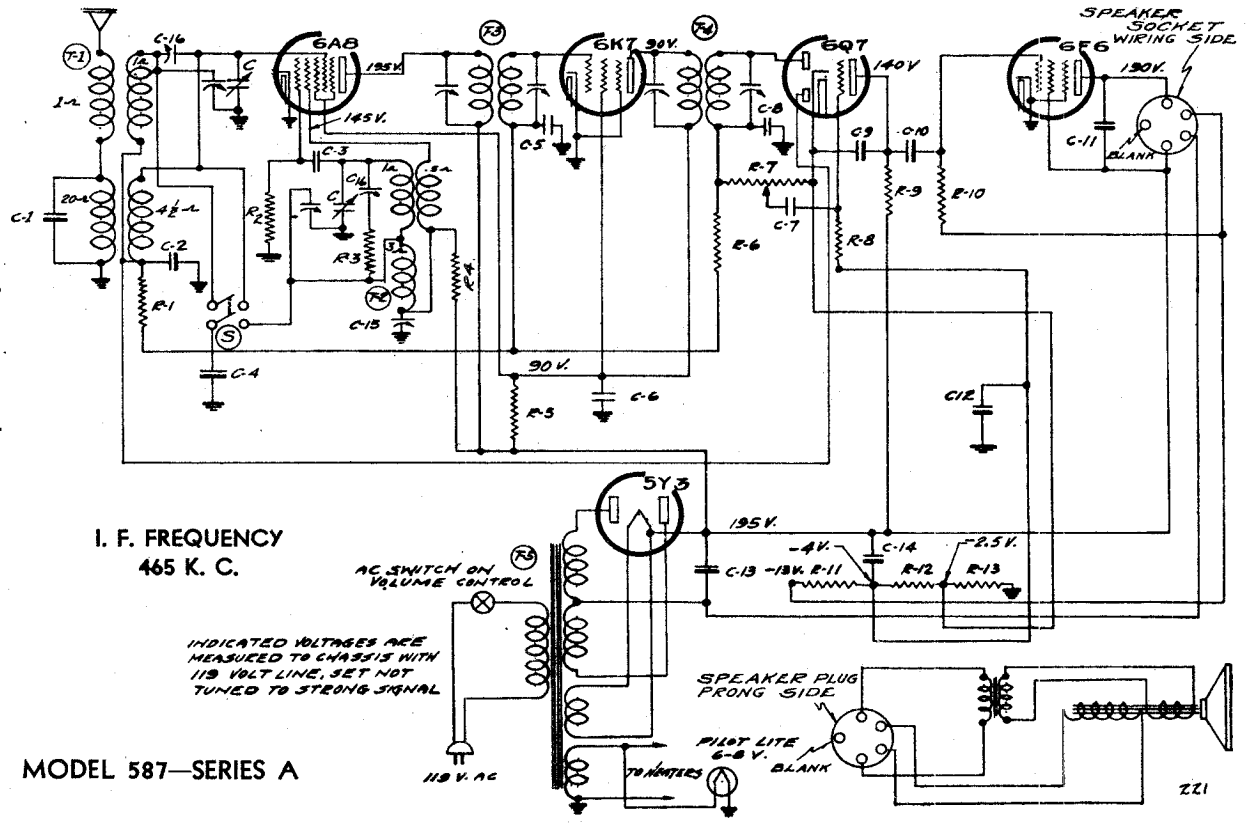
If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw "C" one or two turns; select the new station as explained. Be sure to retighten the locking screw, otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and—your favorite station is selected.

GAMBLE-SKOGMO, INC.

MODEL 587 Series A
Schematic, Voltage
Socket, Trimmers

2-Band A. C. Superheterodyne Receiver




**PARTS (Serial No. 6G310775 and up)**

**RESISTORS**

| No. | Part No. | | Description |
|---|---|---|---|
| R1 | 130-111 | 100M | Ohms 1/10W—20%—50V Carbon |
| R2 | 130-12 | 50M | Ohms 1/3 W—20%—20V Carbon |
| R3 | 130-112 | 100 | Ohms 1/10W—20%—10V Carbon |
| R4 | 130-22 | 5M | Ohms 1/3 W—20%—10V Carbon |
| R5 | 130-77 | 10M | Ohms 1 W—20%—100V Carbon |
| R6 | 130-110 | 1 meg | Ohm 1/10W—10%—100V Carbon |
| R7 | 101-49 | 1 meg | Ohm Volume Control |
| R8 | 130-113 | 2 meg | Ohm 1/10W—20%—100V Carbon |
| R9 | 130-20 | 100M | Ohms 1/3W—20%— 50V Carbon |
| R10 | 130-100 | 150M | Ohms 1/3W—20%— 50V Carbon |
| R11 | 106-26 | 220 | Ohms |
| R12 | 106-26 | 33 | Ohms |
| R13 | 106-26 | 52 | Ohms |

NOTE: R11, R12, and R13 in one unit—106-26

**CONDENSERS**

| | | |
|---|---|---|
| C1 | 129-63 | .0004 Mica—W—10% |
| C2 | 100-26 | .02 x 400 Volt—25% |
| C3 | 129-62 | .00003 Mica—0—10% |
| C4 | 129-61 | .0017 Mica—W—2½% |
| C5 | 100-9 | .05 x 200 Volt—25% |
| C6 | 100-6 | .25 x 200 Volt—25% |
| C7 | 100-11 | .01 x 400 Volt—25% |
| C8 | 129-12 | .00025 Mica—0—20% |
| C9 | 129-12 | .00025 Mica—0—20% |
| C10 | 100-11 | .01 x 400 Volt—25% |
| C11 | 100-19 | .006 x 600 Volt—25% |
| C12 | 100-6 | .25 x 200 Volt—25% |
| C13 | 103-6 | 8 mfd. x 350 Volt Electrolytic |
| C14 | 103-7 | 8 mfd. x 300 Volt Electrolytic |
| C15 | 124-29 | Adjustable condenser 390 mmf. working capacity |
| C16 | 124-30 | Adjustable Dual Condenser |

**TUNING RANGE—**

**Standard Broadcast Band**
**535-1720 Kilocycles.**

**Short Wave Band**
**2280-6600 Kilocycles**

**MISCELLANEOUS PARTS**

| | | |
|---|---|---|
| T1 | 111-56A | Antenna Coil |
| T2 | 110-44 | Oscillator Coil |
| T3 | 108-75A | Input I.F. 465 Kc. |
| T4 | 108-76A | Output I.F. 465 Kc. |
| T5 | 104-56 | Power Transformer—60 Cycles |
| S | 125-19 | Band Switch |
| C | 102-31 | One Section of Two Gang Condenser |

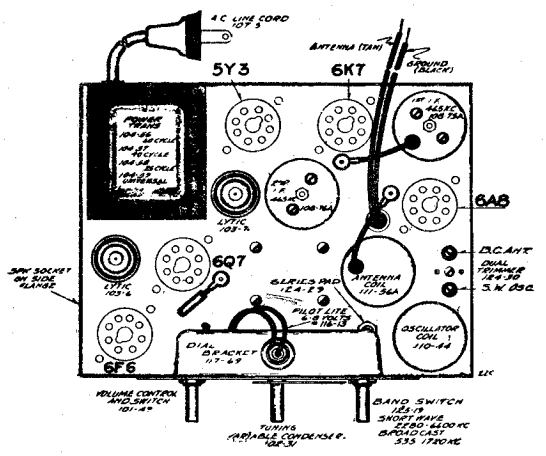



FIG. 1—TOP VIEW

## DESCRIPTION:

### TUBES:

The tube complement of this chassis consists of the following tubes.

The type and function of each tube is as follows:

1—Type 6A8 Pentagrid Mixer, First Detector-oscillator

1—Type 6K7 Remote Cut-Off Pentode, I. F. Amplifier (465 K.C.)

1—Type 6Q7-G Duplex Diode Triode Second Detector, A.V.C. and First Audio.

1—Type 6F6-G Pentode Output Amplifier.

1—Type 5Y3 High Vacuum Rectifier.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 108, 125, 150, 220 and 250 volts (see parts list) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

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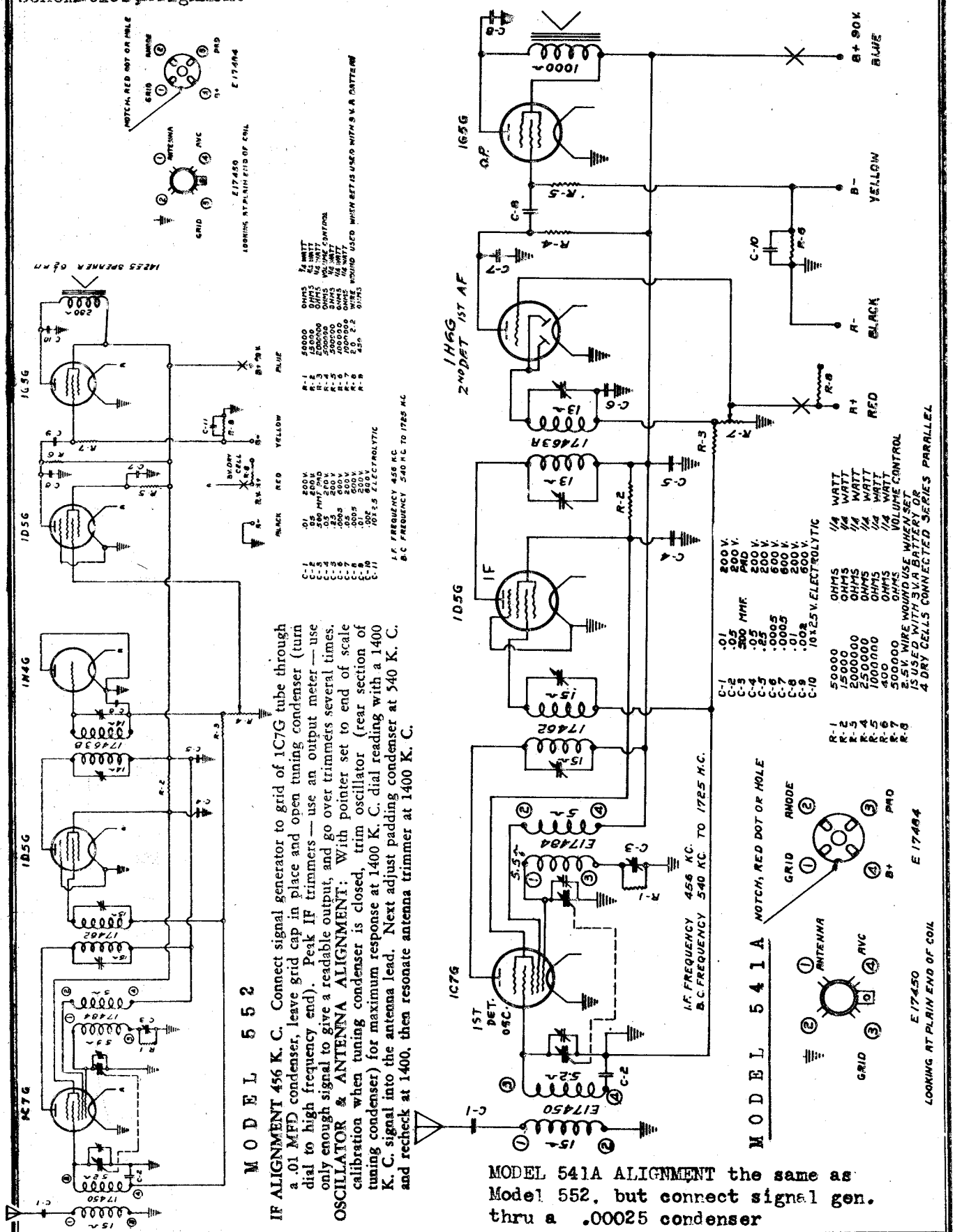
MODEL 541A
MODEL 552
Schematics, Alignment

# GAMBLE-SKOGMO, INC.




**MODEL 552**

**IF ALIGNMENT 456 K. C.** Connect signal generator to grid of 1C7G tube through a .01 MFD condenser, leave grid cap in place and open tuning condenser (turn dial to high frequency end). Peak IF trimmers — use an output meter — use only enough signal to give a readable output, and go over trimmers several times.

**OSCILLATOR & ANTENNA ALIGNMENT:** With pointer set to end of scale calibration when tuning condenser is closed, trim oscillator (rear section of tuning condenser) for maximum response at 1400 K. C. dial reading with a 1400 K. C. signal into the antenna lead. Next adjust padding condenser at 540 K. C. and recheck at 1400, then resonate antenna trimmer at 1400 K. C.

**MODEL 541A ALIGNMENT the same as Model 552, but connect signal gen. thru a .00025 condenser**

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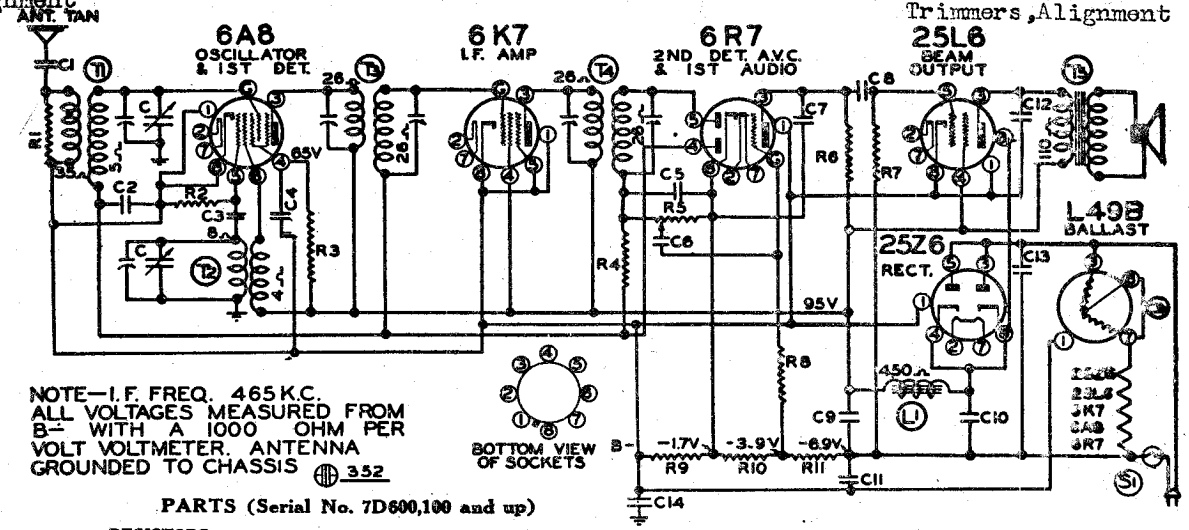
MODEL 602B
MODEL 602C
Alignment

# GAMBLE SKOGMO, INC.

MODEL 602
Schematic, Voltage, Socket
Trimmers, Alignment




NOTE—I.F. FREQ. 465 K.C.
ALL VOLTAGES MEASURED FROM B— WITH A 1000 OHM PER VOLT VOLTMETER. ANTENNA GROUNDED TO CHASSIS




**PARTS (Serial No. 7D600,100 and up)**

**RESISTORS**

| No. | Part No. | Description | |
|---|---|---|---|
| R1 | 130-17 | 10M ohm - 1/3 w. | 20% |
| R2 | 130-12 | 50M ohm - 1/3 w. | 20% |
| R3 | 130-149 | 15M ohm - 1/3 w. | 20% |
| R4 | 130-4 | 3 meg ohm - 1/3 w. | 20% |
| R5 | 101-77 | Volume Control (1 Meg) | |
| R6 | 130-12 | 50M ohm - 1/3 w. | 20% |
| R7 | 130-20 | 100M ohm - 1/3 w. | 20% |
| R8 | 130-19 | 1 megohm - 1/3 w. | 20% |
| R9 | 106-38 | 30 ohm | |
| R10 | 106-38 | 40 ohm | |
| R11 | 106-38 | 55 ohm | |
| | | R9, R10, and R11 in one unit | |

**CONDENSERS**

| No. | Part No. | Description | |
|---|---|---|---|
| C | 102-48 | 2 gang variable | |
| C1 | 100-25 | .002 x 600 | 25% |
| C2 | 100-9 | .05 x 200 | 25% |
| C3 | 129-12 | .00025 Mica | 20% |
| C4 | 100-22 | .05 x 200 | 25% |
| C5 | 129-5 | .0001 Mica | 20% |
| C6 | 100-11 | .01 x 400 | 25% |
| C7 | 129-2 | .0005 Mica | 20% |
| C8 | 100-22 | .05 x 200 | 25% |
| C9 | 119-39 | 20 mfd. lytic - 100 w.v. | |
| C10 | 119-39 | 15 mfd. lytic - 100 w.v. | |
| C11 | 100-20 | .1 x 200 | 25% |
| C12 | 100-13 | .05 x 400 | 25% |
| C13 | 100-39 | .1 x 400 | 30% |
| C14 | 100-53 | .25x400 | 20% |

**PARTS**

| No. | Part No. | Description |
|---|---|---|
| T1 | 111-58B | Antenna Coil Complete |
| T2 | 110-46 | Oscillator Coil Complete |
| T3 | 108-82B | Input I. F. Complete |
| T4 | 108-83B | Output I. F. Complete |
| T5 | 114-71 | Dynamic Speaker |
| L1 | | 450 ohm speaker field |
| S1 | | Switch on Volume Control |

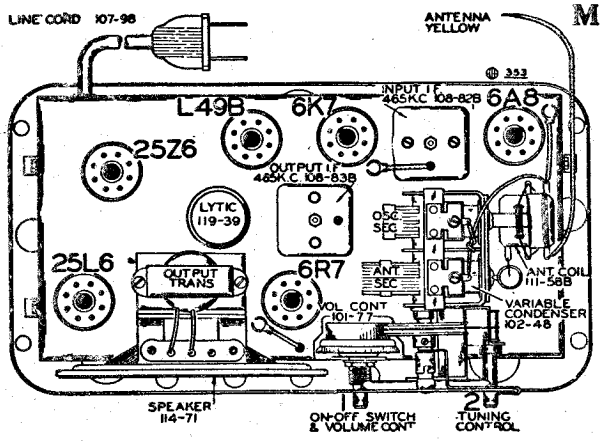



**FIG. 1—TOP VIEW**

## MODEL 602 — Range 535-1720 Kilocycles

**SERVICE NOTES:**

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volt A.C. or D.C. line.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

**RESONANCE INDICATOR:**

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and screen terminals of the type 25L6G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

**I.F. ALIGNMENT - 465 KC - Model 602**
**I.F. ALIGNMENT -470 KC - Models 602 B & C**

Part No. 108-83B Output I.F. Transformer

Part No. 108-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.
   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

**Models 602, 602B & 602C**

**R.F. ALIGNMENT: (535-1720 K.C.)**

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

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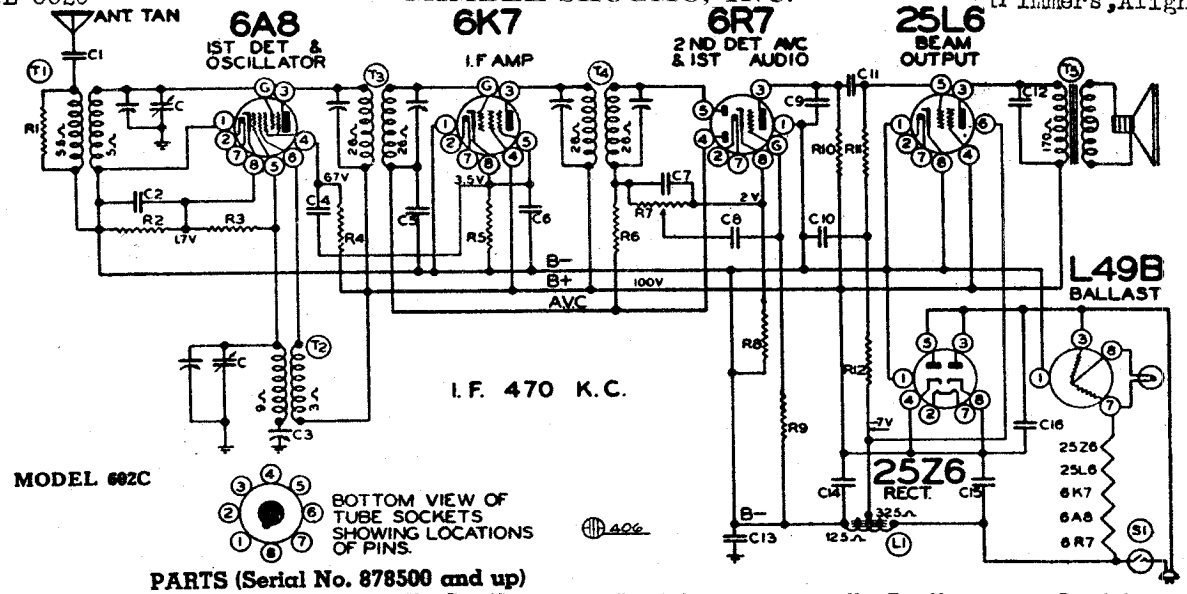
MODEL 602B
MODEL 602C

GAMBLE-SKOGMO, INC.

Schematics, Socket Trimmers, Alignment

Frequency Range 535-1720 Kilocycles




MODEL 602C



BOTTOM VIEW OF TUBE SOCKETS SHOWING LOCATIONS OF PINS.

406

## PARTS (Serial No. 878500 and up)

| No. | Part No. | Description | |
|---|---|---|---|
| | | **CONDENSERS** | |
| C | 102-55 | 2 Gang Variable Condenser | |
| C1 | 100-25 | .002 x 600 | 25% |
| C2 | 100-22 | .05 x 200 | 25% |
| C3 | 129-75 | .0003386 Compression Type Condenser 1% | |
| C4 | 100-22 | .05 x 200 | 25% |
| C5 | 100-9 | .05 x 200 | 25% |
| C6 | 100-20 | .1 x 200 | 25% |
| C7 | 129-21 | .0002 Mica | 20% |
| C8 | 100-11 | .01 x 400 | 25% |
| C9 | 129-2 | .0005 Mica | 20% |
| C10 | 100-75 | .22 x 200 | 10% |
| C11 | 100-10 | .05 x 200 | 10% |
| C12 | 100-67 | .025 x 400 | 25% |
| C13 | 100-53 | .25 x 400 | 20% |
| C14 | 119-42 | 5. mfd. lytic 100 w. v. | |
| C15 | 119-42 | 20. mfd. lytic 100 w. v. | |
| C16 | 100-39 | .1 x 400 | 20% |
| | | **RESISTORS** | |
| R1 | 130-17 | 10M ohm — 1/3 w. | 20% |
| R2 | 130-97 | 200 ohm — 1/3 w. | 10% |
| R3 | 130-12 | 50M ohm — 1/3 w. | 20% |
| R4 | 130-149 | 15M ohm — 1/3 w. | 20% |
| R5 | 130-54 | 500 ohm — 1/3 w. | 20% |
| R6 | 130-4 | 3 megohm — 1/3 w. | 20% |
| R7 | 101-77 | Volume Control (1 meg) | |
| R8 | 130-193 | 3M ohm — 1/3 w. | 10% |
| R9 | 130-19 | 1 megohm — 1/3 w. | 20% |
| R10 | 130-94 | 50M ohm — 1/3 w. | 10% |
| R11 | 130-103 | 100M ohm — 1/3 w. | 10% |
| R12 | 130-194 | 35M ohm — 1/3 w. | 10% |
| | | **PARTS** | |
| T1 | 111-79 | Antenna Coil Complete | |
| T2 | 110-62 | Oscillator Coil Complete | |
| T3 | 108-82B | Input I. F. Complete | |
| T4 | 108-83B | Output I. F. Complete | |
| T5 | 114-88 | 5" Dynamic Speaker | |
| L1 | | Speaker field 450 ohm— total tapped 125 ohm | |
| S1 | | Switch on volume control | |

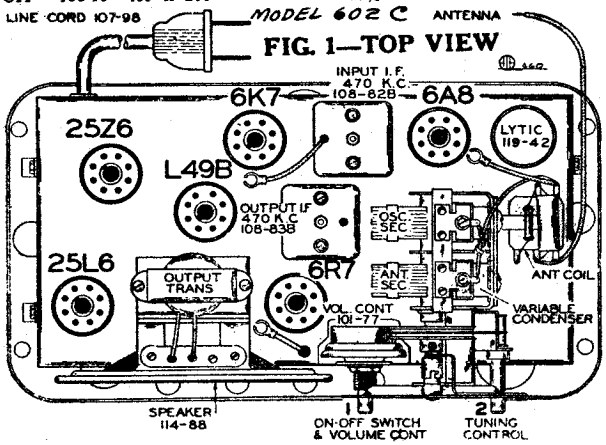



FIG. 1—TOP VIEW

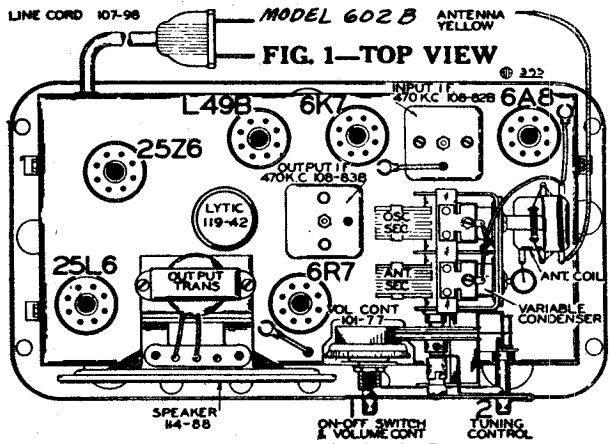
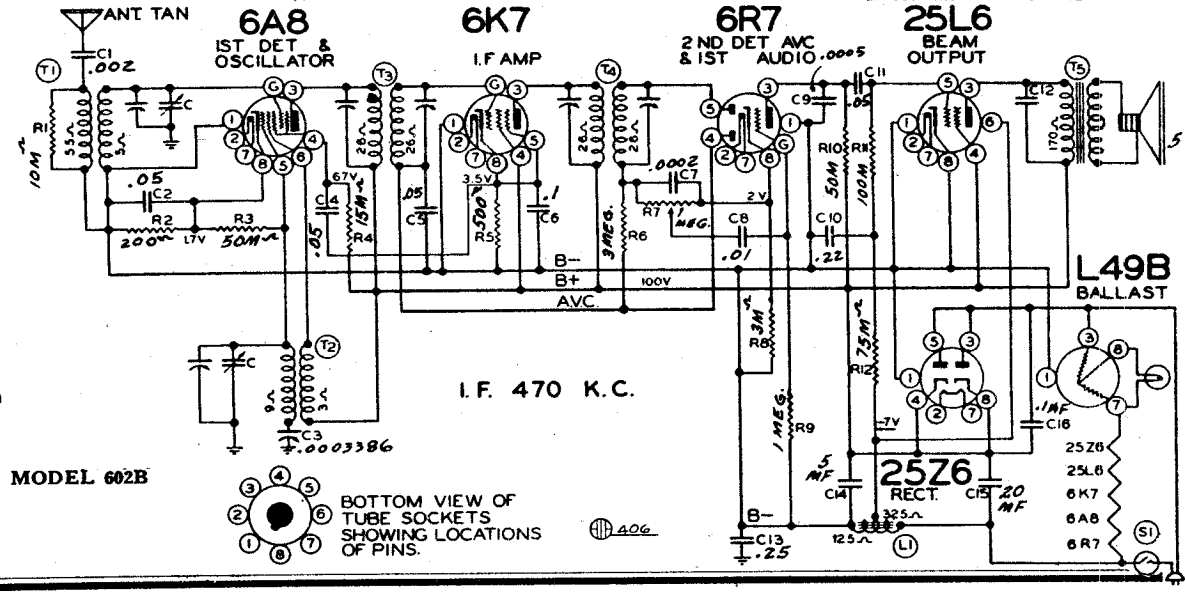



FIG. 1—TOP VIEW

ALIGNMENT FOR MODELS 602B and 602C
THE SAME AS MODEL 602, EXCEPT I.F.
ADJUSTMENT IS AT 470 KC
Range 535-1720 Kilocycles




MODEL 602B



BOTTOM VIEW OF TUBE SOCKETS SHOWING LOCATIONS OF PINS.

406

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Socket, Trimmers
Parts, Notes

# GAMBLE-SKOGMO, INC.

MODEL 666
Schematic, Voltage

The tube complement consists of the latest "Metal-Glass" tubes which are interchangeable with metal tubes.

NOTE.

C3, C4, C8, C15, in one unit—part No. 116-18.

C5, C8, C10, C11, in one unit—part No. 116-17.

C12, C17, C19, in one unit—part No. 116-16.

C24, C25, in one unit—part No. 119-21.

## DESCRIPTION:

Model No. 666 is a six-tube superheterodyne receiver having a tuning range of 530 K.C. to 1550 K.C., operates from a 6.0 volt storage battery and uses the automotive type 6.3 volt tubes. The "B" supply is obtained from a vibrator with a tube rectifier.

The I.F. frequency used is 465 K.C., the R.F. end of the receiver consisting of a high gain iron core antenna coil which gives high signal to noise ratio and an R.F. stage especially designed to give high image rejection and high I.F. attenuation. The I.F. transformers are designed to give high gain and selectivity and yet to have a broad nose for ease of tuning and hi-fidelity response. They are of the air core type and wound with solid wire to give *minimum* drift and variation of gain due to climatic changes.

The receiver is so designed that it may be used as either a single or two unit installation. Taps are provided on the output transformer to a pin jack terminal board, a red dot distinguishing dual speaker tap and green dot for single speaker operation.

For complete details see illustration and Header speaker data chart.

Dash kits for the remote control head are available for 1936 cars drilled for dash plates.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable and are fastened in place by spring clips, self tapping screws and trimount buttons.

All adjustments are accessible and any part replaceable without removing the chassis from the case.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| T6 | 102-26 | Three Gang Variable Condenser | | | | | |
| T7 | 108-72 | Output I.F. Coil—465 Kc. | | | | | |
| T8 | 105-27 | Output Transformer | | | | | |
| T9 | 104-51 | Power Transformer | | | | | |
| L1 | 105-23 | Filter Choke | | | | | |
| L2 | 105-19 | "A" Choke | | | | | |
| L3 | 105-24 | "A" Choke | | | | | |
| L4 | 105-26 | "A" Choke | | | | | |
| L5 | 114-34 | 5¼" Speaker (Field Resistance—4 Ohms) | | | | | |
| V | 126-1 | Vibrator | | | | | |

| CONDENSERS | | | | | RESISTORS | | |
|---|---|---|---|---|---|---|---|
| | C | | Spark Plate | | | | 100M Ohm - ½ Watt 20% - 50 Volt - Carbon |
| C1 | 129-3 | .00002 Mica - "O" - 20% | R3 | 130-94 | 50M Ohm - ½ Watt - 10% - 10 Volt - Carbon | R1 | 130-20 |
| C2 | 129-49 | .00009 Mica - "O" - 5% | R4 | 130-98 | 1500 Ohm - ½ Watt - 20% - 25 Volt - Carbon | R2 | 130-99 |
| C3 | 116-18 | .05 x 200 Volt | R5 | 130-42 | 20M Ohm - ½ Watt - 20% - 100 Volt - Carbon | R3 | 130-94 |
| C4 | 116-18 | .25 x 200 Volt | | | | R4 | 130-98 |
| C5 | 116-17 | .05 x 200 Volt | R6 | 130-70 | 500 Ohm - ½ Watt - 10% - 10 Volt - Carbon | R5 | 130-42 |
| C6 | 129-21 | .0002 Mica - MT - "O" 20% | R7 | 130-95 | 12M Ohm - 1.2 Watt - 10% - 100 Volt - Carbon | R6 | 130-70 |
| C7 | 124-17 | Single Padder J-4-S | R8 | 130-97 | 200 Ohm - ½ Watt - 10% - 10 Volt - Carbon | R7 | 130-95 |
| C8 | 116-17 | .1 x 400 Volt | R9 | 130-3 | 500M Ohm - ½ Watt 20% - 100 Volt - Carbon | R8 | 130-97 |
| C9 | 116-18 | .1 x 400 Volt | R10 | 130-108 | 40M Ohm - ½ Watt - 10% - 100 Volt - Carbon | R9 | 130-3 |
| C10 | 116-17 | .1 x 200 Volt | R11 | 130-107 | 800 Ohm - ½ Watt - 10% - 10 Volt - Carbon | R10 | 130-108 |
| C11 | 116-17 | .1 x 200 Volt | R12 | 101-42 | 50M Ohm - Volume Control and Switch | R11 | 130-107 |
| C12 | 116-16 | .05 x 200 Volt | R13 | 130-22 | 5M Ohm - ½ Watt - 20% -10 Volt - Carbon | R12 | 101-42 |
| C13 | 129-5 | .0001 Mica - MT - "O" 20% | R14 | 130-68 | 1 Meg Ohm - ½ Watt - 10% - 20 Volt - Carbon | R13 | 130-22 |
| C14 | 129-2 | .0005 Mica - MT - "O" - 20% | R15 | 130-9 | 200M Ohm - ½ Watt - 20% - 20 Volt - Carbon | R14 | 130-68 |
| C15 | 116-18 | .02 x 200 Volt | R16 | 130-3 | 500M Ohm - ½ Watt - 20% - 100 Volt - Carbon | R15 | 130-9 |
| C16 | 129-5 | .0001 Mica - MT - "O" - 20% | R17 | 101-45 | 1 Meg Ohm - Tone Control | R16 | 130-3 |
| C17 | 116-16 | .05 x 400 Volt | | | | R17 | 101-45 |
| C18 | 100-37 | .003 x 600 Volt - 10% | | | PARTS | | |
| C19 | 116-16 | .01 x 800 Volt | | | | | |
| C20 | 100-35 | .5 x 200 Volt - 50% - 10% | T1 | 111-48 | Antenna Filter Coil Assembly | | |
| C21 | 100-35 | .5 x 200 Volt - 50% - 10% | T2 | 111-47 | Antenna Coil Assembly | | |
| C22 | 100-35 | .5 x 200 Volt - 50% - 10% | T3 | 109-27 | R.F. Coil Assembly | | |
| C23 | 100-36 | .01 x 1400 Volt - 10% | T4 | 110-37 | Oscillator Coil Assembly | | |
| C24 | 119-21 | 8.0 mfd. Lytic Cond. 350 Working Volts | T5 | 108-69 | Input I.F. Coil—465 Kc. | | |
| C25 | 119-21 | 4.0 mfd. Lytic Cond. 350 Working Volts | | | | | |
| C26 | | 5.0 mmf. Gimmick | | | | | |




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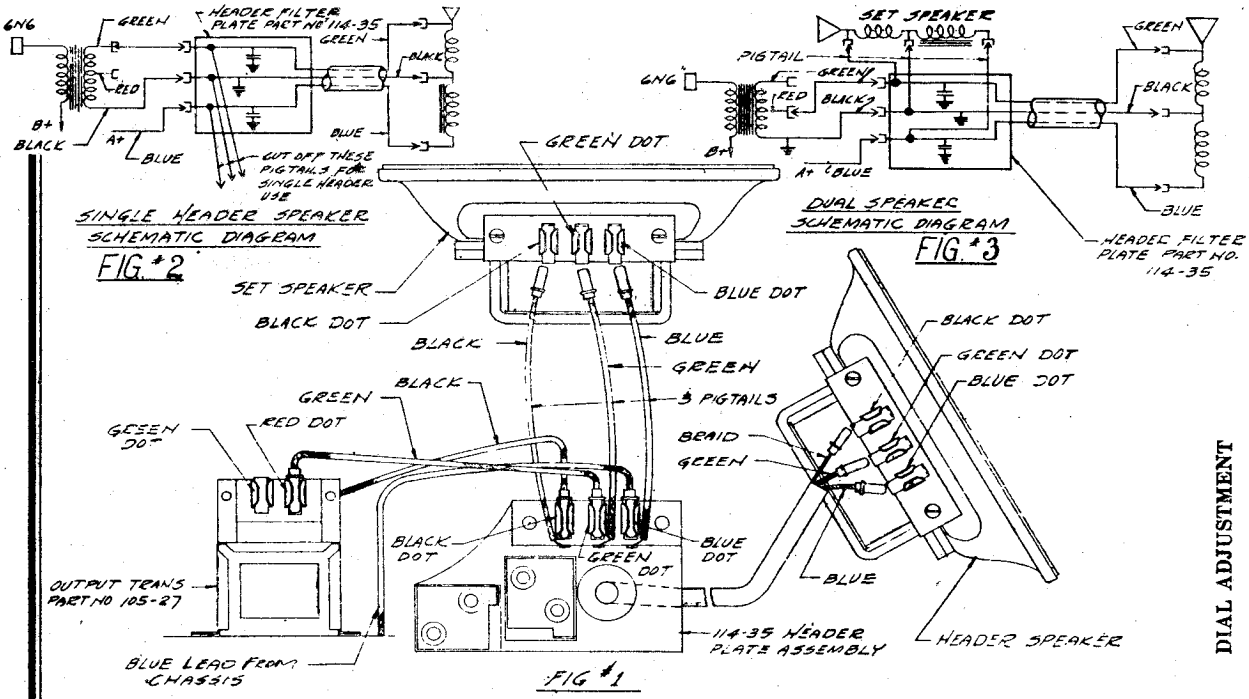
MODEL 666
Speaker Data,
Alignment

# GAMBLE-SKOGMO, INC.




**DIAL ADJUSTMENT**

Tune set to some station of a known frequency (between 800 and 1200 K.C.), hold selector knob, then remove pilot light assembly from back of remote head and with a screw driver adjust the slotted screw through this opening and in this way adjust the dial pointer to the correct frequency setting.

## SINGLE HEADER SPEAKER CONNECTIONS

Consult Fig. No. 1. On this application, all that is required is to remove speaker from receiver case and place in header board of car. Install the special seven foot shielded speaker cable and header filter plate assembly and insert the three leads. (which formerly connected the radio to the speaker) to the pin jacks on the header filter plate assembly. Remove the three short pigtail leads from the header filter plate assembly, namely, black, green and blue. These leads are only used when dual (two) speakers are to be used, one in the header and the other in the receiver case.

## DUAL SPEAKER CONNECTIONS

Consult Fig. No. 1. On this application, leave speaker in receiver case, install a complete header speaker in the header board of the automobile and assemble header filter plate assembly and seven foot shielded cable to front cover of receiver case.

The speaker leads from the radio are removed from the terminal board of the set speaker and plugged into the pin jacks of the header filter plate assembly, making certain to match the colors of the leads with the color dots on the pin jacks. The three short pigtail leads from the header filter plate assembly are then connected to the set speaker. Shift the green lead which runs to the output transformer (No. 105-27) to the pin jack with red dot for dual speaker operation.

For further explanation, consult Fig. No. 2 Single Header Speaker schematic diagram, and Fig. No. 3, Dual Speaker schematic diagram.

A more technical explanation of the manner of interconnecting the set speaker with the header speaker and header filter plate is that for dual speaker operation the two speakers are connected in parallel and for single header speaker operation, three pigtail leads from the header filter plate terminal assembly are cut off. All leads are color-coded and correspond to color dots on the pin jacks mounted on the speakers and the terminal board of the header filter plate assembly. A tapped output transformer is provided for impedance matching.

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .1 mfd. condenser connected in series with the test oscillator output lead.

"Broadcast Dummy"—A 175 mmfd. condenser connected in series with the output lead of the test oscillator.

## I.F. ALIGNMENT

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6K7 I F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108-72 to resonance with oscillator.
3. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers of input I.F. transformer No. 108-69 to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

## BROADCAST ALIGNMENT

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the middle section of the three-gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. and antenna trimmers to resonance (see top view).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 KC. Adjust series pad rocking gang condenser to and fro at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis (see top view.
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.

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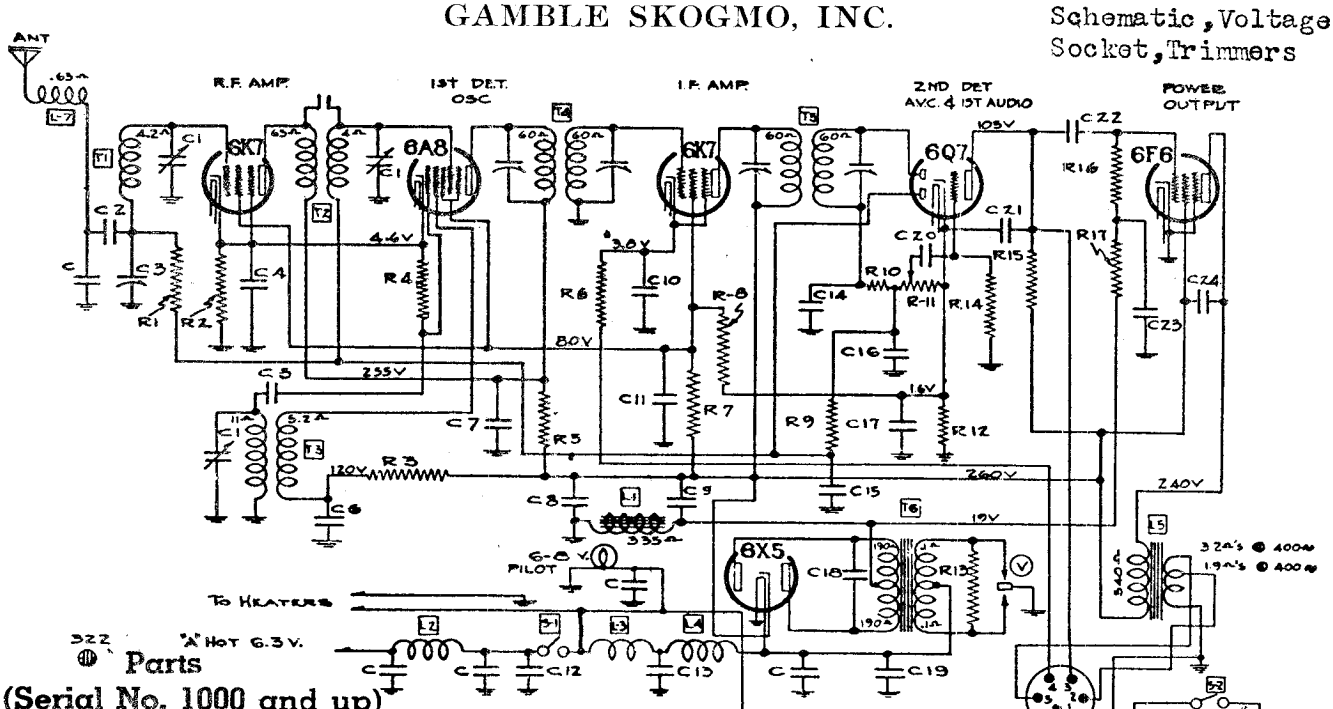
Alignment, Parts

# GAMBLE SKOGMO, INC.

MODEL 667
Schematic, Voltage
Socket, Trimmers




## Parts
## (Serial No. 1000 and up)

| | | CONDENSERS |
|---|---|---|
| C | | Spark Plate |
| C1 | 102-45 | 3 Gang Condenser |
| C2 | 129-73 | .002 Mica - MW-W - 10% |
| C3 | 124-36 | Series Pad |
| C4 | 116-20 | .1 x 200 v. - 20% |
| C5 | 129-12 | .00025 Mica - MT - 20% |
| C6 | 116-19 | .1 x 400 - 20% |
| C7 | 116-19 | .1 x 400 - 20% |
| C8 | 119-34 | 8. mfd. - 350 W v. |
| C9 | 119-34 | 4 mfd. 350 W v. |
| C10 | 116-19 | .05 x 200 v. - 20% |
| C11 | 116-20 | .25 x 200 v. - 20% |
| C12 | 100-31 | .5 x 120 v. - 10-50% - Braid leads |
| C13 | 100-31 | .5 x 120 v. - 10-50% |
| C14 | 129-5 | .0001 Ceramicon - 20% |
| C15 | 116-19 | .05 x 200 v. - 20% |
| C16 | 129-5 | .0001 Ceramicon - 20% |
| C17 | 116-20 | .02 x 200 - 20% |
| C18 | 100-36 | .01 x 1400 v. - 20% - 10%"A" |
| C19 | 100-31 | .5 x 120 v. - 10% - 50% |
| C20 | 116-20 | .02 x 200 - 20% |
| C21 | 129-5 | .0001 Mica - 20% |
| C22 | 100-55 | .01 x 400 - 25% |
| C23 | 100-48 | .25 x 200 - 20% |
| C24 | 100-54 | .006 x 600 - 25% |
| C25 | 100-11 | .01 x 400 - 25% |

C4, C11, C17, C20 All in Block 116-20
C7, C6, C10, C15 All in Block 116-19

| | | RESISTORS |
|---|---|---|
| R1 | 130-141 | 250M ohm - 1/3 w. Insulated |
| R2 | 130-54 | 500 ohm - 1/3 w. |
| R3 | 130-138 | 50M ohm - 1/2 w. Insulated |
| R4 | 130-52 | 50M ohm - 1/3 w. |
| R5 | 130-31 | 1500 ohm - 1/3 w. |
| R6 | 130-154 | 1000 ohm - 1/3 w. Insulated |
| R7 | 130-143 | 30M ohm - 1.2 w. |
| R8 | 130-139 | 40M ohm - 1/3 w. Insulated |
| R9 | 130-19 | 1 meg - 1/3 w. |
| R10 | 130-162 | 50M ohm - 1/3 w. Insulated |
| R11 | 101-73 | 250M ohm - Volume Control |
| R12 | 130-153 | 700 ohm - 1/3 w. |
| R13 | 130-84 | 200 ohm - 1/3 w. |
| R14 | 130-19 | 1 meg ohm - 1/3 w. |
| R15 | 130-11 | 250M ohm - 1/3 w. |
| R16 | 130-5 | 300M ohm - 1/3 w. |
| R17 | 130-11 | 250M ohm - 1/3 w. |
| R18 | 130-161 | 4000 ohm - 1/3 w. Insulated |
| R19 | 101-45 | Tone Control 1 Meg ohm |

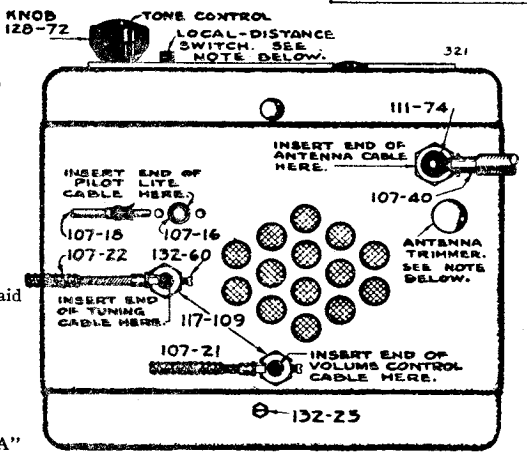



FIG. 1—SIDE VIEW

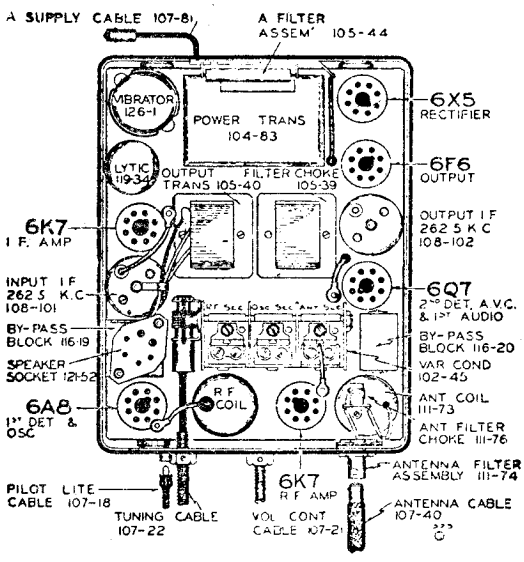
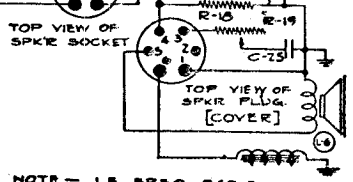



FIG. 2—TOP VIEW




NOTE— I.F. FREQ 262.5 K.C.
ALL VOLTAGES MEASURED FROM GEOUND WITH A 1000Ω/V VOLTMETER
* CATHODE of I.F. AMP TO END 3.8V IN DISTANCE POSITION of LOCAL DISTANCE SWITCH, 7V IN LOCAL POSITION.

I.F. ALIGNMENT - Adj at 262.5 KC thru .5 mf condenser

B.C. ALIGNMENT - Adj. osc. trim. thru 17 mmf cond. at 1500 KC. - Adj. RF & Ant. trim. at 1400 KC. - Pad at 600 KC.

SENSITIVITY - 1000 KC. CHECK

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOLUME V111

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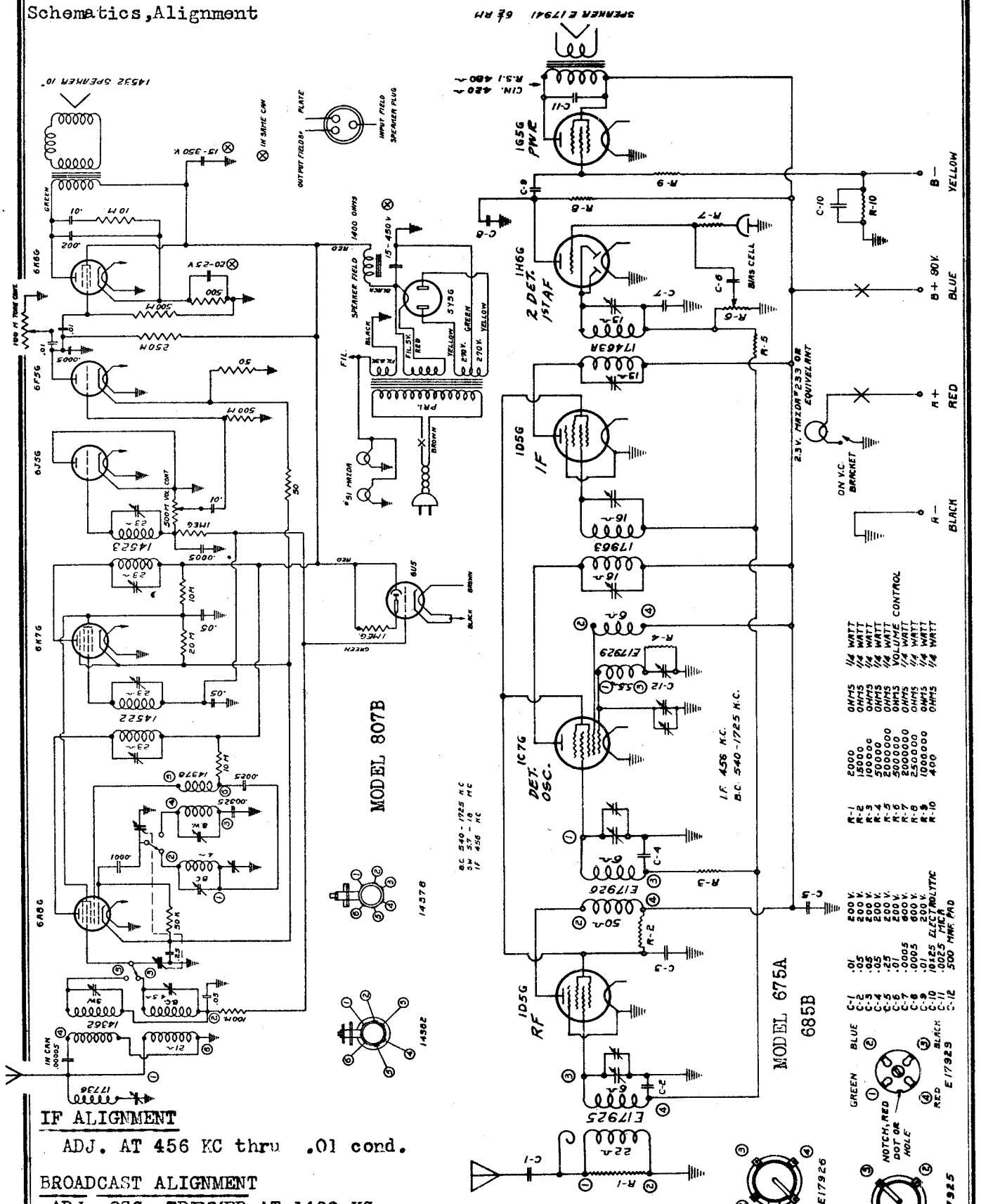
MODELS 675A, 685B
MODEL 807B
Schematics, Alignment

# GAMBLE-SKOGMO, INC.




## IF ALIGNMENT

ADJ. AT 456 KC thru .01 cond.

## BROADCAST ALIGNMENT

ADJ. OSC. TRIMMER AT 1400 KC
THRU .00025 COND. CONVENTIONAL ALIGNMENT
PAD AT 540 KC. SEE SPECIAL SECTION VOL. V111

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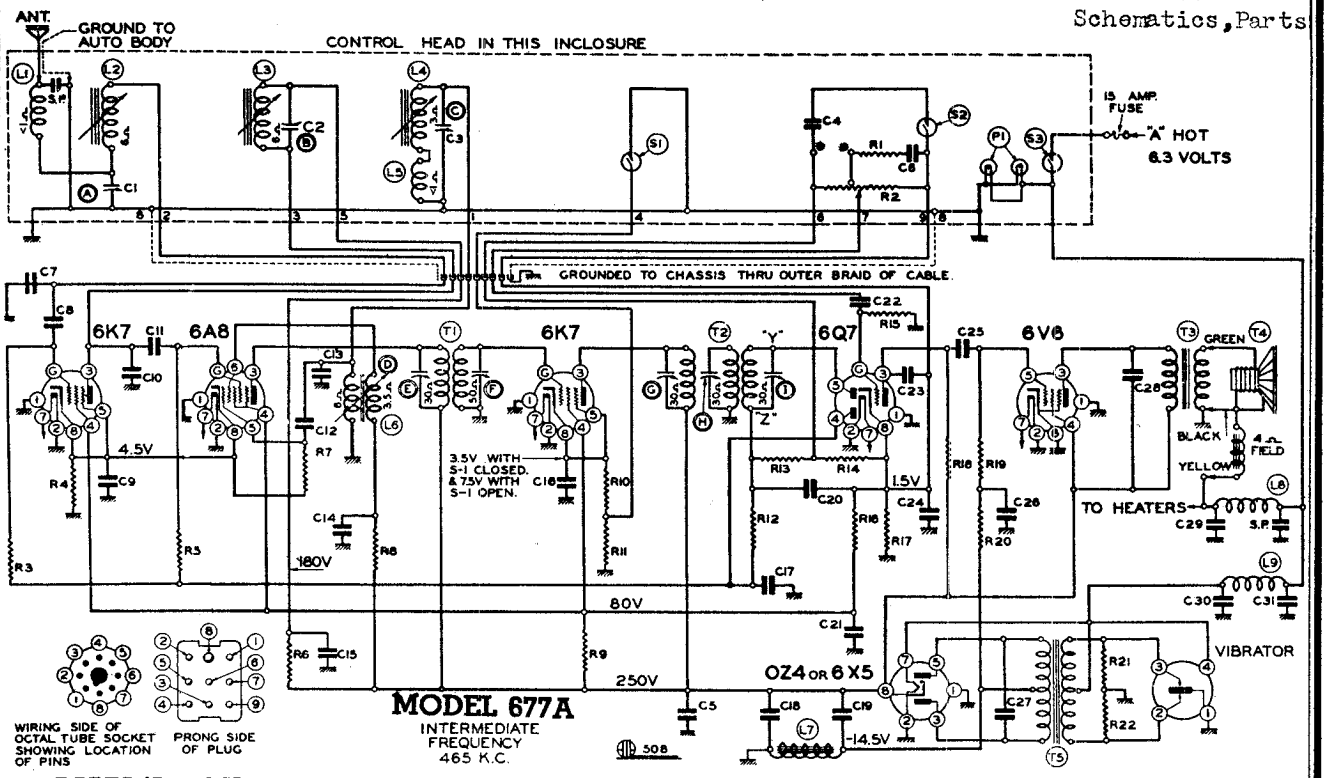
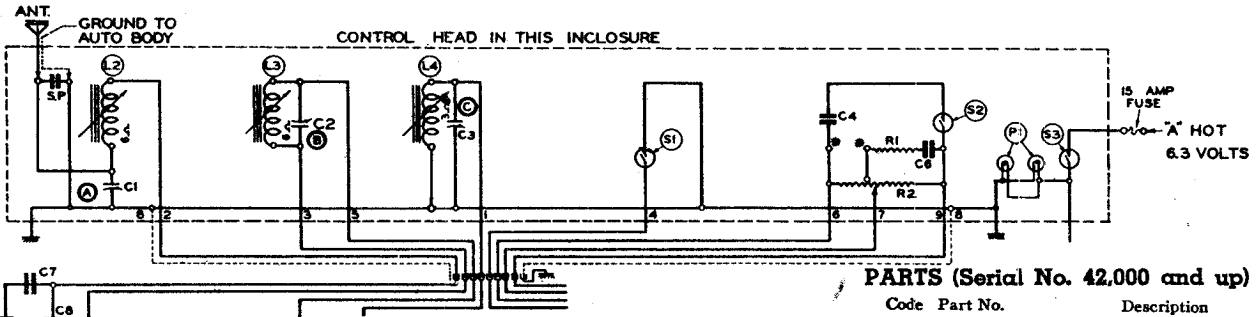
# GAMBLE-SKOGMO, INC.

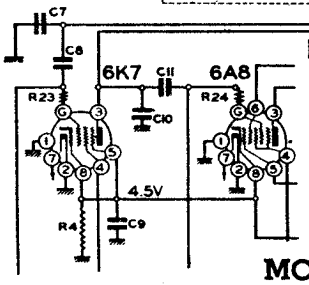
MODEL 677A
MODEL 677B
Schematics, Parts




## PARTS (Serial No. 30,001 and up)

| Code | Part No. | Description |
|---|---|---|
| | | **CONDENSERS** |
| C1 | 124-45 | Antenna trimmer 50 - 450 w. c. 350 mmf. |
| C2 | 127-82 | R. F. Trimmer - 5-30 mmf. |
| C3 | 127-84 | Oscillator Trimmer 5 - 30 mmf. |
| C4 | 100-25 | .002 x 600 v. - 25% |
| C5 | 100-74 | .1 x 400 v. 50 - 10% |
| C6 | 100-19 | .006 x 600 v. - 25% |
| C7 | 129-95 | .00015 Mica 2½% |
| C8 | 129-39 | .00005 Mica 20% |
| C9 | 100-22 | .05 x 200 v. 25% |
| C10 | 129-96 | .000035 Mica 5% |
| C11 | 129-2 | .0005 Mica 20% |
| C12 | 129-12 | .00025 Mica 20% |
| C13 | 129-97 | .00005 Mica 5% |
| C14 | 100-13 | .05 x 400 v. 25% |
| C15 | 116-24 | By pass block .25 x 400 v. 20-10% |
| C16 | 100-9 | .05 x 200 v. 25% |
| C17 | 100-22 | .05 x 200 v. 25% |
| C18 | 119-51 | 8.0 mfd. 350 w.v. lytic |
| C19 | 119-51 | 8.0 mfd. 350 w.v. lytic |
| C20 | 129-5 | .0001 Mica 20% |
| C22 | 100-11 | .01 x 400 v. 25% |
| C21 | 116-24 | .25 x 400 v. 20-10% By pass block |
| C23 | 129-5 | .0001 Mica 20% |
| C24 | 100-26 | .02 x 400 v. 25% |
| C25 | 100-11 | .01 x 400 v. 25% |
| C26 | 116-24 | .25 x 200 v. 20-10% |
| C27 | 100-23 | .01 x 1400 v. 20-10% |
| C28 | 100-38 | .01 x 800 v 10% |
| C29 | 129-6 | .002 Mica 20% |
| C30 | 100-31 | .5 x 120 v. 50-10% |
| C31 | 100-31 | .5 x 120 v. 50-10% |
| SP | | Spark Plates (2) |
| | | C15, C21 and C26 in same unit |
| | | C18 and C19 in same unit |
| | | **RESISTORS** |
| R1 | 130-214 | 30M - ½ w. 20% |
| R2 | 101-109 | 1.2 meg. volume control |
| R3 | 130-19 | 1 megohm - ½ w. 20% |
| R4 | 130-79 | 400 ohm - ½ w. 10% |
| R5 | 130-19 | 1 megohm - ½ w. 20% |
| R6 | 130-21 | 20M ohm - ½ w. 20% |
| R7 | 130-12 | 50M ohm - ½ w. 20% |
| R8 | 130-12 | 50M ohm - ½ w. 20% |
| R9 | 130-65 | 30M ohm - 1 watt 20% |
| R10 | 130-39 | 700 ohm - ½ w. 20% |
| R11 | 130-85 | 3M ohm - ½ w. 20% |
| R12 | 130-19 | 1 megohm - ½ w. 20% |
| R13 | 130-20 | 100M ohm - ½ w. 20% |
| R14 | 130-118 | 600M ohm - ½ w. 20% |
| R15 | 130-19 | 1 megohm - ½ w. 20% |
| R16 | 130-208 | 40M ohm - ½ w. 20% |
| R17 | 130-101 | 600 ohm - ½ w. 10% |
| R18 | 130-11 | 250M ohm - ½ w. 20% |
| R19 | 130-5 | 300M ohm - ½ w. 20% |
| R20 | 130-11 | 250M ohm - ½ w. 20% |
| R21 | 130-56 | 100 ohm - ½ w. 20% |
| R22 | 130-56 | 100 ohm - ½ w. 20% |
| | | **PARTS** |
| L1 | 111-96 | Antenna Choke (No. 111-97) |
| L2 | 111-96 | Antenna permeability coil complete |
| L3 | 109-40 | R. F. Permeability coil complete |
| L4 | 110-77 | Oscillator permeability coil complete |
| L5 | 110-77 | Oscillator series coil (No. 110-79) |
| L6 | 110-75 | Oscillator shunt coil Adj. |
| L7 | 105-62 | Filter Choke - 250 ohms |
| L8 | 105-66 | "A" Choke |
| L9 | 105-65 | "A" Choke |
| T1 | 108-96C | Input I. F. Complete - 465 kc. |
| T2 | 108-115 | Output I. F. Complete - 465 kc. |
| T3 | 105-61 | Output Transformer |
| T4 | 114-113 | 8" Dynamic speaker |
| T5 | 104-132 | Power Transformer |
| S1 | 125-47 | Sensitivity switch |
| S2 | 125-47 | Tone control switch |
| S3 | | Off-on switch on volume control |
| P1 | 107-97 | 6-8 v. pilot light (2) |




PARTIAL SCHEMATIC SHOWING DIFFERENCES BETWEEN MODELS 677 A and 677B. (For balance of schematic refer to diagram Model 677A above).

**MODEL 677 B**

## PARTS (Serial No. 42,000 and up)

| Code | Part No. | Description |
|---|---|---|
| | | **CONDENSERS** |
| C5 | 100-88 | .1 x 400 v. 50 - 10% |
| C13 | 129-101 | .00007 Mica 5% |
| C27 | 100-36 | .01 x 1400 v. 20-10% |
| C28 | 100-89 | .008 x 800 v. 10% |
| | | **RESISTORS** |
| R23 | 130-54 | 500 ohm - ½ w. 20% |
| R24 | 130-54 | 500 ohm - ½ w. 20% |
| | | **PARTS** |
| L2 | 111-100 | Antenna permeability coil complete |
| L3 | 109-40 | R. F. Permeability coil complete |
| L4 | 110-84 | Oscillator permeability coil complete |
| L6 | 110-75 | Oscillator shunt coil Adj. |

For parts not listed, see parts, Model 677A (above).

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MODEL 677A
MODEL 677B
Alignment, Socket, Trimmers
Automatic Tuner Procedure

## PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the dial by means of which six stations may be selected. (See "B" Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs, (See "A" Fig. 2).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now Rotate the turning knob (No. 2) to the left (counter clockwise) as far as it will turn, and tighten the special reset lock screw ("C") located on left side of remote turner unit. (See Fig. 2).

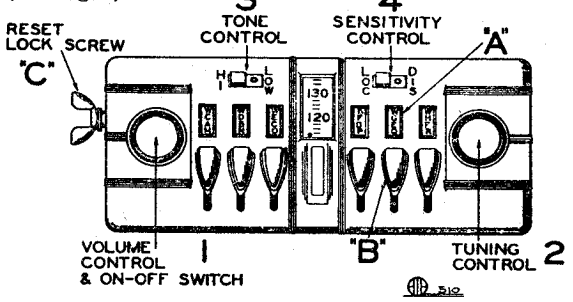



**Fig. 2—Front View of Remote Tuner Unit**

It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Reset lock screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the locking screw "C" one or two turns; select the new station as explained. **Be sure to retighten the locking screw,** otherwise the stations you have selected will not stay adjusted to the levers.

The automatic dial is now set up for quick tuning. Press down on the lever and Presto!—your favorite station is selected.

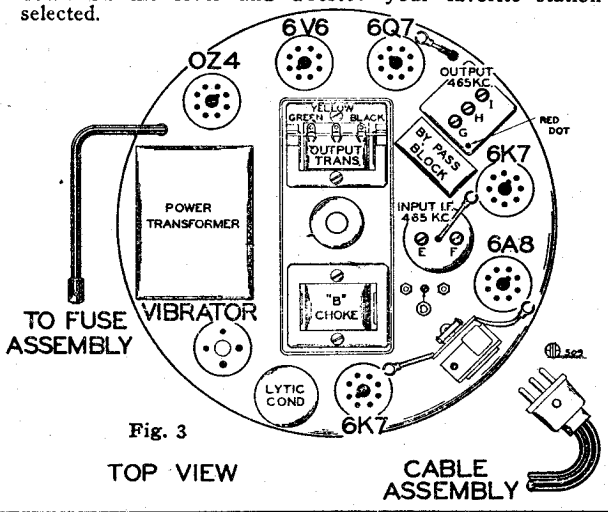



**Fig. 3**

TOP VIEW

MODEL 527A
Tuner Procedure

## I.F. ALIGNMENT: (465 K.C.)

IMPORTANT:

To align the output I.F. transformer without using a cathode ray oscillograph a 10M ohm resistor must be shunted across the tertiary coil of this unit.

Connect the resistor as indicated by points "Y" and "Z" on the circuit diagram as follows:

Locate the wires coming from the bottom of the output I.F. coil assembly on the underside of the radio chassis.

The **white lead with green** tracer which is connected to diode plate terminal No. 5 on the 6Q7 tube socket is one point and the **white lead with brown tracer** which is connected to the end terminal of the terminal strip is the other point. Proceed as follows:

1. With the dial of the Remote Tuner Unit set at 1400 K.C. and with volume control full on, connect test oscillator

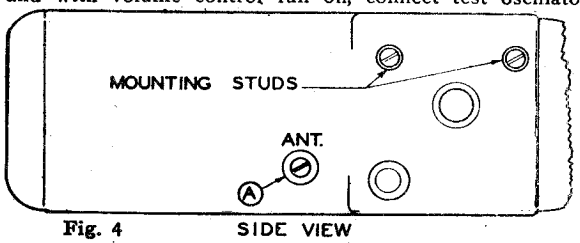
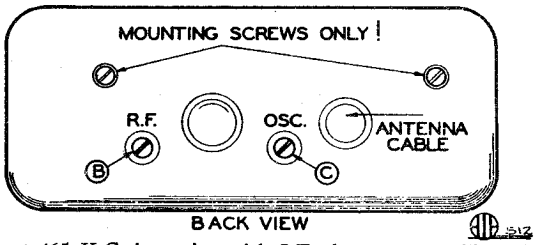



**Fig. 4** SIDE VIEW




BACK VIEW

set at 465 K.C. in series with I.F. dummy to grid of 6K7 I.F. tube. (.5MF COND.)

2. Adjust trimmers "G" and "H" of output I.F. transformer for maximum gain, (See Fig. 3, top view).
3. Disconnect the 10M ohm resistor which has been shunted across the tertiary winding and adjust trimmer "I" for maximum gain.
   (a) This transformer is now correctly tuned. Under no circumstances re-adjust trimmers "G" and "H" after the 10M ohm resistor has been removed.
   (b) For alignment of the output I.F. transformer using a cathode ray oscillograph the 10M ohm resistor is not used and the procedure is similar to the alignment of any two circuit I.F. transformer; merely tune for a symmetrical curve of maximum amplitude.
   (c) Output connections for the cathode ray oscillograph should be made to pin No. 8 on 6Q7 tube socket and to the end terminal on the terminal strip; at this point the diode load resistors terminate.
4. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers "E" and "F" of input I.F. transformer for maximum gain.

NOTE: A red dot on top of output I.F. can designates location of trimmer "G"

## BROADCAST ALIGNMENT:

1. With the dial on the Remote Tuner Unit set at 1560 K. C., connect test oscillator set at 1560 K. C. in series with broadcast dummy to the antenna lead of receiver. (175MMF COND)
2. Adjust oscillator trimmer (adjustment "C", on back of Remote Tuner Unit) to resonance. (See Fig. 4, back view).
3. Re-set test oscillator to 1400 K.C. and pick up signal by rotating dial on Remote Tuner Unit. Adjust R. F. trimmer (adjustment "B", on back of Remote Tuner Unit), and Antenna Trimmer (adjusment "A", on side of Remote Tuner Unit), to resonance.
4. Re-set test oscillator to 600 K.C. and rotate Remote Tuner Unit dial to 600 K. C.
   Adjust shunt oscillator adjustment "D", rotating dial to and fro at the same time adjusting shunt oscillator for maximum gain. This adjustment is accessible from the top of the radio chassis, (See Fig. 3, top view).
5. Go back and check 1400 K. C. If adjustment is made here, check 600 K. C again.

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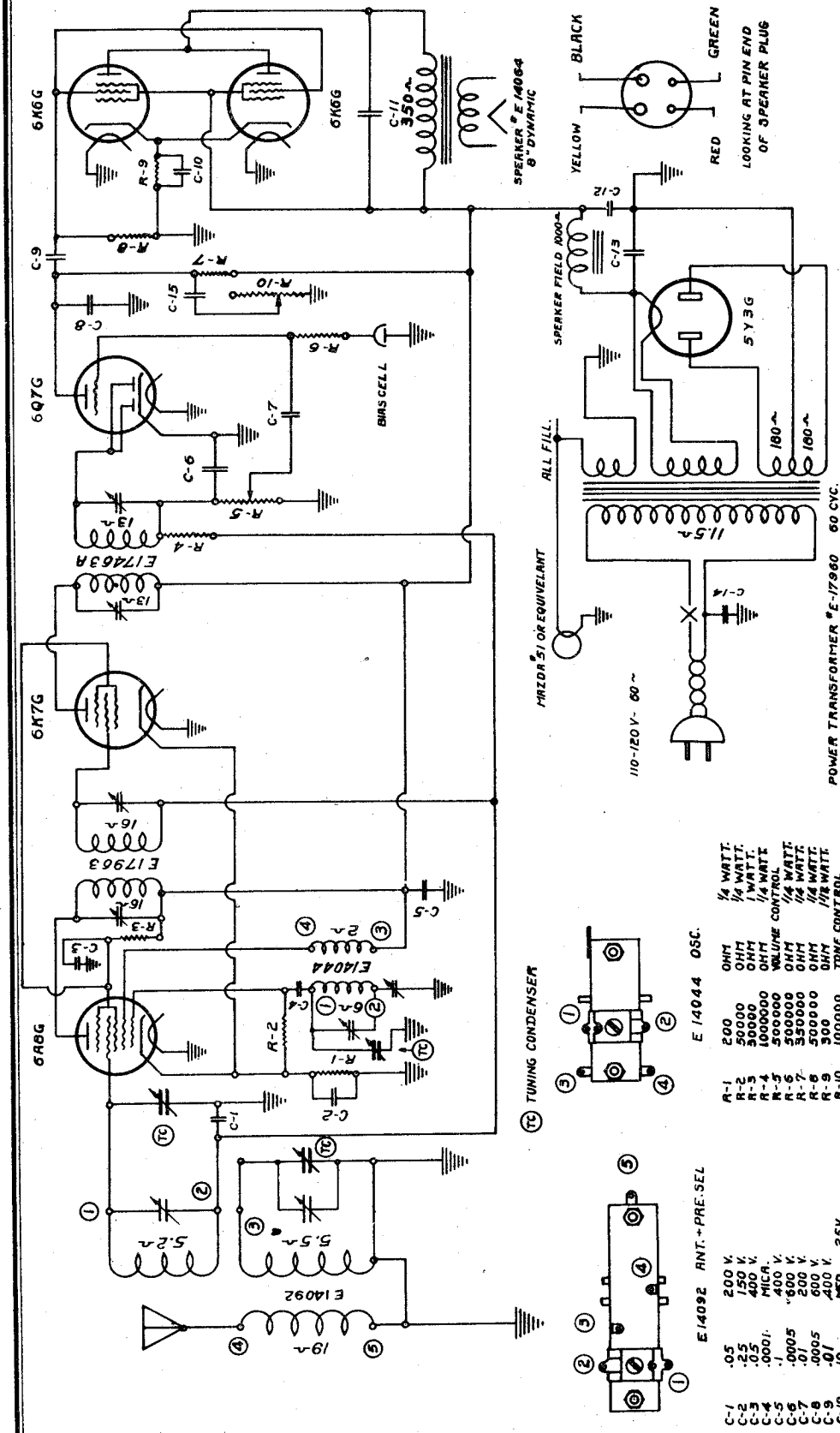
# GAMBLE-SKOGMO, INC.

MODEL 690B
Schematic
Alignment




TUBE FUNCTIONS: "6A8G" First detector - oscillator, "6K7G" Intermediate amplifier, "6Q7G" Second detector and first audio, two "6X6G" as parallel power tubes, "5Y3G" rectifier.

IF ALIGNMENT: Connect signal generator to grid of 6A8G tube, through a .01 condenser, leave grid cap in place and turn tuning condenser open - peak IF transformers at 456 KC.

BROADCAST ALIGNMENT: Check pointer setting - should reach end of scale with condenser closed - may be changed slightly by loosening set screw on lower pulley and slipping pulley around on tuning shaft. Connect signal generator to antenna terminal through .00025 condenser. Trim oscillator at 1400 KC-- this trimmer is reached through hole in top of chassis to the right of antenna coil. Pad at 540 KC, recheck at 1400, and trim preselector trimmer on coil on top of chassis, and antenna trimmer on gang condenser at 1400 KC. Use as low output from generator as possible for final adjustments and it is best to use an output meter connected across speaker to indicate "peak".

C-10 - C-12 - C-13 ALL IN SAME CAN

I.F. 456 K.C.
BC. 540-1725 K.C.

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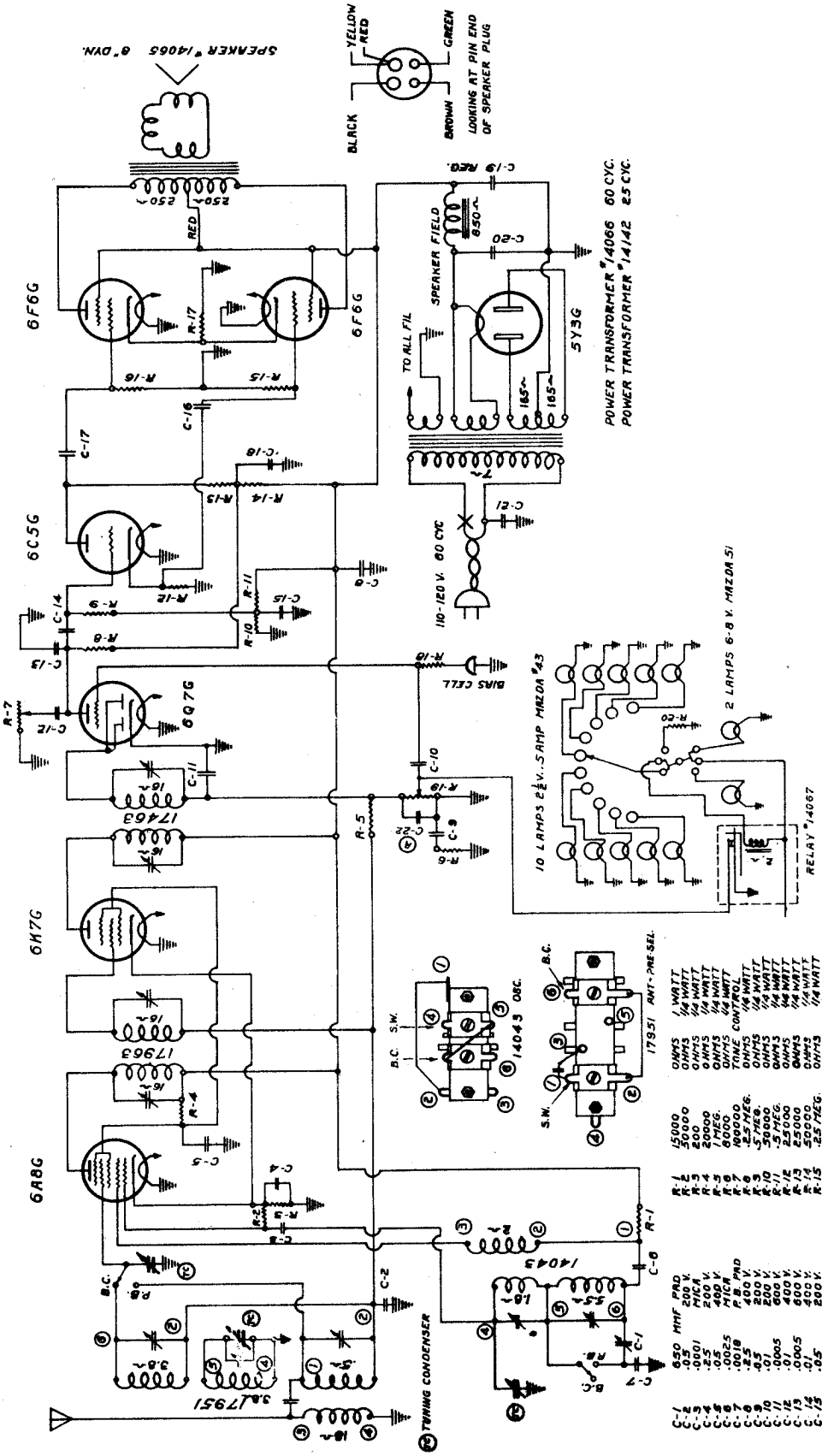
MODEL 715B
Schematic
Alignment

# GAMBLE-SKOGMO, INC.




**IF ALIGNMENT:** Connect signal generator to grid of 6A8G tube, through a .01 condenser, leave grid cap in place and turn tuning condenser open - peak IF transformers at 456 KC.

**BROADCAST ALIGNMENT:** Connect signal generator to antenna terminal through a .00025 condenser. Trim oscillator at 1400 KC (see picture of coil on circuit diagram for location of trimmer). Adjust padder condenser at 540 KC, recheck at 1400 KC, then peak antenna and preselector trimmers at 1400 KC. (See picture on diagram for location of antenna trimmer, preselector trimmer is on gang condenser.)

**SHORT WAVE ALIGNMENT:** Connect signal generator to antenna terminal through a 300 or 400 ohm resistor. Be sure wave switch is to the "left". Trim SW oscillator at 6 MC., also SW antenna coil at same frequency. The SW pad condenser is fixed for proper range.

**TUBE FUNCTIONS & CIRCUIT:** "6A8G" First detector - oscillator, "6K7G" Intermediate amplifier, "6Q7G" Second detector and first audio, "6C5G" Phase invertor, two "6F6G" as push-pull power tubes, "5Y3G" Rectifier.

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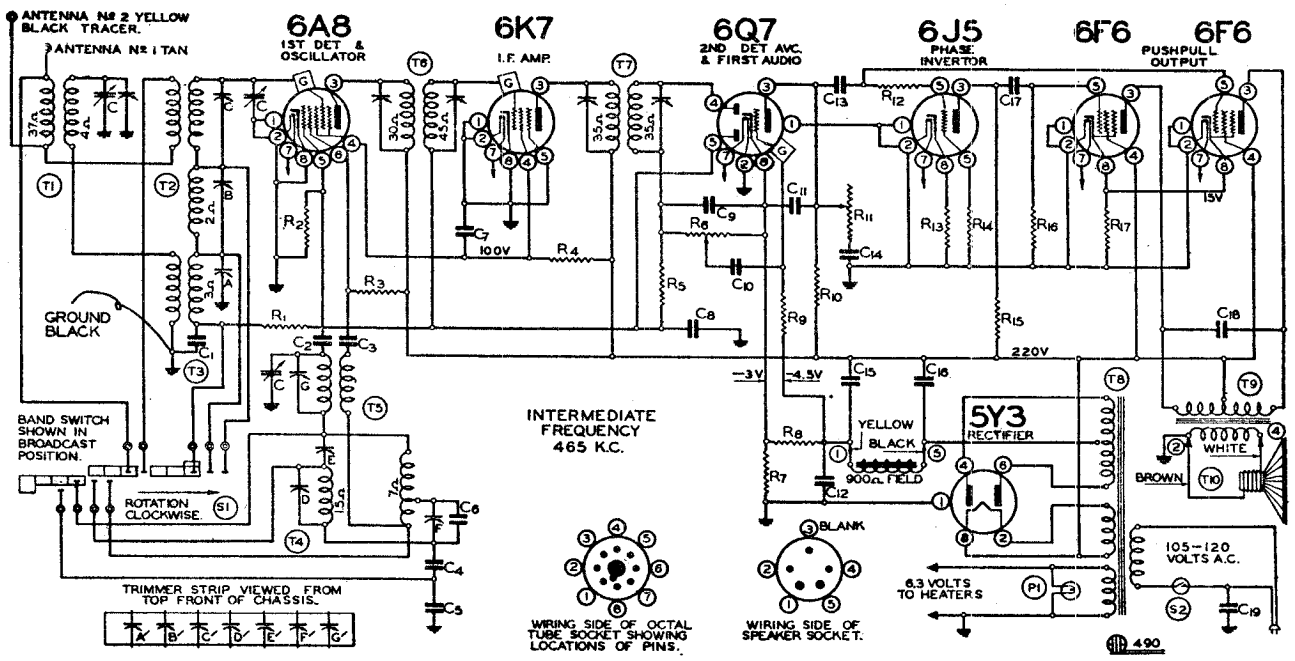
# GAMBLE-SKOGMO, INC.

MODEL 761A
Schematic, Voltage
Socket, Trimmers

| BAND | DIAL SCALE | FREQUENCY RANGE |
|---|---|---|
| Broadcast | Lower Scale | 540 to 1750 K.C. (Kilocycles) |
| Middle Wave | Upper Scale | 1730 to 5800 K.C. (Kilocycles) |
| Short Wave | Center Scale | 5.5 to 18.1 M.C. (Megacycles) |




## PARTS (Serial No. 8A973750 and up)

| Code No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 130-103 | 100M ohm - 1/3 w. 10% |
| R2 | 130-12 | 50M ohm - 1/3 w. 20% |
| R3 | 130-123 | 15M ohm - 1/2 w. 10% |
| R4 | 130-196 | 30M ohm - 1 w. 10% |
| R5 | 130-4 | 3 megohm - 1/3 w. 20% |
| R6 | 101-104 | 1 megohm volume control |
| R7 | 130-198 | 40 ohm - 1/2 w. 10% |
| R8 | 130-197 | 20 ohm - 1/3 w. 10% |
| R9 | 130-4 | 3 megohm - 1/3 w. 20% |
| R10 | 130-103 | 100M ohm - 1/3 w. 10% |
| R11 | 101-105 | 300M ohm - tone control |
| R12 | 130-163 | 400M ohm - 1/3 w. 10% |
| R13 | 130-22 | 5M ohm - 1/3 w. 20% |
| R14 | 130-103 | 100M ohm - 1/3 w. 10% |
| R15 | 130-12 | 50M ohm - 1/3 w. 20% |
| R16 | 130-102 | 500M ohm - 1/3 w. 10% |
| R17 | 130-195 | 250 ohm - 1.2 w. 10% |
| | | **CONDENSERS** |
| C | 102-62 | 3 gang variable |
| C1 | 100-22 | .05 x 200 v. 25% |
| C2 | 129-67 | .00004 Mica 10% |
| C3 | 100-25 | .002 x 600 v. 25% |
| C4 | 129-83 | .0027 Mica 2-1/2% |
| C5 | 129-84 | .003 Mica 2-1/2% |
| C6 | 129-88 | .0006 Mica 5% |

| Code No. | Part No. | Description |
|---|---|---|
| C7 | 100-39 | .1 x 400 v. 20% |
| C8 | 100-26 | .02 x 400 v. 25% |
| C9 | 129-5 | .0001 Mica 20% |
| C10 | 100-26 | .02 x 400 v. 25% |
| C11 | 129-2 | .0005 Mica 20% |
| C12 | 100-20 | .1 x 200 v. 25% |
| C13 | 100-26 | .02 x 400 v. 25% |
| C14 | 100-57 | .006 x 600 v. + 10 - 20% |
| C15 | 103-14 | 16 mfd. lytic 275 w.v. Reg. |
| C16 | 103-6 | 8 mfd. lytic 350 w.v. |
| C17 | 100-26 | .02 x 400 v. 25% |
| C18 | 100-37 | .003 x 600 v. 10% |
| C19 | 100-61 | .02 x 600 v. bakelite 20% |

## MODEL 761 A

FOR ALIGNMENT AND TUNER DATA SEE INDEX

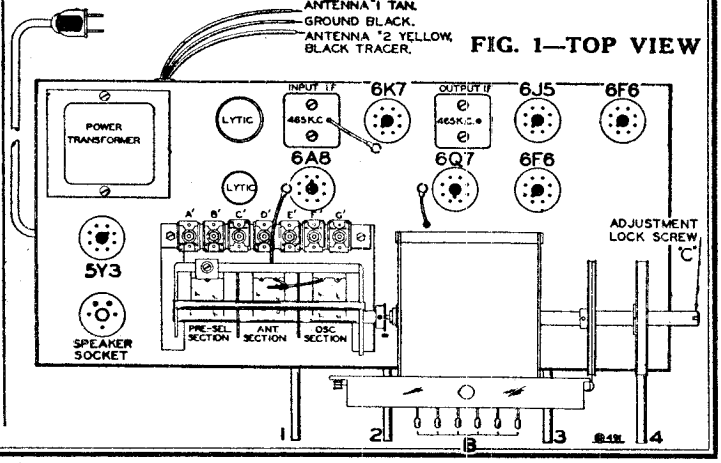



FIG. 1—TOP VIEW

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# NOS. 9, 10, & 11 — 17 BUTTON TELEPHONE DIAL

## NOS. 3 & 7 — PHANTOM LIGHT DIAL

APRIL, 1937

### Identification of Dial and Chassis

The following description will identify the different dials:

No. 9 Dial—17 Button Telephone Dial—Station call letters in black push buttons.

No. 11 Dial—Same as No. 9 Dial except push buttons are brown.

No. 10 Dial—17 Button Telephone Dial—Station call letters are rectangular in shape and are mounted in rectangular openings in escutcheon ring. Equipped with visible tone and volume indicators.

No. 3 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by series of circles.

No. 7 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by slanting lines.

### Telephone Dial Assembly

The telephone dial assembly provides a means of pre-setting a number of broadcasting stations and tuning in these stations at any time by depressing a button and rotating the dial to a stop position.

The apparatus is mounted on an assembly attached at the front of the chassis. An examination of this assembly will clearly show the method of operation.

**Silencer Circuit**—A silencer circuit is provided which results in silent tuning between stations when using the telephone dial buttons.

When a telephone dial button is depressed, a circuit is established between the ungrounded end of the volume control and the chassis ground. Referring to Fig. 1 it will be noted that contact is made between the line from the volume control, contact ring, contact washer arm (when button is depressed), spring and pulley ring stud. Since the pulley ring is at ground potential, this grounds the audio voltage and no signal will be heard until the button is released to break the contact.

It should be noted that the contact ring is part of the pulley ring assembly, but is insulated from it.

In the case of powerful local stations a slight amount of signal may be heard when the button is depressed.

# Telephone Dial Adjustments

### Noise When Tuning in a Signal with a Telephone Dial Button

As explained in the article on "Silencer Circuit" in this manual, no noise or signal should be heard when tuning in a signal with a telephone dial button until the button is released. If noise is heard while tuning in a signal with one of these buttons, it can be corrected as follows:

**If Noise Occurs on All Buttons**—This is probably due to a poor contact between the flat contact spring and the contact ring—See Fig. 1. Clean the flat contact spring and contact ring to insure a good electrical connection. Ordinary cleaning fluid may be used and will be effective in most cases in cleaning the surface without affecting the plating. If the contact is still not satisfactory, a piece of fine emery cloth may be used.

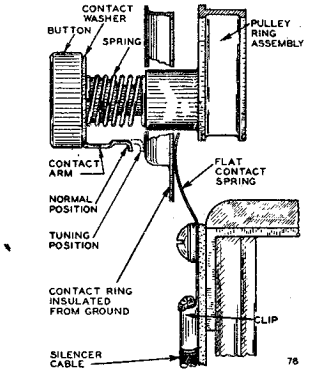


*Fig. 1—Silencer Assembly*

**If Noise Occurs on One Button Only**—This is due to a poor contact between the pulley ring stud, spring, contact washer, and contact ring—See Fig. 1. Clean all of these items of the particular button, in the same manner as mentioned previously, so as to provide a good electrical connection.

### Telephone Dial Drive Cord Slipping

If the telephone dial drive cord slips on the tuning shaft pulley, this may be remedied by adjusting the drive cord tension pulley. Loosen the tension pulley bracket screw and adjust pulley assembly until the desired tension is obtained.

### Position of Stop Pin

When the telephone dial assembly is on the chassis, the gang condenser rotor should not completely open or close. The travel of the rotor in this respect is controlled by the gang stop pin on the pulley ring—See Fig. 4. This is necessary to protect the gang condenser in case the telephone dial is swung rapidly to either of the extreme positions. When the gang stop pin is properly set, it will serve as the stop at both extreme positions. If the rotor is seen to open completely or close completely, the stop pin should be pulled back and re-set to overcome this condition.

### Greasing and Oiling

After a period of time, put some light grease on the pulley ring shaft and on the teeth of the pulley ring. Use light oil on the drive shaft assembly bearing, care being taken not to get any on the drive cord.

# Telephone Dial Replacements

### Replacing Complete Dial and Condenser Assembly

Remove the grid lead clip from tube grid cap.

Remove silencer cable from the contact spring assembly. Unsolder dial lamp lead from terminal of tube socket.

Unsolder the three stator section connections of the gang condenser. Unsolder the three braided shield leads which ground the gang condenser frame to the chassis, taking care not to loosen the connections of any other units which are grounded at these common points.

At the back of the gang condenser is a stud which secures the assembly to an "L" bracket which is secured to the chassis.

Through this stud is a cotter pin. Remove only the cotter pin, metal washer, and rubber washer.

Viewing the assembly from the back, on the left is a brass bolt which holds the dial support bracket to the chassis—remove this bolt from underneath the chassis.

Grasp the dial support brace and move entire assembly toward the front of the chassis. When the support casting rubber cushions slip clear of the slot in front of chassis, lift entire assembly clear of chassis.

To replace this assembly, reverse the procedure as given above.

### Replacing Pulley and Button Ring Assembly Only

Remove drive cord.

From underneath the chassis, unsolder the dial lamp lead from prong of the tube socket. Pull this lead through and out to the front of the assembly.

Remove the four escutcheon screws which hold the escutcheon ring and glass crystal in place. The dial scale pointer is removed by unhooking it from the center stud. Unscrew and remove center stud, washers, and dial scale. Slide pulley ring assembly off the center shaft.

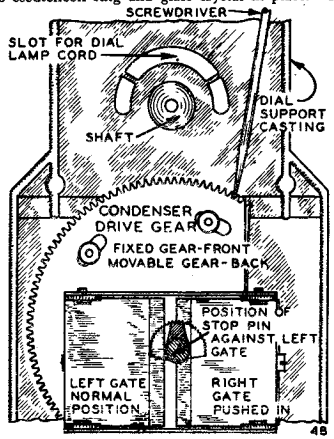


*Fig. 2—Replacing Pulley Ring Assembly*

On the No. 10 dial, two strips of celluloid between the escutcheon ring and the glass crystal will have to be removed.

To replace the pulley ring assembly, proceed as follows: Lay the assembly face down and adjust the stop pin. The stop pin (Fig. 2) is directly in back of the wide spacer on the dial button ring. Pull this pin back and adjust it to the center position —See Fig. 2.

Rotate tuning condenser rotor counter-clockwise (from front) as far as possible—See. Fig. 2.

Place the pulley ring assembly on the shaft with the knot of the dial lamp lead at the top—do not engage the gears.

Pull the dial lamp lead through the slot in the pulley ring gear and through the long slot in the dial support casting. Then place this lead through the clip under the dial support brace and out through the opening in the back of this brace.

With the gears still disengaged, rotate the pulley ring clockwise (from front) ½ revolution until the stop pin passes over the right gate and comes to rest against the left gate—See Fig. 2.

With the condenser rotor fully closed, push the pulley ring on the shaft until the pulley ring gear engages the *fixed gear only* (front) of the condenser drive gear assembly. Hold the pulley ring assembly and with a fine blade screw driver, move the movable (back) gear clockwise one tooth relative to the fixed gear—See Fig. 2. Then push the pulley ring all of the way on, engaging the movable gear.

Now lay the chassis on its back. Replace in the order given the large washer with rectangular hole, dial scale, washers, center stud, dial pointer, glass crystal, and escutcheon. Resolder the lamp lead.

For the No. 10 dial, before putting the escutcheon on, lay the two celluloid strips on the glass crystal with the inside flange facing away from the glass. Then lay the escutcheon on top of the celluloid strips. The section not cut out for station call letters should be at the wide spacer in the button spacer ring. Center the small holes in the celluloid discs in the station call letter openings and then tighten the escutcheon screws.

The stop pin must now be adjusted, as explained in article "Position of Stop Pin," until the condenser does not open or close fully. Injury to the condenser will result if allowed to open or close fully.

Replace the drive cord as explained in the article "Replacing Drive Cord."

### Replacing Gates

After a great amount of use, one or both of the stop gates may wear, making it necessary to replace the stop gate assembly. This is done by first removing the pulley ring assembly as explained in the article "Replacing Pulley and Button Ring Assembly."

The stop gate assembly is then removed by taking out the two screws at the bottom of the assembly

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# Phantom Light Dial - Replacing Drive Cord

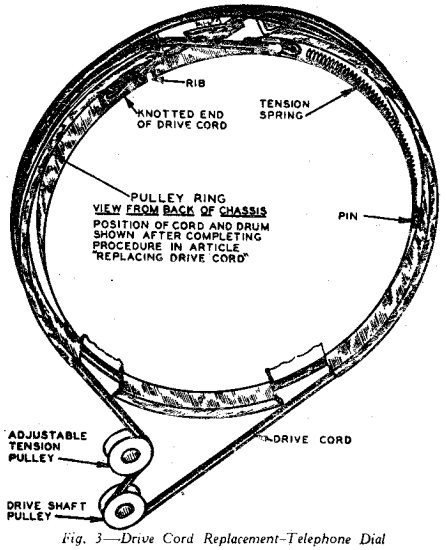


*Fig. 3—Drive Cord Replacement-Telephone Dial*

## Replacing a Telephone Dial Button or Button Shaft

A telephone dial button or button shaft may be replaced without removing the chassis from the cabinet.

Rotate the dial until the button shaft to be replaced is in the position shown in Fig. 4. Using a wooden wedge block or any other wedge, hold this button shaft in place as shown. Remove the clear celluloid disc and the call letter disc with the point of a pin from the button of the shaft to be replaced (No. 10 dial—brown opaque celluloid disc only).

Remove the hairpin spring from the front of this shaft, spreading it with an ice pick or screwdriver. Take off the button, metal washer, molded bushing, and spring. Take out the wedge block, remove the button shaft to be replaced from the back of the dial assembly and put in the new one. Then put the wedge block back in place again as illustrated.

Lay the cabinet back down against a chair so that it will be about 30 degrees from the vertical position.

Assemble the spring, molded bushing, metal washer, and button in the order shown in Fig. 5. (Last three items may be in one unit). Push the button and spring assembly over the button shaft with the tab of the metal washer in the normal position—See illustration in instruction book. Hold the tab and rotate the button until the flat in the shank coincides with the flat on the shaft. Push the button all of the way on.

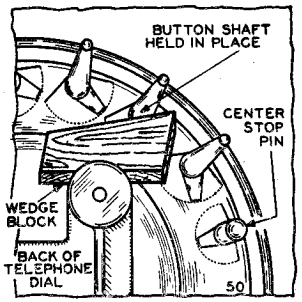


*Fig. 4—Holding a Push Button Shaft in Place*

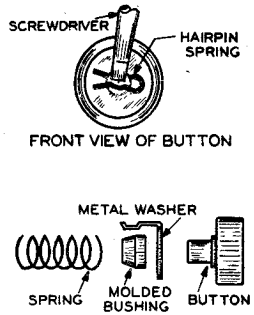


*Fig. 5—Putting a Hair Spring on a Push Button Shaft*

Put the hairpin spring in place, as shown in Fig. 5, with the upper part of the slot near the end of the button shaft and the lower part over the end of the shaft. Place the blade of a screwdriver at the center of the lower part of the spring and push down until the spring snaps into place in the slot on the shaft. Remove the wedge block.

Remove the dial assembly as follows: Take out the screw which secures the dial frame brace to the back of the gang condenser. Take out the two screws which secure the brackets on the bottom of the dial frame to the chassis. Lay the dial assembly face down in front of the chassis—it is not necessary to remove the volume control and tone control indicator cords.

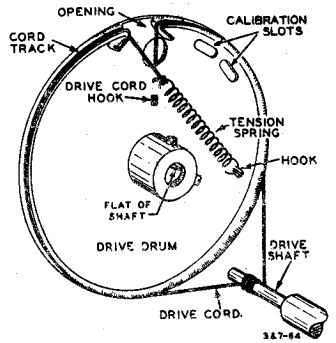


*Fig. 6—Drive Cord Replacement, Phantom Light Dial*

Remove the phantom light assembly from the drive drum by taking out the screw.

Take off the old cord and tension spring. Tie a knot with a small loop in it in one end of the new cord. Then tie the other end of this cord to the hook on the tension spring. The distance from the loop on one end to the tension spring is 17¾ inches.

From the front of the chassis, place the looped end of the cord through the drum hole located near the cord track opening, and hook it over the hook provided for it at the back of the drum.

Bring the cord up and around the right side of the drum, keeping the cord in the grooved track of the drum.

Bring the cord down to the right side of the drive shaft and wind it three and one-third times around this shaft progressing toward the back.

Then bring the cord up and around the left side of the drive drum. Hook the tension spring on the hook of the drive drum.

Replace the phantom light and the dial assembly.

## Phantom Light Dial Parts

See article "Identification of Dial and Chassis" in this manual in order to determine the correct dial and chassis assembly number.

Prices Subject to Change Without Notice.

| DESCRIPTION | No. 3 DIAL PARTS PART NO. | No. 3 DIAL PARTS LIST PRICE | No. 7 DIAL PARTS PART NO. | No. 7 DIAL PARTS LIST PRICE |
|---|---|---|---|---|
| **DIAL ASSEMBLY** | | | | |
| Dial Assembly, Complete with Dial Glass, Dial Assembly Mounting Plate, Brace, Support Bracket, Celluloid Dial Background, Indicator Tension Spring, Indicator Cords, Indicator Cord Takeup Collars, Side Reflectors, Lamp Sockets and Lamps, Fibre Strips, and Fibre Light Shield | Specify Type of Dial, Name on Dial or Escutcheon, Model or Series of Radio | $10.85 | Specify Type of Dial, Name on Dial or Escutcheon, Model or Series of Radio | $10.70 |
| Dial Glass Only (Series A1-A5) | See Above | .95 | See Above | .80 |
| Dial Glass Only (Series A4) | See Above | .95 | See Above | .70 |
| Celluloid Background for Dial (Series A1-A5) | 58X206 | .45 | 9X41 | .40 |
| Celluloid Background for Dial (Series A4) | 58X206 | .45 | 9X42 | .40 |
| Dial Assembly Mounting Plate with Tone & Volume Indicators, and Indicator Pulleys | 25X381 | .90 | 25X411 | 1.00 |
| Dial Assembly Brace (Attached to Gang Condenser) | 25X383 | .10 | 25X383 | .10 |
| Fibre Strip (At Back of Tone and Volume Indicator Lamps) | 11X58 | .10 | 11X58 | .10 |
| Tension Spring for Tone and Volume Indicators | 28X88 | .10 | 28X88 | .10 |
| 8" Black Cord for Indicators | | doz. .20 | | doz. .20 |
| Brass Collars with Set Screws—to secure Indicator Cords to Shafts | 29X20 | ea. .10 | 29X20 | ea. .10 |
| Dial Lamp Reflector (Right From Front) | 41X18 | .10 | 41X18 | .10 |
| Dial Lamp Reflector (Left From Front) | 41X17 | .10 | 41X17 | .10 |
| Dial Lamp Sockets and Clips (For Edge Lighting of Dial and Tone & Volume Indicators) | 7A62 | .10 | 7A62 | .10 |
| Dial Lamp Socket Assembly (4 Sockets) Less Lamps | 7A64 | .60 | 7A64 | .60 |
| Dial Lamp (No. 51 Bayonet Type) | 7A32 | .20 | 7A32 | .20 |
| Phantom Light Assembly Complete with Lamps (Series A1-A5) | 25A164 | 1.65 | 25A164 | 1.65 |
| Phantom Light Assembly Complete with Lamps (Series A4) | 25A207 | 1.30 | 25A207 | 1.30 |
| Springs for Lamps of Above Assembly | 28X86 | ea. .10 | 28X86 | ea. .10 |
| Brass Collars for Lamps of Above Assembly | 19X61 | .10 | 19X61 | .10 |
| Bracket (To secure Phantom Light Assembly to Drum) | 25X360 | .10 | 25X360 | .10 |
| Fibre Strip (At bottom of Dial Glass) | 11X59 | .10 | 11X59 | .10 |
| **DRIVE ASSEMBLY** | | | | |
| Tuning Shaft Only | 26X248 | .15 | 26X248 | .15 |
| Tuning Drive Cord—20" | | doz. .45 | | doz. .45 |
| Tension Spring for Above Cord | 28X27 | ea. .10 | 28X27 | ea. .10 |
| Drive Drum & Hub | 24X279 | .40 | 24X279 | .40 |
| Rubber Cushion (Front) for Assembly Mounting | 8X43 | ea. .10 | 8X43 | ea. .10 |
| Rubber Cushion (Rear)—Gang Mounting | 8X44 | ea. .10 | 8X44 | ea. .10 |
| Rubber Cushion (Rear—under Chassis)—Gang Mounting | 8X45 | ea. .10 | 8X45 | ea. .10 |
| Rear Mounting Foot for Gang Condenser | 25X283 | .10 | 25X283 | .10 |
| Support Bracket and Drive Shaft Bushing for Gang Condenser | 25X380 | .45 | 25X380 | .45 |

MODEL 762
MODEL 774
MODEL 776
Telephone Dial
Parts List

GAMBLE-SKOGMO, INC.

# Telephone Dial Replacement Parts

**See article "Identification of Dial and Chassis" in this manual in order to determine the correct dial and chassis assembly number.**

## Replacing Drive Cord

Remove the old drive cord and tension spring. Rotate telephone dial clockwise (from back of chassis) as far as it will go.

Viewing the pulley ring drum from above and to the back, place the knotted end of the drive cord in the slot provided for it, catching the knot in back of the rib as shown in Fig. 3.

Bring the cord down and around the right side (from back) of the drum at front part of groove in pulley ring drum and under the drive shaft pulley making one-half turn on this pulley. Then bring the cord around the right side (from back) of the adjustable tension pulley and up to the upper left side of the pulley ring drum in front of the cord already on.

Hold the cord in the left hand and rotate the dial counter-clockwise with the right hand. Feed the cord on the drum in such a way that after passing the two openings at the top of the pulley ring drum, it passes to the back of the groove in the drum. After the pulley ring drum makes one complete revolution, place the cord through the left drum opening into the slot and secure the tension spring hook over the pin provided for it—See Fig. 3.

| DESCRIPTION | No. 9 DIAL PARTS | | No. 11 DIAL PARTS | | No. 10 DIAL PARTS | |
|---|---|---|---|---|---|---|
| | PART NO. | LIST PRICE | PART NO. | LIST PRICE | PART NO. | LIST PRICE |
| Pulley, Button Ring and Gang Cond. Assy. complete with Buttons, Dial Scale, Pointer and Glass Crystal (A1, A2, A5, and A7 Chassis) | 11A103 | $23.20 | 11A121 | $23.40 | 11A114 | $25.50 |
| Pulley, Button Ring, and Gang Condenser Assembly, as above (A3 Chassis) | 11A111 | 24.60 | 11A120 | 25.00 | 11A113 | 27.00 |
| Support Casting for above | 25X368 | 1.35 | 25X368 | 1.35 | 25X410 | 1.45 |
| Brace for above Casting (over Tuning Cond.) (A1, A2, A5, and A7 Chassis) | 25X371 | .15 | 25X371 | .15 | 25X371 | .15 |
| Brace as above (A3 Chassis) | 25X367 | .20 | 25X367 | .20 | 25X367 | .20 |
| Hex. Brass Stud (Support Bracket Mounting) | 20X152 | .04 | 20X152 | .04 | 20X152 | .04 |
| Rubber Grommet for above Stud | 6X8 | .10 | 6X8 | .10 | 6X8 | .10 |
| "L" Bracket—Rear Gang Mounting (A1, A2, A5, and A7 Chassis) | 25X362 | .08 | 25X362 | .08 | 25X362 | .08 |
| "L" Bracket—Rear Gang Mounting (A3 Chassis) | 25X382 | .10 | 25X282 | .10 | 25X382 | .10 |
| Stud (Rear Gang Mounting) | 20X150 | .08 | 20X150 | .08 | 20X150 | .08 |
| Rubber Washer for Gang Mounting on "L" Bracket | 2X236 doz. | .15 | 2X236 doz. | .15 | 2X236 doz. | .15 |
| Rubber Grommet for Gang Mounting on "L" Bracket | 6X16 doz. | .30 | 6X16 doz. | .30 | 6X16 doz. | .30 |
| Rubber Cushions for Support Bracket (Front) | 8X43 | .10 | 8X43 | .10 | 8X43 | .10 |
| Drive Cord Tension Spring | 28X114 doz. | .35 | 28X114 doz. | .35 | 28X114 doz. | .35 |
| Drive Cord | 10X23 | .65 | 10X23 | .65 | 10X23 | .65 |
| Cord Tension Adjustment Assembly complete | 26A59 | .20 | 26A59 | .20 | 26A59 | .20 |
| Drive Shaft only (Tuning) | 26X245 | .10 | 26X245 | .10 | 26X245 | .10 |
| Front Brass Bearing Race and Drive Pulley for Drive Shaft | 29X74 | .10 | 29X74 | .10 | 29X74 | .10 |
| Rear Brass Bearing Race for Drive Shaft | 29X73 | .15 | 29X73 | .15 | 29X73 | .15 |
| 8 Ball Bearings in Retainer (Two sets used on above Shaft) | 20X151 | .10 | 20X151 | .10 | 20X151 | .10 |
| Horseshoe Washer for Drive Shaft | 19X67 doz. | .15 | 19X67 doz. | .15 | 19X67 doz. | .15 |
| Gate Assembly complete | 25A154 | .45 | 25A154 | .45 | 25A154 | .45 |
| Spring only for Gate Assembly | 28X45 doz. | .10 | 28X45 doz. | .10 | 28X45 doz. | .10 |
| Condenser Drive Gear Assembly complete | 25A153 | .60 | 25A153 | .60 | 25A153 | .60 |
| Gear Spreader Spring for above | 28X102 doz. | .20 | 28X102 doz. | .20 | 28X102 doz. | .20 |
| Pulley and Button Ring complete (Less Dial Crystal, Dial Crystal Escutcheon, Dial Scale, Dial Scale Washers, Dial Pointer and Stud, and Dial Lamps and Sockets) | 26A61 | 11.50 | 26A62 | 11.50 | 26A62 | 11.50 |
| Pulley Ring Casting only | 25A162 | 3.20 | 25A162 | 3.20 | 25A162 | 3.20 |
| Button Spacer Ring only | 24X273 | 1.70 | 24X285 | 1.70 | 24X285 | 1.70 |
| Silencer Contact Ring | 30X79 | .30 | 30X79 | .30 | 30X79 | .30 |
| Push Button Assembly complete (Including Hairpin Spring, Button Spring, Push Button, Button Bushing, Button Shaft, Metal Washer and Tab) | 26A63 | .40 | 26A64 | .40 | 26A64 | .40 |
| Push Button only | 10A105 | .10 | 10A111 | .10 | 10A111 | .10 |
| Metal Washer and Tab | 19X66 | .10 | 19X66 | .10 | 19X66 | .10 |
| Bakelite Bushing for Push Button | 10A104 | .10 | 10A104 | .10 | 10A104 | .10 |
| Shaft for Push Buttons | 26X238 | .15 | 26X238 | .15 | 26X238 | .15 |
| Hairpin Springs for Push Button Assembly | 28X111 doz. | .10 | 28X111 doz. | .10 | 28X111 doz. | .10 |
| Springs for Push Buttons | 28X109 doz. | .10 | 28X126 doz. | .10 | 28X126 doz. | .10 |
| Stop Pin Shaft Assembly (Behind Wide Spacer) | 26A60 | .30 | 26A60 | .30 | 26A60 | .30 |
| Stop Pin Shaft | 26X244 | .25 | 26X244 | .25 | 26X244 | .25 |
| Spring for above Stop Pin | 28X112 doz. | .10 | 28X112 doz. | .10 | 28X112 doz. | .10 |
| Dial Scale (Specify Type of Dial, Name of Radio, and Series or Model Number) | | .55 | | .55 | | 1.20 |
| Washer, Dial Spacer (Large with rectangular hole) | 19X74 doz. | .10 | 19X74 doz. | .10 | 19X74 doz. | .10 |
| Washer, Dial Clamp (Small with round hole) | 19X73 doz. | .10 | 19X73 doz. | .10 | 19X73 doz. | .10 |
| Dial Pointer | 15X95 | .20 | 15X95 | .20 | 15X95 | .20 |
| Dial Pointer Cap | 15X96 | .10 | 15X104 | .10 | 15X104 | .10 |
| Dial Pointer Stud | 20X171 | .10 | 20X171 | .10 | 20X171 | .10 |
| Glass Crystal | 17X21 | .15 | 17X21 | .15 | 17X21 | .15 |
| Glass Crystal Escutcheon | 4X174 | .45 | 4X196 | .40 | 4X184 | .40 |
| Dial Lamp Socket | 7A62 ea. | .10 | 7A62 ea. | .10 | 7A62 ea. | .10 |
| Dial Lamp Socket Assembly (3 Sockets) Less Lamps | 7A63 | .50 | 7A63 | .50 | 7A63 | .50 |
| Dial Lamp (No. 51 Bayonet Type) | 7A32 | .20 | 7A32 | .20 | 7A32 | .20 |
| Celluloid Dial Light Diffusers | 41X16 | .10 | 41X16 | .10 | 41X16 | .10 |
| Silencer Contact Spring Assembly | 26A57 | .10 | 26A57 | .10 | 26A57 | .10 |
| Complete Set of Station Call Letter Discs with 25 Celluloid Discs | 26A56 | .35 | 26A56 | .35 | 26A56 | .35 |
| Tone Indicator Assembly (Less Dial Light Socket and Dial Lights, Take up Cord and Collar) | | | | | 26A65 | .35 |
| Celluloid Indicator and Arm (Tone or Volume) | | | | | 26A67 | .20 |
| Indicator Mounting Bracket (Tone) | | | | | 25X407 | .10 |
| Spring for Tone or Volume Indicator | | | | | 28X133 doz. | .60 |
| Brass Collar, Cord Take up (Tone or Volume) | | | | | 29X20 | .10 |
| 3" Tone and Volume Indicator Cord | | | | | doz. | .10 |
| Volume Indicator Assembly (Less Dial Light Socket, Dial Light, Take up Cord and Collar) | | | | | 26A66 | .35 |
| Indicator Mounting Bracket (Volume) | | | | | 25X408 | .10 |
| Call Letter Holder, Celluloid | | | | | 58X254 | .25 |
| Brown Opaque Discs for Telephone Dial Buttons | | | | | 58X217 doz. | .10 |
| Dial Lamp Socket Assembly (For Tone or Volume Indicator) | | | | | 7A57 | .10 |
| Paper Light Diffuser—Circular 4⅝" Diameter | | | | | 41X22 | .10 |
| Complete Set of Station Call Letter Cards | | | | | 26A58 | .40 |
| Blank Sheet of Call Letter Cards (Used for Export Sets Only) | | | | | 58X240 | .15 |

Prices Subject to Change Without Notice.

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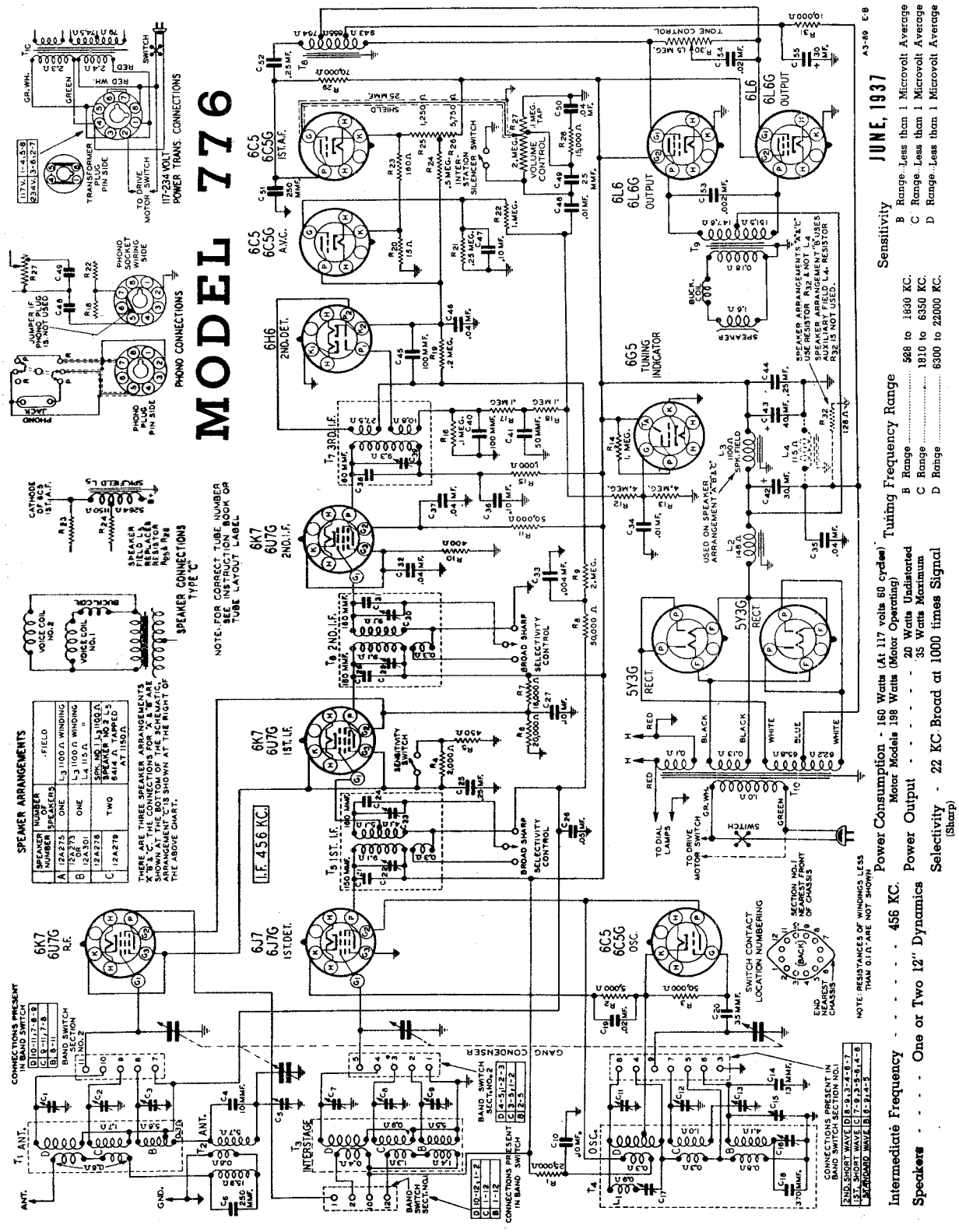
GAMBLE-SKOGMO, INC.

MODEL 776
Schematic, Phono.
Speaker Data


MODEL 776
JUNE, 1937
A3-89 E8
Intermediate Frequency - - - - - - - 456 KC.
Speakers - - - - One or Two 12" Dynamics
Power Consumption - 160 Watts (At 117 volts 60 cycles)
Motor Models 198 Watts (Motor Operating)
Power Output - - - - - - - 20 Watts Undistorted
35 Watts Maximum
Selectivity - 22 KC. Broad at 1000 times Signal
(Sharp)
Tuning Frequency Range
Sensitivity
B Range..Less than 1 Microvolt Average
C Range..Less than 1 Microvolt Average
D Range..Less than 1 Microvolt Average
B Range ..... 568 to 1830 KC.
C Range ..... 1810 to 6350 KC.
D Range ..... 6300 to 22000 KC.
SPEAKER ARRANGEMENTS
SPEAKER CONNECTIONS TYPE "C"
PHONO CONNECTIONS
NOTE: FOR CORRECT TUBE NUMBER SEE INSTRUCTION BOOK OR TUBE LAYOUT LABEL.
I.F. 456 KC.
6K7 6U7G R.F.
6J7 6J7G 1ST. DET.
6K7 6U7G 1ST. I.F.
6K7 6U7G 2ND. I.F.
6H6 2ND. DET.
6C5 6C5G A.V.C.
6C5 6C5G 1ST. A.F.
6C5 6C5G OSC.
6L6 6L6G OUTPUT
6G5 TUNING INDICATOR
5Y3G RECT.
GANG CONDENSER
SELECTIVITY CONTROL
BROAD SHARP
SENSITIVITY SWITCH
TONE CONTROL
VOLUME CONTROL
SWITCH CONTACT LOCATION NUMBERING
NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN

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MODEL 776
Alignment, Socket
Trimmers, Voltage
Coils, Notes

# GAMBLE-SKOGMO, INC.

## ALIGNMENT PROCEDURE

Local-Distance Switch — Distance Position.
Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

| STEP (Follow Order as Given) | BAND SWITCH SETTING | DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | TRIMMERS ADJUSTED See Illustration | PROCEDURE INITIAL STEPS | PROCEDURE ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| I.F. | | | | | | | |
| 3rd I.F. | Range B | .1 mf. | 456 KC | Grid of 2nd I.F. Tube | 3rd I.F. (C39) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 2nd I.F. | Range B | .1 mf. | 456 KC | Grid of 1st I.F. Tube | 2nd I.F. (C29) & (C30) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1st I.F. | Range B | .1 mf. | 456 KC | Grid of 1st Det. | 1st I.F. (C22) & (C23) | Turn Rotor to Full Open | Adjust to Maximum Output |
| RANGE B | | | | | | | |
| 1830 KC | Range B | 200 mmf. | 1830 KC | Antenna Lead | Oscillator Range B (C15) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1500 KC | Range B | 200 mmf. | 1500 KC | Antenna Lead | 1st & 2nd Ant. Range B (C5) & (C3)—Int. Range B (C9) | Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | Adjust to Maximum Output |
| 600 KC | Range B | 200 mmf. | 600 KC | Antenna Lead | 600 KC (C16) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |
| RANGE C | | | | | | | |
| 6350 KC | Range C | 400 Ohm | 6350 KC | Antenna Lead | Oscillator Range C (C12) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 6000 KC | Range C | 400 Ohm | 6000 KC | Antenna Lead | Ant. Range C (C2) Int. Range C (C8) | Turn Rotor to Max. Output | Adjust to Maximum Output |
| 2000 KC | Range C | 400 Ohm | 2000 KC | Antenna Lead | 2000 KC (C13) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |
| RANGE D | | | | | | | |
| 22,000 KC | Range D | 400 Ohm | 22,000 KC | Antenna Lead | Oscillator Range D (C11) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 20,000 KC | Range D | 400 Ohm | 20,000 KC | Antenna Lead | Ant. Range D (C1) Int. Range D (C7) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |
| 7000 KC | Range D | 400 Ohm | 7000 KC | Antenna Lead | 7000 KC (C17) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |

**Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.**

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

On the electric drive models, the pointer is held to the shaft by a friction clip arrangement. With the electric-manual lever in the manual position, hold the tuning knob and move the pointer to the 1500 KC mark on the dial.

In sets using any other type of dial mechanism, it will be necessary to adjust the position of the indicator until it is at the 1500 KC mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

**NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.**

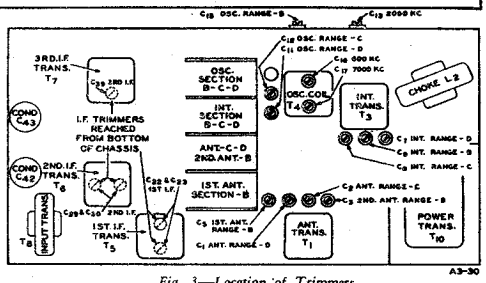



*Fig. 3—Location of Trimmers*

## VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control Maximum
Local-Distance Switch in Distance Position
Readings taken with 1000 Ohm-per-volt meter

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

| TUBE | FUNCTION | VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated) Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 |
|---|---|---|---|---|---|---|---|---|---|
| 6K7—6U7G | R.F. | 0 | 6.1(1) | 250 | 130 | 10.0(2) | | 6.1(1) | 10.0(2) |
| 6J7—6J7G | 1st Det. | 0 | 6.1(1) | 250 | 115 | 0 | | 6.1(1) | 6.0 |
| 6C5—6C5G | Osc. | 0 | 6.1(1) | 115 | | | | 6.1(1) | 0 |
| 6K7—6U7G | 1st I.F. | 0 | 6.1(1) | 250 | 130 | 10.0(2) | | 6.1(1) | 10.0(2) |
| 6K7—6U7G | 2nd I.F. | 0 | 6.1(1) | 240 | 130 | 5.0 | | 6.1(1) | 5.0 |
| 6H6 | 2nd Det. | 0 | 6.1(1) | | | | | 6.1(1) | 0 |
| 6C5—6C5G | A.V.C. | 0 | 6.1(1) | 5(3) | | | | 6.1(1) | .5 |
| 6C5—6C5G | 1st A.F. | 0 | 6.1(1) | 145 | | | | 6.1(1) | 6.0 |
| 6L6—6L6G | Output | 0 | 6.1(1) | 330 | 250 | 21(4) | | 6.1(1) | 0 |
| 5Y3G | Rectifier | 0 | 4.7(5) | | 1100(6) | | 1100(6) | | 4.7(5) |
| 6G5 | Tuning Indicator | Plate to Ground 20(3) | | Target to Ground 250 | | Cathode to Ground 0 | | Across Heater 6.1 A.C. | |

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with a 1000 Ohm-per-volt meter (500 volt scale).
(4) Bias as read across L4 or R32, depending on speaker arrangement. See Schematic Diagram.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

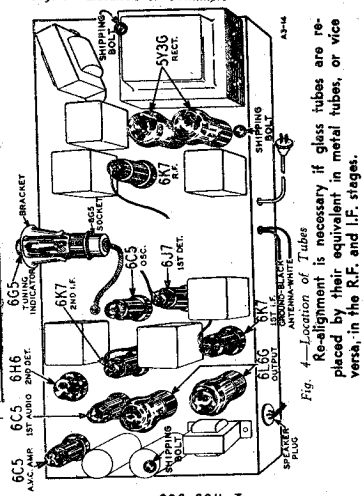
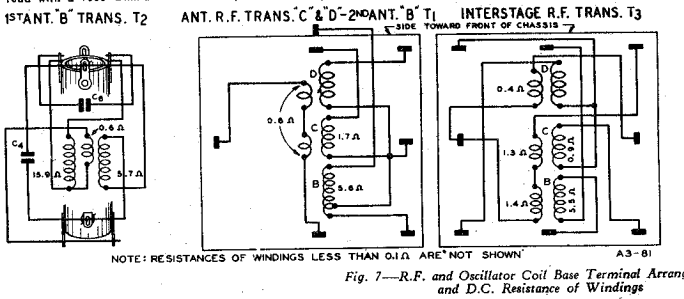



*Fig. 4—Location of Tubes*

**Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.**


1ST ANT. "B" TRANS. T2
ANT. R.F. TRANS. "C" & "D"
2ND ANT. "B" T1
INTERSTAGE R.F. TRANS. T3
SIDE TOWARD FRONT OF CHASSIS
NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1Ω ARE NOT SHOWN
A3-81

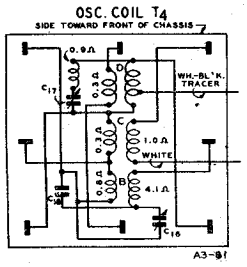



*Fig. 7—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings*

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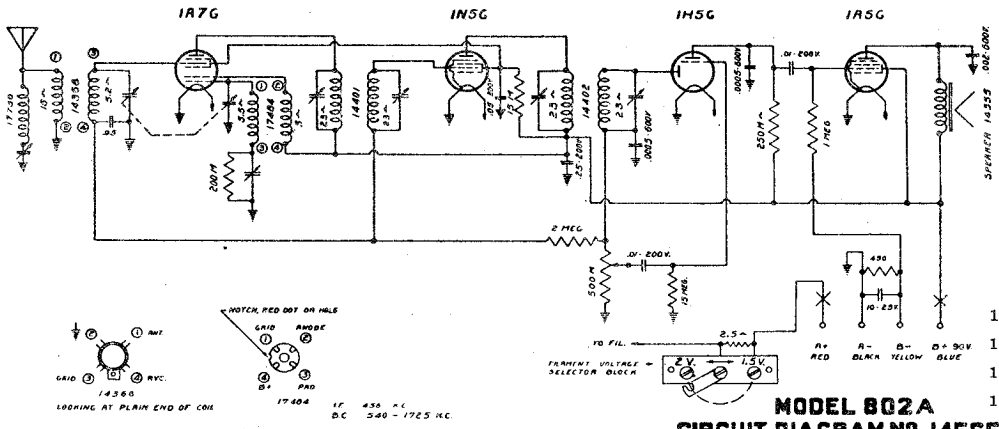
Schematics, Parts

# GAMBLE-SKOGMO, INC.

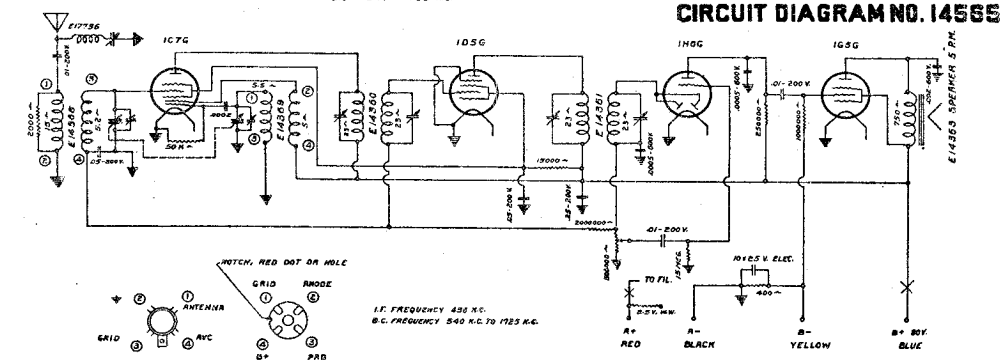
MODEL 802A
MODEL 806A
MODEL 813A
MODEL 813B




## MODEL 802A
## CIRCUIT DIAGRAM NO. 14565

### Model 802-A

| Part No. | Description |
|---|---|
| 14368 | Coil—Antenna ..... |
| 17484 | Coil—Oscillator ..... |
| 14464 | Condenser—Tuning .. |
| 17451 | Control—Volume with Switch ..... |
| 14589 | Disc—Dial Pointer with Hub ..... |
| 14555 | Speaker—5" P. M. .... |
| 14401 | Transformer—IF Input |
| 14402 | Transformer—IF Output |
| 17736 | Trap—Wave ..... |

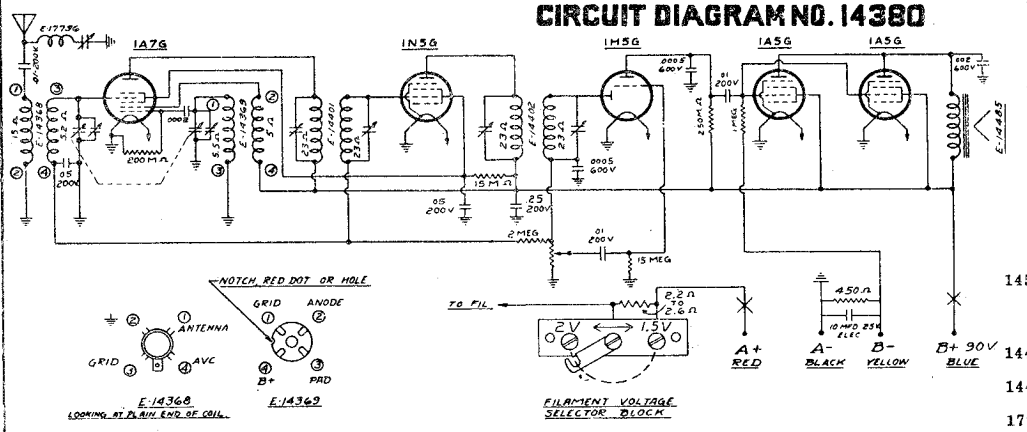



## MODEL 806A
## CIRCUIT DIAGRAM NO. 14380

### SERVICE - PARTS
MODEL ——— 806A

| Part | List Price |
|---|---|
| 14368 COIL ANT | .60 |
| 14369 COIL OSC | .60 |
| 14305 COND TUNING | 2.50 |
| 14357 CABLE BAT | 1.00 |
| 14358 CONTROL VOL | .75 |
| 14316 KNOB LARGE | .20 |
| 14359 KNOB SMALL | .15 |
| 14317 POINTER | .10 |
| 14319 SCALE DIAL | .25 |
| 14363 SPEAKER | 3.50 |
| 14360 I. F. INPUT | 1.30 |
| 14361 I. F. OUTPUT | 1.30 |
| 17736 TRAP WAVE | .50 |
| 17582 RESISTOR (DRY CELL) | .30 |

ORDER CONDENSERS AND RESISTORS BY VALUE ON DIAGRAM.

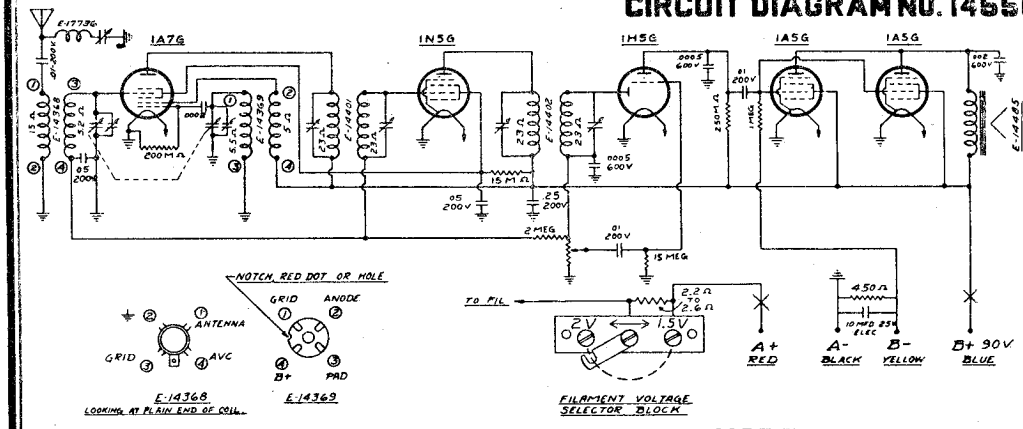



I.F. - 456 K.C.
B.C. FREQUENCY: 540 KC TO 1725 KC

## MODEL 813B
## CIRCUIT DIAGRAM NO. 14556

### Model 813-B

| Part No. | Description |
|---|---|
| 14384 | Button Push ..... |
| 14437 | Belt—Tuning ..... |
| 14368 | Coil—Antenna ..... |
| 14369 | Coil—Oscillator .... |
| 14455 | Condenser—Tuning |
| 14573 | Tuning Unit Assembly complete with tuning condenser ..... |
| 14401 | Transformer—IF Input |
| 14402 | Transformer—IF Output |
| 17736 | Trap—Wave ..... |




I.F. - 456 K.C.
B.C. FREQUENCY: 540 KC TO 1725 KC

## MODEL 813A
## CIRCUIT DIAGRAM NO. 14556

| Part No. | Description |
|---|---|
| 14384 | Button Push ..... |
| 14437 | Belt—Tuning ..... |
| 14368 | Coil—Antenna .... |
| 14369 | Coil—Oscillator .... |
| 14455 | Condenser—Tuning |
| 14475 | Control—Volume ... |
| 14345 | Dial—Scale ..... |
| 14425 | Escutcheon—Dial with Crystal ..... |
| 14485 | Speaker—5 Inch PM. |
| 14364 | Socket—Octal ..... |
| 14401 | Transformer—IF Input |
| 14402 | Transformer—IF Output |
| 17736 | Trap—Wave ..... |

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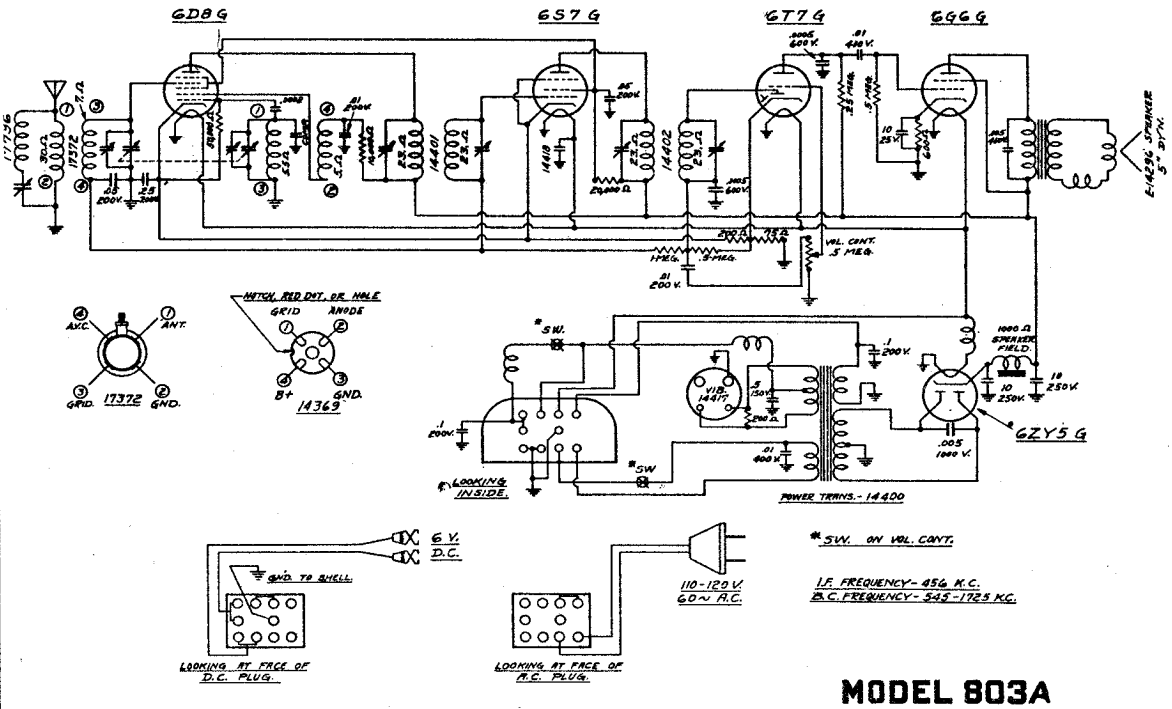
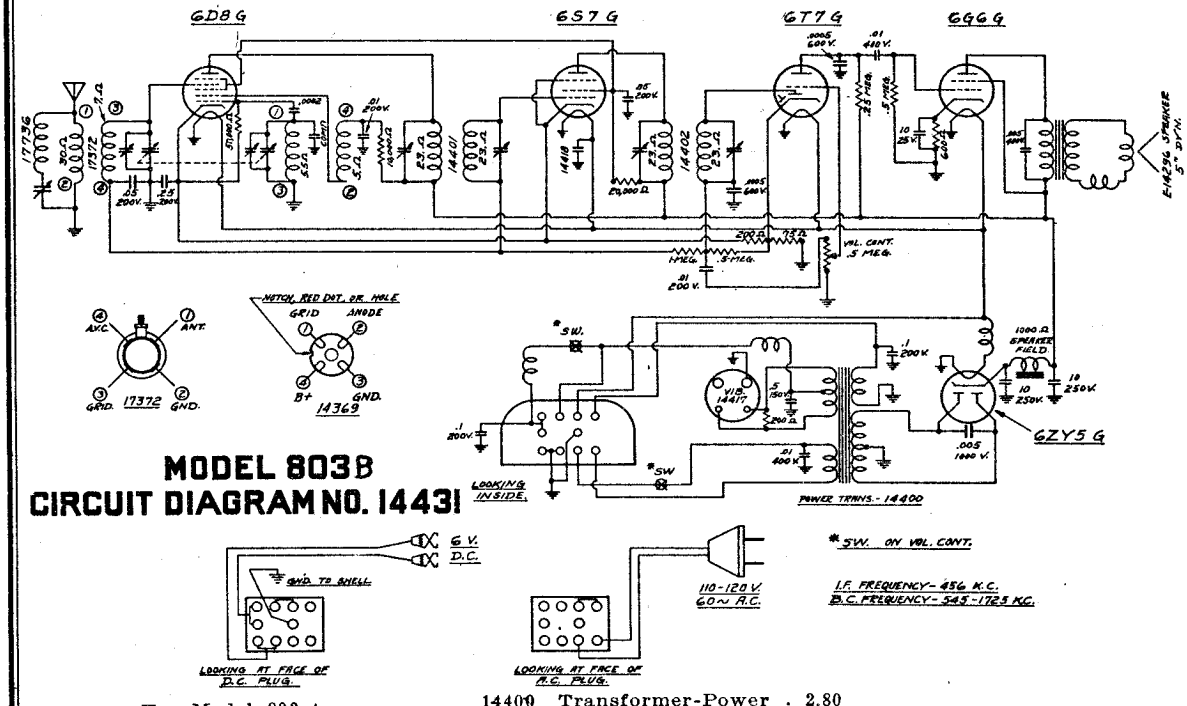
MODEL 803A
MODEL 803B

# GAMBLE-SKOGMO, INC.

Schematics




## MODEL 803A
## CIRCUIT DIAGRAM NO. 14431




## MODEL 803B
## CIRCUIT DIAGRAM NO. 14431

## CHANGES IN ABOVE CIRCUIT FOR 803-B

Speaker field is replaced with filter choke No. 17790
Speaker changed to 6½ P. M.

For Model 803 A.

| Part No. | Name | List Price |
|---|---|---|
| 14429 | Clip "A" Battery .... | .15 |
| 14403 | Condenser - Filter 10-250-10-250 ..... | .90 |
| 17080 | Condenser - Filter 10-25 ..... | .60 |
| 14399 | Control - Volume with Switch ..... | 1.50 |
| 14369 | Coil-Oscillator ..... | .60 |
| 17372 | Coil-Antenna ..... | .80 |
| 14404 | Transformer-Speaker | .70 |
| 17736 | Trap-Wave ..... | .50 |
| 14400 | Transformer-Power . | 2.80 |
| 14401 | Transformer - I. F. Input ..... | 1.20 |
| 14402 | Transformer - I. F. Output ..... | 1.20 |
| 14417 | Vibrator-6 Volt ..... | 2.50 |

For Model 803-B

| Part No. | Name | List Price |
|---|---|---|
| 14403 | Condenser - Filter 10-250-10-250 ..... | .90 |
| 17080 | Condenser - Filter 10-25 ..... | .60 |
| 17790 | Choke—Filter ..... | .80 |
| 14369 | Coil-Oscillator ..... | .60 |
| 17372 | Coil-Antenna ..... | .80 |
| 14571 | Control—Volume with Switch ..... | 1.50 |
| 14404 | Transformer-Speaker | .70 |
| 17736 | Trap-Wave ..... | .50 |
| 14400 | Transformer-Power . | 2.80 |
| 14401 | Transformer - I. F. Input ..... | 1.20 |
| 14402 | Transformer - I. F. Output ..... | 1.20 |
| 14417 | Vibrator-6 Volt ..... | 2.50 |

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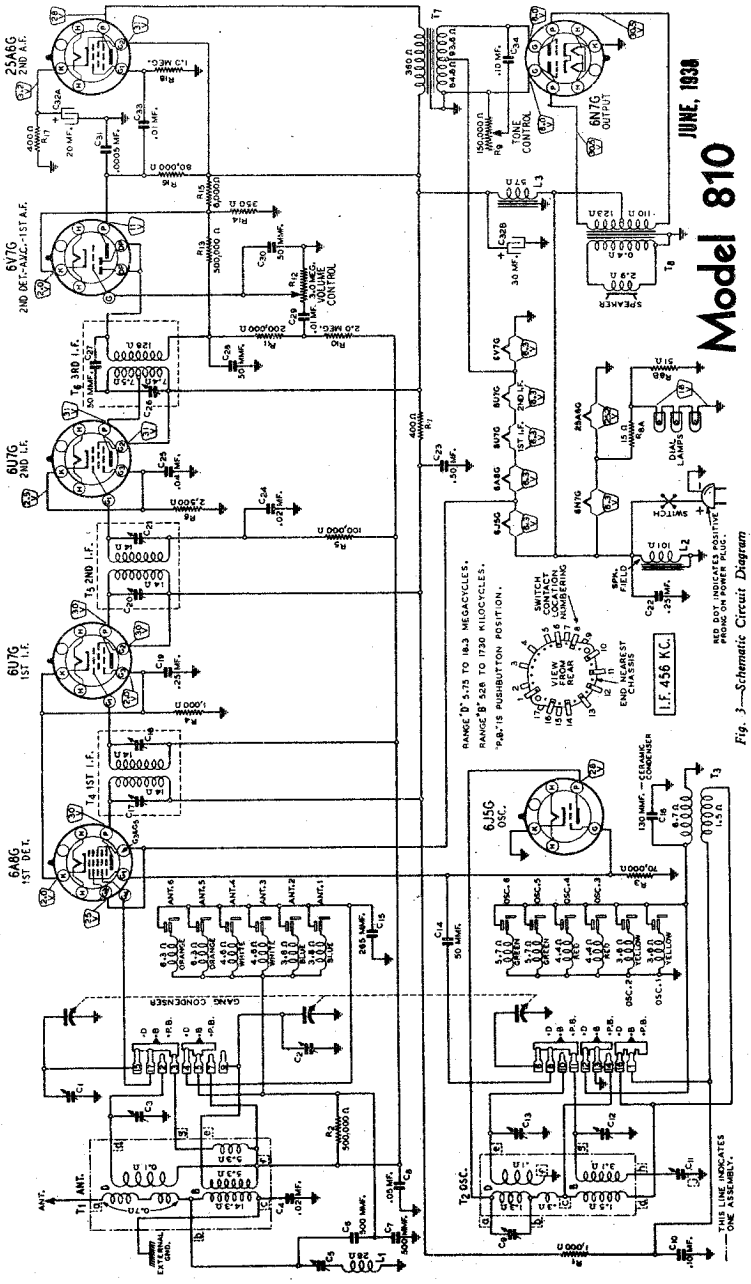
Socket,Tuner,Coils
Sensitivity

# GAMBLE SKOGMO, INC.

MODEL 810(1938)
Schematic,Voltage

## SPECIFICATIONS

Power Consumption - 1.45 Amperes at 32 Volts DC
Power Output - - - - - - - .17 Watts Undistorted
.40 Watts Maximum
Selectivity - - 30 KC Broad at 1000 times Signal
Sensitivity
B Range (Manual Tuning).....6.0 Microvolts Average
B Range (Automatic Tuning).....6.0 Microvolts Average
D Range .....6.0 Microvolts Average
Intermediate Frequency - - - - - - - - 456 KC
Speaker - - - - - - - - - - - - - 8" Dynamic
Tuning Frequency Range
B Range (Manual Tuning)....528 to 1730 KC (Kilocycles)
D Range (Manual Tuning)....5750 to 18300 KC (Kilocycles)
Buttons 1 and 2 (Automatic Tuning).....820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning).....550 to 1250 KC
Buttons 5 and 6 (Automatic Tuning).....520 to 980 KC



MODEL 810(1938)
Alignment, Trimmers

GAMBLE-SKOGMO, INC.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| **I. F.** | | | | | 1st I.F. (C17) & (C18)<br>2nd I.F. (C20) & (C21)<br>3rd I.F. (C26) |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | |
| **WAVE TRAP** | | | Push Button Position Button No. 6 Depressed | | Wave Trap (C5) Adjust for MINIMUM Output |
| 456 KC | Antenna Lead | 200 mmf. | | | |
| **RANGE B** | | | | | |
| 1730 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C12) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | 1st Ant. Range B (C2)<br>2nd Ant. Range B (C1) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C11) Rock Rotor—See Note B |
| **RANGE D** | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C13) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C3) Rock Rotor—See Note B |
| 6000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | 6000 KC (C9) Rock Rotor—See Note B |
| **PERMEABILITY TUNING UNIT** | | | BUTTON DEPRESSED (Band Switch in Push Button Position) | TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book | ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note C |
| 1100 KC | Antenna Lead | 200 mmf. | No. 1 | Setting Screw No. 1 | Antenna Coil No. 1 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 2 | Setting Screw No. 2 | Antenna Coil No. 2 |
| 850 KC | Antenna Lead | 200 mmf. | No. 3 | Setting Screw No. 3 | Antenna Coil No. 3 |
| 850 KC | Antenna Lead | 200 mmf. | No. 4 | Setting Screw No. 4 | Antenna Coil No. 4 |
| 700 KC | Antenna Lead | 200 mmf. | No. 5 | Setting Screw No. 5 | Antenna Coil No. 5 |
| 700 KC | Antenna Lead | 200 mmf. | No. 6 | Setting Screw No. 6 | Antenna Coil No. 6 |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

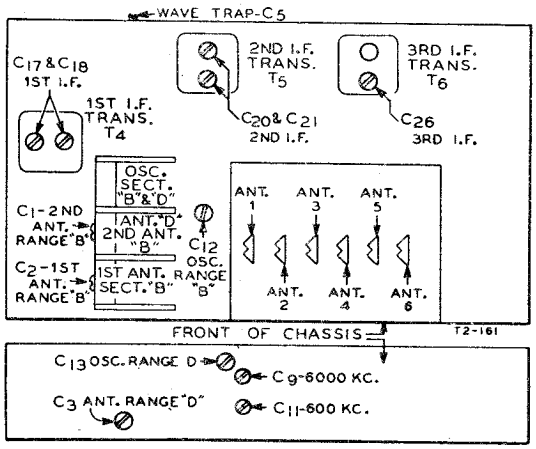



*Fig. 2—Trimmer Location*

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

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GAMBLE-SKOGMO, INC.

MODEL 867A
Schematic, Voltage
Parts

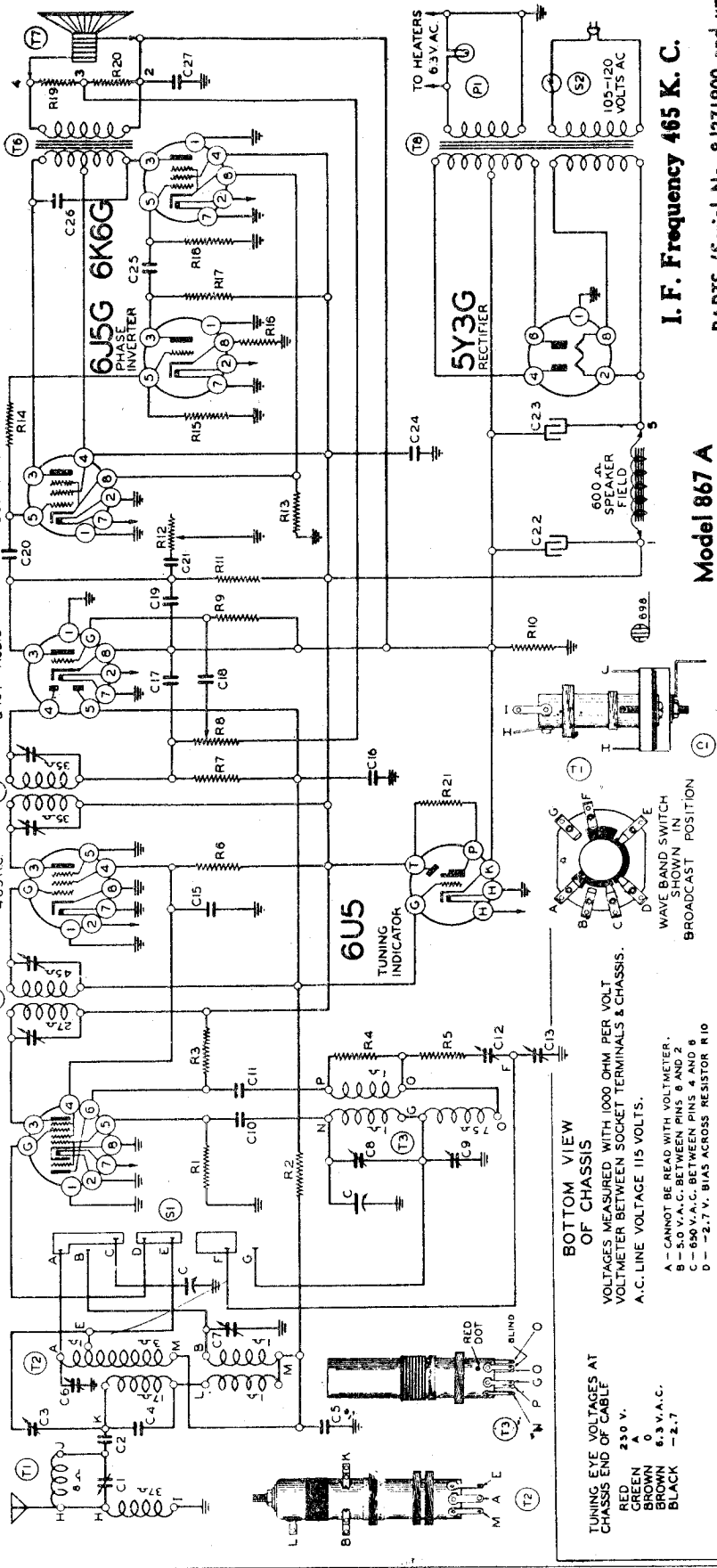
I. F. Frequency 465 K. C.
Model 867 A
6K8G MIXER
6K7 I.F. AMP 465 KC.
6Q7G 2ND DET AVC. & 1ST AUDIO
6K6G PUSH PULL OUT PUT
6J5G PHASE INVERTER
6K6G
5Y3G RECTIFIER
6U5 TUNING INDICATOR
TO HEATERS 6.3 V AC.
105-120 VOLTS AC
600 Ω SPEAKER FIELD
WAVE BAND SWITCH SHOWN IN BROADCAST POSITION
BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
A – CANNOT BE READ WITH VOLTMETER.
B – 5.0 V.A.C. BETWEEN PINS 8 AND 2
C – 650 V.A.C. BETWEEN PINS 4 AND 6
D – –2.7 V. BIAS ACROSS RESISTOR R10
TUNING EYE VOLTAGES AT CHASSIS END OF CABLE
RED 250 V.
GREEN A
BROWN 6.3 V.A.C.
BROWN
BLACK –2.7
RED DOT
BLIND
SPEAKER
REAR OF CHASSIS

FIG. 5

PARTS (Serial No. 8J27 1900 and up)

| Diagram Ref. No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 13094 | 50M ohm—½ w. |
| R2 | 13011 | 250M ohm—½ w. |
| R3 | 13030 | 25M ohm—1 watt |
| R4 | 13031 | 1500 ohm—½ w. |
| R5 | 130231 | 75 ohm—½ w. |
| R6 | 13030 | 25M ohm—1 watt |
| R7 | 1304 | 3 megohm—½ w. |
| R8 | 101144 | 1 megohm volume control |
| R9 | 130225 | 15 megohm—½ w. |
| R10 | 130240 | 30 ohm—½ w. |
| R11 | 130103 | 100M ohm—½ w. |
| R12 | 101145 | 1 megohm tone control |
| R13 | 130220 | 300 ohm—1 watt |
| R14 | 130163 | 400M ohm—½ w. |
| R15 | 130103 | 100M ohm—½ w. |
| R16 | 130218 | 5M ohm—½ w. |
| R17 | 13094 | 50M ohm—½ w. |
| R18 | 130102 | 500M ohm—½ w. |
| R19 | 130168 | 100 ohm —½ w. |
| R20 | 130215 | 25 ohm—½ w. |
| R21 | 130110 | 1 megohm— 1/10 in tuning indicator socket |
| | | **CONDENSERS** |
| C | 10292 | 2 gang variable condenser |
| C1 | 12467 | Wave Trap Trimmer |
| C2 | 10011 | .01 x 400 v. |
| C3 | 12468 | Image Adj. Trimmer |
| C4 | 129132 | .000125 mica |
| C5 | 129131 | .002775 mica |
| C6 | 12469 | B. C. Antenna Trimmer |
| C7 | 12469 | S. W. Antenna Trimmer |
| C8 | 12470 | S. W. Oscillator trimmer |
| C9 | 12470 | B. C. Oscillator Trimmer |
| C10 | 12939 | .00005 mica. |
| C11 | 10025 | .002 x 600 v. |
| C12 | 12466 | .000422 compression type B. C. Oscillator Pad |
| C13 | 12466 | .001366 compression type S. W. Oscillator Pad |
| C15 | 1001 | .1 x 400 v. |
| C16 | 1009 | .05 x 200 v. |
| C17 | 1295 | .0001 mica |
| C18 | 10019 | .006 x 600 v. |
| C19 | 1292 | .0005 mica |
| C20 | 10026 | .02 x 400 v. |
| C21 | 10013 | .05 x 400 v. |
| C22 | 11974 | 10 mfd. lytic—350 w. v. |
| C23 | 11973 | 16 mfd. lytic—400 w. v. |
| C24 | 1001 | .1 x 400 v. |
| C25 | 10026 | .02 x 400 v. |
| C26 | 10012 | .003 x 600 v. |
| C27 | 10020 | .1 x 200 v. |
| | | **PARTS** |
| T1 | 108125 | Wave Trap |
| T2 | 111112 | B. C. and S. W. Antenna Coils |
| T3 | 11098 | B. C. and S. W. Oscillator Coils |
| T4 | 108105B | Input I. F.—465 kc. |
| T5 | 108106M | Output I. F.—465 kc. |
| T6 | 10554B | Output Transformer |
| T7 | 114135 | 8" Dynamic Speaker (600 ohm field) |
| T7 | 114136 | 10" Dynamic Speaker (600 ohm field) |
| T8 | 104143B | Power Transformer |
| S1 | 12568 | Wave Band Switch |
| S2 | | Off-on Switch on Vol. Control |
| P1 | 10794 | 6-8 v. Pilot Light |

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# ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (In Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6K8G | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1730 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer (C9) (See Fig. 4) | Broadcast oscillator | Adjust to maximum output |
| | 1500 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 1500 Kc. | Trimmer (C6) (See Fig. 4) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer (C12C) (See Fig. 4) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| | 465 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer (C1) (See Fig. 4) | I. F. Wave Trap | Adjust for **minimum** output |
| IMAGE REJECTION ADJUST-MENTS | 2330 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Pick up signal at 1400 Kc. on dial | Trimmer (C3) (See Fig. 4) | Image rejection | Adjust for **minimum** output (See note "B") |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 Mc. | Trimmer (C8) (See Fig. 4) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Dial Set at 17 Mc. | Trimmer (C7) (See Fig. 4) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 6 Mc. | Trimmer (C13) (See Fig. 4) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "A") |

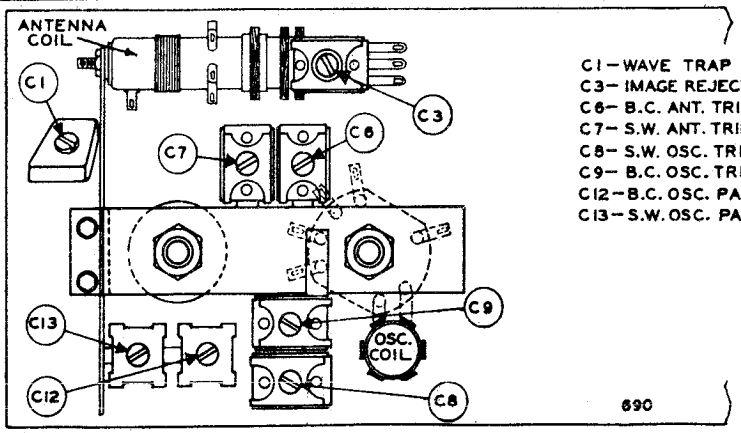



FIG. 4

C1—WAVE TRAP TRIMMER 465 K.C.
C3—IMAGE REJECTION TRIMMER
C6—B.C. ANT. TRIMMER
C7—S.W. ANT. TRIMMER
C8—S.W. OSC. TRIMMER
C9—B.C. OSC. TRIMMER
C12—B.C. OSC. PAD
C13—S.W. OSC. PAD

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

NOTE "B" 1400KC is the image frequency of 2330KC. Adjust Trimmer (C3) until a **minimum** output is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

| BAND SWITCH | BAND | FREQUENCY RANGE |
|---|---|---|
| Extreme Right Rotation | Short Wave | 5.6 to 18 MC. |
| Extreme Left Rotation | Broadcast | 540 to 1730 KC. |

Power Consumption.....80 Watts (At 115 volts 50-60 cycles)
Power Output.....5 Watts Undistorted, 7 Watts Maximum
Intermediate Frequency.....465 KC.

| BAND | DIAL SCALE | FREQUENCY RANGE |
|---|---|---|
| Broadcast | Upper | 540 to 1730 KC. (Kilocycles) |
| Short Wave | Lower | 5.6 to 18.0 MC. (Megacycles) |

# GAMBLE SKOGMO, INC.

MODEL 867A
Socket, Trimmers
Tuner Data, Notes

## PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

**IMPORTANT**—Read carefully before setting the automatic levers.

There are six levers by means of which six stations may be selected. Make a list of local stations or stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner lever button an opening is provided for inserting the call letter tabs.

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the small celluloid tabs supplied should be inserted into place over each of the station call letter tabs.

## NOW, PROCEED AS FOLLOWS:—

1. Pull the dial tuning knob **all the way out** (See Illus. "B," Fig. 3), and rotate the tuning knob to the **left** (counterclockwise) until it cannot be turned any further (See Illus. "D," Fig. 3). This will unlock the automatic tuner mechanism. (NOTE:—Automatic tuner mechanism is locked tight when radio is shipped from the factory.)

2. Press **down all the way** any one of the automatic tuner levers. Holding it down **firmly,** press in on the dial tuning knob No. 3 and tune in the station indicated on the station call letter tab on this lever. You will note that in order to tune the station, the dial tuning knob will have to be **pressed in** (See Illus. "E" Fig. 3). Turn the dial tuning knob very slowly back and forth **(while still holding the automatic tuner lever in downward position),** noting the width of the shadow on the screen of the cathode-ray tuning indicator. Minimum width on the tuning indicator indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in.

3. Press down another automatic tuner lever. Holding it down **firmly, press** in on the dial tuning knob and carefully tune in the station indicated on the call letter tab on this lever.

4. Follow this procedure until you have selected all of your favorite stations.

5. Pull the dial tuning knob **all the way out** (See Illus. "B," Fig. 3) and rotate the tuning knob to the **right** (clockwise) until it cannot be turned any further (See Illus. "C," Fig. 3).

This will lock the automatic tuner mechanism and the stations you have set up for automatic tuning will be locked in place. After you have locked the tuner mechanism, push the dial tuning knob **in.**

6. If you should desire to change any station you selected to another, pull the dial tuning knob all the way **out** and rotate the knob to the left (counterclockwise) and unlock the tuner mechanism. Select the new station as explained. (NOTE:—If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the tuner mechanism not being unlocked all the way. Pull the dail tuning knob out all the way and rotate the knob to the left (counterclockwise) until it will turn no further. The dial mechanism should work freely with the tuner lever pressed down).

7. After you have selected the new station, pull the dial tuning knob all the way **out** and rotate the knob to the **right** (clockwise) to lock the tuner mechanism. Be sure the knob is turned until it will turn no further, then **press** the dial tuning knob **in.**

8. The automatic tuner levers are now set up for quick tuning. Press down the lever key and—YOUR FAVORITE STATION IS SELECTED!

The **important** steps to remember when setting up stations on the tuner levers for automatic tuning are:

1. **To unlock** the tuner mechanism pull the dial tuning knob **all the way out.** You may find it necessary to rotate the knob slightly when pulling it out to make certain that the gears mesh properly. Rotate the dial tuning knob to the left (counterclockwise) as far as it will turn without forcing.

2. **To set a lever,** press down **all the way** and **hold** in this position while tuning in by means of the dial tuning knob the station you want this lever to be tuned to. (NOTE:—you will notice that it will be necessary to keep pressing in on the dial tuning knob while tuning in the station as a spring tends to push the knob out.) Set all the levers in the same manner before locking the mechanism.

3. **To lock** the tuner mechanism pull the dial tuning knob **all the way out.** Rotate the dial tuning knob to the right as far as it will turn making certain that it is tight, but it is not necessary to use force.

4. After locking or unlocking the tuner mechanism always return the dial tuning knob to its normal position **(pushed in).**

## SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 115 volts A. C. on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is **located.**

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

## DIAL CALIBRATION:

To correct dial calibration rotate the tuning knob to the right until the dial pointer reaches the extreme end of the dial scale; then rotate the tuning knob to the left until the pointer reaches the other extreme end of the dial scale.

Stop clamps on the pointer slider bar make the pointer self-aligning, thereby correcting dial calibration.

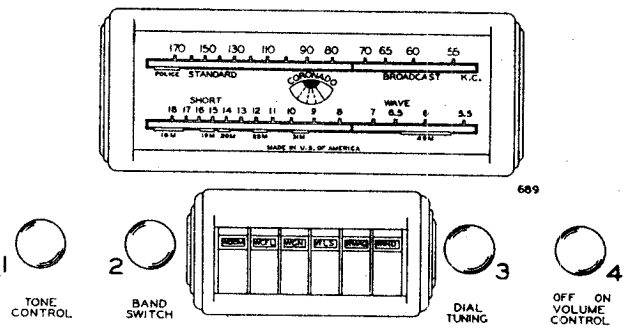
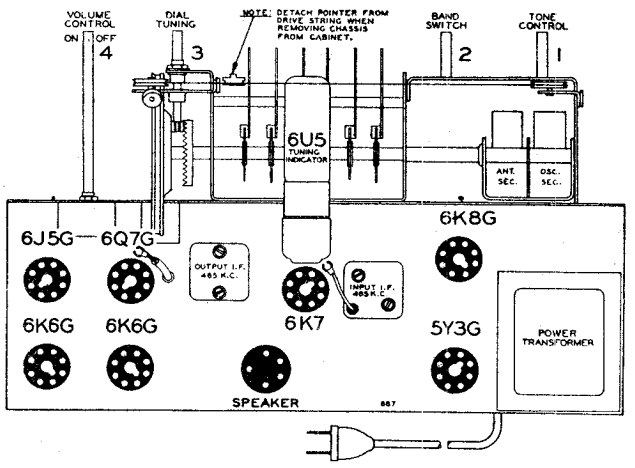



FIG. 2—FRONT VIEW

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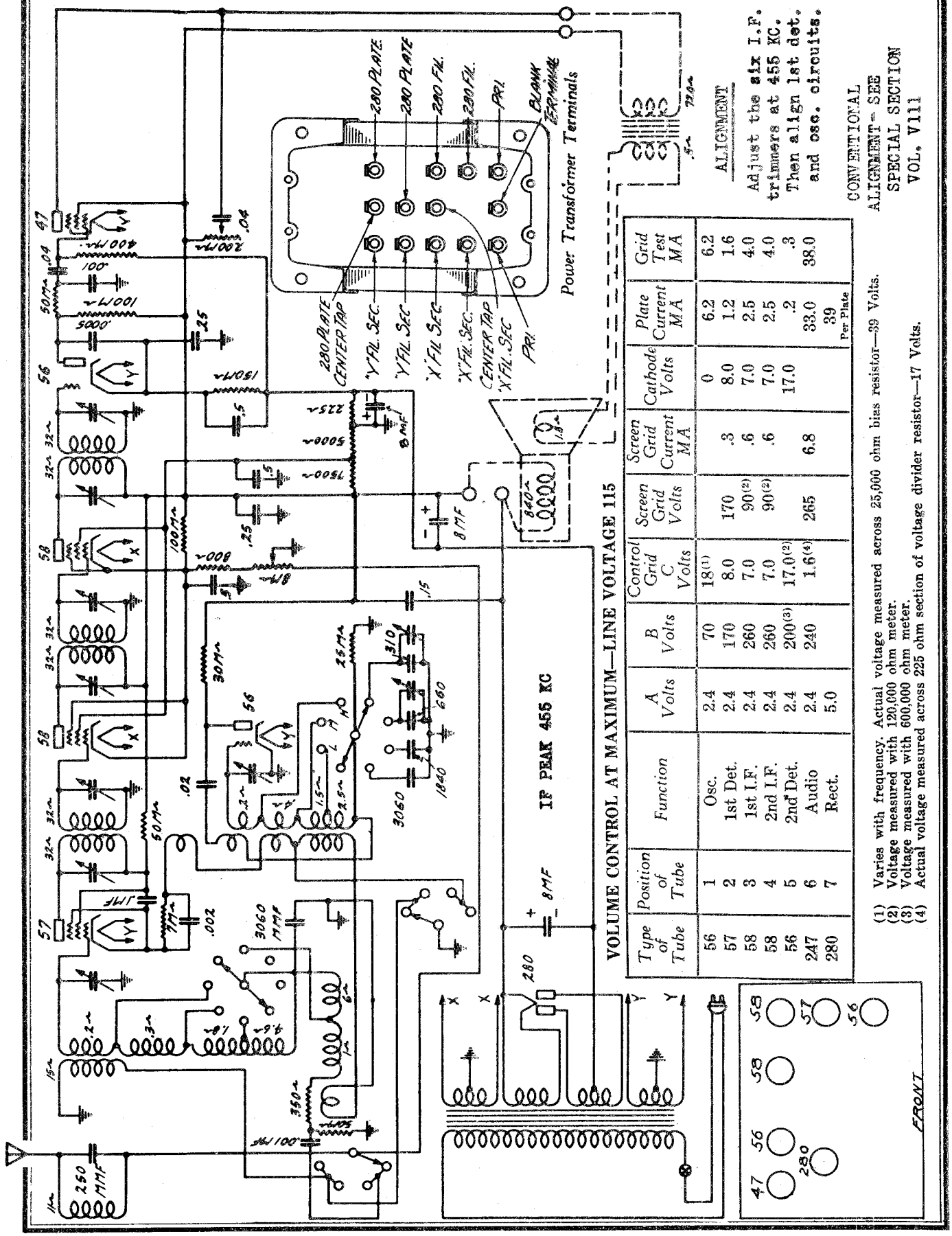
MODEL 2056AW
Schematic, Voltage
Socket, Alignment

# GAMBLE SKOGMO, INC.




VOLUME CONTROL AT MAXIMUM—LINE VOLTAGE 115

| Type of Tube | Position of Tube | Function | A Volts | B Volts | Control Grid C Volts | Screen Grid Volts | Screen Grid Current MA | Cathode Volts | Plate Current MA | Grid Test MA |
|---|---|---|---|---|---|---|---|---|---|---|
| 56 | 1 | Osc. | 2.4 | 70 | 18(1) | | | 0 | 6.2 | 6.2 |
| 57 | 2 | 1st Det. | 2.4 | 170 | 8.0 | 170 | .3 | 8.0 | 1.2 | 1.6 |
| 58 | 3 | 1st I.F. | 2.4 | 260 | 7.0 | 90(2) | .6 | 7.0 | 2.5 | 4.0 |
| 58 | 4 | 2nd I.F. | 2.4 | 260 | 7.0 | 90(2) | .6 | 7.0 | 2.5 | 4.0 |
| 56 | 5 | 2nd Det. | 2.4 | 200(3) | 17.0(2) | | | 17.0 | .2 | .3 |
| 247 | 6 | Audio | 2.4 | 240 | 1.6(4) | 265 | 6.8 | | 33.0 | 38.0 |
| 280 | 7 | Rect. | 5.0 | | | | | | 39 Per Plate | |

(1) Varies with frequency. Actual voltage measured across 25,000 ohm bias resistor—39 Volts.
(2) Voltage measured with 120,000 ohm meter.
(3) Voltage measured with 600,000 ohm meter.
(4) Actual voltage measured across 225 ohm section of voltage divider resistor—17 Volts.

ALIGNMENT

Adjust the six I.F. trimmers at 455 KC. Then align 1st det. and osc. circuits.

CONVENTIONAL ALIGNMENT- SEE SPECIAL SECTION VOL. VIII

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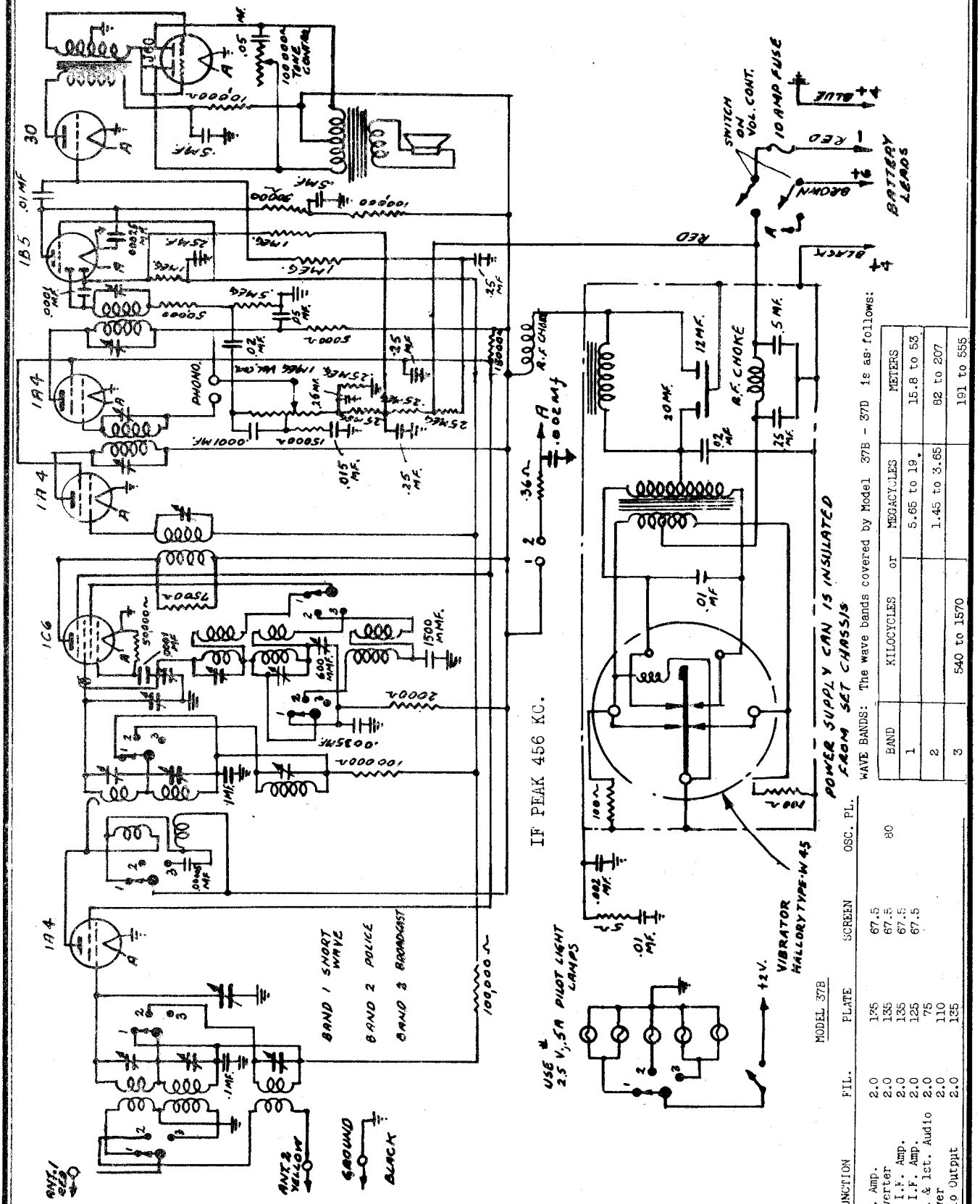
# GAROD RADIO CORP.

MODELS 37B, 37D
Schematic, Voltage




WAVE BANDS: The wave bands covered by Model 37B - 37D is as follows:

| BAND | KILOCYCLES | or | MEGACYCLES | METERS |
|---|---|---|---|---|
| 1 | | | 5.65 to 19 | 15.8 to 53 |
| 2 | | | 1.45 to 3.65 | 82 to 207 |
| 3 | 540 to 1570 | | | 191 to 555 |

MODEL 37B

| TUBE | FUNCTION | FIL. | PLATE | SCREEN | OSC. PL. |
|---|---|---|---|---|---|
| 1A4 | R.F. Amp. | 2.0 | 135 | 67.5 | |
| 1C6 | Converter | 2.0 | 135 | 67.5 | 80 |
| 1A4 | 1st I.F. Amp. | 2.0 | 135 | 67.5 | |
| 1A4 | 2nd I.F. Amp. | 2.0 | 125 | 67.5 | |
| 1B5/25S | Det. & 1st. Audio | 2.0 | 75 | | |
| 50 | Driver | 2.0 | 110 | | |
| 1J60 | Audio Output | 2.0 | 135 | | |

All voltages are measured from socket terminals to chassis and with a 1000 Ohms per volt voltmeter. The set must be in operation and the Wave Band switch in broadcast position with Battery fully charged and new "B" Batteries.

Filament voltages are taken from filament prong to filament prong at tube socket.

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MODELS 37B,37D
Alignment,Socket

# GAROD RADIO CORP.

MODEL 159
Schematic,Socket
Trimmers

I.F. ADJUSTMENT - The signal generator is set at 456 kc. and is connected to the grid of the first detector (1C6). With the oscillator section of the tuning condenser short-circuited and the receiver volume control at its maximum position, the i.f. trimmers are adjusted for maximum output. These trimmers may be found on tops of the i.f. transformer shield cans.

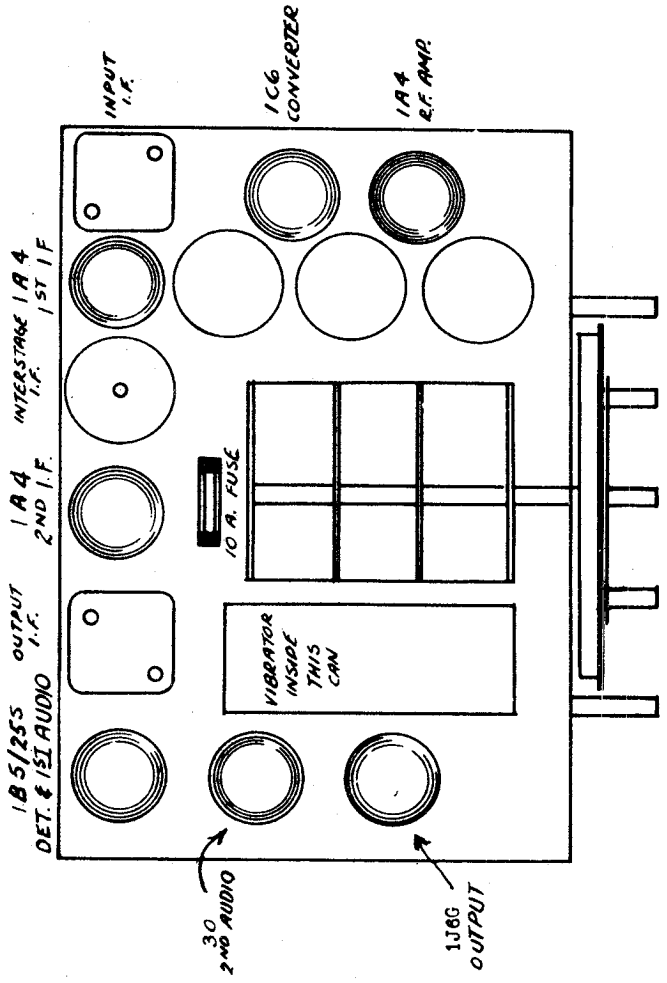
18 MEGACYCLE ADJUSTMENT - The high side of the signal generator is connected to the antenna lead of the receiver and the low side to the ground lead. The receiver and the signal are both tuned to a frequency of 18 mc. with the selector switch in position for band no. 1. The oscillator trimmer condenser is adjusted so that the 18 mc signal is tuned in exactly at the 18 mc calibration point, with the volume control on full and the signal generator adjusted for minimum input. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. These trimmers are located on the sides of the shield cans and are opposite the lower openings. This is the only adjustment on Band #1.

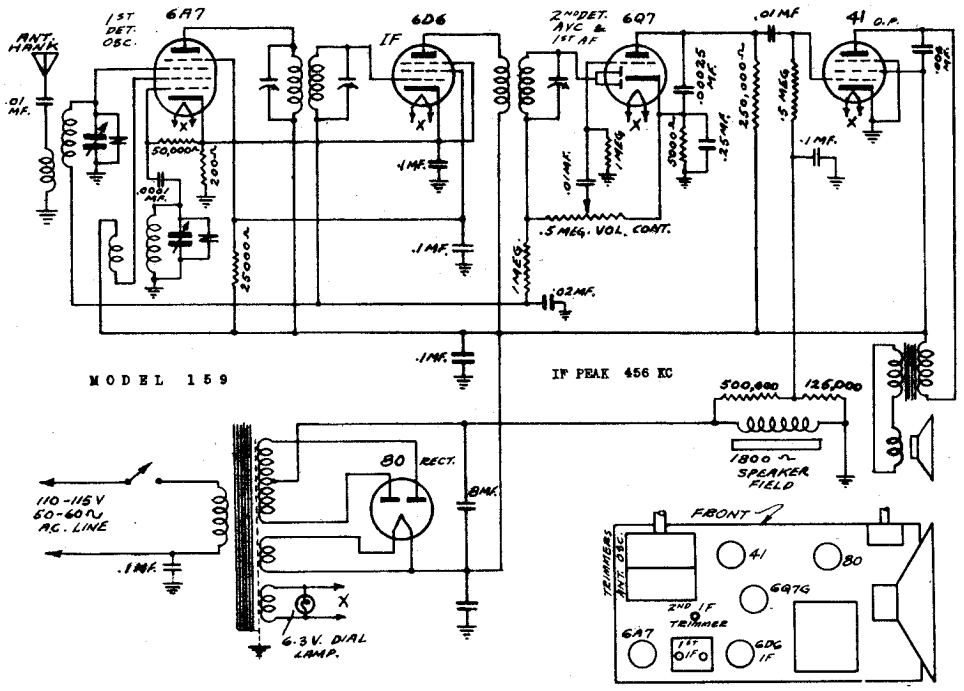
1500 K.C. ADJUSTMENT - With the band selector switch in position for operation on band no. 3. and the receiver and signal generator both set at 1500 K.C. the procedure outlined above is repeated. The oscillator trimmer is found on the rear coil can, and is opposite the upper opening. The antenna preselector and interstage coil trimmers are located in the same positions on the corresponding shield cans.

The signal generator is set at 600 K.C. and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum gain while the gang tuning condenser is rocked slightly to the right and left. The 1500 K.C. adjustment should then be rechecked. The 600 K.C. Padder is located as indicated in the sketch.

3 MC. ADJUSTMENT - The band selector switch is set in position for operation on the No. 2. band. The receiver and signal generator are both set at 3 M.C. and the procedure outlined above is repeated. The oscillator trimmer is found on the Police Band Coil located under the chassis and is towards the rear. The other trimmers for this band are located in similar positions on the corresponding coils.

The signal generator is set at 1.7 M.C. and the signal tuned in on the dial. The padder condenser for the police band is adjusted for maximum response while the gang tuning condenser is rocked slightly to the right and left. The 3 M.C. adjustment should then be rechecked. The 1.7 MC. padder is located as indicated.

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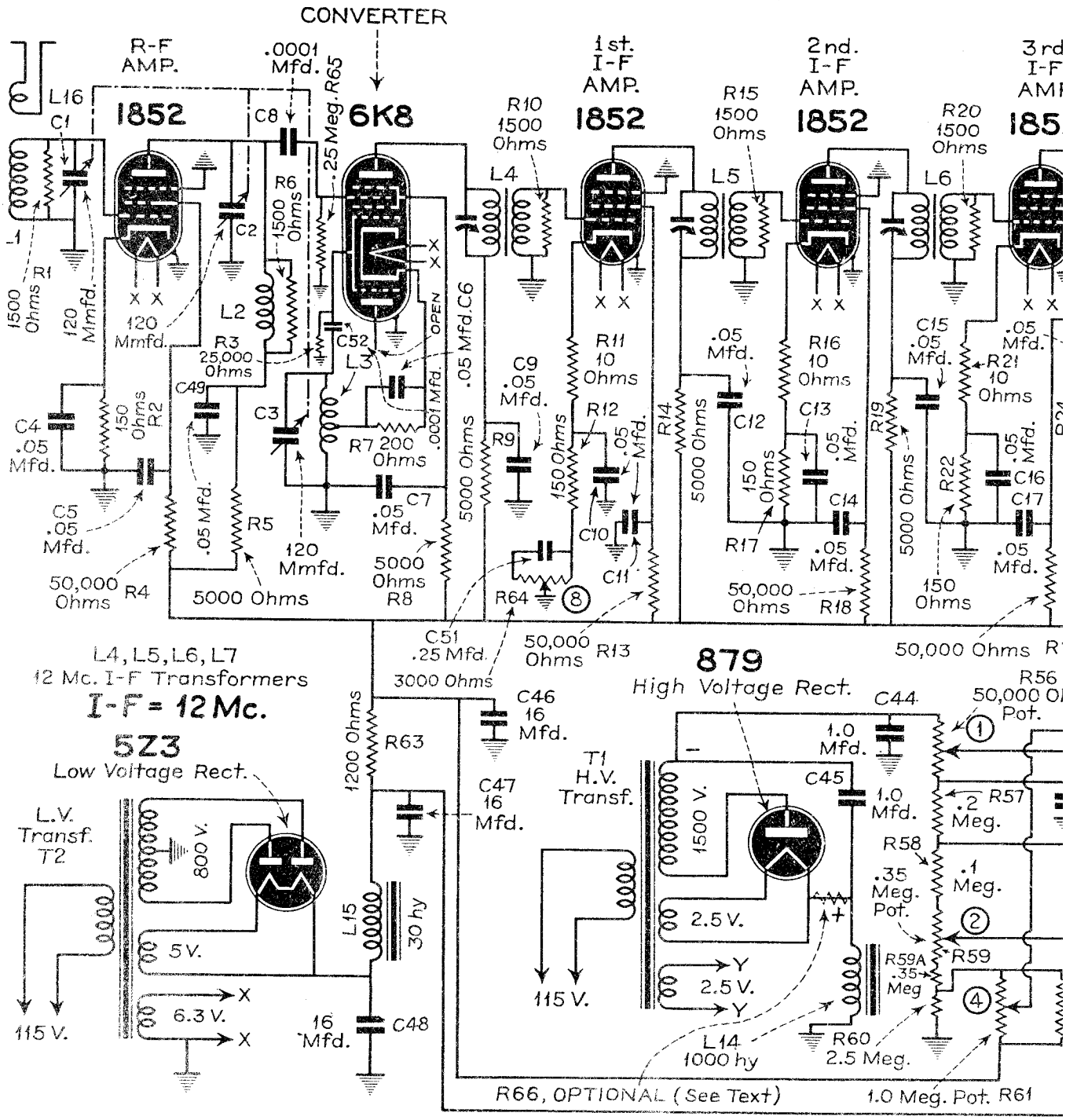


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DIO CORP.

MODEL 100
Schematic

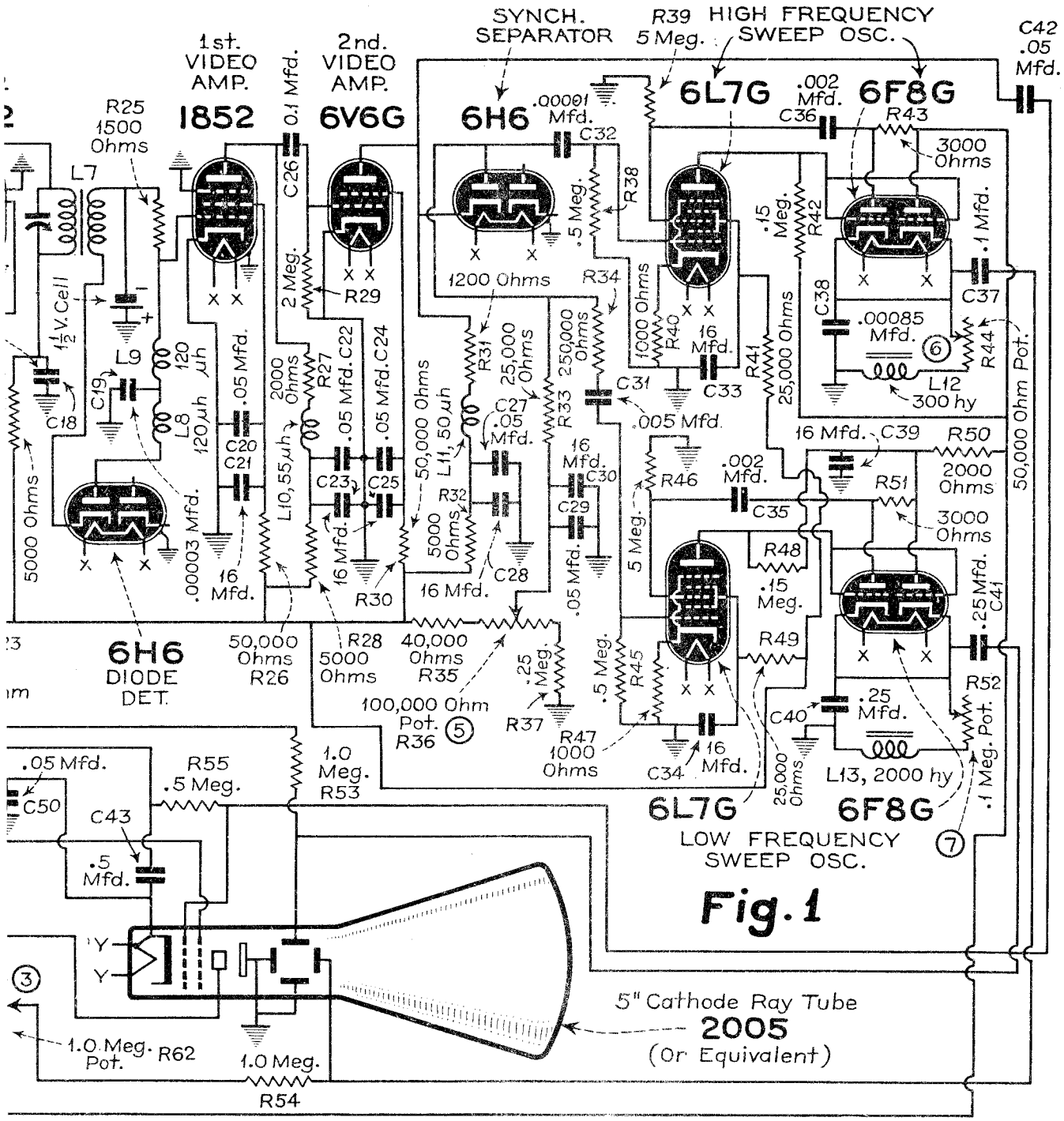
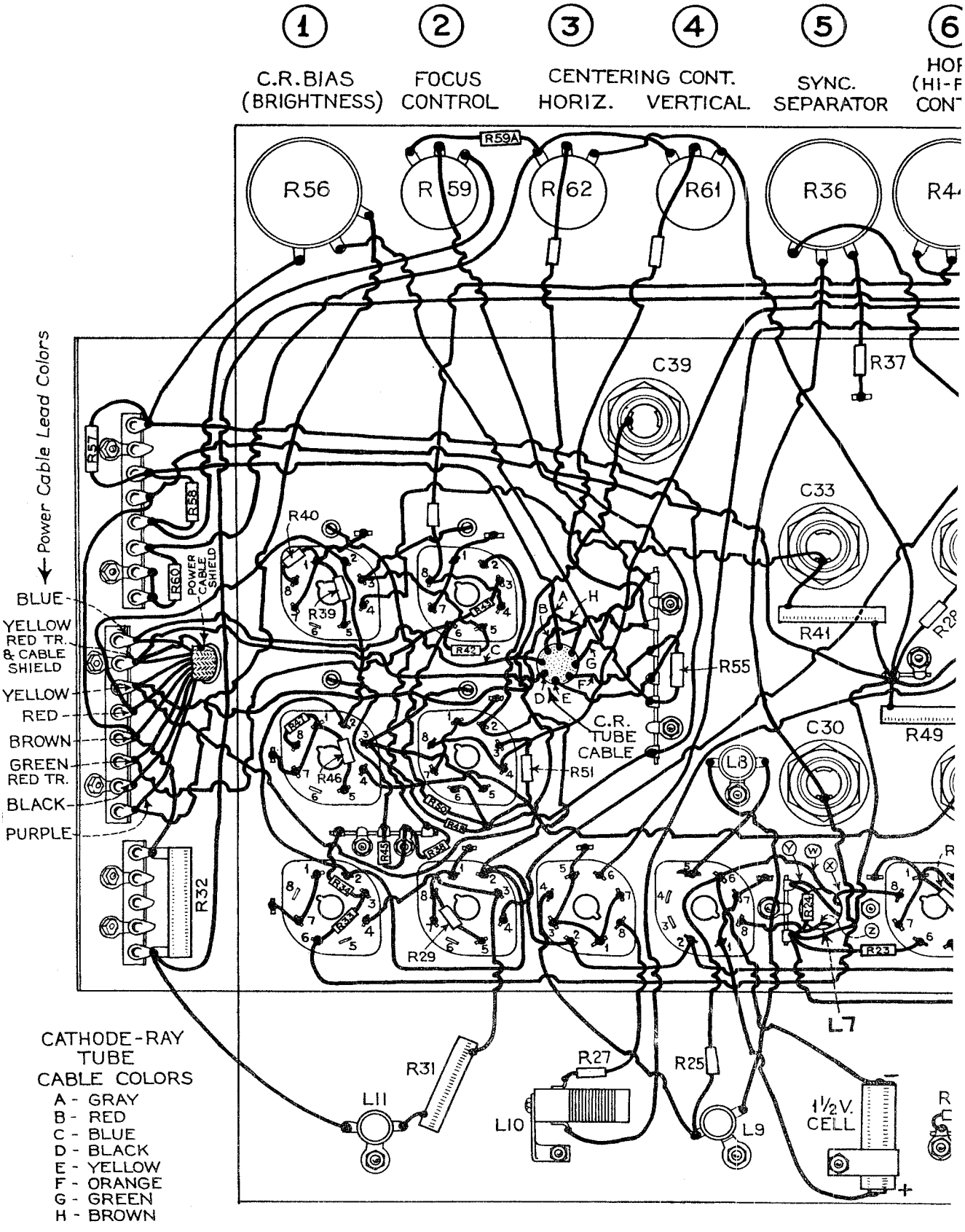



Fig. 1

MODEL 100
Chassis Wiring (Top)

GAROD I

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| | ⑦ | ⑧ |
|---|---|---|
| IZ. REQ) ROL | VERT. (LO-FREQ.) CONTROL | I.F. GAIN (CONTRAST) CONTROL |

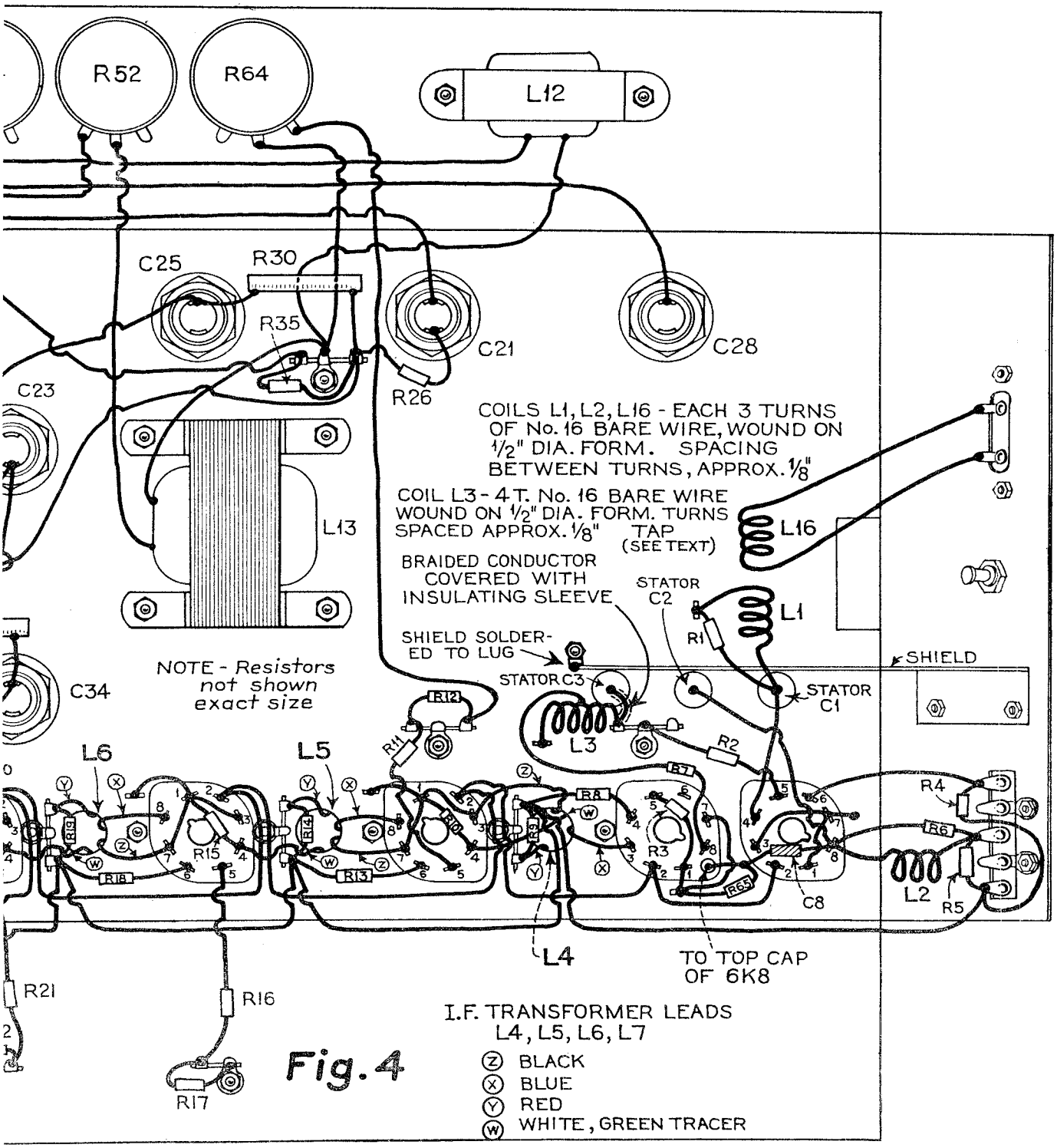
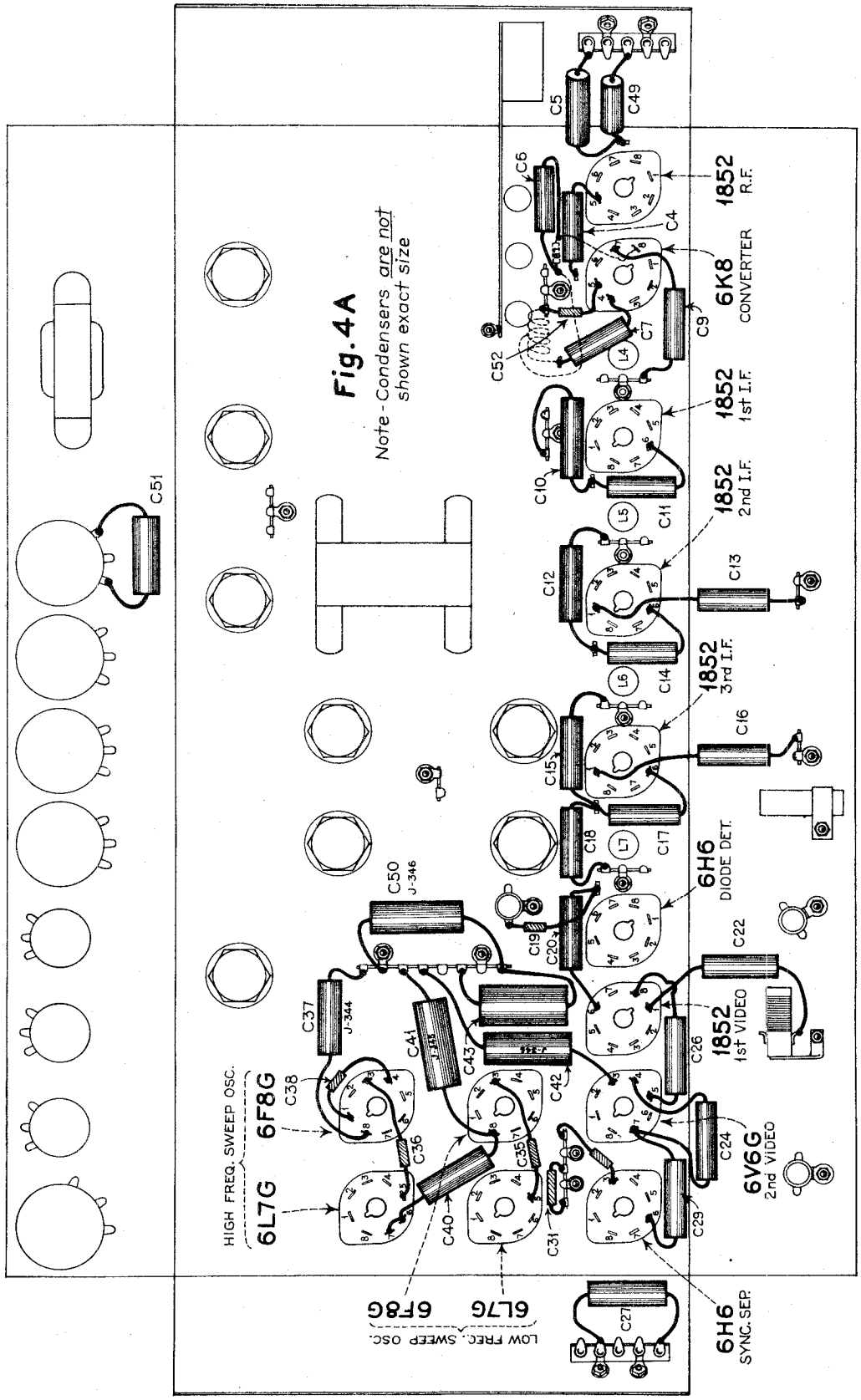



Fig. 4

MODEL 100
Chassis Wiring
(Bottom)

# GAROD RADIO CO.

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MODEL 100
Chassis View
Socket, Controls

GAROD RADIO CORP.

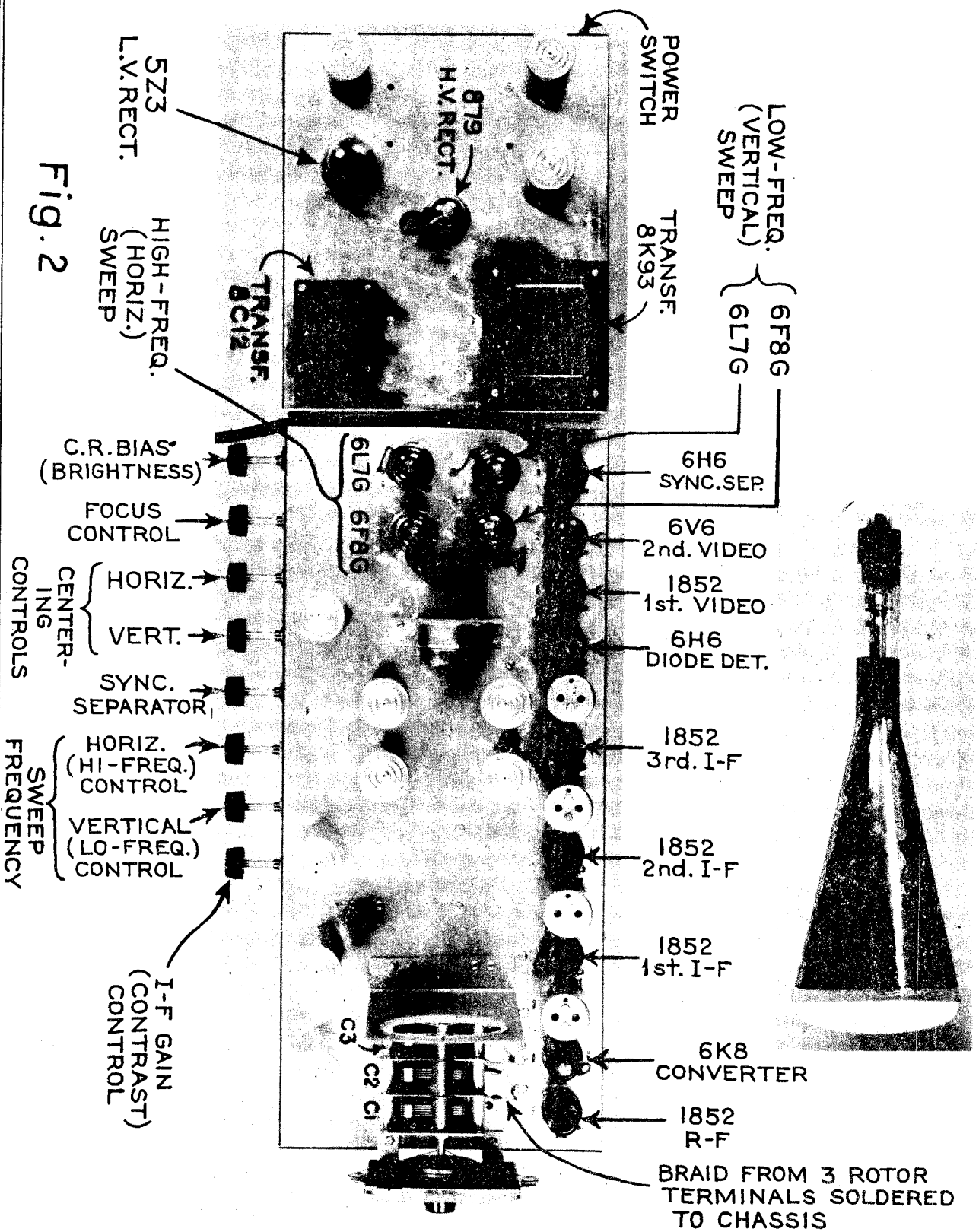


Fig. 2

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Fig. 1 shows the Schematic circuit. It will be noted that is is of the Superheterodyne type. The antenna primary L 16 is connected to the Dipole (or other type) antenna thru a twisted pair. The secondary is tuned to the carrier frequency by the first section of the three gang condenser, and is fed into the grid of the 1852 R.F. amplifier. The plate circuit feeds thru inductor L 2 as a plate load into the control grid of the 6K8 converter (thru the .0001 mfd coupling condenser). The oscillator is of the Hartley type, although the elements have been used in a somewhat unconventional manner. Note that the oscillator plate (#6 pin) is not used. It was found that better stability was obtained with the circuit as shown, than with the conventional arrangement. The converter is followed by three I.F. stages operating at 12 M.C. The 6H6 is used as a diode detector in the usual way. The two chokes L8 - L9 together with the .00003 mfd condenser serve as a filter to remove the I.F. component from the VIDEO channel. The 1852 and 6V6 act as 1st and 2nd VIDEO AMPLIFIERS respectively for the picture signal. A single 1½volt cell such as is used for Pen-Lite flashlights supplies the "C" bias for the 1852 first video stage. This cell is not supplied with the kit, but can be obtained at any Five and Ten Cent store or hardware store. This cell will last for a considerable period, since no current is drawn. The output of the 6H6 is connected to the control grid of the Cathode Ray tube as well as the SYNCH. SEPARATOR.

A second 6H6 serves as a SYNCH. SEPARATOR. This function is accomplished by putting a negative bias on the DIODE plate. This bias may be varied by means of the 100,000 POT.(R36). Thus, since no current can flow until this negative bias is overcome, we have a means of selecting a part of the incoming wave, by adjusting this bias. Since the synchronizing impulses are of considerably higher amplitude than the picture signals, we can adjust our bias so as to bar the passage of these picture signals and permit only the high amplitude Synch. signals to come thru the diode.

The Low and High Frequency SYNCH impulses are then separated by frequency discrimination. The low frequency pulses cannot pass thru the .0001 condenser which couples to the high frequency sweep, but are attenuated very little by the .005 leading to the Low Frequency sweep oscillator.

The Sweep circuit oscillators are of the multi-vibrator type, are very stable in operation, and can be readily controlled by the SYNCH. pulses, which are introduced into the respective grids of the 6L7 tubes. Both sweeps utilize the same circuit arrangement, except of course, that different constants are used for the Horizontal (HIGH) and Vertical (LOW) sweep frequencies. The saw-tooth waves generated in such a multi-vibrator, are, if no compensating means is used, logarithmic in form. Chokes L12 and L13 are therefore inserted to correct this deficiency and produce a saw-tooth, substantially linear, so that the Electron beam is carried across the tube at a uniform rate.

The Synchronized saw-tooth pulses are then fed to the two sets of deflecting plates to scan the face of the Picture tube by means of the Electron Beam emitted by the Electron Gun in the neck of the tube. This beam is in turn modulated (thru the control grid) by the picture impulses obtained from the output of the 6V6.

An 879 Rectifier fed by a separate transformer supplies the High Voltage for the Cathode Ray tube. The 5Z3 serves as a full wave rectifier for the sweep circuits, and other receiver functions. Adequate filtering is used to eliminate any hum voltages that might otherwise interfere with proper operation.

Means are provided for centering the picture by varying the fixed positive potential on the two sets of deflecting plates. Other controls focus the beam by changing the potential on the focusing electrode (R59) and adjust the bias on the Cathode Ray tube (R56) to set the average brightness. (CONTRAST)

Note that the I.F. as well as R.F. circuits are very heavily loaded, so as to broaden the response curves sufficiently to pass the wide band required for good definition.

## ASSEMBLY AND WIRING

The assembly of the component parts may be seen from the photographs FIGS 2 and 3 and diagrams 4, 4A and 5. All parts should be assembled as shown and checked against the cricuit diagram to prevent any possibility of error. The dial assembly is shown in the sketch. (FIG 6) The 2 angle brackets which hold the dial to the chassis are fastened with Self-Tapping screws, which are provided. The cord is strung as indicated. The dial crystal is held by 2 TRIMOUNTS which are also provided. These are simply pressed into the holes, and may be removed to calibrate the scale by pushing them out from the rear. The pointer is fastened to the dial cord by pressing the prongs together, over the piece of sleeving, which has been slipped over the cord to prevent chafing.

Note that the end of the shield on the underside of the chassis is soldered to a lug fastened under one of the screws which holds the gang condenser. (See FIG 4)

The large rubber grommet is slipped into the hole in the REAR picture tube support bracket and serves to insulate the leads from the tube socket.

Other grommets are located as shown in the various figures.

Coils L1, L2, L3, and L16 are wound with #16 bare wire (supplied with kit). A ½" diameter form is used and removed after winding. Turns are spaced approximately 1/8". The number of turns is indicated in the diagram.

It is important that the wiring shown in FIGS 4 and 4A be followed carefully. As each wire or component is put in, it should be checked off on both schematic and picture diagrams. The grounds and heaters should be wired first, then the various B voltages, I.F. transformers; then resistors, mica and tubular condensers. All wiring should be as short and direct as possible. Particular care should be taken in wiring the Video Amplifier to avoid high Grid or Anode capacities to ground, since this will result in a loss of high frequencies with consequent poor detail. This applies especially to leads from the Diode detector to the 1852 and coupling condenser from 1852 to 6V6 as well as wiring from L 11. These should be lifted away from the chassis ¼ to ½ inch. Do not fasten the GRID LEAD from the picture tube to the chassis or wrap it around the other leads in the cable.

After the receiver has been assembled and wired it should be very carefully checked over, to see that it is wired in exact accordance with the schematic and pictorial diagrams. When this has been ascertained, insert all tubes into their respective sockets, as shown in the photograph.

*CAUTION*

Approximately 1400 volts is supplied to the high voltage Anode. This voltage should be treated with great respect, since under certain conditions it may be *DANGEROUS*. Be sure that the power switch is *OFF* or better still, remove the line cord from the outlet, when making any changes, or touching any parts, other than the control knobs.

With a High Resistance (1000 ohms per volt) Voltmeter, measure all voltages, with respect to the chassis. Results should be approximately as tabulated. Variations will occur due to line voltage conditions and tubes. If there is any SUBSTANTIAL deviation in voltage from that given in this table, ascertain the reason, and correct it before proceeding further, or damage to tubes or other components may result.

*WARNING*

Be sure that the Voltmeter prongs are well insulated and use great care in making these measurements to avoid shock from the High Voltage supply.

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MODEL 100
S.P.U.Chassis Wiring
Voltage

# GAROD RADIO CORP.

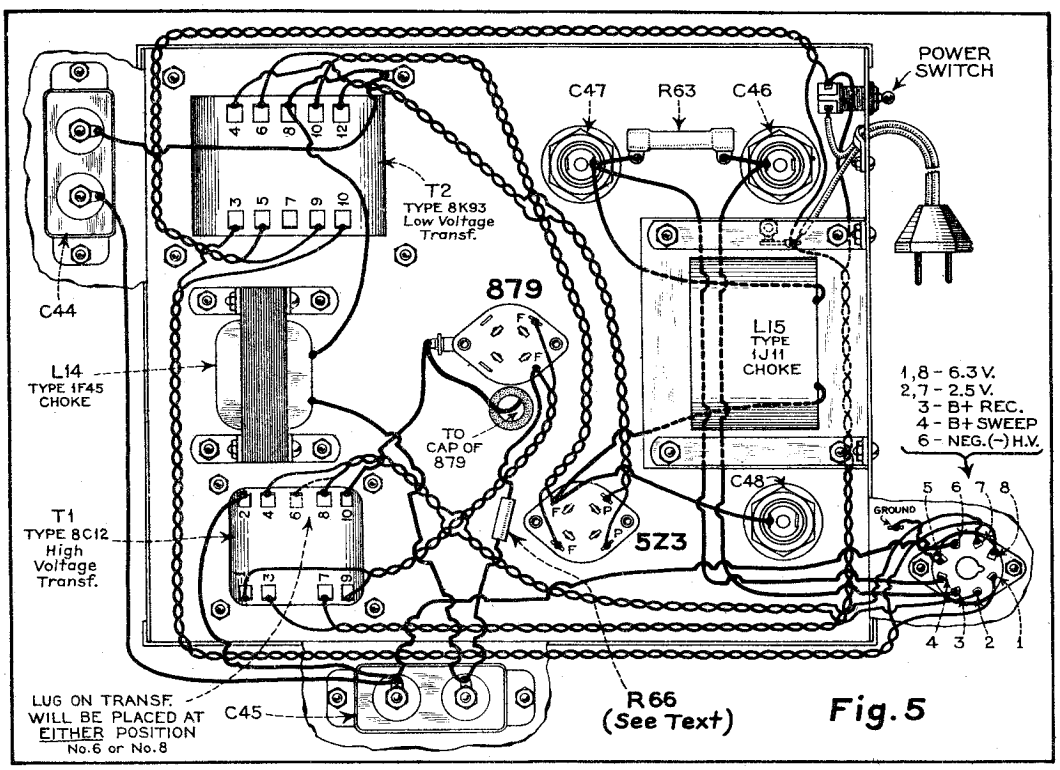


Fig.5

VOLTAGE TABLE — TELEVISION RECEIVER

| | | CAP. | 1 | | 2 | | 3 | | 4 | | 5 | | 6 | | 7 | | 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1852 | R. F. Amp. | | SH. | 0 | H | 6 A. C. | Sup. | 0 | GR. | 0 | K | 2 | SC. | 160 | H | 0 | P | 290 |
| 6K8 | Converter | Contr. GR.0 | SH. | 0 | H | 6 A. C. | P | 275 | SC | 135 | Osc. GR. | 0 | Osc. Pl. | 0 | H | 0 | K | 1.4 |
| 1852 | 1st I.F. Amp. | | SH. | 0 | H | 6 A. C. | Sup. | 0 | GR. | 0 | K | 7 | SC. | 157 | H | 0 | P | 290 |
| 1852 | 2nd I.F. Amp. | | SH. | 0 | H | 6 A. C. | Sup. | 0 | GR. | 0 | K | 2 | SC. | 170 | H | 0 | P | 150 |
| 1852 | 3rd I.F. Amp. | | SH. | 0 | H | 6 A. C. | Sup. | 0 | GR. | 0 | K | 2 | SC. | 170 | H | 0 | P | 150 |
| 6H6 | Diode Det. | | SH. | 0 | H | 6 A. C. | D.P.2 | X | K-2 | X | D.P.1 | -15 | X | | H | 0 | K-1 | -1.5 |
| 1852 | 1st Video | | SH. | 0 | H | 6 A. C. | Sup. | 0 | GR. | 0 | K | 0 | SC. | 160 | H | 0 | P | 235 |
| 6V6G | 2nd Video | | X | | H | 6 A. C. | P | 90 | SC | 125 | G | -2 | X | | H | 0 | K | 0 |
| 6H6 | SYNC. Sep. | | SH. | 0 | H | 6 A. C. | D.P.2 | 100 | K-2 | 92 | D.P.1 | | X | | H | 0 | K-1 | |
| 6L7G | Hi-Freq. Sweep | Contr. GR. 2 | X | 0 | H | 6 A. C. | P | 150 | SC | 150 | Inj.GR | 2 | X | | H | 0 | K | 10 |
| 6F8G | | | X | 0 | H | 6 A. C. | P-2 | 435 | K-2 | 250 | G-1 | 150 | P-1 | 435 | H | 0 | K | -1250 |
| 6L7G | Low Freq. Sweep | Contr. GR. 2 | X | 0 | H | 6 A. C. | P | 110 | SC | 135 | Inj.Gr | 2 | X | | H | 0 | K | 8 |
| 6F8G | | | X | 0 | H | 6 A. C. | P-2 | 235 | K-2 | 270 | G-1 | 110 | P-1 | 240 | H | 0 | K-1 | 170 |
| 2005 | Videotron | | A-2 (Black | 0 | H | 2.2 AC to #7 (Blue | A-1 (Yellow | -850 | Def-1 Pl | 85 (Red | GR-1 (Orange | -1250 | Def-3 Pl. (Green | 100 | H&K (Brown | -1250 | GR#2 (Grey | -1000 |
| 5Z3 | Low Voltage Rect. | | F | 5AC 470 | P | | | | F | 5AC 470 | | | | | | | | |
| 879 | High Voltage Rect. | -1380 | F | 2.3AC | | | | | F | 2.3AC | | | | | | | | |

ALL VOLTAGES MEASURED WITH A HIGH - RESISTANCE D.C. VOLT METER (EXCEPT HEATERS)
ALL CONTROLS TURNED ALL WAY TO THE RIGHT (CLOCKWISE)

SH - Shell
H - Heater
Sup. - Supressor Grid
GR. - Grid
K - Cathode
SC. - Screen
P - Plate
D.P. - Diode Plate
Def.Pl.- Deflecting Plate
A - Anode
Inj. Grid. - Injector Grid
F. - Filament
X. - No connection

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# GAROD RADIO CORP.

## MODEL 100
## Alignment, Operating Antenna Notes

### ALIGNMENT AND OPERATION

Set the Picture Tube bias control (#1) all the way to the right. Set the Horizontal and Vertical Sweep (#6 and 7) controls approximately half way.

Now turn the Spot locating control (#3) all the way to the left and rotate the other spot control (#4) thru its entire range. If neither a spot nor a Raster (the scanning pattern) appears, move the first spot locating control (#3) slightly to the right and rotate the other locating control thru its entire range again. Continue this procedure step by step until something appears upon the viewing screen of the Cathode Ray Tube.

Now adjust the Vertical and Horizontal Sweep controls until a complete raster appears. This should be approximately 4" square (The actual picture will be somewhat smaller due to the presence of the Blanking and Sync pulses in the station carrier).

By means of the Spot Location controls (#3 and #4) this Pattern may now be centered on the tube face. The Cathode Ray Tube socket can be rotated to level the Raster.

The size of the picture is determined by two factors, namely; the sweep circuit voltage and the voltage applied to the second anode. The picture increases with increase in sweep voltage and decreases INVERSELY as the square of the second or High voltage Anode potential. The saw-tooth voltage developed by the multi-vibrators is a function of the "B" voltage applied to the plates. Since we are operating near the voltage limit of the 523 rectifier tube, it is impractical to obtain any improvement in this direction. Amplifiers could be used to increase the sweep voltages, but this would complicate matters greatly. The other alternative is to reduce the 2nd Anode voltage. Referring to the circuit diagram, a 100,000 ohm (R66) dropping resistor is indicated in series with the low voltage filter system. This results in a larger picture, at only a slight sacrifice in brilliance. The use of this resistor is optional, depending upon which characteristic is the more desirable.

The Image Ratio should be 4:3. If the picture does not conform to this ratio, a rearrangement of resistors in the sweep plate and screen circuits will correct this; Potentiometers could be inserted to control the voltages applied to the deflection plates, but these additional controls are hardly necessary, since once this adjustment is made, it need not be changed, for a given set of tubes.

After this has been satisfactorily checked, we may proceed to the I.F. amplifier adjustments. An output meter or preferably an Oscilloscope is connected across the output of the Video amplifier (6V6 plate). A signal from a Signal Generator or equivalent source is now introduced at the converter grid (6K8). The Intermediate Frequency is 12M.C. The I.F. transformers are now adjusted for maximum output in the conventional way.

Now introduce a signal, whose frequency is approximately that of the principal station to be received, into the antenna circuit. Tune this signal by rotating the dial, then align the antenna and R.F. circuits for maximum output by means of the trimmers on the variable condenser.

After this has been done, the receiver is ready for a test on the air. It is best to make adjustments on the fixed pattern transmitted by Television stations during test periods preceeding the regular scheduled programs. The I.F. system should now be readjusted by staggering the peaks to accept a wide band of frequencies (2 Megacycles). This will result in considerable improvement in picture detail, with relatively slight loss in gain.

The I.F. transformers are heavily loaded (with 1500 ohms across each secondary). It is possible to omit these, with an increase in gain if they are carefully realligned so as to stagger the peaks, with a resultant "square top" resonance curve over the desired band.

The R.F. circuits should now be realigned for best tracking. It may be necessary to adjust the R.F. coil inductances slightly to obtain the proper range and tracking. If necessary the end plates of the variable condenser may be bent to accomplish this.

About 20 Volts at the Control Grid of the Cathode Ray Tube is necessary in order to obtain a good picture. If everything is functioning properly this should be easily obtained from stations within range. This can be checked with a vacuum tube voltmeter or calibrated oscilloscope.

A little experience will enable the user to tune in a station quickly and clearly. Proper manipulation of the controls is important, and the function of each should be studied carefully and thoroughly understood. A cathode bias control in the first I.F. stage sets the over-all gain. Other controls locate the pattern, Vertically and Horizontally; set the Vertical and Horizontal Sweep Frequencies; adjust Focus of the Picture Tube, fix the Average Brightness (Contrast); and adjust the Sinc separator and Selector. See Illustration.

### RECEIVING ANTENNA

The installation of an antenna for Television reception is extremely important. In residential locations, the antenna should be elevated as nigh as possible and located in such a way as to be furthest from sources of interference. Automobile Ignition systems cause considerable interference, as do electrical devices having sparking or intermittant contacts. Reflections from buildings, bridges and steel or other metal structures may result in multiple transmission, thereby producing 2 or more images superimposed upon each other, due to the slight time difference in the arrival of the several reflected waves.

This effect may become extremely critical in large cities where a great number of these high structures are present. If possible a "line of sight" transmission path from the transmitter antenna should be selected. Again, care must be taken to obtain the maximum freedom from electrical interference, since this will result in spotting and blotching of the picture.

It is noticed that less of this "noise" interference, from automobile Ignition systems particularly, is picked up when using a Horizontally polarized antenna than with a vertical antenna. Since, from all other considerations, it is equally as effective it is therefore desirable to use such an antenna for our Television receiver, when the field strength is sufficient to give us the necessary signal for satisfactory operation.

A simple dipole with twisted-pair lead-in (or a transposed lead-in) will usually give satisfactory results. These dipoles are available with arms of adjustable length and so arranged that they can be rotated. For a given station, maximum pickup will be obtained when the dipole is at right angles to the signal path from the transmitter. Where several stations are to be received, or the field strength is inadequate, more complicated forms of antennae may be required, or in the case of a directive antenna, a compromise may have to be reached so as to include all the desired stations within range. The length of the dipole is adjusted for maximum pickup from desired stations. An overall length of 120 inches is suggested for a start. In some cases, it may be desirable to use separate antennas facing in different directions for different stations.

It is extremely important that the antenna be securely fastened so as to prevent swinging of either the antenna itself, or the transmission line, since this may result in intermittent blurring or loss of the picture. (To avoid complications, no A.V.C. system has been incorporated in this receiver.)

It is strongly recommended that the builder study all literature available on Television and Ultra Short waves before attempting to go ahead with the construction so as to enable him to proceed intelligently. A knowledge of the exact function of each component will help greatly towards the successful accomplishment of the desired results.

References: QST - Dec, Jan, Feb, Mar, Apr, May 1937
ELECTRONICS - 1937-38
TELEVISION - Vol I and II - RCA Technical Press.

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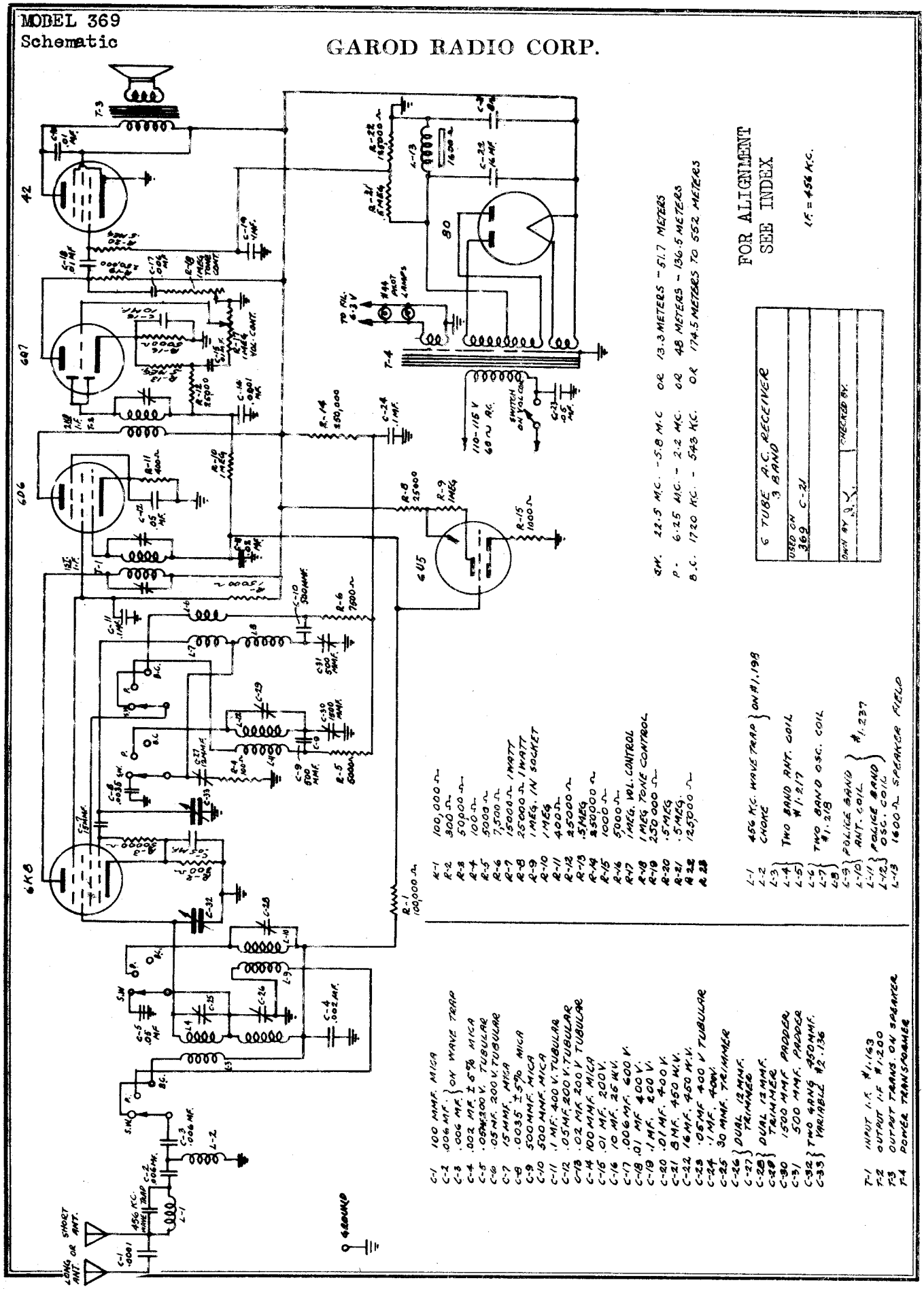
MODEL 369
Schematic

# GAROD RADIO CORP.




| | |
|---|---|
| C-1 | 100 MMF. MICA |
| C-2 | .006 MF. } ON WAVE TRAP |
| C-3 | .006 MF. } |
| C-4 | .002 MF. ± 5% MICA |
| C-5 | .05MF. 200 V. TUBULAR |
| C-6 | .05 MF. 200 V. TUBULAR |
| C-7 | .15 MMF. MICA |
| C-8 | .0035 ± 5% MICA |
| C-9 | 500 MMF. MICA |
| C-10 | 500 MMF. MICA |
| C-11 | .1 MF. 400 V. TUBULAR |
| C-12 | .05MF. 200 V. TUBULAR |
| C-13 | .02 MF. 200 V. TUBULAR |
| C-14 | 100 MMF. MICA |
| C-15 | .01 MF. 200 V. |
| C-16 | .10 MF. 25 WV. |
| C-17 | .006 MF. 600 V. |
| C-18 | .01 MF. 400 V. |
| C-19 | .1 MF. 200 V. |
| C-20 | .01 MF. 400 V. |
| C-21 | 8 MF. 450 W.V. |
| C-22 | 16 MF. 450 W.V. |
| C-23 | .05 MF. 400 V TUBULAR |
| C-24 | .1 MF. 400V. |
| C-25 | 30 MMF. TRIMMER |
| C-26 } | DUAL 13 MMF. |
| C-27 } | TRIMMER |
| C-28 } | DUAL 13 MMF. |
| C-29 } | TRIMMER |
| C-30 | 1500 MMF. PADDER |
| C-31 | 500 MMF. PADDER |
| C-32 } | TWO GANG 450 MMF. |
| C-33 } | VARIABLE #2.136 |

| | |
|---|---|
| R-1 | 100,000 Ω |
| R-2 | 300 Ω |
| R-3 | 50,000 Ω |
| R-4 | 100 Ω |
| R-5 | 5000 Ω |
| R-6 | 7,500 Ω |
| R-7 | 15000 Ω 1 WATT |
| R-8 | 25000 Ω 1 WATT |
| R-9 | 1 MEG. IN SOCKET |
| R-10 | 1 MEG |
| R-11 | 400 Ω |
| R-12 | 25000 Ω |
| R-13 | .5 MEG |
| R-14 | 250000 Ω |
| R-15 | 1000 Ω |
| R-16 | 5000 Ω |
| R-17 | 1 MEG. VOL. CONTROL |
| R-18 | 1 MEG TONE CONTROL |
| R-19 | 250 000 Ω |
| R-20 | .5 MEG |
| R-21 | .5 MEG. |
| R 22 | 12,5000 Ω |
| R 23 | |

| | |
|---|---|
| L-1 | 456 K.C. WAVE TRAP } ON #1,198 |
| L-2 | CHOKE |
| L-3 | |
| L-4 } | TWO BAND ANT. COIL |
| L-5 } | #1,217 |
| L-6 | |
| L-7 } | TWO BAND OSC. COIL |
| L-8 } | #1,218 |
| L-9 } | POLICE BAND ANT. COIL } #1,237 |
| L-10 } | |
| L-11 } | POLICE BAND OSC. COIL |
| L-12 } | |
| L-13 | 1600 Ω SPEAKER FIELD |

| | |
|---|---|
| T-1 | INPUT I.F. #1,163 |
| T-2 | OUTPUT I.F. #1,200 |
| T-3 | OUTPUT TRANS. ON SPEAKER |
| T-4 | POWER TRANSFORMER |

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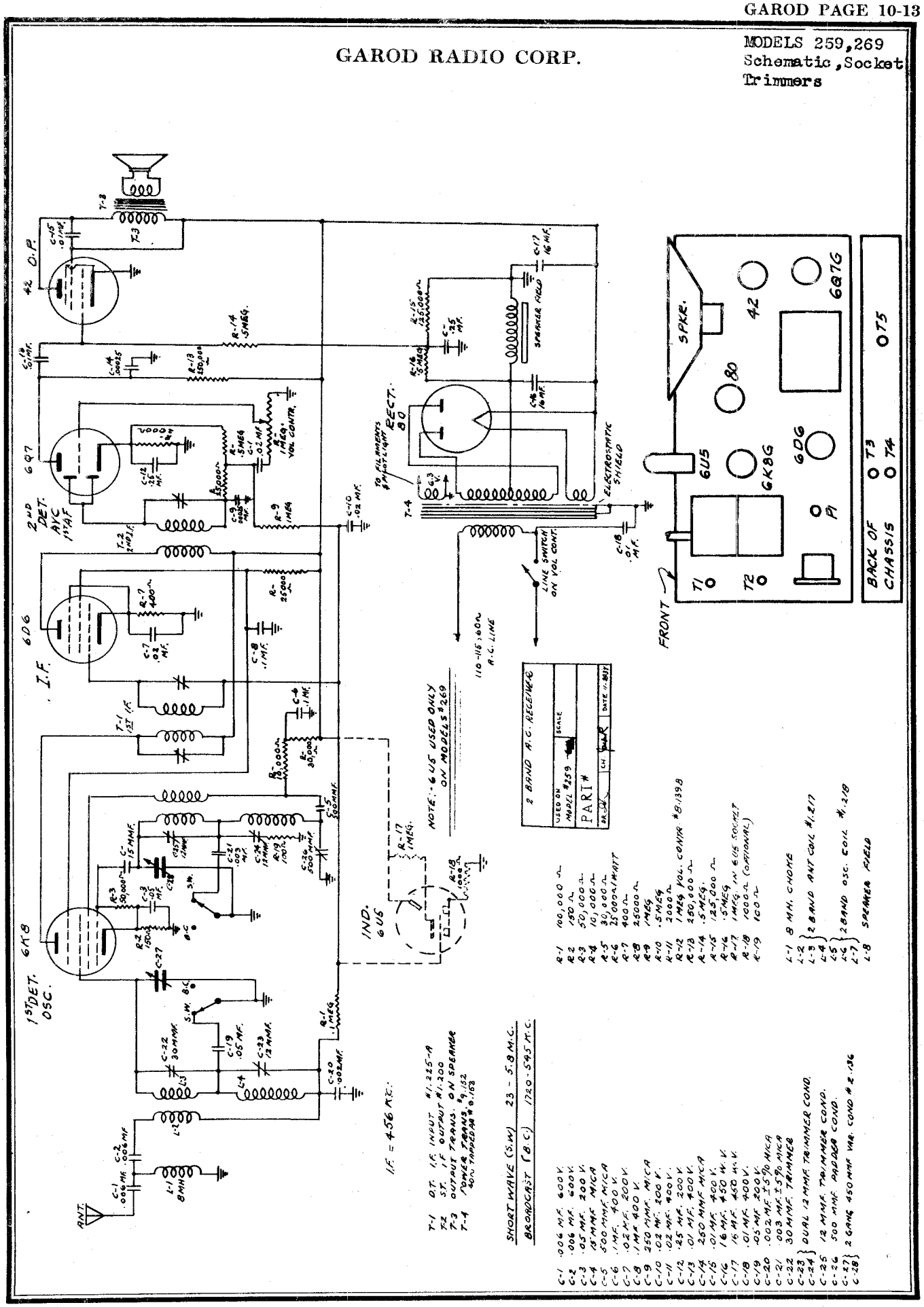
GAROD RADIO CORP.

MODELS 259,269
Schematic, Socket
Trimmers

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MODELS 259,269
MODEL 369
MODELS 629,729
MODEL 739
MODEL 7390

# GAROD RADIO CORP.

Alignment

## ALIGNMENT - MODELS 259,269,629,729,739,7390, and 369.

Re-alignment of this receiver should not be attempted unless all other possible causes have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave bands, and an output meter for indicating the effect of adjustments are required.

1) Line voltage as indicated on instruction sheet
2) Volume and tone control at maximum volume positions.
3) Minimum input from signal generator.

If this proceedure is not adhered to, all adjustments will appear very broad. This is due to the action of the automatic volume control.

During the alignment proceedure all adjustments should be made under the following conditions.

I.F. ADJUSTMENT The signal generator is set at 456 KC and is connected to the grid of the converter tube (6K8) through a .5 MFD condenser. Be sure to connect a resistor of approximately 25,000 ohms between the converter grid and ground so that the grid circuit is at ground potential for D.C.

The Band switch should be set on Broadcast and the pointer set at 550 kc. The Imput I.F. transformer trimmers are located on the rear chassis apron, between the variable condenser and the 6D6 I.F. tube. Both screws are adjusted for maximum output as indicated by the output meter connected across either the voice coil or the primary coil of the loud speaker output transformer.

The output I.F. transformer trimmer is located on the rear chassis apron, under the power transformer adjust the trimmer for maximum output as indicated on the output meter. The Input I.F. should now be re-checked for maximum output.

BROADCAST BAND

The dummy antenna for this band consists of only a 250 MMFD condenser. Set the band Switch in the Broadcast position and condenser plates completely out of mesh.

*MODEL -259,269.*

Set the signal generator at 1720 KC and adjust the broadcast oscillator trimmer located on top of the chassis (it is the trimmer to the rear of the chassis) until a response is indicated on the output meter. The generator is now set at 1500 KC. Turn the variable condenser until a response is indicated. The dial pointer should now co-incide with the 1500 KC mark on the dial. Adjust the 1500 KC Antenna trimmer (located on top of the chassis, near the variable condenser. It is the trimmer to the front of the chassis.) for maximum output.

*MODEL-629,729.*

Set the signal generator at 1770 KC and adjust the broadcast oscillator trimmer on top of the chassis, to the right of the gang condenser. The oscillator trimmer is the front adjustment, until a response is indicated. The dial pointer should now co-incide with the 1500 KC mark on the dial. Adjust the 1500 KC Antenna for maximum output.

*MODEL 739, 7390*

Set the signal generator at 1720 KC and adjust the broadcast oscillator trimmer (under the chassis, behind the tone control. The oscillator trimmer is the one nearest the band switch) until a response is indicated on the output meter. The generator is now set at 1500 KC. Turn the variable condenser until a response is indicated. The dial pointer should now coincide with the 1500 KC mark on the dial. Adjust the 1500 KC Antenna trimmer (located adjacent to the oscillator trimmer, under the chassis) for maximum output.

Set the generator at 600 KC and turn the variable condenser control until a response is indicated. Adjust the broadcast oscillator padder condenser (located directly behind the variable condenser) for maximum response while "rocking" the gang condenser. The high frequency adjustments should now be rechecked.

SHORT-WAVE BAND #1 ADJUSTMENT. Set the band switch to the extreme {(right position) left hand position} which is short wave band #1. — FOR MODEL 369 ONLY — Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is connected to the "short-antenna" lead through a dummy antenna consisting of a 250 MMFD condenser and a 400 ohm non-inductive resistor in series. With the generator set at 22MC (22.5MC) the short wave oscillator trimmer is opened until a response is heard. The trimmer condenser is then opened further (capacity reduced) until a second response is heard. This response (with trimmer at low capacity) is the correct response to use. the other being the image.

With the generator set at 23MC — FOR MODELS 629,729.

Set the generator at 19MC Turn the condenser until a response is indicated. The pointer should coincide with the 19MC mark on the dial. Adjust the antenna trimmer for the short-wave band (located under the chassis, on the antenna coil) for maximum output while rocking the condenser gang from left to right.

SHORT WAVE BAND #2 *MODEL 369 ONLY*

Set the band switch to the middle position. Turn the dial control knob to the extreme high frequency end so that the condenser plates are entirely out of mesh. The signal generator is left connected as for band #1. The generator is set at 6.25 MC and the Band #2 oscillator trimmer is opened until a response is indicated at the lower capacity setting of the trimmer. (Located on top of the chassis, behind the dial bracket. The one is the front trimmer). Set the generator at 6MC and turn the variable condenser until a response is indicated. The pointer should now co-incide with the 6 MC mark on the dial. The antenna trimmer is then adjusted for maximum output while the condenser gang is rocked from right to left. The antenna trimmer is located on the top of the chassis, in line with and directly behind the oscillator trimmer. Set the generator at 2.4 MC and turn the variable condenser knob until a response is indicated. The padder for this band, which is located on top of the chassis and is the projecting adjacent screw to the right of the oscullator trimmer, is now adjusted for maximum output while rocking the condenser gang from left to right. The high frequency adjustments should then be rechecked.

LONG WAVE BAND *MODEL-7390 ONLY*

The dummy antenna for this band is the same one used in aligning the broadcast band.

Set the generator at 300 KC. Set the dial pointer so as to coincide with the 300 KC mark on the dial. The long-wave oscillator trimmer (located on top of chassis, right hand side, behind the right hand dial bracket. The oscillator is the rear trimmer) is now adjusted until a response is indicated. The long wave antenna trimmer (located adjacent to the oscillator trimmer) is now adjusted for maximum output.

Set the generator at 150 KC and tune for a response. Adjust the Long-Wave padding condenser (located on top of chassis to the right and forward of the oscillator antenna trimmers for maximum output while "rocking" the gang condenser. The high frequency adjustments should now be rechecked.

Now set the signal generator at about 1200 kc and leave THE BAND SWITCH ON THE LONG WAVE POSITION. Adjust the generator output voltage until a response is heard. The 1200 kc wave trap on top right of the chassis is now adjusted for MINIMUM response.

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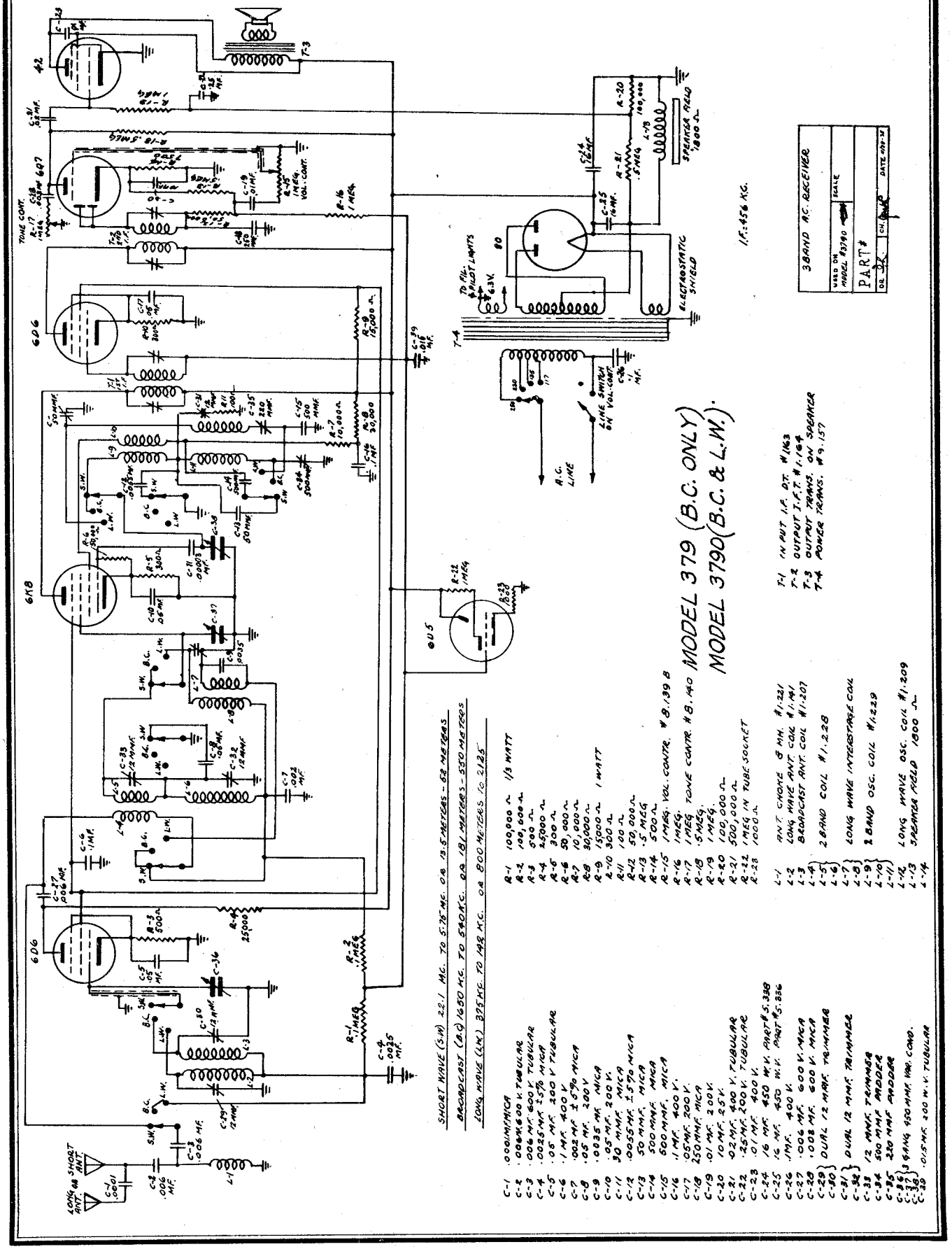
# GAROD RADIO CORP.

MODELS 379,3790
Schematic


MODEL 379 (B.C. ONLY)
MODEL 3790 (B.C. & L.W.).
I.F.: 455 KC.
3 BAND A.C. RECEIVER
PART #
6D6
6K8
6Q7
6V6
6X5
SHORT WAVE (S.W.) 22.1 MC. TO 5.76 MC. OR 13.5 METERS - 52 METERS
BROADCAST (B.C.) 1650 KC. TO 540 KC. OR 181 METERS - 550 METERS
LONG WAVE (L.W.) 375 KC. TO 148 KC. OR 800 METERS TO 2125
SPEAKER FIELD 1800 Ω
ELECTROSTATIC SHIELD
A.C. LINE
LINE SWITCH
TONE CONT.
LONG ANT OR SHORT ANT.

C-1 .000MMFD
C-2 .0005 MF. 600 V. TUBULAR
C-3 .006 MF. 600 V. TUBULAR
C-4 .0025 MF. ±5% MICA
C-5 .05 MF. 200 V TUBULAR
C-6 .1 MF. 400 V
C-7 .002 MF. ±5% MICA
C-8 .05 MF. 200 V
C-9 .0035 MF. MICA
C-10 .05 MF. 200 V.
C-11 .0005 MF. MICA
C-12 .0055 MF. ±5% MICA
C-13 50 MMF. MICA
C-14 500 MMF. MICA
C-15 500 MMF. MICA
C-16 .1 MF. 400 V.
C-17 .05 MF. 200 V.
C-18 250 MMF. MICA
C-19 .01 MF. 200 V.
C-20 .10 MF. 25 V.
C-21 .02 MF. 400 V. TUBULAR
C-22 .25 MF. 200 V. TUBULAR
C-23 .01 MF. 400 V.
C-24 .16 MF. 450 W.V. PART #5.338
C-25 .16 MF. 450 W.V. PART #5.336
C-26 .1 MF. 400 V.
C-27 .006 MF. 600 V. MICA
C-28 .008 MF. 600 V. MICA
C-29 } DUAL 12 MMF. TRIMMER
C-30 }
C-31 } DUAL 12 MMF. TRIMMER
C-32 }
C-33 12 MMF. TRIMMER
C-34 500 MMF. PADDER
C-35 220 MMF. PADDER
C-36 } 4 GANG 450 MMF. VAR. COND.
C-37 }
C-38 .015 MF. 200 W.V. TUBULAR

R-1 100,000 Ω 1/3 WATT
R-2 100,000 Ω
R-3 500 Ω
R-4 25000 Ω
R-5 300 Ω
R-6 30,000 Ω
R-7 10,000 Ω
R-8 30,000 Ω
R-9 15000 Ω 1 WATT
R-10 300 Ω
R-11 100 Ω
R-12 50,000 Ω
R-13 .5 MEG
R-14 500 Ω
R-15 1 MEG. VOL. CONTR. #B.139 B
R-16 1 MEG.
R-17 1 MEG TONE CONTR. #B.140
R-18 .5 MEG.
R-19 1 MEG.
R-20 100,000 Ω
R-21 500,000 Ω
R-22 1 MEG IN TUBE SOCKET
R-23 1000 Ω

T-1 I.N. HUT I.F. DT. #1163
T-2 OUTPUT I.F.T. #1.164
T-3 OUTPUT TRANS. ON SPEAKER
T-4 POWER TRANS. #9.157

L-1 ANT. CHOKE 6 MH. #1.221
L-2 LONG WAVE ANT. COIL #1.141
L-3 BROADCAST ANT. COIL #1.207
L-4 } 2 BAND COIL #1.228
L-5 }
L-6 }
L-7 } LONG WAVE INTERSTAGE COIL
L-8 }
L-9 } 2 BAND OSC. COIL #1.229
L-10 }
L-11 }
L-12 LONG WAVE OSC. COIL #1.209
L-13 SPEAKER FIELD 1800 Ω
L-14

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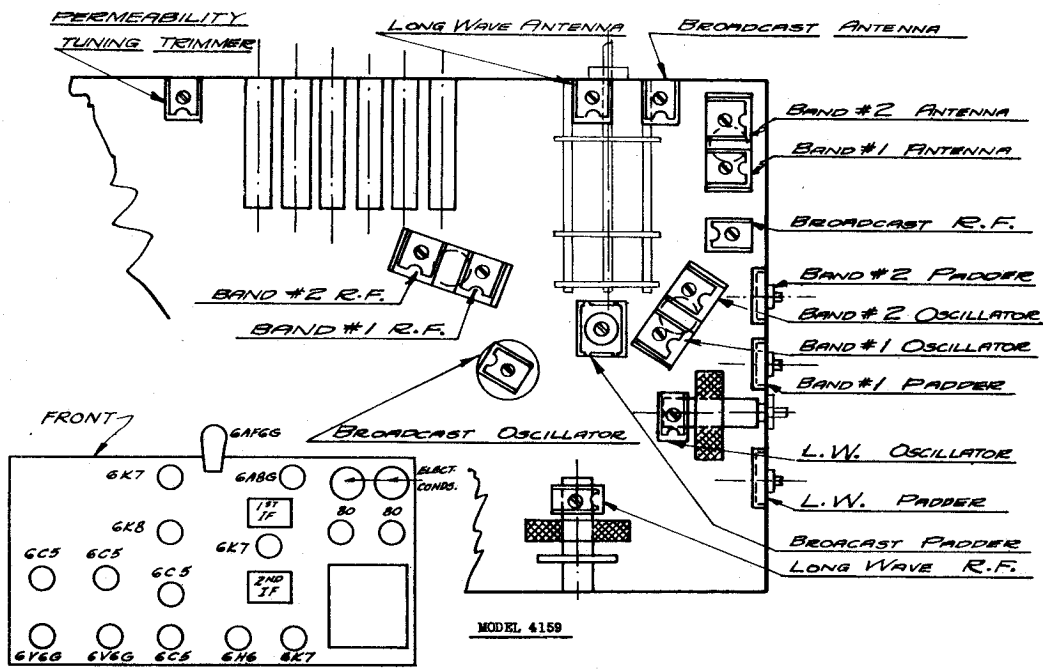
MODELS 379,3790
Socket,Trimmers
Tuner Data

# GAROD RADIO CORP.

MODEL 4159
Socket,Trimmers




**MODELS 379 and 3790**

**PROCEDURE FOR SETTING STATION BUTTONS**

Select the six favorite broadcast stations which you wish to set up for automatic tuning. The stations chosen should be from amount those received most clearly when using dial tuning. It is not advisable to use this system of tuning for short wave or distant broadcast stations.

Although each button will cover the entire dial range it may be most advisable, from the standpoint of convenience, to arrange the stations chosen in order of frequency.

SETTING THE STATION BUTTONS: The proper procedure is as follows--grasp the first button to be set with the finger tips and loosen it by unscrewing it about one-half turn to the left or in a counter clockwise direction. Now tune in the station which you desire to set on this button, using the regular tuning knob. After the station is perfectly tuned, hold the knob firmly with one hand and depress the button just loosened as far as it will go. Then tighten it gently by turning it to the right, or in a clockwise direction. The button should be kept depressed in the meantime, and the dial knob should be held firmly so that the station does not become detuned.

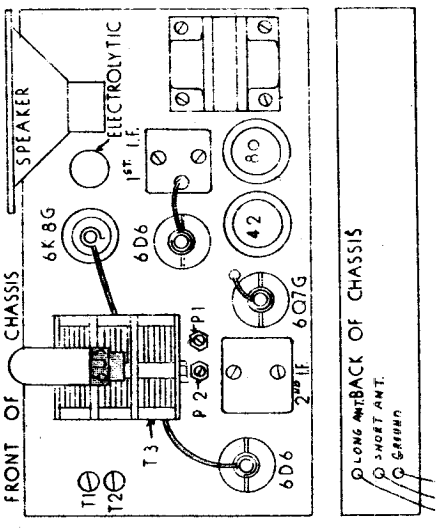
Now release the push button and turn it again in a clockwise direction to make sure it is firmly tightened. Then tune the dial off the station and try depressing the push button as far as it will go. The station should then be perfectly retuned. If it is not tuned properly that is, if you are able to retune it better with the dial, it will be necessary to repeat the above procedure.

The other five buttons may now be set up in the same manner as described above, tuning each to one of the favorite stations which you have selected.

The tabs bearing the station call letters may now be removed from the sheet provided, and placed in the slots below the pushbuttons.

When tuning with the pushbuttons, it must be remembered that this is a mechanically driven device, depending upon pressure for proper operation. For this reason the pushbuttons must be depressed firmly, otherwise the dial may not come to the correct setting before the button is released.

If at any time it is desired to change one of the stations which is set up for automatic tuning, this may be done without disturbing the settings of the other stations. Merely set up the new station on the button which was used for the station no longer desired.

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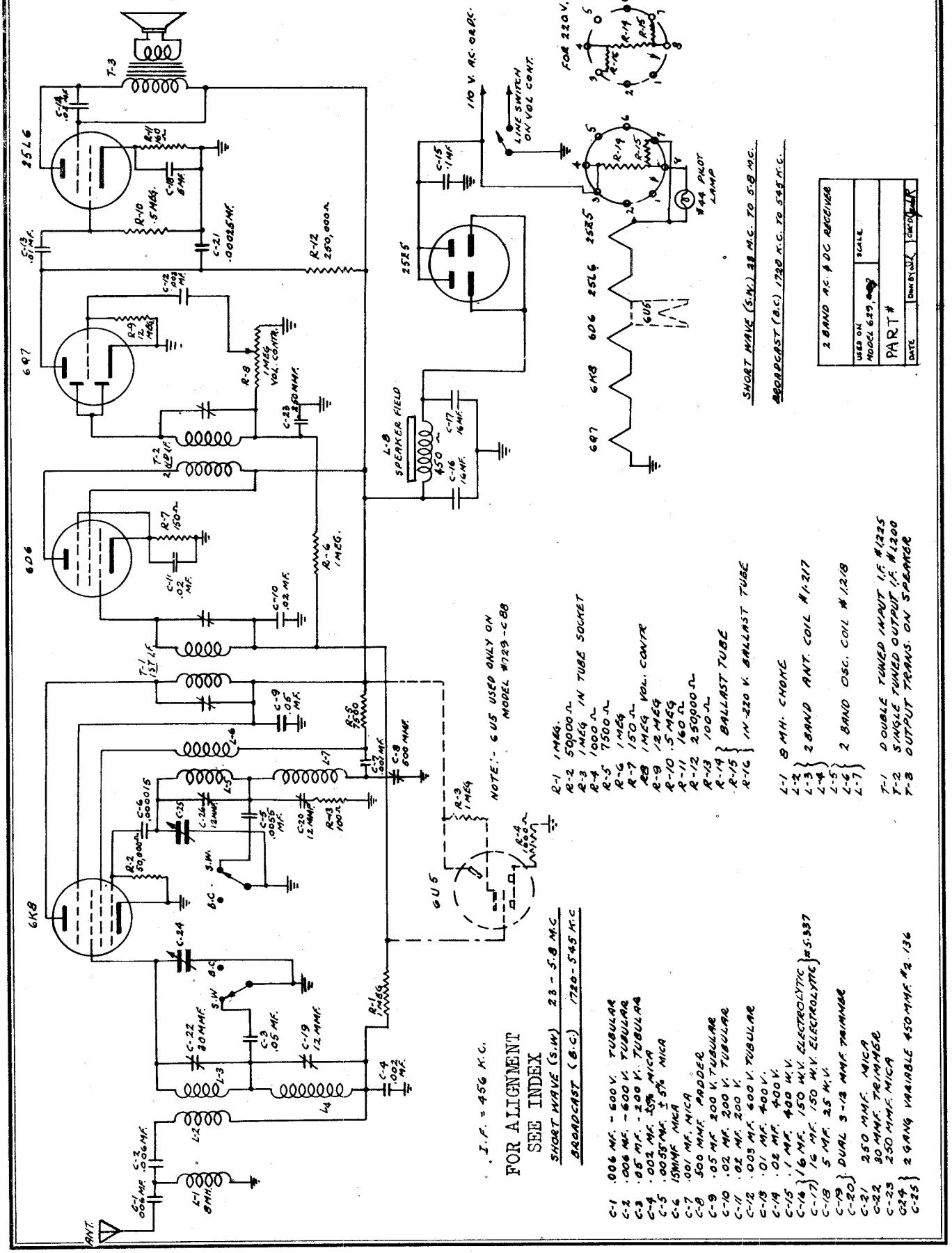
# GAROD RADIO CORP.

MODELS 629, 729
Schematic




C-1 .006 MF. - 600 V. TUBULAR
C-2 .006 MF. - 600 V. TUBULAR
C-3 .05 MF. - 200 V. TUBULAR
C-4 .002 MF. ±5% MICA
C-5 .0055 MF. ±5% MICA
C-6 .00015MF MICA
C-7 .001 MF. MICA
C-8 500 MMF. MOLDED
C-9 .05 MF. 200 V. TUBULAR
C-10 .02 MF. 200 V. TUBULAR
C-11 .02 MF. 200 V.
C-12 .003 MF. 600 V. TUBULAR
C-13 .01 MF. 400 V.
C-14 .02 MF. 400 V.
C-15 .1 MF. 400 W.V.
C-16 } 16 MF. 150 W.V. ELECTROLYTIC } #5-337
C-17 } 16 MF. 150 W.V. ELECTROLYTIC } #5-337
C-18 5 MF. 25 W.V.
C-19 } DUAL 3-12 MMF. TRIMMER
C-20 }
C-21 250 MMF. MICA
C-22 30 MMF. TRIMMER
C-23 250 MMF. MICA
C-24 } 2 GANG VARIABLE 450 MMF. #2 136
C-25 }

R-1 1 MEG.
R-2 50000 Ω
R-3 1 MEG
R-4 1000 Ω
R-5 7500 Ω
R-6 1 MEG
R-7 150 Ω
R-8 1 MEG VOL. CONTR
R-9 12 MEG
R-10 .5 MEG
R-11 160 Ω
R-12 250000 Ω
R-13 100 Ω
R-14 } BALLAST TUBE
R-15 } 1W-220 V. BALLAST TUBE
R-16

L-1 8 MH. CHOKE
L-2 } 2 BAND ANT. COIL #1217
L-3 }
L-4 }
L-5 } 2 BAND OSC. COIL #1218
L-6 }
L-7 }

T-1 DOUBLE TUNED INPUT I.F. #1225
T-2 SINGLE TUNED OUTPUT I.F. #1200
T-3 OUTPUT TRANS. ON SPEAKER

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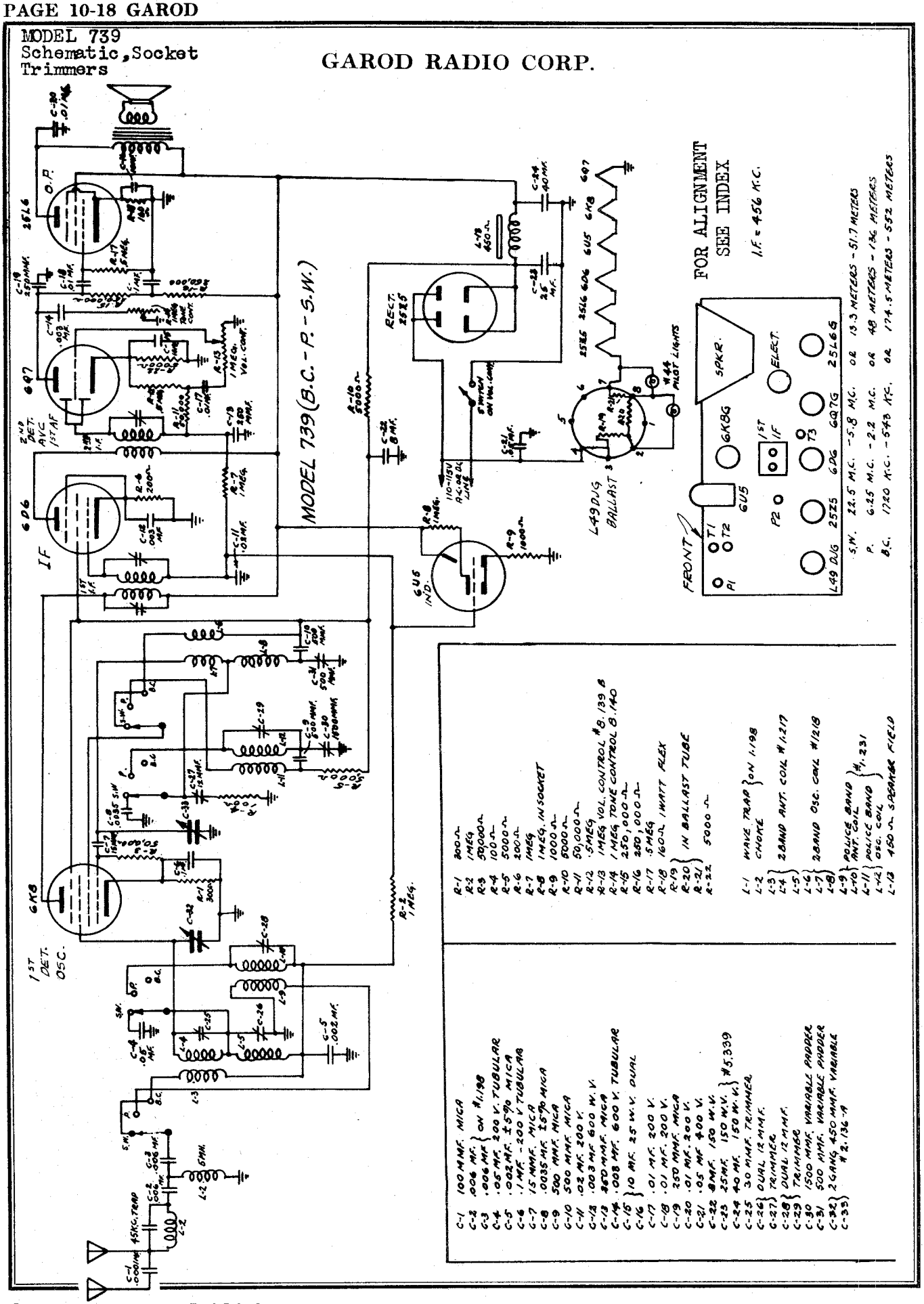
MODEL 739
Schematic, Socket
Trimmers

# GAROD RADIO CORP.




| | |
|---|---|
| C-1 | 100 MMF. MICA |
| C-2 | .006 MF. } CN #1198 |
| C-3 | .006 MF. } |
| C-4 | .05 MF. 200 V. TUBULAR |
| C-5 | .002 MF. ±5% MICA |
| C-6 | .1 MF. - 200 V TUBULAR |
| C-7 | 15 MMF. MICA |
| C-8 | .0035 MF. ±5% MICA |
| C-9 | 500 MMF. MICA |
| C-10 | 500 MMF. MICA |
| C-11 | .02 MF. 200 V. |
| C-12 | .003 MF 600 W. V. |
| C-13 | 250 MMF. MICA |
| C-14 | .008 MF. 600 V. TUBULAR |
| C-15 | .10 MF. 25 W.V. DUAL |
| C-16 | |
| C-17 | .01 MF. 200 V. |
| C-18 | .01 MF. 200 V. |
| C-19 | 250 MMF. MICA |
| C-20 | .01 MF. 200 V. |
| C-21 | .05 MF 400 V. |
| C-22 | 8 MF. 150 W.V. } #5339 |
| C-23 | 25 MF. 150 W.V. } |
| C-24 | 40 MF. 150 W.V. } |
| C-25 | 30 MMF. TRIMMER |
| C-26 | DUAL 12 MMF. |
| C-27 | TRIMMER |
| C-28 | DUAL 12 MMF. |
| C-29 | TRIMMER |
| C-30 | 1500 MMF. VARIABLE PADDER |
| C-31 | 500 MMF. VARIABLE PADDER |
| C-32 | 2 GANG 450 MMF. VARIABLE |
| C-33 | #2136-A |

| | |
|---|---|
| R-1 | 200 Ω |
| R-2 | 1 MEG |
| R-3 | 50,000 Ω |
| R-4 | 100 Ω |
| R-5 | 5000 Ω |
| R-6 | 200 Ω |
| R-7 | 1 MEG |
| R-8 | 1 MEG. IN SOCKET |
| R-9 | 1000 Ω |
| R-10 | 6000 Ω |
| R-11 | 50,000 Ω |
| R-12 | .5 MEG |
| R-13 | 1 MEG VOL. CONTROL #8,139 & |
| R-14 | 1 MEG TONE CONTROL 8.140 |
| R-15 | 250,000 Ω |
| R-16 | 250,000 Ω |
| R-17 | .5 MEG |
| R-18 | 160 Ω 1 WATT FLEX |
| R-19 | } IN BALLAST TUBE |
| R-20 | } |
| R-21 | 5000 Ω |
| R-22 | |

| | |
|---|---|
| L-1 | WAVE TRAP } ON #1198 |
| L-2 | CHOKE } |
| L-3 | } 2 BAND ANT. COIL #1217 |
| L-4 | } |
| L-5 | |
| L-6 | |
| L-7 | } 2 BAND OSC. COIL #1218 |
| L-8 | |
| L-9 | } POLICE BAND } #1231 |
| L-10 | ANT. COIL } |
| L-11 | } POLICE BAND } |
| L-12 | OSC. COIL } |
| L-13 | 450 Ω SPEAKER FIELD |

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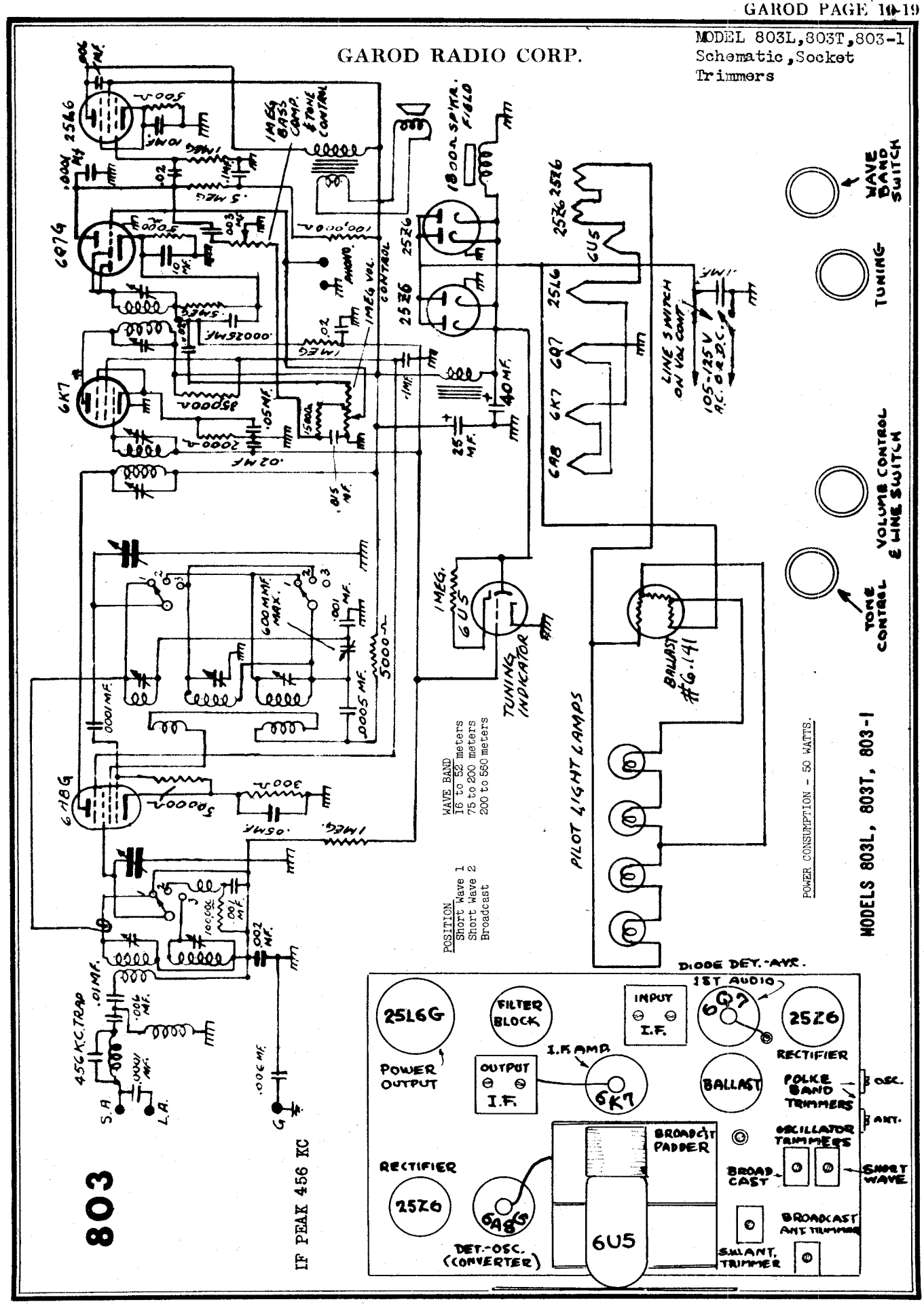
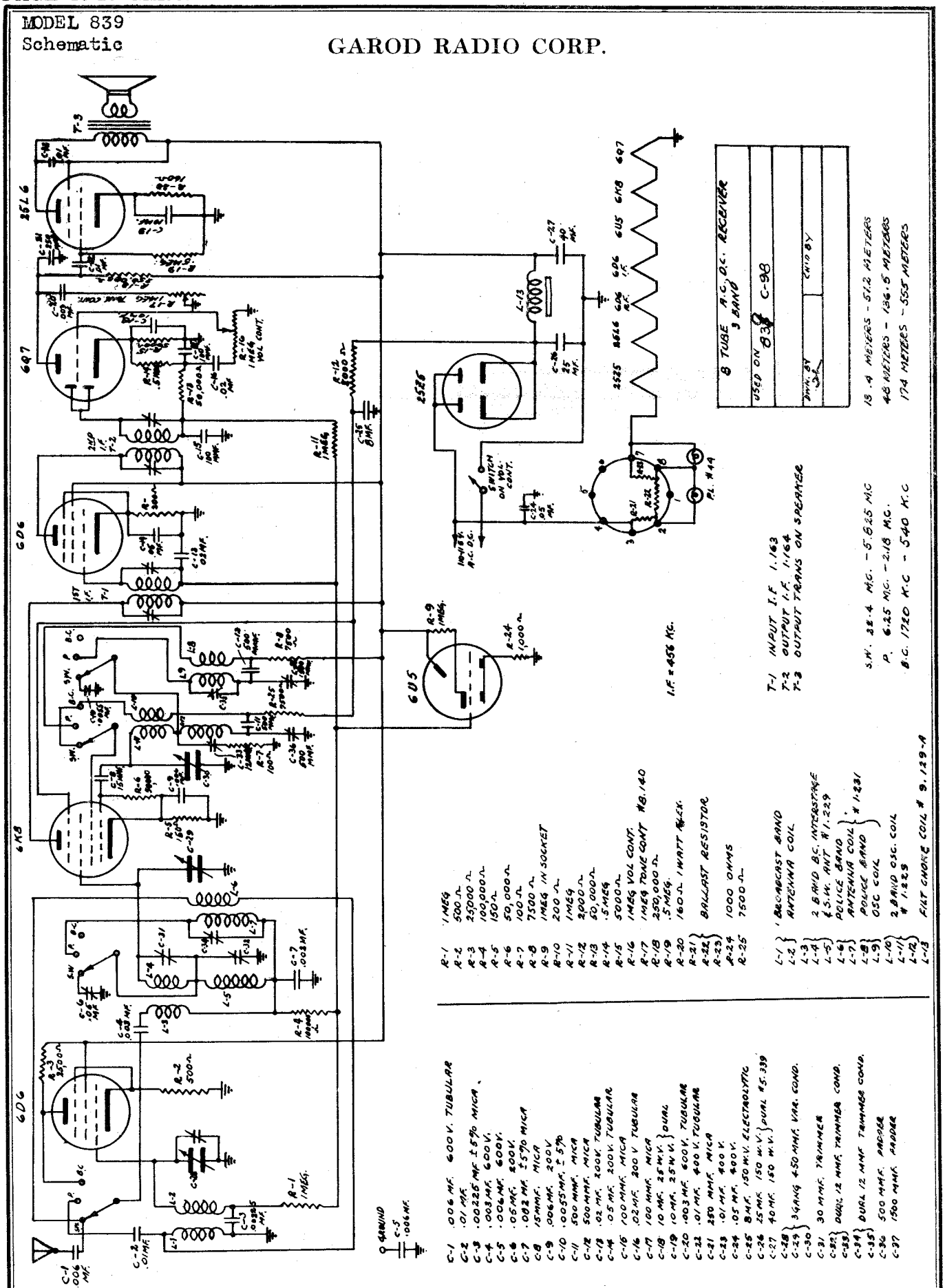
GAROD RADIO CORP.

MODEL 803L, 803T, 803-1
Schematic, Socket
Trimmers


6Q7G
.000025MF.
.02MF.
.05MF.
.001MF.
.0005MF.
.01MF.
.002MF.
.006MF.
.1MEG.
.5MEG.
.3MEG.
.25MEG.
.02MEG.
.05MEG.
.1MEG.
.5MEG.
.85000Ω
.5000Ω
.2000Ω
.300Ω
.5000Ω
.600MMF. MAX.
.001MF.
.0005MF.
.01MF.
.002MF.
.006MF.
.1MEG.
.05MEG.
.02MEG.
.1MEG.
.5MEG.
.3MEG.
.25MEG.
.02MEG.
.05

MODEL 839
Schematic

# GAROD RADIO CORP.


8 TUBE A.C.-D.C. RECEIVER
3 BAND
USED ON 838 C-98
DWN. BY
CHKD BY
18.4 METERS - 51.2 METERS
48 METERS - 136.5 METERS
174 METERS - 555 METERS
S.W. 18.4 M.C. - 5.625 M.C.
P. 6.25 M.C. - 2.18 M.C.
B.C. 1720 K.C. - 540 K.C.
FIAT CHOKE COIL # 9.129-A
T-1 INPUT I.F. 1.163
T-2 OUTPUT I.F. 1.164
T-3 OUTPUT TRANS ON SPEAKER
I.F. = 456 KC.
6DG
6K8
6D6
6A7
1516
2525
6U5
6Q7
PL. #44
SWITCH ON VOL. CONT.
INPUT A.C.-D.C.
GROUND
C-1 .006 MF. 600 V. TUBULAR
C-2 .01 MF.
C-3 .00225 MF ± 5% MICA
C-4 .003 MF. 600 V.
C-5 .006 MF. 600 V.
C-6 .05 MF. 600 V.
C-7 .002 MF ± 5% MICA
C-8 15 MMF. MICA
C-9 .006 MF. 200 V.
C-10 .0055 MF. ± 5%
C-11 500 MMF. MICA
C-12 500 MMF. MICA
C-13 .02 MF. 200 V. TUBULAR
C-14 .05 MF. 200 V. TUBULAR
C-15 100 MMF. MICA
C-16 .02 MF. 200 V. TUBULAR
C-17 100 MMF. MICA
C-18 10 MF. 25 W.V. } DUAL
C-19 10 MF. 25 W.V. }
C-20 .003 MF. 600 V. TUBULAR
C-21 .01 MF. 400 V. TUBULAR
C-22 250 MMF. MICA
C-23 .01 MF. 400 V.
C-24 .05 MF. 400 V.
C-25 8 MF. 150 W.V. ELECTROLYTIC
C-26 25 MF. 150 W.V. } DUAL #5.339
C-27 40 MF. 150 W.V. }
C-28 } 3 GANG 450 MMF. VAR. COND.
C-29 }
C-30 }
C-31 30 MMF. TRIMMER
C-32 } DUAL 12 MMF. TRIMMER COND.
C-33 }
C-34 } DUAL 12 MMF. TRIMMER COND.
C-35 }
C-36 500 MMF. PADDER
C-37 1500 MMF. PADDER
R-1 1 MEG
R-2 500 Ω
R-3 25000 Ω
R-4 100,000 Ω
R-5 150 Ω
R-6 50,000 Ω
R-7 100 Ω
R-8 7500 Ω
R-9 1 MEG IN SOCKET
R-10 200 Ω
R-11 1 MEG
R-12 2,000 Ω
R-13 20,000 Ω
R-14 .5 MEG
R-15 5000 Ω
R-16 1 MEG VOL CONT. #B.140
R-17 1 MEG TONE CONT
R-18 250,000 Ω
R-19 .5 MEG.
R-20 160 Ω 1 WATT WIRE W.
R-21 } BALLAST RESISTOR
R-22 }
R-23 1000 OHMS
R-24 1000 Ω
R-25 7500 Ω
L-1 } BROADCAST BAND
L-2 } ANTENNA COIL
L-3 }
L-4 } 2 BAND B.C. INTERSTAGE
L-5 } 4.5 M.W. ANT. # 1.229
L-6 } POLICE BAND
L-7 } ANTENNA COIL } # 1.231
L-8 }
L-9 } POLICE BAND
L-10 } OSC COIL
L-11 } 2 BAND OSC. COIL
L-12 } # 1.228
L-13 } FIAT CHOKE COIL # 9.129-A

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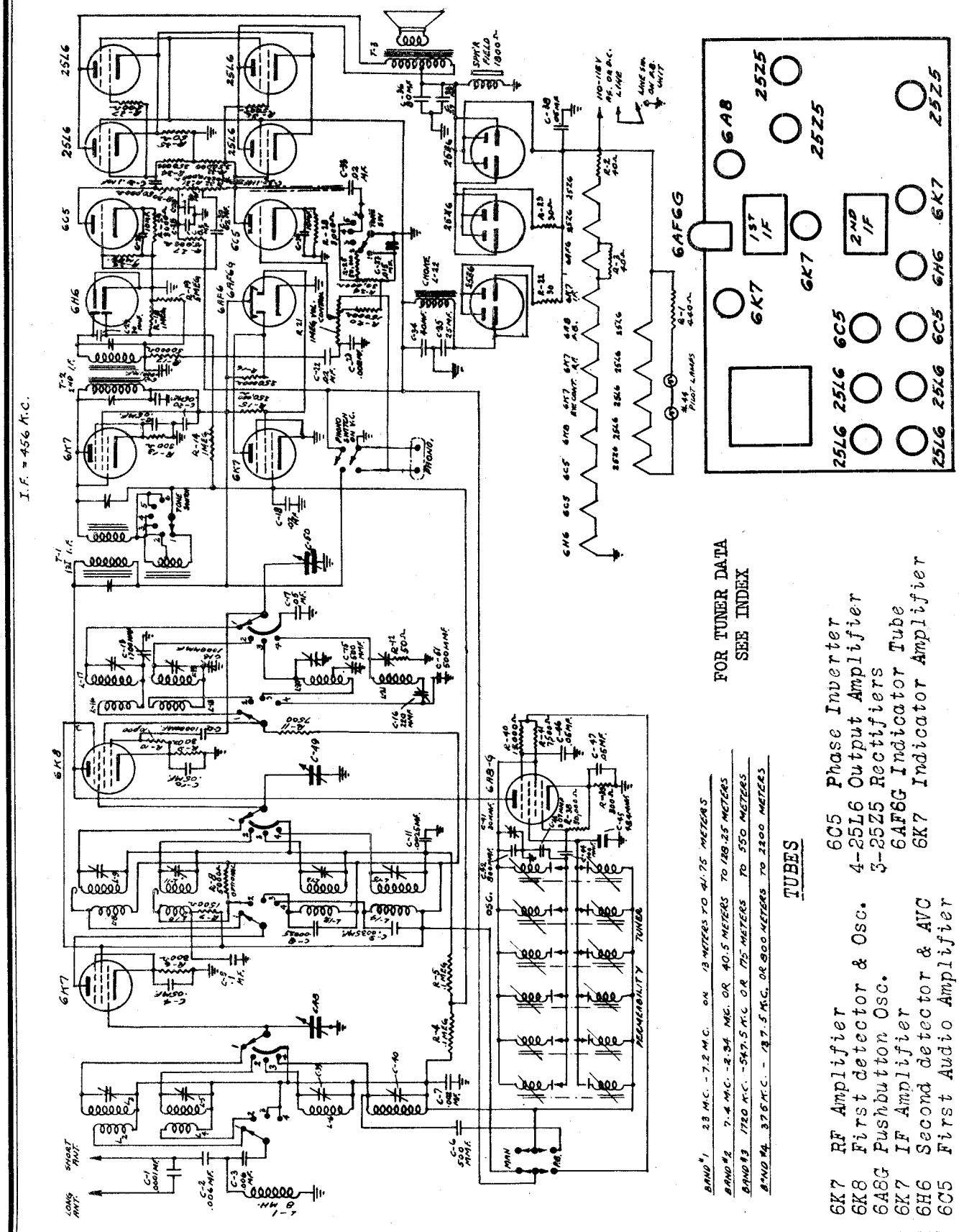
GAROD RADIO CORP.

MODEL 1649
Schematic, Socket


I.F. = 456 K.C.
FOR TUNER DATA
SEE INDEX
BAND #1 23 MC. - 7.2 MC. OR 13 METERS TO 41.75 METERS
BAND #2 7.4 MC. - 2.34 MC. OR 40.5 METERS TO 128.25 METERS
BAND #3 1720 KC. - 547.5 KC. OR 175 METERS TO 550 METERS
BAND #4 376 KC. - 137.5 KC. OR 800 METERS TO 2200 METERS
TUBES
6K7 RF Amplifier
6K8 First detector & Osc.
6A8G Pushbutton Osc.
6K7 IF Amplifier
6H6 Second detector & AVC
6C5 First Audio Amplifier
6C5 Phase Inverter
4-25L6 Output Amplifier
3-25Z5 Rectifiers
6AF6G Indicator Tube
6K7 Indicator Amplifier

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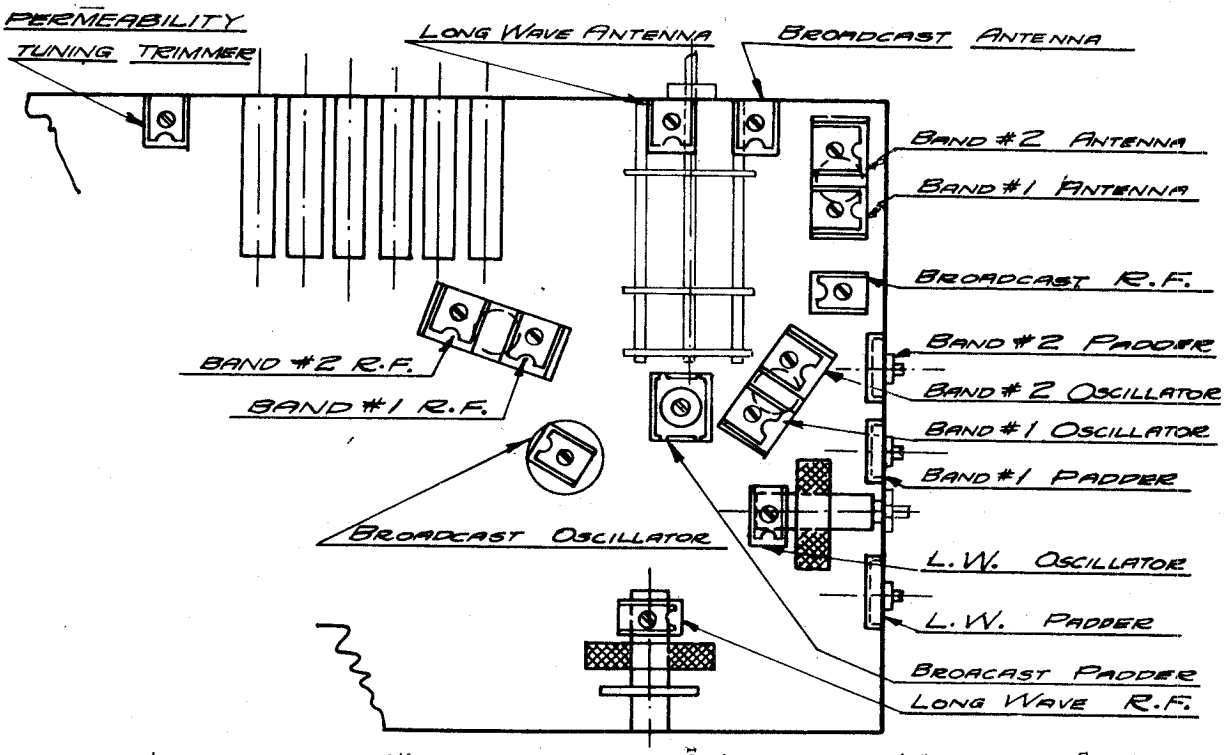
MODEL 1649
Alignment, Trimmers

# GAROD RADIO CORP.




16 TUBE . . . 4 BAND . . . AC - DC RECEIVER

MODEL #1649 C 14

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. Adjustment: The signal generator is set at 456 kc and is connected through a .5 mmfd condenser to the grid of the first detector (6K8). With the band switch set on "Broadcast", the pointer set at 550 kc and the receiver volume control at its maximum position, the I.F. trimmers are adjusted for maximum output. These trimmers may be found on tops of the I.F. transformer shield cans.

Band #1 Adjustment: Turn the dial control knob so that the condenser plates are entirely out of mesh. Set the band switch to band #1. The signal generator should be connected to the short-artenna binding post through the dummy antenna consisting of a 250 mmfd mica condenser and a 400 ohm non-inductive resistor. The oscillator trimmer condenser should be opened to minimum capacity and the signal generator then set to 23 megacycles. The oscillator trimmer is then increased in capacity until maxfmum response is obtained. Two responses are possible and it is important that the high frequency response (oscillator trimmer low capacity) be used. The signal generator is then set to 21 MC and the variable condenser turned until a response is obtained. The pointer should coincide with the 21 MC mark on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named, for maximum output. The variable condenser should be rocked slightly during this last adjustment. The signal generator is now set at 7.2 mc and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum reading of the output meter while the generator tuning condenser is rocked slightly to right and left. The high frequency adjustment should then be rechecked.

Band #2: The band selector switch is set in position for operation on short wave band #2. The variable condenser is opened so that the plates are completely unmeshed and the oscillator trimmer is opened to minimum capacity. The signal generator is set to 7.4 mc and the oscillator trimmer condenser is increased in capacity until a response is heard. Two responses are possible and it is important that the higher frequency response (oscillator trimmer low capacity be used. Set the signal generator at 7 mc and turn the tuning control until a response is indicated on the output meter. The pointer should now coincide with the 7 mc marker on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. After high frequency adjustments have been made set the signal generator at 2.5 mc and turn the variable gang condenser until a response is observed. Adjust the padding condenser for this band for maximum gain while rocking the tuning condenser slightly to the right and the left. The higher frequency adjustment should then be rechecked.

Broadcast Band: The dummy antenna for this band should consist of a 250 mmfd condenser only. The signal generator is set at 1720 kc, the band switch set at broadcast position. The variable condenser should be opened so that the plates are entirely out of mesh. The oscillator trimmer is then adjusted for maximum response on that frequency (1720kc). Set the signal generator at 1500 kc and tune the receiver until a response is indicated. The dial pointer should coincide with the 1500 kc mark on the dial. Then adjust the antenna and detector trimmers in the order indicated for maximum output. The signal generator is then set at 600 kc and the receiver tuned until a response is indicated. The padder condenser is then adjusted for maximum gain while the tuning gang condenser is rocked slightly to the left and right. The 1500 kc adjustment should then be rechecked.

Long Wave Band: The band selector switch is set in position for operation on the long wave band. The receiver and generator are both tuned to 300 kc and the oscillator trimmer is adjusted for maximum response. The antenna and first detector trimmers are adjusted in the order named for maximum output.

The signal generator is then set at 150 kc and the signal is tuned in. The long wave padder condenser is adjusted for maximum response while the gang tuning condenser is rocked slightly to the left and right. The 300 kc adjustment should then be rechecked.

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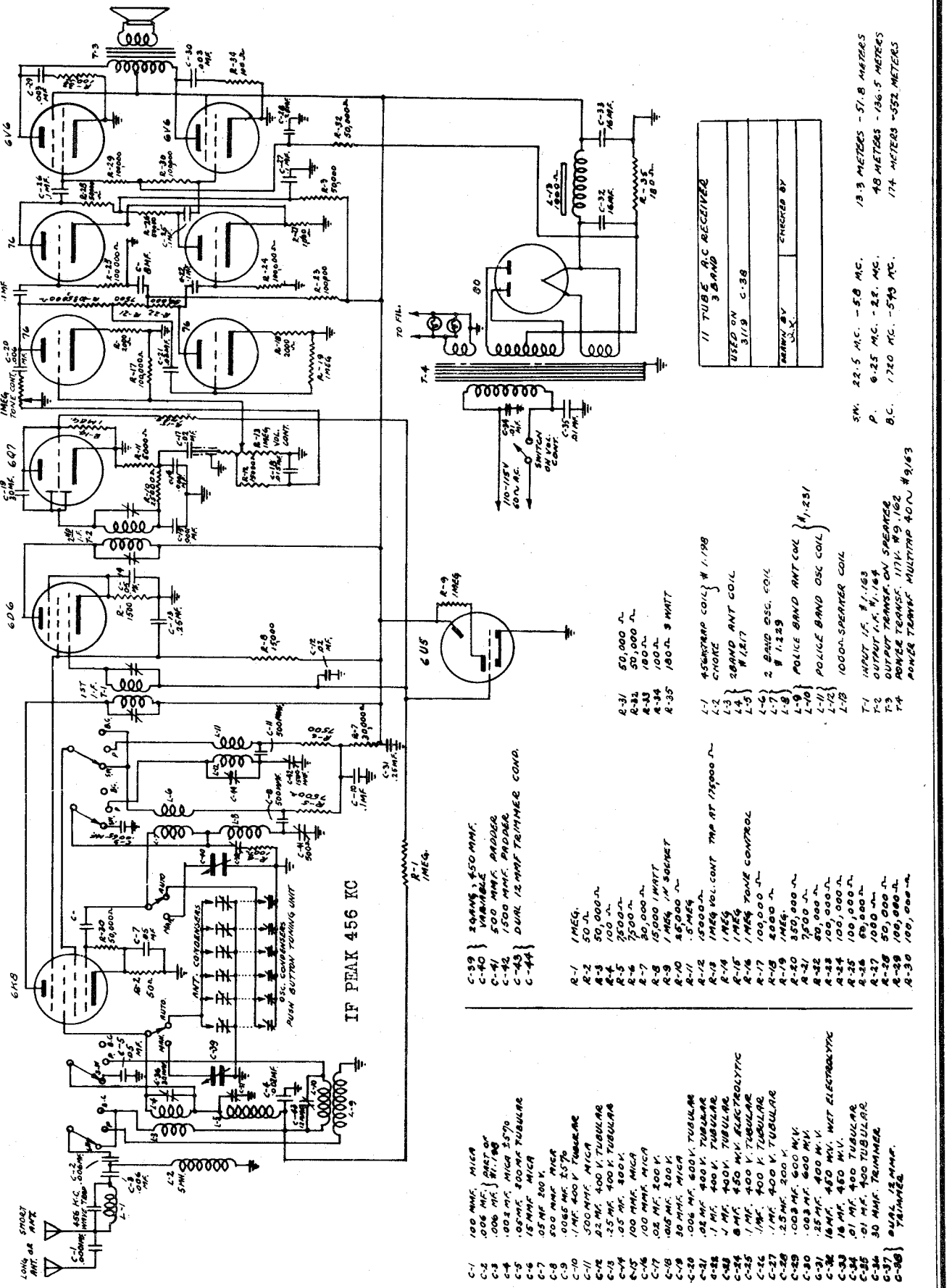
GAROD RADIO CORP.

MODEL 3119
Schematic


IF PEAK 456 KC
11 TUBE A.C RECEIVER
3 BAND
USED ON 3119 C-38
CHECKED BY
MARKED BY
O.K.
SW. 22.5 MC. - 5.8 MC. 13.3 METERS - 51.8 METERS
P. 6.25 MC. - 2.2 MC. 48 METERS - 136.5 METERS
B.C. 1720 KC. - 543 KC. 174 METERS - 552 METERS

C-1 100 MMF. MICA
C-2 .006 MF. } PART OF
C-3 .006 MF. } #1.198
C-4 .002 MF. MICA 5%
C-5 .05 MF. 400 MF TUBULAR
C-6 18 MMF MICA
C-7 .05 MF 200 V.
C-8 200 MMF MICA
C-9 .0065 MF. 5%
C-10 .1 MF. 400 V TUBULAR
C-11 500 MMF. MICA
C-12 .02 MF. 400 V. TUBULAR
C-13 .25 MF. 400 V. TUBULAR
C-14 .05 MF. 400 V.
C-15 100 MMF. MICA
C-16 .02 MF. 200 V.
C-17 .005 MF. 200 V.
C-18 30 MMF. MICA
C-19 .006 MF. 400 V. TUBULAR
C-20 .02 MF 400 V. TUBULAR
C-21 .1 MF. 400 V. TUBULAR
C-22 .1 MF. 400 V. TUBULAR
C-23 8 MF. 450 W.V. ELECTROLYTIC
C-24 .1 MF. 400 V. TUBULAR
C-25 .1 MF. 400 V. TUBULAR
C-26 .25 MF. 200 V.
C-27 .003 MF. 600 W.V.
C-28 .003 MF. 600 W.V.
C-29 .25 MF. 400 W.V.
C-30 16 MF. 450 W.V. WET ELECTROLYTIC
C-31 16 MF. 450 W.V.
C-32 .01 MF. 400 TUBULAR
C-33 .01 MF. 400 TUBULAR
C-34 30 MMF. TRIMMER
C-35 } DUAL 13 MMF.
C-36 } TRIMMER

C-39 } 10 MMF. 450 MMF.
C-40 } VARIABLE
C-41 500 MMF. PADDER
C-42 1500 MMF. PADDER
C-43 } DUAL 12 MMF TRIMMER COND.
C-44 }

R-1 1 MEG.
R-2 50 Ω.
R-3 50,000 Ω
R-4 100 Ω.
R-5 3000 Ω.
R-6 7500 Ω.
R-7 30,000 Ω.
R-8 15,000 1 WATT
R-9 1 MEG. 1/4 SOCKET
R-10 35000 Ω.
R-11 .5 MEG.
R-12 13000 Ω.
R-13 1 MEG VOL. CONT TAP AT 135,000 Ω.
R-14 1 MEG.
R-15 1 MEG.
R-16 1 MEG TONE CONTROL
R-17 100,000 Ω.
R-18 2000 Ω.
R-19 1 MEG.
R-20 350,000 Ω.
R-21 7500 Ω.
R-22 50,000 Ω.
R-23 100,000 Ω.
R-24 100,000 Ω.
R-25 100,000 Ω.
R-26 50,000 Ω.
R-27 1000 Ω.
R-28 50,000 Ω.
R-29 100,000 Ω.
R-30 100,000 Ω.
R-31 50,000 Ω.
R-32 50,000 Ω.
R-33 100 Ω.
R-34 100 Ω. 3 WATT
R-35 180 Ω. 3 WATT

L-1 } 4 SECTION COIL } #1.198
L-2 } CHOKE
L-3 } 2 BAND ANT COIL
L-4 } #1.217
L-5 }
L-6 } 2 BAND OSC. COIL
L-7 } #1.229
L-8 }
L-9 } POLICE BAND ANT COIL } #1.231
L-10 }
L-11 } POLICE BAND OSC COIL
L-12 }
L-13 1000Ω SPEAKER COIL

T-1 INPUT I.F. #1.163
T-2 OUTPUT I.F. #1.164
T-3 OUTPUT TRANSF. ON SPEAKER
T-4 POWER TRANSF. 117V. #9.162
POWER TRANSF. MULTIMP 40Ω #9.163

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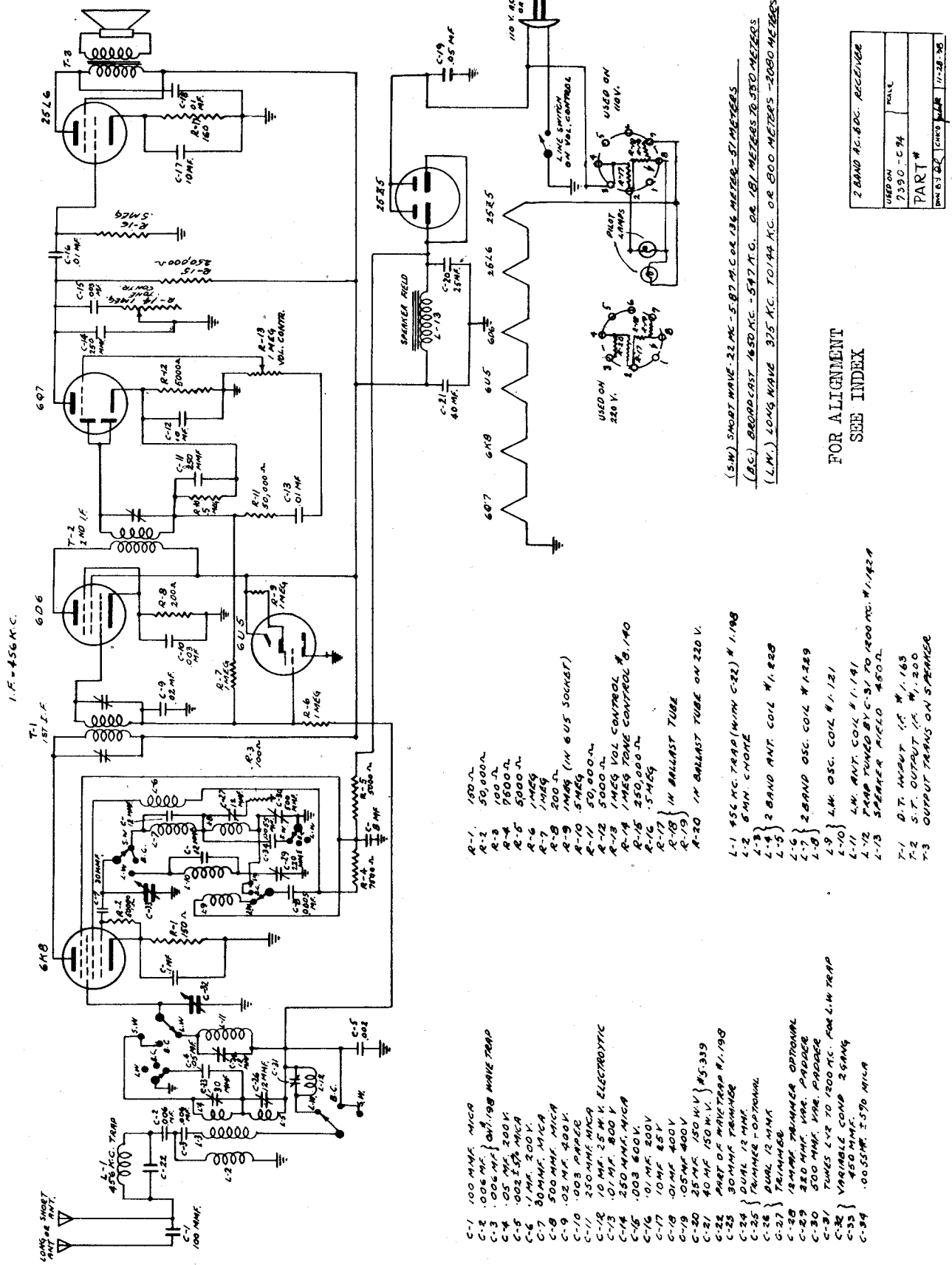
MODEL 7390
Schematic

# GAROD RADIO CORP.




C-1 100 MMF. MICA
C-2 .006 MF. } ON 198 MWE TRAP
C-3 .006 MF. }
C-4 .05 MF. 200 V.
C-5 .002 ± 5% MICA
C-6 .1 MF. 200 V.
C-7 80 MMF. MICA
C-8 500 MMF. MICA
C-9 .02 MF. 400 V.
C-10 .003 PAPER
C-11 250 MMF. MICA
C-12 .1 MF. 25 W.V. ELECTROLYTIC
C-13 .01 MF. 400 V
C-14 250 MMF. MICA
C-15 .003 400 V.
C-16 .01 MF. 200 V.
C-17 .1 MF. 25 V
C-18 .01 MF. 400 V
C-19 .05 MF. 400 V
C-20 25 MF. 150 W.V. } #5-339
C-21 40 MF. 150 W.V. }
C-22 PART OF WAVETRAP #1.198
C-23 30 MMF TRIMMER
C-24 } DUAL 12 MMF.
C-25 } TRIMMER - OPTIONAL
C-26 } DUAL 12 MMF.
C-27 } TRIMMER
C-28 12 MMF. TRIMMER OPTIONAL
C-29 220 MMF. VAR. PADDER
C-30 500 MMF. VAR. PADDER
C-31 TUNES L-12 TO 1200 KC. FOR L.W. TRAP
C-32 } VARIABLE COND 2 GANG
C-33 } 450 MMF.
C-34 .005 MF ± 5% MICA

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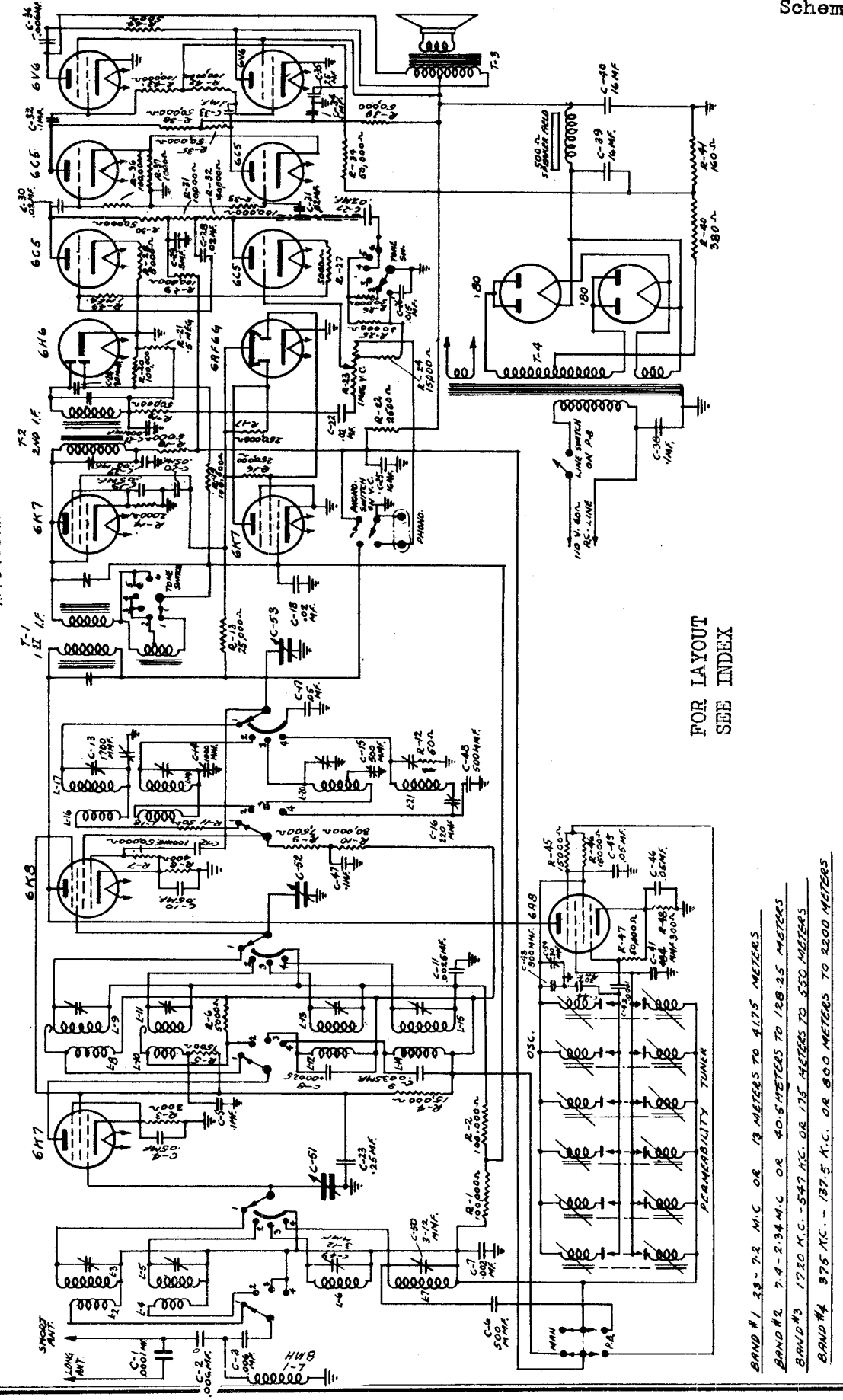
# GAROD RADIO CORP.

MODEL 4159
Schematic

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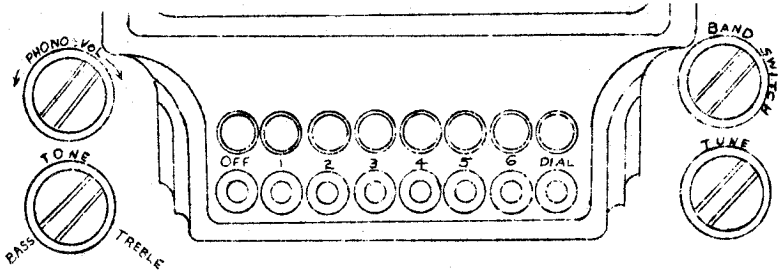
PUSH BUTTON TUNING FOR MODELS 1649 & 4159




*Line Voltage - 105/125 Volts*
*Line Frequency - 50/60 Cycles*

***CAUTION:*** ***THIS RECEIVER MUST NEVER BE USED ON VOLTAGES AND FREQUENCIES OTHER THAN THOSE GIVEN ABOVE. IF IN DOUBT ABOUT THE POWER IN USE IN YOUR LOCATION CONSULT YOUR LOCAL POWER COMPANY BEFORE PLUGGING IN THE RECEIVER.***

***NOTE:*** *Universal models supplied with tapped transformers may be used on 117, 135, 220 and 250 volts, 40 to 60 cycles alternating current. These may be identified by the cylindrical cap on the top of the power transformer, which covers the taps for the various voltages. To set the transformer for the voltage to be used, pull off the cap and clip the flexible lead to the lug marked for the desired voltage.*

## *PROCEDURE FOR SETTING STATION BUTTONS*

*SELECTING THE STATIONS TO BE SET: Make a list of the six favorite stations which you wish to set up for automatic tuning, and arrange them in order of frequency. They should be broadcast stations capable of putting in good signal strength at your locality as shown by the deflection of the tuning eye. It is not advisable to attempt the use of these buttons for tuning weak or distant stations. Next, consult the frequency chart below, in order to determine which button should be used for each station. For convenience in operating, arrange the stations in order of frequency from high to low frequency.*

## *FREQUENCY RANGE OF PUSHBUTTONS*

| | | | |
|---|---|---|---|
| *1* | *955* | *to 1560* | *Kilocycles* |
| *2* | *955* | *to 1560* | *"* |
| *3* | *685* | *to 1125* | *"* |
| *4* | *685* | *to 1125* | *"* |
| *5* | *520* | *to 840* | *"* |
| *6* | *520* | *to 840* | *"* |

*SETTING THE STATION BUTTONS: The push-button frequency adjusting screws are accessable from the front panel. Under each of the tuning buttons you will find a circular pit with a hole in the center. Looking through this hole you should be able to see the slot of a screw. This is the adjusting screw for station setting.*

*After deciding which station is to be set up on the first button, tune in this station on the dial, using manual tuning. This is for identification only, and does not affect the button tuning. Then press in the button which you desire to set for automatic operation, until it remains depressed; the station which was tuned in will probably disappear and a different station or none at all will be heard.*

*With a small screw driver slowly turn the setting screw below button 1, until the desired station, the one previously heard, is tuned in. Be sure not to tune in some other station which is broadcasting the same program. Use the tuning eye as a guide for tuning in the station accurately. During this process, you will be able to check back by pressing the dial button and listening to the original station. The method of tuning will be exactly the same as with the dial except that the screw driver is used instead of the tuning knob.*

*The remaining buttons may be set up in the same manner. Once the adjustments have been made, no further changes will be necessary. The station markers may now be removed from the sheets provided, and inserted in the circular depressions below the corresponding buttons. Blank tabs may be used below buttons on which stations are not set.*

## ALIGNMENT FOR MODEL 4159

Realignment of this receiver should not be attempted unless all other possible causes of faulty operation have been thoroughly investigated. An accurately calibrated signal generator which will cover the necessary wave-bands and an output meter for indicating the effect of adjustments are required.

It is important to remember that in receivers of this kind which are equipped with automatic volume control it is necessary to use the minimum possible signal from the signal generator; otherwise the A.V.C. action will tend to nullify the variations in output as the trimmers are adjusted.

I.F. Adjustment: The signal generator is set at 456 kc and is connected through a .5 mmfd condenser to the grid of the first detector (6K8). With the band switch set on "Broadcast", the pointer set at 550 kc and the receiver volume control at its maximum position, the I.F. trimmers are adjusted for maximum output. These trimmers may be found on tops of the I.F. transformer shield cans.

Band #1 Adjustment: Turn the dial control knob so that the condenser plates are entirely out of mesh. Set the band switch to band #1. The signal generator should be connected to the short-antenna binding post through the dummy antenna consisting of a 250 mmfd mica condenser and a 400 ohm non-inductive resistor. The oscillator trimmer condenser should be opened to minimum capacity and the signal generator then set to 23 megacycles. The oscillator trimmer is then increased in capacity until maximum response is obtained. Two responses are possible and it is important that the high frequency response (oscillator trimmer low capacity) be used. The signal generator is then set to 21 MC and the variable condenser turned until a response is obtained. The pointer should coincide with the 21 MC mark on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named, for maximum output. The variable condenser should be rocked slightly during this last adjustment. The signal generator is now set at 7.2 mc and the signal tuned in on the dial. The padder condenser for this band is adjusted for maximum reading of the output meter while the generator tuning condenser is rocked slightly to right and left. The high frequency adjustment should then be rechecked.

Band #2: The band selector switch is set in position for operation on short wave band #2. The variable condenser is opened so that the plates are completely unmeshed and the oscillator trimmer is opened to minimum capacity. The signal generator is set to 7.4 mc and the oscillator trimmer condenser is increased in capacity until a response is heard. Two responses are possible and it is important that the higher frequency response (oscillator trimmer low capacity be used. Set the signal generator at 7 mc and turn the tuning control until a response is indicated on the output meter. The pointer should now coincide with the 7 mc marker on the dial. The antenna preselector and first detector trimmers are then adjusted in the order named for maximum output. After high frequency adjustments have been made set the signal generator at 2.5 mc and turn the variable gang condenser until a response is observed. Adjust the padding condenser for this band for maximum gain while rocking the tuning condenser slightly to the right and the left. The higher frequency adjustment should then be rechecked.

Broadcast Band: The dummy antenna for this band should consist of a 250 mmfd condenser only. The signal generator is set at 1720 kc, the band switch set at broadcast position. The variable condenser should be opened so that the plates are entirely out of mesh. The oscillator trimmer is then adjusted for maximum response on that frequency (1720kc). Set the signal generator at 1500 kc and tune the receiver until a response is indicated. The dial pointer should coincide with the 1500 kc mark on the dial. Then adjust the antenna and detector trimmers in the order indicated for maximum output. The signal generator is then set at 600 kc and the receiver tuned until a response is indicated. The padder condenser is then adjusted for maximum gain while the tuning gang condenser is rocked slightly to the left and right. The 1500 kc adjustment should then be rechecked.

Long Wave Band: The band selector switch is set in position for operation on the long wave band. The receiver and generator are both tuned to 300 kc and the oscillator trimmer is adjusted for maximum response. The antenna and first detector trimmers are adjusted in the order named for maximum output.

The signal generator is then set at 160 kc and the signal is tuned in. The long wave padder condenser is adjusted for maximum response. while the gang tuning condenser is rocked slightly to the left and right. The 300 kc adjustment should then be rechecked.

# GENERAL ELECTRIC CO.

MODEL GM11
Wireless Record Player
Schematic,
Operating Notes

## SERVICE DATA

***Physical Specifications***

Model.....GM-11
Height.....8 inches
Width.....15⅛ inches
Depth.....13¼ inches

***Electrical Specifications***

115–125 volts.....60 cycles*.....25 watts

*Is also furnished in 50 and 25 cycle models. The operating frequency is shown on the label.

***Record Player Oscillator***

Frequency (Adjustable).....1400–1600 K.C.
Oscillator tube.....Type 12A7

***Phonograph Mechanism***

Motor.....Self-starting, induction
Pickup.....Crystal
Impedance (pickup).....80,000 ohms at 1,000 cycles
Record capacity.....Manual—10 or 12 inch
Turntable speed.....78 rpm.

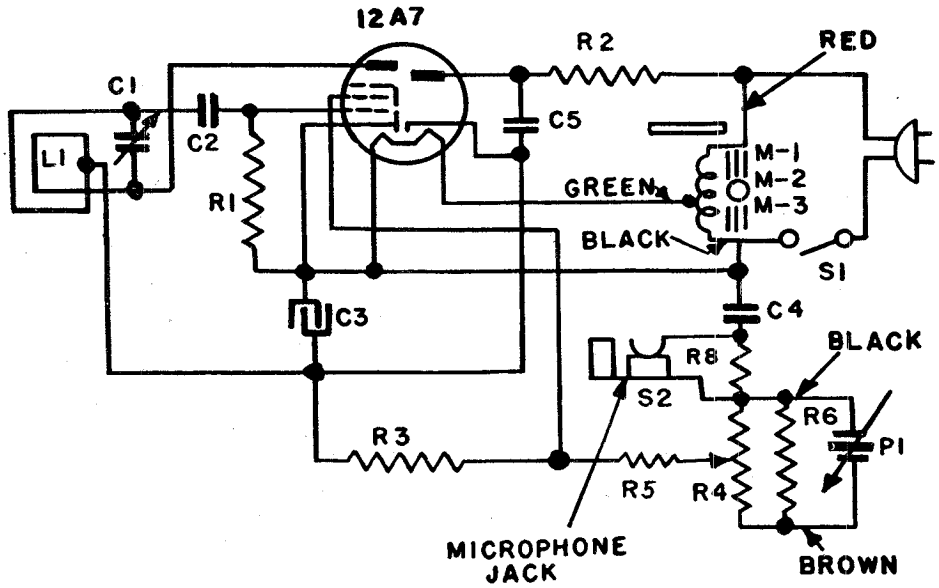
## GENERAL INFORMATION

The Model GM-11 Wireless Record Player uses a Type 12A7 tube as combined rectifier and oscillator working directly from the A.C. power supply. The oscillator section of the 12A7 is modulated with audio from the phonograph recordings by means of a crystal pickup and its associated mechanism. The oscillator operates over a range of 1400–1600 kilocycles and the frequency is adjusted by the tuning trimmer (C-1). This is set at the factory to operate at 1500 K.C.

The turntable is driven at 78 revolutions per minute by a constant speed, self-starting induction motor. The motor is properly lubricated at the factory for long operation and should not require attention under normal weather conditions.

| Symbol | Description |
|---|---|
| C1 | 160–375 mmf., padder |
| C2 | 47 mmf., mica capacitor |
| C3 | 8 mfd., dry electrolytic |
| C4 | .02 mfd., molded capacitor |
| C5 | .01 mfd., molded capacitor |

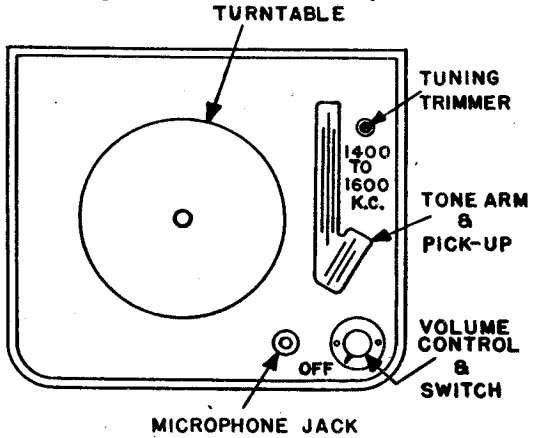
| Symbol | Description |
|---|---|
| R1 | 470,000 ohm, carbon resistor |
| R2 | 15,000 ohm carbon resistor |
| R3 | 3.3 megohm carbon resistor |
| R4 | Volume control, 0.5 meg. |
| R5 | 33,000 ohm carbon resistor |
| R6, 8 | 220,000 ohm carbon resistor |
| L1 | Oscillator coil |
| M1, 2, 3 | Phonograph motor |
| P1 | Crystal pickup |




### *Tuning Trimmer*

This adjustment changes the frequency of the Wireless Record Player Signal. It is adjusted at the factory for approximately 1500 kilocycles and has a range of 1400–1600 kilocycles.

If the record player signal interferes with some local station (characterized by a whistle or low frequency beat note) or the receiver does not tune quite high enough to receive the record player signal, it will be necessary to adjust the tuning trimmer described in a previous paragraph. Proceed by tuning the radio to a quiet point above 1400 K.C. on the dial, then, using a small screw driver, turn the tuning trimmer until the record player is tuned to the dial setting of the receiver. Clockwise rotation of the trimmer lowers the frequency; while counterclockwise rotation raises the frequency.




Control Location

### *Microphone Connections*

A suitable microphone (G-E No. GM-1) may be connected into the circuit of the record player by merely inserting the plug in the microphone jack (location shown in Fig. 1.)

A carbon microphone may be used provided a suitable step-up transformer is used. A suggested circuit is shown in Fig. 2.

### *Operating Notes*

1. If a hum is noted when the pickup case is touched by the hand, merely reverse the power plug in the A.C. outlet.
2. If you are unable to receive the signal from the record player on the radio, it is possible that the oscillator tube in the record player is defective. When replacing, it is advisable to use only a General Electric Type 12A7 tube; otherwise a proper hum balance might not be obtained.
3. A microphonic feedback may be noticed if the record player is located on top or too close to the receiver when the volume is turned up. For this reason it may be desirable and more convenient to operate the record player from a nearby point.

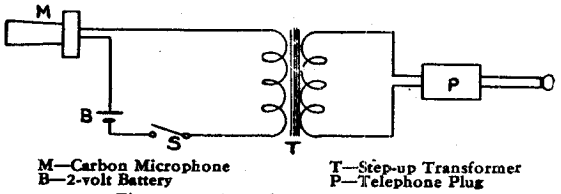



**Fig. 2. Microphone Connections**

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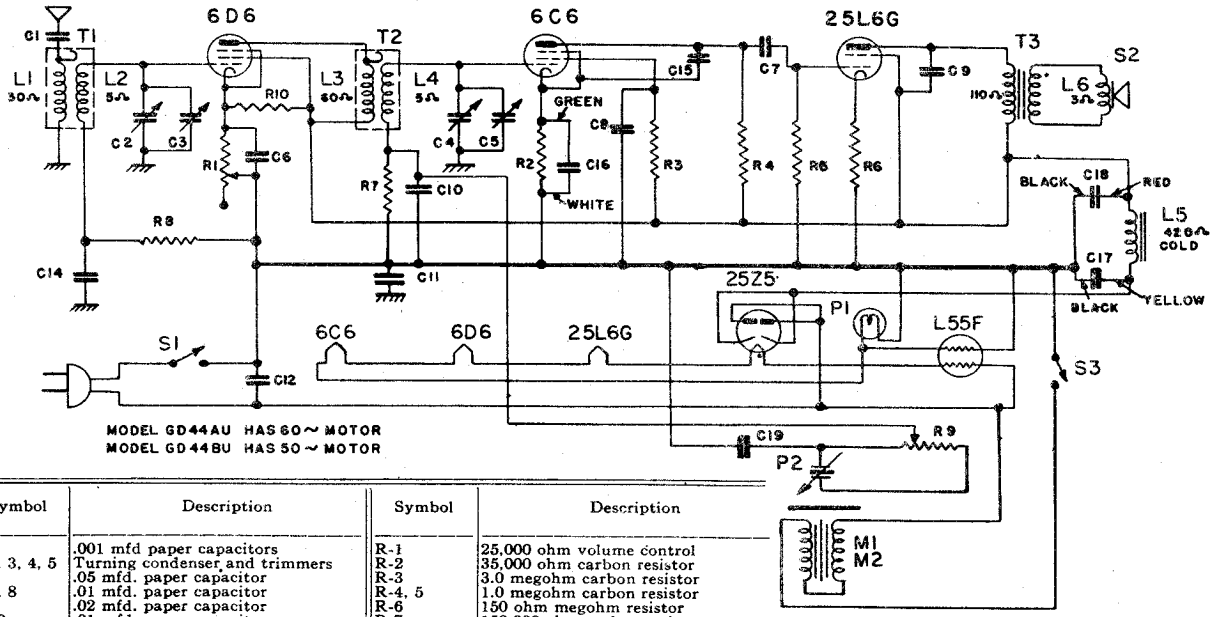
MODELS GD44A, GD44B
GD44AU, GD44BU
Schematic, Voltage
Alignment

# GENERAL ELECTRIC CO.




| Symbol | Description | Symbol | Description |
|---|---|---|---|
| C-1 | .001 mfd paper capacitors | R-1 | 25,000 ohm volume control |
| C-2, 3, 4, 5 | Turning condenser and trimmers | R-2 | 35,000 ohm carbon resistor |
| C-6 | .05 mfd. paper capacitor | R-3 | 3.0 megohm carbon resistor |
| C-7, 8 | .01 mfd. paper capacitor | R-4, 5 | 1.0 megohm carbon resistor |
| C-9 | .02 mfd. paper capacitor | R-6 | 150 ohm megohm resistor |
| C-10 | .01 mfd. paper capacitor | R-7 | 150,000 ohm carbon resistor |
| C-11 | .1 mfd. paper capacitor | R-8 | 500,000 ohm carbon resistor |
| C-12 | .05 mfd. paper capacitor | R-9 | 100,000 ohm volume control |
| C-14 | .01 mfd. paper capacitor | R-10 | 50,000 ohm carbon reistor |
| C-15 | 100 mmf. mica capacitor | S-1 | Power switch |
| C-16 | 5 mfd. dry electrolytic | S-3 | Motor switch |
| C-17 | 16 mfd. dry electrolytic | T-1 | Antenna transformer |
| C-18 | 10 mfd. dry electrolytic | T-2 | RF transformer |
| C-19 | .01 mfd. paper capacitor | T-3 | Output transformer |

### *Tuning Frequency*

Band "B" ..... 540–1800 kc.
Alignment Frequency ..... 1500 kc.

### *Electrical Power Output*

Undistorted ..... 1.0 watt
Maximum ..... 2.0 watts

### *Loud-speaker—Electrodynamic*

Outside Cone Diameter ..... 5 inches
Voice Coil Impedance ..... 3.5 ohms at 400 cycles
Field Coil Resistance ..... 420 ohms (cold)

### *Electrical Specifications*

| Rating Label | Power Supply (Volts) | Frequency (Cycles) | Power Consumption (Volts) |
|---|---|---|---|
| GD-44A | 105–125 | 60 | 48 |
| GD-44B | 105–125 | 50 | 48 |

Models GD-44A and GD-44B are compact four tube AC-DC tuned radio frequency receivers that operate in the broadcast band of frequencies. In addition they have facilities for the reproduction of phonograph recordings. Condensers are used to isolate the power supply voltage from the chassis frame.

### *Phonograph Mechanism*

The record reproducing facilities consist of a high impedance crystal pick-up with its associated balanced tone arm connected across the grid resistor (R-7) of the 6C6 tube. When using the phonograph, the volume control (R-1) should be set at a minimum and control (R-9) used for the desired volume level.

## ALIGNMENT

Connect the high side of the signal generator through a 250 mmf. condenser to the antenna lead. The low side of the signal generator output should be connected to the receiver chassis through a .05 mfd. condenser. Connect a suitable output meter across the voice coil leads; then proceed as follows:

1. With gang condenser plates completely closed, the dial pointer should coincide with the horizontal dial line.
2. Tune receiver to the 1500 kc. point on the dial; then align trimmers (C-3 and C-5) on the gang condenser at 1500 kc. for a maximum output meter reading.

## SOCKET VOLTAGES

| Tube No. | Plate to –B Volts D.C. | | Screen to –B Volts D.C. | | Cathode to –B Volts D.C. | | Cathode Current M.A. D-C | | Heater Volts | |
|---|---|---|---|---|---|---|---|---|---|---|
| | AC | DC | AC | DC | AC | DC | AC | DC | AC | DC |
| 6D6 | 113 | 90 | 113 | 90 | 9.0 | 7.4 | 0.7 | 0.6 | 6.35 | 6.06 |
| 6C6 | 20 * | 16.4 * | 45 | 37 | 3.1 | 2.5 | 0.1 | 0.08 | 6.35 | 6.06 |
| 24L6G | 108 | 88 | 113 | 90 | 7.6 | 6.2 | 40.5 | 33.1 | 25.0 | 23.5 |
| 25Z5 | ... | ... | | | 133 | 108 | 43.0 | 35.0 | 26.0 | 24.0 |

Line voltage 115 AC or DC—No signal input—1000 ohms per voltmeter.
Dial pointer at 540 kc. Volume control at minimum.
* Measured on 250-volt scale.
Note—The B – is not chassis ground.

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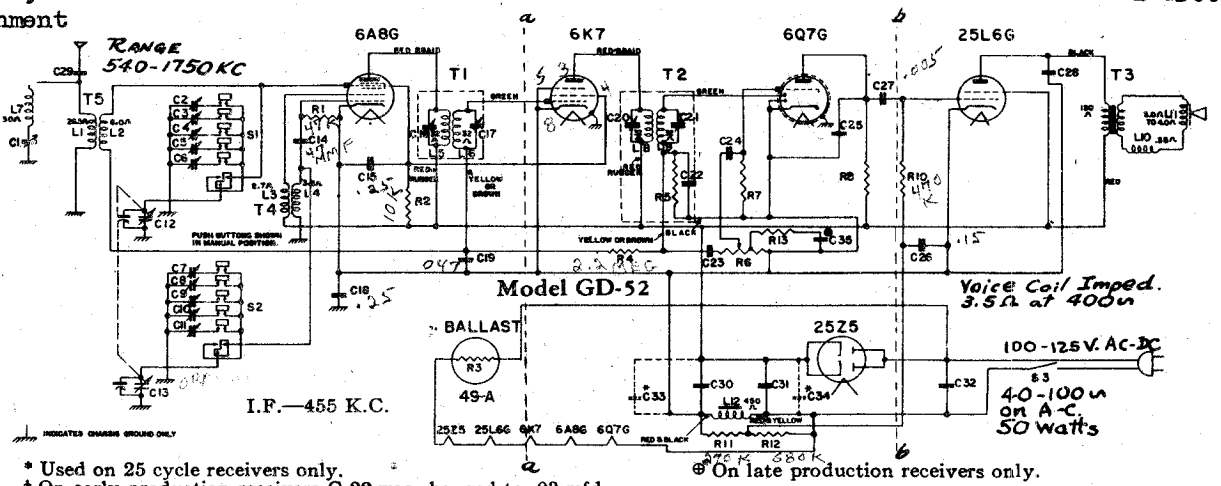
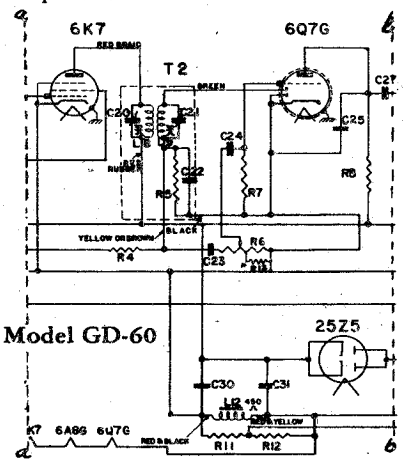
Schematics, Voltage
Socket, Trimmers
Alignment

# GENERAL ELECTRIC CO.

MODEL GD52
MODEL GD60




* Used on 25 cycle receivers only.
† On early production receivers C-28 was changed to .03 mfd. capacitor.
⊕ On late production receivers only.




* Used on early production receivers only. For replacement purposes, use specified volume control and omit resistor, R-13.

NOTE—In some receivers a 150,000 to 390,000 ohm resistor is connected across C-18.

| Symbol | Description |
|---|---|
| C-1 | Wave Trap Trimmer |
| C-2—C-6 | R.F. Trimmer Strip |
| C-7—C-11 | Osc. Trimmer Strip |
| C-12, C-13 | Variable Condenser |
| C-14 | Mica Capacitor, 47 Mmf. |
| C-15 | Paper Capacitor, .25 Mfd. |
| C-16, C-17 | 1st I.F. Trimmer |
| C-18 | Paper Capacitor, .25 Mfd. |
| C-19 | Paper Capacitor, .05 Mfd. |
| C-20, C-21 | 2nd I.F. Trimmers |
| C-22 | Mica Capacitor, 470 Mmf. |
| C-23, C-24 | Paper Capacitor, .002 Mfd. |
| C-25 | Mica Capacitor, 330 Mmf. |
| C-26 | Paper Capacitor, .15 Mfd. |
| C-27, C-35 | Paper Capacitor, .005 Mfd. |
| †C-28 | Paper Capacitor, .01 Mfd. |
| C-29 | Paper Capacitor, .001 Mfd. |
| C-30 | Dry Electrolytic Capacitor, 12 Mfd. |
| C-31 | Dry Electrolytic Capacitor, 20 Mfd. |
| C-32 | Paper Capacitor, .02 Mfd. |
| *C-33 | Dry Electrolytic Capacitor, 35 Mfd. |
| *C-34 | Dry Electrolytic Capacitor, 15 Mfd. |
| R-1 | Carbon Resistor, 47,000 Ohms |
| R-2 | Carbon Resistor, 10,000 Ohms |
| R-3 | Ballast Tube, 49-A, 170 Ohms |
| R-4 | Carbon Resistor, 2.2 Megohms |
| R-5 | Carbon Resistor, 470,000 Ohms |
| R-6 | Volume Control, 2.0 Megohms |
| R-7 | Carbon Resistor, 15.0 Megohms |
| R-8 | Carbon Resistor, 220,000 Ohms |
| R-10 | Carbon Resistor, 470,000 Ohms |
| R-11 | Carbon Resistor, 270,000 Ohms |
| R-12 | Carbon Resistor, 680,000 Ohms |
| R-13 | Carbon Resistor, 68,000 Ohms |
| S-1 | Antenna Switch |
| S-2 | Oscillator Switch |
| S-3 | Power Switch |
| T-1 | 1st I.F. Transformer |
| T-2 | 2nd I.F. Transformer |
| T-3 | Output Transformer |
| T-4 | Oscillator Transformer |
| T-5 | Antenna Transformer |
| L-10 | Hum Buck Coil |
| L-11 | Voice Coil |
| L-12 | Field Coil—450 Ohms (cold) |

### *Tubes*

| | |
|---|---|
| Converter and Oscillator | GE-6A8G |
| I.F. Amplifier | GE-6K7 |
| Detector, AVC and Amplifier | GE-6Q7G |
| Power Amplifier | GE-25L6G |
| Rectifier | GE-25Z5 |
| Ballast Tube | 49-A |

## VOLTAGE CHART

| Tube No. | 6A8G | 6K7 | 6Q7G | 25L6G | 25Z5 |
|---|---|---|---|---|---|
| Plate to −B volts | 115 | 115 | 55* | 110 | .. |
| Screen to −B volts | 75 | 75 | .. | 115 | .. |
| Cathode to −B volts | 0 | 0 | 0 | 0 | 115 |
| Cathode Current MA | 6.6 | 1.4 | 0.5 | 37 | 47 |
| Filament Volts | 6.0 | 6.0 | 6.1 | 24.5 | 24.0 |

Line Voltage—120 AC. No signal input
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

## GENERAL INFORMATION

GD-60, GD-52, is a compact, five-tube AC-DC superheterodyne receiver, employing five General Electric Pre-tested Tubes as described above, in a superheterodyne circuit. It incorporates a simplified trimmer tuned "Touch-Tuning" system, allowing a set up of five stations for automatic tuning. Other features of design include I.F. wave trap, automatic volume control and an improved dustproof speaker.

### *I.F. Alignment*

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G and keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

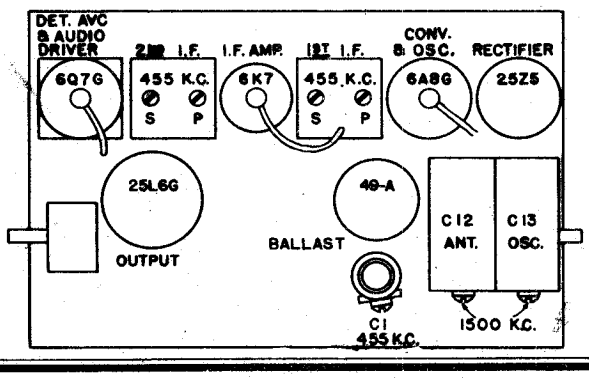
### *Wave Trap Alignment*

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

### *R.F. Alignment*

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-13) and antenna trimmer (C-12) for a maximum output.

**Precaution**—One side of the power supply is connected to the chassis through a .25 mfd. capacitor. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

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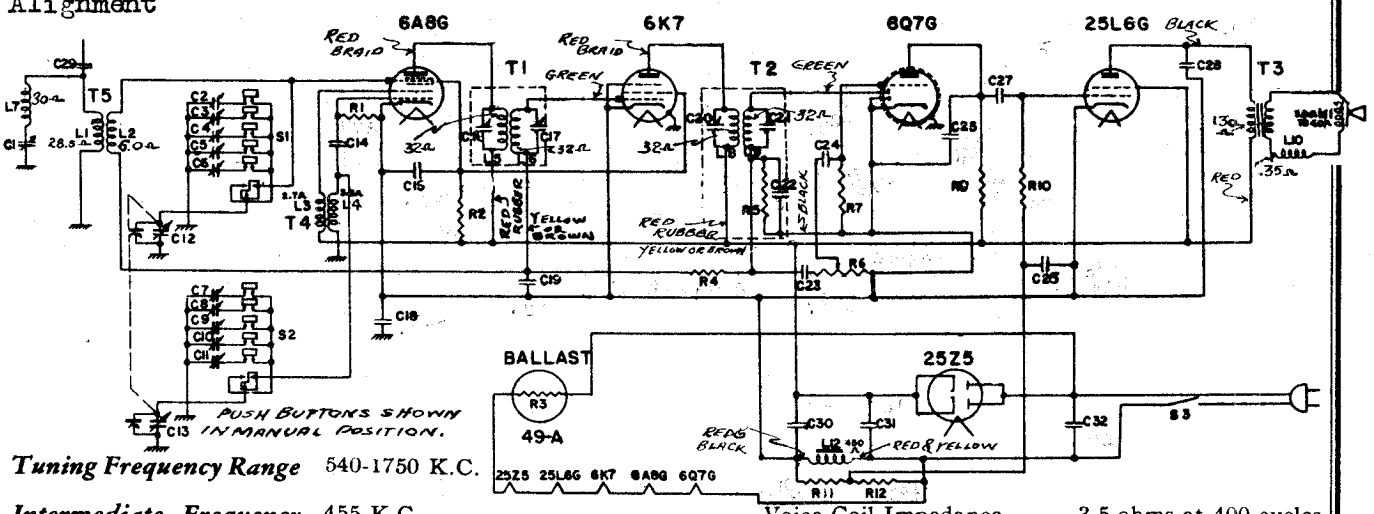
MODEL GD52A
Schematic, Voltage
Socket, Trimmers
Alignment

# GENERAL ELECTRIC CO.




***Tuning Frequency Range*** 540-1750 K.C.

***Intermediate Frequency*** 455 K.C.

Voice Coil Impedance.....3.5 ohms at 400 cycles
Field Coil Resistance.....450 ohms (cold)

| Symbol | Description | Symbol | Description | Symbol | Description |
|---|---|---|---|---|---|
| C-1 | Wave Trap Trimmer, 45-145 Mmf. | C-20 | Trimmer Capacitor, 50-135 Mmf. | R-7 | Carbon Resistor, 15 Megohms |
| C-2 | Selector Trimmer, 100-510 Mmf. | C-21 | Trimmer Capacitor, 50-135 Mmf. | R-8 | Carbon Resistor, 220,000 Ohms |
| C-3 | Selector Trimmer, 75-410 Mmf. | C-22 | Mica Capacitor, 470 Mmf. | R-10 | Carbon Resistor, 470,000 Ohms |
| C-4 | Selector Trimmer, 50-300 Mmf. | C-23 | Paper Capacitor, .002 Mfd. | R-11 | Carbon Resistor, 270,000 Ohms |
| C-5 | Selector Trimmer, 50-300 Mmf. | C-24 | Paper Capacitor, .002 Mfd. | R-12 | Carbon Resistor, 68,000 Ohms |
| C-6 | Selector Trimmer, 20-200 Mmf. | C-25 | Mica Capacitor, 330 Mmf. | R-13 | Carbon Resistor, 68,000 Ohms |
| C-7 | Selector Trimmer, 50-300 Mmf. | C-26 | Paper Capacitor, .15 Mfd. | S-1 | Antenna Switch |
| C-8 | Selector Trimmer, 50-300 Mmf. | C-27 | Paper Capacitor, .005 Mfd. | S-2 | Oscillator Switch |
| C-9 | Selector Trimmer, 20-200 Mmf. | C-28 | Paper Capacitor, .03 Mfd. | S-3 | Power Switch combined with R-6 |
| C-10 | Selector Trimmer, 20-200 Mmf. | C-29 | Paper Capacitor, .001 Mfd. | T-1 | 1st I.F. Transformer |
| C-11 | Selector Trimmer, 10-100 Mmf. | C-30 | Dry Electrolytic Cap., 12 Mfd. | T-2 | 2nd I.F. Transformer |
| C-12 | Tuning Condenser Ant. | C-31 | Dry Electrolytic Cap., 20 Mfd. | T-3 | Output Transformer |
| C-13 | Tuning Condenser Osc. | C-32 | Paper Capacitor, .02 Mfd. | T-4 | Oscillator Transformer |
| C-14 | Mica Capacitor, 47 Mmf. | R-1 | Carbon Resistor, 47,000 Ohms | T-5 | Antenna Transformer |
| C-15 | Paper Capacitor, .25 Mfd. | R-2 | Carbon Resistor, 10,000 Ohms | L-10 | Hum Buck Coil |
| C-16 | Trimmer Capacitor, 50-135 Mmf. | R-3 | Ballast Tube 49-A, 170 Ohms | L-11 | Voice Coil |
| C-17 | Trimmer Capacitor, 50-135 Mmf. | R-4 | Carbon Resistor, 2.2 Megohms | L-12 | Field Coil—450 Ohms (cold) |
| C-18 | Paper Capacitor, .25 Mfd. | R-5 | Carbon Resistor, 470,000 Ohms | | |
| C-19 | Paper Capacitor, 0.5 Mfd. | R-6 | Volume Control, 2 Megohms | | |

NOTE—In some receivers a 150,000 to 390,000 ohm resistor is connected across C-18.

*Fig. 2. Schematic Diagram*

## VOLTAGE CHART

| Tube No. | 6A8G | 6K7 | 6Q7G | 25L6G | 25Z5 |
|---|---|---|---|---|---|
| Plate to −B volts | 115 | 115 | 55* | 110 | |
| Screen to −B volts | 75 | 75 | | 115 | |
| Cathode to −B volts | 0 | 0 | 0 | 0 | 115 |
| Cathode Current MA | 6.6 | 1.4 | 0.5 | 37 | 47 |
| Filament Volts | 6.0 | 6.0 | 6.1 | 24.5 | 24.0 |

Line Voltage—120 AC. No signal input
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

## ALIGNMENT PROCEDURE

### *Alignment Frequencies*

I.F.—455 K.C. Broadcast—1500
The location of all trimmers is shown in Fig. 1.

### *I.F. Alignment*

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G and keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

### *Wave Trap Alignment*

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

### *R.F. Alignment*

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-13) and antenna trimmer (C-12) for a maximum output.

**Precaution**—One side of the power supply is connected to the chassis through a .25 mfd. capacitor. If signal generator is AC operated connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

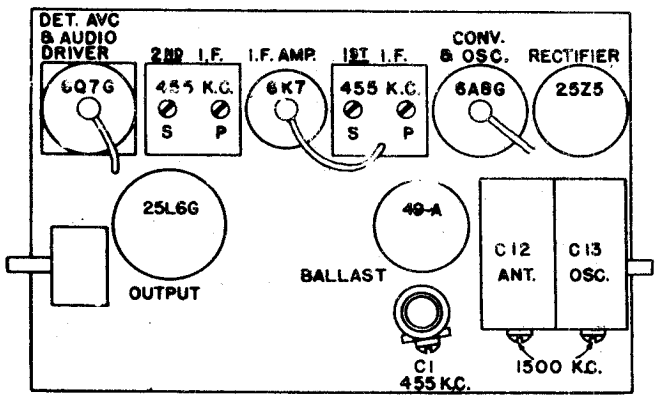



*Fig. 1. Trimmer Location*

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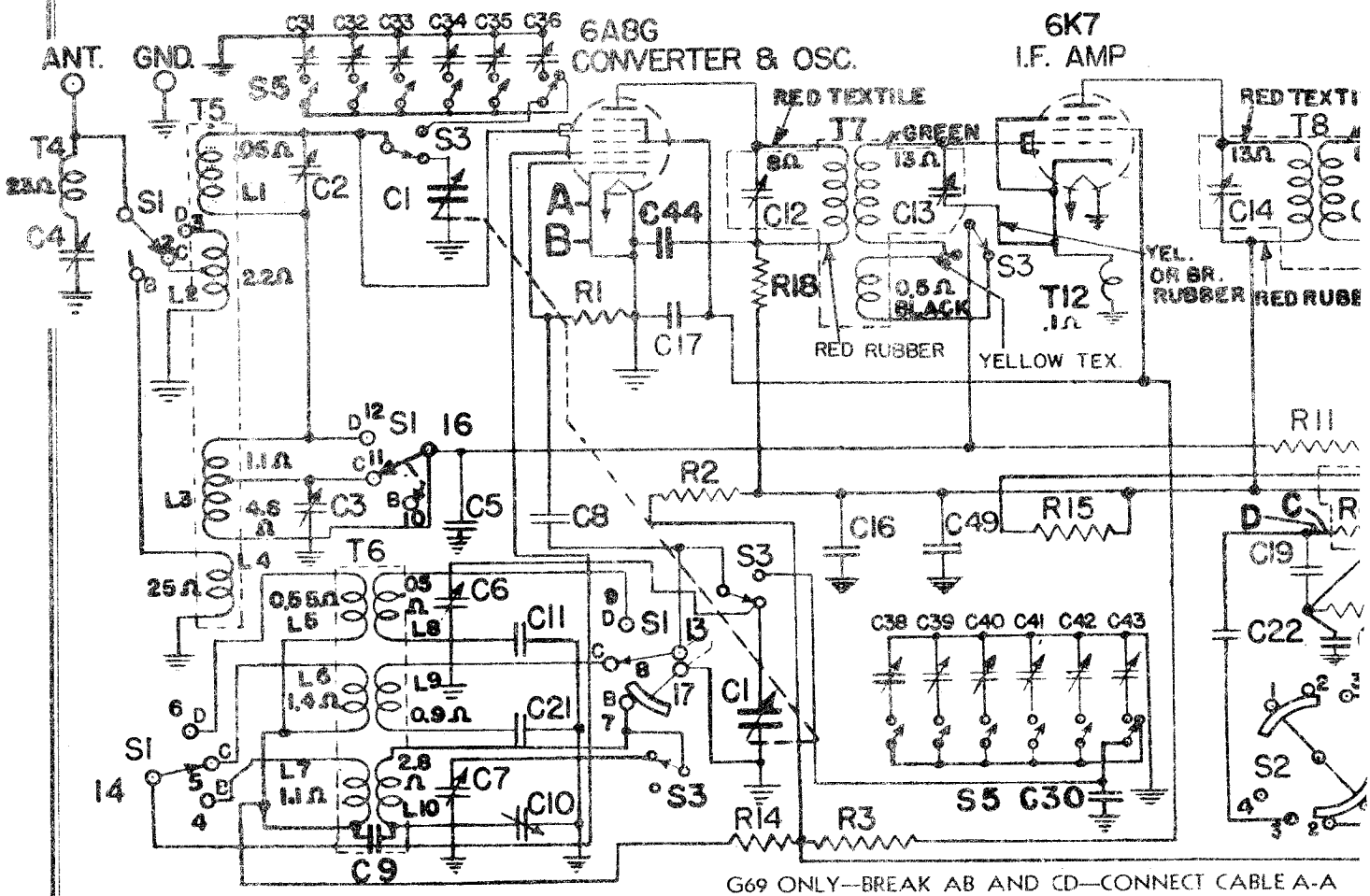


G69 ONLY—BREAK AB AND CD—CONNECT CABLE A-A B-B' C-C' AND D-D' AS SHOWN. CONNECT *C48 FROM POINT G TO GROUND.

Model G-68

Model G-69

*Loud-speaker—Electrodynamic*

| Model | G-61 | G-66 | G-68 | G-69 |
|---|---|---|---|---|
| Outside Cone Diameter | 6½ in. | 12 in. | 12 in. | 12 in. |
| Voice Coil Impedance | 3.5 ohms at 400 cycles | | | |
| Field Coil Resistance | 880 Ohms (cold) | | | |

*Phonograph*

| Model | G-68 | G-69 |
|---|---|---|
| Type Pick-up | Crystal | Crystal |
| Impedance (pick-up) | 80,000 ohms at 1000 cycles | |
| Record Capacity | Manual | 8–10 in., 7–12 in. |
| Turntable Speed | 78 RPM | 78 RPM |

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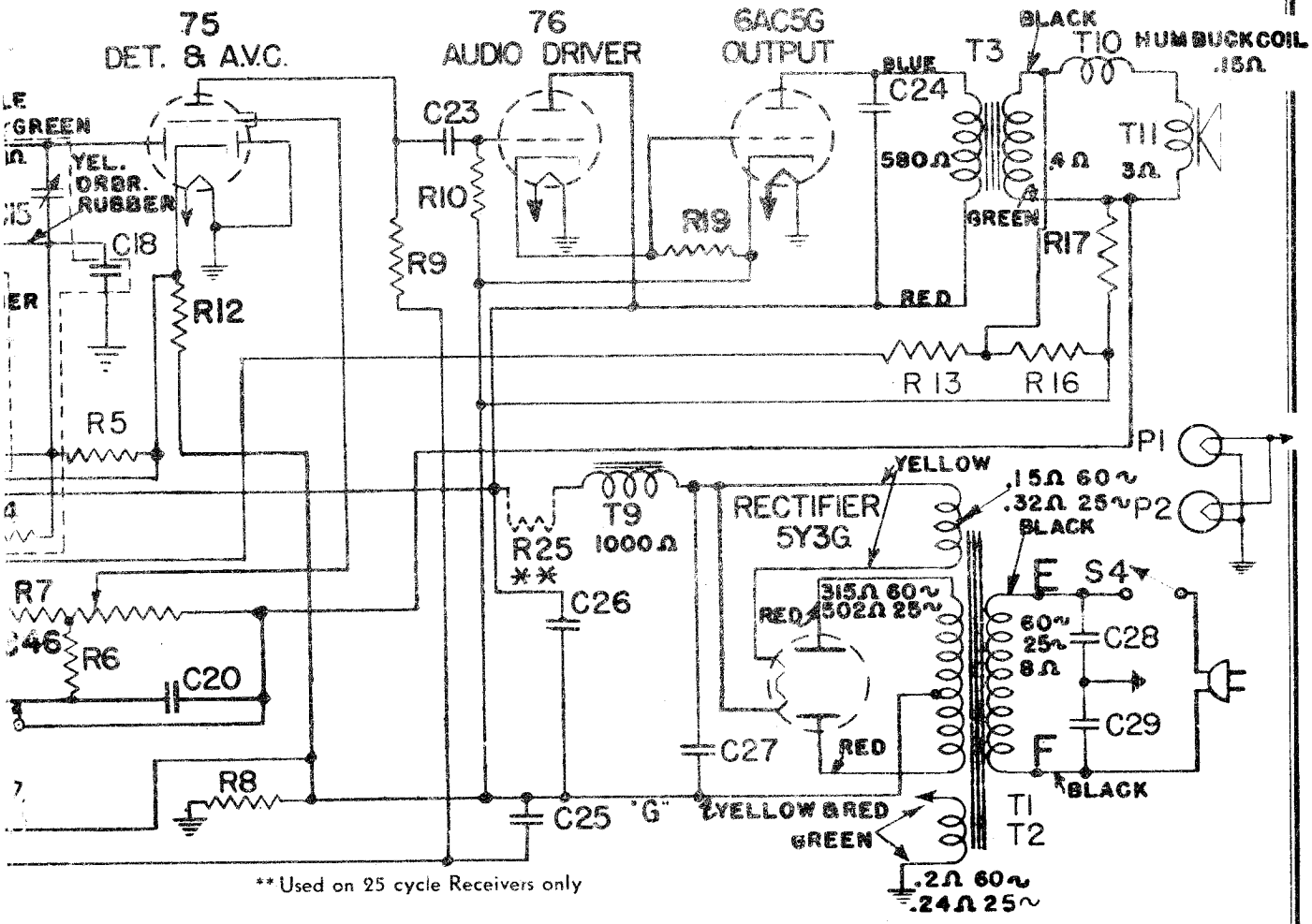
:CTRIC CO.

MODELS G61,G66,G68,G69
Schematic




** Used on 25 cycle Receivers only

| SYMBOL | DESCRIPTION |
|---|---|
| C1 | 450 mmf. tuning condenser |
| C2, C3, C6, C7 | Ant. and Osc. trimmer capacitor |
| C4 | Wave trap trimmer |
| C5 | .1 mfd. paper capacitor |
| C8 | 50 mmf. mica capacitor |
| C9 | .005 mfd. paper capacitor |
| C10 | 300–650 mmf. padder capacitor |
| C11 | 4300 mmf. mica capacitor |
| C16 | .1 mfd. paper capacitor |
| C17 | .05 mfd. paper capacitor |
| C18 | 47 mmf. mica capacitor |
| C19, C20 | .003 mfd. paper capacitor |
| C21 | 1500 mmf. mica capacitor |
| C22 | .0015 mfd. paper capacitor |
| C23 | .005 mfd. paper capacitor |
| C24 | .02 mfd. paper capacitor |
| C25, C26, C27 | 8 mfd., 8 mfd., 12 mfd., dry electrolytic capacitor |
| C28, C29 | .01 mfd. line capacitor |
| C30 | 20 mmf. compensating capacitor |
| C31–C36 | Keyboard tuning trimmers |
| C37 | 470 mmf. mica capacitor |
| C38–C43 | Keyboard tuning trimmers |
| C44, C45 | .05 mfd. paper capacitor |
| C46 | 100 mmf. mica capacitor |
| C47 | 820 mmf. mica capacitor |
| *C48 | 10 mfd. dry electrolytic capacitor |
| C49 | .1 mfd. paper capacitor |
| R1 | 47,000 ohm carbon resistor |

| SYMBOL | DESCRIPTION |
|---|---|
| R2 | 6,800 ohm carbon resistor |
| R3 | 22,000 ohm carbon resistor |
| R4 | 47,000 ohm carbon resistor |
| R5 | 220,000 ohm carbon resistor |
| R6 | 180,000 ohm carbon resistor |
| R7 | 2 megohm volume control |
| R8 | 270 ohm carbon resistor |
| R9 | 220,000 ohm carbon resistor |
| R10 | 1.0 megohm carbon resistor |
| R11 | 2.2 megohm carbon resistor |
| R12 | 150 ohm carbon resistor |
| R13 | 2.2 megohm carbon resistor |
| R14 | 3300 ohm carbon resistor |
| R15 | 33,000 ohm carbon resistor |
| R16 | 47 ohm carbon resistor |
| R17 | 22 ohm carbon resistor |
| R18 | 6800 ohm carbon resistor |
| R19 | 22,000 ohm carbon resistor |
| R20, R21 | 47,000 ohm carbon resistor |
| R22 | 100,000 ohm carbon resistor |
| R23, R24 | 220,000 ohm carbon resistor |
| **R25 | 470 ohm carbon resistor |
| R26 | 220,000 ohm carbon resistor |
| S1 | Band change switch |
| S2 | Tone control |
| S6 | Phono-radio switch |
| T1, T2 | Power transformer |
| T3 | Output transformer |
| T4 | Wave trap coil |

Fig. 2. Schematic Diagram

*ctrical Power Output*

Indistorted . . . . . 3.0 watts
Maximum . . . . . 5.0 watts

*ne Control* . . . . . 4-position

*Models G-61 and G-66*

Rating A . . . . . 115–125 volts, 50–60 cycles, 70 watts
Rating C . . . . . 115–125 volts, 25–60 cycles, 75 watts

*Models G-68 and G-69*

Rating A-6 . . . . . 115–125 volts, 60 cycles, 95 watts
Rating A-5 . . . . . 115–125 volts, 50 cycles, 100 watts
Rating C-2 . . . . . 115–125 volts, 25 cycles, 100 watts

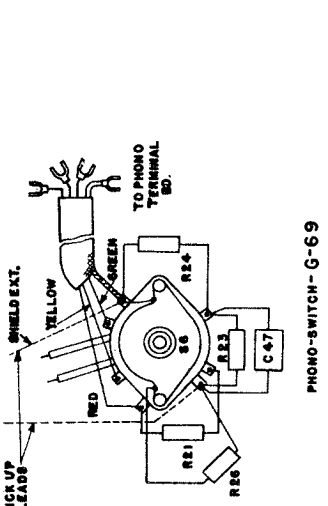
*Tuning Frequency Range*

Band "B" . . . . . 535– 1600 KC
Band "C" . . . . . 1600– 5700 KC
Band "D" . . . . . 5700–18000 KC

*Intermediate Frequency* . . . . . 455 KC

# GENERAL ELECTRIC CO.

MODELS G61,G66,G68,G69
Socket,Trimmers,Chassis
Phono,Connections,Dial



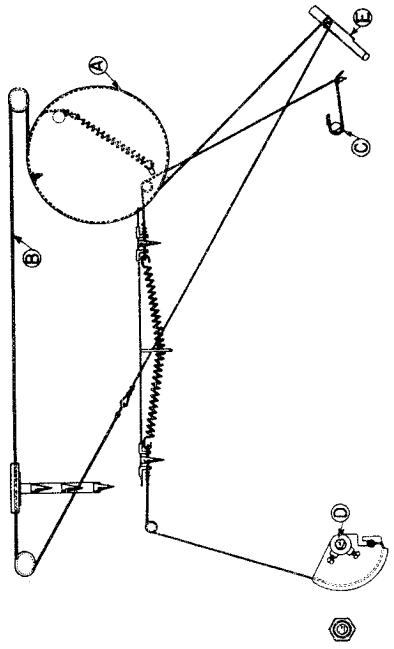




Fig. 5. Dial Mechanism

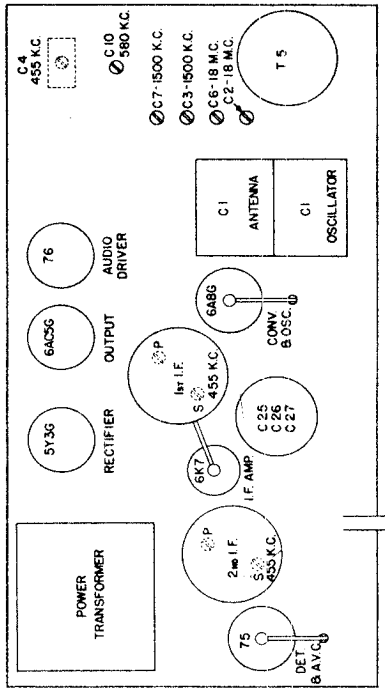
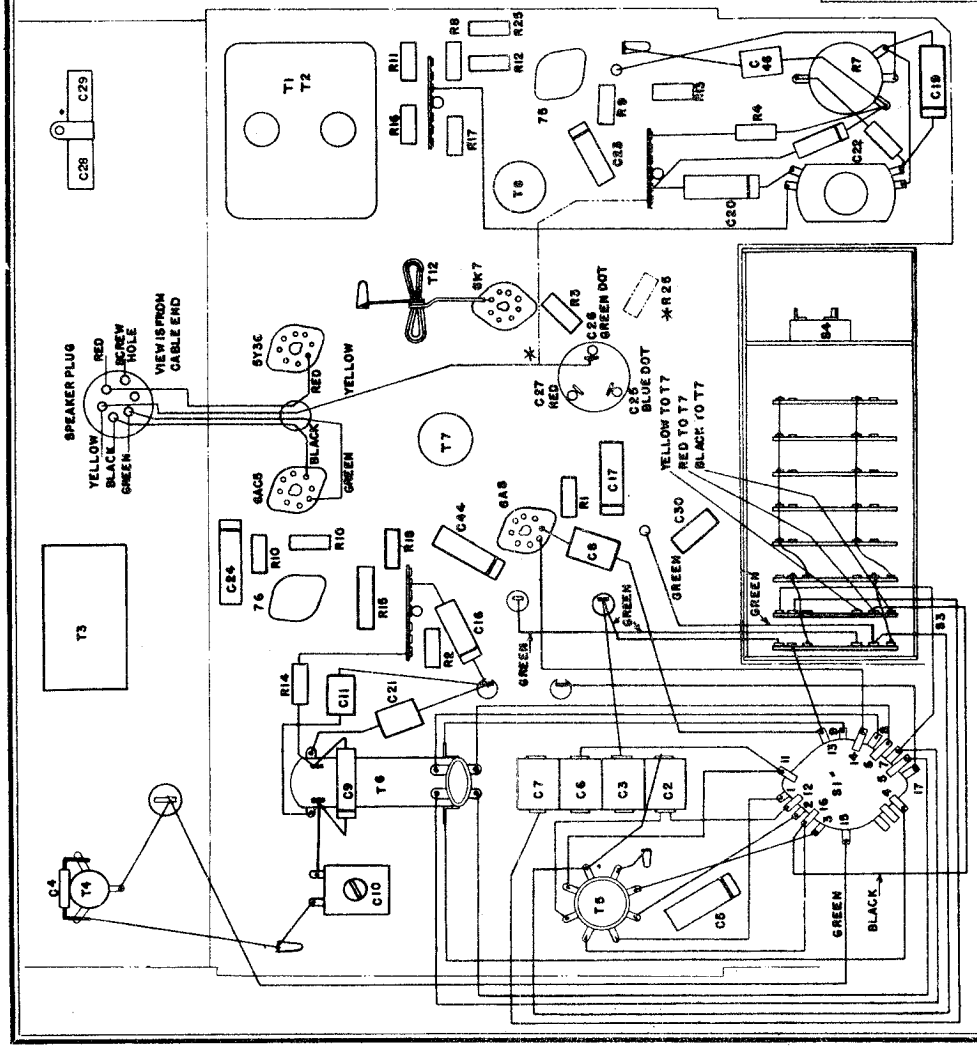



Fig. 4. Trimmer Location




*Used on 25-cycle receivers only

Fig. 6. Chassis Parts Layout

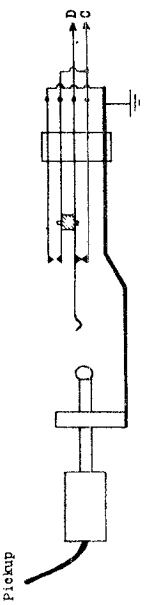



Fig. 1. Phonograph Connections

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## ALIGNMENT PROCEDURE

### I. F. ALIGNMENT WITH OSCILLOSCOPE

| Band Switch Setting | Input Freq. | Point of Input | Dummy Antenna | Trimmer | Comments |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. Sweep | I.F. Grid | .05 Mfd. or Larger | 2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14) | Gang condenser plates closed—"manual" key depressed—connect audio input of oscilloscope to ground and to the junction of C-19 and R-4 of the 2nd I.F. transformer. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resultant curve is shown in Fig. 3. |
| 2. Band "B" | 455 K.C. Sweep | Converter Grid | .05 Mfd. or Larger | 1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12) | |
| 3. Band "B" | 455 K.C. Sweep | Antenna Post | 250 Mmf. 200 ohms | Wave Trap Trimmer (C-4) | Adjust trimmer for minimum amplitude. |

### I. F. ALIGNMENT WITH OUTPUT METER

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. with Modulation | I.F. Grid | .05 Mfd. or Larger | 2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14) | Gang Condenser plates closed—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output. |
| 2. Band "B" | 455 K.C. with Modulation | Converter Grid | .05 Mfd. or Larger | 1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12) | |
| 3. Band "B" | 455 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Wave Trap Trimmer (C-4) | Adjust trimmer for minimum output. |

### R. F. ALIGNMENT

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | | | | | Close gang plates—adjust pointer to first line at left end of tuning scale. |
| 2. Band "D" | 18 M.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. (C-6) Ant. (C-2) | Connect output meter across voice coil—tone control on "Bass" position. The image of any "D" band signal should be heard 930 K.C. below signal input when (C-6) is on proper peak. Example: 15 M.C. image—14.09 M.C. Peak (C-2) while rocking the gang condenser. |
| 3. Band "C" | No adjustments necessary. | | | | |
| 4. Band "B" | 1500 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. (C-7) Ant. (C-3) | Peak trimmers for maximum output with a low input signal. |
| 5. Band "B" | 580 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. Padder (C-10) | Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser. |
| 6. Band "B" | 1500 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. (C-7) Ant. (C-3) | Retrim for maximum output with a low input signal. |

### SOCKET VOLTAGES

| Tube No. | 6A8G | 6K7 | 75 | 76 | 6AC5G | 5Y3G |
|---|---|---|---|---|---|---|
| Plate to Gnd. Volts | Conv.-230 Osc.-180 | 250 | *110 | 250 | 230 | 310/310 RMS |
| Screen to Gnd. Volts | 87 | 87 | ... | ... | ... | |
| Cathode to Gnd. Volts | 0 | 0 | 3.0 | 8.0 | 4.5 | 315 |
| Cathode Current MA | 11.0 | 7.3 | 1.3 | 6.1 | 33.5 | 70 |
| Filament Volts | 6.3 | 6.3 | 6.3 | 6.3 | 6.3 | 5.2 |

*A-c line voltage 125—no signal input. Dial pointer set at 550 KC on "B" band.

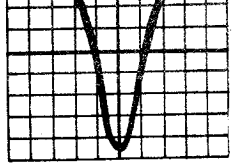

**Fig. 3. Over-all I.F. curve taken on G-E Oscilloscope OFM-1**

### *Coil System*

T-5 and T-6 are the antenna and oscillator transformers respectively for the "B," "C," and "D" bands. All Band Switch terminals are numbered in Fig. 2 and Fig. 6 to facilitate in service by showing common points on the schematic diagram, Fig. 2 and the pictorial wiring diagram, Fig. 6.

The following table shows the coils in use for various positions of the band change switch.

| Band Switch Position | Antenna Primary | Antenna Secondary | Oscillator Grid Coil | Oscillator Plate Coil | Remarks |
|---|---|---|---|---|---|
| Band "B" | L-4 | L-1+L-3 | L-10 | L-7 | |
| Band "C" | Part of L-2 | L-1+Part of L-3 | L-9 | L-6 | Part of L-3 shorted. L-10 shorted |
| Band "D" | L-2 | L-1 | L-8 | L-5 | L-9, L-10 shorted. L-3 shorted |
| Automatic Tuning | L-4 | L-1+L-3 | L-10 | L-7 | C-1 removed. Tuned by fixed trimmers |

Models G-61, G-66, G-68, and G-69 are three-band AC operated receivers employing six General Electric Pre-tested tubes as described above, in a superheterodyne circuit. They incorporate a simplified trimmer tuned "Touch Tuning" system allowing a set-up of six stations for automatic tuning. Other features of design include IF wave trap, degenerative feedback and an improved dustproof electrodynamic speaker.

In addition to the above features Models G-68 and G-69 have facilities for the reproduction of phonograph recordings. Model G-68 has a manually operated phonograph mechanism, while the Model G-69 is designed to play either 10-inch or 12-inch records on one side, automatically.

### *Loud-speaker*

12-inch speaker—To center the voice coil, remove dust cover by softening with acetone. Loosen the two clamping screws and place three 1 in. by ¼ in. by 0.010 in. paper or celluloid strips equally spaced around pole piece for clearance—then tighten clamping screws. Remove strips and cement the dust cap back in place with Glyptal cement.

| STOCK No. | DESCRIPTION | List Price |
|---|---|---|
| | **CHASSIS ASSEMBLY** | |
| *RB-026 | BOARD—Antenna—ground terminal board | $0.10 |
| *RB-046 | BOARD—Terminal board (near 75 tube) | .15 |
| *RB-062 | BOARD—Terminal board (near power trans.) | .10 |
| *RB-079 | BOARD—Phono-terminal board | .10 |
| RC-800 | CAPACITOR—.0013 mfd., 600 V. paper (C-22) | .25 |
| *RC-023 | CAPACITOR—.005 mfd., 600 V. paper (C-9, C-23) | .25 |
| *RC-048 | CAPACITOR—.02 mfd., 600 V. paper (C-24) | .30 |
| *RC-055 | CAPACITOR—.003 mfd., 600 V. paper (C-19, C-20) | .25 |
| *RC-092 | CAPACITOR—.08 mfd. 600 V. paper (C-17, C-14, C-45) | .30 |
| *RC-104 | CAPACITOR—.1 mfd., 600 V. paper (C-5, C-16, C-49) | .30 |
| *RC-206 | CAPACITOR—50 mmf., mica (C-8) | .35 |
| RC-216 | CAPACITOR—47 mmf., mica (C-18) | .25 |
| RC-230 | CAPACITOR—20 mmf., mica compensator (C-30) | .35 |
| *RC-235 | CAPACITOR—100 mmf. mica (C-46) | .25 |
| RC-294 | CAPACITOR—470 mmf., mica (C-37) | .30 |
| *RC-310 | CAPACITOR—820 mmf., mica (C-47) | .25 |
| RC-346 | CAPACITOR—1500 mmf., mica (C-21) | .30 |
| RC-391 | CAPACITOR—4300 mmf., mica (C-11) | .35 |
| RC-594 | CAPACITOR—8 mfd., 400 V.; 8 mfd., 400 V.; 12 mfd., 450 V.; dry electrolytic (C-25, C-26, C-27) | 1.60 |
| RC-693 | CAPACITOR—Wave trap trimmer (45-100 mmf.) (C-4) | .15 |
| RC-676 | CAPACITOR—300-650 mmf. padder (C-10) | .35 |
| RC-677 | CAPACITOR—Antenna and oscillator trimmer (C-2, C-3, C-7) | .55 |
| RC-728 | CONDENSER—2 gang tuning condenser (C-1) | 2.95 |
| *RC-755 | CAPACITOR—.01-.01 mfd., 250 V. A. C. line capacitor (C-28, C-29) | .40 |
| *RC-863 | CORD—Power cord | .65 |
| RC-5105 | CAPACITOR—10 mfd., 50 volt dry electrolytic (C-48) | .60 |
| RC-8035 | CABLE—Speaker cable | .50 |
| RG-016 | GRID CLIP—Control grid clip (large) (Pkg. 5) | .05 |
| RG-016 | GRID CLIP—Control grid clip (small) (Pkg. 5) | .10 |
| RK-027 | KNOB—Control knob (winged) (Pkg. 5) | .50 |
| RK-028 | KNOB—Control knob (plain) (Pkg. 5) | .30 |
| RL-062 | COIL—Antenna coil band B, C, and D (T-5) | 1.50 |
| RL-266 | COIL—Oscillator coil band B, C, and D (T-6) | 1.30 |
| RL-603 | COIL—Wave trap coil (T-4) | .60 |
| RL-802 | COIL—Neutralizing coil (T-12) | .10 |
| RQ-711 | RESISTOR—470 ohm, 3 W. carbon (R-25) | .25 |
| RQ-780 | RESISTOR—33,000 ohm, 3 W. carbon (R-15) | .15 |
| *RQ-1219 | RESISTOR—22 ohm, ½ W. carbon (R-17) (Pkg. 5) | .70 |
| *RQ-1227 | RESISTOR—47 ohm, ½ W. carbon (R-18) (Pkg. 5) | .70 |
| *RQ-1239 | RESISTOR—150 ohm, ½ W. carbon (R-12) (Pkg. 5) | .70 |
| *RQ-1245 | RESISTOR—270 ohm, ½ W. carbon (R-8) (Pkg. 5) | .70 |
| *RQ-1271 | RESISTOR—3,300 ohm, ½ W. carbon (R-14) (Pkg. 5) | .70 |
| *RQ-1279 | RESISTOR—6,800 ohm, ½ W. carbon (R-2, R-18) (Pkg. 5) | .70 |
| RP-107 | PLUG—Male speaker plug | $0.20 |
| RS-074 | SPEAKER—6½-inch speaker | 3.70 |
| *RX-030 | ASSEMBLY—Speaker mounting assembly | .10 |
| | **SPEAKER ASSEMBLY (G-66, G-68, G-69)** | |
| RC-932 | CONE—12-inch cone and voice coil assembly | 1.10 |
| *RC-991 | CLAMP—Cone spider clamp | .05 |
| RD-501 | DUST CAP—Speaker cone dust cap (Pkg. 5) | .10 |
| RP-109 | PLUG—Male speaker plug | .20 |
| RS-073 | SPEAKER—12-inch speaker | 5.40 |
| *RX-030 | ASSEMBLY—Speaker mounting assembly | .10 |
| | **DIAL SCALE MECHANISM** | |
| *RB-155 | BRACKET—Band change bracket (C) | .05 |
| RC-8037 | CORD—Drive cord assembly (set) (B) | .25 |
| RC-8038 | CORD—Tone control cord (Pkg. 5) | .35 |
| RC-8039 | CORD—Volume control cord (Pkg. 5) | .35 |
| RD-071 | DRUM—Condenser drive drum (A) | .35 |
| RD-072 | DIAL—Dial scale | 1.10 |
| RD-205 | DRIVE—Vernier drive bracket assembly (E) | .35 |
| RE-030 | ESCUTCHEON—Dial scale escutcheon | 1.40 |
| *RP-073 | POINTER—Volume and tone control pointer (Pkg. 5) | .10 |
| *RP-075 | PULLEY—Small idler pulley (Pkg. 5) | .20 |
| *RP-077 | POINTER—Dial scale pointer (Pkg. 5) | .90 |
| *RP-084 | PULLEY—Tone control pulley (D) | .10 |
| RR-919 | REFLECTOR—Lamp reflector | .10 |
| RS-186 | SHIELD—Light shield (cardboard) (Pkg. 10) | .05 |
| *RS-218 | SOCKET—Lamp socket assembly | .10 |
| *RS-425 | SPRING—Drive drum spring (Pkg. 5) | .10 |
| RS-445 | SPRING—Tone and volume cord tension spring (Pkg. 5) | .25 |
| RX-048 | ASSEMBLY—Tuning condenser mounting assembly | .25 |
| | **PHONOGRAPH ASSEMBLY MODEL G-68** | |
| *RA-405 | ARM—Pick-up tone arm | 2.30 |
| *RC-5000 | CRYSTAL—Crystal pick-up | 6.00 |
| *RC-8021 | CABLE—Radio-phono shielded cable | .35 |
| *RK-018 | KNOB—Radio-phono switch knob (Pkg. 5) | .40 |
| *RM-106 | MOTOR—Motor complete, 115-125 V., 60 cy. | 13.75 |
| *RM-107 | MOTOR—Motor complete, 115-125 V. 50 cy. | 13.75 |
| *RM-108 | MOTOR—Motor complete, 115-125 V. 25 cy. | 15.25 |
| *RP-024 | PLUG—To contact round female plug | .60 |
| *RP-025 | PLUG—Male connector plug | .20 |
| *RS-366 | SWITCH—Phono radio switch | 1.10 |
| *RS-374 | SWITCH—Automatic stop and switch (complete) | 1.80 |
| *RS-459 | SCREW—Needle screw | .10 |
| *RT-903 | TURNTABLE—10-inch turntable (brown velveteen) | 1.75 |
| *RX-037 | ASSEMBLY—Motor mounting assembly | .20 |
| | **PHONOGRAPH ASSEMBLY MODEL G-69** | |
| RB-165 | BRACKET—Pick-up locating lever mounting bracket (3) | .30 |
| RC-1982 | CAM—Cam and gear assembly (4) | 2.80 |
| *RQ-1291 | RESISTOR—22,000 ohm, ½ W. carbon (R-19) (Pkg. 5) | $0.70 |
| *RQ-1299 | RESISTOR—47,000 ohm, ½ W. carbon (R-1, R-4, R-20, R-21) (Pkg. 5) | .70 |
| *RQ-1307 | RESISTOR—100,000 ohm, ½ W. carbon (R-22) (Pkg. 5) | .70 |
| *RQ-1313 | RESISTOR—180,000 ohm, ½ W. carbon (R-6) (Pkg. 5) | .70 |
| *RQ-1315 | RESISTOR—220,000 ohm, ½ W. carbon (R-5, R-9, R-23, R-24, R-26) (Pkg. 5) | .70 |
| *RQ-1331 | RESISTOR—1.0 megohm, ½ W. carbon (R-10) (Pkg. 5) | .70 |
| *RQ-1339 | RESISTOR—2.2 megohm, ½ W. carbon (R-11, R-13) (Pkg. 5) | .70 |
| *RQ-1491 | RESISTOR—22,000 ohm, 1 W. carbon (R-3) | .20 |
| *RS-200 | SOCKET—Tube socket (6AC5G) (Pkg. 5) | .75 |
| *RS-204 | SOCKET—Five prong octal base socket (Pkg. 5) | .75 |
| *RS-215 | SOCKET—Tube socket (75) (Pkg. 5) | .60 |
| RS-227 | SOCKET—Octal base tube socket | .15 |
| RS-224 | SOCKET—Tube socket (76) (Pkg. 5) | .50 |
| RS-894 | SWITCH—Band change switch (S-1) | .95 |
| RS-895 | SWITCH—Tone control switch (S-2) | .95 |
| RS-3013 | SWITCH—Phono radio switch (G-68, G-69) | 1.00 |
| *RT-0711 | TRANSFORMER—Power transformer 120 V. 25-60 cycles | 7.60 |
| RT-0616 | TRANSFORMER—Power transformer 120 V. 50-60 cycles | 4.60 |
| RT-261 | TRANSFORMER—1st I.F. transformer and shield | 1.60 |
| RT-262 | TRANSFORMER—2nd I.F. transformer and shield | 1.60 |
| RT-408 | TRANSFORMER—Output transformer (T-3) | 1.70 |
| RV-041 | VOLUME CONTROL—2 meg. volume control (R-7) | .70 |
| *RW-101 | WASHER—Felt washer (Pkg. of 10) | .45 |
| *RX-021 | ASSEMBLY—Chassis mounting assembly | .10 |
| | **TOUCH TUNING ASSEMBLY** | |
| RB-513 | BUTTON—Molded push button (Pkg. 5) | .35 |
| RC-8036 | CARDS—Station letter cards (set) | .25 |
| RC-8053 | CARD—"Off" tab card (strip of 10) | .05 |
| RC-8086 | CARD—"Manual" tab card (Strip of 10) | .05 |
| RE-029 | ESCUTCHEON—Push button escutcheon | .60 |
| RS-393 | SWITCH—Push button switch (S-5) | 3.60 |
| RS-444 | SPRING—Spring for push-button (Pkg. 10) | .10 |
| RT-854 | TRIMMER STRIP—Oscillator trimmer strip (C-38, C-39, C-40, C-41, C-42, C-43) | 1.15 |
| RT-855 | TRIMMER STRIP—Antenna trimmer strip (C-31, C-32, C-33, C-34, C-35, C-36) | 1.15 |
| RW-021 | WINDOWS—Celluloid station windows (Pkg. 25) | .10 |
| | **SPEAKER ASSEMBLY (G-61)** | |
| RC-931 | CONE—6½-inch cone and voice coil assembly | .60 |
| RD-300 | DUST CAP—Speaker cone dust cap (Pkg. 5) | .10 |
| RC-1983 | CLUTCH—Trip lever friction clutch assembly (5) | $0.35 |
| RC-1984 | COUPLING—Motor coupling complete with turntable drive gear, rubber strips, motor coupling and drive arm (6) | 1.80 |
| RC-5001 | CRYSTAL—Pick-up crystal cartridge and needle screw | 4.25 |
| RP-402 | FINGER—Trip lever friction finger assembly (7) | .45 |
| RG-107 | GUIDE—Main lever spring guide (11) | .40 |
| RG-500 | GOVERNOR—Motor speed governor | 3.05 |
| RG-701 | GEAR—Long arm and rack gear for front left-hand record post (8) | .60 |
| RG-702 | GEAR—Short arm and rack gear for front right-hand record post (9) | .55 |
| RG-703 | GEAR—Record post gear (10) | .90 |
| RL-927 | LEVER—Index lever assembly (13) | .75 |
| RL-928 | LEVER—Index lever tension spring lever (13) | .30 |
| RL-929 | LEVER—Locating lever and pawl assembly (14) | .70 |
| RL-930 | LEVER—Main lever assembly (15) | 1.35 |
| RL-931 | LEVER—Pick-up lift cable lever and spring assembly (16) | .55 |
| RL-932 | LEVER—Pick-up locating lever assembly (17) | .85 |
| RL-933 | LEVER—Record separator elevating lever complete with adjustment screws (18) | .80 |
| RL-934 | LEVER—Trip detaining lever (19) | .30 |
| RL-935 | LEVER—Trip lever assembly (20) | 1.25 |
| RL-936 | LEVER—Trip regulator lever (21) | .25 |
| RM-116 | MOTOR—Phono-motor 105-125 V., 25 cy. | 23.70 |
| RM-117 | MOTOR—Phono-motor, 105-125 V., 50 cy | 20.80 |
| RM-118 | MOTOR—Phono-motor, 105-125 V., 60 cy | 17.75 |
| RP-400 | PAWL—Trip pawl assembly (22) | .80 |
| RP-401 | PIN—Record post drive pin (23) (Pkg. 5) | .20 |
| RP-501 | PICK-UP—Pick-up and arm complete | 7.45 |
| RR-922 | ROLLER—Pick-up lift cable roller and bracket assembly (24) | .55 |
| RS-452 | SPRING—Cam pawl tension spring on main gear (Pkg. 5) | .20 |
| RS-453 | SPRING—Pick-up locating lever short spring (28) (Pkg. 5) | .40 |
| RS-454 | SPRING—Main lever tension spring (29) | .05 |
| RS-455 | SPRING—Pick-up locating lever long spring or index lever tension spring (30) | .05 |
| RS-456 | SPRING—Pick-up lift cable tension spring (31) (Pkg. 5) | .20 |
| RS-457 | SPRING—Record separator pressure spring (32) (Pkg. 5) | .10 |
| RS-458 | SPRING—Trip detaining lever or locating lever tension spring (33) (Pkg. 5) | .20 |
| RS-809 | SEPARATOR—Record separator knife (25) | .75 |
| Rs-810 | SHELF—Record post shelf assembly (27) | 1.25 |
| RS-811 | SPINDLE—Turntable spindle shaft and spring | 1.40 |
| RS-701 | STRIP—Rubber strips for flexible coupling (set) | .40 |
| RS-867 | SCREW—Cone pointed set screw for trip lever hub or record post shelf (Pkg. 5) | .30 |
| RS-868 | SCREW—Pick-up lift cable screw and nut (Pkg. 5) | .20 |
| RS-869 | SCREW—Special screw to adjust friction-clutch tension (Pkg. 3) | .15 |
| RS-870 | SCREW—Pick-up needle screw (Pkg. 5) | .60 |
| RS-917 | SHAFT—Record separator post shaft (26) | .40 |
| RS-918 | SHAFT—Pick-up pivot arm and shaft assembly | .45 |
| RS-3012 | SWITCH—Motor toggle switch | .90 |
| RT-907 | TURNTABLE—Turntable assembly, less spindle | 3.35 |
| RW-111 | WASHER—Turntable thrust washers (1 steel, 1 bronze, 1 felt) | .15 |

* Used on previous receivers.

(Prices subject to change without notice)

GENERAL ELECTRIC CO.

MODEL G69
Automatic Record
Changer Data

## AUTOMATIC RECORD CHANGER (G-69)

### *General Information*

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc., are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

### *Adjustments*

**A. Main Lever**—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

**B. Friction Clutch.**—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pick-up is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

**C. Pick-up Lift Cable Screw.**—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pick-up lift cable. To adjust pick-up for proper elevation, stop the changer "in-cycle" at the point where pick-up is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

**D. & E. Needle Landing on Record.**—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10-inch record. Position of eccentric stud "E" governs the landing of the needle on a 12-inch record; this, however, is dependent on the proper 10-inch adjustment.

To adjust for needle landing, place 10-inch record on turntable; push index lever to reject position and return to the 10-inch position; see that pick-up locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32 inch end play between hub of lever "20" and pick-up base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone-pointed screw "D."

After adjusting for needle landing on a 10-inch record, place 12-inch record on turntable; push index lever to reject and return to 12-inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10-inch records.

**F. & G. Record Separating Knife.**—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10-inch record is nominally .065 inch, and for the 12-inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .052—.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

**H. Record Support Shelf.**—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12-inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone-pointed screw "H."

*If record shelves or knives are bent, or not perfectly horizontal improper operation and jamming of mechanism will occur.*

**J. Tone Arm Rest Support (not shown).**—When the changer is out-of-cycle, the front lower edge of the pick-up head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

**K. Trip Pawl Stop Pin.**—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

**Lubrication.**—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

### *Miscellaneous Service Hints*

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A."
2. Needle does not land properly on both 10- and 12-inch records—Make complete adjustments "D" and "E."
3. Needle does not land properly on 12-inch record but correct on 10-inch—Effect adjustment "E."
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B." Also, see that levers "7" and "12" are free to move without touching each other.
5. Pick-up strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C."
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pick-up output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H."
11. Needle lands in 10 inch position on 12 inch record—Increase tension of pick-up locating lever spring "30."

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MODELS G61,G66,G68,G69
Phono.Connections,Motor
Data,Assembly of Changer

# GENERAL ELECTRIC CO.

## PHONOGRAPH MECHANISM (G-68)

### *Motor Adjustments*

The speed of the turntable is controlled by a governor which allows correct adjustment of the turntable rotation to 78 revolutions per minute. The speed may be checked by placing a piece of paper under a record and counting the number of revolutions in a minute while the record is being played. If adjustment is necessary lift up the turntable and the speed regulator setscrew will be found adjacent to the turntable hub of the motor. Clockwise rotation of this setscrew reduces speed.

The motor bearings and gears are properly lubricated for long operation under normal weather conditions. If the motor chatters or runs unevenly, place a few drops of light machine oil on the governor felt.

### *Trip Mechanism*

The trip mechanism is of simple design and consists of a latch bar connected to the motor switch and a trip lever. The latch is held closed by means of a spring between the latch bar and the trip lever. The motor switch is mechanically connected to the latch bar so that when the trip mechanism is released the motor switch is in the "off" position. Be sure this latch bar mechanism works freely without binding.

The trip is actuated by an adjustable arm on the trip lever. When the eccentric groove in the record swings the tone arm back and forth, it pushes the latch out of engagement.

### *Phonograph Connections (G-61 and G-66)*

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the G-61 or G-66 circuit for the reproduction of phonograph recordings. This method uses a two circuit jack and is connected into the receiver by opening the circuit at C-D at the output of the 2nd IF transformer; and connecting the jack terminals as shown. A telephone plug is attached to the pick-up leads; and for phonograph operation, it is merely necessary to insert this plug into the jack. The jack may be mounted on the rear chassis deck and all connecting leads should be well shielded.

When the pick-up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction.

NOTE.—A suitable load consisting of a 300,000 ohm resistor should be connected across the pick-up leads when using a crystal type unit.

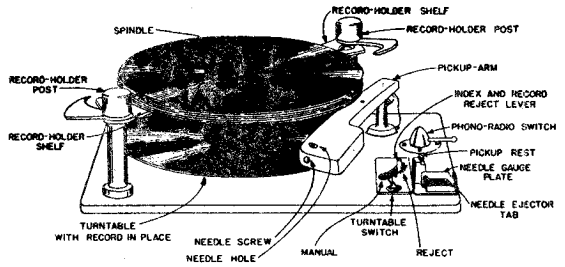
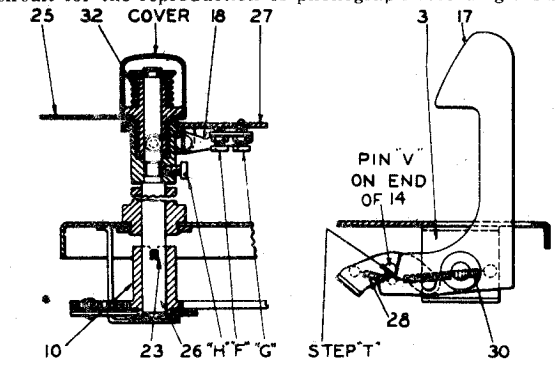
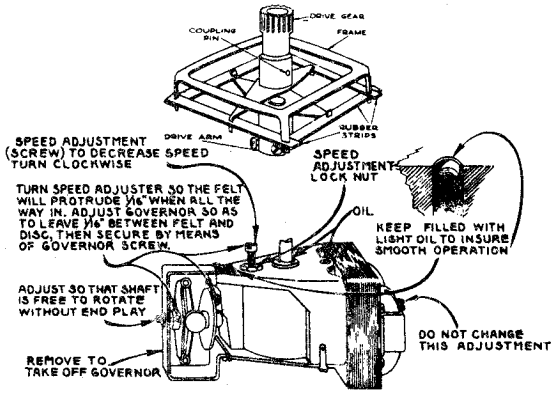


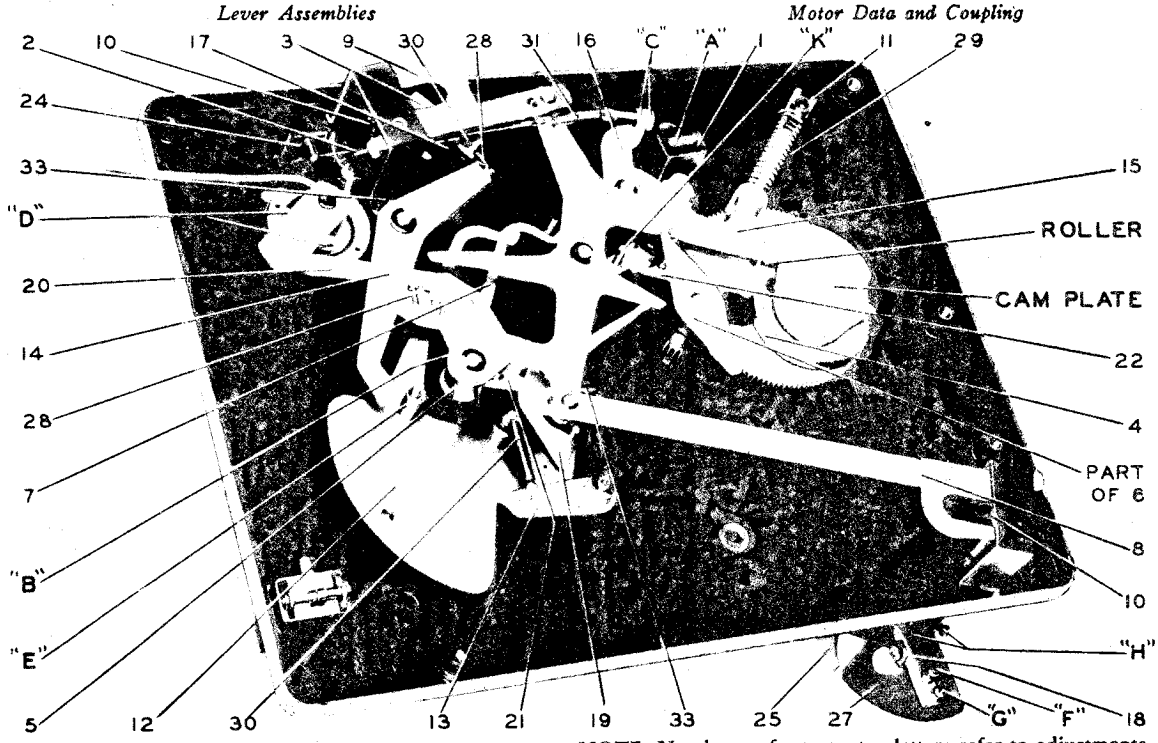

Fig. 7. Top View of Automatic Record Changer




*Details of Record Shelf Posts, and Locating Lever Assemblies*


COUPLING PIN
DRIVE GEAR
FRAME
RUBBER STRIPS
DRIVE ARM
SPEED ADJUSTMENT (SCREW) TO DECREASE SPEED TURN CLOCKWISE
SPEED ADJUSTMENT LOCK NUT
TURN SPEED ADJUSTER SO THE FELT WILL PROTRUDE 1/16" WHEN ALL THE WAY IN. ADJUST GOVERNOR SO AS TO LEAVE 1/16" BETWEEN FELT AND DISC, THEN SECURE BY MEANS OF GOVERNOR SCREW.
OIL
KEEP FILLED WITH LIGHT OIL TO INSURE SMOOTH OPERATION
ADJUST SO THAT SHAFT IS FREE TO ROTATE WITHOUT END PLAY
DO NOT CHANGE THIS ADJUSTMENT
REMOVE TO TAKE OFF GOVERNOR

*Motor Data and Coupling*




*Bottom View of Automatic Record Changer*

NOTE: Numbers refer to parts—letters refer to adjustments.

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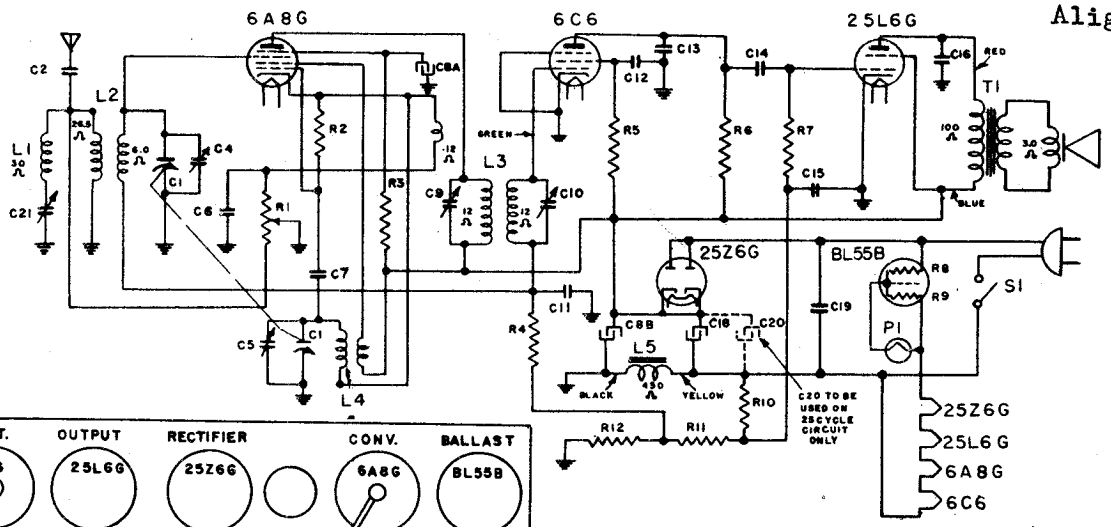
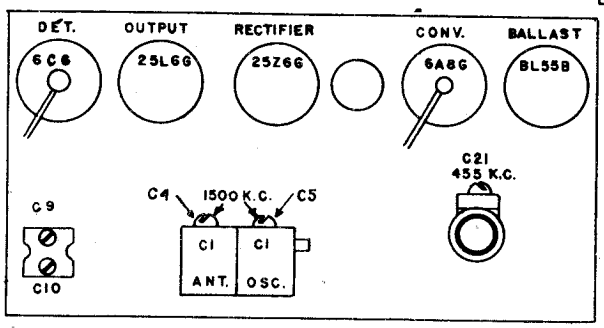
# GENERAL ELECTRIC CO.

**MODEL GD51**
**Schematic, Socket, Trimmers, Voltage Alignment**




| Power Supply (Volts) | Frequency (Cycles on AC) | Power Consumption (Watts) |
|---|---|---|
| 100–125 Volts AC or DC | 40–60 | 45 |

***Electrical Power Output*** *(120—line volts)*

| | DC | AC |
|---|---|---|
| Undistorted | 0.9 | 1.0 |
| Maximum | 1.5 | 1.8 |

***Tuning Frequency Range*** ..... 540-1750 K.C.

***Intermediate Frequency*** ..... 455 K.C.

| Symbol | Description | Symbol | Description | Symbol | Description |
|---|---|---|---|---|---|
| C-1, -4, -5 | Tuning Condenser | C-16 | .03 Mfd., Paper Capacitor | R-7 | 680,000 Ohm Carbon Resistor |
| C-2 | .001 Mfd., Paper Capacitor | C-18 | 15 Mfd., Dry Electrolytic | R-8 | 162 Ohm Ballast Resistor |
| C-6 | .05 Mfd., Paper Capacitor | C-19 | .02 Mfd., Molded Capacitor | R-9 | 31 Ohm Ballast Resistor |
| C-7 | 47 Mmf., Mica Capacitor | C-20 | 35 Mfd., Dry Electrolytic | R-10 | 680,000 Ohm Carbon Resistor |
| C-8a | 10 Mfd., Dry Electrolytic | C-21 | Wave Trap Trimmer | R-11 | 150,000 Ohm Carbon Resistor |
| C-8b | 15 Mfd., Dry Electrolytic | R-1 | 10,000 Ohm Volume Control | R-12 | 75,000 Ohm Carbon Resistor |
| C-11 | .05 Mfd., Paper Capacitor | R-2 | 47,000 Ohm Carbon Resistor | L-1 | Wave Trap Coil |
| C-12 | .02 Mfd., Paper Capacitor | R-3 | 22,000 Ohm Carbon Resistor | L-2 | Antenna Coil |
| C-13 | 100 Mmf., Mica Capacitor | R-4 | 4.7 Megohm Carbon Resistor | L-3 | I.F. Transformer |
| C-14 | .005 Mfd., Paper Capacitor | R-5 | 3.3 Megohm Carbon Resistor | L-4 | Oscillator Coil |
| C-15 | 0.1 Mfd., Paper Capacitor | R-6 | 470,000 Ohm Carbon Resistor | T-1 | Output Transformer |

## VOLTAGE CHART

| Tube No. | 6A8G | 6C6 | 25L6G | 25Z6G |
|---|---|---|---|---|
| Plate to -B Volts | 102 | 30* | 98 | .... |
| Screen to -B Volts | 65 | 20* | 102 | .... |
| Cathode to -B Volts | 0–30 | 0 | 0 | 127 |
| Filament Volts | 6.2 | 6.2 | 24.5 | 25.0 |

Line voltage—120 VAC. No Signal Input.
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

### *Loud-speaker—Electrodynamic*

Outside Cone Diameter ..... 5 inches
Voice Coil Impedance (400 cycles) ... 4.0 ohms
Field Coil Resistance ..... 420 ohms (cold)

### *Tubes*

Converter and Oscillator ..... GE-6A8G
I.F. Detector and Amplifier ..... GE-6C6
Power Amplifier ..... GE-25L6G
Rectifier ..... GE-25Z6G
Ballast Resistor Tube ..... BL-55B
Pilot Lamp ..... Mazda No. 44

Model GD-51 is a compact, five-tube AC-DC superheterodyne receiver employing four General Electric tubes plus a ballast tube, as described above in a superheterodyne circuit. It incorporates a simplified mechanically tuned "Touch Tuning" system allowing a set up of five stations for automatic tuning. Other features of design include I.F. wave trap, automatic overload control and an efficient electrodynamic speaker.

### *Alignment Frequencies*

I.F.—455 K.C. Broadcast—1500 K.C.
The location of all trimmers is shown in Fig. 1.

### *I.F. Alignment*

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G. Keep the test oscillator output as low as possible to give a readable output. Adjust the two I.F. trimmers (C9 and C10) for maximum output.

### *Wave Trap Alignment*

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-21) for minimum output.

### *R.F. Alignment*

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-5) and antenna trimmer (C-4) for a maximum output.

**Precaution**—One side of the power supply is connected directly to the chassis. If the signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

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MODEL GA62
Schematic, Voltage, Socket Trimmers, Alignment

# GENERAL ELECTRIC CO.

***Loud-speaker—Electrodynamic***

Speaker Diameter.....6 inches
Cone Coil Impedance.....4 ohms at 400 cycles

*Tuning Frequency Range*...540–1540 K.C.

*Current Consumption*
Storage Battery.....6.3 volts—7.3 amps

*Electrical Power Output*
Undistorted....2.0 watts
Maximum.....3.5 watts

## GENERAL INFORMATION

Model GA-62 is a compact, six-tube superheterodyne receiver, employing six General Electric Pre-tested Tubes as described previously. The power supply consists of a non-synchronous type vibrator and full-wave high-vacuum rectifier operating in a conventional rectifier circuit. The receiver incorporates a simplified mechanically adjusted "Touch-Tuning" system, allowing a setup of five stations for automatic tuning. The use of an antenna-matching trimmer results in the maximum transfer of energy from the antenna to the control grid of the 6K7 R.F. tube, providing a high signal-to-noise ratio.

## ALIGNMENT

IF ALIGNMENT - Adj. 4 trimmers at 465 KC thru .1 mf cond.

RF ALIGNMENT - Adj. osc. and Ant. trimmers C-3 and C-2 at 1400 KC. thru 100 mmf cond.- PEAK C-8 at 600 KC.

CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOL. VIII.

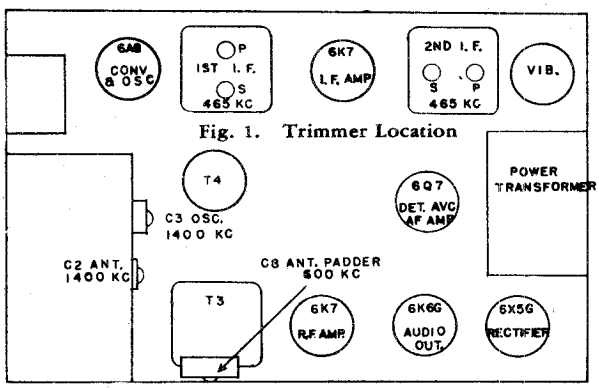
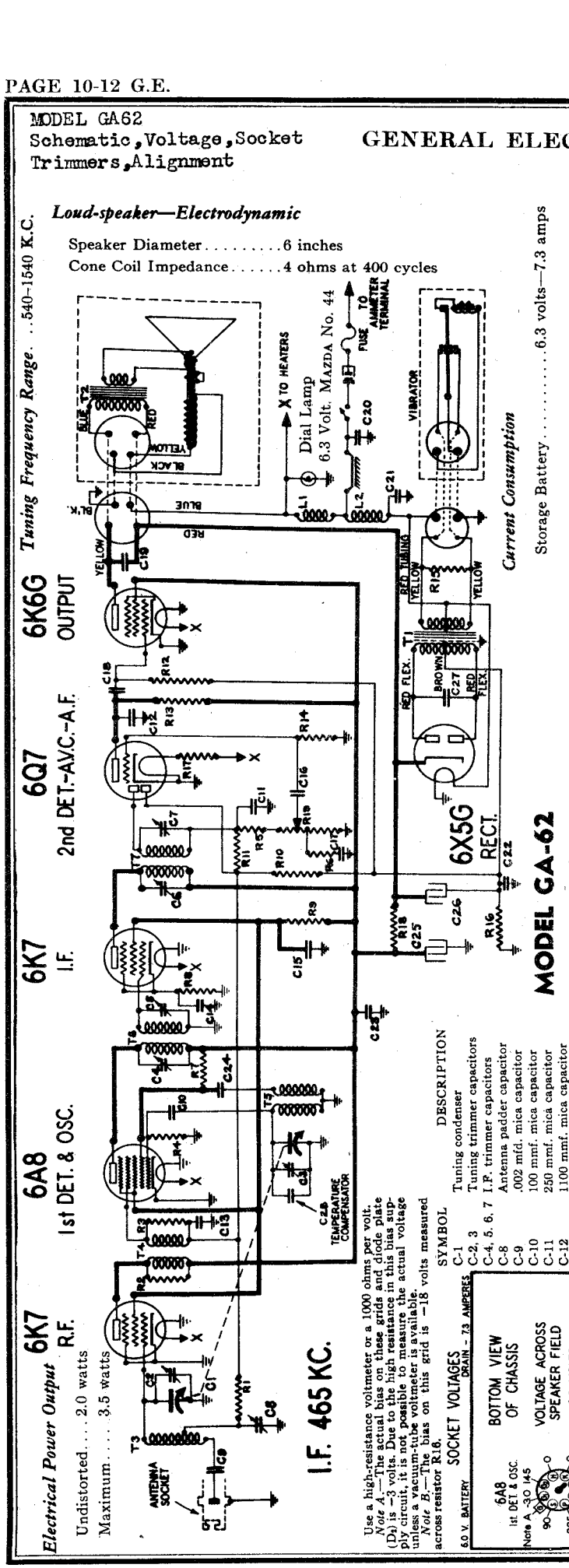



Fig. 1. Trimmer Location




| | SYMBOL | DESCRIPTION |
|---|---|---|
| | C-1 | Tuning condenser |
| | C-2, 3 | Tuning trimmer capacitors |
| | C-4, 5, 6, 7 | I.F. trimmer capacitors |
| | C-8 | Antenna padder capacitor |
| | C-9 | .002 mfd. mica capacitor |
| | C-10 | 100 mmf. mica capacitor |
| | C-11 | 250 mmf. mica capacitor |
| | C-12 | 1100 mmf. mica capacitor |
| | C-13 | .05 mfd. paper capacitor |
| | C-14, 15 | .1 mfd. paper capacitor |
| | C-16, 22 | .004 mfd. paper capacitor |
| | C-17, 24 | .01 mfd. paper capacitor |
| | C-18 | .02 mfd. paper capacitor |
| | C-19 | .005 mfd. paper capacitor |
| | C-20, 21 | .5 mfd. paper capacitor |
| | C-23 | .1 mfd. paper capacitor |
| | C-25, 26 | 8 mfd. dry electrolytic |
| | C-27 | .01 mfd. oil-filled capacitor |
| | C-28 | Temp. compensator capacitor |
| | L-1 | Choke coil (short) |
| | L-2 | Choke coil (long) |
| | R-1 | 470,000 ohms, carbon resistor |
| | R-2 | 68,000 ohms, carbon resistor |
| | R-3 | 33,000 ohms, carbon resistor |
| | R-4, 5, 6 | 47,000 ohms, carbon resistor |
| | R-7 | 22,000 ohms, carbon resistor |
| | R-8 | 820 ohms, carbon resistor |
| | R-9 | 27,000 ohms, carbon resistor |
| | R-10 | 10 megohms, carbon resistor |
| | R-11 | 1.5 megohms, carbon resistor |
| | R-12 | 470,000 ohms, carbon resistor |
| | R-13 | 220,000 ohms, carbon resistor |
| | R-14 | 10 megohms, carbon resistor |
| | R-15 | 220 ohms, wire wound resistor |
| | R-16 | 360 ohms, wire wound resistor |
| | R-17 | 3 ohms, wire wound resistor |
| | R-18 | 1500 ohms, wire wound resistor |
| | R-19 | 500,000 ohms, volume control |
| T-1 | | Power transformer |
| T-2 | | Output transformer |
| T-3 | | Antenna transformer |
| T-4 | | Detector transformer |
| T-5 | | Oscillator transformer |
| T-6 | | 1st I.F. transformer |
| T-7 | | 2nd I.F. transformer |

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# GENERAL ELECTRIC CO.

MODELS GD62, GD67
Schematic, Voltage, Socket
Trimmers, Alignment

| Symbol | Description |
|---|---|
| C1 C2. C3 | Tuning condenser and trimmers |
| C4 | 5-35 mmf. trimmer capacitor |
| C10 | 30-70 mmf. trimmer capacitor |
| C12 | .1 mfd paper capacitor |
| C13 | .001 mfd paper capacitor |
| C14 | .05 mfd paper capacitor |
| C15 | .1 mfd paper capacitor |
| C16 | .005 mfd paper capacitor |
| C17 | .002 mfd paper capacitor |
| C18 | .03 mfd paper capacitor |
| C19 | .25 mfd paper capacitor |
| C20 | .01 mfd moulded capacitor |
| C21 | .005 mfd paper capacitor |
| C22 | .1 mfd paper capacitor |

| Symbol | Description |
|---|---|
| C23 | .1 mfd paper capacitor |
| C27 | 100 mmf mica capacitor |
| C28 | 500 mmf mica capacitor |
| C29 | 250 mmf mica capacitor |
| C32, C33 | 50 mfd, 50 mfd, dry electrolytic |
| R1 | 10 megohm carbon resistor |
| R2 | 47,000 ohm carbon resistor |
| R3 | 15,000 ohm carbon resistor |
| R4 | 2.2 megohm carbon resistor |
| R5 | 2.0 megohm volume control |
| R6 | 470,000 ohm carbon resistor |
| R7 | 180,000 ohm carbon resistor |
| R8 | 220,000 ohm carbon resistor |
| R9 | 330,000 ohm carbon resistor |

| Symbol | Description |
|---|---|
| R10 | 220,000 ohm carbon resistor |
| R11 | 15,000 ohm carbon resistor |
| R12 | 470 ohm carbon resistor |
| R13 | 1.5 megohm carbon resistor |
| R14 | 68 ohm carbon resistor |
| R15 | 230 ohm w.w. resistor |
| R16 | 100,000 ohm carbon resistor |
| R18, R19 | 100 ohm w.w. resistor |
| L1 | Wave trap coil |
| L2 | Antenna coil |
| L3 | Oscillator coil |
| T2 | Output transformer |

## VOLTAGE CHART

| Tube No. | 6A7 | 6D6 | 75 | 25L6G | 25Z6G |
|---|---|---|---|---|---|
| Plate to —B Volts | 115 | 115 | 50* | 105 | 120 V. A.C. |
| Screen to —B Volts | 70 | 115 | | 115 | |
| Cathode to —B Volts | 3.0 | 3.0 | 0.5 | 8.5 | 115 |
| Filament Volts | 6.4 | 6.4 | 6.4 | 23.0 | 24.0 |

*Measured on 250-volt scale.
Line Voltage—120 A.C. No signal input.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

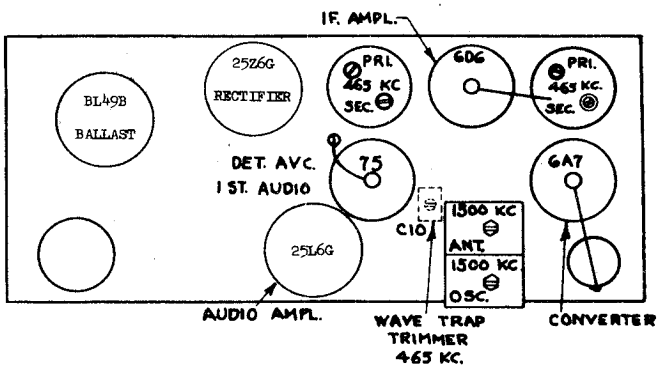



Fig. 1. Trimmer Location

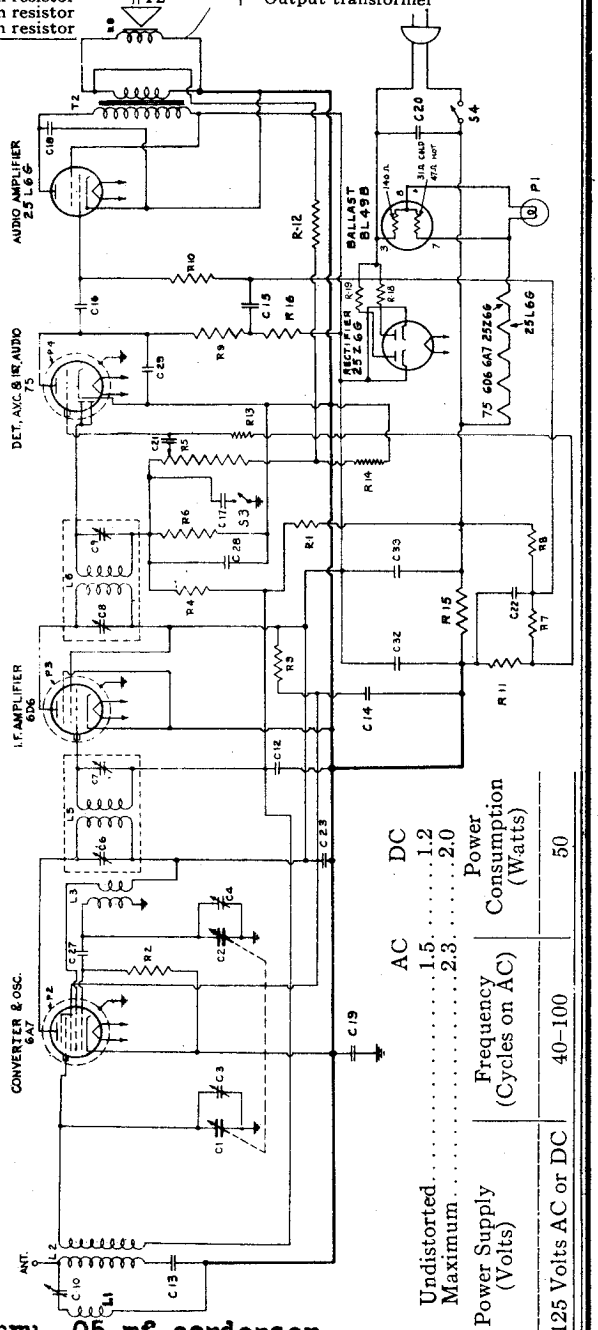
### *Touch-Tuning Mechanism*

The dial mechanism is a very simple arrangement and should not require service. The frequency range of each of the automatic tuning buttons is as follows:

| Button No. | Frequency Range (Kilocycles) | Button No. | Frequency Range (Kilocycles) |
|---|---|---|---|
| 1 | 540–590 | 5 | 830–1150 |
| 2 | 570–670 | 6 | 1020–1400 |
| 3 | 630–780 | 7 | 1220–1700 |
| 4 | 710–940 | 8 | 1580–1800 |

*Tuning Frequency Range*.....540–1800 K.C.

*Intermediate Frequency*.....465 K.C.




**IF ALIGNMENT** - Adj. 4 trimmers at 465 KC thru .05 mf condenser.

**WAVE TRAP** - Adj. C10 cond. at 465 KC thru 250 mmf and 200 ohms series.

**RF ALIGNMENT** - Thru a 250 mmf and 200 ohm series :-Adj. C4 cond. osc. trimmer at 1830 KC - Adj. C3 Ant. trimmer at 1500 KC.

Pwr. Supply connection to chassis is thru .25 mf cond. If Sig. gen. is AC, connect .05 mf cond. in grd. side before chassis connection.

FOR CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOLUME V111.

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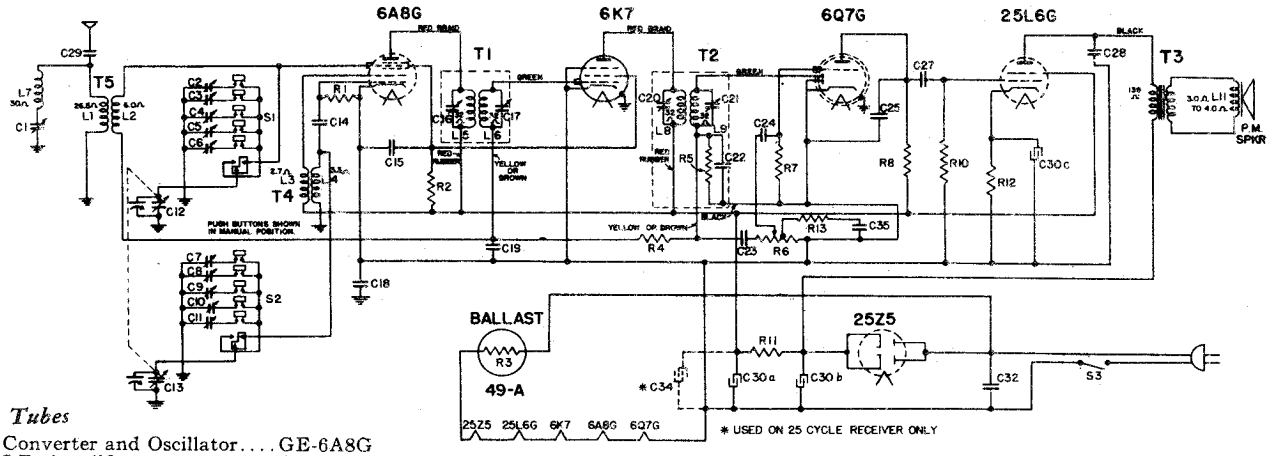
MODEL GD63
Schematic, Voltage, Socket Trimmers, Alignment

# GENERAL ELECTRIC CO.




*Tubes*

Converter and Oscillator....GE-6A8G
I.F. Amplifier.....CE-6K7
Detector, AVC and Amplifier.....GE-6Q7G
Power Amplifier.....GE-25L6G
Rectifier.....GE-25Z5
Ballast Tube.....49-A

*Tuning Frequency Range*.....540–1750 K.C.

*Intermediate Frequency*.....455 K.C.

| Symbol | Description | Symbol | Description |
|---|---|---|---|
| C1 | Wave trap trimmer | C34 | 15 mfd., dry electrolytic |
| C2–C6 | Antenna trimmer strip | C35 | .005 mfd., paper capacitor |
| C7–C11 | Oscillator trimmer strip | R1 | 47,000 ohm, carbon resistor |
| C12 C13 | Tuning condenser | R2 | 10,000 ohm, carbon resistor |
| C14 | 47 mmf., mica capacitor | R3 | Ballast resistance, 49A |
| C15 | .25 mfd., paper capacitor | R4 | 2.2 megohm, carbon resistor |
| C18 | .25 mfd., paper capacitor | R5 | 470,000 ohm, carbon resistor |
| C19 | .05 mfd., paper capacitor | R6 | 2.2 megohm, volume control |
| C22 | 470 mmf., mica capacitor | R7 | 15.0 megohm, carbon resistor |
| C23 24 | .002 mfd., paper capacitor | R8 | 220,000 ohm, carbon resistor |
| C25 | 330 mmf., mica capacitor | R10 | 1.0 megohm, carbon resistor |
| C27 | .005 mfd., paper capacitor | R11 | 2200 ohm, carbon resistor |
| C28 | .01 mfd., paper capacitor | R12 | 180 ohm, carbon resistor |
| C29 | .001 mfd., paper capacitor | R13 | 68,000 ohm, carbon resistor |
| C30a | 20 mfd., dry electrolytic | T1 | 1st I.F. transformer |
| C30b | 40 mfd., dry electrolytic | T2 | 2nd I.F. transformer |
| C30c | 20 mfd., dry electrolytic | T3 | Output transformer |
| C32 | .02 mfd., molded capacitor | T4 | Osc. transformer |
| | | T5 | Antenna transformer |

## ALIGNMENT PROCEDURE

*Alignment Frequencies*

I.F.—455 K.C. Broadcast—1500 K.C.
The location of all trimmers is shown in Fig. 1.

*I.F. Alignment*

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G. Keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

*Wave Trap Alignment*

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

*R.F. Alignment*

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-13) and antenna trimmer (C-12) for a maximum output.

**Precaution**—One side of the power supply is connected to the chassis through a .25 mfd. capacitor. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

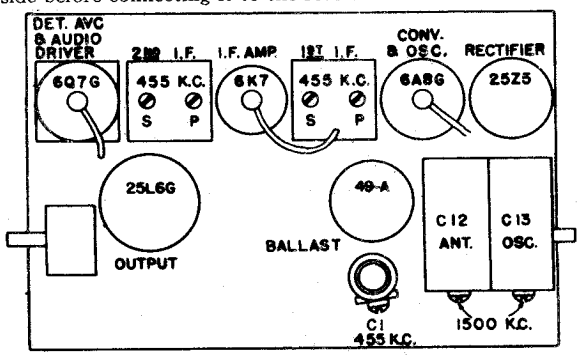



*Fig. 1. Trimmer Location*

## GENERAL INFORMATION

Model GD-63 is a compact, six-tube AC-DC superheterodyne receiver, employing six General Electric Pre-tested Tubes as described above, in a superheterodyne circuit. It incorporates a simplified trimmer tuned "Touch-Tuning" system, allowing a set up of five stations for automatic tuning. Other features of design include I.F. wave trap, automatic volume control and an improved dustproof speaker.

*Electrical Specifications*

| Power Supply (Volts) | Frequency (Cycles on AC) | Power Consumption (Watts) |
|---|---|---|
| 110-125 Volts AC or DC | 40–100 | 50 |

*Electrical Power Output (120—line volts)*

| | AC | DC |
|---|---|---|
| Undistorted | 1.2 | 1.0 |
| Maximum | 2.5 | 2.0 |

*Loud-speaker—Permanent Magnet*

Outside Cone Diameter.....5-inch
Voice Coil Impedance.....4.0 ohms at 400 cycles

## VOLTAGE CHART

| Tube No. | 6A8G | 6K7 | 6Q7G | 25L6G | 25Z5 |
|---|---|---|---|---|---|
| Plate to −B volts | 112 | 112 | 55* | 130 | .. |
| Screen to −B volts | 75 | 75 | .. | 115 | .. |
| Cathode to −B volts | 0 | 0 | 0 | 7.5 | 136 |
| Cathode Current MA | 6.6 | 1.4 | 0.5 | 40 | 50 |
| Filament Volts | 6.0 | 6.0 | 6.1 | 24.5 | 24.0 |

Line Voltage—120 AC. No signal input
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

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GENERAL ELECTRIC CO.

MODELS G64, G65
Schematic, Chassis Wiring

# MODELS G-64 AND G-655

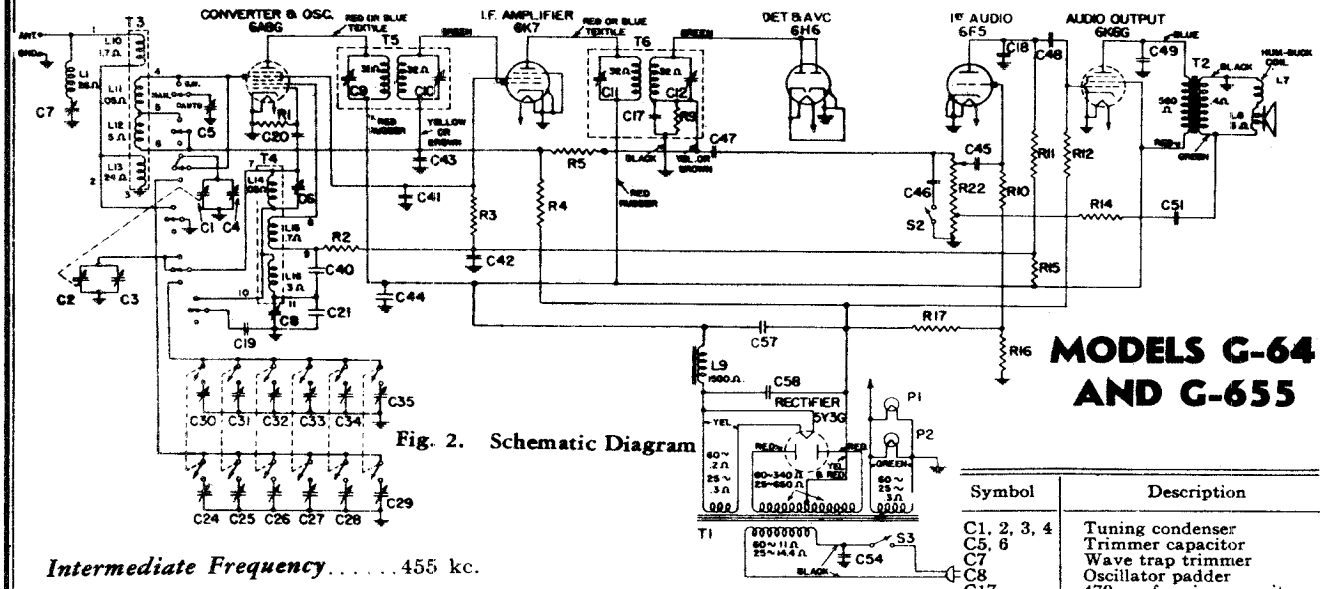
CONVERTER & OSC. 6A8G
I.F. AMPLIFIER 6K7
DET & AVC 6H6
1st AUDIO 6F5
AUDIO OUTPUT 6K6G
RECTIFIER 5Y3G
T1
T2
T3
T4
T5
T6
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C17 C18 C19 C20 C21 C24 C25 C26 C27 C28 C29 C30 C31 C32 C33 C34 C35 C40 C41 C42 C43 C44 C45 C46 C47 C48 C49 C51 C54 C57 C58
R1 R2 R3 R4 R5 R10 R11 R12 R14 R15 R16 R17 R22
L9
S2 S3
P1 P2

Fig. 2. Schematic Diagram

*Intermediate Frequency*.....455 kc.

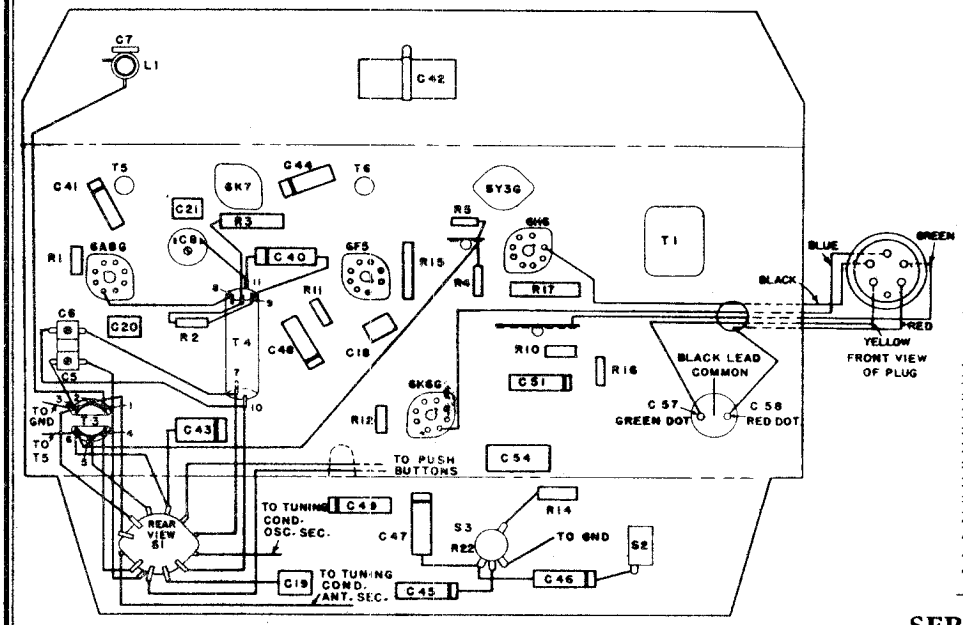


Fig. 3. Chassis Parts Layout

| Symbol | Description |
|---|---|
| C1, 2, 3, 4 | Tuning condenser |
| C5, 6 | Trimmer capacitor |
| C7 | Wave trap trimmer |
| C8 | Oscillator padder |
| C17 | 470 mmf., mica capacitor |
| C18 | 330 mmf., mica capacitor |
| C19 | 3900 mmf., mica capacitor |
| C20 | 47 mmf., mica capacitor |
| C21 | 370 mmf., mica capacitor |
| C24, 29 | Antenna trimmer strip |
| C30, 35 | Oscillator trimmer strip |
| C40 | .001 mfd., paper capacitor |
| C41 | .05 mfd., paper capacitor |
| C42 | 0.5 mfd., paper capacitor |
| C43 44 | .05 mfd., paper capacitor |
| C45 | .01 mfd., paper capacitor |
| C46 | .001 mfd., paper capacitor |
| C47 48 | .005 mfd., paper capacitor |
| C49 | .012 mfd., paper capacitor |
| C51 | 0.1 mfd., paper capacitor |
| C54 | .01 mfd., molded paper |
| C57 | 8 mfd., dry electrolytic |
| C58 | 8 mfd., dry electrolytic |
| R1 | 47,000 ohm, carbon resistor |
| R2 | 4,700 ohm, carbon resistor |
| R3 | 18,000 ohm, carbon resistor |
| R4 | 10.0 megohm, carbon resistor |
| R5 | 1.5 megohm, carbon resistor |
| R9 | 470,000 ohm, carbon resistor |
| R10 | 2.2 megohm, carbon resistor |
| R11, 12 | 330,000 ohm, carbon resistor |
| R14 | 33,000 ohm, carbon resistor |
| R15 | 3900 ohm, carbon resistor |
| R16 | 22 ohm, carbon resistor |
| R17 | 330 ohm, carbon resistor |
| R22 | 2.0 megohm, volume control |
| T1 | Power transformer |
| T2 | Output transformer |
| T3 | Antenna transformer |
| T4 | Oscillator transformer |

## SERVICE DATA

### *Electrical Specifications*

| Rating Label | Power Supply (Volts) | Frequency (Cycles) | Power Consumption (Watts) |
|---|---|---|---|
| A | 115–125 | 50–60 | 65 |
| C | 115–125 | 25–60 | 70 |
| V | 115–125<br>140–155<br>190–220<br>220–250 | 50–60 | 70 |

### *Tuning Frequency Range*

Band "B".....540 to 1750 kc.
Band "D".....5700 to 18,300 kc.

### *Physical Specifications*

| | G-64 | G-655 |
|---|---|---|
| Model | | |
| Height | 11 inches | 34 inches |
| Width | 18⅞ inches | 31 inches |
| Depth | 7 3/16 inches | 11½ inches |

*Tuning Control Drive Ratio*. 10 to 1

### *Electrical Power Output*

Undistorted.....2.0 watts
Maximum.....4.0 watts

*Tone Control*.....2 Point—
Bass and Normal

### *Loud-speaker—Electrodynamic*

| | G-655 | G-64 |
|---|---|---|
| Model | | |
| Cone Diameter | 12 inches | 6.5 inches |
| Voice Coil Impedance (400 cycles) | 3.5 ohms | 3.5 ohms |

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# KEYBOARD RADIOS

*Models G-64 and G-655*

## ALIGNMENT PROCEDURE

### I.F. ALIGNMENT WITH OSCILLOSCOPE

| Band Switch Setting | Input Freq. | Point of Input | Dummy Antenna | Trimmer | Comments |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. Sweep | I.F. Grid | .05 Mfd. or Larger | 2nd I.F. Sec. (C-12) 2nd I.F. Pri. (C-11) | Gang condenser plates wide open—connect audio input of oscilloscope to ground and to the junction of C-47 and R-5. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 5. |
| 2. Band "B" | 455 K.C. Sweep | Converter Grid | .05 Mfd. or Larger | 1st I.F. Sec. (C-10) 1st I.F. Pri. (C-9) | |
| 3. Band "B" | 455 K.C. Sweep | Antenna Post | 250 Mmf. 200 Ohms | Wave Trap Trimmer (C-7) | Adjust trimmer for minimum amplitude. |

### I.F. ALIGNMENT WITH OUTPUT METER

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. with Modulation | I.F. Grid | .05 Mfd. or Larger | 2nd I.F. Sec. (C-12) 2nd I.F. Pri. (C-11) | Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output. |
| 2. Band "B" | 455 K.C. with Modulation | Converter Grid | .05 Mfd. or Larger | 1st I.F. Sec. (C-10) 1st I.F. Pri. (C-9) | |
| 3. Band "B" | 455 K.C. with Modulation. | Antenna Post | 250 Mmf. 200 Ohms | Wave Trap Trimmer (C-7) | Adjust trimmer for minimum output. |

### R.F. ALIGNMENT

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | ..... | ..... | ..... | ..... | Close gang condenser plates. Adjust pointer to first line at left end of tuning scale. |
| 2. Band "B" | 1500 K.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. (C-3) Ant. (C-4) | Connect output meter across voice coil—tone control on "bass" position—peak trimmers for maximum output with a low input signal. |
| 3. Band "B" | 580 K.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. Padder (C-8) | Adjust padder for a maximum output meter indication in vicinity of 580 kc. while rocking the gang condenser. |
| 4. Band "B" | Repeat Operation 2 | | | | |
| 5. Band "D" | 18 M.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. (C-6) Ant. (C-5) | Peak C-5 for maximum output while rocking the gang condenser at the 18 mc. point. The image of any signal on "D" band should be heard 930 kc. below the input signal when proper peak is obtained on oscillator trimmer C-6. Example: 12 mc. image—11.09 mc. |

Use a dummy antenna in making all alignments. The grid lead should not be removed from the tube to which the input signal is applied when aligning the I.F. amplifier.

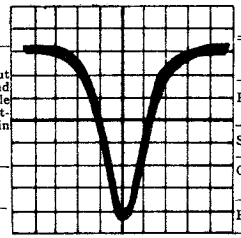


Fig. 5. Over-all I.F. Curve Taken on G-E Oscilloscope OFM-1

### VOLTAGE CHART

| Tube No. | 6A8G | 6K7 | 6P5 | 6K6G | 5Y3G |
|---|---|---|---|---|---|
| Plate to –B volts | Conv.-236 Osc.-186 | 236 | 84 * | 220 | .... |
| Screen to –B volts | 95 | 95 | .... | 236 | .... |
| Cathode to –B volts | 0 | 0 | 0 | 0 | 320 |
| Filament volts | 6.5 | 6.5 | 6.5 | 6.5 | 5.3 |

A-C line voltage—120.
* Measured on 500-volt scale.

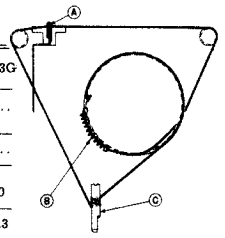



Fig. 6. Dial Drive Mechanism

## GENERAL INFORMATION

### *Coil System*

The "B" and "D" band antenna coils are wound on a single coil form (T-3) as shown in Fig. 2. T-4 is the oscillator transformer for both the "B" and "D" bands. All coil terminals are numbered in Fig. 2 and 3 to facilitate in service by showing common points on the schematic diagram, Fig. 2, and the pictorial wiring diagram, Fig. 3.

### *Phonograph Connections*

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the receiver circuit for the reproduction of phonograph recordings. S-1 is either a rotary or toggle triple-pole, double-throw switch. A suitable loading circuit consisting of a resistor or resistor and capacitor network should be used across the pick-up leads when using a crystal type unit. It is very important that the pick-up leads have a shield such as copper braid to prevent hum interference. This lead should be connected to the chassis ground.

The circuit should be opened between the top end of the volume control (R-22) and (C-47), and phonograph connections made as shown. This procedure requires removal of the chassis from the cabinet.

When the pick-up is connected as shown, the regular radio volume and tone controls work for both radio and phonograph reproduction. The parts suggested are:

| Symbol | Description | Stock No. |
|---|---|---|
| Sp | Phono Switch | RS-366 |
| Rp | 330,000 Ohm Resistor | RQ-1319 |

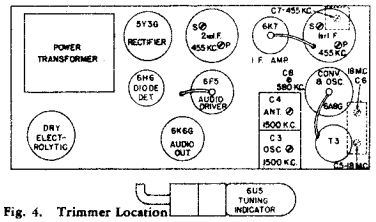



Fig. 4. Trimmer Location

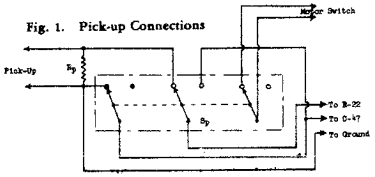



Fig. 1. Pick-up Connections

## REPLACEMENT PARTS LIST

### MODELS G-64 AND G-655

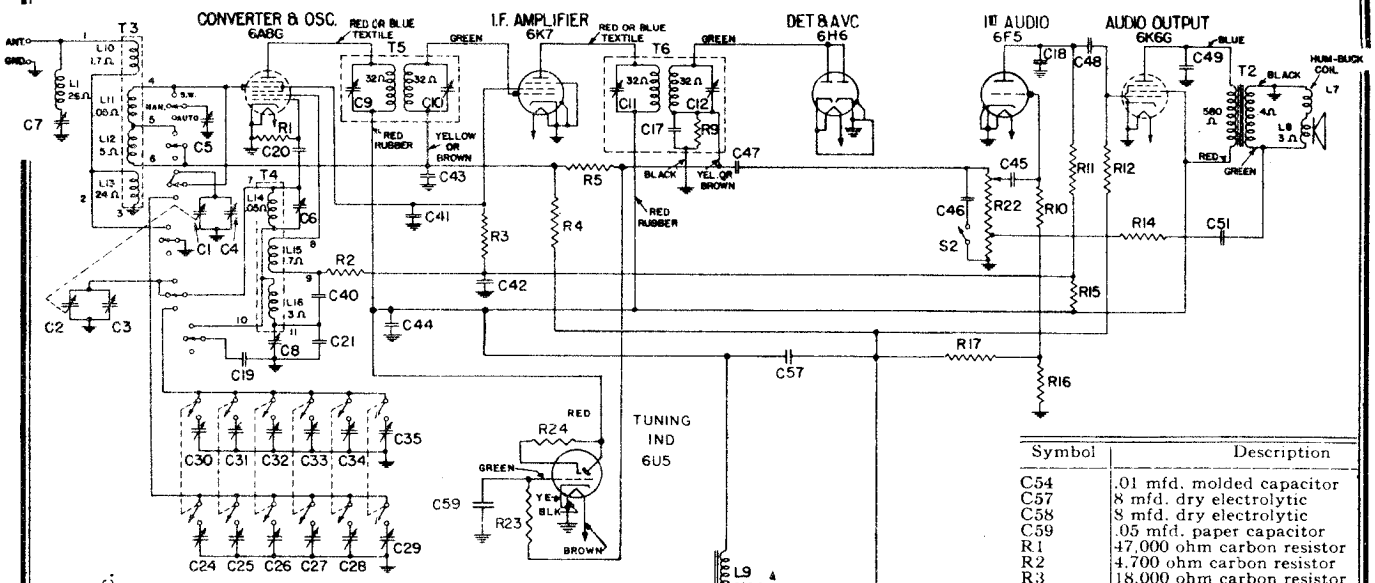
12-38 (8M)

| Stock No. | Description | List Price |
|---|---|---|
| | **CHASSIS ASSEMBLY** | |
| *RB-008 | BOARD—Terminal board (2 lug) | $0.10 |
| RB-093 | BOARD—Terminal board (6 lug) | .10 |
| *RC-009 | CAPACITOR—.001 mfd., 600 V. paper (C-40, 46) | .30 |
| *RC-023 | CAPACITOR—.005 mfd., 600 V paper (C-47, 48) | .25 |
| *RC-039 | CAPACITOR—.01 mfd., 200 V paper (C-45) | .25 |
| RC-044 | CAPACITOR—.012 mfd., 600 V paper (C- | .25 |
| *RC-092 | CAPACITOR—.05 mfd., 600 V paper (C-49) 41, 43, 44) | .30 .30 |
| *RC-104 | CAPACITOR—0.1 mfd., 600 V paper (C-51) | .30 |
| *RC-196 | CAPACITOR—0.5 mfd., 600 V paper (C-42) | .75 |
| RC-216 | CAPACITOR—47 mmf., mica (C-20) | .25 |
| *RC-274 | CAPACITOR—330 mmf., mica (C-18) | .30 |
| RC-285 | CAPACITOR—370 mmf., mica (C-21) | .25 |
| RC-294 | CAPACITOR—470 mmf., mica (C-17) | .30 |
| RC-390 | CAPACITOR—3900 mmf., mica (C-19) | .35 |
| RC-593 | CAPACITOR—8 mfd., 450 V; 8 mfd., 450 V; dry electrolytic (C-57, 58) | 1.40 |
| RC-674 | CAPACITOR—Wave trap trimmer (C-7) | .15 |
| RC-698 | CAPACITOR—Oscillator padder (C-8) | .40 |
| RC-699 | CAPACITOR—Trimmer capacitors "D" band (C-5, 6) | .30 |
| RC-727 | CONDENSER—Tuning condenser (C-1, 2, 3, 4) | 2.25 |
| RC-791 | CAPACITOR—.01 mfd., 250 V. AC (C-54) | .30 |
| RC-8103 | CABLE—Speaker cable and plug | .50 |
| *RC-863 | CORD—Power cord | .65 |
| RG-016 | GRID CLIP—Control grid clip | .10 |
| RK-027 | KNOB—Winged control knob (Pkg. 5) | .50 |
| RK-028 | KNOB—Plain control knob (Pkg. 5) | .30 |
| RL-061 | COIL—Antenna coil bands "B & D" | 1.15 |
| RL-265 | COIL—Oscillator coil bands "B & D" | .75 |
| RL-603 | COIL—Wave trap coil (L-1) | .60 |
| *RQ-1219 | RESISTOR—22 ohm, ½-W. carbon (R-16) (Pkg. 5) | .70 |
| *RQ-1275 | RESISTOR—4,700 ohm, ½-W. carbon (R-2) (Pkg. 5) | .70 |
| *RQ-1295 | RESISTOR—33,000 ohm, ½-W. carbon (R-14) (Pkg. 5) | .70 |
| *RQ-1299 | RESISTOR—47,000 ohm, ½-W. carbon (R-1) (Pkg. 5) | .70 |
| *RQ-1319 | RESISTOR—330,000 ohm, ½-W. carbon (R-11, 12) (Pkg. 5) | .70 |
| *RQ-1323 | RESISTOR—470,000 ohm, ½-W. carbon (R-9) (Pkg. 5) | .70 |
| *RQ-1335 | RESISTOR—1.5 megohm, ½-W. carbon (R-5) (Pkg. 5) | .70 |
| *RQ-1339 | RESISTOR—2.2 megohm, ½-W. carbon (R-10) (Pkg. 5) | .70 |
| *RQ-1355 | RESISTOR—10 megohm, ½-W. carbon (R-4) Pkg. 5) | .70 |
| *RQ-1447 | RESISTOR—330 ohm, 1-W. carbon (R-17) | .20 |
| *RQ-1473 | RESISTOR—3900 ohm, 1-W. carbon (R-15) | .20 |
| *RQ-1489 | RESISTOR—18,000 ohm, 1-W. carbon (R-3) | .20 |
| *RS-200 | SOCKET—Octal base tube socket (Pkg. 5) | .75 |
| *RS-204 | SOCKET—Rectifier tube socket (Pkg. 5) | .75 |
| *RS-223 | SOCKET—Socket for 6A8G (Pkg. 5) | .80 |
| RS-236 | SOCKET—Lamp Socket Assembly | $0.10 |
| RS-390 | SWITCH—Tone control switch (S-2) | .35 |
| RS-391 | SWITCH—Band change switch (S-1) | .90 |
| RT-0516 | TRANSFORMER—Power transformer (50–60 cy.) (T-1) | 4.20 |
| RT-0517 | TRANSFORMER—Power transformer (25 cy.) (T-1) | 7.05 |
| RT-0518 | TRANSFORMER—Power transformer—Universal (T-1) | 9.00 |
| RT-260 | TRANSFORMER—1st IF transformer (complete) | 1.15 |
| RT-286 | TRANSFORMER—2nd IF transformer (complete) | 1.40 |
| RT-438 | TRANSFORMER—Output transformer (T-2) | 1.70 |
| RV-040 | VOLUME CONTROL—2 meg. volume control and power switch (R-22, S-3) | .95 |
| *RW-101 | WASHER—Felt washers for control knobs (Pkg. 10) | .45 |
| RX-046 | ASSEMBLY—Gang condenser mounting assembly | .20 |
| *RX-015 | ASSEMBLY—Chassis mounting assembly | .10 |
| | **SPEAKER ASSEMBLY G-64** | |
| RC-931 | CONE—6½ inch cone and voice coil assembly | .60 |
| RD-300 | DUST CAP—6½ inch cone dust cap (Pkg. 5) | .10 |
| *RP-015 | PLUG—Male speaker plug | .20 |
| RS-098 | SPEAKER—6½ inch speaker (less output trans.) | 4.25 |
| RX-047 | ASSEMBLY—Speaker nuts and washers | .05 |
| | **SPEAKER ASSEMBLY G-655** | |
| RC-932 | CONE—12 inch cone and voice coil assembly | 1.10 |
| RD-301 | DUST CAP—Speaker dust cap (Pkg. 5) | .10 |
| *RP-015 | PLUG—Male speaker plug | .20 |
| RS-096 | SPEAKER—12 inch speaker (less output trans.) | 6.00 |
| RX-047 | ASSEMBLY—Speaker nuts and washers | .05 |
| | **TOUCH-TUNING AND DIAL SCALE MECHANISM** | |
| RB-617 | BUTTON—Molded push button (Pkg. 5) | .45 |
| RC-8034 | CORD—Drive cord (Pkg. 5) | .70 |
| RC-8033 | CARD—Station letter card (set) | .45 |
| RD-070 | DRUM—Condenser drive drum | .20 |
| RD-090 | DIAL—Dial scale | 1.25 |
| RD-204 | DRIVE—Drive shaft | .15 |
| RE-028 | ESCUTCHEON—Dial scale escutcheon | 1.60 |
| *RP-075 | PULLEY—Pointer drive cord pulley (Pkg. 6) | .20 |
| RP-108 | POINTER—Dial scale pointer | .15 |
| RS-392 | SWITCH—Touch-tuning switch (less trimmer strips) | 2.35 |
| *RS-432 | SPRING—Drive cord tension spring (Pkg. 5) | .20 |
| RS-444 | SPRING—Spring for molded push button (Pkg. 10) | .10 |
| RT-852 | TRIMMER STRIP—Push button trimmer strip; osc. sec. | 1.05 |
| RT-853 | TRIMMER STRIP—Push button trimmer strip; RF section | 1.05 |
| RW-027 | WINDOW—Station letter windows (Pkg. 25) | .40 |

* Used on previous productions. (Prices subject to change without notice)

MODEL G75

# GENERAL ELECTRIC CO. Schematic, Chassis Wiring




| Symbol | Description |
|---|---|
| C1, C4 | Tuning condenser and trimmers |
| C5, C6 | Ant. and osc. trimmer capacitor |
| C7 | Wave trap trimmer |
| C8 | Oscillator padder |
| C17 | 470 mmf. mica capacitor |
| C18 | 330 mmf. mica capacitor |
| C19 | 3900 mmf. mica capacitor |
| C20 | 47 mmf. mica capacitor |
| C21 | 370 mmf. mica capacitor |
| C24-C29 | Antenna trimmer strip |
| C30-C35 | Oscillator trimmer strip |
| C40 | .001 mfd. paper capacitor |
| C41 | .05 mfd. paper capacitor |
| C42 | .05 mfd. paper capacitor |
| C43, C44 | .05 mfd. paper capacitor |
| C45 | .01 mfd. paper capacitor |
| C46 | .001 mfd. paper capacitor |
| C47, C48 | .005 mfd. paper capacitor |
| C49 | .012 mfd. paper capacitor |
| C51 | 0.1 mfd. paper capacitor |

| Symbol | Description |
|---|---|
| C54 | .01 mfd. molded capacitor |
| C57 | 8 mfd. dry electrolytic |
| C58 | 8 mfd. dry electrolytic |
| C59 | .05 mfd. paper capacitor |
| R1 | 47,000 ohm carbon resistor |
| R2 | 4,700 ohm carbon resistor |
| R3 | 18,000 ohm carbon resistor |
| R4 | 10 megohm carbon resistor |
| R5 | 1.5 megohm carbon resistor |
| R9 | 470,000 ohm carbon resistor |
| R10 | 2.2 megohm carbon resistor |
| R11, R12 | 330,000 ohm carbon resistor |
| R14 | 33,000 ohm carbon resistor |
| R15 | 3,900 ohm carbon resistor |
| R16 | 22 ohm carbon resistor |
| R17 | 330 ohm carbon resistor |
| R22 | 2.0 megohm volume control |
| R23 | 2.2 megohm carbon resistor |
| R24 | 1.0 megohm carbon resistor |
| T1 | Power transformer |
| T2 | Output transformer |
| S1 | Band switch |
| S2 | Tone control switch |
| S4 | Keyboard tuning switch |

Fig. 2. Schematic Diagram

***Tuning Frequency Range***
Band "B" ..... 540 to 1750 kc.
Band "D" ..... 5700 to 18,300 kc.

***Intermediate Frequency*** ..... 455 kc.

***Electrical Power Output***
Undistorted ..... 2.0 watts
Maximum ..... 3.8 watts

***Tone Control*** ..... 2 Point—
Bass and Normal

***Loud-speaker—Electrodynamic***
Cone Diameter ..... 12 inches
Voice Coil Impedance
(400 cycles) ..... 3.5 ohms

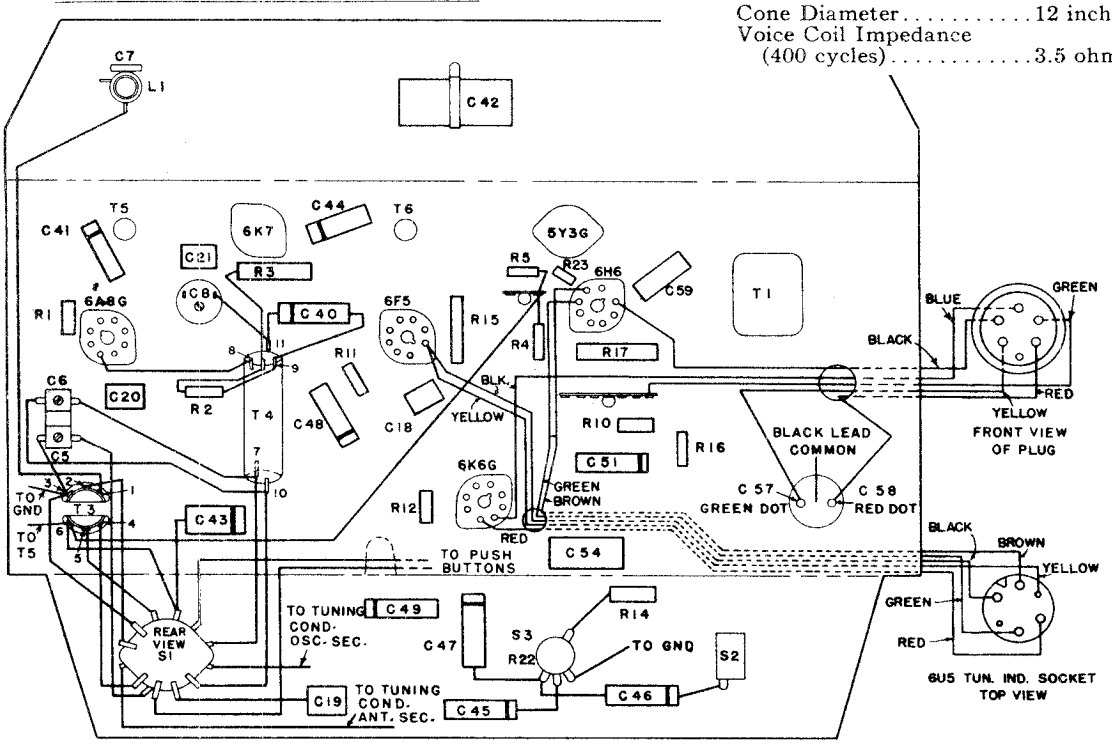



Fig. 3. Chassis Parts Layout

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## ALIGNMENT PROCEDURE

### I.F. ALIGNMENT WITH OSCILLOSCOPE

| Band Switch Setting | Input Freq. | Point of Input | Dummy Antenna | Trimmer | Comments |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. Sweep | I.F. Grid | .05 Mfd. or Larger | 2nd I.F. Sec. (C-12) 2nd I.F. Pri. (C-11) | Gang condenser plates wide open—connect audio input of oscilloscope to ground and to the junction of C-47 and R-5. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 5. |
| 2. Band "B" | 455 K.C. Sweep | Converter Grid | .05 Mfd. or Larger | 1st I.F. Sec. (C-10) 1st I.F. Pri. (C-9) | |
| 3. Band "B" | 455 K.C. Sweep | Antenna Post | 250 Mmf. 200 Ohms | Wave Trap Trimmer (C-7) | Adjust trimmer for minimum amplitude |

### I.F. ALIGNMENT WITH OUTPUT METER

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. with Modulation | I.F. Grid | .05 Mfd. or Larger | 2nd I.F. Sec. (C-12) 2nd I.F. Pri. (C-11) | Gang condenser plates wide open—connect output meter across voice coil—keep input signal low and ...ume control on as far as possible. Adjust all trimmers for maximum output. |
| 2. Band "B" | 455 K.C. with Modulation | Converter Grid | .05 Mfd. or Larger | 1st I.F. Sec. (C-10) 1st I.F. Pri. (C-9) | |
| 3. Band "B" | 455 K.C. with Modulation. | Antenna Post | 250 Mmf. 200 Ohms | Wave Trap Trimmer (C-7) | Adjust trimmer for minimum output. |

### R.F. ALIGNMENT

| | | | | | |
|---|---|---|---|---|---|
| Band "B" | ..... | ..... | ..... | ..... | Close gang condenser plates. Adjust pointer to first line at left end of tuning scale. |
| 2. Band "B" | 1500 K.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. (C-3) Ant. (C-4) | Connect output meter across voice coil—tone control on "bass" position—peak trimmers for maximum output with a low input signal. |
| 3. Band "B" | 580 K.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. Padder (C-5) | Adjust padder for a maximum output meter indication in vicinity of 580 kc. while rocking the gang condenser. |
| 4. Band "B" | Repeat Operation 2 | | | | |
| 5. Band "D" | 18 M.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. (C-6) Ant. (C-5) | Peak C-5 for maximum output while rocking the gang condenser at the 18 mc. point. The image of any signal on "D" band should be heard 930 kc. below the input signal when proper peak is obtained on oscillator trimmer C-6. Example: 12 mc. image—11.09 mc. |

Use a dummy antenna in making all alignments. The grid lead should not be removed from the tube to which the input signal is applied when aligning the I.F. amplifier.

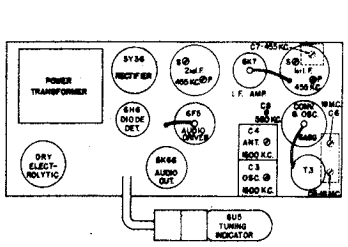



Fig. 4. Trimmer Location

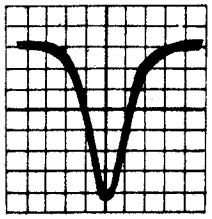


Fig. 5. Over-all I.F. Curve Taken on G-E Oscilloscope OFM-1

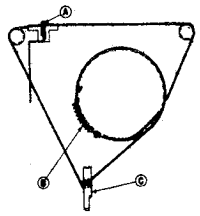


Fig. 6. Dial Drive Mechanism

### *Electrical Specifications*

| Rating Label | Power Supply (Volts) | Frequency (Cycles) | Power Consumption (Watts) |
|---|---|---|---|
| A | 115–125 | 50–60 | 65 |
| C | 115–125 | 25–60 | 70 |
| V | 115–125<br>140–155<br>190–220<br>220–250 | 50–60 | 70 |

### *Coil System*

The "B" and "D" band antenna coils are wound on a single coil form (T-3) as shown in Fig. 2. T-4 is the oscillator transformer for both the "B" and "D" bands. All coil terminals are numbered in Fig. 2 and 4 to facilitate in servicing by showing common points on the schematic diagram, Fig. 2, and the pictorial wiring diagram, Fig. 4.

The following table shows the coils in use for the various positions of the wave change switch.

| Band Switch Position | Antenna Primary | Antenna Secondary | Oscillator Grid Coil | Plate Coil | |
|---|---|---|---|---|---|
| Short Wave | L-10 | L-11 | L-14 | L-15 | L-12 Shorted L-16 Shorted |
| Manual Broadcast | L-10 and L-13 | L-11 and L-12 | L-14 and L-16 | L-15 | Tuned by gang condenser, C-1 and C-2 |
| Automatic Tuning | L-10 and L-13 | L-11 and L-12 | L-14 and L-16 | L-16 | C-1 and C-2 removed and by fixed trimmers |

### *Phonograph Connections*

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the G-75 circuit for the reproduction of phonograph recordings. S-1 is either a rotary or toggle triple-pole, double-throw switch. A suitable loading circuit consisting of a resistor or resistor and capacitor network should be used across the pick-up leads when using a crystal type unit. It is very important that the pick-up leads have a shield such as copper braid to prevent hum interference. This lead should be connected to the chassis ground.

The circuit should be opened between the top end of the volume control (R-22) and (C-47), and phonograph connections made as shown. This procedure requires removal of the chassis from the cabinet.

When the pick-up is connected as shown, the regular radio volume and tone controls work for both radio and phonograph reproduction. The parts suggested are:

| Symbol | Description | Stock No. |
|---|---|---|
| Sp | Phono Switch | RS-366 |
| Rp | 330,000 Ohm Resistor | RQ-1319 |

### VOLTAGE CHART

| Tube No. | 6A8G | 6K7 | 6F5 | 6K6G | 5Y3G |
|---|---|---|---|---|---|
| Plate to −B volts | Conv.-236 Osc.-186 | 236 | 84 * | 220 | .... |
| Screen to −B volts | 95 | 95 | .... | 236 | |
| Cathode to −B volts | 0 | 0 | 0 | 0 | 320 |
| Filament volts | 6.5 | 6.5 | 6.5 | 6.5 | 5.8 |

A-C line voltage—120.
* Measured on 500-volt scale.

## PARTS LIST—MODEL G-75

| Stock No. | Description | List Price |
|---|---|---|
| | **CHASSIS ASSEMBLY** | |
| *RB-008 | BOARD—Terminal board (2 lug) | $0.10 |
| RB-093 | BOARD—Terminal board (6 lug) | .10 |
| *RB-158 | BRACKET—Tuning indicator tube bracket | .15 |
| *RC-009 | CAPACITOR—.001 mfd., 600 V paper (C-40, 46) | .30 |
| *RC-023 | CAPACITOR—.005 mfd., 600 V paper (C-47, 48) | .25 |
| *RC-039 | CAPACITOR—.01 mfd., 200 V paper (C-44) | .25 |
| RC-044 | CAPACITOR—.012 mfd., 600 V paper (C-49) | .25 |
| *RC-092 | CAPACITOR—.05 mfd., 600 V paper (C-41, 43, 44, 59) | .30 |
| *RC-104 | CAPACITOR—0.1 mfd., 600 V paper (C-51) | .30 |
| *RC-196 | CAPACITOR—.05 mfd., 600 V paper (C-42) | .75 |
| RC-216 | CAPACITOR—47 mmf., mica (C-20) | .25 |
| *RC-274 | CAPACITOR—330 mmf., mica (C-18) | .30 |
| RC-285 | CAPACITOR—370 mmf., mica (C-21) | .25 |
| RC-294 | CAPACITOR—470 mmf., mica (C-17) | .30 |
| RC-390 | CAPACITOR—3900 mmf., mica (C-19) | .35 |
| RC-593 | CAPACITOR—8 mfd., 450 V; 8 mfd., 450 V; dry electrolytic (C-57, 58) | 1.40 |
| *RC-630 | CAPACITOR—Oscillator padder (C-8) | .40 |
| RC-674 | CAPACITOR—Wave trap trimmer (C-7) | .15 |
| RC-675 | CAPACITOR—Trimmer capacitors "D" band (C-5, 6) | .30 |
| RC-727 | CONDENSER—Tuning condenser (C-1, 2, 3, 4) | 2.25 |
| RC-791 | CAPACITOR—.01 mfd., 250 V A.C. (C-54) | .30 |
| RC-8098 | CABLE—Tuning indicator cable | .50 |
| RC-8099 | CABLE—Speaker cable and plug | .50 |
| *RC-863 | CORD—Power cord | .65 |
| RG-016 | GRID CLIP—Control grid clip (Pkg. 5) | .10 |
| RK-027 | KNOB—Winged control knob (Pkg. 5) | .50 |
| RK-028 | KNOB—Plain control knob (Pkg. 5) | .30 |
| RL-061 | COIL—Antenna coil bands "B" and "D" | 1.15 |
| RL-265 | COIL—Oscillator coil bands "B" and "D" | .75 |
| RL-603 | COIL—Wave trap coil (L-1) | .60 |
| *RQ-1219 | RESISTOR—22 ohm, ½-W. carbon (R-16) (Pkg. 5) | .70 |
| *RQ-1275 | RESISTOR—4,700 ohm, ½-W. carbon (R-2) (Pkg. 5) | .70 |
| *RQ-1295 | RESISTOR—33,000 ohm, ½-W. carbon (R-14) (Pkg. 5) | .70 |
| *RQ-1299 | RESISTOR—47,000 ohm, ½-W. carbon (R-1) (Pkg. 5) | .70 |
| *RQ-1319 | RESISTOR—330,000 ohm, ½-W. carbon (R-11, 12) (Pkg. 5) | .70 |
| *RQ-1323 | RESISTOR—470,000 ohm, ½-W. carbon (R-9) (Pkg. 5) | .70 |
| *RQ-1331 | RESISTOR—1.0 megohm, ½-W. carbon (R-24) (Pkg. 5) | .70 |
| *RQ-1335 | RESISTOR—1.5 megohm, ½-W. carbon (R-5) (Pkg. 5) | .70 |
| *RQ-1339 | RESISTOR—2.2 megohm, ½-W. carbon (R-10, 23) (Pkg. 5) | .70 |
| *RQ-1355 | RESISTOR—10 megohm, ½-W. carbon (R-4) (Pkg. 5) | .70 |
| *RQ-1447 | RESISTOR—330 ohm, 1-W. carbon (R-17) | $0.20 |
| *RQ-1473 | RESISTOR—3900 ohm, 1-W carbon (R-15) | .20 |
| *RQ-1489 | RESISTOR—18,000 ohm, 1-W. carbon (R-3) | .20 |
| * ... | .00 | .75 |
| *RS-204 | SOCKET—Rectifier tube socket (Pkg. 5) | .75 |
| *RS-218 | SOCKET—Lamp socket assembly | .10 |
| *RS-223 | SOCKET—Socket for 6A8G (Pkg. 5) | .80 |
| RS-360 | SWITCH—Tone control switch (S-2) | .35 |
| RS-391 | SWITCH—Band change switch (S-1) | .90 |
| RT-0712 | TRANSFORMER—Power transformer (50–60 cycles) (T-1) | 5.80 |
| RT-0713 | TRANSFORMER—Power transformer (25 cycles) (T-1) | 8.10 |
| RT-0518 | TRANSFORMER—Power transformer—Universal (T-1) | 9.00 |
| RT-259 | TRANSFORMER—2nd I.F. transformer (complete) | 1.40 |
| RT-260 | TRANSFORMER—1st I.F. transformer (complete) | 1.15 |
| RT-438 | TRANSFORMER—Output transformer (T-2) | 1.70 |
| RV-040 | VOLUME CONTROL—2 meg. volume control and power switch (R-22, S-3) | .95 |
| *RW-101 | WASHER—Felt washers for control knobs (Pkg. 10) | .45 |
| RX-046 | ASSEMBLY—Gang condenser mounting assembly | .20 |
| *RX-015 | ASSEMBLY—Chassis mounting assembly | .10 |
| | **SPEAKER ASSEMBLY** | |
| RC-932 | CONE—12-in. cone and voice coil assembly | 1.10 |
| RD-301 | DUST CAP—Speaker dust cap (Pkg. 5) | .10 |
| RP-015 | PLUG—Male speaker plug | .20 |
| RS-006 | SPEAKER—12-in. speaker (less output transformer) | 6.00 |
| RX-047 | ASSEMBLY—Speaker nuts and washers | .05 |
| | **TOUCH-TUNING AND DIAL SCALE MECHANISM** | |
| RB-617 | BUTTON—Molded push button (Pkg. 5) | .45 |
| RC-8033 | CARD—Station letter card (set) | .45 |
| RC-8034 | CORD—Drive cord (Pkg. 5) | .70 |
| RD-070 | DRUM—Condenser drive drum | .20 |
| RD-204 | DRIVE—Drive shaft | .15 |
| RE-028 | ESCUTCHEON—Dial scale escutcheon | 1.60 |
| RE-046 | ESCUTCHEON—Tuning indicator escutcheon | .25 |
| *RP-075 | PULLEY—Pointer drive cord pulley (Pkg. 6) | .20 |
| RP-108 | POINTER—Dial scale pointer | .15 |
| RS-392 | SWITCH—Touch-tuning switch (less trimmer strips) | 2.35 |
| *RS-432 | SPRING—Drive cord tension spring (Pkg. 5) | .20 |
| RS-444 | SPRING—Spring for molded push button (Pkg. 10) | .10 |
| RT-852 | TRIMMER STRIP—Push button trimmer strip; osc. section | 1.05 |
| RT-853 | TRIMMER STRIP—Push button trimmer strip; R.F. section | 1.05 |
| RW-027 | WINDOW—Celluloid station letter window (Pkg. 25) | .40 |

*Used on previous receivers

(Prices subject to change without notice)

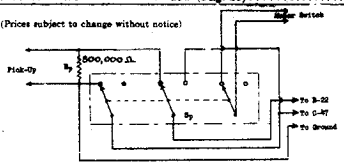



Fig. 1. Pick-up Connections

MODEL G78

# GENERAL ELECTRIC CO.

Schematic, Socket, Trimmers
Chassis Wiring, Voltage

## SOCKET VOLTAGES

| Tube No. | 6A8G | 6SK7 | 6SF5 | 76 | 6AC5G | 5Y3G |
|---|---|---|---|---|---|---|
| Plate to Gnd. Volts | Conv.-210 Osc.-165 | 215 | *100 | 245 | 225 | 310/310 RMS |
| Screen to Gnd. Volts | 100 | 100 | ... | ... | ... | |
| Cathode to Gnd. Volts | 0 | 0 | 3.0 | 8.0 | 4.7 | 315 |
| Cathode Current MA | 12.0 | 9.0 | 0.3 | 6.0 | 33.5 | 71 |
| Filament Volts | 6.4 | 6.4 | 6.4 | 6.4 | 6.4 | 5.2 |

A-c line voltage 125—no signal input. Dial pointer set at 550 kc. on "B" band. *Measured on 500-volt scale.

### *Electrical Power Output*

Undistorted.....3.0 watts
Maximum.....5.0 watts

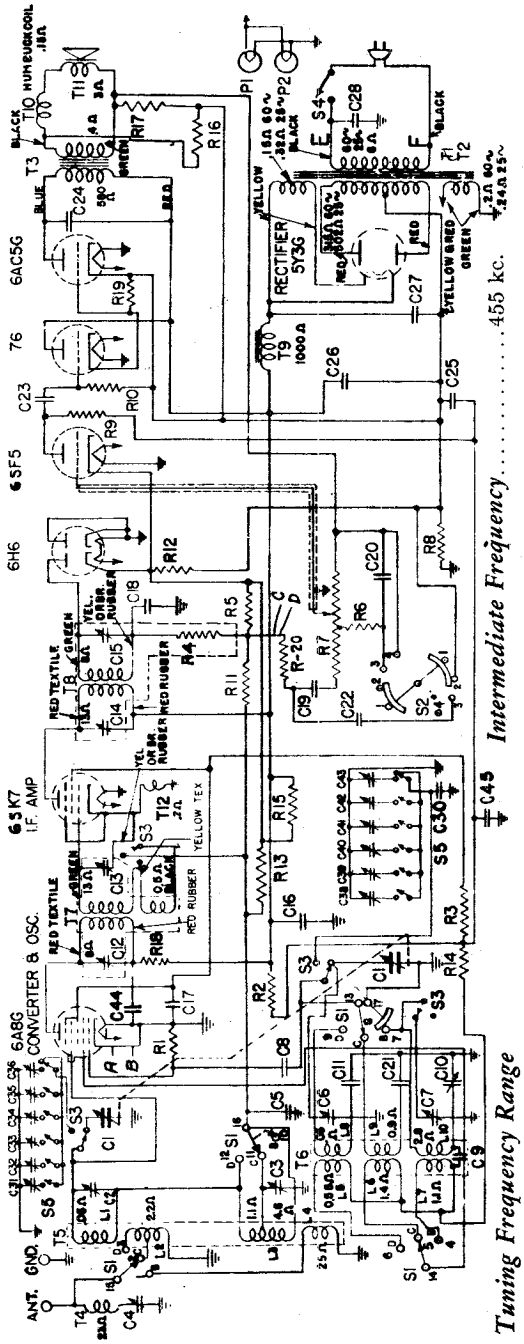
***Tone Control***.....4-position

### *Loud-speaker—Electrodynamic*

Outside Cone Diameter.....12 inches
Voice Coil Impedance (400 Cycles)..3.5 ohms
Field Coil Resistance.....880 ohms (cold)

**MODEL G-78**

| Symbol | Description |
|---|---|
| C1 | Tuning condenser |
| C2, 3 | Antenna trimmers |
| C4 | Wave trap trimmer |
| C5 | .1 mfd. paper capacitor |
| C6, 7 | Oscillator trimmer |
| C8 | 50 mmf., mica capacitor |
| C9 | .005 mfd., paper capacitor |
| C10 | 300–650 mmf., padder |
| C11 | 4300 mmf., mica capacitor |
| C16 | .1 mfd., paper capacitor |
| C17 | .05 mfd., paper capacitor |
| C18 | 47 mmf., mica capacitor |
| C19, 20 | .003 mfd., paper capacitor |
| C21 | 1500 mmf., mica capacitor |
| C22 | .0015 mfd., paper capacitor |
| C23 | .005 mfd., paper capacitor |
| C24 | .015 mfd., paper capacitor |
| C25 | 8 mfd., dry electrolytic |
| C26 | 8 mfd., dry electrolytic |
| C27 | 12 mfd., dry electrolytic |
| C28 | .02 mfd., line capacitor |
| C30 | 20 mmf., compensating capacitor |
| C31-C36 | Antenna trimmer strip |
| C38-C43 | Oscillator trimmer strip |
| C44 | .05 mfd., paper capacitor |
| C45 | .1 mfd., paper capacitor |
| R1 | 47,000 ohm carbon resistor |
| R2 | 6800 ohm carbon resistor |
| R3 | 15,000 ohm carbon resistor |
| R4 | 47,000 ohm carbon resistor |
| R5 | 220,000 ohm carbon resistor |
| R6 | 180,000 ohm carbon resistor |
| R7 | 2.0 megohm volume control |
| R8 | 220 ohm carbon resistor |
| R9 | 220,000 ohm carbon resistor |
| R10 | 1.0 megohm carbon resistor |
| R11 | 2.2 megohm carbon resistor |
| R12 | 150 ohm carbon resistor |
| R13 | 3.3 megohm carbon resistor |
| R14 | 3300 ohm carbon resistor |
| R15 | 33,000 ohm carbon resistor |
| R16 | 100 ohm carbon resistor |
| R17 | 22 ohm carbon resistor |
| R18 | 6800 ohm carbon resistor |
| R19 | 22,000 ohm carbon resistor |
| R20 | 47,000 ohm carbon resistor |
| T1, T2 | Power transformer |
| T3 | Output transformer |
| T4 | Wave trap coil |
| T5 | Antenna coil |
| T6 | Oscillator coil |



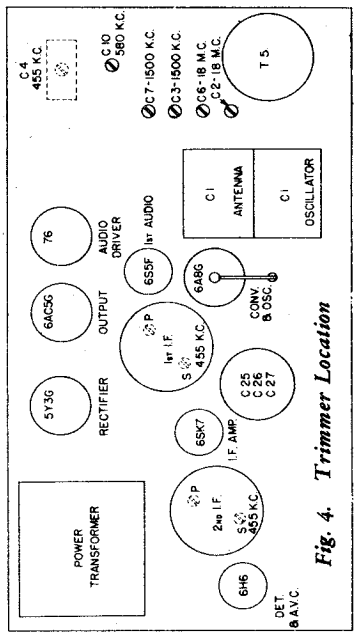




*Fig. 4. Trimmer Location*

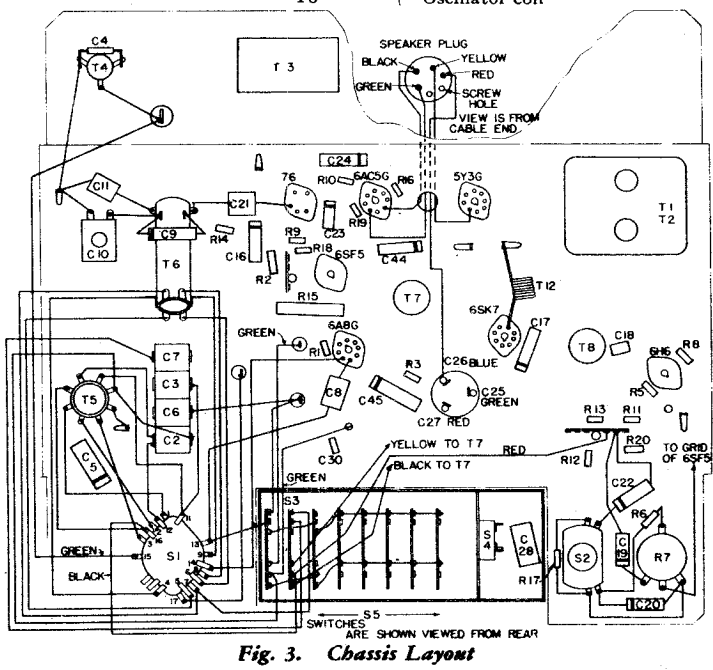



*Fig. 3. Chassis Layout*

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## SERVICE DATA

***Physical Specifications***

Model ..... G-78
Height ..... 39 7/8 inches
Width ..... 27 3/4 inches
Depth ..... 12 3/4 inches

***Tuning Control Drive Ratio*** ..... 13 to 1

***Electrical Specifications***

| Rating Label | Power Supply (Volts) | Frequency (Cycles) | Power Consumption (Watts) |
|---|---|---|---|
| A | 115–125 | 50–60 | 70 |
| C | 115–125 | 25–60 | 75 |

## GENERAL INFORMATION

***Coil System***

T-5 and T-6 are the antenna and oscillator transformers respectively for the "B," "C," and "D" bands. All band switch terminals are numbered in Fig. 2 and Fig. 3 to facilitate circuit tracing by showing common points on the schematic diagram, Fig. 2 and the pictorial wiring diagram, Fig. 3.

The following table shows the coils in use for various positions of the band change switch.

| Band Switch Position | Antenna Primary | Antenna Secondary | Oscillator Grid Coil | Oscillator Plate Coil | Remarks |
|---|---|---|---|---|---|
| Band "B" | L-4 | L-1+L-3 | L-10 | L-7 | |
| Band "C" | Part of L-2 | L-1+Part of L-3 | L-9 | L-6 | Part of L-3 shorted. L-10 shorted |
| Band "D" | L-2 | L-1 | L-8 | L-5 | L-9, L-10 shorted. L-3 shorted |
| Automatic Tuning | L-4 | L-1+L-3 | L-10 | L-7 | C-1 removed. Tuned by fixed trimmers |

***Loud-speaker***

12-inch speaker—To center the voice coil, remove dust cover by softening with acetone. Loosen the two clamping screws and place three 1 in. by ¼ in. by 0.010 in. paper or celluloid strips equally spaced around pole piece for clearance—then tighten clamping screws. Remove strips and cement the dust cap back in place with Glyptal cement.

***Phonograph Connections***

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pickup into the G-78 circuit for the reproduction of phonograph recordings. Sp is a rotary triple-pole, double-throw switch. A suitable loading circuit consisting of a resistor or resistor and capacitor network should be used across the pickup leads when using a crystal type unit. It is very important that the pickup leads have a shield such as copper braid to prevent hum interference. This lead should be connected to the chassis ground.

The 6A8G cathode circuit should be opened between A-B on the schematic. Also open the circuit between C-D in the diode circuit and make connections of phono switch as indicated in Fig. 1.

When the pickup is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction. The following are suggested parts:

| Symbol | Description | Stock No. |
|---|---|---|
| Sp | Triple-pole, double-throw switch..... | RS-3013 |
| Rp | 330,000-ohm carbon resistor..... | RQ-1319 |

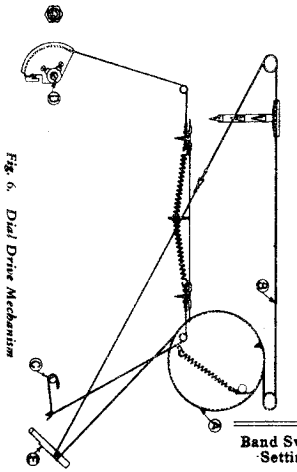


*Fig. 6. Dial Drive Mechanism*

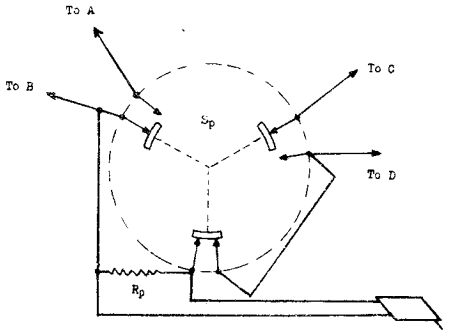



*Fig. 1. Pickup Connections*

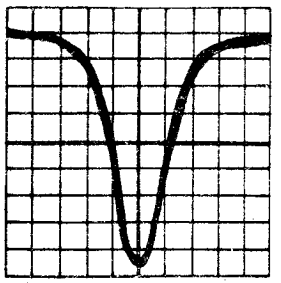


*Fig. 5. Over-all I. F. curve taken on G-E oscilloscope OFM-1*

**Tubes:**
**Converter and Oscillator-GE-6A8G**
**IF Amplifier-GE-6SK7**
**Detector and AVC-GE-6H6**
**1st Audio- GE-6SF5**
**Driver --- GE-76**
**Power Output-GE-6AC5G**
**Rectifier- GE-5Y3G**
**Pilot Lamp (2) Mazda No. 44**

MODEL G-78

## ALIGNMENT PROCEDURE

### I. F. ALIGNMENT WITH OSCILLOSCOPE

| Band Switch Setting | Input Freq. | Point of Input | Dummy Antenna | Trimmer | Comments |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. Sweep | I.F. Grid | .05 Mfd. or Larger | 2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14) | Gang condenser plates closed—"manual" key depressed—connect audio input of oscilloscope to ground and to the junction of C-19 and R-20 of the 2nd I.F. transformer. |
| 2. Band "B" | 455 K.C. Sweep | Converter Grid | .05 Mfd. or Larger | 1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12) | Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resultant curve is shown in Fig. 5. |
| 3. Band "B" | 455 K.C. Sweep | Antenna Post | 250 Mmf. 200 ohms | Wave Trap Trimmer (C-4) | Adjust trimmer for minimum amplitude. |

### I. F. ALIGNMENT WITH OUTPUT METER

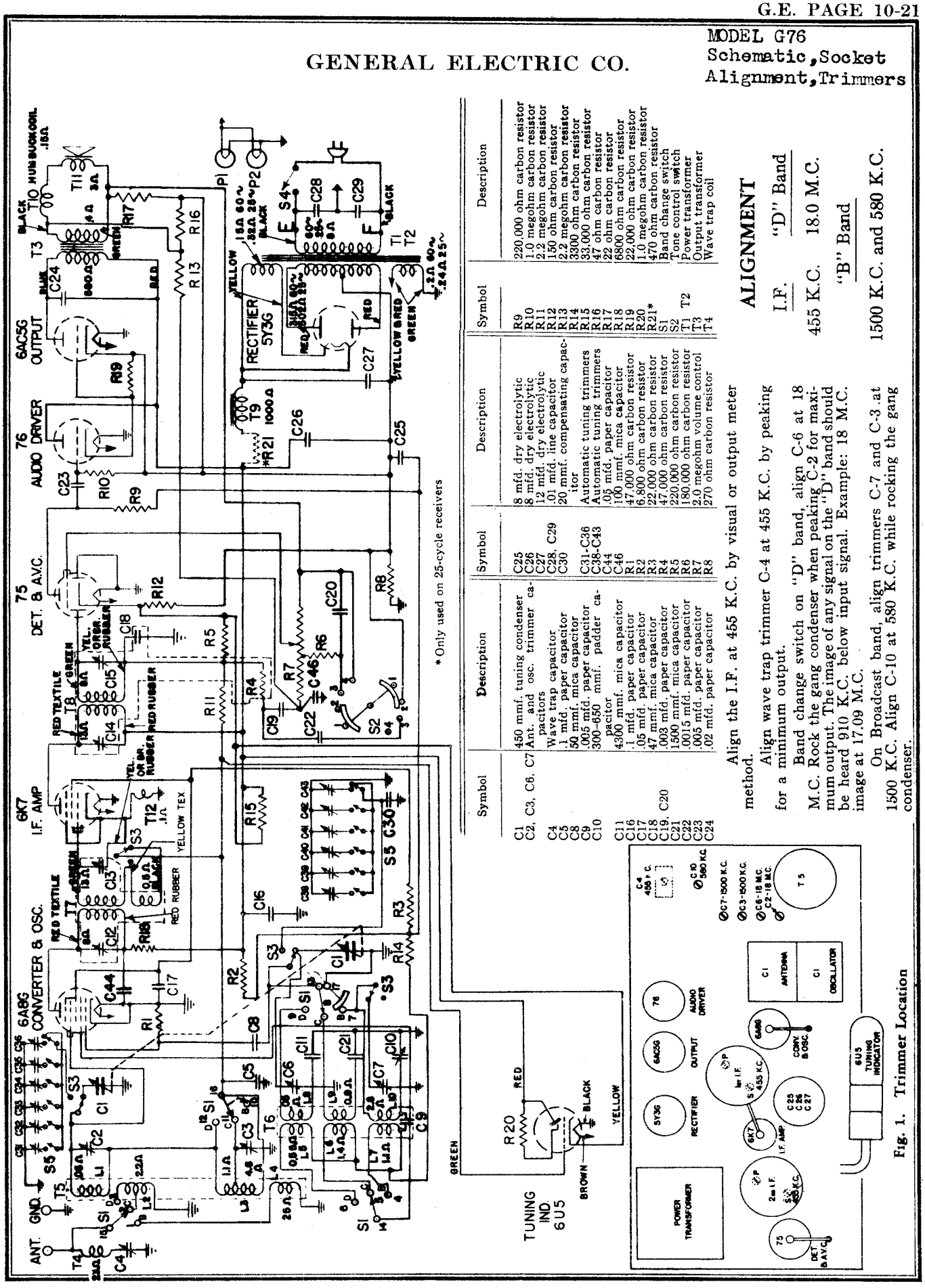
| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. with Modulation | I.F. Grid | .05 Mfd. or Larger | 2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14) | Gang condenser plates closed—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output. |
| 2. Band "B" | 455 K.C. with Modulation | Converter Grid | .05 Mfd. or Larger | 1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12) | |
| 3. Band "B" | 455 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Wave Trap Trimmer (C-4) | Adjust trimmer for minimum output. |

### R. F. ALIGNMENT

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | | | | | Close gang plates—adjust pointer to first line at left end of tuning scale. |
| 2. Band "D" | 18 M.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. (C-6) Ant. (C-2) | Connect output meter across voice coil—tone control on "Bass" position. The image of any "D" band signal should be heard 930 K.C. below signal input when (C-6) is on proper peak. Example: 15 M.C. image—14.09 M.C. Peak (C-2) while rocking the gang condenser. |
| 3. Band "C" | No adjustments necessary. | | | | |
| 4. Band "B" | 1500 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. (C-7) Ant. (C-3) | Peak trimmers for maximum output with a low input signal. |
| 5. Band "B" | 580 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. Padder (C-10) | Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser. |
| 6. Band "B" | 1500 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. (3-7) Ant. (C-3) | Retrim for maximum output with a low input signal. |

# GENERAL ELECTRIC CO.

MODEL G76
Schematic, Socket
Alignment, Trimmers




* Only used on 25-cycle receivers

| Symbol | Description |
|---|---|
| C1<br>C2, C3, C6, C7 | 450 mmf. tuning condenser<br>Ant. and osc. trimmer capacitors |
| C4 | Wave trap capacitor |
| C5 | .1 mfd. paper capacitor |
| C8 | 50 mmf. mica capacitor |
| C9 | .005 mfd. paper capacitor |
| C10 | 300-650 mmf. padder capacitor |
| C11 | 4300 mmf. mica capacitor |
| C16 | .1 mfd. paper capacitor |
| C17 | .05 mfd. paper capacitor |
| C18 | 47 mmf. mica capacitor |
| C19, C20 | .003 mfd. paper capacitor |
| C21 | 1500 mmf. mica capacitor |
| C22 | .0015 mfd. paper capacitor |
| C23 | .005 mfd. paper capacitor |
| C24 | .02 mfd. paper capacitor |

| Symbol | Description |
|---|---|
| C25 | 8 mfd. dry electrolytic |
| C26 | 8 mfd. dry electrolytic |
| C27 | 12 mfd. dry electrolytic |
| C28, C29 | .01 mfd. line capacitor |
| C30 | 20 mmf. compensating capacitor |
| C31-C36 | Automatic tuning trimmers |
| C38-C43 | Automatic tuning trimmers |
| C44 | .05 mfd. paper capacitor |
| C46 | 100 mmf. mica capacitor |
| R1 | 47,000 ohm carbon resistor |
| R2 | 6,800 ohm carbon resistor |
| R3 | 22,000 ohm carbon resistor |
| R4 | 47,000 ohm carbon resistor |
| R5 | 220,000 ohm carbon resistor |
| R6 | 180,000 ohm carbon resistor |
| R7 | 2.0 megohm volume control |
| R8 | 270 ohm carbon resistor |

| Symbol | Description |
|---|---|
| R9 | 220,000 ohm carbon resistor |
| R10 | 1.0 megohm carbon resistor |
| R11 | 2.2 megohm carbon resistor |
| R12 | 150 ohm carbon resistor |
| R13 | 2.2 megohm carbon resistor |
| R14 | 3300 ohm carbon resistor |
| R15 | 33,000 ohm carbon resistor |
| R16 | 47 ohm carbon resistor |
| R17 | 22 ohm carbon resistor |
| R18 | 6800 ohm carbon resistor |
| R19 | 22,000 ohm carbon resistor |
| R20 | 1.0 megohm carbon resistor |
| R21* | 470 ohm carbon resistor |
| S1 | Band change switch |
| S2 | Tone control switch |
| T1 T2 | Power transformer |
| T3 | Output transformer |
| T4 | Wave trap coil |

## ALIGNMENT

Align the I.F. at 455 K.C. by visual or output meter method.

Align wave trap trimmer C-4 at 455 K.C. by peaking for a minimum output.

Band change switch on "D" band, align C-6 at 18 M.C. Rock the gang condenser when peaking C-2 for maximum output. The image of any signal on the "D" band should be heard 910 K.C. below input signal. Example: 18 M.C. image at 17.09 M.C.

On Broadcast band, align trimmers C-7 and C-3 at 1500 K.C. Align C-10 at 580 K.C. while rocking the gang condenser.

| I.F. | "D" Band |
|---|---|
| 455 K.C. | 18.0 M.C. |
| | "B" Band |
| | 1500 K.C. and 580 K.C. |

Fig. 1. Trimmer Location

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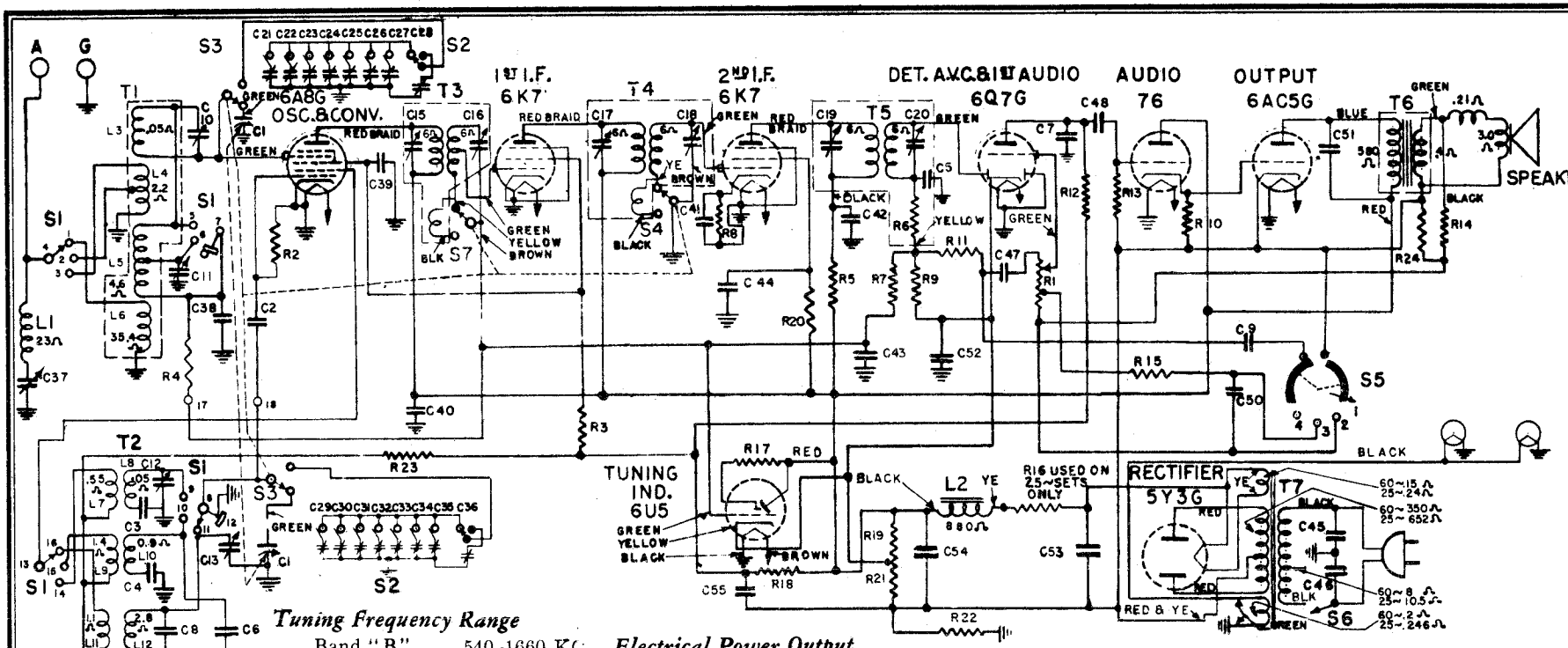


### *Tuning Frequency Range*

Band "B" . . . . 540–1660 KC
Band "C" . . . . 1650–5600 KC
Band "D" . . . . 5500–18,200 KC.

### *Intermediate Frequency*

455 KC

### *Electrical Power Output*

Undistorted . . . . . 3.0 watts
Maximum . . . . . 5.0 watts

### *Loud Speaker—Electrodynamic*

Outside Cone Diameter . . . . . 12 inches
Voice Coil Impedance . . . . . 3.5 ohms at 400 cycles
Field Coil Resistance . . . . . 880 ohms (cold)

| | | | | | |
|---|---|---|---|---|---|
| C1 | Tuning Condenser | C44 | .05 mfd 400 V. Paper Capacitor | R15 | 120,000 ohm, Car. Resistor |
| C2 | 50 mmf Mica Capacitor | C45 | .01 mfd 250 V.—Ac Line Capacitor | R16 | 470 ohm, 3 watt, Car. Resistor |
| C3 | 3900 mmf Mica Capacitor | C46 | .01 mfd 250 V.—Ac Line Capacitor | R17 | 1.0 megohm, Car. Resistor |
| C4 | 1200 mmf Mica Capacitor | C47 | .003 mfd 600 V. Paper Capacitor | R18 | 6800 ohm, Car. Resistor |
| C5 | 47 mmf Mica Capacitor | C48 | .005 mfd 600 V. Paper Capacitor | R19 | 39,000 ohm, 2 watt, Car. Resistor |
| C6 | 6 mmf Mica Capacitor | C49 | .005 mfd 600 V. Paper Capacitor | R20 | 82,000 ohm, Car. Resistor |
| C7 | 47 mmf Mica Capacitor | C50 | .004 mfd 600 V. Paper Capacitor | R21 | 150 ohm, Car. Resistor |
| C8 | 20 mmf Compensating Capacitor | C51 | .02 mfd 600 V. Paper Capacitor | R22 | 180 ohm, Car. Resistor |
| C9 | .0012 mf 600 V. Paper Capacitor | C52 | 0.1 mfd 100 V. Paper Capacitor | R23 | 3300 ohm, Car. Resistor |
| C10 | 3–20 mmf "D" Ant. Trimmer | C53 | 12 mfd 450 V., Dry Electro | R24 | 22 ohm, Car. Resistor |
| C11 | 3–20 mmf "B" Ant. Trimmer | C54 | 8 mfd 400 V., Dry Electro | | |
| C12 | 3–20 mmf "D" Osc. Trimmer | C55 | 8 mfd 200 V., Dry Electro | S1 | Band Change Switch |
| C13 | 3–30 mmf "B" Osc. Trimmer | | | S2 | Station Selector Switch |
| C14 | 300–650 mmf. "B" Padder | L1 | Wave Trap Coil | S3 | Man.-Auto. Switch |
| C15 | 200–400 mmf. 1st I.F. Pri. Trimmer | | | S4 | I.F. Band Expansion Switch on S-3 1st |
| C16 | 200–400 mmf 1st I.F. Sec. Trimmer | R1 | 2 megohm, Volume Control | S5 | Tone Control |
| C17 | 200–400 mmf 2nd I.F. Pri. Trimmer | R2 | 47,000 ohm, Car. Resistor | S6 | Power Switch on S-3 |
| C18 | 200–400 mmf 2nd I.F. Sec. Trimmer | R3 | 15,000 ohm, Car. Resistor | S7 | I.F. Band Expansion Switch on S-3 (2nd |
| C19 | 200–400 mmf 3rd I.F. Pri. Trimmer | R4 | 470,000 ohm, Car. Resistor | SPKR | Speaker 12 in. |
| C20 | 200–400 mmf 3rd I.F. Sec. Trimmer | R5 | 1,000 ohm, Car. Resistor | | |
| C21–C28 | Antenna Trimmer Strip | R6 | 47,000 ohm, Car. Resistor | T1 | Antenna Transformer |
| C29–C36 | Oscillator Trimmer Strip | R7 | 2.2 megohm, Car. Resistor | T2 | Oscillator Transformer |
| C37 | 30–70 mmf Wave Trap Trimmer | R8 | 1,000 ohm, Car. Resistor | T3 | 1st I.F. Transformer |
| C38 | .05 mfd 200 V. Paper Capacitor | R9 | 220,000 ohm, Car. Resistor | T4 | 2nd I.F. Transformer |
| C39 | .05 mfd 400 V. Paper Capacitor | R10 | 22,000 ohm, Car. Resistor | T5 | 3rd I.F. Transformer |
| C40 | 0.1 mfd 400 V. Paper Capacitor | R11 | 82,000 ohm, Car. Resistor | T6 | Output Transformer |
| C41 | 0.1 mfd 100 V. Paper Capacitor | R12 | 220,000 ohm, Car. Resistor | T7 | 50–60 Power Transformer |
| C42 | .05 mfd 400 V. Paper Capacitor | R13 | 1,000,000 ohm, Car. Resistor | T8 | 25–60 Power Transformer |
| C43 | .05 mfd 200 V. Paper Capacitor | R14 | 82 ohm, Car. Resistor | | |

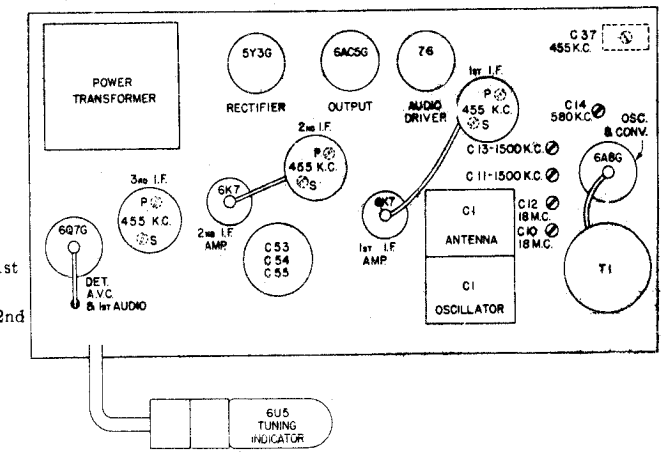


Fig. 6. Chassis Layout and Trimmer Location

Dial Mechanism

MODEL G85

GENERAL ELECTRIC CO. Chassis Wiring, Coil Data

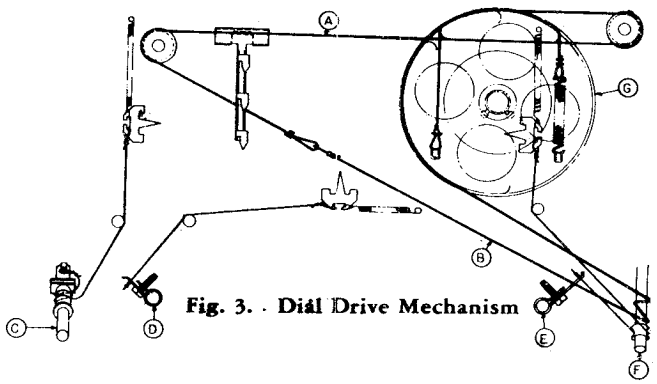

Fig. 3. Dial Drive Mechanism

| Band Switch Position | Antenna Primary | Antenna Secondary | Oscillator Grid Coil | Oscillator Plate Coil | Remarks |
|---|---|---|---|---|---|
| Band "B" | L-6 | L-3 + L-5 | L-12 | L-11 | |
| Band "C" | Part of L-4 | L-3 + L-5 | L-10 | L-9 | Lower portion of L-5 shorted |
| Band "D" | L-4 | L-3 | L-8 | L-7 | L-5 shorted |
| Automatic Tuning | L-6 | L-3 + L-5 | L-12 | L-11 | Condenser C-1 removed. Tuned by fixed trimmers |

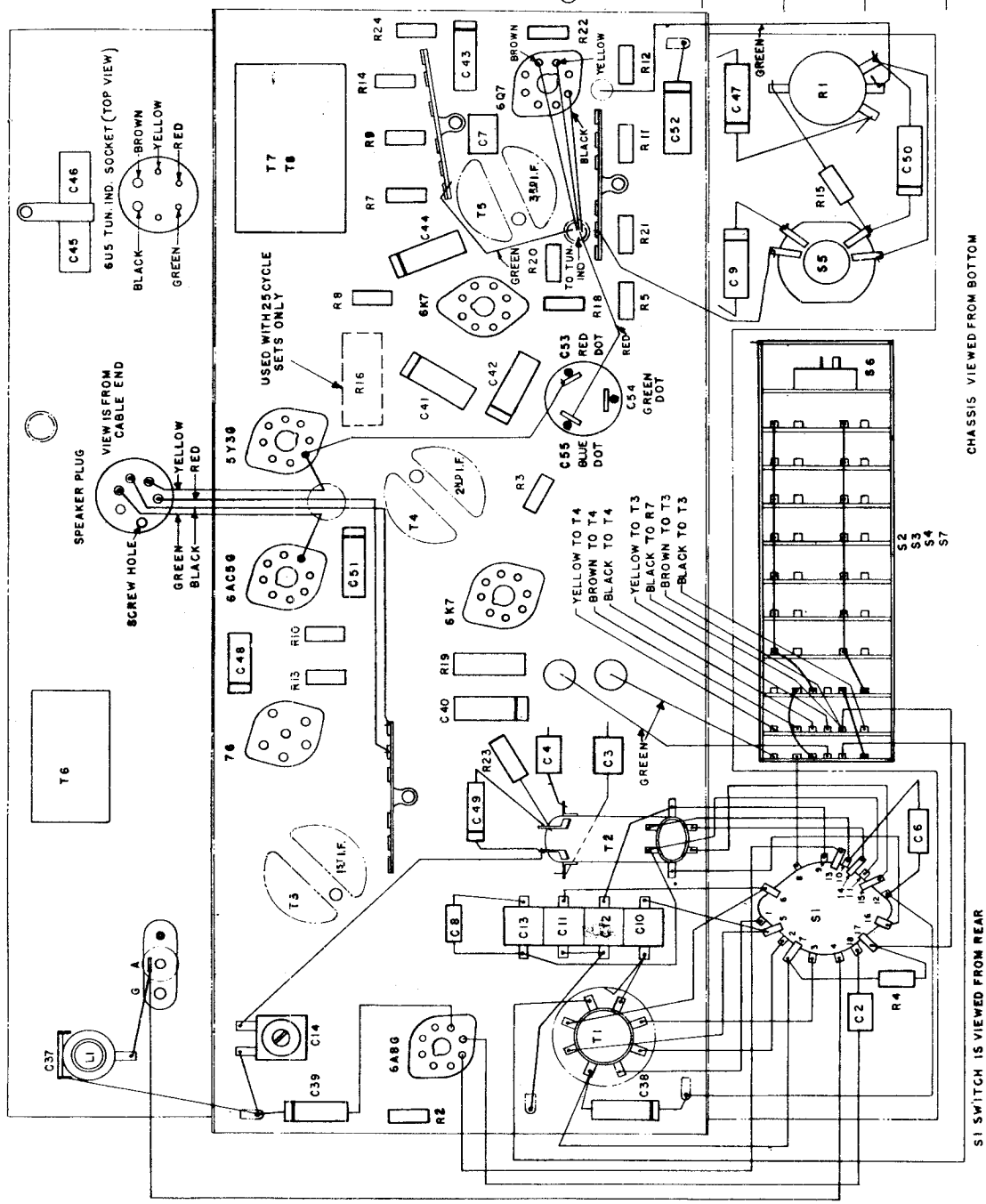


Fig. 4. Chassis Parts Layout

## *Coil System*

The "B," "C" and "D" band antenna coils are wound on a single coil form, T-1 as shown in Fig. 2. T-2 is the oscillator transformer for all three bands. All switch points are numbered in Fig. 2 to facilitate in locating these switch points on the pictorial wiring diagram Fig. 4.

The following table gives the coils in use for the various positions of the wave change switch.

| Rating Label | Power Supply (Volts) | Frequency (Cycles) | Power Consumption (Volts) |
|---|---|---|---|
| A | 115 125 | 50-60 " | 70 |
| C | 115-125 | 25 60 | 75 |

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## ALIGNMENT PROCEDURE

### I.F. Alignment with Oscilloscope

| Band Switch Setting | Input Frequency | Point of Input | Dummy Ant. | Trimmer | Remarks |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. Sweep | 2nd I.F. Grid | .05 Mfd. | 3rd I.F. Sec. (C-20) Pri. (C-19) | Manual key depressed—gang condenser plates closed—connect vertical input of oscilloscope to ground and the junction of R-9 and R-11 on 3rd I.F. transformer. Adjust trimmers for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 5. |
| 2. Band "B" | 455 K.C. Sweep | 1st I.F. Grid | .05 Mfd. | 2nd I.F. Sec. (C-18) Pri. (C-17) | |
| 3. Band "B" | 455 K.C. Sweep | Converter Grid | .05 Mfd. | 1st I.F. Sec. (C-16) Pri. (C-15) | |
| 4. Band "B" | 455 K.C. Sweep | Antenna Post | 250 Mmf. 200 Ohms | Wave trap trimmer (C-37) | Adjust trimmer for minimum amplitude. |

### I.F. Alignment with Output Meter

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. with Modulation | 2nd I.F. Grid | .05 Mfd. | 3rd I.F. Sec. (C-20) Pri. (C-19) | Manual key depressed—gang condenser plates closed—connect output meter across voice coil—keep input signal low and volume control at maximum. Adjust all trimmers in order mentioned for maximum output. Do not attempt an overall realignment after stage by stage alignment has been accomplished. |
| 2. Band "B" | 455 K.C. with Modulation | 1st I.F. Grid | .05 Mfd. | 2nd I.F. Sec. (C-18) Pri. (C-17) | |
| 3. Band "B" | 455 K.C. with Modulation | Converter Grid | .05 Mfd. | 1st I.F. Sec. (C-16) Pri. (C-15) | |
| 4. Band "B" | 455 K.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Wave trap trimmer (C-37) | Adjust trimmer for minimum output. |

### R.F. Alignment

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | | | | | Close gang plates—adjust pointer to first line at left end of tuning scale. |
| 2. Band "D" | 18 M.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. (C-12) Ant. (C-10) | Connect output meter across voice coil—manual key depressed. The image of any "D" band signal should be heard 930 K.C. below input signal when (C-12) is on proper peak. Example: 15 M.C. image—14.09 K.C. Peak (C-10) while rocking the gang condenser. |
| 3. Band "C" | No adjustment necessary | | | | |
| 4. Band "B" | 1500 K.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. (C-13) Ant. (C-11) | Peak trimmers for maximum output with a low input signal. |
| 5. Band "B" | 580 K.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. padder (C-14) | Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser. |
| 6. Band "B" | Repeat operation 4 | | | | |

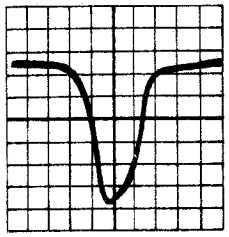

Fig. 5. Overall IF Curve Taken on G-E Oscilloscope OFM-1

Socket voltages taken at 120 volt line—No signal input. —1000 ohms per volt meter—Dial pointer at 550 K.C. on "B" band.

### VOLTAGE CHART

| Tube No. | Plate to Gnd. Volts D.C. | Screen to Gnd. Volts D.C. | Cathode to Gnd. Volts D.C. | Filament Volts |
|---|---|---|---|---|
| 6A8G | 240 Conv. 150 Osc. | 97 | 0 | 6.4 |
| 6K7 | 240 | 97 | 0 | 6.4 |
| 6K7 | 230 | 105 | 5.1 | 6.4 |
| 6Q7G | 102 | ... | 3.0 | 6.4 |
| 76 | 230 | ... | 7.5 | 6.4 |
| 6AC5G | 230 | ... | 4.5 | 6.4 |
| 6U5 | 240 | ... | 3.0 | 6.4 |
| 5Y3G | 306/306 A.C. RMS. | | 310 | 5.1 |

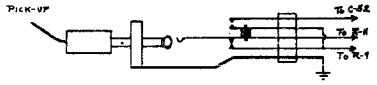


Fig. 1. Phonograph Connections

*Phonograph Connections*

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the G-85 circuit for the reproduction of phonograph recording. This method uses a two circuit jack and is connected into the receiver by opening the circuit between R-11 and the junction of R-7 and R-9; connecting the jack terminals as shown. A telephone plug is attached to the pick-up leads; and for phonograph operation, it is merely necessary to insert it into the jack. The jack may be mounted on the rear chassis deck and all connecting leads should be properly shielded to prevent interference.

When the pick-up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction.

NOTE—A suitable loading circuit consisting of a 300,000 ohm resistor should be connected across the pick-up leads when using a crystal type unit.

| Stock No. | Description | List Price |
|---|---|---|
| | **CHASSIS ASSEMBLY** | |
| *RB-017 | BOARD—Terminal board (1 lug) | $0.10 |
| *RB-026 | BOARD—Ant. Grd. terminal board | .10 |
| *RB-062 | BOARD—Terminal board (6 lug) | .10 |
| RC-012 | CAPACITOR—.0012 mfd., 600 V. paper (C-9) | .25 |
| *RC-023 | CAPACITOR—.005 mfd., 600 V. paper (C-48, 49) | .25 |
| *RC-048 | CAPACITOR—.02 mfd., 600 V. paper (C-51) | .30 |
| *RC-049 | CAPACITOR—.004 mfd., 600 V. paper (C-50) | .35 |
| *RC-055 | CAPACITOR—.003 mfd., 600 V. paper (C-47) | .25 |
| *RC-092 | CAPACITOR—.05 mfd., 600 V. paper (C-38, 39, 42, 43, 44) | .30 |
| *RC-104 | CAPACITOR—.1 mfd., 600 V. paper (C-40, 41, 52) | .30 |
| *RC-206 | CAPACITOR—50 mmf., mica (C-2) | .35 |
| RC-216 | CAPACITOR—47 mmf., mica (C-5, 7) | .25 |
| RC-220 | CAPACITOR—6 mmf., mica (C-6) | .25 |
| RC-230 | CAPACITOR—20 mmf., compensating capacitor (C-8) | .35 |
| RC-341 | CAPACITOR—1200 mmf., mica (C-4) | .35 |
| RC-390 | CAPACITOR—3900 mmf., mica (C-3) | .35 |
| RC-594 | CAPACITOR—8 mfd., 400 V.; 8 mfd., 400 V.; 12 mfd., 450 V.; dry electrolytic (C-53, 54, 55) | 1.60 |
| RC-674 | CAPACITOR—Wave trap trimmer (30–70 mmf.) (C-37) | .15 |
| RC-676 | CAPACITOR—300–650 mmf., "B" padder (C-14) | .35 |
| RC-677 | CAPACITOR—Antenna and oscillator trimmer (C-10, 11, 12, 13) | .55 |
| RC-728 | CONDENSER—2 gang tuning condenser (C-1) | 2.95 |
| *RC-754 | CAPACITOR—.01–.01 mfd., 250 V. A.C. line capacitor (C-45, 46) | .40 |
| *RC-863 | CORD—Power cord | .65 |
| RC-8035 | CABLE—Speaker cable and plug | .50 |
| RC-8054 | CABLE—Tuning indicator cable and socket | .40 |
| RD-205 | DRIVE—Vernier drive bracket assembly | .35 |
| RG-016 | GRID CLIP—Control grid clip (pkg. of 5) | .10 |
| RK-027 | KNOB—Control knob (winged) (pkg. 5) | .50 |
| RK-028 | KNOB—Control knob (plain) (pkg. 5) | .30 |
| RL-062 | COIL—Ant. coil assembly | 1.50 |
| RL-266 | COIL—Oscillator coil and bracket | 1.30 |
| RL-603 | COIL—Wave trap coil (T-4) | .60 |
| RQ-711 | RESISTOR—470 ohm, 3 w. carbon (R-16) (Pkg. of 5) | .25 |
| *RQ-1219 | RESISTOR—22 ohm, ½ w. carbon (R-24) (pkg. 5) | .70 |
| *RQ-1233 | RESISTOR—82 ohm, ½ w. carbon (R-14) (pkg. 5) | .70 |
| *RQ-1239 | RESISTOR—150 ohm, ½ w., carbon (R-21) (pkg. 5) | .70 |
| RQ-1241 | RESISTOR—180 ohm, ½ w. carbon (R-22) (pkg. 5) | .70 |
| *RQ-1259 | RESISTOR—1000 ohm, ½ w. carbon (R-5, 8) (pkg. 5) | .70 |
| *RQ-1271 | RESISTOR—3300 ohm, ½ w. carbon (R-23) (pkg. 5) | .70 |
| *RQ-1279 | RESISTOR—[illegible]00 ohm, ½ w. carbon (R-18) (pkg. 5) | .70 |
| *RQ-1287 | RESISTOR—15,000 ohm, ½ w. carbon (R-3) (pkg. 5) | .70 |
| *RQ-1291 | RESISTOR—22,000 ohm, ½ w. carbon (R-10) (pkg. 5) | .70 |
| *RQ-1299 | RESISTOR—47,000 ohm, ½ w. carbon (R-2, 6) (pkg. 5) | .70 |
| RQ-1305 | RESISTOR—82,000 ohm, ½ w. carbon (R-11, 20) (pkg. 5) | .70 |
| *RQ-1309 | RESISTOR—120,000 ohm, ½ w. carbon (R-15) (pkg. 5) | .70 |
| *RQ-1315 | RESISTOR—220,000 ohm, ½ w. carbon (R-9, 12) (pkg. 5) | .70 |
| *RQ-1323 | RESISTOR—470,000 ohm, ½ w. carbon (R-4) (pkg. 5) | .70 |
| *RQ-1331 | RESISTOR—1.0 megohm, ½ w. carbon (R-13, 17) (pkg. 5) | .70 |
| *RQ-1339 | RESISTOR—2.2 megohm, ½ w. carbon (R-7) (pkg. 5) | $0.70 |
| *RR-281 | RESISTOR—39,000 ohm, 2 w. carbon (R-19) | .30 |
| RS-185 | SHIELD—6A8G tube shield and base | .15 |
| RS-188 | SHIELD—Antenna coil shield | .20 |
| *RS-200 | SOCKET—Octal base tube socket (pkg. 5) | .75 |
| *RS-204 | SOCKET—Rectifier tube socket (pkg. 5) | .75 |
| *RS-223 | SOCKET—Octal base tube socket (pkg. 5) | .80 |
| RS-224 | SOCKET—Tube socket (76) (pkg. 5) | .50 |
| RS-227 | SOCKET—Octal base tube socket (6A8G) | .15 |
| RS-394 | SWITCH—Band change switch (S-1) | .95 |
| RS-395 | SWITCH—Tone control switch (S-2) | .55 |
| RT-0711 | TRANSFORMER—Power transformer (T-7) 120 V. 25–60 cy. | 7.60 |
| RT-0616 | TRANSFORMER—Power transformer (T-7) 120 V., 50–60 cy. | 4.60 |
| RT-265 | TRANSFORMER—3rd I.F. transformer | 1.60 |
| RT-266 | TRANSFORMER—2nd I.F. transformer and shield | 1.80 |
| RT-267 | TRANSFORMER—1st I.F. transformer and shield | 1.90 |
| RT-438 | TRANSFORMER—Output transformer (T-3) | 1.70 |
| RV-051 | VOLUME CONTROL—2 megohm volume control (R-1) | .80 |
| *RW-101 | WASHER—Felt washer for control shafts (pkg. 10) | .45 |
| *RX-021 | ASSEMBLY—Chassis mounting assembly | .10 |
| RX-048 | ASSEMBLY—Tuning condenser mounting assembly | .25 |
| | **SPEAKER ASSEMBLY** | |
| RC-932 | CONE—12-inch cone and V.C. assembly | 1.10 |
| *RC-991 | CLAMP—Cone spider clamp | .05 |
| RD-301 | DUST CAP—Speaker cone dust cap (pkg. 5) | .10 |
| RP-109 | PLUG—Male speaker plug | .20 |
| RS-073 | SPEAKER—12-inch speaker | 5.40 |
| *RX-030 | ASSEMBLY—Speaker mounting assembly | .10 |
| | **DIAL DRIVE MECHANISM** | |
| *RB-152 | BRACKET—Tone control indicator bracket (D) | .05 |
| *RB-155 | BRACKET—Band change bracket (E) | .05 |
| RB-614 | BUSHING—Volume control drive bushing (C) | .15 |
| RC-1977 | CLAMP—Tuning indicator tube clamp and thumbscrews | .10 |
| RC-8048 | CORD—Volume indicator cord (pkg. 5) | .50 |
| RC-8049 | CORD—Tone indicator cords (pkg 5) | .50 |
| RC-8050 | CORD—Band change indicator cord (pkg. 5) | .50 |
| RC-8051 | CORD—Dial pointer drive cord (A) (B) | .20 |
| *RD-013 | DRUM—Condenser drive drum (G) | .35 |
| RD-074 | DIAL—Dial scale | 2.70 |
| RE-033 | ESCUTCHEON—Dial scale escutcheon | 1.65 |
| RP-112 | POINTER—Tone, band change and volume indicator pointer | .10 |
| RP-113 | POINTER—Dial scale pointer | .30 |
| RP-303 | PULLEY—Idler pulley (pkg. 2) | .10 |
| RR-920 | REFLECTOR—Lamp reflector assembly | .50 |
| RS-187 | SHIELD—Lamp shield (pkg. 10) | .05 |
| *RS-218 | SOCKET—Lamp socket assembly | .10 |
| *RS-425 | SPRING—Drive drum spring (pkg. 5) | .10 |
| *RS-427 | SPRING—Volume, tone, and band change cord spring (pkg. 5) | .20 |
| | **TOUCH TUNING ASSEMBLY** | |
| RB-613 | BUTTON—Molded push button (pkg. 5) | .35 |
| RC-8036 | CARDS—Station letter cards (set) | .25 |
| RC-8052 | CARDS—"Manual" tab cards (strip of 10) | .05 |
| RC-8053 | CARDS—"Off" tab cards (strip of 10) | .05 |
| RE-032 | ESCUTCHEON—Push button escutcheon | .50 |
| RS-444 | SPRING—Spring for push button (pkg. 10) | .10 |
| RS-3002 | SWITCH—Power switch | 2.15 |
| RS-3010 | SWITCH—Push button switch (less trimmers) | 3.90 |
| RT-856 | TRIMMER STRIP—Osc. trimmer strip (C-29, 30, 31, 32, 33, 34, 35, 36) | 1.40 |
| RT-857 | TRIMMER STRIP—Antenna section trimmer strip (C-21, 22, 23, 24, 25, 26, 27, 28) | 1.40 |
| RW-021 | WINDOWS—Celluloid station windows (pkg. 25) | .10 |

*Indicates parts used in previous production receivers.

(Prices subject to change without notice)

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# GENERAL ELECTRIC CO.

MODEL G86
Schematic, Voltage, Socket Trimmers

***Tone Control***

.....4 position

***Intermediate Frequency***

.....455 K.C.

***Electrical Power Output***

Undistorted.....3.0 watts
Maximum.....5.0 watts

***Loud-speaker—Electrodynamic***

Outside Cone Diameter.....12 inches
Voice Coil Impedance (400 cycles)...3.5 ohms
Field Coil Resistance.....880 ohms (cold)

***Tubes***

Oscillator and Converter.....GE-6A8G
I.F. Amplifier.....GE-6SK7
Detector and AVC.....GE-6H6
1st Audio Amplifier.....GE-6SF5
Driver.....GE-76
Power Output.....GE-6AC5G
Tuning Indicator.....GE-6U5
Rectifier.....GE-5Y3G
Pilot Lamps.....(2) MAZDA No. 44

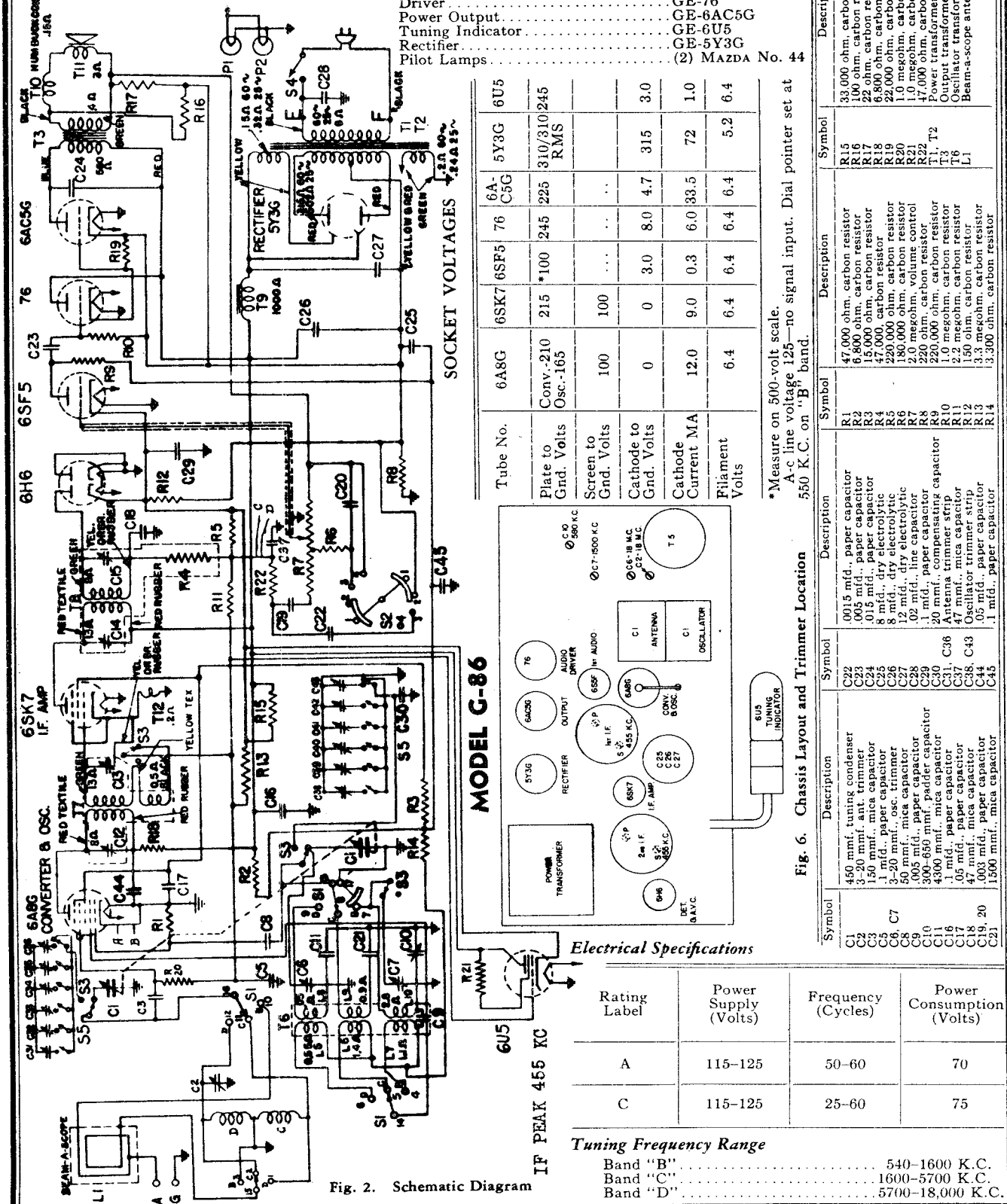


Fig. 2. Schematic Diagram

*Measure on 500-volt scale.
A-c line voltage 125—no signal input. Dial pointer set at 550 K.C. on "B" band.

Fig. 6. Chassis Layout and Trimmer Location

| Symbol | Description | Symbol | Description | Symbol | Description |
|---|---|---|---|---|---|
| C1 | 450 mmf., tuning condenser | C22 | .0015 mfd., paper capacitor | R1 | 47,000 ohm, carbon resistor |
| C2 | 3-20 mmf. ant. trimmer | C23 | .005 mfd., paper capacitor | R2 | 6,800 ohm, carbon resistor |
| C3 | 150 mmf., mica capacitor | C24 | .015 mfd., paper capacitor | R3 | 15,000 ohm, carbon resistor |
| C4 | .1 mfd., paper capacitor | C25 | 8 mfd., dry electrolytic | R4 | 47,000, carbon resistor |
| C5, C7 | 3-20 mmf., osc. trimmer | C26 | 8 mfd., dry electrolytic | R5 | 220,000 ohm, carbon resistor |
| C6 | 50 mmf., mica capacitor | C27 | 12 mfd., dry electrolytic | R6 | 180,000 ohm, carbon resistor |
| C8 | .005 mfd., paper capacitor | C28 | .02 mfd., line capacitor | R7 | 2.0 megohm, volume control |
| C9 | 300-650 mmf., padder capacitor | C29 | .1 mfd., paper capacitor | R8 | 220 ohm, carbon resistor |
| C10 | 4300 mmf., mica capacitor | C30 | 20 mmf., compensating capacitor | R9 | 220,000 ohm, carbon resistor |
| C11 | .1 mfd., paper capacitor | C31, C36 | Antenna trimmer strip | R10 | 1.0 megohm, carbon resistor |
| C16 | .05 mfd., paper capacitor | C37 | 47 mmf., mica capacitor | R11 | 2.2 megohm, carbon resistor |
| C17 | 47 mmf., mica capacitor | C38, C43 | Oscillator trimmer strip | R12 | 150 ohm, carbon resistor |
| C18 | .003 mfd., paper capacitor | C44 | .05 mfd., paper capacitor | R13 | 3.3 megohm, carbon resistor |
| C19, 20 | 1500 mmf., mica capacitor | C45 | .1 mfd., paper capacitor | R14 | 3,300 ohm, carbon resistor |

| Symbol | Description |
|---|---|
| R15 | 33,000 ohm, carbon resistor |
| R16 | 100 ohm, carbon resistor |
| R17 | 22 ohm, carbon resistor |
| R18 | 6,800 ohm, carbon resistor |
| R19 | 22,000 ohm, carbon resistor |
| R20 | 1.0 megohm, carbon resistor |
| R21 | 1.0 megohm, carbon resistor |
| R22 | 47,000 ohm, carbon resistor |
| T1, T2 | Power transformer |
| T3 | Output transformer |
| T6 | Oscillator transformer |
| L1 | Beam-a-scope antenna |

***Electrical Specifications***

| Rating Label | Power Supply (Volts) | Frequency (Cycles) | Power Consumption (Volts) |
|---|---|---|---|
| A | 115–125 | 50–60 | 70 |
| C | 115–125 | 25–60 | 75 |

***Tuning Frequency Range***

Band "B".....540–1600 K.C.
Band "C".....1600–5700 K.C.
Band "D".....5700–18,000 K.C.

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MODEL G86
Alignment, Chassis Wiring "Beam-A-Scope" Data, Dial Phono. Data

# GENERAL ELECTRIC CO.

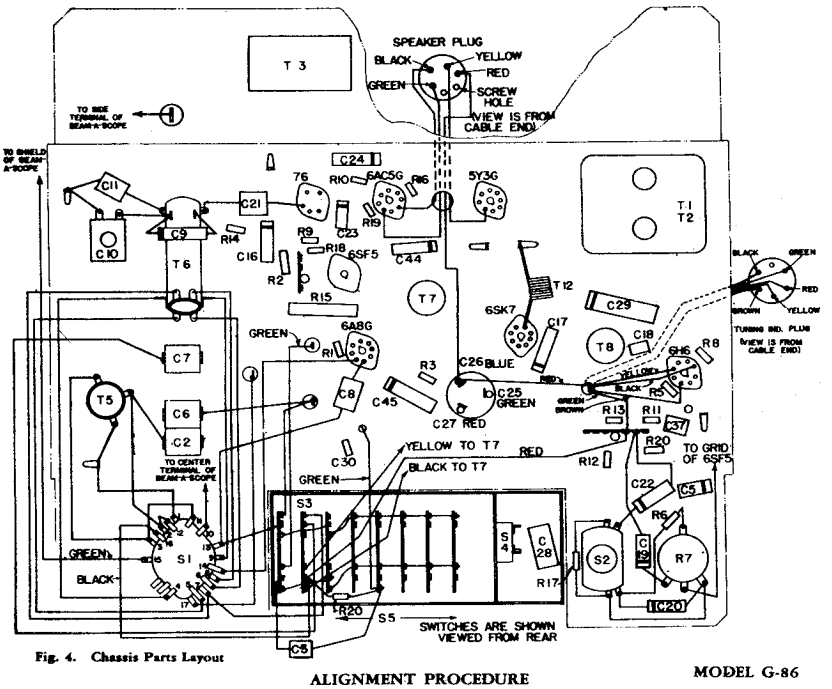


Fig. 4. Chassis Parts Layout

## SERVICE DATA

*Physical Specifications*

| | |
|---|---|
| Model | G-86 |
| Height | 42 inches |
| Width | 29⅝ inches |
| Depth | 14½ inches |

*Tuning Control Drive Ratio*

13:1

## GENERAL INFORMATION

The Model G-86 is a three-band A-C operated receiver, employing eight General Electric Pre-tested tubes in a superheterodyne circuit as described above. It incorporates a simplified trimmer tuned "Touch Tuning" system; and the new and exclusive self-contained antenna system, "Beam-a-Scope." Other features of design include I.F. band expansion when using Touch Tuning, degenerative audio feedback, and an improved dustproof electrodynamic speaker.

### BEAM-A-SCOPE

The "Beam-a-Scope" is essentially a tuned coil antenna wound on an impregnated frame and shielded by a Faraday screen against electrostatic disturbances. This construction discriminates in favor of the desired signal as against a local man-made noise source in three ways. First, since any noise source is composed of two components—electrostatic and magnetic fields—the "Beam-a-Scope" may be revolved so that a null point is found where no voltage is produced from these two components in the direction where the noise originates. Due to the fact that this null point is very sharp, it is very unusual that any desired station will be in a direct line with the rejected noise signal and thereby have its signal strength reduced appreciably. In the second place, the "Beam-a-Scope" eliminates the external return path to ground present in the case of an unshielded antenna. This reduces or eliminates local man-made noise sources in much the same way as a shielded antenna lead-in does in an ordinary antenna installation. In the third place, the "Beam-a-Scope" discriminates against the electrostatic component of an incoming wave in comparison with the magnetic component, because of the Faraday shield. Since the electrostatic component of a local noise source is a great deal larger than the magnetic component, this rejection property brings about an enormous increase in signal-to-noise ratio.

The above operation is only available on the broadcast band and in this position the Beam-a-Scope is also the first tuned grid circuit. On the "C" and "D" bands, the Beam-a-Scope is connected to operate as a capacity type antenna. When an outside antenna is connected to the receiver, it is tapped in on the grid coil (Beam-a-Scope L-1) when operating on the "B" band. On the "C" and "D" bands the outside antenna is connected through the Beam-a-Scope to the "C" and "D" band primaries of the antenna coil.

*Loud-speaker*

To center the voice coil, remove the dust cover by softening with acetone. Loosen the two spider clamping screws and place three 1 in. by ¼ in. by 0.010 in. paper or celluloid strips equally spaced around pole piece for clearance; then tighten clamping screws. Remove centering strips and cement the dust cap in place with Glyptal cement.

*Coil System*

The "C" and "D" band antenna coils are wound on a single coil form as shown in Fig. 2, T-6 is the oscillator transformer for all three bands. All switch points are numbered in Fig. 2 and Fig. 4 to facilitate in service by showing common points on the schematic diagram, Fig. 2, and the pictorial wiring diagram, Fig. 4.

*Phonograph Connections*

Fig. 1 shows a simple sketch for connecting a crystal or high-impedance magnetic pick-up into the G-86 circuit for the reproduction of phonograph recordings. SP is a rotary triple-pole, double-throw switch. A suitable loading circuit consisting of a resistor or resistor and capacitor network should be used across the pick-up leads when using a crystal type unit. It is very important that the pick-up leads have a shield such as copper braid to prevent hum interference. This lead should be connected to chassis ground.

The 6A8G cathode circuit should be opened between A-B as shown on the schematic. Also open the circuit between C-D in the diode load and make connections to phonograph switch as indicated in Fig. 1.

When the pick-up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction. The following are suggested parts:

| Symbol | Description | Stock No. |
|---|---|---|
| SP | Triple-pole, double-throw switch | RS-3013 |
| RP | 330,000-ohm carbon resistor | RQ-1319 |

## ALIGNMENT PROCEDURE

MODEL G-86

**I.F. Alignment with Oscilloscope**

| Band Switch Setting | Input Freq. | Point of Input | Dummy Antenna | Trimmer | Comments |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. Sweep | I.F. Grid | .05 Mfd. or Larger | 2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14) | Gang condenser plates closed—"manual" key depressed—connect audio input of oscilloscope to ground and to the junction of R-11 and R-4 of the 2nd I.F. transformer. Adjust trimmers in order mentioned for a single symmetrical curve of maximum amplitude. The resultant curve is shown in Fig. 3. When a station key is depressed, this I.F. curve should expand considerably. |
| 2. Band "B" | 455 K.C. Sweep | Converter Grid | .05 Mfd. or Larger | 1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12) | |

**I.F. Alignment with Output Meter**

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. with Modulation | I.F. Grid | .05 Mfd. or Larger | 2nd I.F. Sec. (C-15) 2nd I.F. Pri. (C-14) | Gang condenser plates closed—connect output meter across voice coil—keep input signal low and volume control on as far as possible. Adjust all trimmers for maximum output. |
| 2 Band "B" | 455 K.C. with Modulation | Converter Grid | .05 Mfd. or Larger | 1st I.F. Sec. (C-13) 1st I.F. Pri. (C-12) | |

**R.F. Alignment**

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | | | | | Close gang plates—adjust pointer to first line at left end of tuning scale. |
| 2. Band "D" | 18 M.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. (C-6) Ant. (C-2) | Connect output meter across voice coil—tone control on "Bass" position. The image of any "D" band signal should be heard 910 K.C. below signal input when (C-6) is on proper peak. Example: 15 M.C. image—14.09 M.C. Peak (C-2) while rocking the gang condenser. |
| 3. Band "C" | No adjustments necessary. | | | | |
| 4. Band "B" | 1500 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. (C-7) | Peak oscillator trimmer C-7 for maximum output in vicinity of 1500 K.C. while rocking the gang condenser. |
| 5. Band "B" | 580 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. Padder (C-10) | Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser. |
| 6. Band "B" | 1500 K.C. with Modulation | Antenna Post | 250 Mmf. 200 ohms | Osc. (C-7) | Retrim for maximum output as described in step No. 4. |

Use a "dummy" antenna in making all alignments. The grid lead should not be removed from the tube to which the input signal is applied when aligning the I.F. amplifier.

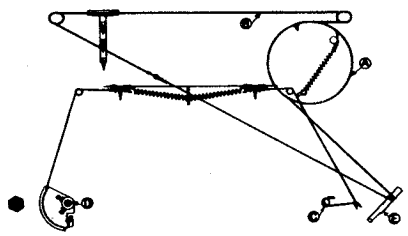

Fig. 3. Dial Drive Mechanism

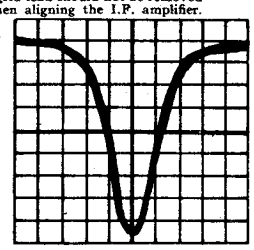

Fig. 5. Over-all I.F. Curve Taken on G-E Oscilloscope OFM-1

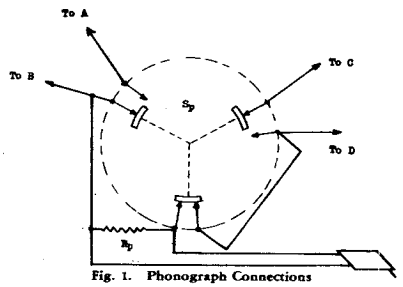


Fig. 1. Phonograph Connections

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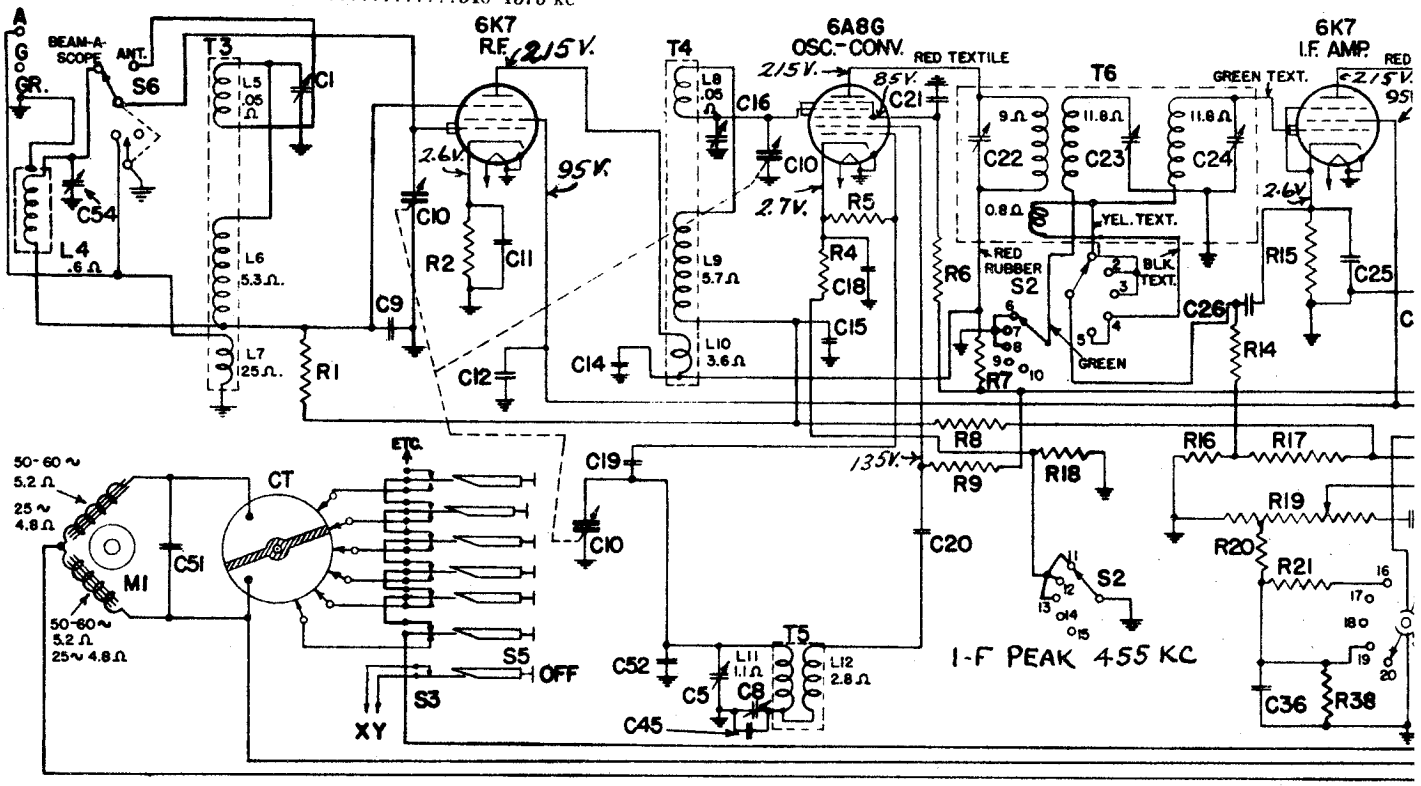
*Tuning Frequency Range*

Band "B".....540–1575 kc



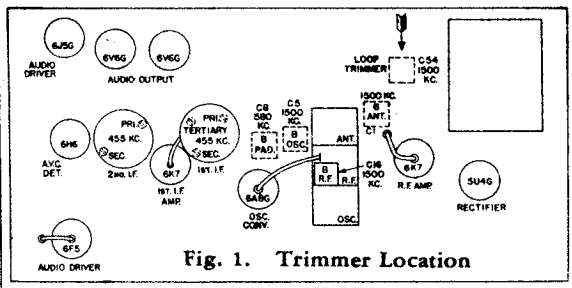




Fig. 1. Trimmer Location

Rating "A"....105–115 (115–125)* volts, 50–60 cycles, 155 watts

Rating "C"....105–115 (115–125)* volts, 25–60 cycles, 160 watts

* The receivers as shipped from the factory have the power cord connected to the 115–125-volt tap of the transformer (black and red lead). If the normal voltage of the power supply is always below 110 volts, the connection of the power cord should be removed from this lead and soldered to the 105–115-volt tap (black and yellow lead). After changing the connection, tape the soldered joint as well as the exposed end of the unused lead. This change requires removal of the chassis from the cabinet.

| SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION | SYMBOL | DESCRIPTION | SYMBOL | DE |
|---|---|---|---|---|---|---|---|
| R-1 | 220,000 Ohm Carbon Resistor | R-33 | 220,000 Ohm Carbon Resistor | C-24 | 50-135 MMF. 1st I.F. Tert. Trimmer | C-51 | 60 MFD. 40 V. |
| R-2 | 330 Ohm Carbon Resistor | R-34 | 230 Ohm Resistor (W.W.) | C-25 | .05 MFD. 200 V. Paper Capacitor | C-52 | 20 MMF. Comp |
| R-4 | 330 Ohm Carbon Resistor | R-35 | 4 Sections Voltage Divider | C-26 | .05 MFD. 200 V. Paper Capacitor | C-54 | 2-20 MMF. Trir |
| R-5 | 47,000 Ohm Carbon Resistor | (1) | 1600 Ohms | C-27 | 50-135 MFF. 2nd I.F. Pri. Trimmer | C-55 | .25 MFD. 200 V |
| R-6 | 39,000 Ohm Carbon Resistor | (2) | 9000 Ohms | C-28 | 100-230 MMF. 2nd I.F. Sec. Trimmer | C-56 | .25 MFD. 200 V. |
| R-7 | 1,000 Ohm Carbon Resistor | (3) | 9000 Ohms | C-29 | 150 MMF. Mica Capacitor | T-1 | Power Transfor |
| R-8 | 1.8 Megohm Carbon Resistor | (4) | 11 Ohms | C-30 | 150 MMF. Mica Capacitor | | cycles |
| R-9 | 22,000 Ohm Carbon Resistor | R-36 | 1,000 Ohm Carbon Resistor | C-31 | .05 MFD. 400 V. Paper Capacitor | T-2 | Output Transfor |
| R-14 | 2.2 Megohm Carbon Resistor | R-37 | 1,000 Ohm Carbon Resistor | C-32 | .02 MFD. 200 V. Paper Capacitor | T-3 | Ant. Transforme |
| R-15 | 330 Ohm Carbon Resistor | R-38 | 470,000 Ohm Carbon Resistor | C-33 | .0055 MFD. 600 V. Paper Capacitor | T-4 | R.F. Transforme |
| R-16 | 56,000 Ohm Carbon Resistor | R-40 | 20 Ohm W.W. Resistor | C-34 | .002 MFD. 600 V. Paper Capacitor | T-5 | Osc. Transforme |
| R-17 | 220,000 Ohm Carbon Resistor | C-1 | 5–40 MMF. "B" Ant. Trimmer | C-35 | .05 MFD. 200 V. Paper Capacitor | T-6 | 1st I.F. Transfor |
| R-18 | 330 Ohm Carbon Resistor | C-5 | 7–23 MMF. "B" Osc. Trimmer | C-36 | .0055 MFD. 600 V. Paper Capacitor | T-7 | 2nd I.F. Transf |
| R-19 | 2 Megohm, 1 Megohm Tap. Vol. Control | C-8 | 160–375 MMF. "B" Padder | C-37 | .02 MFD. 200 V. Paper Capacitor | L-1 | Field Coil 460 C |
| R-20 | 68,000 Ohm Carbon Resistor | C-9 | .05 MFD. 200 V. Paper Capacitor | C-39 | 270 MMF. Mica Capacitor | L-2 | Hum Buck Coil |
| R-21 | 68,000 Ohm Carbon Resistor | C-10 | 10–450 MMF. Tuning Capacitor | C-40 | .02 MFD. 400 V. Paper Capacitor | L-3 | Voice Coil, 3.5 C |
| R-22 | 1.2 Megohm Carbon Resistor | C-11 | .05 MFD. 200 V. Paper Capacitor | C-41 | .05 MFD. 400 V. Paper Capacitor | L-4 | Beam-a-Scope |
| R-23 | 1,000 Ohm Carbon Resistor | C-12 | .05 MFD. 200 V. Paper Capacitor | C-42 | .05 MFD. 400 V. Paper Capacitor | CT | Contactor Assem |
| R-24 | 1,000 Ohm Carbon Resistor | C-14 | .1 MFD. 400 V. Paper Capacitor | C-43 | .0015 MFD. 1500 V. Paper Capacitor | P-3 | Tuning Lamp 25 |
| R-25 | 47,000 Ohm Carbon Resistor | C-15 | .05 MFD. 200 V. Paper Capacitor | C-44 | .0015 MFD. 1500 V. Paper Capacitor | S-2 | Tone Control Sv |
| R-26 | 470,000 Ohm Carbon Resistor | C-16 | 5-30 MMF. "B" R.F. Trimmer | C-45 | 175 MMF. Compensating Capacitor | S-3 | Power Supply Sv |
| R-27 | 1.5 Megohm Carbon Resistor | C-18 | .05 MFD. 200 V. Paper Capacitor | C-46 | 25 MFD. 25 V. W.V. Dry Electro. | S-4 | Tuning Lamp Sv |
| R-28 | 82,000 Ohm Carbon Resistor | C-19 | 50 MMF. Silver Plated Capacitor | C-47 | 10 MFD. 400 V. W.V. Dry Electro. | S-5 | Station Selector |
| R-29 | 1.2 Megohm Carbon Resistor | C-20 | 4,700 MMF. Mica Capacitor | C-48 | 30 MFD. 450 V. W.V. Wet Electro. | S-6 | Beam-a-Scope— |
| R-30 | 68,000 Ohm Carbon Resistor | C-21 | .05 MFD. 400 V. Paper Capacitor | C-49 | 30 MFD. 450 V. W.V. Wet Electro. | M | Tuning Motor |
| R-31 | 68,000 Ohm Carbon Resistor | C-22 | 100-230 MMF. 1st I.F. Pri. Trimmer | C-50 | .01-.01 MFD. 250 V. A.C. Line Capacitor | | Cycles |
| R-32 | 220,000 Ohm Carbon Resistor | C-23 | 50-135 MMF. 1st I.F. Sec. Trimmer | | | | |

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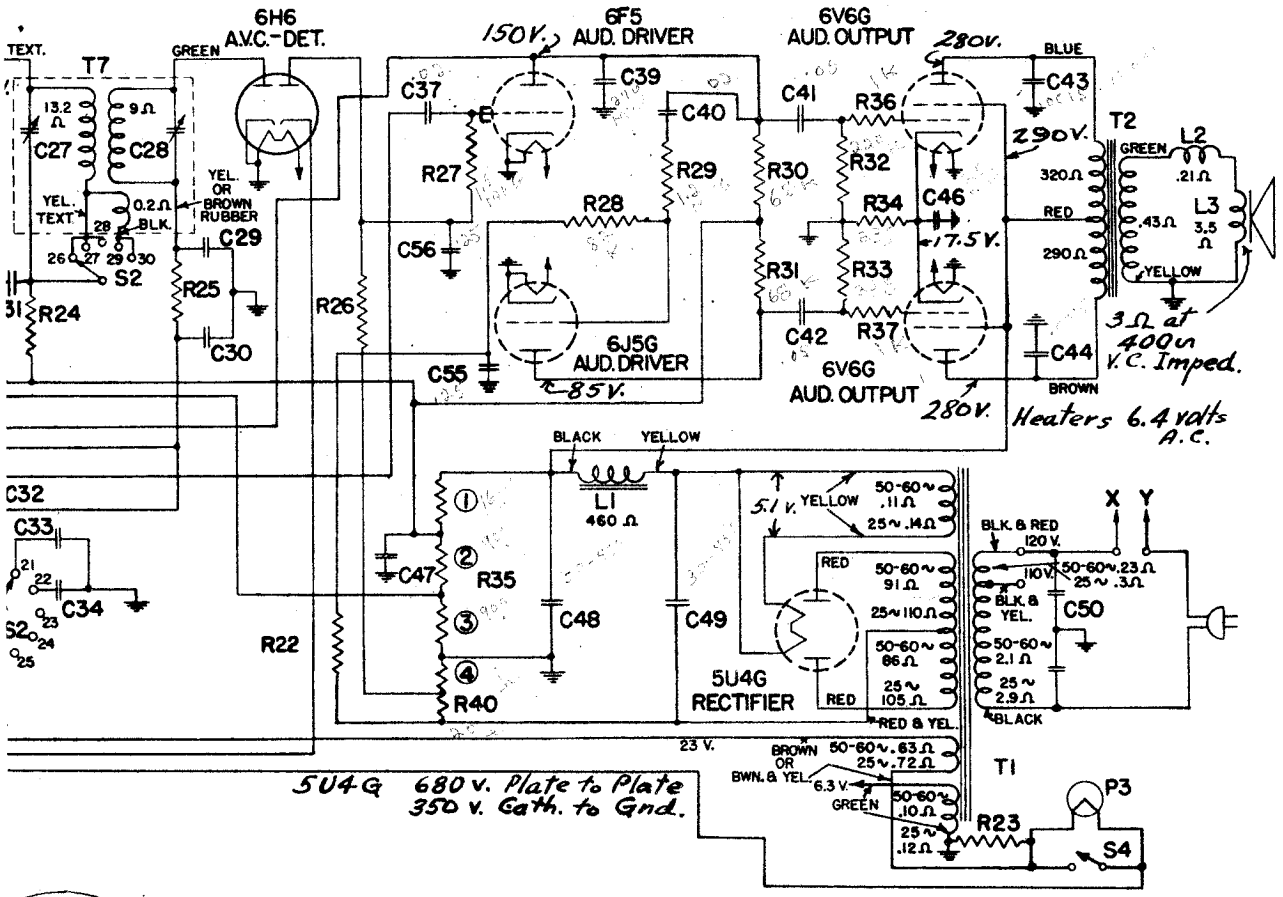
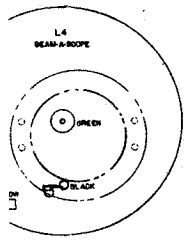
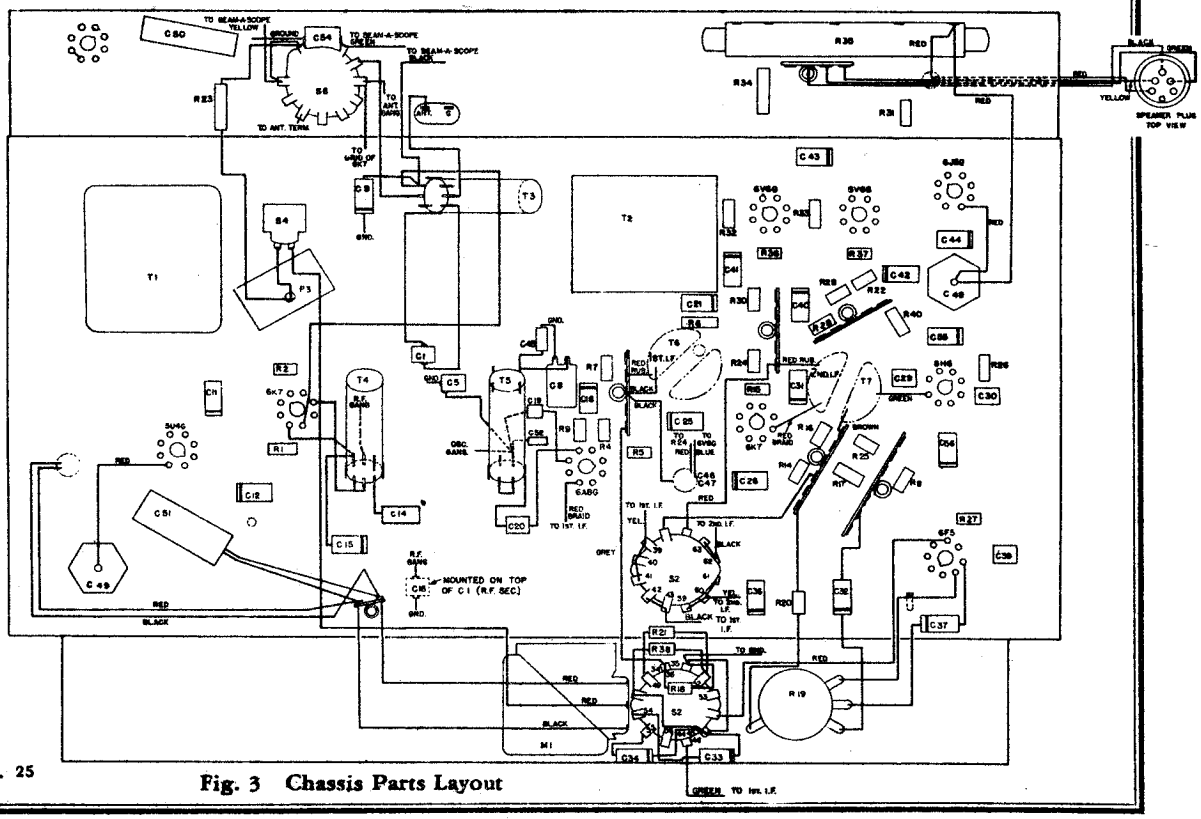
'TRIC CO.

MODEL G95, Radioforte
Schematic, Chassis Wiring
Socket, Trimmers, Voltage





SCRIPTION

A.C. Dry Electro.
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Paper Capacitor
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hms

bly
V.—.2 Amps.
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vitch
vitch
Switch
Ant. Switch
23 V. 50-60 Cycles. 25

Fig. 3 Chassis Parts Layout

# GENERAL ELECTRIC CO.

MODEL G95, Radioforte
Alignment, Phono., Parts

| Stock No. | Description | List Price |
|---|---|---|
| | **CHASSIS ASSEMBLY** | |
| RS-396 | SWITCH—Tone control switch (S-2) | 1.35 |
| RS-397 | SWITCH—Station set-up lamp switch (S-4) | .20 |
| RS-399 | SWITCH—Antenna-Beam-a-Scope switch (S-6) | .85 |
| RS-446 | SPRING—Drive cord tension spring (K) (Pkg. of 5) | .25 |
| RS-448 | SPRING—Vol. control drive pulley spacer spring (C) | .05 |
| RS-449 | SPRING—Tone control drive cord tension spring (H) (Pkg. of 5) | .10 |
| RC-006 | CAPACITOR—.0015 mfd., 1500 V. paper (C-43, 44) | .25 |
| *RC-011 | CAPACITOR—.002 mfd., 600 V. paper (C-34) | .25 |
| *RC-023 | CAPACITOR—.005 mfd., 600 V. paper (C-36) | .25 |
| RC-028 | CAPACITOR—.006 mfd., 600 V. paper (C-33) | .30 |
| *RC-048 | CAPACITOR—.02 mfd., 600 V. paper (C-32, 37, 40) | .30 |
| *RC-092 | CAPACITOR—.05 mfd., 600 V. paper (C-9, 11, 12, 15, 18, 21, 25, 26, 31, 41 42) | .30 |
| *RC-104 | CAPACITOR—.1 mfd., 600 V. paper (C-14) | .30 |
| *RC-136 | CAPACITOR—.25 mfd., 200 V. paper (C-55, 56) | .30 |
| RC-217 | CAPACITOR—50 mmf., mica (silver plated) (C-19) | .35 |
| RC-230 | CAPACITOR—20 mmf., compensating capacitor (C-52) | .35 |
| *RC-242 | CAPACITOR—150 mmf., mica (C-29-30) | .25 |
| RC-245 | CAPACITOR—175 mmf., compensating capacitor (C-45) | .45 |
| RC-263 | CAPACITOR—270 mmf., mica (C-39) | .25 |
| RC-393 | CAPACITOR—4700 mmf., mica (silvered) (C-20) | .50 |
| *RC-429 | CAPACITOR—30 mfd., 450 V. wet electrolytic (C-48, 49) | 1.35 |
| RC-596 | CAPACITOR—25 mfd., 25 V.; 10 mfd., 400 V. dry electrolytic (C-46, 47) | 1.10 |
| RC-597 | CAPACITOR—60 mfd., 40 V. A.C. motor capacitor (C-51) | 1.00 |
| *RC-672 | CAPACITOR—5-35 mmf., R.F. trimmer (C-16) | .15 |
| RC-678 | CAPACITOR—[illegible] mmf., "B" padder (C-8) | .30 |
| *RQ-1305 | RESISTOR—82,000 ohm, ½-W. carbon (R-28) (Pkg. of 5) | $0.70 |
| *RQ-1315 | RESISTOR—220,000 ohm, ½-W. carbon (R-1, 17, 32, 33) (Pkg. of 5) | .70 |
| *RQ-1323 | RESISTOR—470,000 ohm, ½-W. carbon (R-26, 38) (Pkg. of 5) | .70 |
| *RQ-1333 | RESISTOR—1.2 megohm, ½-W. carbon (R-22, 29) (Pkg. of 5) | .70 |
| *RQ-1335 | RESISTOR—1.5 megohm, ½-W. carbon (R-27) (Pkg. of 5) | .70 |
| *RQ-1337 | RESISTOR—1.8 megohm, ½-W. carbon (R-8) (Pkg. of 5) | .70 |
| *RQ-1339 | RESISTOR—2.2 megohm, ½-W. carbon (R-14) (Pkg. of 5) | .70 |
| RQ-1459 | RESISTOR—1000 ohm, 1-W. carbon (R-23) | .20 |
| RQ-1497 | RESISTOR—39,000 ohm, 1-W. carbon (R-6) | .20 |
| RR-740 | RESISTOR—Voltage divider resistor (R-35) | .85 |
| RR-1006 | RESISTOR—20 ohm, ½-W. W.W. resistor (R-40) (Pkg. of 5) | .70 |
| RR-1007 | RESISTOR—230 ohm, 2-W. resistor (R-34) | .20 |
| RS-509 | SPACER—Volume control pulley spacers (Pkg. of 2) | .10 |
| RS-911 | SHAFT—Idler drive wheel shaft and collar | .15 |
| RS-914 | SHAFT—Tone or volume flexible drive shaft (A) | .35 |
| RS-915 | SHAFT—Vol. or tone drive shafts | .10 |
| RT-104 | TRANSFORMER—Power transformer, 105-125 V. 25-60 cycles (T-1) | 14.75 |
| RT-105 | TRANSFORMER—Power transformer, 105-125 V. 50-60 cycles (T-1) | 9.00 |
| RT-263 | TRANSFORMER—1st I.F. transformer and shield (T-6) | 2.30 |
| RC-679 | CAPACITOR—2-20 mmf., trimmer (C-54) | $0.20 |
| RC-681 | CAPACITOR—7-23 mmf., "B" osc. trimmer (C-5) | .90 |
| RC-683 | CAPACITOR—5-40 mmf., ant. trimmer (C-1) | .35 |
| RC-729 | CONDENSER—3-gang tuning condenser (C-10) | 5.60 |
| *RC-755 | CAPACITOR—.01-.01 mfd., line capacitor (C-50) | .40 |
| *RC-863 | CORD—Power cord | .65 |
| RC-1980 | COUPLER—Volume or tone control coupling unit (B) | .20 |
| RC-8035 | CABLE—Speaker cable and plug | .50 |
| RC-8044 | CABLE—Condenser drive cable (J) (Pkg. of 5) | .65 |
| RC-8083 | CABLE—Tone control drive cable (G) | .25 |
| RC-8084 | CABLE—Vol. control drive cable | .20 |
| RG-016 | GRID CLIP—Control grid clip (for metal tubes) (Pkg. of 5) | .10 |
| RL-063 | COIL—Ant. coil Band "B," "C," and "D" (T-3) | 1.25 |
| RL-142 | COIL—R.F. coil Band "B," "C," and "D" (T-4) | 1.15 |
| RL-267 | COIL—Osc. Coil Band "B," "C," and "D" | 1.25 |
| RL-500 | BEAM-A-SCOPE—Beam-a-Scope Antenna (complete) | 9.15 |
| RM-112 | MOTOR—Tuning motor, 50-60 cycles | 4.00 |
| RM-113 | MOTOR—Tuning motor, 25 cycles | 5.35 |
| *RP-048 | DRIVE PULLEY—Condenser drive pulley (F) | .35 |
| *RP-076 | PULLEY—Vol. control driven pulleys or tone control drive pulleys (D) | .15 |
| RP-300 | PULLEY—Rubber cone drive pulley (motor) | .25 |
| RP-301 | PULLEY—Drive cord idler pulley (Pkg. of 2) | .10 |
| RP-305 | PULLEY—Tone control driven pulley (I) | .30 |
| RP-306 | PULLEY—Volume control drive pulley (E) | .20 |
| *RQ-1247 | RESISTOR—330 ohm, ½-W. carbon (R-2, 4, 15, 18) (Pkg. of 5) | .70 |
| *RQ-1259 | RESISTOR—1000 ohm, ½-W. carbon (R-7 24, 36, 37) (Pkg. of 5) | .70 |
| *RQ-1291 | RESISTOR—22,000 ohm, ½-W. carbon (R-9) (Pkg. of 5) | .70 |
| *RQ-1299 | RESISTOR—47,000 ohm, ½-W. carbon (R-5, 25) (Pkg. of 5) | .70 |
| *RQ-1301 | RESISTOR—56,000 ohm, ½-W. carbon (R-16) (Pkg. of 5) | .70 |
| *RQ-1303 | RESISTOR—68,000 ohm, ½-W. carbon (R-20, 21, 30, 31) (Pkg. of 5) | .70 |
| RT-264 | TRANSFORMER—2nd I.F. transformer and shield (T-7) | $1.60 |
| RT-439 | TRANSFORMER—Output transformer (T-2) | 3.20 |
| RV-045 | VOLUME CONTROL—2 meg. vol. control (R-19) | .75 |
| *RW-101 | WASHERS—Felt washers for knobs (Pkg. of 10) | .45 |
| *RB-008 | BOARD—Terminal board (2 lug) | $0.10 |
| *RB-023 | BOARD—Terminal board (4 lug) | .10 |
| *RB-049 | BOARD—Ant.-Gnd. terminal board | .10 |
| *RB-062 | BOARD—Terminal board (6 terminals) | .10 |
| *RB-066 | BOARD—Terminal board (4 lugs) | .10 |
| *RB-070 | BOARD—Terminal board (3 lugs) | .10 |
| RB-094 | BOARD—Terminal board (7 lugs) | .10 |
| RB-160 | BRACKET—Reduction drive wheel bracket | .20 |
| RB-161 | BRACKET—Manual and motor drive bracket | .40 |
| RB-162 | BRACKET—Tuning condenser mtg. bracket (front) | .45 |
| RB-700 | BRAKE—Drive wheel friction brake (complete) | .20 |
| *RS-174 | SHIELD—Grid shield cap (Pkg. of 5) | .25 |
| *RS-200 | SOCKET—8-prong octal base socket (Pkg. of 5) | .75 |
| *RS-204 | SOCKET—5-prong octal tube socket (Pkg. of 5) | .75 |
| RS-226 | SOCKET—Octal base (on rear deck of chassis) | .15 |
| RS-227 | SOCKET—Tube socket (low loss octal base) | .15 |
| RS-228 | SOCKET—Station set-up lamp socket | .20 |
| RS-229 | SOCKET—Tube socket (6A8G) | .35 |
| RW-900 | WHEEL—Idler drive wheel | .45 |
| RW-904 | WHEEL—Vol. control wheel | .65 |
| RW-905 | WHEEL—Tone control wheel | .65 |
| *RX-027 | ASSEMBLY—Chassis mounting assembly | .15 |
| RX-049 | ASSEMBLY—Condenser mounting assembly | .15 |
| | **SPEAKER ASSEMBLY** | |
| RC-936 | CONE—12-inch cone and voice coil assembly | 1.10 |
| RC-991 | CLAMP—Cone spider clamp | .05 |
| RD-301 | DUST CAP—Speaker cone dust cap (Pkg. of 5) | .10 |
| RP-109 | PLUG—Male speaker plug | .20 |
| RS-075 | SPEAKER—12-inch speaker | 5.50 |
| *RX-030 | ASSEMBLY—Speaker mounting assembly | .10 |
| | **PUSH-BUTTON MECHANISM** | |
| RC-8045 | CARDS—Station letter cards (set) | .60 |
| RC-8046 | CABLE—Power cable and plug to push button assembly | .50 |
| RC-8047 | CABLE—Station selector button cable | .95 |
| RK-203 | KEY—Station key (Pkg. of 5) | .30 |
| RS-444 | SPRING—Station button springs (Pkg. of 10) | .10 |
| RS-864 | SCREWS—Keyboard assembly thumb screws (Pkg. of 10) | .40 |
| RS-3008 | SWITCH—Button "On-Off" switch | .50 |
| RT-906 | TAB—"Off" tab for station button (Strip of 10) | .05 |
| RW-025 | WINDOW—Celluloid station window (Pkg. of 25) | .15 |
| RX-051 | ASSEMBLY—Keyboard Touch Tuning Assembly switch | 7.40 |
| | **STATION SELECTOR ASSEMBLY (BEHIND TUNING CONDENSER)** | |
| RB-701 | BAND—Contactor band | .10 |
| RC-1978 | CONTACT—Thumbscrew contact (complete) (Pkg. of 5) | .45 |
| RD-080 | DIAL—Dial scale for contactor drum | .15 |
| RI-108 | INSULATOR—Contactor band insulator (Pkg. of 5) | .15 |
| RS-447 | SPRING—Contactor band tension spring (Pkg. of 5) | .15 |
| RW-901 | WHEEL—Contactor wheel (CT) (complete) (Prices subject to change without notice) | 2.00 |

*Used on previous receivers.

**I.F. Alignment with Oscilloscope**

| Step No. | Input Frequency | Tone Control Position | Point of Input | Trimmer | Comments |
|---|---|---|---|---|---|
| 1. Band B | 455 K.C. and 30 K.C. Sweep | Normal | I.F. 6K7 Grid | 2nd I.F. Sec.<br>2nd I.F. Pri. | Condenser gang at minimum capacity—vertical input to ground and junction of R-25, R-31 and C-42. Adjust trimmers in order mentioned for a single curve of maximum amplitude. The resulting curve on the "normal" position is shown in Fig. 2A. The expanded curve taken with tone control at "Treble 1" is shown in Fig. 2B. |
| 2. Band B | 455 K.C. and 30 K.C. Sweep | Treble 1 | Converter 6A8 Grid | 1st I.F. Sec.<br>1st I.F. Pri. | |
| 3. Band B | 455 K.C. and 30 K.C. Sweep | Normal | Converter 6A8 Grid | 1st I.F. Tertiary | |
| 4. Band B | 455 K.C. and 30 K.C. Sweep | Normal | Converter 6A8 Grid | All IF Trimmers | |

**I.F. Alignment with Output Meter**

| Step No. | Input Frequency | Tone Control Position | Point of Input | Trimmer | Comments |
|---|---|---|---|---|---|
| 1. Band B | 455 K.C. modulated | Normal | I.F. 6K7 Grid | 2nd I.F. Sec.<br>2nd I.F. Pri. | Condenser gang at minimum capacity. output meter connected across voice coil-volume control. Adjust trimmers in order listed for maximum output. Do not attempt an alignment in the expanded position. |
| 2. Band B | 455 K.C. modulated | Normal | Converter 6A8 Grid | 1st I.F. Sec.<br>1st I.F. Pri.<br>1st I.F. Tertiary | |
| 3. Band B | 455 K.C. modulated | Normal | Converter 6A8 Grid | All I.F. trimmers | |

**R.F. Alignment**

| Step No. | Input Frequency | Tone Control Position | Point of Input | Trimmer | Comments |
|---|---|---|---|---|---|
| 1. Band B | | | | | Adjust tuning mechanism so that pointer coincides with first line at left hand end of dial scale when condenser plates are fully meshed. |
| 2. Band B | 1500 K.C. modulated | Bass | Antenna post | Osc. (C-5)<br>Ant. (C-16)<br>Ant. (C-1) | Connect output meter across voice coil-volume control. Rotate R.F. trimmers in clockwise position. Adjust trimmers in order listed for maximum output. |
| 3. Band B | 580 K.C. modulated | Bass | Antenna post | Osc. Padder (C-8) | Adjust padder for maximum output in vicinity of 580 K.C. white rocking gang condenser. |
| 4. Band B | Repeat Step 2 | | | | |
| 5. Band B | 1500 K.C. modulated | Bass | Antenna post | Beam-a-Scope (C-54) | Turn antenna switch to clockwise position, align Beam-a-Scope trimmer for maximum output. |

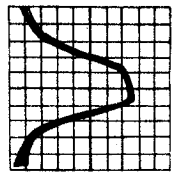


Fig. 2. I.F. curves taken on G-E oscilloscope OFM-1

NOTE—In most cases a suitable loading circuit composed of a resistor or resistor and capacitor network should be used across the pick-up leads when using a crystal type unit.

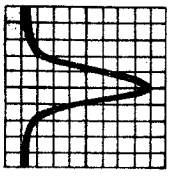


Fig. 11. Phonograph Connections

***Phonograph Connections***

Fig. 11 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the Radioforté circuit for the reproduction of phonograph recording. The method uses a two circuit jack and is connected into the receiver by opening the circuit between C-32 and the volume control (R-19) and connecting the pick-up leads as shown. A telephone plug is attached to the pick-up leads and for phonograph operation, it is merely necessary to insert it into the jack. The jack may be mounted on the rear chassis deck and all connecting leads should be properly shielded to prevent pick-up.

When the pick-up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction.

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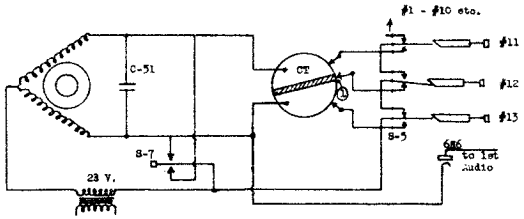


Fig. 5. Schematic of Touch-Tuning System

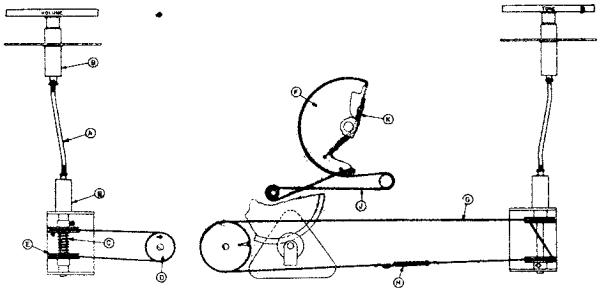

Fig. 8. Drive Mechanism

## TOUCH-TUNING

The General Electric "Touch-Tuning" system consists of three essential units: the keyboard assembly of fourteen keys, used for touch-tuning control; the motor and drive mechanism; and the split contact segment with its adjustable station buttons, allowing a set up of thirteen different stations to be tuned automatically.

Thirteen keys are used for the selection of pre-set stations while the No. 14 key is used to turn power "Off." Pressing-in any key will lock the key in a semi-depressed position and release any other that may be in the circuit, thus the selection of any station by a station key will release the "Off" key, turning the set power on.

The tuning motor is operated as a 23-volt split phase induction motor using capacitor C-51 as the phase shifting device. The 23 volts is supplied directly from the receiver power transformer.

Fig. 5 shows a simplified schematic of the control circuit and the following cycle of operation may be traced very easily. When a key is depressed, it completes the 23-volt circuit through the button making contact with the contact segment (CT) and energizes one winding of the motor. The other winding on the motor is energized through the condenser C-51. The rotation of the motor is dependent upon whichever half of the contact segment (CT) that the station button first energizes. When voltage is applied to the motor, the rotor is pulled further into motor field, and engages its rubber cone hub with the dial drive wheel which in turn rotates the gang condenser and contact segment (CT). This operation continues until the insulated segment (1) breaks the station button circuit to the contact segment and removes voltage from the motor. The inertia in the tuning system drives the insulated segment past the station button and makes contact with the other half of the contact segment. This energizes the other winding of the motor and causes the motor to reverse. The brake on the dial drive wheel does not allow the tuning system to store up enough inertia to go past this insulated strip on the reversal of the motor and thus allows the station button to come to rest on the narrow insulated segment, thus stopping the tuning operation to this pre-set position.

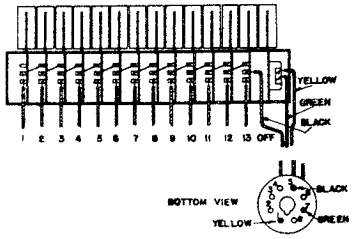


Fig. 6. Keyboard Wiring Diagram

### *Silent Tuning*

During period of motor operation, either for automatic station selection or for scanning, silent tuning is incorporated. This is accomplished by a circuit which gives both instantaneous cut-off of the audio amplifier and time delay in restoring the response. By reference to the schematic Fig. 4, it will be observed that one half of the 6H6 diode is used to rectify the 23.0 volts AC available from the motor and the resulting DC voltage is used to bias the audio amplifier tube to cut-off. Note that the charging time of the bias circuit is only determined by the diode resistance which is very small. The time required for the audio amplifier (6F5) to return to normal bias however, is determined by the product of R-26 and C-56 and is therefore controllable.

### *Drive Wheel Brake Adjustment*

A friction brake has been incorporated on the drive wheel circumference (D) to accomplish accurate stopping of the motor-driven tuning system. When the button passes into the insulated segment it will easily over-ride the insulated segment on the contactor drum, since this segment is very narrow. If this condition continues an oscillatory motion or "Hunting" is set up and the motor will not come to rest as long as the station key is pressed. The brake, located at the left side of dial scale, should be adjusted on normal line voltage so that the motor only has to make one or two reversals.

This adjustment should be made under an average operating line voltage and allowance made for changes in voltage over the 24-hour period.

### *Stopping Accuracy*

The exact location at which the drive mechanism will come to rest may be made more accurate by slightly lowering the insulated segment (X) on the contactor wheel as shown in Fig. 7. Merely loosen the two screws (Y) and lower the yoke (Z).

The proper adjustment is made at the factory and should not require alteration provided the contactor drum is kept well lubricated.

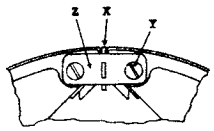


Fig. 7

### *Lubrication*

For smooth and noiseless operation of the tuning system, it is absolutely necessary to keep it well lubricated.

Contactor drum—use thin film of petroleum jelly.

Dial Pointer Guide Rods—use thin film of petroleum jelly.

Motor bearings—These are oilless type and do not require lubrication.

## REMOTE CONTROL

The GM-8 Remote Control is merely another station keyboard assembly that is wired in parallel with the regular station keys. In addition, a remotely controlled motor is used to either raise or lower the volume at the receiver. By referring to Fig. 10, the details of the operation of this device may be readily understood. Leads No. 2 to No. 7 are the automatic tuning button control leads that parallel any six of the regular receiver station keys. Lead No. 1 supplies twenty-three volts to the remote keyboard assembly while leads No. 8 and No. 9 are the phase reversing leads to the volume control motor.

When the remote control is attached to a receiver, then the semi-depressed positions of the receiver push button keys may or may not indicate which station is tuned in. This will then depend upon whether the receiver was last operated from the remote control or from the station keys of the receiver itself. For this reason, the key assembly of the remote control has not been equipped with a latch bar.

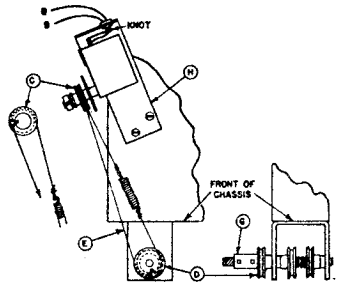


Fig. 9. Volume Control Motor Mounting

All keys of the remote control key assembly are wired in series to avoid possibility of two keys completing the circuit to the motor at the same time.

The remote volume control motor uses a phase shifting resistor in place of a condenser as used on the tuning motor when operating from a 50 or 60 cycle power supply. When operation is desired from 25 cycles replace the 30 ohm, 10-watt resistor across the volume control motor terminals with a 60 microfarad motor capacitor (RC-597).

The mechanical installation of the volume control motor is shown in Fig. 9. For full installation instructions refer to service notes RGMS-8.

### *Remote Control Notes*

1. If key assembly on remote control unit is too high in the case, it is possible that one or all of the keys may be slightly depressed at all times so as to cause faulty operation of the system. To remedy, lower the complete assembly by loosening the two set screws on the inside of the case and then lower assembly—tighten set screws.

2. The tension of the friction clutch on the remote control motor is adjusted at the factory and should not require resetting. If it is set too tight, the volume control may be damaged when "VOL DEC." key is held in a depressed position after the volume control is turned to the minimum position. If this slip clutch is too loose the control will fail to turn.

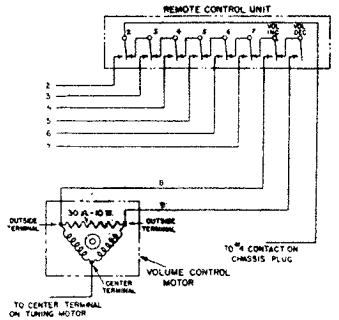


Fig. 10. Remote Control Schematic

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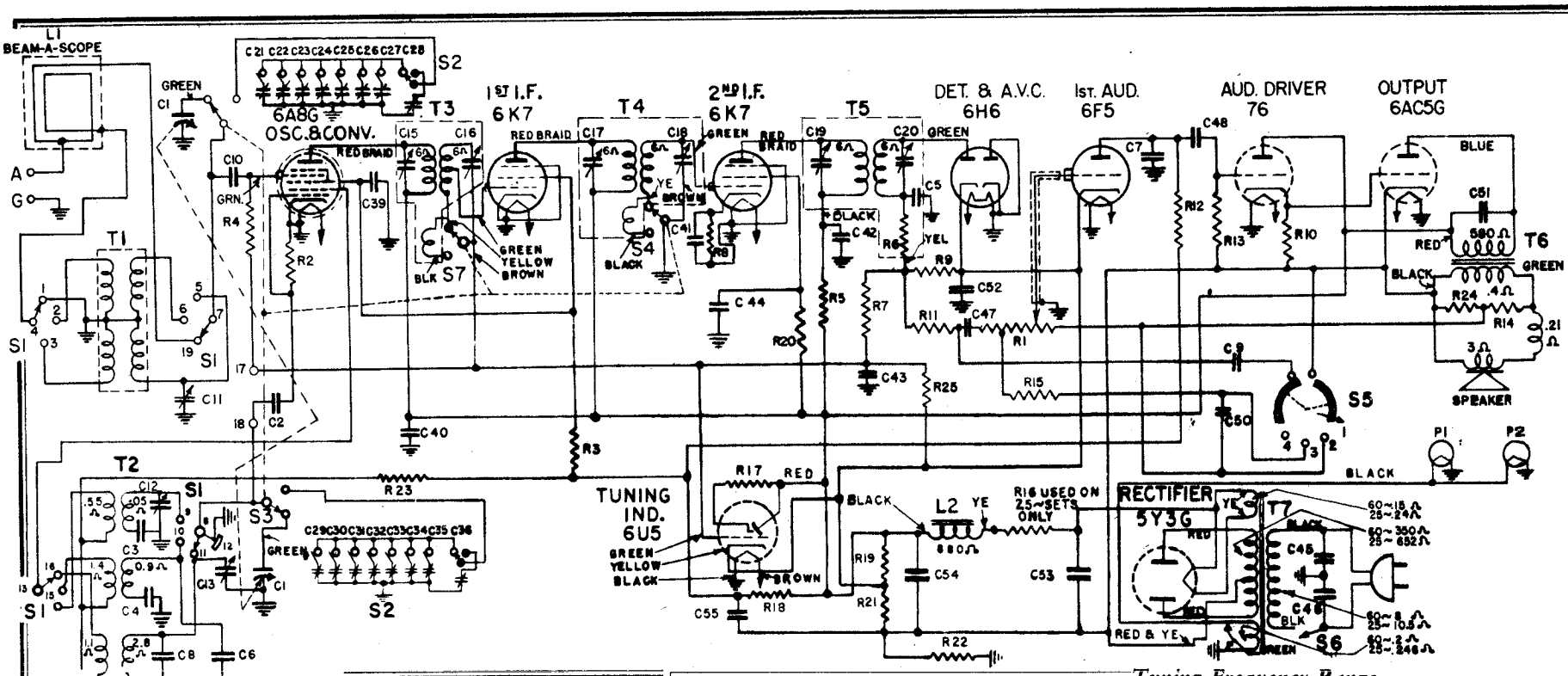


| Symbol | Description |
|---|---|
| C1 | Tuning Capacitor |
| C2 | 50 mmf mica capacitor |
| C3 | 3900 mmf mica capacitor |
| C4 | 1200 mmf mica capacitor |
| C5 | 47 mmf mica capacitor |
| C6 | 6 mmf mica capacitor |
| C7 | 47 mmf mica capacitor |
| C8 | 20 mmf regulating capacitor |
| C9 | .0012 mfd paper capacitor |
| C10 | 150 mmf mica capacitor |
| C11-C13 | Trimmer capacitors |
| C14 | "B" band padder |
| C21-C28 | Antenna trimmer strip |
| C29-C36 | Oscillator trimmer strip |
| C39 | .05 mfd paper capacitor |
| C40, 41 | 0.1 mfd paper capacitor |
| R23 | 3300 ohm carbon resistor |
| R24 | 12 ohm carbon resistor |
| R25 | 1.0 megohm carbon resistor |
| S1 | Band change switch |
| S2, S3 | Station selector switch |
| S5 | Tone control switch |
| T1 | Antenna transformer |
| T2 | Oscillator transformer |
| T3 | 1st I.F. transformer |
| T4 | 2nd I.F. transformer |
| T5 | 3rd I.F. transformer |
| T6 | Output transformer |
| T7 T8 | Power transformer |

| Symbol | Description |
|---|---|
| C42, 43, 44 | .05 mfd paper capacitor |
| C45, 46 | .01 mfd line capacitor |
| C47 | .003 mfd paper capacitor |
| C48, 49 | .005 mfd paper capacitor |
| C50 | .004 mfd paper capacitor |
| C51 | .02 mfd paper capacitor |
| C52 | 0.1 mfd paper capacitor |
| C53 | 12 mfd 450 V dry electrolytic |
| C54 | 8 mfd 400 V dry electrolytic |
| C55 | 8 mfd 400 V dry electrolytic |
| R1 | 2 megohm volume control |
| R2 | 47,000 ohm carbon resistor |
| R3 | 15,000 ohm carbon resistor |
| R4 | 1.5 megohm carbon resistor |
| R5 | 1,000 ohm carbon resistor |
| R6 | 47,000 ohm carbon resistor |
| R7 | 2.2 megohm carbon resistor |
| R8 | 1,000 ohm carbon resistor |
| R9 | 220,000 ohm carbon resistor |
| R10 | 22,000 ohm carbon resistor |
| R11 | 82,000 ohm carbon resistor |
| R12 | 220,000 ohm carbon resistor |
| R13 | 1.0 megohm carbon resistor |
| R14 | 82 ohm carbon resistor |
| R15 | 120,000 ohm carbon resistor |
| R16 | 470 ohm carbon resistor |
| R17 | 1.0 megohm carbon resistor |
| R18 | 6,800 ohm carbon resistor |
| R19 | 39,000 ohm carbon resistor |
| R20 | 82,000 ohm carbon resistor |
| R21 | 150 ohm carbon resistor |
| R22 | 180 ohm carbon resistor |

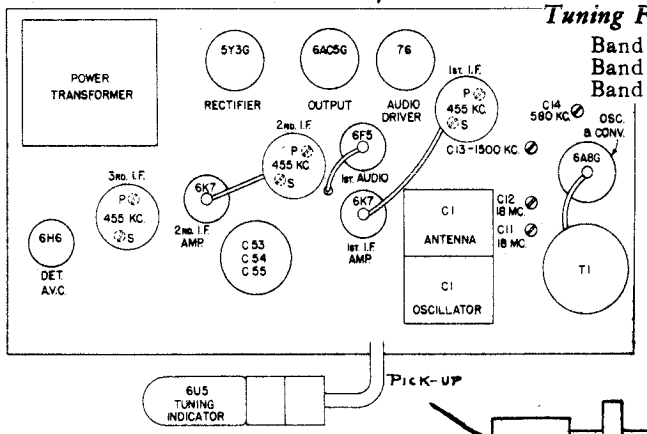


Fig. 6. Chassis Layout and Trimmer Location

*Tuning Frequency Range*

Band "B" ..... 540–1660 K.C.
Band "C" .....1650–5600 K.C.
Band "D" .....5500–18,200 K.C.

IF PEAK 455 KC

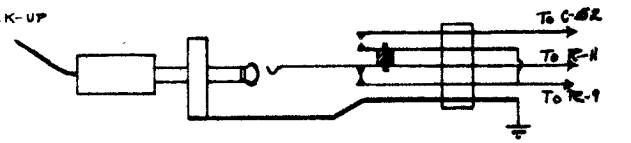


Fig. 1. Phonograph Connections

MODEL G99
Voltage, Chassis Wiring
Dial Mechanism

GENERAL ELECTRIC CO.

## VOLTAGE CHART

| Tube No. | Plate to Ground Volts, D.C. | Screen to Ground Volts, D.C. | Cathode to Ground Volts, D.C. | Filament Volts |
|---|---|---|---|---|
| 6A8G | 240 Conv.<br>150 Osc. | 97 | 0 | 6.4 |
| 6K7 | 240 | 97 | 0 | 6.4 |
| 6K7 | 230 | 105 | 5.1 | 6.4 |
| 6F5 | 102 | .... | 3.0 | 6.4 |
| 76 | 230 | .... | 7.5 | 6.4 |
| 6AC5G | 230 | .... | 4.5 | 6.4 |
| 6U5 | 240 | .... | 3.0 | 6.4 |
| 5Y3G | 306/306 A.C. RMS. | . . . | 310 V | 5.1 |

Socket voltages taken at 120-volt line—no signal input—1000 ohms per volt meter—Dial pointer at 550 K.C. on "B" band.

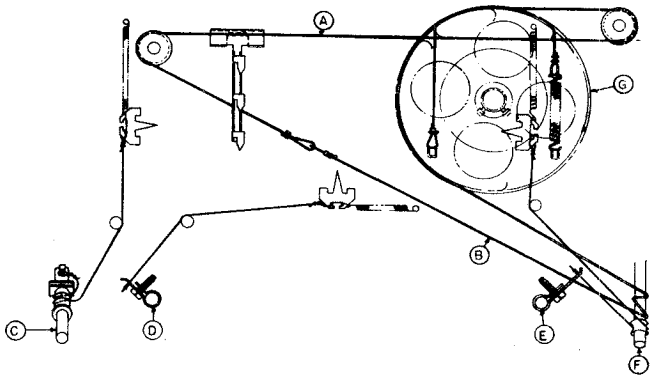


Fig. 3. Dial Drive Mechanism

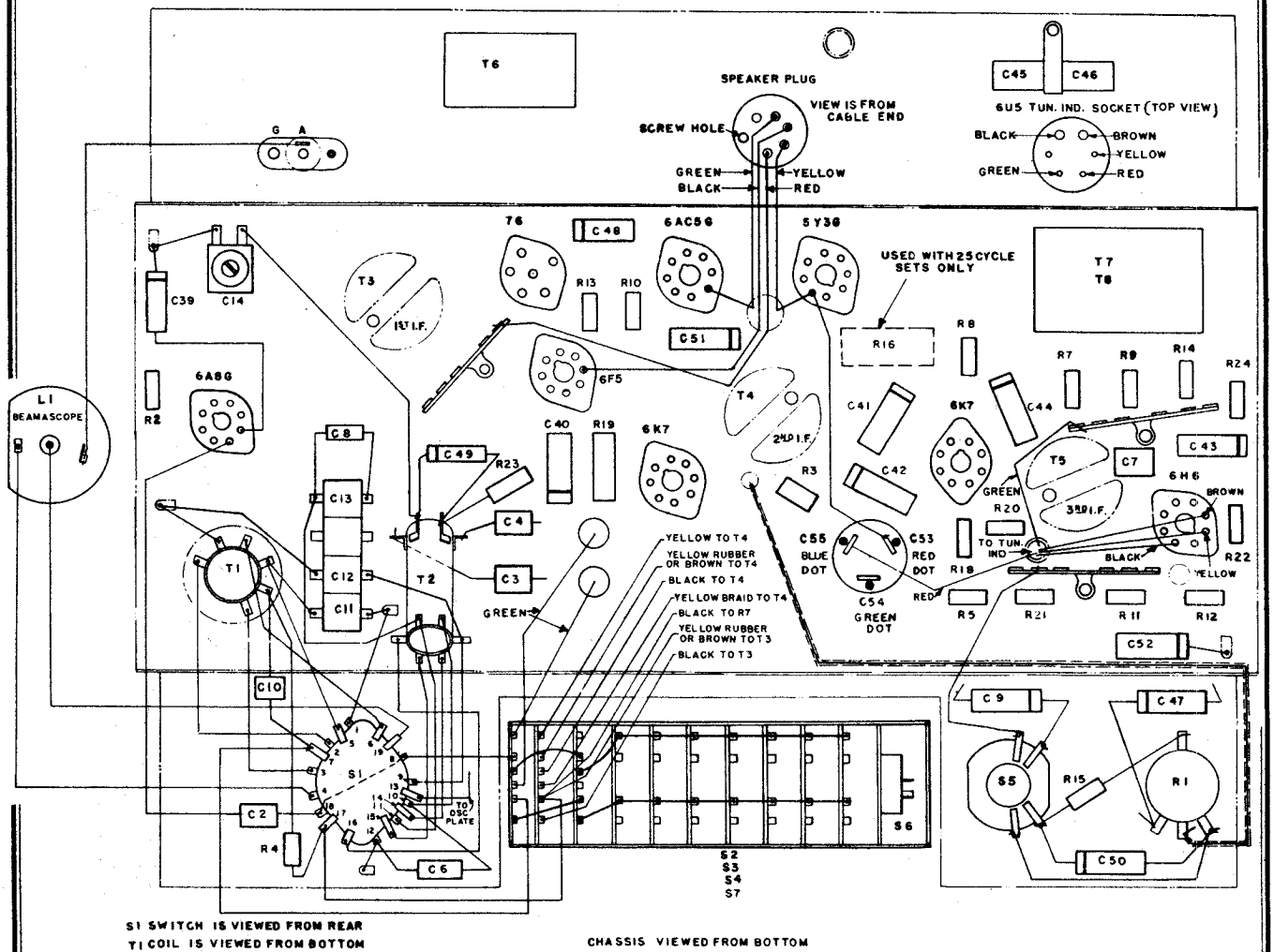


Fig. 4. Chassis Parts Layout

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## ALIGNMENT PROCEDURE

### I.F. Alignment with Oscilloscope

| Band Switch Setting | Input Frequency | Point of Input | Dummy Ant. | Trimmer | Remarks |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. Sweep | 2nd I.F. Grid | .05 Mfd. | 3rd I.F. Sec. (C-20) Pri. (C-19) | Manual key depressed—gang condenser plates closed—connect vertical input of oscilloscope to ground and the junction of R-9 and R-11 on 3rd I.F. transformer. Adjust trimmers for a single symmetrical curve of maximum amplitude. The resulting curve with input at converter grid is shown in Fig. 5. When a station key is pressed this I.F. curve should expand considerably. |
| 2. Band "B" | 455 K.C. Sweep | 1st I.F. Grid | .05 Mfd. | 2nd I.F. Sec. (C-18) Pri. (C-17) | |
| 3. Band "B" | 455 K.C. Sweep | Converter Grid | .05 Mfd. | 1st I.F. Sec. (C-16) Pri. (C-15) | |

### I.F. Alignment with Output Meter

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | 455 K.C. with Modulation | 2nd I.F. Grid | .05 Mfd. | 3rd I.F. Sec. (C-20) Pri. (C-19) | Manual key depressed—gang condenser plates closed—connect output meter across voice coil—keep input signal low and volume control at maximum. Adjust all trimmers in order mentioned for maximum output. Do not attempt an over-all realignment after stage by stage alignment has been accomplished. |
| 2. Band "B" | 455 K.C. with Modulation | 1st I.F. Grid | .05 Mfd. | 2nd I.F. Sec. (C-18) Pri. (C-17) | |
| 3. Band "B" | 455 K.C. with Modulation | Converter Grid | .05 Mfd. | 1st I.F. Sec. (C-16) Pri. (C-15) | |

### R.F. Alignment

| | | | | | |
|---|---|---|---|---|---|
| 1. Band "B" | | | | | Close gang plates—adjust pointer to first line at left end of tuning scale. |
| 2. Band "D" | 18 M.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. (C-12) Ant. (C-11) | Connect output meter across voice coil—manual key depressed. The image of any "D" band signal should be heard 930 K.C. below input signal when (C-12) is on proper peak. Example: 15 M.C. image—14.09 K.C. Peak (C-11) while rocking the gang condenser. |
| 3. Band "C" | No adjustment necessary. | | | | |
| 4. Band "B" | 1500 K.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Osc. (C-13) | Peak oscillator trimmer (C-13) for maximum output in vicinity of 1500 K.C. while rocking the gang condenser. |
| 5. Band "B" | 580 K.C. with Modulation | Antenna Post | 250 Mmf. 200 Ohms | Padder (C-14) | Adjust padder for maximum output in vicinity of 580 K.C. while rocking the gang condenser. |
| 6. Band "B" | Repeat Operation 4 | | | | |

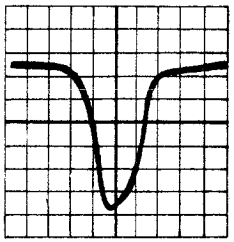

Fig. 5. Over-all IF Curve Taken on G-E Oscilloscope OFM-1

| Rating Label | Power Supply (Volts) | Frequency (Cycles) | Power Consumption (Volts) |
|---|---|---|---|
| A | 115–125 | 50–60 | 70 |
| C | 115–125 | 25–60 | 75 |

***Electrical Power Output***

Undistorted....3.0 watts
Maximum....5.0 watts

***Tone Control***

....4-position

***Loud-speaker—Electrodynamic***

Outside Cone Diameter....12 inches
Voice Coil Impedance....3.5 ohms at 400 cycles
Field Coil Resistance....880 ohms (cold)

## REPLACEMENT PARTS LIST

### MODEL G-99

| Stock No. | Description | List Price |
|---|---|---|
| | **CHASSIS ASSEMBLY** | |
| *RB-017 | BOARD—Terminal board (1 lug) | $0 10 |
| *RB-026 | BOARD—Ant. grid terminal board | .10 |
| *RB-062 | BOARD—Terminal board (near power trans.) | .10 |
| RC-012 | CAPACITOR—.0012 mfd., 600 V. paper (C-9) | .25 |
| *RC-023 | CAPACITOR—.005 mfd., 600 V. paper (C-48, 49) | $0.25 |
| *RC-048 | CAPACITOR—.02 mfd., 600 V. paper (C-51) | .30 |
| *RC-049 | CAPACITOR—.004 mfd., 600 V. paper (C-50) | .35 |
| *RC-055 | CAPACITOR—.003 mfd., 600 V. paper (C-47) | .25 |

### MODEL G-99

| Stock No. | Description | List Price |
|---|---|---|
| *RC-092 | CAPACITOR—.05 mfd., 600 V. paper (C-39, 42, 43, 44) | |
| *RC-104 | CAPACITOR—.1 mfd., 600 V. paper (C-40, 41, 52) | $0.30 |
| *RC-206 | CAPACITOR—50 mmf., mica (C-2) | .30 |
| RC-216 | CAPACITOR—47 mmf., mica (C-5, 7) | .35 |
| RC-220 | CAPACITOR—6 mmf., mica (C-6) | .25 |
| RC-230 | CAPACITOR—20 mmf., compensating capacitor (C-8) | .35 |
| RC-242 | CAPACITOR—150 mmf., mica (C-10) | .25 |
| RC-341 | CAPACITOR—1200 mmf., mica (C-4) | .35 |
| RC-390 | CAPACITOR—3900 mmf., mica (C-3) | .35 |
| RC-594 | CAPACITOR—8 mfd., 400 V.; 8 mfd., 400 V; 12 mfd., 450 V.; dry electrolytic (C-53, 54, 55) | 1.60 |
| RC-676 | CAPACITOR—300-650 mmf., "B" padder (C-14) | .35 |
| RC-692 | CAPACITOR—Antenna and oscillator trimmer (C-11, 12, 13) | .30 |
| RC-728 | CONDENSER—2-gang tuning condenser (C-1) | 2.95 |
| *RC-754 | CAPACITOR—.01-.01 mfd., 250 V. A.C. line capacitor (C-45, 46) | .40 |
| *RC-863 | CORD—Power cord | .65 |
| RC-8035 | CABLE—Speaker cable and plug | .50 |
| RC-8054 | CABLE—Tuning indicator cable and socket | .40 |
| RD-205 | DRIVE—Vernier drive bracket assembly | .35 |
| RG-016 | GRID CLIP—Control grid clip (Pkg. of 5) | .10 |
| RK-027 | KNOB—Control knob (winged) (Pkg. of 5) | .50 |
| RK-028 | KNOB—Control knob (plain) (Pkg. of 5) | .30 |
| RL-062 | COIL—Ant. coil assembly | 1.50 |
| RL-266 | COIL—Oscillator coil and bracket | 1.30 |
| RL-501 | BEAM-A-SCOPE—Beam-a-Scope antenna (L-1) | 9.25 |
| RQ-711 | RESISTOR—470 ohms, 3 W. carbon (R-16) | .25 |
| RQ-1213 | RESISTOR—12 ohm, ½ W. carbon (R-24) (Pkg. of 5) | .70 |
| *RQ-1233 | RESISTOR—82 ohm, ½ W. carbon (R-14) (Pkg. of 5) | .70 |
| *RQ-1239 | RESISTOR—150 ohm, ½ W. carbon (R-21) (Pkg. of 5) | .70 |
| RQ-1241 | RESISTOR—180 ohm, ½ W. carbon (R-22) (Pkg. of 5) | .70 |
| *RQ-1259 | RESISTOR—1000 ohm, ½ W. carbon (R-5, 8) (Pkg. of 5) | .70 |
| *RQ-1271 | RESISTOR—3300 ohm, ½ W. carbon (R-23) (Pkg. of 5) | .70 |
| *RQ-1279 | RESISTOR—6800 ohm, ½ W. carbon (R-18) (Pkg. of 5) | .70 |
| *RQ-1287 | RESISTOR—15,000 ohm, ½ W. carbon (R-3) (Pkg. of 5) | .70 |
| *RQ-1291 | RESISTOR—22,000 ohm, ½ W. carbon (R-10) (Pkg. of 5) | .70 |
| *RQ-1299 | RESISTOR—47,000 ohm, ½ W. carbon (R-2, 6) (Pkg. of 5) | .70 |
| RQ-1305 | RESISTOR—82,000 ohm, ½ W. carbon (R-11, 20) (Pkg. of 5) | .70 |
| *RQ-1309 | RESISTOR—120,000 ohm, ½ W. carbon (R-15) (Pkg. of 5) | .70 |
| *RQ-1315 | RESISTOR—220,000 ohm, ½ W. carbon (R-9, 12) (Pkg. of 5) | .70 |
| *RQ-1331 | RESISTOR—1.0 megohm, ½ W. carbon (R-13, 17, 25) (Pkg. of 5) | .70 |
| *RQ-1335 | RESISTOR—1.5 megohm, ½ W. carbon (R-4) (Pkg. of 5) | .70 |
| *RQ-1339 | RESISTOR—2.2 megohm, ½ W. carbon (R-7) (Pkg. of 5) | .70 |
| *RR-281 | RESISTOR—39,000 ohm, 2 W. carbon (R-19) | .30 |
| RS-185 | SHIELD—6A8G tube shield and base | .15 |
| *RS-200 | SOCKET—Octal base tube socket (Pkg. of 5) | .75 |
| *RS-204 | SOCKET—Rectifier tube socket (Pkg. of 5) | .75 |
| *RS-223 | SOCKET—Octal base tube socket (Pkg. of 5) | .80 |
| RS-224 | SOCKET—Tube socket (76) (Pkg. of 5) | .50 |
| RS-227 | SOCKET—Octal base tube socket (6A8G) | $0.15 |
| RS-395 | SWITCH—Tone control switch (S-2) | .55 |
| RS-3011 | SWITCH—Band change switch (S-1) | .95 |
| RT-0711 | TRANSFORMER—Power transformer (T-7) 120 V. 25-60 cy. | 7.60 |
| RT-0616 | TRANSFORMER—Power transformer (T-7) 120 V. 50-60 cy. | 4.60 |
| RT-265 | TRANSFORMER—3rd I.F. transformer | 1.60 |
| RT-266 | TRANSFORMER—2nd I.F. transformer and shield | 1.80 |
| RT-267 | TRANSFORMER—1st I.F. transformer and shield | 1.90 |
| RT-438 | TRANSFORMER—Output transformer (T-3) | 1.70 |
| RV-051 | VOLUME CONTROL—2 megohm volume control (R-1) | .80 |
| *RW-101 | WASHER—Felt washer for control shafts (Pkg. of 10) | .45 |
| *RX-021 | ASSEMBLY—Chassis mounting assembly | .10 |
| RX-048 | ASSEMBLY—Tuning condenser mounting assembly | .25 |
| | **SPEAKER ASSEMBLY** | |
| RC-932 | CONE—12-inch cone and V. C. assembly | 1.10 |
| *RC-991 | CLAMP—Cone spider clamp | .05 |
| RD-301 | DUST CAP—Speaker cone dust cap (Pkg. of 5) | .10 |
| RP-109 | PLUG—Male speaker plug | .20 |
| RS-073 | SPEAKER—12-inch speaker | 5.40 |
| *RX-030 | ASSEMBLY—Speaker mounting assembly | .10 |
| | **DIAL DRIVE MECHANISM** | |
| *RB-152 | BRACKET—Tone control indicator bracket (D) | .05 |
| *RB-155 | BRACKET—Band change bracket (E) | .05 |
| RB-614 | BUSHING—Volume control drive bushing (C) | .15 |
| RC-1977 | CLAMP—Tuning indicator tube clamp and thumbscrews | .10 |
| RC-8048 | CORD—Volume indicator cord (Pkg. of 5) | .50 |
| RC-8049 | CORD—Tone indicator cord (Pkg. of 5) | .50 |
| RC-8050 | CORD—Band change indicator cord (Pkg. of 5) | .50 |
| RC-8051 | CORD—Dial pointer drive cord (A) (B) | .20 |
| *RD-013 | DRUM—Condenser drive drum (G) | .35 |
| RD-074 | DIAL—Dial scale | 2.70 |
| RE-033 | ESCUTCHEON—Dial scale escutcheon | 1.65 |
| RP-112 | POINTER—Tone, band change or volume indicator pointer | .10 |
| RP-113 | POINTER—Dial scale pointer | .30 |
| RP-303 | PULLEY—Idler pulley (Pkg. of 2) | .10 |
| RR-920 | REFLECTOR—Lamp reflector assembly | .50 |
| RS-187 | SHIELD—Lamp shield (Pkg. of 10) | .05 |
| *RS-218 | SOCKET—Lamp socket assembly | .10 |
| *RS-425 | SPRING—Drive drum spring (Pkg. of 5) | .10 |
| *RS-427 | SPRING—Volume, tone or band change cord spring (Pkg. of 5) | .20 |
| | **TOUCH TUNING ASSEMBLY** | |
| RB-613 | BUTTON—Molded push button (Pkg. of 5) | .35 |
| RC-8036 | CARDS—Station letter cards (set) | .25 |
| RC-8052 | CARDS—"Manual" tab cards (strip of 10) | .05 |
| RC-8053 | CARDS—"Off" tab cards (strip of 10) | .05 |
| RE-032 | ESCUTCHEON—Push button escutcheon | .50 |
| RS-444 | SPRING—Spring for push button (Pkg. of 10) | .10 |
| RS-3009 | SWITCH—Power switch | 1.00 |
| RS-3010 | SWITCH—Push button switch (less trimmers) | 3.90 |
| RT-856 | TRIMMER STRIP—Osc. trimmer strip (C-29, 30, 31, 32, 33, 34, 35, 36) | 1.40 |
| RT-857 | TRIMMER STRIP—Antenna section trimmer strip (C-21, 22, 23, 24, 25, 26, 27 28) | 1.40 |
| RW-021 | WINDOWS—Celluloid station windows (Pkg. of 25) | .10 |

* Used on previous receivers.

(Prices subject to change without notice)

### *Phonograph Connections*

Fig. 1 shows a simple sketch for connecting a crystal or high impedance magnetic pick-up into the G-99 circuit for the reproduction of phonograph recordings. This method uses a two circuit jack and is connected into the receiver by opening the circuit between R-11 and the junction of R-7 and R-9; connecting the jack terminals as shown. A telephone plug is attached to the pick-up leads; and for phonograph operation, it is merely necessary to insert it into the jack. The jack may be mounted on the rear chassis deck and all connecting leads should be properly shielded to prevent interference.

When the pick-up is connected as suggested, the regular radio volume and tone controls work for both radio and phonograph reproduction.

NOTE—A suitable loading circuit consisting of a 300,000 ohm resistor should be connected across the pick-up leads when using a crystal type unit.

Antenna and Ground

Since this receiver operates at a relatively high radio frequency, it is very essential to construct a good antenna and ground system in order to obtain maximum results.

For distances up to within thirty miles from the transmitter, a simple horizontal di-pole as shown in Fig. 1 should give excellent results. It should be located free from all obstructions and placed as high from the earth as possible. Make sure it is run approximately at right angles to the direction of the transmitter: i.e., if the transmitter is located due west, run the horizontal doublet in a north and south direction. The horizontal flat top has an effective antenna length of 10-feet, 8-inches and consists of #12 or #14 bare copper wire (preferably stranded), cut in the middle and the two halves insulated by glass insulators. A twisted lead-in wire is then soldered to each side of the doublet as shown, and the other two ends of the transmission line are connected to the #1 and #2 terminals on the receiver chassis. The lead-in transmission line may be of any length up to 100 feet and should consist of low loss antenna lead-in wire. A good ground connection to a water pipe is connected to the terminal marked "G".

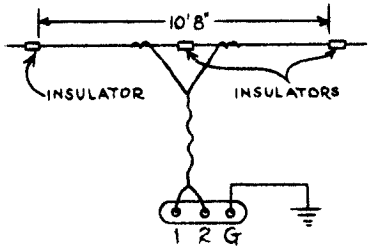

Fig. 1

Somewhat better results may be obtained by constructing the antenna shown in Fig. 2. This varies somewhat from the di-pole antenna and is more efficient due to the fact that the transmission line has very little loss.

The antenna proper consists of a 10-foot, 8-inch length of 1-inch diameter copper pipe supported at the middle by a pole located as high above ground as possible. The transmission line is made up of two #12 or #14 copper wires, spaced about 2-inches apart and transposed every two or three feet. The antenna end of the transmission line is soldered 13-1/2 inches each side of the center of the copper pipe and should form a triangle, 27 inches on all sides. As in the previous installation, the horizontal flat-top should run approximately at right angles to the direction of the transmitter.

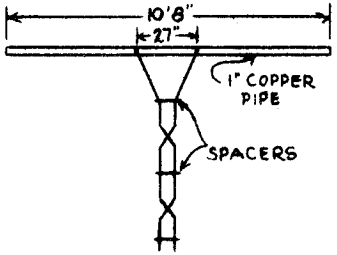

Fig. 2

For greater distances, somewhat better results may be obtained by using a reflector in conjunction with the antenna described and shown in Fig. 2. A suggested system is to use a 1-inch diameter copper pipe similar to the antenna, running parallel to the regular antenna and located farthest from the direction of the received signal. Fig. 3 shows a diagram looking from top and dimensions should be followed very carefully. By experimenting, however, with the distance between reflector and antenna, improvement in the individual installation may be noted.

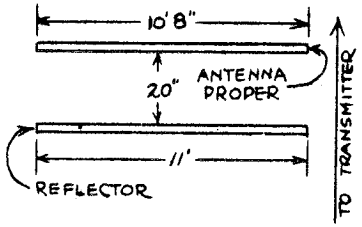

Fig. 3

Note - The reflector is a floating copper bar and there are no external connections. Connect and install the regular antenna as shown in Fig. 2.

| | |
|---|---|
| Model | GM-125 |
| Height | 36-1/4 inches |
| Width | 39-3/8 inches |
| Depth | 17-1/8 inches |
| Tuning Control Drive Ratio | 1:1 |

Electrical Specifications

| | |
|---|---|
| Volts | 115-125 |
| Frequency | 50/60 Cycles |
| Watts Consumption | 160 |
| Tuning Frequency Range | 37-44 M.C. |

Intermediate Frequency

| | |
|---|---|
| Mid-frequency | 3.0 M.C. |
| Band Width | 300 K.C. |

Electrical Power Output

| | |
|---|---|
| Undistorted | 12.0 Watts |
| Maximum | 15.0 Watts |

Loudspeaker - Electrodynamic

| | |
|---|---|
| Cone - Outside Diameter | 10 inches |
| Voice Coil Impedance (400 cycles) | 3.5 Ohms |
| Field Resistance | 450 Ohms (cold) |

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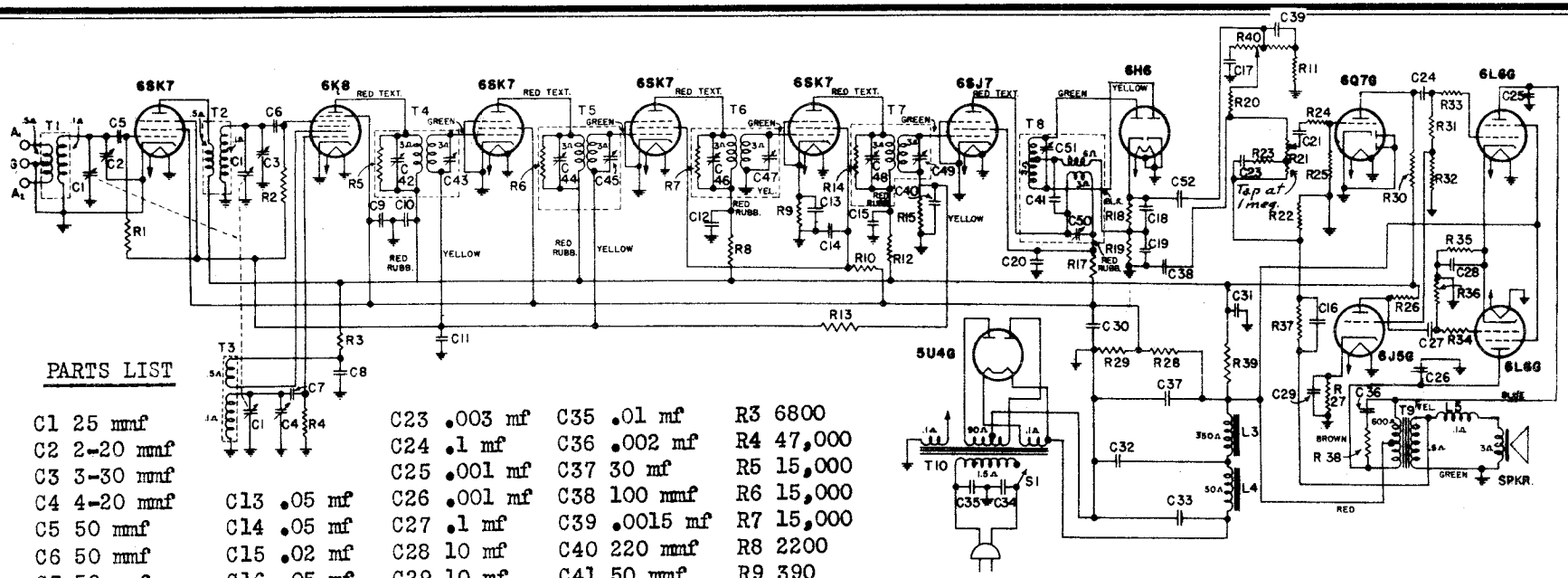
# GENERAL ELECTRIC CO.

MODEL GM125
Schematic, Voltage




## PARTS LIST

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C1 25 mmf | C13 .05 mf | C23 .003 mf | C35 .01 mf | R3 6800 | R15 330,000 | R21 2 meg. | R31 120,000 |
| C2 2-20 mmf | C14 .05 mf | C24 .1 mf | C36 .002 mf | R4 47,000 | R17 2200 | R22 15 | R32 8200 |
| C3 3-30 mmf | C15 .02 mf | C25 .001 mf | C37 30 mf | R5 15,000 | R18 100,000 | R23 180,000 | R33 1000 |
| C4 4-20 mmf | C16 .05 mf | C26 .001 mf | C38 100 mmf | R6 15,000 | R19 100,000 | R24 47,000 | R34 1000 |
| C5 50 mmf | C17 68 mmf | C27 .1 mf | C39 .0015 mf | R7 15,000 | R20 470,000 | R25 15 meg. | R35 180 |
| C6 50 mmf | C18 22 mmf | C28 10 mf | C40 220 mmf | R8 2200 | | R26 68,000 | R36 120,000 |
| C7 50 mmf | C19 22 mmf | C29 10 mf | C41 50 mmf | R9 390 | | R27 1500 | R37 47 |
| C8 220 mmf | C20 .05 mf | C30 8 mf | C42 to C51 | R10 2200 | | R28 5600 | R38 10,000 |
| C9 .05 mf | C21 .01 mf | C31 8 mf | 14-50 mmf | R11 270,000 | | R29 5600 | R39 2000 |
| C10 .05 mf | | C32 30 mf | C52 .02 mf | R12 2200 | | R30 220,000 | R40 2 meg. |
| C11 .05 mf | | C33 30 mf | R1 470,000 | R13 2.2 meg. | | | |
| C12 .02 mf | | C34 .01 mf | R2 470,000 | R14 15,000 | | | |

IF FREQUENCY
Mid-frequency ..... 3 MC
Band Width .... 300 KC

| Tube | Application | Plate to Gnd Volts | Screen to Gnd Volts | Cathode to Gnd Volts | Cathode Cur.MA | Filament Volts |
|---|---|---|---|---|---|---|
| 6SK7 | RF | 240 | 90 | 0 | 7.5 | 6.4 |
| 6K8 | Conv. | 238 | 90 | 0 | 8.0 | 6.4 |
| | Osc. | 188 | | | | |
| 6SK7 | 1st IF | 238 | 90 | 0 | 8.1 | 6.4 |
| 6SK7 | 2nd IF | 230 | 83 | 0 | 6.1 | 6.4 |
| 6SK7 | 3rd IF | 225 | 83 | 2.9 | 6.1 | 6.4 |
| 6SJ7 | 4th IF | 65 | 65 | 0 | 7.2 | 6.4 |
| 6Q7G | 1st Audio | 65 | -- | 0 | --- | 6.4 |
| 6J5G | Invertor | 48 | -- | 1.7 | 2.0 | 6.4 |
| (2) 6L6G | Output | 267 | 285 | 21 | 112 | 6.4 |
| 5U4G | Rectifier | 350/350 V. A.C. RMS | --- | --- | 180 | 50 |

Line Voltage - 120 No signal input. Pilot Light-Mazda 44

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MODEL GM125
Socket, Trimmers
Alignment

# GENERAL ELECTRIC CO.




TUBE AND TRIMMER LOCATION

## CIRCUIT ALIGNMENT

### IF Amplifier

Due to the good stability of components and the wide band characteristics of this amplifier, alignment should be unnecessary under normal operating conditions. Should it become imperative that an IF alignment is desirable, it will be necessary to use a cathode ray oscilloscope in conjunction with a 3.0 megacycle signal generator with a superimposed ±300 K.C. sweep frequency. This generator may be built up by constructing an oscillator with the tank condenser semi-fixed and variable, the variable portion being designed to be rotated by a motor and of proper capacity to give ± 300 K.C. variation of the 3.0 megacycle mid-frequency. Connect the vertical plates of the oscilloscope across the resistor R-15 of the 4th IF stage and align transformers T-7, T-6, T-5 and T-4 in a progressive step by step method.

### Frequency Demodulator

With the same oscillator and sweep signal as used above, connect the vertical oscilloscope plates across the resistors, R-18 and R-19, then align the transformer T-8 for a cross-over curve as shown in Fig. 4. Proper alignment of trimmer C-51 is indicated when the curve crosses about mid-way in a vertical plane. Proper alignment of C-50 is indicated when the sides of the curve near cross-over are nearest to a straight line.



Fig. 4

Note - Keep signal input high enough so that noise limiter is functioning. This point is indicated when an increase in signal input no longer changes the size of the curve.

### RF Alignment

Make sure the last division on the low frequency end of the drum dial coincides with the escutcheon mark when the gang condenser is completely closed; then, proceed as follows:

1. Connect a high resistance 0-10 V D.C. voltmeter across R-15.
2. Apply a 42.8 megacycle unmodulated signal to the antenna terminal board.
3. Set dial accle so it is tuned to 42.8 megacycle and peak oscillator trimmer C-4 for maximum voltage reading on the meter.
4. Peak the antenna (C-2) and RF (C-3) trimmers for maximum voltage output on meter.

Note - The proper location of the trimmers is shown on a following page.

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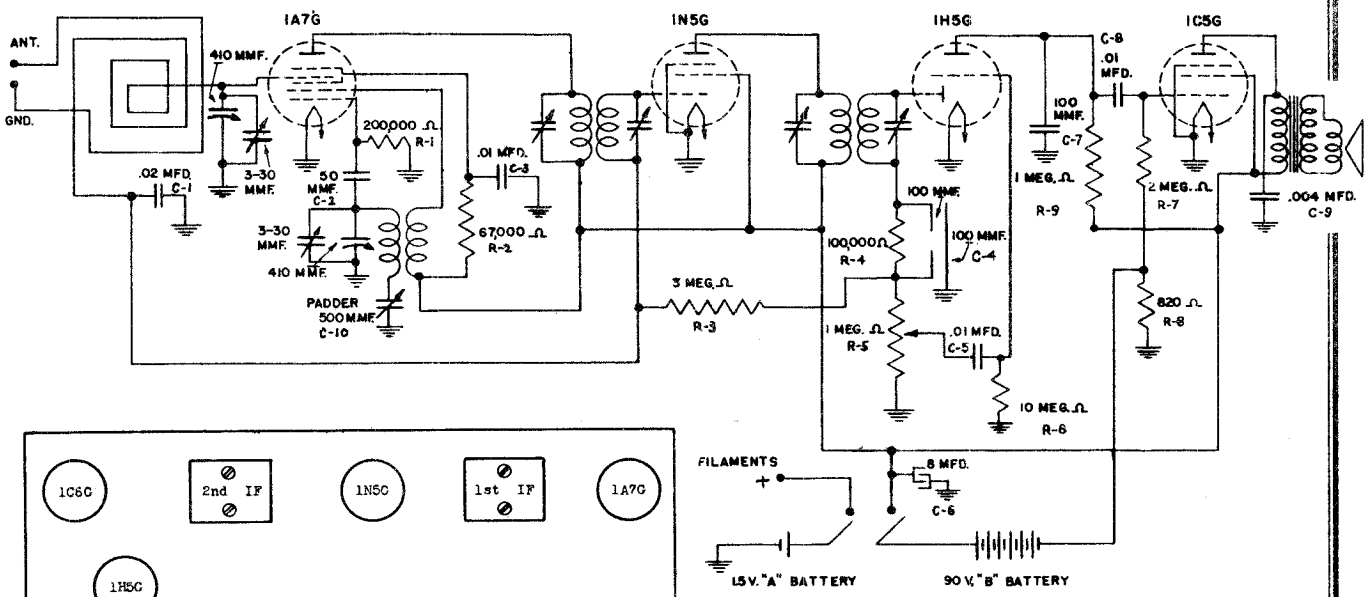
GENERAL ELECTRIC CO. MODEL GD400 Schematic, Socket, Trimmers Alignment



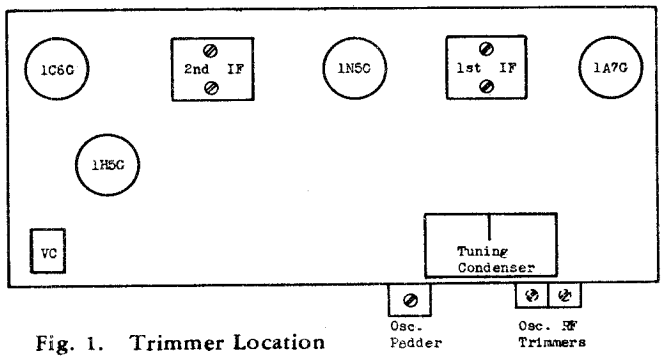




Fig. 1. Trimmer Location

# MODEL GB-400 BATTERY-OPERATED

## SERVICE DATA

### *Physical Specifications*

| | |
|---|---|
| Model | GB-400 |
| Height | 9⅜ inches |
| Width | 13 inches |
| Depth | 8¼ inches |

***Tuning Control Drive Ratio*** ..... 1:1

### *Batteries Required*

1—1½-volt "A" battery (Eveready No. 741 or equivalent).

2—45-volt "B" batteries (Eveready No. 762 or equivalent).

***Tuning Frequency Range*** ..... 540–1600 kc.

### *Alignment Frequency*

| | |
|---|---|
| IF | 455 kc. |
| RF | 600 and 1500 kc. |

### *Loud-speaker—Permanent Magnet*

| | |
|---|---|
| Over-all diameter | 5 inch |
| Cone Coil Impedance (400 cycles) | 3.0 ohms |

### *Tubes*

| | |
|---|---|
| Converter and Oscillator | GE-1A7G |
| IF Amplifier | GE-1N5G |
| Detector and 1st Audio | GE-1H5G |
| Power Amplifier | GE-1C5G |

## GENERAL INFORMATION

The Model GB-400 is a compact and portable battery-operated receiver that employs four tubes in a superheterodyne circuit. Features of design include self-contained "A" and "B" battery supply, an efficient loop antenna built inside of the cabinet, and an efficient P.M. speaker.

## ALIGNMENT PROCEDURE

### *Alignment Frequencies*

IF—455 kc. Broadcast—1500 kc. and 600 kc.

*NOTE—Do not rest the chassis on any of its sides when attempting to align; place in either an inverted or upright position.*

### *IF Alignment*

To align the IF, it will be necessary to remove the chassis from the cabinet. Connect an output meter across the voice coil. Set the volume control for maximum.

Adjust the test oscillator to 455 kc. and apply the signal to the control grid of the 1A7G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 1A7G tube. Keep the test oscillator output as low as possible to give a readable output. Adjust all four IF trimmers for maximum output.

### *RF Alignment*

The following alignment should be made with the receiver fastened in the case. Turn the receiver to its inverted position and make trimmer and padder alignments through the holes provided in the bottom of the case.

Connect the ground lead of the signal generator to the receiver chassis and the other lead to the receiver antenna terminal (located underneath cabinet). A dummy antenna consisting of a 250 mmf. capacitor in series with 200 ohms should be connected in the antenna lead of the signal generator. Apply a 600 kc. modulated signal and adjust the oscillator padder for a maximum output while rocking the gang condenser in vicinity of 600 kc. mark on the dial.

Using the same dummy antenna with a 1500 kc. signal generator input, adjust the oscillator trimmer for a maximum output. Now remove signal generator leads, tune in a station at approximately the 1500 kc. point on dial and then peak the RF trimmer for a maximum signal.

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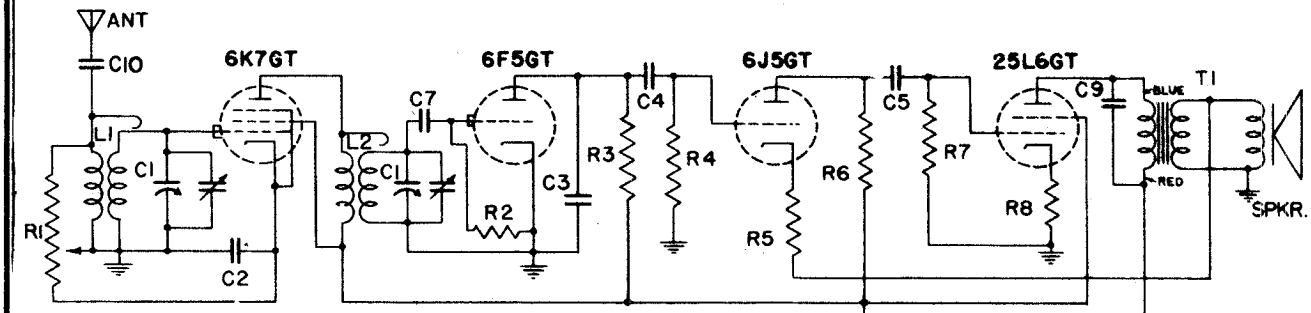
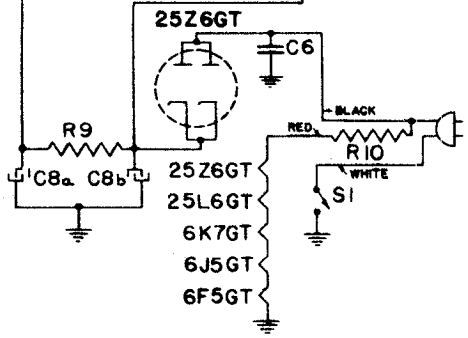
MODEL GD 500 — Voltage, Alignment
Schematic, Socket, Trimmers — GENERAL ELECTRIC CO.




| Symbol | Description |
|---|---|
| C-1 | Tuning Condenser |
| C-2 | .05 mfd., Paper Capacitor |
| C-3 | .001 mfd., Paper Capacitor |
| C-4, -5 | .005 mfd., Paper Capacitor |
| C-6, -7 | .01 mfd., Paper Capacitor |
| C-8a | 15 mfd., Dry Electrolytic |
| C-8b | 30 mfd., Dry Electrolytic |
| C-9 | .02 mfd., Paper Capacitor |
| C-10 | .002 mfd., Paper Capacitor |
| R-1 | 30,000 ohm, Volume Control |
| R-2 | 15 megohm, Carbon Resistor |
| R-3, -4 | 470,000 ohm, Carbon Resistor |
| R-5 | 3,300 ohm, Carbon Resistor |
| R-6 | 100,000 ohm, Carbon Resistor |
| R-7 | 470,000 ohm, Carbon Resistor |
| R-8 | 150 ohm, Carbon Resistor |
| R-9 | 4,700 ohm, Carbon Resistor |
| R-10 | 162 ohm, Power Cord Resistor |
| L-1 | Antenna Coil |
| L-2 | RF Coil |
| T-1 | Output Transformer |

*Tubes*

RF Amplifier.....GE-6K7GT
Detector.....GE-6F5GT
1st Audio.....GE-6J5GT
Power Output.....GE-25L6GT
Rectifier.....GE-25Z6GT




# MODEL GD-500
# TRF RECEIVER

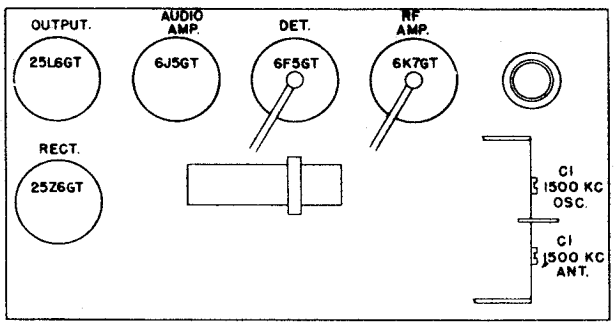



*Fig. 1. Trimmer Location*

## VOLTAGE CHART

| Tube No. | 6K7GT | 6J5GT | 6F5GT | 25L6GT | 25Z6GT |
|---|---|---|---|---|---|
| Plate to −B Volts | 88 | 30 * | 35 * | 132 | 120 AC |
| Screen to −B Volts | 88 | ... | .... | 88 | .... |
| Cathode to −B Volts | 0 | 1.3 | 0 | 5.5 | 140 |
| Filament Volts | 6.4 | 6.3 | 6.2 | 25.0 | 25.0 |

Voltage measured when volume control is set to maximum.
Line Voltage—120 AC. No signal input.
* Measured on 500-volt scale.
On DC, voltages should read approximately 10% lower.

## *Electrical Specifications*

| Power Supply (Volts) | Frequency (Cycles on AC) | Power Consumption (Watts) |
|---|---|---|
| 110–120 AC or DC | 25–60 | 45 |

*Tuning Frequency Range*

Band "B".....540–1750 KC
Alignment Frequency.....1500 KC

*Electrical Power Output*

Undistorted.....1.4 watts
Maximum.....2.0 watts

*Loudspeaker—Permanent Magnet*

Outside Cone Diameter.....4½ inches
Voice Coil Impedance (400 cycles).....3.5 ohms

## GENERAL INFORMATION

Model GD-500 is a compact five-tube AC-DC tuned radio frequency receiver that tunes the broadcast band of frequencies. One side of the power line is connected directly to the chassis ground, therefore, caution should be exercised in servicing.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If any hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

## ALIGNMENT

Connect the high side of the signal generator through a 250 mmf. condenser to the antenna lead. The low side of the signal generator output should be connected to the receiver chassis through a .05 mfd. condenser. Connect a suitable output meter across the voice coil leads; then proceed as follows:

1. With gang condenser plates completely closed, the tuning mark should be over the last mark on the dial.
2. Tune receiver to the 1500 KC point on the dial; then align trimmers on the gang condenser at 1500 KC for a maximum output meter reading.

Precaution—One side of the power supply is connected to the chassis. Do not connect chassis to any external ground.

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MODELS GD520,GD521
Schematic,Socket,Trimmers
Voltage,Alignment

# GENERAL ELECTRIC CO.

***Tuning Frequency Range***

Band "B" . . . . . 535 to 1730 kc

***Electrical Power Output***

Undistorted . . . . . 1.1 watts
Maximum . . . . . 2.0 watts

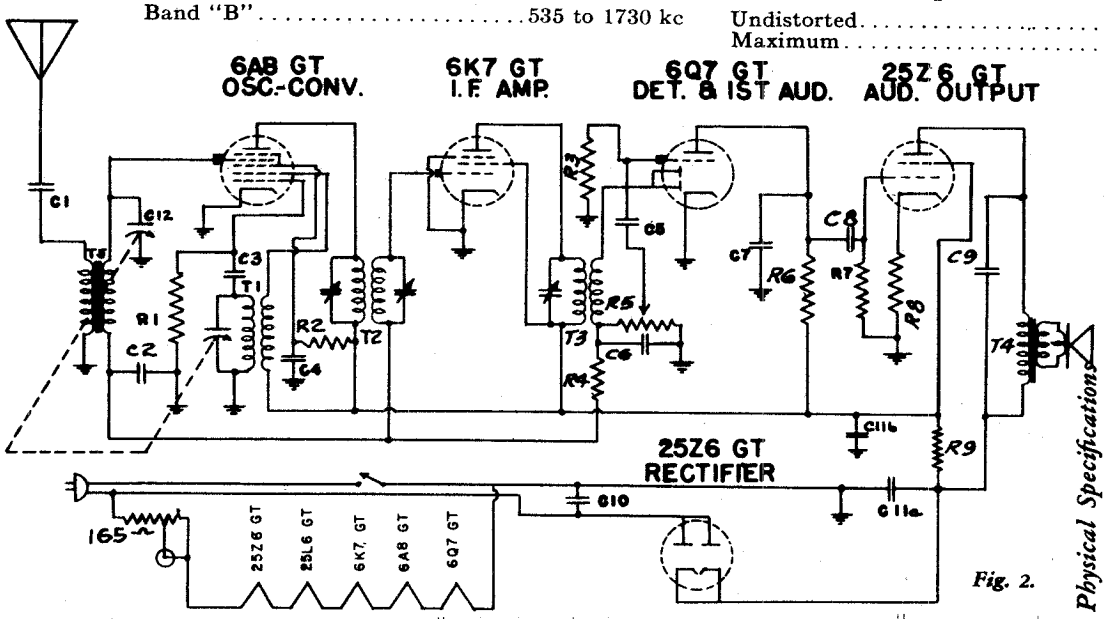


Fig. 2.

***Physical Specifications***

Height . . . . . 5 1/4 inches
Width . . . . . 7 5/8 inches
Depth . . . . . 4 1/4 inches

***Tuning Control Drive Ratio*** . . . . . 3 to 1

***Loud-speaker—Permanent Magnet***

Outside Cone Diameter . . . . . 3 7/16 inches
Voice Coil Impedance (400 cycles) . . 3.0 ohms

| Symbol | Description | Symbol | Description | Symbol | Description |
|---|---|---|---|---|---|
| C1 | .005 mfd. paper capacitor | C10 | .05 mfd. paper capacitor | R6 | 250,000 ohm, carbon resistor |
| C2 | .02 mfd. paper capacitor | C11a | 25 mfd. dry electrolytic | R7 | 500,000 ohm, carbon resistor |
| C3 | 50 mmf. mica capacitor | C11b | 20 mfd. dry electrolytic | R8 | 180 ohm, carbon resistor |
| C4 | .01 mfd. paper capacitor | C12 | Tuning condenser | R9 | 2000 ohm, carbon resistor |
| C5 | .01 mfd. paper capacitor | R1 | 50,000 ohm, carbon resistor | T1 | Oscillator transformer |
| C6 | 250 mmf. mica capacitor | R2 | 40,000 ohm, carbon resistor | T2 | 1st I.F. transformer |
| C7 | 250 mmf. mica capacitor | R3 | 5 megohm, carbon resistor | T3 | 2nd I.F. transformer |
| C8 | .01 mfd. paper capacitor | R4 | 2 megohm, carbon resistor | T4 | Output transformer |
| C9 | .03 mfd. paper capacitor | R5 | 500,000 ohm, volume control | T5 | Antenna transformer |

| Power Supply | Frequency | Power Consumption |
|---|---|---|
| 105–125 Volts AC or DC | 60 Cycles | 45 Watts |

## MODELS GD-520 AND GD-521

### GENERAL INFORMATION

Models GD-520 and GD-521 are compact five-tube AC-DC superheterodyne receivers, employing five General Electric Pre-tested Tubes. One side of the power line is connected directly to the chassis ground in either receiver; therefore, caution should be exercised in servicing.

When operating from a D-c source of power, it is necessary to insert the power plug with proper polarity; otherwise, the receiver will fail to function. If any hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

***Alignment Frequencies***

I.F.—456 kc. . . . . Broadcast—1500 kc

The location of all trimmers is shown in Fig. 1.

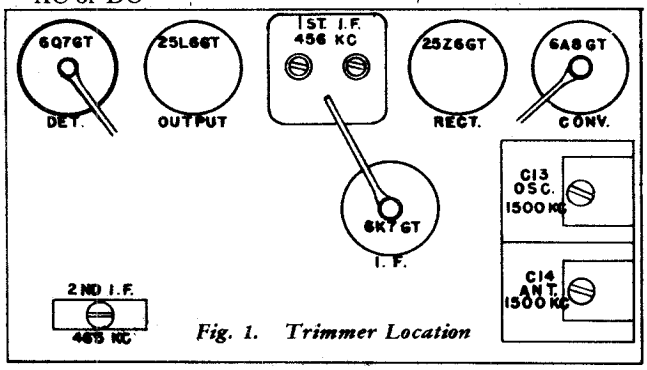


Fig. 1. *Trimmer Location*

***I.F. Alignment***

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 456 kc and apply signals to the control grid of the 6A8GT tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8GT. Keep the test oscillator output as low as possible to give a readable output. Adjust all three I.F. trimmers for maximum output.

***R.F. Alignment***

Set test oscillator to 1500 kc and connect one output lead to the receiver chassis† and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust the oscillator trimmer (C-13) and the antenna trimmer (C-14) for a maximum output.

†**Precaution.** One side of the power supply is connected to the chassis. Do not connect chassis to any external ground. If signal generator is A-c operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

### VOLTAGE CHART

| Tube No. | 6A8GT | 6K7GT | 6Q7GT | 25L6GT | 25Z6GT |
|---|---|---|---|---|---|
| Plate to −B Volts | 92 | 92 | 32* | 125 | 120 AC |
| Screen to −B Volts | 37 | 92 | .... | 92 | .... |
| Cathode to −B Volts | 0 | 0 | 0 | 5.9 | 133 |
| Filament Volts | 6.4 | 6.3 | 6.2 | 25.0 | 25.0 |

Voltage measured when volume control is set to minimum.
Line Voltage—120 AC. No signal input.
* Measured on 500-volt scale.
On DC, voltages should read approximately 10% lower.

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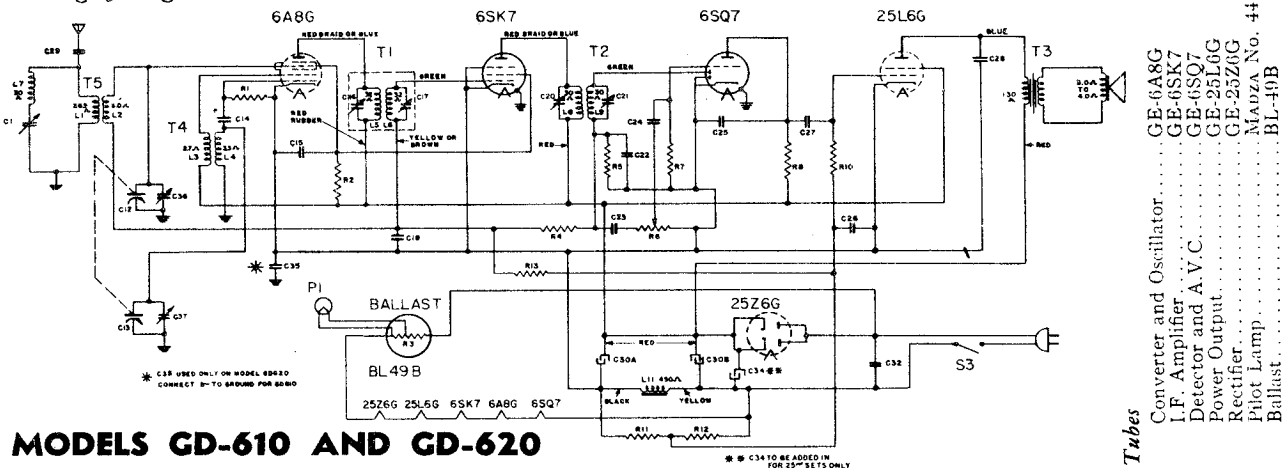
MODELS GD610, GD620
Schematic, Socket, Trimmers
Voltage, Alignment

GENERAL ELECTRIC CO.




Tubes
Converter and Oscillator ..... GE-6A8G
I.F. Amplifier ..... GE-6SK7
Detector and A.V.C. ..... GE-6SQ7
Power Output ..... GE-25L6G
Rectifier ..... GE-25Z6G
Pilot Lamp ..... Mazda No. 44
Ballast ..... BL-49B

# MODELS GD-610 AND GD-620

| Symbol | Description | Symbol | Description | Symbol | Description |
|---|---|---|---|---|---|
| C1 | Wave trap trimmer | C29 | .001 mfd., paper capacitor | R7 | 15 megohm, carbon resistor |
| C12, 13 | Tuning condenser | C30a | 10 mfd., dry electrolytic | R8 | 220,000 ohm, carbon resistor |
| C14 | 47 mmf., mica capacitor | C30b | 30 mfd., dry electrolytic | R10 | 470,000 ohm, carbon resistor |
| C15 | .25 mfd., paper capacitor | C32 | .02 mfd., paper capacitor | R11 | 270,000 ohm, carbon resistor |
| C19 | .05 mfd., paper capacitor | **C34 | .35 mfd., dry electrolytic | R12 | 680,000 ohm, carbon resistor |
| C22 | 470 mmf., mica capacitor | *C35 | .2 mfd., paper capacitor | R13 | 15 megohm, carbon resistor |
| C23 | .002 mfd., paper capacitor | R1 | 47,000 ohm, carbon resistor | T1 | 1st I.F. transformer |
| C24 | .002 mfd., paper capacitor | R2 | 10,000 ohm, carbon resistor | T2 | 2nd I.F. transformer |
| C25 | 330 mmf., mica capacitor | R3 | Ballast resistance, BL49B | T3 | Output transformer |
| C26 | .15 mfd., paper capacitor | R4 | 2.2 megohm, carbon resistor | T4 | Oscillator transformer |
| C27 | .005 mfd., paper capacitor | R5 | 470,000 ohm, carbon resistor | T5 | Antenna transformer |
| C28 | .03 mfd., paper capacitor | R6 | 2.0 megohm, volume control | | |

## SERVICE DATA

*Specifications*

| | GD-610 | GD-620 |
|---|---|---|
| Model | | |
| Height | 8¼ inches | 8¼ inches |
| Width | 12⅜ inches | 12⅜ inches |
| Depth | 5¾ inches | 5¾ inches |

***Tuning Control Drive Ratio*** ..... 1:1

## VOLTAGE CHART

| Tube No. | 6A8G | 6SK7 | 6SQ7 | 25L6G | 25Z6G |
|---|---|---|---|---|---|
| Plate to —B volts | 112 | 112 | 50* | 102 | .... |
| Screen to —B volts | 75 | 75 | .. | 112 | .. |
| Cathode to —B volts | 0 | 0 | 0 | 0 | 134 |
| Filament Volts | 6.4 | 6.4 | 6.4 | 24.5 | 24.5 |

Line Voltage—120 V. AC. Volume control at maximum.
* Measured on 250 volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

## ALIGNMENT PROCEDURE

*Alignment Frequencies*

I.F.—455 K.C. Broadcast—1500 K.C.
The location of all trimmers is shown in Fig. 1.

*I.F. Alignment*

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 K.C. and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G. Keep the test oscillator output as low as possible to give a readable output. Adjust all four I.F. trimmers for maximum output.

*Wave Trap Alignment*

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

*R.F. Alignment*

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-37) and antenna trimmer (C-36) for a maximum output.

**Precaution**—On the Model GD-610 one side of the power supply is connected to the chassis. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

| Power Supply (Volts) | Frequency (Cycles on AC) | Power Consumption (Watts) |
|---|---|---|
| 100-125 Volts AC or DC | 40-60 | 50 |

***Tuning Frequency Range*** ..... 540-1750 K.C.

***Intermediate Frequency*** ..... 455 K.C.

***Electrical Power Output (120-line Volts)***

| | A-C | D-C |
|---|---|---|
| Undistorted | 1.0 | 0.9 |
| Maximum | 1.8 | 1.5 |

***Loud-speaker—Electrodynamic***

Outside Cone Diameter ..... 5 inches
Voice Coil Impedance (400 cycles) ..... 4.0 ohms
Field Coil Resistance ..... 420 ohms

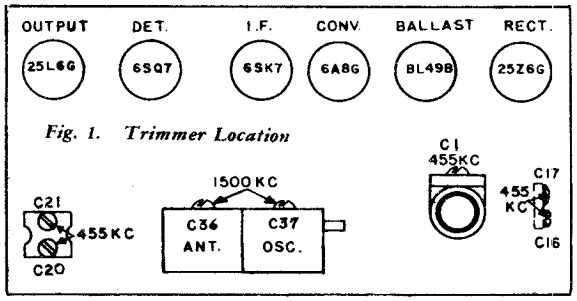



*Fig. 1. Trimmer Location*

***Production Change***

On a number of receivers, substitute electrolytic capacitor RC-5113 is used for C30b with both sections tied in parallel and RC5114 is used for C30a.

## GENERAL INFORMATION

The models GD-610 and GD-620 are compact six tube AC-DC superheterodyne receivers employing five General Electric tubes plus a ballast tube, described above in a superheterodyne circuit. Features of design include I.F. wave trap, automatic volume control, and an efficient electrodynamic speaker. Model GD-620 is fully approved by Underwriters Laboratories.

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# GENERAL ELECTRIC CO.

MODEL GD600
MODEL GD630
Schematics

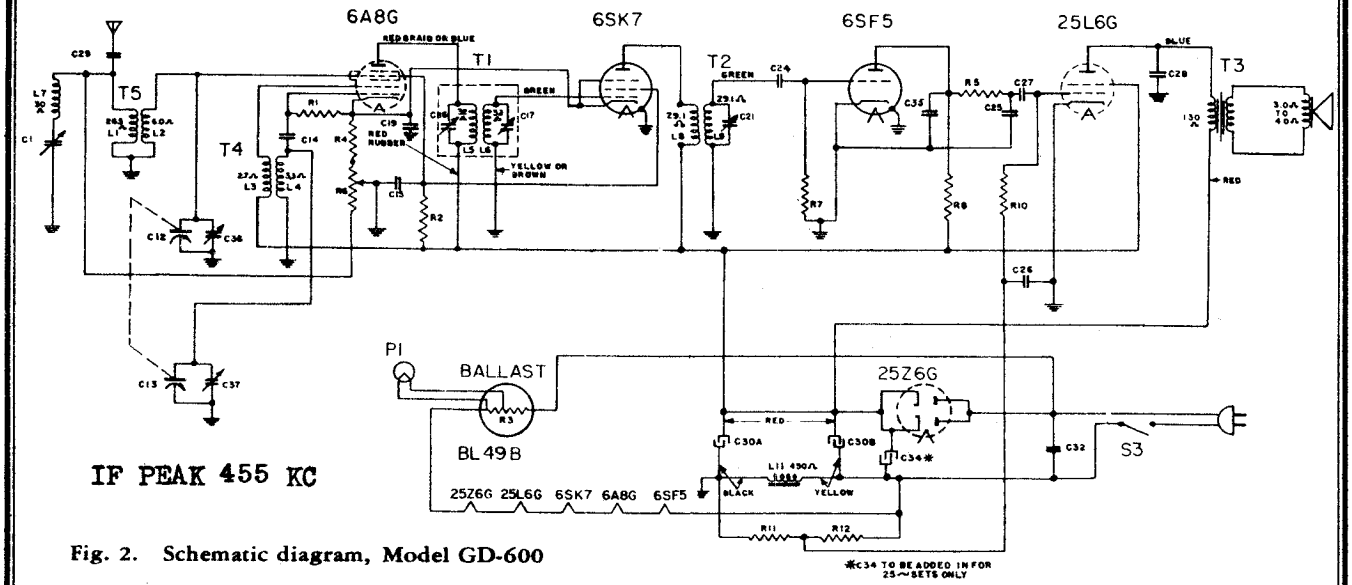


Fig. 2. Schematic diagram, Model GD-600

| Symbol | Description | Symbol | Description | Symbol | Description |
|---|---|---|---|---|---|
| C1 | Wave trap trimmer | C30a | 10 mfd., dry electrolytic | R6 | 10,000 ohm volume control |
| C12, 13 | Tuning condenser | C30b | 30 mfd., dry electrolytic | R7 | 15 megohm carbon resistor |
| C14 | 47 mmf., mica capacitor | C32 | .02 mfd., line capacitor | R8, 10 | 470,000 ohm carbon resistor |
| C15 | .25 mfd., paper capacitor | C34 | 35 mfd., dry electrolytic (for 25 v sets only) | R11 | 270,000 ohm carbon resistor |
| C19 | .05 mfd., paper capacitor | | | R12 | 680,000 ohm carbon resistor |
| C24 | .002 mfd., paper capacitor | C35 | 150 mmf., mica capacitor | T1 | 1st I.F. transformer |
| C25 | 330 mmf., mica capacitor | R1 | 47,000 ohm carbon resistor | T2 | 2nd I.F. transformer |
| C26 | .15 mfd., paper capacitor | R2 | 10,000 ohm carbon resistor | T3 | Output transformer |
| C27 | .005 mfd., paper capacitor | R3 | Ballast resistor | T4 | Oscillator transformer |
| C28 | .03 mfd., paper capacitor | R4 | 330 ohm carbon resistor | T5 | Antenna transformer |
| C29 | .001 mfd., paper capacitor | R5 | 10,000 ohm carbon resistor | | |

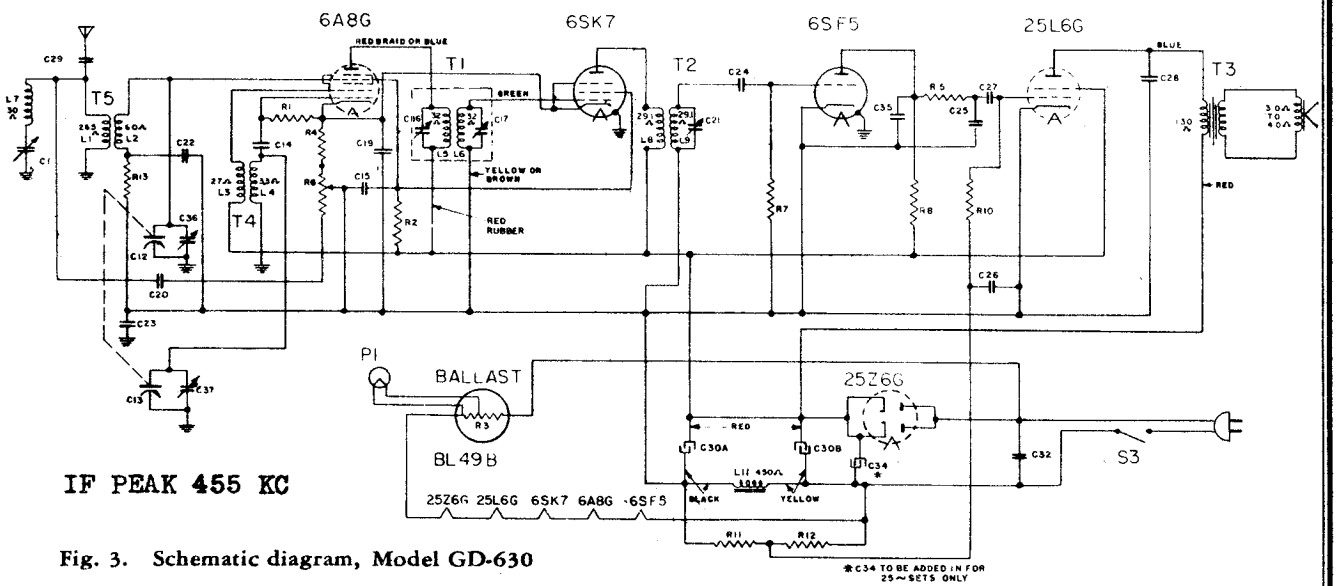


Fig. 3. Schematic diagram, Model GD-630

| Symbol | Description | Symbol | Description | Symbol | Description |
|---|---|---|---|---|---|
| C1 | Wave trap trimmer | C28 | .03 mfd., paper capacitor | R5 | 10,000 ohm carbon resistor |
| C12, 13 | Tuning condenser | C29 | .001 mfd., paper capacitor | R6 | 10,000 ohm volume control |
| C14 | 47 mmf., mica capacitor | C30a | 10 mfd., dry electrolytic | R7 | 15 megohm carbon resistor |
| C15 | .25 mfd., paper capacitor | C30b | 30 mfd., dry electrolytic | R8, 10 | 470,000 ohm carbon resistor |
| C19 | .05 mfd., paper capacitor | C32 | .02 mfd., line capacitor | R11 | 270,000 ohm carbon resistor |
| C20 | .05 mfd., paper capacitor | C34 | 35 mfd. dry electrolytic (used on 25-cycle sets only) | R12 | 680,000 ohm carbon resistor |
| C22 | .05 mfd., paper capacitor | | | R13 | 470,000 ohm carbon resistor |
| C23 | .20 mfd., paper capacitor | C35 | 150 mmf., mica capacitor | T1 | 1st I.F. transformer |
| C24 | .002 mfd., paper capacitor | R1 | 47,000 ohm carbon resistor | T2 | 2nd I.F. transformer |
| C25 | 330 mmf., mica capacitor | R2 | 10,000 ohm carbon resistor | T3 | Output transformer |
| C26 | .15 mfd. paper capacitor | R3 | Ballast resistor | T4 | Oscillator transformer |
| C27 | .005 mfd., paper capacitor | R4 | 330 ohm carbon resistor | T5 | Antenna transformer |

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MODEL GD600
MODEL GD630
Socket, Trimmers
Voltage, Alignment

GENERAL ELECTRIC CO.

# MODELS GD-600 AND GD-630

## SERVICE DATA

*Specifications*

| | GD-600 | GD-630 |
|---|---|---|
| Model | | |
| Height | 8¼ inches | 8¼ inches |
| Width | 12⅜ inches | 12⅜ inches |
| Depth | 5¾ inches | 5¾ inches |

*Tuning Control Drive Ratio*.....1:1

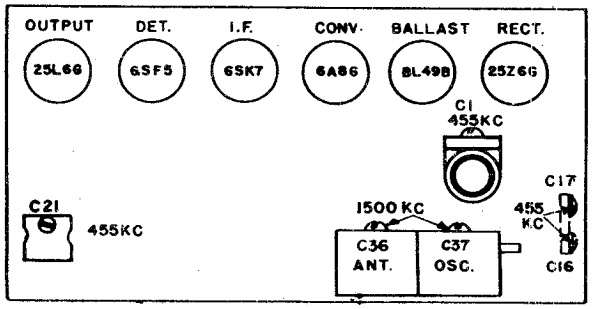


Fig. 1. Trimmer Location

*Electrical Specifications*

| Power Supply (Volts) | Frequency (Cycles on AC) | Power Consumption (Watts) |
|---|---|---|
| 100–125 Volts AC or DC | 40–60 | 50 |

*Tuning Frequency Range*.....540–1750 kc.

*Intermediate Frequency*.....455 kc.

*Electrical Power Output (120-line Volts)*

| | AC | DC |
|---|---|---|
| Undistorted | 1.0 | 0.9 |
| Maximum | 1.8 | 1.5 |

*Loud-speaker—Electrodynamic*

Outside Cone Diameter.....5 inches
Voice Coil Impedance (400 cycles).....4.0 ohms
Field Coil Resistance.....420 ohms

*Tubes*

Converter and Oscillator.....GE-6A8G
I.F. Amplifier.....GE-6SK7
Detector.....GE-6SF5
Power Output.....GE-25L6G
Rectifier.....GE-25Z6G
Pilot Lamp.....MAZDA No. 44
Ballast.....BL49-B

*Production Change*

On a number of receivers, substitute electrolytic RC-5113 is used for C30b with both sections tied in parallel and RC-5114 is used for C30a.

## VOLTAGE CHART

| Tube No. | 6A8G | 6SK7 | 6SF5 | 25L6G | 25Z6G |
|---|---|---|---|---|---|
| Plate to −B volts | 112 | 112 | 35* | 102 | .. |
| Screen to −B volts | 75 | 75 | .. | 112 | .. |
| Cathode to −B volts | 3.4 | 3.4 | 0 | 0 | 134 |
| Filament volts | .6.4 | 6.4 | 6.4 | 24 | 24 |

Line Voltage—120 V. AC. No signal input—Vol. control at max.
* Measured on 250-volt scale.
On DC, voltages are about 15 per cent lower.

When operating from a DC source of power, it is necessary to insert the power plug with proper polarity; otherwise the receiver will fail to function. If excessive hum is noticed when the receiver is used on AC, reverse the power plug in the receptacle.

## GENERAL INFORMATION

The models GD-600 and GD-630 are compact six-tube AC-DC superheterodyne receivers employing five General Electric tubes plus a ballast tube, as described above in a superheterodyne circuit. Features of design include I.F. wave trap, automatic overload control and an efficient electrodynamic speaker. Model GD-630 is fully approved by Underwriters' Laboratories.

## ALIGNMENT PROCEDURE

*Alignment Frequencies*

I.F.—455 K.C. Broadcast—1500 K.C.
The location of all trimmers is shown in Fig. 1.

*I.F. Alignment*

Connect an output meter across the voice coil. Set the volume control for maximum.

Set test oscillator to 455 K.C. and apply signal to the control grid of the 6A8G tube through a .05 mfd. capacitor. Do not remove the grid lead from the 6A8G. Keep the test oscillator output as low as possible to give a readable output. Adjust all I.F. trimmers for maximum output.

*Wave Trap Alignment*

Leave the test oscillator set to 455 K.C. and connect one output lead to the receiver chassis and the other through a 250 mmf. capacitor in series with 200 ohms to the receiver antenna lead. Adjust (C-1) for minimum output.

*R. F. Alignment*

Use the same dummy antenna (250 mmf. and 200 ohms) with 1500 K.C. input, adjust the oscillator trimmer (C-37) and antenna trimmer (C-36) for a maximum output.

**Precaution**—On the Model GD-600, one side of the power supply is connected to the chassis. If signal generator is AC operated, connect a .05 mfd. capacitor in the ground side before connecting it to the receiver chassis.

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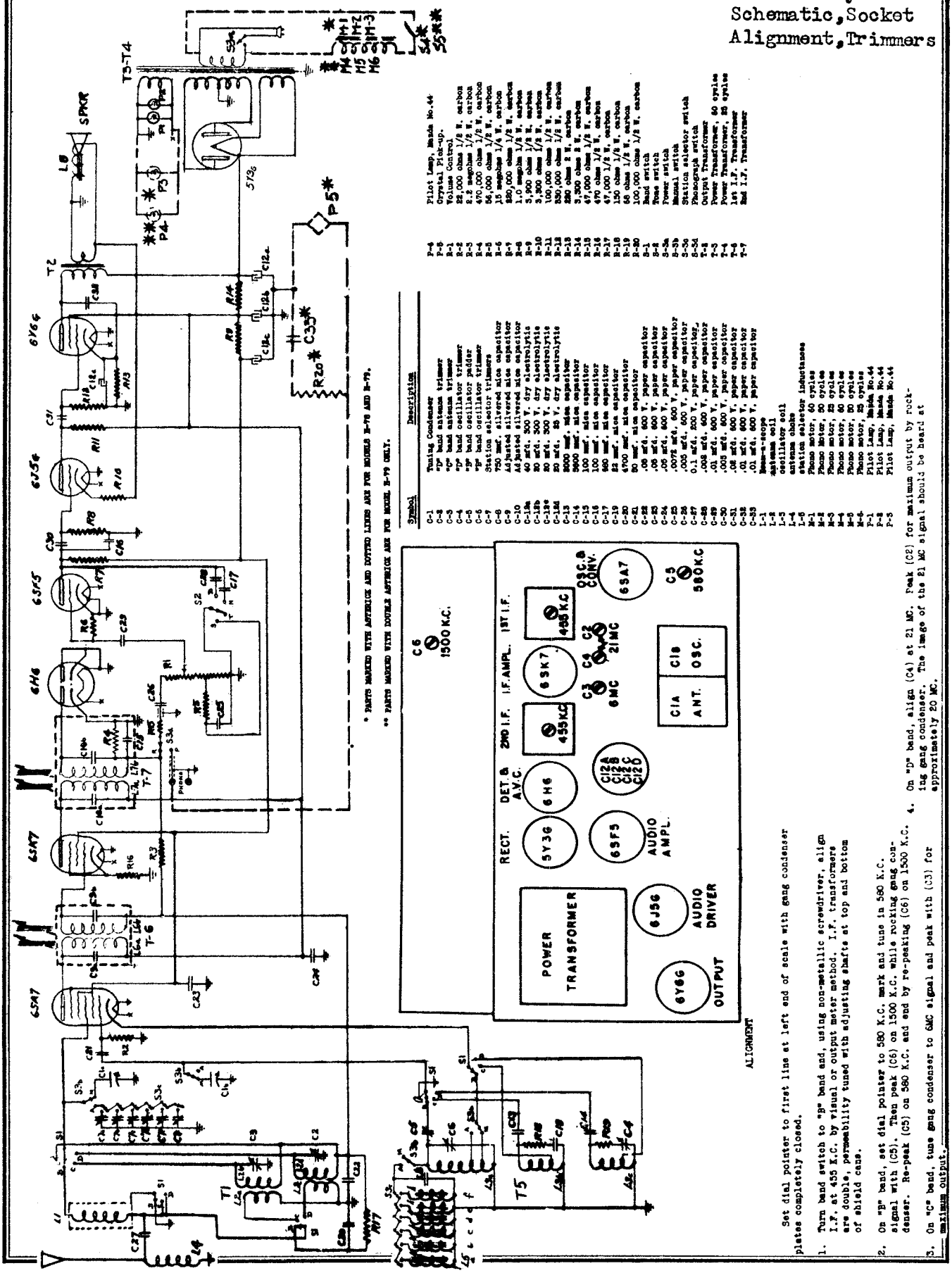
# GENERAL ELECTRIC CO.

## MODELS H73, H77, H79
## Preliminary
## Schematic, Socket
## Alignment, Trimmers




| Symbol | Description |
|---|---|
| C-1 | Tuning Condenser |
| C-2 | "p" band antenna trimmer |
| C-3 | "p" band antenna trimmer |
| C-4 | "p" band oscillator trimmer |
| C-5 | "p" band oscillator padder |
| C-6 | "p" band oscillator trimmer |
| C-7 | Station selector trimmers |
| C-8 | 750 mmf. silvered mica capacitor |
| C-9 | Adjusted silvered mica capacitor |
| C-10 | Adjusted silvered mica capacitor |
| C-11a | 40 mfd. 300 V. dry electrolytic |
| C-11b | 20 mfd. 300 V. dry electrolytic |
| C-11c | 20 mfd. 25 V. dry electrolytic |
| C-12 | 8000 mmf. mica capacitor |
| C-13 | 8000 mmf. mica capacitor |
| C-14 | 100 mmf. mica capacitor |
| C-15 | 100 mmf. mica capacitor |
| C-16 | 150 mmf. mica capacitor |
| C-17 | 25 mmf. mica capacitor |
| C-18 | 4700 mmf. mica capacitor |
| C-20 | 50 mmf. mica capacitor |
| C-21 | .05 mfd. 600 V. paper capacitor |
| C-22 | .05 mfd. 600 V. paper capacitor |
| C-23 | .05 mfd. 600 V. paper capacitor |
| C-24 | .0075 mfd. 600 V. paper capacitor |
| C-25 | .002 mfd. 600 V. paper capacitor |
| C-26 | .1 mfd. 200 V. paper capacitor |
| C-27 | .006 mfd. 600 V. paper capacitor |
| C-28 | .01 mfd. 600 V. paper capacitor |
| C-29 | .006 mfd. 600 V. paper capacitor |
| C-30 | .02 mfd. 600 V. paper capacitor |
| C-31 | .01 mfd. 600 V. paper capacitor |
| C-32 | .01 mfd. 600 V. paper capacitor |
| C-33 | Beam-stop |
| L-1 | Antenna coil |
| L-2 | Oscillator coil |
| L-3 | Station selector inductance |
| M-1 | Phono motor, 60 cycles |
| M-2 | Phono motor, 50 cycles |
| M-3 | Phono motor, 25 cycles |
| M-4 | Phono motor, 40 cycles |
| M-5 | Phono motor, 50 cycles |
| M-6 | Phono motor, 25 cycles |
| P-1 | Pilot Lamp, Mazda No.44 |
| P-2 | Pilot Lamp, Mazda No.44 |
| P-3 | Pilot Lamp, Mazda No.44 |
| P-4 | Pilot Lamp, Mazda No.44 |
| P-5 | Crystal Pick-up. |
| R-1 | Volume Control |
| R-2 | 22,000 ohms 1/2 W. carbon |
| R-3 | 2.2 megohms 1/2 W. carbon |
| R-4 | 470,000 ohms 1/2 W. carbon |
| R-5 | 56,000 ohms 1/2 W. carbon |
| R-6 | 15 megohm 1/4 W. carbon |
| R-7 | 680,000 ohms 1/2 W. carbon |
| R-8 | 1.0 megohm 1/2 W. carbon |
| R-9 | 5,600 ohms 1/2 W. carbon |
| R-10 | 3,300 ohms 1/2 W. carbon |
| R-11 | 100,000 ohms 1/2 W. carbon |
| R-12 | 250,000 ohms 1/2 W. carbon |
| R-13 | 220 ohms 2 W. carbon |
| R-14 | 3,300 ohms 2 W. carbon |
| R-15 | 47,000 ohms 1/2 W. carbon |
| R-16 | 470 ohms 1/2 W. carbon |
| R-17 | 47,000 1/2 W. carbon |
| R-18 | 150 ohms 1/2 W. carbon |
| R-19 | 68 ohms 1/2 W. carbon |
| R-20 | 100,000 ohms 1/2 W. carbon |
| S-1 | Band switch |
| S-2 | Tone switch |
| S-3a | Power switch |
| S-3b | Manual switch |
| S-3c | Station selector switch |
| S-3d | Phonograph switch |
| T-1 | Output Transformer |
| T-2 | Power Transformer, 60 cycles |
| T-4 | Power Transformer, 25 cycles |
| T-5 | 1st I.F. Transformer |
| T-6 | 2nd I.F. Transformer |
| T-7 | |

### ALIGNMENT

Set dial pointer to first line at left end of scale with gang condenser plates completely closed.

1. Turn band switch to "p" band and, using non-metallic screwdriver, align I.F. at 455 K.C. by visual or output meter method. I.F. transformers are double, permeability tuned with adjusting shafts at top and bottom of shield cans.
2. On "p" band, set dial pointer to 580 K.C. mark and tune in 580 K.C. signal with (C5). Then peak (C6) on 1500 K.C. while rocking gang condenser. Re-peak (C5) on 580 K.C. and end by re-peaking (C6) on 1500 K.C.
3. On "c" band, tune gang condenser to 6MC signal and peak with (C3) for maximum output.
4. On "p" band, align (C4) at 21 MC. Peak (C2) for maximum output by rocking gang condenser. The image of the 21 MC signal should be heard at approximately 20 MC.

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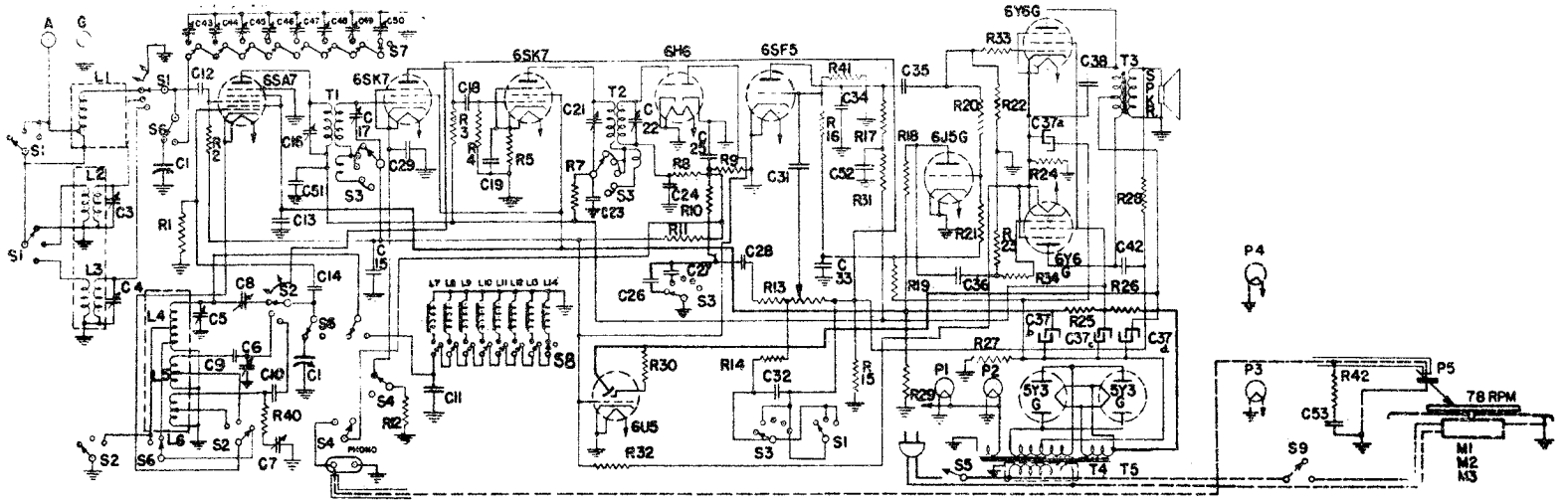
**MODELS H116,H118**
**Preliminary**
**Schematic,Socket**
**Alignment,Trimmers**

# GENERAL ELECTRIC CO.




| Symbol | Description |
|---|---|
| C-1 | Tuning Capacitor |
| C-3 | "C" Band Antenna Trimmer |
| C-4 | "D" Band Antenna Trimmer |
| C-5 | "B" Band Oscillator Trimmer |
| C-6 | "C" Band Oscillator Trimmer |
| C-7 | "D" Band Oscillator Trimmer |
| C-8 | "B" Band Padder |
| C-9 | 1500 mmf. mica Capacitor |
| C-10 | 4500 mmf. Mica Capacitor |
| C-11 | 750 mmf. Silvered Mica Capacitor |
| C-12 | 150 mmf. Mica Capacitor |
| C-13 | 0.1 mfd. 600 V. Paper Capacitor |
| C-14 | 47 mmf. mica Capacitor |
| C-15 | 0.1 mfd. 800 V. Paper capacitor |
| C-16 | 47 mmf. mica Capacitor |
| C-19 | .05 mfd. 200 V. Paper Capacitor |
| C-23 | .05 mfd. 600 V. Paper Capacitor |
| C-24 | 100 mmf. Mica Capacitor |
| C-25 | 47 mmf. Mica Capacitor |
| C-26 | .001 mfd. 600 V. Paper Capacitor |
| C-27 | 470 mmf. Mica Capacitor |
| C-28 | .01 mfd. 600 V. Paper Capacitor |
| C-29 | .05 mfd. 200 V. Paper Capacitor |
| C-31 | .01 mfd. 600 V. Paper Capacitor |
| C-32 | .003 mfd. 600 V. Paper Capacitor |
| C-33 | 0.1 mfd. 200 V. Paper Capacitor |
| C-34 | 47 mmf. Mica Capacitor |
| C-35 | .05 mfd. 600 V. Paper Capacitor |
| C-36 | .05 mfd. 600 V. Paper Capacitor |
| C-37a | 20 mfd. 25 V. Dry Electrolytic |
| C-37b | 20 mfd. 300 V. Dry Electrolytic |
| C-37c | 20 mfd. 300 V. Dry Electrolytic |
| C-37d | 40 mfd. 350 V. Dry Electrolytic |
| C-38 | .02 mfd. 1500 V. Paper Capacitor |
| C-42 | .01 mfd. 1000 V. Paper Capacitor |
| C-51 | 0.1 mfd. 600 V. Paper Capacitor |
| C-52 | .25 mfd. 600 V. Paper Capacitor |
| C-53 | .01 mfd. 600 V. Paper Capacitor |
| R-1 | 22,000 ohms, 1/2-W. Carbon Resistor |
| R-2 | 1.0 megohm, 1/2-W. Carbon Resistor |
| R-3 | 6800 ohms, 1/2-W. Carbon Resistor |
| R-4 | 47,000 ohms, 1/2-W. Carbon Resistor |
| R-5 | 330 ohms, 1/2-W. Carbon Resistor |
| R-7 | 1000 ohms, 1/2-W. Carbon Resistor |
| R-8 | 47,000 ohms, 1/2-W. Carbon Resistor |
| R-9 | 220,000 ohms, 1/2-W. Carbon Resistor |
| R-10 | 47,000 ohms, 1/2-W. Carbon Resistor |
| R-11 | 2.2 megohms, 1/2-W. Carbon Resistor |
| R-12 | 470 ohms, 1/2-W. Carbon Resistor |
| R-13 | 2 megohm Volume Control |
| R-14 | 100,000 ohms, 1/2-W. Carbon Resistor |
| R-15 | 15 ohms, 1/2-W. Carbon Resistor |
| R-16 | 4.7 megohms, 1/2-W. Carbon Resistor |
| R-17 | 150,000 ohms, 1/2-W. Carbon Resistor |
| R-18 | 47,000 ohms, 1/2-W. Carbon Resistor |
| R-19 | 1.0 megohms, 1/2-W. Carbon Resistor |
| R-20 | 3.3 megohms, 1/2-W. Carbon Resistor |
| R-21 | 270,000 ohms, 1/2-W. Carbon Resistor |
| R-22 | 220,000 ohms, 1/2-W. Carbon Resistor |
| R-23 | 220,000 ohms, 1/2-W. Carbon Resistor |
| R-24 | 100 ohms, 3.4 W. Wire Wound |
| R-25 | 2400 ohms, 2 W. Carbon Resistor |
| R-26 | 2200 ohms, 2.6 W. Wire Wound |
| R-27 | 12 ohms, 1/2-W. Carbon Resistor |
| R-28 | 68 ohms, 1/2-W. Carbon Resistor |
| R-29 | 47,000 ohms, 1/2-W. Carbon Resistor |
| R-30 | 1.0 megohm, 1/2-W. Carbon Resistor |
| R-31 | 47,000 ohms, 1/2-W. Carbon Resistor |
| R-32 | 5.6 megohms, 1/2-W. Carbon Resistor |
| R-33 | 1000 ohms, 1/2-W. Carbon Resistor |
| R-34 | 1000 ohms, 1/2-W. Carbon Resistor |
| R-40 | 33 ohms, 1/2-W. Carbon Resistor |
| R-41 | 4.7 megohms, 1/2-W. Carbon Resistor |
| R-42 | 100,000 ohms, 1/2-W. Carbon Resistor |
| PI-4 | Pilot Lights, Mazda #44 |

## ALIGNMENT

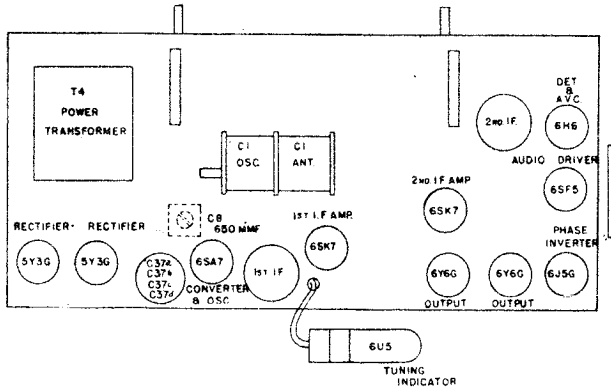
Set dial pointer to first line at left end of scale with gang condenser plates completely closed.

1. Turn band switch to "B" band and, using non-metallic screwdriver, align I.F's at 455 KC by visual or output meter method. I.F. transformers are double, permeability tuned with adjusting shafts at top and bottom of shield cans.

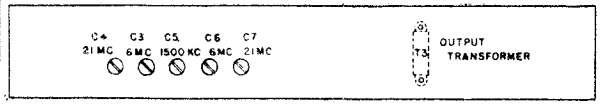
2. On "B" band, set dial pointer to 580 KC mark and tune in 580 KC signal with (C-8). Then peak (C-5) on 1500 KC while rocking gang condenser. Re-peak (C-8) on 580 KC and end by re-peaking (C-5) on 1500 KC.

3. On "C" band, set pointer to 6MC mark and align (C-6) to 6MC. Peak (C-3) for maximum output.

4. On "D" band, align (C-7) at 21 MC. Peak (C-4) for maximum output by rocking gang condenser. The image of the 21 MC signal should be heard at approximately 20 MC.




PARTS AND CONNECTORS SHOWN WITH DASH LINES ARE FOR H-118 ONLY.

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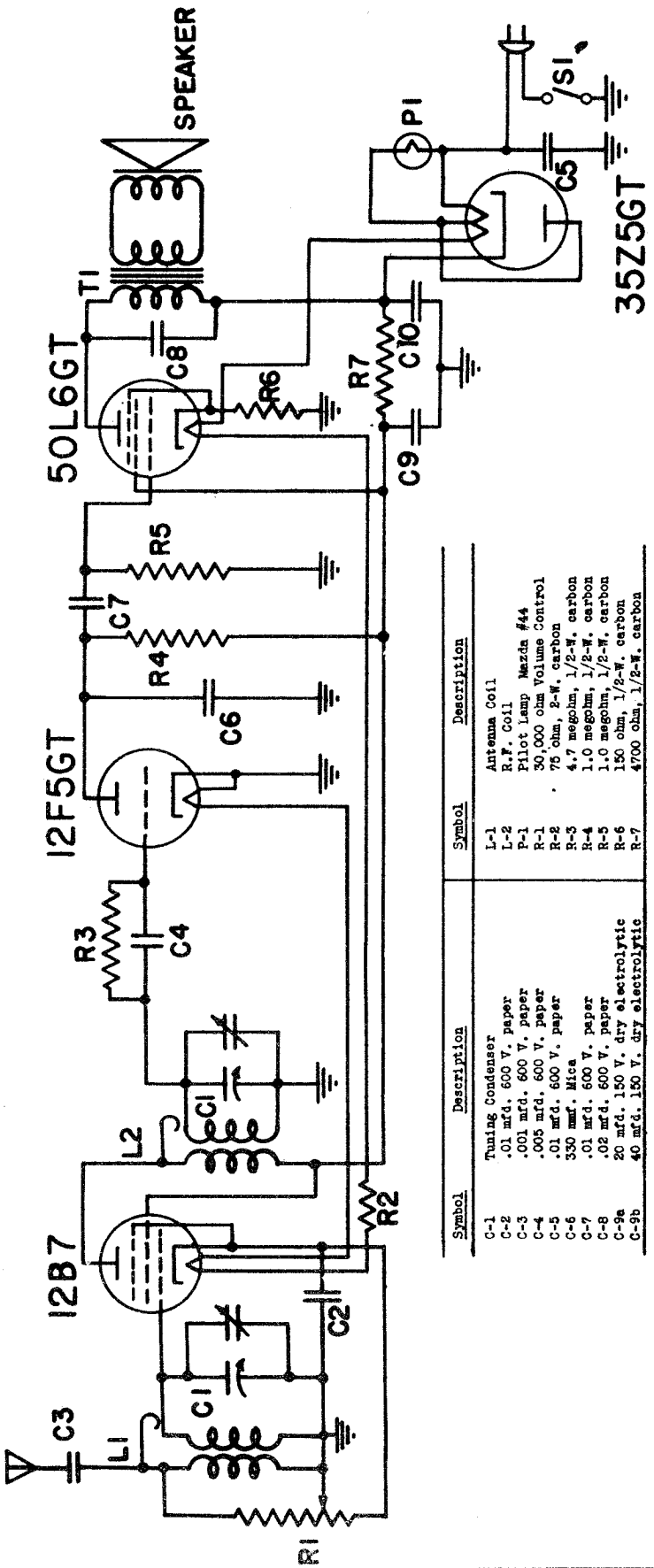
# GENERAL ELECTRIC CO.

MODEL H400, Preliminary Schematic, Socket Alignment, Trimmers




| Symbol | Description |
|---|---|
| C-1 | Tuning Condenser |
| C-2 | .01 mfd. 600 V. paper |
| C-3 | .001 mfd. 600 V. paper |
| C-4 | .005 mfd. 600 V. paper |
| C-5 | .01 mfd. 600 V. paper |
| C-6 | 330 mmf. Mica |
| C-7 | .01 mfd. 600 V. paper |
| C-8 | .02 mfd. 600 V. paper |
| C-9a | 20 mfd. 150 V. dry electrolytic |
| C-9b | 40 mfd. 150 V. dry electrolytic |

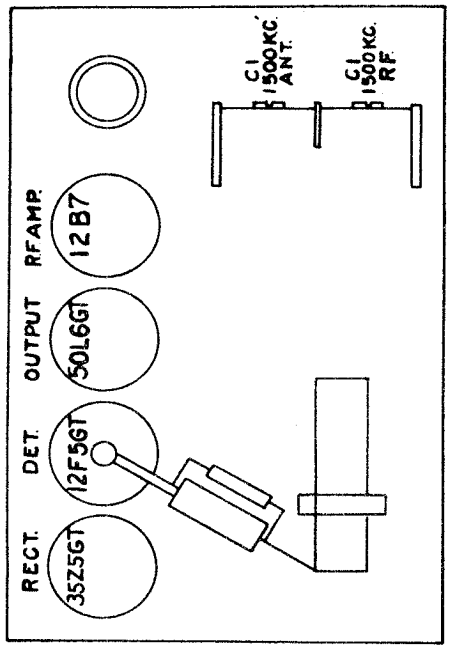
| Symbol | Description |
|---|---|
| L-1 | Antenna Coil |
| L-2 | R.F. Coil |
| P-1 | Pilot Lamp Mazda #44 |
| R-1 | 30,000 ohm Volume Control |
| R-2 | 75 ohm, 2-W. carbon |
| R-3 | 4.7 megohm, 1/2-W. carbon |
| R-4 | 1.0 megohm, 1/2-W. carbon |
| R-5 | 1.0 megohm, 1/2-W. carbon |
| R-6 | 150 ohm, 1/2-W. carbon |
| R-7 | 4700 ohm, 1/2-W. carbon |

ALIGNMENT

Connect the high side of the signal generator through a 100 mmf. capacitor to the terminal to which the antenna hank is soldered. The low side of the signal generator output should be connected to the receiver chassis through a .05 mfd. condenser. Connect a suitable output meter across the voice coil leads; then proceed as follows:

1. With gang condenser plates completely closed, the tuning mark should be over the last mark on the dial.
2. Set volume control to about 3/4 maximum.
3. Rotate gang to minimum capacity and tune trimmers on the gang condenser to 1750 K.C. signal. Re-tune gang to 1500 K.C. signal and peak trimmers by alternate adjustment.

Precaution--one side of the power supply is connected to the chassis. Do not connect the chassis to any external ground.

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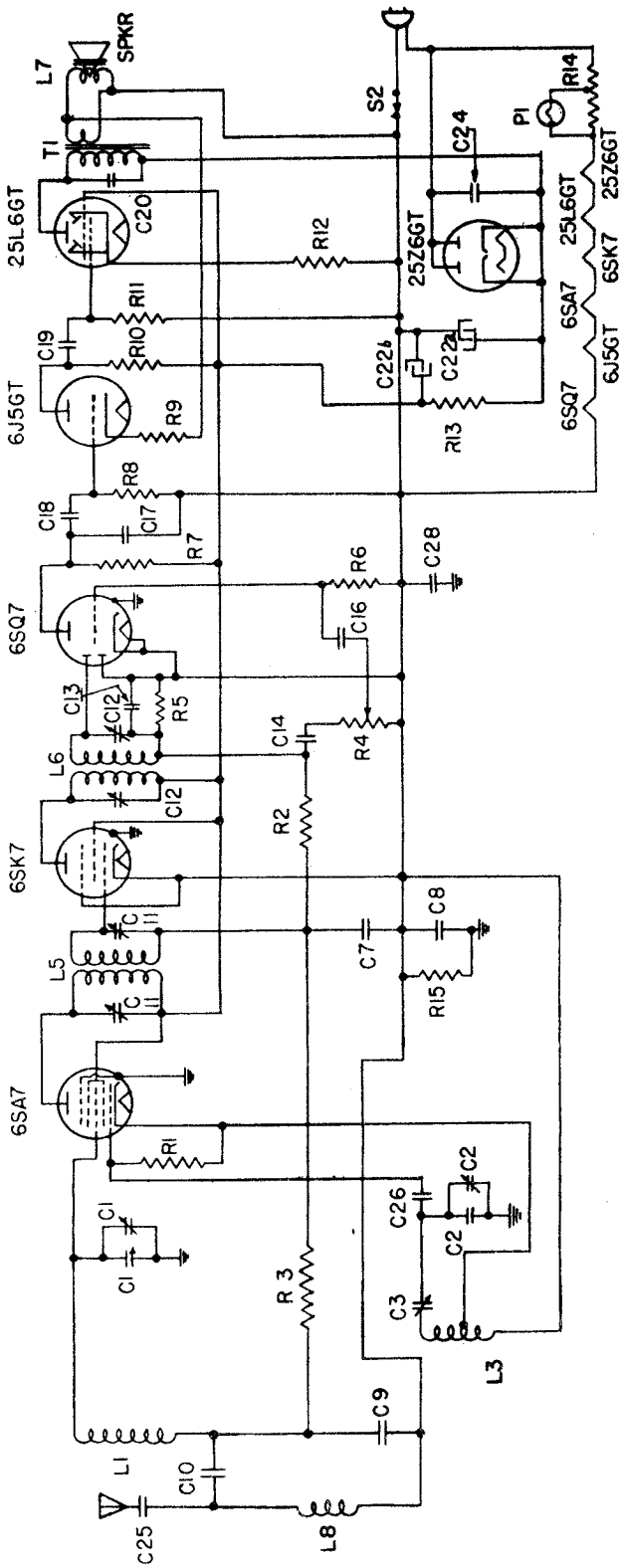
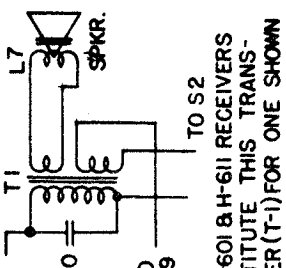
MODELS H600,H601,H610
H611, Preliminary
Schematic,Socket
Alignment,Trimmers

GENERAL ELECTRIC CO.




ON H-601 & H-611 RECEIVERS SUBSTITUTE THIS TRANSFORMER (T-1) FOR ONE SHOWN ABOVE.

ALIGNMENT

With gang condenser plates completely closed, set dial pointer to first line at left-end of scale.

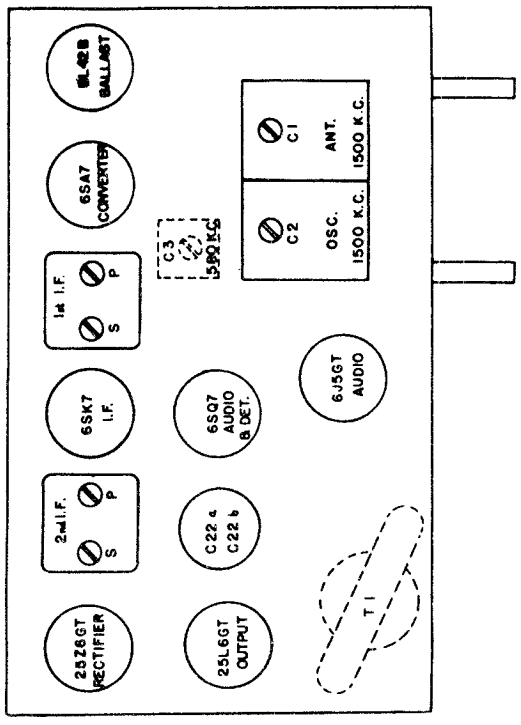
1. Align I. F.'s at 455 K.C. by visual or output meter method.

2. Apply a 1500 K.C. signal either through a standard I.R.E. dummy to the antenna terminal, or by a loop coupled to the 1500 K.C. coil in the set. Tune receiver to 1500 K.C. Use additional loop, if necessary, which is coupled to the receiver. Use a 'scope. Align (C-2) at 1500 K.C. and peak (C-1) for maximum output. Then peak (C-3) on 580 K.C. while rocking the gang condenser. Retrim at 1500 K.C.

| Symbol | Description |
|---|---|
| C-1, 2 | Tuning Condenser |
| C-3 | "B" Band Padder |
| C-7 | .05 mfd. Paper Capacitor |
| C-8 | .1 mfd. Paper Capacitor |
| C-9 | 3500 mmf. Mica Capacitor |
| C-10 | .01 mfd. Paper Capacitor |
| C-13 | 470 mmf. Mica Capacitor |
| C-14 | .002 mfd. Paper Capacitor |
| C-16 | .002 mfd. Paper Capacitor |
| C-17 | 470 mmf. Mica Capacitor |
| C-18 | .005 mfd. Paper Capacitor |
| C-19 | .005 mfd. Paper Capacitor |

| Symbol | Description |
|---|---|
| C-20 | .01 mfd. Paper Capacitor |
| C-22a | 50 mfd. Dry Electrolytic |
| C-22b | 30 mfd. Dry Electrolytic |
| C-24 | .05 mfd. Paper Capacitor |
| C-25 | .01 mfd. Paper Capacitor |
| C-26 | 47 mmf. Mica Capacitor |
| C-28 | .1 mfd. Paper Capacitor |
| L-1 | Loop |
| L-3 | "B" Band Oscillator Coil |
| L-5 | Antenna Choke 1 1/2 MH. |
| L-6 | Pilot Lamp Bezel #44 |
| R-1 | 10,000 Ohm Carbon Resistor |
| R-2 | 2.2 megohm Carbon Resistor |

| Symbol | Description |
|---|---|
| R-3 | 470,000 Ohm Carbon Resistor |
| R-4 | Volume Control, 2 megohm |
| R-5 | 470,000 Ohm Carbon Resistor |
| R-6 | 15 megohm Carbon Resistor |
| R-7 | 470,000 Ohm Carbon Resistor |
| R-8 | 1.0 megohm Carbon Resistor |
| R-9 | 3300 Ohm Carbon Resistor |
| R-10 | 39,000 Ohm Carbon Resistor |
| R-11 | 470,000 Ohm Carbon Resistor |
| R-12 | 1200 Ohm Carbon Resistor |
| R-13 | 1000 Ohm Carbon Resistor |
| R-14 | Ballast Resistor BL42B |
| R-15 | 470,000 Ohm Carbon Resistor |

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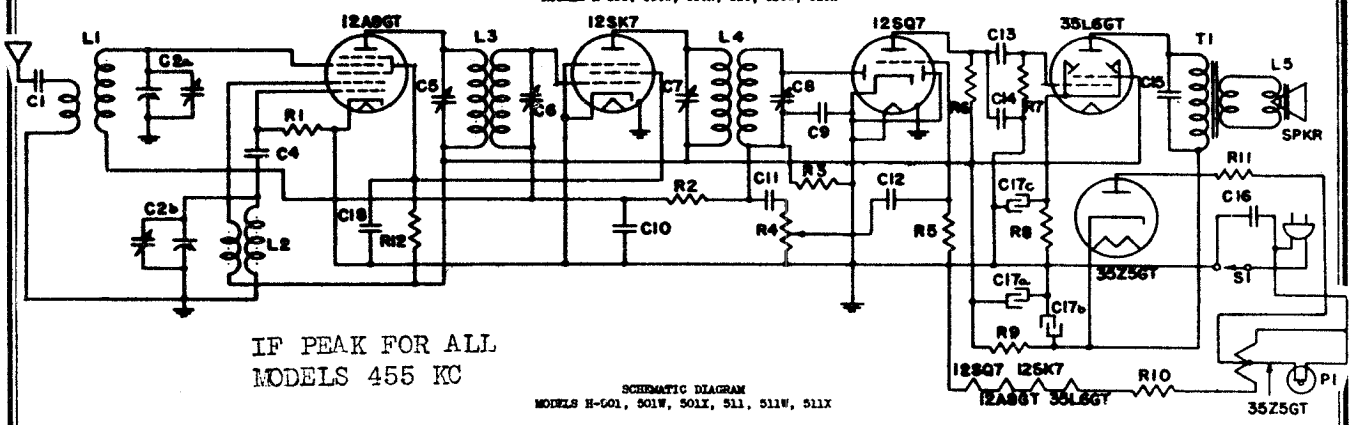
MODELS H520,H520W,H520X
MODELS H521,H521W,H521X
Schematics Preliminary

# GENERAL ELECTRIC CO.

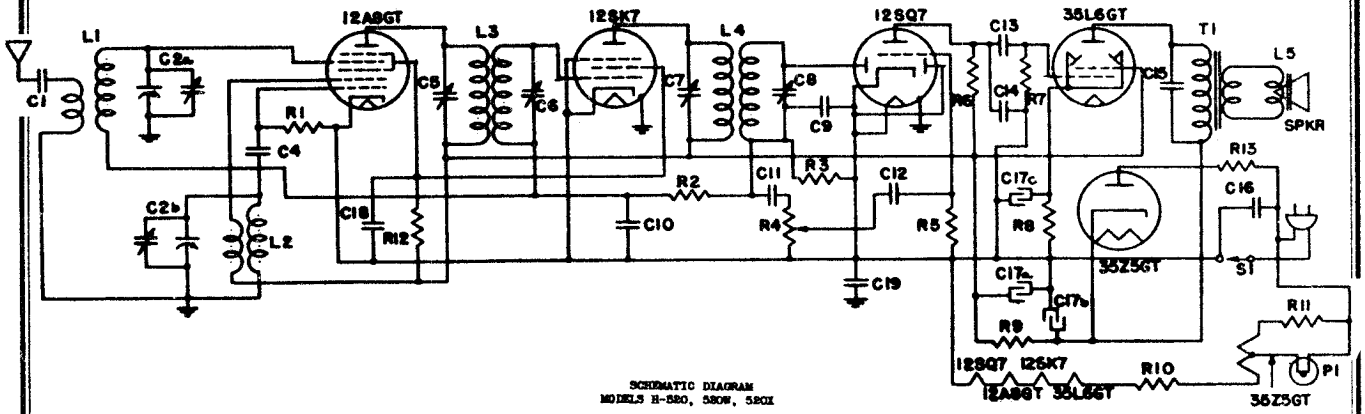
MODELS H500,H500W,H500X
H510,H510W,H510X
MODELS H501,H501W,H501X
H511,H511W,H511X

MODELS H-500, 500W, 500X, 510, 510W, 510X

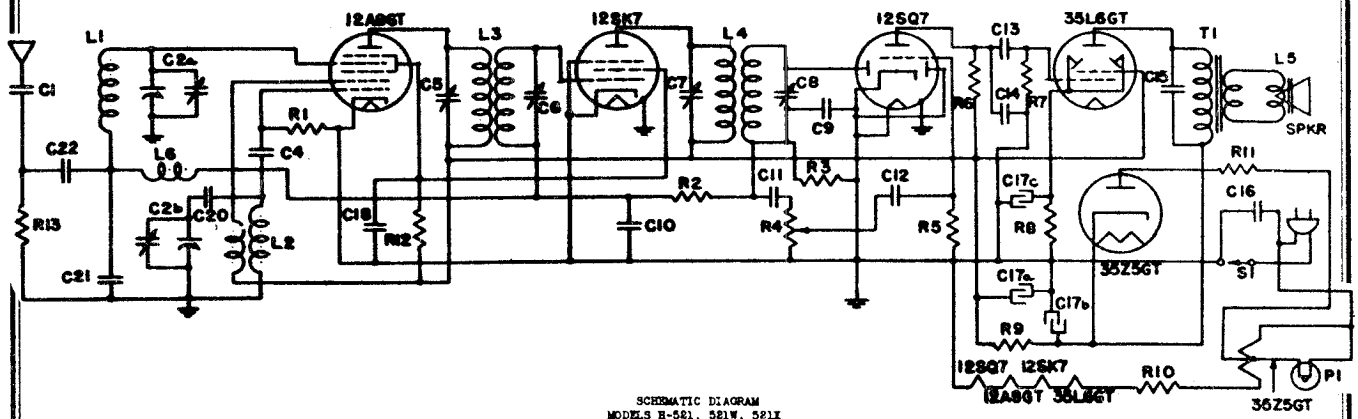



IF PEAK FOR ALL
MODELS 455 KC

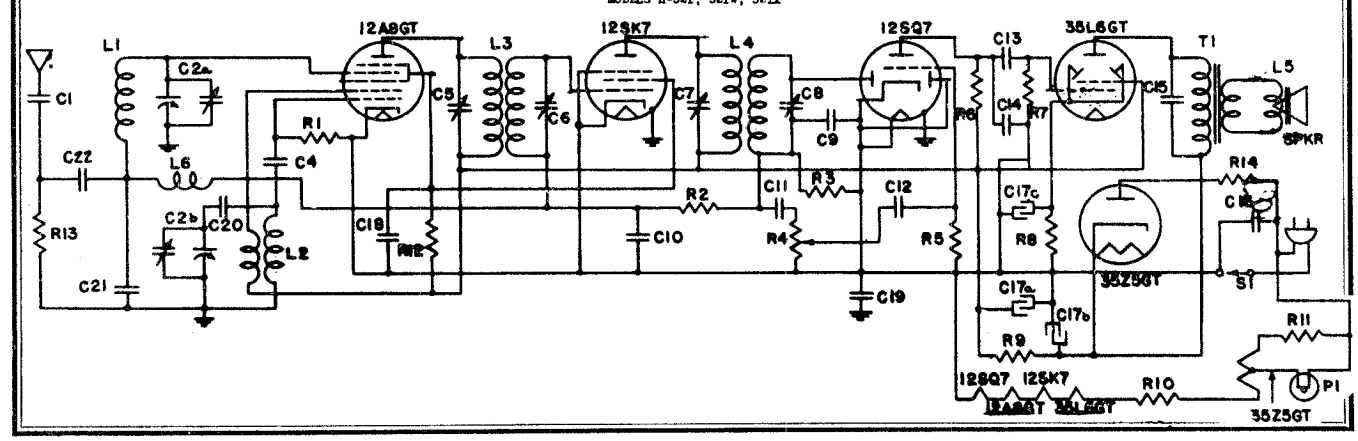
SCHEMATIC DIAGRAM
MODELS H-501, 501W, 501X, 511, 511W, 511X




SCHEMATIC DIAGRAM
MODELS H-520, 520W, 520X




SCHEMATIC DIAGRAM
MODELS H-521, 521W, 521X

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MODELS H500,H500W,H500X
H510,H510W,H510X
MODELS H501,H501W,H501X
H511,H511W,H511X

# GENERAL ELECTRIC CO.

MODELS H520,H520W,H520X
MODELS H521,H521W,H521X
Alignment,Socket,Parts
Trimmers Preliminary

PRELIMINARY
REPLACEMENT PARTS LIST
MODELS H-500, 501, 510, 511, 520, 521
(W & X MODELS INC.)

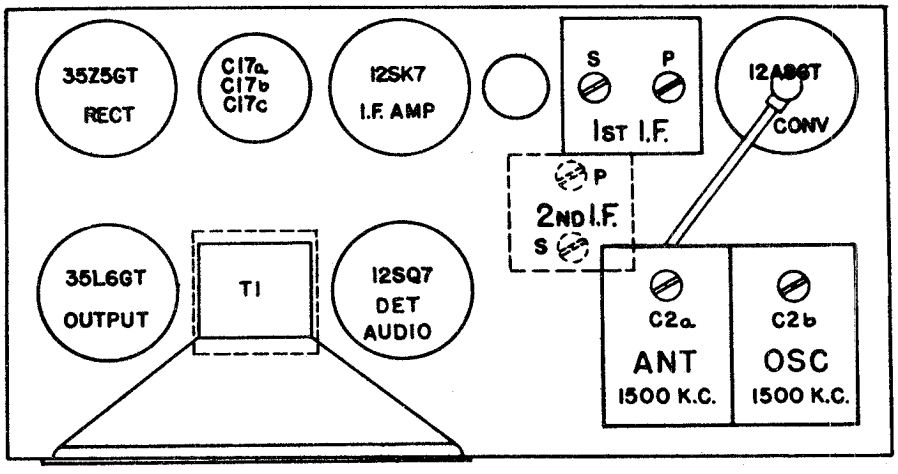
| Stock No. | | Description | List Price |
|---|---|---|---|
| *RB-008 | BOARD | - Terminal board (8 lug) | .10 |
| *RB-015 | BOARD | - Terminal board (2 lug) for models H-500, 501, 510, 511 | .10 |
| *RB-070 | BOARD | - Terminal board (3 lug) for models H-520 and H-521 | .10 |
| RB-179 | BRACKET | - Bracket for beam-a-scope frame for models H-520 and H-521 | |
| RB-914 | BACK COVER | - Cabinet back for models H-500, 501, 510, 511 (W and X models included) | |
| RB-915 | BACK COVER | - Plastic cabinet back for models H-520 and H-521 | |
| RB-916 | BACK COVER | - Plastic cabinet back for models H-520W and H-521W | |
| RB-917 | BACK COVER | - Plastic cabinet back for models H-520X and H-521X | |
| RC-016 | CAPACITOR | - .008 mfd. 600 V. paper (C-1,11,18) | .25 |
| *RC-023 | CAPACITOR | - .005 mfd. 600 V. paper (C-13) | .25 |
| *RC-039 | CAPACITOR | - .01 mfd. 600 V. paper (C-15) | .25 |
| *RC-072 | CAPACITOR | - .05 mfd. 200 V. paper (C-10,18) | .25 |
| *RC-092 | CAPACITOR | - .05 mfd. 600 V. paper (C-16) | .30 |
| *RC-130 | CAPACITOR | - .2 mfd. 400 V. paper for models H-501, H-511, H-521 (C-19) | .30 |
| *RC-216 | CAPACITOR | - 47 mmf. mica (C-4) | .25 |
| *RC-274 | CAPACITOR | - 330 mmf. mica (C-14) | .30 |
| *RC-294 | CAPACITOR | - 470 mmf. mica (C-9) | .30 |
| *RC-348 | CAPACITOR | - 1600 mmf. mica for models H-520, 521 | .35 |
| *RC-390 | CAPACITOR | - 3900 mmf. mica for models H-520 and H-521 C-21 | .35 |
| *RC-865 | CORD | - Power Cord | .65 |
| RC-1990 | CLAMP | - Antenna coil clamp for models H-500, 501, 510, 511 | |
| RC-5136 | CAPACITOR | - 30 mfd. 150 V; 40 mfd. 150 V; 20 mfd. 25 V; dry electrolytic (C-17a, 17b, 17c) | |
| RC-7018 | CONDENSER | - Tuning condenser for models H-510, 511, 520, 521 (C-2a, 2b) | |
| RC-7019 | CONDENSER | - Tuning condenser for models H-500 and H-501 (C-2a, 2b) | |
| RC-8508 | CARDS | - Station letter cards for models H-510, 511, 520, 521 | |
| RC-9018 | CORE ASSEMBLY | - Core assembly for all models | |
| RD-111 | DIAL | - Dial scale for models H-500, 501, 510, 511 | |
| RD-118 | DIAL | - Dial scale for models H-520 and H-521 | |
| RD-410 | DRUM | - Tuning condenser drive drum assembly for models in brown | |
| RD-411 | DRUM | - Tuning condenser drive drum assembly for all models in white and onyx | |
| *RG-016 | GRID CLIP | - Tube control grid clip (Pkg. 5) | .10 |
| RH-007 | HANK | - Antenna hank for models H-500,501,510,511 | |
| RK-048 | KNOB | - Control knob for all white models | |
| RK-061 | KNOB | - Control knob for all models except white | |

| Stock No. | | Description | List Price |
|---|---|---|---|
| RK-206 | KEY | - Station selector key for models H-510,511, 520,521 | |
| RK-207 | KEY | - Station selector key for models H-510W, H-511W, H-520W, H-521W | |
| RK-208 | KEY | - Station selector key for models H-510X, H-511X, H-520X, H-521X | |
| RL-086 | COIL | - Antenna coil for models H-500,501,510,511 (L-1) | |
| RL-290 | COIL | - Oscillator coil for models H-500,501,510,511 (L-2) | |
| RL-291 | COIL | - Oscillator coil for models H-520 and H-521 (L-2) | |
| RL-346 | CHOKE | - RF choke for models H-520 and H-521 (L-6) | |
| RL-510 | LOOP | - Beam-a-scope assembly for models H-520 and H-521 (L-1) | |
| RP-134 | PIN | - Key pin for models H-510,511,520,521 | |
| *RQ-1215 | RESISTOR | - 15 ohms, 1/2-W. carbon (Pkg. 5) | .70 |
| *RQ-1219 | RESISTOR | - 22 ohms, 1/2-W. carbon (R-11)(Pkg. 5) Models H-501,511,521 | .70 |
| *RQ-1239 | RESISTOR | - 150 ohms, 1/2-W. carbon (R-8)(Pkg. 5) | .70 |
| *RQ-1261 | RESISTOR | - 1200 ohms, 1/2-W. carbon (R-9)(Pkg. 5) | .70 |
| *RQ-1281 | RESISTOR | - 8200 ohms, 1/2-W. carbon (R-12)(Pkg. 5) | .70 |
| *RQ-1285 | RESISTOR | - 10,000 ohms, 1/2-W. carbon (R-13)(Pkg. 5) Models H-520 and H-521 | .70 |
| *RQ-1299 | RESISTOR | - 47,000 ohms, 1/2-W. carbon (R-1)(Pkg. 5) | .70 |
| *RQ-1323 | RESISTOR | - 470,000 ohms, 1/2-W. carbon (R-3,6,7)(Pkg.5) | .70 |
| *RQ-1339 | RESISTOR | - 2.2 megohms, 1/2-W. carbon (R-2)(Pkg. 5) | .70 |
| *RQ-1365 | RESISTOR | - 15 megohms, 1/4 W. carbon (R-5)(Pkg. 5) | .70 |
| RR-351 | RESISTOR | - 100 ohms, 3.4 W. Wire Wound (R-10) | |
| *RS-258 | SOCKET | - Octal tube socket | .15 |
| RS-256 | SOCKET | - Electrolytic mounting socket for models H-501,511,521 | |
| RS-257 | SOCKET | - Electrolytic mounting socket for models H-500,510,520 | |
| RS-258 | SOCKET | - Pilot lamp socket | |
| RS-951 | SPACER | - Speaker cabinet spacer | |
| RS-1016 | SPEAKER | - 4-inch speaker for models H-501,511,521 (L-5) | |
| RS-1017 | SPEAKER | - 4-inch speaker for models H-500,510,520 (L-5) | |
| RT-321 | TRANSFORMER | - 1st IF transformer (L-3) for models H-520 and H-521 (W and X models included) | |
| RT-322 | TRANSFORMER | - 2nd IF transformer (L-4) | |
| RT-325 | TRANSFORMER | - 1st IF transformer for models H-500,H-501,H-510, H-511 (W and X models included) | |
| RT-465 | TRANSFORMER | - Output transformer (T-1) | |
| RV-070 | VOLUME CONTROL | - 2 meg. volume control (R-4) | |
| RW-039 | WINDOW | - Celluloid station letter window for models H-510, 511,520,521 | |
| RZ-152 | CABINET | - Cabinet for models H-510,511,520,521 | |
| RZ-153 | CABINET | - Cabinet for models H-510W,H-511W, H-520W,H-521W | |
| RZ-154 | CABINET | - Cabinet for models H-510X,H-511X,H-520X,H-521X | |
| RZ-155 | CABINET | - Cabinet for models H-500,H-501 | |
| RZ-156 | CABINET | - Cabinet for models H-500W, H-501W | |
| RZ-157 | CABINET | - Cabinet for models H-500X, H-501X | |

*Used on previous receivers

(Prices subject to change without notice)

ALIGNMENT FOR
MODELS
H-500,H-501,H-510,H-511
H-520,H-521
(W and X Models incl.)




I-F ALIGNMENT:

Apply a 455-kc signal to the grid of the 12SK7 and align the 2nd i-f transformer by visual or output meter method. Repeat the procedure,applying the 455-kc signal to the grid of the 12A8GT and aligning the 1st i-f transformer.

R-F ALIGNMENT:

On Models H500,H501,H510 and H511 (W and X models incl.) apply a 1500-kc signal through a 100 mmf mica condenser to the antenna terminal. Align C-2b. Peak C-2a for maximum output.

On Models H-520 and H-521 (W and X models incl.), apply a 1500-kc signal either through a standard I.R.E. dummy to the antenna terminal or by a loop coupling arrangement using an additional loop at the signal generator into which the 1500-kc signal is fed and which magnetically couples to the receiver Beam-a-scope. Align C-2b. Peak C-2a for maximum output.

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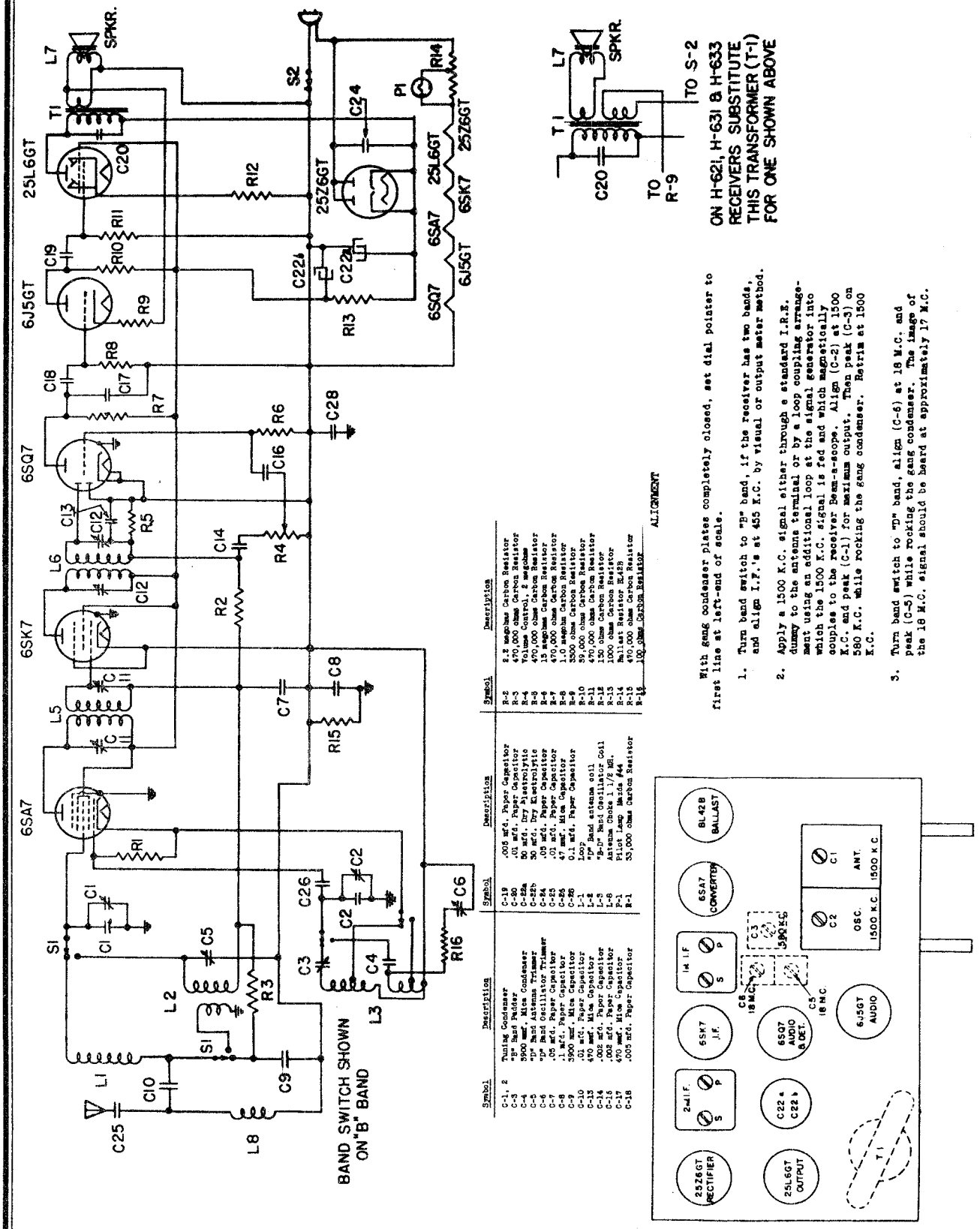
GENERAL ELECTRIC CO.

MODELS H620, H621, H630
H631, H632, H633
Schematic, Socket, Trimmers
Alignment Preliminary




| Symbol | Description |
|---|---|
| C-1, 2 | Tuning Condenser |
| C-3 | 370 mmf. Mica Condenser |
| C-4 | 5900 mmf. Mica Condenser |
| C-5 | "B" Band Antenna Trimmer |
| C-6 | "B" Band Oscillator Trimmer |
| C-7 | .05 mfd. Paper Capacitor |
| C-8 | .1 mfd. Paper Capacitor |
| C-9 | 3900 mmf. Mica Capacitor |
| C-10 | .01 mfd. Paper Capacitor |
| C-13 | 470 mmf. Mica Capacitor |
| C-14 | .002 mfd. Paper Capacitor |
| C-16 | .002 mfd. Paper Capacitor |
| C-17 | 470 mmf. Mica Capacitor |
| C-18 | .005 mfd. Paper Capacitor |
| C-19 | .005 mfd. Paper Capacitor |
| C-20 | .01 mfd. Paper Capacitor |
| C-22a | 20 mfd. Dry Electrolytic |
| C-22b | 30 mfd. Dry Electrolytic |
| C-24 | .05 mfd. Paper Capacitor |
| C-25 | .01 mfd. Paper Capacitor |
| C-26 | 47 mmf. Mica Capacitor |
| L-1 | 0.1 mfd. Paper Capacitor |
| L-2 | Loop |
| L-3 | "B" Band antenna coil |
| L-5 | "B-D" Band Oscillator Coil |
| L-6 | Antenna Choke 1 1/2 MH. |
| L-7 | Field Coil Model #44 |
| R-1 | 53,000 ohms Carbon Resistor |

| Symbol | Description |
|---|---|
| R-2 | 2.2 megohms Carbon Resistor |
| R-3 | 470,000 ohms Carbon Resistor |
| R-4 | 500,000 Control, 2 Sections |
| R-5 | 470,000 ohms Carbon Resistor |
| R-6 | 15 megohms Carbon Resistor |
| R-7 | 470,000 ohms Carbon Resistor |
| R-8 | 1.0 megohm Carbon Resistor |
| R-9 | 3500 ohms Carbon Resistor |
| R-10 | 39,000 ohms Carbon Resistor |
| R-11 | 470,000 ohms Carbon Resistor |
| R-12 | 150 ohms Carbon Resistor |
| R-13 | 1000 ohms Carbon Resistor |
| R-14 | Ballast Resistor BL42B |
| R-15 | 470,000 ohms Carbon Resistor |
| R-16 | 150 ohms Carbon Resistor |

ALIGNMENT

With gang condenser plates completely closed, set dial pointer to first line at left-end of scale.

1. Turn band switch to "B" band, if the receiver has two bands, and align I.F.'s at 455 K.C. by visual or output meter method.
2. Apply a 1500 K.C. signal either through a standard I.R.E. dummy to the antenna terminal or by a loop coupling arrangement using an additional loop at the signal generator into which the 1500 K.C. signal is fed and which magnetically couples to the receiver Beam-a-scope. Align (C-2) at 1500 K.C. and peak (C-1) for maximum output. Then peak (C-3) on 580 K.C. while rocking the gang condenser. Retrim at 1500 K.C.
3. Turn band switch to "D" band, align (C-6) at 18 M.C. and peak (C-5) while rocking the gang condenser. The image of the 18 M.C. signal should be heard at approximately 17 M.C.

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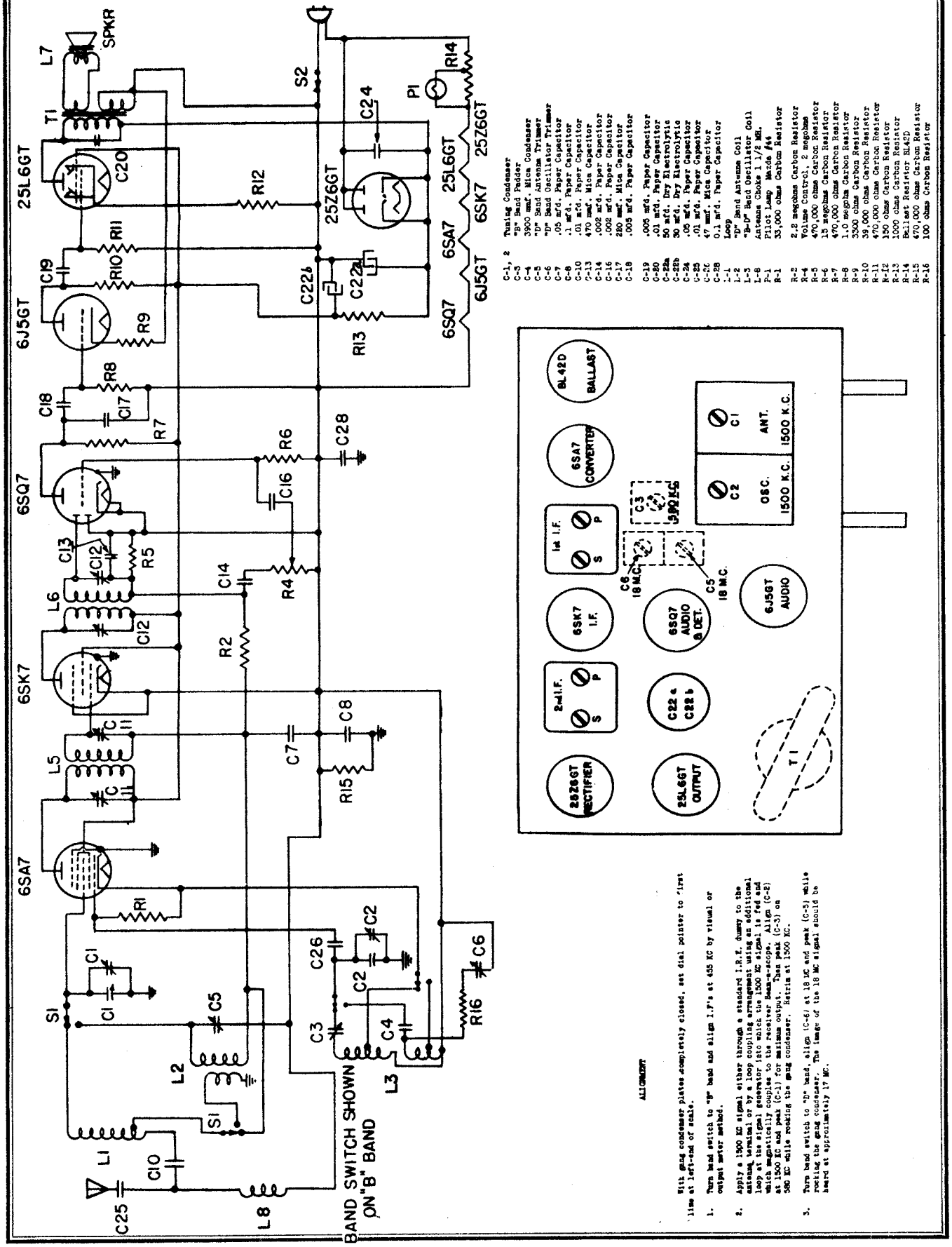
MODEL H625 Preliminary
Schematic, Socket
Alignment, Trimmers

# GENERAL ELECTRIC CO.




| | | |
|---|---|---|
| C-1, 2 | Tuning Condenser | |
| C-3 | "B" Band Padder | |
| C-4 | 3900 mmf. Mica Condenser | |
| C-5 | "D" Band Antenna Trimmer | |
| C-6 | "D" Band Oscillator Trimmer | |
| C-7 | .05 mfd. Paper Capacitor | |
| C-8 | .1 mfd. Paper Capacitor | |
| C-10 | .01 mfd. Paper Capacitor | |
| C-13 | 470 mmf. Mica Capacitor | |
| C-14 | .002 mfd. Paper Capacitor | |
| C-16 | .002 mfd. Paper Capacitor | |
| C-17 | 280 mmf. Mica Capacitor | |
| C-18 | .005 mfd. Paper Capacitor | |
| C-19 | .005 mfd. Paper Capacitor | |
| C-20 | .01 mfd. Paper Capacitor | |
| C-22a | 50 mfd. Dry Electrolytic | |
| C-22b | 30 mfd. Dry Electrolytic | |
| C-24 | .05 mfd. Paper Capacitor | |
| C-25 | .01 mfd. Paper Capacitor | |
| C-26 | 47 mmf. Mica Capacitor | |
| C-28 | 0.1 mfd. Paper Capacitor | |
| L-1 | Loop | |
| L-2 | "D" Band Antenna Coil | |
| L-3 | "B-D" Band Oscillator Coil | |
| L-6 | Antenna Choke 1 1/2 MH. | |
| P-1 | Pilot Lamp Mazda #44 | |
| R-1 | 33,000 ohms Carbon Resistor | |
| R-2 | 2.2 megohms Carbon Resistor | |
| R-4 | Volume Control, 2 megohms | |
| R-5 | 470,000 ohms Carbon Resistor | |
| R-6 | 15 megohms Carbon Resistor | |
| R-7 | 470,000 ohms Carbon Resistor | |
| R-8 | 1.0 megohm Carbon Resistor | |
| R-9 | 3300 ohms Carbon Resistor | |
| R-10 | 39,000 ohms Carbon Resistor | |
| R-11 | 470,000 ohms Carbon Resistor | |
| R-12 | 150 ohms Carbon Resistor | |
| R-13 | 1000 ohms Carbon Resistor | |
| R-14 | Ballast Resistor BL42D | |
| R-15 | 470,000 ohms Carbon Resistor | |
| R-16 | 100 ohms Carbon Resistor | |

ALIGNMENT

With gang condenser plates completely closed, set dial pointer to first line at left-end of scale.

1. Turn band switch to "B" band and align I.F.'s at 455 KC by visual or output meter method.

2. Apply a 1500 KC signal either through a standard I.R.E. dummy to the antenna terminal or by a loop coupling arrangement using an additional loop at the signal generator into which the 1500 KC signal is fed and which is capacitively coupled to the receiver loop antenna. Align (C-2) with 1500 KC signal and (C-1) for maximum output. Then peak (C-3) on 590 KC calls rocking the gang condenser. Retrim at 1500 KC.

3. Turn band switch to "D" band, align (C-6) at 18 MC and peak (C-5) while rocking the gang condenser. The image of the 18 MC signal should be heard at approximately 17 MC.

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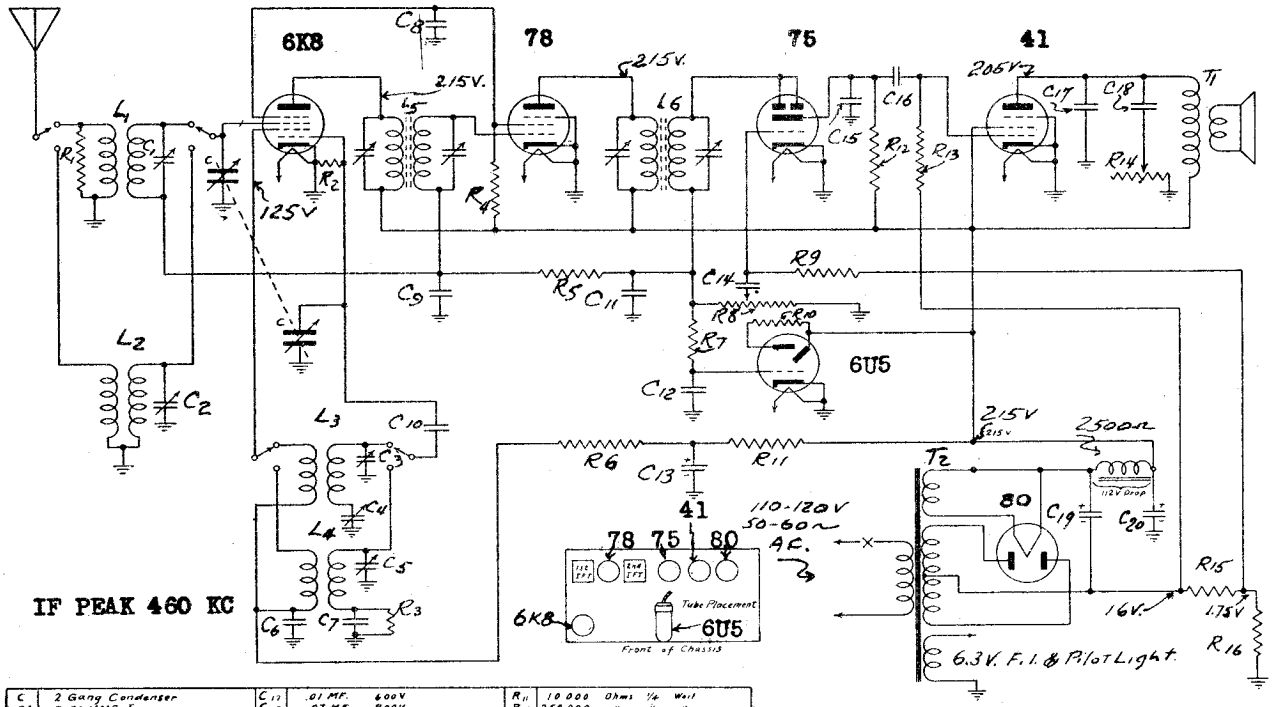
# GILFILLAN BROS., INC.

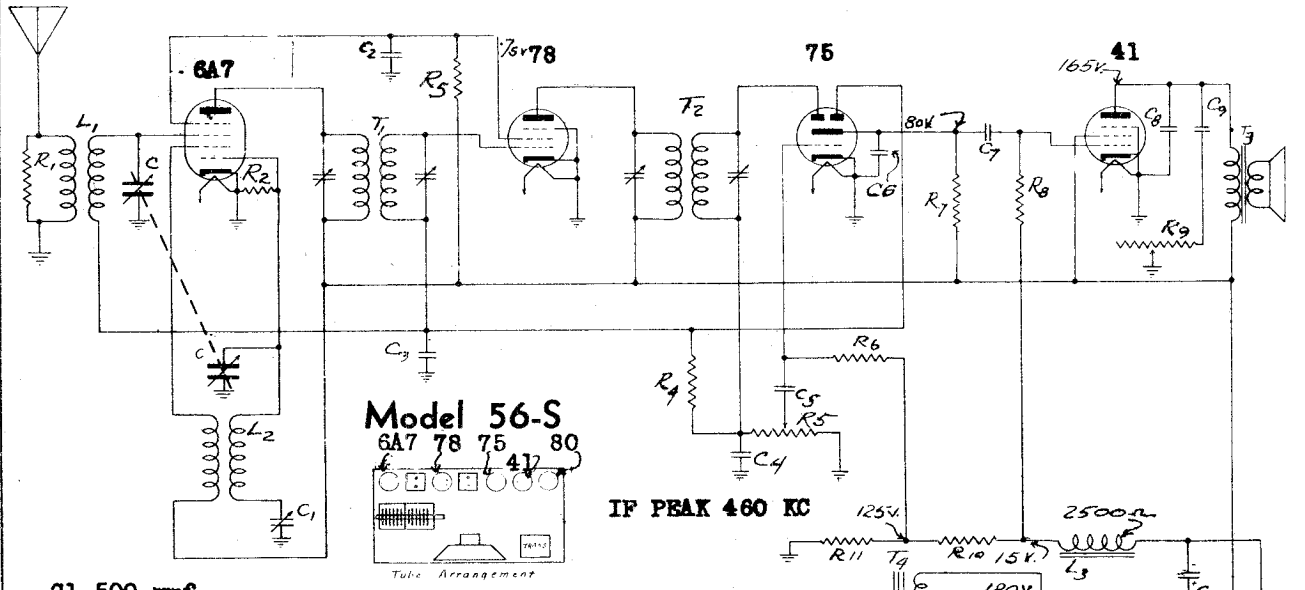
MODEL 56S
MODEL 66S
Schematics
Socket, Voltage




| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C | 2 Gang Condenser | C12 | .01 MF. | 600V | R11 | 10 000 Ohms | 1/2 Watt |
| C1 | 3-30 MMF. Trimmer | C18 | .03 MF. | 800V | R12 | 250 000 " | " " |
| C2 | 3-30 MMF. " | C19 | 12 MF. | 375V Elec | R13 | 1 Meg " | " " |
| C3 | 3-30 MMF. " | C20 | 16 MF | 250V " | R14 | 50 000 " | Tone Control |
| C4 | 500 MMF. Padder | | | | R15 | 350 " | 1/2 Watt |
| C5 | 3-50 MMF. Trimmer | R1 | 25000 | Ohms 1/2 Watt | R16 | 30 " | 1/4 " |
| C6 | .05 MF. 400V Mica | R2 | 100000 | " " " | L, L2 | Antenna Coil B.C. & S.W. | |
| C7 | " " " | R3 | 30000 | " " " | L3 | Oscillator Coil B.C. " S.W. | |
| C8 | .25 MF. 400V | R4 | 50000 | " 1 " | L4 | " " | |
| C9 | .05 MF. 200V | R5 | 2 Meg | " 1/2 " | L5 | 1st I.F. Trans. | |
| C10 | .50 MMF. " Mica | R6 | 10000 | " " " | L6 | 2nd I.F. Trans. | |
| C11 | 250 MMF. " Mica | R7 | 2 Meg | " " " | T1 | Output Trans. | |
| | | R8 | 50 000 | " Vol Control | T2 | Power Trans. | |
| | | R9 | 2 Meg | " 1/2 Watt | | | |
| | | R10 | 1 Meg | " " " | | | |

Power consumption:-
40 watts at 115 volts
60 cycles on primary,
All voltages to ground
with a 1000 ohm per
volt meter.

Gilfillan Bros. Inc.
MODEL 66-S
1938




| | | | | | |
|---|---|---|---|---|---|
| C1 | 500 mmf | C7 | .01 mf | R2 | 100,000 |
| C2 | .05 mf | C8 | .006 mf | R3 | 50,000 |
| C3 | .05 mf | C9 | .03 mf | R4 | 2 meg |
| C4 | 250 mmf | C10 | 8x8 mf | R5 | 500,000 |
| C5 | .01 mf | R1 | 25000 | R6 | 2 meg. |
| C6 | .001 mf | | | | |

| | | |
|---|---|---|
| R7 | 250,000 | |
| R8 | 1 meg. | |
| R9 | 50,000 | |
| R10 | 350 | |
| R11 | 30 | |

Power consumption at 115 Volts, 60 cycles - 37 watts
All voltages measured to ground with 115 volts, 60 cycles applied to transformer primary using 1000 ohms per volt meter.

Gilfillan Bros. Inc.
Model 56-S
1938

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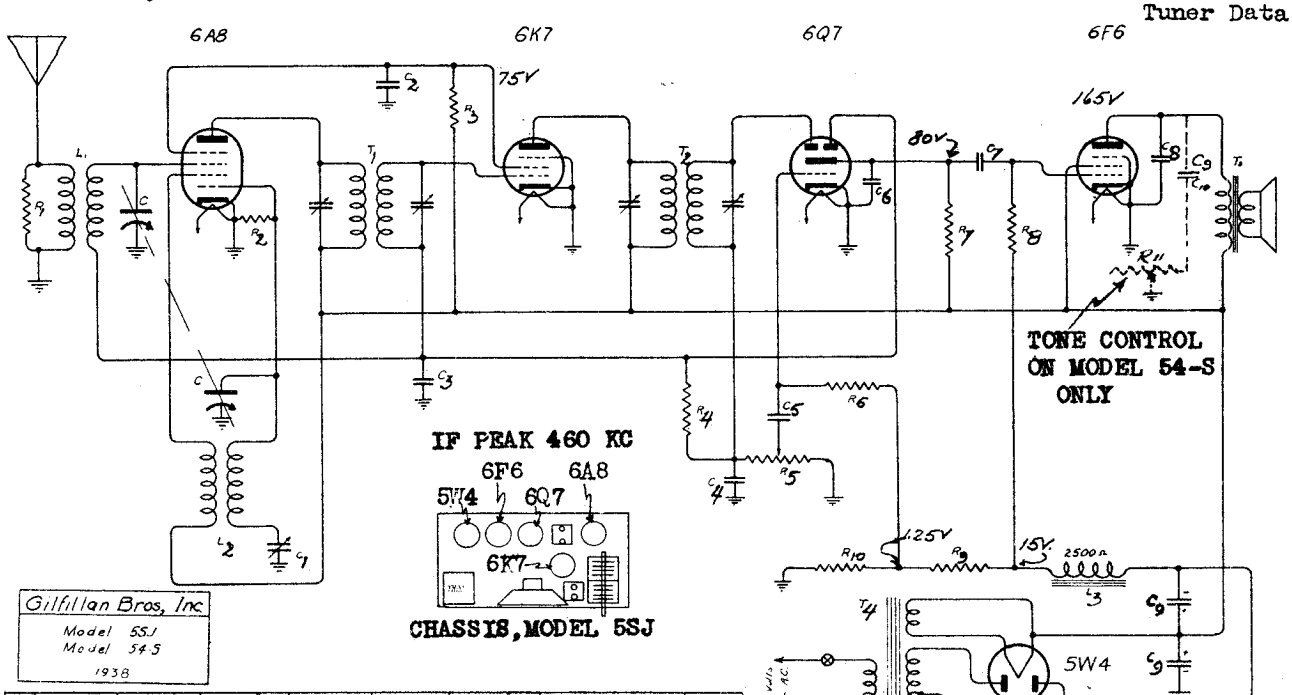
MODELS 5SJ, 54S
Schematic, Socket

# GILFILLAN BROS., INC.

MODEL 56S
MODEL 66S
Tuner Data




Gilfillan Bros, Inc
Model 5SJ
Model 54S
1938

| Code | Value | Type | Part No. |
|---|---|---|---|
| C | 2 Gang Variable | Condenser | |
| $C_1$ | 500 MMF | Padder | |
| $C_2$ | .05 MF | 400 V. Tubular | |
| $C_3$ | .05 MF | 200 V. " | |
| $C_4$ | 250 MMF | Mica | |
| $C_5$ | .01 MF | 200 V. Tubular | |
| $C_6$ | .001 MF | 600 V. " | |
| $C_7$ | .01 MF | 600 V. " | |
| $C_8$ | .006 MF | 600 V. " | |
| $C_9$ | 8×8 MF | 450 V. Elec. | |
| $C_{10}$ | .03 MF | 800 V. Tub. | |

| Code | Value | Type | Part No. |
|---|---|---|---|
| R | 25,000 Ohms | ½ Watt | |
| $R_1$ | 100,000 " | " " | |
| $R_2$ | 50,000 " | " " | |
| $R_3$ | 1 Meg " | " " | |
| $R_4$ | 500,000 " | Vol. Control | |
| $R_5$ | 2 Meg " | ½ Watt | |
| $R_6$ | 250,000 " | " " | |
| $R_8$ | 1 Meg " | " " | |
| $R_9$ | 350 " | ½ Watt | |
| $R_{10}$ | 50,000 " | Tone Contr. | |

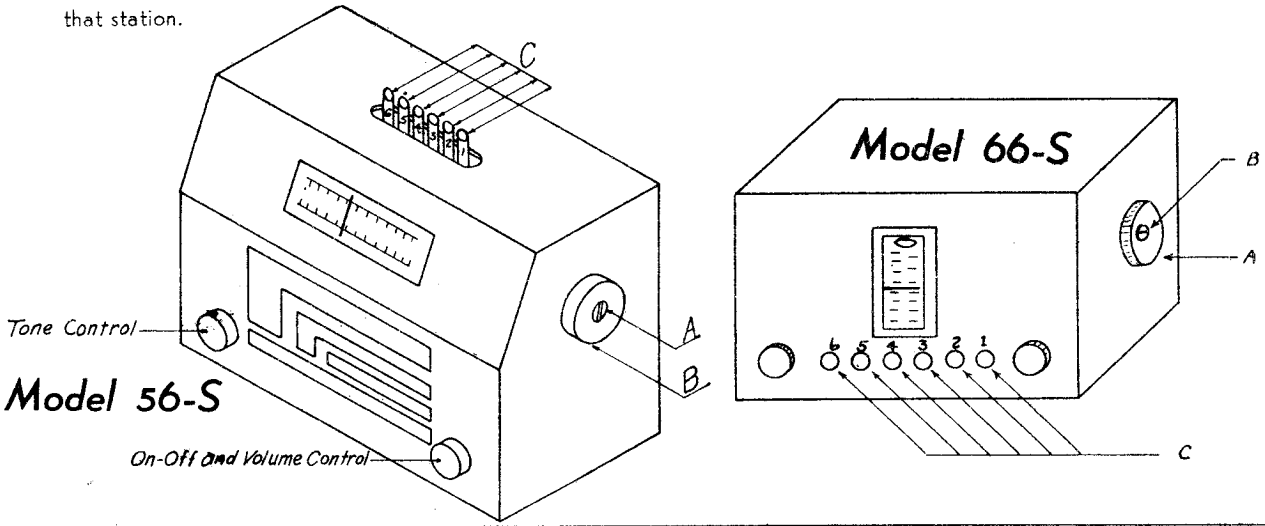
| Code | Item | Part No. |
|---|---|---|
| $L_1$ | Antenna Coil | |
| $L_2$ | Oscillator Coil | |
| $L_3$ | Speaker Field - 2500 Ω | |
| $T_1$ | IF Transformer #1 | |
| $T_2$ | IF Transformer #2 | |
| $T_3$ | Output Transformer | |
| $T_4$ | Power Transformer | |

Power Consumption at 115 Volts, 60 Cycles is 53 Watts.
All voltages measured to ground with 115 Volts 60 cycles applied to transformer primary.

## SETTING PUSH BUTTONS MODELS 56-S, 66-S.

To set push button station selector proceed as follows:

1. Release mechanism by turning screw "B" in center of manual control knob "A" approximately three turns to the left.
2. Manually tune the radio set by means of turning knob "A" until the pointer is at the bottom end of the dial scale (so that it is pointed at 170). Starting from this point tune the desired station you want to hear (on No. 1 button)
3. Press button marked 1 all the way in, then release. Tune the next station desired manually, then press button No. 2 all the way in, then proceed progressively until all six buttons have been tuned.
4. Turn screw "B" in center of manual control "A" to right until tight, locking the selector mechanism. Any of the stations selected can now be received by depressing its corresponding push button. **BE SURE SELECTOR BUTTON IS PUSHED ALL THE WAY IN,** both when setting selector to a station and when using push button tuning to receive that station.

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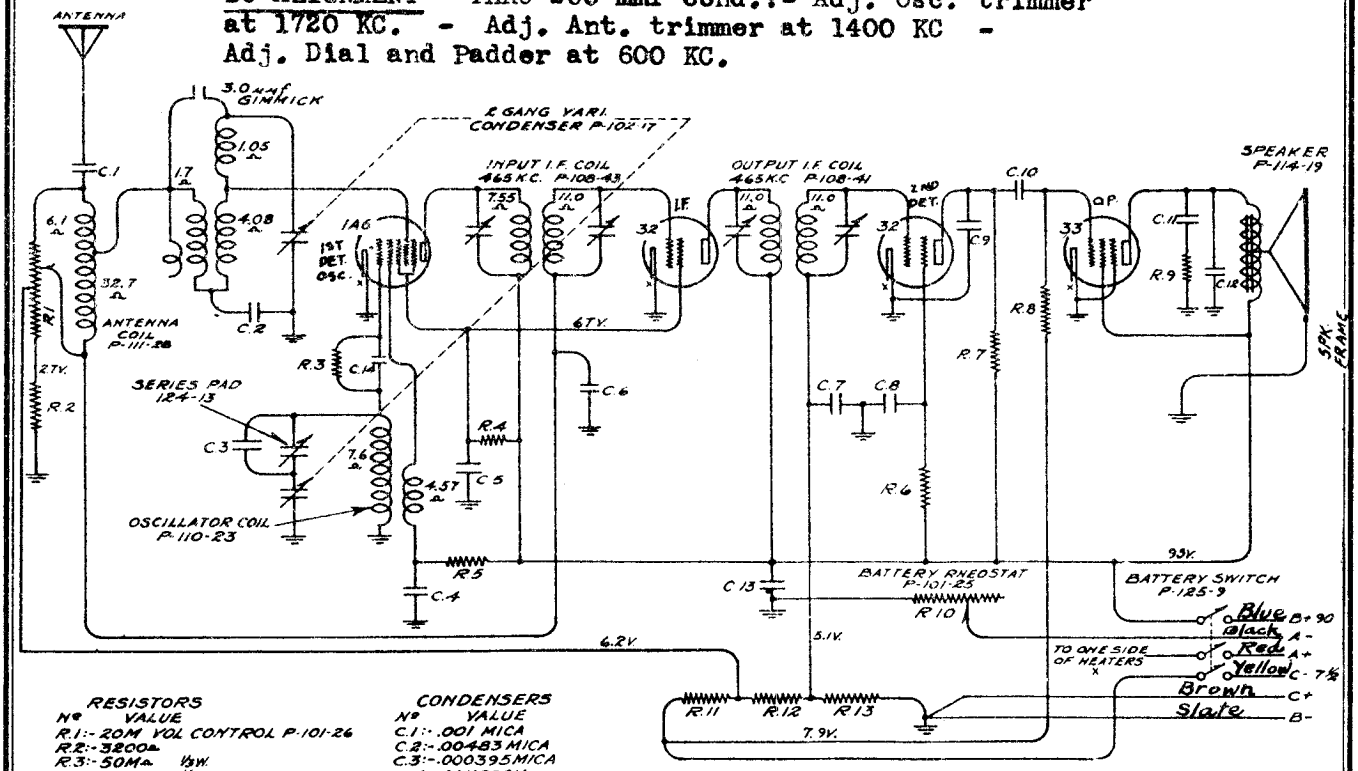
Socket, Trimmers
Alignment

MODEL 404

# GOODYEAR TIRE & RUBBER CO., INC. Schematic, Voltage

**IF ALIGNMENT** - Adj. trimmers at 465 KC thru .1 mf cond.-

**BC ALIGNMENT** - THRU 200 mmf cond.:- Adj. Osc. trimmer at 1720 KC. - Adj. Ant. trimmer at 1400 KC - Adj. Dial and Padder at 600 KC.



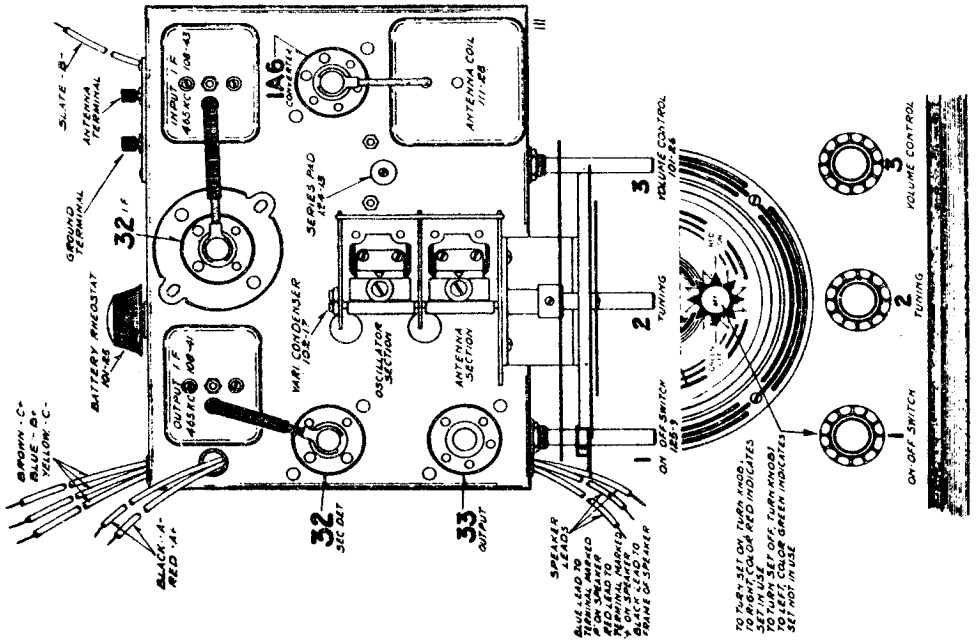

| RESISTORS | | |
|---|---|---|
| No | VALUE | |
| R.1 | 20M VOL CONTROL P-101-26 | |
| R.2 | 3200Ω | |
| R.3 | 50MΩ | ½W. |
| R.4 | 11MΩ | ½W |
| R.5 | 10MΩ | ½W. |
| R.6 | 3 MEGΩ | ½W. |
| R.7 | 750MΩ | ½W. |
| R.8 | 500MΩ | ½W. |
| R.9 | 35MΩ | ½W. |
| R.10 | 4Ω BAT. RHEOSTAT P-101-25 | |
| R.11 | 1300Ω | |
| R.12 | 1920Ω | |
| R.13 | 9800Ω | ½W |

| CONDENSERS | |
|---|---|
| No | VALUE |
| C.1 | .001 MICA |
| C.2 | .00483 MICA |
| C.3 | .000395 MICA |
| C.4 | .01 X 200V. |
| C.5 | .05 X 200V |
| C.6 | .25 X 200V. |
| C.7 | .05 X 200V |
| C.8 | .01 X 200V. |
| C.9 | .00025 MICA |
| C.10 | .01 X 400V |
| C.11 | .01 X 400V |
| C.12 | .0005 MICA |
| C.13 | .25 X 200V |
| C.14 | .00025 MICA |

- NOTE -
R. 2, R.11, R.12 ARE IN ONE UNIT. P-106-21
C.4, C.5 ARE IN ONE UNIT P-118-11
C.6, C.13 " " " " P-118-5
C.7, C.8 " " " " P-118-11
NUMBERS PREFIXED BY LETTER 'P' ARE PART Nos
ALL VOLTAGES INDICATED ARE WITH NEW BATTERIES, VOLUME CONTROL ON FULL

**IF PEAK 465 KC**

**Serial No. 5D115200A and up**




**BATTERIES NEEDED**

The following batteries are needed.

2.....45 vdlt "B" Batteries.

1.....7½ Volt "C" Battery..

1.....3 Volt Dry "A" Battery or 2 Volt Storage Battery.

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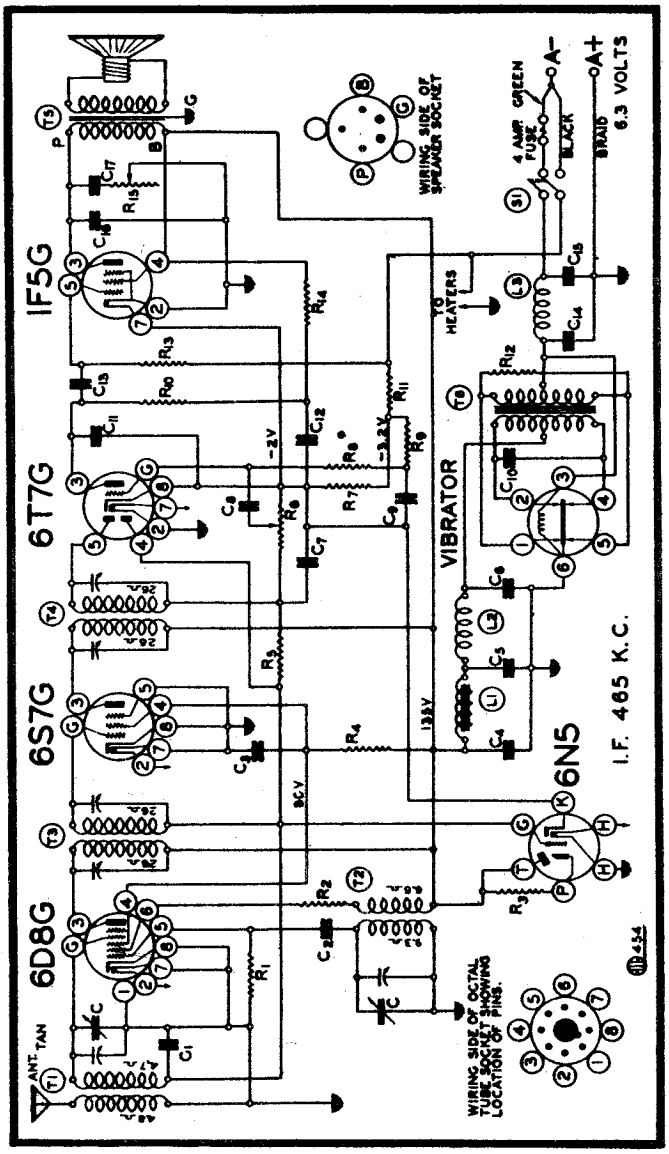
MODEL 504
Schematic, Voltage
Socket, Trimmers
Alignment

# GOODYEAR TIRE & RUBBER CO., INC.

**IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.**

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagram.




Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

**ALIGNING I.F. TRANSFORMERS: (465 K. C.):**

Part No. 108-85 Output I.F. Transformer.

Part No. 108-84 Input I.F. Transformer.

These I.F. Transformers have two adjustments, both of which are accessible from the top of chassis (see fig. 1, top view).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments.
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-85) to resonance.
   (b) Move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-84) to resonance.
   (c) With oscillator still connected to 6D8G readjust output I.F. transformer (108-85) if necessary.

**R. F. ALIGNMENT: (535-1720 K.C.)**

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to tan antenna and black ground leads and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick-up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser)
   (c) Check sensitivity at 600 and 1000 kilocycles.

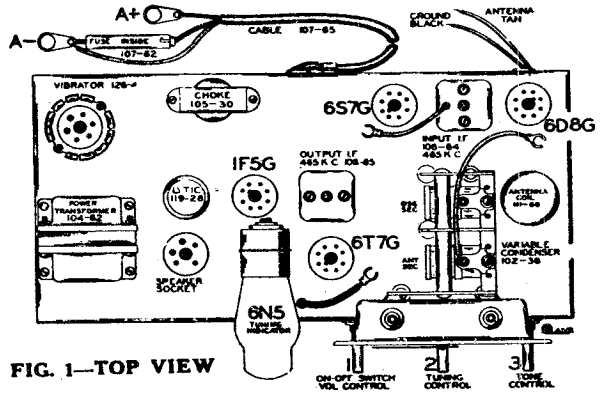



FIG. 1—TOP VIEW

## 504 SERIES A
## 535-1720 Kilocycles Battery Operated

| No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 130-76 | 30M ohm - 1/3 w. |
| R2 | 130-23 | 2M ohm - 1/3 w. |
| R3 | 130-186 | 250M ohm - 1/10 w. - in tuning indicator |
| R4 | 130-123 | 15M ohm - 1/3 w. |
| R5 | 130-121 | 3.2 megohm - 1/3 w. |
| R6 | 101-56 | 1 megohm volume control |
| R7 | 106-36 | 10 ohms - resistor strip |
| R8 | 130-19 | 1 megohm - 1/3 w. |
| R9 | 130-19 | 1 megohm - 1/3 w. |
| R10 | 130-100 | 150M ohm - 1/3 w. |
| R11 | 106-36 | 25 ohms - resistor strip |
| R12 | 130-84 | 200 ohms - 1/3 w. |
| R13 | 130-19 | 1 megohm - 1/3 w. |
| R14 | 130-20 | 100M ohm - 1/3 w. |
| R15 | 101-72 | 300M ohm - tone control |
| | | R7 and R11 in same unit |
| | | **CONDENSERS** |
| C | 102-38 | 2 gang variable |
| C1 | 100-9 | .05 x 200 v. |
| C2 | 129-39 | .0005 Mica |
| C3 | 100-33 | .1 x 200 v. |
| C4 | 119-28 | 5.0 mfd. - 200 w. v. lytic |
| C5 | 119-28 | 5.0 mfd. - 200 w. v. lytic |
| C6 | 100-33 | .1 x 200 v. |
| C7 | 129-5 | .0001 Mica |
| C8 | 100-11 | .01 x 400 v. |
| C9 | 100-11 | .01 x 400 v. |
| C10 | 100-34 | .005 x 1200 v. |
| C11 | 129-12 | .00025 Mica |
| C12 | 100-33 | .1 x 200 v. |
| C13 | 100-11 | .01 x 400 v. |
| C14 | 100-40 | .5 x 200 v. |
| C15 | 100-40 | .5 x 200 v. |
| C16 | 100-37 | .003 x 600 v. |
| C17 | 100-11 | .01 x 400 v. |
| | | C4 and C5 in same unit |
| | | **PARTS** |
| T1 | 111-66 | Antenna coil complete |
| T2 | 110-45 | Oscillator coil complete |
| T3 | 108-84 | Input I.F. coil complete - 465 kc. |
| T4 | 108-85 | Output I.F. coil complete - 465 kc. |
| T5 | 114-63 | P.M. Speaker |
| T6 | 104-62 | Power Transformer |
| L1 | 105-30 | Filter Choke |
| L2 | 123-3 | R. F. "B" Choke |
| L3 | 105-19 | "A" Choke |
| S1 | | Switch on volume control |
| | 126-4 | Vibrator |

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# GOODYEAR TIRE & RUBBER CO., INC.

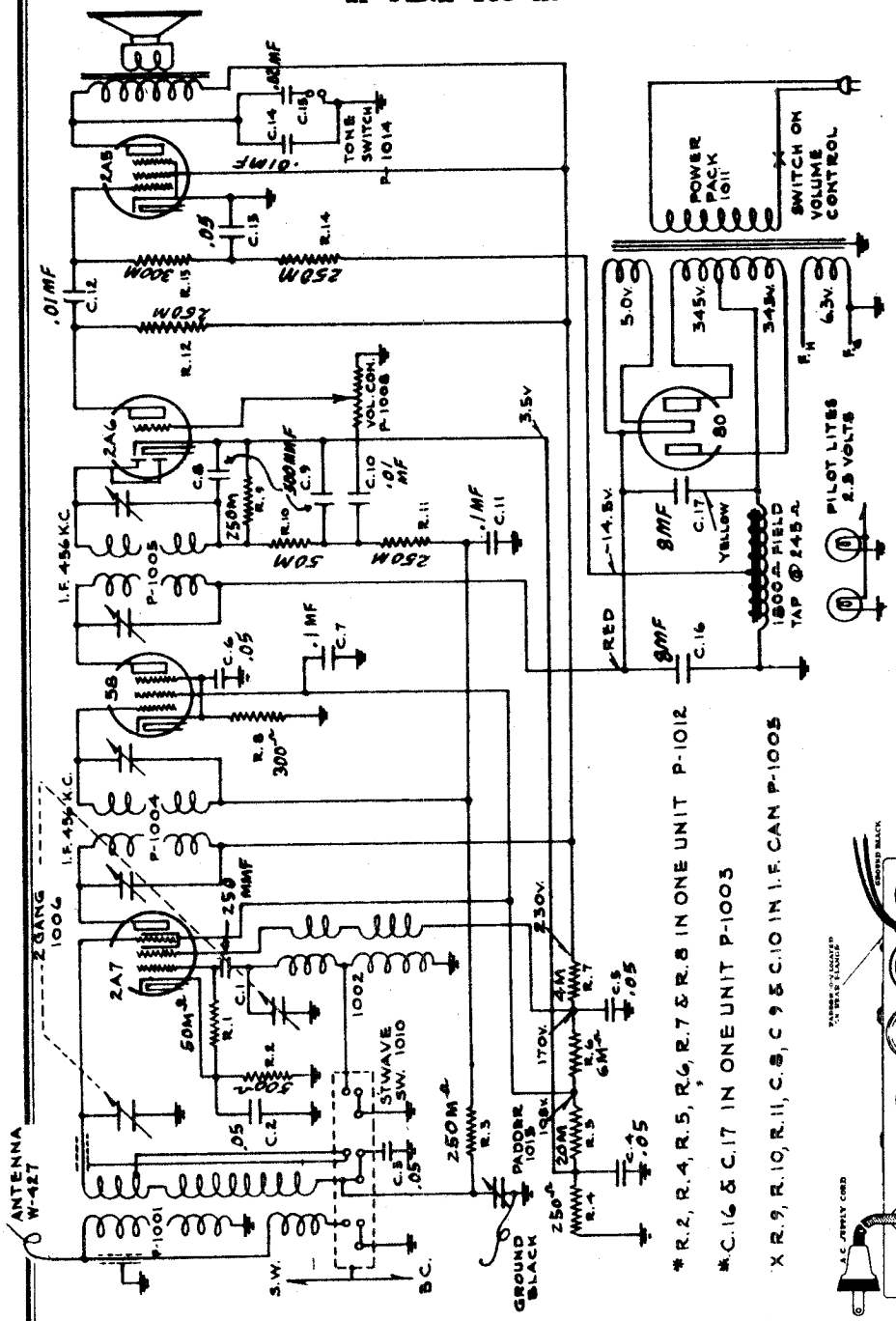
MODEL 550
Schematic, Voltage
Socket, Trimmers
Alignment

105-115 volts alternating current 50-60 cycles - 60 watts.
GREEN (Broadcast band) 530 - 1550 Kilocycles
RED (Short wave band) 1550 - 14,000 Kilocycles

NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.
VOLTAGES WITH 119V. A.C. LINE

33248

## IF PEAK 456 KC




* R.2, R.4, R.5, R.6, R.7 & R.8 IN ONE UNIT P-1012

*C.16 & C.17 IN ONE UNIT P-1003

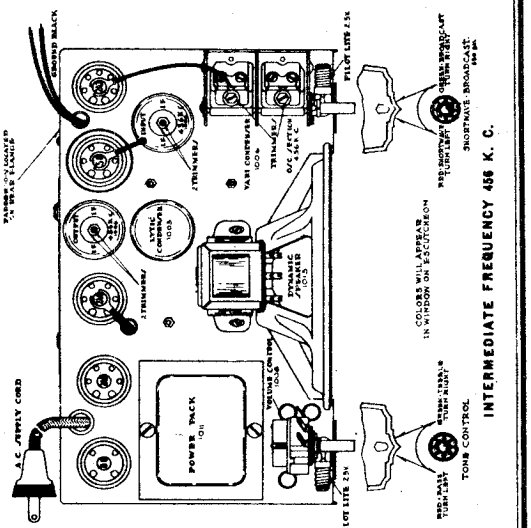
X R.9, R.10, R.11, C.8, C.9 & C.10 IN I.F. CAN P-1005

To peak I.F. transformers connect oscillator (set at 456 KC) to grid of 247 tube and (Black) ground wire. With variable condenser set at minimum capacity, (extreme left of its rotation) adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).

To align Broadcast band, set wave changing switch to Green (right turn) and with variable condenser at minimum capacity disconnect antenna wire and connect 1550 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimmer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimmer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

To align Short wave band, set wave changing switch to RED (left turn) and with input oscillator connected as above and set at 1720 KC, tune in signal, adjust padding condenser on rear of chassis to resonance. Check for output at 1550 KC and at harmonics of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and of 1720 KC (3440 KC). DO NOT BEND PLATES.

For failure to operate over both bands check 247 tube and connections to and contacts of wave changing switch.

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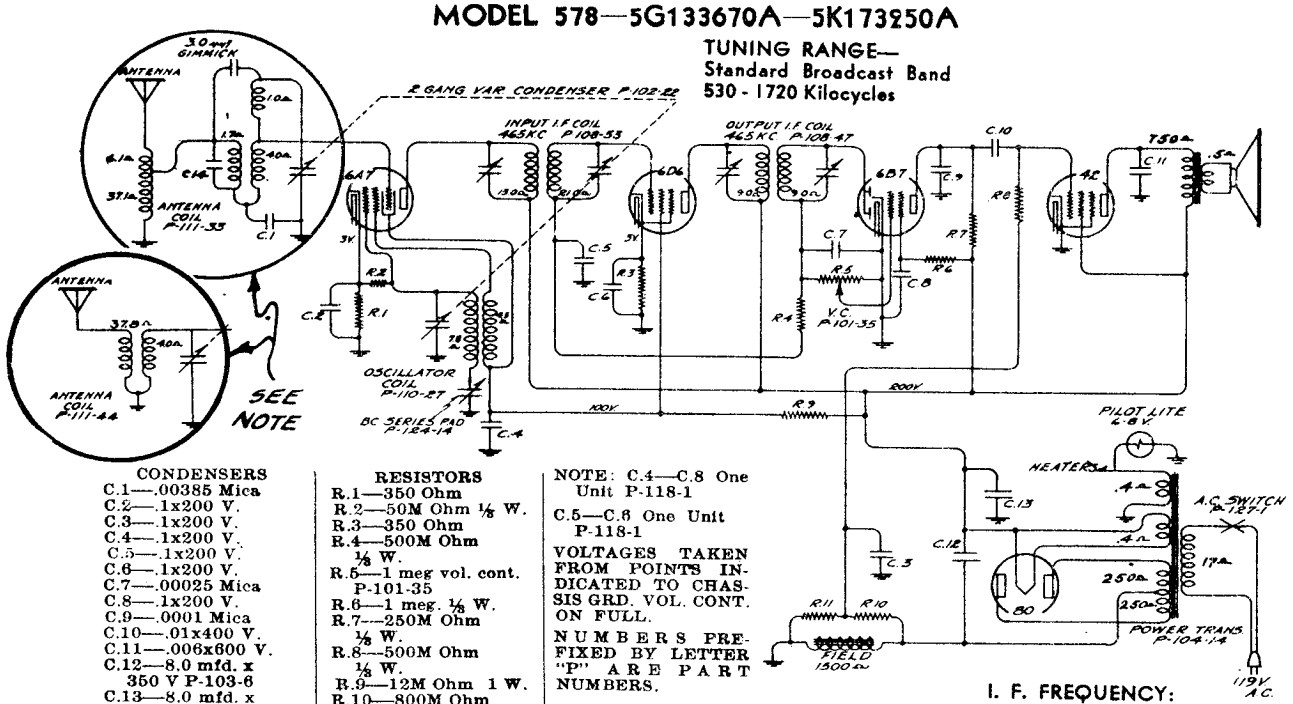
MODEL 578, Series A
Schematic, Voltage

# GOODYEAR TIRE & RUBBER CO., INC.

Socket, Trimmers
Alignment

## MODEL 578—5G133670A—5K173250A

TUNING RANGE—
Standard Broadcast Band
530 - 1720 Kilocycles




CONDENSERS
C.1—.00385 Mica
C.2—.1x200 V.
C.3—.1x200 V.
C.4—.1x200 V.
C.5—.1x200 V.
C.6—.1x200 V.
C.7—.00025 Mica
C.8—.1x200 V.
C.9—.0001 Mica
C.10—.01x400 V.
C.11—.006x600 V.
C.12—8.0 mfd. x 350 V P-103-6
C.13—8.0 mfd. x 300 V P-103-7
C.14—110 mfd. Either external Mica Cond. or cap. winding in coil.

RESISTORS
R.1—350 Ohm
R.2—50M Ohm 1/8 W.
R.3—350 Ohm
R.4—500M Ohm 1/8 W.
R.5—1 meg vol. cont. P-101-35
R.6—1 meg. 1/8 W.
R.7—250M Ohm 1/8 W.
R.8—500M Ohm 1/8 W.
R.9—12M Ohm 1 W.
R.10—800M Ohm 1/8 W.
R.11—201M Ohm 1/8 W.

NOTE: C.4—C.8 One Unit P-118-1

C.5—C.6 One Unit P-118-1

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GRD. VOL. CONT. ON FULL.

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

**NOTE:—**

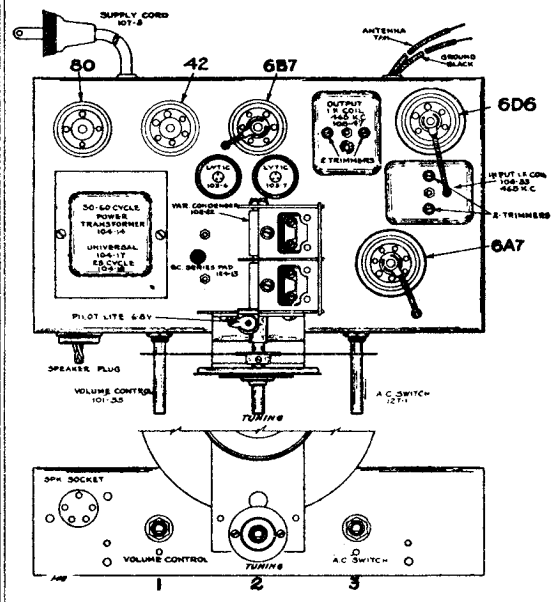
Beginning with 5K173250A, Antenna Coil No. 111-44 replaced No. 111-33, and capacities C1—.00385 mfd. and C14—.00011 mfd. were eliminated. Note: On early models C14 was a capacity winding on the primary of the No. 111-33 Antenna Coil.

See revised diagram

## Tubes

The Tube complement of this chassis is as follows:

1 Type 6A7—pentagrid electron coupled oscillator and first detector.
1 Type 6D6—remote cut-off pentode as I.F. amplifier.
1 Type 6B7—duplex diode pentode as diode detector, A.V.C. and A.F.
1 Type 42—pentode output tube.
1 Type 80—high vacuum rectifier.




Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram

All voltages are measured with 119 volts on the primary of the power transformer.

## ALIGNING INSTRUCTIONS

Description of various dummy antennas used and referred to in these instructions:

(1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.

(2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

## Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with variable condenser at its minimum capacity position, plates entirely out of mesh, adjust the I.F. transformers (two adjustments at the top of parts number 108-53 and 108-47)

(a) Connect external oscillator which has been adjusted to 465 kilocycles in series with I.F. dummy antenna, to the control grid cap of the type 6D6 tube and chassis ground. Adjust output I.F. transformer, part number 108-47, to resonance.

(b) Move generator output clip from grid of 6D6 to grid cap of 6A7 tube and align input I.F. transformer, part number 108-53.

(c) With generator connected to grid of type 6A7 tube, readjust output I.F. transformer, part number 108-47, to resonance.

## R. F. Alignment—

(530 - 1720 Kilocycles)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with broadcast dummy antenna to tan antenna and black ground leads and make the following adjustments:

(a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer, (rear of gang condenser).

(b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance, (front section of gang condenser).

(c) Re-set external oscillator to 600 kilocycles and adjust series pad to resonance, rotate condenser and move dial pointer to 600 kilocycles by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance, maximum deflection on an output meter. This adjustment is accessible from the top of the chassis and is located between variable condenser and power transformer.

25 Cycle Chassis differ only from 60 cycle chassis in that part number 104-18 transformer is used in place of 50/60 cycle transformer, part number 104-14.

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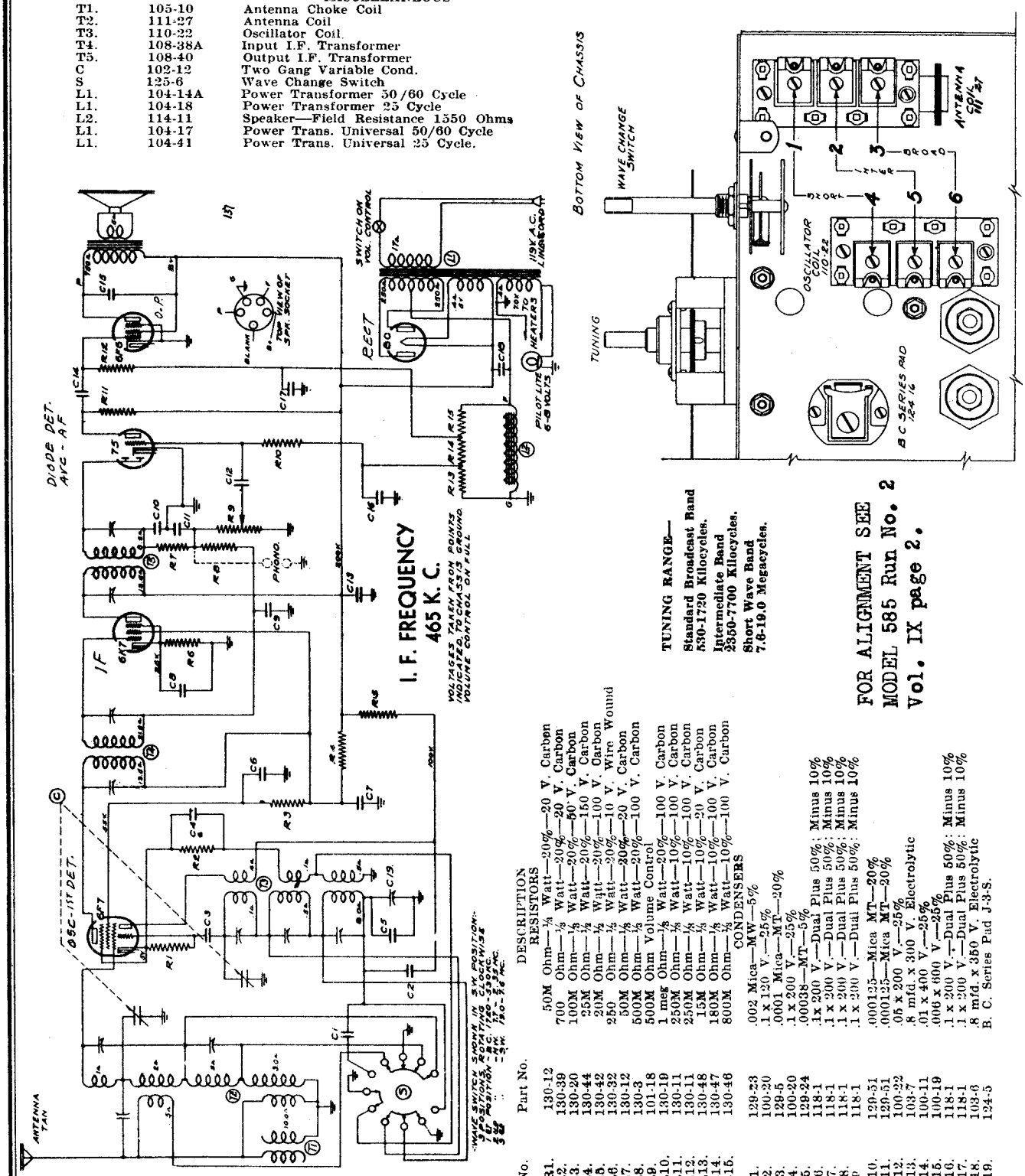
# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 585
Schematic, Voltage
Socket, Trimmers
Alignment

MISCELLANEOUS

| | | |
|---|---|---|
| T1. | 105-10 | Antenna Choke Coil |
| T2. | 111-27 | Antenna Coil |
| T3. | 110-22 | Oscillator Coil |
| T4. | 108-38A | Input I.F. Transformer |
| T5. | 108-40 | Output I.F. Transformer |
| C | 102-12 | Two Gang Variable Cond. |
| S | 125-6 | Wave Change Switch |
| L1. | 104-14A | Power Transformer 50/60 Cycle |
| L1. | 104-18 | Power Transformer 25 Cycle |
| L2. | 114-11 | Speaker—Field Resistance 1550 Ohms |
| L1. | 104-17 | Power Trans. Universal 50/60 Cycle |
| L1. | 104-41 | Power Trans. Universal 25 Cycle. |




| No. | Part No. | DESCRIPTION |
|---|---|---|
| | | RESISTORS |
| R1. | 130-12 | 50M Ohm—½ Watt—20%—20 V. Carbon |
| R2. | 130-39 | 700 Ohm—½ Watt—20%—20 V. Carbon |
| R3. | 130-20 | 100M Ohm—½ Watt—20%—50 V. Carbon |
| R4. | 130-44 | 25M Ohm—½ Watt—20%—150 V. Carbon |
| R5. | 130-42 | 20M Ohm—½ Watt—20%—100 V. Carbon |
| R6. | 130-32 | 250 Ohm—½ Watt—20%—10 V. Wire Wound |
| R7. | 130-12 | 50M Ohm—½ Watt—20%—20 V. Carbon |
| R8. | 130-3 | 500M Ohm—½ Watt—20%—100 V. Carbon |
| R9. | 101-18 | 500M Ohm Volume Control |
| R10. | 130-19 | 1 meg Ohm—½ Watt—20%—100 V. Carbon |
| R11. | 130-11 | 250M Ohm—½ Watt—10%—100 V. Carbon |
| R12. | 130-11 | 250M Ohm—½ Watt—10%—100 V. Carbon |
| R13. | 130-48 | 15M Ohm—½ Watt—10%—20 V. Carbon |
| R14. | 130-47 | 180M Ohm—½ Watt—10%—100 V. Carbon |
| R15. | 130-46 | 800M Ohm—½ Watt—10%—100 V. Carbon |
| | | CONDENSERS |
| C1. | 129-23 | .002 Mica—MW—5% |
| C2. | 100-20 | .1 x 120 V.—25% |
| C3. | 129-5 | .0001 Mica—MT—20% |
| C4. | 100-20 | .1 x 200 V.—25% |
| C5. | 129-24 | .00038—MT—5% |
| C6. | 118-1 | .1x 200 V.—Dual Plus 50%; Minus 10% |
| C7. | 118-1 | .1 x 200 V.—Dual Plus 50%; Minus 10% |
| C8. | 118-1 | .1 x 200 V.—Dual Plus 50%; Minus 10% |
| C9. | 118-1 | .1 x 200 V.—Dual Plus 50%; Minus 10% |
| C10. | 129-51 | .000125—Mica MT—20% |
| C11. | 129-51 | .000125—Mica MT—20% |
| C12. | 100-22 | .05 x 200 V.—25% |
| C13. | 103-7 | .8 mfd. x 300 V. Electrolytic |
| C14. | 100-11 | .01 x 400 V.—25% |
| C15. | 100-19 | .006 x 600 V.—25% |
| C16. | 118-1 | .1 x 200 V.—Dual Plus 50%; Minus 10% |
| C17. | 118-1 | .1 x 200 V.—Dual Plus 50%; Minus 10% |
| C18. | 103-6 | .8 mfd. x 350 V. Electrolytic |
| C19. | 124-5 | B. C. Series Pad J-3-S. |

FOR ALIGNMENT SEE MODEL 585 Run No. 2 Vol. IX page 2.

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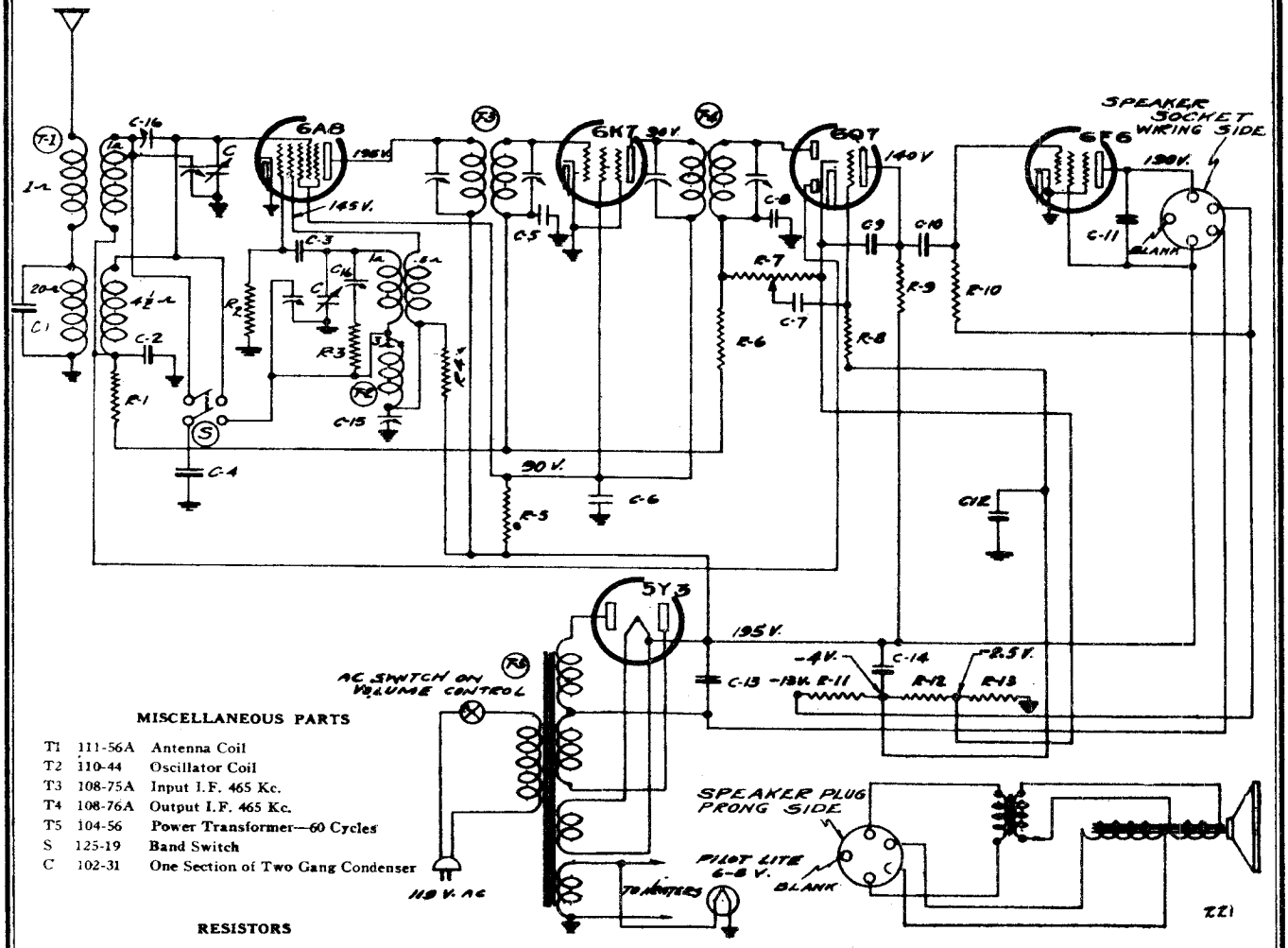
MODEL 587
Schematic

# GOODYEAR TIRE & RUBBER CO., INC.

Voltage
Socket, Trimmers
Alignment




## MISCELLANEOUS PARTS

| | | |
|---|---|---|
| T1 | 111-56A | Antenna Coil |
| T2 | 110-44 | Oscillator Coil |
| T3 | 108-75A | Input I.F. 465 Kc. |
| T4 | 108-76A | Output I.F. 465 Kc. |
| T5 | 104-56 | Power Transformer—60 Cycles |
| S | 125-19 | Band Switch |
| C | 102-31 | One Section of Two Gang Condenser |

## RESISTORS

| No. | Part No. | | Description |
|---|---|---|---|
| R1 | 130-111 | 100M | Ohms 1/10W—20%—50V Carbot. |
| R2 | 130-12 | 50M | Ohms 1/3 W—20%—20V Carbon |
| R3 | 130-112 | 100 | Ohms 1/10W—20%—10V Carbon |
| R4 | 130-22 | 5M | Ohms 1/3 W—20%—10V Carbon |
| R5 | 130-77 | 10M | Ohms 1 W—20%—100V Garbon |
| R6 | 130-110 | 1 meg | Ohm 1/10W—10%—100V Carbon |
| R7 | 101-49 | 1 meg | Ohm Volume Control |
| R8 | 130-113 | 2 meg | Ohm 1/10W—20%—100V Carbon |
| R9 | 130-20 | 100M | Ohms 1/3W—20%— 50V Carbon |
| R10 | 130-100 | 150M | Ohms 1/3W—20%— 50V Carbon |
| R11 | 106-26 | 220 | Ohms |
| R12 | 106-26 | 33 | Ohms |
| R13 | 106-26 | 52 | Ohms |

NOTE: R11, R12, and R13 in one unit—106-26

## CONDENSERS

| | | |
|---|---|---|
| C1 | 129-63 | .0004 Mica—W—10% |
| C2 | 100-26 | .02 x 400 Volt—25% |
| C3 | 129-62 | .00003 Mica—0—10% |
| C4 | 129-61 | .0017 Mica—W—2½% |
| C5 | 100-9 | .05 x 200 Volt—25% |
| C6 | 100-6 | .25 x 200 Volt—25% |
| C7 | 100-11 | .01 x 400 Volt—25% |
| C8 | 129-12 | .00025 Mica—0—20% |
| C9 | 129-12 | .00025 Mica—0—20% |
| C10 | 100-11 | .01 x 400 Volt—25% |
| C11 | 100-19 | .006 x 600 Volt—25% |
| C12 | 100-6 | .25 x 200 Volt—25% |
| C13 | 103-6 | 8 mfd. x 350 Volt Electrolytic |
| C14 | 103-7 | 8 mfd. x 300 Volt Electrolytic |
| C15 | 124-29 | Adjustable condenser 390 mmf. working capacity |
| C16 | 124-30 | Adjustable Dual Condenser |

**I. F. FREQUENCY**
**465 K. C.**

**MODEL 587**
CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

ALIGNMENT FREQUENCIES
I.F. 465 KC.
S.W.OSC. TRIMMER 6.6 M.C.
B.C.OSC. TRIMMER 1720 KC.
B.C.ANT. TRIMMER 1550 KC.
B.C.SERIES PAD 600 KC.
S.W.ANT. TRIMMER 6M.C.

**TUNING RANGE—**
**Standard Broadcast Band**
**535-1720 Kilocycles.**
**Short Wave Band**
**2250-6000 Kilocycles**

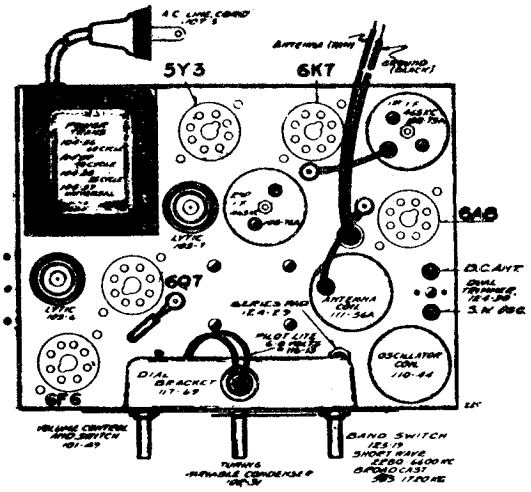



FIG. 1—TOP VIEW

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Socket, Trimmers
Alignment

MODEL 601, Runs 1, 2
Schematic, Voltage

# GOODYEAR TIRE & RUBBER CO., INC.

## ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-83 Output I.F. Transformer
Part No. 108-82 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 78 tube, and adjust the output I.F. transformer (No. 108-83) to resonance.

   (b) Move oscillator output clip from grid of 78 grid cap of 6A7 and adjust input I.F. transformer (No. 108-82) to resonance.

   (c) With oscillator still connected to 6A7, readjust output I.F. transformer (108-83) if necessary.

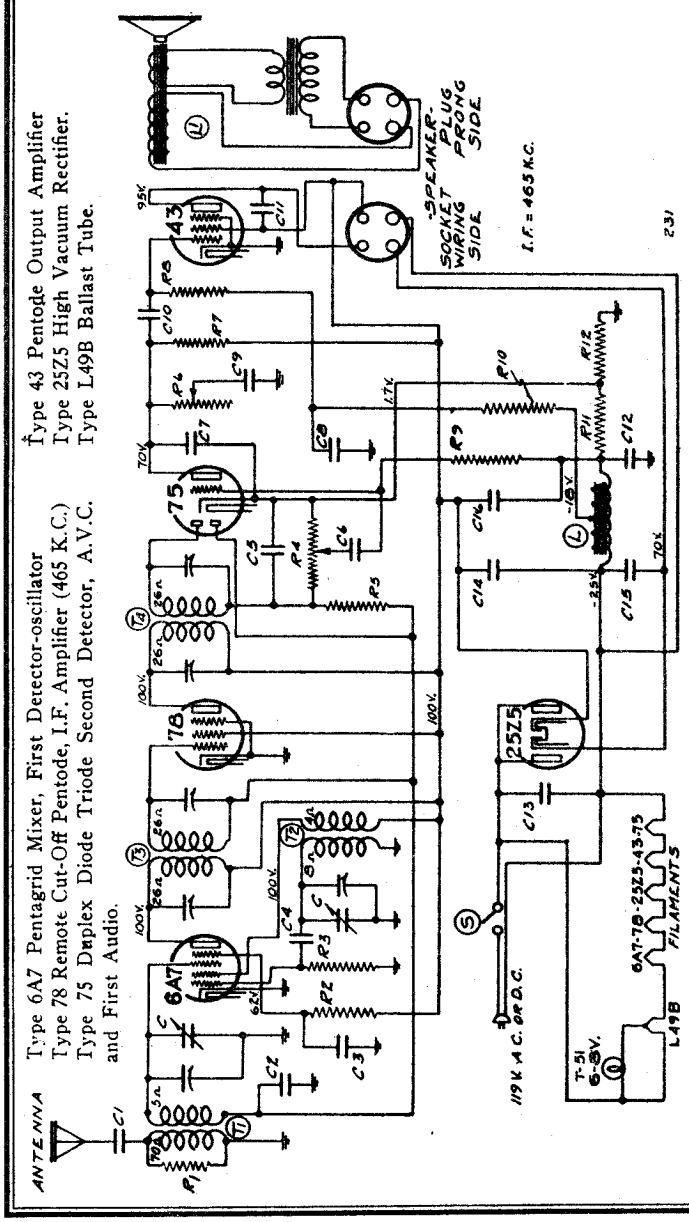
## R.F. ALIGNMENT: (535-1720 K.C.)

1. Unsolder the antenna wire from its terminal on the antenna coil and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 50 mmf. condenser to the antenna terminal on the antenna coil and chassis ground and make the following adjustments:

   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

   (b) Re-set external oscillator to 1550 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.


ANTENNA
Type 6A7 Pentagrid Mixer, First Detector-oscillator
Type 78 Remote Cut-Off Pentode, I.F. Amplifier (465 K.C.)
Type 75 Duplex Diode Triode Second Detector, A.V.C. and First Audio.
Type 43 Pentode Output Amplifier
Type 25Z5 High Vacuum Rectifier.
Type L49B Ballast Tube.
SPEAKER SOCKET WIRING SIDE
SPEAKER PLUG PRONG SIDE
I.F. = 465 K.C.
6A7-78-2525-43-75 FILAMENTS
119 V. A.C. OR D.C.
T-51 6-3V.
L49B

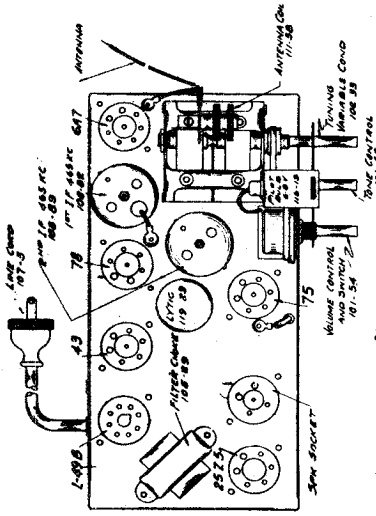



FIG. 2—TOP VIEW

**MODEL 601—SERIES B is the same as Series A, except for the following changes:-**
**1 - The C15 condenser was eliminated.**
**2 - The C14 condenser was replaced by a C15 (Part #119-29) 30 mfd. capacity, and the C16 was replaced by a C14 (Part #119-29) 5 mfd. capacity.**

**RESISTORS**

| No. | Part No. | Description |
|---|---|---|
| R1 | 130-12 | 50M Ohm—½W—20%— 20V—Carbon |
| R2 | 130-21 | 20M Ohm—½W—20%— 20V—Carbon |
| R3 | 130-12 | 50M Ohm—½W—20%— 20V—Carbon |
| R4 | 101-54 | 1 meg Ohm—Volume Control |
| R5 | 130-119 | 3 meg Ohm—½W—20%—100V—Carbon |
| R6 | 101-55 | 1 meg Ohm—Tone Control |
| R7 | 130-120 | 100M Ohm—½W—20%— 50V—Carbon |
| R8 | 130-5 | 300M Ohm—½W—20%—100V—Carbon |
| R9 | 130-38 | 2 meg Ohm—½W—20%—100V—Carbon |
| R10 | 130-9 | 200M Ohm—½W—20%— 20V—Carbon |
| R11 | 106-28 | 35 Ohm—Muter Strip |
| R12 | 106-28 | 50 Ohm—Muter Strip |

NOTE: R11 and R12 in one unit—No. 106-28.

**CONDENSERS**

| | | |
|---|---|---|
| C1 | 100-29 | .002 x600 Volt—25% |
| C2 | 100-22 | .05 x200 Volt—25% |
| C3 | 100-22 | .05 x200 Volt—25% |
| C4 | 129-12 | .00025 Mica—MT—20% |
| C5 | 129-12 | .00025 Mica—MT—20% |
| C6 | 100-11 | .01 x400 Volt—20% |
| C7 | 129-2 | .0005 Mica—MT—20% |
| C8 | 100-20 | .1 x200 Volt—25% |
| C9 | 100-11 | .01 x400 Volt—25% |
| C10 | 100-11 | .01 x400 Volt—25% |
| C11 | 100-25 | .002 x600 Volt—25% |
| C12 | 100-6 | .25 x200 Volt—20% |
| C13 | 100-39 | .1 x400 Volt—20% |
| C14 | 119-25 | 16 mfd.x160 Volt—Working Voltage |
| C15 | 119-25 | 5 mfd.x100 Volt—Working Voltage |
| C16 | 119-25 | 8 mfd.x100 Volt—Working Voltage |

NOTE: C14, C15, and C16 in one unit—No. 119-25

| | | |
|---|---|---|
| C | 102-33 | One section of two gang condenser |
| T1 | 111-57 | Antenna Coil |
| T2 | 110-46 | Oscillator Coil |
| T3 | 108-82 | Input I.F. Coil—465 Kc. |
| T4 | 108-83 | Output I.F. Coil—465 Kc. |
| L | 105-29 | Filter Choke (Resistance 600 Ohms) |
| L1 | 114-43 | Five Inch Speaker (Field resistance 3000 Ohms) |
| S | 101-54 | On and off switch on Volume Control |

**TUNING RANGE—**
**Standard Broadcast Band**
**535-1720 Kilocycles**

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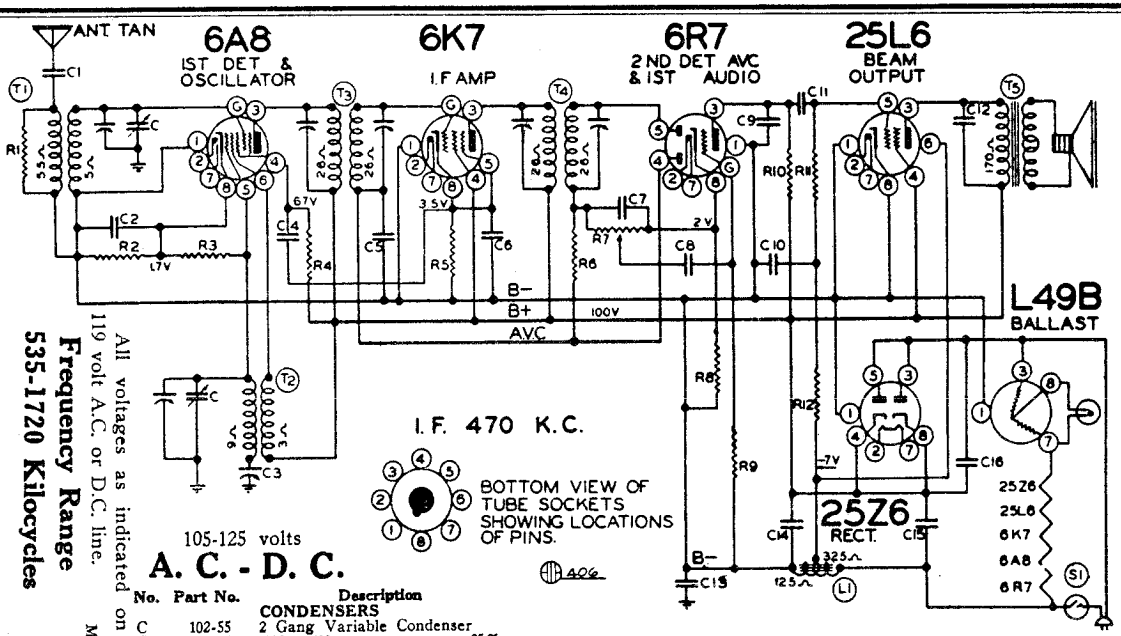



| No. | Part No. | Description | |
|---|---|---|---|
| | | **CONDENSERS** | |
| C | 102-55 | 2 Gang Variable Condenser | |
| C1 | 100-25 | .002 x 600 | 25% |
| C2 | 100-22 | .05 x 200 | 25% |
| C3 | 129-75 | .0003386 Compression Type Condenser 1% | |
| C4 | 100-22 | .05 x 200 | 25% |
| C5 | 100-9 | .05 x 200 | 25% |
| C6 | 100-20 | .1 x 200 | 25% |
| C7 | 129-21 | .0002 Mica | 20% |
| C8 | 100-11 | .01 x 400 | 25% |
| C9 | 129-2 | .0005 Mica | 20% |
| C10 | 100-75 | .22 x 200 | 10% |
| C11 | 100-10 | .05 x 200 | 10% |
| C12 | 100-67 | .025 x 400 | 25% |
| C13 | 100-53 | .25 x 400 | 20% |
| C14 | 119-42 | 5. mfd. lytic 100 w. v. | |
| C15 | 119-42 | 20. mfd. lytic 100 w. v. | |
| C16 | 100-39 | .1 x 400 | 20% |
| | | **RESISTORS** | |
| R1 | 130-17 | 10M ohm — 1/3 w. | 20% |
| R2 | 130-97 | 200 ohm — 1/3 w. | 10% |
| R3 | 130-12 | 50M ohm — 1/3 w. | 20% |
| R4 | 130-149 | 15M ohm — 1/3 w. | 20% |
| R5 | 130-54 | 500 ohm — 1/3 w. | 20% |
| R6 | 130-4 | 3 megohm — 1/3 w. | 20% |
| R7 | 101-77 | Volume Control (1 meg) | |
| R8 | 130-193 | 3M ohm — 1/3 w. | 10% |
| R9 | 130-19 | 1 megohm — 1/3 w. | 20% |
| R10 | 130-94 | 50M ohm — 1/3 w. | 10% |
| R11 | 130-103 | 100M ohm — 1/3 w. | 10% |
| R12 | 130-194 | 35M ohm — 1/3 w. | 10% |
| | | **PARTS** | |
| T1 | 111-79 | Antenna Coil Complete | |
| T2 | 110-62 | Oscillator Coil Complete | |
| T3 | 108-82B | Input I. F. Complete | |
| T4 | 108-83B | Output I. F. Complete | |
| T5 | 114-88 | 5" Dynamic Speaker | |
| L1 | | Speaker field 450 ohm— total tapped 125 ohm | |
| S1 | | Switch on volume control | |

Mica condensers are coded with an additional dot indicating tolerance:

| Tolerance percent | Color of Dot |
|---|---|
| More Than 20% | None |
| 20% | Red |
| 15% | Yellow |
| 10% | Blue |
| 5% | Green |
| 2½% | White |

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

**ALIGNING I.F. TRANSFORMERS: (470 K.C.):**

Part No. 108-83B Output I.F. Transformer

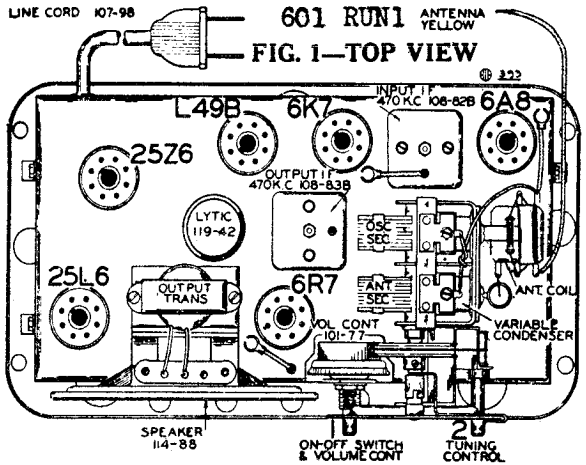
Part No. 108-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

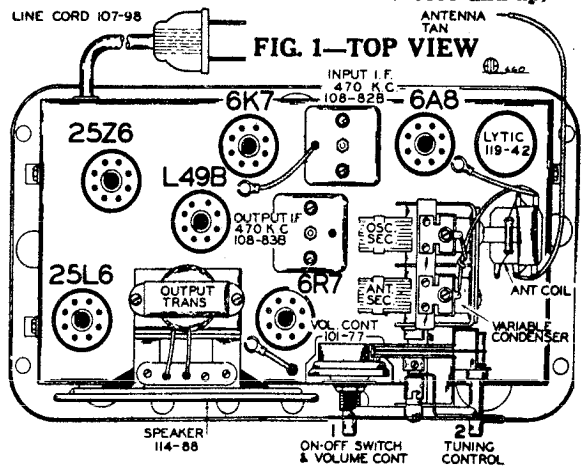
1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 470 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.
   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

**R.F. ALIGNMENT: (535-1720 K.C.)**

1. Unsolder the antenna wire from its terminal on the antenna coil and with gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 50 mmf. condenser to the antenna terminal on the antenna coil and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.




602 RUN2 **(Serial No. 878500 and up)**



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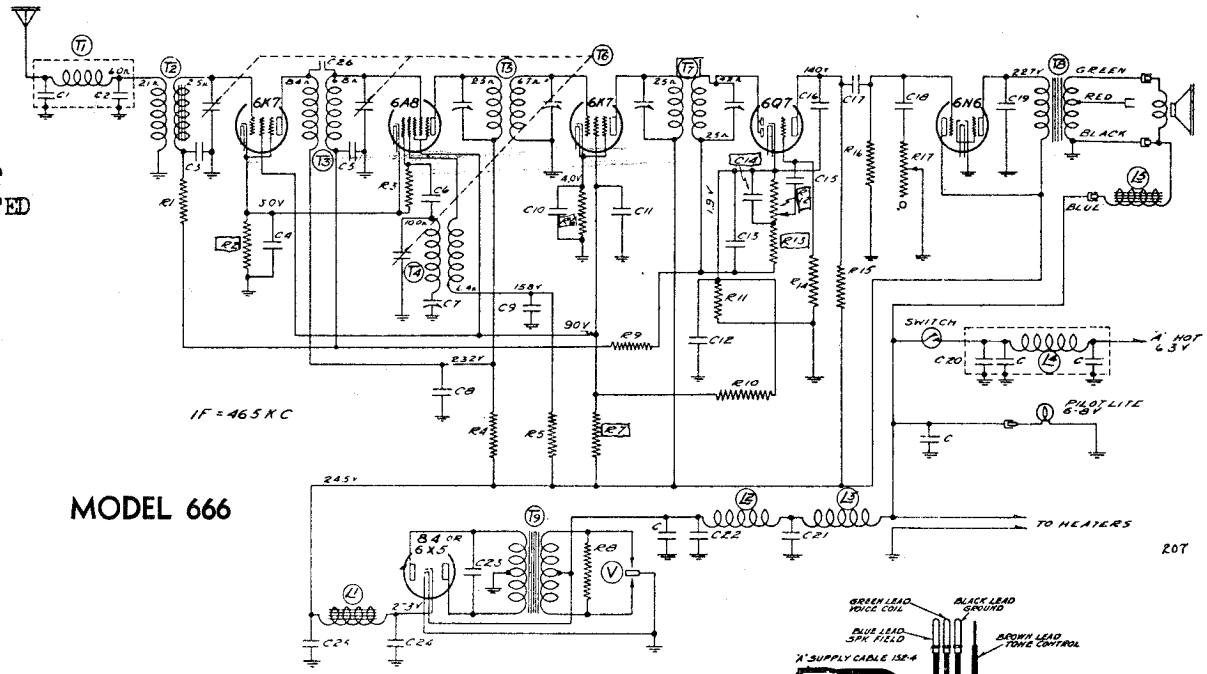
GOODYEAR TIRE & RUBBER CO., INC.

MODEL 666, Runs 1, 2
Schematic, Voltage
Socket, Trimmers
Changes

NOTE:- IN RUN 2 CERTAIN PARTS HAVE BEEN SUBSTITUTED WHICH DIFFER FROM THOSE OF THE FIRST RUN. THESE CHANGES ARE INDICATED BY THE BOXED NUMBERS ON THE SCHEMATIC AND IN THE PARTS LIST BELOW.

| | | |
|---|---|---|
| R2 | 130-79 | 400 Ohm - ⅛ Watt - 10% - 10 Volt - Carbon IRC |
| R6 | 130-101 | 600 Ohm - ⅛ Watt - 10% - 10 Volt - Carbon |
| R7 | 130-116 | 15M Ohm - 1.5 Watt - 10% - 100 Volt - Carbon |
| R12 | 101-41 | 500M Ohm - Volume Control and Switch |
| R13 | 130-94 | 50M Ohm - ⅛ Watt - 10% -10 Volt - Carbon |
| C.14 | 129-60 | .00015 Mica - MT - "O" 20% |
| T1 | 108-70 | Output I.F. Coil—465 Kc. |




## MODEL 666

| No. | Part No. | Description |
|---|---|---|
| | | RESISTORS |
| R1 | 130-20 | 100M Ohm - ⅛ Watt 20% - 50 Volt - Carbon |
| *R2 | 130-99 | 300 Ohm - ⅛ Watt - 20% - 10 Volt - Carbon |
| R3 | 130-94 | 50M Ohm - ⅛ Watt - 10% - 10 Volt - Carbon |
| R4 | 130-98 | 1500 Ohm - ½ Watt 20% - 25 Volt - Carbon |
| R5 | 130-42 | 20M Ohm - ⅛ Watt - 20% - 100 Volt - Carbon |
| *R6 | 130-70 | 500 Ohm - ⅛ Watt - 10% - 10 Volt - Carbon |
| *R7 | 130-95 | 12M Ohm - 1.2 Watt - 10% - 100 Volt - Carbon |
| R8 | 130-97 | 200 Ohm - ½ Watt - 10% - 10 Volt - Carbon |
| R9 | 130-3 | 500M Ohm - ⅛ Watt 20% - 100 Volt - Carbon |
| R10 | 130-108 | 40M Ohm - ⅛ Watt - 10% - 100 Volt - Carbon |
| R11 | 130-107 | 800 Ohm - ½ Watt - 10% - 10 Volt - Carbon |
| *R12 | 101-42 | 50M Ohm - Volume Control and Switch |
| *R13 | 130-22 | 5M Ohm - ⅛ Watt - 20% -10 Volt - Carbon |
| R14 | 130-68 | 1 Meg Ohm - ⅛ Watt - 10% - 20 Volt - Carbon |
| R15 | 130-9 | 200M Ohm - ⅛ Watt - 20% - 20 Volt - Carbon |
| R16 | 130-3 | 500M Ohm - ⅛ Watt - 20% - 100 Volt - Carbon |
| R17 | 101-45 | 1 Meg Ohm - Tone Control |

| | | |
|---|---|---|
| | | CONDENSERS |
| C | | Spark Plate |
| C1 | 129-3 | .00002 Mica - "O" - 20% |
| C2 | 129-49 | .00009 Mica - "O" - 5% |
| C3 | 116-18 | .05 x 200 Volt |
| C4 | 116-18 | .25 x 200 Volt |
| C5 | 116-17 | .05 x 200 Volt |
| C6 | 129-21 | .0002 Mica - MT - "O" - 20% |
| C7 | 124-17 | Single Padder J-4-S |
| C8 | 116-17 | .1 x 400 Volt |
| C9 | 116-18 | .1 x 400 Volt |
| C10 | 116-17 | .1 x 200 Volt |
| C11 | 116-17 | .1 x 200 Volt |
| C12 | 116-16 | .05 x 200 Volt |
| C13 | 129-5 | .0001 Mica - MT - "O" - 20% |
| *C14 | 129-2 | .0005 Mica - MT - "O" - 20% |
| C15 | 116-18 | .02 x 200 Volt |
| C16 | 129-5 | .0001 Mica - MT - "O" - 20% |
| C17 | 116-16 | .05 x 400 Volt |
| C18 | 100-37 | .003 x 600 Volt - 10% |
| C19 | 116-16 | .01 x 800 Volt |
| C20 | 100-35 | .5 x 200 Volt - 50% - 10% |
| C21 | 100-35 | .5 x 200 Volt - 50% - 10% |
| C22 | 100-35 | .5 x 200 Volt - 50% - 10% |
| C23 | 100-36 | .01 x 1400 Volt - 10% |
| C24 | 119-21 | 8.0 mfd. Lytic Cond. 350 Working Volts |
| C25 | 119-21 | 4.0 mfd. Lytic Cond. 350 Working Volts |
| C26 | | 5.0 mmf. Gimmick |

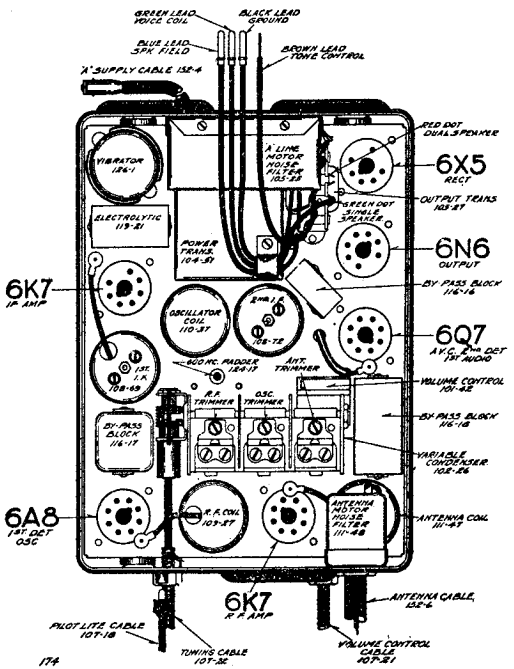
| | | |
|---|---|---|
| | | PARTS |
| T1 | 111-48 | Antenna Filter Coil Assembly |
| T2 | 111-47 | Antenna Coil Assembly |
| T3 | 109-27 | R.F. Coil Assembly |
| T4 | 110-37 | Oscillator Coil Assembly |
| T5 | 108-69 | Input I.F. Coil—465 Kc. |
| T6 | 102-26 | Three Gang Variable Condenser |
| *T7 | 108-72 | Output I.F. Coil—465 Kc. |
| T8 | 105-27 | Output Transformer |
| T9 | 104-51 | Power Transformer |
| L1 | 105-23 | Filter Choke |
| L2 | 105-19 | "A" Choke |
| L3 | 105-24 | "A" Choke |
| L4 | 105-26 | "A" Choke |
| L5 | 114-34 | 5¼" Speaker (Field Resistance—4 Ohms) |
| V | 126-1 | Vibrator |

C3, C4, C9, C15, in one unit—part No. 116-18.

C5, C8, C10, C11, in one unit—part No. 116-17.

C12, C17, C19, in one unit—part No. 116-16.

C24, C25, in one unit—part No. 119-21.



MODEL 666, Runs 1, 2

Alignment

Speaker Connections

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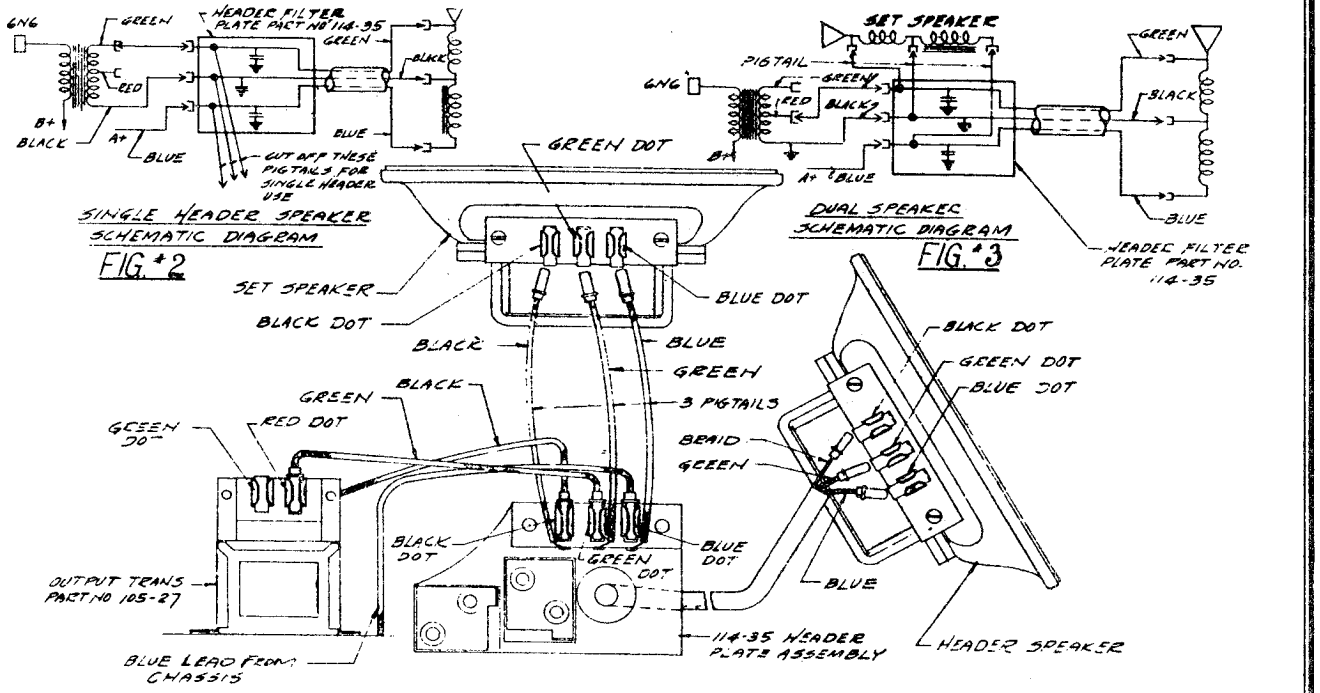


## NO SPARK PLUG SUPPRESSORS ARE REQUIRED

**DESCRIPTION:**

Model No. 666 is a six-tube superheterodyne receiver having a tuning range of 530 K.C. to 1550 K.C., operates from a 6.0 volt storage battery and uses the automotive type 6.3 volt tubes. The "B" supply is obtained from a vibrator with a tube rectifier.

The I.F. frequency used is 465 K.C., the R.F. end of the receiver consisting of a high gain iron core antenna coil which gives high signal to noise ratio and an R.F. stage especially designed to give high image rejection and high I.F. attenuation. The I.F. transformers are designed to give high gain and selectivity and yet to have a broad nose for ease of tuning and hi-fidelity response. They are of the air core type and wound with solid wire to give *minimum* drift and variation of gain due to climatic changes.

The receiver is so designed that it may be used as either a single or two unit installation. Taps are provided on the output transformer to a pin jack terminal board, a red dot distinguishing dual speaker tap and green dot for single speaker operation.

For complete details see illustration and Header speaker data chart.

Dash kits for the remote control head are available for 1936 cars drilled for dash plates.

This receiver has been carefully designed to facilitate servicing, the top and bottom covers are both removable and are fastened in place by spring clips, self tapping screws and trimount buttons.

All adjustments are accessible and any part replaceable without removing the chassis from the case.

**TUBE COMPLEMENT**

1—Type No. 6K7—Remote Cut-off Pentode as an R.F. Amplifier
1—Type No. 6A8—Pentagrid Converter (composite first detector and oscillator)
1—Type No. 6K7—Remote Cut-off Pentode as an I.F. Amplifier (465 K.C.)
1—Type No. 6Q7—Duplex Diode Triode Second Detector, A.V.C. and First Audio
1—Type No. 6N6—Twin Triode Output Amplifier
1—Type No. 6X5—High Vacuum Rectifier

The tube complement consists of the latest "Metal-Glass" tubes which are interchangeable with metal tubes.

Cars with floating power must have the motor bonded to the bulkhead and again to the frame to provide a direct path for the high frequency interference developed in the ignition system. ⅝" copper braid will be necessary, SMALL DIAMETER WIRE WILL NOT DO. Bond flexible shaft leads, such as free wheeling, choke wires, etc., which pick up motor noise and reradiate it into the car. Free wheeling cables should be grounded at the point at which they go through the fire wall of the car. In extreme cases it has been found necessary to ground the steering column.

**I.F. ALIGNMENT**

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C. in series with I.F. dummy antenna, to grid of 6K7 I.F. tube.
2. Adjust trimmer condensers of output I.F. transformer No. 108-72 to resonance with oscillator.
3. Move test oscillator connection to grid of 6A8 tube and adjust trimmer condensers of input I.F. transformer No. 108-69 to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

**BROADCAST ALIGNMENT**

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. in series with broadcast dummy to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance. (This adjustment is on the middle section of the three-gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. and antenna trimmers to resonance (see top view).
4. Re-set test oscillator to 600 K.C. and rotate variable condenser to 600 KC. Adjust series pad rocking gang condenser to and fro at the same time adjusting series pad for maximum gain. This adjustment is accessible from the top of chassis (see top view.
5. Go back and check 1400 K.C. If adjustment is made here, check 600 K.C. again.
6. Check for sensitivity at 1000 K.C. by setting test oscillator to this frequency and picking up the signal by rotating variable condenser. Under no circumstances bend plates of variable condenser sections to correct tracking.

***Make certain that the instrument panel has a ground connection to the frame of the car.***

NOTE—Where ignition coils are mounted in motor compartments a .5 mfd cond (148-1 or 148-3) connected between primary coil terminal and receiver mounting bolt will often reduce motor noise.

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MODEL 691
Schematic, Voltage
Socket, Trimmers

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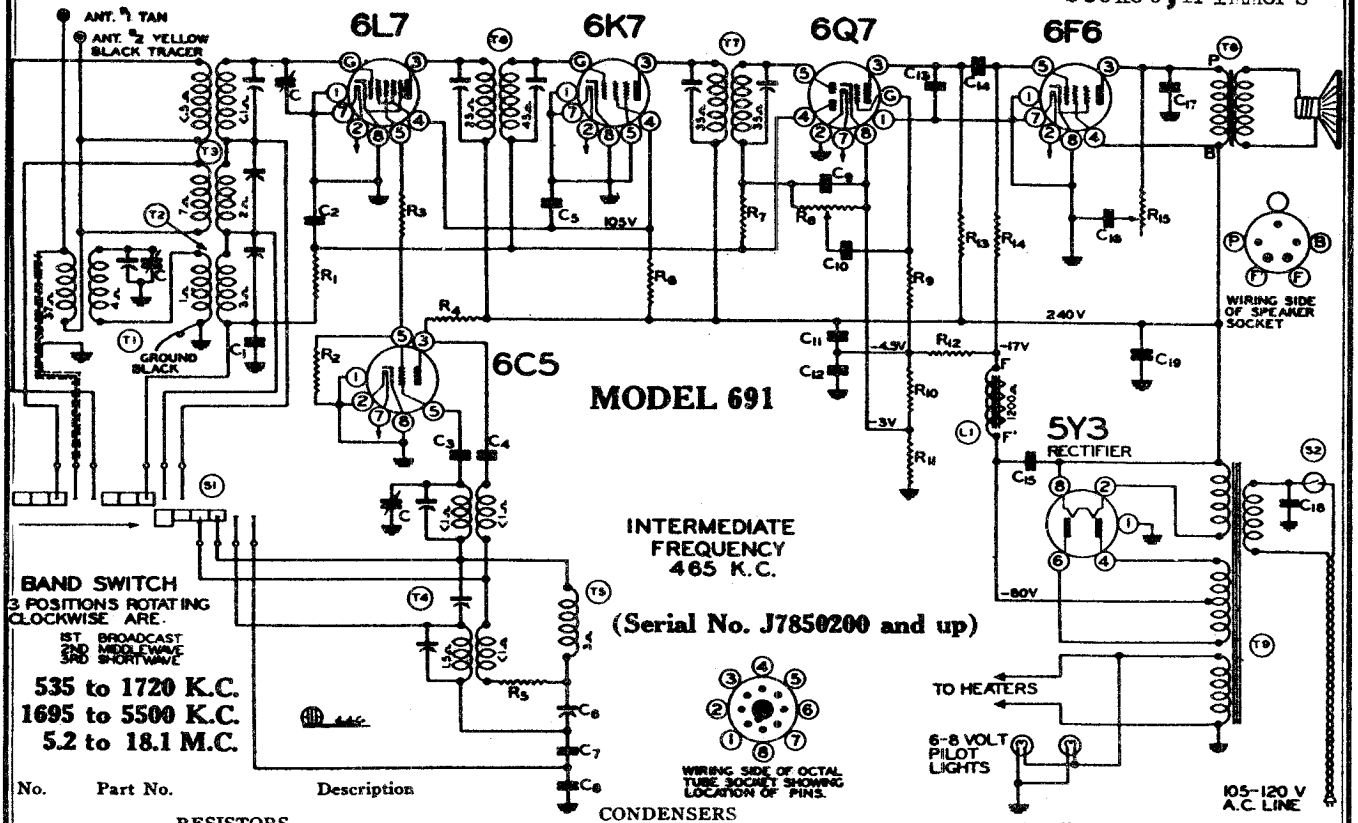


| No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 130-103 | 100M ohm - 1/3 w. |
| R2 | 130-12 | 50M ohm - 1/3 w. |
| R3 | 130-105 | 150 ohm - 1/3 w. |
| R4 | 130-77 | 10M ohm - 1 watt |
| R5 | 130-27 | 50 ohm - 1/3 w. |
| R6 | 130-34 | 19M ohm - 1 watt |
| R7 | 130-4 | 3 meg - 1/3 w. |
| R8 | 101-93 | 1 meg volume control |
| R9 | 130-4 | 3 meg - 1/3 w. |
| R10 | 106-26 | 32 ohm - resistor strip |
| R11 | 106-26 | 52 ohm - resistor strip |
| R12 | 106-26 | 220 ohm - resistor strip |
| R13 | 130-103 | 100M ohm - 1/3 w. |
| R14 | 130-102 | 500M ohm - 1/3 w. |
| R15 | 101-92 | 50M ohm - tone control |
| | | R10, R11 and R12 in same unit |
| | | **CONDENSERS** |
| C | 102-60 | 3 gang variable |
| C1 | 100-22 | .05 x 200 |
| C2 | 100-26 | .02 x 400 |
| C3 | 129-39 | .00005 Mica |
| C4 | 100-37 | .003 x 600 |
| C5 | 100-1 | .1 x 400 |
| C6 | 124-40 | .000715 W.C. Series Pad |
| C7 | 129-55 | .0034 Mica |
| C8 | 129-54 | .003 Mica |
| C9 | 129-5 | .0001 Mica |
| C10 | 100-26 | .02 x 400 |
| C11 | 119-45 | 8 mfd. - 400 w. v. lytic |
| C12 | 100-20 | .1 x 200 |
| C13 | 129-2 | .0005 Mica |
| C14 | 100-11 | .01 x 400 |
| C15 | 119-45 | 8 mfd. 400 w. v. lytic |
| C16 | 100-65 | .015 x 600 |
| C17 | 100-37 | .003 x 600 |
| C18 | 100-61 | .02 x 600 |
| C19 | 100-11 | .01 x 400 |
| | | C11 and C15 in same unit |
| | | **PARTS** |
| T1 | 111-51 | Preselector Coil |
| T2 | 111-49 | B. C. Antenna Coil Complete |
| T3 | 111-50 | S.W. M.W. Antenna Coil complete |
| T4 | 110-39 | S.W. M.W. Oscillator Coil complete |
| T5 | 110-38 | B.C. Oscillator Coil complete |
| T6 | 108-109 | Input I.F. Coil complete 465 kc. |
| T7 | 108-110 | Output I.F. Coil complete 465 kc. |
| T8 | 114-85B | 6" dynamic Speaker |
| T9 | 104-106 | Power Transformer |
| L1 | | Speaker field 1200 ohm |
| S1 | 125-40 | Wave band switch |
| S2 | | Off-On Switch on Volume Control |

Mica condensers are coded with an additional dot indicating tolerance:

| Tolerance percent | Color of Dot |
|---|---|
| 2½ % | White |
| 5% | Green |
| 10% | Blue |
| 15% | Yellow |
| 20% | Red |
| More Than 20% | None |

The power consumption of this receiver is 75 watts.

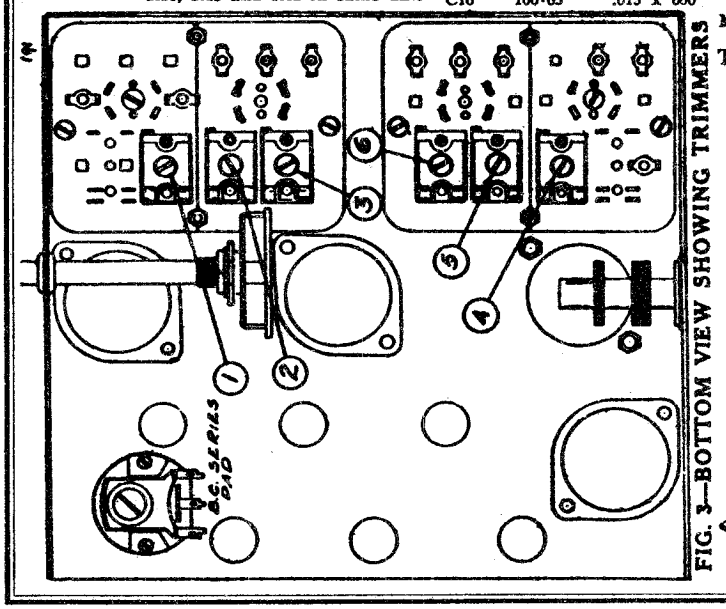


FIG. 3—BOTTOM VIEW SHOWING TRIMMERS

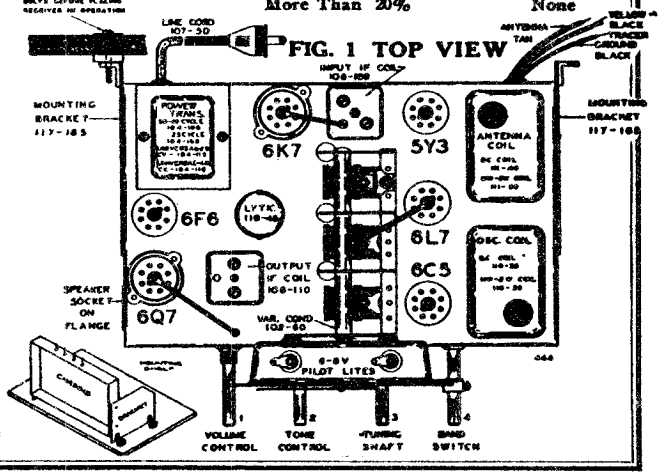


FIG. 1 TOP VIEW

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# MODEL 691 (Serial No. J7850200 and up)

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.

All voltages are to be measured with 115 volts on the primary of the power transformer.

**DUMMY ANTENNAS:**

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

**ALIGNING I.F. TRANSFORMERS: (465 K.C.):**

Part No. 108-110 Output I.F. Transformer
Part No. 108-109 Input I.F. Transformer
These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-110) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6L7 and adjust input I.F. transformer (No. 108-109) to re-

**BROADCAST BAND ALIGNMENT:**
**535 to 1720 Kilocycles**

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly. Fig. 3.)
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

**SHORT WAVE BAND ALIGNMENT:**
**5.2 to 18.1 Megacycles**

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.2 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 17 megacycle signal appears near 16.1 megacycles.

**MIDDLE WAVE BAND ALIGNMENT:**
**1695 to 5500 Kilocycles**

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments.
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5500 kilocycles and 1695 kilocycles for band coverage.
   (d) Recheck broadcast band alignment.

# MODEL 787

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

**DUMMY ANTENNAS:**

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

**ALIGNING I.F. TRANSFORMERS; (465 K.C.):**

Part No. 108-73 Output I.F. Transformer.
Part No. 108-74 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on (the extreme right of its rotation), the band changing switch in the broadcast position (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1," to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-73) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer (No. 108-74) to resonance.
   (c) With oscillator still connected to 6L7, readjust output I.F. transformer (108-73) if necessary.

**BROADCAST BAND ALIGNMENT:**
**535 to 1720 Kilocycles**

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment number 1; see bottom view of coil assembly, Fig. 3).
   (b) Re-set external oscillator to 1550 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment number 4) to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3.)
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

**SHORT WAVE BAND ALIGNMENT:**
**5.2 to 18.3 Megacycles**

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment number 3) and short wave antenna (Adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.3 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 18.3 megacycle signal appears near 17.4 megacycles.

**MIDDLE WAVE BAND ALIGNMENT:**
**1695 to 5500 Kilocycles**

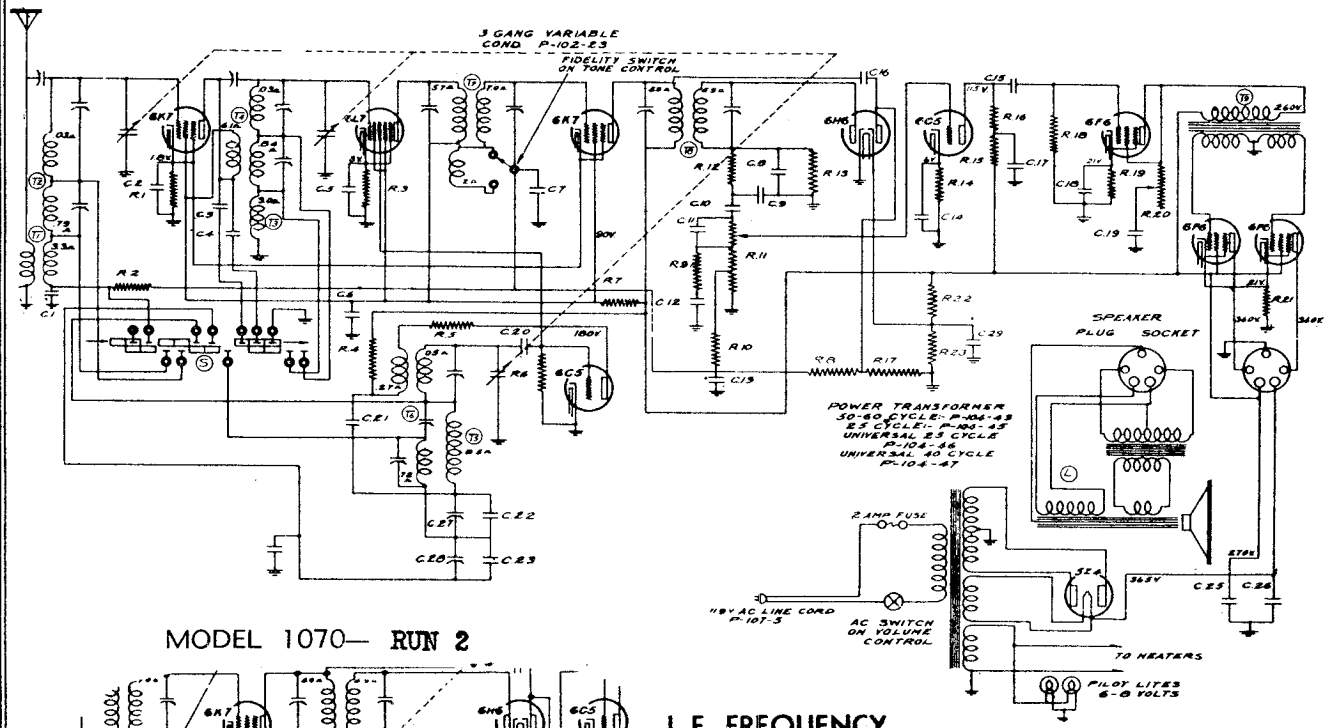
1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment number 2) and middle wave antenna (Adjustment number 5) to resonance.
   (b) Re-set external oscillator to 1800 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 5400 kilocycles and 1700 kilocycles for band coverage.

Schematic, Socket Trimmers, Changes

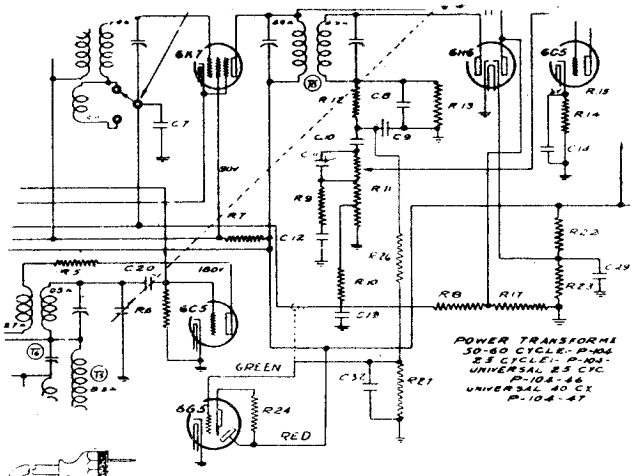
MODEL 1070, Runs 1,2

# GOODYEAR TIRE & RUBBER CO., INC.

## MODEL 1070— RUN 1

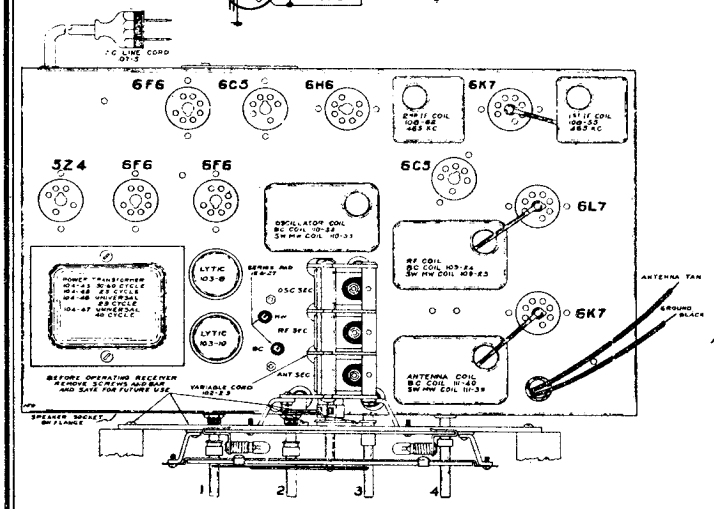


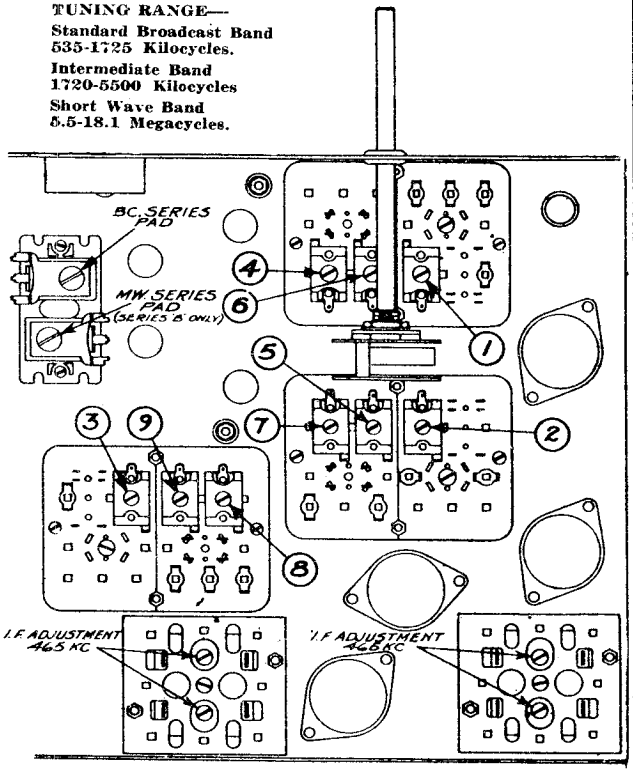

## MODEL 1070— RUN 2




**I. F. FREQUENCY**
**465 K. C.**

**TUNING RANGE—**
**Standard Broadcast Band**
**535-1725 Kilocycles.**
**Intermediate Band**
**1720-5500 Kilocycles**
**Short Wave Band**
**5.5-18.1 Megacycles.**




BOTTOM VIEW—SHOWING TRIMMERS

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# 10-Tube A. C. All Wave

## 3-Band High Fidelity Superheterodyne Receiver with Cathode Ray Tuning Indicator

# MODEL 1070 - RUN 2

**NOTE:—Operation of Cathode-Ray Tuning Indicator**

Due to unsatisfactory indication of the cathode-ray tuning indicator on weak signals in some territories, a change was made in the circuit to correct this condition and still allow the tube to operate correctly on a strong signal.

Referring to the circuit diagram, resistors R26, R27 and condenser C32 were added and connected to the green wire from the cathode-ray tuning indicator as shown.

The dotted line on the circuit diagram indicates the manner in which the green wire for the cathode-ray tuning indicator cable was formerly connected, before resistors R26, R27 and condenser C32 were added.

1—Type 6G5 Cathode ray tuning indicator.

Form 1006 2M 8-36

# MODEL 1070 - RUN 1

### DESCRIPTION

The tube complement of this chassis is as follows:

1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6L7 Pentode first detector
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier (465 K.C.)
1—Type 6H6 Duplex diode second detector and A.V.C.
1—Type 6C5 First audio amplifier
1—Type 6F6 Pentode driver stage
2—Type 6F6 Class AB Output pentodes in push-pull
1—Type 5Z4 High vacuum rectifier

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 40 and 60 cycles and with primary taps for 105, 125, 150, 220 and 250 volts (see instructions) and also sometimes equipped with 25 cycle transformers with 105-115 volt or 220 volt primaries, not universals.

### SERVICE NOTES

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagrams of series A.

**IN ORDER TO PREVENT SIGNAL FROM ACTING UPON AVC AND AFFECTING ACCURACY OF VOLTAGE MEASUREMENTS, AERIAL AND GROUND LEADS SHOULD BE SHORT CIRCUITED WHILE MAKING MEASUREMENTS.**

**All voltages are to be measured with 110 volts on the primary of the power transformer.**

Resistances of coils and transformer windings are indicated in ohms on schematic circuit diagrams.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D.C. voltages is usually caused by a shorted electrolytic condenser, open by-pass condensers frequently cause oscillation and distorted tone.

This chassis is protected against damage from faulty tubes or abnormal line conditions by a fuse in the primary circuit.

If when set is turned on pilot lights do not light, look for a blown fuse.

This fuse is made accessible for replacement by removing fuse cover located on back flange of chassis, replace only with a 2 ampere fuse. If replacement fuse blows out, check tubes, (particularly 5Z4 rectifier) circuit, repair or replace defective tubes or parts.

NEVER ATTEMPT TO REPLACE FUSE WITHOUT FIRST DISCONNECTING POWER.

NEVER REPLACE WITH FUSE OTHER THAN 2 AMPERE RATING.

NOTE: Chassis with serial numbers from 5K194500 to 5K195497 have the fuse mounted on the under-side of the chassis, it is necessary to remove the chassis from the cabinet to replace the fuse.

### ALIGNING INSTRUCTIONS
### Dummy Antennas

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Intermediate and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

**Resonance Indicator:**

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or by means of an adapter between the plate and cathode terminals of the 5 prong speaker socket. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

**CAUTION:**

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the four bolts by which it is fastened.

### ALIGNING I.F. TRANSFORMERS (465 K.C.)

Part No. 108-62 Output I.F. Transformer
Part No. 108-55 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the underside of chassis (see bottom view).

1. With volume control full on, (the extreme right of its rotation), the wave changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, located between the two I.F. transformers, and adjust the output I.F. transformer to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6L7 and adjust input I.F. transformer to resonance.
   (c) With oscillator still connected to 6L7, re-adjust output I.F. transformer.

### ALIGNMENT PROCEDURE

The following adjustments to be made after the I.F.'s have been aligned as explained above.

### BROADCAST BAND ALIGNMENT:

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 600 kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Adjust broadcast series pad to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained. Note: This adjustment is accessible from the top of the chassis and is located between the variable condenser and the electrolytic condenser. See top view.
   (b) Re-set external oscillator to 1400 K.C., move dial pointer to 1400 K.C. and adjust oscillator (adjustment number 3), R.F. (adjustment number 2) and antenna (adjustment number 1) to resonance. See bottom view for location of these adjustments.
   (c) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

NOTE: IT IS EXTREMELY NECESSARY IN MAKING ALL OF THESE ADJUSTMENTS THAT THE FUNDAMENTAL OSCILLATOR SIGNAL BE TUNED IN AND NOT THE IMAGE FREQUENCY WHICH WILL FALL BELOW THE FUNDAMENTAL.

### SHORT WAVE BAND ALIGNMENT:

1. With wave changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (adjustment number 8), short wave R.F. (adjustment number 7) and short wave antenna (adjustment number 6) to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check for sensitivity.

### INTERMEDIATE BAND ALIGNMENT:

1. With wave changing switch in the intermediate wave position, center of its rotation, and with external oscillator set at 1500 K.C. and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Rotate variable condenser to approximately 1300 K.C., tune in oscillator signal and adjust M.W. series pad (see top view) to resonance. Slowly rock condenser to and fro while making this adjustment to be sure maximum output is obtained.
   (b) Set external oscillator at 5 M.C., rotate condenser, pick up signal and adjust intermediate wave R.F. (adjustment number 5), intermediate wave antenna (adjustment number 4) and intermediate wave oscillator (adjustment number 9) to resonance.
   (c) Re-check broadcast alignment and if it is found necessary to re-adjust either R.F. or antenna trimmers, repeat the 17 M.C. short wave and 5 M.C. intermediate wave adjustments.

## REPAIR PARTS LIST—MODEL 1070—RUN 1

## REPAIRS PARTS LIST—MODEL 1070—RUN 2

| Part No. | DESCRIPTION | Circuit Diagram Reference | List Price Each |
|---|---|---|---|
| | **CONDENSERS** | | |
| 100-1 | .1 x 400 Volt Tubular | C17, C19 | $0.25 |
| 100-6 | .25 x 200 Volt Tubular with Bracket | C2 | .35 |
| 100-7 | .006 x 600 Volt Tubular | C29 | .25 |
| 100-9 | .05 x 200 Volt Tubular | C1, C7, C10 | .25 |
| 100-11 | .01 x 400 Volt Tubular | C32 | .25 |
| 100-13 | .05 x 400 Volt Tubular | C15, C21 | .25 |
| 100-20 | .1 x 200 Volt Tubular | C5 | .25 |
| 100-22 | .05 x 200 Volt Tubular | C12, C13 | .25 |
| 100-24 | .25 x 400 Volt Tubular | C6 | .35 |
| 100-32 | .0005 x 1000 Volt Condenser | C31 | .35 |
| 102-5 | 14 Mfd. x 400 Volt Electrolytic | C25 | 1.35 |
| 102-10 | 30 Mfd. x 450 Volt Electrolytic | C26 | 1.35 |
| 119-10 | Dual 30 Mfd. x 25 Volt Electrolytic | C14, C18 | 1.25 |
| 119-21 | 25 mfd. x 25 Volt Electrolytic | C30 | .75 |
| 122-2 | .0005 Mica - Type MT - 20% | C11 | .25 |
| 122-3 | .00002 Mica - Type MT - 20% | C16 | .25 |
| 122-21 | .0002 Mica - Type MT - 20% | C4 | .25 |
| 122-22 | .0014 Mica - Type MW - 5% | C23 | .25 |
| 122-28 | .00066 Mica - Type MT - 5% | C22 | .25 |
| 122-29 | .0038 Mica - Type MW - 2½% | C24 | .50 |
| 122-30 | .0014 Mica - Type MW - 20% | C3 | .25 |
| 125-35 | .00005 Mica - Type MT - 10% | C8, C9 | .25 |
| 125-52 | .000015 Mica - Type MT - 10% | C30 | .25 |
| | **RESISTORS** | | |
| 106-25 | Metal Clad Resistor | R19, R21 | .50 |
| 130-8 | 500M Ohm - ½ Watt - 20% - 100 Volt Carbon | R8, R17, R18 | .20 |
| 130-9 | 800M Ohm - ½ Watt - 20% - 20 Volt Carbon | R22 | .20 |
| 130-11 | 250M Ohm - ½ Watt - 20% - 80 Volt Carbon | R13 | .20 |
| 130-20 | 100M Ohm - ½ Watt - 20% - 50 Volt Carb | R2, R12, R15, R16 | .20 |
| 130-21 | 20M Ohm - ½ Watt - 20% - 20 Volt Carbon | R23, R25 | .20 |
| 130-22 | 5M Ohm - ½ Watt - 20% - 10 Volt Carbon | R9 | .20 |
| 130-26 | 10M Ohm - ½ Watt - 20% - 50 Volt Carbon | R14 | .20 |
| 130-49 | 15M Ohm - ½ Watt - 20% - 150 Volt Carbon | R4 | .20 |
| 130-52 | 60M Ohm - ½ Watt - 20% - 10 Volt Carbon | R6 | .20 |
| 130-53 | 150 Ohm Wire - 20% | R5 | .20 |
| 130-54 | 500 Ohm - ½ Watt - 20% - 10 Volt Carbon | R3 | .20 |
| 130-90 | 100 Ohm - ½ Watt - 20% - 10 Volt Carbon | R1 | .20 |
| 130-95 | 2M Ohm - ½ Watt - 20% - 10 Volt Carbon | R10 | .20 |
| 130-98 | 10M Ohm - 2 Watt - Wire Wound | R7 | .45 |
| 130-110 | 1 Megohm—1/10 Watt—10%—100 Volt Carbon | R24 | .20 |
| 130-126 | 1 Megohm—1/10 Watt—20%—100 Volt Carbon | R26 | .20 |
| 130-127 | 4 Megohm—1/10 Watt—20%—100 Volt Carbon | R27 | .20 |
| | **COILS** | | |
| 106-55 | Input I.F. Coil Assembly Complete—Less Can | T7 | 2.50 |
| 106-56 | Output I.F. Coil Assembly Complete—Less Can | T8 | 1.50 |
| 109-94 | Broadcast R.F. Coil Assembly Complete—Less Can | T3 | .50 |
| 109-95 | Mid-Wave & Short Wave R.F. Coil Assembly Complete—less Can | T4 | 1.50 |
| 110-33 | Broadcast Oscillator Coil Assembly Complete—Less Can | T5 | .50 |
| 110-35 | Mid-Wave & Short Wave Oscillator Coil Assembly Complete—Less Can | T6 | 1.00 |
| 111-39 | Mid-Wave & Short Wave Antenna Coil Assembly Complete—less Can | T2 | 1.00 |
| 111-40 | Broadcast Antenna Coil Assembly Complete—Less Can | T1 | .75 |
| | **TRANSFORMERS** | | |
| 104-43 | 50/60 Cycle Power Transformer | | 5.00 |
| 104-48 | 25 Cycle Power Transformer | | 7.00 |
| 104-46 | Universal - 25 Cycle Primary | | 5.00 |
| 104-47 | Universal - 40 Cycle Primary | | 7.50 |
| 104-50 | 50/60 Cycle - Special 195 Volt Power Transformer | | 7.00 |
| | **SOCKETS** | | |
| 121-4 | Five Prong Socket - "Speaker" | | .10 |
| 121-12 | Seven Prong Socket - "6K7" | | .15 |
| 121-14 | Seven Prong Socket - "6F6" | | .15 |
| 121-16 | Five Prong Socket - "5Z4" | | .10 |
| 121-17 | Six Prong Socket - "6C5" | | .15 |
| 121-18 | Seven Prong Socket - "6L7" | | .15 |
| 121-19 | Seven Prong Socket - "6H6" | | .15 |
| | **SPEAKER** | | |
| 114-28 | Twelve Inch Dynamic (Field 1500 Ohm) | L | 10.00 |
| | **MISCELLANEOUS** | | |
| 101-36 | Volume Control and Switch (1 Meg. Ohm) | R11 | 1.35 |
| 101-40 | Tone Control and Fidelity Switch (2M Ohm) | R20 | 1.35 |
| 102-28 | Three Gang Variable Condenser | | 5.00 |
| 107-5 | Line Cord and Plug | | .50 |
| 115-35 | Antenna, Oscillator & R. F. Shield | | .15 |
| 115-36 | I.F. Shield | | .15 |
| 106-17 | Audio Transformers | T9 | 1.35 |
| 124-27 | 1/3-6.3 Series Dial Pad | C27, C28 | .60 |
| 125-18 | Wave Change Switch | S | .90 |
| 113-47 | Fuse Clip Assembly | | .15 |
| 125-51 | Wood Knob with Spring | | .15 |
| 121-34 | 2 Amp. Fuse - Type 3AG | | .10 |
| | **CATHODE-RAY TUNING INDICATOR PARTS** | | |
| 107-28 | Cable and Socket Assembly | | $0.75 |
| 115-158 | Metal Oval Escutcheon | | .25 |
| 117-67 | Holder and Clamp | | .25 |
| 130-119 | 1 Meg. Ohm—1/10 Watt—10%—100 Volt Carbon | | .20 |
| | **ASSEMBLING** | | |
| 112-133 | Belt Take-up Assembly—Including: | | .25 |
| | 1—No. 117-18 Take-up Arm | | |
| | 1—No. 117-81 Take-up Pulley | | |
| | 1—No. 117-24A Stud for Above | | |
| | 1—No. 117-24A Stud | | |
| | 1—No. 121-26 Spring Washer | | |
| | 2—No. 124-2 Horse Shoe Washer | | |
| 112-136 | Switch Assembly—Including: | | .65 |
| | 2—No. 117-16 Sand Indicator Arm | | |
| | 1—No. 117-15 Link | | |
| | 1—No. 117-14 Elbow | | |
| | 1—No. 117-13 Link | | |
| | 2—No. 125-5 Rivets | | |
| | 3—No. 121-30 Spring Washer | | |
| | 1—No. 117-23A Threaded Stud | | |
| | 1—No. 117-23A Stud Red Cellulose | | |
| 112-135 | Volume Indicator Assembly—Including: | | .75 |
| | 1—No. 112-122 Pointer Disc | | |
| | 1—No. 117-26 Bushing | | |
| | 1—No. 130-5A Spring Clip | | |
| | 1—No. 120-7 Coil Spring | | |
| | No. 120-11 Fish Line | | |
| | 1—No. 117-22 Pulley | | |
| | 1—No. 124-2 Red Cellulose | | |
| 112-137 | Dial Plate Assembly—Including: | | 1.25 |
| | 1—No. 117-17 Dial Plate | | |
| | 2—No. 117-11 Dial Bracket | | |
| | 4—No. 122-4 Rivets | | |
| | 2—No. 117-25A Volume & Tone Indicator Studs | | |
| | 1—No. 117-19 Bushing for Tuning Shaft | | |
| | No. 124-2 Horse Shoe Washer | | |
| 112-138 | Switch Arm Assembly—Including: | | .25 |
| | 1—No. 117-12 Switch Arm | | |
| | 1—No. 117-25 Bushing | | |
| | 2—No. 122-18 Set Screw | | |
| | **DIAL PARTS ONLY** | | |
| 112-117A | Tuning Shaft | | .05 |
| 113-118 | Metal Oval Escutcheon Only | | 1.25 |
| 113-119 | Dial Pointer with No. 122-5 Screw | | .25 |
| 113-120 | Sand Spread Pointer Disc | | .10 |
| 113-123 | Oval Glass Crystal Only | | .35 |
| 113-124 | Glass Dial Scale | | .20 |
| 113-125 | Drive Belt | | 1.25 |
| 113-126 | Pilot Light Socket | | .50 |
| 113-127 | Pilot Light Bracket | | .10 |
| 113-129 | Oval Glass Retaining Ring | | .10 |
| 107-16 | 6-8 Volt T-3/4 Pilot Light | | .10 |
| 117-24A | Drive Belt Pulley | | .25 |
| 117-29 | Background Plate (Specify if Blue or Brown Desired) | | .10 |
| 117-30 | Reflector Plate | | .25 |
| 120-4 | Drive Belt Take-up Coil Spring | | .05 |
| 121-32 | Glass Retaining Clips | | .025 |

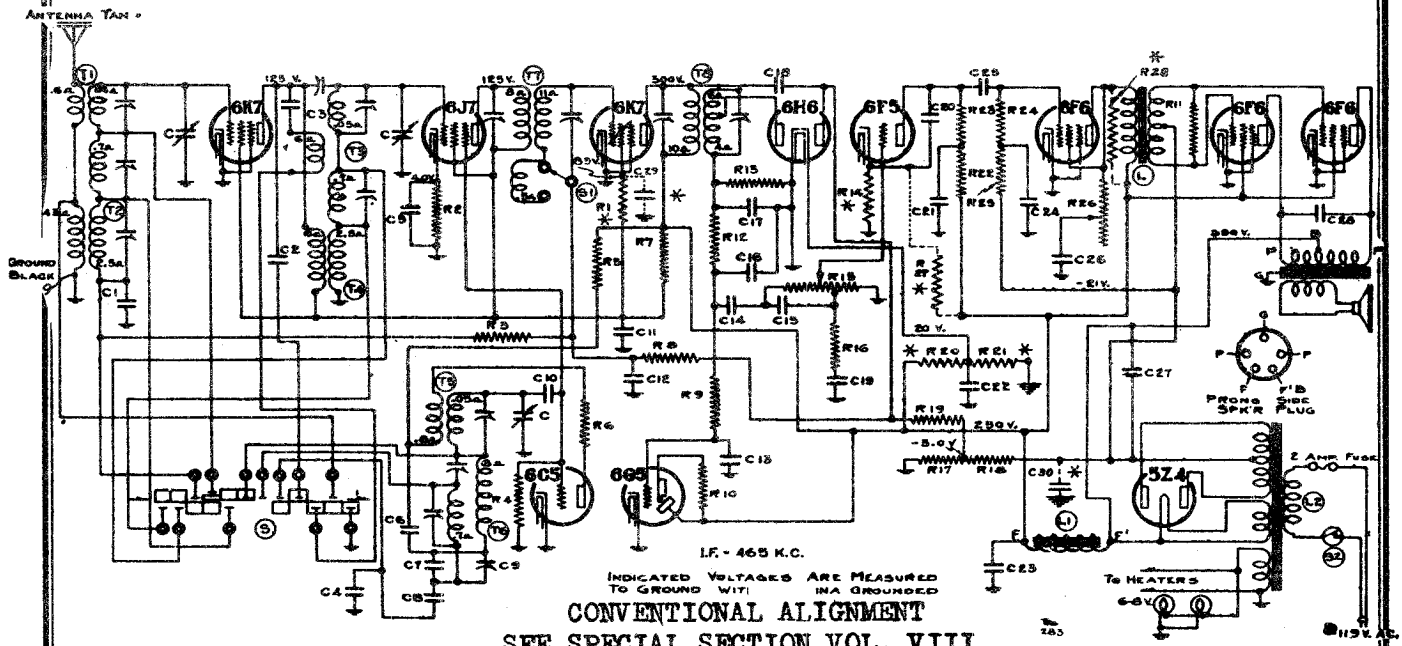
Form 1006 2M 8-36

Trimmers, Alignment

MODELS 1170, 1171

# GOODYEAR TIRE & RUBBER CO., INC.

Schematic, Socket




## CONVENTIONAL ALIGNMENT

SEE SPECIAL SECTION VOL. VIII.

BAND CHANGE SWITCH
THREE POSITIONS, ROTATING CLOCKWISE ARE:
1st BROADCAST: 535-1720 K.C.
2nd MIDDLE WAVE: 1690-5300 K.C.
3rd SHORT WAVE: 5.2-18.1 M.C.

**TUNING RANGE—**

**Standard Broadcast Band**
**535-1720 Kilocycles.**

**Middle Wave Band**
**1690-5300 Kilocycles**

**Short Wave Band**
**5.2-18.1 Megacycles.**

| Part No. | Description |
|---|---|
| | RESISTORS |
| *R1 | 130-76 30M Ohm—½ Watt—20%—Carbon |
| R2 | 130-129 2500 Ohm—½ Watt—10%—Carbon |
| R3 | 130-20 100M Ohm—½ Watt—20%—Carbon |
| R4 | 130-12 50M Ohm—½ Watt—20%—Carbon |
| R5 | 130-77 10M Ohm—1 Watt—20%—Carbon |
| R6 | 130-60 100 Ohm—½ Watt—20%—Carbon |
| R7 | 130-88 10M Ohm—2 Watt—20%—Wire Wound |
| R8 | 130-19 1 meg Ohm—½ Watt—20%—Carbon |
| R9 | 130-4 3 meg Ohm—½ Watt—20%—Carbon |
| R10 | 130-110 1 meg Ohm—1/10 Watt—10%—Carbon |
| R11 | 130-21 20M Ohm—½ Watt—20%—Carbon |
| R12 | 130-20 100M Ohm—½ Watt—20%—Carbon |
| R13 | 130-20 100M Ohm—½ Watt—20%—Carbon |
| *R14 | 130-70 500 Ohm—½ Watt—10%—Carbon |
| R15 | 101-47 1 meg Ohm—Volume Control |
| R16 | 130-22 5M Ohm—½ Watt—20%—Carbon |
| R17 | 106-31 30 Ohm—Muter |
| R18 | 106-31 175 Ohm—Muter |
| R19 | 130-3 500M Ohm—½ Watt—20%—Carbon |
| *R20 | 130-130 100M Ohm—½ Watt—10%—Carbon |
| *R21 | 130-82 10M Ohm—½ Watt—10%—Carbon |
| R22 | 130-20 100M Ohm—½ Watt—20%—Carbon |
| R23 | 130-20 100M Ohm—½ Watt—20%—Carbon |
| R24 | 130-45 250M Ohm—½ Watt—20%—Carbon |
| R25 | 130-45 250M Ohm—½ Watt—20%—Carbon |
| R26 | 101-40 5000 Ohm Tone Control |
| *R27 | 130-130 100M Ohm—½ Watt—10%—Carbon |
| *R28 | 130-131 20M Ohm—½ Watt—10%—Carbon |

NOTE: R17 and R18 in one Unit—No. 105-31.

| | | |
|---|---|---|
| | | CONDENSERS |
| C1 | 100-9 | .05 x 200 Volt—25% |
| C2 | 129-59 | .0003 Mica—5%—MT—0 |
| C3 | 129-39 | .00005 Mica—20%—MT—0 |
| C4 | 129-69 | .0023 Mica—2½%—MT—0 |
| C5 | 100-9 | .05 x 200 Volt—25% |
| C6 | 100-13 | .05 x 400 Volt—25% |
| C7 | 129-57 | .0005 Mica—5%—MT—0 |
| C8 | 129-55 | .0034 Mica—2½%—MT—0 |
| C9 | 124-34 | 200 mmf. Working cap. adjustable Pad |
| C10 | 129-31 | .000025 Mica—15%—MT—0 |
| C11 | 100-41 | .25 x 400 Volt—20% |
| C12 | 100-9 | .05 x 200 Volt—25% |
| C13 | 100-11 | .01 x 400 Volt—25% |
| C14 | 100-22 | .05 x 200 Volt—25% |
| C15 | 129-12 | .00025 Mica—20%—MT—0 |
| C16 | 129-60 | .00015 Mica—20%—MT—0 |
| C17 | 129-60 | .00015 Mica—20%—MT—0 |
| C18 | 129-3 | .00002 Mica—20%—MT—0 |
| C19 | 100-9 | .05 x 200 Volt—25% |
| C20 | 129-5 | .0001 Mica—20%—MT—0 |
| C21 | 100-20 | .1 x 200 Volt—25% |
| C22 | 100-19 | .006 x 600 Volt—25% |
| C23 | 103-8 | 14 mfd.—400 Volt—Electrolytic |
| C24 | 100-20 | .1 x 200 Volt—25% |
| C25 | 100-13 | .05 x 400 Volt—25% |
| C26 | 100-45 | .1 x 600 Volt—25% |
| C27 | 103-10 | 30 mfd. x 450 Volt—Electrolytic |
| C28 | 100-32 | .0005 x 1000 Volts—20% |
| *C29 | 100-11 | .01 x 400 Volts—25% |
| *C30 | 100-20 | .1 x 200 Volt—25% |

| | | |
|---|---|---|
| | | PARTS |
| C | 102-35 | One section of three gang condenser |
| T1 | 111-54 | MW and SW Antenna Coil Assem. |
| T2 | 111-55 | Broadcast Antenna Coil Assem. |
| T3 | 109-29 | MW and SW R.F. Coil Assem. |
| T4 | 109-30 | Broadcast R.F. Coil |
| T5 | 110-42 | MW and SW Osc. Coil Assem. |
| T6 | 110-43 | Broadcast Osc. Coil Assem. |
| T7 | 108-64 | Input I.F. Coil—465 Kc. |
| T8 | 108-63 | Output I.F. Coil—465 Kc. |
| L | 105-33 | Audio Transformer |
| L1 | 114-47C | Speaker (Field Resist. 1225 ohm) Hot |
| L2 | 104-72 | Power Transformer (50-60 Cycle) |
| S | 125-18 | Band Switch |
| S1 | 101-40 | Fidelity Switch on Tone Control |
| S2 | 101-47 | On-Off Switch on Volume Control |

**NOTE:** Resistors and Condensers which are prefixed with an asterisk (*) on the circuit diagram and parts list were added or the values changed during production to meet certain conditions.

Resistors R1, R27, R28, and Condensers C29, C30 were added to correct certain variances of tube characteristics. Resistors R14, R20, R21 the values were changed. In some chassis the values of these resistors are as follows:

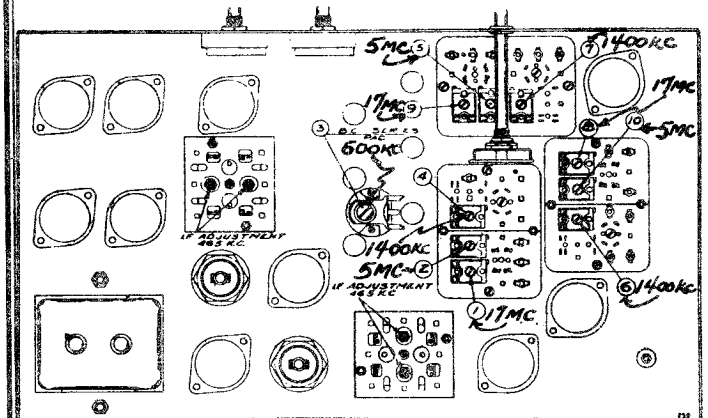
R14—2500 Ohm—½ Watt
R20—200M Ohm..½ Watt
R21—20M Ohm—½ Watt

Present values of these resistors are:

R14—500 Ohm—½ Watt
R20—100M Ohm—½ Watt
R21—10M Ohm—½ Watt

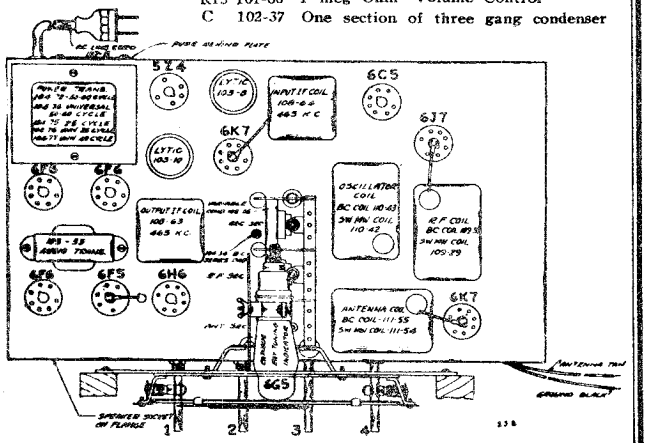
*MODEL 1171 USES THESE PART NUMBERS:-*

R15 101-60 1 meg Ohm—Volume Control
C 102-37 One section of three gang condenser




ORDER OF ADJUSTMENTS
I.F., B.C., S.W., MIDDLE BAND

FIG. 1—BOTTOM VIEW SHOWING TRIMMERS

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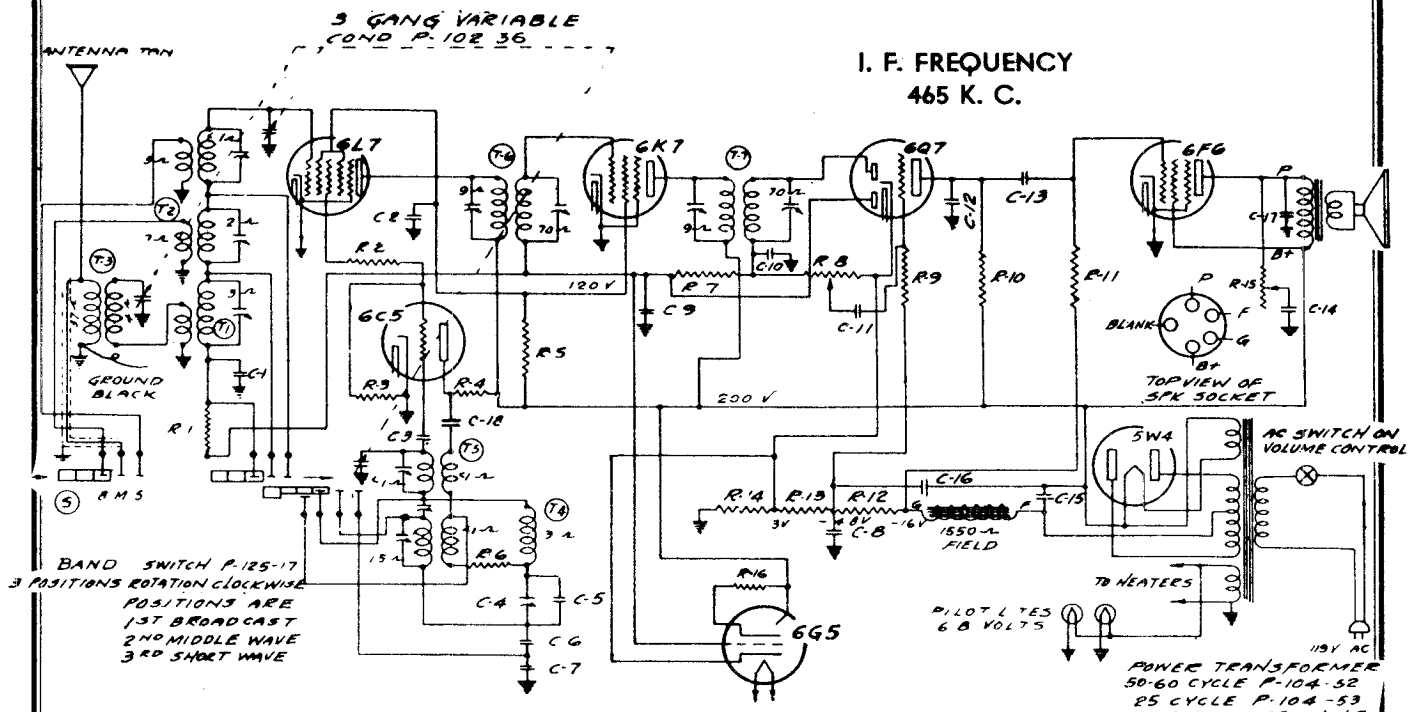
MODEL 787
Schematic, Voltage
Socket, Trimmers

# GOODYEAR TIRE & RUBBER CO., INC.




**RESISTORS**

| No. | Part No. | Description |
|---|---|---|
| R1 | 130-20 | 100M Ohm—½ Watt—20%— 50 Volt Carbon |
| R2 | 130-105 | 150 Ohm—½ Watt—20%— 10 Volt Carbon |
| R3 | 130-12 | 50M Ohm—½ Watt—20%— 10 Volt Carbon |
| R4 | 130-104 | 9M Ohm— 1 Watt—20%—100 Volt Carbon |
| R5 | 130-34 | 19M Ohm— 1 Watt—20%—100 Volt Carbon |
| R6 | 130-27 | 50 Ohm—½ Watt—20%— 3 Volt Carbon |
| R7 | 130-19 | 1 Meg Ohm—½ Watt—20%—100 Volt Carbon |
| R8 | 101-46 | 1 Meg Ohm—Volume Control |
| R9 | 130-4 | 3 Meg Ohm—½ Watt—20%—100 Volt Carbon |
| R10 | 130-103 | 100M Ohm—½ Watt—20%— 50 Volt Carbon |
| R11 | 130-102 | 500M Ohm—½ Watt—10%— 50 Volt Carbon |
| R12 | | 220 Ohm |
| R13 | 106-26 | 32 Ohm |
| R14 | | 52 Ohm |
| R15 | 101-53 | 50M Ohm—Tone Control |
| R16 | 130-110 | 1 Meg Ohm—1/10 Watt—10%—100 Volt Carbon |

**CONDENSERS**

| | | |
|---|---|---|
| C1 | 100-22 | .05x200 Volt—25% |
| C2 | 100-1 | .1x400 Volt—+50%—10% |
| C3 | 129-39 | .00005 Mica (MT-O)—20% |
| C4 | 124-28 | Series Pad (80-225) |
| C5 | 129-65 | .00055 Mica (MT-O)—5% |
| C6 | 129-55 | .0034 Mica (MW-W)—2½% |
| C7 | 129-54 | .003 Mica (MW-W)—2½% |
| C8 | 100-20 | .1x200 Volt—25% |
| C9 | 100-22 | .05x200 Volt—25% |
| C10 | 129-12 | .00025 Mica (MT-O)—20% |
| C11 | 100-11 | .01x400 Volt—25% |
| C12 | 129-2 | .0005 Mica (MT-O)—20% |
| C13 | 100-11 | .01x400 Volt —25% |
| C14 | 100-27 | .025x600 Volt—25% |
| C15 | 103-6 | 8 Mfd. x 350 Volt Electrolytic |
| C16 | 103-7 | 8 Mfd. x 300 Volt Electrolytic |
| C17 | 100-25 | .002x600 Volt—20% |
| C18 | 100-37 | .003x600 Volt—10% |

**PARTS**

| | | |
|---|---|---|
| T1 | 111-49 | Broadcast Antenna Coil |
| T2 | 111-50 | S.W.-M.W. Antenna Coil |
| T3 | 111-51 | B.C.-Pre-Selector Coil Assem. |
| T4 | 110-38 | B.C. Oscillator Coil |
| T5 | 110-39 | S.W.-M.W. Oscillator Coil |
| T6 | 108-74 | Input I.F. - 465 K.C. |
| T7 | 108-73 | Output I.F. - 465 K.C. |
| S | 125-17 | Wave Change Switch |

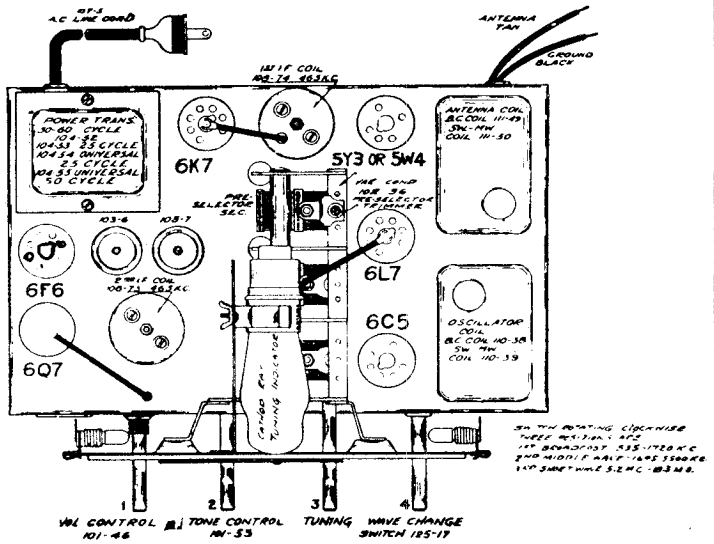
**TUNING RANGE—**

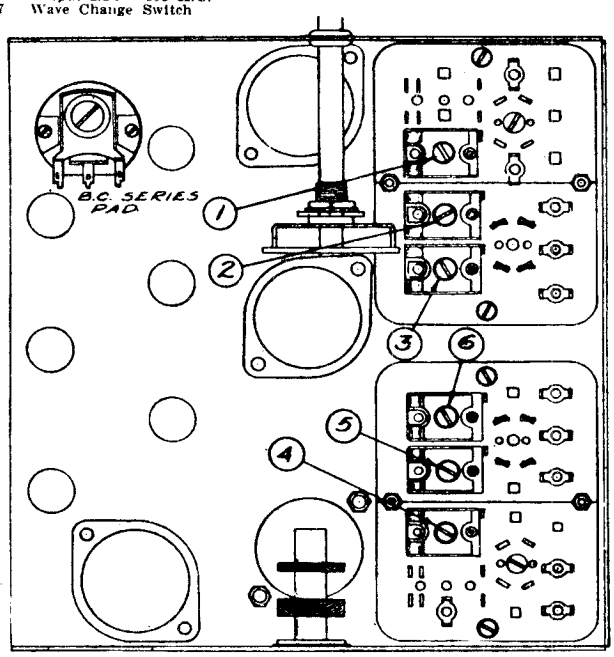
**Standard Broadcast Band 535-1720 Kilocycles.**

**Middle Wave Band 1695-5500 Kilocycles.**

**Short Wave Band 5.2-18.3 Megacycles.**

FOR ALIGNMENT
SEE INDEX




BOTTOM VIEW (Showing Trimmers)

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# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 1175
Schematic
Voltage




## IF PEAK 465 KC. FREQUENCY RANGE 5.35 to 18.1 M.C. CHASSIS MODEL 1175 (Serial No. 7M920500 and up)

535 to 1720 K.C.
1695 to 5500 K.C.

### RESISTORS

| Code | Part No. | Description |
|---|---|---|
| R1 | 130-20 | 100M ohm - 1/3 w. - 20% |
| R2 | 130-166 | 150 ohm - 1/3 w. - 10% |
| R3 | 130-129 | 2500 ohm - 1/3 w. - 10% |
| R4 | 130-60 | 100 ohm - 1/3 w. - 20% |
| R5 | 130-12 | 50M ohm - 1/3 w. - 20% |
| R6 | 130-19 | 1 megohm - 1/3 w. - 20% |
| R7 | 130-133 | 15M ohm - 1/2 w. - 20% |
| R8 | 106-46 | 2900 ohm - resistor strip |
| R9 | 130-4 | 3 megohm - 1/3 w. - 20% |
| R10 | 130-201 | 25M ohm - 1/10 w. - 20% |
| R11 | 130-110 | 1 megohm - in tuning indicator socket 1/10 w. - 20% |
| R12 | 130-186 | 250M ohm - 1/10 w. - 20% |
| R13 | 130-12 | 50M ohm - 1/3 w. - 20% |
| R14 | 106-46 | 600 ohm - Resistor Strip |
| R15 | 130-22 | 5M ohm - 1/3 w. - 20% |
| R16 | 130-85 | 3M ohm - 1/3 w. - 20% |
| R17 | 130-3 | 500M ohm - 1/3 w. - 20% |
| R18 | 106-46 | 2500 ohm - resistor strip |
| R19 | 101-102 | 1 megohm - volume control |
| R20 | 130-37 | 750M ohm - 1/3 w. - 20% |
| R21 | 130-45 | 250M ohm - 1/3 w. - 20% |
| R22 | 101-103 | 300M ohm - Tone control |
| R23 | 130-103 | 100M ohm - 1/3 w. - 10% |
| R24 | 106-47 | Resistor Strip - 11 ohm |
| R25 | 106-47 | 22 ohm - Resistor strip |
| R26 | 106-47 | 170 ohm - Resistor strip |
| R27 | 130-45 | 250M ohm - 1/3 w. - 20% |
| R28 | 130-37 | 750M ohm - 1/3 w. - 20% |
| R29 | 130-45 | 250M ohm - 1/3 w. - 20% |
| R30 | 130-103 | 100M ohm - 1/3 w. - 10% |
| R31 | 130-82 | 10M ohm - 1/3 w. - 10% |
| R32 | 130-103 | 100M ohm - 1/3 w. - 10% |
| R33 | 130-45 | 250M ohm - 1/3 w. - 20% |
| R34 | 130-45 | 250M ohm - 1/3 w. - 20% |
| R6, R14 and R18 | | in same unit |
| R24, R25 and R26 | | in same unit |
| R10 and R12 | | in output I.F. Can |

### CONDENSERS

| | | |
|---|---|---|
| C | 102-66 | 3 gang variable Condenser |
| C1 | 129-40 | .0001 - 10% Mica |
| C2 | 100-22 | .05 x 200 v. - 25% |
| C3 | 100-53 | .25 x 400 v. - 20% |
| C4 | 129-34 | .0002 - 5% Mica |
| C5 | 129-38 | .00005 - 10% Mica |
| C6 | 129-38 | .00005 - 10% Mica |
| C7 | 100-25 | .002 x 600 v. - 25% |
| C8 | 124-35 | .00074 Series Pad |
| C9 | 129-92 | .0033 - 2-1/2% Compression type condenser |
| C10 | 129-90 | .0023 - 2-1/2% Compression type condenser |
| C11 | 100-33 | .1 x 200 v. - 50 - 10% |
| C12 | 100-22 | .05 x 200 v. - 25% |
| C13 | 100-78 | .01 x 200 v. - 25% |
| C14 | 129-3 | .00002 - 20% Mica |
| C15 | 129-39 | .00005 - 20% Ceramicon |
| C16 | 129-38 | .00005 - 10% Mica |
| C17 | 100-9 | .05 x 200 v. - 25% |
| C18 | 129-3 | .00002 - 20% Mica |
| C19 | 100-22 | .05 x 200 v. - 25% |
| C20 | 129-38 | .00005 - 10% Mica |
| C21 | 100-19 | .006 - 600 v. - 25% |
| C22 | 100-78 | .01 x 200 v. - 25% |
| C23 | 100-11 | .01 x 400 v. - 25% |
| C24 | 100-9 | .05 x 200 v. - 25% |
| C25 | 129-40 | .0001 - 10% Mica |
| C26 | 100-12 | .003 x 600 v. - 25% |
| C27 | 100-26 | .02 x 400 v. - 25% |
| C28 | 100-33 | .1 x 200 v. - 50 - 10% |
| C29 | 103-10 | 30 mfd. - 450 w.v. lytic |
| C30 | 100-13 | .05 x 400 v. - 25% |
| C31 | 100-80 | .05 x 400 v. - 25% |
| C32 | 103-10 | 30 mfd. - 450 w.v. lytic |
| C33 | 100-33 | .1 x 200 v. - 50 - 10% |
| C34 | 100-32 | .0005 - 1000 v. - 20% |
| C35 | 100-61 | .02 x 600 v. - 20% Bakelite |

### PARTS

| | | |
|---|---|---|
| T1 | 111-90 | SW - MW - Antenna Coil |
| T2 | 111-68 | BC - Antenna Coil |
| T3 | 109-32B | SW - MW - R.F. Coil |
| T4 | 109-33 | BC - R.F. Coil |
| T5 | 110-53B | SW - MW Oscillator Coil |
| T6 | 110-52B | BC - Oscillator Coil |
| T7 | 108-113 | Input I.F. 465 kc. |
| T8 | 108-114 | Output I.F. 465 kc. |
| T9 | 105-56 | Output Transformer |
| T10 | 114-107 | 12" Dynamic Speaker |
| T11 | 104-117 | Power Transformer 50/60 cycle |
| S1 | 125-44 | Band Switch |
| S2 | | Hi Fi Switch on tone control |
| S3 | | Off-on switch on volume control |
| S4 | 125-14 | Mute Switch |
| P1 | 107-94 | 6-8 v. Pilot lights |

For conventional types of antennas connect the tan wire to the antenna lead and the **yellow with black tracer and the black wire** together to the ground lead.

When a doublet antenna is used connect the tan wire and **the yellow with black tracer wire to the doublet antenna and the solid black wire to the ground lead. (See Fig. 1—Top View).**

Mica condensers are coded with an additional dot indicating tolerance:

| Color of Dot | Tolerance percent |
|---|---|
| White | 2½% |
| Green | 5% |
| Blue | 10% |
| Yellow | 15% |
| Red | 20% |
| None | More Than 20% |

Receivers of this model which are to be used on voltages or frequencies other than 105-115 volts, 60 cycles are so marked. The power consumption of this receiver is 125 watts.

All voltages are to be measured with 115 volts on the primary of the power transformer.

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MODEL 1175
Socket, Trimmers
Tuner Data

# GOODYEAR TIRE & RUBBER CO., INC.

**MODEL 1175**

**(Serial No. 7M920500 and up)**

The tube complement of this chassis consists of the following metal and octal base glass tubes which are interchangeable with metal tubes:

1—Type 6K7 Remote cut-off pentode R.F. amplifier
1—Type 6J7 Pentode first detector
1—Type 6C5 Oscillator
1—Type 6K7 Remote cut-off pentode I.F. amplifier
1—Type 6H6 Duplex diode second detector and A.V.C.
1—Type 6F5 First audio amplifier
1—Type 6J5 Phase Inverter stage
2—Type 6F6 Output pentodes in push-pull
1—Type 5U4 High vacuum rectifier
1—Type 6U5 Cathode-Ray Tuning Indicator.

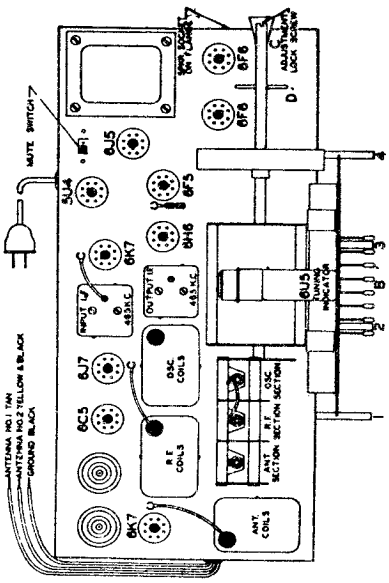


FIG. 1—TOP VIEW

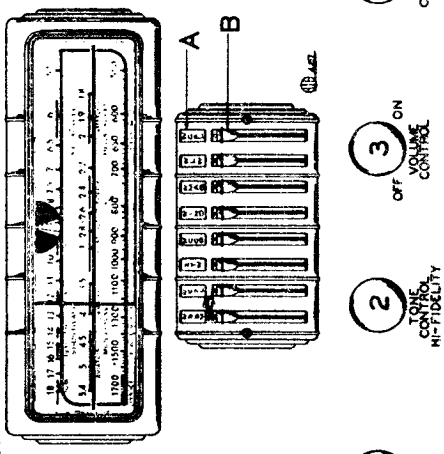


FIG. 2—FRONT VIEW

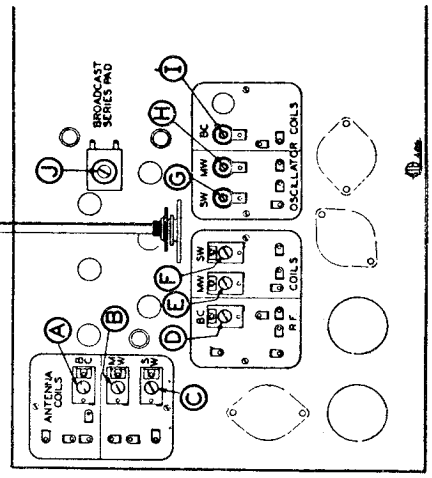


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

## PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

### IMPORTANT—READ CAREFULLY BEFORE SETTING THE AUTOMATIC LEVERS:

A mute feature has been incorporated in the automatic tuning mechanism of the Model 1175. The function of this feature is to permit SILENT TUNING from one station to another by means of the automatic tuning levers. When any one of the levers are pressed down, the speaker is automatically disconnected from the radio and NO SIGNAL is heard until the lever is RELEASED.

To facilitate an accurate adjustment of the levers it is desirable to hear the station being tuned in while the lever is being adjusted; therefore a MUTE SWITCH is provided to manually connect or disconnect the silent tuning feature.

Referring to the top view of the radio (Fig. 1 in this manual), THE POSITION OF THE SWITCH (located on the top of the radio chassis alongside the power transformer), IS IMPORTANT.

Set the switch as follows:

WHILE SETTING THE AUTOMATIC LEVERS:
Switch should be snapped to the right (white dot not visible).

AFTER AUTOMATIC LEVERS HAVE BEEN SET:
Switch should be snapped to the left (white dot showing).

There are eight levers on the dial by means of which eight stations may be selected, (See "B", Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including 8.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs, (See "A" Fig. 2). Any order of grouping may be used, however, it is recommended that the left hand four automatic levers be used for high frequency stations (1750 to 1000 K.C.) and the right hand four automatic levers for low frequency stations (1000 to 540 K.C.).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob No. 4 the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position), noting the width of the shadow indicated on the screen of the cathode-ray tuning eye. Minimum width on the eye indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Rotate the tuning knob No. 4 to the right (clockwise) as far as it will turn. Now remove from the right side of the cabinet the metal button, and, with a screw driver inserted through the hole, tighten the locking adjustment screw "C". It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT. If a screw driver is not available, the locking screw can be tightened by reaching in from the back of the cabinet, and, by means of the pin "D" (see Fig. 1), rotate the locking screw shaft to the right (clockwise) until thoroughly tight.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the locking screw "C" four or five complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the locking screw being too tight. Loosen the locking screw "C" until the dial mechanism works freely with the tuner lever pressed down.)

BE SURE TO RETIGHTEN THE LOCKING SCREW; otherwise the stations you have selected will not stay adjusted to the levers.

Snap mute switch to silent tuning position (white dot showing)

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# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 1175
Alignment
MODEL 01029
Tuner, Alignment

## MODEL 1175

**DUMMY ANTENNAS:**

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1," "Dummy 2," and "Dummy 3."

**Dummy 1:** (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

**Dummy 2:** (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

**Dummy 3:** (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

**ALIGNING I.F. TRANSFORMERS (465 K.C.)**

Part No. 108-114 Output I.F. Transformer
Part No. 108-113 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), the tone control on "Hi" part of the sharp position (as much right rotation as possible without operating the Hi Fidelity switch), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1." to the control grid cap of the type 6K7 I.F. tube and adjust the output I.F. transformer 108-114 to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap to 6J7 and adjust input I.F. transformer (108-113) to resonance.
   (c) With oscillator still connected to 6J7, re-adjust output I.F. transformer if necessary.

**BROADCAST BAND ALIGNMENT:**
**535 to 1720 Kilocycles**

1. With band changing switch in the broadcast position, extreme left of its rotation, and with external oscillator set at 1720 Kilocycles and connected in series with "Dummy 2" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 1720 Kilocycles and adjust broadcast oscillator trimmer (adjustment I) to resonance. See bottom view, Fig. 3.
   (b) Re-set external oscillator to 1400 Kilocycles, move dial pointer to 1400 Kilocycles and adjust broadcast antenna trimmer, (adjustment A) and broadcast R.F. trimmer (adjustment D) to resonance.
   (c) With external oscillator set at 600 K.C. adjust broadcast series pad (adjustment J) to resonance with oscillator. Keep set in tune with oscillator by slowly rocking to and fro the variable condenser until maximum output is obtained.
   (d) Repeat adjustments (a) and (c) until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 Kilocycles. UNDER NO CIRCUMSTANCES BEND PLATES OF VARIABLE CONDENSER TO CORRECT TRACKING.

**SHORT WAVE BAND ALIGNMENT:**
**5.35 to 18.1 Megacycles**

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 Megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 Megacycles and adjust short wave oscillator (adjustment G), short wave R.F. (adjustment F) and short wave antenna (adjustment C) to resonance.
   (b) Re-set external oscillator to 6 Megacycles and pick up signal by rotating variable condenser and check for sensitivity.

   NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. As an example of this a fundamental 17 megacycle signal can be tuned in not only at 17 on the dial, but also at approximately 16.1 megacycles.

**MIDDLE WAVE ALIGNMENT:**
**1095 to 5500 Kilocycles**

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5 Megacycles connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Rotate condenser, pick up signal and adjust middle wave oscillator (adjustment H), middle wave R.F. (adjustment E) middle wave antenna (adjustment B) to resonance.
   (b) Re-check broadcast alignment and if it is found necessary; re-adjust either R.F. or antenna trimmers. Repeat the 17 megacycles short wave and 5 megacycles middle wave adjustments.

## MODEL 01029 CHASSIS 860

**(Serial No. 7L807400 and up)**

**PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:**

There are eight levers on the dial by means of which eight stations may be selected, (See "B", Fig. 2).

Make a list of local stations you tune in regularly; any number up to and including 8.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

Above each automatic tuner lever an opening in the escutcheon is provided for inserting the call letter tabs, (See "A" Fig. 2). Any order of grouping may be used, however, it is recommended that the left hand four automatic levers be used for high frequency stations (1750 to 1900 K.C.) and the right hand four automatic levers for low frequency stations (1000 to 540 K.C.).

Insert the call letter tabs in the rectangular openings in the escutcheon above each of the automatic tuner levers. One of the small celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 4) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) noting the width of the shadow indicated on the screen of the cathode-ray tuning eye. Minimum width on the eye indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Rotate the tuning knob (No. 4) to the right (clockwise) as far as it will turn. Now remove from the right side of the cabinet the metal button, and, with a screw driver inserted through the hole, tighten the locking adjustment screw "C". It is VERY IMPORTANT that this locking screw is turned until it is ABSOLUTELY TIGHT. If a screw driver is not available, the locking screw can be tightened by reaching in from the back of the cabinet, and, by means of the pin "D" (see Fig. 1), rotate the locking screw shaft to the right (clockwise) until thoroughly tight.

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, loosen the locking screw "C" four or five complete turns; select the new station as explained. (Note: If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the locking screw being too tight. Loosen the locking screw "C" until the dial mechanism works freely with the tuner lever pressed down.)

BE SURE TO RETIGHTEN the LOCKING SCREW; otherwise the stations you have selected will not stay adjusted to the levers.

**DUMMY ANTENNAS:**

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

**Dummy 1:** (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

**Dummy 2:** (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

**Dummy 3:** (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

**ALIGNING I.F. TRANSFORMERS: (465 K.C.):**

Part No. 108-106E Output I.F. Transformer
Part No. 108-105D Input I.F. Transformer

These I. F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view, Fig. 1).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-106E) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6K7 to grid cap of 6A8G and adjust input I.F. transformer (No. 108-105D) to resonance.

**BROADCAST BAND ALIGNMENT:**
**540 to 1750 Kilocycles**

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to tan antenna lead and black ground lead, make following adjustments:
   (a) Set external oscillator to 1750 K.C. and adjust broadcast oscillator trimmer to resonance (adjustment E'; see top view, Fig. 1).
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (Adjustment A') to resonance; also adjust preselector trimmer which is mounted on the top of the rear section of the three gang variable tuning condenser to resonance. (See top view of chassis, Fig. 1, for location of this adjustment.)
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (Adjustment F') to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained.
   (d) Repeat adjustments "a" and "c" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1000 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

**SHORT WAVE BAND ALIGNMENT:**
**5.5 to 18.1 Megacycles**

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator (Adjustment G') and short wave antenna (Adjustment C') to resonance.
   (b) Re-set external oscillator to 6 megacycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 5.5 megacycles for band coverage.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental. An example of this is an image of a fundamental 17 megacycle signal appears near 16.1 megacycles.

**MIDDLE WAVE BAND ALIGNMENT:**
**1730 to 5000 Kilocycles**

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5000 kilocycles and connected in series with "Dummy 3" to the tan antenna and black ground lead, make the following adjustments:
   (a) Move dial pointer to 5000 kilocycles and adjust middle wave oscillator (Adjustment D') and middle wave antenna (Adjustment B') to resonance.
   (b) Re-set external oscillator to 1900 kilocycles and pick up signal by rotating variable condenser and check sensitivity.
   (c) Re-check broadcast band alignment.

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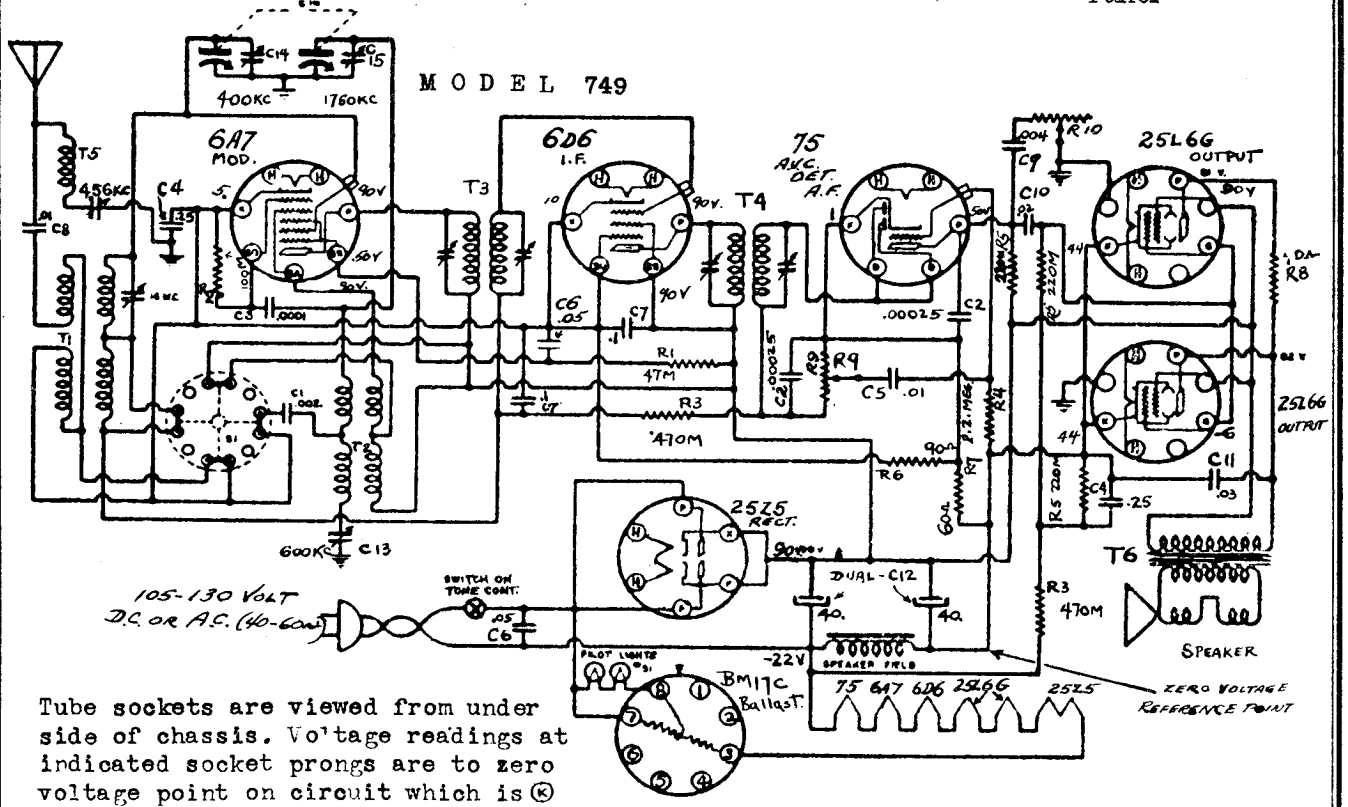
MODEL 749
Schematic, Voltage

# GOODYEAR TIRE & RUBBER CO., INC.

Socket, Trimmers
Tuner

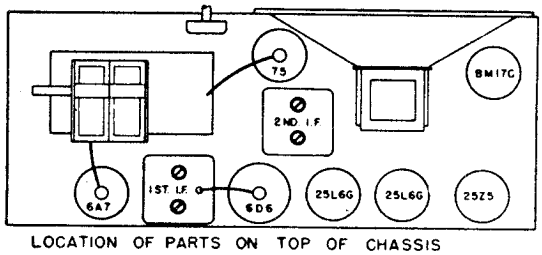



Tube sockets are viewed from under side of chassis. Voltage readings at indicated socket prongs are to zero voltage point on circuit which is Ⓚ on 25L6G tube. Voltages must be measured with no signal. Alignment is to be made at the frequencies shown on the trimmer cordensers.

Figures at cathodes are cathode currents in milliamperes. Capacity values are in microfarads.

Wave trap adjustment at 456 KC. Input is made to provide maximum reduction of signal. Where no voltage reading is shown at socket prongs, it indicates zero voltage or very low reading.

IF PEAK 456 KC




LOCATION OF PARTS ON TOP OF CHASSIS

**SETTING PUSH-BUTTONS**

1. By means of the Station Selector Knob, tune in **WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE** the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, **PUSH THE PUSH-BUTTON IN ALL THE WAY** with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your six selected stations for automatic operation, merely push in **ALL THE WAY** the Button set up for that station.

To receive all other stations in the regular manner, push in the Station Selector Knob and turn it to the frequency of the station desired.

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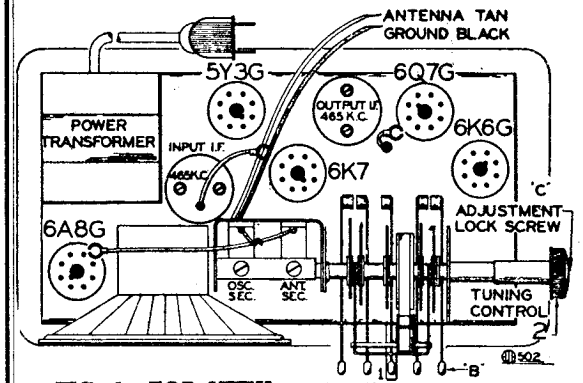
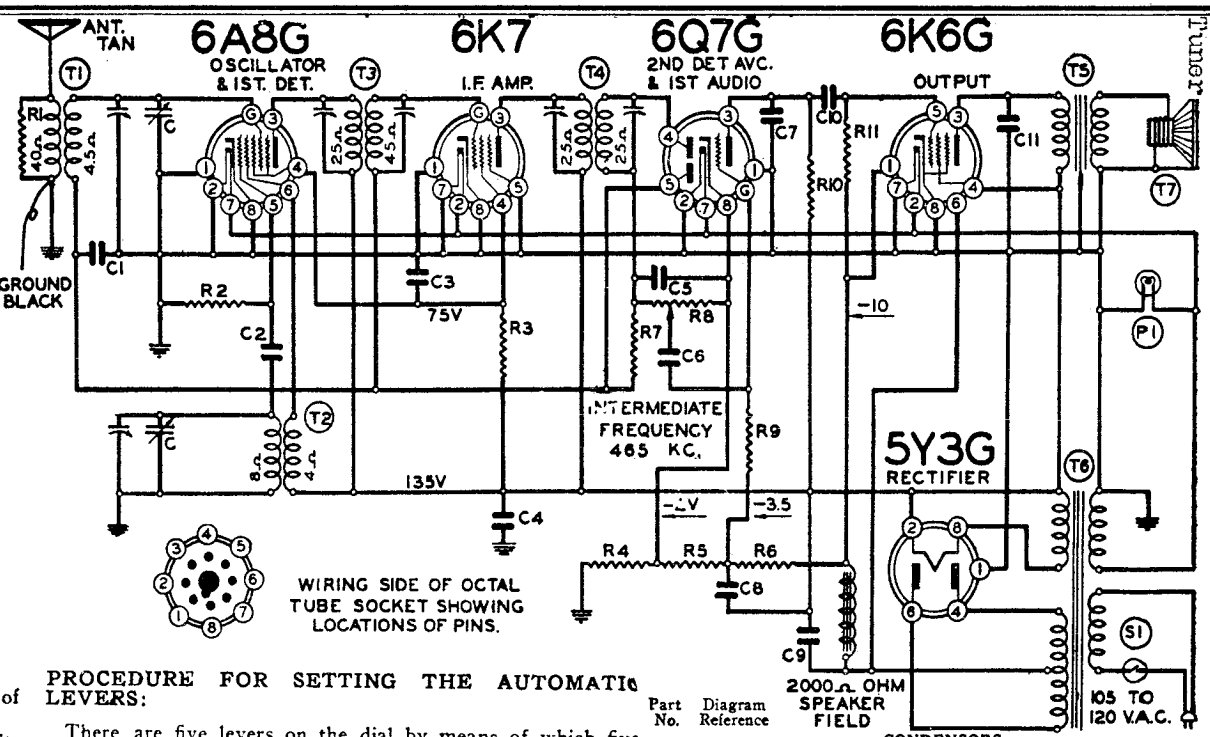



**FIG. 1—TOP VIEW**




Mica condensers are coded with an additional dot indicating tolerance.

| Color of Dot | Tolerance percent |
|---|---|
| White | 2½% |
| Green | 5% |
| Blue | 10% |
| Yellow | 15% |
| Red | 20% |
| None | More Than 20% |

## ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No.108-95B Output I.F. Transformer
Part No. 108-96 Input I. F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condensor, to the control grid cap of the type 6K7 tube, and adjust the output I.F. transformer (No. 108-95B) to resonance.
   (b) Move oscillator output clip from grid of 6K7 to grid of 6A8G and adjust input I.F. transformer (No. 108-96) to resonance.
   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-95B) if necessary.

## 1. R.F. ALIGNMENT: (535-1720 K.C.)

1. With the gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 100 mmf. condensor to the antenna lead and chassis ground and make the following adjustments:
   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).
   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).
   (c) Check sensitivity at 600 and 1000 kilocycles.

## PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are five levers on the dial by means of which five stations may be selected,

Press DOWN ALL THE WAY any one of the automatic tuner levers. Holding it down FIRMLY, tune in by means of the tuning knob (No. 2) the station indicated on the station call letter tab above this lever. Turn the tuning knob very slowly back and forth (while still holding lever in downward position) until the signal is clearest. The station will then be accurately tuned in. Release the lever.

Press down another automatic tuner lever. Holding it down FIRMLY, carefully tune in the station indicated on the call letter tab above this lever. Release this lever.

Follow this procedure until you have selected all of your favorite stations.

Now hold tuning knob securely with left hand to prevent it from turning, or Rotate the tuning knob (No. 2) to the right (clockwise) as far as it will turn, and with a coin (half dollar), tighter the special locking screw ("C") in the center of the tuning knob, (See Fig. 1).

This screw will lock in place all the stations you have selected on the automatic tuner levers. (Note: Locking screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob No. 2 securely and with a coin loosen the locking screw "C" one or two turns; select the new station as explained. **Be sure to retighten the locking screw,** otherwise the stations you have selected will not stay adjusted to the levers.

| Part No. | Diagram Reference | |
|---|---|---|
| | | **CONDENSORS** |
| 100-1 | C3 | .1 x 400 volt Tubular Condenser |
| 100-9 | C1 | .05 x 200 volt Tubular Condenser |
| 100-11 | C6, C10 | .01 x 400 volt Tubular Condenser |
| 100-13 | C4 | .05 x 400 volt Tubular Condenser |
| 100-19 | C11 | .006 x 600 volt Tubular Condenser |
| 119-47D | C8, C9 | Dual 5MFD x 250 W. V. Filter Condenser |
| 129-2 | C7 | .0005 Mica Type Condenser — 20% |
| 129-5 | C5 | .0001 Mica Type Condenser — 20% |
| 129-12 | C2 | .00025 Mica Type Condenser — 20% |
| | | **RESISTORS** |
| 106-35 | R4, R5, R6 | 65 Ohm, 45 Ohm, 220 Ohm Metal Clad |
| 130-9 | R10 | 200M Ohm — 1/3 Watt Resistor — 20% |
| 130-12 | R2 | 50M Ohm — 1/3 Watt Resistor — 20% |
| 130-21 | R1 | 20M Ohm — 1/3 Watt Resistor — 20% |
| 130-118 | R11 | 600M Ohm — 1/3 Watt Resistor — 20% |
| 130-149 | R3 | 15M Ohm — 1/3 Watt Resistor — 20% |
| 130-170 | R7, R9 | 3 Megohm — 1/3 Watt Resistor — 25% |
| | | **COILS** |
| 108-95B | T4 | Output I.F. Coil Assembly Complete with can |
| 108-96 | T3 | Input I.F. Coil Assembly Complete with can |
| 110-73 | T2 | Oscillator Coil Assembly Complete |
| 111-92 | T1 | Antenna Coil Assembly Complete |
| | | **SOCKETS** |
| 121-93 | | Eight Prong Octal Socket for "6K6" |
| 121-93 | | Eight Prong Octal Socket for "6Q7" |
| 121-93 | | Eight Prong Octal Socket for "6A8" |
| 121-93 | | Eight Prong Octal Socket for "5Y3" |
| 121-94 | | Seven Prong Octal Socket for "6K7" |
| | | **TRANSFORMERS** |
| 104-129 | T6 | 50/60 Cycle Transformer 105-115 volt Primary |
| 104-130 | | 25/60 Cycle Transformer 105-115 volt Primary |
| | | **SPEAKER** |
| 114-111 | T7 | Five Inch Dynamic Speaker (Field 2000 Ohms) |
| 105-55c | T5 | Output Transformer for Speaker (Mounted on Chass |
| | | **MISCELLANEOUS** |
| 101-107 | R8, S1 | Volume Control and Switch (500M Ohms) |
| 102-67 | C | Two Gang Variable Condenser |

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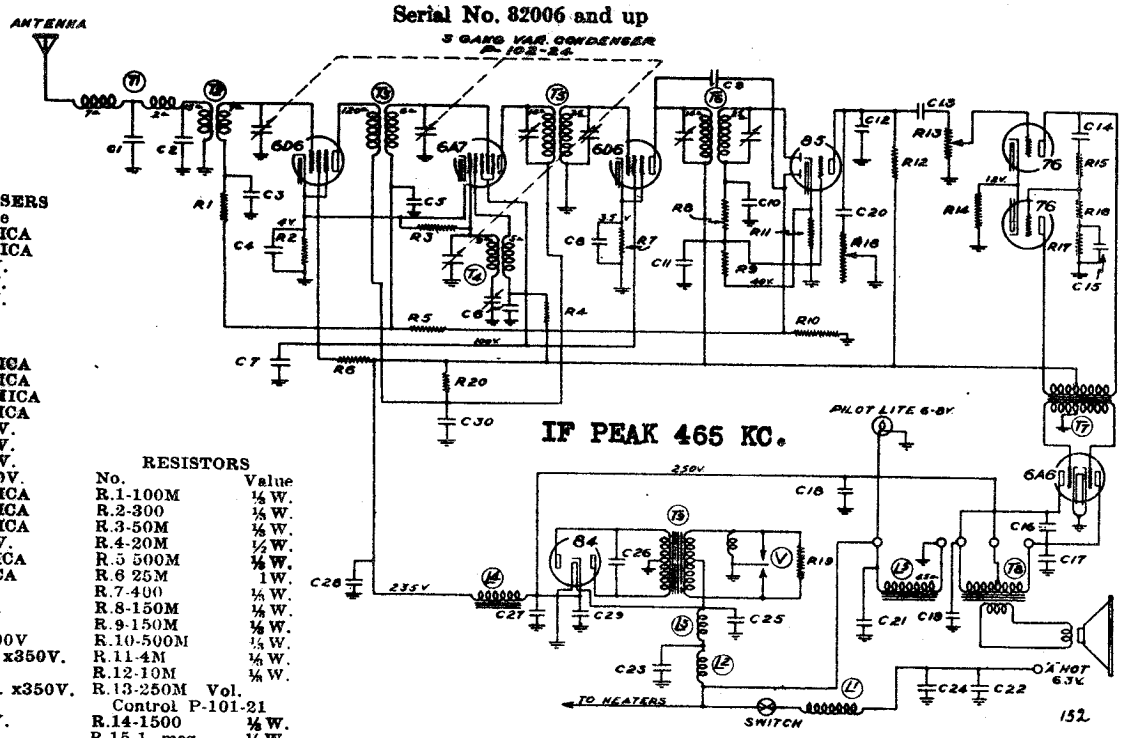
MODEL 01018,Runs 1,2
Chassis 880
Schematic,Voltage
Socket,Trimmers
Alignment

# GOODYEAR TIRE & RUBBER CO., INC.

**Serial No. 82006 and up**




**CONDENSERS**

| No. | Value |
|---|---|
| C.1 | .00009 MICA |
| C.2 | .00002 MICA |
| C.3 | .01x400V. |
| C.4 | .25x200V. |
| C.5 | .05x200V. |
| C.6 | .1x200V. |
| C.7 | .1x200V. |
| C.8 | .1x200V. |
| C.9 | .00002 MICA |
| C.10 | .0001 MICA |
| C.11 | .00005 MICA |
| C.12 | .0001 MICA |
| C.13 | .02x400V. |
| C.14 | .02x400V. |
| C.15 | .01x400V. |
| C.16 | .006x600V. |
| C.17 | .0005 MICA |
| C.18 | .0005 MICA |
| C.19 | .0005 MICA |
| C.20 | .05x400V. |
| C.21 | .0005 MICA |
| C.22 | .002 MICA |
| C.23 | .5x120V. |
| C.24 | .5x120V. |
| C.25 | .5x120V. |
| C.26 | .015x1400V |
| C.27 | 8.0 mfd. x350V. P-119-16 |
| C.28 | 12.0 mfd. x350V. P-119-16 |
| C.29 | .01x400V. |
| C.30 | .1x400V. |
| 117-2 Dash Mounting Bracket | |
| 117-1 Bracket Steering Column | |
| Dash Mounting Assembly | |

**RESISTORS**

| No. | Value |
|---|---|
| R.1 | 100M ½ W. |
| R.2 | 300 ½ W. |
| R.3 | 50M ½ W. |
| R.4 | 20M ½ W. |
| R.5 | 500M ½ W. |
| R.6 | 25M 1W. |
| R.7 | 400 ½ W. |
| R.8 | 150M ½ W. |
| R.9 | 150M ½ W. |
| R.10 | 500M ½ W. |
| R.11 | 4M ½ W. |
| R.12 | 10M ½ W. |
| R.13 | 250M Vol. Control P-101-21 |
| R.14 | 1500 ½ W. |
| R.15 | 1 meg ½ W. |
| R.16 | 91M ½ W. |
| R.17 | 75M ½ W. |
| R.18 | 100M Tone Control P-101-39 |
| R.19 | 200 ½ W. |
| R.20 | 1500 ½ W. |

**PARTS**

| No. | Part No. |
|---|---|
| T1-Antenna Filter | P-111-43 |
| T2-Antenna Coil | P-111-42 |
| T3-R.F. Coil | P-109-20 |
| T4-Oscillator Coil | P-110-34 |
| T5-Input I.F. Coil | P-108-56 |
| T6-Output I.F. Coil | P-108-57 |
| T7-Audio Trans. | P-105-13 |
| T8-Output Trans. | |
| T9-Power Trans. | P-104-21 |
| L1-"A" Choke | P-105-18 |
| L2-"A" Choke | P-105-18 |
| L3-"A" Choke | P-105-19 |
| L4-Filter Choke | P-105-11 |
| L5-Speaker Field | |
| V-Vibrator | 142-4 |

## DUMMY ANTENNAS:

The dummy antennas referred to in the following instructions are:

"I.F. Dummy" —A .1 mfd. condenser connected in series with the test oscillator output lead.

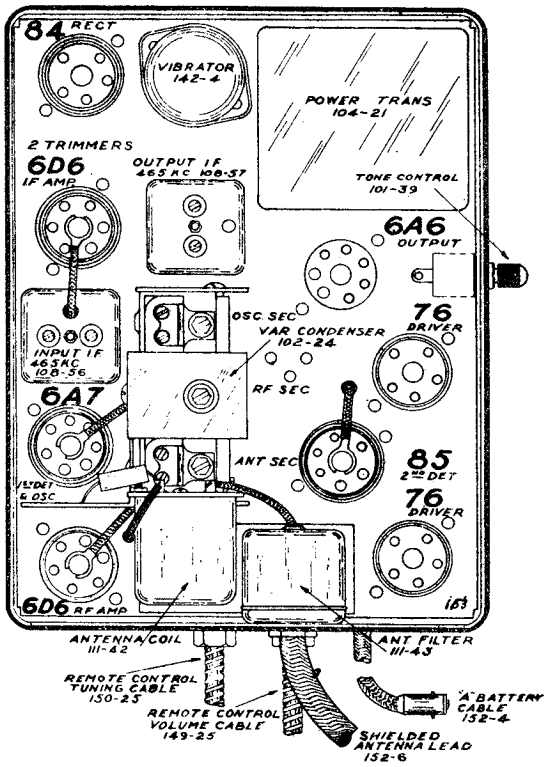
"Broadcast Dummy"—A 200 mmfd. condenser connected in series with the output lead of the test oscillator.

## I.F. ALIGNMENT:

1. With variable condenser in its minimum capacity position (plates entirely out of mesh) and with volume control full on, connect test oscillator set at 465 K.C., in series with I.F. dummy antenna, to the grid cap of the type 6A7 tube.
2. Adjust trimmer condensers of both input (108-56) and output (108-57) I.F. transformers to resonance with oscillator. See top view for location of these transformers. There are two adjustments on each and they are accessible from the top of the transformer shield and should be adjusted with an insulated screw driver.

## BROADCAST ALIGNMENT:

1. With variable condenser in its minimum capacity position, connect test oscillator set at 1550 K.C. and in series with broadcast dummy, to the antenna lead of receiver.
2. Adjust oscillator trimmer of variable condenser to resonance (this adjustment is on the end section of the three gang condenser—see top view).
3. Shift test oscillator to 1400 K.C. and pick up signal by rotating condenser and adjust R.F. (center) and antenna (front) trimmers to resonance, see top view.
4. Re-set external oscillator to 600 K.C. and adjust series pad to resonance, rotate condenser and move dial pointer to 600 K.C. by gently rocking condenser to and fro. Pick up oscillator signal while adjusting series pad to resonance. This adjustment is accessible from the bottom of the chassis.
   (a) Check for sensitivity at 1000, 800 and 600 K.C. by setting test oscillator to these frequencies and picking up the signal by rotating variable condenser. Under no circumstances bend plates of oscillator section, bend R.F. and antenna plates only if absolutely necessary.

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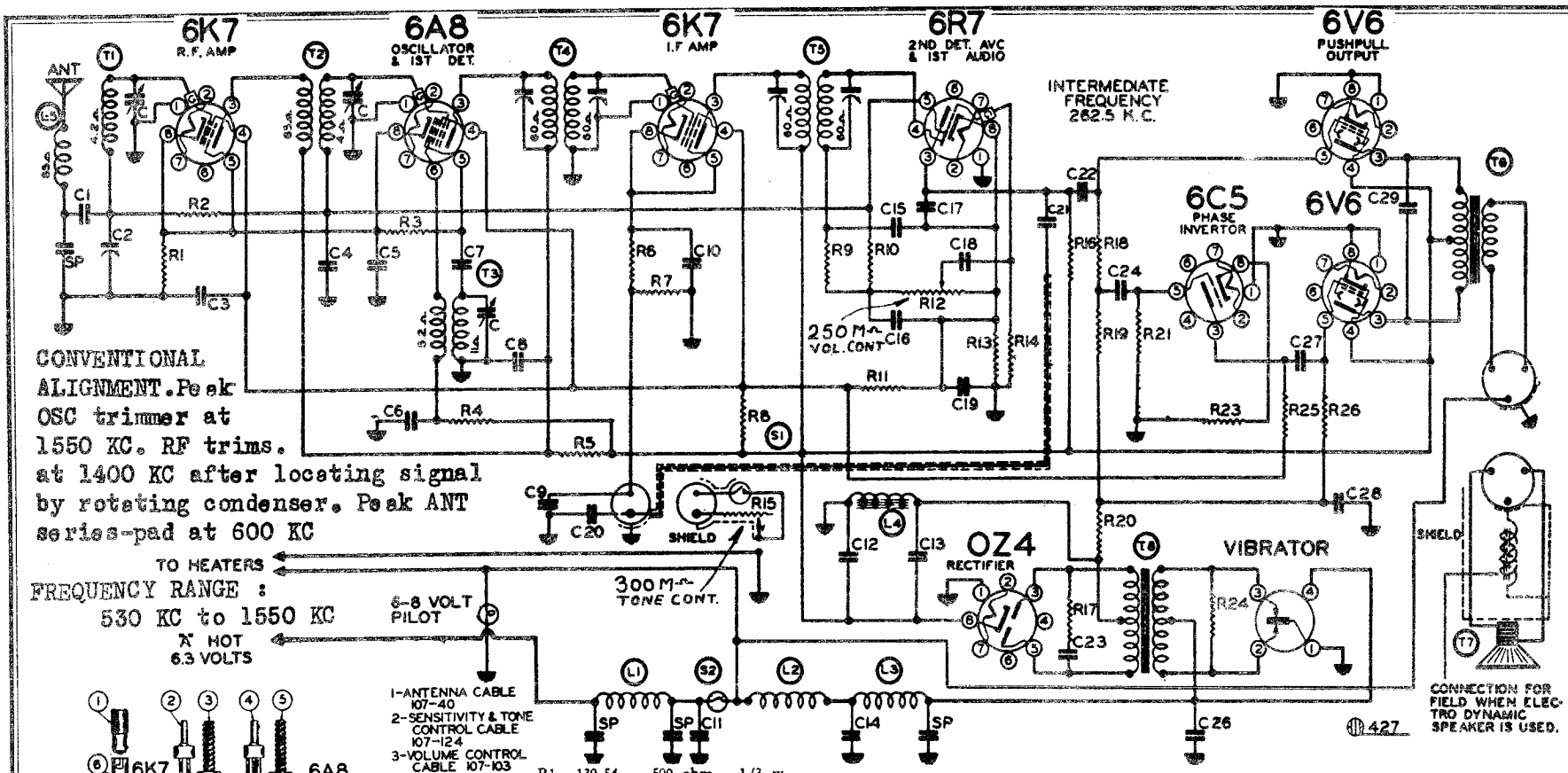
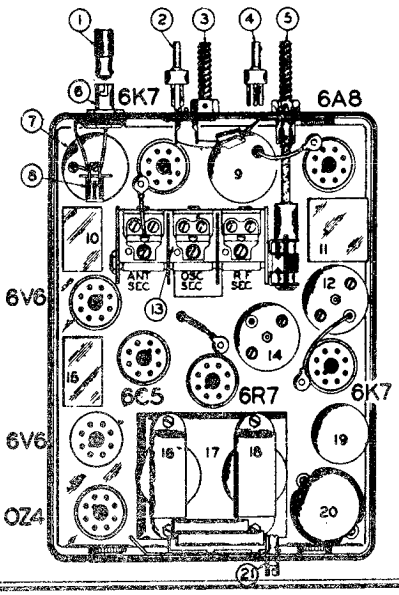
# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 01020
Chassis 881
Schematic, Socket Trimmers, Alignment




1-ANTENNA CABLE 107-40
2-SENSITIVITY & TONE CONTROL CABLE 107-124
3-VOLUME CONTROL CABLE 107-103
4-SPEAKER CABLE 107-133
5-TUNING CONTROL CABLE 107-104
6-ANTENNA FILTER ASSEMBLY 111-74
7-ANTENNA COIL 111-73A
8-ANTENNA FILTER CHOKE 111-76
9-R.F. COIL 109-36
10-BY-PASS BLOCK 116-20B
11-BY-PASS BLOCK 116-19B
12-INPUT I.F. 262.5KC 108-101
13-VARIABLE CONDENSER 102-45A
14-OUTPUT I.F. 262.5KC 108-102B
15-BY-PASS BLOCK 116-23
16-B FILTER CHOKE 105-48
17-POWER TRANSFORMER 104-112
18-OUTPUT TRANSFORMER 105-49
19-'LYTIC CONDENSER 119-43
20-VIBRATOR 126-1
21-A FILTER ASSEMBLY 105-50

| | | | |
|---|---|---|---|
| R1 | 130-54 | 500 ohm - 1/3 w. | |
| R2 | 130-141 | 250M ohm - 1/3 w. | |
| R3 | 130-52 | 50M ohm - 1/3 w. | |
| R4 | 130-138 | 50M ohm - 1/2 w. | |
| R5 | 130-31 | 1500 ohm - 1/3 w. | |
| R6 | 130-154 | 1000 ohm - 1/3 w. | |
| R7 | 130-161 | 4M ohm - 1/3 w. | |
| R8 | 130-185 | 20M ohm - 1/2 w. | |
| R8 | 130-185 | 20M ohm - 1.2 w. | |
| R9 | 130-162 | 50M ohm - 1/3 w. | |
| R10 | 130-142 | 1 megohm - 1/3 w. | |
| R11 | 130-139 | 40M ohm - 1/3 w | |
| R12 | 101-86 | Volume control - | |
| R13 | 130-184 | 700 ohm - 1/3 w. | |
| R14 | 130-142 | 1 megohm - 1/3 w. | |
| R15 | 101-90 | Tone control in control head | |
| R16 | 130-181 | 100M ohm - 1/3 w. | |
| R17 | 130-22 | 5M ohm - 1/3 w. | |
| R18 | 130-183 | 150M ohm - 1/3 w | |
| R19 | 130-181 | 100M ohm 1/3 w. | |
| R20 | 130-141 | 250M ohm - 1/3 w. | |
| R21 | 130-190 | 30M ohm - 1/3 w. | |
| R23 | 130-178 | 3M ohm - 1/3 w. | |
| R24 | 130-87 | 200 ohm - 1/3 w. | |
| R25 | 130-181 | 100M ohm - 1/3 w. | |
| R26 | 130-141 | 250M ohm - 1/3 w. | |

**CONDENSERS**

| | | |
|---|---|---|
| C | 102-45A | 3 gang variable |
| C1 | 129-73 | .002 - Mica |
| C2 | 124-36 | 350 mmf. Nominal - Series pad |
| C3 | 116-20B | .25 x 200 v. - Red |
| C4 | 116-19B | .05 x 200 v. - Yellow |
| C5 | 116-20B | .1 x 200 v. - Yellow |
| C6 | 116-19B | .1 x 400 v. - Red |
| C7 | 129-12 | .00025 Mica |
| C8 | 116-19B | .1 x 200 v. - Green |
| C9 | 129-2 | .0005 - Mica |
| C10 | 116-19B | .05 x 200 v. - Black |
| C11 | 100-31 | .5 x 120 v. |
| C12 | 119-43 | 8.0 mfd. 'lytic |
| C13 | 119-43 | 12.0 mfd. 'lytic |
| C14 | 100-31 | .5 x 120 v. |
| C15 | 129-5 | .0001 Cer. |
| C16 | 129-5 | .0001 Cer. |
| C17 | 129-5 | .0001 Mica |
| C18 | 116-20B | .02 x 200 v. - Blue |
| C19 | 116-20B | .02 x 200 v. - Green |
| C20 | 129-2 | .0005 - Mica |
| C21 | 100-13 | .05 x 400 |
| C22 | 116-23 | .02 x 400 v. - White |
| C23 | 100-68 | .003 x 1400 v. |
| C24 | 116-23 | .1 x 200 v. - Red |
| C26 | 100-31 | .5 x 120 v. |
| C27 | 116-23 | .02 x 400 v. - Green |
| C28 | 116-23 | .5 x 200 v. - Yellow |
| C29 | 100-58 | .005 x 1200 v. |

C3, C5, C18 and C19 in same unit
C4, C6, C8 and C10 in same unit
C22, C24, C27 and C28 in same unit

**PARTS**

| | | |
|---|---|---|
| T1 | 111-73A | Antenna Coil |
| T2 | 109-36 | R. F. Coil |
| T3 | 110-59 | Oscillator Coil |
| T4 | 108-101 | Input I. F. Coil |
| T5 | 108-102B | Output I. F. Coil |
| T6 | 105-49 | Output Transformer |
| T7 | 114-94 | 8" Dynamic Speaker |
| T8 | 104-112 | Power transformer |
| L1 | 105-26 | RFA Choke |
| L2 | 105-24 | RFA Choke |
| L3 | 105-19 | A Choke |
| L4 | 105-48 | B Choke |
| L5 | 111-76 | Antenna Filter choke assembly |
| S1 | | Sensitivity switch in control head |
| S2 | | On-off Switch in control head |

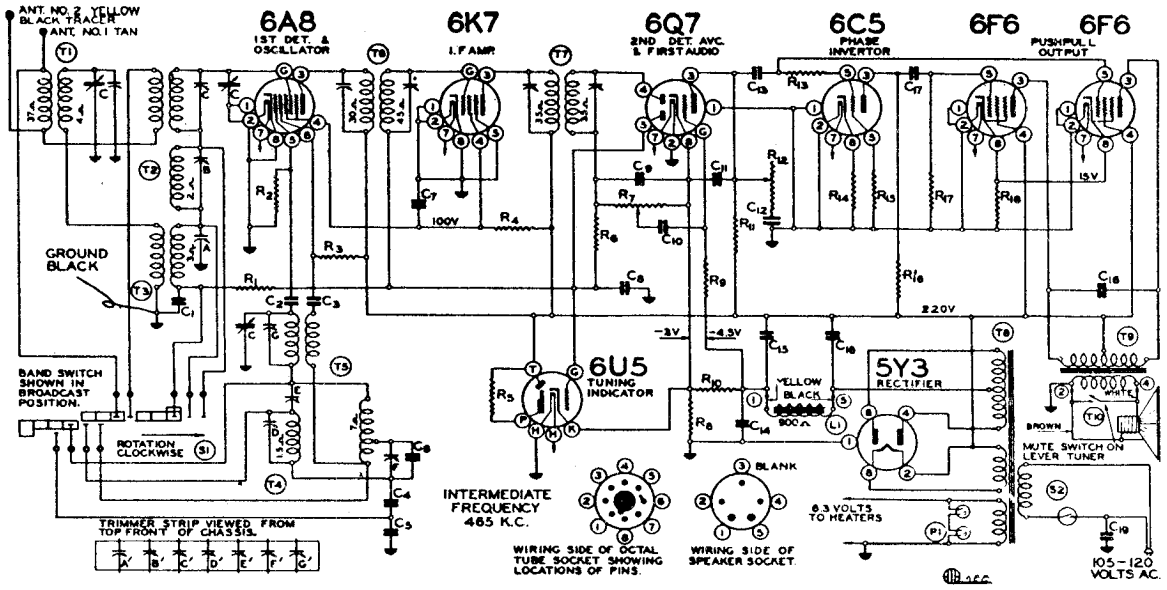
**881**

**(Serial No. 88000 and up)**

MODEL 01029
Chassis 860
Schematic, Voltage

Socket, Trimmers

# GOODYEAR TIRE & RUBBER CO., INC.




| Code No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | 130-103 | 100M ohm - 1/3 w. 10% |
| R2 | 130-12 | 50M ohm - 1/3 w. 20% |
| R3 | 130-123 | 15M ohm - 1/2 w. 10% |
| R4 | 130-196 | 30M ohm - 1 w. 10% |
| R5 | 130-110 | 1 megohm - 1/10 w. 20% In tuning indicator socket |
| R6 | 130-4 | 3 megohm -1/3 w. 20% |
| R7 | 101-97 | 1 megohm volume control |
| R8 | 130-198 | 40 ohm - 1/2 w. 10% |
| R9 | 130-4 | 3 megohm - 1/3 w. 20% |
| R10 | 130-197 | 20 ohm - 1/3 w. 10% |
| R11 | 130-103 | 100M ohm - 1/3 w. 10% |
| R12 | 101-98 | 300M ohm - tone control |
| R13 | 130-163 | 400M ohm - 1/3 w. 10% |
| R14 | 130-22 | 5M ohm - 1/3 w. 20% |
| R15 | 130-103 | 100M ohm - 1/3 w. 10% |
| R16 | 130-12 | 50M ohm - 1/3 w. 20% |
| R17 | 130-102 | 500M ohm - 1/3 w. 10% |
| R18 | 130-195 | 250 ohm - 1.2 w. 10% |
| | | **CONDENSERS** |
| C | 102-62 | 3 gang variable |
| C1 | 100-22 | .05 x 200 v. - 25% |
| C2 | 129-67 | .00004 Mica 10% |
| C3 | 100-25 | .002 x 600 v. 25% |
| C4 | 129-83 | .0027 Mica 2-1/2% |
| C5 | 129-84 | .003 Mica 2-1/2% |
| C6 | 129-88 | .0006 Mica 5% |
| C7 | 100-1 | .1 x 400 v. - 50 - 10% |
| C8 | 100-26 | .02 x 400 v. 25% |
| C9 | 129-5 | .0001 Mica 20% |
| C10 | 100-26 | .02 x 400 v. 25% |
| C11 | 129-2 | .0005 Mica 20% |
| C12 | 100-57 | .006 x 600 v. - 10 - 20% |
| C13 | 100-26 | .02 x 400 v. 25% |
| C14 | 100-20 | .1 x 200 v. 25% |
| C15 | 103-14 | 16 mfd. Regulating Lytic - 275 w.v. |
| C16 | 103-6 | 8 mfd. Lytic - 350 w.v. |
| C17 | 100-26 | .02 x 400 v. 25% |
| C18 | 100-37 | .003 x 600 v. 10% |
| C19 | 100-61 | .02 x 600 v. 20% Bakelite |
| | | **PARTS** |
| T1 | 111-88 | B.C. Pre-selector complete |
| T2 | 111-87 | S.W.M.W. Antenna Coil - complete |
| T3 | 111-86 | B.C. Antenna Coil Complete |
| T4 | 110-69 | M.W. Osc. Coil Complete |
| T5 | 110-70 | S.W.B.C. Osc. Coil Complete |
| T6 | 108-105D | Input I.F. Coil - complete 465 kc. |
| T7 | 108-106E | Output I.F. Coil - complete 465 kc. |
| T8 | 104-87B | Power Transformer |
| T9 | 105-54 | Output Transformer |
| T10 | 114-99 | 10" Dynamic speaker |
| L1 | | 900 ohm speaker field |
| S1 | 125-42 | Wave change switch |
| S2 | | Off-on switch on tone control |
| P1 | 107-94 | 6-8 volt pilot light |

For conventional types of antennas connect the yellow wire to the antenna lead and the yellow with black tracer and the black wire together to the ground lead.

When a doublet antenna is used connect the yellow wire and the yellow with black tracer wire to the doublet antenna and the solid black wire to the ground lead. (See Fig. 1-Top View)

FOR ALIGNMENT AND TUNER DATA, SEE INDEX

Mica condensers are coded with an additional dot indicating tolerance:

| Tolerance percent | Color of Dot |
|---|---|
| 2½% | White |
| 5% | Green |
| 10% | Blue |
| 15% | Yellow |
| 20% | Red |
| More Than 20% | None |

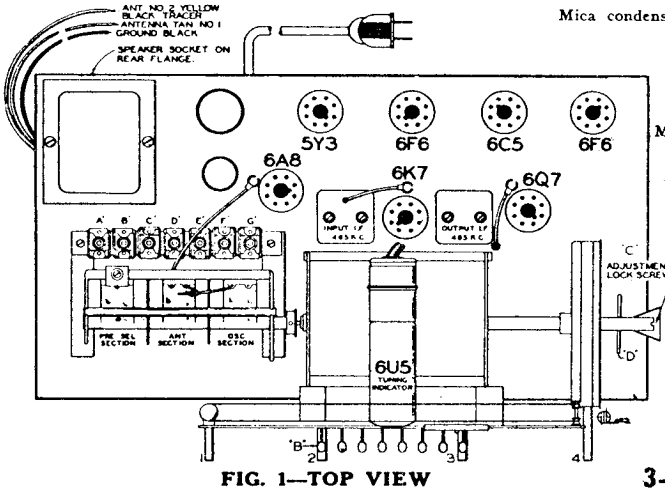



FIG. 1—TOP VIEW

**FREQUENCY RANGE**
**540 to 1750 K.C.**
**1730 to 5800 K.C.**
**5.5 to 18.1 M.C.**

**CHASSIS MODEL 860**

(Serial No. 7L897400 and up)

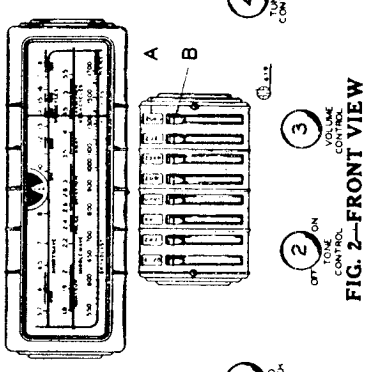



FIG. 2—FRONT VIEW

**3-Band All-Wave A.C. Superheterodyne Receiver**

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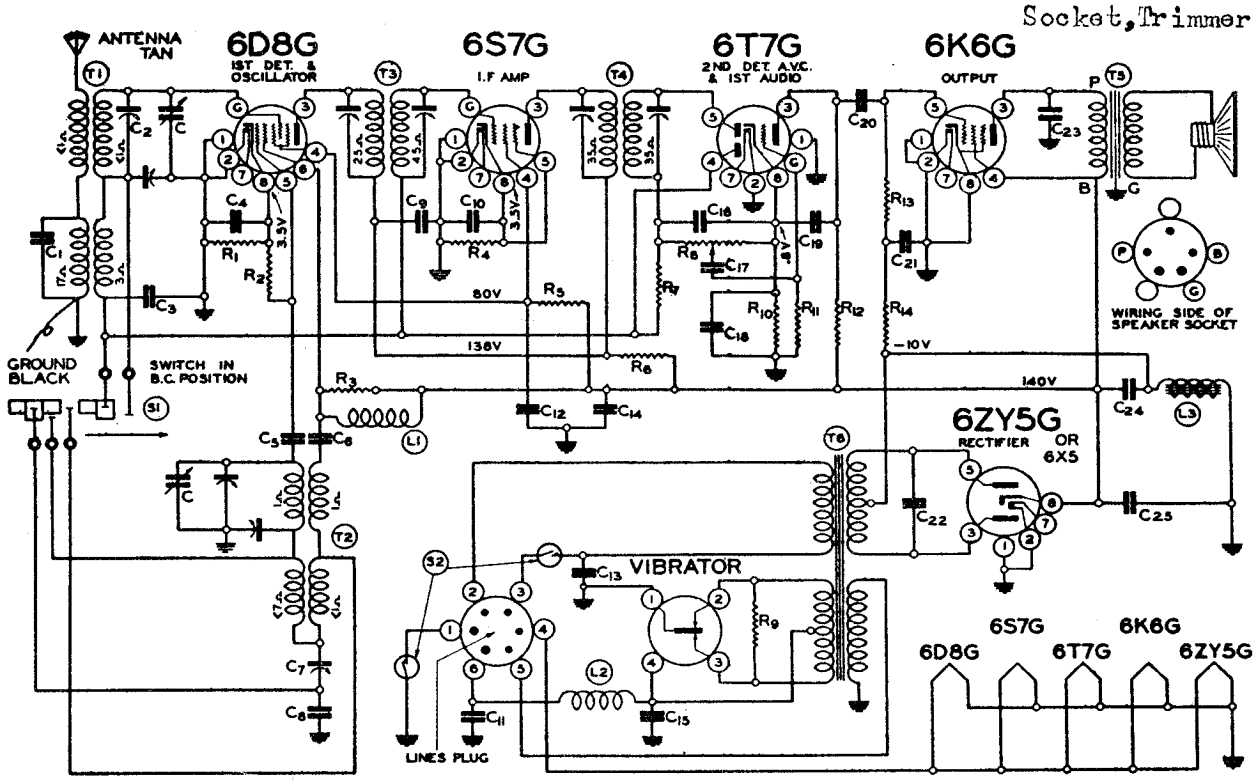
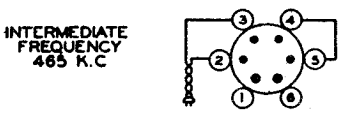
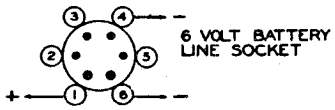
MODEL 01554
Chassis 505
Schematic, Voltage
Socket, Trimmers

# GOODYEAR TIRE & RUBBER CO., INC.



RP 447

## 505 SERIES "A"

**(Serial No. 7J851300 and up)**

FOR ALIGNMENT SEE INDEX

| | | |
|---|---|---|
| R1 | 130-70 | 500 ohm - 1/3 w. |
| R2 | 130-12 | 50M ohm - 1/3 w. |
| R3 | 130-12 | 50M ohm - 1/3 w. |
| R4 | 130-92 | 1000 ohm - 1/3 w. |
| R5 | 130-149 | 15M ohm - 1/3 w. |
| R6 | 130-192 | 2M ohm - 1/3 w. |
| R7 | 130-170 | 3 megohm - 1/3 w. |
| R8 | 101-91 | 1 meg volume control |
| R9 | 130-84 | 200 ohm - 1/3 w. |
| R10 | 130-192 | 2M ohm - 1/3 w. |
| R11 | 130-19 | 1 meg - 1/3 w. |
| R12 | 130-100 | 150M ohm - 1/3 w. |
| R13 | 130-3 | 500M ohm - 1/3 w. |
| R14 | 130-11 | 250M ohm - 1/3 w. |
| C | 102-43 | 2 gang variable |
| C1 | 129-5 | .0001 Mica |
| C2 | 124-39B | Adj. condenser |
| C3 | 100-22 | .05 x 200 |
| C4 | 100-20 | .1 x 200 |
| C5 | 129-39 | .00005 Mica |
| C6 | 100-25 | .002 x 600 |
| C7 | 124-38 | Series Pad |
| C8 | 129-54 | .003 Mica |
| C9 | 100-6 | .25 x 200 |
| C10 | 100-20 | .1 x 200 |
| C11 | 100-40 | .5 x 200 |
| C12 | 100-20 | .1 x 200 |
| C13 | 129-82 | .003 Mica |
| C14 | 129-12 | .00025 Mica |
| C15 | 100-40 | .5 x 200 |
| C16 | 129-5 | .0001 Mica |
| C17 | 100-11 | .01 x 400 |
| C18 | 119-22 | 10 mfd. [illegible] 25 wv. |
| C19 | 129-12 | .00025 [illegible] |
| C20 | 100-11 | .01 x 400 |
| C21 | 100-20 | .1 x 200 |
| C22 | 100-73 | .008 x 1200 |
| C23 | 100-37 | .003 x 500 |
| C24 | 119-24B | 5 mfd. [illegible] |
| C25 | 119-24B | 5 mfd. [illegible] |

| | | |
|---|---|---|
| T1 | 111-83 | Antenna Coil |
| T2 | 110-66B | Oscillator Coil |
| T3 | 108-105B | Input I.F. |
| T4 | 108-106B | Output I.F. |
| T5 | 114-95 | or |
| | 114-96 | Speaker |
| T6 | 104-114 | Power Transformer |
| L1 | 123-4 | "B" Choke |
| L2 | 105-19 | "A" Choke |
| S1 | 125-39 | Wave band switch |
| S2 | | Off-On Switch on Volume Control |
| L3 | 105-52 | 300 ohm 4.5 henry filter choke |

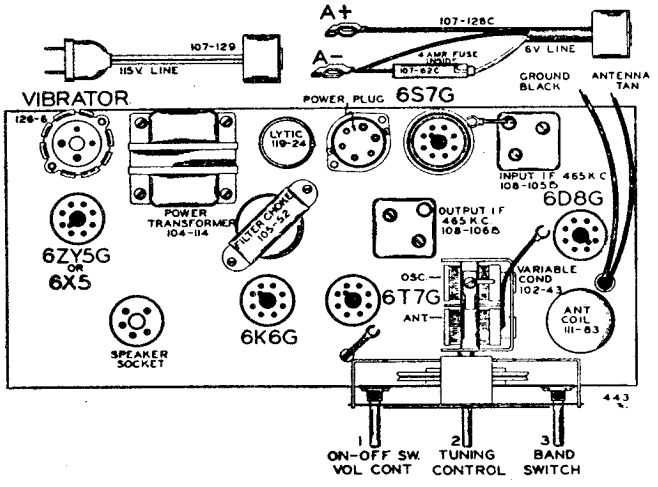



FIG. 1—TOP VIEW

**BAND DIAL SCALE FREQUENCY RANGE**

Broadcast..... Upper..... 535 to 1720 K.C. (Kilocycles)
Short Wave.. Lower..... 5.5 to 18.1 M.C. (Megacycles)

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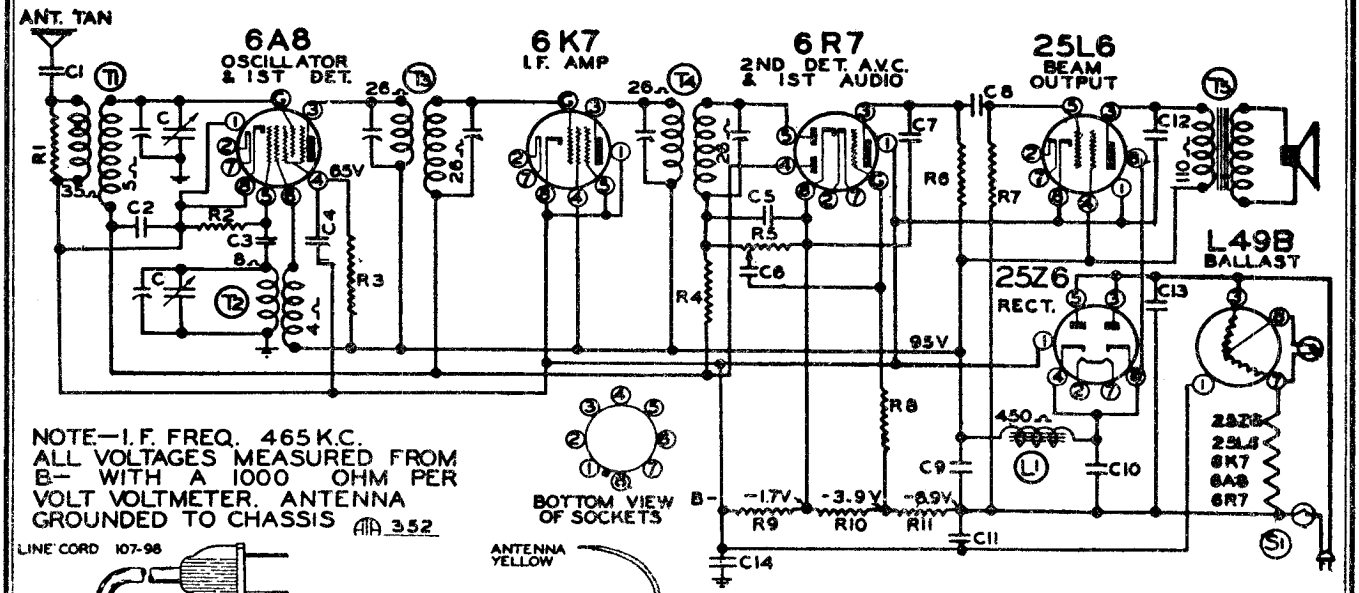
MODEL 010211, Ch. 602E
MODEL 010222
Ch. 602I

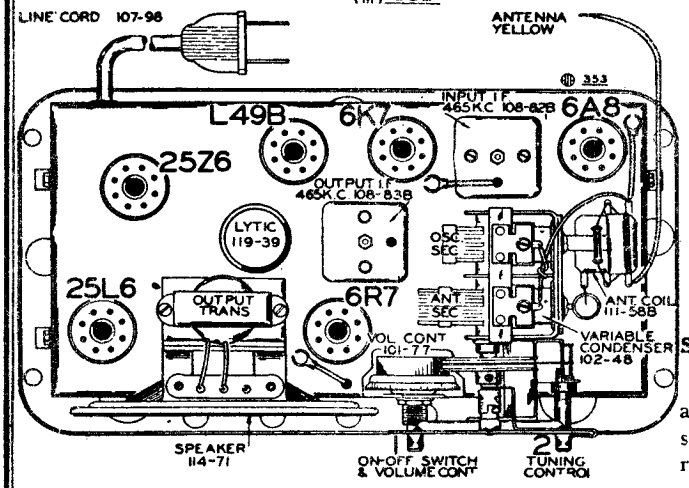
# GOODYEAR TIRE & RUBBER CO., INC.

Schematic, Voltage
Socket, Trimmers
Alignment




NOTE—I.F. FREQ. 465 K.C.
ALL VOLTAGES MEASURED FROM B— WITH A 1000 OHM PER VOLT VOLTMETER. ANTENNA GROUNDED TO CHASSIS




## ALIGNING I.F. TRANSFORMERS: (465 K.C.):

Part No. 108-83B Output I.F. Transformer

Part No. 108-82B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6K7G tube, and adjust the output I.F. transformer (No. 108-83B) to resonance.

   (b) Move oscillator output clip from grid of 6K7G to grid of 6A8G and adjust input I.F. transformer (No. 108-82B) to resonance.

   (c) With oscillator still connected to 6A8G, readjust output I.F. transformer (108-83B) if necessary.

## R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:

   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).

   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.

## SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on diagram are measured with 119 volt A.C. or D.C. line.

### RESISTORS

| No. | Part No. | Description | |
|---|---|---|---|
| R1 | 130-17 | 10M ohm - 1/3 w. | 20% |
| R2 | 130-12 | 50M ohm - 1/3 w. | 20% |
| R3 | 130-149 | 15M ohm - 1/3 w. | 20% |
| R4 | 130-4 | 3 meg ohm - 1/3 w. | 20% |
| R5 | 101-77 | Volume Control (1 Meg) | |
| R6 | 130-12 | 50M ohm - 1/3 w. | 20% |
| R7 | 130-20 | 100M ohm - 1/3 w. | 20% |
| R8 | 130-19 | 1 megohm - 1/3 w. | 20% |
| R9 | 106-38 | 30 ohm | |
| R10 | 106-38 | 40 ohm | |
| R11 | 106-38 | 55 ohm | |
| | | R9, R10, and R11 in one unit | |

### CONDENSERS

| | | | |
|---|---|---|---|
| C | 102-48 | 2 gang variable | |
| C1 | 100-25 | .002 x 600 | 25% |
| C2 | 100-9 | .05 x 200 | 25% |
| C3 | 129-12 | .00025 Mica | 20% |
| C4 | 100-22 | .05 x 200 | 25% |
| C5 | 129-5 | .0001 Mica | 20% |
| C6 | 100-11 | .01 x 400 | 25% |
| C7 | 129-2 | .0005 Mica | 20% |
| C8 | 100-22 | .05 x 200 | 25% |
| C9 | 119-39 | 20 mfd. lytic - 100 w.v. | |
| C10 | 119-39 | 15 mfd. lytic - 100 w.v. | |
| C11 | 100-20 | .1 x 200 | 25% |
| C12 | 100-13 | .05 x 400 | 25% |
| C13 | 100-39 | .1 x 400 | 20% |
| C14 | 100-53 | .25x400 | 20% |

### PARTS

| | | |
|---|---|---|
| T1 | 111-58B | Antenna Coil Complete |
| T2 | 110-46 | Oscillator Coil Complete |
| T3 | 108-82B | Input I. F. Complete |
| T4 | 108-83B | Output I. F. Complete |
| T5 | 114-71 | Dynamic Speaker |
| L1 | | 450 ohm speaker field |
| S1 | | Switch on Volume Control |

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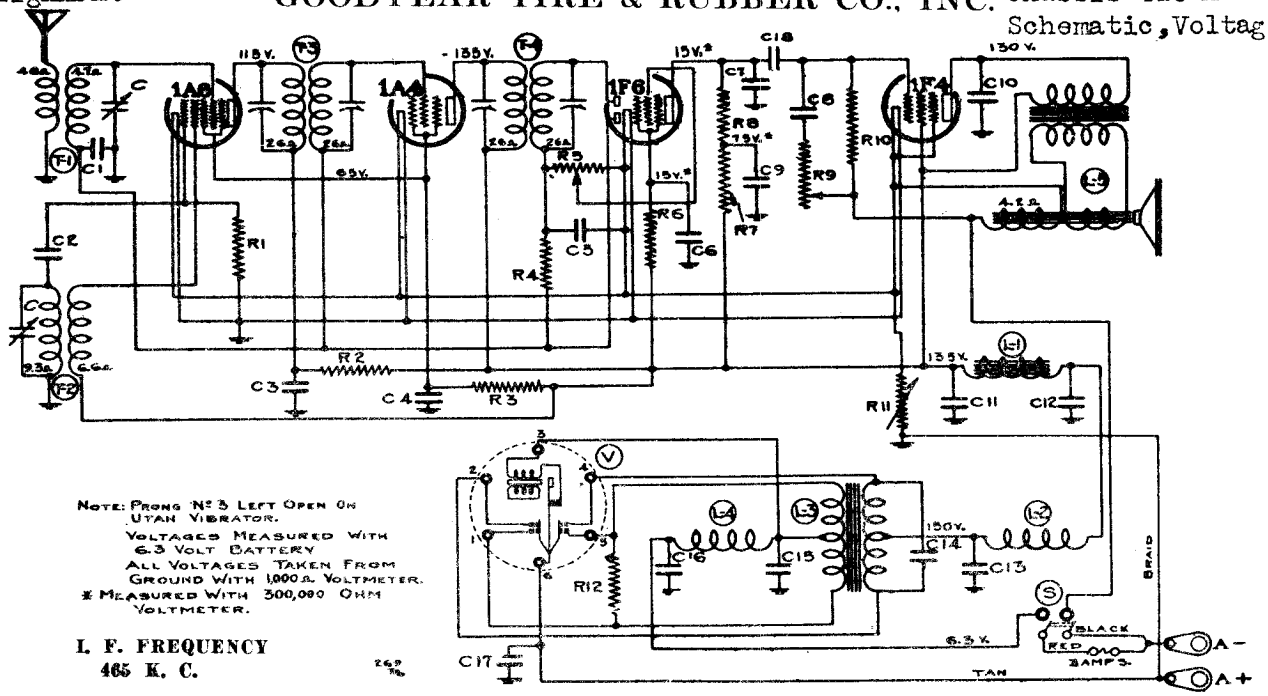
Socket, Trimmers
Alignment

# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 010219, Run 1
Chassis 415-A
Schematic, Voltage




NOTE: PRONG No 3 LEFT OPEN ON UTAH VIBRATOR.
VOLTAGES MEASURED WITH 6.3 VOLT BATTERY
ALL VOLTAGES TAKEN FROM GROUND WITH 1,000Ω VOLTMETER.
* MEASURED WITH 300,000 OHM VOLTMETER.

**I. F. FREQUENCY**
**465 K. C.**

| No. | Part No. | Description |
|---|---|---|
| | | CONDENSERS |
| C1 | 100-10 | .05 x 200 Volts |
| C2 | 129-12 | .00025 Mica |
| C3 | 100-33 | .1 x 200 Volts |
| C4 | 100-33 | .1 x 200 Volts |
| C5 | 129-12 | .00025 Mica |
| C6 | 100-33 | .1 x 200 Volts |
| C7 | 129-5 | .0001 Mica |
| C8 | 100-25 | .002 x 600 Volts |
| C9 | 100-9 | .05 x 200 Volts |
| C10 | 100-7 | .005 x 600 Volts |
| C11 | 119-28 | 5 mfd. x 200 Working Voltage |
| C12 | 119-28 | 5 mfd. x 200 Working Voltage |
| C13 | 100-33 | .1 x 200 Volts |
| C14 | 100-34 | .005 x 1200 Volts |
| C15 | 100-40 | .5 mfd. x 200 Working Voltage |
| C16 | 100-40 | .5 mfd. x 200 Working Voltage |
| C17 | 100-35 | .5 x 200 Volts |
| C18 | 100-11 | .01 x 400 Volts |
| NOTE: C11 & C12 in one unit—No. 119-28 | | |
| | | RESISTORS |
| R1 | 130-94 | 50M Ohm—1/3 Watt |
| R2 | 130-17 | 10M Ohm—1/3 Watt |
| R3 | 130-123 | 15M Ohm—1/2 Watt |
| R4 | 130-121 | 3.2 megohm—1/3 Watt |
| R5 | 101-56 | 1 meg ohm—Volume Control |
| R6 | 130-19 | 1 meg ohm—1/3 Watt |
| R7 | 130-20 | 100M Ohm—1/3 Watt |
| R8 | 130-11 | 250M Ohm—1/3 Watt |
| R9 | 101-59 | 1 meg ohm—Tone Control |
| R10 | 130-37 | 750M Ohm—1/3 Watt |
| R11 | 101-44 | 4.75 Ohm—Filament Rheostat |
| R12 | 130-124 | 200 Ohm—1/2 Watt |

| | | MISCELLANEOUS PARTS |
|---|---|---|
| C | 102-38 | One Section of Two Gang |
| T1 | 111-66 | Antenna Coil |
| T2 | 110-45 | Oscillator Coil |
| T3 | 108-84 | Input I.F.—465 Kc. |
| T4 | 108-85 | Output I.F.—465 Kc. |
| L1 | 105-30 | Filter Choke |
| L2 | 123-3 | R.F. Choke Coil |
| L3 | 104-62 | Power Transformer |
| L4 | 105-19 | "A" Choke |
| L5 | 114-50 | 6" Spkr. (Field Res. 4.2 Ohms) |
| S | 101-56 | On Volume Control |
| V | 126-4 | Vibrator Unit |
| NOTE: R11, Part No. 101-44 Variable Filament Rheostat is adjusted at the factory to keep the filament voltage of the tubes at 2 volts. | | |

## TUBES:

The tube complement of this chassis consists of the following tubes:

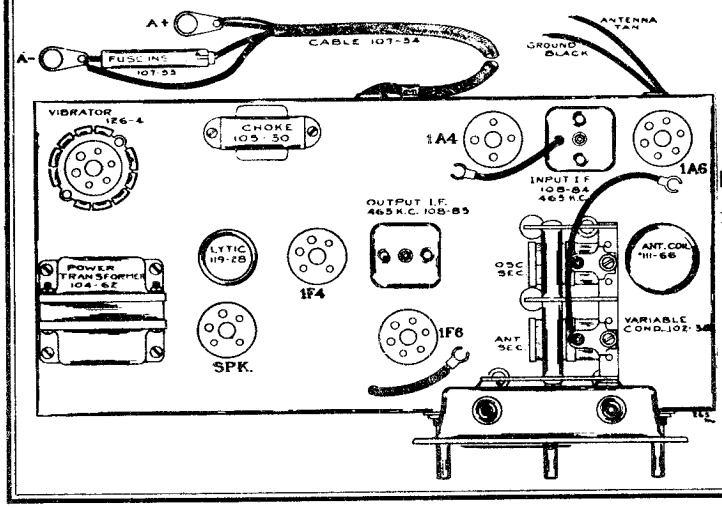
The type and function of each tube is as follows:

1—Type 1A6 Pentagrid Mixer, First Detector-oscillator.

1—Type 1A4 Super Control R. F. Tetrode I. F. Amplifier (465 K.C.)

1—Type 1F6 Duplex Diode Pentode, Second Detector, A.V.C. and First Audio.

1—Type 1F4 Pentode Output Amplifier.




## ALIGNING I.F. TRANSFORMERS: (465 K. C.):

Part No. 108-85 Output I.F. Transformer.
Part No. 108-84 Input I.F. Transformer.

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view)

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 1A4 tube, and adjust the output I.F. transformer (No. 108-85) to resonance.

   (b) Move oscillator output clip from grid of 1A4 to grid cap of 1A6 and adjust input I.F. transformer (No. 108-84) to resonance.

   (c) With oscillator still connected to 1A6, readjust output I.F. transformer (108-85) if necessary.

## R.F. ALIGNMENT: (535-1720 K.C.)

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to tan antenna and black ground leads and make the following adjustments:

   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.

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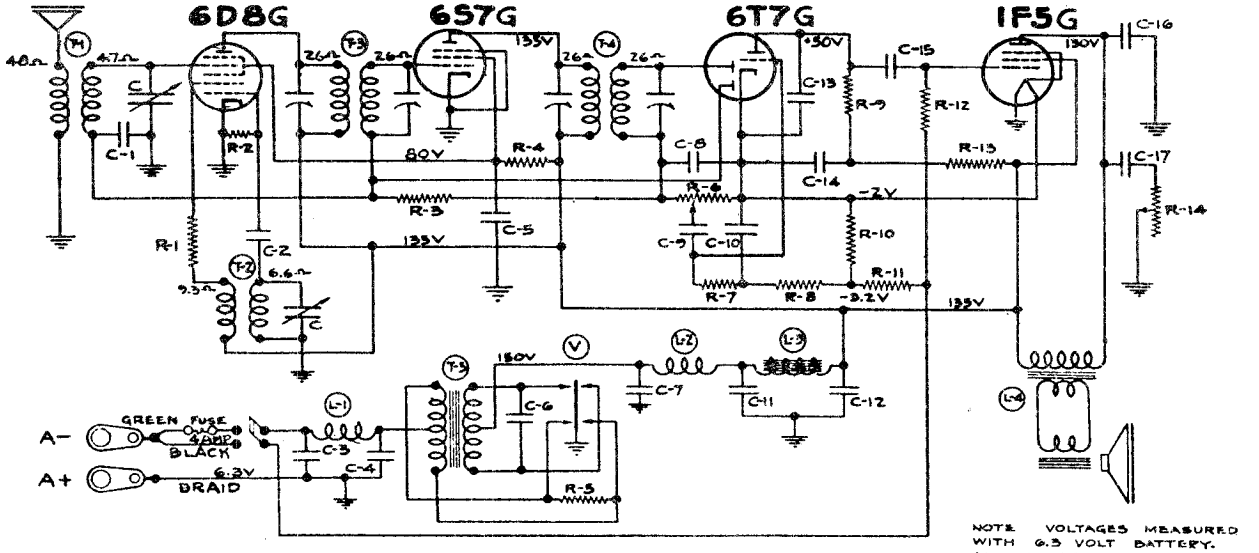
MODEL 010219, Run 2
Chassis 415-B
Schematic, Voltage

# GOODYEAR TIRE & RUBBER CO., INC.

Socket, Trimmers
Alignment



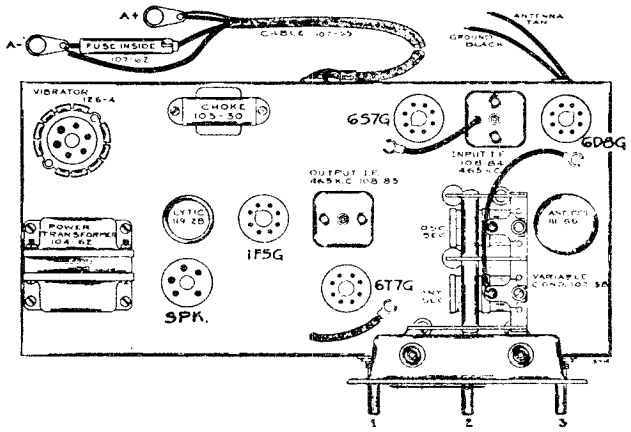

IF PEAK 465 KC

305

| No. | Part No. | DESCRIPTION<br>RESISTORS |
|---|---|---|
| R1 | 130-23 | 2M-1/3 |
| R2 | 130-76 | 30M-1/3 |
| R3 | 130-121 | 3.2 meg-1/3 |
| R4 | 130-123 | 15M-1/2 |
| R5 | 130-84 | 200-1/3 |
| R6 | 101-56 | 1 meg-Volume Control |
| R7 | 130-19 | 1 meg-1/3 |
| R8 | 130-19 | 1 meg-1/3 |
| R9 | 130-100 | 150M-1/3 |
| R10 | 106-36 | 10 Ohm Muter |
| R11 | 106-36 | 25 Ohm Muter |
| R12 | 130-19 | 1 meg-1/3 |
| R13 | 130-20 | 100M-1/3 |
| R14 | 101-72 | 300M-Tone control |

| | | CONDENSERS |
|---|---|---|
| C1 | 100-9 | .05-200 v. |
| C2 | 129-39 | .00005-Mica |
| C3 | 100-40 | .5-200 v. |
| C4 | 100-40 | .5-200 v. |
| C5 | 100-33 | .1-200 v. |
| C6 | 100-34 | .005-1200 v. |
| C7 | 100-33 | .1-200 v. |
| C8 | 129-5 | .0001-Mica |
| C9 | 100-11 | .01-400 v. |
| C10 | 100-11 | .01-400 v. |
| C11 | 119-28 | 5. Electrolytic-200 wv. |
| C12 | 119-28 | 5. Electrolytic-200 wv. |
| C13 | 129-12 | .00025-Mica |
| C14 | 100-33 | .1-200 v. |
| C15 | 100-11 | .01-400 v. |
| C16 | 100-37 | .003-600 v. |
| C17 | 100-11 | .01-400 v. |

| | | PARTS |
|---|---|---|
| T1 | 111-66 | Antenna Coil |
| T2 | 110-45 | Oscillator Coil |
| T3 | 108-84 | Input I. F. Coil |
| T4 | 108-85 | Output I. F. Coil |
| T5 | 104-62 | Power Transformer |
| L1 | 105-19 | "A" Choke |
| L2 | 123-3 | RF "B" Choke |
| L3 | 105-30 | Filter Choke |
| L4 | 114-63 | Speaker (P. M. Dynamic) |
| V | 126-4 | Vibrator |
| C | 102-38 | Variable Condenser |




The type and function of each tube is as follows:

1—Type 6D8G Pentagrid Mixer, First Detector-oscillator.

1—Type 6S7G Remote Cut-off Pentode I. F. Amplifier (465 K.C.)

1—Type 6T7G Duplex Diode Triode, Second Detector, A.V.C. and First Audio.

1—Type 1F5G Pentode Output Amplifier.

**RESONANCE INDICATOR:**

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 1F5G output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

**ALIGNING I.F. TRANSFORMERS: (465 K. C.):**

Part No. 108-85 Output I.F. Transformer.
Part No. 108-84 Input I.F. Transformer.

These I.F. Transformers have two adjustments, both of which are accessible from the top of chassis (see fig. 1, top view page 2).

1. With volume control full on (the extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments.

   (a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-85) to resonance.

   (b) Move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-84) to resonance.

   (c) With oscillator still connected to 6D8G readjust output I.F. transformer (108-85) if necessary.

**R. F. ALIGNMENT: (535-1720 K.C.)**

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to tan antenna and black ground leads and make the following adjustments:

   (a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer (rear of gang condenser).

   (b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick-up oscillator signal and adjust antenna trimmer to resonance (front section of gang condenser).

   (c) Check sensitivity at 600 and 1000 kilocycles.

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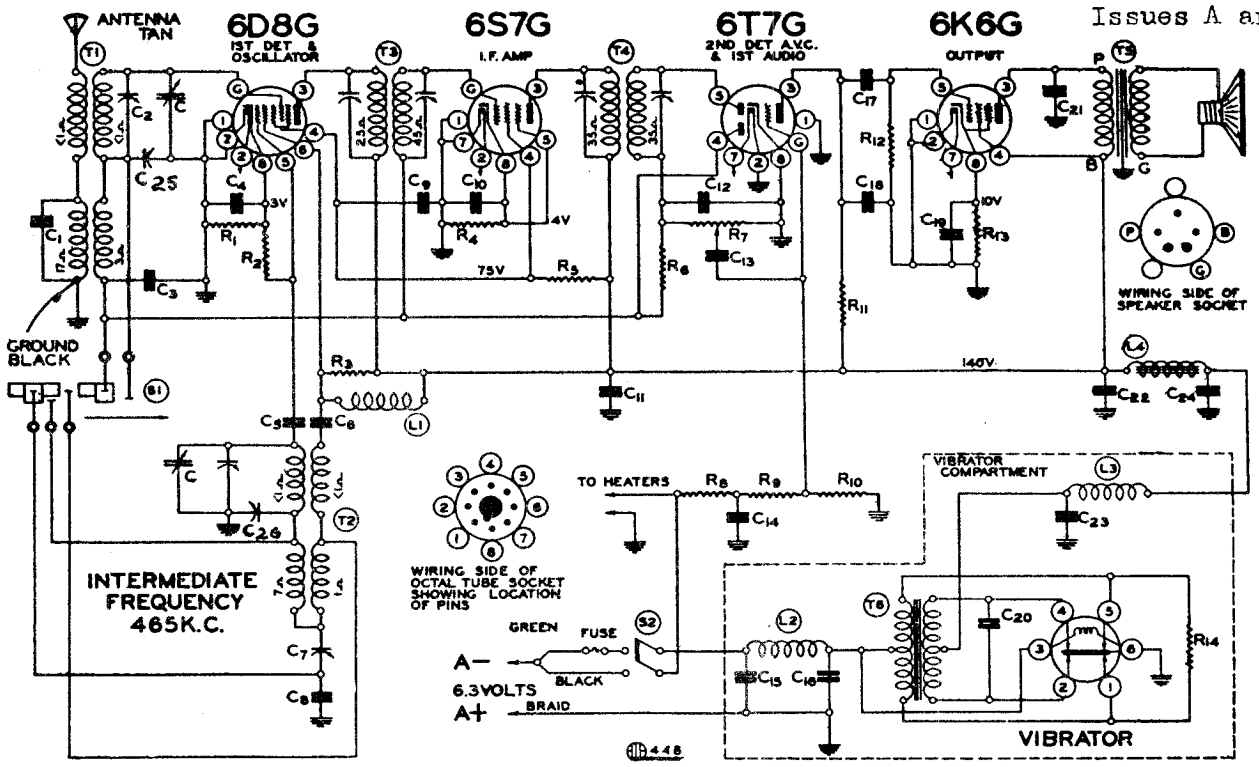
Schematic, Voltage
Socket, Trimmers

# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 010219
Runs 3,4
Chassis 489
Series A
Issues A and B




## RESISTORS

| | | |
|---|---|---|
| R1 | 130-54 | 500 ohm - 1/3 w. |
| R2 | 130-12 | 50M ohm - 1/3 w. |
| R3 | 130-12 | 50M ohm - 1/3 w. |
| R4 | 130-26 | 1000 ohm - 1/3 w. |
| R5 | 130-149 | 15M ohm - 1/3 w. |
| R6 | 130-4 | 3 megohm - 1/3 w. |
| R7 | 101-91 | 1 meg volume control |
| R8 | 130-191 | 1.5 megohm - 1/3 w. |
| R9 | 130-4 | 3 megohm - 1/3 w. |
| R11 | 130-9 | 200M ohm - 1/3 w. |
| R12 | 130-3 | 500M ohm - 1/3 w. |
| R13 | 130-153 | 700 ohm - 1/3 w. |
| R14 | 130-84 | 200 ohm - 1/3 w. |
| R10 | 130-191 | 1.5 meg - 1/3 w. |

## CONDENSERS

| | | |
|---|---|---|
| C | 102-43 | 2 gang variable |
| C1 | 129-5 | .0001 Mica |
| C2 | 124-39B | Adj. Cond. 2-25 mmf. |
| C3 | 100-22 | .05 x 200 |
| C4 | 100-20 | .1 x 200 |
| C5 | 129-39 | .00005 Mica |
| C6 | 100-25 | .002 x 600 |
| C7 | 124-38 | Series pad 600 mmf. W. C. |
| C8 | 129-54 | .003 Mica |
| C9 | 100-20 | .1 x 200 |
| C10 | 100-20 | .1 x 200 |
| C11 | 100-11 | .01 x 400 |
| C12 | 129-5 | .0001 Mica |
| C13 | 100-11 | .01 x 400 |
| C14 | 100-11 | .01 x 400 |
| C15 | 100-40 | .5 x 200 |
| C16 | 100-40 | .5 x 200 |
| C17 | 100-26 | .02 x 400 |
| C18 | 129-2 | .0005 Mica |
| C19 | 119-22 | 10.0 mfd. 25 v. lytic |
| C20 | 100-34 | .005 x 1200 |
| C21 | 100-19 | .006 x 600 |
| C22 | 119-28B | 5.0 mfd. lytic |
| C23 | 100-20 | .1 x 200 |
| C24 | 119-28B | 5.0 mfd. lytic |

C22 - C24 in same unit

| | | |
|---|---|---|
| C25 | 124-30B | Adjustable Trimmer, 2-20 mmf. |
| C26 | 124-30B | Adjustable Trimmer, 2-20 mmf. C25 and C26 in same unit |

## (Serial No. 7J852300 and up)
## ISSUE B (Serial No. 8C136800 and up)

PARTS

| | | |
|---|---|---|
| T1 | 111-83 | Antenna coil complete |
| T2 | 110-66B | Oscillator coil complete |
| T3 | 108-105B | Input I.F. complete 465 kc. |
| T4 | 108-106B | Output I.F. complete 465 kc. |
| T5 | 114-96 | 6" speaker (P.M.) |
| T6 | 104-62E | Power Transformer |
| L1 | 123-4 | R. F. "B" Choke |
| L2 | 105-19 | A Choke |
| L3 | 123-3 | R. F. "B" Choke |
| L4 | 105-30E | "B" Filter Choke (400 ohms) |
| S1 | 125-39 | Wave Band Switch |
| S2 | | Switch on volume control |

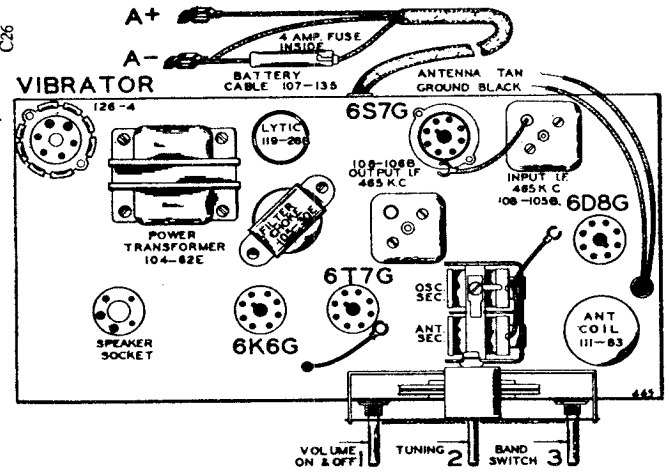



FIG. 1—TOP VIEW

FREQUENCY RANGE

DIAL SCALE

| BAND | Upper | Lower |
|---|---|---|
| Broadcast | 535 to 1720 K.C. (Kilocycles) | |
| Short Wave | 5.5 to 18.1 M.C. (Megacycles) | |

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MODEL 010219
Runs 3,4
Chassis 489
Series A
Issues A and B
Socket, Trimmers
Alignment

# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 01554
Trimmers
Alignment

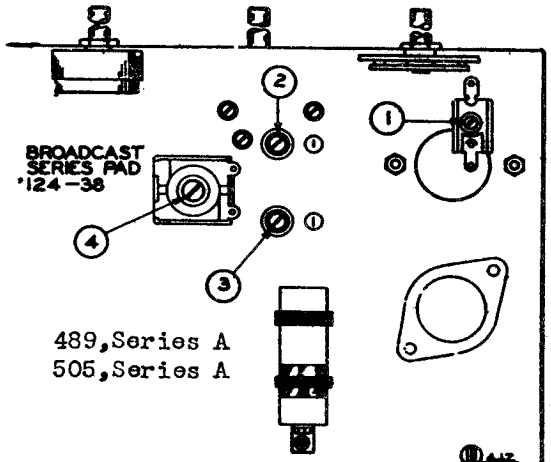


FIG 3.—BOTTOM VIEW

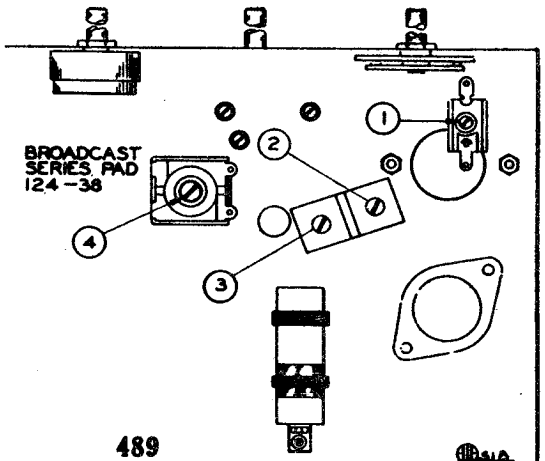


FIG 3.—BOTTOM VIEW

**(Serial No. 8C136800 and up)**

**DUMMY ANTENNAS:**

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

**ALIGNING I.F. TRANSFORMERS: (465 K. C.):**

Part No. 108-106B Output I.F. Transformer
Part No. 108-105B Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser in its minimum capacity position, plates entirely out of mesh, make the following adjustments:

   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-106B) to resonance.

   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap of 6D8G and adjust input I.F. transformer (No. 108-105B) to resonance.

**SHORT WAVE BAND ALIGNMENT:**
**5.5 to 18.1 Megacycles**

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 17 megacycles and connected in series with "Dummy 3" to the antenna and ground leads, make the following adjustments:

   (a) Move dial pointer to 17 megacycles and adjust short wave oscillator trimmer to resonance.

   This adjustment is the trimmer mounted on the top of rear section of the variable gang condenser (see Fig. 1, top view).

   (b) Adjust short wave antenna trimmer (Adjustment Number 1), to resonance (see Fig. 3, bottom view).

**BROADCAST BAND ALIGNMENT:**
**535 to 1720 Kilocycles**

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground leads make following adjustments:

   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 3, see bottom view of chassis, Fig. 3).

   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast antenna trimmer (adjustment number 2), to resonance.

   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 4), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).

   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.

   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

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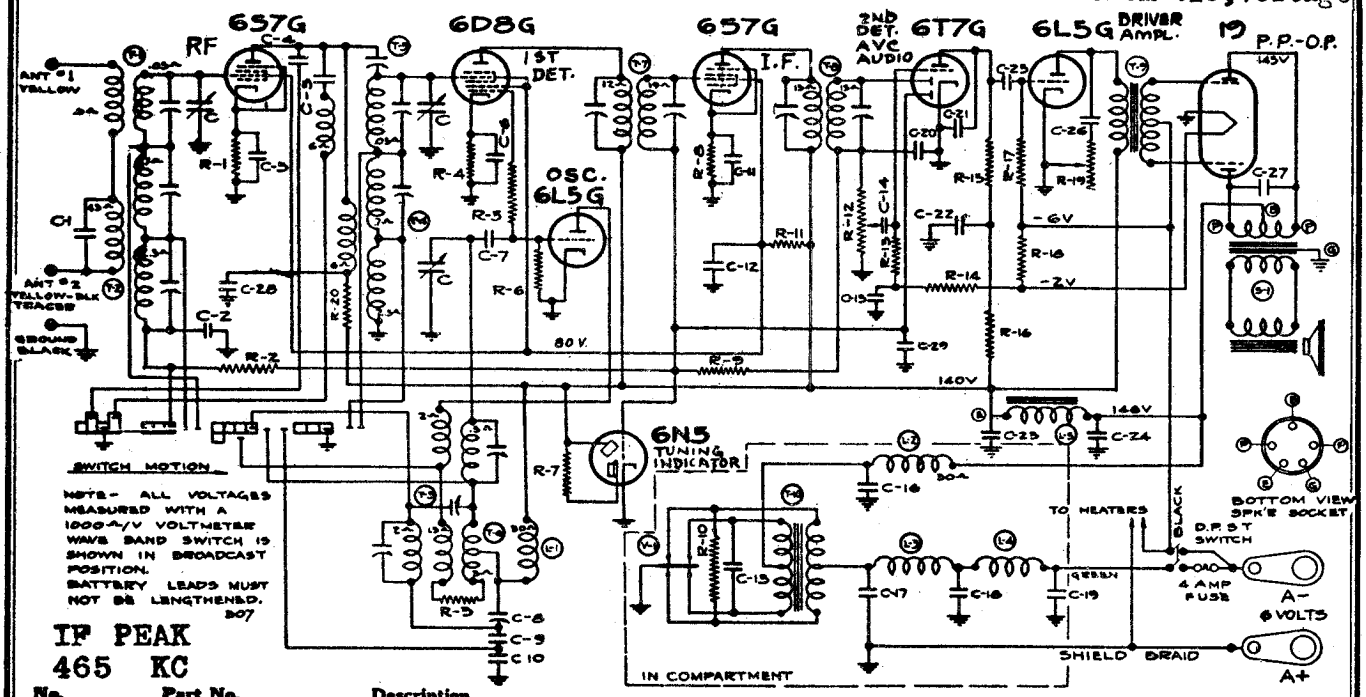
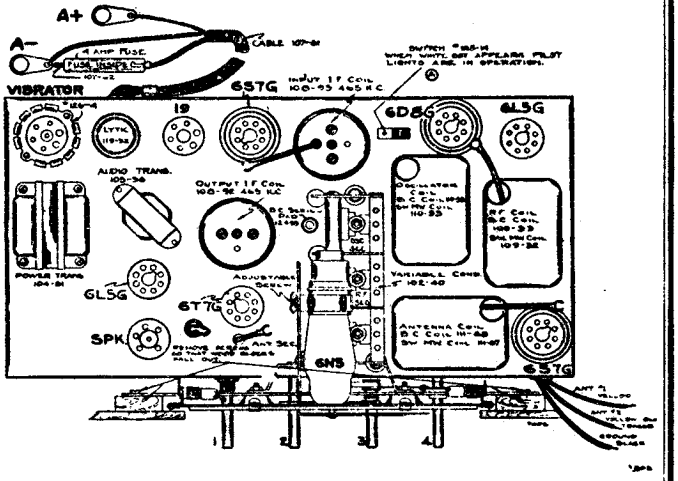
Socket, Trimmers

MODEL 010221
Chassis 804
Schematic, Voltage

# GOODYEAR TIRE & RUBBER CO., INC.




| No. | Part No. | Description |
|---|---|---|
| | | **CONDENSERS** |
| C | 102-40 | Variable Condenser |
| C1 | 129-5 | .0001 Mica—MO—O—20% |
| C2 | 100-9 | .05 x 200 v.—25% |
| C3 | 100-9 | .05 x 200 v.—25% |
| C4 | 129-72 | .0004 Mica—MT—W—5% |
| C5 | 129-38 | .00005 Mica—MO—O—10% |
| C6 | 100-9 | .05 x 200 v.—25% |
| C7 | 129-38 | .00005 Mica—MO—O—10% |
| C8 | 124-35 | J.S. Series Pad |
| C9 | 129-70 | .004 Mica MW—J—2½% |
| C10 | 129-71 | .002—Mica MW—W—2½% |
| C11 | 100-20 | .1 x 200v.—25% |
| C12 | 100-20 | .1 x 200v.—25% |
| C13 | 100-34 | .005 x 1200 v.—10% |
| C14 | 100-11 | .01 x 400 v.—25% |
| C15 | 100-11 | .01 x 400 v.—25% |
| C16 | 100-14 | .1 x 200 v.—25% |
| C17 | 100-56 | .5 x 200 v.—50%—10% |
| C18 | 100-56 | .5 x 200 v.—50%—10% |
| C19 | 100-25 | .002 x 600 v.—25% |
| C20 | 129-5 | .0001 Mica MO—O—20% |
| C21 | 129-2 | .0005 Mica MT—O—20% |
| C22 | 100-20 | .1 x 200 v.—25% |
| C23 | 119-32 | 4. mfd. 200 w. v. Lytic |
| C24 | 119-32 | 8. mfd. 200 w. v. Lytic |
| C25 | 100-11 | .01 x 400 v.—25% |
| C26 | 100-26 | .02 x 400 v.—25% |
| C27 | 100-25 | .002 x 600 v.—25% |
| C28 | 100-50 | .25 x 200 v.—20% |
| C29 | 100-22 | .05 x 200 v.—25% |
| | | **RESISTORS** |
| R1 | 130-140 | 1200 ohm 1/3 w.—20% |
| R2 | 130-20 | 100M 1/3 w.—20% |
| R3 | 130-27 | 50 1/3 w.—20% |
| R4 | 130-54 | 500 ohm 1/3 w.—20% |
| R5 | 130-27 | 50 1/3 w.—20% |
| R6 | 130-2 | 75 M 1/3 w.—20% |
| R7 | | ½ meg (in m. e. socket) |
| R8 | 130-140 | 1200 ohm 1/3 w.—20% |
| R9 | 130-38 | 2 meg 1/3 w.—20% |
| R10 | 130-84 | 200 ohm 1/3 w.—20% |
| R11 | 130-157 | 12M ½ w.—10% |
| R12 | 101-66 | 500M Volume Control |
| R13 | 130-19 | 1 meg 1/3 w.—20% |
| R14 | 130-19 | 1 meg 1/3 w.—20% |
| R15 | 130-20 | 100M 1/3 w.—20% |
| R16 | 130-20 | 100M 1/3 w.—20% |
| R17 | 130-4 | 3 meg 1/3 w.—20% |
| R18 | 130-158 | 16 ohm 1 w.—Insulated |
| R19 | 101-67 | 100M Tone Control |
| R20 | 130-85 | 3 M 1/3 w.—20% |
| | | **PARTS** |
| T1 | 111-67 | S.W. M.W. Ant. Coil |
| T2 | 111-68 | B.C. Antenna Coil |
| T3 | 109-32 | S.W. M. W. R.F. Coil |
| T4 | 109-33 | B.C. R.F. Coil |
| T5 | 110-53 | S.W. M.W. Osc. Coil |
| T6 | 110-55 | B.C. Osc. Coil |
| T7 | 108-93 | Input I.F. Coil |
| T8 | 108-92 | Output I.F. Coil |
| T9 | 105-36 | Audio Input Transformer |
| T10 | 104-81 | Power Transformer |
| S1 | 114 | P.M. Dynamic Spkr. 8" |
| L-1 | 123-3 | Osc. "B" Choke |
| L-2 | 123-3 | R.F. "B" Choke |
| L-3 | 105-19 | "A" Choke |
| L-4 | 105-19 | "A" Choke |
| L-5 | 105-30 | "B" Filter Choke |
| V-1 | 126-4 | Vibrator |




Vol. Control On-Off Switch | Tone Control | Tuning Control | Band Switch

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MODEL 010221
Chassis 804
Trimmers, Alignment

# GOODYEAR TIRE & RUBBER CO., INC.

**SERVICE NOTES:**

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

**In order to prevent signal from acting upon A.V.C. and** affecting accuracy of voltage measurements, aerial and ground leads should be short circuited while making measurements.

All voltages are to be measured with 6.3 volts input to receiver. Resistances of coils and transformer windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

**RESONANCE INDICATOR:**

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the two plate terminals of the type 19 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range meter should be used.

**DUMMY ANTENNAS:**

The following dummy antennas are used in aligning and are referred to in the following alignment instructions as "Dummy 1", "Dummy 2", and "Dummy 3".

Dummy 1: (I.F.)—Consists of a .1 mfd. condenser connected in series with the external oscillator.

Dummy 2: (Broadcast)—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

Dummy 3: (Middle and Short Wave)—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

**ALIGNING I.F. TRANSFORMERS: (465 K.C.):**

Part No. 108-92 Output I.F. Transformer
Part No. 108-93 Input I.F. Transformer

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see top view).

1. With volume control full on, (the extreme right of its rotation), the band changing switch in the broadcast position, (extreme left of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:
   (a) Connect external oscillator set at 465 kilocycles, in series with "Dummy 1", to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-92) to resonance.
   (b) With "Dummy 1" still connected, move oscillator output clip from grid of 6S7G to grid cap to 6D8G and adjust input I.F. transformer (No. 108-93) to resonance.

**SHORT WAVE BAND ALIGNMENT:**

**5.35 to 18.1 Megacycles**

1. With band changing switch in the short wave position, extreme right of its rotation, and with external oscillator set at 18 megacycles and connected in series with "Dummy 3" to the antenna and ground posts, make the following adjustments:
   (a) Move dial pointer to 18 megacycles and adjust short wave oscillator trimmer (adjustment number 1) to resonance.
   (b) Re-set external oscillator to 17 megacycles and pick up signal by rotating variable condenser and adjust short wave R.F. trimmer (adjustment number 8), and short wave antenna trimmer (adjustment number 9), to resonance.
   (c) Re-set external oscillator and check set at 18.1 megacycles and 6 megacycles for band coverage and sensitivity.

NOTE: It is extremely necessary in making all of these adjustments that the fundamental oscillator signal be tuned in and not the image frequency which will fall below the fundamental on the receiver dial. As an example of this a fundamental 18.3 megacycle signal can be tuned in not only at 18.3 on the dial but also at approximately 17.4 megacycles.

**MIDDLE WAVE BAND ALIGNMENT:**

**1690 to 5500 Kilocycles**

1. With band changing switch in the middle wave position, center of its rotation, and with external oscillator set at 5.5 megacycles and connected in series with "Dummy 3" to the antenna and ground posts make the following adjustments:
   (a) Move dial pointer to 5.5 megacycles and adjust middle wave oscillator trimmer (adjustment number 2) to resonance.
   (b) Re-set external oscillator to 5 megacycles and pick up signal by rotating variable condenser and adjust middle wave R.F. trimmer (adjustment number 10), and middle wave antenna trimmer (adjustment number 5), to resonance.
   (c) Re-set external oscillator and check sensitivity at 1700 kilocycles.

**BROADCAST BAND ALIGNMENT:**

**540 to 1720 Kilocycles**

1. With band changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with "Dummy 2" to antenna and ground posts, make following adjustments:
   (a) Set external oscillator to 1720 K.C. and adjust broadcast oscillator trimmer to resonance. (Adjustment number 4; see bottom view of coil assembly, Fig. 3)
   (b) Re-set external oscillator to 1400 K.C., rotate variable gang condenser and pick up signal. Adjust broadcast R.F. trimmer (adjustment number 6) and broadcast antenna trimmer (adjustment number 7) to resonance.
   (c) Re-set external oscillator to 600 K.C., and adjust broadcast series pad (adjustment number 3), to resonance by rotating condenser to approximately 600 K.C., rocking it slowly to and fro until by adjusting series pad maximum output is attained. This adjustment is located on the bottom of the chassis directly under the variable gang condenser. (See bottom view of chassis, Fig. 3).
   (d) Repeat adjustments "a" and "b" until sensitivity is at its maximum.
   (e) Check for tracking and sensitivity at 1400, 1000, and 600 kilocycles. **Under no circumstances bend plates of variable condenser sections to correct tracking.**

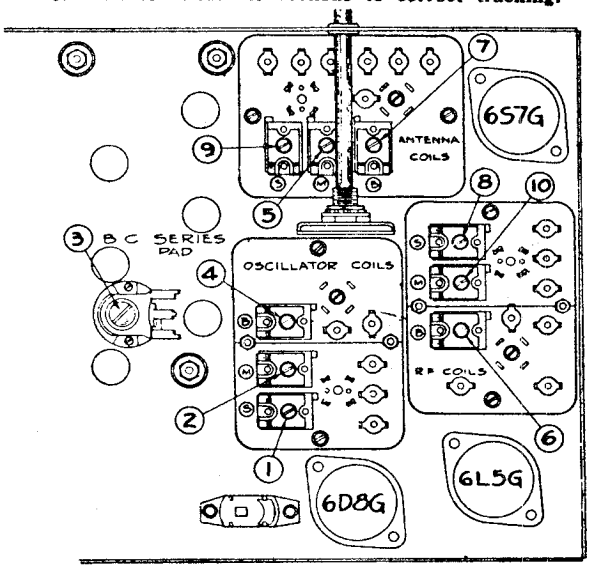


FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

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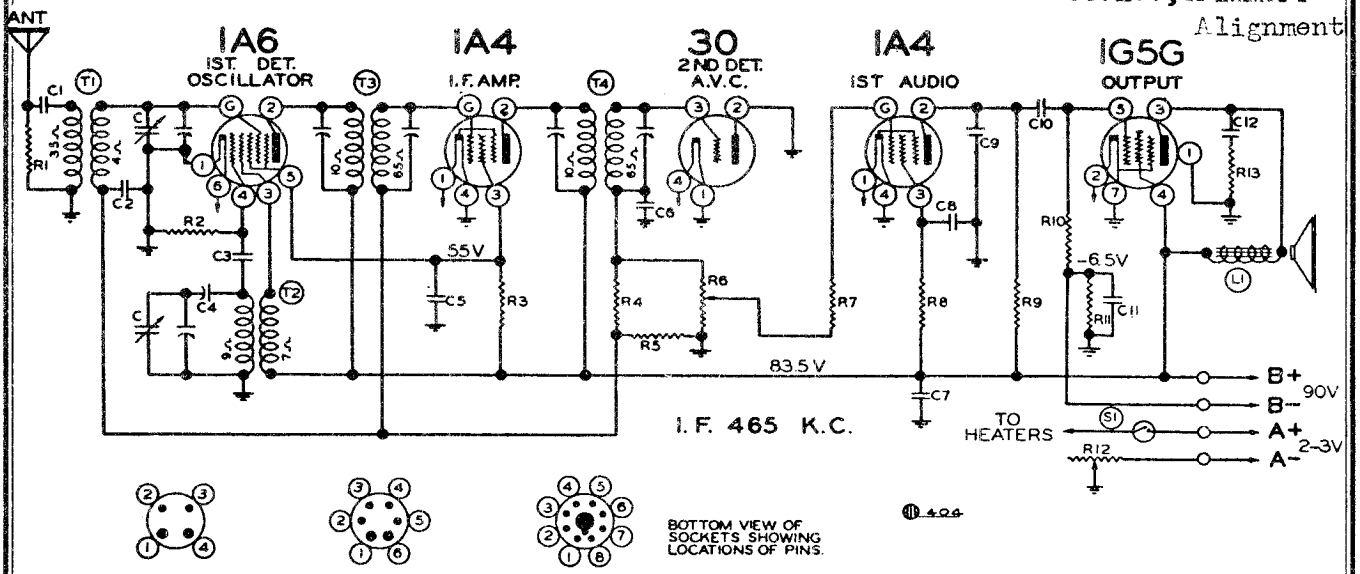
# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 010220 Run 2
Chassis 523B
Schematic, Voltage
Socket, Trimmers
Alignment






BOTTOM VIEW OF SOCKETS SHOWING LOCATIONS OF PINS.

| No. | Part No. | Description | | No. | Part No. | Description | |
|---|---|---|---|---|---|---|---|
| | | **CONDENSERS** | | C11 | 119-22 | 10.0 mfd. x 25 w. v. | |
| C | 102-56 | 2 Gang Variable Condenser | | C12 | 100-11 | .01 x 400 v. | 25% |
| C1 | 100-11 | .01 x 400 v. | 25% | | | **RESISTORS** | |
| C2 | 100-22 | .05 x 200 v. | 25% | R1 | 130-17 | 10M ohm - 1/3 w. | 20% |
| C3 | 129-12 | .00025 Mica | 20% | R2 | 130-52 | 50M ohm - 1/3 w. | 20% |
| C4 | 124-14 | Series Pad | | R3 | 130-17 | 10M ohm - 1/3 w. | 20% |
| C5 | 100-9 | .05 x 200 v. | 25% | R4 | 130-38 | 2 megohm - 1/3 w. | 20% |
| C6 | 129-5 | .0001 Mica | 20% | R5 | 130-38 | 2 megohm - 1/3 w. | 20% |
| C7 | 100-48 | .25 x 200 v. | 20% | R6 | 101-69 | 1 megohm Volume Control | |
| C8 | 100-9 | .05 x 200 v. | 25% | R7 | 130-52 | 50M ohm - 1/3 w. | 20% |
| C9 | 129-2 | .0005 Mica | 20% | R8 | 130-19 | 1 megohm - 1/3 w. | 20% |
| C10 | 100-11 | .01 x 400 v. | 25% | R9 | 130-9 | 200M ohm - 1/3 w. | 20% |
| | | | | R10 | 130-19 | 1 megohm - 1/3 w. | 20% |
| | | | | R11 | 130-93 | 450 ohm - 1/3 w. | 10% |
| | | | | R12 | 101-44 | 475 ohm Rheostat | |
| | | | | R13 | 130-52 | 50M ohm - 1/3 w. | 20% |
| | | | | | | **PARTS** | |
| | | | | T1 | 111-46 | Antenna Coil Complete | |
| | | | | T2 | 110-36 | Oscillator Coil Complete | |
| | | | | T3 | 108-67 | Input I.F. Coil Complete | |
| | | | | T4 | 108-68 | Output I.F.Complete | |
| | | | | L1 | 114-76 | 6" P. M. Speaker | |
| | | | | L1 | 114-19 | Speaker - 6" Magnetic | |
| | | | | S1 | | Switch on Volume Control | |

## ALIGNING I.F. TRANSFORMERS: (465 K.C.)

1. With volume control full on and with variable condenser at its minimum capacity position, plates entirely out of mesh, and wth external oscillator set at 465 K.C. connected in series with a .1 mfd. condenser, to the grid of the 1A6 tube (cap at top of tube), adjust I.F. transformers, parts number 108-67 and 108-68, to resonance. Both of these transformers have two (2) adjustments each, they are accessible from the tops of the cans (for location see top view).

   Use as a resonance indicator an output meter connected across the outside terminals of the speaker or by means of an adapter to the plate and screen of the type 1G5G output tube. Maximum deflection of the volt meter indicates resonance.

   Use only enough signal to get a readily readable output.

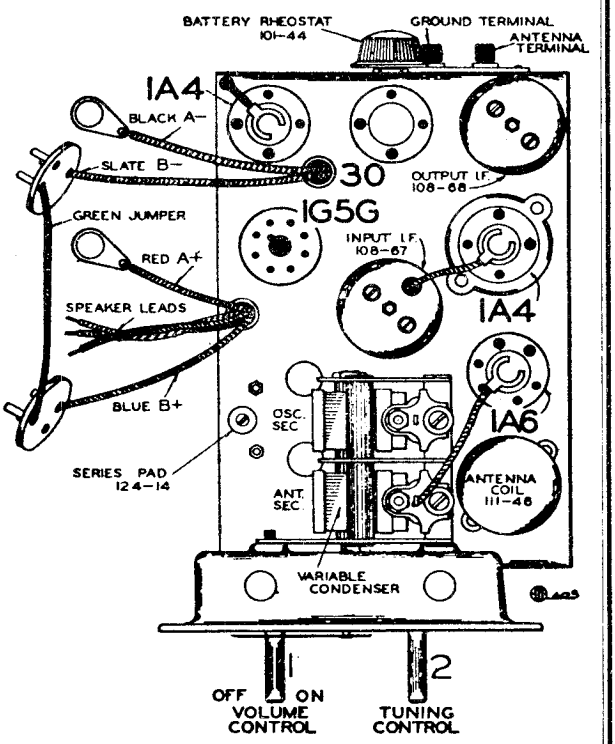
   A low range output meter or the low scale of a multi-range meter should be used.

## BROADCAST BAND ALIGNMENT:

1. Set external oscillator to 1720 K.C. and connect it in series with a 200 mmfd. condenser to the antenna and ground posts.
   (a) With variable condenser in its minimum capacity position, plates entirely out of mesh, adjust oscillator trimmer (rear section of variable condenser) to resonance.
   (b) Re-set external oscillator to 1400 K.C. Rotate variable condenser, pick up signal and adjust antenna trimmer (front section of variable condenser) to resonance.
   (c) Re -set external oscillator to 600 K.C., move dial pointer to 600 K.C., and adjust series pad, part number 124-14 (see top view), to resonance. While making this adjustment, slowly rock variable condenser to and fro until maximum output is obtained.
   (d) Check for sensitivity at 1400, 1000, 600 K.C. DO NOT BEND PLATES.

FOR BEST OPERATION THIS RECEIVER MUST HAVE AN OUTSIDE AERIAL NOT OVER FIFTY FEET LONG INCLUDING THE LEAD IN.

## Frequency Range 535-1720 Kilocycles

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MODEL 01050
Runs 1,2
Chassis 582
Series A,B

# GOODYEAR TIRE & RUBBER CO., INC.

Schematic, Voltage
Socket, Trimmers
Alignment

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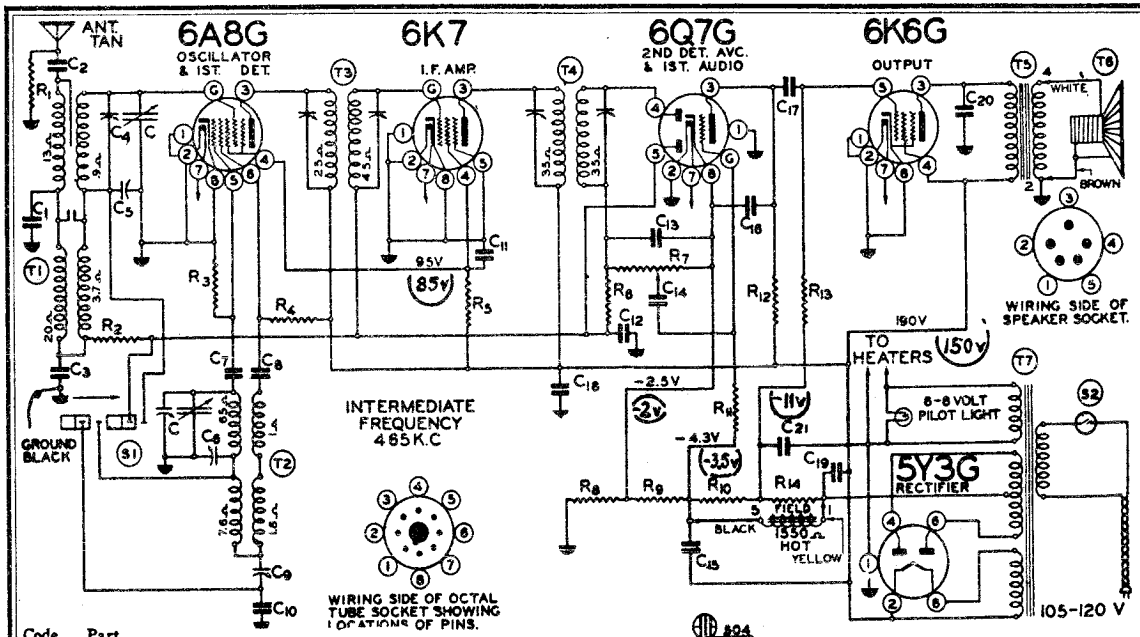
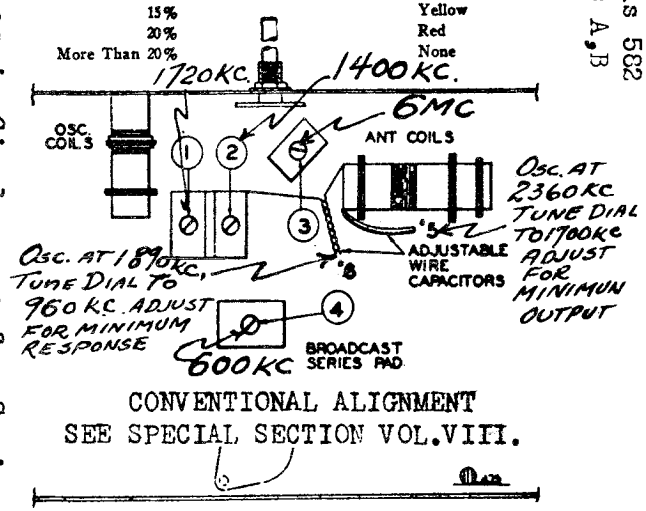



Voltages in Circles are for Series "A"

Mica condensers are coded with an additional dot indicating tolerance:

| Tolerance percent | Color of Dot |
|---|---|
| 2½ % | White |
| 5% | Green |
| 10% | Blue |
| 15% | Yellow |
| 20% | Red |
| More Than 20% | None |




CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

FIG. 3.—BOTTOM VIEW SHOWING TRIMMERS

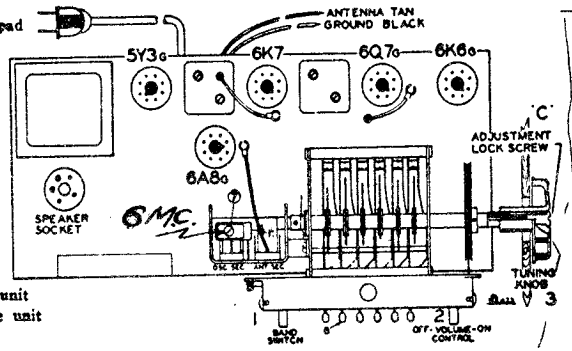



FIG. 1—TOP VIEW

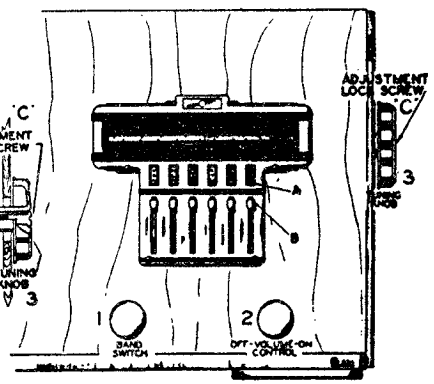



FIG. 2—FRONT VIEW

FOR TUNER DATA, SEE INDEX

| Code No. | Part No. | Description |
|---|---|---|
| | | RESISTORS |
| R1 | 130-17 | 10M ohm - 1/3 w. 20% |
| R2 | 130-20 | 100M ohm - 1/3 w. 20% |
| R3 | 130-12 | 50M ohm - 1/3 w. 20% |
| R4 | 130-17 | 10M ohm - 1/3 w. 20% |
| R5 | 130-42 | 20M ohm - ½ w. 20% |
| R6 | 130-4 | 3 megohm - 1/3 w. 20% |
| R7 | 101-100 | 1 megohm - Volume Control |
| R8 | 130-204 | 55 ohm - 1/3 w. 10% |
| R9 | 130-203 | 40 ohm - 1/3 w. 10% |
| R10 | 130-205 | 100M ohm - ½ w. 10% |
| R11 | 130-4 | 3 megohm - 1/3 w. 20% |
| R12 | 130-9 | 200M ohm - 1/3 w. 20% |
| R13 | 130-102 | 500M ohm - 1/3 w. 10% |
| R14 | 130-46 | 800M ohm - 1/3 w. 10% |
| | | CONDENSERS |
| C | 102-63 | 2 Gang Variable |
| C1 | 129-86 | .000038 Mica 5% |
| C2 | 129-87 | .000105 Mica 10% |
| C3 | 100-77 | .00304 x 600 v. 5% |
| C4 | 124-39C | 2-25 mmf. Adjustable Condenser |
| C5 | 124-30B | 2-20 mmf. Dual Adjustable Condenser |
| C6 | 124-30B | 2-20 mmf. Dual Adjustable Condenser |
| C7 | 129-5 | .0001 Mica 20% |
| C8 | 100-12 | .093 x 600 25% |
| C9 | 124-44 | 450 wkg. cap. - Series pad |
| C10 | 129-85 | .0014 - 2½ % Mica |
| C11 | 100-79 | .25 x 400 v. 50 - 10% |
| C12 | 100-9 | .05 x 200 v. 25% |
| C13 | 129-5 | .0001 Mica 20% |
| C14 | 100-11 | .01 x 400 v. 25% |
| C15 | 119-48 | 8 mfd. x 350 w. v. lytic |
| C16 | 129-2 | .0005 Mica 20% |
| C17 | 100-16 | .01 x 400 v. 10% |
| C18 | 100-13 | .05 - 400 v. 25% |
| C19 | 119-48 | 4 mfd. x 350 w. v. lytic |
| C20 | 100-19 | .006 x 600 v. 25% |
| C21 | 100-4 | .1 x 200 v. 10% |
| | | C5 and C6 in same unit |
| | | C15 and C19 in same unit |
| | | PARTS |
| T1 | 111-89 | Antenna Coil Complete |
| T2 | 110-71 | Oscillator Coil Complete |
| T3 | 108-105E | Input I.F. 465 kc. Complete |
| T4 | 108-106F | Output I.F. 465 kc. Complete |
| T5 | 105-57 | Output Transformer |
| T6 | 114-110 | 6" Dynamic speaker (1550 Ohm Field) |
| T7 | 104-124 | Power Transformer |
| S1 | 125-43 | Wave band switch |
| S2 | | Switch on volume control |

**MODEL 582**

**535 to 1720 K.C.**

**2000 to 7000 K.C.**

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt. These voltages are clearly indicated on the circuit diagram.

All voltages are to be measured with 115 volts on the primary of the power transformer.

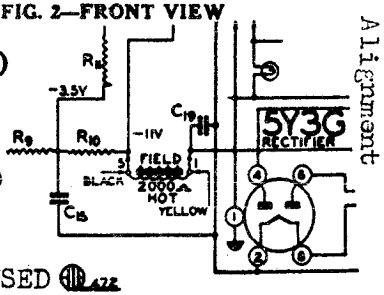
**SERIES "A" (Serial No. 7L894500 and up)**

| | | |
|---|---|---|
| R5 | 130-149 | 15M ohm - 1/3 w. 20% |
| R8 | 106-45 | 65 ohm 10% |
| R9 | 106-45 | 45 ohm 10% |
| R10 | 106-45 | 220 ohm 10% |

$R_{14}$ Grid Bias Res. NOT USED

| | | |
|---|---|---|
| C15 | 119-47 | 5.0 mfd. 250 w. v. lytic |
| C19 | 119-47 | 5.0 mfd. 250 w. v. lytic |
| C20 | 100-12 | .003 x 600 v. 25% |

$C_{21}$ Bias-Filter Cond. NOT USED

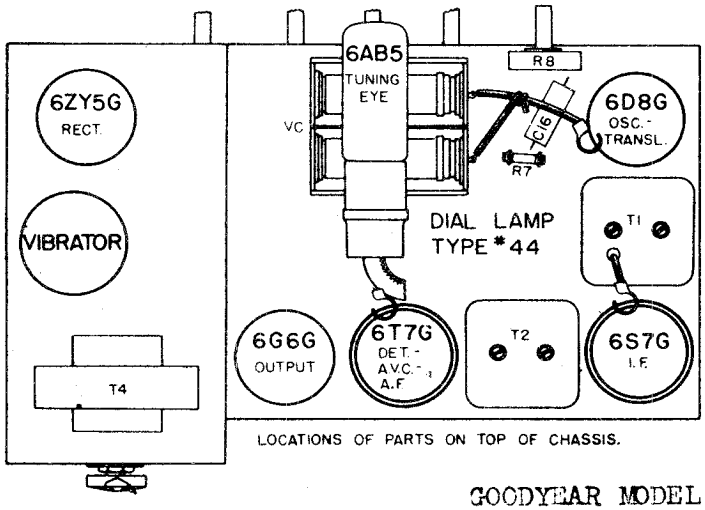


MODEL 015130
Socket, Trimmers

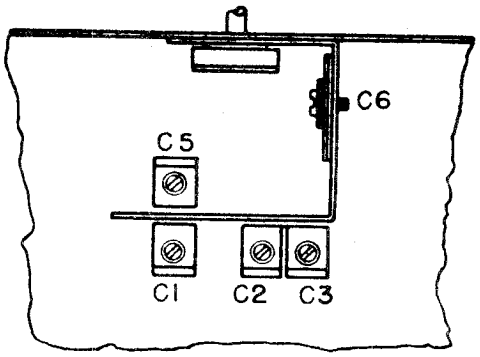
# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 015040
Schematic, Voltage
Socket, Trimmers
Alignment

WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
CAPACITY VALUES ARE IN MICROFARADS.




LOCATIONS OF PARTS ON TOP OF CHASSIS.

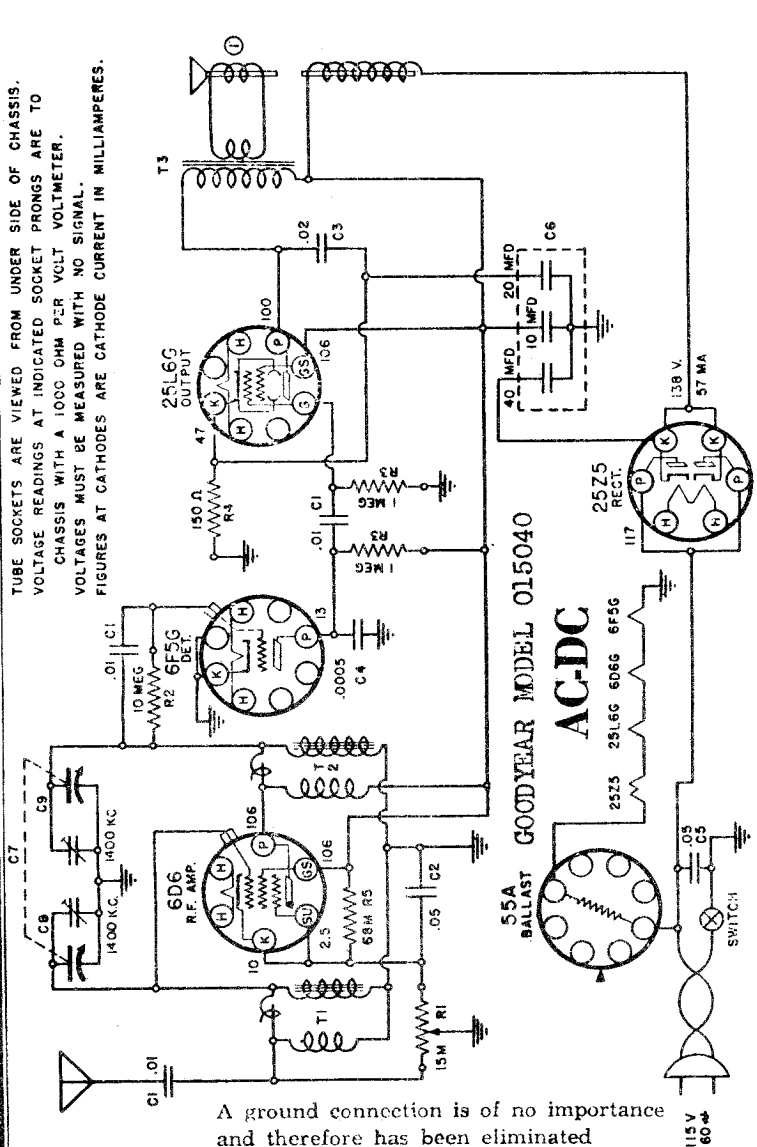



LOCATIONS OF TRIMMERS UNDER CHASSIS

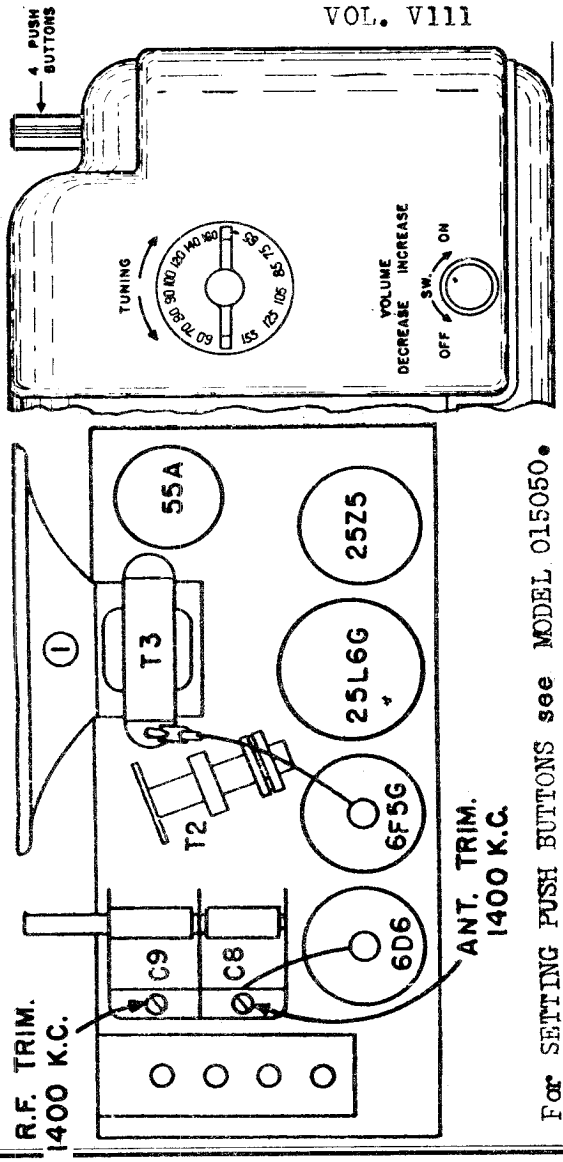
GOODYEAR MODEL 015130.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS WITH A 1000 OHM PER VOLT VOLTMETER.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.




A ground connection is of no importance and therefore has been eliminated




For SETTING PUSH BUTTONS see MODEL 015050.

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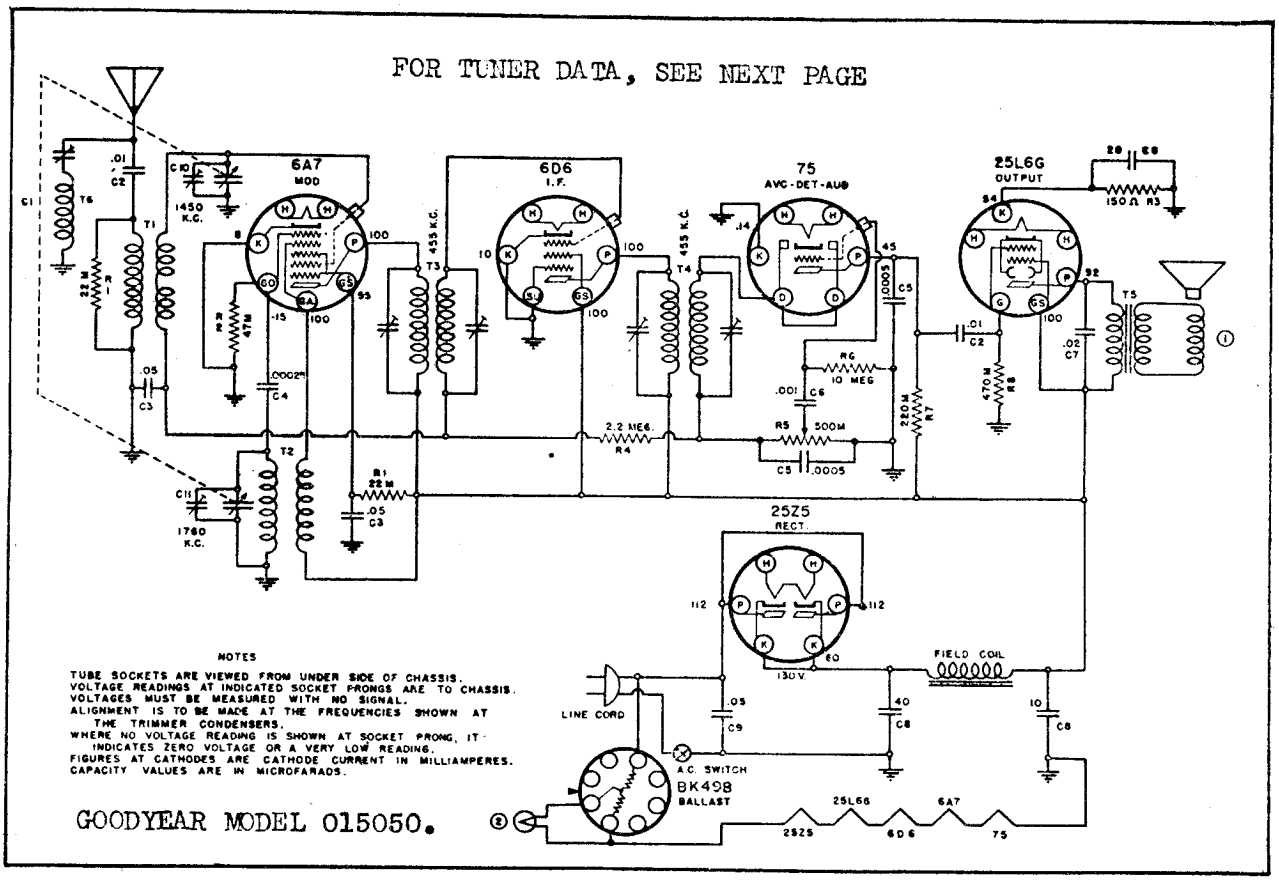
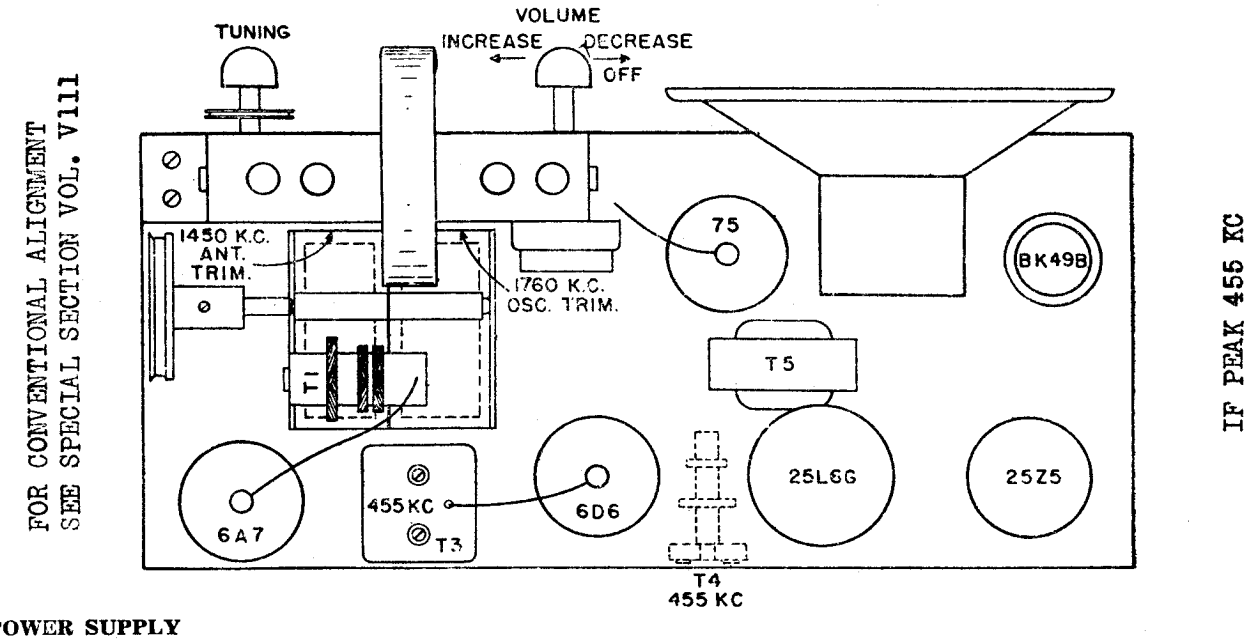
MODEL 015050
Schematic, Voltage
Socket, Trimmers
Alignment

# GOODYEAR TIRE & RUBBER CO., INC.




GOODYEAR MODEL 015050.




FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

IF PEAK 455 KC

**POWER SUPPLY**

The receiver is designed for operation from 105-130 volt Alternating Current (A.C.) supply or a 105-130 volt Direct Current (D.C.) supply. Never connect the receiver to any supply having a higher voltage than that specified on the sticker. If you are not sure of the power supply voltage at your home, your Power Company will furnish the information.

When using a D.C. supply allow sufficient time for tubes to warm up (approximately 1½ minutes); and if at that time the receiver does not operate, remove the line cord plug from the socket and reverse. Replace plug in the reverse position and allow tubes to warm up, at which time the receiver will operate.

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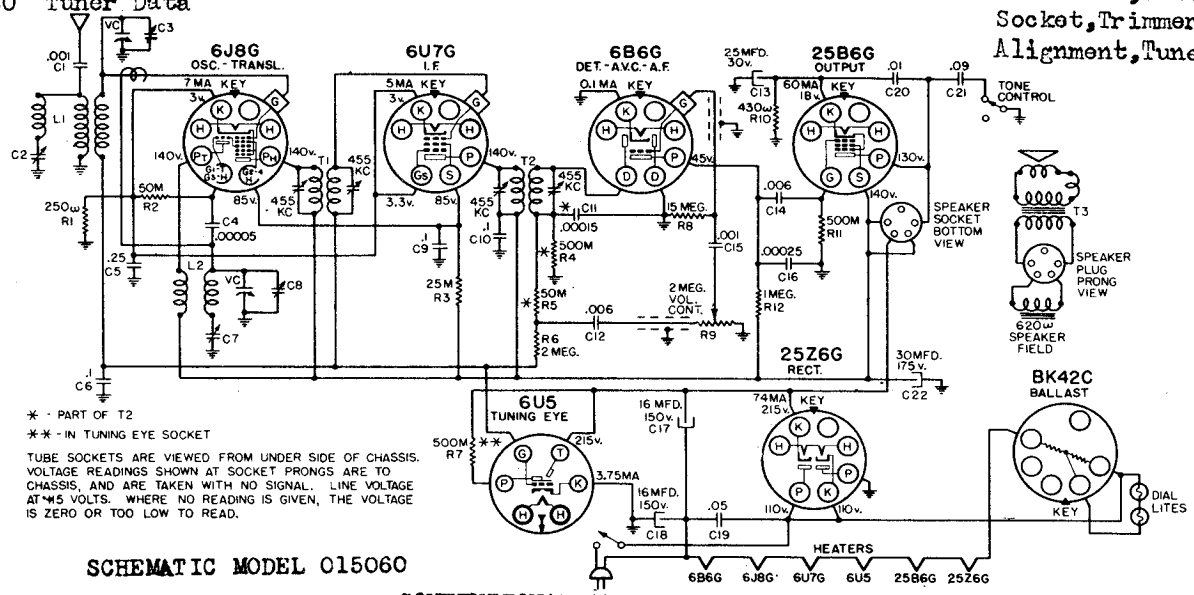
MODELS 015040,015050
015100,015110,015120
015130 Tuner Data

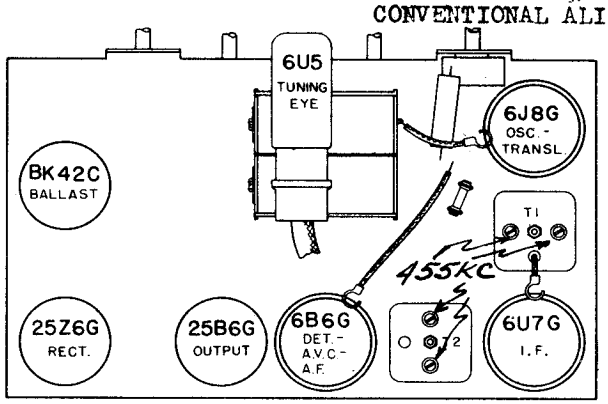
# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 015060
Schematic, Voltage
Socket, Trimmers
Alignment, Tuner

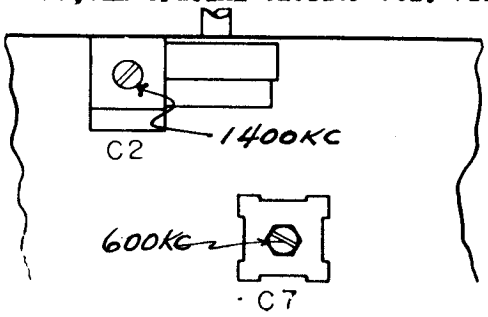



SCHEMATIC MODEL 015060

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII




LOCATION OF PARTS ON TOP OF CHASSIS




GOODYEAR MODEL 015060.
LOCATION OF TRIMMERS
UNDER CHASSIS

## PUSH BUTTON TUNING FOR MODELS 015040, 015050, 015100, 015110

**SETTING PUSH-BUTTONS**

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the highest frequency—that is, your selected station which is tuned in nearest number 160 on the Station Selector Knob.
2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).
3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.
4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of highest frequency and the Call Letter Tab for this station should be in the Push-button nearest the rear of the receiver.

Follow through with this same procedure, setting up the other 3 stations in the order of their frequency—that is, the second station set up will be second highest in frequency and the third station set up will be third highest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner turn the tuning knob to the frequency of the station desired.

## PUSH BUTTON TUNING FOR MODELS 015060, 015120, 015130

**SETTING UP:**

Unscrew (turn counter-clockwise) the push button two or three turns. (Use a token or screwdriver in the button slot to unscrew it, if necessary.) Push the button all the way in. Hold it in firmly and at the same time tune in your desired station. With your station tuned in, lock the adjustment by securely tightening (turn clockwise) the push button knob, using token or screwdriver. Hold the button in while tightening it. Unless the button is tightened securely, the adjustments may slip. Punch out the station's call letters from the sheet supplied and insert the call letters in the recess in the button. Then cover the call letters with one of the clear celluloid discs supplied.

Proceed in the same manner for the remaining buttons. If a change in selection of stations is desired, the old call letters can be removed with a pin inserted in the slot under the call letters.

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MODEL 015070

Schematic, Voltage Socket, Trimmers

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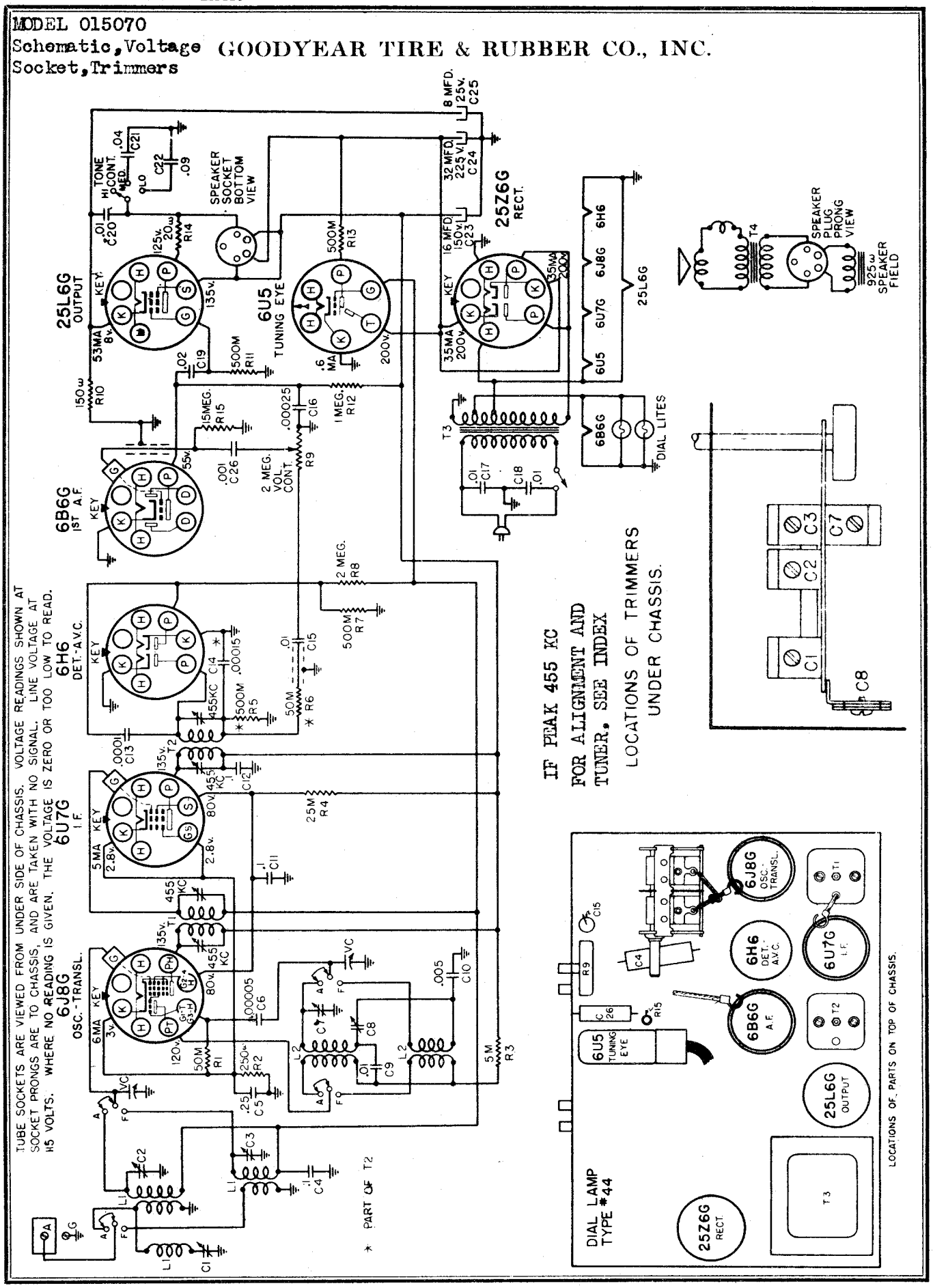
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
6J8G OSC.-TRANSL.
6U7G I.F.
6H6 DET.-A.V.C.
6B6G 1ST A.F.
25L6G OUTPUT
6U5 TUNING EYE
25Z6G RECT.
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
925ω SPEAKER FIELD
DIAL LITES
IF PEAK 455 KC FOR ALIGNMENT AND TUNER, SEE INDEX
LOCATIONS OF TRIMMERS UNDER CHASSIS.
DIAL LAMP TYPE #44
LOCATIONS OF PARTS ON TOP OF CHASSIS.
* PART OF T2

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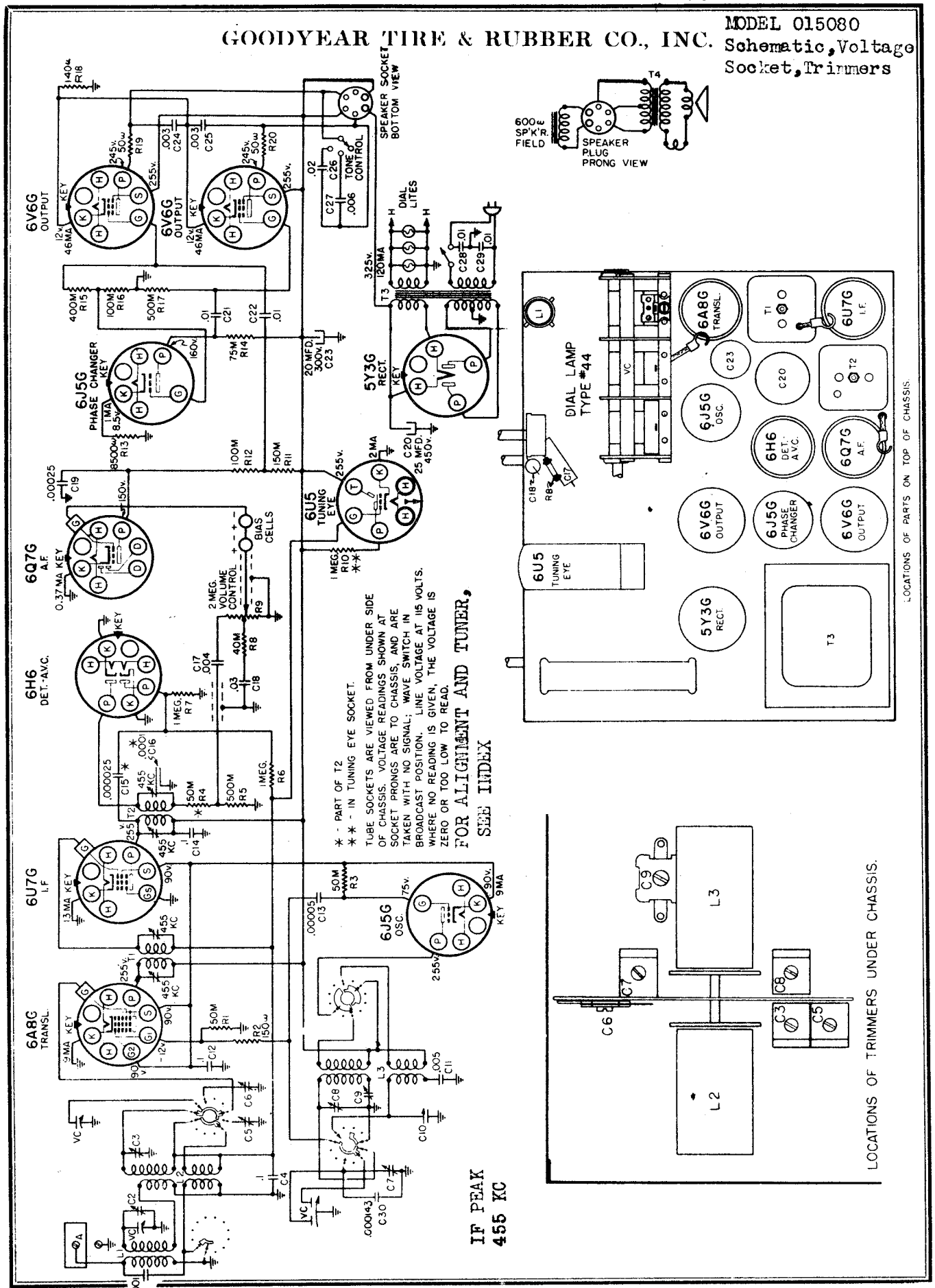
# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 015080
Schematic, Voltage
Socket, Trimmers


6V6G OUTPUT
6V6G OUTPUT
6J5G PHASE CHANGER
5Y3G RECT.
6Q7G A.F.
6H6 DET. A.V.C.
6U5 TUNING EYE
6U7G I.F.
6A8G TRANSL.
6J5G OSC.
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
600Ω SP'K'R FIELD
DIAL LITES
DIAL LAMP TYPE #44
BIAS CELLS
2 MEG. VOLUME CONTROL
TONE CONTROL
* - PART OF T2
** - IN TUNING EYE SOCKET.
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
FOR ALIGNMENT AND TUNER, SEE INDEX
IF PEAK 455 KC
LOCATIONS OF PARTS ON TOP OF CHASSIS.
LOCATIONS OF TRIMMERS UNDER CHASSIS.

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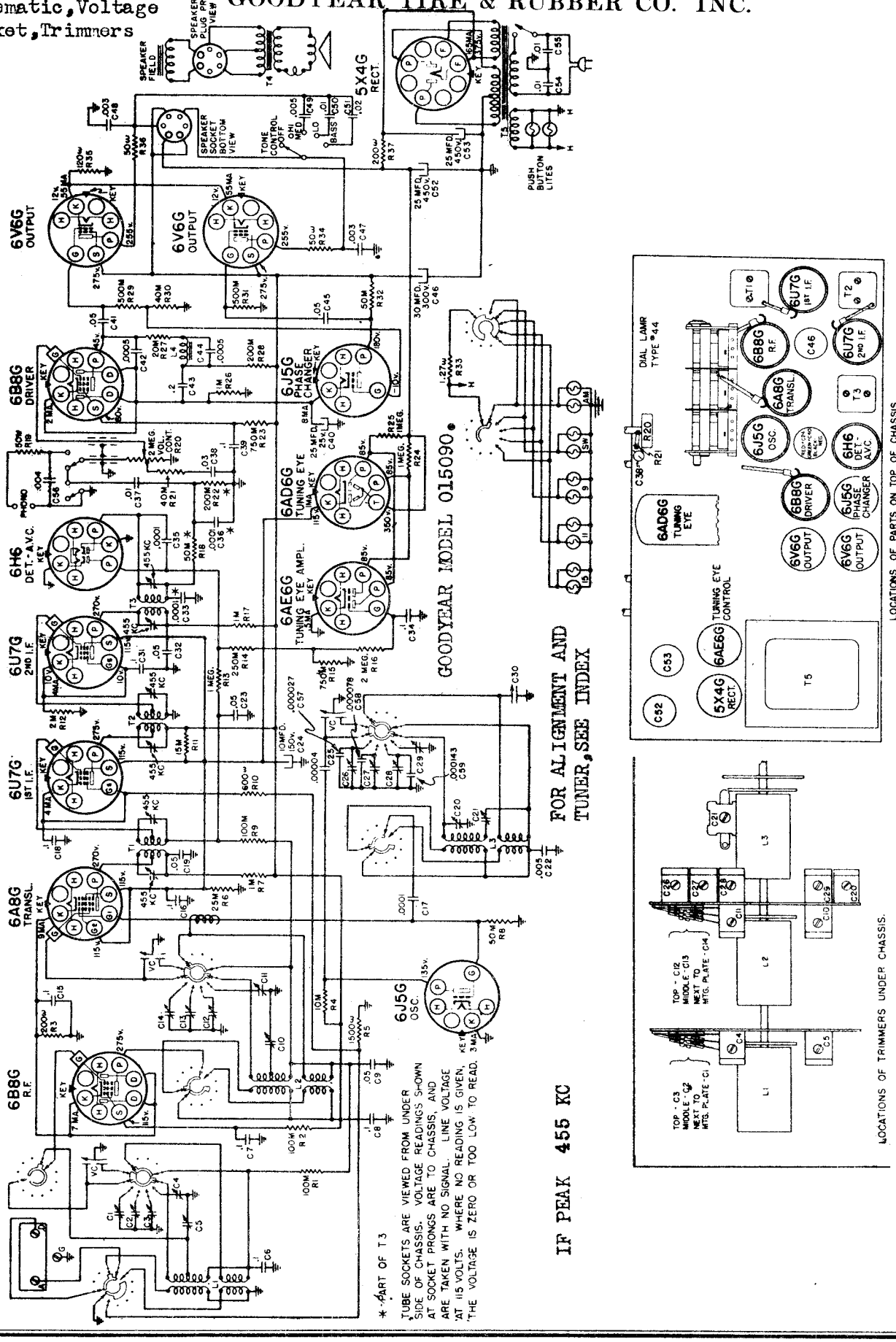
MODEL 015090
Schematic, Voltage
Socket, Trimmers

# GOODYEAR TIRE & RUBBER CO. INC.


GOODYEAR MODEL 015090
FOR ALIGNMENT AND TUNER, SEE INDEX
IF PEAK 455 KC
6V6G OUTPUT
6B8G DRIVER
6J5G PHASE CHANGER
6AD6G TUNING EYE
6H6 DET.-A.V.C.
6U7G 2ND I.F.
6AE6G TUNING EYE AMPL.
6U7G 1ST I.F.
6A8G TRANSL.
6B8G R.F.
6J5G OSC.
5X4G RECT.
SPEAKER FIELD
SPEAKER PLUG PRONG VIEW
SPEAKER SOCKET BOTTOM VIEW
TONE CONTROL
PUSH BUTTON LITES
PHONO
6AE6G TUNING EYE CONTROL
DIAL LAMP TYPE #44
6U7G 1ST I.F.
6B8G R.F.
6A8G TRANSL.
6J5G OSC.
6H6 DET.-AVC.
6U7G 2ND I.F.
LOCATIONS OF PARTS ON TOP OF CHASSIS.
TOP - C12
MIDDLE - C13
NEXT TO MTG. PLATE - C14
TOP - C3
MIDDLE - C2
NEXT TO MTG. PLATE - C1
LOCATIONS OF TRIMMERS UNDER CHASSIS.
* - PART OF T3
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

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# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 015070
MODEL 015080
MODEL 015120
MODEL 015130
Alignment

## GOODYEAR MODEL 015120

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . . 0.37 volts
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully clockwise
Position of Tone Control . . . . . HI
Position of Dial Pointer with variable fully closed . . . . . Horizontal

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION |
|---|---|---|---|---|---|---|
| "AM" | Closed | 455 kc | .1 mfd. | 1G73 Grid | T2, T1 | IF Output IF Input |
| "AM" | 600 kc | 455 kc* | .0002 mfd. | Ant. Term. | C1* | Wave Trap |
| "AM" | 1400 kc | 1400 kc | .0002 mfd. | Ant. Term. | C6, C2 | Osc.,Transl. |
| "AM" | 600 kc(rock) | 600 kc | .0002 mfd. | Ant. Term. | C7 | Padder |
| "SW" | 16 mc(rock) | 16 mc | 400 ohms | Ant. Term. | C4 | Transl. |

IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

PUSH BUTTON TUNING

FOR SETTING UP PUSH BUTTONS
SEE GOODYEAR MODEL 015060

## GOODYEAR MODEL 015130

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across Loud speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . . 0.32 volts
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully clockwise
Position of Tone Control . . . . . HI
Position of Dial Pointer with variable fully closed . . . . . Horizontal. To be along first heavy line below 550 kc

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION |
|---|---|---|---|---|---|---|
| "AM" | Closed | 455 kc | .1 mfd. | 6D8G Grid | T2, T1 | IF Output IF Input |
| "AM" | 900 kc | 455 kc* | .0002 mfd. | Ant. Term. | C1* | Wave Trap |
| "AM" | 1500 kc | 1500 kc | .0002 mfd. | Ant. Term. | C5, C2 | Os.,Transl. |
| "AM" | 600 kc(rock) | 600 kc | .0002 mfd. | Ant. Term. | C6 | Padder |
| "SW" | 15 mc(rock) | 15 mc | 400 ohms | Ant. Term. | C3 | Transl. |

IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

## GOODYEAR MODEL 015070

ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . . 1.22 volts
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully clockwise
Position of Tone Control . . . . . HI
Position of Dial Pointer with variable fully closed . . . . . Center of first mark to left of 550 kc calibration mark.

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION |
|---|---|---|---|---|---|---|
| "AM" | Closed | 455 kc | .1 mfd. | 6J8G Grid | T2, T1 | IF Output IF Input |
| "AM" | 600 kc | 455 kc* | .0002 mfd. | Ant. Term. | C1* | Wave Trap |
| "AM" | Fully open | 1720 kc | .0002 mfd. | Ant. Term. | C7 | Oscillator |
| "AM" | 1400 kc | 1400 kc | .0002 mfd. | Ant. Term. | C2 | Translator |
| "AM" | 600 kc (rock) | 600 kc | .0002 mfd. | Ant. Term. | C6 | Padder |
| "SW" | 15 mc (rock) | 15 mc | 400 ohms | Ant. Term. | C3 | Translator |

IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 455 kc is known, the generator should be adjusted to the frequency of that station instead of to 455 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

## GOODYEAR MODEL 015080

ALIGNMENT PROCEDURE

PRELIMINARY.

Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . . 0.98 volts
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully clockwise
Position of Tone Control . . . . . HI
Position of Dial Pointer with variable fully closed . . . . . Center of block to left of 550 kc calibration mark.

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION |
|---|---|---|---|---|---|---|
| "AM" | Closed | 455 kc | .1 mfd. | 6A8G Grid | T2, T1 | IF Output IF Input |
| "SW" | 15 mc(rock) | 15 mc | 400 ohms | Ant. Term. | C5 | Translator |
| "9MC" | 9.55 mc | 9.55 mc | 400 ohms | Ant. Term. | C7* C6 | Oscillator Translator |
| "AM" | 1400 kc | 1400 kc | .0002 mfd. | Ant. Term. | C8,C3,C2 | Osc.,Trans,Ant. |
| "AM" | 900 kc(rock) | 800 kc | .0002 mfd. | Ant. Term. | C9 | Padder |

IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

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MODELS 015080 and 015090

## PUSH BUTTON TUNING

**SETTING UP:**

Leave the radio turned on for about 15 minutes before adjusting the push buttons. This "warming up" period will insure permanent and accurate settings.

1. Make a list of the stations that you want to set up for push button tuning. It is helpful to arrange the stations in the order of their frequency (kilocycles); that is, the station of lowest frequency will be #1, the station of next higher frequency #2, etc. The top left push button can be used for station #1, the lower left one for station #2, the next upper one for station #3, etc. If you wish, short wave stations that can be tuned in on a SPREAD BAND scale can be set up for push button tuning. The stations selected must give strong and reliable reception.

2. Remove the four screws that hold the plate through which the push buttons protrude, and remove the plate. (This plate is called the "escutcheon".)

3. Push the tuning knob in and turn it so that the dial pointer comes to the left end of the dial. Engage the small screw driver, supplied, with the slotted shaft that is between the tuning knob and the push buttons. Unlock the mechanism by pushing the shaft in and unscrewing it (turn counter-clockwise) about four turns. Then remove the screw driver.

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is tuned in exactly, as indicated by the tuning eye. Be as exact as possible in tuning your station since this will determine how accurately your station will be tuned whenever you use the push button. Then let go of the push button before turning the tuning knob again. If properly done, the tuning eye indication will not change when you let go of the push button.

5. Push in your #2 button. Hold it in firmly and tune in your #2 station accurately. Then let go of the push button; then the tuning knob. Proceed in the same manner for the other stations on your list.

CAUTION: Use the small screw driver supplied for performing the next operation. Use of a larger screw driver than the one supplied will result in too much force being applied. The locking mechanism must not be turned too far to the right. Otherwise it may be impossible to obtain proper operation of the push buttons and the mechanism is liable to be permanently damaged.

6. After the last station has been set up, lock the mechanism by pushing the slotted shaft in and securely tightening it (turn clockwise), using the small screw driver, supplied. (Pushing the slotted shaft in will release the last push button. The dial pointer will move to the right end of the dial as the slotted shaft is turned.) Then remove the screw driver. If the slotted shaft remains pushed in when the screw driver is removed, turning it back and forth very slightly will release it.

After locking the mechanism, test the setting of each button by pushing it in. Then see if the station can be tuned still more accurately by using the tuning knob. Increased accuracy of tuning with the knob will be indicated by a narrower shadow of the tuning eye. If you find any stations that have not been correctly set up, unlock the mechanism, as described in Step 3, and readjust the setting. Be sure to lock the mechanism again before tuning any stations.

7. Punch out the call letters of your desired stations from the call letter sheets supplied. Insert the call letters in the recesses in the front of the push buttons. Cover the call letters with the clear celluloid tabs supplied. Replace the escutcheon.

8. You may change your choice of stations at any time by unlocking the mechanism as described in Step 3 and adjusting the button to the new station, as described in Step 4. Then relock the mechanism as described in Step 6. The call letters of the new station should be inserted in the proper push button.

**OPERATION:**

Push the button, indicated for your desired station, all the way in. Your station then will be tuned in. If you have selected short wave stations for push button tuning, be sure the band switch is turned to the proper band. The button will remain part way in, indicating what station is tuned in, until you push another button or until you push the tuning knob.

GOODYEAR 015070

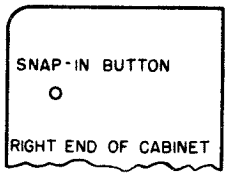


FIG. 1

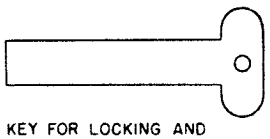


FIG. 2

**SETTING UP:**

Leave the radio turned on for about 15 minutes before adjusting the push buttons. This "warming up" period will insure permanent and accurate settings.

1. Make a list of the stations that you want to set up for push button tuning. It is advisable, but not necessary, to arrange the stations in the order of their frequency (kilocycles); that is, the station of lowest frequency will be #1, the station of next higher frequency #2, etc. The top left push button can be used for station #1, the lower left one for station #2, the next upper one for station #3, etc. If you wish, short wave stations can be set up for approximate push button tuning and then tuned accurately with the tuning knob. The stations selected must give strong and reliable reception.

2. Remove the four screws that hold the plate through which the push buttons protrude, and remove the plate. (This plate is called the "escutcheon".) If your radio is a table model (not a console), remove the snap-in button at the right side of the cabinet. See Fig 1.

3. Push the tuning knob in and turn it so that the dial pointer comes to the right end of the dial. If your radio is a table model, a key, illustrated in Fig. 2, will be found in the Instruction Leaflet envelope. Insert this key in the hole in the side of the cabinet from which the snap-in button was removed and engage the key with the slot at the end of the push button locking mechanism. Unscrew (turn counter-clockwise) the key a few turns, unlocking the mechanism. (A screw driver can be used for unlocking the mechanism instead of the key supplied.)

If yours is a console model, the mechanism can be unlocked by reaching in from the back of the cabinet and unscrewing (turning counter-clockwise) the wing nut, at the end of the mechanism, a few turns. (This can be done by hand.)

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is tuned in exactly. Then let go of the push button, making sure not to turn the tuning knob until you have let go of the button. (Turning the knob while the button is pushed in would spoil the accuracy of the adjustment.) Be as exact as possible in tuning your station since this will determine how accurately your station will be tuned whenever you use the push button.

5. Push in your #2 button. Hold it in firmly and tune in your #2 station accurately. Then let go of the push button and then the tuning knob. Proceed in the same manner for the other stations on your list.

6. When all of the stations have been set up, push the tuning knob in and turn it so that the dial pointer comes to the left end of the dial. Then lock the mechanism by tightening (turning clockwise) the wing nut for console models or by using the key for table models. If yours is a table model, replace the snap-in button in the side of the cabinet.

7. Punch out the call letters of your desired stations from the call letter sheets supplied. Insert the call letters in the celluloid holders at the back of the escutcheon. Be sure to insert the call letters so that they are opposite their respective push buttons. Then replace the escutcheon.

8. You may change your choice of stations at any time by unlocking the mechanism as described in Step 3 and adjusting the button to the new station, as described in Step 4. Then relock the mechanism as described in Step 6. The call letters of the new station should be inserted in the call letter holder in their proper position.

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MODEL 015090
Alignment
MODEL 015120
Socket, Trimmers

# GOODYEAR TIRE & RUBBER CO., INC.

ALIGNMENT GOODYEAR MODEL 015090

Output meter connection ..... Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts.....1.06 volts*
Generator ground lead connection .....Receiver chassis
Dummy antenna value to be in series with generator output, See chart below
Connection of generator output lead..... See chart below
Generator modulation..... 30%, 400 cycles
Position of volume control..... Fully clockwise
Position of tone control..... HI
Position of dial pointer(variable closed) .... Center of block to left of 550 kc calibration mark.

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION |
|---|---|---|---|---|---|---|
| "AM" | Closed | 455 kc | .1 mfd. | 6A8G Grid | T3, T2, T1 | IF Output, IF Interstage, IF Input. |
| "SW" | 18 mc | 18 mc | 400 ohms | Ant. Term. | C39* | Oscillator |
| "SW" | 15 mc (rock) | 15 mc | 400 ohms | Ant. Term. | C11, C4 | Translator, RF |
| "9" | 9.55 mc | 9.55 mc | 400 ohms | Ant. Term. | C38*<br>C12<br>C3 | Oscillator<br>Translator<br>RF |
| "11" | 11.7 mc | 11.7 mc | 400 ohms | Ant. Term. | C37*<br>C13<br>C2 | Oscillator<br>Translator<br>RF |
| "15" | 14.9 mc | 14.9 mc | 400 ohms | Ant. Term. | C36*<br>C14<br>C1 | Oscillator<br>Translator<br>RF |
| "AM" | 1400 kc | 1400 kc | .0002 mfd. | Ant. Term. | C30<br>C10<br>C5 | Oscillator<br>Translator<br>RF |
| "AM" | 600 kc (rock) | 600 kc | .0002 mfd. | Ant. Term. | C31 | Padder |

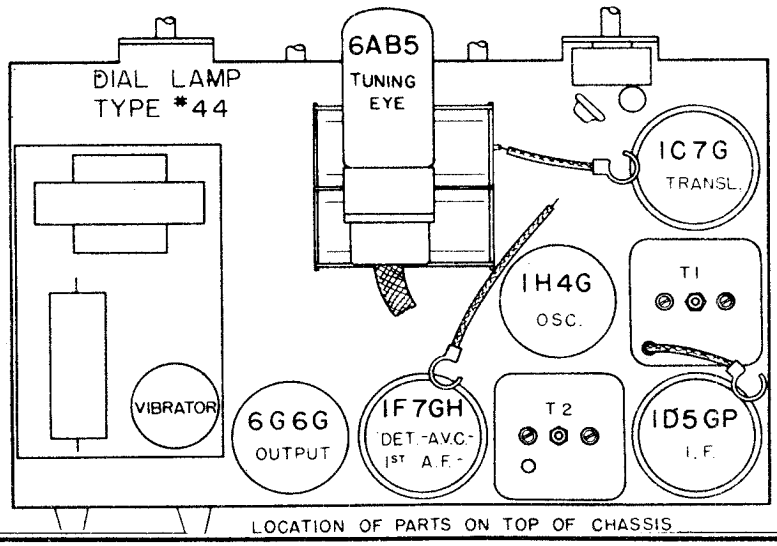
## IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

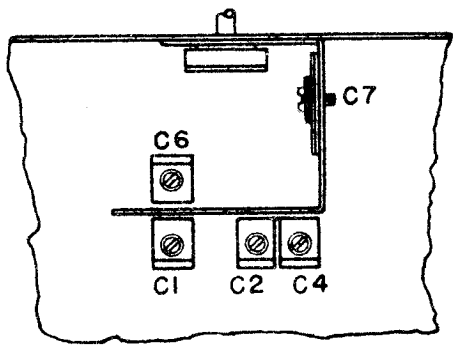
Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.



LOCATION OF PARTS ON TOP OF CHASSIS

MODEL 015120



LOCATIONS OF TRIMMERS UNDER CHASSIS

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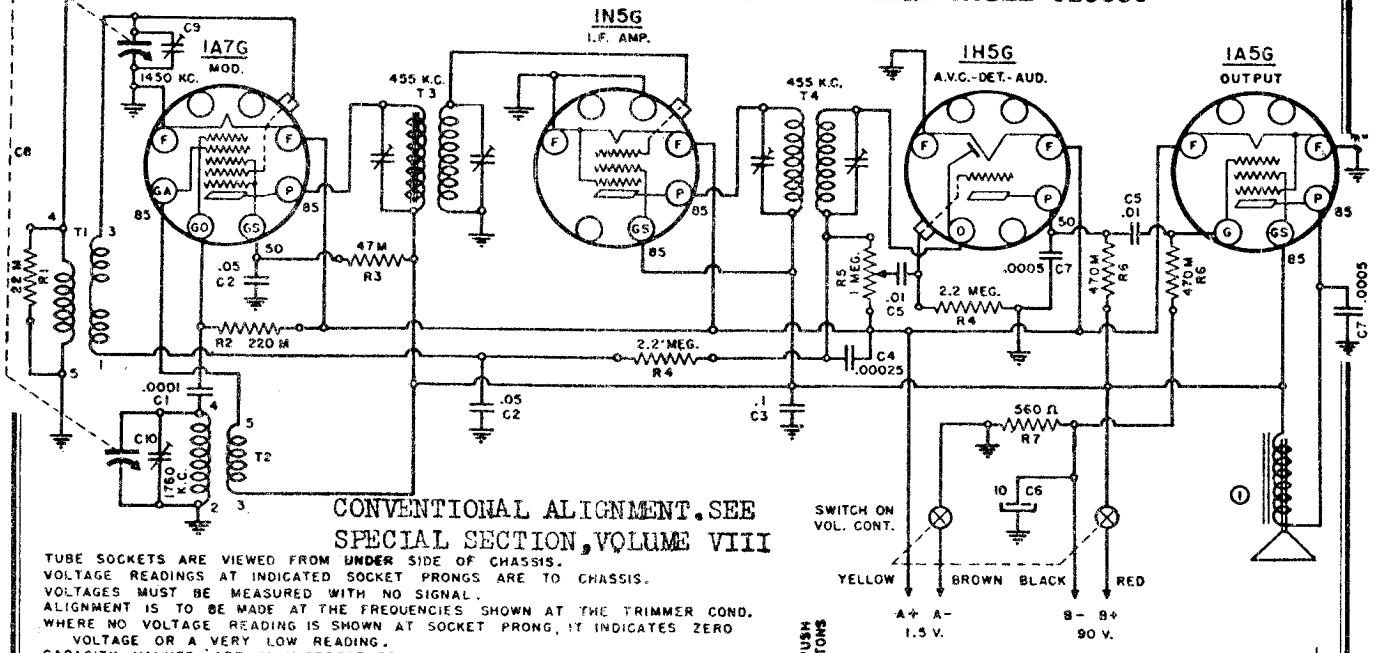
MODEL 015100
Schematic, Voltage

# GOODYEAR TIRE & RUBBER CO., INC.

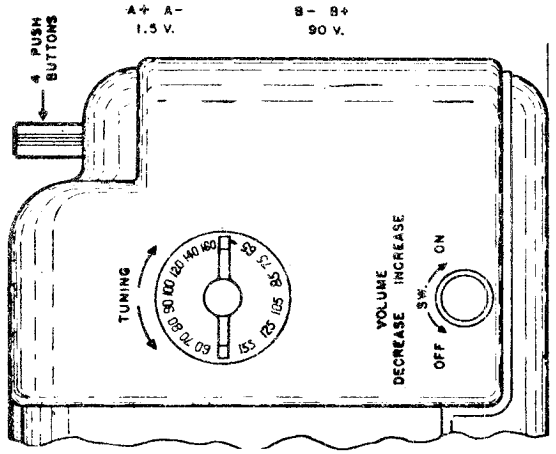
Socket, Trimmers
Alignment

**FOR SETTING UP PUSH BUTTONS - SEE GOODYEAR MODEL 015050**



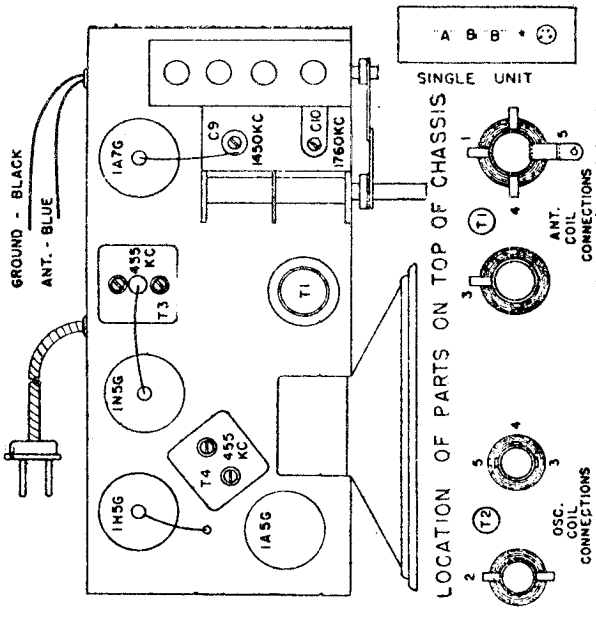

CONVENTIONAL ALIGNMENT. SEE SPECIAL SECTION, VOLUME VIII

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER COND.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY VALUES ARE IN MICROFARADS.




| Schematic Location | Part No. | Description | Price Each |
|---|---|---|---|
| | 10141463 | Booklet—Call Letter | .25 |
| | 101419422 | Booklet—Instruction | .25 |
| | 1011242184 | Cabinet—Molded, Ivory | 4.70 |
| | 1011242184 | Cabinet—Molded, Walnut | 2.65 |
| | 1011323130 | Cable—Battery | .62 |
| | 101373509 | Clips—Grid ....Doz. | .15 |
| C1 | | Condenser—.0001 mfd. Mica | .25 |
| C2 | | Condenser—.05 mfd. 200 V. Tub. | .25 |
| C3 | | Condenser—.1 mfd. 200 V. Tub. | .25 |
| C4 | | Condenser—.00025 mfd. Mica | .25 |
| C5 | | Condenser—.01 mfd. 400 V. Tub. | .25 |
| C6 | 1012118235 | Condenser—Elec. 10 mfd. 35 Volts | .50 |
| C7 | | Condenser—.0005 mfd. Mica | .25 |
| C8 | 1012019134 | Condenser—Variable C9 and C10 | .80 |
| R5 | 1012524126 | Control—Volume 1 meg ohm | .90 |
| | 101374710 | Grommet—Rubber ⅜" ....Doz. | .20 |
| | 101374700 | Grommet—Rubber ¼" ....Doz. | .20 |
| | 1014067367 | Knob—Tuning, Ivory or Cream & Tan | .38 |
| | 1014052116 | Knob—Volume, Ivory or Cream & Tan | .15 |
| | 1012752129 | Knob—(Push Button) & Stem, Ivory or Cream and Tan | .15 |
| | 1012739251 | Lever—Driven | .15 |
| | 1012739252 | Lever—Driver | .10 |
| | 1012739253 | Link—Connecting | .05 |
| | 10137862 | Lockwasher—⅜" ....Doz. | .05 |
| | 1013756102 | Nut—Hex ⅜" ....Doz. | .15 |
| | 1013783118 | Panel—Back | .20 |
| R1 | | Resistor—22 M ohm 1/3 W | .20 |
| R2 | | Resistor—220 M ohm 1/3 W | .20 |
| R3 | | Resistor—47 M ohm 1/3 W | .20 |
| R4 | | Resistor—2.2 meg ohm 1/3 W | .20 |
| R6 | | Resistor—470 M ohm 1/3 W | .20 |
| R7 | | Resistor—560 ohm 1/3 W | .20 |
| | 10127654 | Rivets—Shoulder ....Doz. | .10 |
| | 1012774117 | Screws—Set 8/32 hex hd. cup. pt. ....Doz. | .20 |
| | 101386855 | Socket—8 Prong | .10 |
| 1 | 10151179260 | Speaker—5" Permanic | 2.40 |
| | 1012770109 | Spring | .05 |
| T1 | 1011810258 | Transformer—Antenna | .75 |
| T2 | 1011810257 | Transformer—Oscillator | .75 |
| T3 | 1015510251 | Transformer—1st I.F. | 1.50 |
| T4 | 1015710259 | Transformer—2nd I.F. | 1.25 |
| | 1013722112 | Tri-points—Back panel ....Doz. | .15 |
| | 101289956 | Tuner | 1.30 |

ALL PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

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MODEL 015110
Schematic, Voltage
Socket, Trimmers
Alignment

# GOODYEAR TIRE & RUBBER CO., INC.

| Schematic Location | Part No. | Description | Selling Price Each |
|---|---|---|---|
| | 1011323128 | Cable—Battery | .45 |
| | 101373509 | Caps—Grid Small ..... Doz. | .10 |
| | 1012739257 | Drum & Lever Assem. | .40 |
| | 1014052127 | Knob—Tuning, Ivory or Cream & Tan | .15 |
| | 1014052132 | Knob—Volume, Ivory or Cream & Tan | .15 |
| | 101318901 | Lamp—Pilot No. 40 | .15 |
| | 1012739248 | Lever—Driver | .05 |
| | 1012739247 | Link—Connecting | .05 |
| L3 | 1011633218 | Choke—Filament | .20 |
| L2 | 1011610246 | Choke—R.F. (B) | .20 |
| L1 | 1011633217 | Choke—Vibrator | .20 |
| | 101373516 | Clamps—Battery | .20 |
| C1 | 1012216127 | Condenser—Buffer .004 mfd. 1000V | .25 |
| C2 | | Condenser—.05 mfd. 400V Tub. | .25 |
| C3 | | Condenser—.004 mfd. 400V Tub. | .25 |
| C4 | | Condenser—.001 mfd. 400V Tub. | .25 |
| C5 | | Condenser—.5 mfd. 200V Tub. | .25 |
| C6 | | Condenser—.25 mfd. 200V Tub. | .25 |
| C7 | | Condenser—.1 mfd. 200V Tub. | .25 |
| C8 | | Condenser—.05 mfd. 200V Tub. | .25 |
| C9 | | Condenser—.0005 mfd. Mica | .25 |
| C10 | | Condenser—.00025 mfd. Mica | .25 |
| C11 | | Condenser—.0001 mfd. Mica | .25 |
| C12 | 1012118236 | Condenser—Electrolytic 40x16 mfd. 200V | 1.00 |
| C13 | 1012019132 | Condenser—Variable C14 & C15 | 2.05 |
| | 1012524124 | Control—Volume 500M ohm | .75 |
| 1 | | 1015179256 Speaker—5" P.M. with | 5.00 |
| T5 | * | Output Transformer | |
| | 1012770110 | Spring—Drive | .05 |
| | 1012670111 | Spring—Ribbon | .05 |
| | 1012770105 | Spring—String | .05 |
| T1 | 1011810239 | Transformer—Antenna | .45 |
| T2 | 1011810240 | Transformer—Oscillator | .30 |
| T3 | 1015510253 | Transformer—1st I.F. | 1.25 |
| T4 | 1015710252 | Transformer—2nd I.F. | .80 |
| T6 | 1016580160 | Transformer—Power, Virb. | 1.75 |
| | 1013722112 | Tripoints—Back Panel ..... Doz. | .15 |
| | 1013722103 | Tripoints—Ribbon ..... Doz. | .15 |
| | 10127957 | Tuner—4 Button | 1.20 |
| 2 | 1016234103 | Vibrator | 4.00 |
| | 10128866 | Washers—"C" ..... Doz. | .10 |

*When ordering Speaker output transformer refer to number stamped on speaker frame.

| | | | |
|---|---|---|---|
| | 1012752131 | Push Button & Stems, Cream & Tan or Ivory | .15 |
| R1 | | Resistors—10 meg ohm 1/3W | .20 |
| R2 | | Resistors—1 meg ohm 1/3W | .20 |
| R3 | | Resistors—220M ohm 1/3W | .20 |
| R4 | | Resistors—47M ohm 1/3W | .20 |
| R5 | | Resistors—22M ohm 1/3W | .20 |
| R6 | | Resistors—15M ohm 1/3W | .20 |
| R7 | | Resistors—100 ohm 1/3W | .20 |
| R8 | | Resistors—1500 ohm 1/2W | .20 |
| R9 | | Resistors—220 ohm 1/2W | .20 |

| | | |
|---|---|---|
| 10146844 | Ribbon—Eyelet Assem. (Pointer) | .15 |
| 101276504 | Rivets—Shoulder ..... Doz. | .10 |
| 10127845 | Roller & Shaft Assem. | .35 |
| 1012667394 | Scale-Dial | .15 |
| 1012774117 | Screws—Set 8/32x3/8 hex. hd. cup. pt. ..... Doz. | .10 |
| 10128846 | Shaft Assem.—Drive | .35 |
| 10149717 | Shield—Tube | .10 |
| 1013868852 | Socket—6 Prong | .10 |
| 1013868855 | Socket—8 Point | .10 |
| 10138875 | Socket—Pilot Light | .10 |

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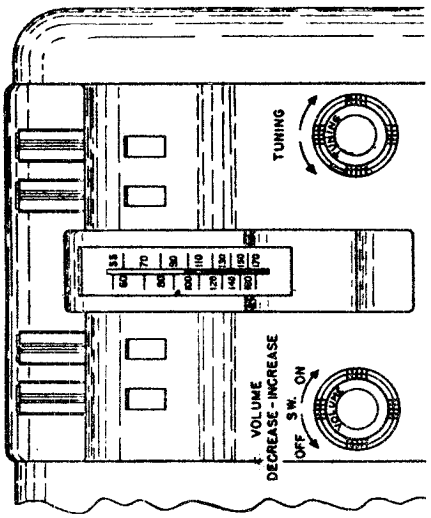
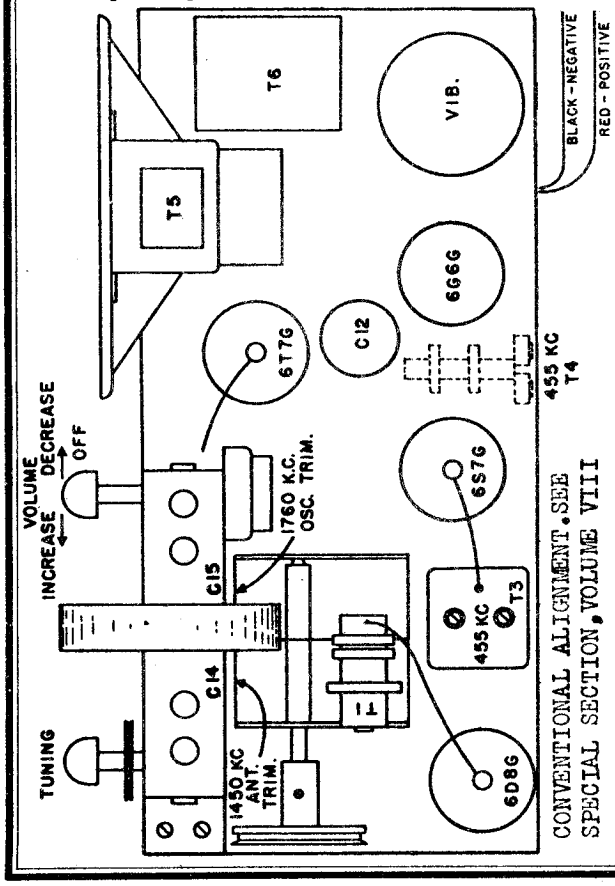
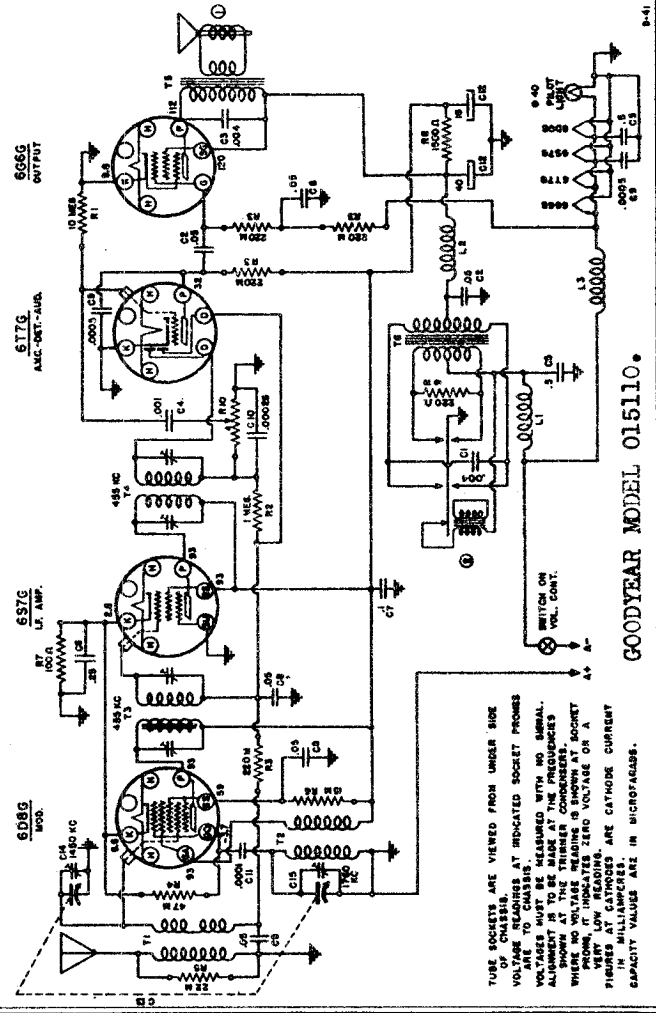



CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION, VOLUME VIII

FOR SETTING UP PUSH BUTTONS - SEE GOODYEAR MODEL 015050

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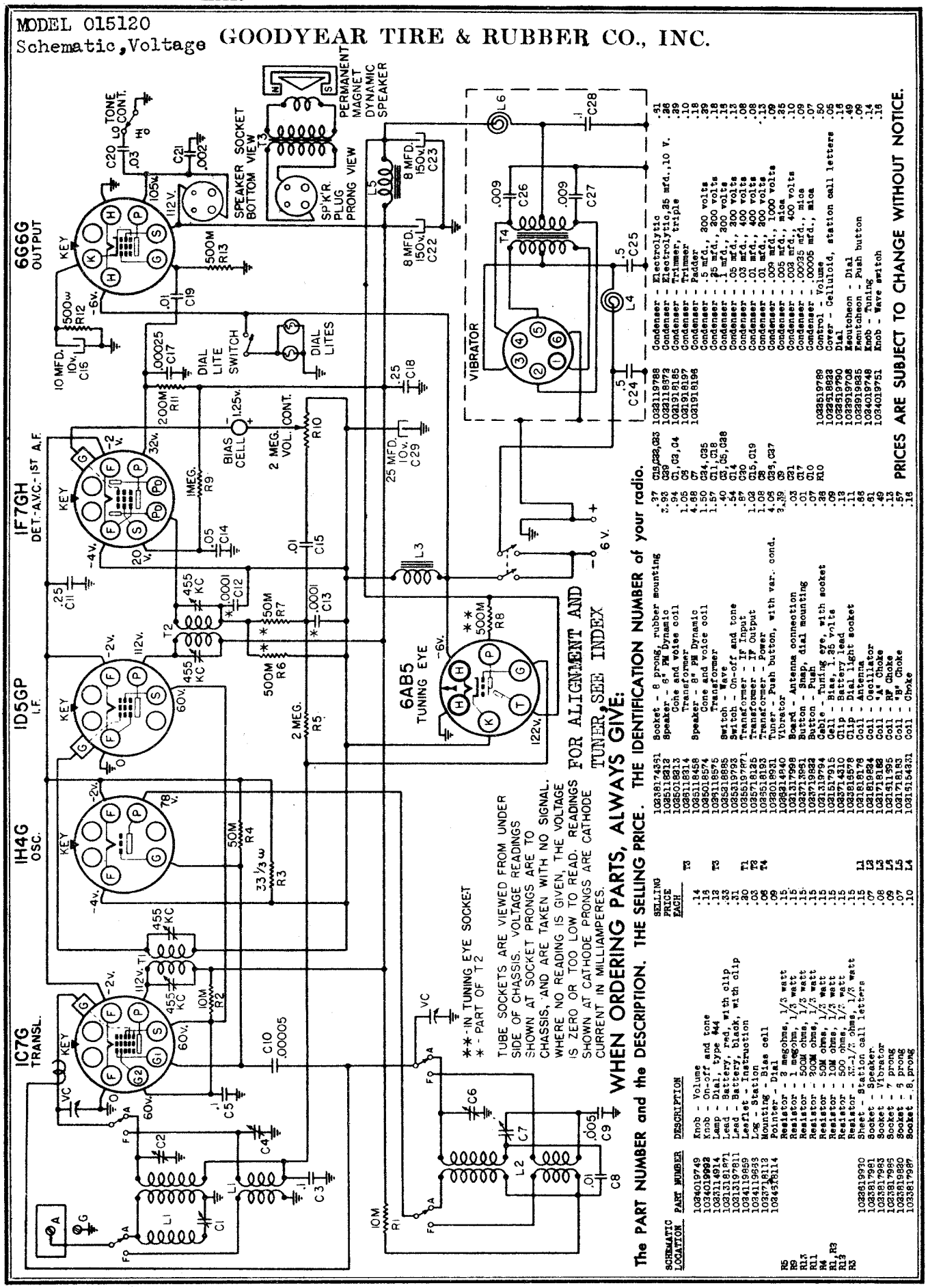
MODEL 015120
Schematic, Voltage

# GOODYEAR TIRE & RUBBER CO., INC.


6G6G OUTPUT
IF7GH DET.-AVC.-1ST A.F.
ID5GP I.F.
1H4G OSC.
1C7G TRANSL.
6AB5 TUNING EYE
VIBRATOR
SPEAKER SOCKET BOTTOM VIEW
PERMANENT MAGNET DYNAMIC SPEAKER
SPK'R. PLUG PRONG VIEW
TONE CONT.
DIAL LITE SWITCH
DIAL LITES
BIAS CELL
2 MEG. VOL. CONT.
TUNER, SEE INDEX
FOR ALIGNMENT AND
6 V.
**-IN TUNING EYE SOCKET
*- PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. READINGS SHOWN AT CATHODE PRONGS ARE CURRENT IN MILLIAMPERES.

## WHEN ORDERING PARTS, ALWAYS GIVE:

**The PART NUMBER and the DESCRIPTION. THE SELLING PRICE. THE IDENTIFICATION NUMBER of your radio.**

| SCHEMATIC LOCATION | PART NUMBER | DESCRIPTION | | SELLING PRICE EACH |
|---|---|---|---|---|
| | 1038174331 | Socket - 8 prong, rubber mounting | | .37 |
| | 1038118212 | Speaker - 8" PM Dynamic | | 2.93 |
| | 1038018313 | Cone and voice coil | | .94 |
| | 1038118314 | Transformer | | 1.05 |
| | 1038118458 | Speaker - 8" PM Dynamic | | 4.88 |
| | 1038018574 | Cone and voice coil | | 1.50 |
| | 1039118575 | Transformer | | 1.57 |
| | 1038218885 | Switch - Wave | | .40 |
| | 1038319793 | Switch - On-off and tone | | .54 |
| | 1038519797 | Transformer - IF Input | | .87 |
| | 1038718125 | Transformer - IF Output | | 1.02 |
| | 1038518193 | Transformer - Power | | 1.08 |
| | 1038018931 | Tuner - Push button, with var. cond. | | 4.05 |
| | 1038114940 | Vibrator | | 3.39 |
| | 1038117998 | Board - Antenna connection | | .03 |
| | 1038713981 | Button - Snap, dial mounting | | .01 |
| | 1038719822 | Button - Push | | .07 |
| | 1038119794 | Cable - Tuning eye, with socket | | .28 |
| | 1038517915 | Cell - Bias, 1.25 volts | | .26 |
| | 1038714310 | Clip - Battery lead | | .09 |
| | 1038818578 | Clip - Dial light socket | | .13 |
| | 1038118179 | Coil - Antenna | | .11 |
| | 1038619824 | Coil - Oscillator | | .66 |
| | 1038718182 | Coil - 1st Choke | | .61 |
| | 1038119825 | Coil - IF Choke | | .49 |
| | 1038718183 | Coil - RF Choke | | .13 |
| | 1038154371 | Coil - Choke | | .97 |
| | | | | .18 |
| | | | | .91 |
| | | | | .26 |
| | | | | .29 |
| | | | | .10 |
| | | | | .18 |
| | | | | .29 |
| | | | | .18 |
| | | | | .13 |
| | | | | .18 |
| | | | | .08 |
| | | | | .08 |
| | | | | .13 |
| | | | | .09 |
| | | | | .25 |
| | | | | .10 |
| | | | | .09 |
| | | | | .07 |
| | | | | .50 |
| | | | | .06 |
| | | | | .18 |
| | | | | .49 |
| | | | | .06 |
| | | | | .14 |
| | | | | .18 |
| | 1038119788 | Condenser - Electrolytic | C19,C22,C23 | |
| | 1038118373 | Condenser - Electrolytic,25 mfd.,10 v. | C29 | |
| | 1038118185 | Condenser - Trimmer, triple | C1,C3,C4 | |
| | 1038118197 | Condenser - Trimmer | C6 | |
| | 1038118196 | Condenser - Padder | C7 | |
| | | Condenser - .5 mfd., 200 volts | C34,C35 | |
| | | Condenser - .25 mfd., 200 volts | C11,C18 | |
| | | Condenser - .1 mfd., 200 volts | C3,C5,C28 | |
| | | Condenser - .05 mfd., 300 volts | C14 | |
| | | Condenser - .03 mfd., 400 volts | C30 | |
| | | Condenser - .01 mfd., 400 volts | C15,C19 | |
| | | Condenser - .01 mfd., 200 volts | C8 | |
| | | Condenser - .009 mfd., 1000 volts | C33,C37 | |
| | | Condenser - .005 mfd., mica | C9 | |
| | | Condenser - .003 mfd., 400 volts | C21 | |
| | | Condenser - .00035 mfd., mica | C17 | |
| | | Condenser - .00005 mfd., mica | C10 | |
| | 1038519789 | Control - Volume | R10 | |
| | 1038518823 | Cover - Celluloid, station call letters | | |
| | 1038519790 | Dial | | |
| | 1038919708 | Escutcheon - Dial | | |
| | 1038919835 | Escutcheon - Push button | | |
| | 1038019748 | Knob - Tuning | | |
| | 1038019751 | Knob - Wave switch | | |
| R1 | 1038819930 | Resistor - 10 megohms, 1/3 watt | | .15 |
| R2 | 1038719981 | Resistor - 1 megohm, 1/3 watt | | .15 |
| R3 | 1038719965 | Resistor - 500 ohms, 1/3 watt | | .15 |
| R4 | 1038719995 | Resistor - 50M ohms, 1/3 watt | | .15 |
| R5,R8 | 1038819820 | Resistor - 50M ohms, 1/3 watt | | .15 |
| R6 | 1038719987 | Resistor - 500 ohms, 1/3 watt | | .15 |
| R7 | | Resistor - 2.2-1/2 ohms, 1/3 watt | | .15 |
| | 1038819930 | Sheet - Station call letters | | .15 |
| | 1038719981 | Socket - Speaker | | .07 |
| | 1038719965 | Socket - Vibrator | | .08 |
| | 1038719995 | Socket - 7 prong | | .09 |
| | 1038819820 | Socket - 5 prong | | .07 |
| | 1038719987 | Socket - 8 prong | | .10 |

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# GOODYEAR TIRE & RUBBER CO., INC.

MODEL 100502
Double Eagle
Above Serial 42,000
Schematic, Changes, Tuner

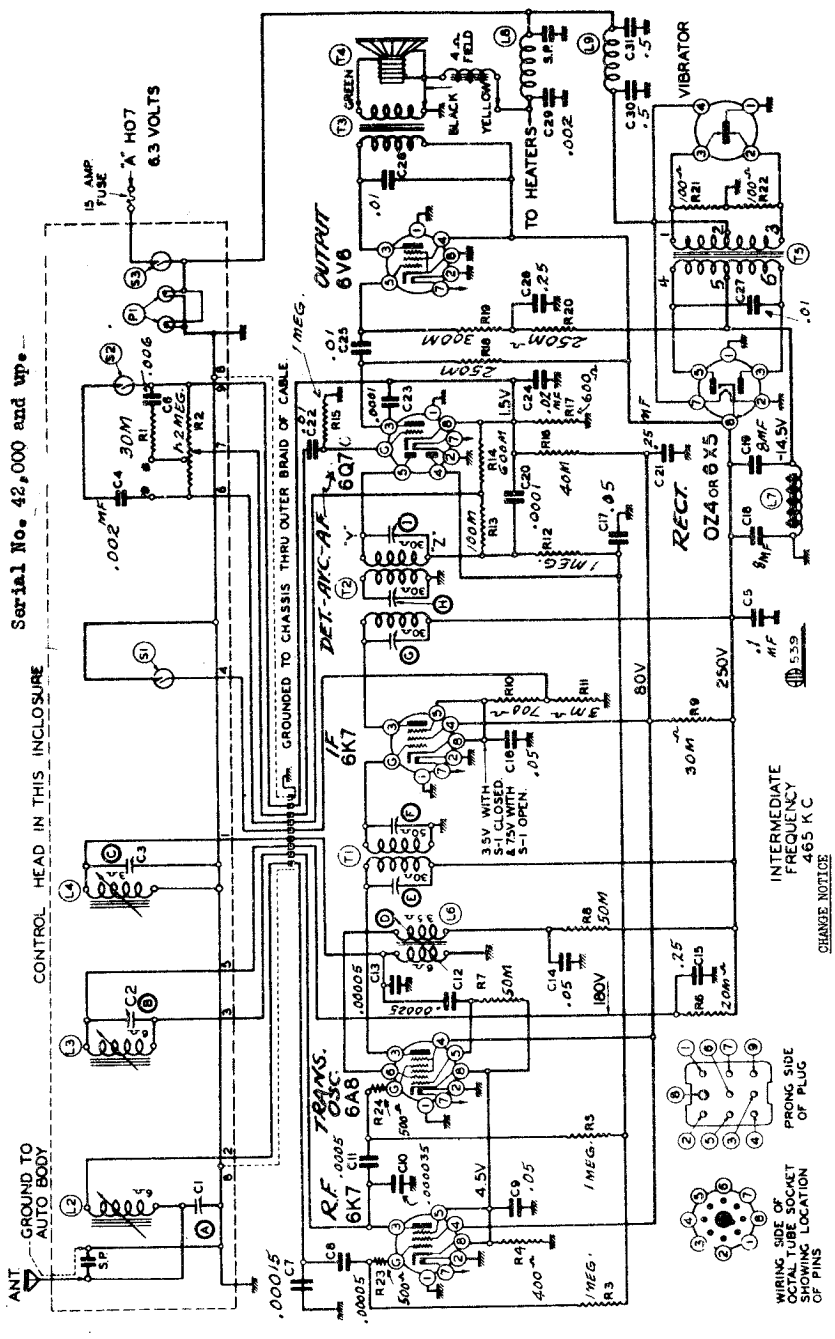
SETTING THE AUTOMATIC TUNER LEVERS TO STATIONS:

When setting up stations for the tuner levers it is important that the lever is pressed all the way down and held firmly in this position until the station is carefully selected by means of the manual tuning control.

This same procedure is followed until all the levers have been set up for stations, then the locking screw should be turned until it is absolutely tight. This is extremely important inasmuch as if the locking screw is not tight the cams on the cam shaft will slip and the stations will not stay adjusted to the tuner lever settings.

To reset one or more tuner levers to other stations it is only necessary to loosen the locking screw sufficiently to permit the mechanism to turn freely when the lever is pressed down as explained above and select the new station for the particular lever, however, make sure to re-tighten the locking screw again to lock the cams back in place.

## DIAGRAM FOR GOODYEAR CHASSIS 100502




The antenna tuning coil assembly and oscillator tuning coil assembly contained in the remote tuner unit on all models, starting with serial No. 42,000, were revised slightly from the coils used on radios serial numbered from 30,000 to 40,500.

The two groups of coils are interchangeable, however, it is recommended that in cases where replacement of a coil is necessary, that the early type coils be used on radios serial numbered from 30,000 to 40,500 and the later type coils on radios serial numbered from 42,000 up, it is apparent that L1 and L5 have been eliminated in the later type coils.

The part numbers of the coils were changed and following is a list giving the part number for both groups of coils.

SERIAL NO. 30,000 to 40,500

| Schematic Location | Part Number | Description | Selling Price Each |
|---|---|---|---|
| L1, L2 | 1001811196 | Antenna tuning coil assembly complete with antenna trimmer assembly, antenna choke coil, iron slug and shield can | 2.60 |
| L4, L5 | 1001811077 | Oscillator tuning coil assembly, complete with trimmer assembly, series oscillator coil, iron slug and shield can | 2.60 |

SERIAL NO. 42,000 AND UP

| Schematic Location | Part Number | Description | Selling Price Each |
|---|---|---|---|
| L2 | 1001811100 | Antenna tuning coil assembly, complete with antenna trimmer assembly, iron slug and shield can | 2.80 |
| L4 | 1001811084 | Oscillator tuning coil assembly, complete with trimmer assembly, iron slug and shield can | 2.80 |

POWER SUPPLY:
"A" . . 6 volt, Automobile storage battery.
"B" . . . . . Vibrator-Rectifier
"A" Drain . . . . . 7.5 amperes
"B" Drain . . . . . 57 ma

ALIGNMENT FREQUENCIES:
Oscillator . Antenna & Shunt Oscillator Trimmer
Trimmer . R.F. Trimmer
1560 kc . 1400 kc

LOUD SPEAKER:
Type . . . . . Dynamic
Size . . . . . 8"
Approximate Field Resistance . . 4 ohms

POWER OUTPUT:
Type . . . . . Beam Tube
Undistorted . . . . . 4 watts
Maximum . . . . . 7 watts

FREQUENCY RANGE:
Broadcast . . . . . 535-1560 kc
Trimmer . 600 kc

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Model 100502
Double Eagle
Early Schematic of
Coils

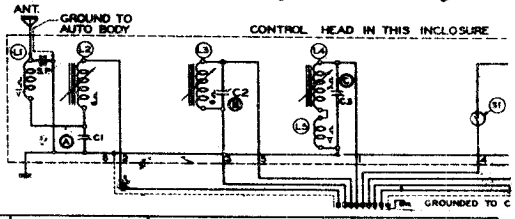
# GOODYEAR TIRE & RUBBER CO., INC.

ALIGNMENT PROCEDURE

Early, Late Alignment, Socket, Trimmers

WIRING DIAGRAM FOR GOODYEAR WINGS 100502

Serial No. 30,000 to 40,500




Preliminary:

Output meter connections.....Across voice coil leads
Output meter readings to indicate 1 watt output.....1.78 volts
Average sensitivity in microvolts for 1 watt output.....3 micro volts
Dummy antenna value to be in series with generator output See chart below
Connection of generator output lead.....See chart below
Connection of generator ground lead.....To chassis
Generator modulation.....30%, 400 cycles
Position of volume control.....Fully clockwise
Position of tone control.....Snapped to "Hi"
Position of local-distance switch..... Snapped to Distance position

| Dial setting of remote tuner unit | Generator Frequency | Dummy Antenna | Generator Connection | Trimmers Adjusted (in order shown) | Trimmer Function | Adjustment | Approximate Microvolts |
|---|---|---|---|---|---|---|---|
| 1400 K.C. | 465 K.C. | .5 mfd. | Grid of 6K7 I.F. tube | G, H See note "A" below | Output I.F. | Adjust to maximum output | 20,000 |
| 1400 K.C. | 465 K.C. | .5 mfd. | Grid of 6K7 I.F. tube | I See "B" below | Output I.F. | Adjust to maximum output | 20,000 |
| 1400 K.C. | 465 K.C. | .5 mfd. | Grid of 6A8 Converter Tube | E,F | Input I.F. | Adjust to maximum output | 512 |
| 1560 K.C. | 1560 K.C. | .000175 mfd. | Antenna Lead | C. See Fig. 11 | Oscillator | Adjust to resonance | 512 |
| 1400 K.C. | 1400 K.C. | .000175 mfd. | Antenna Lead | A, B See Fig. 11 | Antenna and R.F. | Adjust to maximum output | 3 |
| 600 K.C. | 600 K.C. | .000175 mfd. | Antenna Lead | D See Fig. 10 | Shunt oscillator Series adjustment | Adjust to maximum output Rock dial See note "C" | 1.5 |

**IMPORTANT ALIGNMENT NOTES**

A- To align the output I.F. transformer without using a cathode ray oscillograph, a 10M ohm resistor must be shunted across one winding of the output I.F. coil assembly while adjustment to trimmers G and H are being made.

Connect the resistor as indicated by points "Y" and "Z" on the circuit diagram as follows:

Locate the wires coming from the bottom of the output I.F. coil assembly on the underside of the radio chassis.

The white lead with green tracer which is connected to diode plate terminal No. 5 on the 6Q7 tube socket is one point and the white lead with brown tracer which is connected to the end terminal of the terminal strip is the other point.

B- Disconnect the 10M ohm resistor before adjusting trimmer "I". If a cathode ray oscillograph is used it will not be necessary to connect a 10M ohm resistor across a portion of the I.F. coil as explained.

C- When adjusting the shunt oscillator trimmer "D", which is mounted on the base of the radio receiver unit (See Fig. #10), the dial on the remote tuner unit should be rotated slightly to and fro at the same time adjusting trimmer "D" for maximum gain.

It is advisable to repeat the entire alignment procedure to insure greater accuracy.

Always keep the output from the test generator (oscillator) at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

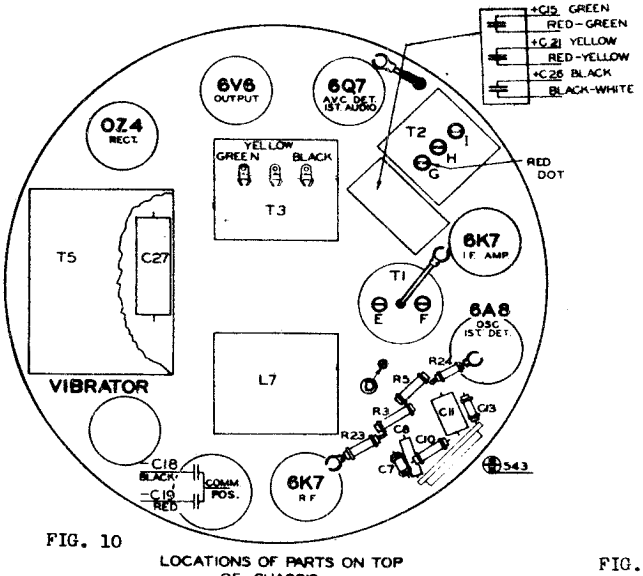



FIG. 10 LOCATIONS OF PARTS ON TOP OF CHASSIS

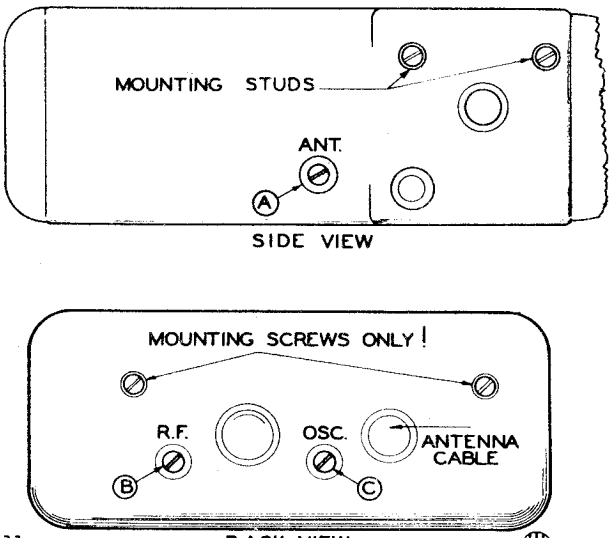



FIG. 11

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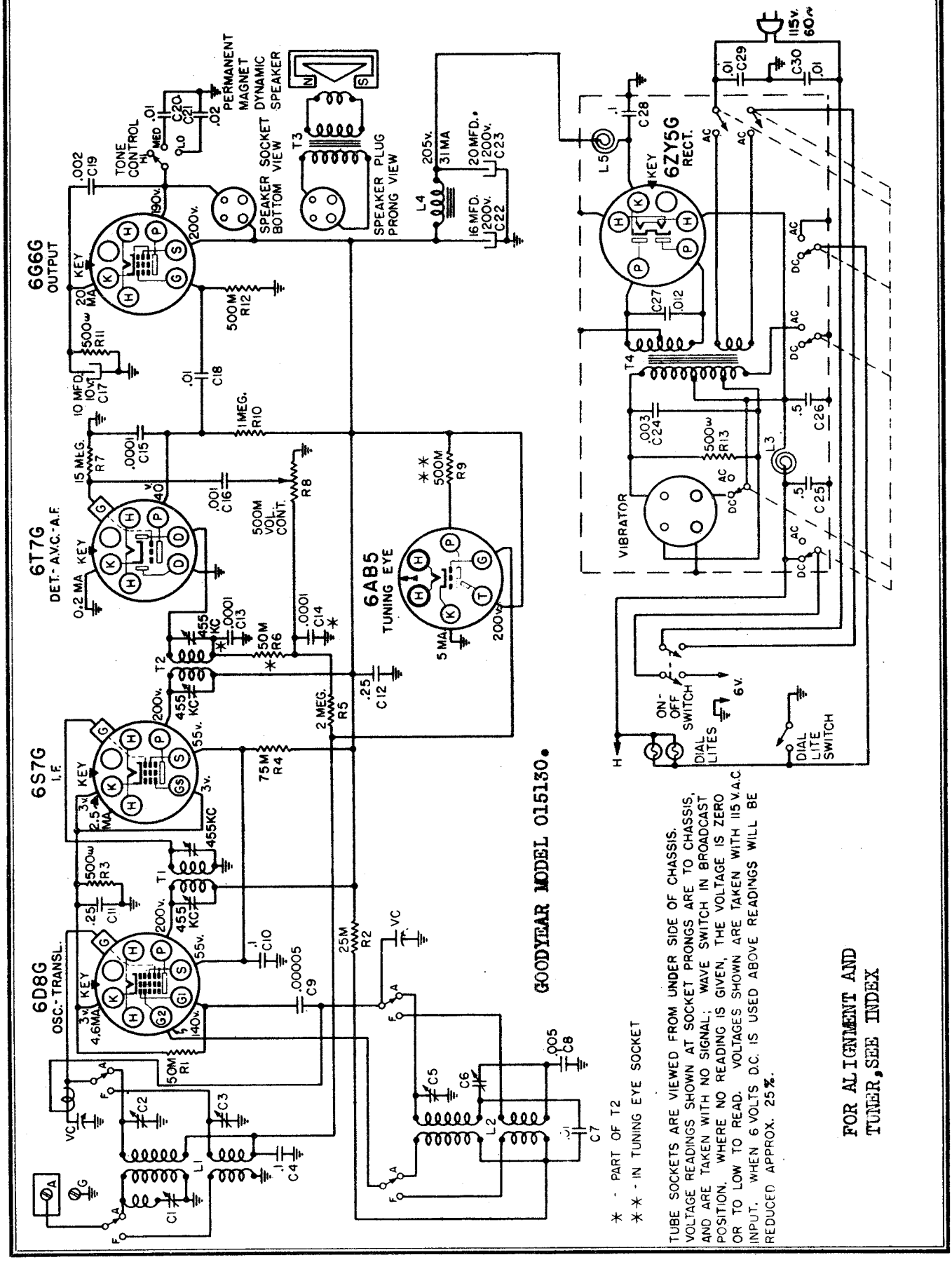
MODEL 015130

# GOODYEAR TIRE & RUBBER CO., INC. Schematic, Voltage


6D8G
OSC.-TRANSL.
6S7G
I.F.
6T7G
DET.-A.V.C.-A.F
6AB5
TUNING EYE
6G6G
OUTPUT
6Z5G
RECT.
VIBRATOR
ON-OFF SWITCH
DIAL LITES
DIAL LITE SWITCH
TONE CONTROL
PERMANENT MAGNET DYNAMIC SPEAKER
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
500M VOL. CONT.
115v. 60~
6v.
GOODYEAR MODEL 015130.
* - PART OF T2
** - IN TUNING EYE SOCKET
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TO LOW TO READ. VOLTAGES SHOWN ARE TAKEN WITH 115 V.A.C. INPUT. WHEN 6 VOLTS D.C. IS USED ABOVE READINGS WILL BE REDUCED APPROX. 25%.
FOR ALIGNMENT AND TUNER, SEE INDEX

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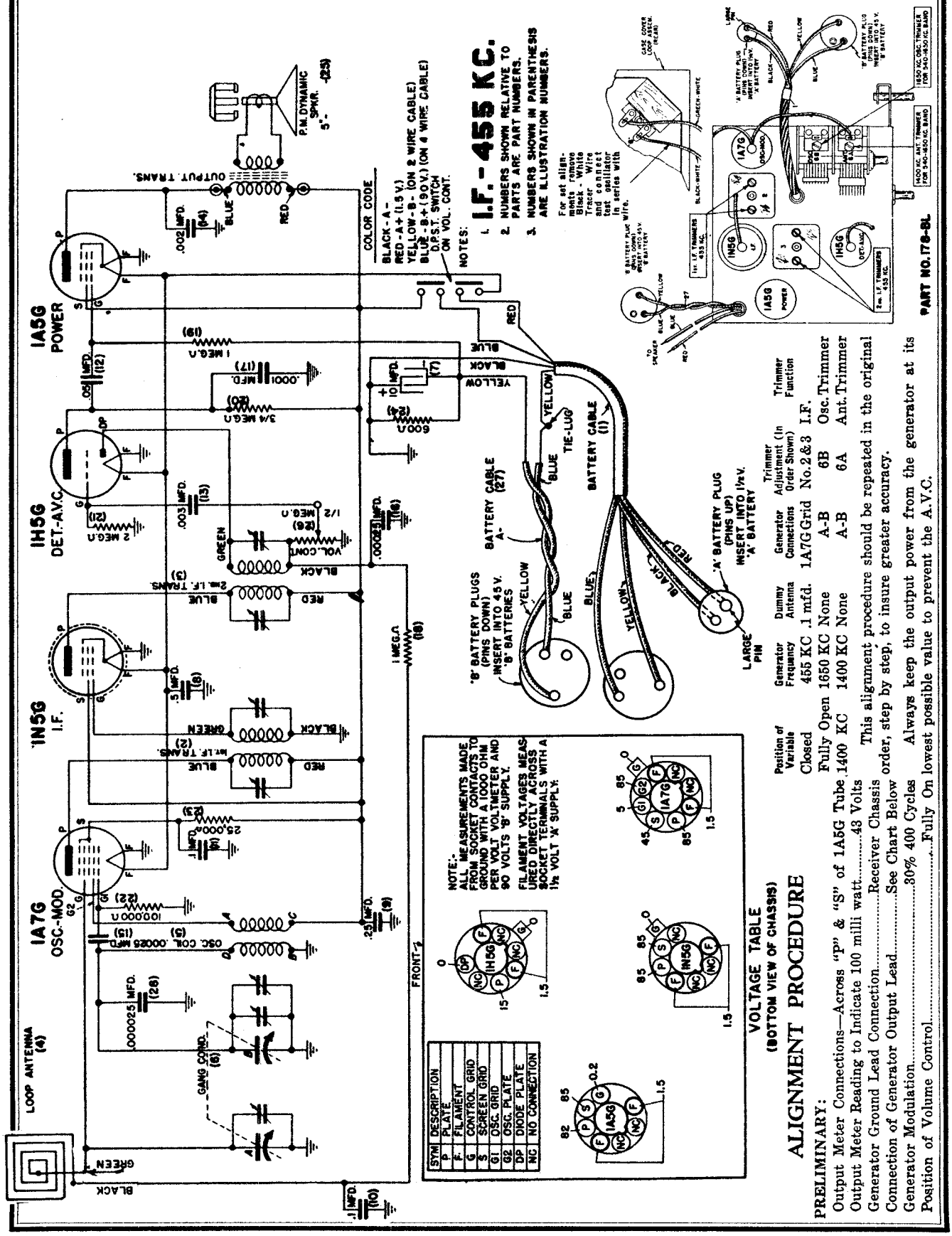
MODEL 103533
Schematic, Socket
Trimmers, Voltage
Alignment

# GOODYEAR TIRE & RUBBER CO., INC.


I.F. - 455 KC.
NOTES:
1. I.F. - 455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
COLOR CODE
BLACK - A -
RED - A + (1.5 V.)
YELLOW - B - (ION & WIRE CABLE)
BLUE - B + (90 V.) (ON 4 WIRE CABLE)
D.P.S.T. SWITCH ON VOL. CONT.
1A5G POWER
1H5G DET.-A.V.C.
1N5G I.F.
1A7G OSC.-MOD.
OUTPUT TRANS.
P.M. DYNAMIC SPKR.
LOOP ANTENNA (4)
GANG COND. (6)
OSC. COIL .00025 MFD.
FRONT
BATTERY CABLE (27)
BATTERY CABLE (1)
TIE-LUG
'B' BATTERY PLUGS (PINS DOWN) INSERT INTO 45 V. 'B' BATTERIES
'A' BATTERY PLUG (PINS UP) INSERT INTO 1½ V. 'A' BATTERY
LARGE PIN
1st. I.F. TRANSFORMER 455 KC.
2nd. I.F. TRANSFORMER 455 KC.
1650 KC. OSC. TRIMMER FOR 540-1650 KC. BAND
1400 KC. ANT. TRIMMER FOR 540-1650 KC. BAND
PART NO. 178-8L
NOTE:- ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY.
FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS WITH A 1½ VOLT 'A' SUPPLY.
SYM DESCRIPTION
P PLATE
F FILAMENT
G CONTROL GRID
S SCREEN GRID
G1 OSC. GRID
G2 OSC. PLATE
DP DIODE PLATE
NC NO CONNECTION
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

| Generator Frequency | Dummy Antenna | Generator Connections | Trimmer Adjustment (In Order Shown) | Trimmer Function |
|---|---|---|---|---|
| 455 KC | .1 mfd. | 1A7G Grid | No. 2 & 3 | I.F. |
| 1650 KC | None | A-B | 6B | Osc. Trimmer |
| 1400 KC | None | A-B | 6A | Ant. Trimmer |

| Position of Variable | Dial Setting |
|---|---|
| Closed | 0 |
| Fully Open | 15 |

## ALIGNMENT PROCEDURE

PRELIMINARY:

Output Meter Connections—Across "P" & "S" of 1A5G Tube
Output Meter Reading to Indicate 100 milli watt.....43 Volts
Generator Ground Lead Connection.....Receiver Chassis
Connection of Generator Output Lead.....See Chart Below
Generator Modulation.....30% 400 Cycles
Position of Volume Control.....Fully On

This alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the A.V.C.

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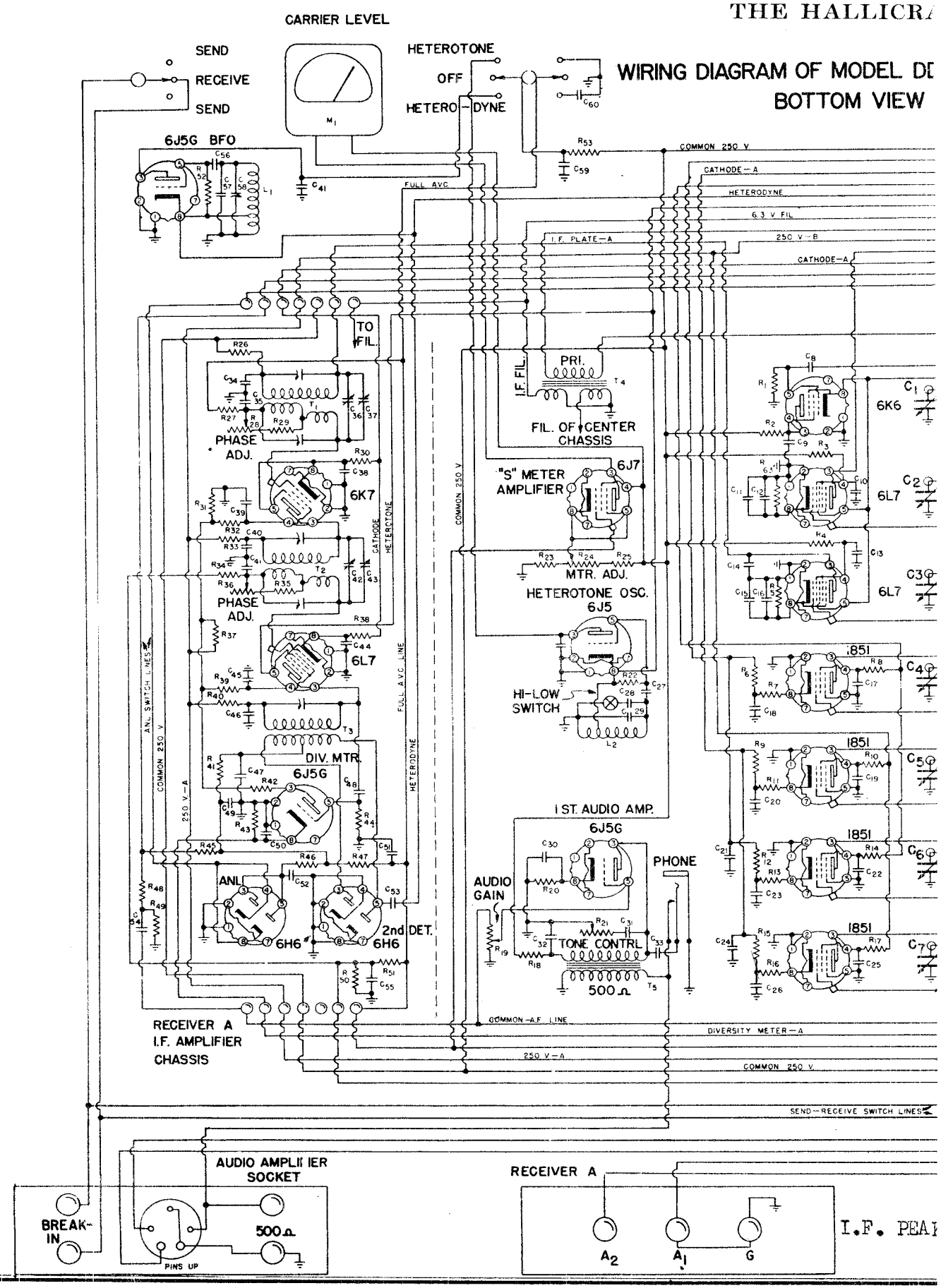
# WIRING DIAGRAM OF MODEL DE
## BOTTOM VIEW

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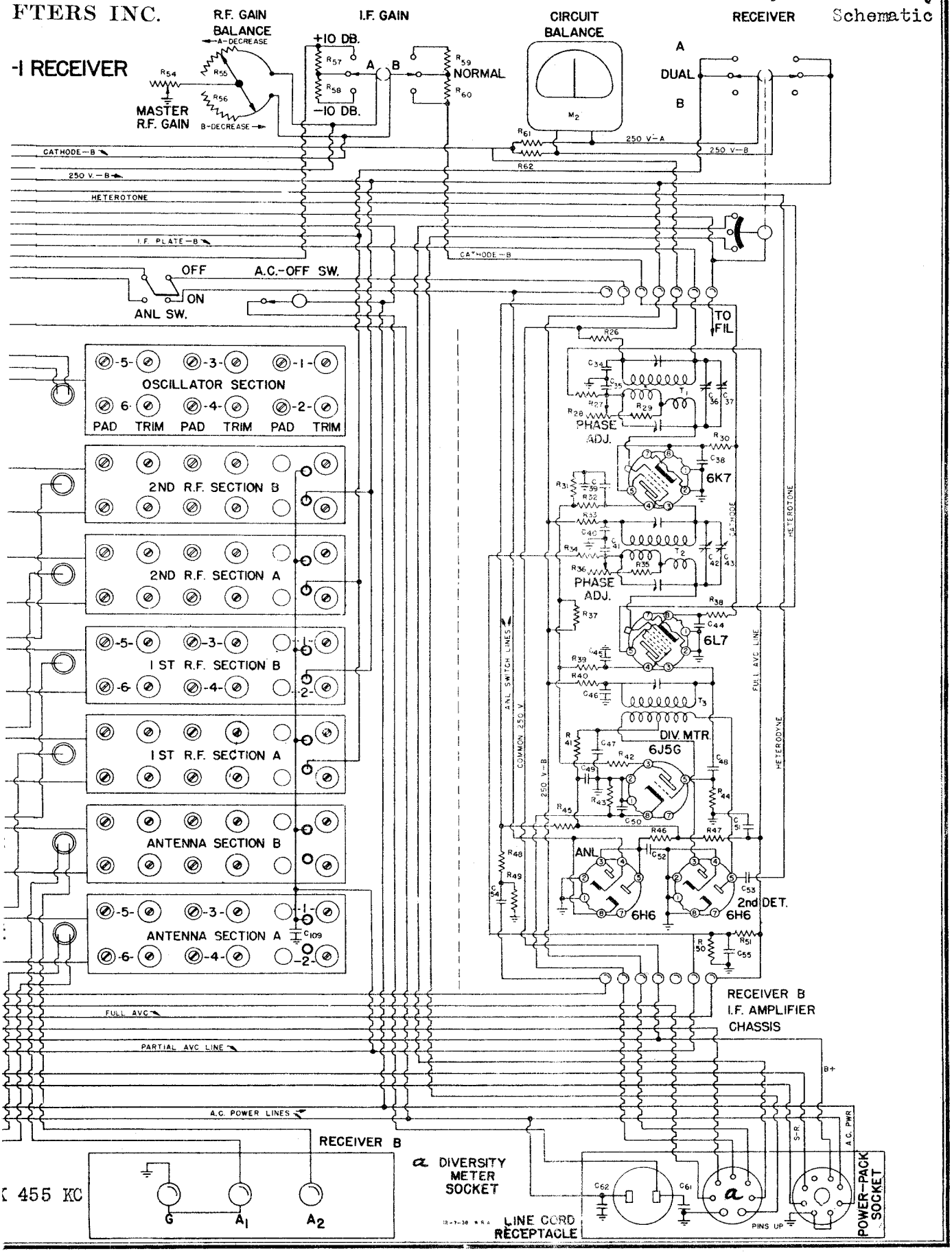
MODEL DD-1, Dual Diversity RECEIVER Schematic

FTERS INC.

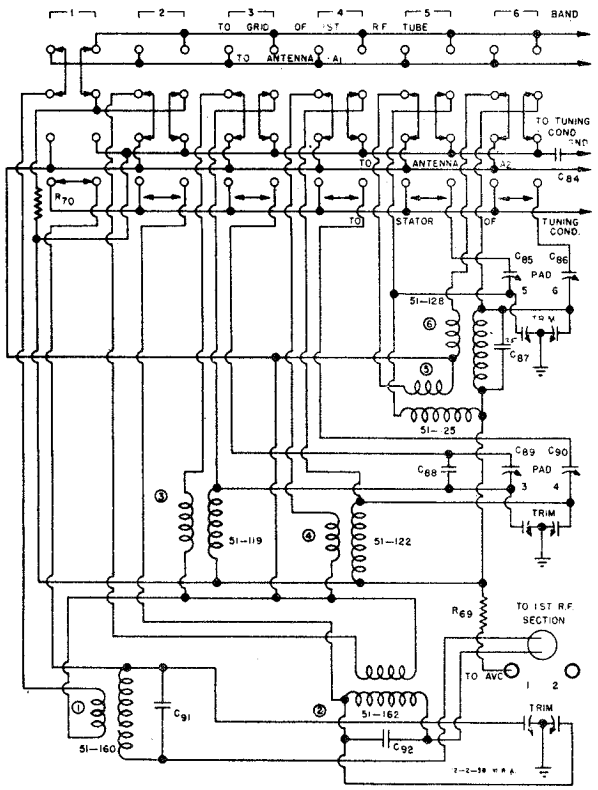
-1 RECEIVER



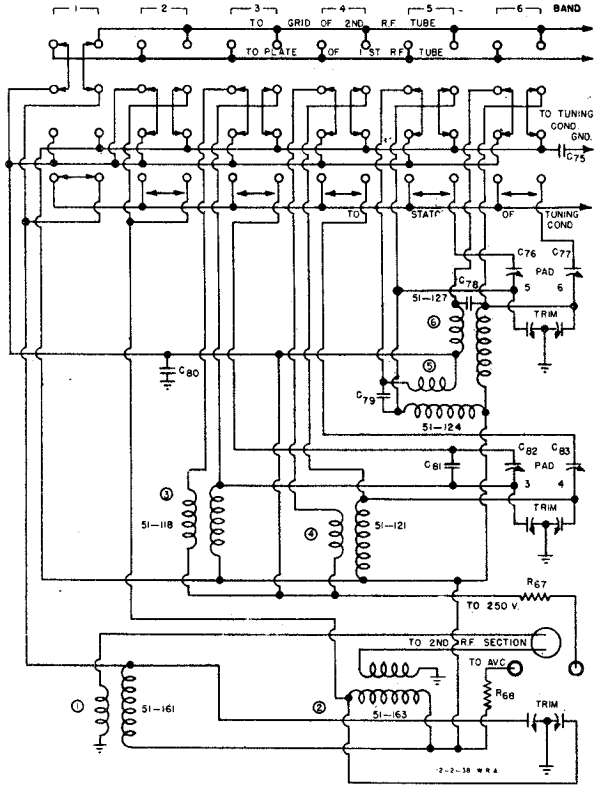
# THE HALLICRAFTERS INC.

MODEL DD-1
Dual Diversity
Detailed Schematics

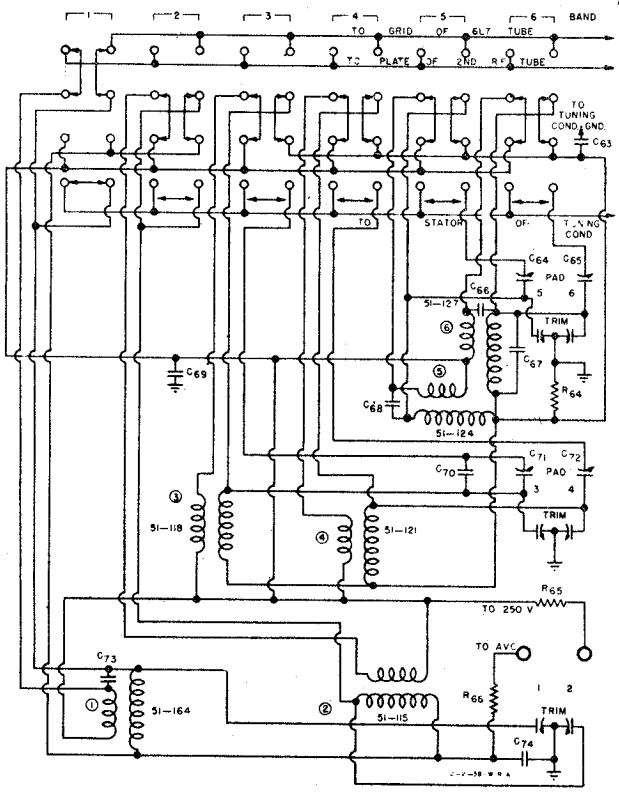
ANTENNA SECTION



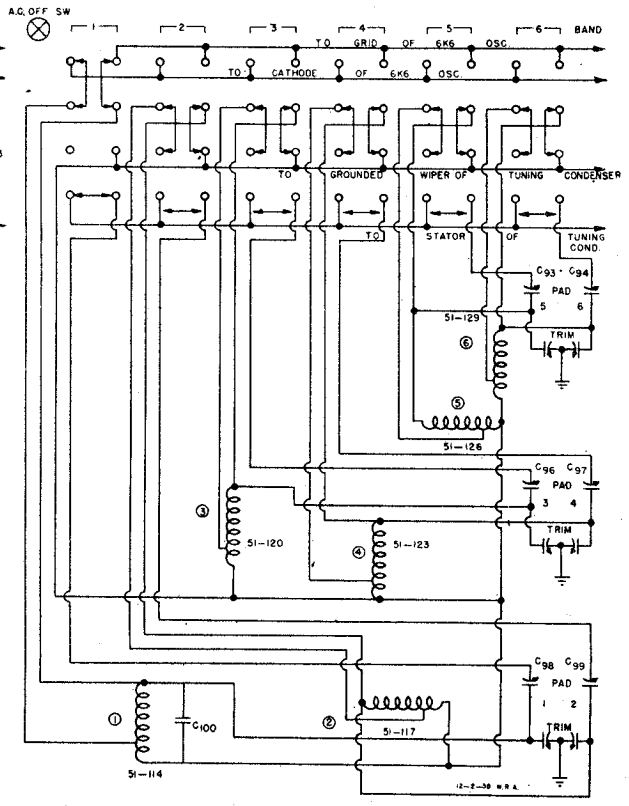

1ST R.F. SECTION




2ND R.F. SECTION




OSCILLATOR SECTION

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# MODEL DD-1, Dual Diversity A-F Schematic Parts List

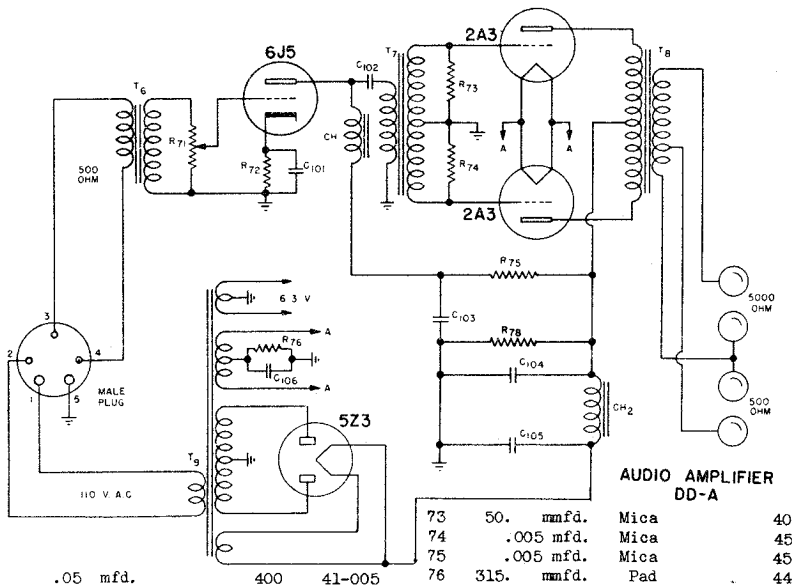
## THE HALLICRAFTERS INC.

### RESISTOR PARTS LIST MODEL DD-1

| NO. | VALUE OHMS | WATTAGE | PARTS NO. |
|---|---|---|---|
| R1 | 50,000 | 1/3 | 20-084 |
| 2 | 3,500 | 2 | 22-126 |
| 3 | 30,000 | 1 | 22-075 |
| 4 | 30,000 | 1 | 22-075 |
| 5 | 600 | 1/3 | 22-128 |
| 6 | 120 | 1/3 | 22-127 |
| 7 | 35 | 1/3 | 20-115 |
| 8 | 60,000 | 1/3 | 22-056 |
| 9 | 120 | 1/3 | 22-127 |
| 10 | 60,000 | 1/3 | 22-056 |
| 11 | 35 | 1/3 | 20-115 |
| 12 | 120 | 1/3 | 20-116 |
| 13 | 35 | 1/3 | 20-115 |
| 14 | 60,000 | 1/3 | 22-056 |
| 15 | 120 | 1/3 | 22-127 |
| 16 | 35 | 1/3 | 20-115 |
| 17 | 60,000 | 1/3 | 22-056 |
| 18 | 5,000 | 1 | 22-051 |
| 19 | 500,000 | Audio Gain | 25-038 |
| 20 | 4,000 | 1/3 | 22-050 |
| 21 | 100,000 | Tone Control | 25-037 |
| 22 | 50,000 | 1/3 | 20-084 |
| 23 | 400 | 1/3 | 22-023 |
| 24 | 500 | 1/3 | 22-026 |
| 25 | 50,000 | 1 | 22-081 |
| 26 | 1,000 | 1/3 | 20-033 |
| 27 | 1,000 | 1/3 | 20-033 |
| 28 | 15,000 | 1/3 | 22-068 |
| 29 | 30,000 | 1/3 | 22-077 |
| 30 | 300 | 1/3 | 22-020 |
| 31 | 20,000 | 1 | 20-072 |
| 32 | 1,000 | 1/3 | 20-033 |
| 33 | 1,000 | 1/3 | 20-033 |
| 34 | 1,000 | 1/3 | 20-033 |
| 35 | 25,000 | 1/3 | 22-074 |
| 36 | 15,000 | 1/3 | 22-068 |
| 37 | 15,000 | 2 | 22-129 |
| 38 | 300 | 1/3 | 22-020 |
| 39 | 1,000 | 1/3 | 20-033 |
| 40 | 1,000 | 1/3 | 20-033 |
| 41 | 20,000 | 1/3 | 20-072 |
| 42 | 5,000 | 1/3 | 22-053 |
| 43 | 10,000 | 1/3 | 20-063 |
| 44 | 1,000,000 | 1/3 | 20-108 |
| 45 | 100,000 | 1/3 | 20-093 |
| 46 | 1,000,000 | 1/3 | 20-108 |
| 47 | 500,000 | 1/3 | 22-098 |
| 48 | 100,000 | 1/3 | 20-093 |
| 49 | 250,000 | 1/3 | 20-099 |
| 50 | 750,000 | 1/3 | 22-104 |
| 51 | 500,000 | 1/3 | 22-098 |
| 52 | 50,000 | 1/3 | 20-084 |
| 53 | 20,000 | 1 | 20-070 |
| 54 | 2,500 | Mas. R.F. Gain | 25-122 |
| 55 | 1,000 | Bal. Control | 25-035 |
| 56 | 1,000 | Bal. Control | |
| 57 | 600 | 1/3 | 22-125 |
| 58 | 600 | 1/3 | 22-125 |
| 59 | 600 | 1/3 | 22-125 |
| 60 | 600 | 1/3 | 22-125 |
| 61 | 200 | 1/3 | 22-014 |
| 62 | 200 | 1/3 | 22-014 |
| 63 | 600 | 1/3 | 22-125 |
| 64 | 100,000 | 1/3 | 20-093 |
| 65 | 1,000 | 1/3 | 20-033 |
| 66 | 100,000 | 1/3 | 20-093 |
| 67 | 1,000 | 1/3 | 20-033 |
| 68 | 100,000 | 1/3 | 20-093 |
| 69 | 100,000 | 1/3 | 20-093 |
| 70 | 100,000 | 1/3 | 20-093 |
| 71 | 250,000 | A.F. Gain Con. | 25-038 |
| 72 | 1,000 | 1 | 22-030 |
| 73 | 100,000 | 1/2 | 22-091 |
| 74 | 100,000 | 1/2 | 22-091 |
| 75 | 10,000 | 2 | 24-042 |
| 76 | 750 | 10 | 26-000 |
| 77 | 10,000 | 20 | 26-002 |
| 78 | 30,000 | 20 | 26-001 |

### CONDENSER PARTS LIST MODEL DD-1

| NO. | CAPACITY | TYPE | VOLTAGE | PART NO. |
|---|---|---|---|---|
| C1 | | | | |
| 2 | | Main | | 48-023 |
| 3 | 440 mmfd. | | | |
| 4 | per section | Tunive | | |
| 5 | " " | | | 48-024 |
| 6 | " " | Gang | | |
| 7 | " " | | | |
| 8 | 100 mmfd. | Mica | | 40-011 |
| 9 | .01 mfd. | | 600 | 45-002 |
| 10 | .05 mfd. | | 400 | 41-005 |
| 11 | .01 mfd. | Mica | | 43-022 |
| 12 | .05 mfd. | | 200 | 41-004 |
| 13 | .05 mfd. | | 400 | 41-005 |
| 14 | 15 mmfd. | Mica | | 40-022 |
| 15 | .01 mfd. | Mica | | 43-022 |
| 16 | .05 mfd. | | 200 | 41-004 |
| 17 | .05 mfd. | | 400 | 41-005 |
| 18 | .01 mfd. | Mica | | 43-022 |
| 19 | .05 mfd. | | 400 | 41-005 |
| 20 | .01 mfd. | Mica | | 43-022 |
| 21 | 1 mfd. | | 200 | 41-012 |
| 22 | .05 mfd. | | 400 | 41-005 |
| 23 | .01 mfd. | Mica | | 41-022 |
| 24 | 1 mfd. | | 200 | 41-012 |
| 25 | .05 mfd. | | 400 | 41-005 |
| 26 | .01 mfd. | Mica | | 43-022 |
| 27 | .01 mfd. | | 400 | 41-001 |
| 28 | .01 mfd. | Mica | | 41-022 |
| 29 | .01 mfd. | Mica | | 41-022 |
| 30 | 20. mfd. | | 25 | 42-025 |
| 31 | .02 mfd. | | 200 | 41-002 |
| 32 | 10. mfd. | Elec. | 250 | 42-007 |
| 33 | .02 mfd. | | 400 | 41-003 |
| 34 | .05 mfd. | | 600 | 45-007 |
| 35 | .01 mfd. | | 400 | 41-001 |
| 36 | 25. mmfd. | Air | | 48-012 |
| 37 | 1. mmfd. | Air | | 48-027 |
| 38 | .05 mfd. | | 400 | 41-005 |
| 39 | .05 mfd. | | 400 | 41-005 |
| 40 | .05 mfd. | | 600 | 45-007 |
| 41 | .01 mfd. | | 400 | 41-001 |
| 42 | 25. mmfd. | Air | | 48-012 |
| 43 | 1. mmfd. | Air | | 48-027 |
| 44 | .05 mfd. | | 400 | 41-005 |
| 45 | .05 mfd. | | 400 | 41-005 |
| 46 | .05 mfd. | | 600 | 45-007 |
| 47 | 50. mmfd. | Mica | | 40-023 |
| 48 | 100. mmfd. | Mica | | 40-011 |
| 49 | 50. mmfd. | Mica | | 40-023 |
| 50 | .05 mfd. | | 400 | 41-005 |
| 51 | .05 mfd. | | 400 | 41-005 |
| 52 | .05 mfd. | | 400 | 41-005 |
| 53 | 10. mmfd. | | | 40-021 |
| 54 | .05 mfd. | | 400 | 41-005 |
| 55 | .05 mfd. | | 400 | 41-005 |
| 56 | 100. mmfd. | Mica | | 40-007 |
| 57 | 400. mmfd. | Pad | | 44-036 |
| 58 | 25. mmfd. | Air | | 48-034 |
| 59 | 10. mfd. | Elec. | 400 | 42-007 |
| 60 | 8. mfd. | | 150 | 45-012 |
| 61 | .01 mfd. | | 600 | 45-002 |
| 62 | .01 mfd. | | 600 | 45-002 |
| 63 | .005 mfd. | Mica | | 45-011 |
| 64 | 315. mmfd. | Pad | | 44-028 |
| 65 | 100. mmfd. | Pad | | |
| 66 | 15. mmfd. | Mica | | 40-022 |
| 67 | 10. mmfd. | | | 40-021 |
| 68 | 10. mmfd. | | | 40-021 |
| 69 | .002 mfd. | Mica | | 40-013 |
| 70 | 1500. mmfd. | Mica | | 43-021 |
| 71 | 2200. mmfd. | Pad | | 44-029 |
| 72 | 440 mmfd. | Pad | | |
| 73 | 50. mmfd. | Mica | | 40-023 |
| 74 | .005 mfd. | Mica | | 45-011 |
| 75 | .005 mfd. | Mica | | 45-011 |
| 76 | 315. mmfd. | Pad | | 44-028 |
| 77 | 100. mmfd. | Pad | | |
| 78 | 15. mmfd. | Mica | | 40-022 |
| 79 | 10. mmfd. | Mica | | 40-021 |
| 80 | .002 mfd. | Mica | | 40-013 |
| 81 | 1500. mmfd. | Mica | | 43-021 |
| 82 | 2200. mmfd. | Pad | | 44-029 |
| 83 | 440. mmfd. | Pad | | |
| 84 | .005 mfd. | Mica | | 45-011 |
| 85 | 315. mmfd. | Pad | | 44-028 |
| 86 | 100. mmfd. | Pad | | |
| 87 | 25. mmfd. | Mica | | 40-024 |
| 88 | 1000. mmfd. | Mica | | 40-011 |
| 89 | 2200. mmfd. | Pad | | 44-029 |
| 90 | 440. mmfd. | Pad | | |
| 91 | 25. mmfd. | Mica | | 40-024 |
| 92 | 25. mmfd. | Mica | | 40-024 |
| 93 | 230. mmfd. | Pad | | 44-030 |
| 94 | 90. mmfd. | Pad | | |
| 95 | | | | |
| 96 | 1120. mmfd. | Pad | | 44-031 |
| 97 | 340. mmfd. | Pad | | |
| 98 | 540. mmfd. | Pad | | 44-032 |
| 99 | 1.070mmfd. | Pad | | |
| 100 | 6 mmfd. | Mica | | 40-025 |
| 101 | 10. mfd. | Elec. | 50 | 42-003 |
| 102 | .1 mfd. | | 600 | 45-008 |
| 103 | 1. mfd. | | 400 | 41-013 |
| 104 | 16. mfd. | | 475 | 42-022 |
| 105 | 16. mfd. | | 475 | 42-022 |
| 106 | 20. mfd. | | 100 | 42-023 |
| 107 | 16. mfd. | | 400 | 42-019 |
| 108 | 16. mfd. | | 400 | 42-019 |
| 109 | .1 mfd. | | 200 | 41-006 |

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THE HALLICRAFTERS INC.

MODEL DD-1, Dual Diversity

Alignment

S.P.U. Schematic

## ALIGNMENT & SERVICING INSTRUCTIONS FOR SKYRIDER DIVERSITY RECEIVER MODEL DD1

### SWITCHING ARRANGEMENT

For speed, ease and accuracy in aligning the Duel Diversity receiver, it is recommended that the output of the signal generator be terminated in a switching box in which you have installed a double throw single pole switch. From this switching box enclosed in a shielded cable which will serve as ground, run two leads one of which is connected appropriately to section "A" and the other to Section "B". Operation of the switch will readily allow you to switch the signal generator to either receiver section being aligned for a quick comparative check.

### INTERMEDIATE FREQUENCY ALIGNMENT

Have controls set as follows:-
Have I.F. gain switch in NORMAL position.
Receiver switch to "A" side.
Set rejector control to 3 KC marking.
Balance control in center position.
All other gain controls adjusted for maximum gain.

### IN ALIGNING "A" SECTION:-

Connect signal generator to the grid of the "A" section 6L7 converter (see diagram for location.) Adjust the signal generator for 455 KC output. Adjust I.F. transformers in the "A" receiver until they are peaked for maximum gain.

### In Aligning "B" Section:-

Connect the signal generator as indicated above to the 6L7 converter tube in the "B" receiver and duplicate the adjustments done to the I.F. transformers of section "A". The receiver switch will necessarily be switched to the "B" side.

### REJECTOR ADJUSTMENT

Before aligning the I.F. Rejector Circuit, the variable rejector condensers found below the chassis and driven by the long flexible copper cable, should be set as follows: With the rejector pointer set at ± 3 KC, check the first rejector condenser (closest to front panel in each I.F. section). It should have its rotor plates about 80% in mesh. The second rejector condenser (farthest from front panel) should have its plates about 20% in mesh. The same relationship should also exist between the condensers in the other I.F. section. When turning the rejector control from ± 3 KC toward ± 18 KC, the plates on the first rejector condenser should unmesh at the same time the plates on the second rejector condenser are meshing.

To correctly adjust the rejector circuit it is necessary to have two signals available which are accurately removed from the 455 KC fundamental by 3 KC on each side. The most satisfactory way to accomplish this is to use two crystals, one for 452 KC output and the other for 458 KC output. In the event, however, that crystals of those frequencies are not available, a satisfactory substitute can be used which consists of the following procedure: Put the BFO switch in the heterodyne position. Feed 455 KC from the signal generator into either 6L7 converter. Remove modulation from the signal being delivered by the generator. Obtain zero beat on the B.F.O. by operating the pitch control knob. Tune the generator slowly away from the 455 KC setting until a beat note of 3000 cycles (+ or - of 455 KC) is heard. Remember the pitch of that note. It will be necessary in adjusting the signal generator to a frequency 3000 cycles on the other side of 455 KC. A little practice will enable you to reset to each side of 455 KC by the 3 KC difference quite accurately and when signals of 452 and 458 KC are then available by this method, these signals should be used to properly peak the rejection circuit. This method is recommended only when a closely calibrated signal generator or a crystal controlled signal generator are not available.

Begin with receiver B. Set signal generator to 458 KC output. Adjust the 2nd Rejector Control (shown in the top chassis view) for minimum response. There should be two points of minimum output. If there is only one minimum point, rotate the adjusting nut on this control approximately 1/4 turn from the minimum, and very, very carefully adjust the 1st rejector control until a minimum occurs. After this has been accomplished, adjust the 2nd rejector control for minimum response. Now adjust the first phasing control (screw driver shaft nearest front panel), for minimum response. Readjust the 2nd rejector control carefully for minimum response. Repeat with "A" side without changing setting of the signal generator, connecting the signal generator to the "A" side 6L7, and switching the receiver to the "A" side. Readjust signal generator to 452 KC. Make similar adjustments on Rejector Controls 3 and 4 and the rear phasing control. Switch over to the "B" receiver and repeat these adjustments on the "B" side.

Now retune signal generator to 455 KC (still connected to "B" side). Carefully repeat each of the I. F. transformer trimming condensers. Switch signal generator output to 6L7 in "A" side and repeat the above operation.

**NOTE:** The gain of each receiver should be approximately the same, variation between receiver sections should not exceed 25% as shown on output meter readings. If gain-balance is far off, interchanging the 6L7 I.F. amplifier tubes sometimes improves it.

### R. F. ALIGNMENT

Adjust receiver to Band 1, set "A". Have all gain controls at maximum, balance control in center position.

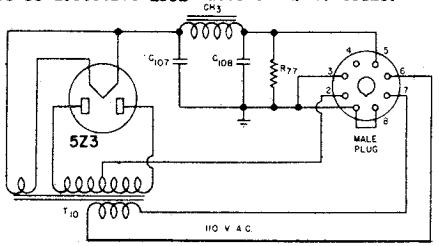
Now connect signal generator to antenna post of "A" receiver section through a 400 ohm resistor. Be sure shorting strap from A2 to G remains connected. During all adjustments the grounded side of the generator should be connected to the ground post on the receiver.

Set band spread dial to "0" and leave it there during entire alignment. Adjust generator to 1400 KC. Set dial on receiver to that frequency. Align oscillator, 2nd R. F., 1st R. F. and antenna trimmers in the order named for maximum gain. Switch over to Receiver "B" and repeat the above operations with the exception of the oscillator section which does not require readjustment this time. Set generator and receiver to 600 KC. Adjust oscillator padder for maximum response. Retrim oscillator at 1400 KC. Repeat the above procedure on the remaining bands, except that on bands 3-4-5-6 the R. F. padders should also be adjusted for maximum response at the low frequency ends of each band.

Care should be exercised in avoiding alignment on the image frequency. In every case, the image will be heard approximately 1 megacycle lower in frequency when adjusting the main tuning dial.

The greatest caution should be taken when adjusting the No. 6 band oscillator padder because only a slight change causes a large variation in frequency and may throw the oscillator frequency completely out of the band. The relative sensitivities of receivers "A" and "B" should not vary more than 50%. A frequent cause of unbalance between receivers is defective 1851 tubes or R. F. coils.

POWER PACK
DD-P



MODEL DD-1, Dual Diversity
Socket, Trimmers
Alignment, Part 2

THE HALLICRAFTERS INC.

**BEAT FREQUENCY OSCILLATOR ADJUSTMENTS**

Place the B.F.O. Key in the Heterodyne position.

With 455 KC signal from generator feeding into the "A" 6L7 converter and receiver "A" functioning, and the chassis standing on its left end (looking at set from the front) adjust the padding condenser inside the B.F.O. Shield can until zero beat is reached. The B.F.O. shield can is located directly behind the pitch control. Prior to making this adjustment assure yourself that the PITCH CONTROL condenser is at 50% capacity pointer on control positioned vertically). When properly adjusted, rotation of the pitch control condenser will show two beat note signals 180 degrees apart.

**S METER ADJUSTMENT**

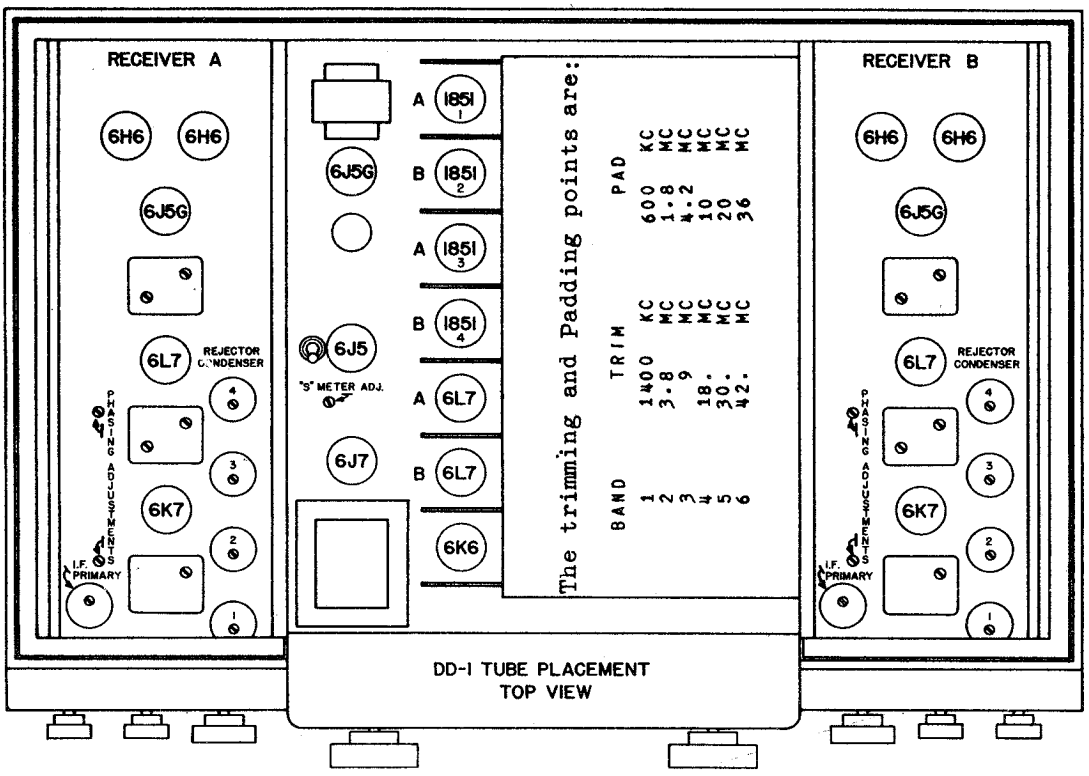
Push in No. 6 Band Button. With gain controls at maximum, adjust the zero reset control on all meters for zero.

**NOTES:**

If overload occurs on the broadcast band it might be advisable to shorten the length of the receiving antennas. If this recommendation is of little help check for a short to ground in the A.V.C. circuit.

Should the occasion of examining the coil units arise, exercise extreme care in moving the heavy leads attached to the switch terminals. Excessive movement of one of these leads may cause the contacting portion of the switch to be thrown out of alignment and provide improper contact.

If it becomes difficult to properly heterodyne a strong signal when listening to C. W. reception, reduce the overall gain with the master gain control till a satisfactory note is obtained.

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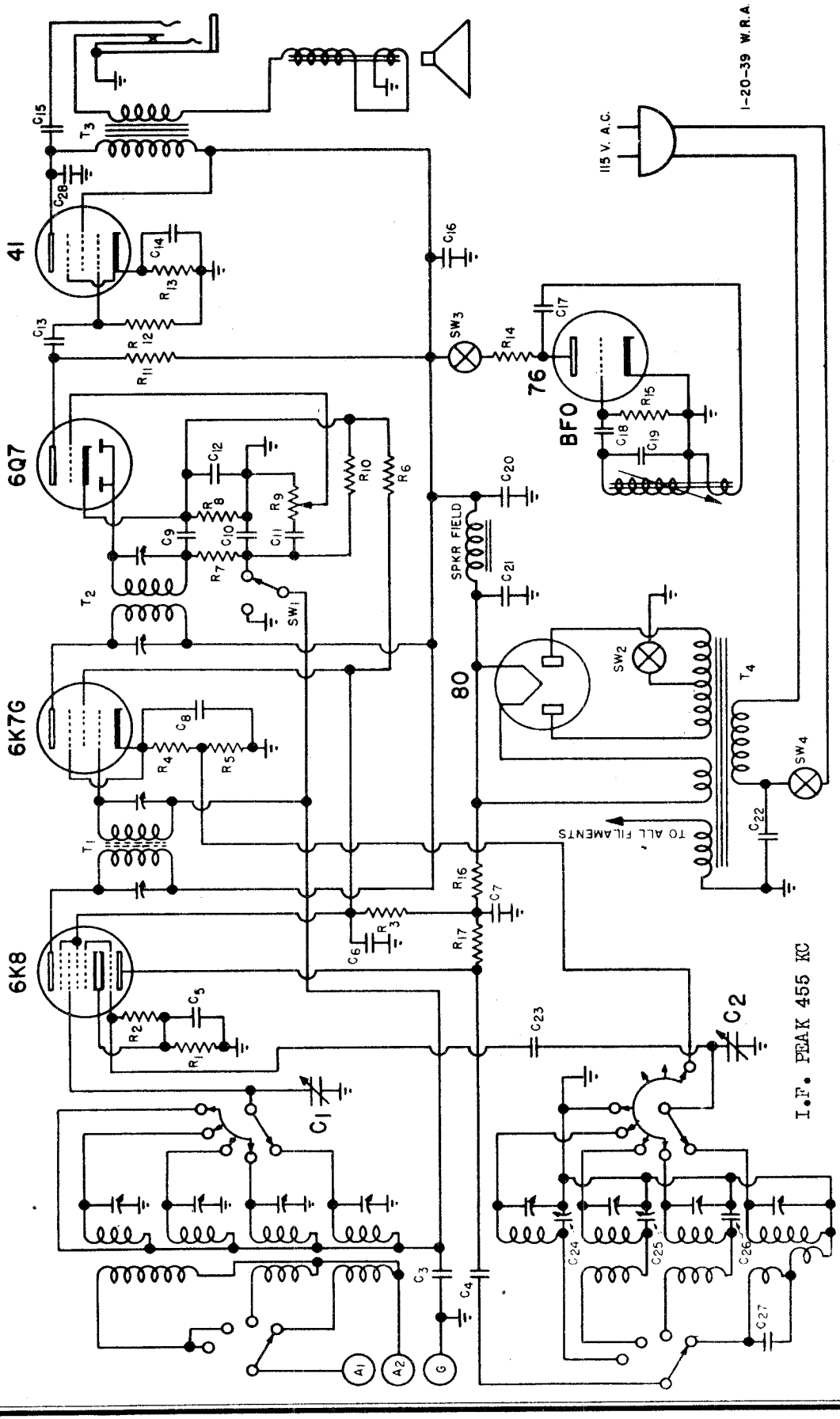
MODEL S-19R, Sky Buddy
Schematic


1-20-39 W.R.A.
115 V. A.C.
41
6Q7
6K7G
6K8
80
76
BFO
SPKR FIELD
TO ALL FILAMENTS
I.F. PEAK 455 KC
MAIN TUNING
This control rotates the large calibrated dial so that the desired frequency can be easily located. The accuracy of calibration is held to close tolerances. This calibration will be correct, however, only if the "Bandspread" dial is set at "0" or minimum capacity.

SCHEMATIC DIAGRAM
SKY BUDDY—MODEL S-19R

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MODEL S-19R, Sky Buddy
Socket, Trimmers, Parts

# THE HALLICRAFTERS INC.

## Sky Buddy — Model S19-R

The model S19-R Sky Buddy is a 6 tube 4 band superheterodyne receiver covering the following frequencies:

Band 1 - 540 KC to 1700 KC
2 - 1.7 MC to 5.5 MC
3 - 5.5 MC to 17.0 MC
4 - 16.0 MC to 46.0 MC

### S19R CONDENSER PARTS LIST

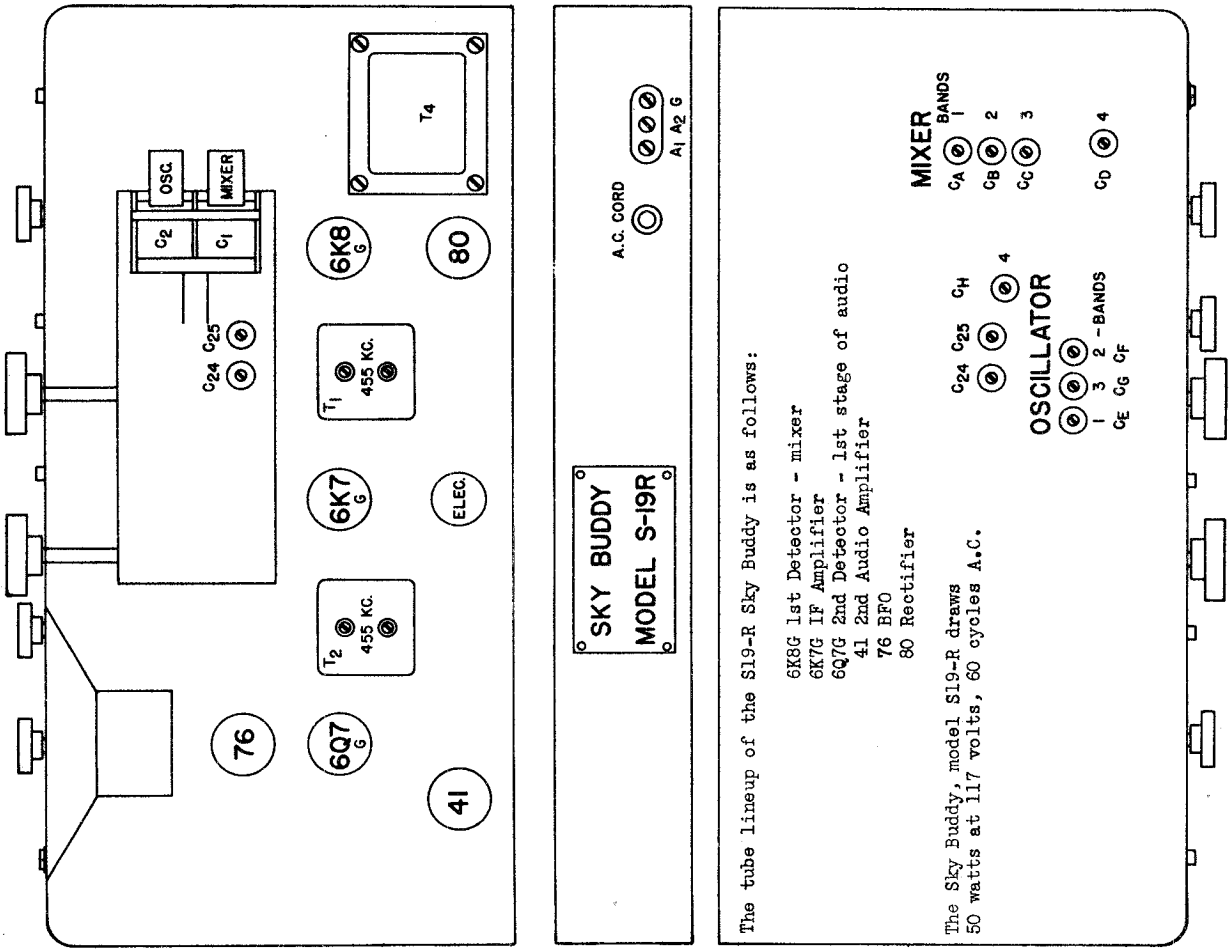
| NO. | CAPACITY | TYPE | VOLTAGE |
|---|---|---|---|
| C1 | .000375 mfd. | Maintaining | |
| 2 | " | " | |
| 3 | .05 | " | 200 |
| 4 | .01 | " | 400 |
| 5 | .05 | " | 200 |
| 6 | .05 | " | 200 |
| 7 | 10 | " | 300 |
| 8 | .05 | " | 200 |
| 9 | .0001 | Mica | |
| 10 | .0001 | " | |
| 11 | .02 | " | 200 |
| 12 | .1 | " | 200 |
| 13 | .02 | " | 200 |
| 14 | 10 | " | 25 |
| 15 | .01 | " | 600 |
| 16 | .1 | " | 400 |
| 17 | .01 | " | 400 |
| 18 | .0001 | Mica | |
| 19 | .0005 | " | |
| 20 | 10 | " | 300 |
| 21 | 10 | " | 350 |
| 22 | .01 | " | 600 |
| 23 | .0001 | Ceramic | |
| 24 | .000375 | Pad | |
| 25 | .001 | " | |
| 26 | .0043 | " | |
| 27 | .0001 | Mica | |
| 28 | .01 | " | 600 |

### S19R RESISTOR PARTS LIST

| NO. | OHMS | WATTAGE |
|---|---|---|
| R1 | 300 | 1/3 |
| 2 | 50000 | " |
| 3 | 10000 | 1 |
| 4 | 500 | 1/3 |
| 5 | 3500 | " |
| 6 | 25000 | 1 |
| 7 | 50000 | 1/3 |
| 8 | 300 | " |
| 9 | 1000000 | Variable |
| 10 | 500000 | 1/3 |
| 11 | 250000 | " |
| 12 | 1000000 | " |
| 13 | 600 | 1/2 |
| 14 | 50000 | 1/3 |
| 15 | 50000 | " |
| 16 | 3000 | 1/2 |
| 17 | 10000 | 1/2 |

### SWITCHES

| SW | |
|---|---|
| 1 | A.V.C. on - off |
| 2 | Send - Receive |
| 3 | BFO on - off |




The tube lineup of the S19-R Sky Buddy is as follows:

6K8G 1st Detector - mixer
6K7G IF Amplifier
6Q7G 2nd Detector - 1st stage of audio
41 2nd Audio Amplifier
76 BFO
80 Rectifier

The Sky Buddy, model S19-R draws 50 watts at 117 volts, 60 cycles A.C.

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## ANTENNA

For successful operation of the receiver throughout its tuning range very satisfactory results can be obtained with an inverted "L" type antenna 75 feet long overall. When this type of antenna is used the jumper should remain connected between A2 and G.

If the operator should wish to obtain the maximum in performance from the receiver on any one frequency, it is suggested that a half wave doublet antenna cut for that frequency be installed.

The formula for calculating the overall length of this antenna is:

$$\text{Length in feet} = \frac{463}{\text{Frequency in megacycles}}$$

The antenna is cut in the center and connected to a twisted pair transmission line having a characteristic impedance of 75 ohms. The other end of this line is connected to the A1 and A2 antenna posts.

This antenna will not perform well at harmonic frequencies but should be better than the inverted "L" on the frequency for which it has been designed. Performance on the #4 band, even with a suitable antenna, is subject to varying conditions of the time of the day and year.

A ground is usually not necessary for satisfactory performance of the model S19-R Sky Buddy receiver. If a ground does prove helpful it is connected to the "G" post of the antenna terminal strip.

## "BANDSPREAD"

In no other similar receiver but the S19-R Sky Buddy can be found such extremely smooth and satisfactory electrical bandspread action. The stator plates are an integral part of the main condenser and the separate rotor sections are driven by a gearless mechanism through the separate bandspread knob.

The controls along the bottom edge of the receiver are:

SEND-RECEIVE SWITCH which, when in the "send" position, removes plate voltage from the tubes.

The BAND SWITCH allows selection of any one of the four ranges covered by the receiver. The newly incorporated 10 meter band will prove to be most interesting when conditions are favorable for reception on that range.

The B.F.O. "ON-OFF" SWITCH allows optional use of the Beat Frequency Oscillator and is used when the operator is copying code signals. It will be of additional help in locating weak fone signals by first locating their carrier. Once located, the B.F.O. may then be turned off to eliminate the whistle.

The PITCH-CONTROL Knob allows the operator to vary the pitch of the beat note when the BFO switch is in the "on" position. Selection of the pitch of the beat note most pleasing to the operator will be of help in copying through interference. The A.V.C. "OFF" and "ON" Switch is for optional use of automatic volume control. Should the strength of the telephone signal be so strong as to block the receiver the A.V.C. switch should be "on". For maximum sensitivity leave the AVC switch "off" and manually adjust the gain of the receiver with the audio gain control.

The receiver is turned on and off with this control and additionally provides variation of the volume delivered by the receiver to suit the requirements of the listener.

A Headphone Jack is mounted on the panel to the right of the Pitch Control Knob. When headphones are used, inserting the phone plug in the jack automatically disconnects the speaker.

## ALIGNMENT PROCEDURE FOR SKY BUDDY MODEL S19-R

### I. F. ALIGNMENT

Have the controls set as follows:

Audio gain control at maximum

A.V.C. switch "on".

Range switch on Band #2.

Set main dial to minimum capacity 5.5 M.C. position

Remove 6K8 grid cap and connect signal generator to this tube.

Set signal generator for 455 KC output.

Adjust trimmers on transformers T1, T2 for maximum output.

For adjustment of the B.F.O., place the BFO switch in the "on" position. Remove the knob from the pitch control shaft. You will see a small adjustment screw in the center of this shaft. On the under-chassis side of this shaft you will see a set screw which should be loosened in order to allow adjustment of the screw in the center of the pitch control shaft. Adjust to zero beat. Tighten the set screw and replace the knob. Should the BFO still fail to operate check the .0005 condenser in the BFO circuit, or the 76 BFO tube.

### R. F. ALIGNMENT

Connect the generator to the A1 terminal on the antenna terminal strip found on the rear apron of the chassis through a 400 ohm resistor. Leave the jumper connected between A2 and G. The trim and pad points for the 4 bands are indicated below:

Set the signal generator to the required frequencies for each band, adjust the main tuning dial to those frequencies (with the bandspread condenser at minimum capacity) and then adjust the indicated trimmers and padders to resonance.

| Trim | Band | Pad |
|---|---|---|
| 1400 KC Adjust $C_A$ $C_E$ | Band 1 | 600 KC Adjust $C_{24}$ |
| 4 MC Adjust $C_B$ $C_F$ | Band 2 | 2 MC Adjust $C_{25}$ |
| 14 MC Adjust $C_C$ | Band 3 | None-check at 7 MC |
| 30 MC Adjust $C_D$ $C_H$ | Band 4 | None-check at 18 MC |

On the two high frequency bands where no padding adjustments are found, the checking frequencies should fall within 1 division of the dial calibration with no further adjustments.

During the R.F. alignment process it is advisable to "Rock" the main tuning condenser across the frequency on which you are making adjustments to the receiver. Once the exact point of maximum output is obtained further adjustment is unnecessary.

MODEL SX23
Super Skyrider
Operating Data
Antenna Notes

# THE HALLICRAFTERS INC.

MODEL SX24
Skyrider Defiant
Antenna Notes

**ANTENNA: SUPER SKYRIDER MODEL SX23**

The SKYRIDER 23 has an antenna input circuit which will allow the use of either a doublet or Marconi (inverted "L") antenna. The approximate antenna input impedance of the SKYRIDER 23 is 400 ohms.

A very serviceable antenna will be the inverted "L", or Marconi type. This antenna should be approximately 75 feet long overall, including the lead-in to the set. Satisfactory operation of the SKYRIDER 23 is obtained throughout its tuning range with this type of antenna and because of that fact as well as its ease of construction it is highly recommended. Should a doublet antenna be used it is suggested that a transmission line of 400 ohms value of impedance be constructed so that a most efficient transfer of energy is obtained. The commercially available all wave doublet antennas are usually provided with a coupling transformer which matches the transmission line to the receiver. This transformer connects to the $A_1$ and $A_2$ terminals on the antenna strip. The half-wave length-doublet antenna cut for a particular frequency can be computed by the following formula:

$$\text{Length in feet} = \frac{463}{\text{Frequency in megacycles}}$$

This type of antenna is broken in the center with an insulator and has the transmission line connected to each resulting quarter wave section at that point. This antenna is a very good performer, in a direction broadside to its length, only on the relatively narrow group of frequencies for which it was cut. It does not function well on harmonic frequencies.

When using either type of doublet antennas the transmission line should be connected to $A_1$ and $A_2$ binding posts. The wire connecting the $A_2$ to ground or G can be left connected if the performance of the receiver is improved.

## CONTROLS AND OPERATION

Each of the controls is identified by appropriate marking on the panel. The "Tone Control" turns the receiver "on" and "off", and also allow the operator to make adjustments for the type of reproduction most pleasing to him. Treble reproduction is to the far left position, just after the set is turned on, while the base is at the extreme right. Intermediate positions allow for any desired degree of mixing.

The "Pitch Control" is to be used when code or CW signals are being received. In its counter clockwise position the Beat Frequency Oscillator is "off". Rotating the control clockwise turns on the B.F.O. in addition to varying the pitch of the beat note to the operator's taste.

Directly below the two controls mentioned will be found the "Phone Jack". Any type of high impedance headphones may be used because no direct current flows in the headphone circuit. The strength of the signal in the headphones will be found to be at the proper level for most comfortable headphone reception. When headphones are used the speaker is automatically disconnected.

The "AF Gain" control adjusts the volume of the receiver by varying the output of the audio amplifier. Volume is controlled in both the headphone and loud speaker circuits and the setting of this control is optional with the user of the receiver for the amount of volume desired.

"AVC Off" positions, an extremely strong signal will cause the receiver to block. Because of the unusually low residual noise level of the SKYRIDER 23 it is advised to adjust all controls carefully in familiarizing yourself with their functions and effects.

The "Stand-By" or "Send-Receive" switch when in the "Send" position removes plate voltage from the tubes. This allows the receiver to be made temporarily inoperative should it be used in conjunction with a transmitter.

The hand-wheel marked "Tuning", is for adjusting the main dial to the frequency desired. The mechanism is quiet in operation and free from back lash. The conveniently located control will give the greatest tuning ease after continued hours of operation.

The "ANL" or Automatic Noise Limiter control turns the noise limiter "on" or "off". No modern communications receiver is complete without an effective noise limiter. With the A.N.L. switch in the "on" position the noise limiter will prove to be of great assistance and frequently mean the difference between hearing a signal which otherwise would be inaudible on the higher frequencies where ignition and other pulsating types of interference are most aggravating.

The "RF Gain" control adjusts the sensitivity of the receiver by varying the cathode bias on the RF and IF amplifiers. Maximum sensitivity will be obtained with this control rotated clockwise as far as it will go. When this is done a switch will be operated, the function of which will be described under S meter.

When using the receiver under varying local conditions of noise, it will be advisable to adjust both the "RF" and "AF" gain controls until the most favorable signal to noise ratio is found. Until such a time as you have become thoroughly familiar with the function of all controls it is suggested that the R. F. gain be advanced until the white dot on the knob is pointing approximately at the "6" on SKYRIDER. Later experiment to find the best position for a given signal bearing in mind that with the selectivity switch in any of the

## CRYSTAL OPERATION

There are three controls which must be properly adjusted for most satisfactory crystal filter operation. Their operation shall be treated in the order in which they are called upon to perform their functions in the receiver.

Selectivity Switch -

There are three positions of selectivity with the Automatic Volume Control circuit operating. For high fidelity broadcast reception the selectivity switch should be rotated to the "IF Broad" position.

With the switch placed in the "IF Sharp" position the selectivity is greatly increased at no apparent sacrifice in tone reproduction.

The "Phone Crystal" position affords maximum selectivity with automatic volume control. The receiver will have to be accurately resonated on each desired signal because this step of selectivity greatly attenuates the side-bands of a modulated carrier. You will notice the apparent slot into which the signal falls, only in the exact center of which will intelligibility of a good order be maintained. The "Phone Crystal" position is recommended under conditions of extreme interference where adjacent channel stations are causing objectionable heterodynes.

Rotating the switch in a counter-clockwise position still farther allows the receiver to be used in the three selectivity positions with the A.V.C. circuit disconnected. When the selectivity switch is so adjusted it is then necessary to manually adjust the "RF Gain" to keep the signal under control.

In the "CW Crystal" position the maximum selectivity of the set is obtained. The drop in background noise is immediately apparent. This position is recommended only for the reception of CW or code signals because the selectivity is so great phone signals are practically unreadable. To realize the maximum in performance from the SKYRIDER 23 crystal circuit, the following two controls should be adjusted as described. First tune in an extremely strong CW signal.

The "Pitch Control" should be turned until a beat note is audible. Then adjust the main tuning control and go across the signal. Two distinct signals will be heard either side of zero beat, or the null position in the center tuning through which no signal is audible. See whether the low or the high frequency side of the signal (that which appears either side of zero beat) is the weaker. Leave the receiver set on whichever of the two signals is the weaker. Now very carefully adjust the "Phasing Control" until you have eliminated that signal as much as possible. As an additional step to see whether you have chosen the proper low or high frequency image to reject, rotate the "Pitch Control" through zero beat to the other side so that a beat note of approximately the same pitch as before is obtained. Now retune the receiver and it will be apparent that the signal on the other side of zero beat (as referred to the markings on the dial at which this signal was first tuned in) is reduced in volume. Again carefully adjust the "Phasing Control" and compare the strength of the audio image when this side has been phased out, or rejected. When you have demonstrated that the phasing or rejection is better on either the low or high frequency audio image the phasing control is left in that position and you then have the SKYRIDER 23 adjusted for the extremely selective crystal action for which it is noted.

The "Pitch and Phasing Controls" should be called upon frequently to demonstrate how, through proper adjustment, extreme conditions of interference can be coped with. Frequently, a slight adjustment of the pitch control will place a desired signal in the clear when the two signals differ in frequency by only a few hundred cycles. Minute adjustment of the phasing control will frequently obliterate an interfering signal by dropping it in the crystal slot.

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# THE HALLICRAFTERS INC.

MODEL SX23
Super Skyrider
Schematic, Notes

## TUBE LINE-UP

6SK7 R.F. Amplifier
6SA7 1st Detector-Mixer
6SJ7 High Frequency Oscillator
6SK7 1st I.F. Amplifier
6SK7 2nd I.F. Amplifier
6SQ7 2nd Detector, 1st Stage of Audio
6F6 2nd Stage of Audio
6SJ7 Beat Frequency Oscillator
6H6 Automatic Noise Limiter
6B8 Amplified A.V.C.
80 Rectifier

## S METER

Close to the license tag on the rear of the receiver will be found a knurled shaft which is to be used in adjusting the "S" meter. Prior to adjusting this control the R. F. gain control must be in the maximum gain position, or rotated clockwise until a switch which is mounted on this control, is heard to operate. Additionally, the Selectivity Switch must be in any one of the three "A.V.C. On" selectivity positions. When the above two conditions are filled the meter is in the circuit and should be adjusted as follows: Disconnect the antenna from the receiver, being sure no strong local signal is being picked up by the receiver with the antenna removed. Now adjust the S meter shaft until the meter rests at zero. Reconnecting the antenna will then show the meter indicating relative carrier strength in both S units as well as DB's or decibels. Should most accurate S meter indication be desired, it is recommended that the meter be adjusted with the Selectivity Switch in the step of selectivity most frequently used.

The S meter does not function with the Selectivity Switch in the "A.V.C. Off" position because the meter is connected in the A.V.C. circuit which preferably is used for telephone reception.




SCHEMATIC DIAGRAM — SKYRIDER 23

the hallicrafters inc.

The SKYRIDER 23 draws 110 watts at 115 volts 60 cycles alternating current.

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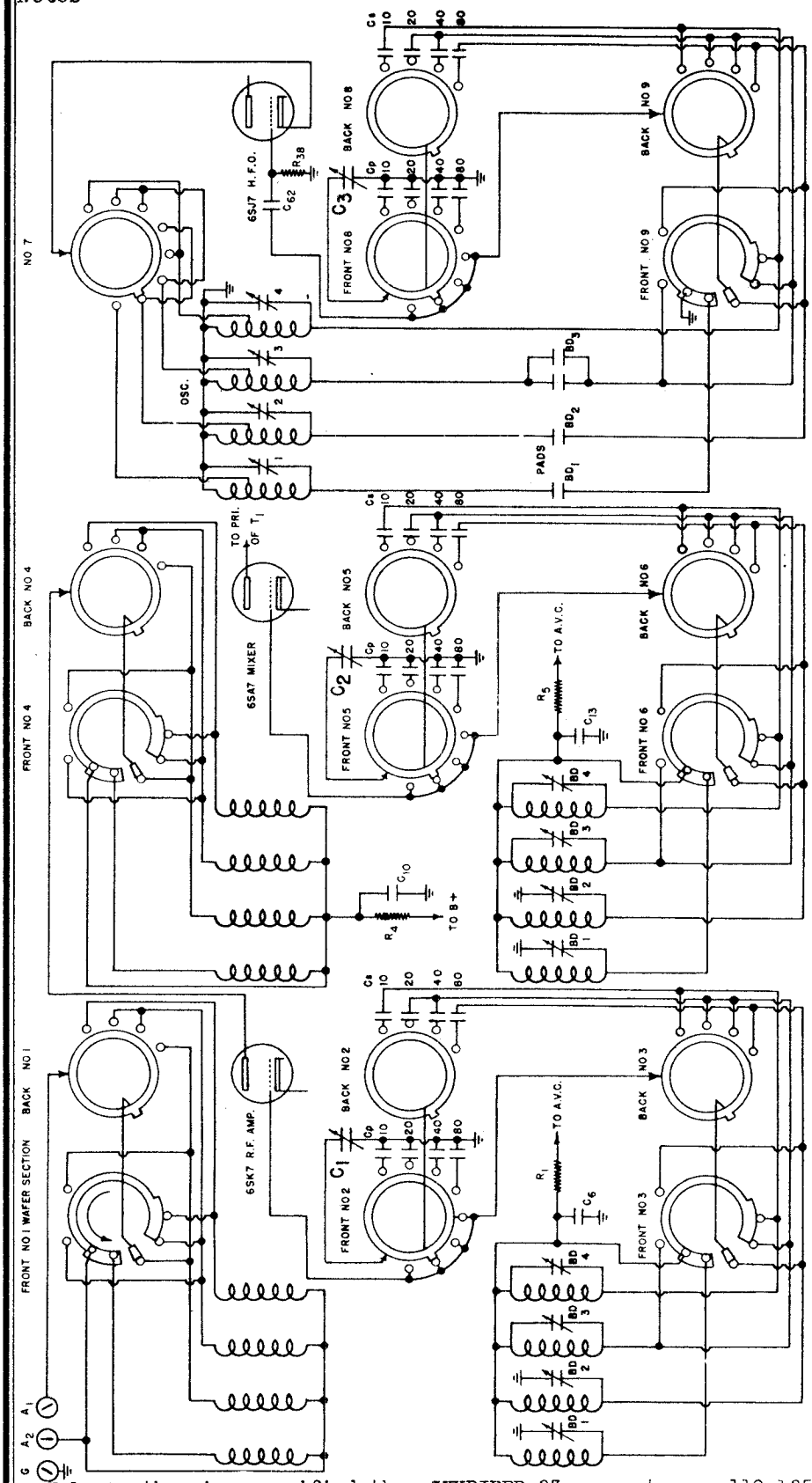
MODEL SX23, Super Skyrider
R-F Switching Schematic
Notes

# THE HALLICRAFTERS INC.




NO. 1 WAFER IS FARTHEST FROM THE FRONT PANEL AND SELECTS ANTENNA PRIMARIES

Cp (CONDENSERS PARALLEL)

| | | |
|---|---|---|
| 10 | 59.7 | mmfd CERAMICON |
| 20 | 104.4 | " " |
| 40 | 571 | " " |
| 80 | 943 | " " |

Cs (CONDENSERS SERIES) R.J.H. 04113923

| | | |
|---|---|---|
| 10 | 51.4 | mmfd CERAMICON |
| 20 | 38. | " " |
| 40 | 313.6 | " " |
| 80 | 99.5 | " " |

## DETAILED SCHEMATIC R.F. SWITCHING SECTION

On the rear apron of the chassis you will find output terminal strips marked 500 and 5000 ohms. The Hallicrafters permanent magnet dynamic matching S23 speaker should be connected to the 5000 ohm terminals. The 500 ohm contacts can be connected to a separate speaker or a load of that impedance value. The terminals marked "EXT SW" should be connected to an external switch, a portion of which is used to turn "on" and "off" your transmitter. The "EXT SW" terminals are paralleled with the front panel "Send Receive" switch. In order to make the external switch operate the "Send Receive" switch must be left in the "send" position. In viewing the receiver from the back the right hand "EXT SW" contact is grounded. When connecting to associated equipment this point should be borne in mind so that no potential difference will arise between it and the receiver.

## FREQUENCY RANGE

| | | |
|---|---|---|
| Band 1 | 540 KC | 1,700 KC |
| 2 | 1.7 MC | 5.2 MC |
| 3 | 5.2 MC | 16.5 MC |
| 4 | 11 MC | 34.0 MC |

Unless otherwise specified the SKYRIDER 23 operates on 110-125 volts 60 cycle alternating current. A universal transformer model is available which will operate on 25-60 cycle current. This transformer is provided with taps to cover in 5 steps a voltage range from 110 to 250 volts. Actual operation is identical with either the 25 or 60 cycle transformer.

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MODEL SX23, Super Skyrider

# THE HALLICRAFTERS INC.

Socket, Trimmers, Parts

## LIST OF CONDENSERS SKYRIDER 23

| NO. | VALUE | VOLTAGE | TYPE |
|---|---|---|---|
| 1 | | | |
| 2 | 437 mmfd. | Main tuning gang | |
| 3 | | | |
| 4 | 1.2-12.0 " | R.F. Circuit trimmer | |
| 5 | Series padding for Band Spread | | |
| | See detailed Schematic. | | |
| | .05 mfd. | 200 | Paper |
| 6 | Parallel padding for Band Spread | | |
| 7 | See detailed Schematic. | | |
| 8 | .05 mfd. | 200 | Paper |
| 9 | .01 " | 400 | " |
| 10 | .05 " | " | " |
| 11 | 1.2-12 mmfd. | R.F. Circuit trimmer | |
| 12 | Series padding for Band Spread | | Paper |
| 13 | .05 mfd. | 200 | |
| 14 | Parallel Padding for Band Spread | | Paper |
| 15 | .05 mfd. | 200 | Paper |
| 16 | .002 " | | Mica |
| 17 | 50 mmfd. | | Ceramic |
| 18 | .01 mfd. | 400 | Paper |
| 19 | .002 " | | Mica |
| 20 | 250 mmfd. | | Ceramic |
| 21 | 200 " | | " |
| 22 | .05 mfd. | 400 | Paper |
| 23 | 100 mmfd. | | Ceramic |
| 24 | 100 " | | " |
| 25 | 2-25 " | Variable | |
| 26 | 5-50 " | " | Mica |
| 27 | 250 " | | Ceramic |
| 28 | .05 mfd. | 200 | Paper |
| 29 | .01 " | " | " |
| 30 | .05 " | " | " |
| 31 | 250 mmfd. | | Ceramic |
| 32 | 250 " | | " |
| 33 | 250 " | | Mica |
| 34 | .05 mfd. | 200 | Paper |
| 35 | .05 mfd. | 400 | Paper |
| 36 | 250 mmfd. | | Ceramic |
| 37 | 3 " | | Gimmick |
| 38 | 100 " | | Ceramic |
| 39 | 50 " | | Ceramic |
| 40 | .05 mfd. | 200 | Paper |
| 41 | .05 " | 400 | " |
| 42 | .01 " | " | " |
| 43 | .01 " | " | " |
| 44 | 20 " | 25 | Electrolytic |
| 45 | .002 " | | Mica |
| 46 | .01 " | 400 | Paper |
| 47 | 250 mmfd. | | Mica |
| 48 | 500 " | | Ceramic |
| 49 | 2-25 " | | Variable |
| 50 | .05 mfd. | 400 | Paper |
| 51 | 150 mmfd. | | Ceramic |
| 52 | .1 mfd. | 200 | Paper |
| 53 | 250 mmfd. | | Mica |
| 54 | .05 mfd. | " | Paper |
| 55 | .05 " | " | " |
| 56 | .05 " | " | " |
| 57 | 16 " | 475 | Electrolytic |
| 58 | 16 " | " | " |
| 59 | .25 " | 200 | Paper |
| 60 | .002 " | | Mica |
| 61 | 50 mmfd. | | Ceramic |
| 62 | Parallel padding for Band Spread | | |
| 63 | Series " " | | " |
| 64 | 1.2-12 mmfd. | | O & C trimmer |
| 65 | .002 mfd. in 3rd Band OSC Series | | |
| 66 | tracking pad | | |
| 67 | .01 " | 400 | Paper |
| 68 | .02 " | 200 | " |
| 69 | .1 " | " | " |

## LIST OF RESISTORS SKYRIDER 23

| NO. | OHMS | WATTAGE | TOLERANCE |
|---|---|---|---|
| R1 | 100,000 | 1/3 | 20% |
| 2 | 1,000 | " | 10% |
| 3 | 10,000 | R.F. Gain Control | |
| 4 | 5,000 | 1/3 | 20% |
| 5 | 100,000 | " | " |
| 6 | 600 | " | 10% |
| 7 | 20,000 | " | 20% |
| 8 | 5,000 | " | " |
| 9 | 100,000 | " | " |
| 10 | 1,000 | " | 10% |
| 11 | 5,000 | " | 20% |
| 12 | 1,000 | " | 10% |
| 13 | 5,000 | " | 20% |
| 14 | 1,000,000 | " | " |
| 15 | 200,000 | " | 10% |
| 16 | 400,000 | " | " |
| 17 | 500,000 | " | 20% |
| 18 | 500,000 | A.F. Gain Control | |
| 19 | 400 | 1 | 10% |
| 20 | 5,000 | 2 | 20% |
| 21 | 50,000 | 1 | " |
| 22 | 50,000 | 1/3 | " |
| R23 | 5,000 | 1/3 | 20% |
| 24 | 500,000 | " | " |
| 25 | 250,000 | " | 10% |
| 26 | 200,000 | " | " |
| 27 | 500 | " | " |
| 28 | 1,000,000 | " | 20% |
| 29 | 25,000 | " | " |
| 30 | 5,000 | 2 | |
| 31 | 6,500 | 7 | |
| 32 | 500 | 1/3 | 10% |
| 33 | 500 | "S" Meter Adjustment | |
| 34 | 15,000 | 1 | 20% |
| 35 | 25,000 | " | " |
| 36 | 3,000 | 1/3 | 10% |
| 37 | 500 | " | " |
| 38 | 50,000 | " | 20% |
| 39 | 500,000 | Tone Control | |
| 40 | 1,000 | 1/3 | 10% |
| 41 | 1,000 | " | " |
| 42 | 10,000 | 1/2 | 20% |
| 43 | 100,000 | 1/3 | " |




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## BAND SPREAD

Realizing that reset accuracy is a very desirable feature the SKYRIDER 23 was designed so that only the amateur bands from 10 to 80 meters could be bandspread. The switch mechanism and associated temperature compensated condensers are unique and eliminate the necessity of accurately resetting the main tuning dial whenever it is desired to band spread the amateur frequencies.

The four "Band Spread" positions found on the SKYRIDER 23 cover the frequencies indicated below:

| | | |
|---|---|---|
| Band 10 - 28 MC to 30 MC | | 40 - 7 MC to 7.30 MC |
| 20 - 14 MC to 14.4 MC | | 80 - 3.50 MC to 4.00 MC |

When operating the receiver in the band spread position it will be noticed that more than just the frequencies of each amateur band are covered. This has been found advisable for the reception of signals being sent on frequencies outside the amateur bands, as well as the reception of commercial stations for marker purposes, inasmuch as their exact frequency is usually known.

Each amateur band is spread over a sufficient number of divisions on the band spread scale to make tuning on that particular band effortless and accurate.

In addition to the frequency range in the circuit being identified by the Hallicrafters band switch knob under the main tuning dial, that particular band is also shown by referring to the illuminated indicator directly to the right of the main dial.

## ALIGNMENT PROCEDURE

The alignment of the S23 is straightforward and requires no equipment other than the usual signal generator, or other signal source, and an output meter.

### I. F. ALIGNMENT

No. 1 - Remove the "Bottom Pan" from the cabinet and then the square "RF Coil Shield Bottom" so that the RF oscillator and mixer tube bases, switch and coils are accessible.

No. 2 - Unsolder the control grid wire from 6SA7 tube base at the point at which it connects to switch section No. 6. Signal is applied to this grid for alignment of I. F. AVC and BFO circuits. An output meter is connected across 5000 ohm speaker terminals.

No. 3 - Connect the signal generator to the control grid of the 6SA7 mixer through a .01 mfd condenser. Now connect a 100,000, 1/3 watt, resistor from the control grid of the 6SA7 to AVC Return on the mixer RF coil form. (See note "A" Schematic).

No. 4 - Place the selectivity switch in "AVC Off IF Sharp" position; the wave band switch in #5.2-16.0 megacycle position or #3 band, volume and RF controls in maximum gain position.

No. 5 - Apply 455 KC signal of sufficient strength to give an approximate output of 500 milliwatt and adjust trimmers A1, A2, A4, A5, A6, A7 and A8 to maximum deflection of output meter.

### B.F.O. ADJUSTMENT

Turn the BFO control so that the dot on the knob is pointing to the top of the cabinet and then adjust A10 until the beat note is zero frequency.

### CRYSTAL ALIGNMENT

No. 6 - For alignment of crystal, place selectivity switch in CW crystal position, remove modulation from signal source, adjust BFO pitch control until a beat note of approximately 1000 cycles is attained. Detune the signal source from 455 KC and then adjust the crystal phasing control to a point where the hiss noise from the speaker is reduced to a minimum. Now vary the frequency of the signal source from about 453 to 457 KC. At some frequency between these points a sharp increase in speaker output will be noted. This is the resonant frequency of the crystal. The signal generator should be adjusted to this point of crystal resonance for maximum meter deflection. Touch up all trimmers, No. A2, A4, A5, A6, A7 and A8 for precise alignment to the crystal frequency. Assuming the output beat note is still set at approximately 1000 cycles, and leaving all controls on the receiver as previously adjusted, change the frequency of the signal generator until the output beat note is reduced from 1000 cycles down thru zero beat and up to the other side to a frequency of approximately 400 cycles. Now balance A1, and the crystal phasing control until the rejection slot is at minimum. It will be necessary to increase the output of the signal generator for this adjustment in order to obtain a satisfactory output level.

Note: A3 is a coupling condenser which should never need adjustment as it will not effect the alignment of the set but only vary the gain of the I. F. unit.

No. 7 - To adjust the AVC, turn the BFO pitch control to "off" position, the selectivity switch to "AVC On I. F. Sharp" position. Adjust the frequency of the modulated signal source to the resonant frequency of the I. F. unit with the signal strength sufficient to set up about 500 milliwatts in output meter. Now adjust A9 until the output is reduced to a minimum, which is the point where the AVC is resonant and operating properly.

Resolder the grid wire of the 6SA7 to the switch section contact and replace the R.F. coil shield bottom.

### R.F. ALIGNMENT

The holes in the "RF Coil Box Cover" marked "W" as shown in the instruction book are to permit the insertion of a "Wand" into the coil forms for checking of alignment. The "Wand" is a rod of insulating material having a brass slug in one end and a powdered iron slug in the other. When the iron slug is placed in field of coil the inductance is increased, and when the brass slug is used, the inductance is decreased.

NOTE: When checking points of alignment the meter deflection should decrease when either end of "Wand" is used, if the set is properly aligned. If the meter deflection increases when the "Iron" end of "Wand" is in the field then the trimmer capacity should be increased. If, however, the meter reading increases when the "Brass" end of "Wand" is used then the trimmer capacity will have to be reduced.

When the condenser gang is fully closed be certain that the indicating line on the dial window is in line with the zero mark on the band spread calibration and the small line below the 550 KC calibration point. Place selectivity control in the "I. F. Sharp-AVC off" position. R. F. and Audio gain controls adjusted for maximum gain and signal of sufficient strength fed to the receiver to give approximately 500 milliwatts output.

Band No. 1 - "545 KC to 1700 KC"

Connect a wire between A2 and ground terminal or "G" on the antenna strip. Connect the ground side of the signal generator to the ground terminal of antenna strip and connect the high side of signal generator to A1 thru a 200 mmfd condenser.
Set the receiver dial and signal generator dial to 1500 KC - align trimmer indicated as Osc. 1 to resonance with this signal frequency and then adjust RF trimmer and antenna trimmer as indicated Band No. 1 to obtain maximum deflection on output meter. Next set the generator signal and receiver to 600 KC and while rocking the main tuning knob adjust low frequency pad (indicated as Pad BD1) until the output is maximum. Recheck alignment at 1500 KC and then the 600 KC position again for precise alignment.

Band No. 2 - "1700 KC to 5.2 Megacycles"

Note: Replace the 200 mmfd condenser with a 400 ohm resistor for alignment of Bands Nos. 2, 4 and 5.

Following same procedure as Band No. 1, align first at 4000 KC, using trimmers indicated as "Osc. 2" and R. F. trimmers "Band 2". The low frequency end is checked at 1800 KC by rocking condenser gang while adjusting pad BD2 until maximum output is obtained.

Band No. 3 - "5.2 Megacycles to 16 Megacycles"

The high frequency end of this band is aligned at 14 megacycles, using oscillator Trimmer "Osc-3" and RF trimmers indicating Band 3. The low frequency end is padded at 7. megacycles using series pad indicated "Pad BD3".

Band No. 4 - "10 Megacycles to 34. Megacycles"

This band is aligned at 30 megacycles first by setting dial at 30 megacycles and adjust Osc. 4 until signal is received, then by "rocking" condenser gang slightly and adjusting ("Band 4") RF trimmer until maximum output is obtained. Antenna trimmer, Band 4, is not aligned until the oscillator and R. F. trimmers are first adjusted for maximum output. It is not necessary to adjust the oscillator for low frequency tracking as this is adjusted at factory and should be permanent.

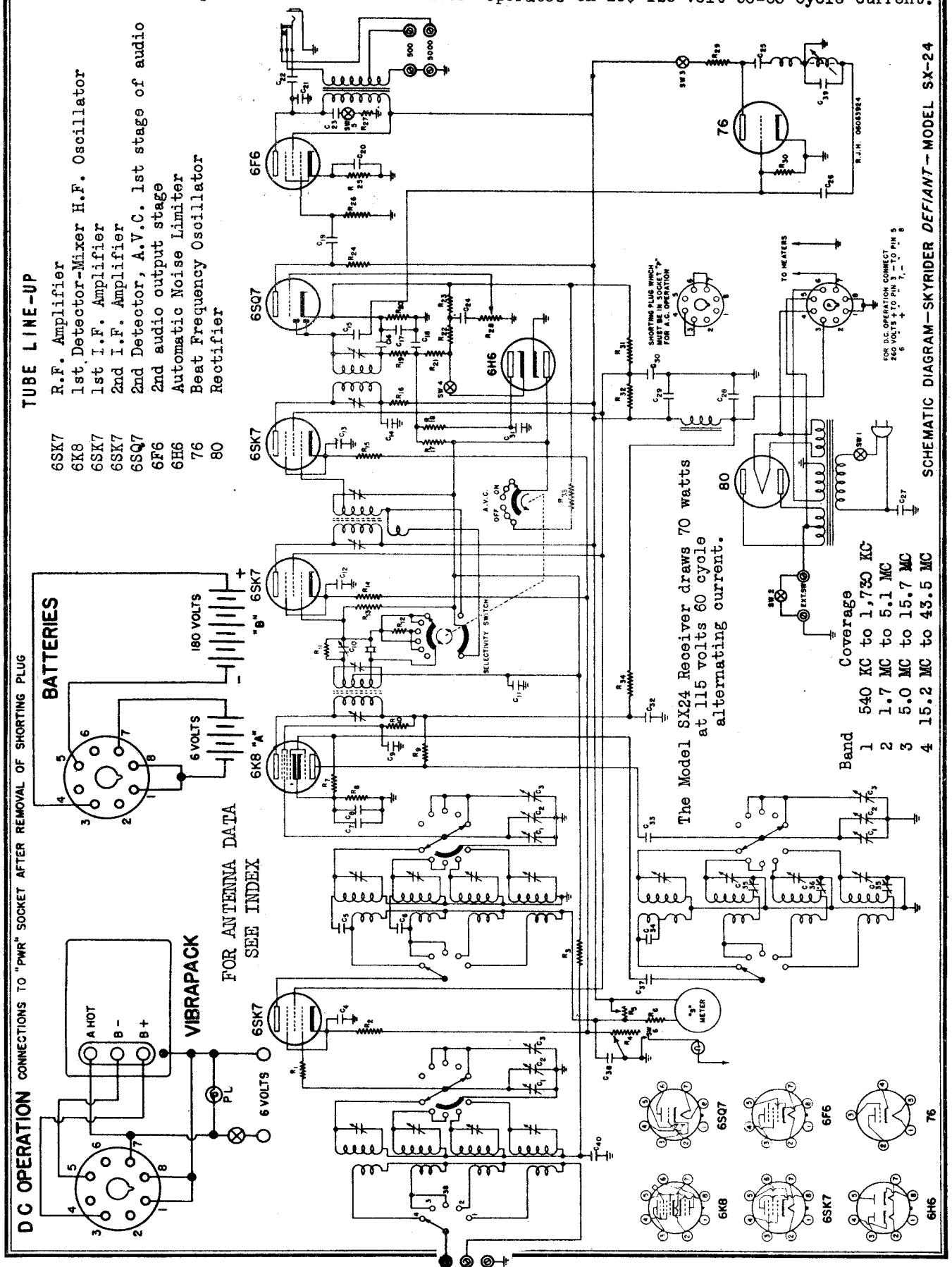
The band spread positions do not require alignment as the alignment for band coverage position also takes care of band spread alignment.

Schematic

# THE HALLICRAFTERS INC.

MODEL SX24
Skyrider Defiant

Unless otherwise specified the SX24 Receiver operates on 100-125 volt 50-60 cycle current.

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# MODEL SX24, Skyrider Defiant

## Socket, Trimmers Parts List Alignment

# THE HALLICRAFTERS INC.

### RESISTORS

| NO. | OHMS | WATTAGE | NO. | OHMS | WATTAGE |
|---|---|---|---|---|---|
| 1 | 30 | 1/3 | 18 | 1,000,000 | 1/3 |
| 2 | 200 | " | 19 | 50,000 | " |
| 3 | 100,000 | " | 20 | 100 | " |
| 4 | 10,000 | R.F. Gain Control | 21 | 250,000 | " |
| 5 | 500 | Variable | 22 | 100,000 | " |
| 6 | 400 | 1/3 | 23 | 250,000 | " |
| 7 | 50,000 | " | 24 | 250,000 | " |
| 8 | 200 | " | 25 | 500 | 1 |
| 9 | 15,000 | 1 | 26 | 500,000 | 1/3 |
| 10 | 30,000 | 1 | 27 | 5,000 | 1 |
| 11 | 2,000,000 | 1/3 | 28 | 500,000 | A.F. Gain Control |
| 12 | 50,000 | " | 29 | 20,000 | 1 |
| 13 | 500,000 | " | 30 | 50,000 | 1/3 |
| 14 | 300 | " | 31 | 20,000 | 1 |
| 15 | 300 | " | 32 | 15,000 | 1 |
| 16 | 1,000 | " | 33 | 150 | 1/3 |
| 17 | 1,000,000 | " | 34 | 5,000 | 1 |

### CONDENSERS

| NO. | CAPACITY | VOLTAGE | TYPE | NO. | CAPACITY | VOLTAGE | TYPE |
|---|---|---|---|---|---|---|---|
| 1 | 440 mmfd | Per Section | | 21 | .005 mfd | 600 | Paper |
| 2 | 4 " | " " | | 22 | .01 " | 400 | " |
| 3 | 26 " | " " | | 23 | .02 " | 600 | " |
| 4 | .05 mfd | 200 | Paper | 24 | .02 " | 200 | " |
| 5 | 25. mmfd | | Ceramicon | 25 | .01 " | 400 | " |
| 6 | 10. " | | " | 26 | 100. mmfd | | Mica |
| 7 | .002 mfd | | Mica | 27 | .01 mfd | 600 | Paper |
| 8 | .05 " | 200 | Paper | 28 | 30. " | 350 | Electrolytic |
| 9 | .05 " | 400 | " | 29 | 10. " | " | Electrolytic |
| 10 | 25. mmfd | Crystal Phasing | Air | 30 | .1 " | 400 | Paper |
| 11 | .02 " | 200 | Paper | 31 | .05 " | 200 | " |
| 12 | .05 " | " | " | 32 | 10. " | 350 | " |
| 13 | .05 " | " | " | 33 | 100 mmfd | | Mica |
| 14 | .02 " | 400 | " | 34 | 105 " | | Ceramicon |
| 15 | 3. " | Twisted Pair | | | 2200 | | |
| 16 | 100. " | | Mica | 35 | 450 " | Dual Pad | |
| 17 | 10. mfd | 25 | Electrolytic | 36 | 1400 " | " | |
| 18 | 50. mmfd | | Mica | 37 | .002 mfd | | Mica |
| 19 | .05 mfd | 400 | Paper | 38 | .05 " | 400 | Paper |
| 20 | 10. " | 25 | Electrolytic | 39 | .0005 " | | Mica |
| | | | | 40 | .05 " | 200 | Paper |

SW1 - AC Switch On AF Gain
SW2 - Send RC Switch
SW3 - B.F.O. on & OFF
SW4 - A.N.L. on & OFF
SW5 - Hi-Low Tone Switch
SW6 - S-Meter

## ALIGNMENT PROCEDURE

455 KC, Intermediate-Frequency Alignment.
Have the controls set as follows:
AF and RF gain controls for maximum volume.
B.F.O. switch in the "ON" position.
Set band switch to #2 band.
Set main dial to 2 megacycles, band spread to zero.
Selectivity switch in "CW Sharp" position.
Remove 6K8 grid cap and connect the hot side of your 455 KC generator to this tube. Connect the ground terminal of the signal generator to the chassis of the receiver. Now feed a 455 KC signal into the receiver and set the pitch control to give a beat note of approximately 1000 cycles. Adjust all I.F. transformer trimmers for maximum gain with the exception of the secondary trimmer on transformer T1. In adjusting this trimmer it will be noted that the output reaches a maximum goes through a dip and then back to maximum again. Wobbulate the IF frequency and align to the dip between the two maximum points. A distinct change in the crystal note sounding like an apparent broadening of the crystal action will be noted when the correct adjustment has been reached. Now repeak carefully the other trimmers for maximum gain.

## R. F. ALIGNMENT

Re-connect the grid cap to the 6K8 tube. Connect the hot side of the generator to the $A_1$ antenna terminal on the rear of the chassis. Be sure a jumper is connected to $A_2$ and G. Leave signal generator ground connected to the chassis of the receiver.

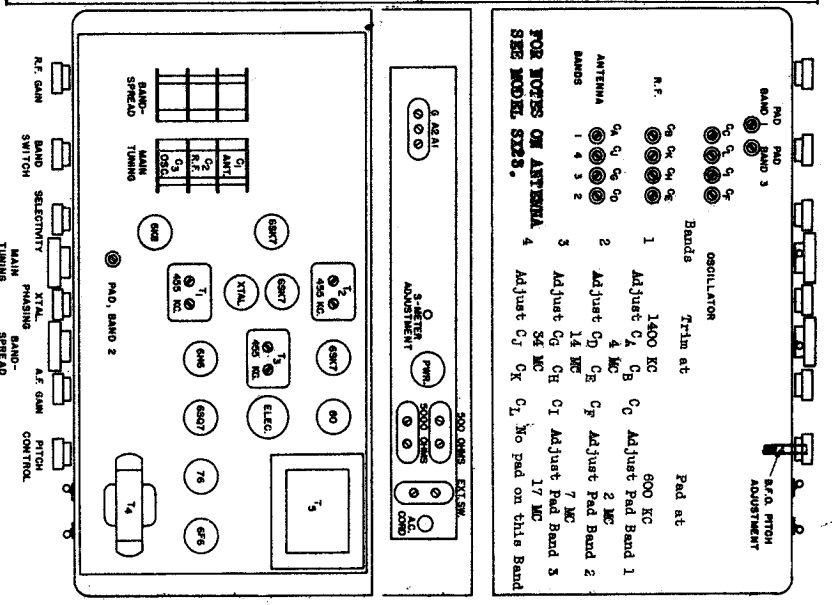
The location of the following trimmers and padders can be determined by referring to the top and bottom chassis views. All pad adjustments are for the low frequency end of each band while the trimmers are for the high frequency ends.

In order to get at the RF trimmers the guarantee card can be removed by placing a knife under the small snap fasteners holding it in place. So that most satisfactory adjustment of the trimmers and padders can be made, it is advisable to "Rock" the condenser gang across the signal being delivered by the generator until that particular circuit has been accurately peaked.

## "S" METER

When the R.F. gain control is advanced until a switch is heard to operate, a light will appear behind the translucent scale of the meter itself. Only when this light is on will the meter indicate in "S" units. With the R.F. gain control backed off from maximum the meter is still in the circuit but will not indicate carrier level accurately. When so adjusted the meter can be used as a resonance indicator. On the rear apron of the chassis is the "S" meter adjustment screw. To set the "S" meter, disconnect the antenna and have the R.F. Gain Control on full and the selectivity switch in the "I.F. sharp A.V.C. on" position. Now, adjust this knurled knob until the meter reads zero. Reconnecting the antenna and tuning in a station will show its relative carrier intensity.

The 500 and 5000 ohm terminals are for connections to a loud speaker or other load of those impedance values. The matching SX23 speaker should be connected to the 5000 ohm strip. When headphones are plugged into the phone jack the 5000 ohm speaker connection is automatically disconnected.




Note: The accuracy of the main dial calibration will hold only if the BAND SPREAD condenser is set at minimum capacity, or the position indicated by "0" on the Band Spread dial which has been approached by turning the Band Spread Knob in a clockwise direction, or to the right, as far as it will go.

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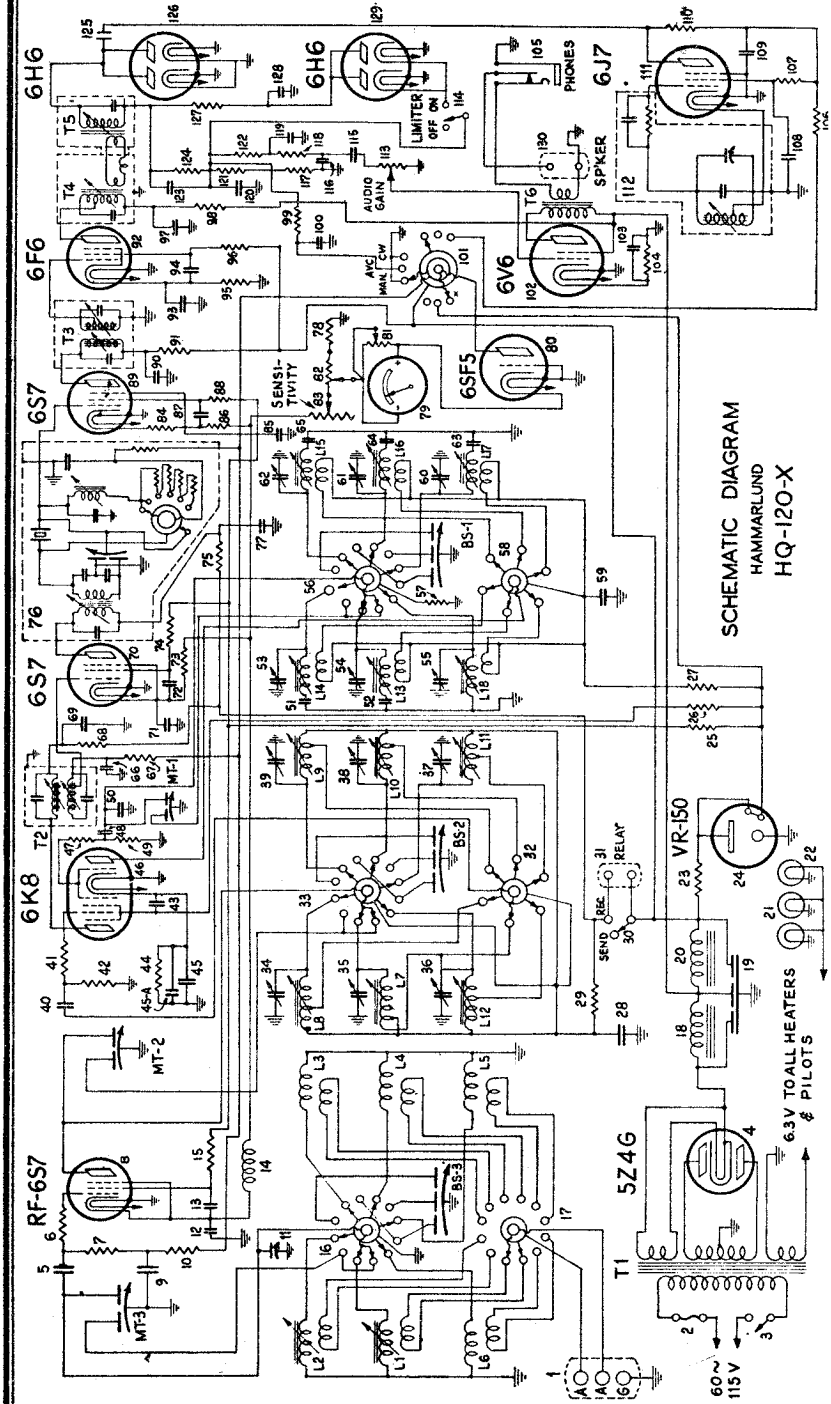
# HAMMARLUND MFG. CO.

MODEL HQ-120X, Crystal
Schematic, Socket
Trimmers, Notes

12-tube superheterodyne covers a continuous range of from 31 to .54 mc. (9.7 to 555 meters) in 6 steps, thus taking in all important communication, amateur and broadcast bands.



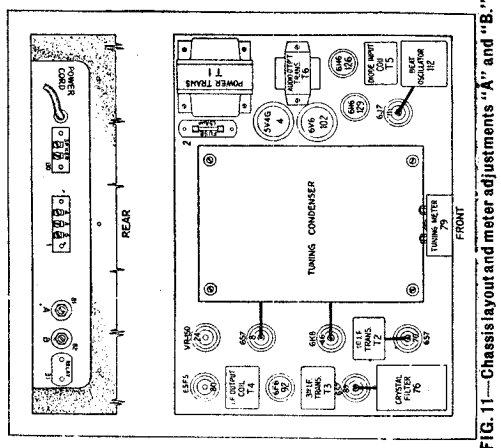




FIG. 11—Chassis layout and meter adjustments "A" and "B."

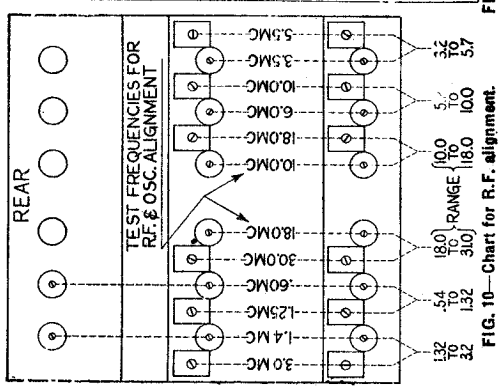



FIG. 10—Chart for R.F. alignment.

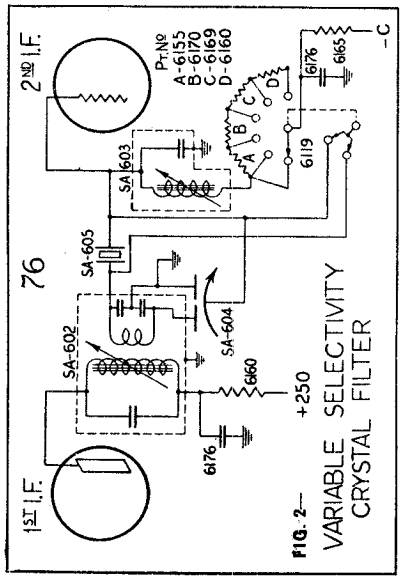



FIG. 2—

## ANTENNA REQUIREMENTS

The input of the "HQ-120" is arranged so that various types of antennas may be employed. The average input impedance is 400 to 600 ohms. The most common type of antenna used generally by the amateur and short wave listener is the Marconi, consisting of a single wire and ground connection.



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## CIRCUIT ARRANGEMENT

PRE-SELECTION: The pre-selector stage in this receiver is extremely high in gain due to its tuned grid and tuned plate circuits. An additional feature has been included in this stage in order to compensate for various types of antennas which may be used with the receiver. The adjustable compensating control which appears on the panel, directly underneath the meter, provides an external adjustment for perfectly aligning the circuits with any given antenna system. This is highly desirable for it is almost impossible to maintain fixed circuit alignment when antennas are frequently changed. Also, because the selectivity is thus improved and the gain considerably increased, this feature affords maximum signal-to-noise ratio and maximum image rejection. See Fig. 1.

BAND SPREAD: Much of the detail as to the band-spread arrangement has been covered in the introduction of this book. The band-spread control has five scales. The first is an arbitrary scale readjng 0 to 200 for calibration in any of the bands covered by the receiver. This dial also includes four other scales calibrated in megacycles for the 80, 40, 20, and 10 meter amateur bands. It is rather unusual to find a band-spread dial calibrated directly in megacycles. However, due to the excellent stability of the receiver in general, and the outstanding design of the tuning condenser assembly, this has proved absolutely practical and, to say the least, most convenient.

CONVERTER STAGE: The converter stage uses the newly developed 6K8 tube which, incidentally, becomes more efficient as the frequency increases. The converter stage in this receiver has been treated in such a manner that the overall RF gain is relatively constant not only from one end of a particular amateur band to the other, but also from one band to the other. This is done because it can be readily seen that if the RF gain is not relatively uniform throughout each band and from one band to the other, the "S" meter reading will not be a true indication of signal strength. In some bands it would require a stronger signal to indicate "S-8" on the meter than in others. This has for a long time been a common ailment in receivers and a barrier to true meter readings. However, in the case of the "HQ-120-X" circuit adjustment has been made to permit accurate meter readings.

In order to increase stability, the oscillator is operated from a controlled voltage circuit employing the VR 150 voltage regulator tube. It is a well-known fact that fluctuations in power line voltage in many cases induce a frequency change in the high frequency oscillator stage. The use of the voltage regulator tube in a very effective circuit eliminates all danger from this source because the voltage applied to the oscillator portion of the converter remains constant regardless of power line changes. Also, the calibration of the receiver is maintained more accurately.

CRYSTAL FILTER: The crystal filter included in the "HQ-120-X" is an outstanding HAMMARLUND development. Unlike most other crystal filters, this one has five ranges of selectivity. These five degrees of selectivity are controllable directly from the panel by operation of a rotary switch. And, these degrees of selectivity remain permanent regardless of the rejector control setting. These five steps include 1, 2, and 3 for phone reception, varying from broad to fairly sharp, in convenient steps. The fourth and fifth are for CW or code reception. Four, being moderately selective and "five" the maximum selectivity of the crystal filter. The crystal can also be cut out for general use, by the sixth contact on the switch; see diagram in Fig. 2. Various curves showing the selectivity for these settings of the selectivity control are indicated in Fig. 3. There is absolutely no interlocking of the controls in this crystal filter. The rejector or phasing control can be set to eliminate a heterodyne of some particular frequency within its range, and will not require re-adjustment when the selectivity control of the filter is changed. Also, the output, or overall gain, of the receiver is not noticeably affected by changes in selectivity of the filter. This feature is extremely desirable, especially from the standpoint of accurately determining the strength of incoming signals. It is not necessary to make allowances for usual attenuation in the crystal filter, should it be necessary to change the selectivity in order to eliminate interference.

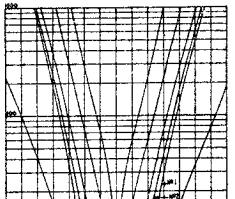


FIG. 3—Overall selectivity curves for the H.F. amplifier and crystal filter. Labeling of the curves corresponds to the markings on the panel.

NOISE LIMITER: The automatic noise limiter faithfully follows the carrier signal strength, It is intended to eliminate automobile-ignition interference and other similar disturbances. It works with the A.V.C either on or off and is so arranged that its operation does not affect the intelligibility of the received signal by altering the audio form. Its effect on modulation is negligible. There is also a switch on the panel for cutting out the noise limiter when it is not required, although it can be left in the circuit permanently without ill effects.

I. F. AMPLIFIER: The intermediate frequency amplifier consists of three stages employing iron core permeability-tuned transformers. The intermediate frequency is 455 kc. which has now become the R.M.A. standard. Overall selectivity curves for the I. F. amplifier with crystal filter are shown in Fig. 3. The A.V.C. arrangement in this amplifier provides remarkably smooth operation. There is a switch for cutting out the A.V.C. and providing manual control of volume or sensitivity.

"S" METER: The "S" meter is calibrated to read in "S" units from 1 to 9. "S-1" corresponds to approximately .39 microvolts input at the antenna terminals. "S-9" corresponds to 100 microvolts. The meter is also calibrated up to 40 DB. above "S-9." "S-8" equals 50 M.V., "S-7"—25, "S-6"—12.5, etc. Special compensating controls for the meter are provided so that, regardless of particular local conditions, corrections can always be made for irregularities. These controls and the adjustment of them are thoroughly discussed under "Operation."

BEAT FREQUENCY OSCILLATOR: The beat frequency oscillator circuit is designed to effectively heterodyne signals of varied signal level. This oscillator is so isolated that it has no material effect on the operation of the I.F. amplifier. The variable control on the panel provides a wide selection of beat frequencies. A switch is also provided for cutting the oscillator off.

A. F. AMPLIFIER: The A.F. amplifier consists of a 6V6 tube with an output of approximately 4 watts. A manual gain control is provided in this stage in order that the operator may choose the proper amount of amplification. The output impedance is 6 ohms, and the output terminals connect directly to the voice coil of a permanent-magnet dynamic speaker.

POWER SUPPLY: Special care has been exercised in the design of this part of the receiver. Components used have a very large safety factor in order to insure satisfactory operation over a long period of time. A two-section filter is employed with a total inductance of 40 henries, and a total capacity of 40 microfarads. This heavy duty filter provides humless operation.

## REALIGNMENT PROCEDURE

I. F. AMPLIFIER: The "HQ-120-X" receiver is aligned by the usual oscillographic method during final inspection. Its I. F. circuits are of an extremely stable type employing high grade silver-plated mica fixed condensers which are practically unaffected by even extreme changes in temperature or humidity. Accurate circuit alignment is accomplished by adjusting the position of the iron dust cores in the I. F. coils by means of the slotted screws protruding from the sides of the I. F. transformers T2, T3, T4, and T5 and the crystal filter shield 76. This construction results in tuned circuits that hold their adjustment regardless of mechanical shocks or atmospheric conditions. For these reasons it is extremely unlikely that realignment will be necessary and it should not be attempted unless there is very good reason to suspect trouble in the I. F. end of the receiver. Slight misalignment of transformers T2 and T3 will have the most marked effect on sensitivity and selectivity and their adjustment can be checked as follows:

Connect an output meter across the speaker voice coil leads. A low reading copper-oxide rectifier meter is quite suitable for this purpose. Connect a test oscillator (modulated) to the input terminals of the receiver. The frequency of this test oscillator may be anything within the range of the receiver, but its output must be steady. Then tune in its signal on the receiver with the crystal selectivity switch set on No. 1 (phasing control at centerscale) and adjust sensitivity (MAN) until a reading of approximately 1 volt is obtained on the output meter. It will now be found that the output meter reading is very sensitive to slight changes in tuning. After adjusting the tuning dial for peak output meter reading, check each adjusting screw on I. F. transformers T2 and T3. If any great change occurs readjust the tuning dial and again check the four I. F. adjustments. When no further improvement can be made T2 and T3 will be perfectly aligned. The lower, or plate circuit adjusting screw of the Crystal Filter transformer 76 may be checked at the same time and in the same manner.

To *perfectly* align the upper, or grid circuit of the crystal filter 76 an oscillograph and sweep oscillator are required. When such equipment is available the Crystal Selectivity switch may be set on No. 3 or No. 4 and the sweep frequency oscillator adjusted to coincide with the quartz crystal resonant frequency (phasing control at centerscale). Then, with Crystal Selectivity switch on No. 1, adjust the upper screw of Crystal Filter 76 for symmetrical pattern on the oscillograph screen. When such visual aligning equipment is not available a fairly satisfactory setting of this upper screw may be made as follows: After checking the alignment of T2, T3 and the lower screw of Crystal Filter 76 with the output meter as previously outlined, leave the Crystal Selectivity switch on No. 1 and tune in a broadcast station. Then adjust the upper screw in Crystal Filter 76 for best quality of reproduction of speech and music. In making this adjustment no attention should be paid to loudness. On either side of the correct setting, the speech and music will sound low and drummy, with a conspicuous absence of high audio frequencies. The correct setting can be checked by means of the tuning dial, by slowly turning it back and forth across resonance. When the upper screw is properly adjusted, the signal will tune in and out smoothly and there will be no peaks or lobes as the dial is turned. In fact, the signal should tune in and out just as *smoothly* as with the Crystal "off" except that the band width will be noticeably *narrower*.

R. F. AND H. F. OSCILLATOR: Before attempting to realign these circuits the following instructions should be read through very carefully. As in the case of the I. F. amplifier, these circuits have also been accurately aligned during final inspection and great care has been taken in their design to insure stability and permanence of adjustment. Therefore, they should not be disturbed unless it is absolutely certain that readjustment is necessary. Even in that case, only very slight alterations will be necessary to restore the receiver to its original efficiency. In general, a small fraction of a turn on either inductance adjuster or trimmer condenser will suffice. These adjustments, together with their respective test frequencies, are clearly shown on the chart (Fig. 10). On the bands from 3.2 mc. to 31 mc. it is extremely important to have the band spread dial set at 200, since that is the setting at which the main dial has been calibrated. Naturally, the alignment of the receiver cannot be more accurate than the source of the test signal. The aligning during final inspection at the factory is accomplished with special test oscillators which are frequently compared with standard frequency crystals. The front row of adjustments shown on the chart on page 13 control the high frequency oscillator circuits and consequently the dial calibration. These adjustments should be disturbed *only* if the calibration of the main dial (with band spread dial at 200) is known to be off. As clearly indicated in the diagram, the inductance should be adjusted at the low test frequency in each band and the trimmer capacitor at the high test frequency. These adjustments mutually affect each other, therefore, if any considerable change is made at one end of a band the other end of the same band must be readjusted. This procedure must be repeated until no further readjustment at either end is necessary.

The adjustments in the middle row control the first detector input circuits. No great accuracy of test signal is required to check their correctness. Set the oscillator approximately to the frequency shown on the chart and tune in on the receiver (using the output meter). Then adjust for peak meter reading by means of the inductance adjuster at the low test frequency and the trimmer capacitor at the high frequency end. At 30 mc. there is a certain amount of interlock between the detector and H. F. oscillator, so in order to avoid a false setting of the trimmer capacitor in this range, it will be necessary to rock the tuning condenser back and forth while the test is being made.

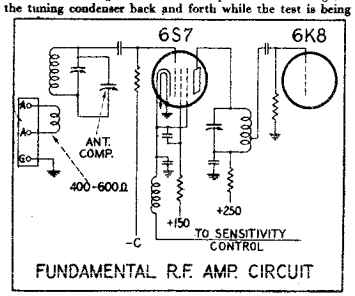


FIG. 1—Fundamental R.F. amplifier diagram showing antenna compensating condenser.

## MAINTENANCE

This chart provides information as to the various voltages which will appear between certain tube socket prongs and the ground or B-negative side of the circuit. A slight explanation of the chart might be in order. As an example, when checking the R.F. tube (6S7) we find that the reading from pin 3 to ground should be 200 volts if read on a 0–250 scale meter. The scale that should be used for making the check is contained in the parentheses below the voltage. In the course of making this check it may be found that the voltage will vary slightly in some cases. This, of course, will be due to varying line voltage conditions in the particular location where the receiver is being tested. The voltage values indicated should be found in cases where the line voltage is exactly 117 volts. A meter having a resistance of 1000 ohms per volt with scales approximately as indicated can be used for the checking.

In compiling the parts lists, an endeavor has been made to indicate all values of parts readily obtainable in the open market. For instance, such common items as .02 mf. paper condensers with 500 volt ratings and 10,000 ohm ½w. resistors are standard items. Other parts whose values are not standard should be obtained by writing to the factory. Such parts as 5.5 mmf. silver mica condenser, of course, are not readily obtainable. However, in many cases these special items are located in parts of the circuit where it is almost impossible for them to become defective through ordinary operation of the receiver.

| | SWITCH ON MAN. | | | | | | | SWITCH ON CW AVC | |
|---|---|---|---|---|---|---|---|---|---|
| TUBE | RF 6S7 | Conv. 6K8 | 1-IF 6S7 | 2-IF 6S7 | 3-IF 6F6 | Audio 6V6-G | REG VR150 | B.O. 6J7 | Meter 6F5 |
| Pin 3 to ground | 200 (250) | 215 (250) | 215 (250) | 210 (250) | 270 (500) | 260 (500) | ... | 35. (250) | ... |
| Pin 4 to ground | 115 (250) | 105 (250) | 115 (250) | 115 (250) | 122 (250) | 275 (500) | ... | 75. (250) | 150 (250) |
| Pin 5 to ground | ... | ... | ... | ... | ... | ... | 150 (250) | ... | ... |
| Pin 6 to ground | ... | 115 (250) | ... | ... | ... | ... | ... | ... | ... |
| Pin 8 to ground | 3.2 (10) | 3.2 (10) | 6.2 (10) | 6.2 (10) | 2.3 (10) | 15. (100) | ... | ... | 1.8 (10) |

# HAMMARLUND MFG. CO.

MODEL HQ-120X, Crystal Operating Notes, Parts

**HQ-120-X**

## OPERATION

After unpacking the receiver check the chassis carefully to determine that all tubes are properly fitted into their respective sockets. Also, be certain that all grid clips are in place on the tops of the tubes. It is possible that the grid clips or tubes may have been dislodged during transportation.

This receiver, unless it is a special model, operates on 105 to 125 volts AC at 50 to 60 cycles. If you are uncertain as to the type of power available for operating the receiver, check with your local power company office. An attempt to operate the set on other types of power is liable to ruin it. Next, connect the speaker to the receiver. Two wires from the permanent magnetic dynamic speaker connect to the two terminals on the rear edge of the chassis marked "speaker." The main power supply switch that turns the receiver on and off is operated in conjunction with the "audio gain" control. When this control is in the "off" position, the receiver is completely inoperative. So, the next operation is to turn this control on slightly and wait for the tubes to heat up to their operating temperature. In the meantime, set the band selector switch in the .54–1.32 megacycle position; this is the major part of the standard broadcast band, the remainder is covered in the 1.32 to 3.2 mc. band. Also, set the control marked "MAN-AVC.-BFO." in the AVC position. The crystal selectivity control knob should be set in the "off" position. This is the broadest setting. The control in the lower left-hand corner of the panel should be set in the "REC" position. This latter control turns the receiver on and off for stand-by and transmitting periods during communication, but does not disconnect the receiver from the power line thus leaving the tubes heated and ready for instant use. By this time, the receiver is in operation—tubes having had ample time to heat up. We can now tune in broadcast stations by turning the sensitivity control full on and advancing the audio gain control to the point permitting the desired volume. All tuning in the broadcast band is done with the "main tuning" control. The band-spread control does not operate in the first two ranges. For accurate tuning, it will be necessary to watch the "S" meter. At this point it might be well to mention that it is possible that the meter may not be operating properly and may require adjustment. Along the rear edge of the chassis we find two screw driver adjustments (see Fig. 11) marked "A" and "B." These are for aligning the meter so that it operates properly. First, with the receiver turned off the indicator on the meter should rest to the extreme left, at the beginning of the scale to the left of the first arrow. If not, the zero adjustment on the meter (the small screw in the lower central portion) should be adjusted and the receiver turned on again. Also, it might be wise to short-circuit the two antenna posts to ground in order to eliminate signal pickup because in adjusting the meter no signal should be present. With the receiver in the AVC position and the sensitivity control set on zero, the screw driver adjustment "A" on the rear of the chassis should be adjusted so that the indicating needle of the meter is opposite the arrow at the extreme right of the scale. With the "sensitivity" control turned to 10, adjust "B" so that the meter needle is opposite the small arrow at the left of the scale. This should be rechecked because there is a slight interlocking of these controls. It may be necessary to repeat the operation two or three times.

After the meter circuit has been properly aligned and the antenna system connected to the receiver (see chapter on antenna requirements) the main tuning control should be adjusted for maximum reading of the meter on any particular station. The antenna compensating control is the final tuning adjustment. This should be set also for maximum meter reading. If, for any reason, automatic volume control is not desired, the switch so marked should be set in the "MAN" (or manual) position. In this case, sensitivity is controlled with the control thus marked and then the audio control should be turned all the way on.

A jack is provided in the lower right-hand corner of the panel for those who desire to use head-phones. This jack cuts the speaker out of the circuit. On the rear of the chassis, will be found terminals marked "relay." These pin jacks are in parallel with the "send-receive" switch and can be connected to a send-receive relay for break-in operation.

Operation on the remaining high frequency bands is essentially the same, except that the band spread dial comes into use. There are five scales on the band-spread dial. The 0–200 scale is for general coverage and is an arbitrary scale for accurately logging in any one of the various short wave broadcast bands. The other scales are for each of the amateur bands from 80 to 10 meters inclusive, and are calibrated in megacycles. The main tuning dial is also calibrated in megacycles and this calibration holds true when the band-spread dial is set at 200 on the arbitrary scale.

In short wave reception of either amateur or short wave broadcast stations, other features of the receiver are brought into use. For instance, the beat frequency oscillator is used for CW code reception and also for logging weak phone stations. This oscillator is only available without the AVC action and, when turned on, brings the main sensitivity control into operation. The beat oscillator tuning control provides wide variety of tones—the selection of which will depend upon the operator. Also in short wave reception we may need the noise limiter. There is a switch on the panel which provides this feature. The noise limiter operates independent of the setting of any of the other controls on the panel. Its purpose is to limit the interference caused by automobile ignition and similar disturbances.

The next important feature is the crystal filter. Detailed description and diagram can be found under "Circuit Arrangement." The variable feature permits the operator to select the band width that best suits receiving conditions. Normally, the phasing control should be set at the arrow in the center of its scale. Adjustment of this control will cut out interference from stations on either side of the desired signal in any of the five selectivity ranges of the crystal filter. When using the crystal filter, select the band width that provides the greatest fidelity with a minimum of interference. The selectivity of the filter increases as the switch is rotated clockwise. The first three positions of the selectivity control are intended for phone reception, although they can also be used for code in cases where interference is not too severe. The remaining positions are, of course, for single signal code reception in extremely crowded bands.

## HQ-120-X PARTS LIST

| DIAGRAM | DESCRIPTION | PART NO. |
|---|---|---|
| L-1 | Antenna coil .54–1.32 mc. range | 6007 |
| L-2 | Antenna coil 1.32–3.2 mc. range | 6010 |
| L-3 | Antenna coil 3.2–5.7 mc. range | 6013 |
| L-4 | Antenna coil 5.7–10 mc. range | 6016 |
| L-5 | Antenna coil 10–18 mc. range | 6019 |
| L-6 | Antenna coil 18–31 mc. range | 6022 |
| L-7 | R.F. coil .54–1.32 mc. range | 6008 |
| L-8 | R.F. coil 1.32–3.2 mc. range | 6011 |
| L-9 | R.F. coil 3.2–5.7 mc. range | 6014 |
| 28 | .005 mf. mica condenser | 6056 |
| 30-114 | Send-Receive and Limiter switches | 6098 |
| 31 | Relay pin jack | 6142 |
| 32 | Det. grid tap and osc. plate switch wafers | 6064 |
| 34-35-36-37-38-39-53-54-55-60-61-62-42-49-117-118-121-122-124 | Special MEX trimmer cond. | 6055 |
| | 50,000 ohm resistor (½ W.) | 6075 |
| 44 | 230 ohm resistor (½ W.)* | 6156 |
| 45-71-85-94-100-108-109 | .05 mf. condenser (500 V.) | 6174 |
| 45A | .005 mf. mica condenser | 6194 |
| 46 | Tube socket 6K8-Conv. (iso.) | 6107 |
| 47 | 15 ohm resistor (½ W.) | 6154 |
| 48 | 50. mmf. condenser (silver) | 6074 |
| 50 | 5.5 mmf. condenser (silver) | 6151 |
| 51 | 673 mmf. condenser (silver) | 6061 |
| 52 | 500 mmf. condenser (silver) | 6060 |
| 56 | H.F. osc. grid switch wafer | 6132 |
| 57 | 10. ohm resistor (½ W.) | 6089 |
| 64 | .0015 mf. mica condenser | 6058 |
| 65 | .001 mf. mica condenser | 6059 |
| 70-89 | Tube socket 6S7 | 6109 |
| 73 | 700. ohm resistor (½ W.) | 6159 |
| 76 | Crystal filter | SA-600 |
| 78 | 50. ohm resistor ½ (W.) | 6170 |
| 79 | Tuning meter | 6139 |
| 80 | Tube socket 6SF-5 | 6106 |
| 81-82 | 80. ohm meter circ. potentiometers | 6140 |
| 83 | Sensitivity control 10,000 ohms | 6096 |
| 84 | 400 ohm resistor (½ W.) | 6168 |
| 86 | 300. ohm resistor (½ W.) | 6169 |
| 92 | Tube socket 6F6 | 6108 |
| 93-128 | .1 mf. condenser (500 V.) | 6173 |
| 95 | 600 ohm resistor (½ W.) | 6158 |
| 96 | 50,000 ohm resistor 1 watt | 6166 |
| 99-127 | 1-meg. resistor (½ W.) | 6167 |
| 101 | AVC-MAN-BFO switch | 6097 |
| 102 | Tube socket 6V6—Audio | 6113 |
| 103 | 40 mf. electrolytic condenser | 6171 |
| 104 | 350. ohm resistor (1 W.) | 6157 |
| 105 | Phone jack | 6087 |
| 107-110 | 100,000 ohm resistor (½ W.) | 6135 |
| 111 | Tube socket 6J7 | 6112 |
| 112 | Beat oscillator | SA-680 |
| 113 | Audio gain control (500,000 ohm combined with power switch) | 6095 |
| 115 | .01 mf. condenser (500 V.) | 6175 |
| 116-119-120 | 100. mmf. mica condenser | 6191 |
| 123 | 1000. mmf. mica condenser | 6177 |
| 125 | 10. mmf. mica condenser | 6178 |
| 126-129 | Tube socket 6H6 | 6111 |
| 130 | Speaker terminal strip | 3843 |
| L-10 | R.F. coil 5.7–10 mc. range | 6017 |
| L-11 | R.F. coil 10–18 mc. range | 6020 |
| L-12 | R.F. coil 18–31 mc. range | 6023 |
| L-13 | H.F. osc. coil .54–1.32 mc. range | 6009 |
| L-14 | H.F. osc. coil 1.32–3.2 mc. range | 6012 |
| L-15 | H.F. osc. coil 3.2–5.7 mc. range | 6015 |
| L-16 | H.F. osc. coil 5.7–10 mc. range | 6018 |
| L-17 | H.F. osc. coil 10–18 mc. range | 6021 |
| L-18 | H.F. osc. coil 18–31 mc. range | 6024 |
| T-1 | Power transformer 50–60 cycle, 115 V | 6082 |
| T-2 | First I.F. transformer | 6116 |
| T-3 | Third I.F. transformer | 6118 |
| T-4 | I.F. output coil assembly | SA-669 |
| T-5 | Diode input coil | SA-670 |
| T-6 | Audio output transformer 6 ohm | 6086 |
| 1 | Antenna terminal strip | 6088 |
| 2 | Fuse block (1.5A fuse Pt. No. 6065) | 3859 |
| 3 | Power switch (comb. with audio gain control), 500,000 ohm | 6095 |
| 4 | Rectifier tube socket 5V4-G | 6114 |
| 5-40 | 600 mmf. grid coupling condensers | 6073 |
| 6-41 | 25. ohm resistor (½ W.) | 6155 |
| 7 | 500,000 ohm resistor (½ W.) | 6076 |
| 8 | Tube socket 6S7-RF (iso.) | 6107 |
| 9-12-13-43-59-66-69-72-77-87-90-97 | .02 mf. paper cond. (500 V.) | 6176 |
| 10-67-106 | 10,000 ohm resistor (½ W.) | 6165 |
| 11 | Antenna compensating condenser | SA-617 |
| 14 | R.F. choke | CHX |
| 15-29-68-74-75-88-91-98 | 2000 ohm resistor (½ W.) | 6160 |
| 16-33 | R.F. and detector grid switch wafer | 6063 |
| 17 | Antenna switch wafer | 6062 |
| 18 | First filter choke | 6083 |
| 19 | Filter condenser | 6085 |
| 20 | Second filter choke | 6084 |
| 21 | .15 amp. pilot lamps (6-8 V.) | 6036 |
| 22 | Dial and meter lamps socket assembly | 6045 |
| 23 | 3000 ohm resistor (10 W. wire wound) | 6161 |
| 24 | Tube socket VR-150 | 6115 |
| 25 | 6000 ohm resistor (1 W.) | 6163 |
| 26 | 7000 ohm resistor (1 W.) | 6164 |
| 27 | 10,000 ohm resistor (1 W.) | 6162 |

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MODEL 4B
Schematic, Voltage
Notes

# HOWARD RADIO CO.

## MODEL 4B - BATTERY RECEIVER

This model must not be confused with the Model 4BT. Electrically they are much the same but the Model 4B is built into an upright table cabinet with an oval dial, whereas the 4BT is a flat type cabinet with straight line dial.

The function of the tubes is as follows: 1A7G - Modulator, 1N5G - IF Amplifier, 1H5G - Diode Det. AVC, 1C5G - Output.

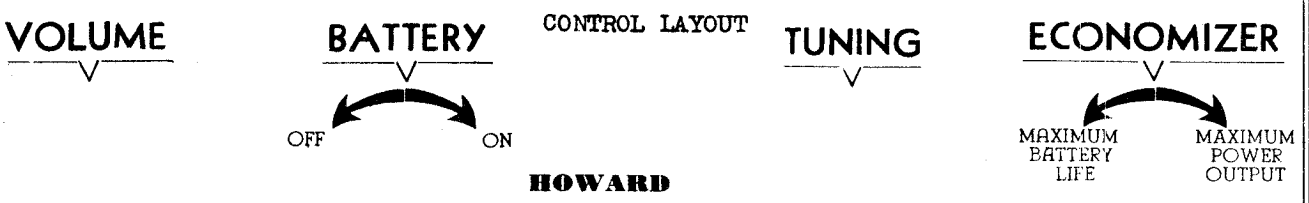
The trimmers for the antenna and oscillator coils are mounted directly on each coil.

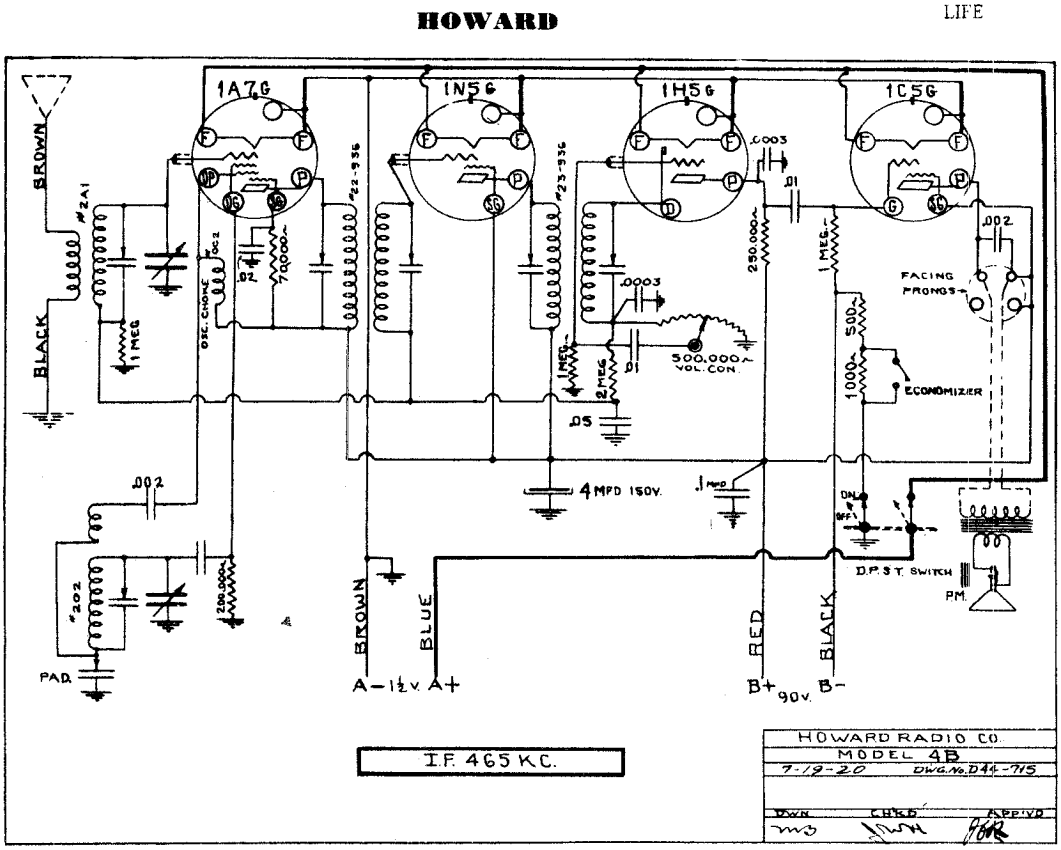
The output is rated at .180 to .360 milliwatts.

"A" Battery Drain at 1½ volts - .25 amps.

"B" Battery Drain at 90 volts - .012 mils., or 7 mils. when using the "Economizer".

CONTROL LAYOUT




| PART NUMBER | DESCRIPTION | PART NUMBER | DESCRIPTION |
|---|---|---|---|
| 18-190T | Cabinet | 21-720X | Drive Shaft with Friction Discs |
| 21-270 | Condenser - 2 Gang | 10-328X | Drive Disc - 5-1/8 OD with Hub |
| 36-266 | Condenser - "E" Filter - Dual 10 Mfd. 200 V. | 16-352 | Escutcheon |
| | | 22-936 | I.F. Assembly - 1st |
| 49-262 | Condenser - Padding | 23-936 | I.F. Assembly - 2nd |
| 8218-3 | Condenser - Trimmer, 3-30 Mmfd. | 18-490 | Knob - 1", Brown Bakelite |
| 23-281 | Control - Volume | 8-490 | Knob - 13/16", Brown Bakelite |
| 0C2 | Choke - Oscillator | 17-602 | Plug - 3 Prong, "B" Circuit |
| 2A1 | Coil - Antenna | 18-602 | Plub - 2 Prong, "A" Circuit |
| 202 | Coil - Oscillator | 1-806 | Speaker - 6", PM Type |
| 7-427B | Dial Glass - 1 Band | 12-917 | Switch - S.P.S.T. for Economizer |
| 4059 | Dial Hand | 16-917 | Switch - D.P.S.T. - OFF-ON |

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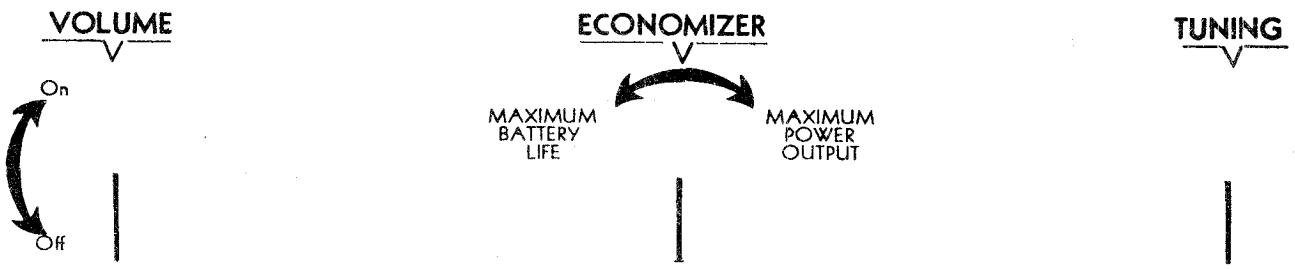
MODEL 4BT
Schematic, Voltage
Notes

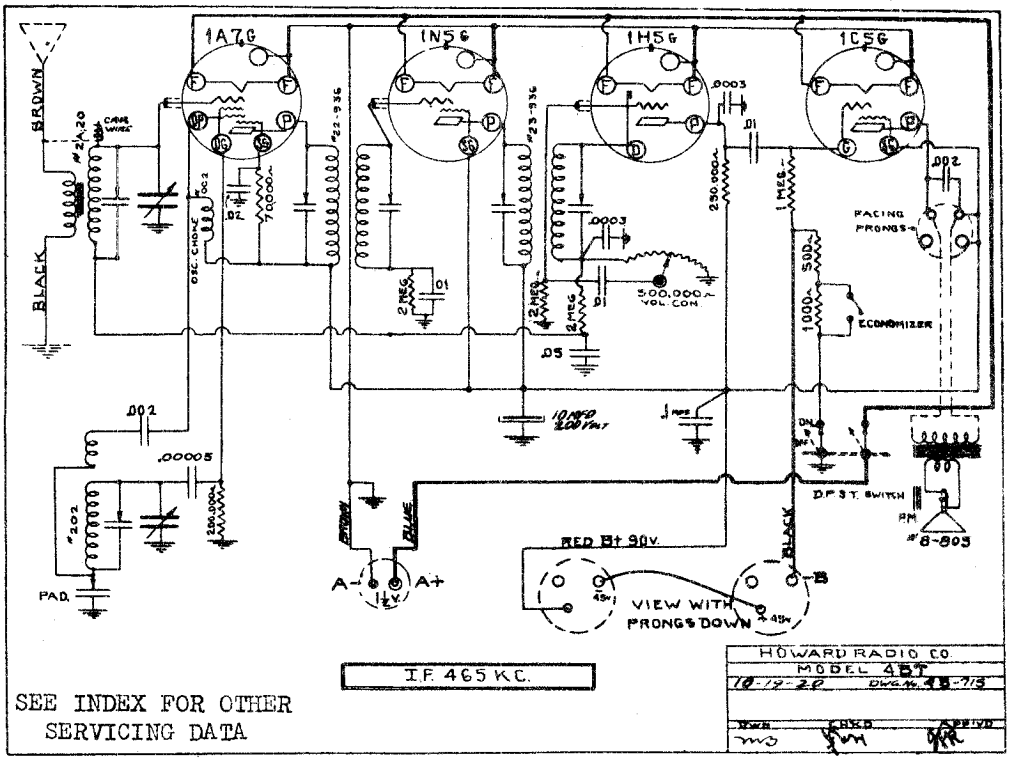
# HOWARD RADIO CO.

## MODEL 4BT - BATTERY RECEIVER

This receiver is designed on the 220 style chassis.
"A" Battery Drain at 1¼ volts - .25 amps.
"B" Battery Drain at 90 volts - .012 mils., or 7 mils. when using the "Economizer".
Output - .180 to .360 milliwatts, maximum.
The set is equipped with plugs that are inserted directly into the "A" and "B" batteries of the socket type construction since most all batteries are made that way at this time.

CONTROL LAYOUT




SEE INDEX FOR OTHER SERVICING DATA

REPLACEMENT PARTS LIST - MODEL 4BT

| PART NUMBER | DESCRIPTION | PART NUMBER | DESCRIPTION |
|---|---|---|---|
| 38-270 | Condenser - 2 Gang for Model 4BT | 17-829 | Drive Cord Spring |
| 36-266 | Condenser - "E" Filter - Dual 10 Mfd. 200 V. | 34-720X | Drive Shaft with Wood Hub |
| 49-262 | Condenser - Padding | 4-429 | Drive Shaft Grommet |
| 39-281 | Control - Volume, with Switch | 12-788 | Drive Shaft & Wood Hub |
| 56-188 | Cabinet | 22-936 | I.F. Assembly |
| 2A20 | Coil - Antenna | 23-936 | I.F. Assembly |
| 202 | Coil - Oscillator | 18-490 | Knob - 1" Diameter - Brown Bakelite |
| OC2 | Choke - Oscillator | 1-609X | Pulley with 4-425 Gear Assembly |
| 62-310 | Dial Glass - 1 Band | 3-609 | Pulleys for Drive Cord |
| 20-448 | Dial Hand finished with Eyelet | J8-805 | Speaker - 5" with Transformer - PM |
| 1-288 | Drive Cord - 36" | 17-917 | Switch, Rotary Shaft |

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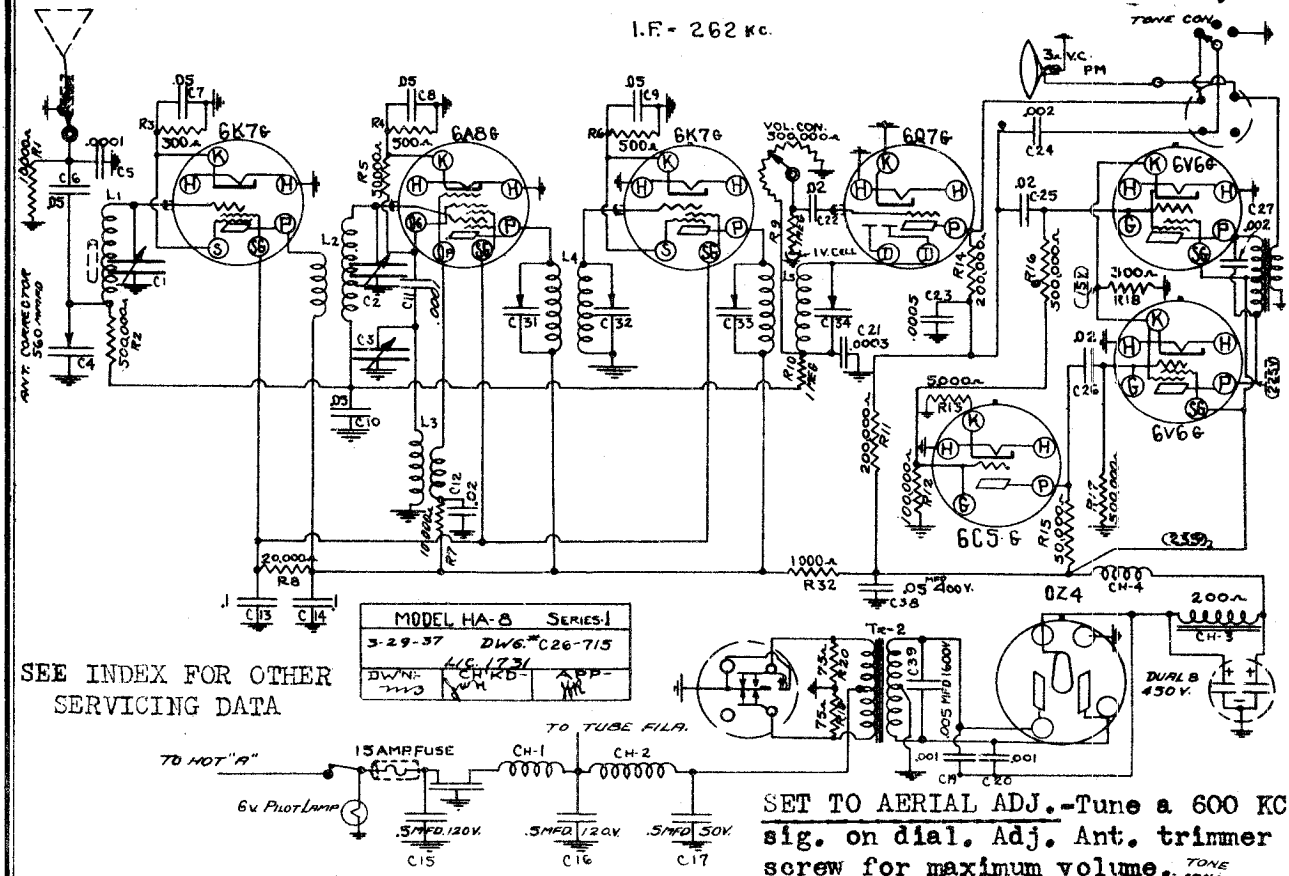
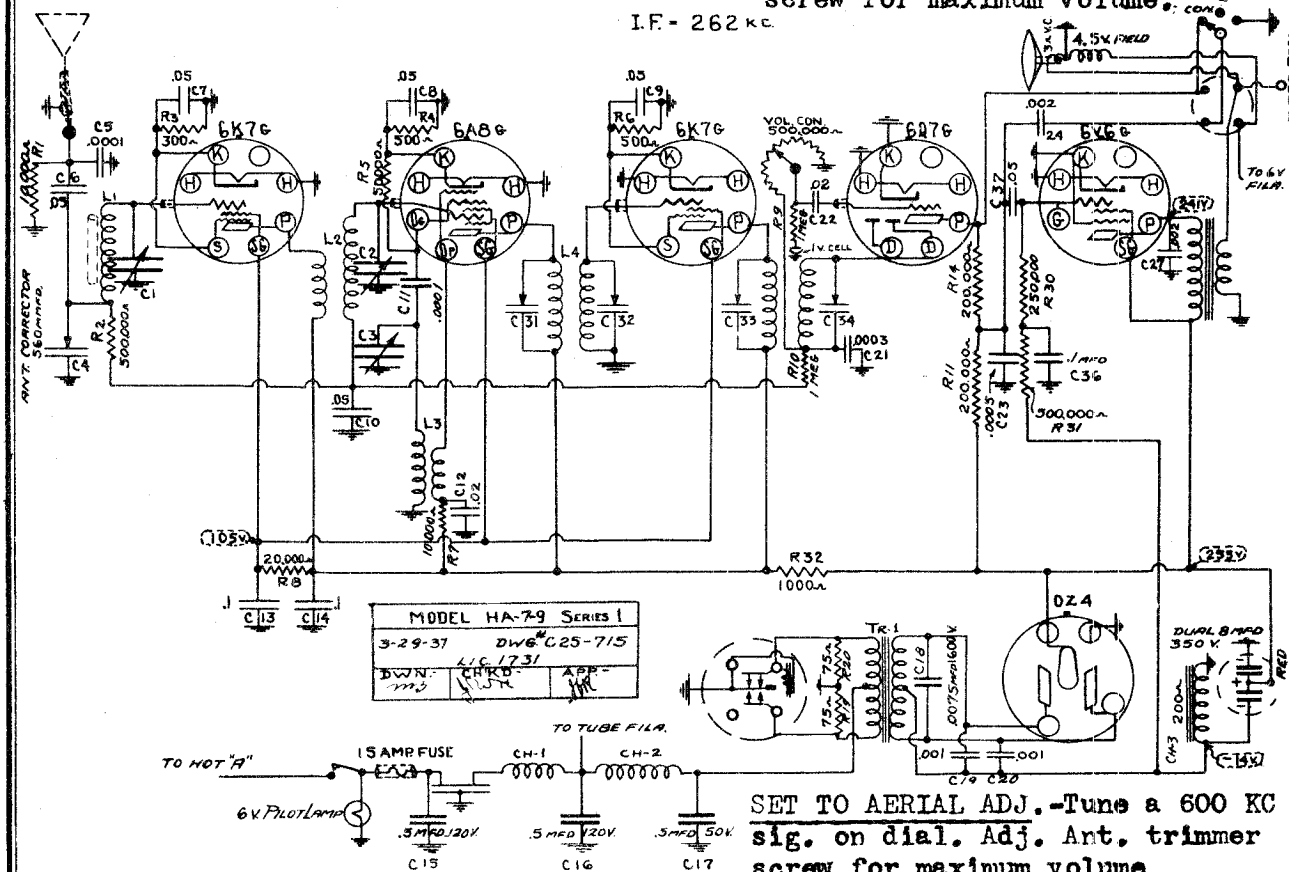
Alignment

# HOWARD RADIO CO.

MODELS HA7, HA9
MODEL HA8
Schematics, Voltage




At any future date should the tubes be checked and changed it is very important that the same type tubes as specified be substituted. Do not substitute a metal tube for the glass type, especially in the 6V6G position.

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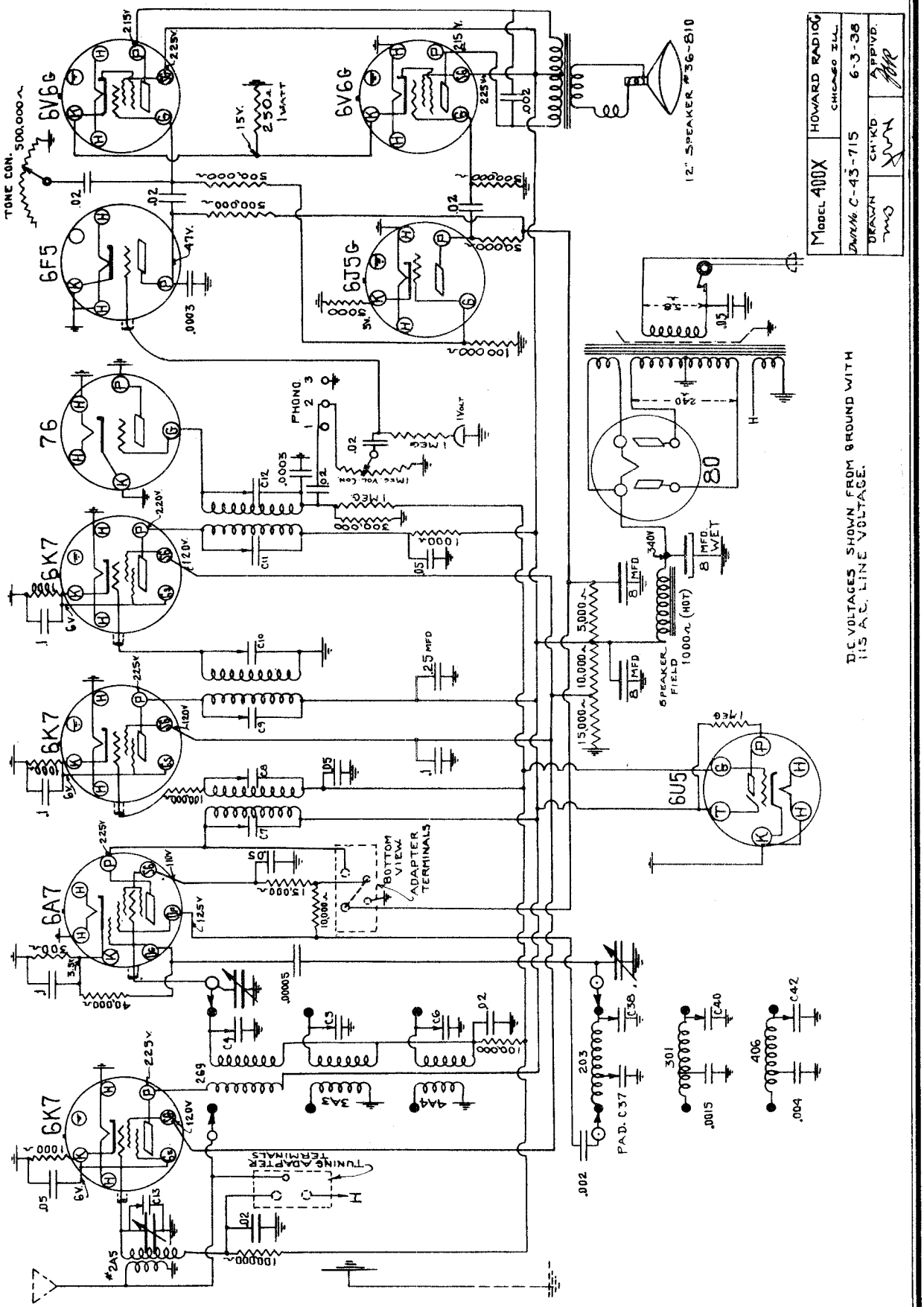
MODEL 400X
Schematic, Voltage

# HOWARD RADIO CO.

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# HOWARD RADIO CO.

## MODEL 210

Push Button Adapter

Schematic, Instructions

Parts List

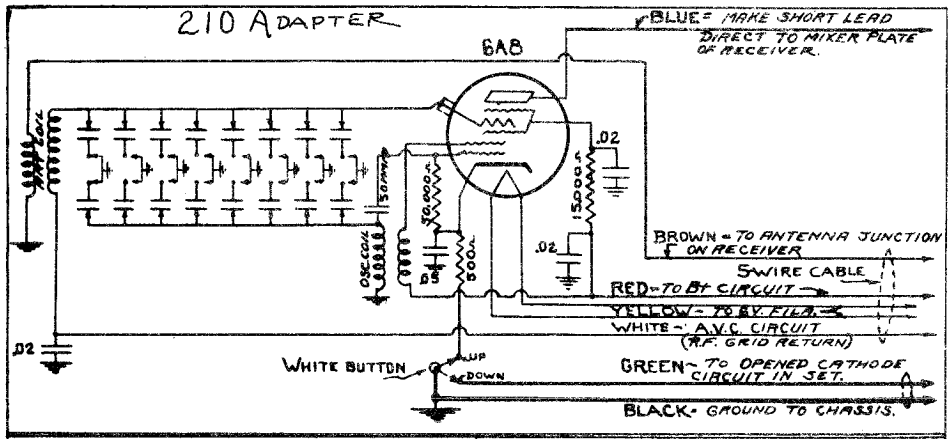
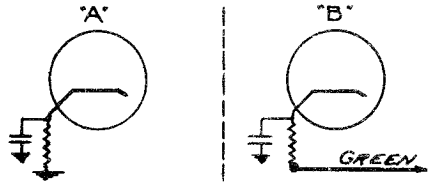
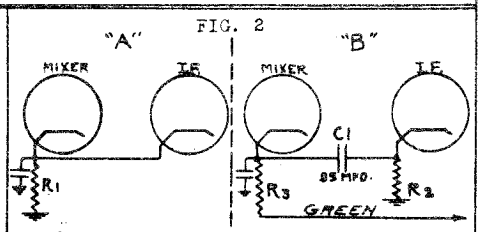



FIG. 1



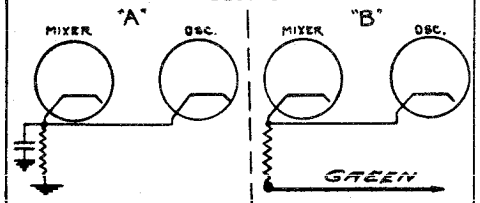

CATHODE CIRCUIT OF THE 6A7 OR 6A8 TUBES WHERE NO OTHER CATHODES ARE COMMON - MERELY REMOVE RESISTOR FROM GROUND AND ATTACH GREEN WIRE TO THE RESISTOR.
NOTE-SHOULD CATHODE BE ALREADY DIRECT TO GROUND - REMOVE GROUND AND CONNECT GREEN WIRE DIRECT TO CATHODE TERMINAL.

FIG. 2



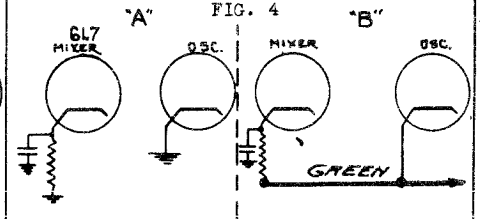

CIRCUITS IN WHICH I. F. CATHODES ARE CONNECTED COMMON TO MIXER CATHODE — SUBSTITUTE RESISTORS R2 AND R3 FOR R1 OF SUCH VALUES TO OBTAIN ORIGINAL CATHODE VOLTAGE. ADD C1 CONDENSER (.05 MFD 200 V.) BETWEEN CATHODES AS SHOWN, AND CONNECT GREEN WIRE TO END OF R3 RESISTOR.

FIG. 3




THE ABOVE ARRANGEMENT IS USED WHEN OSCILLATOR CATHODE AND THE MIXER CATHODE ARE COMMONLY COUPLED BY RESISTOR - MERELY REMOVE GROUND AND ATTACH GREEN WIRE AS SHOWN.

FIG. 4




WITH CIRCUITS AS SHOWN ABOVE WHERE 6L7 CATHODE USES BIAS RESISTOR AND THE SEPARATE OSCILLATOR CATHODE IS GROUNDED - TIE CATHODES TOGETHER SO THAT GREEN WIRE CONTROLS THE GROUND RETURN FOR BOTH.

H.R.CO. DWG No 41-715

### PARTS LIST FOR MODEL "210" ADAPTER

| QUANTITY PER SET | PART NO. | LIST PRICE | DESCRIPTION |
|---|---|---|---|
| 1 | 2A12 | .40 | Coil - Antenna |
| 1 | 2011 | .40 | Coil - Oscillator |
| 1 | 20-266 | 1.10 | Condenser - 16-8 Mfd. Electrolytic |
| 1 | | .16 | Condenser - .02 Mfd. 200 Volt |
| 2 | | .16 | Condenser - .02 Mfd. 400 Volt |
| 1 | | .16 | Condenser - .05 Mfd. 200 Volt |
| 1 | | .16 | Condenser - .00005 Mfd. Mica |
| 1 | 39-262 | .40 | Condenser - Dual Trimmer |
| 1 | 40-262 | .40 | Condenser - Dual Trimmer |
| 1 | 41-262 | .40 | Condenser - Dual Trimmer |
| 1 | 42-262 | .40 | Condenser - Dual Trimmer |
| 1 | 43-262 | .40 | Condenser - Dual Trimmer |
| 1 | 44-262 | .40 | Condenser - Dual Trimmer |
| 1 | 45-262 | .40 | Condenser - Dual Trimmer |
| 1 | 46-262 | .40 | Condenser - Dual Trimmer |
| 1 | 22-352 | .35 | Escutcheon Plate |
| 2 | 2-114 | .25 | Moulded Bar Trim |
| 1 | 14-602 | .15 | Plug with shell, 3 prong |
| 1 | 15-602 | .15 | Plug with shell, 4 prong |
| 8 | | .05 | Push Buttons - Brown |
| 1 | | .05 | Push Buttons - White |
| 1 | | .15 | Resistor - 500 Ohm 1/2 Watt |
| 1 | | .15 | Resistor - 15,000 Ohm 1/2 Watt |
| 1 | | .12 | Resistor - 40,000 Ohm 1/3 Watt |
| 1 | | .15 | Socket - 8 Prong |
| 1 | 9-772 | .15 | Socket - 3 Prong for part # 14-602 |
| 1 | 10-772 | .15 | Socket - 4 Prong for part # 15-602 |
| 1 | | .30 | Station Tab Sheet |
| 4 | 7-658 | .05 | Pilister Head Screws - 6-32 x 3/4 Long |
| 4 | 1-182 | .05 | Cinch Buttons |
| 4 | 17-844 | .03 | Friction Strip |
| 4 | | .02 | Wood Spacer - 1/4" long 3/8 OD |
| 1 | 10-917 | 3.30 | Switch - Push Button complete |
| | | | REPLACEMENT PARTS FOR ABOVE (less knobs) |
| 1 | | .10 | Selector Key "Off" position |
| 8 | 4-488 | .08 | Selector Keys |
| 1 | 5-114 | .10 | Latch Bar |
| 1 | 11-829 | .05 | Bronze Spring for latch bar |
| 1 | 10-829 | .05 | Coil Type Spring 1" for key |
| 8 | 9-829 | .05 | Coil Type Spring 13/16" for 4-488 keys |
| 9 | 21-972 | .02 | Felt Washers |
| 18 | 7-829 | .04 | Main Contact springs, silver finish |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

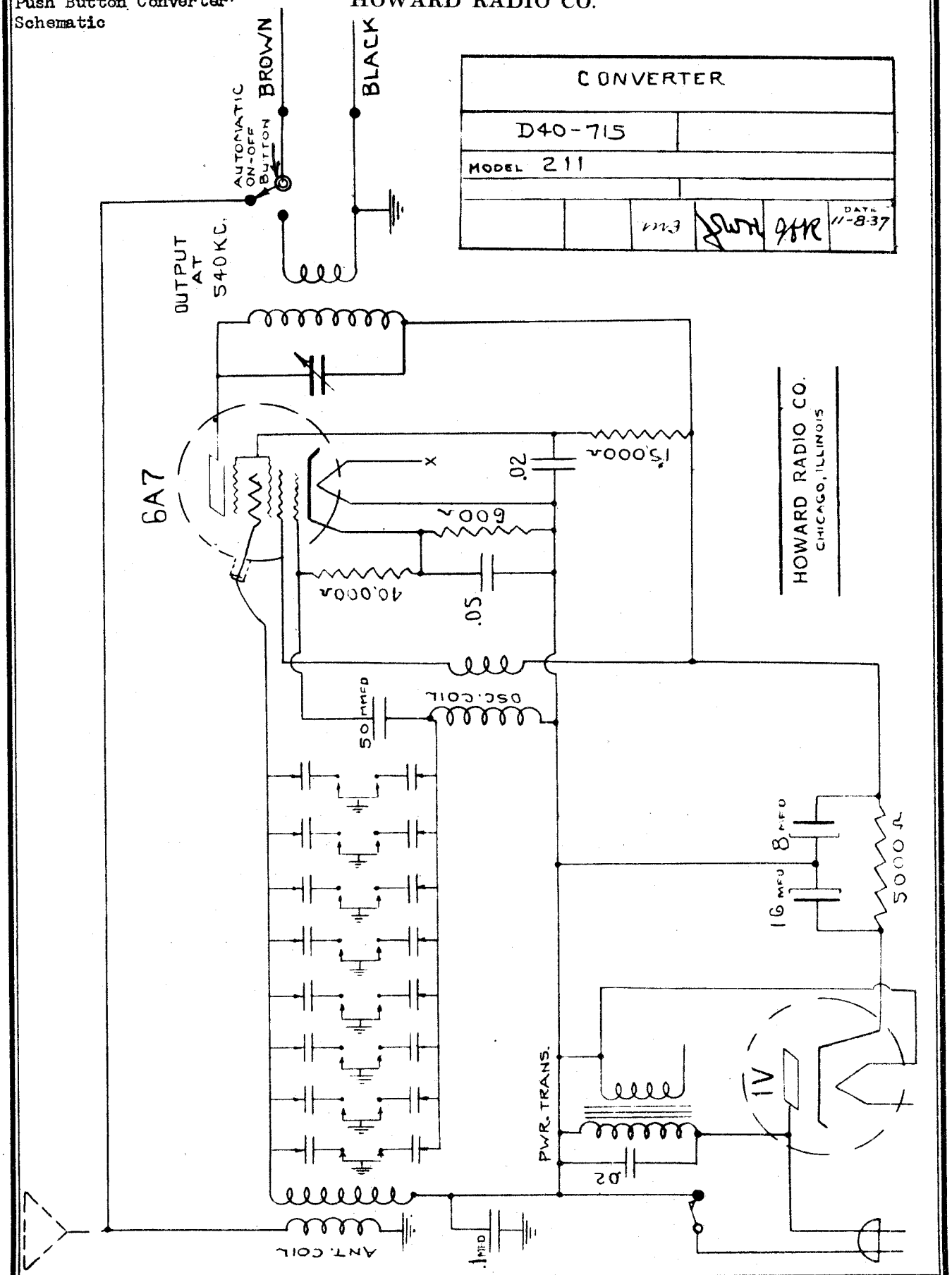
NOTE:

See installation instructions for the operation of this adapter.

MODEL 211
Push Button Converter
Schematic

HOWARD RADIO CO.

| CONVERTER | | | | | |
|---|---|---|---|---|---|
| D40-715 | | | | | |
| MODEL 211 | | | | | |
| | | | | | DATE 11-8-37 |

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MODEL 210
MODEL 211
Instructions

# HOWARD RADIO CO.

MODEL 4B
MODEL 4BT
MODELS 220,270
MODELS 221,271
Alignment

MODELS 220, 221, 270, 271,
4B, 4BT
ALIGNMENT CHART

| MODELS | CHECK BAND SWITCH POSITION & SET DIAL TO | GENERATOR FREQUENCY | GENERATOR CONNECTION | TRIMMER LOCATION | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS FOR 50 MILLIWATT OUTPUT |
|---|---|---|---|---|---|---|
| 220<br>221 | Maximum Capacity | 465 KC | Grid of 6A7 | C31,C32,<br>C33,C34<br>Fig. 2 | IF | 27 |
| 220<br>221 | 107 MC<br>(1700 KC) | 1700 KC | Antenna Lead | T10,T11<br>Fig. 2 | Osc. & RF | 9 |
| 220<br>221 | 600 KC | 600 KC | Antenna Lead | P 18 | Osc. Pad.<br>(Rock Dial) | 10 |
| | | | | | | |
| 270<br>271 | Maximum Capacity | 465 KC | Grid of 6A7 | C31,C32,<br>C33,C34<br>Fig. 2 | IF | 27 |
| 270<br>271 | 18 MC | 18 MC | Antenna Lead | T1, T2<br>Fig. 3 | Osc. & RF | 20 |
| 270<br>271 | 1.7 MC<br>(1700 KC) | 1.7 MC | Antenna Lead | T3, T4<br>Fig. 3 | Osc. & RF | 9 |
| 270<br>271 | 600 KC | 600 KC | Antenna Lead | P 12 | Osc. Pad.<br>(Rock Dial) | 10 |
| | | | | | | |
| 4BT | Maximum Capacity | 465 KC | Grid of 1A7G | C31,C32,<br>C33,C34<br>Fig. 2 | IF | 50-75 |
| 4BT | 1.7 MC | 1.7 MC | Antenna Lead | T10,T11 | Osc. & RF | 29 |
| 4BT | 600 KC | 600 KC | Antenna Lead | P 12<br>Fig. 2 | Osc. Pad.<br>(Rock Dial) | 30 |

NOTE 1: When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.

NOTE 2: When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.

NOTE 3: When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.

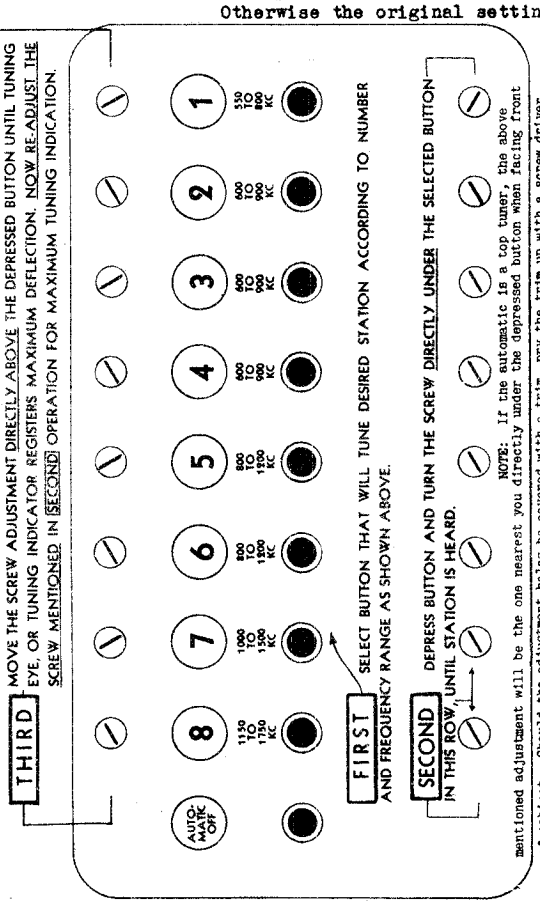
NOTE 4: Check for an image signal about .9 mc. lower in frequency. For example:- If a peak has been made at 6 mc. an image should be heard at about 5.1 mc. Otherwise the original setting was not correct.

BATTERY RECOMMENDATIONS

The color code for the battery leads for the Models 4B or 4BT

| | |
|---|---|
| Red | B+ 90 volts |
| Black | B— 90 volts |
| Blue | A+ 1½ volts |
| Brown | A— 1½ volts |

SET-UP INSTRUCTIONS—HOWARD AUTOMATIC
MODELS 210 & 211


THIRD
MOVE THE SCREW ADJUSTMENT DIRECTLY ABOVE THE DEPRESSED BUTTON UNTIL TUNING EYE, OR TUNING INDICATOR REGISTERS MAXIMUM DEFLECTION. NOW RE-ADJUST THE SCREW MENTIONED IN SECOND OPERATION FOR MAXIMUM TUNING INDICATION.
FIRST
SELECT BUTTON THAT WILL TUNE DESIRED STATION ACCORDING TO NUMBER AND FREQUENCY RANGE AS SHOWN ABOVE.
SECOND
DEPRESS BUTTON AND TURN THE SCREW DIRECTLY UNDER THE SELECTED BUTTON IN THIS ROW, UNTIL STATION IS HEARD.
AUTO-MATIC OFF
1
2
3
4
5
6
7
8
550 1100 KC
600 1200 KC
800 1500 KC
1000 1700 KC
1150 1700 KC

mentioned adjustment will be the one nearest you directly under the depressed button when facing front of cabinet. Should the adjustment holes be covered with a trim, pry the trim up with a screw driver and remove while making adjustments.

FOURTH Insert the station call letter tab over button number just selected. Repeat this procedure for the remaining buttons. Replace trim.

TO USE RADIO IN THE CONVENTIONAL MANNER, DEPRESS BUTTON MARKED "AUTOMATIC OFF".

NOTE: If the automatic is a top tuner, the above

## EXAMPLE

Station desired, WGN: Frequency is 720 KC, therefore button 2, 3, or 4 can be used. Button 3 is depressed, the lower adjustment is moved until WGN is heard. The adjustment above #3 button is then adjusted for maximum eye deflection. The lower adjustment is again checked for maximum deflection.

WGN tab is removed from tab sheet and inserted in escutcheon over #3. Insert tab by pushing in place with finger-tip.

## SUGGESTIONS

FIRST: Do not try to extend the adjustments beyond their frequency rating.

SECOND: Move adjustments slowly.

THIRD: Double-check before moving any adjustment to make sure the adjustment about to be moved corresponds to the depressed button. Carelessness will cause you to misadjust adjustments already completed.

FOURTH: Check adjustments occasionally for maximum deflection of eye or tuning indicator, while receiver is in service. This will not have to be done often but it is good assurance that your receiver is always tuned perfectly.

A good method to identify the station being set up, is to tune the station in by dial on radio set, then switch to automatic by depressing the button on which set-up is being made and tune in by adjustment same program as heard when tuned in by dial as mentioned above.

When selecting a station automatically it is only necessary to depress button carrying the desired station call letters.

To use manual tuning depress "Automatic OFF" button.

8-54/

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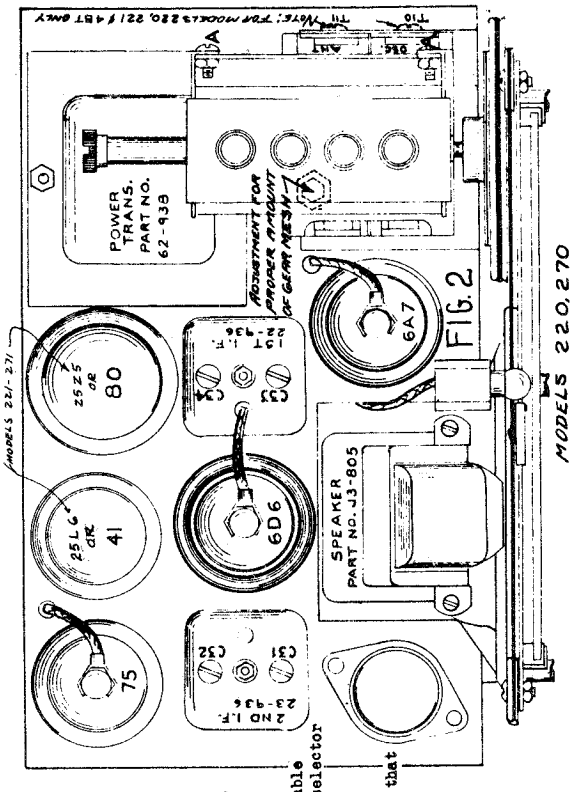
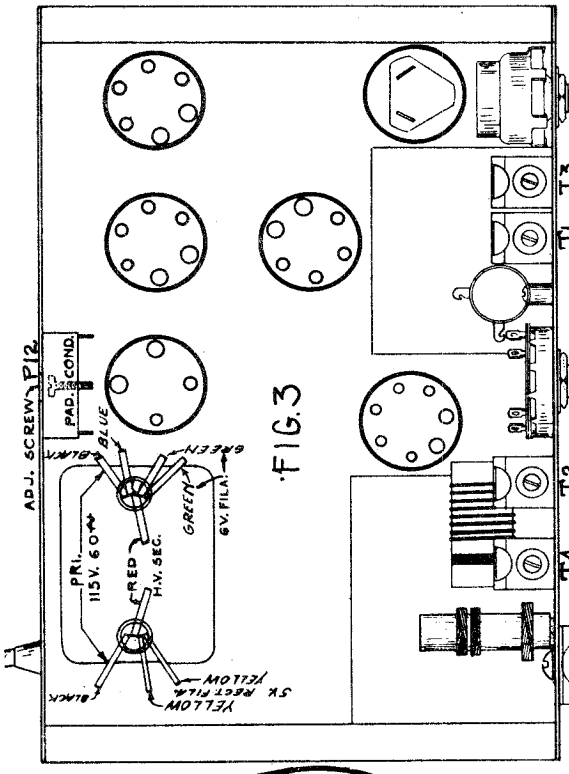
MODEL 4B
MODEL 4BT
MODELS 220,270
MODELS 221,271

# HOWARD RADIO CO.

Socket,Trimmers
Tuner Data,Dial



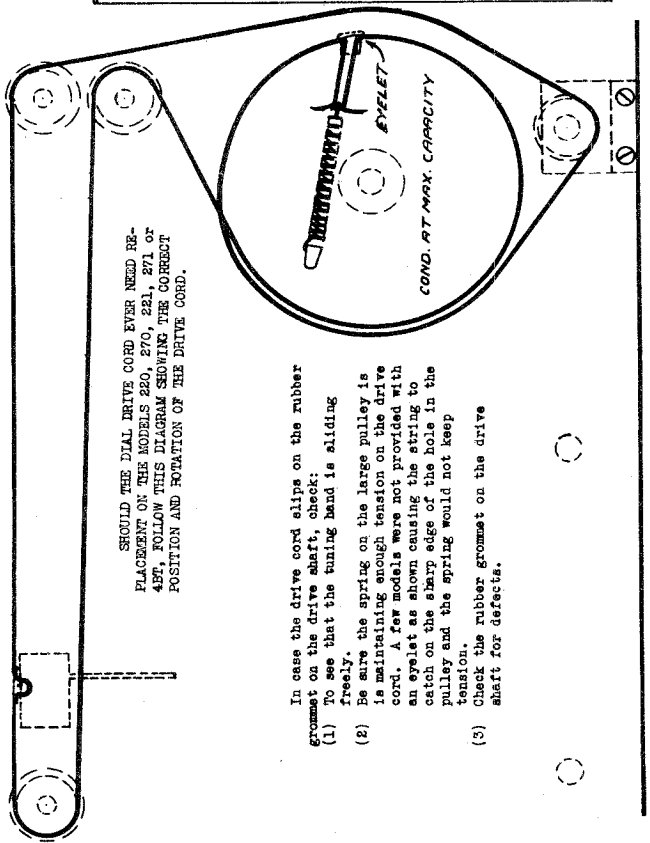




## HOW TO SET AUTOMATIC TUNING BUTTONS

(1) From the rear of the tuning mechanism within the cabinet extends a slotted screw; loosen this screw by turning it to the left.
(2) Tune set in the regular way and decide upon what four stations are used the most in your locality.
(3) With a station exactly in tune press one button ALL THE WAY DOWN which will set the adjustment, then the button will spring back in its original position.
(4) Repeat this procedure for each of the remaining three buttons, being careful not to touch any other buttons while pressing down on one.
(5) Now tighten the rear screw, using a coin in the slot when tightening, if necessary, to make sure it will not loosen. Insert station letters into top of buttons.

THE GEAR ADJUSTMENT between the gear on the selector unit and the gear on the variable condenser is located on the top of the variable condenser in the form of a screw. The selector unit always tends to press against this screw head due to the mounting at point "A". See Fig. 2

To lower or raise the selector unit to change the gear spacing, loosen the hex nut that locks the adjustment screw and adjust as required.




SHOULD THE DIAL DRIVE CORD EVER NEED REPLACEMENT ON THE MODELS 220, 270, 221, 271 or 4BT, FOLLOW THIS DIAGRAM SHOWING THE CORRECT POSITION AND ROTATION OF THE DRIVE CORD.

In case the drive cord slips on the rubber grommet on the drive shaft, check:
(1) To see that the tuning hand is sliding freely.
(2) Be sure the spring on the large pulley is is maintaining enough tension on the drive cord. A few models were not provided with an eyelet as shown causing the string to catch on the sharp edge of the hole in the pulley and the spring would not keep tension.
(3) Check the rubber grommet on the drive shaft for defects.

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MODELS 220,270
Schematic,Voltage
Notes

# HOWARD RADIO CO.

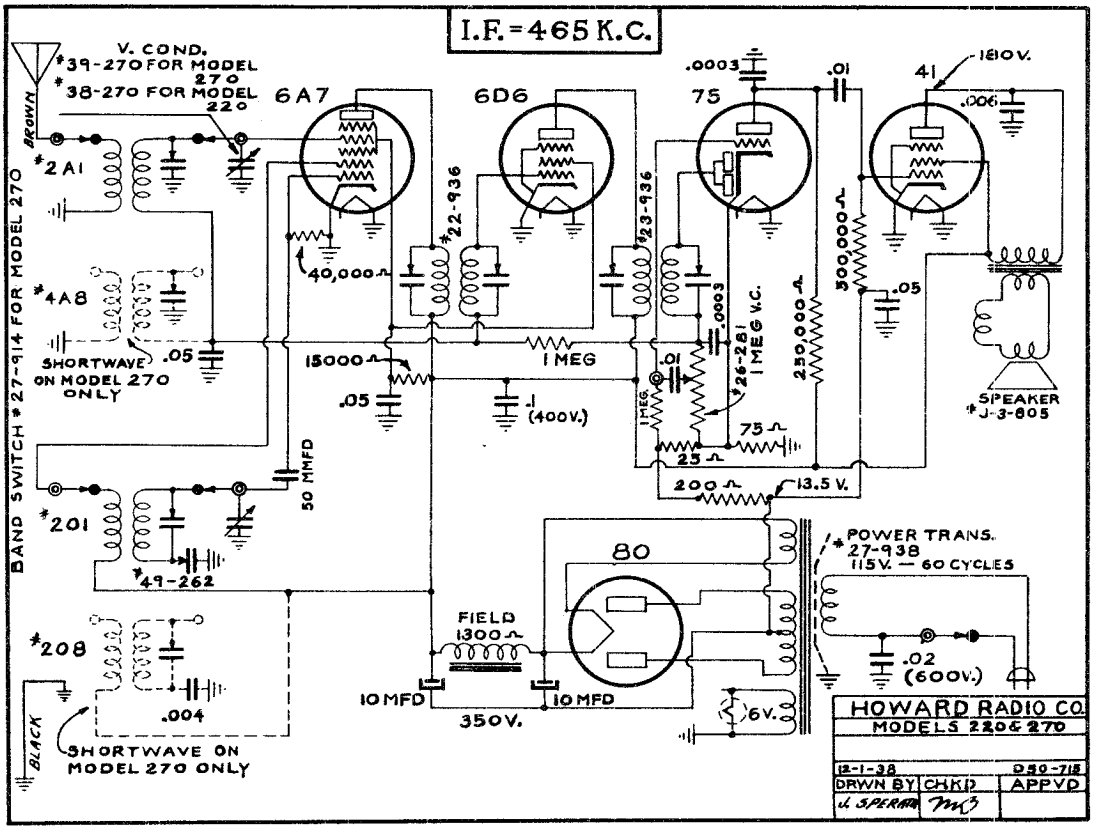
## GENERAL DESCRIPTION - MODELS 220 and 270
## FOR USE ON ALTERNATING CURRENT ONLY

The schematic diagram below covers both models 220 and 270, the main difference being the use of the short wave band for Model 270. The circuit is conventional with 6A7 mixer, 6D6, IF amplifier, 75 Diode Det. AVC, 41 Output, 80 Rectifier. The cathode circuit of the filter system is not grounded direct, the bias voltages are obtained by resistors from C.T. of high voltage to ground.

The output to be obtained will be from 1-1/2 to 2/25 watts, maximum.

For the models having four push buttons, a mechanical type tuner, the proper set-up is given on the following page.

FOR OTHER SERVICING DATA, SEE INDEX




## REPLACEMENT PARTS LIST - MODELS 220 - 270

| PART NUMBER | DESCRIPTION |
|---|---|
| 27-914 | Band Switch for Model 270 |
| 39-270 | Condenser - 2 Gang for Model 270 |
| 38-270 | Condenser - 2 Gang for Model 220 |
| 31-277 | Condenser - "E" Filter - Dual 10 Mfd. 350 V. |
| 50-262 | Condenser - Single Trimmer 3-30 Mfd. |
| 49-262 | Condenser - Padding |
| 36-281 | Control - Volume, with Switch |
| 53-188 | Cabinet - Model 270 |
| 54-188 | Cabinet - Model 220 |
| 62-310 | Dial Glass - Model 220 - 1 Band |
| 61-310 | Dial Glass - Model 270 - 2 Band |
| 20-448 | Dial Hand finished with Eyelet |
| 1-288 | Drive Cord - 36" |
| 17-829 | Drive Cord Spring |

| PART NUMBER | DESCRIPTION |
|---|---|
| 34-720X | Drive Shaft with Wood Hub |
| 4-429 | Drive Shaft Grommet |
| 12-788 | Drive Shaft & Wood Hub |
| 6-425X | Gear with Hub for Selector Unit |
| 18-490 | Knob - 1" Diameter - Brown Bakelite |
| 36-290 | Push Buttons |
| 2-276 | Push Button Selector Unit |
| 1-609X | Pulley with 4-425 Gear Assembly |
| 3-609 | Pulleys for Drive Cord |
| 11-786 | Pilot Light Sockets |
| 2-498 | Pilot Light - 6 V. Bayonet Type |
| J3-805 | Speaker - 5-1/2" with Transformer 1300 Ohm Field |
| 27-938 | Transformer - Power 115 V. 60 Cycle |

REFER TO SCHEMATIC DIAGRAM FOR REPLACEMENT PARTS NOT SHOWN IN ABOVE LIST.

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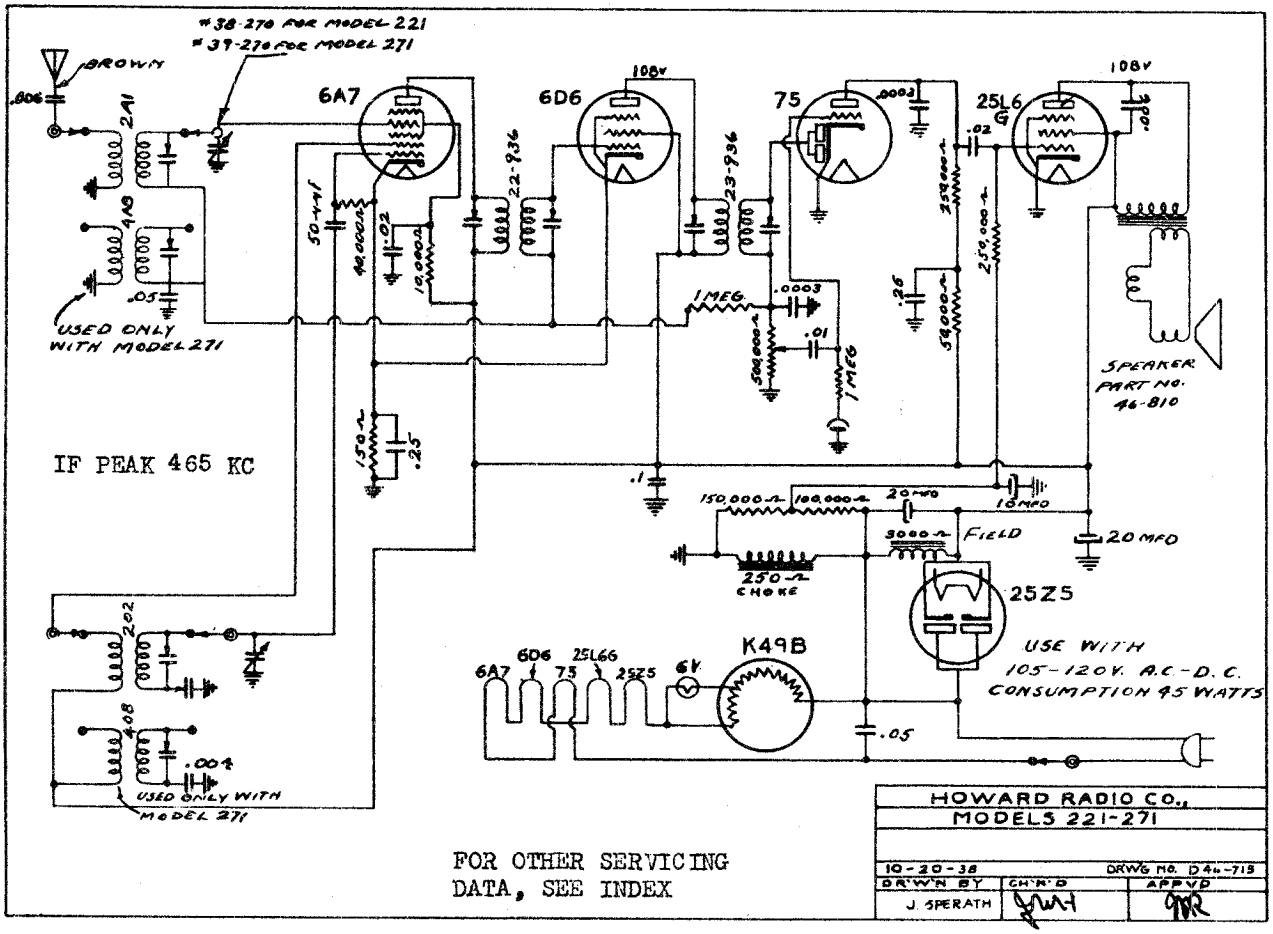
MODELS 221,271
Schematic,Voltage
Notes

# HOWARD RADIO CO.

## GENERAL DESCRIPTION - MODELS 221 and 271
## FOR USE ON EITHER DIRECT OR ALTERNATING CURRENT

**The schematic diagram below covers both 221 and 271 AC-DC Models, the main difference being that the 271 has a short wave band. Mechanical specifications are similar to the 220 - 270 series.**

**The maximum power output to be obtained is 2.7 watts, 1.7 watts undistorted.**




## REPLACEMENT PARTS LIST .- MODELS 221 - 271

| PART NUMBER | DESCRIPTION |
|---|---|
| 27-914 | Band Switch for Model 271 |
| 39-270 | Condenser - 2 Gang for Model 271 |
| 38-270 | Condenser - 2 Gang for Model 221 |
| 32-266 | Condenser - "E" Filter - Dual 20 Mfd. 150 Volt |
| 50-262 | Condenser - Single Trimmer 3-30 Mfd. |
| 49-262 | Condenser - Padding |
| 36-281 | Control - Volume, with Switch |
| 53-188 | Cabinet - Model 271 |
| 54-188 | Cabinet - Model 221 |
| 62-310 | Dial Glass - Model 221 - 1 Band |
| 61-310 | Dial Glass - Model 271 - 2 Band |
| 20-448 | Dial Hand finished with Eyelet |
| 1-288 | Drive Cord - 36" |
| 17-829 | Drive Cord Spring |
| 34-720X | Drive Shaft with Wood Hub |
| 4-429 | Drive Shaft Grommet |
| 12-788 | Drive Shaft and Wood Hub |
| 19-212 | Filter Choke - 240 Ohms |
| 6-425X | Gear with Hub for Selector Unit |
| 18-490 | Knob - 1" Diameter - Brown |
| 36-290 | Push Buttons Bakelite |
| 2-276 | Push Button Selector Unit |
| 1-609X | Pulley with 4-425 Gear Assembly |
| 3-609 | Pulleys for Drive Cord |
| 2-498 | Pilot Light - 6 V. Bayonet Type |
| 46-810 | Speaker - 5-1/2" with Transformer 3000 Ohm Field |

REFER TO SCHEMATIC DIAGRAM FOR REPLACEMENT PARTS NOT SHOWN IN ABOVE LIST.

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# HOWARD RADIO CO.

MODEL X275
Schematic, Voltage

Each of the three bands has a separate antenna and oscillator coil.

The intermediate frequency stages are tuned to 465 KC and have a sensitivity of about 27 microvolts. (for 50 milliwatt output)
The maximum output is rated at about 5 watts, and 3.5 watts undistorted.

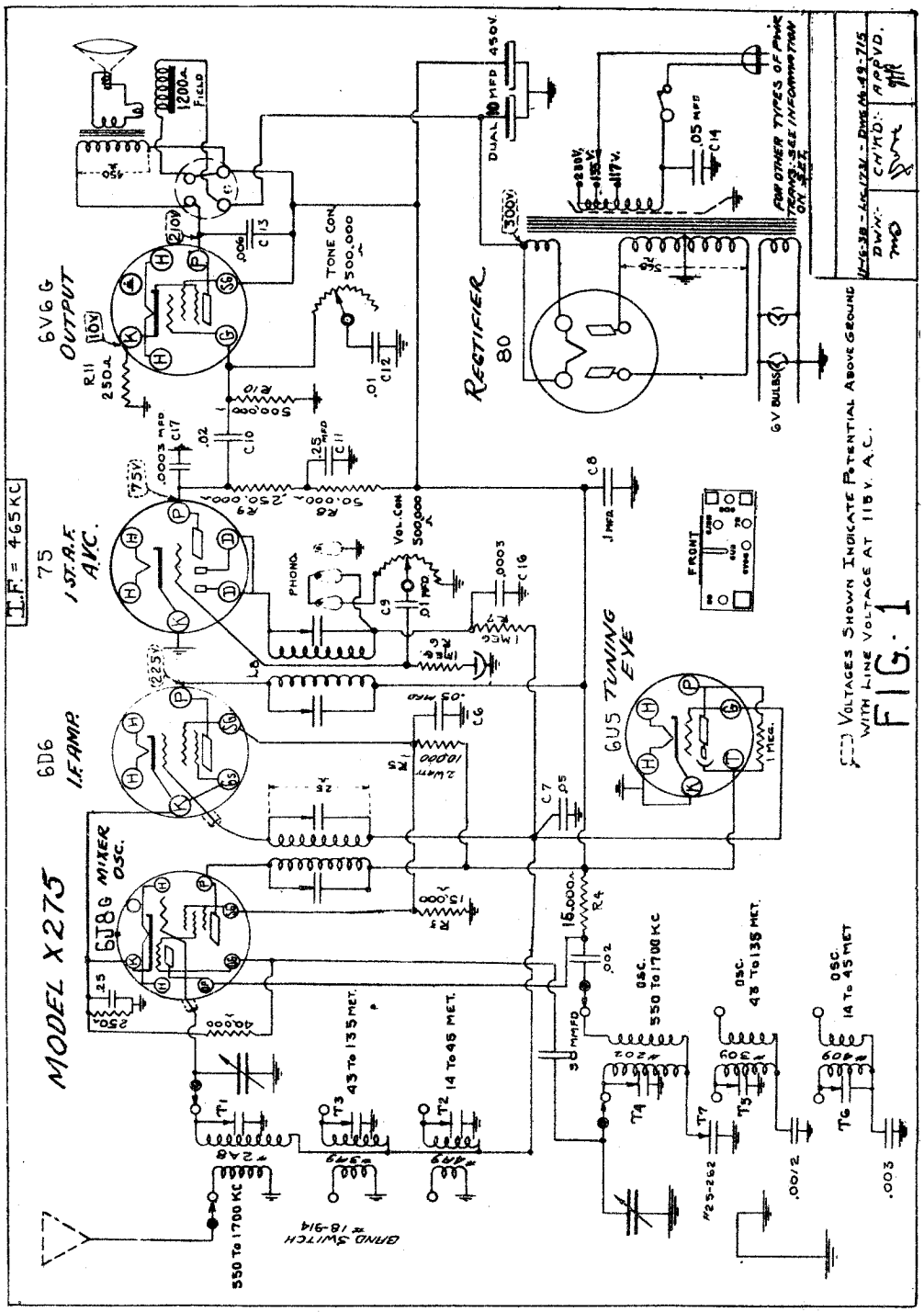
MODEL X275
I.F. = 465 KC
6V6 G OUTPUT
6D6 I.F. AMP.
75 1ST A.F. A.V.C.
6J8 G MIXER OSC.
6U5 TUNING EYE
80 RECTIFIER
TONE CON. 500,000
VOL. CON. 500,000
PHONO
FRONT
GANG SWITCH # 18-914
550 To 1700 KC
43 To 135 MET.
14 To 45 MET.
OSC. 550 TO 1700 KC
OSC. 43 TO 135 MET.
OSC. 14 TO 45 MET.
6V BULBS
FOR OTHER TYPES OF PWR. TRANS. SEE INFORMATION ON SET.
VOLTAGES SHOWN INDICATE POTENTIAL ABOVE GROUND WITH LINE VOLTAGE AT 115 V. A.C.

FIG. 1

Use this receiver only with Alternating Current, 40-60 Cycles. The receiver is adaptable to three line voltages; determine the line voltage with which the set is to be used, then check the adjustable plug position on top of the power transformer, with the coded socket for 117, 135 and 240 volts. Insert plug in the correct socket before turning on set. REFER TO INSTRUCTION TAG ATTACHED TO POWER TRANSFORMER.

If any other type transformer is being used, a different tag will explain the correct connections.

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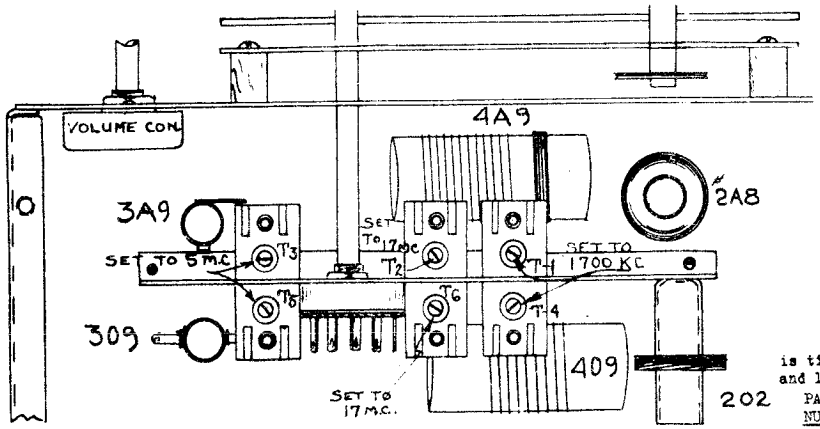



BOTTOM VIEW

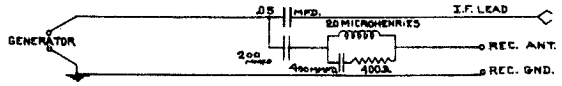
# MODEL X275, 285

FIG. 3

## ALIGNMENT

No change should be made with the I.F. or R.F. adjustments unless it is certain that such adjustments are necessary.

The following instructions are given with the assumption that the service station has the proper generator, means of measuring the output and proper input connections. The following circuit is recommended for the input from the signal generator.




See that the dial hand is straight across when the condenser is at full capacity.

After aligning the four trimmers of the IF system to 465 KC, refer to Fig. 3 showing the position of the R.F. trimmer and the frequency to which they are to be adjusted. Although the dial is calibrated in meters, there will be found on the dial extra points representing the frequency in kilocycles corresponding to the trimmer adjustments as shown in Fig. 3.

N O T E S:

Always peak the oscillator circuit first and recheck after the antenna circuit is adjusted.

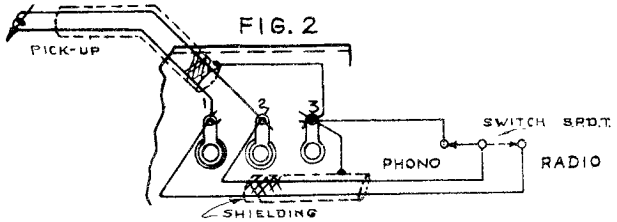
Be certain the alignment is not made at an image frequency.

Seal trimmers after final adjustment.

The normal voltages are shown on the schematic circuit taken from the various points to ground.

## THE ADAPTATION OF THE SET FOR USE WITH PHONOGRAPH

Out of the back of the chassis there extends three lugs labeled "Phone" 1-2-3. For phonograph use, the jumper is removed and the pick-up leads from the pick-up are connected to Nos. 1 and 2 terminals, with the overall wire shield grounded to No. 3 terminal. A single pole double throw switch may be used to change from Radio to "Phono". See Fig. 2.




**NOTE:**

With certain models, the chassis is floated on cushion rubber. In shipment the chassis is tightened on corner wood strips. To release, loosen the four bottom screws, remove strips and let chassis float free

REPLACEMENT PARTS LIST MODEL 285

| PART NUMBER | DESCRIPTION |
|---|---|
| 18-914 | Band Switch - 4 pole, 3 position |
| 19-212 | Choke - 340 Ohm |
| 22-936 | Coil Assembly |
| 23-936 | Coil Assembly |
| 2A8 | Coil - B.C. Antenna |
| 202 | Coil - B.C. Oscillator |
| 4A9 | Coil - S.W. Antenna |
| 409 | Coil - S.W. Oscillator |
| 3A9 | Coil - P.B. Antenna |
| 309 | Coil - P.B. Oscillator |
| OC-2 | Choke - Oscillator Plate |
| 32-266 | Condenser - Dual 30 Mfd. 150 Volt |
| 8218-3 | Condenser - Single Trimmer |
| 25-262 | Condenser - Padding, 5 Plate |
| 23-281 | Control - Volume |
| 11-278 | Control - Tone & Switch |

| PART NO. | DESCRIPTION |
|---|---|
| 285 | Dial Glass - Specify name on glass |
| 2-498 | Dial Lamp - 6 V. Bayonet Type |
| 12-768 | Dial Lamp Socket Assembly |
| 9-328 | Drive Disc - 2-3/4" dia. with hub & friction assembly |
| 11-328 | Drive Disc for mounting on V. Cond. |
| 285 | Drive Shaft with friction discs |
| 18-490 | Knob for Controls |
| 2-625 | Resistor - Candohm 50 Ohms |
| 3-191 | Resistance Line Cord, 215 Ohms |
| J5-806 | Speaker |

REPLACEMENT PARTS LIST MODEL X275

| PART NUMBER | DESCRIPTION |
|---|---|
| 18-914 | Band Switch - 4 pole, 3 position |
| 22-936A | Coil - 1st I.F. Complete |
| 23-936A | Coil - 2nd I.F. Complete |
| 8547 | Coil - P.B. Oscillator (301) |
| 30-266 | Condenser, Electrolytic Dual 10, 450 V. |
| 8218-3 | Condenser, Single Trimmer |
| 25-262 | Condenser, Padding |
| 21-270 | Condenser, Variable 2 Gang |
| 11-278 | Control - Volume |
| 23-281 | Control - Tone & Switch |
| X275 | Dial Glass - Calibrated, specify name on glass |
| 2-498 | Dial Lamp - 6 V. Bayonet Type |
| 11-768 | Dial Lamp Socket Assembly |
| 11-328 | Drive Disc - for mounting on V. Cond. Shaft |
| 9-328 | Drive Disc - 2-3/4" dia. with hub & friction assembly |
| X275 | Drive Shaft with friction discs |
| 18-490 | Knob for Controls |
| 6-771 | Socket and Cable for Tuning Eye |
| 35-810 | Speaker - 6-1/2" |
| 52-938 | Transformer - 40-60 Cycle, 3 tap Primary |
| 37-938 | Transformer - 40-60 Cycle, 2 range Primary |

| | |
|---|---|
| 2A8 | Coil - B.C. Antenna |
| 202 | Coil - B.C. Oscillator |
| 4A6 | Coil - S.W. Antenna |
| 406 | Coil - S.W. Oscillator |
| 8546 | Coil - P.B. Antenna |

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# HOWARD RADIO CO.

MODEL 285
Schematic, Voltage
Notes

THIS RECEIVER CAN BE USED ON EITHER ALTERNATING OR DIRECT CURRENT AND IS ADAPTABLE TO THREE DIFFERENT LINE VOLTAGES BY CHANGING THE TERMINAL ARRANGEMENT ON THE BACK OF THE CHASSIS.

BEFORE CONNECTING RADIO, VERIFY THE VOLTAGE WITH WHICH THE RADIO IS TO BE USED, AND FOLLOW DIRECTIONS AS GIVEN ON CHASSIS, OR AS FOLLOWS:

FOR A LINE VOLTAGE BETWEEN 100 and 125 VOLTS, CONNECT ALL THREE TERMINALS TOGETHER.

FOR A LINE VOLTAGE FROM 125 to 150 VOLTS, OMIT JUMPER BETWEEN EXTREME LEFT TERMINAL AND CENTER TERMINAL.

FOR A LINE VOLTAGE BETWEEN 200 and 240 VOLTS, REMOVE ALL CONNECTIONS.

BE CAREFUL NOT TO LET LOOSE ENDS OF THE WIRES TOUCH THE CHASSIS

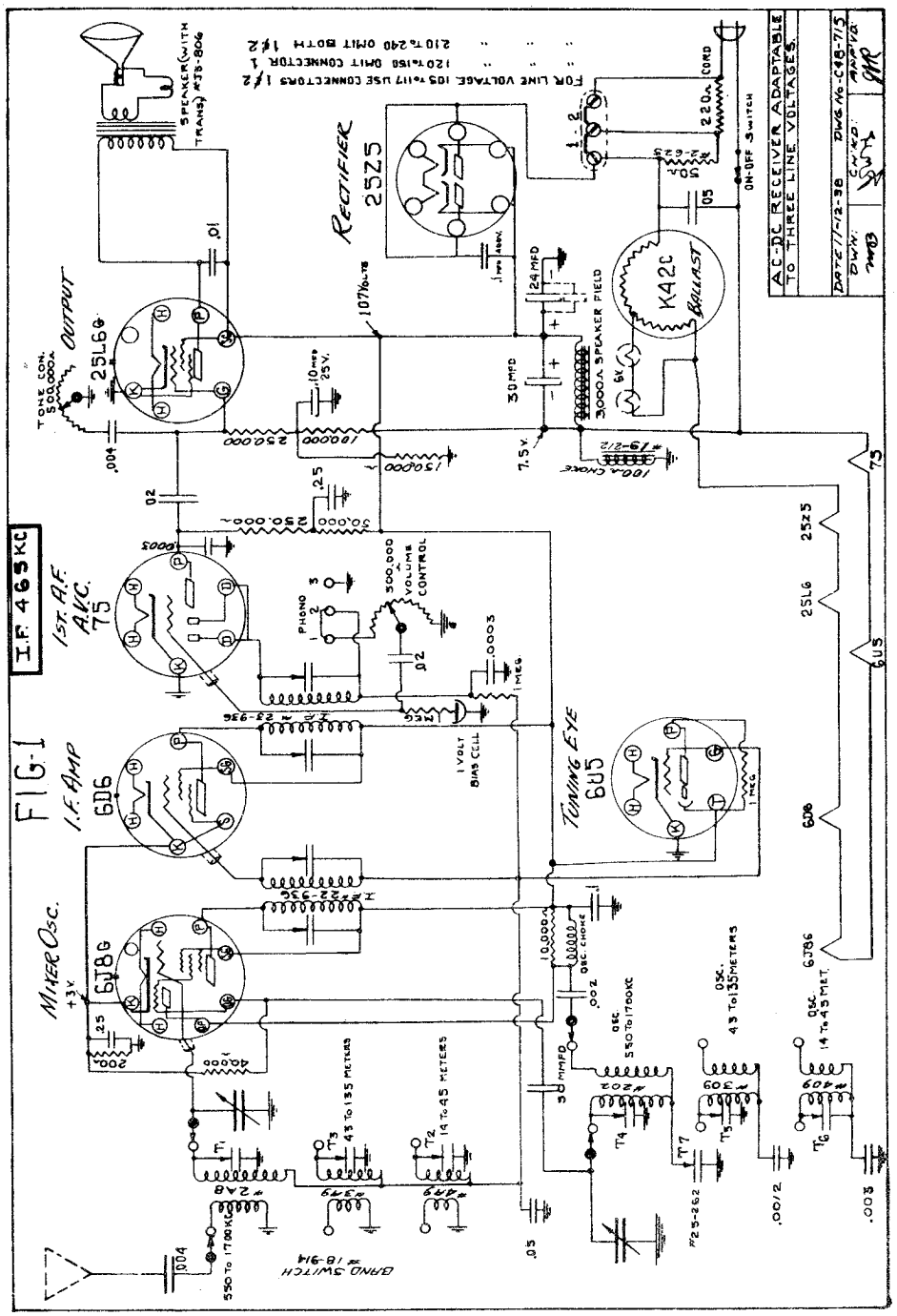


FIG. 1

DO NOT USE A GROUND ON THIS RECEIVER.

MODEL 285

Each of the three bands has a separate antenna and oscillator coil.

The intermediate frequency stages are tuned to 465 KC and have a sensitivity of about 27 microvolts. (for 50 milliwatt output)

The maximum output is rated at about 4-1/2 watts, and 2.4 watts undistorted.

The three line voltage ranges are obtained by use of the resistance cord, an extra resistor within the chassis, and the Ballast tube. See schematic diagram. The Ballast tube also provides necessary voltage for the two pilot lights connected in series.

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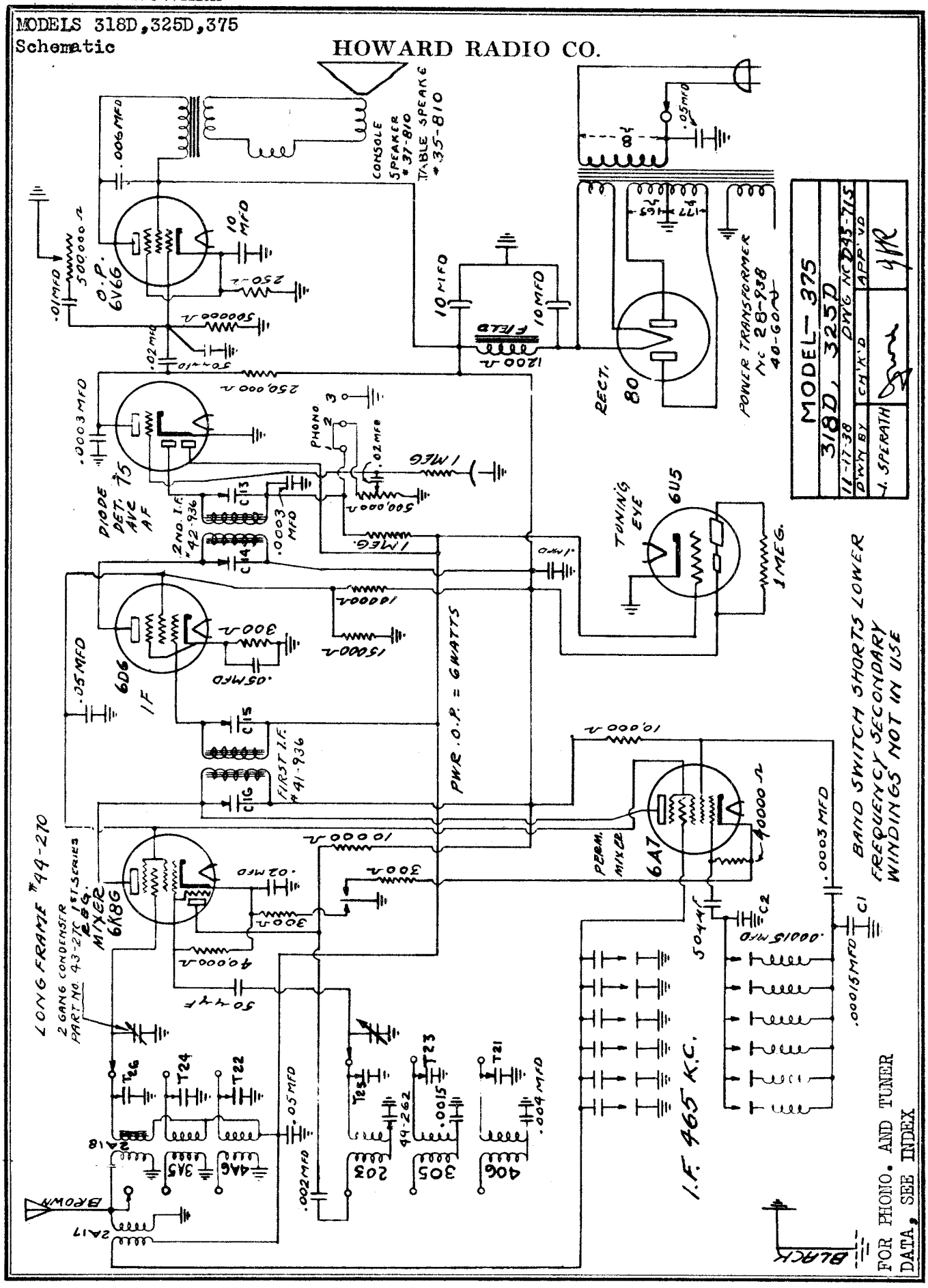
MODELS 318D,325D,375
Schematic

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MODEL 377
Schematic, Voltage

# HOWARD RADIO CO.

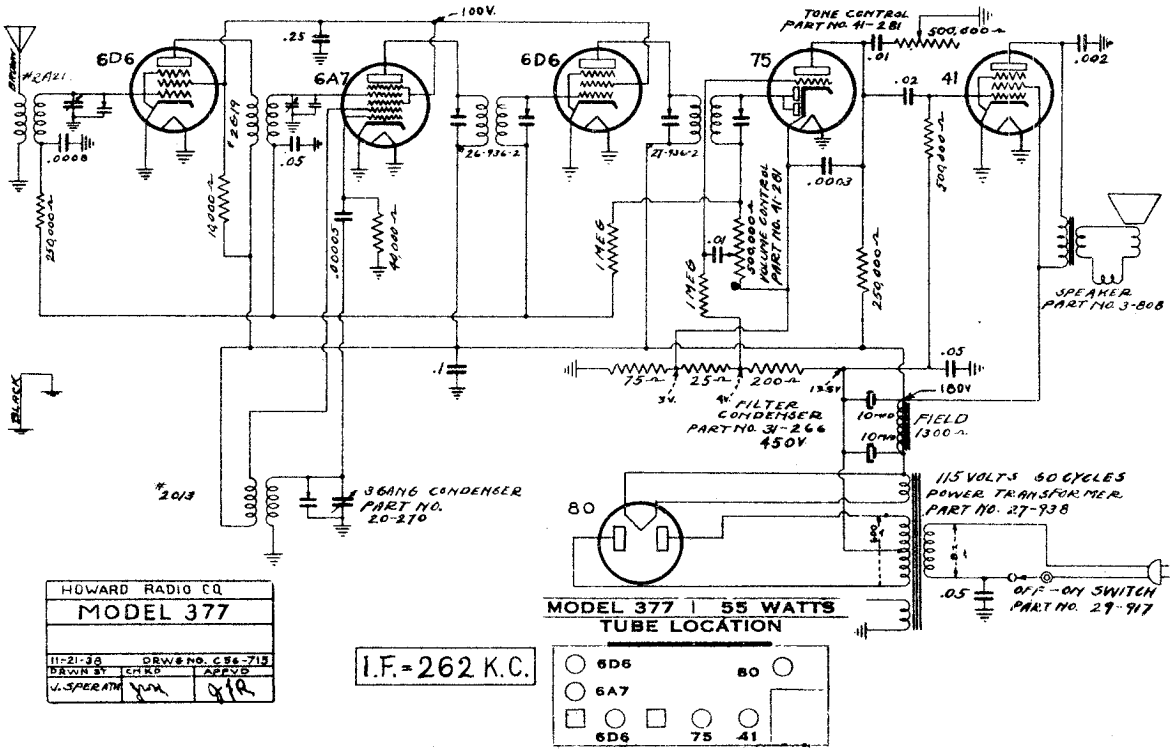
MODELS 318D, 325D, 375
Socket, Trimmers
Alignment

The Model 377 is designed as a single band for Broadcast reception. Three gang condenser is used to tune the Antenna, R.F. and Oscillator circuits. The Intermediate Frequency is 262 KC. The bias voltages are obtained by series resistors from the high voltage center tap to ground. The negative side of the filter is not grounded.

The maximum output obtainable is 2½ watts.

The variable condenser section for the oscillator circuit is the cut-plate type.

See circuit diagram for other specifications.



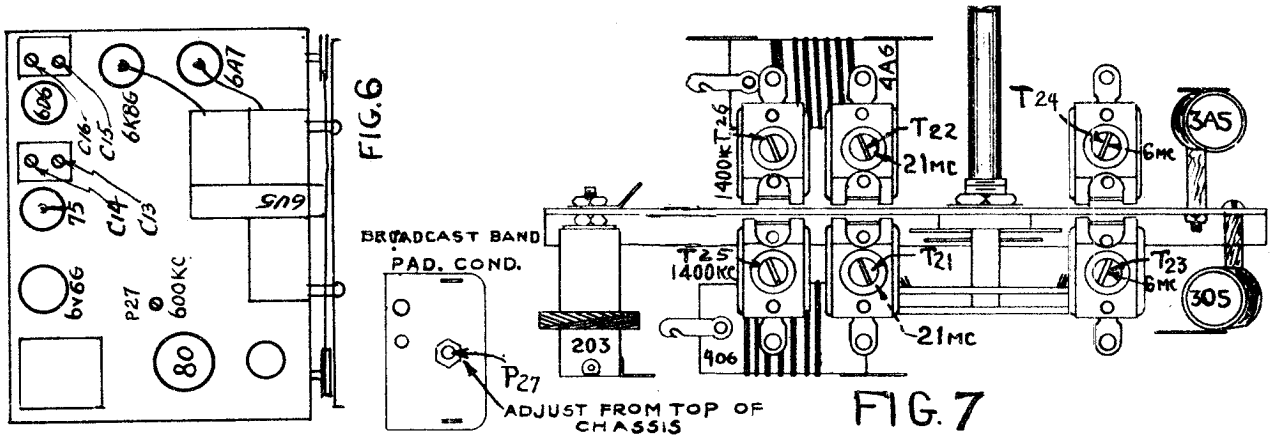




FIG. 6

FIG. 7

ALIGNMENT CHART FOR MODEL 375

| CHECK BAND SWITCH POSITION & SET DIAL TO | GENERATOR FREQUENCY | GENERATOR CONNECTION | TRIMMER LOCATION | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS FOR 50 MILLIWATT OUTPUT |
|---|---|---|---|---|---|
| 540 KC | 465 KC | Grid of 6K8G | C13, C14, C15, C16 Fig. 6 | I.F. | 20 |
| 21 MC | 21 MC | Antenna Lead | T21, T22 Fig. 7 | OSC. & ANT. | 5 |
| 6 MC | 6 MC | Antenna Lead | T23, T24 | OSC. & ANT. | 3 |
| 1400 KC | 1400 KC | Antenna Lead | T25, T26 | OSC. & ANT. | 1 |
| 600 KC | 600 KC | Antenna Lead | P27 | OSC. PAD | 1 |

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## SET-UP INSTRUCTIONS FOR HOWARD PERMA-MATIC AUTOMATIC TUNER NO 1

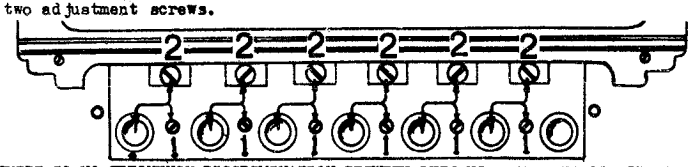
## NOTE:-DO NOT ATTEMPT ANY ADJUSTMENTS UNTIL THE SET HAS BEEN TURNED ON AT LEAST 20 MINUTES.

(1) Remove the push-button escutcheon plate by prying forward from ends, taking care not to scratch cabinet.

(2) Depress any one of the selector buttons, tune the desired station in by turning slotted screw with small screw-driver (this screw is numbered 1 in the illustration and is always the screw adjacent to and right of depressed button.) This moves the iron core in oscillator circuits.

(3) Adjust the screw with slotted head for maximum electric eye deflection. This adjustment is numbered 2 in illustration and always the one directly above the station selector adjustment mentioned in above paragraph. If electric eye overlaps on strong stations, adjust for maximum overlap.

**When making the two adjustments it is possible to obtain a strong deflection of the tuning eye apparently for a station and yet no station is present. THIS IS A NORMAL CONDITION and just means that the two adjustments are not close enough in relation to each other and can be corrected by varying the two adjustment screws.**




THERE IS NO FREQUENCY DISCRIMINATION BETWEEN BUTTONS. ANY ONE OF SELECTORS WILL TUNE THE ENTIRE BROADCAST BAND (1600-540 KC).

NOTICE: DO NOT FORCE ANY ADJUSTMENTS if they tighten up in the course of adjustment, either the maximum or minimum has been reached and the adjustment should be made in opposite rotation.

It will be found easier to adjust if the low frequency stations are started on right side and progress toward high frequency stations to left. IN SAME ORDERS AS MAIN DIAL.

However, the above procedure is not absolutely necessary if there should be some preference for arranging stations otherwise.

AFTER ALL ADJUSTMENTS HAVE BEEN MADE -- GO OVER EACH ADJUSTMENT THE SECOND TIME TO MAKE CERTAIN THEY ARE CORRECT AND TO COMPENSATE FOR SUBSEQUENT ADJUSTMENTS.

It is a big help to tune the desired station in on mail dial while making adjustments, in order that the station can be quickly recognized by switching from manual back to button being adjusted.

It is not necessary to lock any of the adjustments as they are automatically locked.

Place station call letter tabs in escutcheon and replace escutcheon by pressing in place on cabinet.

NOTICE: Turning station selector screw clock-wise lowers the frequency.

Best results will be had when band switch is in broadcast position when using automatic tuning.

## MECHANICAL ACTION OF THE HOWARD

USED IN MODELS 318D,325D 375,418,468 AND 525

PERM-A-MATIC TUNER NO. 2
8-966
WITH SLIDE TYPE CONTACTS

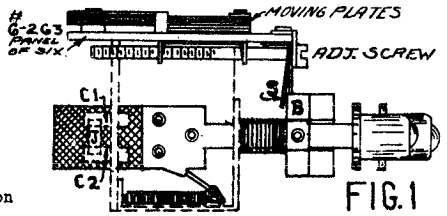



FIG.1

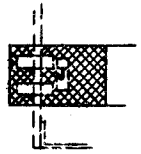



FIG.2

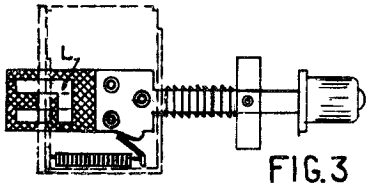



FIG.3

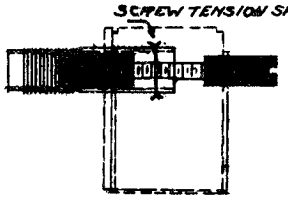



FIG.4

Fig. 1 shows one of the buttons depressed for a station. The trimmer panel assembly (for the antenna circuit) is designed with spring fingers "S" that make contact with cross bar "B" completing the ground circuit of the R.F. Trimmer.

When making the original set-up, the adjusting screw may indicate two positions for resonance. This is due to the possibility of the small amount of play in the screw thread and is of no concern as long as it is set to the exact resonance point.

The jumper contact "J" connects C1 contact to C2 contact with the button "IN". This completes the oscillator circuit for that particular button.

Fig. 2 shows the jumper position with the button "OUT".

Fig. 3 shows the manual OFF-ON button in the "OUT" position.

The "L" shaped sliding contact is the common cathode return circuit and alternates the bias on the 6K8 for manual tuning or on the 6A7 for push button tuning.

Fig. 4 shows the iron core movement within the oscillator coil. Its position is held stationary by the small spring wire across the coil form. The position of this spring must be such that no spring action is apparent from the end of the adjustment stud due to pressure with a screwdriver. Otherwise, when the screwdriver is removed, the core will shift out of position.

The button is held down by action of the latch bar and is released when another key raises the latch bar on its way down.

If it is necessary to replace a coil, mount it in line with the other coils and cement it in place.

WHEN ORDERING ANY PARTS, SPECIFY PART NUMBER AND DETERMINE WHETHER THE PART IS FOR PERM-A-MATIC TUNER NO. 1 OR NO. 2. TUNER NO. 1 WAS CONSTRUCTED WITH THE SLOTTED BRASS SCREW FOR CORE ADJUSTMENT, WHEREAS TUNER NO. 2 CONSISTED OF THE BLACK RUBBER STUD AS SHOWN IN FIG. 4.

MODEL Perm-A-Matic Tuner
No.9-966 Changes

## HOWARD RADIO CO.

REPLACE HOWARD PERM-A-MATIC TUNERS #7-966 or #8-966 WITH PERM-A-MATIC TUNER #9-966 WHICH REQUIRES THE CHANGE OF THE ANTENNA COIL ON THE CHASSIS AS EXPLAINED AT THE BOTTOM OF THIS PAGE.

There are six leads between the tuner and the receiver circuits to be unsoldered. UNSOLDER THE CONNECTIONS FROM THE RECEIVER TERMINALS AND NOT FROM THE TUNING UNIT AS THE NEW TUNER WILL HAVE THE NECESSARY LEADS.

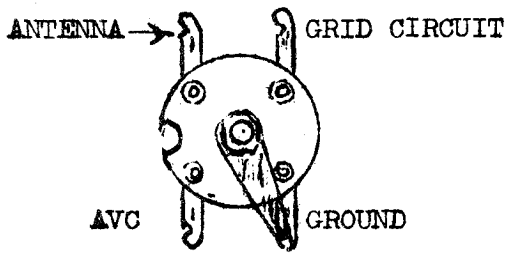
Mechanically, it is only necessary to remove two screws from the front plate to release the tuner.

Due to the fact that the two ceramic condensers (green in color), one each in the grid and plate circuits of the oscillator, are now a part of the new Tuner, they must be removed from within the receiver and returned with the tuner being replaced.

Since the colors of the leads are different in the two type tuners, it is advisable to follow the schematic diagram together with the following chart.

| TUNER NO. 1 (7-966)<br>LEAD COLOR | CIRCUIT | TUNER NO. 2 (8-966)<br>TUNER NO. 3 (9-966)<br>LEAD COLOR |
|---|---|---|
| Unsolder from ANTENNA COIL 2A17 | GRID 6A7 | SAME |
| WHITE WITH BLUE TRACER | CATHODE BIAS SWITCH | SAME |
| GREEN<br>Unsolder from .0005 Condenser | OSCILLATOR GRID 6A7 | SAME |
| GREEN<br>Unsolder from .0003 Condenser | OSCILLATOR PLATE 6A7 | BLUE |
| BROWN<br>Unsolder from 6K8 Cathode | CATHODE RETURN FOR 6K8 | BROWN WITH WHITE TRACER |
| BLUE | CATHODE RETURN FOR 6A7 | GREEN WITH WHITE TRACER |

DUE TO THE FACT THAT THIS NEW UNIT, #9-966, HAS A DIFFERENT TRIMMER CAPACITY RANGE, THE ASSOCIATED ANTENNA COIL, 2A17, IN THIS CIRCUIT MUST BE CHANGED TO 2A23. THIS IS THE COIL ON THE LEFT SIDE WHEN FACING FRONT OF SET. FOLLOW DIAGRAM FOR TERMINAL ARRANGEMENT.




BOTTOM VIEW

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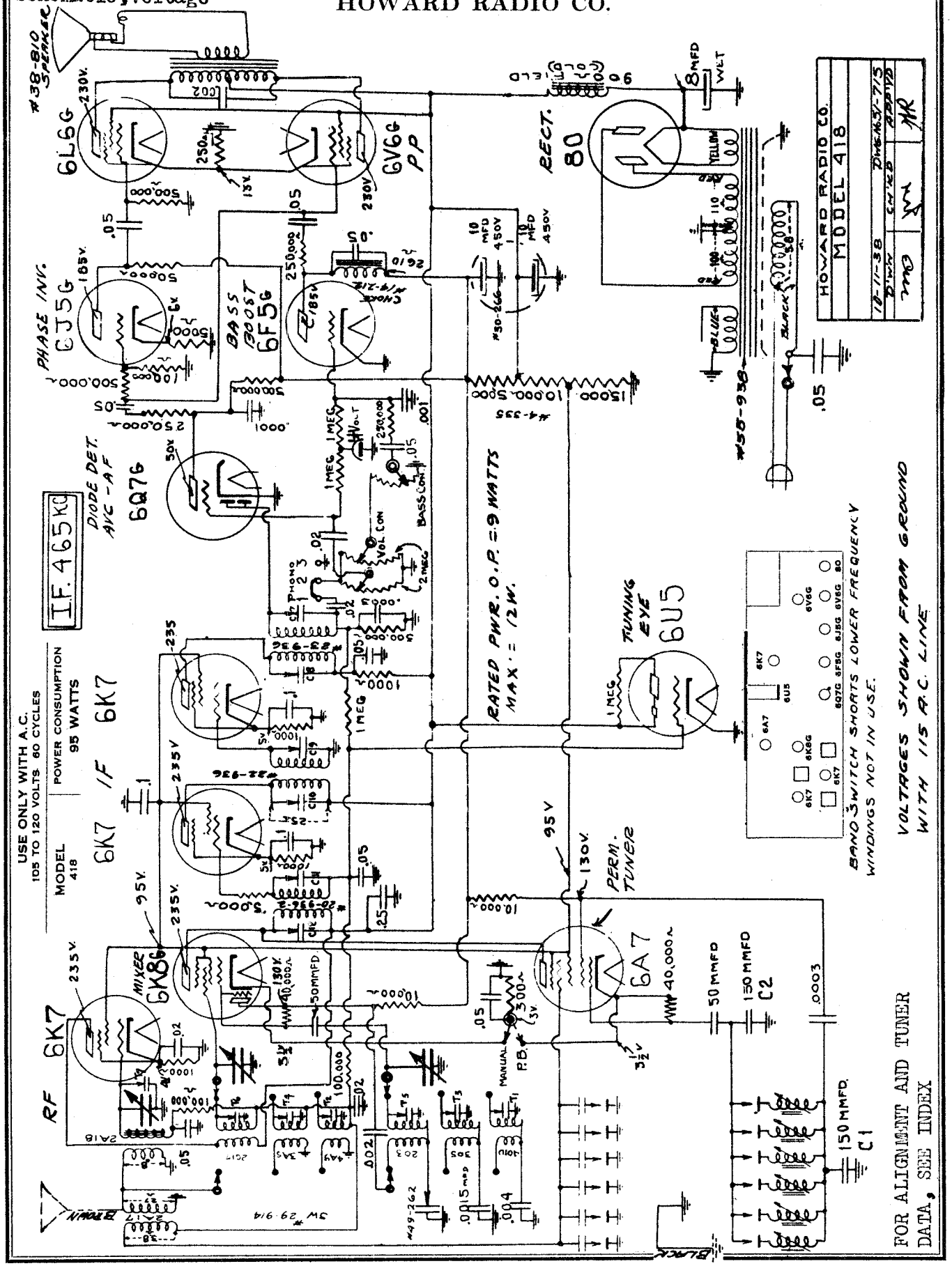
MODEL 418
Schematic, Voltage

# HOWARD RADIO CO.


#38-810 SPEAKER
6L6G
6V6G PP
RECT. 80
8 MFD WLT
PHASE INV. 6J5G
BASS BOOST 6F5G
DIODE DET. AVC-AF 6Q7G
IF. 465 KC
6K7 IF 6K7
RF 6K7
MIXER 6K8G
6U5 TUNING EYE
6A7 PERM. TUNED
RATED PWR. O.P. = 9 WATTS MAX. = 12 W.
USE ONLY WITH A.C. 105 TO 120 VOLTS 60 CYCLES
MODEL 418 | POWER CONSUMPTION 95 WATTS
BAND SWITCH SHORTS LOWER FREQUENCY WINDINGS NOT IN USE.
VOLTAGES SHOWN FROM GROUND WITH 115 A.C. LINE
FOR ALIGNMENT AND TUNER DATA, SEE INDEX
HOWARD RADIO CO.
MODEL 418
10-11-38 DWN. CHKD. APPVD.
DRAWN 5-7-38

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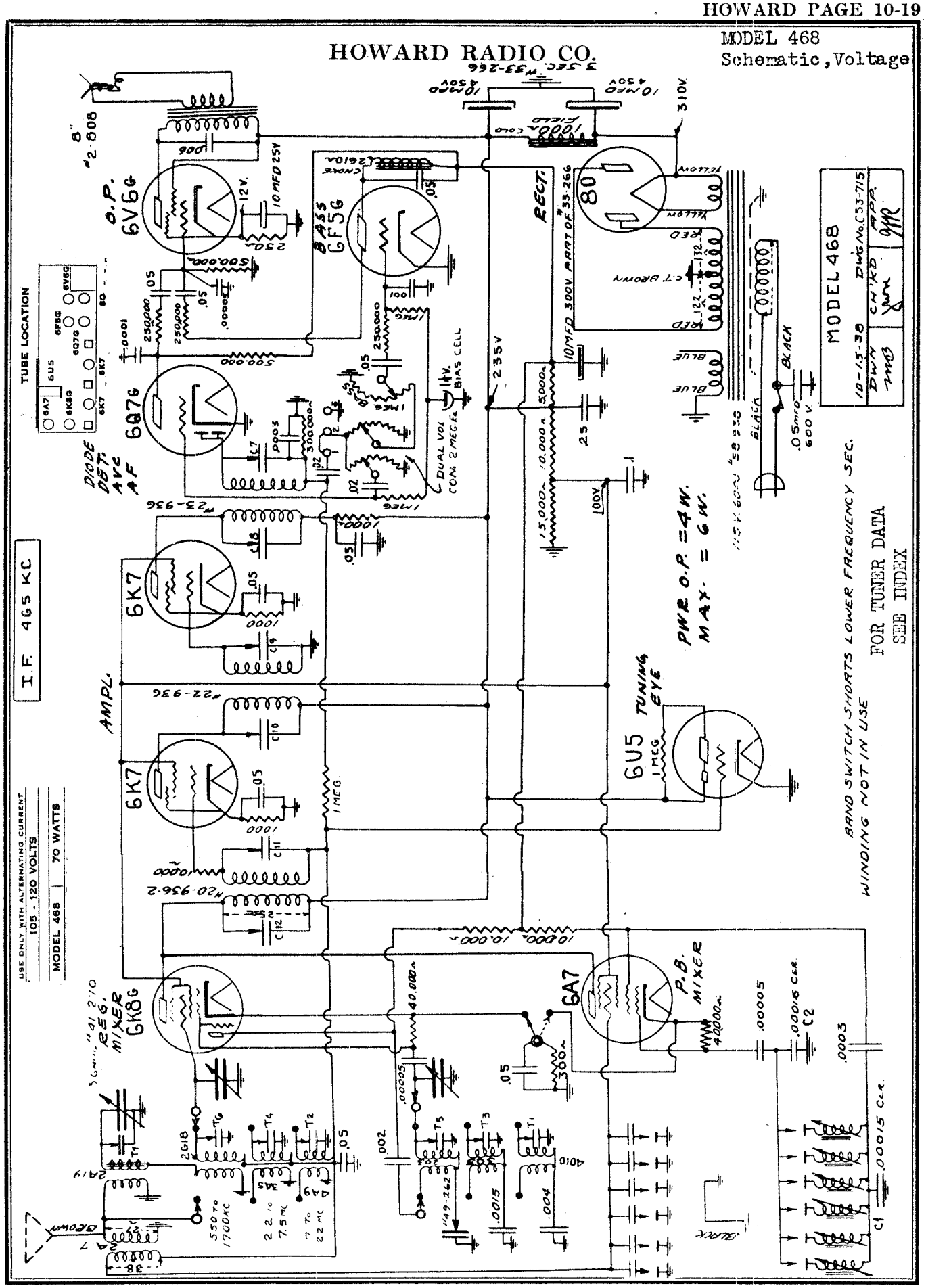


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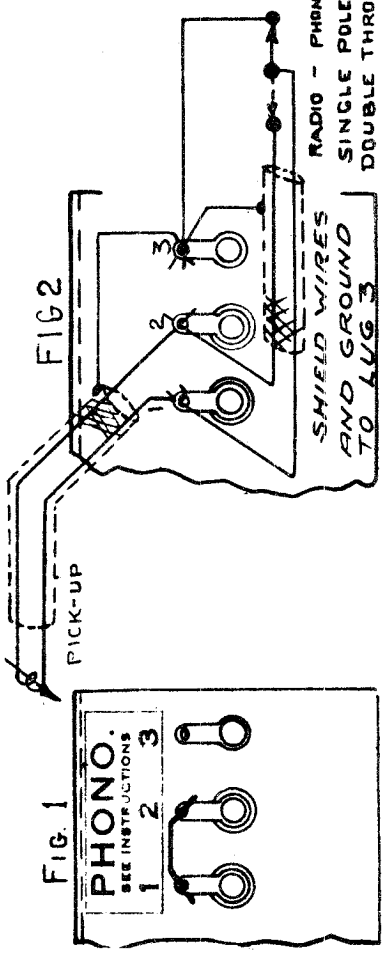
MODEL 418
MODEL 468
MODEL 525
Socket, Trimmers, Alignment
Phono. Data

# HOWARD RADIO CO.

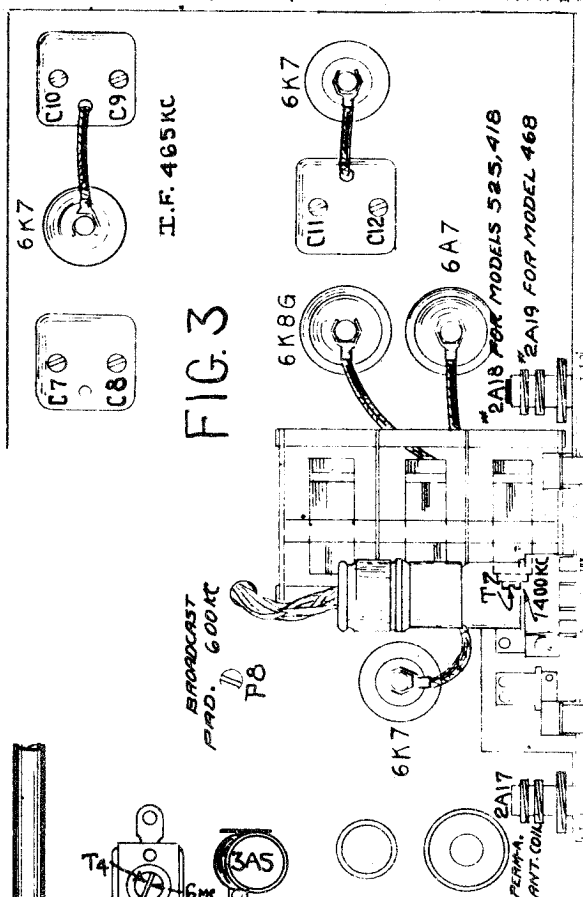
MODELS 318D, 325D, 375
Phono. Data

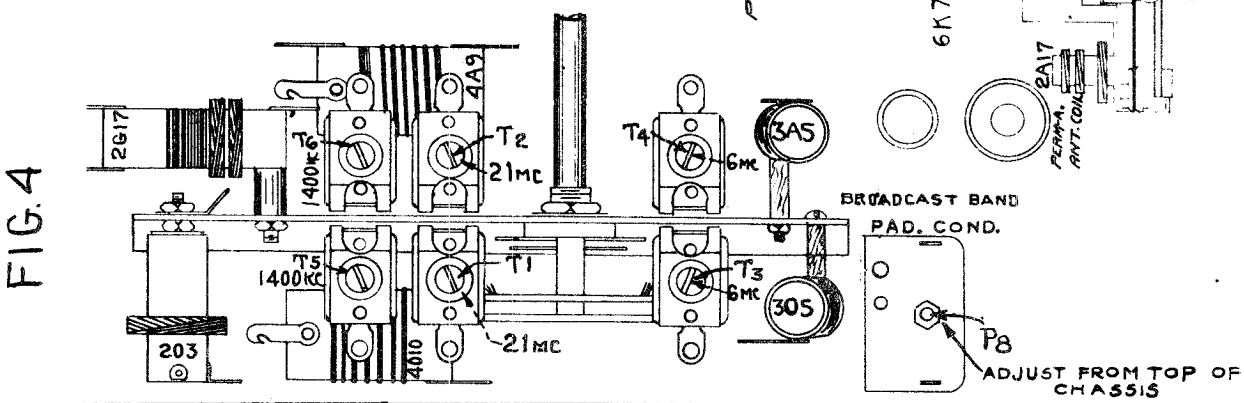
FOR ALL MODELS ADAPTABLE TO PHONOGRAPH CONNECTION

Out of the back of the chassis there extends three lugs as shown in Diagram Fig. 1. For phonograph use, the jumper is removed and a single pole, double throw switch is connected as shown in Fig. 2. The pick-up leads from the pick-up are connected to Nos. 1 and 2 terminals, with the overall shield grounded to No. 3 terminal.




NOTE 1 - When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.
NOTE 2 - When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.
NOTE 3 - When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.
NOTE 4 - When aligning the short wave band, be sure not to adjust at the image frequency. This can be checked as follows: If the signal generator is set for 21,000 KC, the signal will be heard at 21,000 KC on the dial. The image signal, which is much weaker, will be heard at 21,000 less 2 times the IF, 465, (930KC) or 20,070 KC on the dial. It may be necessary to increase the input to hear the image. If the image is not heard then, the original alignment was not made at the right peak.
NOTE 5 - If there is an apparent lack of sensitivity, especially on the short wave bands, first check the 6K8G tube by substituting one or more in its place.




| CHECK BAND SWITCH POSITION & SET DIAL TO | GENERATOR FREQUENCY | GENERATOR CONNECTION | TRIMMER LOCATION | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS FOR 50 MILLIWATT OUTPUT |
|---|---|---|---|---|---|
| 540 KC | 465 KC | Grid of 6K8G | C7,C8,C9,C10,C11,C12 Fig. 3 | I.F. | 10 to 20 |
| 21 MC | 21 .MC | Antenna Lead | T1, T2 Fig. 4 | OSC. & ANT. | 1 |
| 6 MC | 6 MC | Antenna Lead | T3, T4 Fig. 4 | OSC. & ANT. | 5 |
| 1400 KC | 1400 KC | Antenna Lead | T5,T6,T7 Fig. 4 | OSC., R.F. & ANT. | 1 |
| 600 KC | 600 KC | Antenna Lead | P8 Fig. 3 | OSC. PAD (Rock Dial) | 1 |

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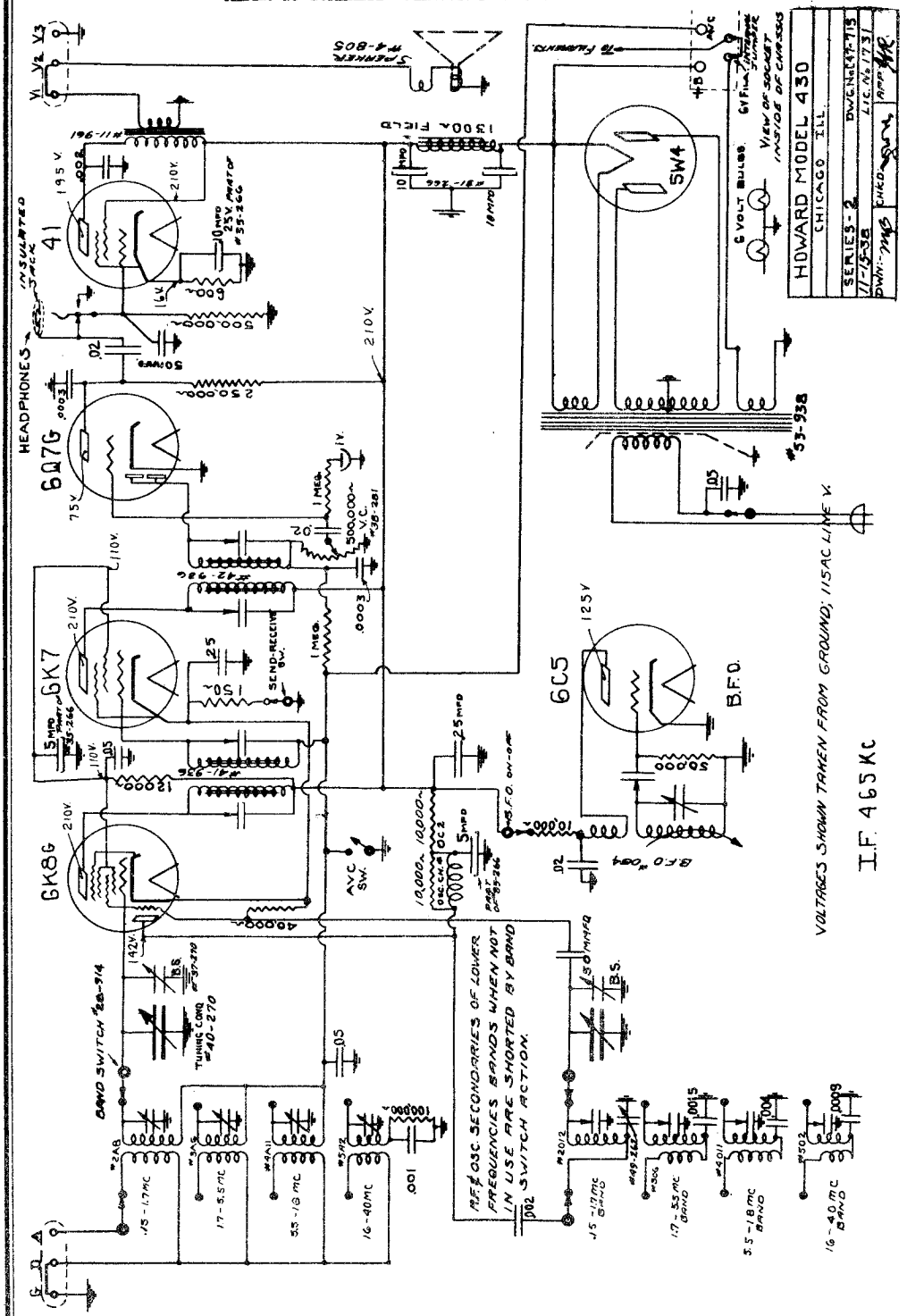
# HOWARD RADIO CO

MODEL 430, Series 2
Schematic, Voltage

| PART NUMBER | DESCRIPTION |
|---|---|
| 9-132 | Ball Bearing - 1/8" Dia. |
| 7601 | Bias Cell - 1½ V. |
| 52-188 | Cabinet - Complete |
| 17-829 | Coil Spring for Drive Cord |
| 50-262 | Condenser - Single Trimmer |
| 49-262 | Condenser - Padding, BC Band |
| | Condenser - .0015 Mfd. - Mica |
| | Condenser - .0009 Mfd. - Mica |
| | Condenser - .004 Mfd. - Mica |
| 40-270 | Condenser - 2 Gang - Tuning |
| 37-270 | Condenser - 2 Gang - Band Spread |
| 31-266 | Condenser - "E", 10-10 Mfd. 350 V. |
| 35-266 | Condenser - "E", 10-5-5 Mfd. 350,350,25 V. |
| 47-590 | Dial Plate - Calibrated |
| 1-288 | Drive Cord |
| 27-448 | Tuning Hand |
| 38-281 | Volume Control - 1 Meg. |
| 3-485 | Headphone Jack |
| 41-936 | I.F. Assembly Complete (Input) |
| 42-936 | I.F. Assembly Complete (Output) |
| 28-448 | Indicator Pointer Hands |
| 20-490 | Knob - 1-1/8" |
| 21-490 | Knob - 1-9/16" |
| 2-498 | Pilot Light - 6 V. Bayonet |
| 14-768 | Pilot Light Socket - Bayonet |
| 19-427 | Pyralin Window |
| 4-167 | Rubber Mounting Feet |
| 4-805 | Speaker - 6½", Cord and Plug |
| 15-829 | Spring Clamp for Ball Bearing on Shaft |
| 14-917 | Toggle Switches - S.P.S.T. |
| 53-938 | Transformer - Power 115 V. 60 Cycles |
| 11-961 | Transformer - Output |

REFER TO SCHEMATIC DIAGRAM FOR REPLACEMENT PARTS NOT SHOWN IN ABOVE LIST.




THE POWER OUTPUT for the Model 430 is about 1½ watts, undistorted.

Ceramic coil forms are used on the high frequency band. Ceramic trimmers are used throughout. The unused secondaries of the lower frequency bands are shorted as the band switch is shifted toward the higher frequency bands.

The frequency coverage from .55 to 42 megacycles is divided into four bands. The lower scale from 0 to 100 is for logging purposes. The left hand pointer indicates the band in operation. For correct tuning calibration, the Band Spread pointer must be at 100.

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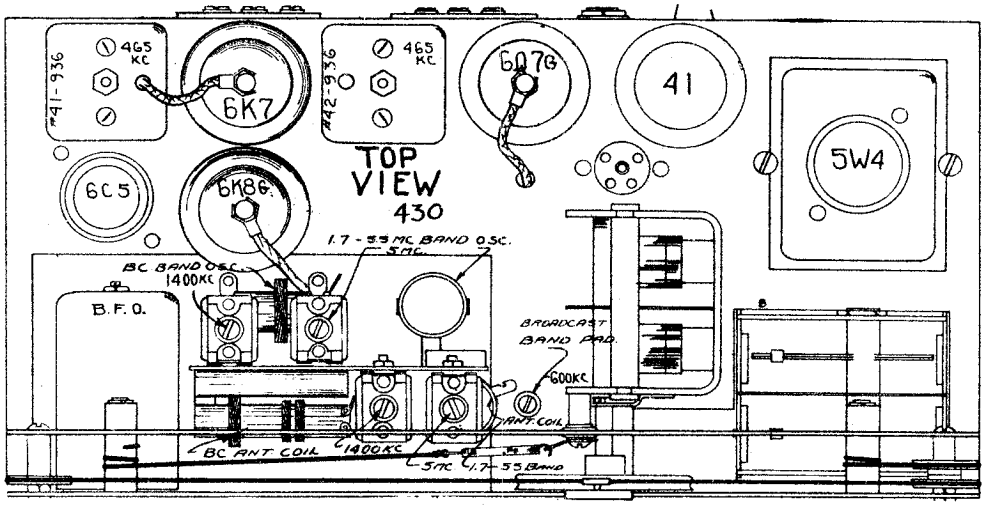
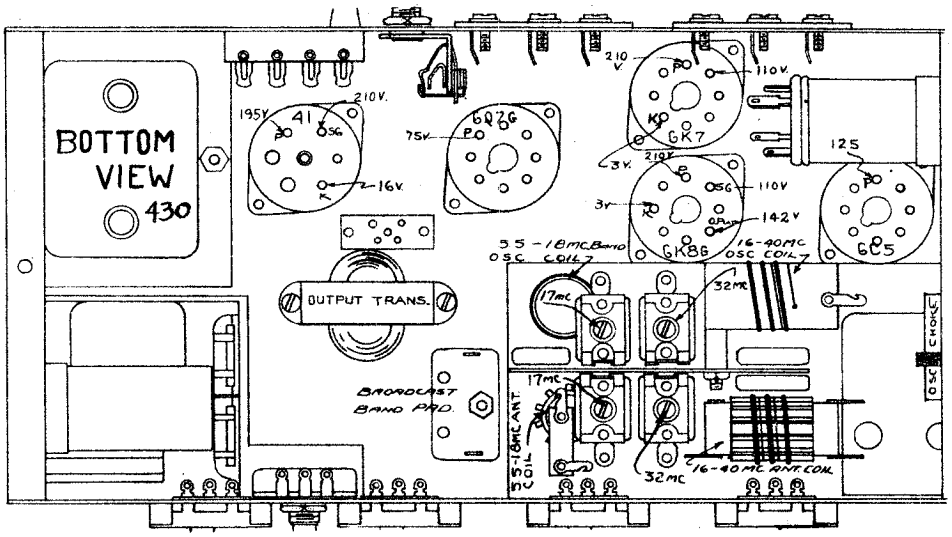
MODEL 430,Series 2
Alignment,Socket
Trimmers,Dial Data
MODEL 438
Dial Data

# HOWARD RADIO CO.




NOTE 1: When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.
NOTE 2: When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.
NOTE 3: When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.




NOTE 4: After the chassis has been removed from the cabinet, be sure when it is again assembled that the speaker plug is in place in the socket on top of the chassis and that the speaker cable wires do not lay back near the RF circuit, thus causing howling.

NOTE 5: Check for an image signal about .9 mc. lower in frequency. For example:- If a peak has been made at 6 mc. an image should be heard at about 5.1 mc. Otherwise the original setting was not correct.

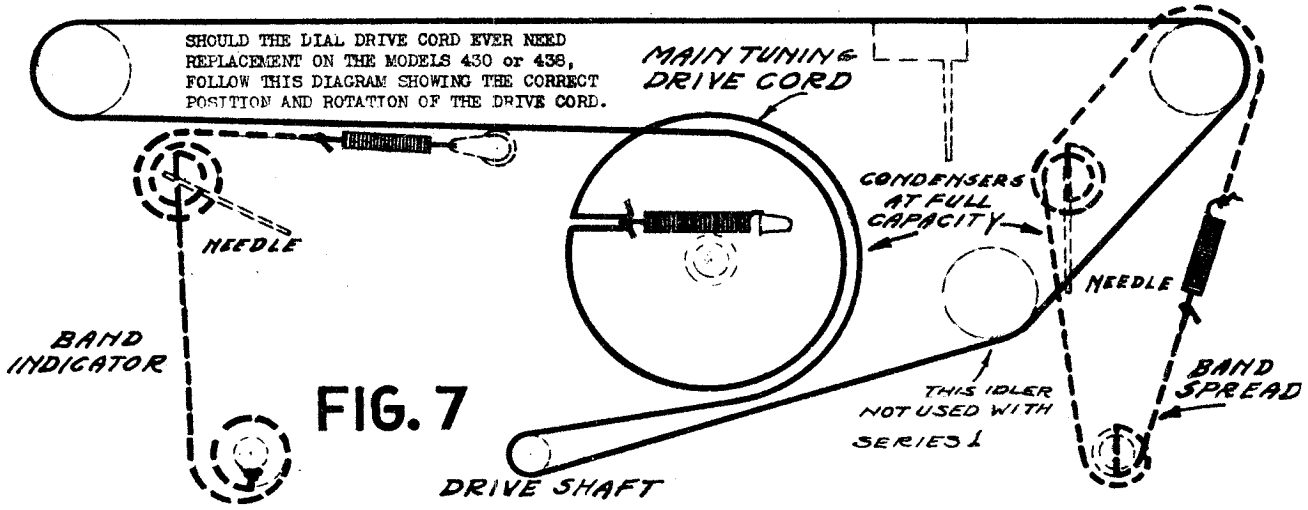

SHOULD THE DIAL DRIVE CORD EVER NEED REPLACEMENT ON THE MODELS 430 or 438, FOLLOW THIS DIAGRAM SHOWING THE CORRECT POSITION AND ROTATION OF THE DRIVE CORD.
MAIN TUNING DRIVE CORD
NEEDLE
BAND INDICATOR
CONDENSERS AT FULL CAPACITY
NEEDLE
BAND SPREAD
THIS IDLER NOT USED WITH SERIES 1
DRIVE SHAFT

FIG. 7

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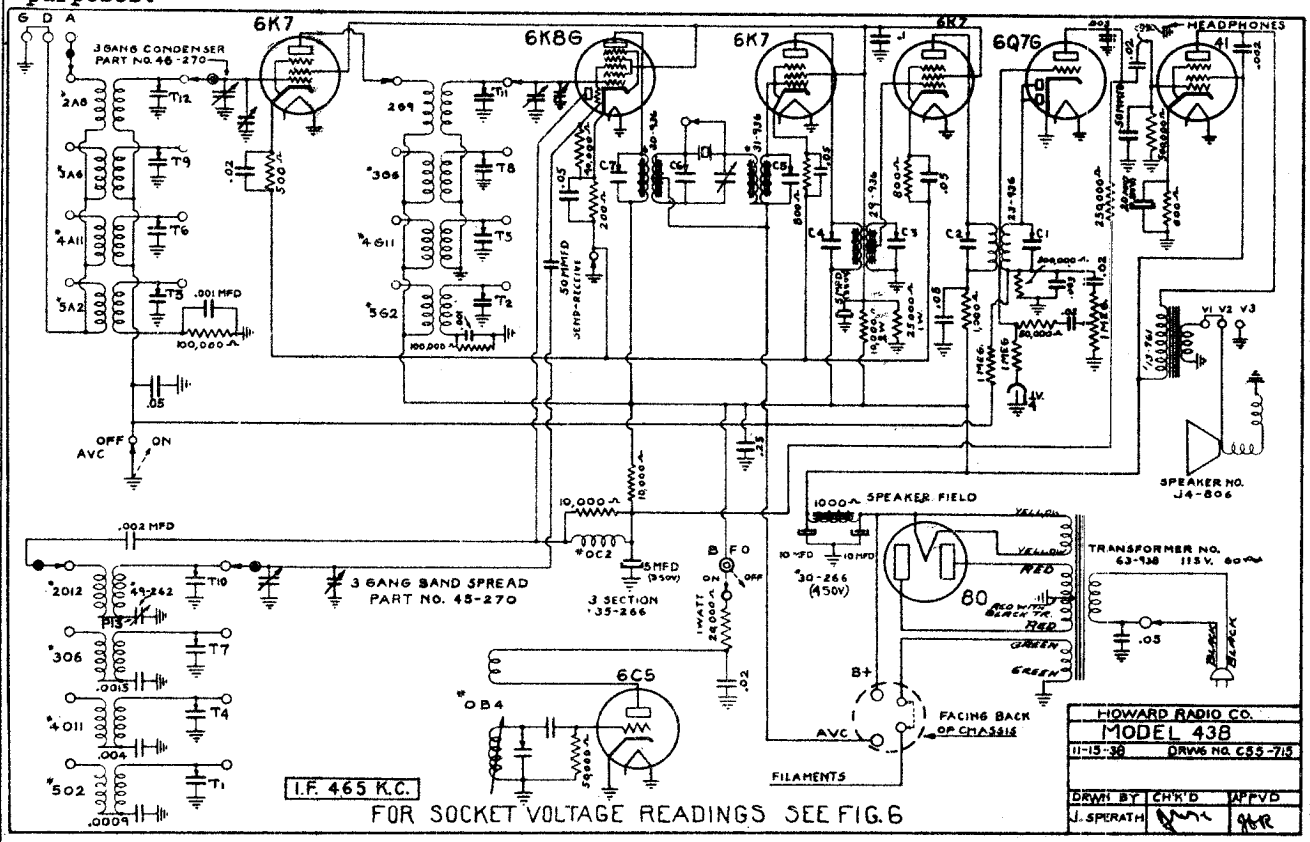
# HOWARD RADIO CO.

MODEL 438
Schematic

**The frequency coverage from .55 to 42 megacycles is divided into four bands. The left-hand pointer indicates the band in operation. For correct tuning calibration, the band spread pointer must be set at 100. The lower scale 0 to 100 is for logging purposes.**




THE POWER OUTPUT will be about 2½ watts, undistorted.

For each band there is a Radio Frequency stage with individual coils for the RF Oscillator and Mixer stages for each band.

Ceramic coil forms are used on the high frequency band. Ceramic trimmers are used throughout. The unused coil secondaries of the lower frequency bands are shorted as the band switch is shifted to the higher bands.

The Intermediate Frequency is 465 KC. The Crystal input, Crystal output, and the 2nd IF consist of windings wound on iron cores.

| PART NO. | DESCRIPTION |
|---|---|
| 9-132 | Ball Bearing - 1/8" dia. |
| 7601 | Bias Cell - 1½ V. |
| 57-188 | Cabinet - Complete |
| 17-829 | Coil Spring for Drive Cord |
| 50-262 | Condenser - Single Trimmer |
| 58-262 | Condenser - Variable Trimmer (Xtal Phase) |
| 49-262 | Condenser - Padding, BC Band |
| | Condenser - .0015 Mfd. - Mica |
| | Condenser - .0009 Mfd. - Mica |
| | Condenser - .004 Mfd. - Mica |
| 1-303 | Crystal - 465 KC |
| 1-288 | Drive Cord |
| 35-268 | Filter Condenser - 5,5,20 Mfd. 350,350 25 Volt |
| 30-266 | Filter Condenser - 10,10 Mfd. 450,450 Volt |

| PART NO. | DESCRIPTION |
|---|---|
| 3-485 | Headphone Jack |
| 28-448 | Indicator Pointer Hands |
| 20-490 | Knob - 1-1/8" |
| 21-490 | Knob - 1-9/16" |
| 2-498 | Pilot Light - 6 V. Bayonet |
| 14-768 | Pilot Light Socket - Bayonet |
| 19-427 | Pyralin Window |
| 19-917 | Rotary Switch |
| 7-167 | Rubber Mtg. Feet |
| J4-806 | Speaker - 6½", Cord and Plug |
| 15-829 | Spring Clamp for Ball Bearing on Shaft |
| 14-917 | Toggle Switches - S.P.S.T. |
| 27-448 | Tuning Hand |
| 40-281 | Volume Control - 1 Meg. |

REFER TO SCHEMATIC DIAGRAM FOR REPLACEMENT PARTS NOT SHOWN IN ABOVE LIST.

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MODEL 438
Alignment, Socket Trimmers

# HOWARD RADIO CO.

MODEL 440, Series 1,2
Crystal Alignment

NOTE: When using a Crystal set Phasing Control to almost minimum capacity. See special alignment instructions below for Crystal.

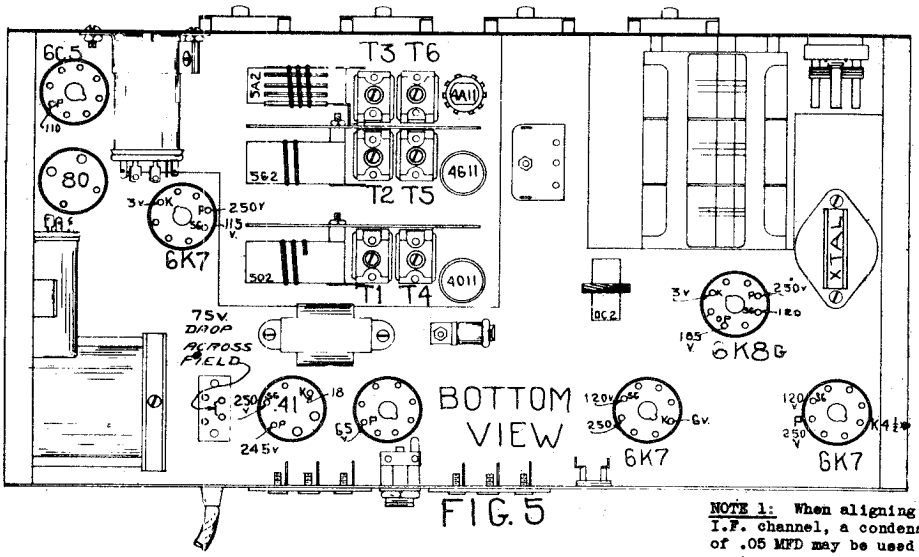


FIG. 5

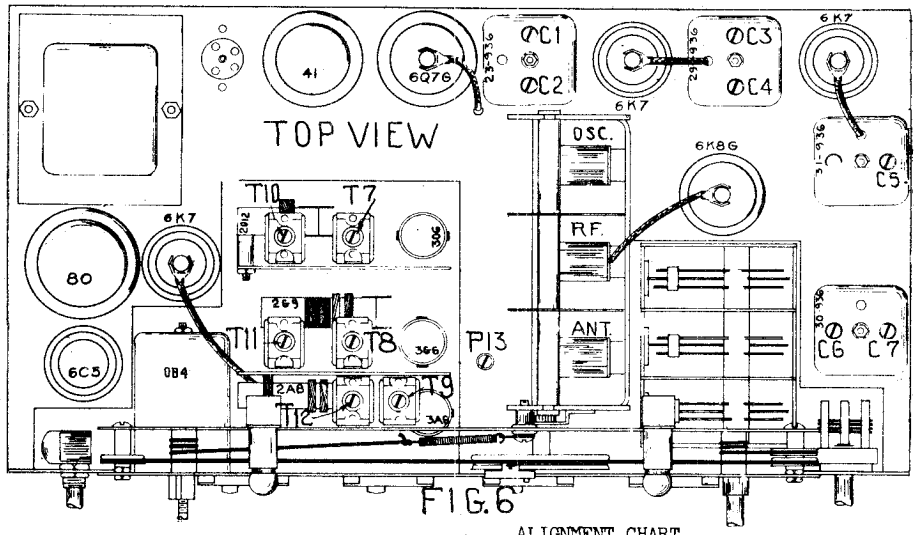


FIG. 6

**NOTE 1:** When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.

**NOTE 2:** When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.

**NOTE 3:** When aligning the short wave bands, a 400 ohm resister may be used in series with the signal generator.

**NOTE 4:** After the chassis has been removed from the cabinet, be sure when it is again assembled that the speaker plug is in place in the socket on top of the chassis and that the speaker cable wires do not lay back near the RF circuit, thus causing howling.

**NOTE 5:** Check for an image signal about .9 mc. lower in frequency. For example:- If a peak has been made at 6 mc. an image should be heard at about 5.1 mc. Otherwise the original setting was not correct.

ALIGNMENT CHART

| BAND MC | GENERATOR FREQUENCY | GENERATOR CONNECTION | TRIMMER LOCATION | TRIMMER ADJUSTMENTS | TRIMMER FUNCTION | APPROX. MICROVOLTS |
|---|---|---|---|---|---|---|
| IF | 465 KC | Grid of 6K8G | See Fig. 6 | C1, C2, C3, C4, C5, C6, C7 | IF | 15 |
| 42-16 | 32 MC | A and DG | See Fig. 5 | T1, T2, T3 | OSC. RF. ANT. | 8 |
| 18- 5.5 | 17 MC | A and DG | See Fig. 5 | T4, T5, T6 | OSC. RF. ANT. | 3 |
| 5.5- 1.7 | 5 MC | A and DG | See Fig. 6 | T7, T8, T9 | OSC. RF. ANT. | 1 |
| 1.6- 5.5 | 1400 KC | A and DG | See Fig. 6 | T10, T11, T12 | OSC. RF. ANT. | 1 |
| 1.6- 5.5 | 600 KC | A and DG | See Fig. 6 | P13 | OSC. PAD. | 1 |

ALIGNMENT INSTRUCTIONS - FOR RECEIVERS EQUIPPED WITH CRYSTALS

(1) REMOVE CRYSTAL, set crystal phasing condenser to almost minimum capacity and throw "XTAL" switch to "IN" position.

(2) With the 465 KC signal, re-adjust the I.F. Trimmer C-6 by turning the screw counterclockwise. The signal now may be slightly weaker than before and sound "off-side". This, however, is a normal condition.

(3) REPLACE THE CRYSTAL - A very noticeable drop in signal strength may be noted due to the filtering action of the crystal and the frequency control of the signal generator must be "rocked" slowly back and forth until the increase in signal strength indicates the exact frequency of the crystal being used. Now re-align the entire I.F. system to this frequency.

(4) Adjust "XTAL" phasing condenser for the lowest pitched note possible and re-adjust signal generator frequency. Repeat and continue to repeat this alignment procedure until no further improvement in the alignment can be accomplished.

NOTE: If the "XTAL" switch should now be thrown to another position, an apparent rise in gain will be noticed, which is caused by the addition of higher frequencies and background noise, so it does not mean that the sensitivity of this set is impaired in any way by use of the crystal.

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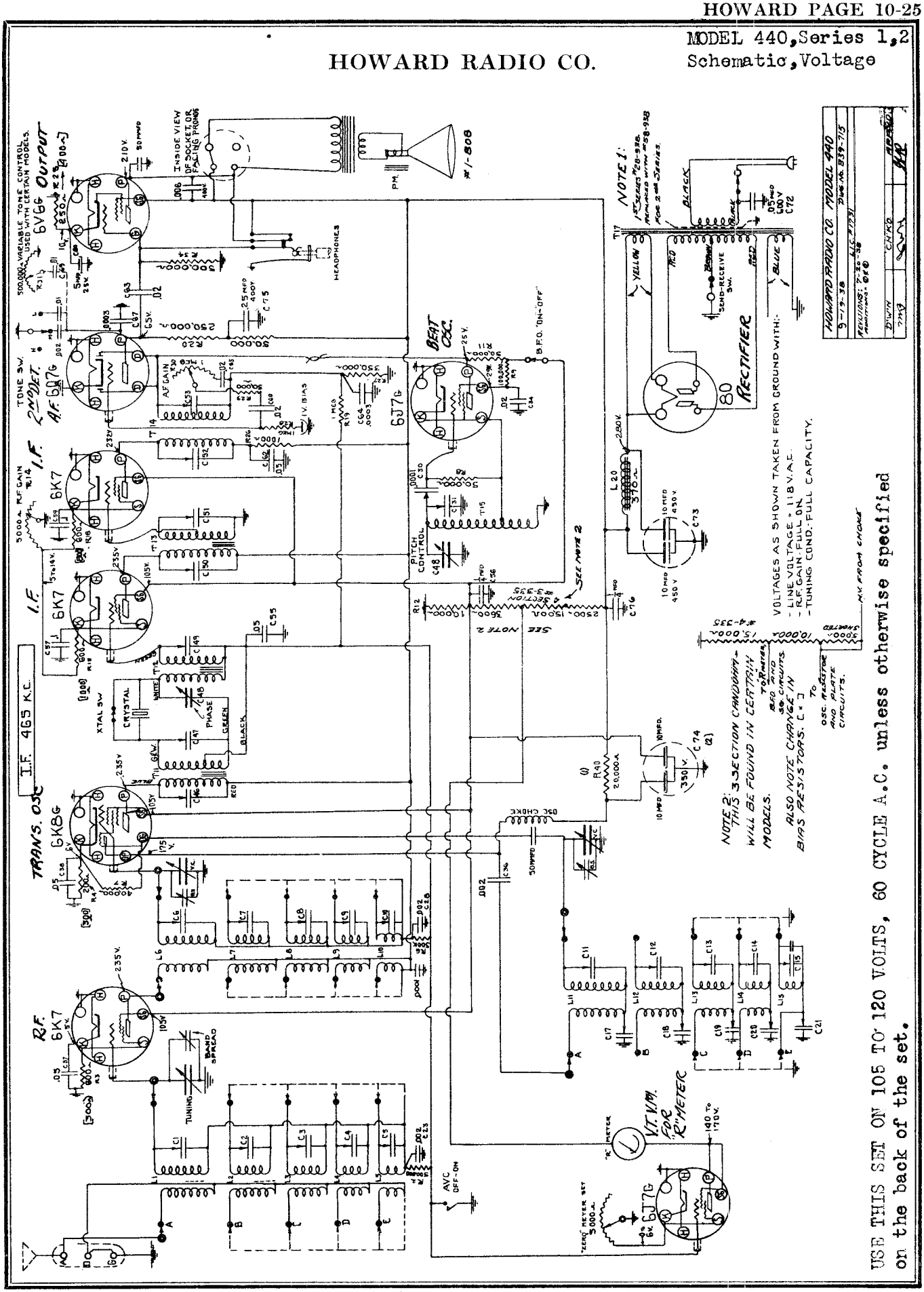
HOWARD RADIO CO.

MODEL 440, Series 1,2
Schematic, Voltage


6V6 OUTPUT
2ND DET. AF 6J7G
1.F. 6K7
1.F. 6K7
TRANS. OSC. 6K8G
R.F. 6K7
BEAT OSC. 6J7G
80 RECTIFIER
I.F. 465 K.C.
VOLTAGES AS SHOWN TAKEN FROM GROUND WITH:-
- LINE VOLTAGE = 118 V.A.C.
- R.F. GAIN FULL ON.
- TUNING COND. FULL CAPACITY.
NOTE 1:
NOTE 2:
USE THIS SET ON 105 TO 120 VOLTS, 60 CYCLE A.C. unless otherwise specified on the back of the set.

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## ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection - 4000 ohm or more copper oxide meter across 5 ohm terminals. Shunt with speaker.

Output meter reading to indicate .5 watt . . . . . 1.575 V.

Average sensitivity in microvolts for .5 watt output . . . . . See chart below

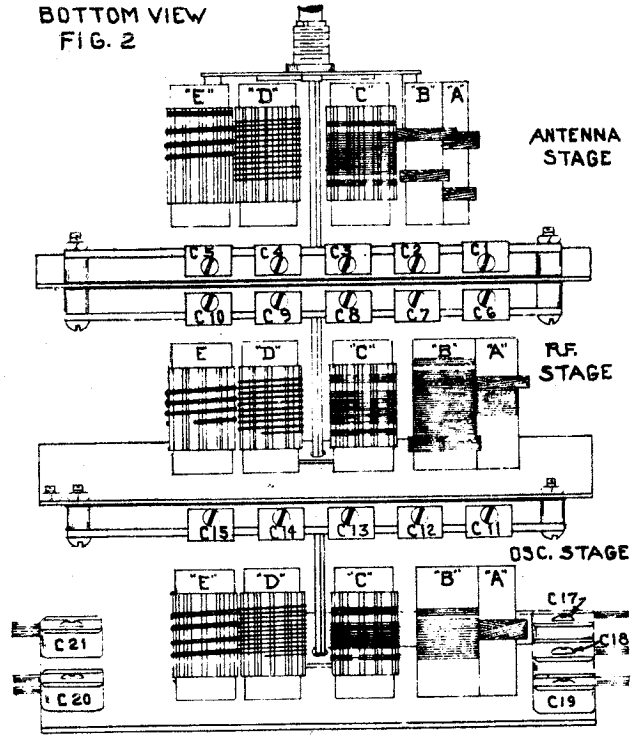
Generator ground lead connection . . . . . Direct to chassis

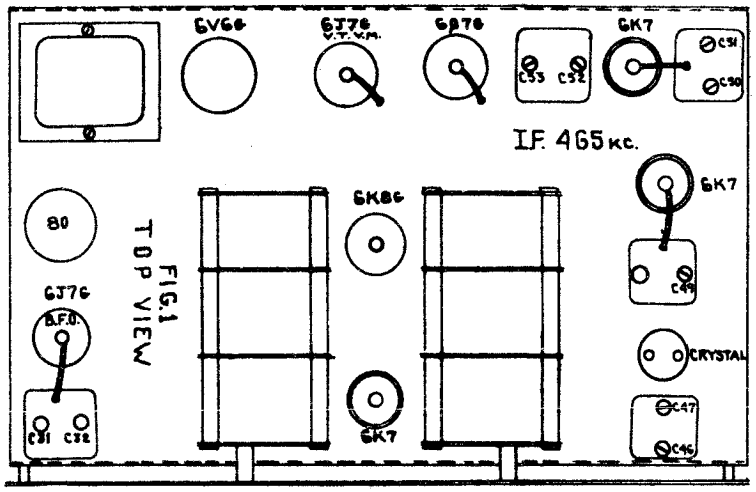
A.V.C. Switch . . . . . On

Band spread dial set at 100 . . . . . Min. Capacity

Generator modulation . . . . . 30%, 400 cycles

Position of volume control A.F. gain Position of volume control R.F. gain . Full On




NOTE 1: When aligning the I.F. channel, a condenser of .05 MFD may be used in series with the generator lead.

NOTE 2: When aligning the broadcast band, a 250 MMFD condenser may be used in series with the signal generator.

NOTE 3: When aligning the short wave bands, a 400 ohm resistor may be used in series with the signal generator.

| POSITION OF VARIABLE AND BAND SW. | GENERATOR FREQUENCY | GENERATOR CONNECTION | TRIMMER LOCATION | TRIMMER ADJUSTMENTS IN ORDER | TRIMMER FUNCTION | APPROX. MICRO-VOLTS |
|---|---|---|---|---|---|---|
| Closed "A" Band | 465 KC | 6L7 Grid | See Fig.1 | C53,52,51, 50,49,47,46 | I.F. | 15 |
| 36 MC "E" | 36 MC | A-D-G Ant. Term. | See Fig.2 | C15, 10, 5 | Osc Trans.Ant. | 3 |
| 16 MC "E" | 16 MC | A-D-G Ant. Term. | | C21 | Padder | 3 |
| 15 MC "D" | 15 MC | A-D-G Ant. Term. | See Fig.2 | C14, 9, 4 | Osc.Trans.Ant. | 1 |
| 7 MC "D" | 7 MC | A-D-G Ant. Term. | | | Padder | 1 |
| 6 MC "C" | 6 MC | A-D-G Ant. Term. | See Fig.2 | C13, 8, 3 | Osc.Trans.Ant. | 1 |
| 3 MC "C" | 3 MC | A-D-G Ant. Term. | | C19 | Padder | 1 |
| 2.6 MC "B" | 2.6 MC | A-D-G Ant. Term. | See Fig.2 | C12, 7, 2 | Osc.Trans.Ant. | 1 |
| 1.3 MC "B" | 1.3 MC | A-D-G Ant. Term. | | C18 | Padder | 1 |
| 1.2 MC "A" | 1200 KC | A-D-G Ant. Term. | See Fig.2 | C11, 6, 1 | Osc.Trans.Ant. | 1 |
| .6 MC "A" | 600 KC | A-D-G Ant. Term. | | C17 | Padder | 1 |

NOTE 4: When using a CRYSTAL, set PHASING CONTROL to almost minimum capacity. See special alignment instructions for Crystal MODEL 438

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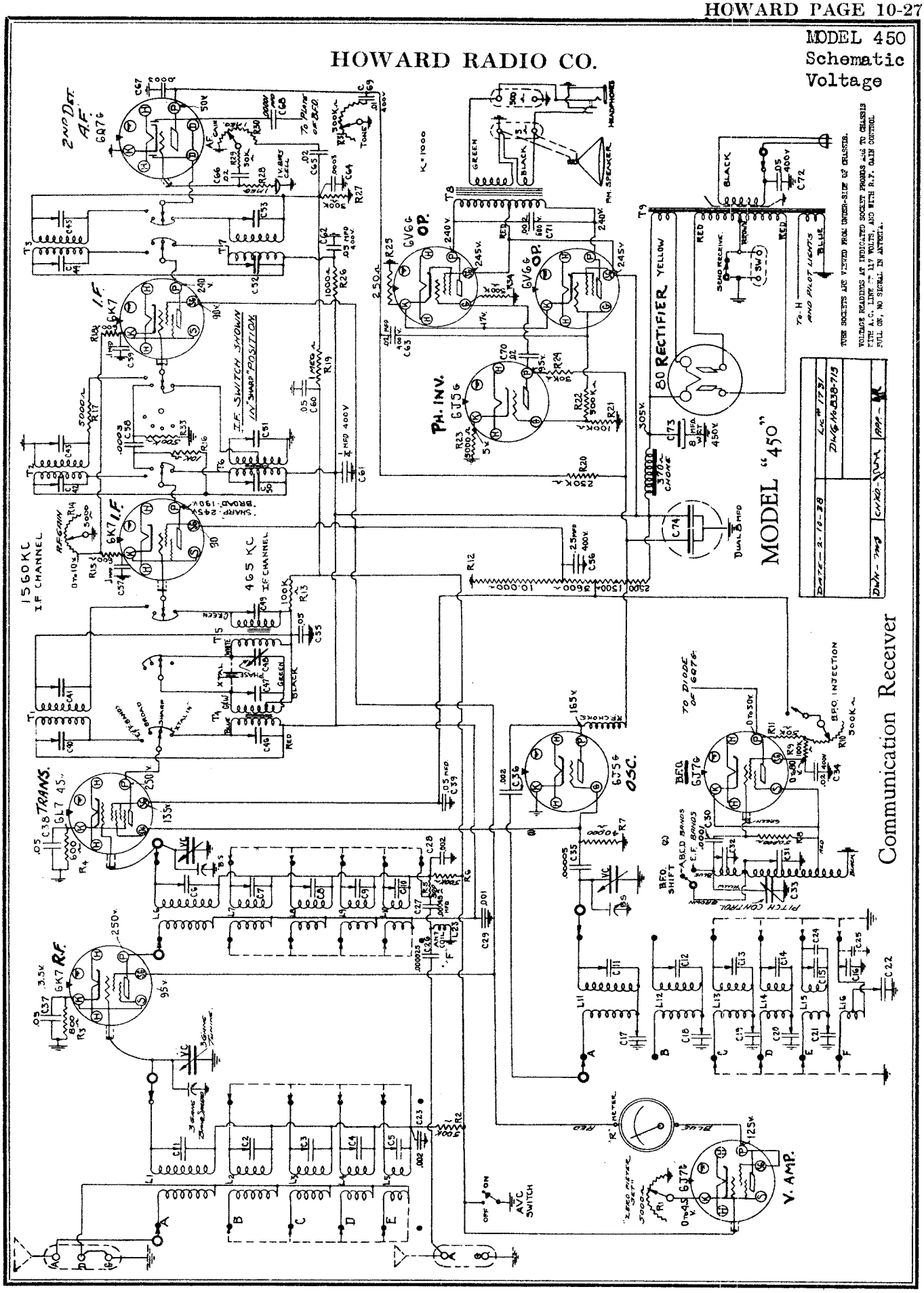


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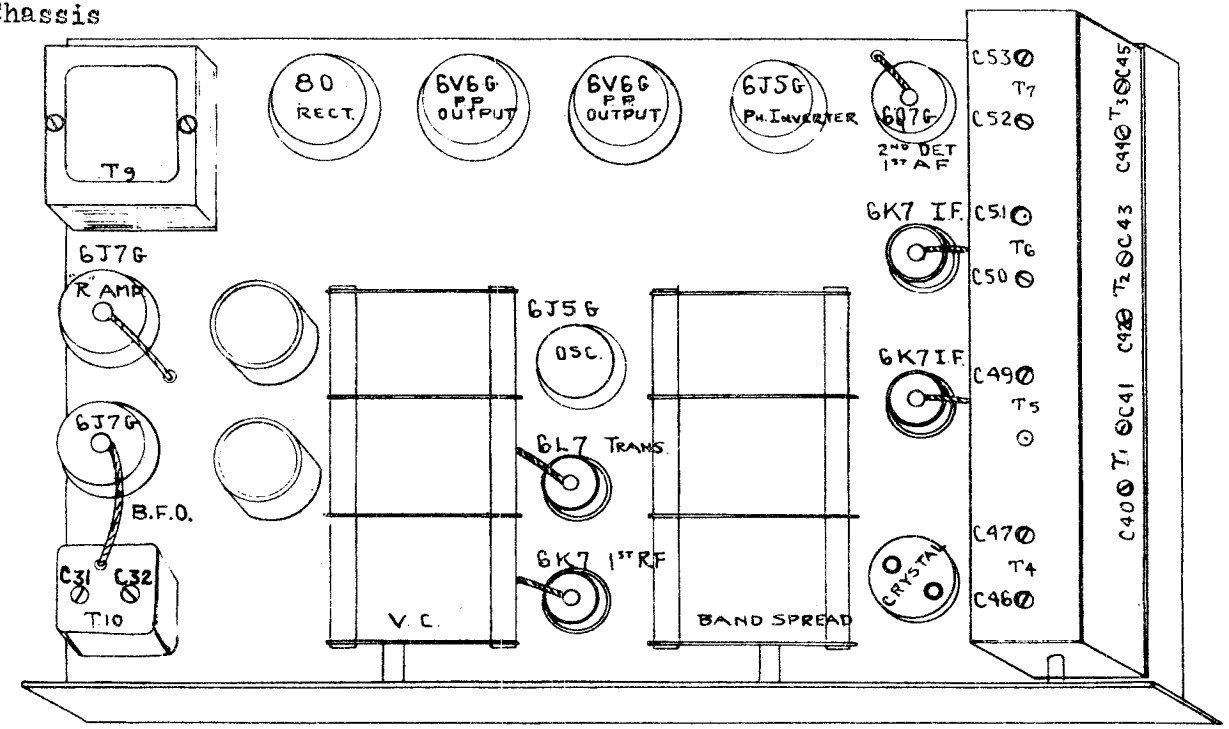
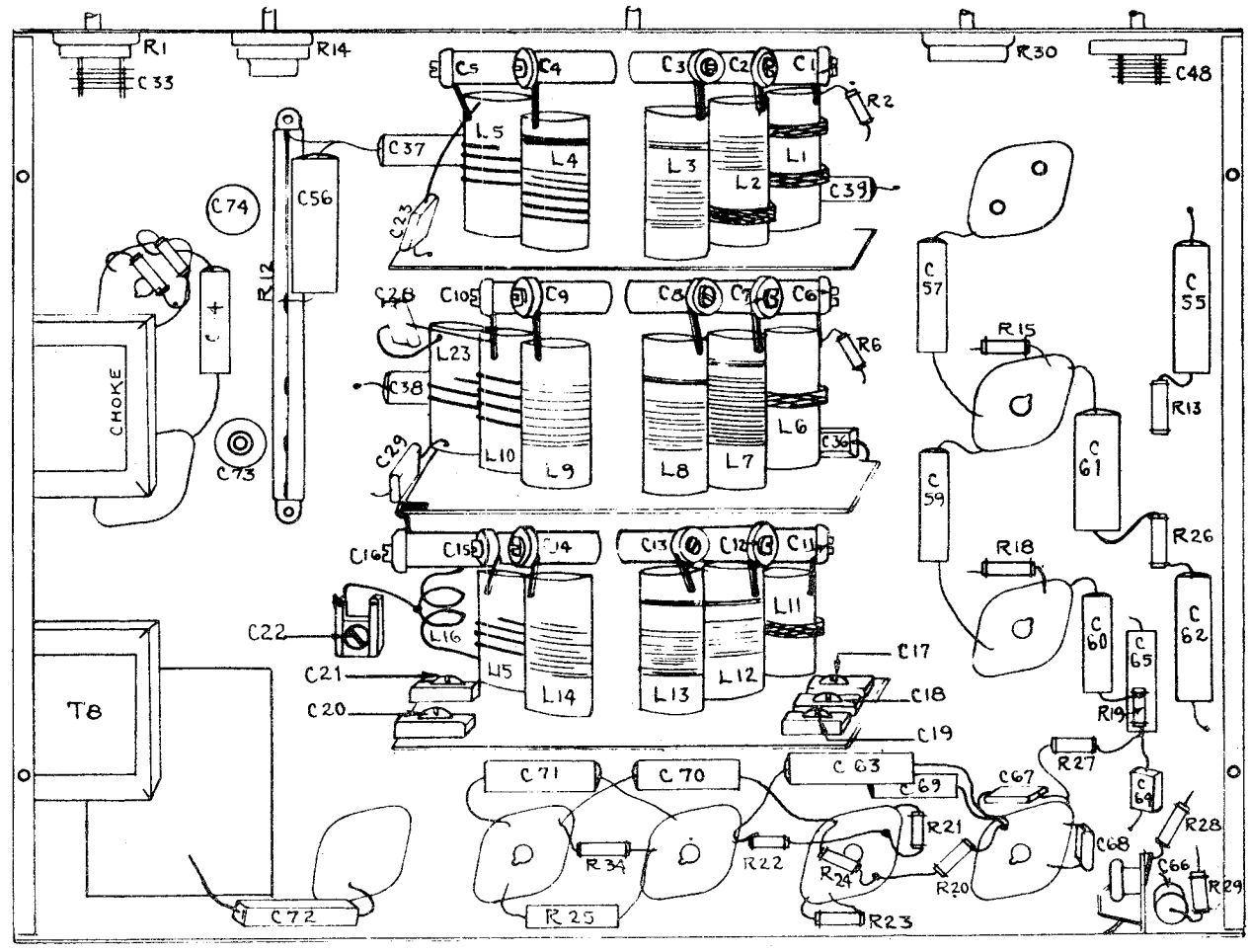
MODEL 450
MODEL 450A
Socket, Trimmers
Chassis

# HOWARD RADIO CO.

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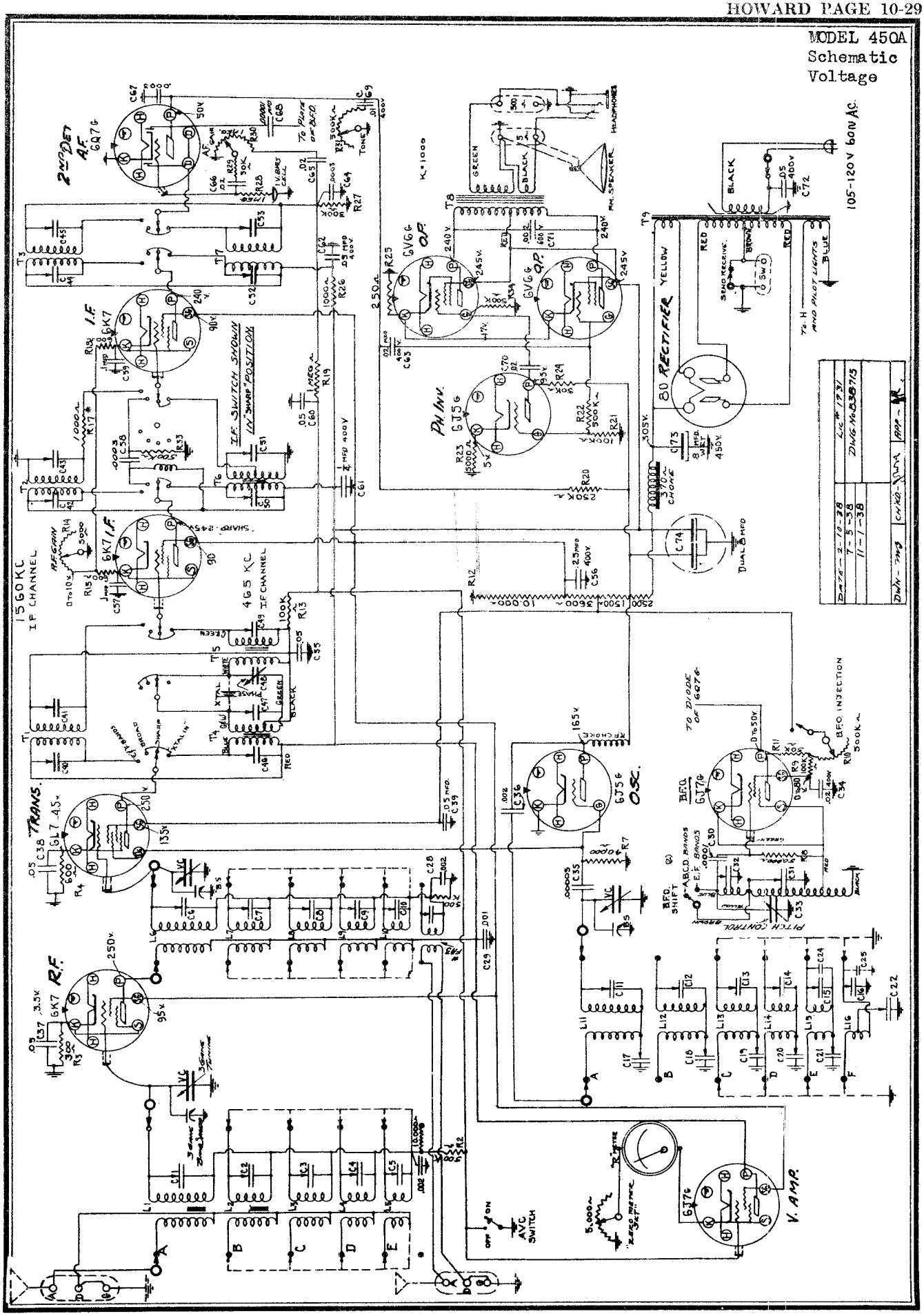


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MODEL 450
MODEL 450A
Antenna Data

# HOWARD RADIO CO.

Color Code Data

ALIGNMENT FREQUENCIES:

| | | | |
|---|---|---|---|
| Band A | 600 | AND | 1200 KC |
| Band B | 1.3 | AND | 2.6 MC |
| Band C | 3.0 | AND | 6.0 MC |
| Band D | 7.0 | AND | 15 MC |
| Band E | 16 | AND | 36 MC |
| Band F | 40 | AND | 60 MC |

BANDS E & F - . . . . . 1560 KC

LOUD SPEAKER:

Type . . . . . Permanent Magnet Dynamic
Size . . . . Within Separate Case 10 Inch

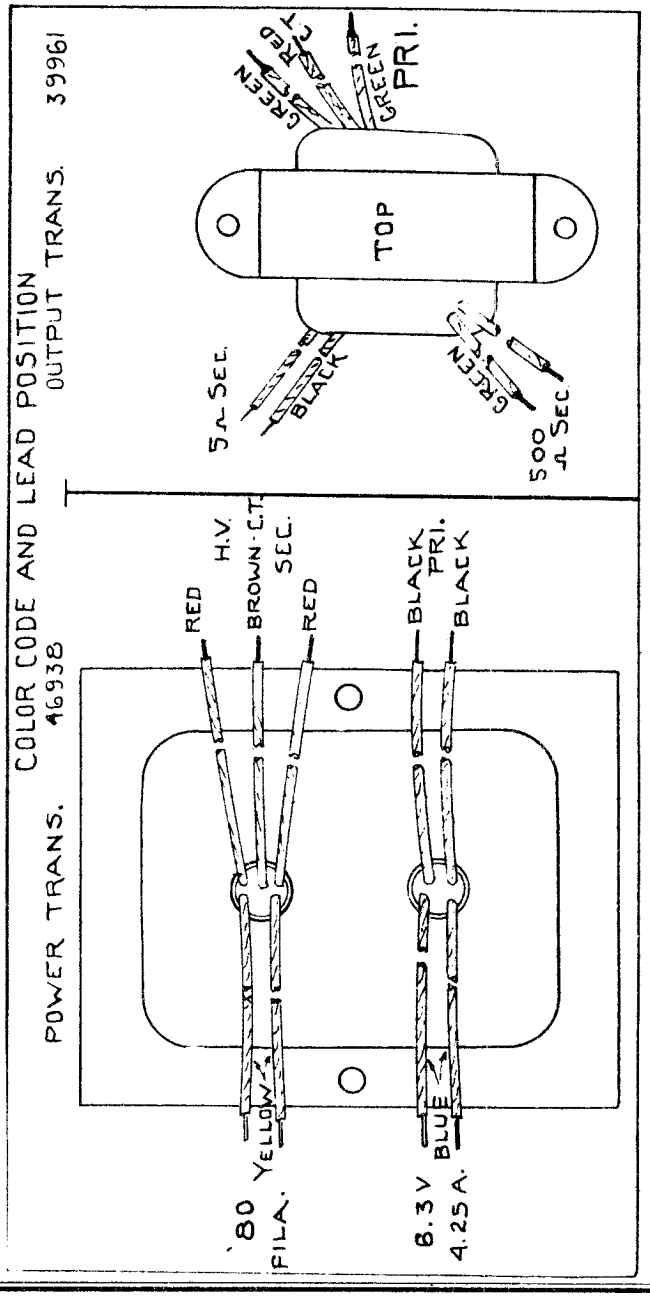
INTERMEDIATE FREQUENCY = BANDS A,B,C, & D - 465 KC

CHASSIS FEATURES:

SEND-RECEIVE terminals in rear of chassis for break-in connection.
RF Stages . . . . . One
VARIABLE CONDENSER . . . . . Three Gang
ANTENNAE . . . . . TWO REQUIRED
TYPE . . . . . SEE PAGE 3
HEADPHONE JACK . . . . . ON FRONT PANEL
Crystal Phaser.
Beat Frequency Oscillator, Pitch Control.
B.F.O. OFF-ON Switch with Injection Control.
Two range B.F.O. switch

OPERATING FEATURES:

A.V.C. with ON-OFF Switch
Three Gang Electrical Band Spread
A.F. Gain or Audio Level
R.F. Gain or Sensitivity
Tone Control
"R" Meter Showing Signal Strength
"R" Meter Zero Adjustment
Four-position IF Setting: 1560 KC
Iron Core Broad 465 KC
Iron Core Sharp 465 KC
Crystal Filter-In Position




POWER OUTPUT:

Type . . . . . Push Pull Output
Undistorted . . . . . 9 Watts
Maximum . . . . . 15 Watts

SPECIFICATIONS FOR A 5 METER ANTENNA

On the "F" band, we have found very good results by the use of a vertical rod 3/16" in diameter and about 5ft" long. Note that the lead from the base of this rod to the antenna terminal of the set should not be more than about eight inches.

The "G" terminal is for the connection to ground.

THE THREE TERMINALS - A, D, and G in the middle back of the chassis are for the ANTENNA AND GROUND connections. When using the conventional flat-top and lead-in type of antenna, CONNECT THE LEAD-IN TO THE TERMINAL MARKED "A", being sure that a wire jumper connects from D to G terminals. The G terminal is for the ground connection.

For any DOUBLET TYPE of antenna, remove the shorting jumper from D to G and connect the two leads of the doublet system to A and D.

Note* For maximum performance on short waves especially the two highest bands, a little experimenting can be done regarding the antenna location, length and type which is very important.

THE TERMINALS MARKED 500 OHMS which are connections from the out-put transformer can be connected when and if desired to any output load having 500 ohms impedance.

THE TERMINALS MARKED S W are for use of an external switch to turn the set on or off for a stand by This set of contacts may be connected to a relay or separate switch. Since these terminals are in the circuit across the panel switch for SEND and RECEIVE the switch would therefore have to be in the SEND position if the back CONTACTS are used in any way.

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MODEL 450
MODEL 450A
Alignment

# HOWARD RADIO CO.

## ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection.....4,000 ohm or more copper oxide meter across 5 ohm terminals. Shunt with speaker

Output meter reading to indicate .5 watt.....1.575 V.

Average sensitivity in microvolts for .5 watt output.....See chart below

Generator ground lead connection.....Direct to chassis

Dummy antenna value in series with generator output.....See Note 1 below

Connection of generator output lead.....See Chart Below

Generator modulation.....30%, 400 cycles

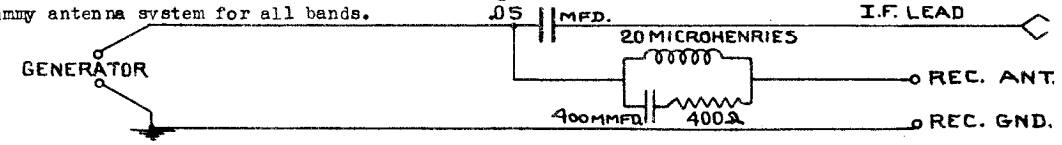
Position of volume control A.F. gain.....Full on

Position of volume control R.F. gain.....Full on

A.V.C. Switch.....On

Band spread dial set at 100.....Min. Capacity

NOTE 1 When aligning the two I.F. channels a condenser of .05 Mfd. may be used in series with the generator lead. For the other bands the following circuit is shown with the values that make a universal dummy antenna system for all bands.




| POSITION OF VARIABLE AND BAND SW. | GENERATOR FREQ. | GENERATOR CONNECTION | POSITION OF I.F. BAND SWITCH | TRIMMER ADJUSTMENTS IN ORDER | TRIMMER FUNCTION | APPROX. MICROVOLTS |
|---|---|---|---|---|---|---|
| Closed "A" Band | 465 KC | 6L7 Grid | "XTAL" See Note 2 | C53,52,51 50,49,47,46 | I.F. | 15 |
| Closed "A" Band | 1560 KC | 6L7 Grid | "E" & "F" | C45,44,43 42,41,40 | I.F. | 15 |
| 60 MC "F" | 60 MC | A-G Ant. Term. | "E" & "F" | C16 | Osc. | Approx. 10 |
| 40 MC "F" | 40 MC | A-G Ant. Term. | "E" & "F" | C22 | Padder | Approx. 10 |
| 36 MC "E" | 36 MC | A-D-G Ant. Term. | "E" & "F" | C15,10,5 | Osc. Trans. Ant. | Approx. 3 |
| 16 MC "E" | 16 | A-D-G Ant. Term. | "E" & "F" | C21 | Padder | Approx. 3 |
| 15 MC "D" | 15 MC | A-D-G Ant. Term. | XTAL or "Sharp" | C14, 9,4 | Osc. Trans. Ant. | Approx. 1 |
| 7 MC "D" | 7 MC | A-D-G Ant. Term. | XTAL or "Sharp" | C20 | Padder | Approx. 1 |
| 6 MC "C" | 6 MC | A-D-G Ant. Term. | XTAL or "Sharp" | C13, 8,3 | Osc. Trans. Ant. | Approx. 1 |
| 3 MC "C" | 3 MC | A-D-G Ant. Term. | XTAL or "Sharp" | C19 | Padder | Approx. 1 |
| 2.6MC "B" | 2.6 | A-D-G Ant. Term. | XTAL or "Sharp" | C12, 7,2 | Osc. Trans. Ant. | Approx. 1 |
| 1.3MC "B" | 1.3 | A-D-G Ant. Term. | XTAL or "Sharp" | C18 | Padder | Approx. 1 |
| 1.2MC "A" | 1200 KC | A-D-G Ant. Term. | XTAL or "Sharp" | C11, 6,1 | Osc. Trans. Ant. | Approx. 1 |
| .6 MC "A" | 600 KC | A-D-G Ant. Term. | XTAL or "Sharp" | C17 | Padder | Approx. 1 |

NOTE 2: When using a CRYSTAL, set PHASING CONTROL to almost minimum capacity. See special alignment instructions below for Crystal. Align set in "sharp" position if set is without crystal.

### ALIGNMENT INSTRUCTIONS - FOR RECEIVERS EQUIPPED WITH CRYSTALS

(A) REMOVE CRYSTAL, set crystal phasing condenser to almost minimum capacity and throw IF switch to "XTAL" position.

(B) With the 465 KC signal, re-adjust the I.F. Trimmer C-46 - the one nearest the front panel of the receiver - by turning the screw counter-clockwise. The signal now may be slightly weaker than before and sound "off-side". This, however, is a normal condition.

(C) REPLACE THE CRYSTAL - A very noticeable drop in signal strength may be noted, due to the filtering action of the crystal, and the frequency control of the signal generator must be "rocked" slowly back and forth, until the increase in signal strength indicates the exact frequency of the crystal being used. Now re-align the entire I.F. system to this frequency.

(D) Adjust "XTAL" phasing condenser for the lowest pitched note possible and re-adjust signal generator frequency. Repeat and continue to repeat this alignment procedure until no further improvement in the alignment can be accomplished.

NOTE: If the IF switch should now be thrown to another position, an apparent rise in gain will be noticed, which is caused by the addition of higher frequencies and background noise, so it does not mean that the sensitivity of this set is impaired in any way by use of the crystal.

NOTE 3: THE BEAT FREQUENCY OSCILLATOR is adjusted for the A, B, C, D, Bands with Trimmer C31. With models having an "E" & "F" Band B.F.O.—Adjust C32 with dial at 1560 on Band D to 1560 KC. Recheck C31. Set pitch control to half capacity.

SINCE THE BAND SPREAD SYSTEM is accomplished by means of a separate three-gang condenser, the spread in degrees over the assigned amateur bands is as follows:-

(3.5-4 MC = 5400 + 126°) (14.005-14.395 MC = 810°) (1.716-2 MC = 360 + 162°)

(56-60 MC = 144°) (7-7.3 MC = 1500 + 126°) (28-30 MC = 1600)

However, for those who wish to DOUBLE the amount of band spread, it is only necessary to remove one ROTOR plate from each section of the BAND SPREAD CONDENSER. This accomplished by merely cutting the separating link holding the two plates together and pulling the plate from the rotor shaft.

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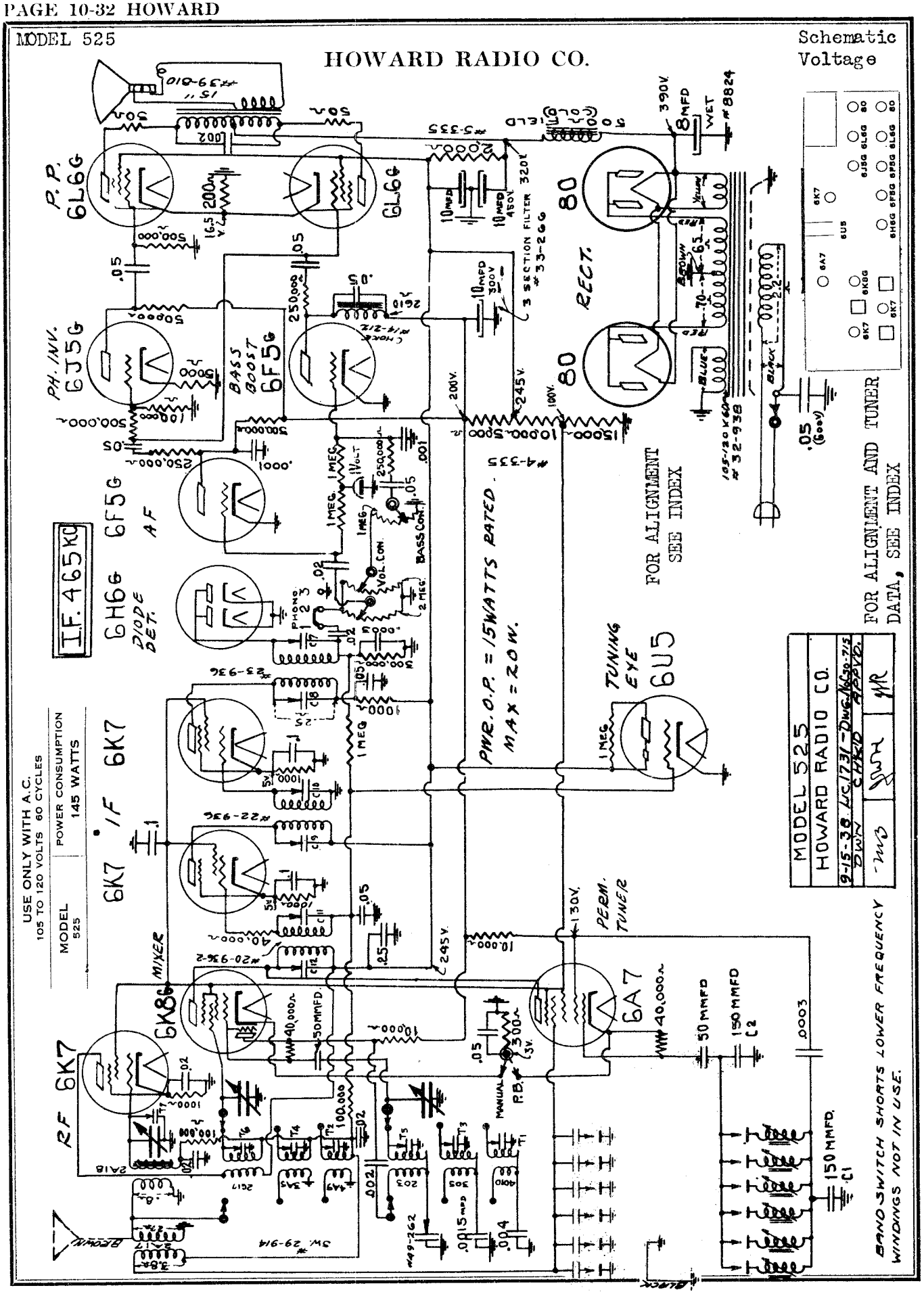


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# HUDSON MOTOR CAR CO.

MODEL DB-38
MODEL SA-38
Schematics, Socket
Trimmers, Alignment

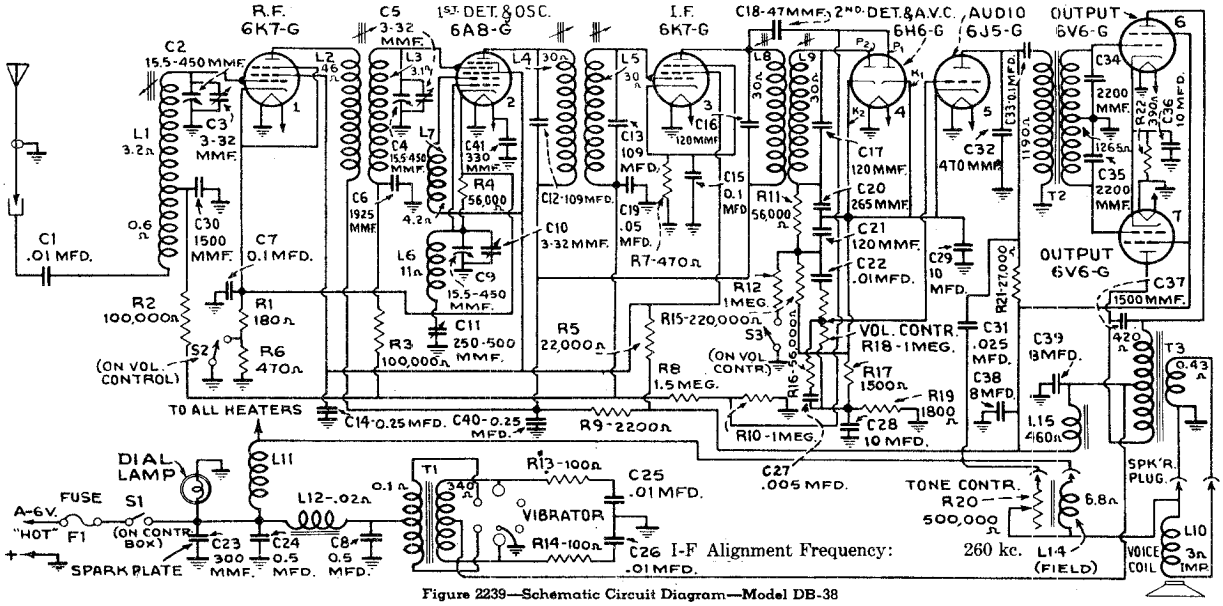


Figure 2239—Schematic Circuit Diagram—Model DB-38

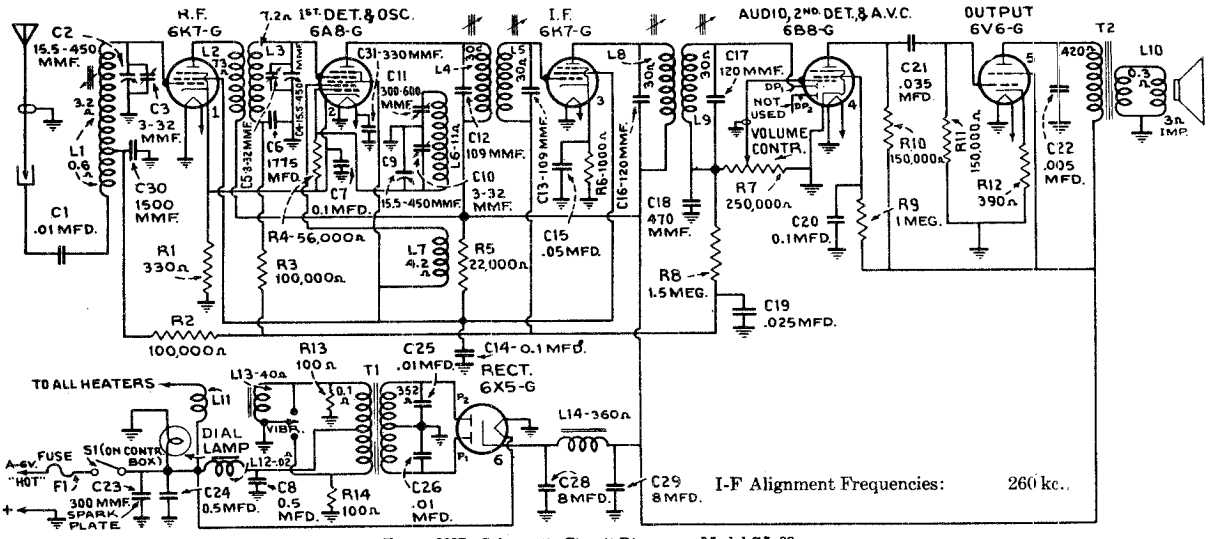


Figure 2237—Schematic Circuit Diagram—Model SA-38

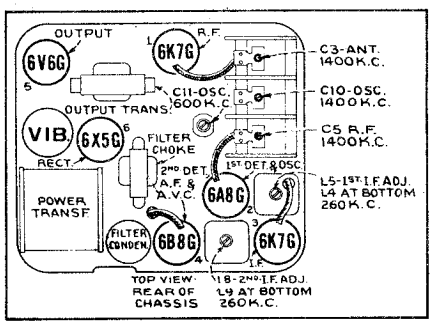


Figure 2235—Radiotron Location—Model SA-38

1938 HUDSON RADIOS
MODELS SA-38 AND DB-38

| SA-38 | | DB-38 | |
|---|---|---|---|
| (1) | 6K7-G | (1) | 6K7-G |
| (2) | 6A8-G | (2) | 6A8-G |
| (3) | 6K7-G | (3) | 6K7-G |
| (4) | 6B8-G | (4) | 6H6-G |
| | | (5) | 6J5-G |
| (5) | 6V6-G | (6) | 6V6-G |
| (6) | 6X5-G | (7) | 6V6-G |

Tuning Range: 550 kc. to 1600 kc. **both models**

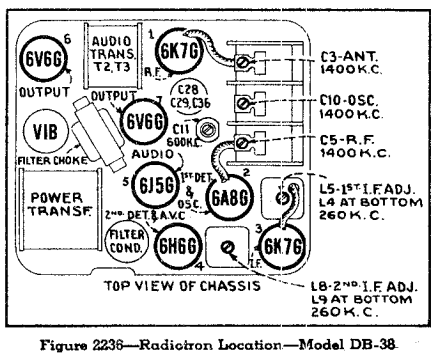


Figure 2236—Radiotron Location—Model DB-38

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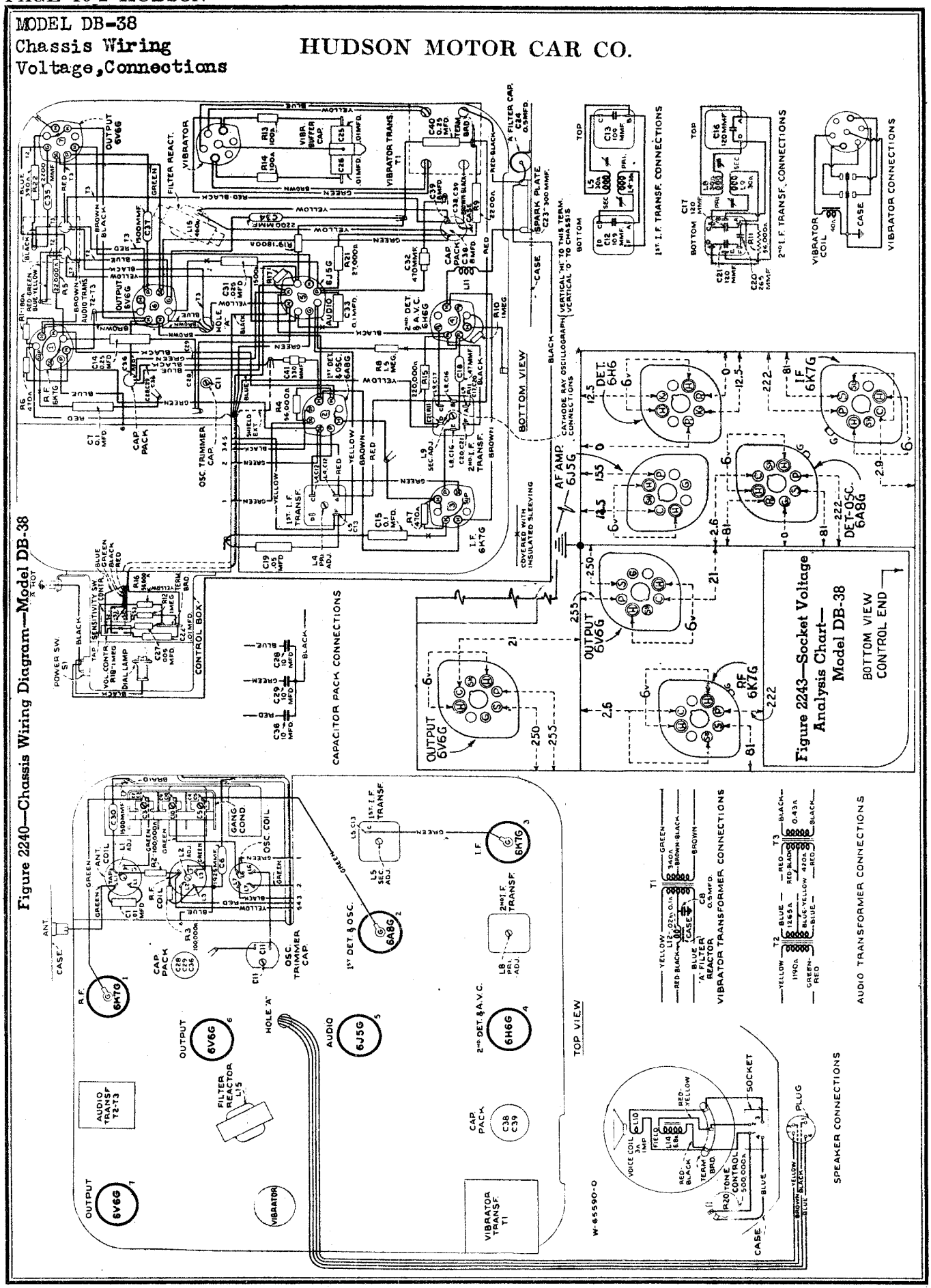
MODEL DB-38
Chassis Wiring
Voltage, Connections

# HUDSON MOTOR CAR CO.

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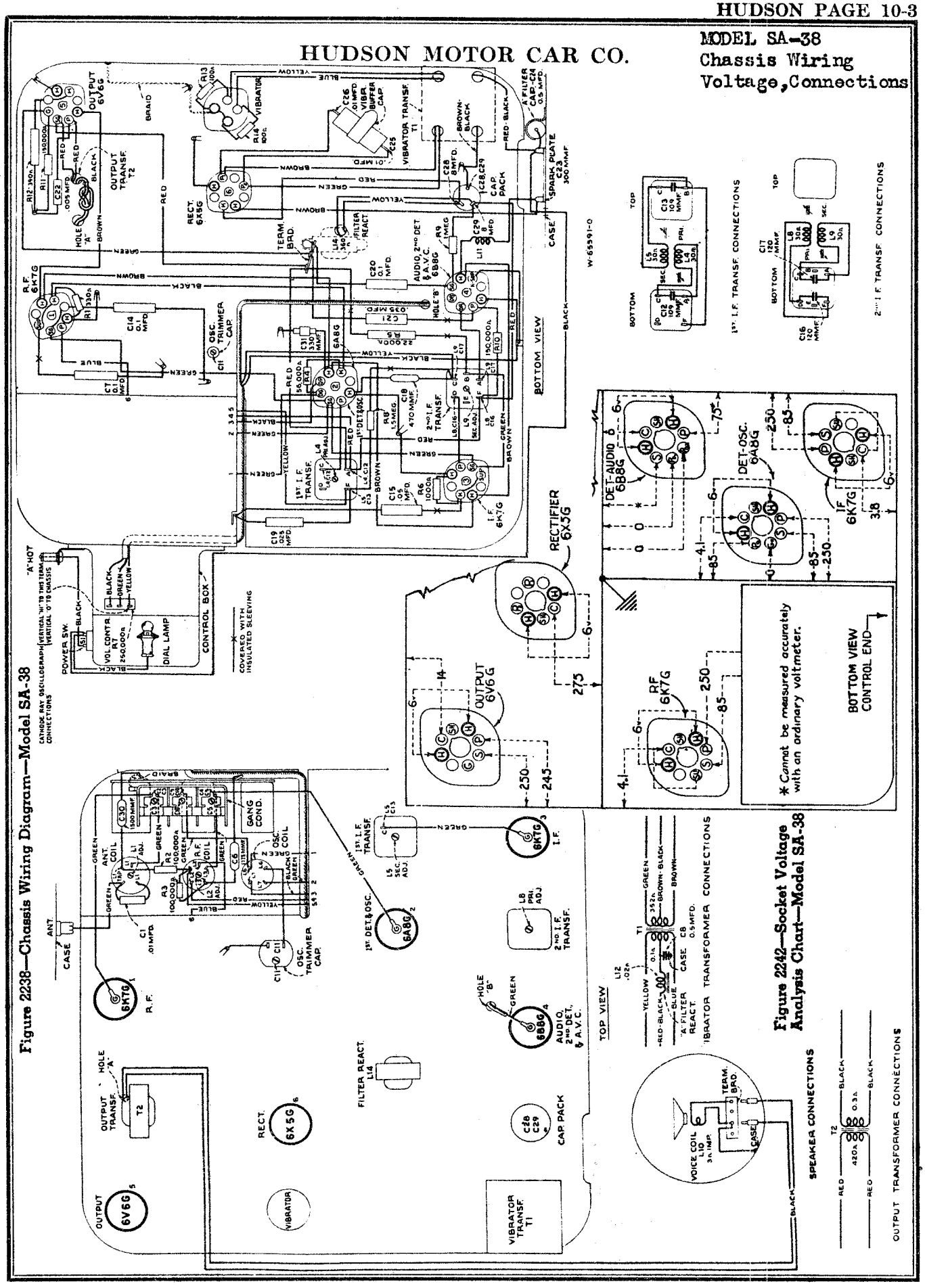


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MODEL DB-38
MODEL SA-38

Alignment Procedure

# HUDSON MOTOR CAR CO.

## ALIGNMENT PROCEDURE

In readjusting the tuned circuits, it is important to apply a definite procedure and to use adequate and reliable test equipment. A standard test oscillator will be required as the source of signal at the specified alignment frequencies. Means for indication of the receiver output during alignment is also necessary to show accurately when the correct point of adjustment is reached. Two indication methods are applicable. One requires use of cathode-ray oscillograph equipment, and the other requires a voltmeter or output indicator. The cathode-ray alignment method is advantageous in that the indication provided is in the form of a wave image which represents the resonance characteristics of the circuits being tuned.

Adjust the control box by turning the tuning knob clockwise until a definite stop is reached at the high-frequency end of the dial scale. Then turn the tuning knob counter-clockwise until a definite stop is reached at the low-frequency end of the dial scale.

Figures 2235 and 2236 give the locations of the tubes and trimmer screws for adjustable capacitors and magnetite cores for models SA-38 and DB-38 respectively.

Place the receiver in operation with its two covers removed. Attach the output indicator across the loudspeaker voice coil circuit and advance the receiver volume control to full volume position. (If cathode-ray oscillograph is used for output indication, the vertical input terminals should be connected between the i-f transformer side of R15 (Figure 2240) and the receiver chassis for the DB-38 model, and between the high side of the volume control R7 (in control unit) (Figure 2238) and the receiver chassis for model SA-38. The cathode-ray oscillograph method of i-f alignment requires the conventional cathode-ray oscillograph, frequency modulator and signal generator set-up.)

For each adjusting operation, regulate the test oscillator output control so that the signal level is as low as possible and still observable on the indicating device. Use of such small signal will obviate broadness of tuning which would otherwise result from a.v.c. action on a stronger one.

## I-F ADJUSTMENTS

1. Connect the "high" output of the test oscillator to the control grid cap of the i-f tube (6K7-G) through a 0.25 mfd. capacitor and connect the ground of the test oscillator to the receiver chassis. Adjust the frequency of the test oscillator to 260 kc. Tune the receiver to a point where no interference is received from the heterodyne oscillator or local stations.

2. Adjust the two screws L8 and L9 (attached to magnetite cores) of the second i-f transformer, one on top and one on bottom, until maximum output is produced on the indicating device.

3. Remove the test oscillator from the i-f tube input and connect it between the control grid cap of the first detector tube (6A8-G) and chassis ground, using the 0.25 mfd. capacitor as previously. Allow its tuning to remain at 260 kc. Tune the receiver to avoid interference as in 1.

4. Adjust the two screws L4 and L5 of the first i-f transformer for maximum (peak) receiver output.

5. Repeat procedures 1, 2, 3 and 4 as a check.

## R-F ADJUSTMENTS

6. Connect the "high" output of the test oscillator to the antenna plug of the receiver through a 100 mmfd. capacitor, leaving the test oscillator ground connected to the receiver chassis. If the antenna lead-in is used, the value of this capacitor should be 50 mmfd. Tune the test oscillator to 1400 kc. Allow the output indicator to remain attached to the receiver as for i-f alignment.

7. Tune the receiver so that the dial reading is approximately halfway between 1300 and 1500 kc., which gives a 1400 kc. setting. Then adjust the oscillator, detector and antenna coil trimmers, C10, C5, and C3 respectively, adjusting each to the point producing maximum indicated receiver output.

8. Shift the test oscillator frequency to 600 kc. and tune the receiver to pick up this signal, disregarding the dial reading at which it is received. The oscillator series trimmer C11 should then be adjusted, simultaneously rocking the receiver tuning control backward and forward through the signal until maximum (peak) receiver output results from these combined operations.

9. The adjustment of C10, C5 and C3 should then be repeated as in operation 7 to correct for any change in their alignment due to the adjustment of C11.

NOTE: The antenna coil L1 has a magnetite core which is adjusted at the factory for the correct inductance. This adjustment should not be disturbed.

**DB-38**

Speaker:
Type: Electrodynamic 8″
Impedance (v.c.) 3 ohms. at 400 cycles
Vibrator: Synchronous
Power Output: Undistorted, 6 watts; maximum, 9 watts
Power Rating: Supply voltage 6.3 volts (storage battery)
Current drain 8.25 amperes at 6.3 volts
Fuse protection 15 amperes
R-F Alignment Frequencies:
Antenna coil 1400 kc.
Oscillator coil 600 kc. and 1400 kc.
Detector coil 1400 kc.

**SA-38**

Speaker:
Type: Six Inch Dynamic
Impedance (v.c.) 3 ohms. at 400 cycles
Vibrator: Non-synchronous
Power Output: Undistorted, 2.6 watts; maximum, 4 watts
Power Rating: Supply voltage 6.3 volts (storage battery)
Current drain 6.0 amperes at 6.3 volts
Fuse protection 15 amperes
R-F Alignment Frequencies:
Antenna coil 1400 kc.
Oscillator coil 600 and 1400 kc.
Detector coil 1400 kc.

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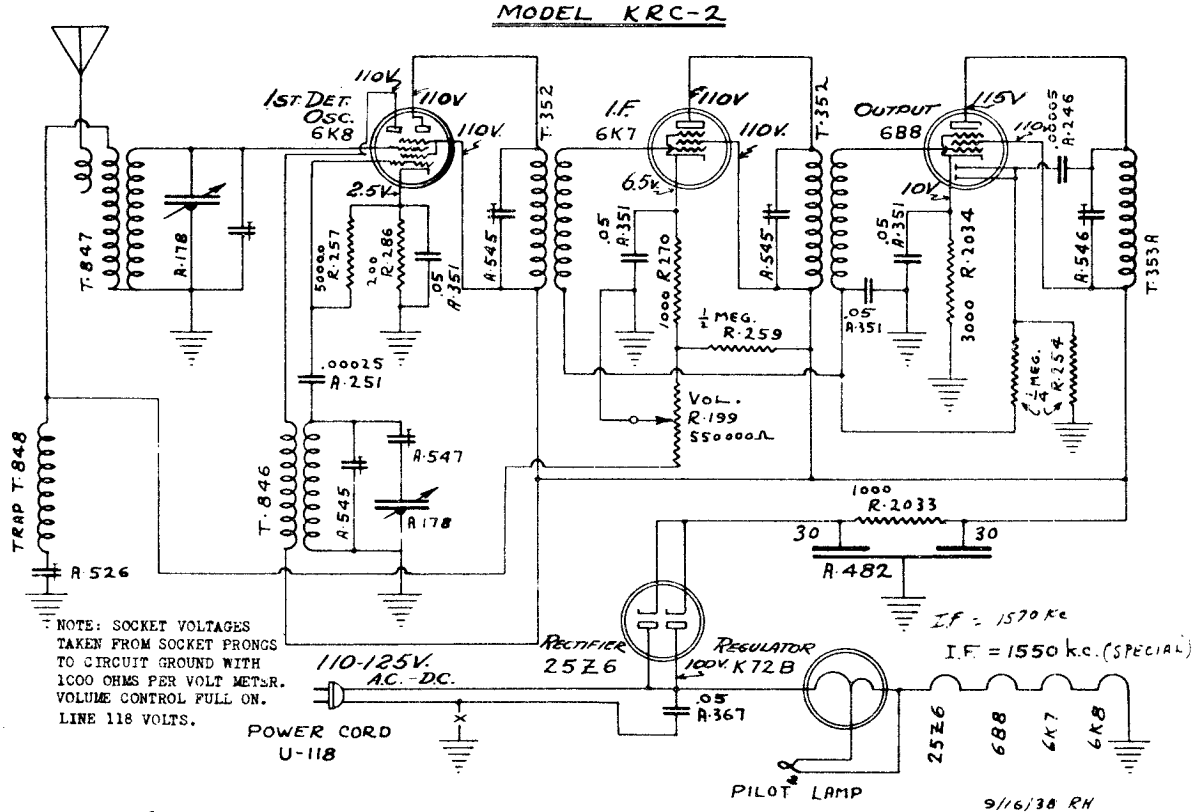
MODEL KRC-2, Tunemaster
MODEL 845
Schematics

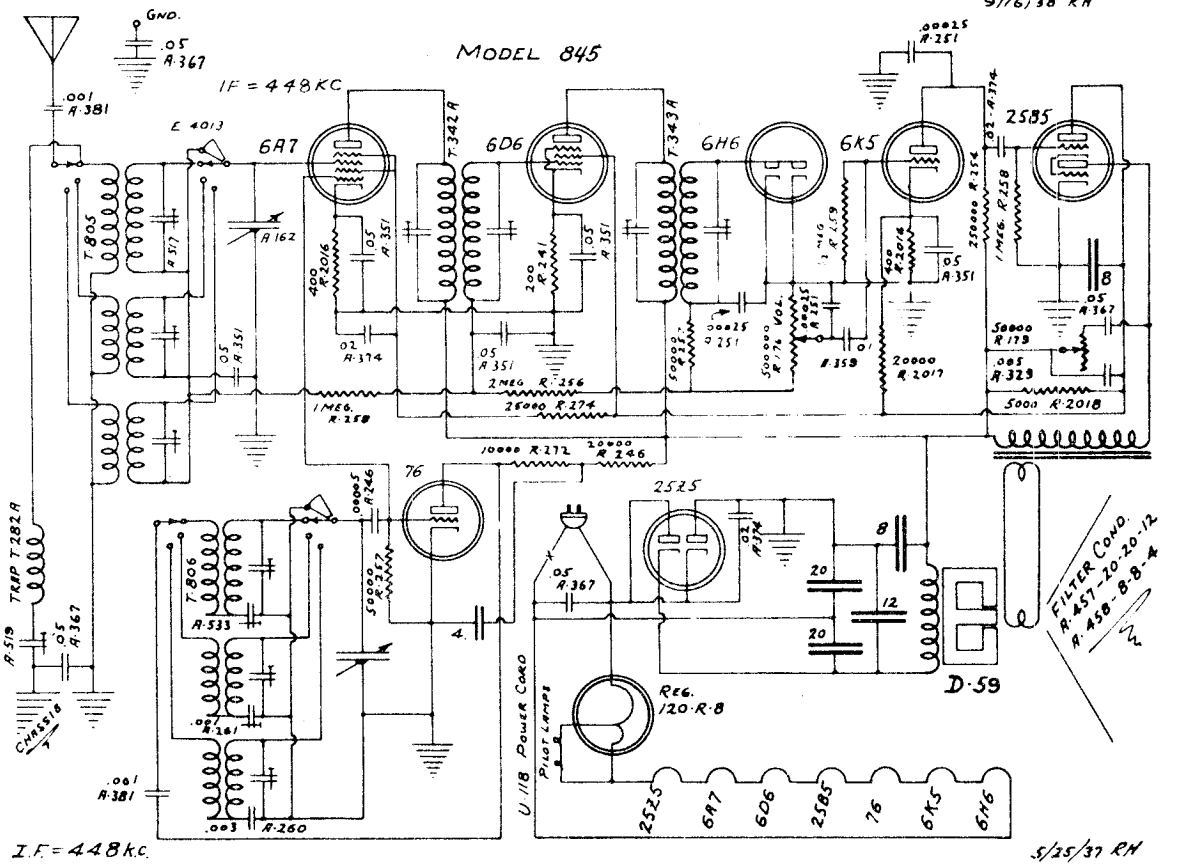
# INTERNATIONAL INDUSTRIES, INC.

## MODEL KRC-2




9/16/38 RH

## MODEL 845




5/25/37 RH

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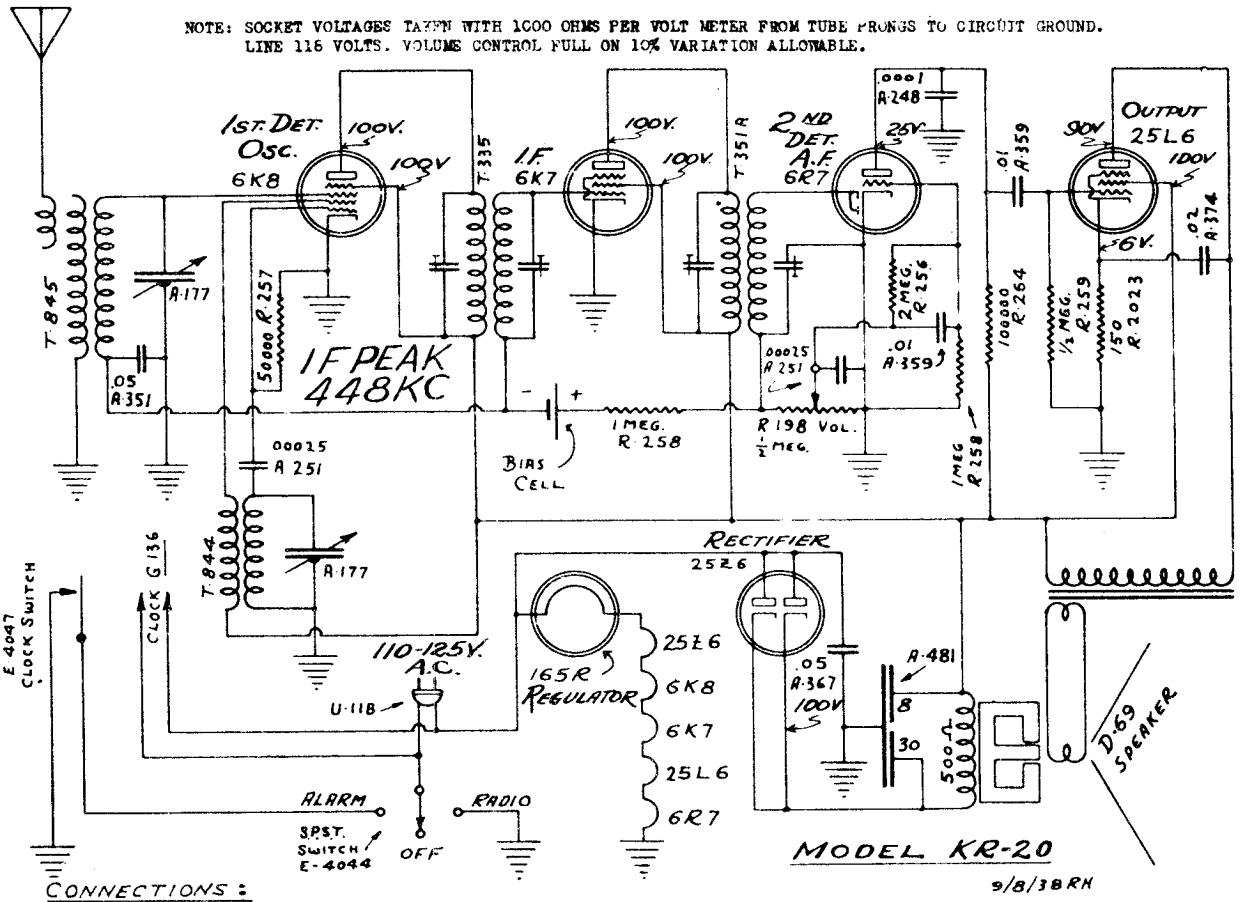
MODEL KR-20, Autime Schematic, Voltage Alignment

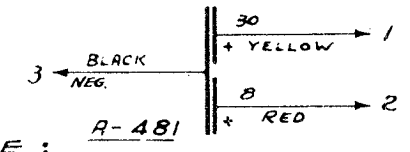
# INTERNATIONAL INDUSTRIES, INC.

MODEL KRC-2 Alignment

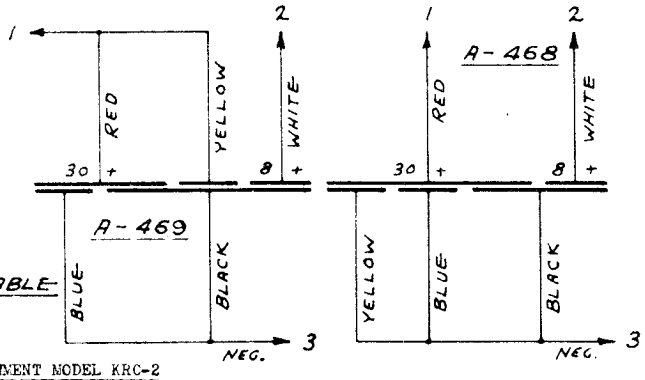



CONNECTIONS:

1 - 30 μfd — TO RECTIFIER CATHODE
2 - 8 μfd. — TO B+
3 - NEGATIVE — TO GROUND.




NOTE: THESE PARTS ARE INTERCHANGEABLE ON MODEL KR-20, BUT MUST BE CONNECTED AS SHOWN.




ALIGNMENT MODEL KRC-2

I. F. TRIMMERS: Feed 1570 Kc. modulated signal from signal generator directly to antenna of Tunemaster. Adjust both IF trimmers to maximum reading on output meter. Then adjust output coil trimmer to maximum.
R. F. TRIMMERS: Set Tunemaster dial at 1500 Kc. and feed 1500 Kc. signal from signal generator to antenna of Tunemaster. Set antenna trimmer approximately 1/4 turn from tight. Peak oscillator trimmer at 1500 Kc. Set dial at 600 Kc. and peak series oscillator trimmer. Move dial and series trimmer simultaneously by small amounts so as to get maximum output at 600 Kc. Tune back to 1500 Kc. and peak oscillator trimmer. Repeat previous peaking of series trimmer at 600 Kc. Retune to 1500 Kc. and peak oscillator trimmer. Set dial at approximately 1400 Kc. Tune signal generator to resonance with Tunemaster. Then peak antenna trimmer.

ALIGNMENT MODEL KR 20

I. F. TRIMMERS: To align the I.F. circuits, set the signal generator to 448 Kc. and feed its modulated signal direct to the antenna. Adjust the first I.F. transformer trimmers for maximum meter reading. Go over both adjustments at least three or four times for accuracy. Repeat this process on the second I. F. transformer. If adjustments are not made accurately, selectivity will be poor and I. F. oscillation may result.
R. F. TRIMMERS: Turn the dial to 1500 Kc. and feed a very weak 1500 Kc. modulated signal from your signal generator to the antenna. Adjust the oscillator trimmer for maximum reading. Then peak the antenna trimmer to this setting. Aligning of broadcast band should be done on 1500, 1000 and 600 kilocycles. There is no adjustable padder condenser in this model so resonance on lower frequencies is accomplished by bending plates on tuning condensers.

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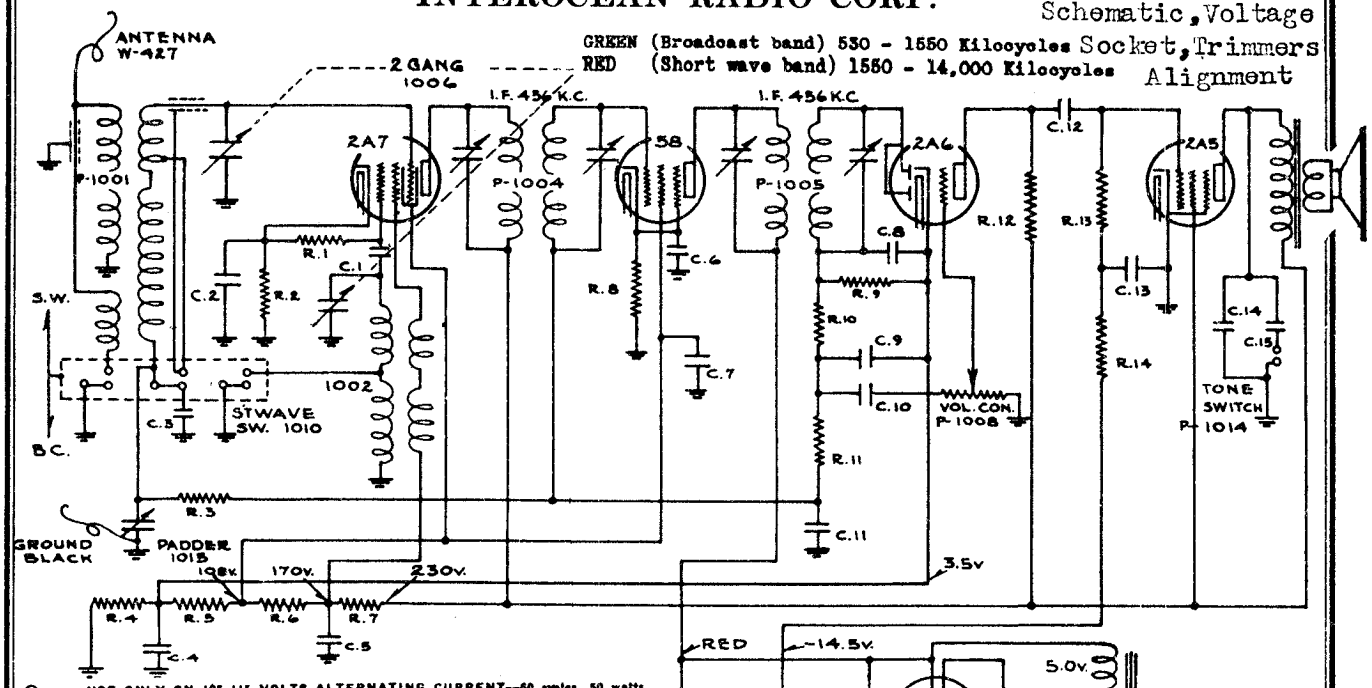
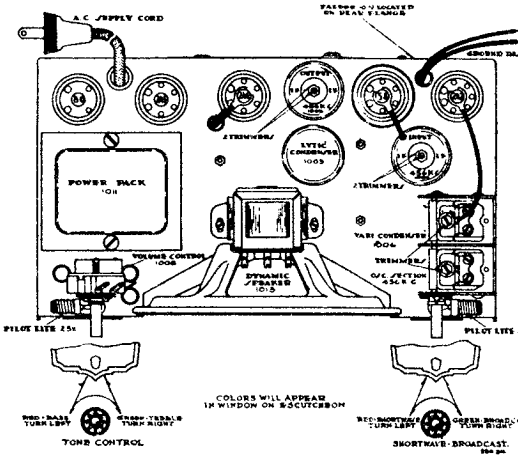
KR 20 autime

# INTEROCEAN RADIO CORP.

MODEL 202
Schematic, Voltage
Socket, Trimmers
Alignment




VOLTAGES TAKEN FROM POINTS INDICATED
TO CHASSIS GROUND. VOLUME CONTROL
ON FULL VOLTAGES WITH 119V. A.C. LINE.

| Nº | VALUE |
|---|---|
| C.1:- | 250MMF. |
| C.2:- | .05 |
| C.3:- | .05 |
| C.4:- | .05 |
| C.5:- | .05 |
| C.6:- | .05 |
| C.7:- | .1 |
| C.8:- | 500MMF. X |
| C.9:- | 500MMF. X |
| C.10:- | .01 X |
| C.11:- | .1 |
| C.12:- | .01 |
| C.13:- | .05 |
| C.14:- | .01 |
| C.15:- | .02 |
| C.16:- | 8MF. * |
| C.17:- | 8MF. * |

RESISTORS

| Nº | VALUE |
|---|---|
| R.1:- | 50M |
| R.2:- | 500 * |
| R.3:- | 250M |
| R.4:- | 250 * |
| R.5:- | 20M * |
| R.6:- | 6M * |
| R.7:- | 4M * |
| R.8:- | 300 * |
| R.9:- | 250M X |
| R.10:- | 50M X |
| R.11:- | 250M X |
| R.12:- | 250M |
| R.13:- | 300M |
| R.14:- | 250M. |

5J030001

*R.2, R.4, R.5, R.6, R.7 & R.8 IN ONE UNIT P-1012
*C.16 & C.17 IN ONE UNIT P-1003
X R.9, R.10, R.11, C.8, C.9 & C.10 IN I.F. CAN P-1005

## ALIGNMENT

Connect oscillator at 456 KC to grid of 2A7 tube and ground wire. Variable condenser at minimum capacity, adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance.

Broadcast band, wave changing switch to Green, variable condenser at minimum capacity. Disconnect antenna wire, connect 1550 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimmer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimmer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

Short wave band, set wave changing switch to RED and with input oscillator connected as above and set at 1720 KC and at harmonics of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and 1720 KC (3440 KC). DO NOT BEND PLATES.

For failure to operate over both bands check 2A7 tube and connections to and contacts of wave changing switch.

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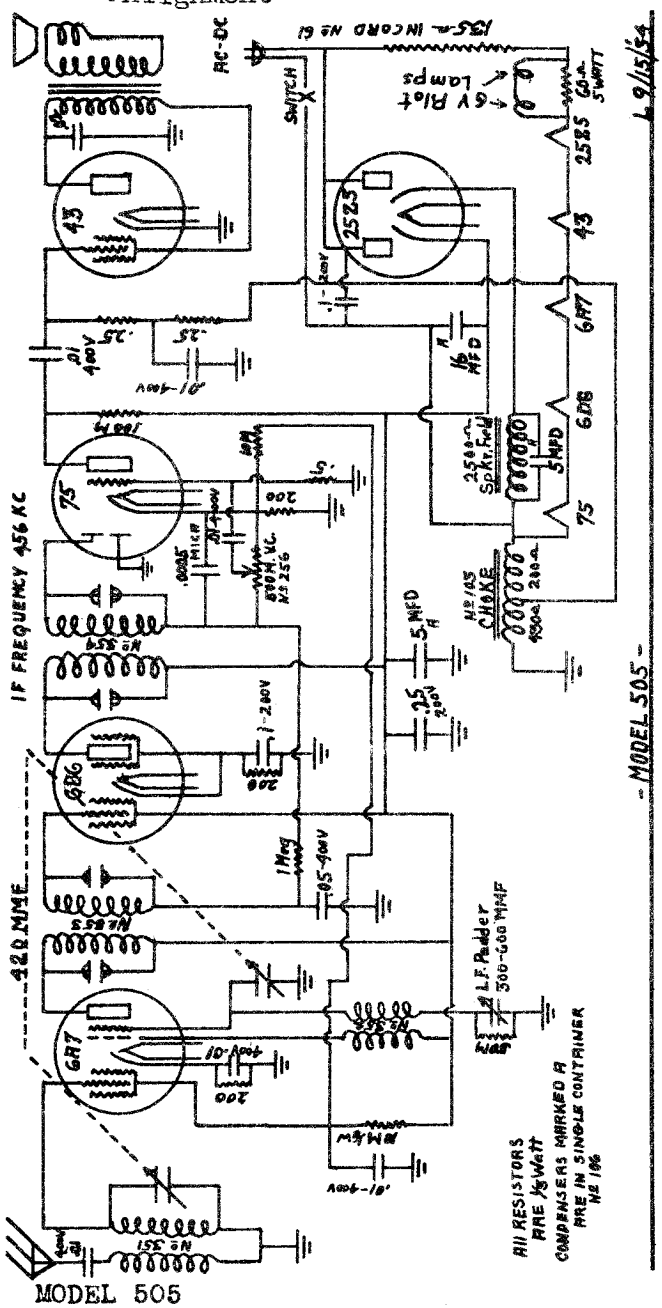
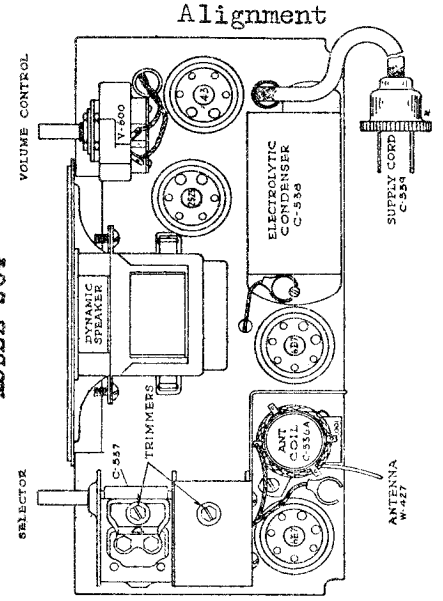
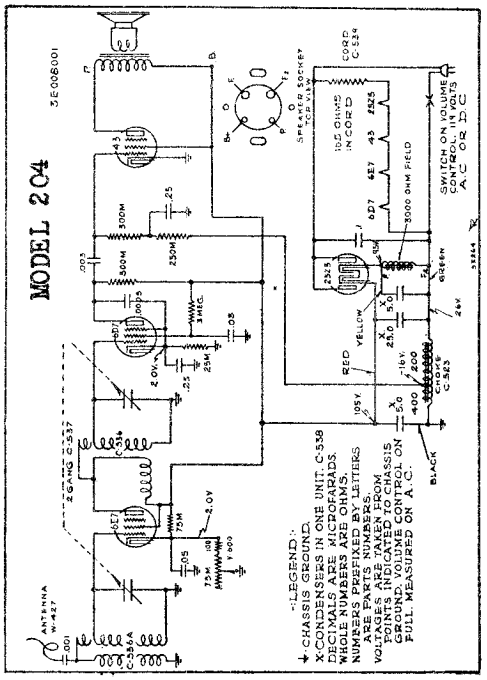
MODEL 505
Schematic, Alignment

# INTEROCEAN RADIO CORP.

MODEL 204
Schematic, Socket Trimmers, Voltage Alignment




Schematic circuit diagram AC-DC Radio Receiver. Should it be necessary at any time to rebalance this set the procedure is as follows: Disconnect antenna wire and attach an oscillator in series with a 50 mmfd. condenser to the antenna coil. With variable condenser at its minimum capacity position—at the extreme left of its rotation-touch trimmer condensers for maximum deflection on an output meter connected across the primary of the speaker input transformer, check trimmer adjustment at 1400 kilocycles, then align at 1200-1000-800-600-540 kilocycles, bend slotted plates of variable condenser if necessary.

USE ONLY ON 105-115 VOLTS ALTERNATING (any cycles) or DIRECT CURRENT—35 WATTS.

MODEL 505

1. I.F. Alignment -
   To peak I.F. transformers, apply an oscillator note of 456 KC to the grid of the 6A7 tube and adjust screws seen in tops of I.F. transformers until maximum peak is obtained.
2. Broadcast -
   Connect an oscillator adjusted to 1720 KC, to the antenna of set, then adjust trimmer of oscillator section first with variable condenser way open to peak output, next adjust antenna section trimmer on variable condenser to peak output.
3. Low Frequency Padder -
   Next apply a 600 KC note from oscillator and while rocking variable condenser back and forth across signal, adjust padder to maximum output.
4. Check alignment again at 1400 KC; 1000 KC and 800 KC. It will not be necessary to bend plates to align this receiver.

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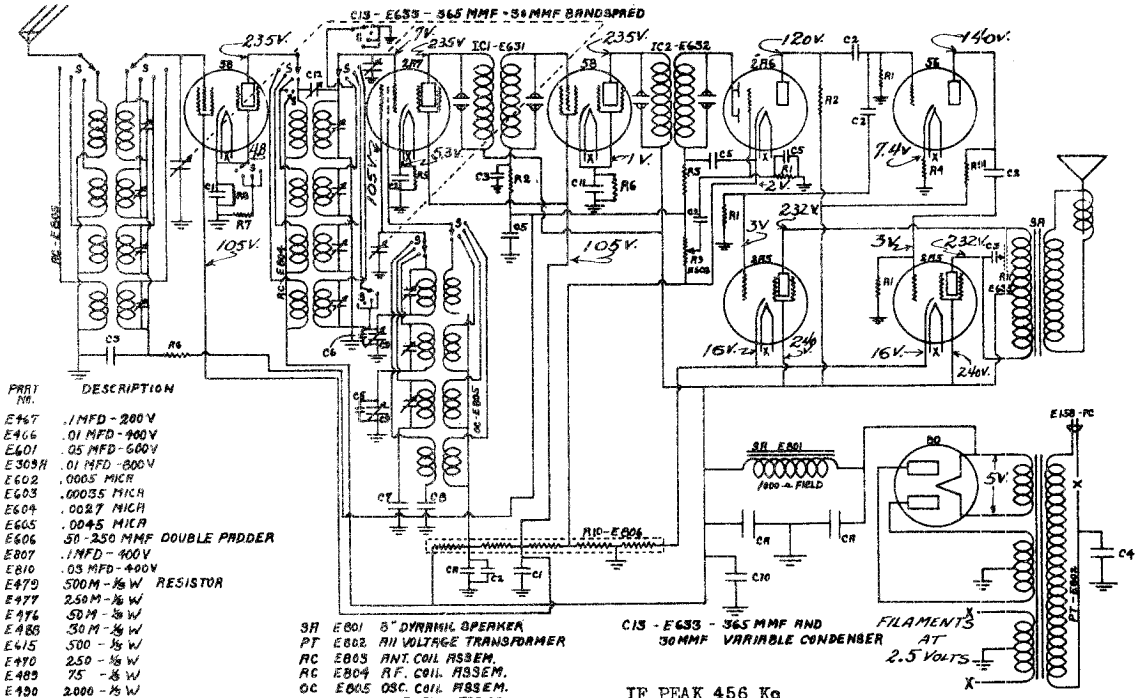
MODELS 508,522,525,525A Chassis 508

# INTEROCEAN RADIO CORP.

MODELS 511,524,527,527A Chassis 511

## Schematics, Voltage Trimmers




| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | E467 | .1 MFD - 200 V |
| C2 | E466 | .01 MFD - 400 V |
| C3 | E601 | .05 MFD - 600 V |
| C4 | E309A | .01 MFD - 800 V |
| C5 | E602 | .0005 MICA |
| C6 | E603 | .00035 MICA |
| C7 | E604 | .0027 MICA |
| C8 | E605 | .0045 MICA |
| C9 | E606 | 50 - 250 MMF DOUBLE PADDER |
| C10 | E807 | .1 MFD - 400 V |
| C11 | E810 | .03 MFD - 400 V |
| R1 | E479 | 500M - ½ W RESISTOR |
| R2 | E477 | 250M - ½ W |
| R3 | E476 | 50M - ½ W |
| R4 | E488 | 30M - ½ W |
| R5 | E615 | 500 - ½ W |
| R6 | E470 | 250 - ½ W |
| R7 | E469 | 75 - ½ W |
| R8 | E490 | 2000 - ½ W |
| R9 | E608 | 500 M VOL. CONT. WITH SWITCH |
| R10 | E806 | METAL RESISTANCE STRIP |
| R11 | E635 | 50M V TONE CONTROL |
| R91 | E808 | 100M - ½ W RESISTOR |
| CR | E607 | 4-8 MFD - 500 V, 4 MFD - 300 V |

| | | |
|---|---|---|
| SR | E801 | 8" DYNAMIC SPEAKER |
| PT | E802 | ALL VOLTAGE TRANSFORMER |
| AC | E803 | ANT. COIL ASSEM. |
| RC | E804 | R.F. COIL ASSEM. |
| OC | E805 | OSC. COIL ASSEM. |
| IC1 | E631 | I.F. TRANS. - TOP GRID |
| IC2 | E632 | I.F. TRANS. - BOTTOM GRID |
| PC | E158 | POWER CORD |
| S | E809 | 5 GANG BAND SW. BC. POSITION |
| C12 | E811 | 3-30 MMF PADDER |

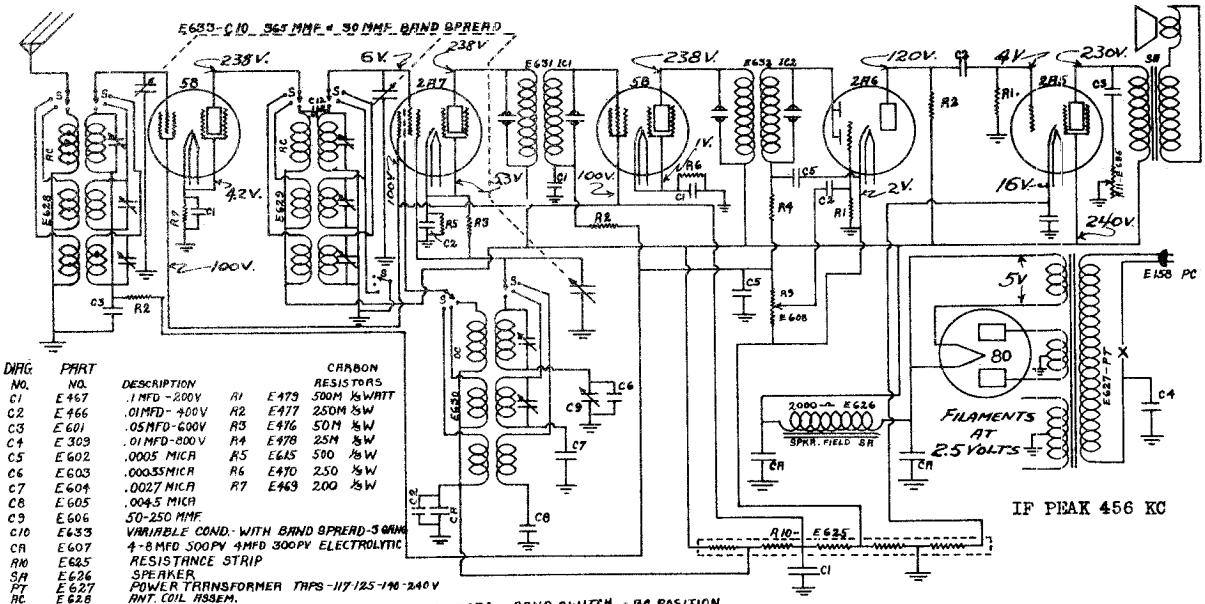
C13 - E633 - 365 MMF AND 30 MMF VARIABLE CONDENSER

TRIMMER LOCATION (BOTH MODELS)

CHASSIS 508:- BAND 1, TOPS OF RESPECTIVE CANS. BANDS 2 AND 3, BOTTOM OF CANS, (ANT., R.F., OSC.).

CHASSIS 511:-TRIMMERS WILL BE FOUND IN BOTTOM OF CANS, EXCEPT BAND 4 OSC (HAS NO TRIMMER).

NOTE:- THE VOLTAGES SHOWN ON BOTH SCHEMATICS ARE TAKEN WITH LINE 115 VOLTS, AERIAL AND GROUND DISCONNECTED, USING 1000 OHMS PER VOLT METER; TAKEN FROM POINTS INDICATED TO GROUND.




| DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | E467 | .1 MFD - 200V |
| C2 | E466 | .01MFD - 400V |
| C3 | E601 | .05MFD - 600V |
| C4 | E309 | .01 MFD - 800 V |
| C5 | E602 | .0005 MICA |
| C6 | E603 | .00035MICA |
| C7 | E604 | .0027 MICA |
| C8 | E605 | .0045 MICA |
| C9 | E606 | 50-250 MMF. |
| C10 | E633 | VARIABLE COND. WITH BAND SPREAD-3 GANG |
| CR | E607 | 4-8 MFD 500PV 4MFD 300PV ELECTROLYTIC |
| R10 | E625 | RESISTANCE STRIP |
| SR | E626 | SPEAKER |
| PT | E627 | POWER TRANSFORMER TAPS-117-125-196-240 V |
| AC | E628 | ANT. COIL ASSEM. |
| RC | E629 | R.F. COIL ASSEM. |
| OC | E630 | OSC. COIL ASSEM. |
| IC1 | E631 | I.F. TRANS. - TOP GRID. |
| IC2 | E632 | I.F. TRANS. - BOTTOM GRID |
| PC | E158 | POWER CORD + PLUG |
| R9 | E608 | 500M - VOLUME CONTROL WITH SWITCH |

CARBON RESISTORS

| | | | |
|---|---|---|---|
| R1 | E479 | 500M | ½ WATT |
| R2 | E477 | 250M | ½ W |
| R3 | E476 | 50M | ½ W |
| R4 | E478 | 25M | ½ W |
| R5 | E615 | 500 | ½ W |
| R6 | E470 | 250 | ½ W |
| R7 | E469 | 200 | ½ W |

S - E634 - BAND SWITCH - BC. POSITION

R11 - E635 - 50M - TONE CONTROL

C11 - E636 - 10 MFD 25V ELECTROLYTIC

C12 E811 - 3-30 MMF PADDER

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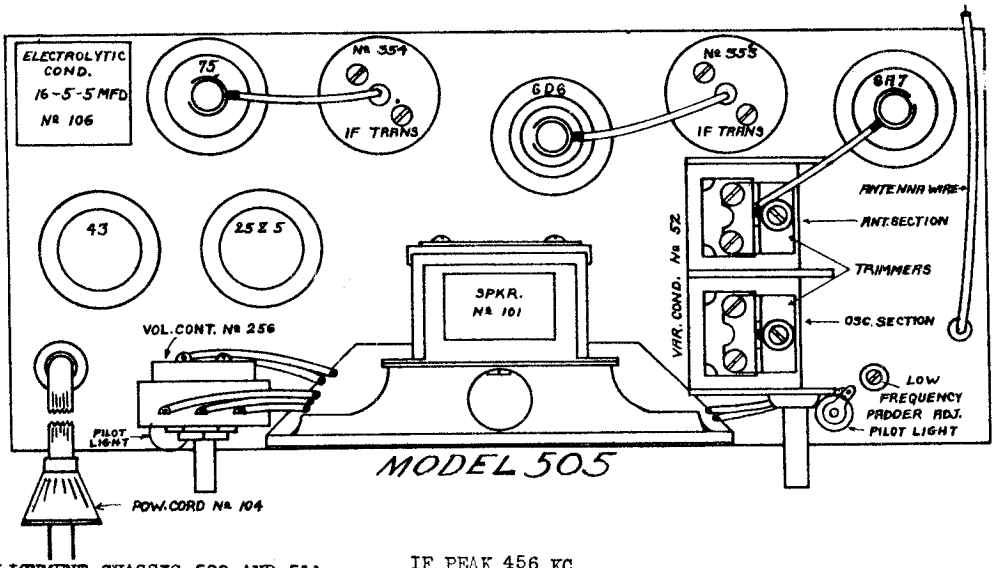
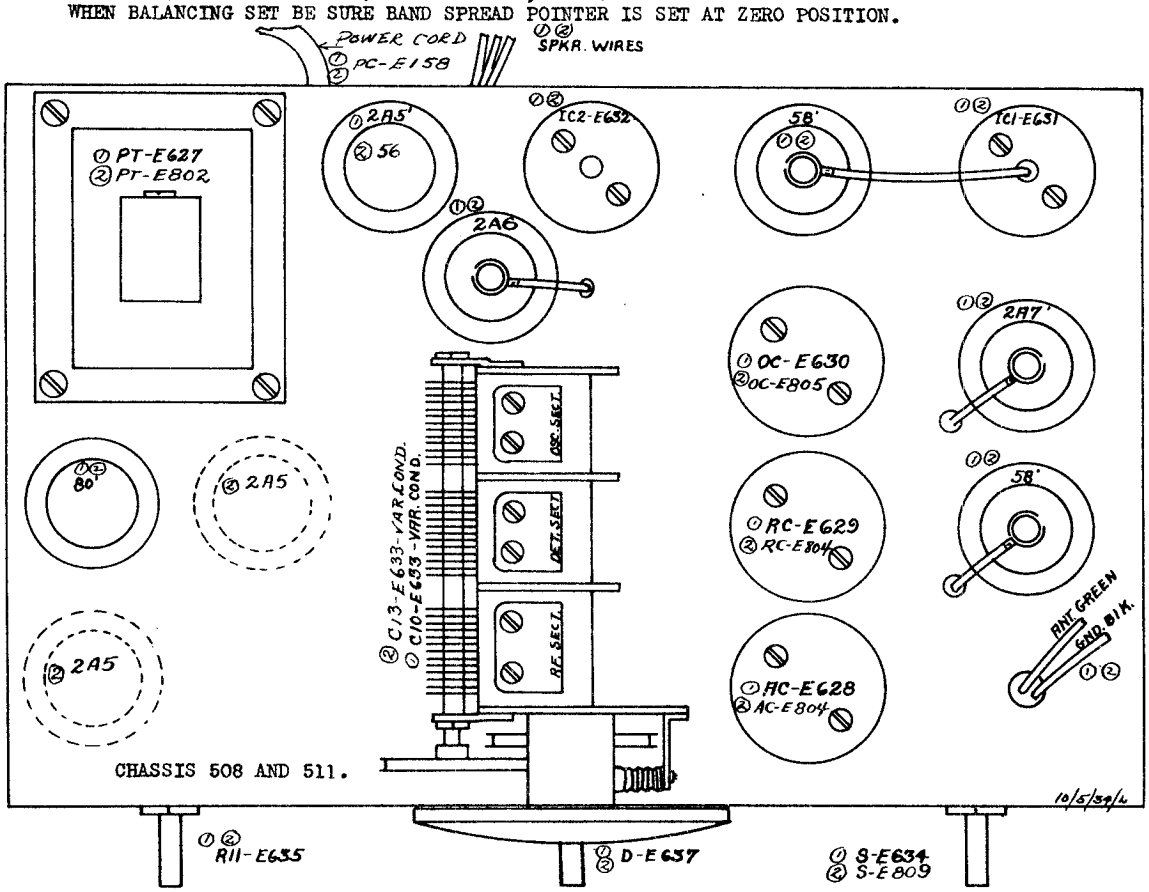
MODELS 508,522,525,525A INTEROCEAN RADIO CORP. MODEL 505
MODELS 511,524,527,527A Socket, Trimmers
Socket,Trimmers
Alignment




ALIGNMENT, CHASSIS 508 AND 511. IF PEAK 456 KC
BAND 1:- ADJUST TRIMMERS AT 1500 KC AND IF PADDER AT 600 KC(BOTH AT RIGHT OF CHASSIS).
BAND 2:-(CHASSIS 508 ONLY) ADJUST AT 9000KC (NO L.F. PADDER ON THIS BAND).
BAND 2:-(CHASSIS 511 ONLY) ADJUST AT 3700KC, L.F. PADDER AT 1700 KC.
BAND 3:-(CHASSIS 508 ONLY) ADJUST AT 21,000KC (NO L.F. PADDER ON THIS BAND)
BAND 3:-(CHASSIS 511 ONLY) ADJUST AT 9,000KC.
BAND 4:-(CHASSIS 511 ONLY) ADJUST AT 21,000KC.
WHEN BALANCING SET BE SURE BAND SPREAD POINTER IS SET AT ZERO POSITION.




TUBE LAYOUT FOR MODELS 508-522-525-525A,CHASSIS 508 AND 511-524-527-527A,CHASSIS 511.
NOTE:- TUBES AND PARTS INDICATED ① ARE FOR CHASSIS 508; ② INDICATES SAME FOR CHASSIS 511.

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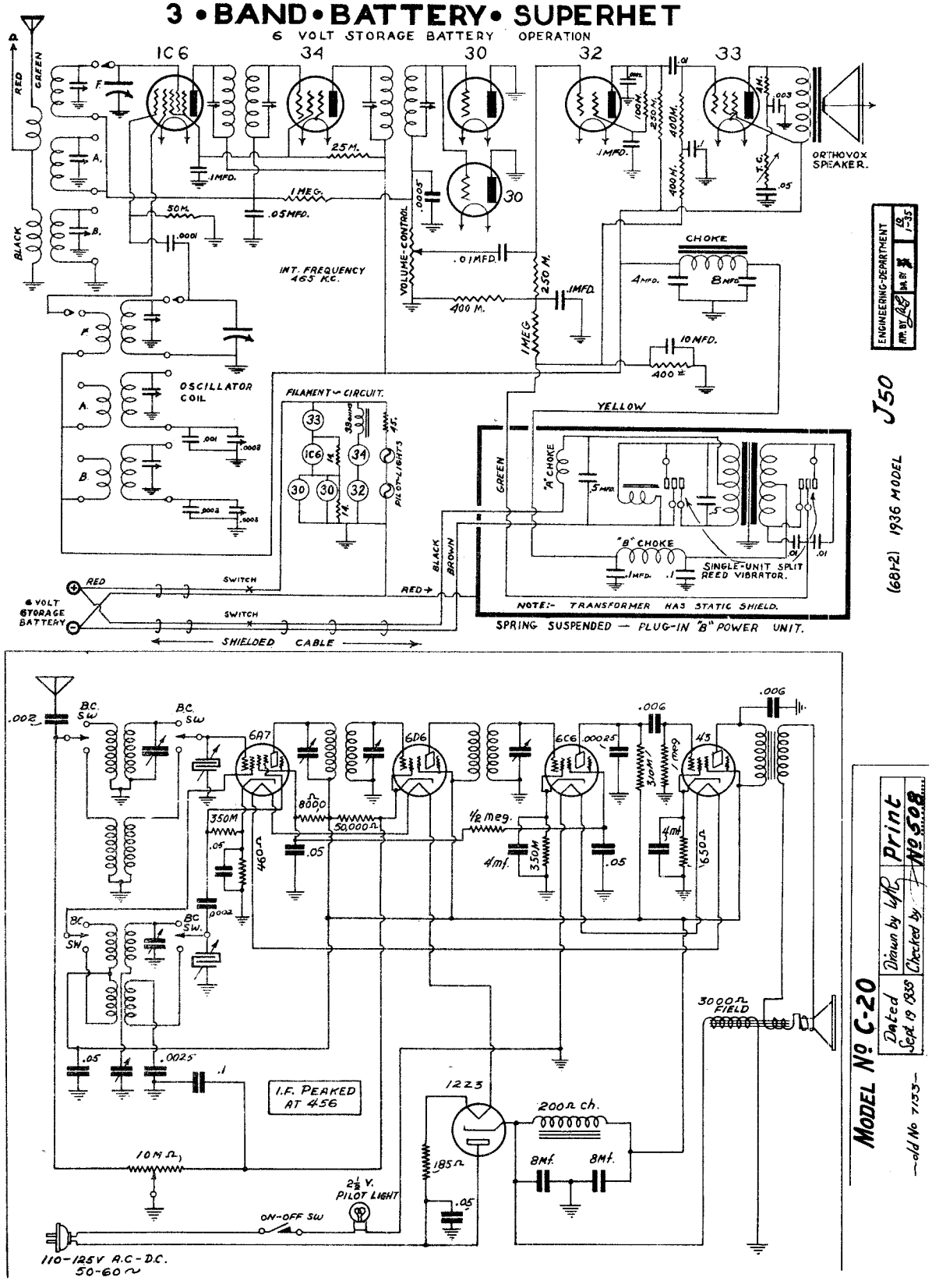
# LAFAYETTE RADIO MFG. CO.

MODEL C20
MODEL J50
Schematics

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# Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

### I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator to the grid of the 1st detector through a 0.1 MF condenser.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 5.

## Range B Alignment

### 1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C38) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C13) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

### 600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

## Range C Alignment

### 5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C40) until maximum output is obtained. See Fig. 3 for location of this trimmer.

### 5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C9 and C12) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

## Range D Alignment

### 18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C41) until maximum output is obtained. See Fig. 3 for location of this trimmer.

### 15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C10 and C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

### 6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

## Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

## D. C. Resistance of Windings

| Part No. | Winding | Code | In Ohms |
|---|---|---|---|
| P-9A418 | Antenna R. F. Transformer | T1 | |
| | Range B Primary Winding | | 21.4 |
| | Range C Primary Winding | | 0.3 |
| | Range D Primary Winding | | 0.2 |
| | Range B Secondary Winding | | 6.1 |
| | Range C Secondary Winding | | 2.1 |
| | Range D Secondary Winding | | Small |
| P-9A411 | 1st Interstage R. F. Transformer | T2 | |
| | Range B Primary Winding | | 3.6 |
| | Range C Primary Winding | | 2.4 |
| | Range D Primary Winding | | 0.5 |
| | Range B Secondary Winding | | 5.8 |
| | Range C Secondary Winding | | 2.1 |
| | Range D Secondary Winding | | Small |
| P-50X24 | Audio Input Transformer | T7 | |
| | Primary Winding | | 415.0 |
| | Secondary Winding | | |
| | Center Tap to Inside | | 211.7 |
| | Center Tap to Outside | | 288.5 |
| P-51X26 | Audio Output Transformer | T8 | |
| | Primary Winding | | |
| | Center Tap to Inside | | 135.5 |
| | Center Tap to Outside | | 155.3 |
| | Secondary Winding | | |
| | Tap to Upper Side | | 0.16 |
| | Tap to Ground Side | | 0.12 |
| P-53X82 | Power Transformer (115 Volt-60 Cycle) | T9 | |
| | Primary Winding | | 1.7 |
| | Tube Filament Secondary (A-A) | | Small |
| | Tube Filament Secondary (B-B), (80) | | Small |
| | High Voltage Secondary Winding | | |
| | Center Tap to Inside | | 97.9 |
| | Center Tap to Outside | | 106.4 |
| P-9A427 | Oscillator Coils | T10 | |
| | Range B Grid Coil | | |
| | Red White Tap to White | | 3.1 |
| | Red White Tap to Ground | | 0.7 |
| | Range C Grid Coil | | |
| | Green White Tap to Green | | 1.7 |
| | Green White Tap to Ground | | 0.5 |
| | Range D Grid Coil | | |
| | Black White Tap to Black | | Small |
| | Black White Tap to Ground | | Small |
| | Oscillator Plate Coil | | 0.2 |
| P-9A400 | 2nd I. F. Plate Isolating Reactor | L1 | 34.7 |
| P-12A204 | 12" Dynamic Speaker (No. 1—See Fig. 2) | | |
| | Speaker Field | L4 | 6400. |
| | Voice Coil | | Small |
| P-12A205 | 12" Dynamic Speaker (No. 2—See Fig. 2) | | |
| | Speaker Field | L3 | 1000. |
| | Voice Coil | | Small |
| P-12A226 | 12" Dynamic Speaker (No. 3—See Fig. 2) | | |
| | Speaker Field | L2 | 1000. |
| | Voice Coil | | Small |
| P-52X39 | Reactor Assembly | L5 | 143.6 |
| P-9A391 | High Frequency Oscillator Tracking Coil | L6 | 1.0 |
| P-9A412 | 2nd Interstage R. F. Coils | T3 | |
| | Range B Section | | |
| | Long Portion | | 5.9 |
| | Short Portion | | 0.2 |
| | Range C Section | | |
| | Long Portion | | 1.8 |
| | Short Portion | | 0.2 |
| | Range D Section | | Small |
| P-9A413 | 1st I. F. Transformer | T4 | |
| | Primary Winding | | 4.4 |
| | Coupling Winding | | 0.3 |
| | Secondary Winding | | |
| | Tap to Condenser Side | | 2.3 |
| | Tap to Switch Side | | 2.3 |
| P-9A414 | 2nd I. F. Transformer | T5 | |
| | Primary Winding | | 4.3 |
| | Coupling Winding | | 0.3 |
| | Secondary Winding | | |
| | Tap to Condenser Side | | 2.3 |
| | Tap to Switch Side | | 2.3 |
| P-9A415 | 3rd I. F. Transformer | T6 | |
| | Primary Winding | | 9.8 |
| | Secondary Winding | | 30.0 |

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# LAFAYETTE RADIO MFG. CO.

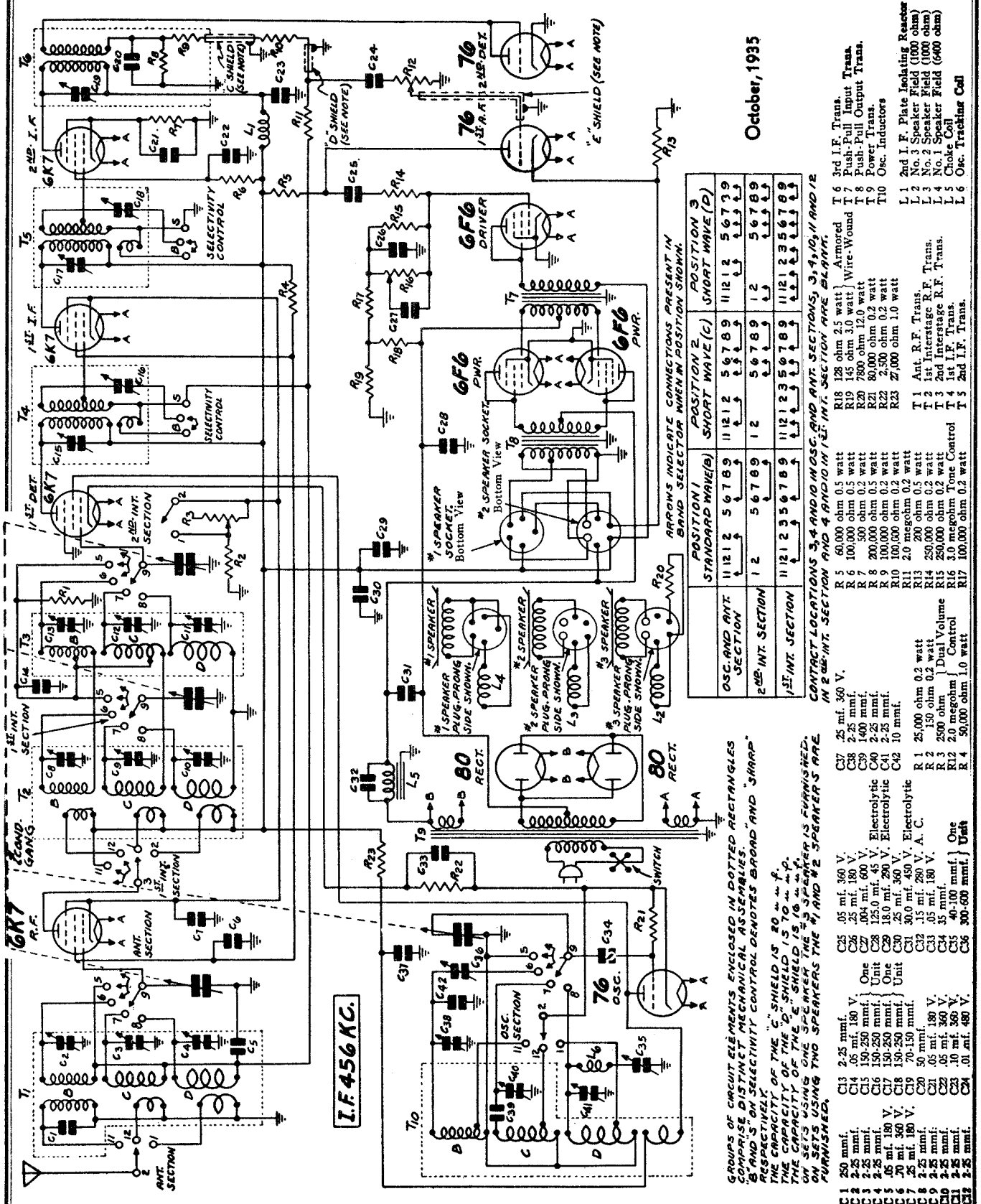
MODELS B30, B32
Schematic

Power Consumption - 140 Watts (At 115 volts 60 cycles)

Power Output - - - - - - 15 Watts Undistorted

Tuning Frequency Range

B Range - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - 1715 to 5800 KC.
D Range - - - - - - - - - 5750 to 18300 KC.




| | POSITION 1 STANDARD WAVE(B) | POSITION 2 SHORT WAVE(C) | POSITION 3 SHORT WAVE(D) |
|---|---|---|---|
| OSC. AND ANT. SECTION | 1 1 2 1 2 5 6 7 8 9 | 1 1 2 1 2 5 6 7 8 9 | 1 1 2 1 2 5 6 7 8 9 |
| 2ND INT. SECTION | 1 2 5 6 7 8 9 | 1 2 5 6 7 8 9 | 1 2 5 6 7 8 9 |
| 1ST INT. SECTION | 1 1 2 1 2 3 5 6 7 8 9 | 1 1 2 1 2 3 5 6 7 8 9 | 1 1 2 1 2 3 5 6 7 8 9 |

CONTACT LOCATIONS 3,4 AND 10 OSC. AND ANT. SECTIONS; 3,4, 10, 11 AND 12 IN 2ND INT. SECTION AND 4 AND 10 IN 1ST INT. SECTION ARE BLANK.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. "B" AND "S" ON SELECTIVITY CONTROL DENOTES BROAD AND "SHARP" RESPECTIVELY.
THE CAPACITY OF THE "C" SHIELD IS 20 mmf.
THE CAPACITY OF THE "D" SHIELD IS 10 mmf.
THE CAPACITY OF THE "E" SHIELD IS 10 mmf.
ON SETS USING ONE SPEAKER THE #3 SPEAKER IS FURNISHED.
ON SETS USING TWO SPEAKERS THE #1 AND #2 SPEAKERS ARE FURNISHED.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 250 mmf. | C13 | 2-25 mmf. | C25 | .05 mf. 360 V. | C37 | .25 mf. 360 V. | R 5 | 60,000 ohm 0.5 watt | R18 | 128 ohm 2.5 watt } Armored | T 6 3rd I.F. Trans. |
| C2 | 2-25 mmf. | C14 | .05 mf. 180 V. | C26 | .25 mf. 180 V. | C38 | 2-25 mmf. | R 6 | 100,000 ohm 0.5 watt | R19 | 145 ohm 3.0 watt } Wire-Wound | T 7 Push-Pull Input Trans. |
| C3 | 2-25 mmf. | C15 | 150-250 mmf. } One | C27 | .004 mf. 600 V. | C39 | 1400 mmf. | R 7 | 500 ohm 0.2 watt | R20 | 7800 ohm 12.0 watt | T 8 Push-Pull Output Trans. |
| C4 | 2-25 mmf. | C16 | 150-250 mmf. } Unit | C28 | 125.0 mf. 45 V. Electrolytic | C40 | 2-25 mmf. | R 8 | 200,000 ohm 0.5 watt | R21 | 80,000 ohm 0.2 watt | T 9 Power Trans. |
| C5 | .05 mf. 180 V. | C17 | 150-250 mmf. } One | C29 | 18.0 mf. 290 V. Electrolytic | C41 | 2-25 mmf. | R 9 | 100,000 ohm 0.2 watt | R22 | 2,500 ohm 0.2 watt | T10 Osc. Inductors |
| C6 | .25 mf. 180 V. | C18 | 150-250 mmf. } Unit | C30 | .25 mf. 360 V. Electrolytic | C42 | 10 mmf. | R10 | 100,000 ohm 0.2 watt | R23 | 27,000 ohm 1.0 watt | |
| C7 | .20 mf. 360 V. | C19 | 70-150 mmf. | C31 | 30.0 mf. 450 V. Electrolytic | | | R11 | 2.0 megohm 0.2 watt | | | L 1 2nd I. F. Plate Isolating Reactor |
| C8 | 2-25 mmf. | C20 | 50 mmf. | C32 | .15 mf. 280 V. A. C. | R 1 | 25,000 ohm 0.2 watt | R13 | 200 ohm 0.5 watt | T 1 | Ant. R.F. Trans. | L 2 No. 3 Speaker Field (1000 ohm) |
| C9 | 2-25 mmf. | C21 | .05 mf. 180 V. | C33 | .05 mf. 180 V. | R 2 | 150 ohm 0.2 watt | R14 | 250,000 ohm 0.2 watt | T 2 | 1st Interstage R.F. Trans. | L 3 No. 2 Speaker Field (1000 ohm) |
| C10 | 2-25 mmf. | C22 | .05 mf. 360 V. | C34 | 35 mmf. | R 3 | 2500 ohm } Dual Volume | R15 | 250,000 ohm 0.2 watt | T 3 | 2nd Interstage R.F. Trans. | L 4 No. 1 Speaker Field (6400 ohm) |
| C11 | 2-25 mmf. | C23 | .10 mf. 360 V. | C35 | 40-100 mmf. } One | R12 | 2.0 megohm } Control | R16 | 3.0 megohm Tone Control | T 4 | 1st I.F. Trans. | L 5 Choke Coil |
| C12 | 2-25 mmf. | C24 | .01 mf. 480 V. | C36 | 300-600 mmf. } Unit | R 4 | 50,000 ohm 1.0 watt | R17 | 100,000 ohm 0.2 watt | T 5 | 2nd I.F. Trans. | L 6 Osc. Tracking Coil |

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MODELS B30,B32
Voltage,Socket,Coils
Trimmers,Phono.Data

# LAFAYETTE RADIO MFG. CO.

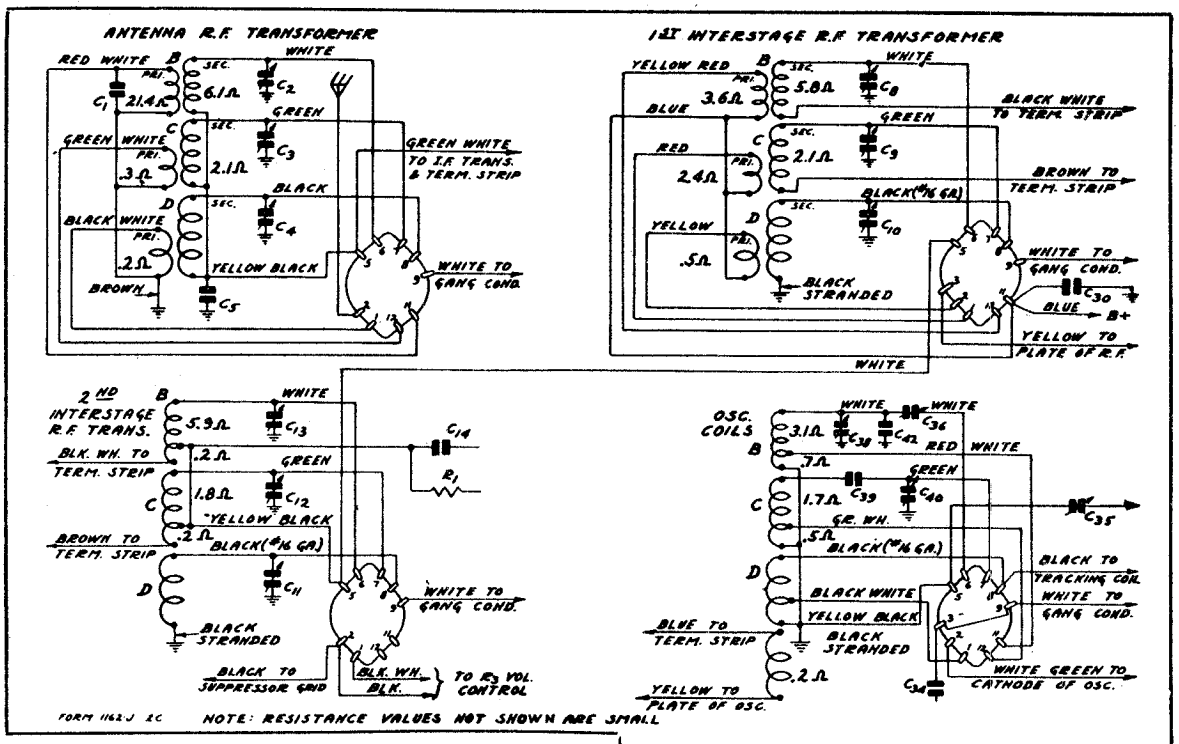

ANTENNA R.F. TRANSFORMER
1ST INTERSTAGE R.F. TRANSFORMER
2ND INTERSTAGE R.F. TRANS.
OSC. COILS
NOTE: RESISTANCE VALUES NOT SHOWN ARE SMALL

*Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings. (Also see complete D. C. Resistance List)*

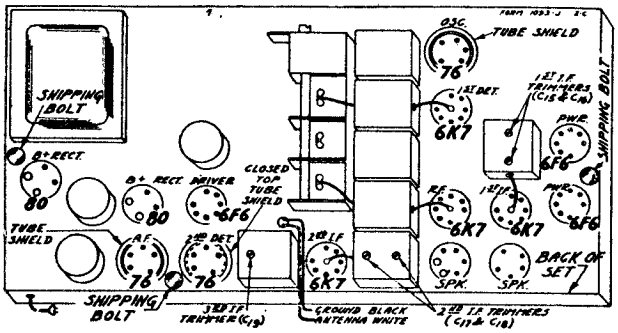
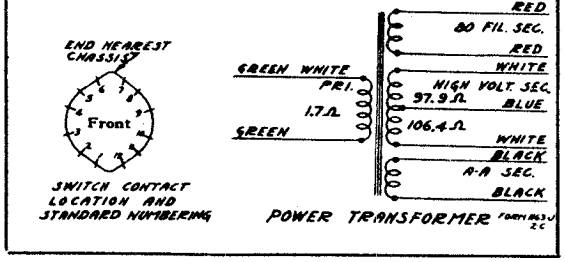



*Fig. 5—Location of Tubes*



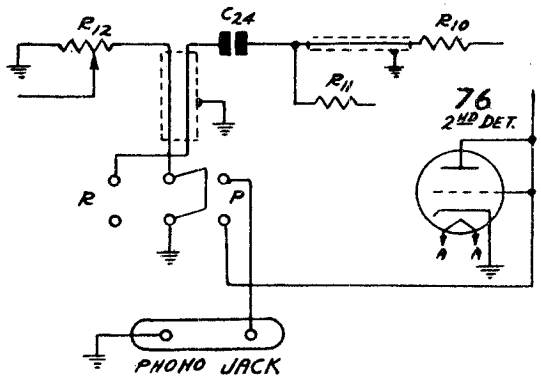




*Fig. 7—Phonograph Connections*

**VOLTAGES AT SOCKETS**
**Line Voltage 115 - Antenna Shorted to Ground**
**Volume Control at Maximum**

| Tube | Function | Across Heater | Plate to Ground | Screen to Ground | Cath. to Ground | Cath. M A |
|---|---|---|---|---|---|---|
| 6K7 | R. F. | 6.2 | 245 | 80 | 2.8 | 7.6 |
| 6K7 | 1st Det. | 6.2 | 245 | 90 | 6.5 | 2.6 |
| 76 | Osc. | 6.2 | 90 | | | 5.3 |
| 6K7 | 1st I. F. | 6.2 | 245 | 80 | 2.8 | 7.6 |
| 6K7 | 2nd I. F. | 6.2 | 245 | 74 | 3.9 | 7.0 |
| 76 | 2nd Det. | 6.2 | | | | |
| 76 | 1st A. F. | 6.2 | 110 | | 5.6 | 2.1 |
| 6F6 | Driver | 6.2 | 235 | 230 | 20.0(1) | 27.0 |
| 6F6 | Power | 6.2 | 345 | 345 | 38.0(2) | 22.5 |
| 80 | Rectifier | 5.1 | 500(3) | | | 140.0(4) |

(1) As read across R19
(2) Grid to Ground
(3) Plate to Center Tap
(4) Two tubes in parallel

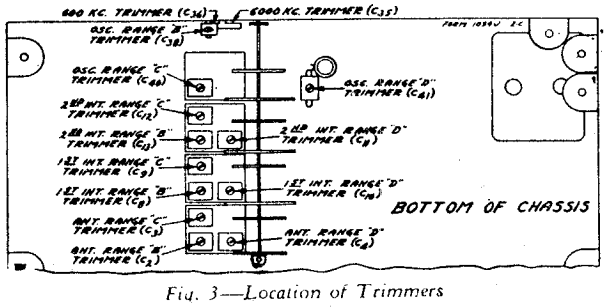



*Fig. 3—Location of Trimmers*

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# LAFAYETTE RADIO MFG. CO.

MODELS B35, B36
Schematic

Sept., 1935

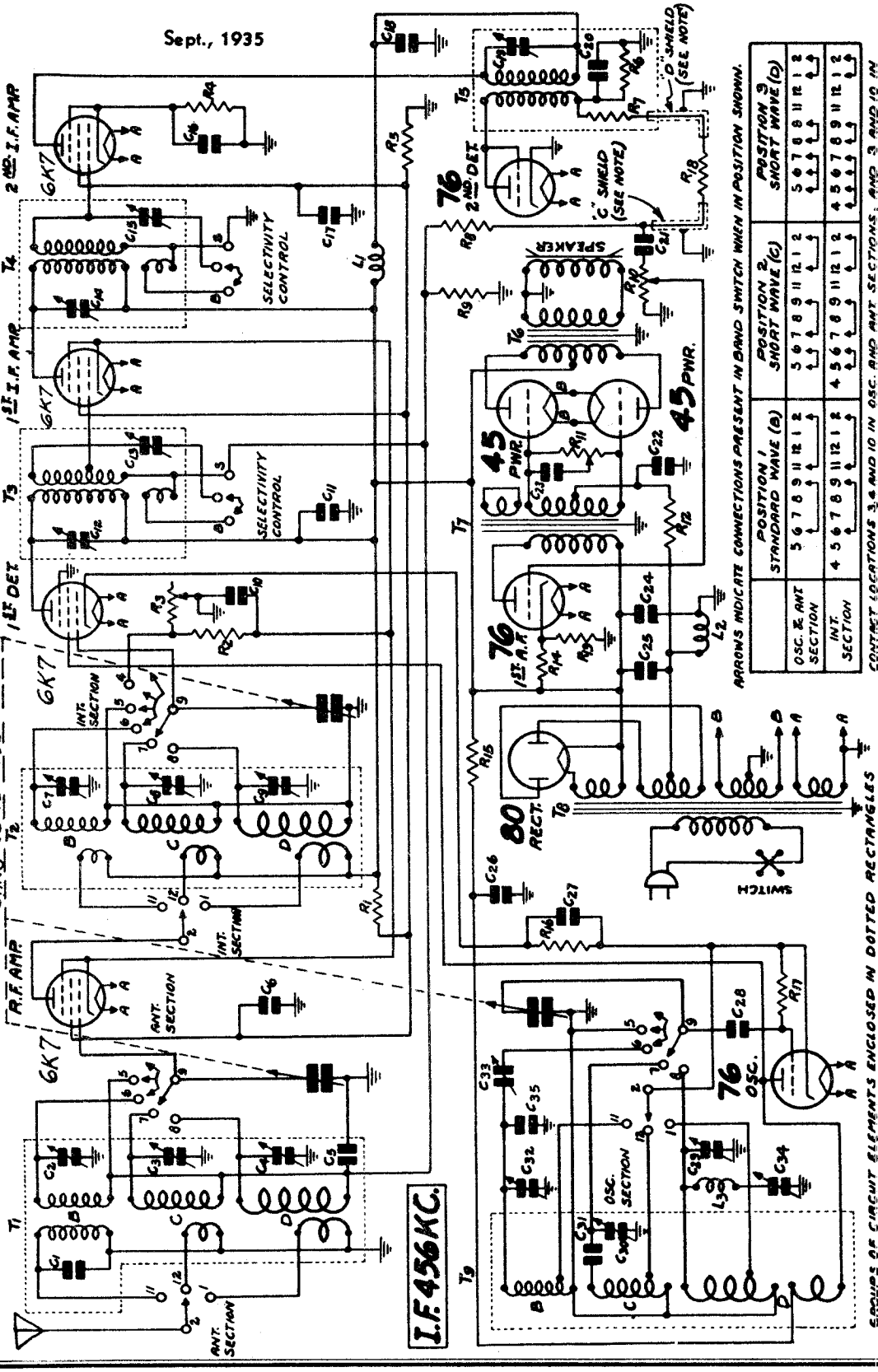
**Power Consumption - 90 Watts (At 115 volts 60 cycles)**

**Power Output - - - - - - - 5 Watts Undistorted**

**Selectivity - 22 KC Broad at 1000 times Signal (Sharp)**

**Tuning Frequency Range**

| | |
|---|---|
| B Range | 535 to 1730 KC. |
| C Range | 1715 to 5800 KC. |
| D Range | 5750 to 18300 KC. |




ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

| | POSITION 1 STANDARD WAVE (B) | POSITION 2 SHORT WAVE (C) | POSITION 3 SHORT WAVE (D) |
|---|---|---|---|
| OSC. & ANT SECTION | 5 6 7 8 9 11 12 1 2 | 5 6 7 8 9 11 12 1 2 | 5 6 7 8 9 11 12 1 2 |
| INT. SECTION | 4 5 6 7 8 9 11 12 1 2 | 4 5 6 7 8 9 11 12 1 2 | 4 5 6 7 8 9 11 12 1 2 |

CONTACT LOCATIONS 3, 4 AND 10 IN OSC. AND ANT SECTIONS, AND 3 AND 10 IN INT. SECTION ARE BLANK.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

"B" AND "S" ON SELECTIVITY CONTROL DENOTES "BROAD" AND "SHARP" RESPECTIVELY.

THE CAPACITY OF THE "C" SHIELD IS 55 mmf. THE CAPACITY OF THE "D" SHIELD IS 20 mmf.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C1 | 250 mmf. | C11 | .25 mf. 360 V. | C21 | .01 mf. 360 V. | C31 | 1400 mmf. |
| C2 | 2-25 mmf. | C12 | 150-250 mmf. \| ONE | C22 | .50 mf. 180 V. | C32 | 2-25 mmf. |
| C3 | 2-25 mmf. | C13 | 150-250 mmf. \| UNIT | C23 | .004 mf. 600 V. | C33 | 300-600 mmf. \| ONE |
| C4 | 2-25 mmf. | C14 | 150-250 mmf. \| ONE | C24 | 18.0 mf. 290 V. | C34 | 40-100 mmf. \| UNIT |
| C5 | .05 mf. 180 V. | C15 | 150-250 mmf. \| UNIT | C25 | 14.0 mf. 400 V. | | |
| C6 | .05 mf. 180 V. | C16 | .05 mf. 180 V. | C26 | .05 mf. 360 V. | R 1 | 16,000 ohm 2.0 W. |
| C7 | 2-25 mmf. | C17 | 4.0 mf. 150 V. | C27 | .05 mf. 180 V. | R 2 | 150 ohm .2 W. |
| C8 | 2-25 mmf. | C18 | .10 mf. 360 V. | C28 | .35 mmf. | R 3 | 2,500 ohm \| Dual Volume |
| C9 | 2-25 mmf. | C19 | 70-150 mmf. | C29 | 2-25 mmf. | R10 | 2.0 megohm \| Control |
| C10 | .25 mf. 180 V. | C20 | 50 mmf. | C30 | 2-25 mmf. | R 4 | 400 ohm .2 W. |

| | | | |
|---|---|---|---|
| R 5 | 30,000 ohm 1.0 W. | T 1 | Ant. R.F. Trans. |
| R 6 | 300,000 ohm .2 W. | T 2 | Interstage R.F. Trans. |
| R 7 | 100,000 ohm .2 W. | T 3 | 1st I.F. Trans. |
| R 8 | 2.0 megohm .2 W. | T 4 | 2nd I.F. Trans. |
| R 9 | 1.0 megohm .2 W. | T 5 | Diode Input Trans. |
| R11 | 3.0 megohm Tone Cont. | T 6 | Audio Output Trans. |
| R12 | 100,000 ohm .2 W. | T 7 | Audio Input Trans. |
| R13 | 1,000 ohm .5 W. | T 8 | Power Trans. |
| R14 | 25,000 ohm 3.0 W. | T 9 | Osc. Inductors |
| R15 | 25,000 ohm 1.0 W. | | |
| R16 | 2,500 ohm .2 W. | L 1 | Isolating Reactor |
| R17 | 80,000 ohm .2 W. | L 2 | Speaker Field (570 Ohm) |
| | | L 3 | Osc. Tracking Coil |

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MODELS B35,B36
Voltage,Socket,Coils
Trimmers,Phono.Data

# LAFAYETTE RADIO MFG. CO.

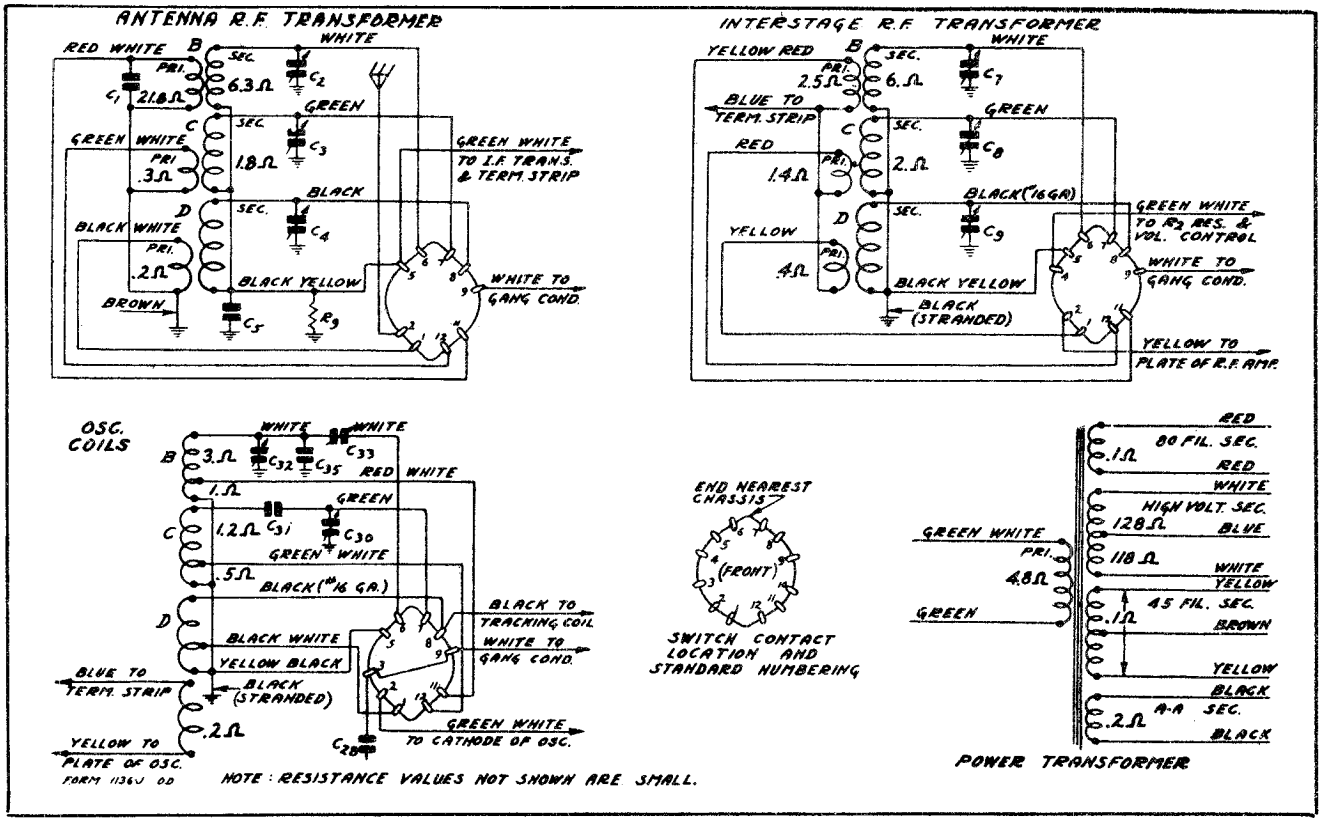


*Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings (Also see complete D. C. Resistance List in this Manual)*

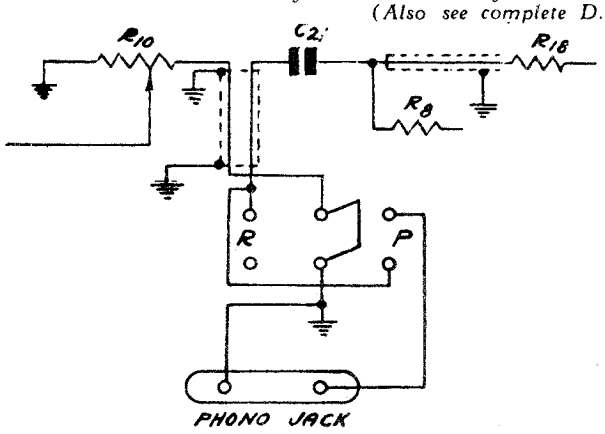


*Fig. 7—Phonograph Connections*

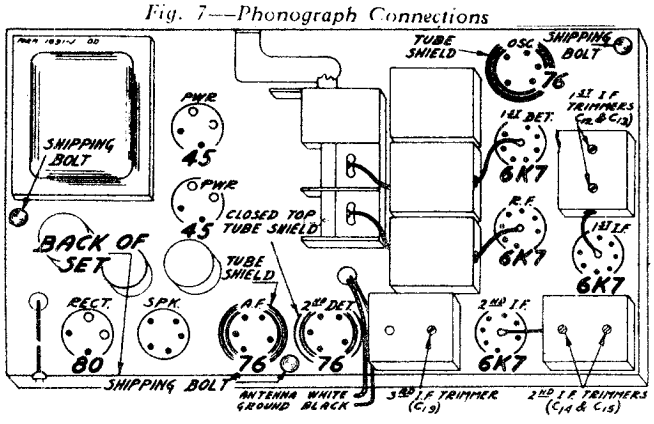


*Fig. 5—Location of Tubes*

## VOLTAGES AT SOCKETS

**Line Voltage, 115 - Volume Control at Maximum Antenna Shorted to Ground**

| Type of Tube | Function | Heater or Filam't | Plate to Ground | Screen to Ground | Cathode to Ground | Cathode M. A. |
|---|---|---|---|---|---|---|
| 6K7 (6D6) | R. F. | 6.1 | 265 | 120 | 3.7 | 9.0 |
| 6K7 (6D6) | 1st Det. | 6.1 | 265 | 110 | 9.5 | 3.8 |
| 76 | Osc. | 6.1 | 110 | | | 5.8 |
| 6K7 (6D6) | 1st. I. F. | 6.1 | 265 | 120 | 3.7 | 9.0 |
| 6K7 (6D6) | 2nd I. F. | 6.1 | 265 | 120 | 3.7 | 9.0 |
| 76 | 2nd Det. | 6.1 | | | | |
| 76 | 1st A. F. | 6.1 | 265 | | 14. | 5.0 |
| 45 | Power | 2.5 | 265 | | 50.(1) | 22. |
| 80 | Rectifier | 4.9 | | | | 90. (total) |

(1) As-read with 500 Volt Scale. Grid to Ground.

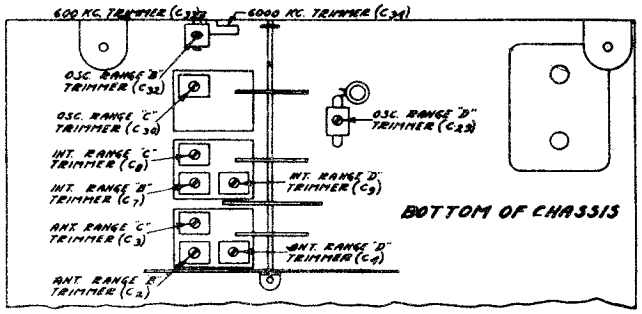
600 KC. TRIMMER (C34)
6000 KC. TRIMMER (C24)
OSC. RANGE "B" TRIMMER (C32)
OSC. RANGE "C" TRIMMER (C30)
OSC. RANGE "D" TRIMMER (C28)
INT. RANGE "C" TRIMMER (C8)
INT. RANGE "D" TRIMMER (C9)
INT. RANGE "B" TRIMMER (C7)
ANT. RANGE "C" TRIMMER (C3)
ANT. RANGE "D" TRIMMER (C4)
ANT. RANGE "B" TRIMMER (C2)
BOTTOM OF CHASSIS

*Fig. 3—Location of Trimmers*

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# Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

### I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 5.

## Range B Alignment

### 1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

### 600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

## Range C Alignment

### 5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C30) until maximum output is obtained. See Fig. 3 for location of this trimmer.

### 5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C8) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

## Range D Alignment

### 18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C29) until maximum output is obtained. See Fig. 3 for location of this trimmer.

### 15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

### 6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

## D. C. Resistance of Windings

### Refer to Fig. 4.

**Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.**

| Part No. | Winding | Code | D.C. Resistance in Ohms |
|---|---|---|---|
| P-9A405 | Antenna R. F. Transformer | T1 | |
| | Range B Primary Winding | | 21.8 |
| | Range C Primary Winding | | 0.3 |
| | Range D Primary Winding | | 0.2 |
| | Range B Secondary Winding | | 6.3 |
| | Range C Secondary Winding | | 1.8 |
| | Range D Secondary Winding | | Small |
| P-9A425 | Interstage R. F. Transformer | T2 | |
| | Range B Primary Winding | | 2.5 |
| | Range C Primary Winding | | 1.4 |
| | Range D Primary Winding | | 0.4 |
| | Range B Secondary Winding | | 6.0 |
| | Range C Secondary Winding | | 2.0 |
| | Range D Secondary Winding | | Small |
| P-9A426 | Oscillator Coils | T9 | |
| | Range B Grid Coil | | |
| | Red White Tap to White | | 3.0 |
| | Red White Tap to Ground | | 1.0 |
| | Range C Grid Coil | | |
| | Green White Tap to Green | | 1.2 |
| | Green White Tap to Ground | | 0.5 |
| | Range D Grid Coil | | |
| | Black White Tap to Black | | Small |
| | Black White Tap to Ground | | Small |
| | Oscillator Plate Coil | | 0.2 |
| P-9A397 | 1st I. F. Transformer | T3 | |
| | Primary Winding | | 4.6 |
| | Secondary Winding | | |
| | Long Portion | | 3.4 |
| | Short Portion | | 1.7 |
| | Coupling Winding | | 0.2 |
| P-9A398 | 2nd I. F. Transformer | T4 | |
| | Primary Winding | | 9.4 |
| | Secondary Winding | | 9.0 |
| | Coupling Winding | | 0.5 |
| P-9A399 | 3rd I. F. Transformer | T5 | |
| | Primary Winding | | 10.2 |
| | Secondary Winding | | 28.4 |
| P-50X16 | Audio Input Transformer | T7 | |
| | Primary Winding | | 2350. |
| | Secondary Winding | | |
| | Center Tap to Inside | | 2000. |
| | Center Tap to Outside | | 2690. |
| P-51X32 | Audio Output Transformer | T6 | |
| | Primary Winding | | |
| | Center Tap to Inside | | 198. |
| | Center Tap to Outside | | 222. |
| | Secondary Winding | | 0.4 |
| P-12A208 | Dynamic Speaker (10") | | |
| | Speaker Voice Coil | | 1.6 |
| | Speaker Field | L2 | 570. |
| P-53X94 | 115 Volt 60 Cycle Power Trans. | T8 | |
| | Primary Winding | | 4.8 |
| | Tube Filament Secondary (A-A) | | 0.2 |
| | Tube Filament Secondary (B-B) (45) | | 0.1 |
| | Rectifier Filament Secondary | | 0.1 |
| | High Voltage Secondary Winding | | |
| | Center Tap to Inside | | 118. |
| | Center Tap to Outside | | 128. |
| P-9A403 | 2nd I. F. Plate Isolating Reactor | L1 | 36. |
| P-9A391 | High Frequency Oscillator Tracking Coil | L3 | 1.2 |

### Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

### Changes in Early Models

In the early models of this receiver the tone control resistor (R11) was connected as a series variable resistor connecting in series through the condenser C23 between the grids of the 45 tubes in the audio output stage. In the later models it is employed as a potentiometer in the manner shown in Fig. 2.

The 100,000 ohm resistor (R18) was not used in the early models. Condenser C21 was connected directly to resistor R7.

The type 6K7 metal tubes replace the type 6D6 glass tubes which were used in the early models.

Condenser C35 was added to the oscillator coil standard wave section in later models. It is not, however, used in all cases but only when this capacity is required in this circuit.

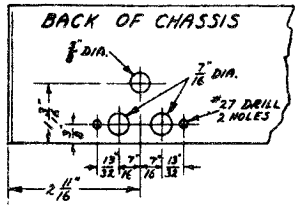



*Fig. 8—Details of Panel Drilling for Phono Assembly*

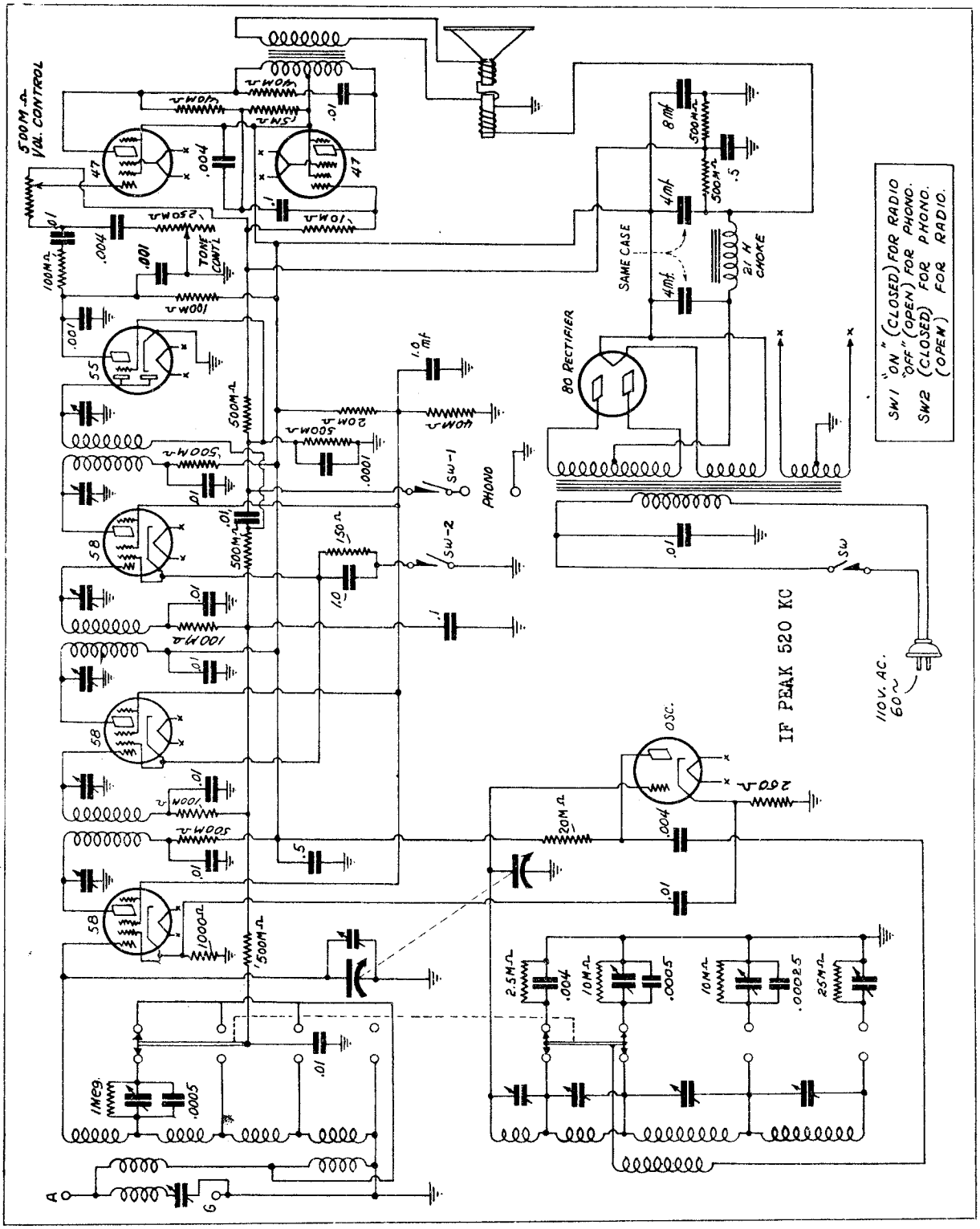
## Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required to make this installation are shown in the parts list.

To mount the phono switch and phono jack, drill holes of a size and in the position shown in Fig. 8 at the left hand side (from back) of the rear panel of the chassis.

MODELS M41, M43
Schematic

# LAFAYETTE RADIO MFG. CO.




## Lafayette DUAL WAVE M-41 - M-43
## 8 TUBE SUPERHET'

| Dated | Drawn by | PRINT |
|---|---|---|
| Sept. 26 1935 | Checked by | No. 110 |

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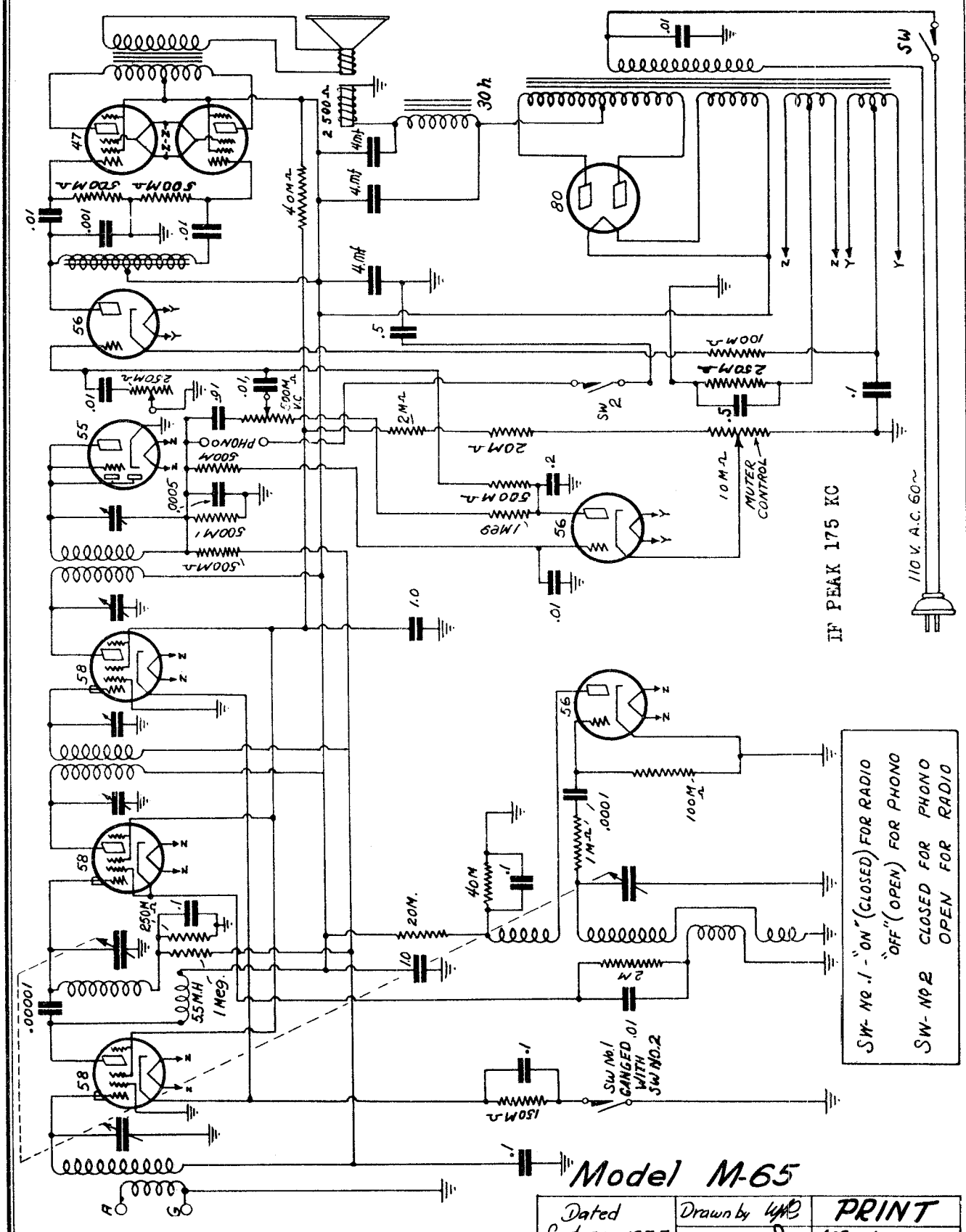
MODEL M65
Schematic

# LAFAYETTE RADIO MFG. CO.

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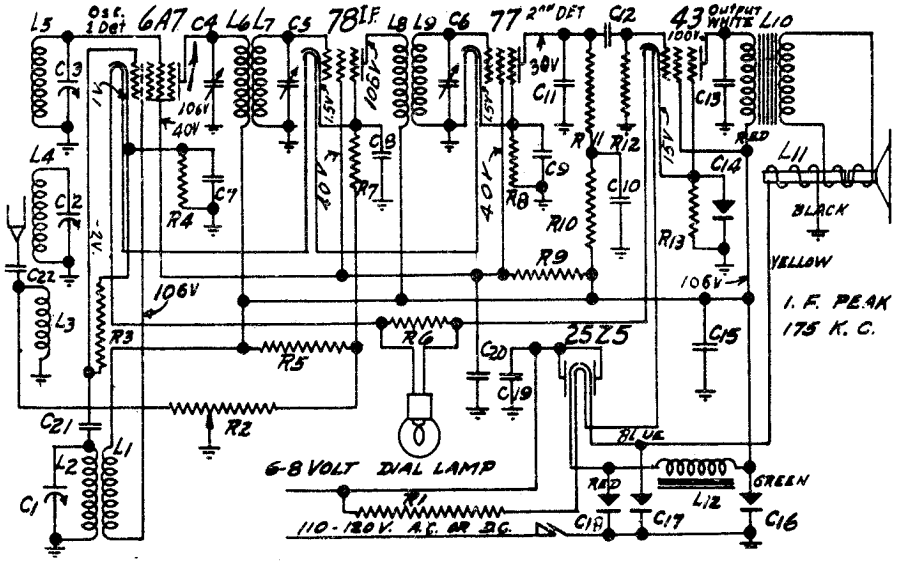
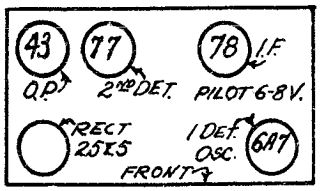



## MODEL A77

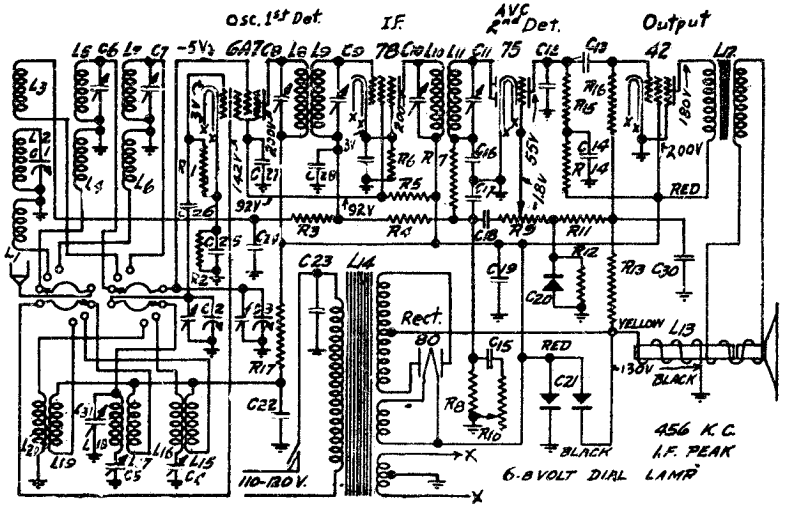
| | | | |
|---|---|---|---|
| R1 | 20-1125 | 130 | Ohm Resistor in Power Cord |
| R2 | 19-1296 | 10,000 | Ohm Volume Control & Switch |
| R3 | 53-898 | 50,000 | Ohm Resistor Oscillator Grid |
| R4 | 53-1062 | 250 | Ohm Resistor 6A7 Cathode |
| R5 | 53-922 | 75,000 | Ohm Resistor I.F.Cathode Feed |
| R6 | 53-1508 | 20 | Ohm Resistor Pilot Light Shunt |
| R7 | 53-1063 | 500 | Ohm Resistor I.F.Cathode |
| R8 | 53-941 | 20,000 | Ohm Resistor Second Detector Cathode |
| R9 | 53-921 | 40,000 | Ohm Resistor Screen Feed |
| R10 | 53-923 | 100,000 | Ohm 77 Plate Hum Resistor |
| R11 | 53-924 | 250,000 | Ohm Resistor 77 Plate |
| R12 | 53-925 | 500,000 | Ohm Resistor Output Grid |
| R13 | 53-1063 | 500 | Ohm Resistor Output Cathode |

| | | |
|---|---|---|
| C1 | 77-833 | 336 MMFD. Oscillator Section 3 Gang |
| C2 | 77-833 | 371 MMFD. Preselector Section 3 Gang |
| C3 | 77-833 | 371 MMFD. Preselector Section 3 Gang |
| C4 | 78-2008 | First I.F. Primary Trimmer |
| C5 | 78-2007 | First I.F. Secondary Trimmer |
| C6 | 78-788 | Second I.F. Trimmer |
| C7 | 75-272A | .1 Mfd. 200 Volt 6A7 Cathode |
| C8 | 75-272A | .1 Mfd. 200 Volt 78 Cathode |
| C9 | 75-267A | 5. Mfd. 200 Volt 77 Cathode |
| C10 | 75-272A | .1 Mfd. 200 Volt 77 Plate Hum Filter |
| C11 | 76-265 | .001 Mfd. Mica 77 Plate By-Pass |
| C12 | 75-269A | .01 Mfd. 400 Volt Audio Feed Condenser |
| C13 | 75-343A | .004 Mfd. Paper Output Plate By-Pass |
| C14 | 18-928 | 25 Mfd. 25 Volt Output Cathode |
| C15 | 75-267A | .5 Mfd. 200 Volt B Supply By-Pass |
| C16 | 18-1085 | 4 Mfd. 150 Volt Dry Electrolytic Condenser |
| C17 | 18-1085 | 4 Mfd. 150 Volt Dry Electrolytic Condenser |
| C18 | 18-1085 | 10 Mfd. 150 Volt Dry Electrolytic Condenser |
| C19 | 75-272A | .1 Mfd. 200 Volt 110 Volt Line By-Pass |
| C20 | 75-272A | .1 Mfd. 200 Volt Screen By-Pass |
| C21 | 76-264 | .00005 Mfd. Mica Oscillator Grid Condenser |
| C22 | 76-265 | .001 Mfd. Mica Antenna Series Condenser |

| | | |
|---|---|---|
| L11 | 64-1260 | 3000 Ohm Speaker Field |
| L12 | 14-940 | 20 Henry Choke |




## CHASSIS LAYOUT

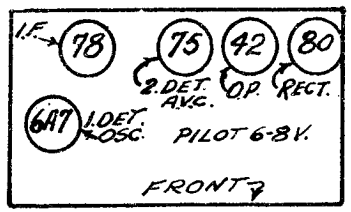



## MODEL A81, A81L

| | | | |
|---|---|---|---|
| R1 | 53-941 | 20,000 | Ohm Oscillator Grid Resistor |
| R2 | 53-1062 | 250 | Ohm Oscillator Cathode Resistor |
| R3 | 53-923 | 100,000 | Ohm A.V.C. Network |
| R4 | 53-926 | 1 | Megohm A.V.C. Network |
| R5 | 53-1042 | 25,000 | Ohm Screen Feed |
| R6 | 53-1063 | 500 | Ohm I.F. Cathode |
| R7 | 53-898 | 50,000 | Ohm Diode Filter |
| R8 | 53-925 | 500,000 | Ohm Diode Load |
| R9 | 19-1291 | 500,000 | Ohm Volume Control & Switch |
| R10 | 19-1317 | 250,000 | Ohm Tone Control |
| R11 | 53-923 | 100,000 | Ohm C Bias Network |
| R12 | 53-919 | 5,000 | Ohm C Bias Network |
| R13 | 53-926 | 1 | Megohm C Bias Network |
| R14 | 53-923 | 100,000 | Ohm 75 Plate Hum Resistor |
| R15 | 53-924 | 250,000 | Ohm 75 Plate |
| R16 | 53-925 | 500,000 | Ohm 42 Grid |
| R17 | 53-277 | 10,000 | Ohm Oscillator Plate Resistor |

| | | |
|---|---|---|
| L1 | 17-20[illegible] | Broadcast Preselector Primary |
| L2 | 17-2031 | Broadcast Preselector First Secondary |
| L3 | 17-2031 | Broadcast Preselector Second Secondary |
| L4 | 17-2031 | Long Wave Band Preselector Primary |
| L5 | 17-2031 | Long Wave Band Preselector Secondary |
| L6 | 17-2017 | Foreign Band Preselector Primary |
| L7 | 17-2017 | Foreign Band Preselector Secondary |
| L8 | 17-2016 | First I.F. Primary |
| L9 | 17-2016 | First I.F. Secondary |
| L10 | 17-2016 | Second I.F. Primary |
| L11 | 17-2016 | Second I.F. Secondary |
| L12 | 64-2003 | Single 42 Output Transformer |
| L13 | -2003 | 2500 Ohm Speaker Field |

| | | |
|---|---|---|
| C1 | 77-1581 | 16-366 MMFD. Third Section of 3 Gang Condenser |
| C2 | 77-1581 | 16-366 MMFD. Oscillator Section of 3 Gang Condenser |
| C3 | 77-1581 | 16-366 MMFD. Second Section of 3 Gang Condenser |
| C4 | 78-1569 | 450 MMFD. Broadcast Oscillator Trimmer |
| C5 | 78-1569 | 140 MMFD. Long Wave Band Oscillator Trimmer |
| C6 | 78-1568 | 3-30 MMFD. Long Wave Band Preselector Trimmer |
| C7 | 78-1568 | 3-30 MMFD. Skip Band Preselector Trimmer |
| C8 | 78-2005 | 80 MMFD. First I.F. Primary Trimmer |
| C9 | 78-2005 | 80 MMFD. First I.F. Secondary Trimmer |
| C10 | 78-2005 | 80 MMFD. Second I.F. Primary Trimmer |
| C11 | 78-2005 | 80 MMFD. Second I.F. Secondary Trimmer |
| C12 | 76-265 | .001 MFD. Mica Second Detector Plate |
| C13 | 75-269A | .01 MFD. 400 Volt Audio Feed Condenser |
| C14 | 75-1326A | .1 MFD. 400 Volt 75 Plate Hum Filter |
| C15 | 75-269A | .01 MFD. 400 Volt Tone Control Condenser |
| C16 | 76-339 | .0001 MFD. Mica Diode Filter Net work |
| C17 | 76-339 | .0001 MFD. Mica Diode Filter Net work |
| C18 | 75-269A | .01 MFD. 400 Volt Audio Feed Condenser |
| C19 | 75-266 | 1. MFD. 400 Volt B. Supply By-Pass |
| C20 | 18-928 | 25 MFD. 25 Volt C Bias |
| C21 | 18-1274 | 4-4 MFD. 450 Volt Dry Electrolytic Condenser |
| C22 | 75-269A | .01 MFD. 400 Volt Oscillator Plate By-Pass |
| C23 | 75-269A | .01 MFD. 400 Volt 110 Volt Line By-Pass |
| C24 | 75-272A | .1 MFD. 200 Volt A.V.C. Network By-Pass |
| C25 | 75-272A | .1 MFD. 200 Volt 6A7 Cathode By-Pass |
| C26 | 76-264 | .00005 MFD. Mica Oscillator Grid Condenser |
| C27 | 75-272A | .1 MFD. 200 Volt Screen By-Pass |
| C28 | 75-272A | .1 MFD. 200 Volt A.V.C. Network By-Pass |
| C29 | 75-272A | .1 MFD. 200 Volt 78 Cathode By-Pass |
| C30 | 75-183A | .2 MFD. 200 Volt C Bias Network By-Pass |
| C31 | 78-1568 | 3-30 MMFD. Long Wave Band Oscillator Trimmer |




## CHASSIS LAYOUT

MODEL B78
Schematic

# LAFAYETTE RADIO MFG. CO.

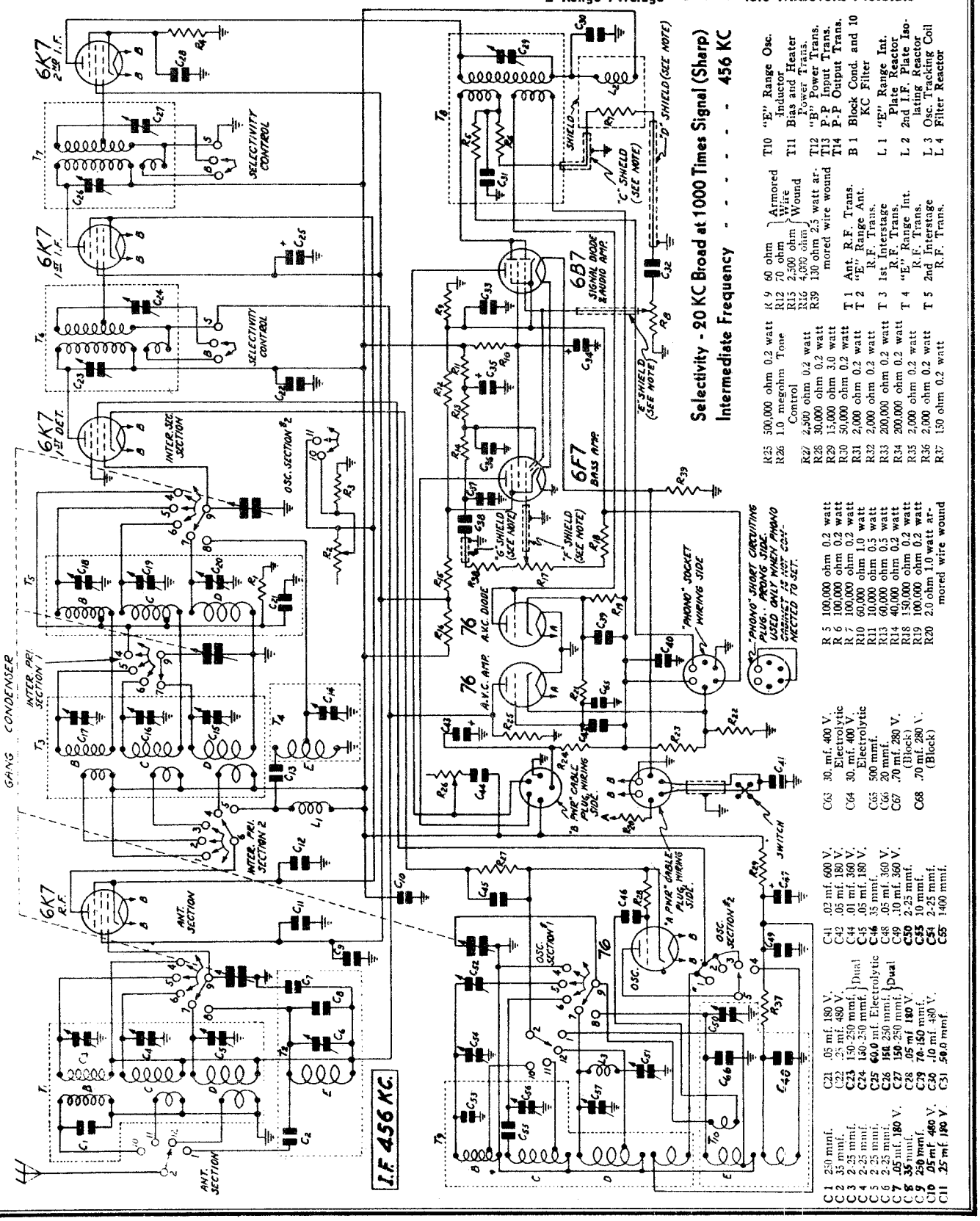
**Power Consumption - - - - - - - 290 Watts**
**(At 115 Volts 60 Cycles)**

**Power Output - - - - 30 Watts Undistorted**

**Sensitivity**

**B Range Average - - - - 0.5 Microvolts Absolute**
**C Range Average - - - - 1.0 Microvolts Absolute**
**D Range Average - - - - 2.0 Microvolts Absolute**
**E Range Average - - - - 40.0 Microvolts Absolute**

**Selectivity - 20 KC Broad at 1000 Times Signal (Sharp)**
**Intermediate Frequency - - - - - - - 456 KC**




| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 250 mmf. | C21 | .05 mf. 180 V. | C41 | .02 mf. 600 V. | C63 | 30. mf. 400 V. Electrolytic | R5 | 100,000 ohm 0.2 watt | R25 | 500,000 ohm 0.2 watt | R 9 | 60 ohm | Armored Wire Wound | T10 "E" Range Osc. Inductor |
| C2 | 35 mmf. | C22 | .25 mf. 480 V. | C42 | .05 mf. 180 V. | C64 | 30. mf. 400 V. Electrolytic | R6 | 100,000 ohm 0.2 watt | R26 | 1.0 megohm Tone Control | R12 | 70 ohm | | T11 Bias and Heater Power Trans. |
| C3 | 2-25 mmf. | C23 | 150-250 mmf. Dual | C44 | .01 mf. 360 V. | C65 | 500 mmf. | R7 | 100,000 ohm 0.2 watt | R27 | 2,500 ohm 0.2 watt | R15 | 2,500 ohm | Wound | T12 "B" Power Trans. |
| C4 | 2-25 mmf. | C24 | 150-250 mmf. Dual | C45 | .05 mf. 180 V. | C66 | 20 mmf. | R10 | 60,000 ohm 1.0 watt | R28 | 30,000 ohm 0.2 watt | R16 | 4,000 ohm | | T13 P-P Input Trans. |
| C5 | 2-25 mmf. | C25 | 60.0 mf. Electrolytic | C46 | .35 mmf. | C67 | .70 mf. 280 V. (Block) | R11 | 10,000 ohm 0.5 watt | R29 | 15,000 ohm 3.0 watt | R39 | 130 ohm 2.5 watt | armored wire wound | T14 P-P Output Trans. |
| C6 | 2-25 mmf. | C26 | 150 250 mmf. Dual | C48 | .05 mf. 360 V. | C68 | .70 mf. 280 V. (Block) | R13 | 60,000 ohm 0.5 watt | R30 | 50,000 ohm 0.2 watt | | | | B 1 Block Cond. and 10 KC Filter |
| C7 | .05 mf. 180 V. | C27 | 150 250 mmf. Dual | C49 | .10 mf. 360 V. | | | R14 | 40,000 ohm 0.2 watt | R31 | 2,000 ohm 0.2 watt | T 1 | Ant. R.F. Trans. | | L 1 "E" Range Int. Plate Reactor |
| C8 | 35 mmf. | C28 | .05 mf 180 V. | C50 | 2-25 mmf. | | | R18 | 150,000 ohm 0.2 watt | R32 | 2,000 ohm 0.2 watt | T 2 | "E" Range Ant. R.F. Trans. | | L 2 2nd I.F. Plate Isolating Reactor |
| C9 | 250 mmf. | C29 | 70-150 mmf. | C55 | 10 mmf. | | | R19 | 100,000 ohm 0.2 watt | R33 | 200,000 ohm 0.2 watt | T 3 | 1st Interstage R.F. Trans. | | L 3 Osc. Tracking Coil |
| C10 | .05 mf 480 V. | C30 | .10 mf. 480 V. | C54 | 2-25 mmf. | | | R20 | 2.0 ohm 1.0 watt armored wire wound | R34 | 200,000 ohm 0.2 watt | T 4 | "E" Range Int. R.F. Trans. | | L 4 Filter Reactor |
| C11 | .25 mf 180 V. | C31 | 50.0 mf. | C55 | 1400 mmf. | | | | | R35 | 2,000 ohm 0.2 watt | T 5 | 2nd Interstage R.F. Trans. | | |
| | | | | | | | | | | R36 | 2.000 ohm 0.2 watt | | | | |
| | | | | | | | | | | R37 | 150 ohm 0.2 watt | | | | |

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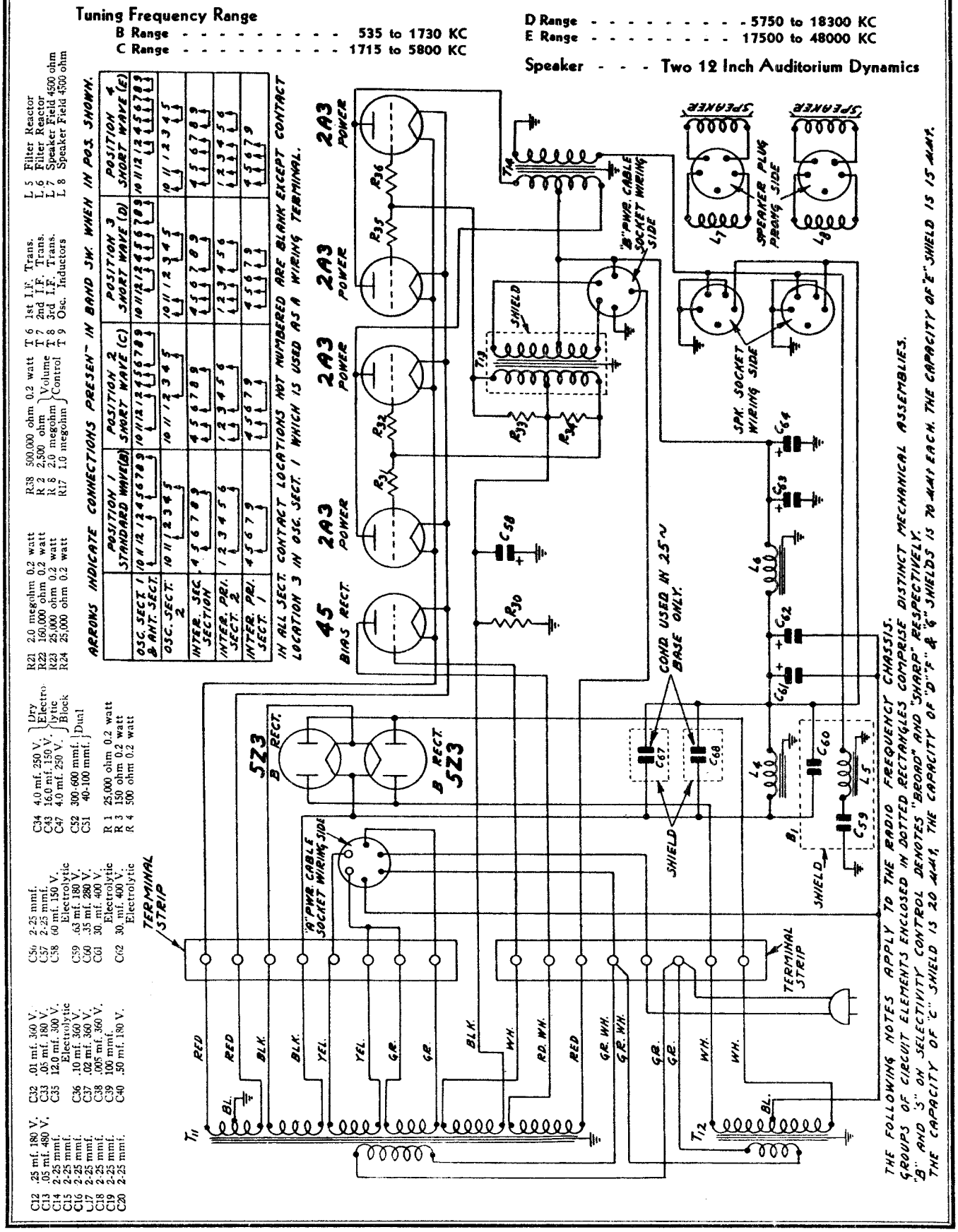
MODEL B78
S.P.U. Schematic

# LAFAYETTE RADIO MFG. CO.


Tuning Frequency Range
B Range - - - - - - - - - - 535 to 1730 KC
C Range - - - - - - - - - - 1715 to 5800 KC
D Range - - - - - - - - - - 5750 to 18300 KC
E Range - - - - - - - - - - 17500 to 48000 KC
Speaker - - - Two 12 Inch Auditorium Dynamics
ARROWS INDICATE CONNECTIONS PRESENT IN BAND SW. WHEN IN POS. SHOWN.
IN ALL SECT. CONTACT LOCATIONS NOT NUMBERED ARE BLANK EXCEPT CONTACT LOCATION 3 IN OSC. SECT. 1 WHICH IS USED AS A WIRING TERMINAL.
THE FOLLOWING NOTES APPLY TO THE RADIO FREQUENCY CHASSIS.
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
"B" AND "S" ON SELECTIVITY CONTROL DENOTES "BROAD" AND "SHARP" RESPECTIVELY.
THE CAPACITY OF "C" SHIELD IS 20 MMF. THE CAPACITY OF "D" & "E" SHIELDS IS 70 MMF EACH. THE CAPACITY OF "E" SHIELD IS 15 MMF.
45 BIAS RECT.
2A3 POWER
523 B RECT.
COND USED IN 25" BASE ONLY.
SHIELD
TERMINAL STRIP
"B" PWR CABLE SOCKET WIRING SIDE
SPK. SOCKET WIRING SIDE
SPEAKER PLUG PRONG SIDE
SPEAKER
RED
BLK.
YEL.
GR.
WH.
BL.
RD. WH.
GR. WH.

| | POSITION 1 STANDARD WAVE(B) | POSITION 2 SHORT WAVE (C) | POSITION 3 SHORT WAVE (D) | POSITION 4 SHORT WAVE (E) |
|---|---|---|---|---|
| OSC. SECT. 1 & ANT. SECT. | 10 11 12 1 2 3 4 5 6 7 8 9 | 10 11 12 1 2 3 4 5 6 7 8 9 | 10 11 12 1 2 3 4 5 6 7 8 9 | 10 11 12 1 2 3 4 5 6 7 8 9 |
| OSC. SECT. 2 | 10 11 1 2 3 4 5 | 10 11 1 2 3 4 5 | 10 11 1 2 3 4 5 | 10 11 1 2 3 4 5 |
| INTER. SEC. SECTION | 4 5 6 7 8 9 | 4 5 6 7 8 9 | 4 5 6 7 8 9 | 4 5 6 7 8 9 |
| INTER. PRI. SECT. 2 | 1 2 3 4 5 6 | 1 2 3 4 5 6 | 1 2 3 4 5 6 | 1 2 3 4 5 6 |
| INTER. PRI. SECT. 1 | 4 5 6 7 9 | 4 5 6 7 9 | 4 5 6 7 9 | 4 5 6 7 9 |

C12 .25 mf. 180 V.
C13 .05 mf. 480 V.
C14 2-25 mmf.
C15 2-25 mmf.
C16 2-25 mmf.
C17 2-25 mmf.
C18 2-25 mmf.
C19 2-25 mmf.
C20 2-25 mmf.
C32 .01 mf. 360 V.
C33 .05 mf. 180 V.
C35 12.0 mf. 300 V. Electrolytic
C36 .10 mf. 360 V.
C37 .02 mf. 360 V.
C38 .005 mf. 360 V.
C39 100 mmf.
C40 .50 mf. 180 V.
C56 2-25 mmf.
C57 2-25 mmf.
C58 60 mf. 150 V. Electrolytic
C59 .63 mf. 180 V.
C60 .35 mf. 280 V.
C61 30. mf. 400 V. Electrolytic
C62 30. mf. 400 V. Electrolytic
C34 4.0 mf. 250 V. Dry
C43 16.0 mf. 150 V. Electrolytic
C47 4.0 mf. 250 V. Block
C52 300-600 mmf. Dual
C51 40-100 mmf.
R 1 25,000 ohm 0.2 watt
R 3 150 ohm 0.2 watt
R 4 500 ohm 0.2 watt
R21 2.0 megohm 0.2 watt
R22 160,000 ohm 0.2 watt
R23 25,000 ohm 0.2 watt
R24 25,000 ohm 0.2 watt
R38 500,000 ohm 0.2 watt
R 2 2,500 ohm Volume Control
R 8 2.0 megohm
R17 1.0 megohm
T 6 1st I.F. Trans.
T 7 2nd I.F. Trans.
T 8 3rd I.F. Trans.
T 9 Osc. Inductors
L 5 Filter Reactor
L 6 Filter Reactor
L 7 Speaker Field 4500 ohm
L 8 Speaker Field 4500 ohm

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# LAFAYETTE RADIO MFG. CO.

MODEL B78
Voltage, Trimmers
Chassis

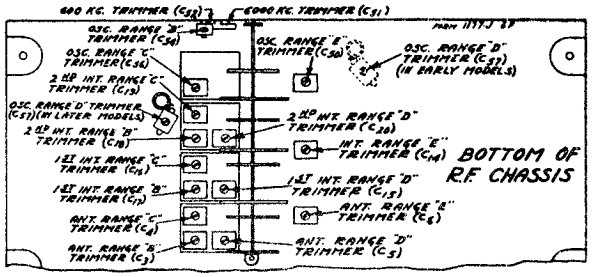
600 KC. TRIMMER (C52)
6000 KC. TRIMMER (C51)
OSC. RANGE "F" TRIMMER (C36)
OSC. RANGE "E" TRIMMER (C34)
OSC. RANGE "C" TRIMMER (C32)
OSC. RANGE "D" TRIMMER (C33) (IN EARLY MODELS)
2ND INT. RANGE "C" TRIMMER (C29)
OSC. RANGE "D" TRIMMER (C31) (IN LATER MODELS)
2ND INT. RANGE "B" TRIMMER (C28)
2ND INT. RANGE "D" TRIMMER (C30)
INT. RANGE "E" TRIMMER (C14)
BOTTOM OF R.F. CHASSIS
1ST INT. RANGE "C" TRIMMER (C12)
1ST INT. RANGE "B" TRIMMER (C11)
1ST INT. RANGE "D" TRIMMER (C13)
ANT. RANGE "C" TRIMMER (C4)
ANT. RANGE "E" TRIMMER (C6)
ANT. RANGE "B" TRIMMER (C3)
ANT. RANGE "D" TRIMMER (C5)

*Fig. 6—Trimmer Location*

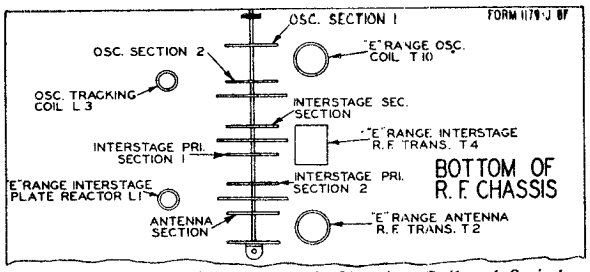
OSC. SECTION 1
FORM 1179-J 6F
OSC. SECTION 2
"E" RANGE OSC. COIL T10
OSC. TRACKING COIL L3
INTERSTAGE SEC. SECTION
INTERSTAGE PRI. SECTION 1
"E" RANGE INTERSTAGE R.F. TRANS. T4
BOTTOM OF R.F. CHASSIS
INTERSTAGE PRI. SECTION 2
"E" RANGE INTERSTAGE PLATE REACTOR L1
ANTENNA SECTION
"E" RANGE ANTENNA R.F. TRANS. T2

*Fig. 5—Bottom View of Chassis Showing Coil and Switch Section Location*

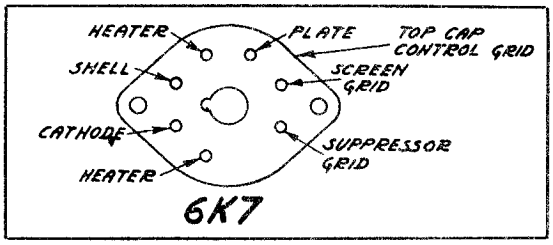


*Fig. 7—Bottom View of Metal Tube Socket*

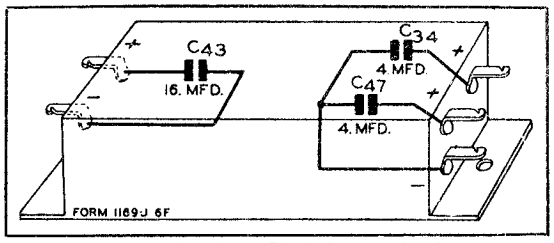


*Fig. 8—Condenser Block Internal Wiring*

**VOLTAGES AT SOCKETS**
**Antenna Shorted to Ground - Line Voltage 110**
**Volume Control Maximum**

| Tube | Function | Across Heater | Plate to Ground | Screen to Ground | Cathode to Ground | Cathode M. A. |
|---|---|---|---|---|---|---|
| 6K7 | R. F. | 5.8 | 300 | 110 | 4.1 | 10.5 |
| 6K7 | 1st Det. | 5.8 | 300 | 142 | 10.0 | 3.5 |
| 76 | Osc. | 5.8 | 142 | | | 10.0 |
| 6K7 | 1st I. F. | 5.8 | 300 | 110 | 4.1 | 10.5 |
| 6K7 | 2nd I. F. | 5.8 | 300 | 110 | 3.7 | 10.0 |
| 6B7 | Sig. Diode & Audio Amp. | 5.8(1) 5.6(2) | 300 | 115 | 3.6 | 4.5 |
| 6F7 | Bass Amp. | 5.8(1) 5.6(2) | 275(3) 125(4) | 115 | 7.2 | 9.0 |
| 76 | A.V.C. Diode | 4.9 | | | | |
| 76 | A.V.C. Amp. | 4.9 | 0 | | 62.0 | |
| 2A3 | Power | 2.35 | 300 | | 60(5) | 60.0(6) |
| 5Z3 | 'B' Rect. | 4.8 | | | | 375.0(7) |
| 45 | Bias Rect. | 2.4 | | | | |

(1) Measured with A. C. Voltmeter—early models with letter "A" under chassis.
(2) Measured with D. C. Volt.neter—later models with letter "B" under chassis.
(3) Penode Plate
(4) Triode Plate
(5) Control Grid to ground.
(6) Each Side of push-pull Circuit—120 Ma. total for 4 tubes.
(7) Total for both tubes—Milliameter in series with 1st Choke.

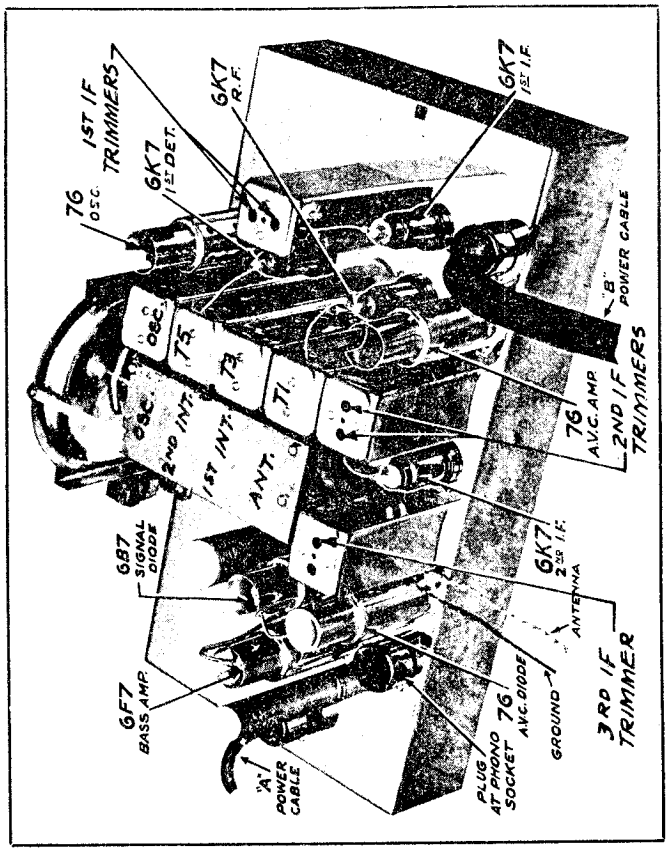


*Fig. 10—Tube Arrangement in R.F. Chassis*

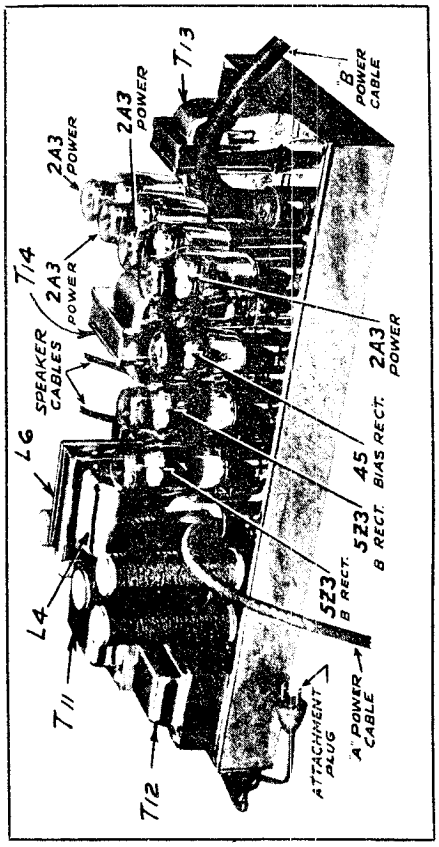


*Fig. 11—Tube Arrangement in A.F. Chassis*

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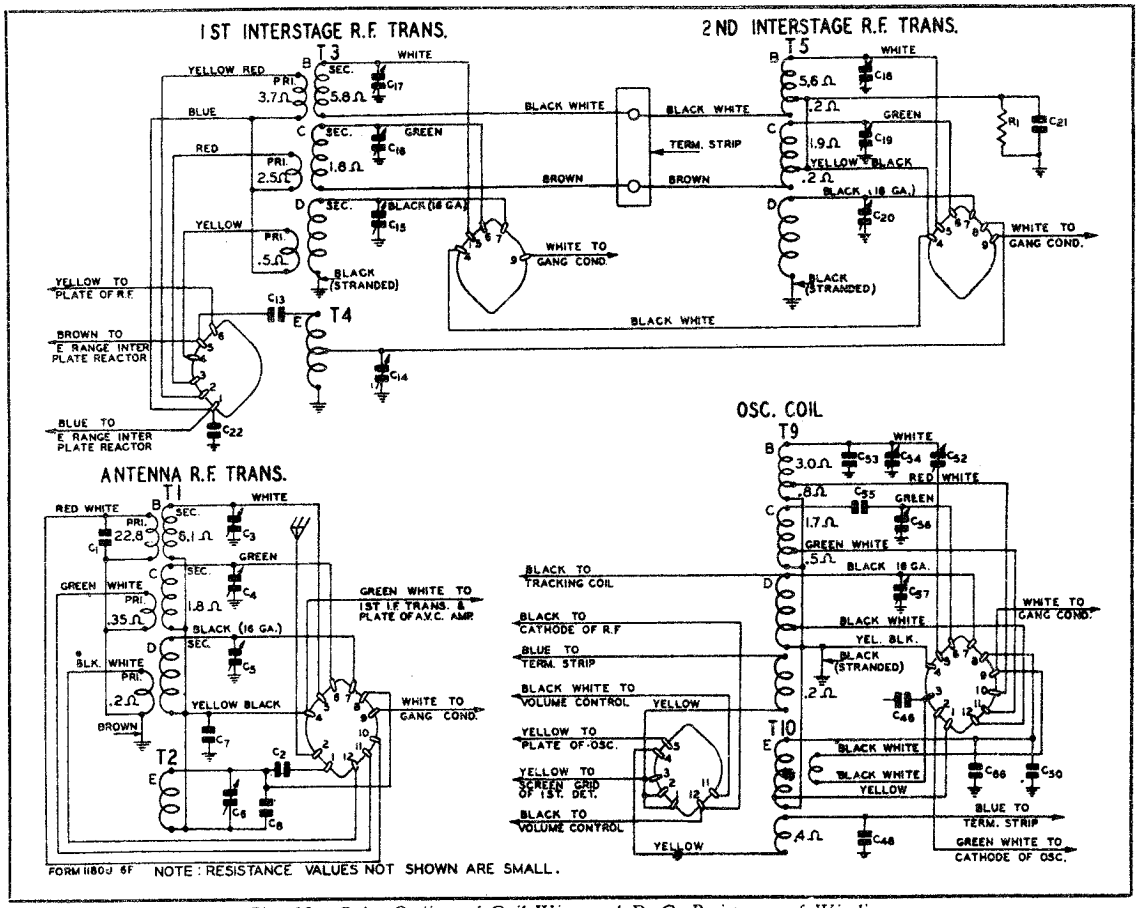


*Fig. 12—Color Coding of Coil Wires and D. C. Resistances of Windings*

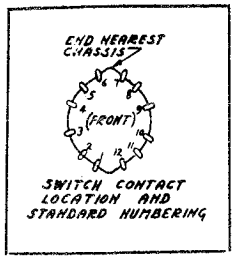


*Fig. 9—Numbering of Switch Contacts*

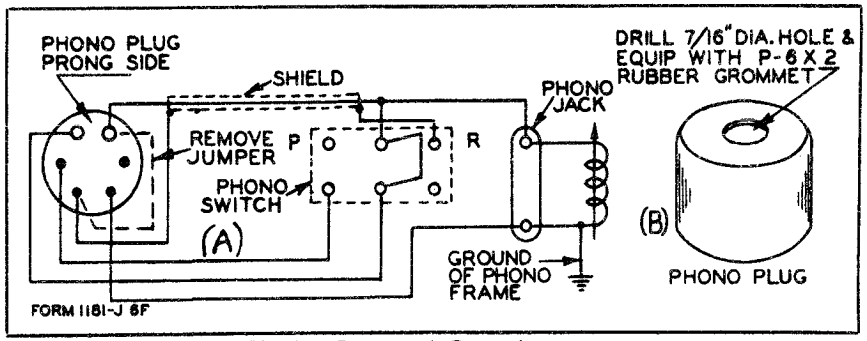


*Fig. 13—Phonograph Connections*

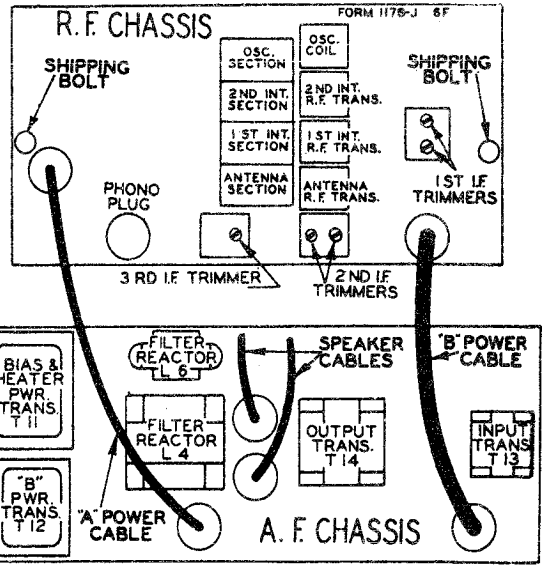


*Fig. 4—Top View of Chassis Showing Location of Units*

## Changes in Early Models

In the early models condenser C65, shown in the R.F. Schematic Fig. 2, was not used. A 20 mmf. condenser, also designated as C65, was connected in parallel with condenser C14.

Condenser C10 from B+ to ground was not used in early models. Another condenser in the early models, also designated as C10 and 250 mmf. in value, was connected from the A.V.C. amplifier plate to ground.

Resistor R38 was not used in early models.

On the A.F. chassis the speaker sockets were wired with ground to the opposite side of voice coil.

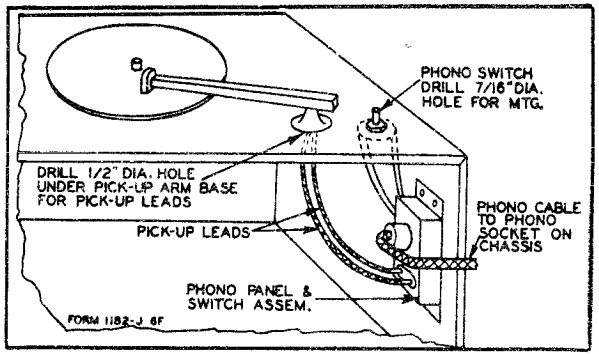
PHONO SWITCH DRILL 7/16" DIA. HOLE FOR MTG.
DRILL 1/2" DIA. HOLE UNDER PICK-UP ARM BASE FOR PICK-UP LEADS
PICK-UP LEADS
PHONO CABLE TO PHONO SOCKET ON CHASSIS
PHONO PANEL & SWITCH ASSEM.
FORM 1182-J 6F

*Fig. 14—Phonograph Connections Using Phono Cable and Panel Assembly*

# LAFAYETTE RADIO MFG. CO.

MODEL B78
Alignment
Resistances

## D. C. Resistance of Windings

### Refer to Figs. 12, 2 & 3.

| Part No. | Winding | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| P-9A428 | Antenna R.F. Transformer | T1 | |
| | Range B Primary Winding | | 22.8 |
| | Range C Primary Winding | | 0.35 |
| | Range D Primary Winding | | 0.2 |
| | Range B Secondary Winding | | 6.1 |
| | Range C Secondary Winding | | 1.8 |
| | Range D Secondary Winding | | Small |
| P-9A435 | "E" Range Antenna R.F. Coil | T2 | Small |
| P-9A429 | 1st Interstage R.F. Transformer | T3 | |
| | Range B Primary Winding | | 3.7 |
| | Range C Primary Winding | | 2.5 |
| | Range D Primary Winding | | 0.5 |
| | Range B Secondary Winding | | 5.8 |
| | Range C Secondary Winding | | 1.8 |
| | Range D Secondary Winding | | Small |
| P-9A436 | "E" Range Interstage R.F. Coil | T4 | |
| | Tap to either side | | Small |
| P-53X85 | "B" Power Transformer (115 Volts 60 Cycles) | T12 | |
| | Primary Winding | | 1.9 |
| | Secondary Winding | | |
| | Center Tap to Inside | | 48.0 |
| | Center Tap to Outside | | 53.1 |
| P-50X25 | Audio Input Transformer | T13 | |
| | Primary Winding | | |
| | Tap to Plate of 6F7 | | 6600. |
| | Tap to Tone Control and Plate of 6B7 | | 4650. |
| | Secondary Winding | | |
| | Center Tap to Inside | | 2840. |
| | Center Tap to Outside | | 3260. |
| P-51X33 | Audio Output Transformer | T14 | |
| | Primary Winding | | |
| | Center Tap to Inside | | 19.7 |
| | Center Tap to Outside | | 22.4 |
| | Secondary Winding | | 0.4 |
| P-12A206 | 12" Dynamic Speaker | | |
| | Speaker Voice Coil | | 6.3 |
| | Speaker Field | L7 | 4500. |
| P-12A213 | 12" Dynamic Speaker | | |
| | Speaker Voice Coil | | 6.3 |
| | Speaker Field | L8 | 4500. |
| P-9A391 | "E" Range Interstage Plate Reactor | L1 | 1.0 |
| P-9A450 | 2nd I.F. Plate Isolating Reactor | L2 | 35.0 |
| P-9A391 | High Frequency Oscillator Tracking Coil | L3 | 1.0 |
| P-52X35 | Filter Reactor | L4 | 51.6 |
| P-52X36 | Filter Reactor | L6 | 11.2 |
| P-48X201 | Block Condenser & 10 KC Reactor Assembly | B1 | |
| | 10 KC Reactor | L5 | 0.6 |
| P-9A430 | 2nd Interstage R.F. Coils | T5 | |
| | Range B Section | | |
| | Long Portion | | 5.6 |
| | Short Portion | | 0.2 |
| | Range C Section | | |
| | Long Portion | | 1.9 |
| | Short Portion | | 0.2 |
| | Range D Section | | Small |
| P-9A432 | 1st I.F. Transformer | T6 | |
| | Primary Winding | | 4.4 |
| | Coupling Winding | | 0.3 |
| | Secondary Winding | | |
| | Tap to Condenser Side | | 3.0 |
| | Tap to Switch Side | | 1.3 |
| P-9A433 | 2nd I.F. Transformer | T7 | |
| | Primary Winding | | 4.4 |
| | Coupling Winding | | 0.3 |
| | Secondary Winding | | |
| | Tap to Condenser Side | | 3.0 |
| | Tap to Switch Side | | 1.3 |
| P-9A434 | 3rd I.F. Transformer | T8 | |
| | Primary Winding (Yellow to Blue) | | 9.7 |
| | Signal Diode Secondary | | 12.4 |
| | A.V.C. Secondary (Brown to Green) | | 7.0 |
| P-9A431 | Oscillator Coils | T9 | |
| | Range B Grid Coil | | |
| | Red-White tap to White | | 3.0 |
| | Red-White tap to Black-Yellow | | 0.8 |
| | Range C Grid Coil | | |
| | Green-White tap to Green | | 1.7 |
| | Green-White tap to Black-Yellow | | 0.5 |
| | Range D Grid Coil | | |
| | Black-White tap to Black | | Small |
| | Black-White tap to Black-Yellow | | Small |
| | Oscillator Range D Plate Coil | | 0.2 |
| P-9A437 | "E" Range Oscillator Coils | T10 | |
| | Range E Grid Coil | | Small |
| | Range E Plate Coil | | .4 |
| | Range E Series Grid Coil | | Small |
| P-53X88 | Filament Transformer (115 Volts 60 Cycles) | T11 | |
| | Primary Winding | | 4.4 |
| | Filament Transformer Secondaries, below | | |
| | Red to Red | | Small |
| | Black to Black | | Small |
| | Yellow to Yellow | | Small |
| | Green to Green | | Small |
| | Black to White | | 22.8 |
| | Red-White to Red | | 32.9 |

#### Phonograph in Separate Cabinet

For this assembly, a 5 conductor cable and a small metal panel assembly are supplied. This assembly has the radio-phono switch, tip jacks for pick-up leads and terminal plate for phono cable.

The phono panel is mounted at the most convenient place in the cabinet at which connections can be completed. The switch is secured to the motor board as illustrated in Fig. 14.

The socket at the end of the cable is secured to the terminal plate on the panel and the plug at the other end of the cable is inserted into the phono socket on the R.F. chassis.

When the switch is thrown to the radio side, the phono pick-up is excluded from the signal diode circuit. When it is thrown to the phono side, the signal diode circuit is opened and the phonograph connections completed to this circuit. Resistor R23 is short circuited. This brings the grid and cathode of the 76 A.V.C. amplifier to the same potential and causes a plate current in this tube of sufficient intensity to bring the R.F. and 1st I.F. tubes to the point of cut off (See article on circuit for further information regarding operation of A.V.C. system.)

#### Phonograph and Radio in Combination Cabinet

For this assembly, a number of separate items as shown in the parts list are supplied. The phono short circuiting plug supplied with the receiver is used after certain changes have been made.

First take off the shell of this plug by twisting the shell in either direction. The shell is then drilled and equipped with a rubber grommet as shown in Fig. 13 (B). Next unsolder and remove the jumper wire from the plug as shown in Fig. 13 (A). Extend the leads through the hole in the shell and solder the leads to the prongs on the plug as illustrated. Complete the connections to the switch and tip jacks as shown. The switch is mounted on the motor board and the tip jacks at the nearest convenient place.

The description of the connections as given for the separate phonograph cabinet also applies to the combination.

## Alignment and Calibration

Correct alignment is extremely important in connection with all-wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 9000, 18,300, 15,000, 6000, 48,000 and 40,000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

#### I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator to the grid of the 1st detector through a 0.1 mf. condenser.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the leveling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 4.

### Range B Alignment

#### 1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C54) until maximum output is obtained. The location of this trimmer is shown in Fig. 6.

#### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Re-tighten the set screw.

Adjust the 1st and 2nd interstage Range B trimmers (C17 and C18) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

#### 600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

### Range C Alignment

#### 5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C56) until maximum output is obtained. See Fig. 6 for location of this trimmer.

#### 9000 KC Adjustment

Set the signal generator for 9000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C16 and C19) and antenna Range C trimmer (C4) to maximum.

Do not change the setting of the oscillator Range C trimmer.

### Range D Alignment

#### 18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C57) until maximum output is obtained. See Fig. 6 for location of this trimmer.

#### 15,000 KC Adjustment

Set the signal generator for 15,000 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C15 and C20) and antenna Range D trimmer (C5) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

#### 6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 6 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

### Range E Alignment

#### 48,000 KC Adjustment

Set the signal generator for 48,000 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range E position (3rd short wave band—brown dial color).

Adjust the oscillator Range E trimmer (C50) until maximum output is obtained. See Fig. 6 for location of this trimmer.

#### 40,000 KC Adjustment

Set the signal generator for 40,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range E trimmer (C14) and antenna Range E trimmer (C6) to maximum.

Do not change the setting of the oscillator Range E trimmer.

### Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 9. In contact locations not used, the number applying to that particular location is not employed.

### Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver in the fact that special twenty-five cycle filament and "B" power transformers must be used. It also has two additional condensers in the power unit—C67 and C68 as illustrated in Fig. 3. The twenty-five cycle transformers and the condensers are shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply if the two condensers C67 and C68 are removed. However, the reverse is not true, that is, a sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

115-230 Volt, 40 to 60 cycle filament and "B" power transformers are also available for this model.

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MODEL B90(R)Early
Voltage,Socket
Trimmers,Coils
Resistances

# LAFAYETTE RADIO MFG. CO.

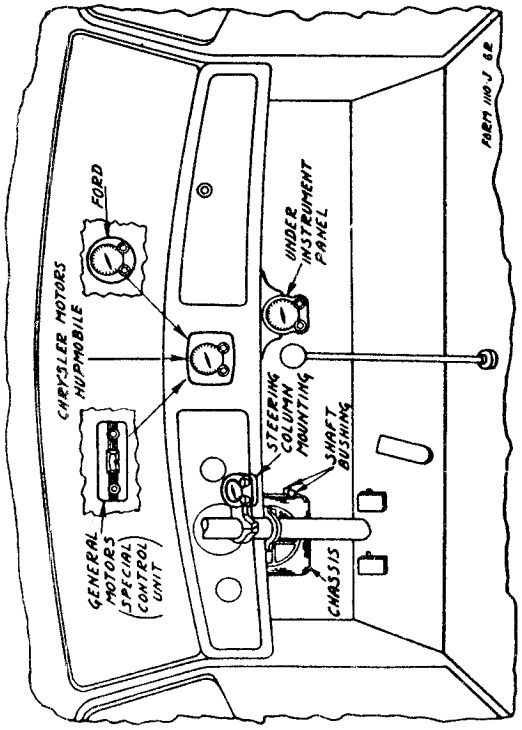


Fig. 5—Various Control Unit Mountings

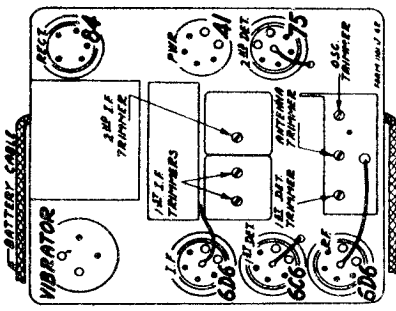


Fig. 2—Location of Tubes and Trimmers

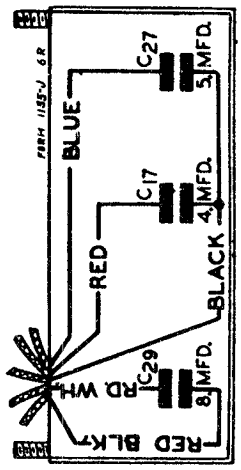


Fig. 4—Condenser Block—Internal Wiring

## VOLTAGES AT SOCKETS

**Antenna Disconnected  Battery 6 Volts Under Load**

| Type of Tube | Function | Across Heater | Plate to Ground | Screen to Ground | Cathode to Ground | Cathode Current M. A. |
|---|---|---|---|---|---|---|
| 6D6 | R. F. Amp. | 5.8 | 220 | 90 | 4.5 | 6.3 |
| 6C6 | 1st Det. Osc. | 5.8 | 220 | 90 | 0 | 2.4 |
| 6D6 | I. F. Amp. | 5.8 | 220 | 90 | 4.5 | 6.3 |
| 75 | 2nd Det. | 5.8 | 130(1) | | 1.2 | 0.3 |
| 41 | Power | 5.8 | 210 | 220 | 16(2) | 25.3 |
| 84 | Rectifier | 5.8 | | | | 50.0 |

(1) With 250,000 Ohm Meter
(2) As read across filter choke.

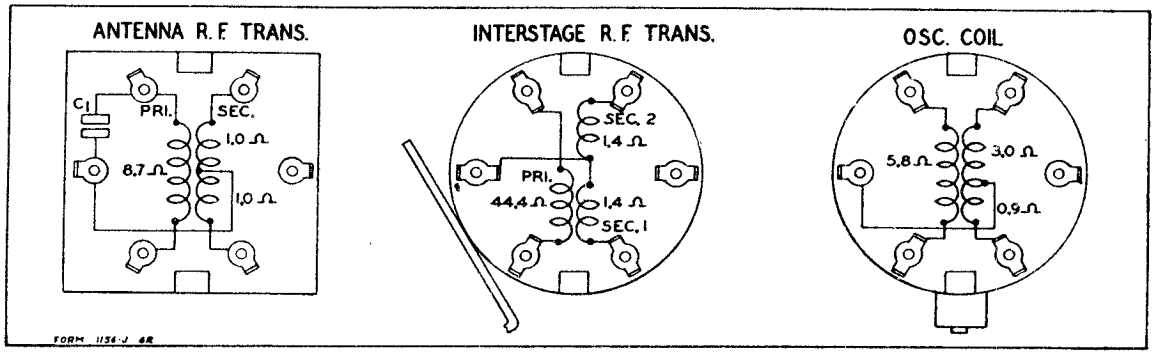


Fig. 3—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings

## D. C. Resistance of Windings

**Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.**

| Part No. | Winding | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| P-9A443 | Antenna Transformer | T1 | |
| | Primary Winding | | 8.7 |
| | Secondary Winding--Either Portion | | 1.0 |
| P-9A439 | Interstage Transformer | T2 | |
| | Primary Winding | | 44.4 |
| | Secondary Winding--Either Portion | | 1.4 |
| P-9A441 | 1st I. F. Transformer | T3 | |
| | Primary Winding | | 93.5 |
| | Secondary Winding | | 97.6 |
| P-9A442 | 2nd I. F. Transformer | T4 | |
| | Primary Winding | | 44.1 |
| | Secondary Winding | | 49.6 |

| Part No. | Winding | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| P-12A227 | Dynamic Speaker | | |
| | Output Transformer Primary | T5 | 416.6 |
| | Output Transformer Secondary | T5 | Small |
| | Speaker Field | L3 | 5.3 |
| | Speaker Voice Coil | | Small |
| P-9A440 | Oscillator Coils | T6 | |
| | Grid Coil | | |
| | Long Portion | | 3.0 |
| | Short Portion | | 0.9 |
| | Plate Coil | | 5.8 |
| P-53X108 | Power Transformer | T7 | |
| | Primary Winding | | |
| | Center Tap to Inside | | Small |
| | Center Tap to Outside | | Small |
| | Secondary Winding | | |
| | Center Tap to Inside | | 200. |
| | Center Tap to Outside | | 200. |
| P-9A444 | Motor Noise Reactor | L1 | Small |
| P-9A448 | Pilot Light Line Reactor | L2 | Small |
| P-9A446 | Filament Reactor | L4 | Small |
| P-52X42 | Filter Choke | L5 | 312.5 |
| P-9A447 | R. F. "B" Plate Reactor | L6 | 4.1 |
| P-9A445 | Vibrator Filter Reactor | L7 | Small |

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# LAFAYETTE RADIO MFG. CO.

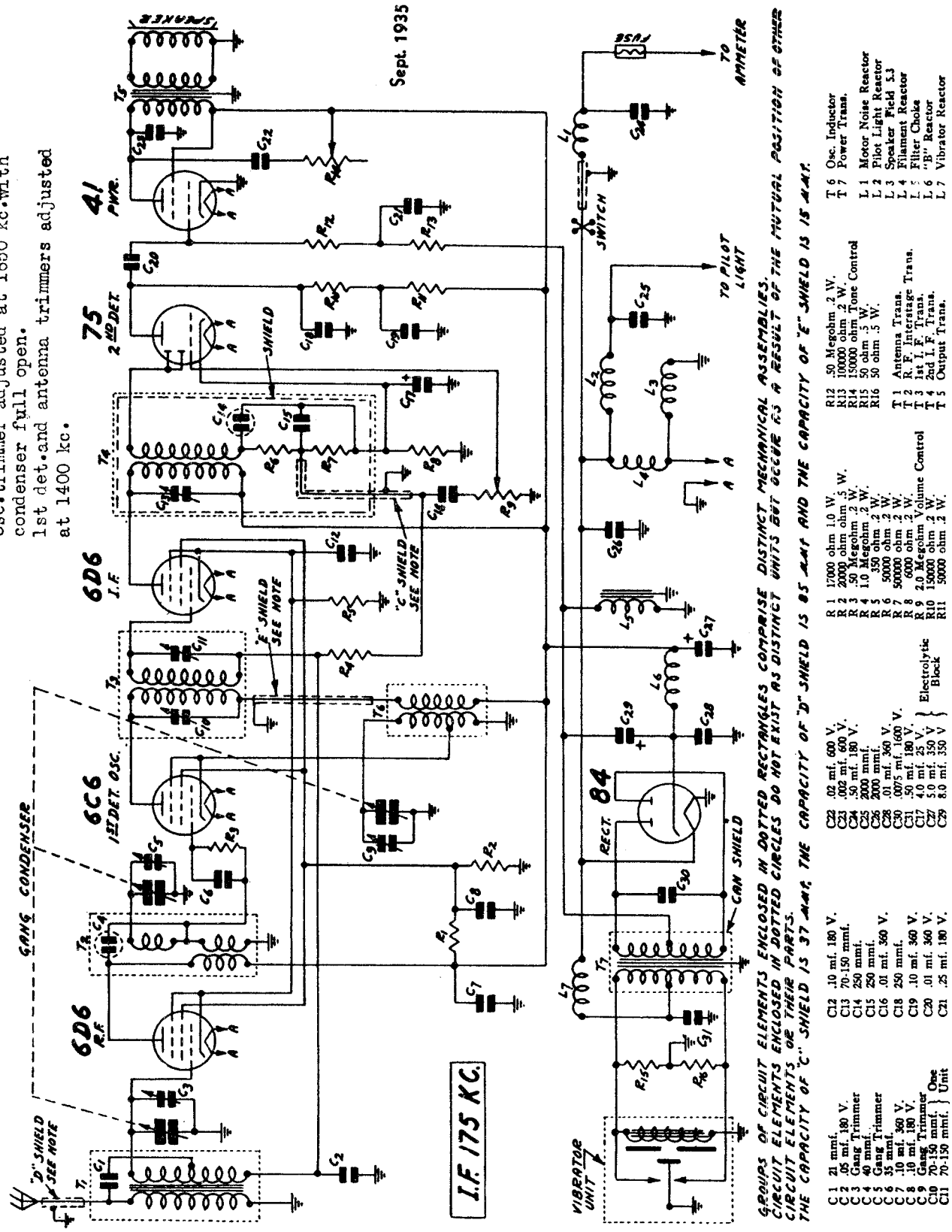
MODEL B90(R)Early
Schematic

Power Consumption - - 6.5 Amperes at 6.3 Volts
Power Output - - - - - 3 Watts Undistorted

Tuning Frequency Range - - - - - 530-1650 KC

Sept. 1935

Osc.trimmer adjusted at 1650 kc.with condenser full open.
1st det.and antenna trimmers adjusted at 1400 kc.




GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER CIRCUIT ELEMENTS OR THEIR PARTS.
THE CAPACITY OF "C" SHIELD IS 37 MMF, THE CAPACITY OF "D" SHIELD IS 85 MMF AND THE CAPACITY OF "E" SHIELD IS 18 MMF.

C1 21 mmf.
C2 .05 mf. 180 V.
C3 Gang Trimmer
C4 40 mmf.
C5 Gang Trimmer
C6 35 mmf.
C7 .10 mf. 360 V.
C8 .10 mf. 180 V.
C9 Gang Trimmer
C10 70-150 mmf. } One
C11 70-150 mmf. } Unit
C12 .10 mf. 180 V.
C13 70-150 mmf.
C14 250 mmf.
C15 250 mmf.
C16 .01 mf. 360 V.
C18 250 mmf.
C19 .10 mf. 360 V.
C20 .01 mf. 360 V.
C21 .25 mf. 180 V.
C22 .02 mf. 600 V.
C23 .002 mf. 600 V.
C24 .50 mf. 180 V.
C25 2000 mmf.
C26 2000 mmf.
C28 .01 mf. 360 V.
C30 .0075 mf. 1600 V.
C31 .50 mf. 180 V.
C17 4.0 mf. 25 V. } Electrolytic
C27 5.0 mf. 350 V } Block
C29 8.0 mf. 350 V }
R 1 17000 ohm 1.0 W.
R 2 20000 ohm ohm .5 W.
R 3 .50 Megohm .2 W.
R 4 1.0 Megohm .2 W.
R 5 350 ohm .2 W.
R 6 50000 ohm .2 W.
R 7 500000 ohm .2 W.
R 8 6000 ohm .2 W.
R 9 2.0 Megohm Volume Control
R10 150000 ohm .2 W.
R11 50000 ohm .2 W.
R12 .50 Megohm .2 W.
R13 100000 ohm .2 W.
R14 150000 ohm Tone Control
R15 50 ohm .5 W.
R16 50 ohm .5 W.
T 1 Antenna Trans.
T 2 R. F. Interstage Trans.
T 3 1st I. F. Trans.
T 4 2nd I. F. Trans.
T 5 Output Trans.
T 6 Osc. Inductor
T 7 Power Trans.
L 1 Motor Noise Reactor
L 2 Pilot Light Reactor
L 3 Speaker Field 5.3
L 4 Filament Reactor
L 5 Filter Choke
L 6 "B" Reactor
L 7 Vibrator Reactor

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MODEL B90(N)Late
Schematic, Socket
Trimmers

# LAFAYETTE RADIO MFG. CO.

| | | | |
|---|---|---|---|
| **Power Consumption** | 7.0 Amperes at 6.0 Volts | **Tuning Frequency Range** | 530 to 1650 KC |
| **Power Output** | 3 Watts Undistorted | **Intermediate Frequency** | 175 KC |
| **Sensitivity** | 1.0 Microvolt Absolute | **Speaker** | 6 inch Dynamic |
| **Selectivity** | 45 KC Broad at 1000 Times Signal | | |

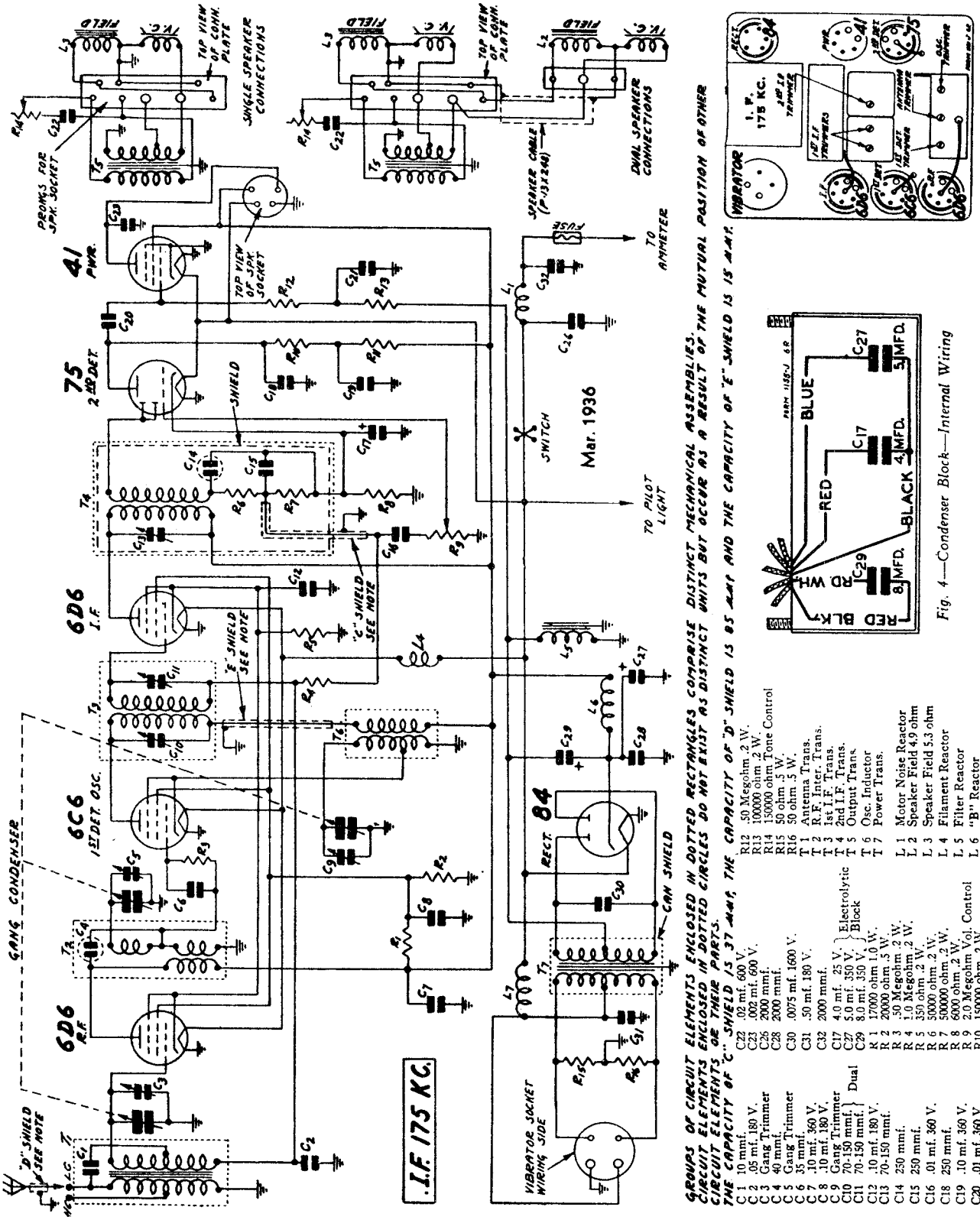


Fig. 2—Location of Tubes and Trimmers

Fig. 4—Condenser Block—Internal Wiring

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. CIRCUIT ELEMENTS ENCLOSED IN DOTTED CIRCLES DO NOT EXIST AS DISTINCT UNITS BUT OCCUR AS A RESULT OF THE MUTUAL POSITION OF OTHER THE CAPACITY OF "C" SHIELD IS .37 MMF; THE CAPACITY OF "D" SHIELD IS 85 MMF AND THE CAPACITY OF "E" SHIELD IS 14 MMF.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C1 | 10 mmf. | C22 | .02 mf. 600 V. | R12 | .50 Megohm .2 W. | T1 | Antenna Trans. |
| C2 | .05 mf. 180 V. | C23 | .002 mf. 600 V. | R13 | 100000 ohm .2 W. | T2 | R.F. Inter. Trans. |
| C3 | Gang Trimmer | C26 | 2000 mmf. | R14 | 150000 ohm Tone Control | T3 | 1st I.F. Trans. |
| C4 | 40 mmf. | C28 | 2000 mmf. | R15 | 50 ohm .5 W. | T4 | 2nd I.F. Trans. |
| C5 | Gang Trimmer | C30 | .0075 mf. 1600 V. | R16 | 50 ohm .5 W. | T5 | Output Trans. |
| C6 | .35 mmf. | C31 | .50 mf. 180 V. | T1 | Antenna Trans. | T6 | Osc. Inductor |
| C7 | .10 mf. 360 V. | C32 | 2000 mmf. | T2 | R.F. Inter. Trans. | T7 | Power Trans. |
| C8 | .10 mf. 180 V. | C17 | 4.0 mf. 25 V. } Electrolytic | T3 | 1st I.F. Trans. | L1 | Motor Noise Reactor |
| C9 | Gang Trimmer | C27 | 5.0 mf. 350 V. } Block | T4 | 2nd I.F. Trans. | L2 | Speaker Field 4.9 ohm |
| C10 | 70-150 mmf. } Dual | C29 | 8.0 mf. 350 V. } | T5 | Output Trans. | L3 | Speaker Field 5.3 ohm |
| C11 | 70-150 mmf. } | R1 | 17000 ohm 1.0 W. | T6 | Osc. Inductor | L4 | Filament Reactor |
| C12 | .10 mf. 180 V. | R2 | 20000 ohm .5 W. | T7 | Power Trans. | L5 | Filter Reactor |
| C13 | 70-150 mmf. | R3 | .50 Megohm .2 W. | L1 | Motor Noise Reactor | L6 | "B" Reactor |
| C14 | 250 mmf. | R4 | 1.0 Megohm .2 W. | L2 | Speaker Field 4.9 ohm | L7 | Vibrator Reactor |
| C15 | 250 mmf. | R5 | 350 ohm .2 W. | L3 | Speaker Field 5.3 ohm | | |
| C16 | .01 mf. 360 V. | R6 | 50000 ohm .2 W. | L4 | Filament Reactor | | |
| C18 | 250 mmf. | R7 | 500000 ohm .2 W. | L5 | Filter Reactor | | |
| C19 | .10 mf. 360 V. | R8 | 6000 ohm .2 W. | L6 | "B" Reactor | | |
| C20 | .01 mf. 360 V. | R9 | 2.0 Megohm Vol. Control | L7 | Vibrator Reactor | | |
| C21 | .25 mf. 180 V. | R10 | 150000 ohm .2 W. | | | | |
| | | R11 | 50000 ohm .2 W. | | | | |

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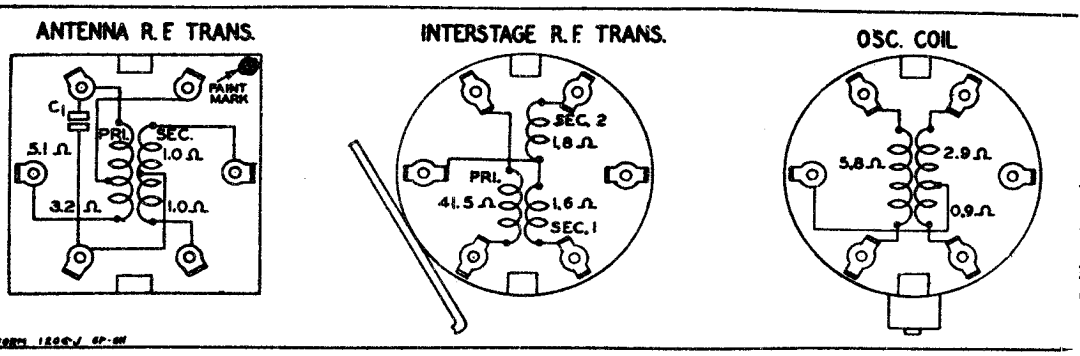
LAFAYETTE RADIO MFG. CO.

MODEL B90(N)Late
Voltage,Alignment
Coils,Resistances




**Calibrating the Receiver**

To calibrate the receiver, tune in a station of known frequency. At the back of the control head is the calibration screw. Remove the pilot lamp assembly. Insert a fine blade screwdriver and turn this screw until the pointer on the dial scale is at the frequency of the station being received. The knob must be held during this adjustment.

If the control head is inaccessible it may be calibrated by setting the pointer from the front. Remove the crystal by inserting a knife blade under the lower edge. Loosen the pointer screw, set the pointer and retighten.

*Fig. 3—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings*

## D. C. Resistance of Windings

**Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.**

| Code | Winding | D. C. Resistance in Ohms |
|---|---|---|
| T1 | Antenna Transformer | |
| | Primary Winding | |
| | Long Portion | 5.1 |
| | Short Portion | 3.2 |
| | Secondary Winding—Either Portion | 1.0 |
| T2 | Interstage Transformer | |
| | Primary Winding | 41.5 |
| | Secondary Winding | |
| | No. 1 | 1.6 |
| | No. 2 | 1.8 |
| T3 | 1st I. F. Transformer | |
| | Primary Winding | 88.0 |
| | Secondary Winding | 87.0 |
| T4 | 2nd I. F. Transformer | |
| | Primary Winding | 43.0 |
| | Secondary Winding | 48.2 |
| T5 | Dynamic Speaker Output Transformer | |
| | Primary | 416.6 |
| | Secondary | Small |
| L3 | Speaker Field | 5.3 |
| | Speaker Voice Coil | Small |
| T6 | Oscillator Coils | |
| | Grid Coil | |
| | Long Portion | 2.9 |
| | Short Portion | 0.9 |
| | Plate Coil | 5.8 |
| T7 | Power Transformer | |
| | Primary Winding | |
| | Center Tap to Inside | Small |
| | Center Tap to Outside | Small |
| | Secondary Winding | |
| | Center Tap to Inside | 200.0 |
| | Center Tap to Outside | 200.0 |
| L1 | Motor Noise Reactor | Small |
| L4 | Filament Reactor | .22 |
| L5 | Filter Choke | 300.0 |
| L6 | R. F. "B" Plate Reactor | 4.0 |
| L7 | Vibrator Filter Reactor | Small |

### VOLTAGES AT SOCKETS

**Antenna Disconnected  Battery 6 Volts Under Load**

| Type of Tube | Function | Across Heater | Plate to Ground | Screen to Ground | Cathode to Ground | Cathode Current M. A. |
|---|---|---|---|---|---|---|
| 6D6 | R. F. Amp. | 5.6 | 245 | 105 | 5.2 | 7.5 |
| 6C6 | 1st Det. Osc. | 5.6 | 245 | 105 | 0 | 2.9 |
| 6D6 | I. F. Amp. | 5.6 | 245 | 105 | 5.2 | 7.5 |
| 75 | 2nd Det. | 5.8 | 120(1) | | 1.4 | 0.14 |
| 41 | Power | 5.8 | 235 | 245 | 15.0(2) | 30.0 |
| 84 | Rectifier | 5.8 | | | | 52.0 |

(1) With 250,000 Ohm Meter
(2) Read Across Filter Choke

### I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. (See Fig. 2 for location of this section.) This can be done by pushing a wire or conductor between the stator plates or by extending an insulated wire thru the hole in the shield over the stator and pushing the wire thru the hole in the lug which extends up from the insulated stator assembly.

Connect the ground lead of the signal generator to the chassis ground.

Short out the oscillator section of the tuning condenser.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

### 1650 KC Adjustment

Set the signal generator for 1650 KC.

Turn the rotor of the tuning condenser to the full open position.

If a low capacity antenna is used connect the shielded antenna lead from the chassis through a 150 mmf. condenser to the antenna post of the signal generator. (If high capacity, use 1500 mmf.)

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

### 1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

### Adjusting Antenna Trimmer

After the receiver is installed and the car antenna is connected it will be necessary to adjust the antenna trimmer. Tune in a weak signal between 1200 and 1400 KC with the volume control about three-fourths on. Remove the cover of the chassis case. **The antenna trimmer is on the center tuning condenser section—see Fig. 2.** Turn the adjusting screw of this condenser up or down until maximum output is obtained. CAUTION—Do not turn any of the other trimmer adjusting screws for this adjustment.

## Antenna

IMPORTANT—If the car antenna is of high capacity (600 mmf. or higher) insert the antenna plug with the mark on the HC side—See Fig. 10. If it is a low capacity antenna, insert the plug with the mark on the LC side.

The General Motors cars have steel roofs, and a running board or other under car antenna must be used. These are low capacity antennas. The Chrysler motor cars (except Plymouth) have a steel roof separated from the body proper, which is used as an antenna. These are high capacity antennas. Other cars without steel roofs such as Ford and Plymouth have a built-in roof antenna which is of low capacity. If a running board or under-car antenna is used, it must be one which is covered with a suitable insulation, to prevent short circuiting in wet weather.

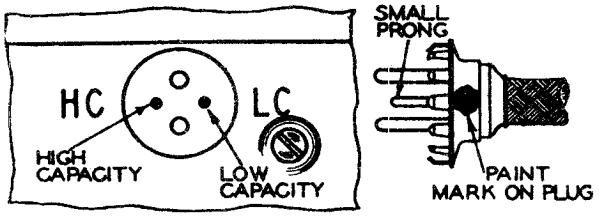



*Fig. 10—Antenna Plug Insertion*

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MODEL B92(K)Early
Schematic,Socket

# LAFAYETTE RADIO MFG. CO.

Coils,Alignment
Voltage,Trimmers

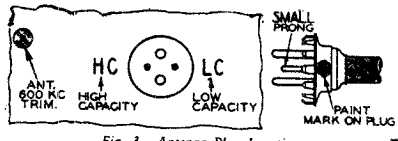
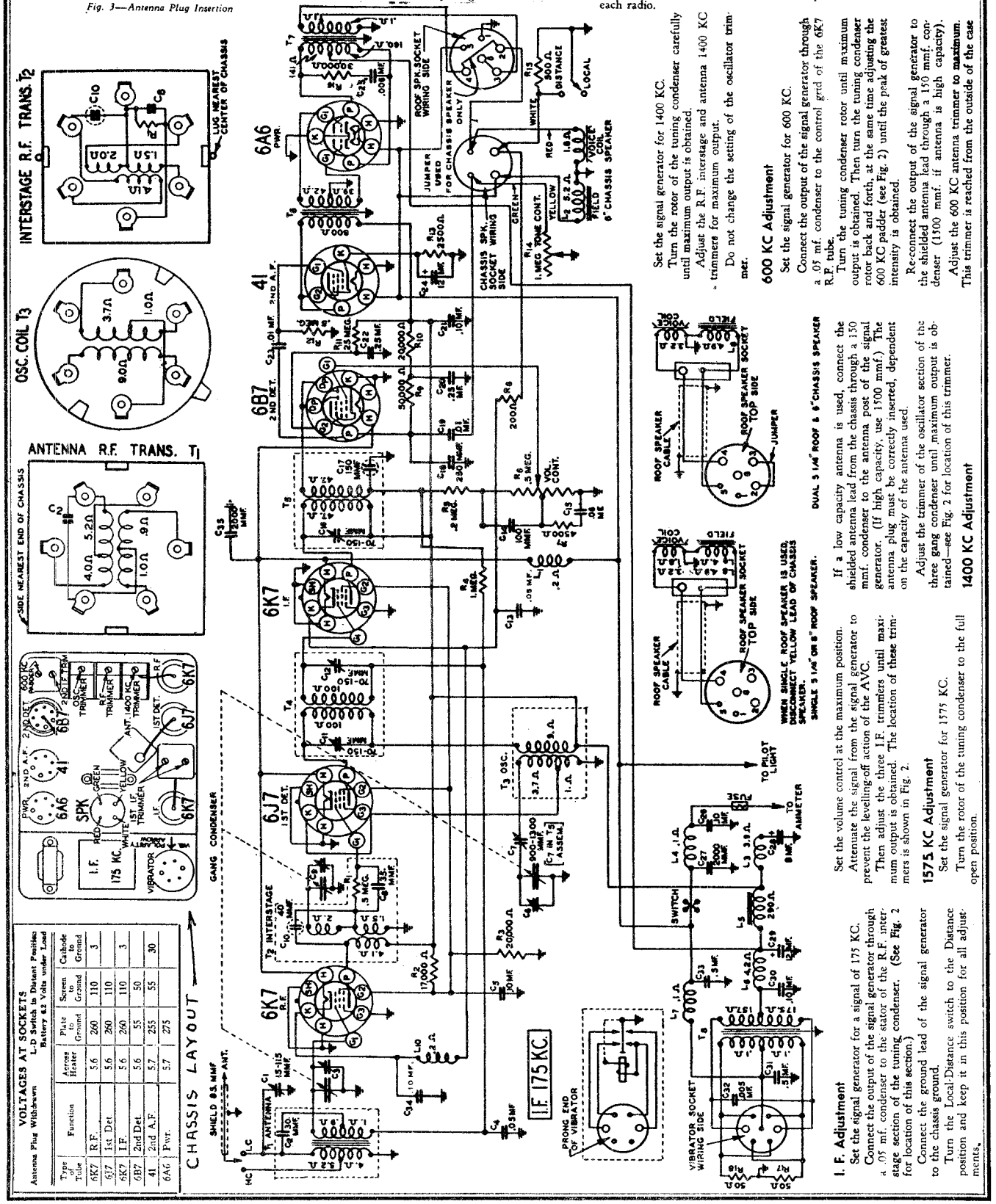



*Fig. 3—Antenna Plug Insertion*

## Adjusting Antenna 600 KC Trimmer

After the receiver is installed and the car antenna is connected, it will be necessary to adjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained. See Fig 3 for location of this trimmer.

As shown in this illustration, the antenna plug is inserted in one of two ways, depending on whether the car has a high or low capacity antenna. Full instructions are in the installation manual packed with each radio.




### VOLTAGES AT SOCKETS

L-D Switch In Distant Position
Antenna Plug Withdrawn
Battery 6.2 Volts under Load

| Type Tube | Function | Across Heater | Plate to Ground | Screen to Ground | Cathode to Ground |
|---|---|---|---|---|---|
| 6K7 | R.F. | 5.6 | 260 | 110 | 3 |
| 6J7 | 1st Det. | 5.6 | 260 | 110 | |
| 6K7 | I.F. | 5.6 | 260 | 110 | 3 |
| 6B7 | 2nd Det. | 5.6 | 55 | 50 | |
| 41 | 2nd A.F. | 5.7 | 255 | 55 | 30 |
| 6A6 | Pwr. | 5.7 | 275 | | |

### I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the output of the signal generator through a .05 mf. condenser to the stator of the R.F. interstage section of the tuning condenser. (See Fig. 2 for location of this section.)

Connect the ground lead of the signal generator to the chassis ground.

Turn the Local-Distance switch to the Distance position and keep it in this position for all adjustments.

Set the volume control at the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the three I.F. trimmers until maximum output is obtained. The location of these trimmers is shown in Fig. 2.

If a low capacity antenna is used, connect the shielded antenna lead from the chassis through a 150 mmf. condenser to the antenna post of the signal generator. (If high capacity, use 1500 mmf.) The antenna plug must be correctly inserted, dependent on the capacity of the antenna used.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained—see Fig. 2 for location of this trimmer.

### 1400 KC Adjustment

Set the signal generator for 1400 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the R.F. interstage and antenna 1400 KC trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

### 600 KC Adjustment

Set the signal generator for 600 KC.

Connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6K7 R.F. tube.

Turn the tuning condenser rotor until maximum output is obtained. Then turn the tuning condenser rotor back and forth, at the same time adjusting the 600 KC padder (see Fig. 2) until the peak of greatest intensity is obtained.

Re-connect the output of the signal generator to the shielded antenna lead through a 150 mmf. condenser (1500 mmf. if antenna is high capacity).

Adjust the 600 KC antenna trimmer to maximum. This trimmer is reached from the outside of the case

### 1575 KC Adjustment

Set the signal generator for 1575 KC.

Turn the rotor of the tuning condenser to the full open position.

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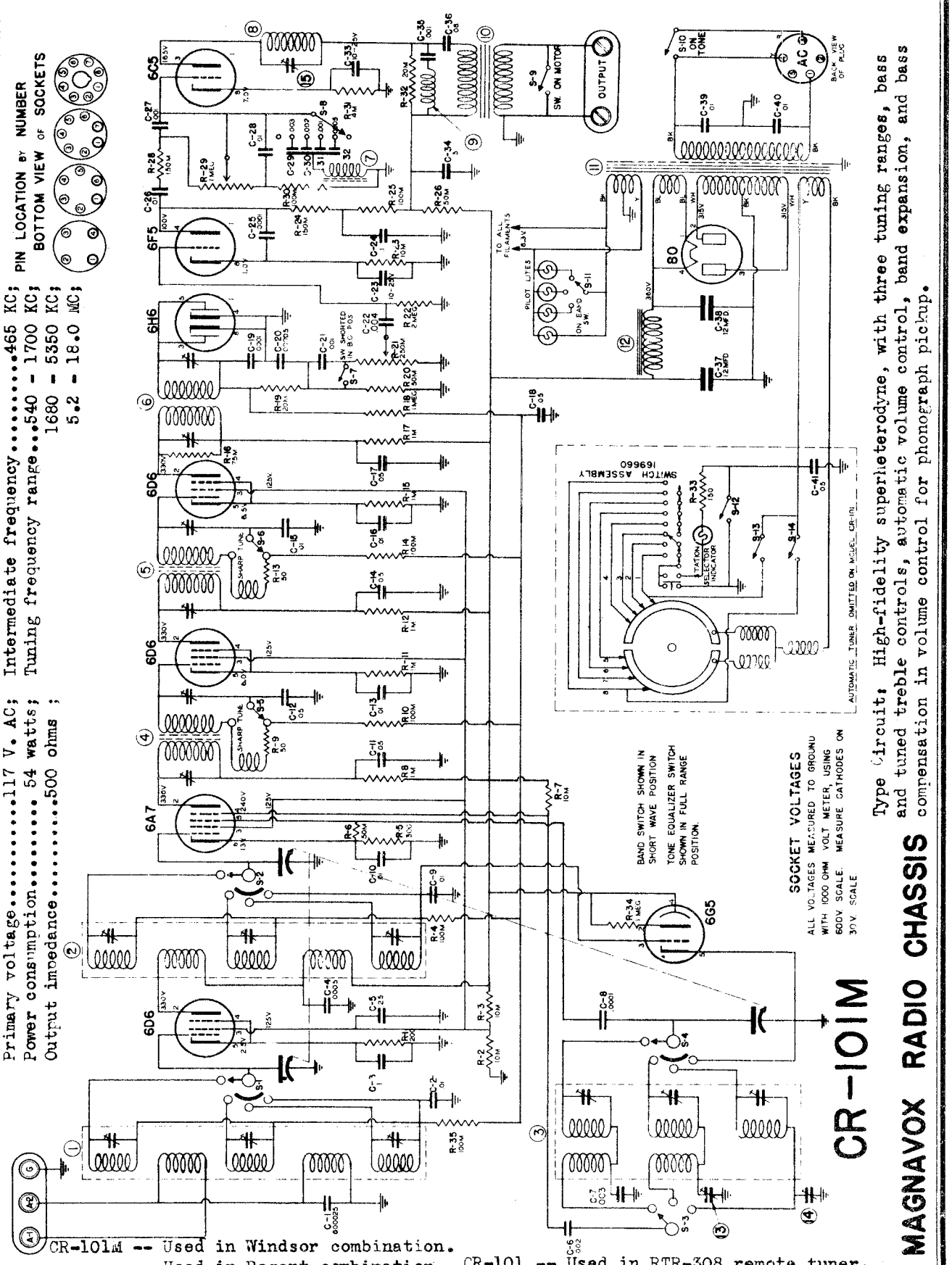
THE MAGNAVOX CO., INC.

CHASSIS CR101,CR101M
Schematic, Voltage


Primary voltage.....117 V. AC;
Power consumption.....54 watts;
Output impedance.....500 ohms ;
Intermediate frequency.....465 KC;
Tuning frequency range...540 - 1700 KC;
1680 - 5350 KC;
5.2 - 18.0 MC;
PIN LOCATION BY NUMBER
BOTTOM VIEW OF SOCKETS
6C5
6F5
6H6
6D6
6A7
6G5
80
OUTPUT
S-9 SW. ON MOTOR
S-10 ON TONE
AC
BACK VIEW OF PLUG
TO ALL FILAMENTS
PILOT LITES
ON-EAD SW.
SWITCH ASSEMBLY 196660
STATION SELECTOR INDICATOR
AUTOMATIC TUNER OMITTED ON MODEL CR-101
BAND SWITCH SHOWN IN SHORT WAVE POSITION
TONE EQUALIZER SWITCH SHOWN IN FULL RANGE POSITION.
SOCKET VOLTAGES
ALL VOLTAGES MEASURED TO GROUND WITH 1000 OHM VOLT METER, USING 600V SCALE. MEASURE CATHODES ON 30V SCALE.
CR-101M
MAGNAVOX RADIO CHASSIS
Type Circuit: High-fidelity superheterodyne, with three tuning ranges, bass and tuned treble controls, automatic volume control, band expansion, and bass compensation in volume control for phonograph pickup.
CR-101M -- Used in Windsor combination.
Used in Regent combination.
CR-101 -- Used in RTR-308 remote tuner.

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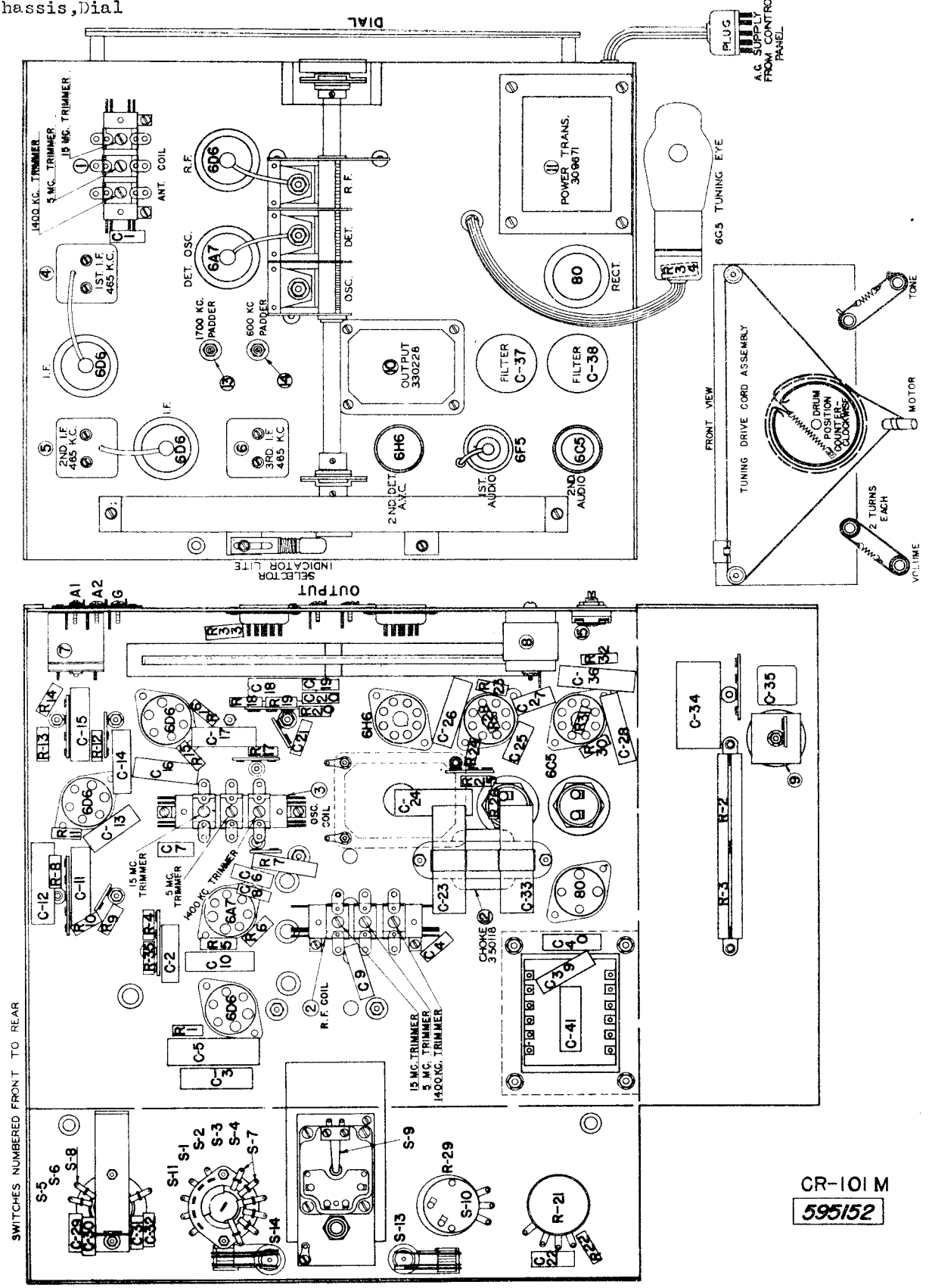
CHASSIS CR101,CR101M
Socket,Trimmers
Chassis,Dial

THE MAGNAVOX CO., INC.




CR-101M
595152

It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies partiuclarly to ground points.

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# ALIGNMENT PROCEDURE

It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device be used when aligning the receiver.

## ALIGNING THE I.F. STAGES AT 465 KILOCYCLES

1. Use a .00025 mfd. condenser in series with the signal generator output.
2. Connect an output meter across the voice coil of the speakers.
3. Turn the tone equalizer to the "sharp-tune" position.
4. Turn the volume control up to 10 or more, and adjust the signal generator output until a reading of one volt is obtained when a signal is applied.
5. Align the third I.F. transformer first by connecting the signal generator to the grid of the 6D6 second I.F. tube. Now adjust the third I.F. transformer until a maximum deflection is obtained on the output meter.
6. Align the second I.F. transformer by connecting the output of the signal generator to the grid of the 6D6, first I.F. tube. Readjust the output of the signal generator so that the output meter reading does not exceed one volt and adjust the second I.F. transformer until a maximum deflection of the output meter is obtained.
7. Connect the output of the signal generator to the grid of the 6A7 tube. Readjust the output of the signal generator so that the output meter reading does not exceed one volt and adjust the first I.F. transformer until a maximum deflection of the output meter is obtained.

## ALIGNING THE 540-1700 KILOCYCLE BAND

1. Use a .00025 Mfd. condenser in series with the signal generator output.
2. Set the wave band switch for reception on the broadcast band.
3. Run the dial pointer to the extreme left position. This will adjust the tuning condensers to maximum capacity.
4. Holding the tuning condensers at maximum capacity, adjust the dial pointer to a position at the end of the horizontal scale. This is done by sliding the pointer on the dial string.
5. Connect the signal generator output to the grid of the 6A7 tube, tune the radio and signal generator to 600 KC and adjust the 600 KC padder for maximum deflection of the output meter.
6. Turn the signal generator and radio to 1400 KC and adjust the 1400 KC oscillator trimmer for maximum deflection of the output meter.
7. Leave the signal generator and radio set at 1400 KC, connect the signal generator output to the antenna binding post "A1", connect binding post "A2" to ground and adjust the 1400 KC R.F. trimmer and the 1400 KC antenna trimmer for maximum deflection of the output meter.

## ALIGNING THE 1680-5350 KILOCYCLE BAND

1. Use a 400 ohm resistor in series with the signal generator output when connecting to the antenna binding post. Use both this resistor and a .00025 mfd. condenser when connecting to the 6A7 grid.
2. Set the band switch for reception on the foreign band.
3. Connect the output of the signal generator to the grid of the 6A7 tube, set the signal generator and the radio to 1700 KC and adjust the 1700 KC padder for maximum deflection on the output meter.
4. Set the signal generator and radio to 5000 KC and adjust the 5000 KC oscillator trimmer for maximum deflection of the output meter.
5. Leave the signal generator and radio set at 5000 KC, connect the signal generator output to the antenna binding post "A1" and adjust the 5000 KC R.F. trimmer and the 5000 KC antenna trimmer for maximum deflection of the output meter.

## ALIGNING THE 5.6-18.0 MEGACYCLE BAND

1. Use a 400 ohm resistor in series with the signal generator when connecting to the antenna post. Use both this resistor and a .00025 Mfd. condenser when connecting to the 6A7 grid.
2. Set the band switch for reception on the foreign band.
3. Connect the signal generator output to the grid of the 6A7 tube, set the signal generator and the radio to 15 megacycles and adjust the 15 megacycle oscillator trimmer for maximum deflection of the output meter.
4. Leave the signal generator and radio set for 15 megacycles, connect the signal generator output to the antenna binding post "A1" and adjust the 15 megacycle R.F. trimmer and the 15 megacycle antenna trimmer for maximum deflection of the output meter.

# RESTRINGING THE DIAL CABLE

To restring the cable on this model, it is necessary first to remove the glass dial. Bend back the small metal ears that hold the glass in place, on the left and lower sides only. Slip the three dividing strips from the assembly and the four glass strips will be easily removable. Slip the brown backing from the assembly exposing the cable tension spring inside the disc.

Remove the spring "A" from the small nook "B", and tie one end of cable to the spring, lacing it through the opening in the groove of the disc, allowing about 1/2 inch between the end of the spring and the inside edge of the groove. Proceed around the disc in a clockwise direction for one complete revolution, continue around the drive shaft "C" for 2 1/2 turns in a clockwise direction up through the left-hand idler pulley "D", across the top and around the right-hand idler pulley "E"; downward around the disc in a clockwise direction, through the opening in the groove and secure it to the spring, until the other end can be secured to the hook. Replace the dial strips in their original locations and the operation is completed.

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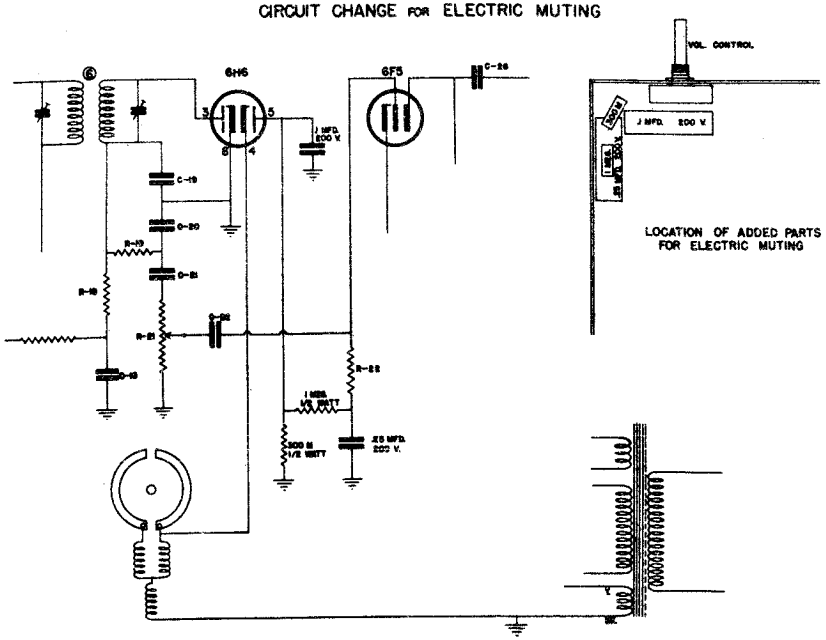
CIRCUIT CHANGE FOR ELECTRIC MUTING




Some of the earlier models were not equipped with electric muting. This feature may be incorporated by following the instructions outlined below.

1. Remove the two jumpers shunting the cathodes and plates of the 6H6 tube.
2. One cathode (8) is left at ground potential and the other cathode (4) is connected to the tuning motor as shown in the above schematic.
3. One plate (3) is left in its original circuit connection and the other plate (5) is connected to the junction of the 1 megohm and 300,000 ohm resistors that have been inserted in series with R-22 to ground.
4. Install one .25 Mfd. condenser from the junction of R-22 and the 1 megohm resistor to ground.
5. Ground the side of the transformer winding that connects to the tuning motor, completing the operation.

## MISCELLANEOUS NOTES

The radio chassis must "float" freely and it is, therefore, important that none of the knobs touch the panel. The four holes in the radio support bracket "C" Fig. 1, are sufficiently large to permit adjustment of the chassis until it "floats" properly. Be sure that this "floating" condition exists before attempting to tighten the screws "A" Fig. 1, after replacing the chassis in the cabinet.

If one of the push-button switches does not function, remove the radio panel in the manner outlined in the foregoing instructions, and check the switch contacts. It is entirely probable that the trouble can be corrected by either cleaning the contacts or by bending them so that they form a solid connection.

When the release button on the radio push-button assembly is depressed, the switch arm nearest the end of the assembly must break one contact before making the other contact. Failure of the release button switch to operate in this manner will cause the "set-up" pilot lamp to burn out, in which case the arm of the switch should be bent until the "break-before-make" action is obtained.

Due to the extremely high sensitivity of the receiver, it is possible for some excessively strong signals to overload and cause distortion in the radio. This condition is very rare and occurs only on a very strong signal when the receiver has a very efficient antenna. This difficulty is recognized by distortion on a strong signal and being absent on weak signals. To correct this trouble, it is necessary to connect a 500 ohm resistor across the broadcast antenna primary to ground. The terminal for making this connection is available at the rear of the R.F. transformer on the top of the chassis. Connect the resistor from the lug having the red-with-blue tracer lead connected to it, to the ground bus wire which ties the three trimmer condensers together.

It is possible for the distortion mentioned above, to occur due to defective 6D6 I.F. tubes. The second I.F. tube is more susceptible to this difficulty and should be replaced before checking the first I.F. tube.

When push-button tuning is used, the dial pointer may have a tendency to "hunt" on either side of the desired frequency before coming to rest. This condition is caused by insufficient pressure of the small spring at the rear of the tuning motor, against the armature shaft. The spring should be "kinked" slightly to provide additional pressure, using a pair of long-nosed pliers to make the adjustment.

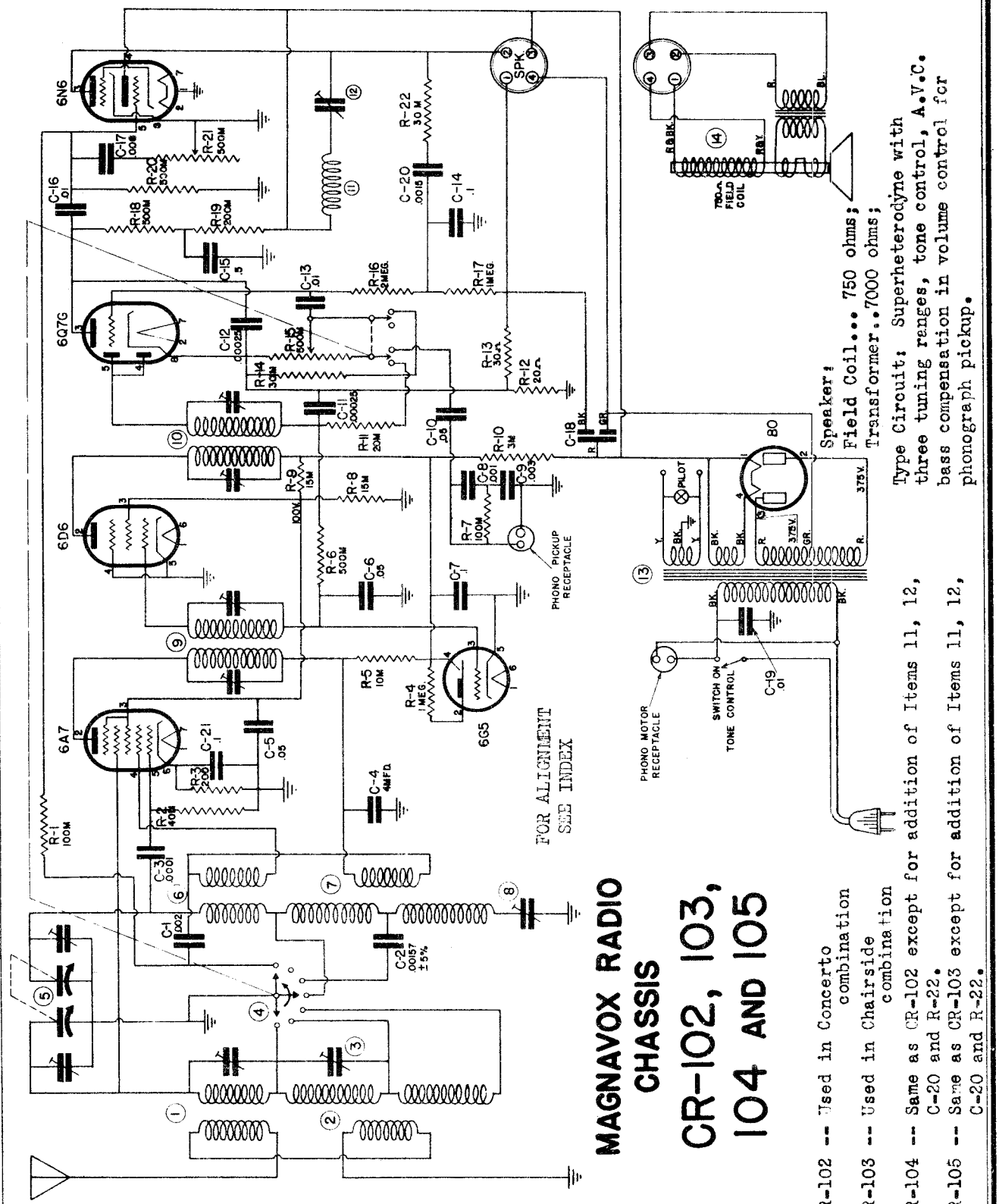
If a distinct hum is heard in the speakers when using the radio, the 6F5 tube should be replaced as a possible cure. It is extremely important that the grid lead of the 6F5 tube is shielded as near to the cap of the tube as is possible, or hum will be picked up in this lead.

The two .05 Mfd. condensers connected across the two motor push-button switches should be removed to prevent a "scraping" noise that may be apparent when the receiver is tuned manually.

The 1000 ohm bias resistor in the cathode circuit of the 6A7 tube should be replaced with a 300 ohm resistor to increase the stability of the receiver.

THE MAGNAVOX CO., INC.

CHASSIS CR102,CR103
CR104,CR105
Schematic




# MAGNAVOX RADIO CHASSIS CR-102, 103, 104 AND 105

Speaker:
Field Coil... 750 ohms;
Transformer..7000 ohms;

Type Circuit: Superheterodyne with three tuning ranges, tone control, A.V.C. bass compensation in volume control for phonograph pickup.

CR-102 -- Used in Concerto combination
CR-103 -- Used in Chairside combination
CR-104 -- Same as CR-102 except for addition of Items 11, 12, C-20 and R-22.
CR-105 -- Same as CR-103 except for addition of Items 11, 12, C-20 and R-22.

Primary voltage.....117 V. AC;
Power consumption..... 80 watts;
Power output..... 4 watts;

Intermediate frequency.....456 KC;
Tuning frequency range 540 - 1760 KC;
1.6 - 5.0 MC;
5.0 - 19. MC;

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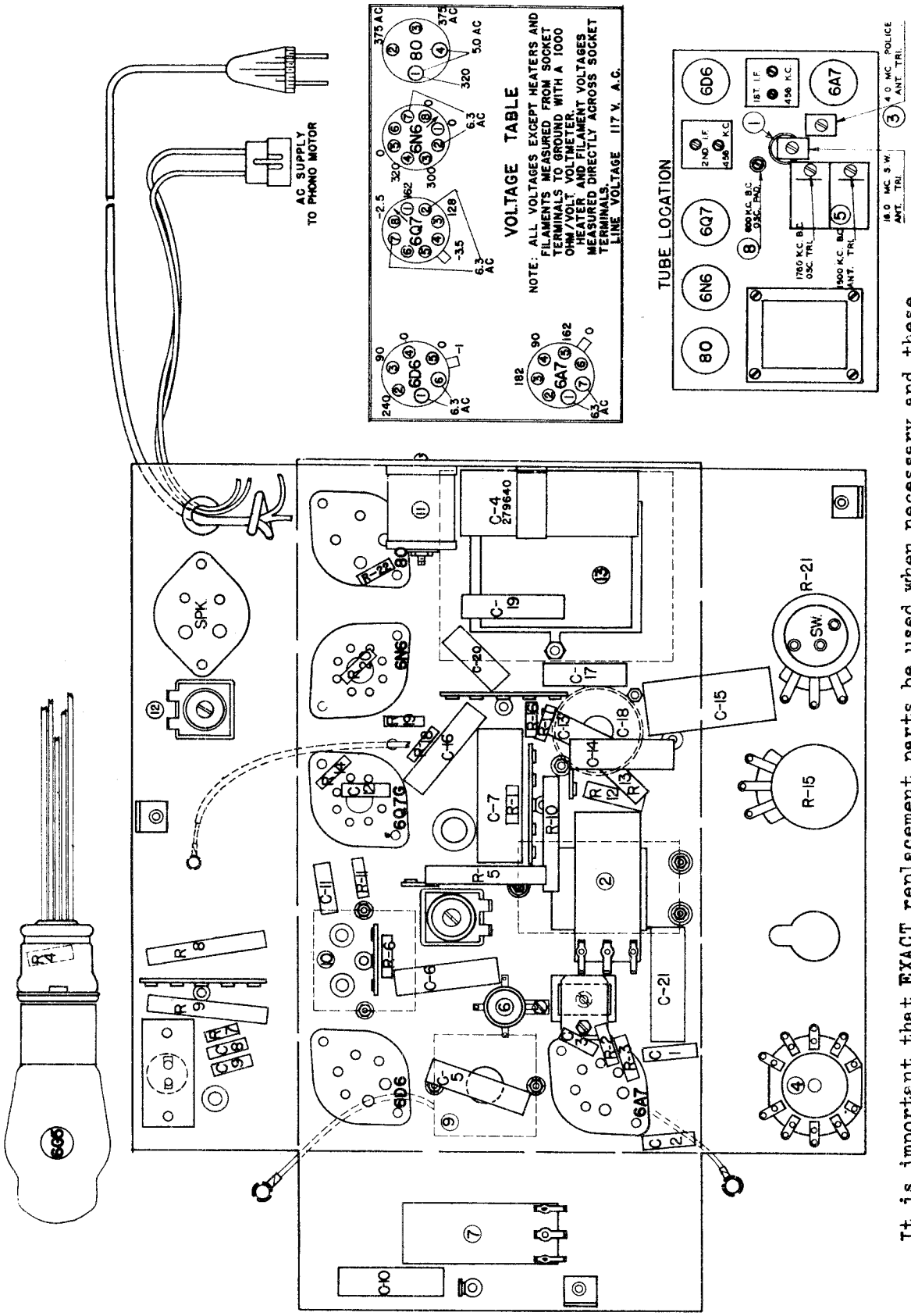
CHASSIS CR102,CR103
CR104,CR105
Socket,Voltage
Chassis,Trimmers

# THE MAGNAVOX CO., INC.




It is important that **EXACT** replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

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THE MAGNAVOX CO., INC.

CHASSIS CR106,CR109,CR111
Schematic,Voltage

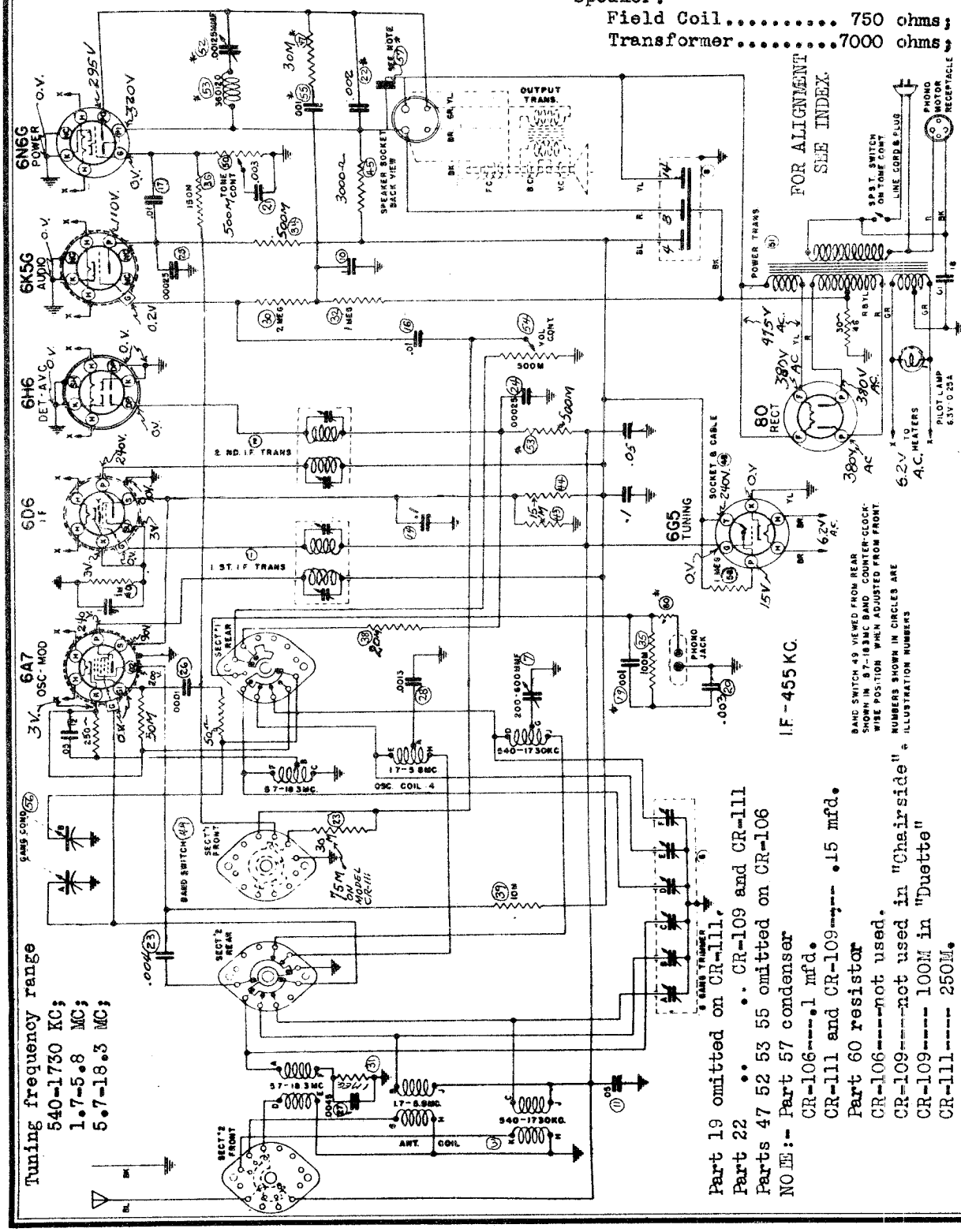
CR-106 -- Used in Concerto combination.

CR-109 -- Used in Chairside combination.

CR-111 -- Used in Berkeley combination.

Type Circuit: Superheterodyne with three tuning ranges, tone control, A.V.C. bass compensation in volume control for phonograph pickup.

Speaker:
Field Coil..... 750 ohms;
Transformer.....7000 ohms;




Tuning frequency range
540-1730 KC;
1.7-5.8 MC;
5.7-18.3 MC;

Part 19 omitted on CR-111.
Part 22 " " CR-109 and CR-111
Parts 47 52 53 55 omitted on CR-106
NOTE:- Part 57 condenser
CR-106----.1 mfd.
CR-111 and CR-109----- .15 mfd.
Part 60 resistor
CR-106----not used.
CR-109----not used in "Chairside"
CR-109---- 100M in "Duette"
CR-111---- 250M.

ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT METER.
HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. LINE VOLTAGE 115 VOLTS A.C.

Primary voltage.....117 V. AC; 595155
Power consumption..... 90 watts; CR-106
Power output.....5.5 watts;

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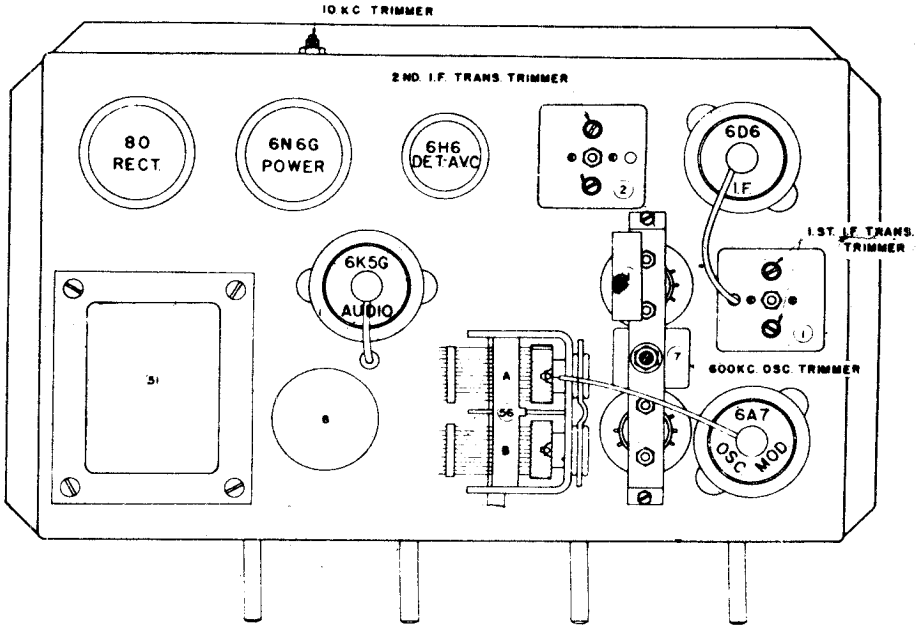
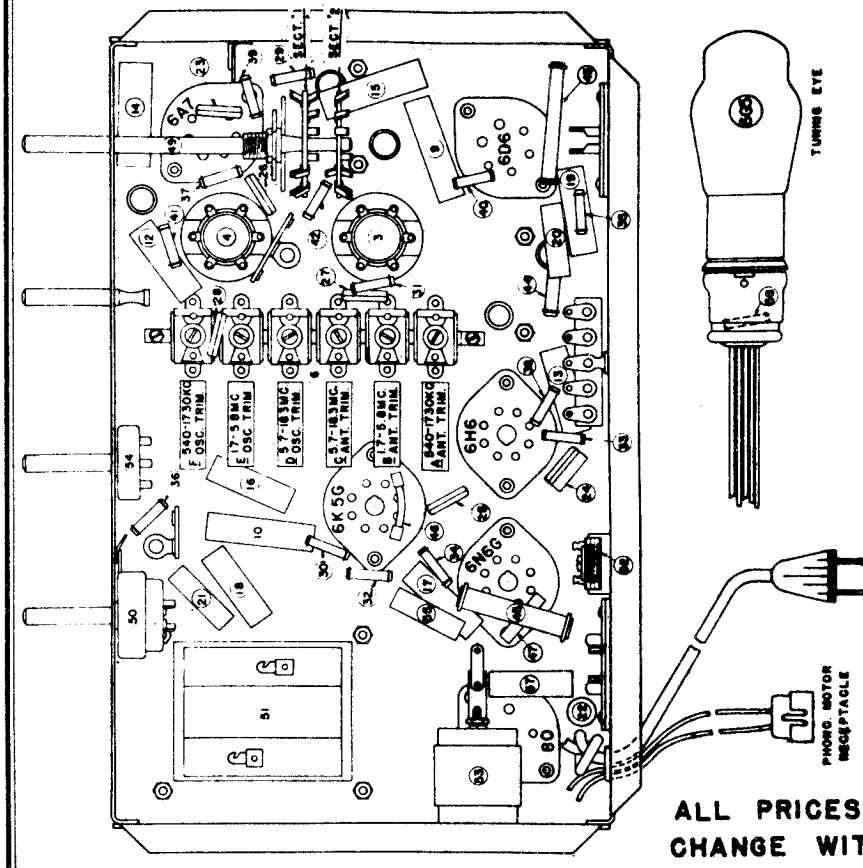
CHASSIS CR106,CR109,CR111
Socket,Trimmers,Chassis
Filter Adjustment

THE MAGNAVOX CO., INC.

CHASSIS CR113,-114,-115
-118,-125
Filter Adjustments




# MAGNAVOX RADIO CHASSIS CR-106, 109 AND 111

It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

## 10 K.C. FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser on the back of the chassis near the speaker socket.

| | | | |
|---|---|---|---|
| 143267 | Knob | "Tuning" | .15 |
| 143265 | Knob | "Tone" | .15 |
| 143266 | Knob | "Volume" | .15 |
| 143268 | Knob | "o-B-P-E" | .15 |
| 633320 | Pulley | Dial pulley | .10 |
| 633315 | Shaft | Tuning shaft | .20 |

**ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE**

| | | | |
|---|---|---|---|
| 182592 | Bulb | Pilot lamp, 6.3 volt .25 ampere | .15 |
| 103322 | Washer | "C" washer, tuning shaft retainer | .05 |
| 449801 | Cable | Dial drive cable | |
| 883308 | Dial Assb. | Complete assembly less glass scale | 4.00 |
| 153238 | Dial | Calibrated glass scale | 1.20 |
| 153273 | Escutcheon | Dial escutcheon with crystal | 1.80 |
| 103321 | Spring | Dial cord tension spring | .05 |

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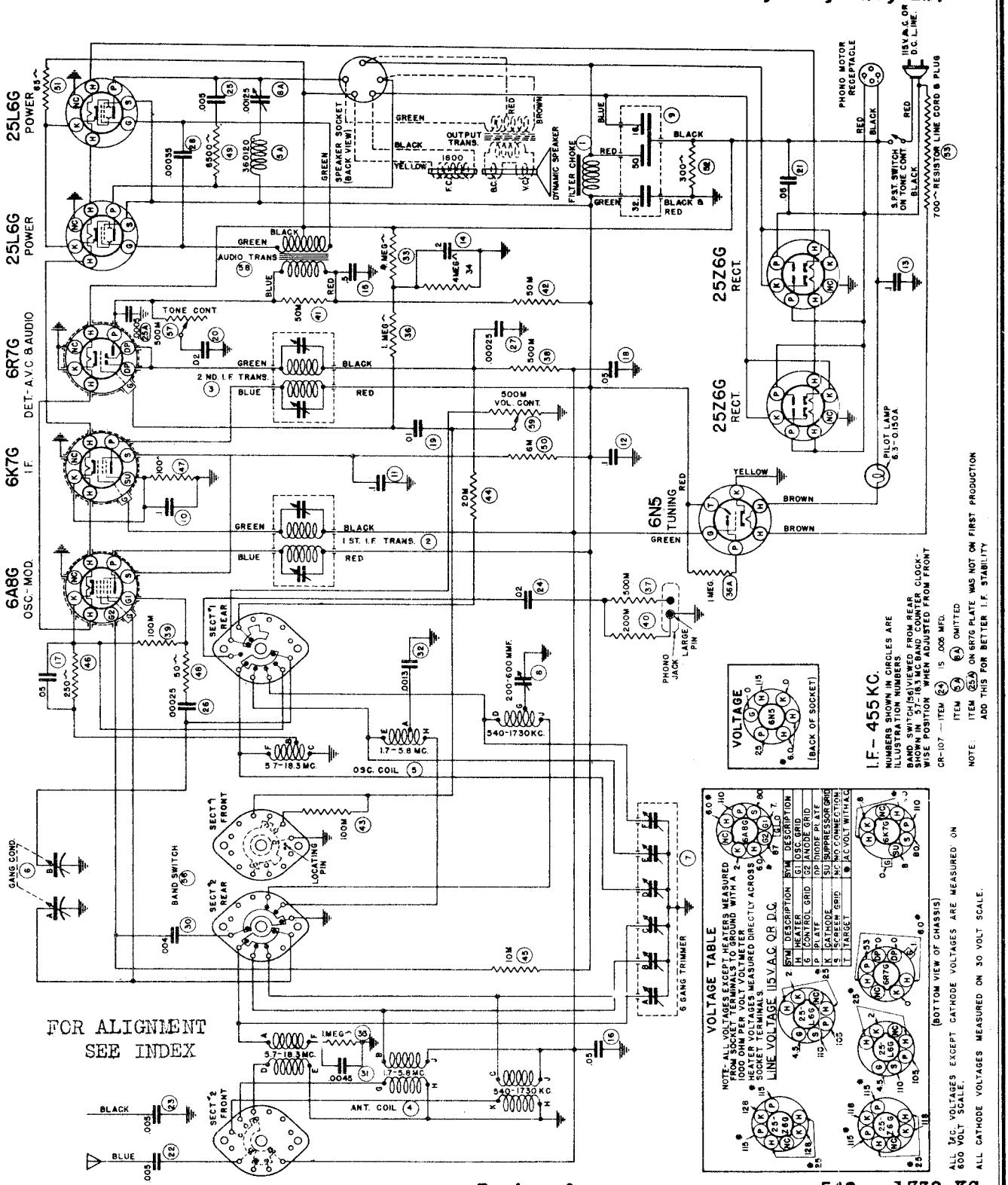
Schematic, Voltage Socket

# THE MAGNAVOX CO., INC.

CHASSIS CR107,-110,-112 -119,-120,-126,-127




Primary voltage.....117 V. AC-DC;
Power consumption..... 80 watts;
Power output..... 6 watts;

Speaker:
Field coil.....1800 ohms;
Transformer.....3000 ohms;

Tuning frequency range 540 - 1730 KC;
1.7 - 5.8 MC;
5.7 - 18.3 MC;

Type Circuit: Superheterodyne with three tuning ranges, tone control, A.V.C., bass compensation in volume control for phonograph pickup.

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CHASSIS CR107,-110,-112
-119,-120,-126,-127
Socket,Trimmers,Chassis

THE MAGNAVOX CO., INC.

# MAGNAVOX RADIO CHASSIS CR-107, 110, 112, 119, 120, 126, 127




## ALIGNMENT PROCEDURE

SEE CHASSIS CR-106.




CR-107 -- Used in AC-DC Concerto combination.
Has .005 mfd. condenser for item 24.
10 KC filter consisting of items 5A and 8A are omitted.

CR-110 -- Has brackets for mounting in Chairside cabinet.

CR-112 -- Has brackets insulated from chassis for mounting in Berkeley cabinet.

CR-120 -- Speaker mounted on the chassis for use in AC-DC Playfellow combination.

CR-126 -- Has brackets for mounting in Berkeley cabinet.

CR-127 -- Has brackets for mounting in Hepplewhite cabinet.

**It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.**

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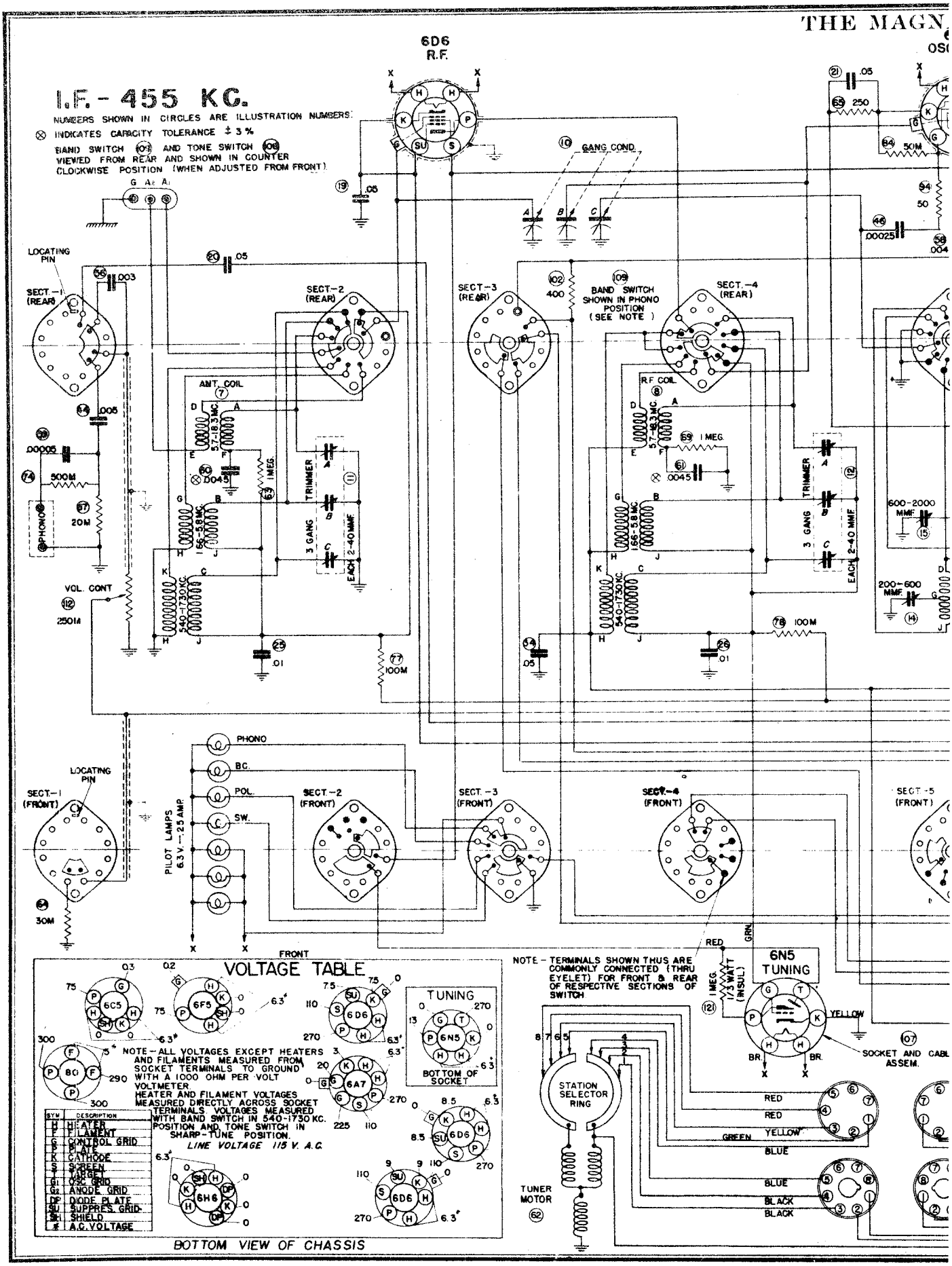


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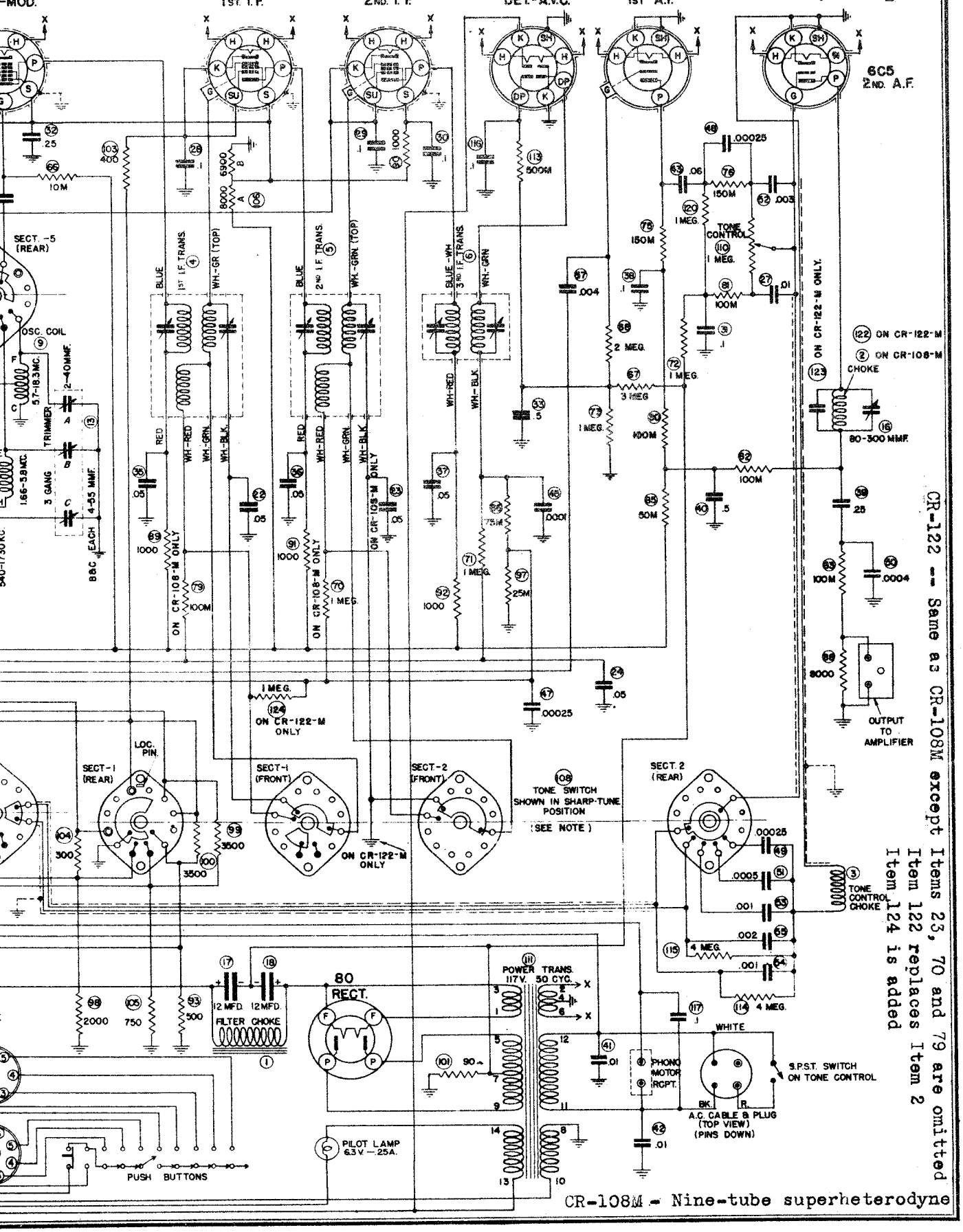
# AVOX CO., INC.

CHASSIS CR108M, CR122
Schematic, Voltage




CR-122 -- Same as CR-108M except Items 23, 70 and 79 are omitted
Item 122 replaces Item 2
Item 124 is added

CR-108M - Nine-tube superheterodyne

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# ALIGNMENT PROCEDURE

It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device be used when aligning the receiver.

## ALIGNING THE I. F. STAGES AT 455 KILOCYCLES

1. Connect an output meter across the voice coil of the speakers.
2. Turn the tone equalizer to the sharp-tune position.
3. Turn the volume control up to 7 or more, and adjust the signal generator output until a reading of one volt is obtained on the output meter when a signal is applied.
4. Align the third I.F. transformer first, by connecting the signal generator to the grid of the 6A6, second I.F. tube; now adjust the third I.F. transformer until a maximum output meter deflection is obtained. THE OUTPUT OF THE SIGNAL GENERATOR IS TO BE CONNECTED THROUGH A .00025 MFD. CONDENSER AT ALL TIMES.
5. Align the second I.F. transformer first, by connecting the signal generator to the grid of the 6D6 first I.F. tube. Readjust the output of the signal generator so that the output meter reading does not exceed one volt and adjust the second I.F. transformer until a maximum deflection of the output meter is obtained.
6. Connect the output of the signal generator to the grid of the 6A7 tube. Readjust the output of the signal generator so that the output meter reading does not exceed one volt, and adjust the first I.F. transformer until a maximum deflection of the output meter is obtained.

## ALIGNING THE 540-1730 K.C. BAND

1. Set the wave-band switch for reception on the broadcast band.
2. Run the dial pointer to the extreme left position. This will adjust the tuning condensers to maximum capacity.
3. Holding the tuning condensers at maximum capacity, adjust the dial pointer to a position at the end of the horizontal scale. This is done by sliding the pointer on the dial string.
4. Connect the signal generator output to the grid of the 6A7 tube, tune the radio and signal generator to 600 KC and adjust the 600 KC padder for maximum deflection of the output meter.
5. Turn the radio and signal generator to 1400 KC and adjust the 1400 KC trimmer for maximum deflection of the output meter.
6. Leave the signal generator and radio switch at 1400 KC, connect the signal generator output to the antenna binding post "A1" and adjust the 1400 KC R.F. stage trimmer for maximum deflection of the output meter.

## ALIGNING THE 1660-5800 K.C. BAND

1. Set the band switch for reception on the police band.
2. Connect the output of the signal generator to the grid of the 6A7 tube, set the signal generator and radio to 1800 KC and adjust the 1800 KC padder for maximum deflection of the output meter.
3. Set the radio and the signal generator to 5000 KC and adjust the 5000 KC oscillator trimmer for maximum deflection of the output meter.
4. Leave the radio and signal generator set at 5000 KC, connect the signal generator output to the antenna binding post "A1", and adjust the 5000 KC first detector trimmer and the 5000 KC R.F. trimmer for maximum deflection of the output meter.

## ALIGNING THE 5700-18300 K.C. BAND

1. Set the band switch for reception on the foreign band.
2. Connect the signal generator output to the grid of the 6A7 tube, set the radio and the signal generator to 15 megacycles and adjust the 15 megacycle oscillator trimmer for maximum deflection of the output meter.
3. Leave the signal generator and the radio set for 15 megacycles, connect the signal generator output to the antenna binding post "A1" and adjust the 15 megacycle first detector trimmer and the 15 megacycle oscillator trimmer for maximum deflection of the output meter.

# MISCELLANEOUS NOTES

The radio chassis must "float" freely and it is therefore important that none of the knobs touch the panel. The four holes in the radio support bracket "C" Fig. 1, are sufficiently large to permit adjustment of the chassis until it "floats" properly. Be sure that this "floating" condition exists before attempting to tighten the screws "A" Fig. 1, after replacing the chassis in the cabinet.

If one of the push-button switches does not function, remove the radio panel in the manner outlined in the foregoing instructions, and check the switch contacts. It is entirely probably that the trouble can be corrected by either cleaning the contacts or by bending them so that they form a solid connection.

When the release button of the radio push-button assembly is depressed, the switch arm nearest the end of the assembly must break one contact before making the other contact. Failure of the release button to operate in this manner will cause the setup pilot lamp to burn out, in which case the arm of the switch should be bent until the "break-before-make" action is obtained.

Due to the extremely high sensitivity of the receiver, it is possible for some excessively strong signals to overload and cause distortion in the radio. This condition is very rare and occurs only on a very strong signal when the receiver has a very efficient antenna. This difficulty is recognized by distortion on a strong signal and being absent on weak signals. To correct this trouble, it is necessary to connect a 500 ohm resistor across the broadcast antenna primary to ground. The terminal for making this connection is accessible at the rear of the R.F. transformer on the top of the chassis. Connect the resistor from the lug having the red-with-blue tracer lead connected to it, to the ground bus wire which ties the three trimmer condensers together.

It is possible for the distortion mentioned above, to occur due to defective 6D6 I.F. tubes. The second I.F. tube is more susceptible to this difficulty and should be replaced before checking the first I.F. tube.

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MISCELLANEOUS NOTES (continued)

The tuning shaft "A" Fig. 2, can be bent very easily when the chassis is out of the cabinet if extreme care is not exercised. If the shaft is bent only slightly, it can possibly be bent back to its original shape, otherwise it should be replaced.

To replace the tuning shaft, first slip the dial cable from the front groove of the disc "B" Fig. 2, by releasing the spring holding that cable in place. Now rotate the disc until the dial pointer is at the extreme right end of the scale, at which point the hole "C" in the disc is in line with the hole in the shaft support bracket. Insert a small screw driver through the two holes and remove the motor mounting screw. Remove the other two motor mounting screws and lift the motor from the chassis.

Now remove the "C" washer from the shaft immediately to the front of the shaft support bracket, and slide the shaft toward the inside of the chassis. Insert a new shaft and gear, wrap 2 1/2 turns of the dial cable in the groove provided, and fasten the "C" washer in place. The method of properly stringing the dial cable is shown in detail in Fig. 2 and is fully described in the following paragraphs. Remount the motor with the three mounting screws. The holes through which these screws pass, are sufficiently large to permit adjustment of the motor so that the gears mesh properly. The procedure outlined above for replacing a tuning shaft may also be used in replacing a tuning motor.

To adjust the position of the volume or tone compensator semaphore discs, loosen the small set-screw on the brass bushing behind the disc, and slide the disc until the proper setting is obtained. Tighten the set-screw, and the operation is completed.

When push-button tuning is used, the dial pointer may have a tendency to "hunt" on either side of the desired frequency before coming to rest. This condition is caused by insufficient pressure of the small spring at the rear of the tuning motor, against the armature shaft. The spring should be "kinked" slightly to provide additional pressure, using a pair of long-nosed pliers to make the adjustment.

If a distinct hum is heard in the speakers when using the radio, the 6F5 tube should be replaced as a possible cure. It is extremely important that the grid lead of the 6F5 tube is shielded as near to the cap of the tube as is possible or hum will be picked up in this lead.

The shell of the cap on the phonograph input plug should not be allowed to contact the chassis or else a hum will be heard in the speakers with phonograph operation. A small felt washer is used between the plug and the receptacle to prevent this and should be replaced at any time that it is necessary to remove this plug from its receptacle.

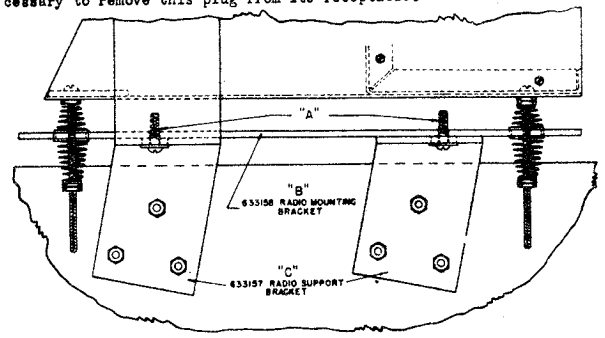



FIG. 1

## RESTRINGING THE DIAL CABLE

To restring the pointer cable, first tie one end of the cable to the pointer tension spring, Fig. 2, after the spring has been removed from the small hook on disc "B". Lace the cord through the eyelet in the rear groove, allowing about 1/2 inch between the spring and the inside edge of the groove. Proceed around the idler pulley at the left end of the dial, across the front of the disc "B", through the back of the pointer clamp (see inset Fig. 2), around the right-end idler pulley and around the rear disc groove in a counter-clockwise direction threading it into the eyelet mentioned above. Knot the cable to the spring, bringing the spring toward the inside rim of the disc as close as possible. Now stretch the spring until the other end can be secured to the hook, completing the operation.

To restring the drive shaft cable, first tie one end of the cable to the drive shaft cable tension spring, after the spring has been removed from the small hook on disc "B". Lace the cord through the eyelet in the front groove allowing about 1/2 inch between the end of the spring and inside edge of the groove. Proceed around the disc in a counter-clockwise direction, wrap two and one-half turns around shaft "A" Fig. 2, in a clockwise direction and from front to rear. Continue around the groove in a counter-clockwise direction threading the cable through the eyelet near the spring. Knot the cable to the spring, bringing the spring toward the inside rim of the disc as close as possible. Stretch the spring until the other end can be secured to the hook, and the operation is completed.

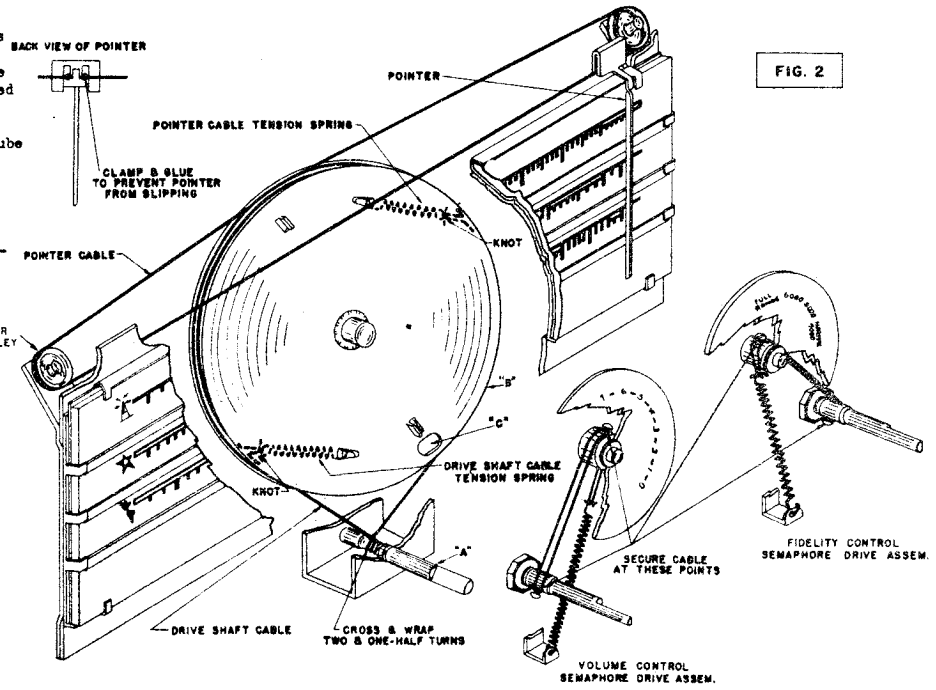
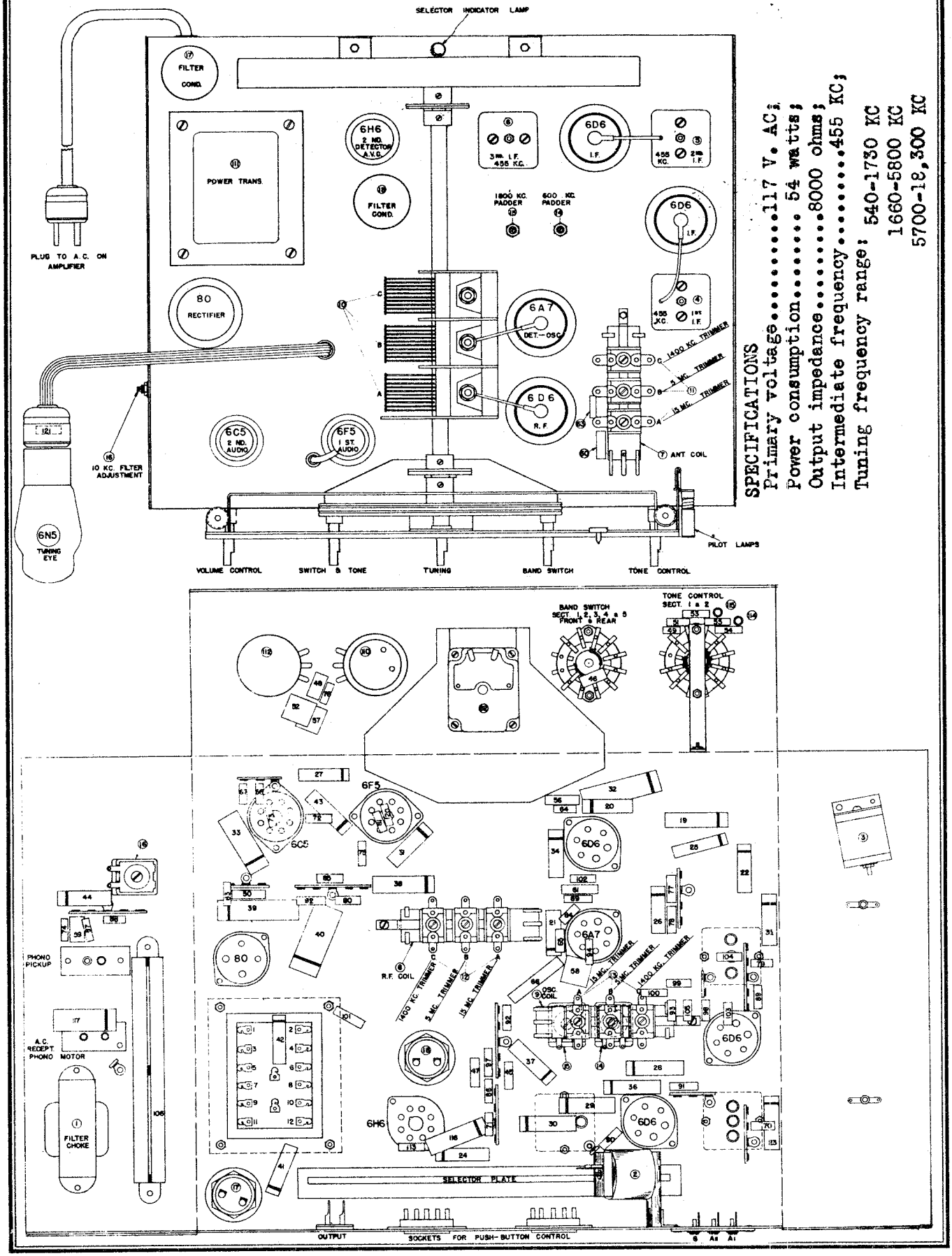



FIG. 2

CHASSIS CR108M,CR122

# THE MAGNAVOX CO., INC.

Socket,Trimmers,Chassis




SPECIFICATIONS

Primary voltage.....117 V. AC;
Power consumption..... 54 watts;
Output impedance.....8000 ohms;
Intermediate frequency.....455 KC;
Tuning frequency range: 540-1730 KC
1660-5800 KC
5700-18,300 KC

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CHASSIS CR102,-103,104,105
CHASSIS CR106,-109,-111
CHASSIS CR107,-110,-112,
-119,-120,-126,-127

# THE MAGNAVOX CO., INC.

CHASSIS CR113,-114,-115,
-118,-125
CHASSIS 121,-124
Alignment

MODELS CR102, 103, 104, 105

## ALIGNING THE I. F. AT 456 KILOCYCLES

1. Connect the ground lead of the test oscillator to the chassis or set ground lead (black). Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .00025 Mfd. condenser.
2. Set the band switch for reception on the broadcast band and set the dial pointer to 1,000 Kilocycles, adjusting the receiver volume control to its maximum setting.
3. Now feed a 456 kilocycle signal from the test oscillator and peak each of the second I.F. trimmer condensers.
4. Peak each of the first I.F. trimmer condensers, repeating the adjustments several times for most accurate setting.

## ALIGNING THE 540-1760 KILOCYCLE BAND

1. Remove the test oscillator lead from the grid of the 6A7 tube and connect it to the receiver antenna lead (blue) through a .00025 mfd. condenser.
2. Check the tuning dial adjustment by turning the gang condenser until the plates are completely meshed at which point the dial pointer must be exactly even with the last line at the low frequency end of the band (540 KC).
3. With the band selector set for reception on the broadcast band, set the dial pointer to the extreme high frequency end of the band (1760 KC) and feed a 1760 KC signal from the signal generator, adjusting the 1760 kilocycle oscillator trimmer for maximum output.
4. Now set the receiver and test oscillator frequency to 1500 KC and adjust the 1500 KC antenna trimmer for maximum output.
5. Set the receiver and test oscillator frequency to 600 KC and adjust the 600 KC oscillator padder to maximum output while tuning the receiver back and forth across the signal. This completes the alignment of the broadcast band.

## ALIGNING THE 1600-5000 KILOCYCLE BAND

1. Set the band selector for operation on the police band.
2. Set the receiver and test oscillator frequency to 4 megacycles and adjust the 4 megacycle antenna trimmer for maximum output.

## ALIGNING THE 4.0-19.0 MEGACYCLE BAND

1. Set the band selector for operation on the foreign band.
2. Set the receiver and test oscillator frequency to 15 megacycles and adjust the 15 megacycle antenna trimmer for maximum output.

## IO KILOCYCLE FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser on the rear of the chassis adjacent to the speaker socket.

MODELS CR106, 109, 111; CR107, 110, 112, 119, 120, 126, 127; CR113, 114, 115, 118, 125; CR121, 124

## ALIGNING THE I.F. STAGES AT 455 K.C.

1. Connect the ground lead of the test oscillator to the chassis or radio ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .00025 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.
2. Set the test oscillator to EXACTLY 455 kilocycles and turn the receiver volume to its maximum setting.
3. Peak each of the second I.F. transformer trimmer condensers.
4. Peak each of the first I.F. transformer trimmer condensers.

## ALIGNING THE 540-1730 K.C. BAND

Remove the test oscillator lead from the grid of the 6A7 tube and connect it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.

Set the test oscillator frequency and receiver dial to EXACTLY 1730 kilocycles. Adjust the 1730 kilocycle oscillator trimmer to bring in 1730 kilocycle test oscillator signal to maximum output.

Tune the receiver and test oscillator frequency to EXACTLY 1400 kilocycles and adjust the 1400 kilocycle antenna trimmer for maximum output as indicated on the output meter.

Set the test oscillator and receiver frequency to approximately 600 Kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 600 kilocycle oscillator padder for maximum signal.

## ALIGNING THE 1.7-5.8 M.C. BAND

Substitute a 400 ohm resistor for the .00025 mfd. condenser in series with the antenna lead.

Tune the receiver and test oscillator frequency to EXACTLY 5 megacycles and adjust the 5 megacycle antenna trimmer for maximum output.

## ALIGNING THE 5.7-18.3 M.C. BAND

Leave the 400 ohm resistor in series with the test oscillator lead and set the band selector switch for operation on the 5.7 - 18.3 megacycle band (short wave).

Set the receiver and test oscillator frequency to EXACTLY 18.3 megacycles.

Adjust the 18.3 megacycle oscillator trimmer for maximum signal as indicated on the output meter.

When adjusting this trimmer two peaks may be noticed, in which case CARE MUST BE TAKEN THAT THE PROPER PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.3 MC. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the second peak -- if more than one is noticed -- which is the correct one to use, is tuned in.

Set the receiver and test oscillator frequency to 15 megacycles.

Rock the gang condenser slightly to the right and to the left, adjusting the 15 megacycle antenna trimmer for maximum signal as indicated on the output meter.

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# THE MAGNAVOX CO., INC.

CHASSIS CR113,-114,-115
CR118,-125
Schematic, Voltage

Type circuit: Superheterodyne with three tuning ranges, tone control, A.V.C., bass compensation in volume control for phonograph pickup.

Intermediate frequency.....455 KC;
Tuning frequency range 540 - 1730 KC;
1.7 - 5.8 MC;
5.7 - 18.3 MC;

MODEL CR-113
OMIT PARTS (47) (52) (53) (59) (61)
PART (60) SHORTED
PART (57) IS .05 MFD.

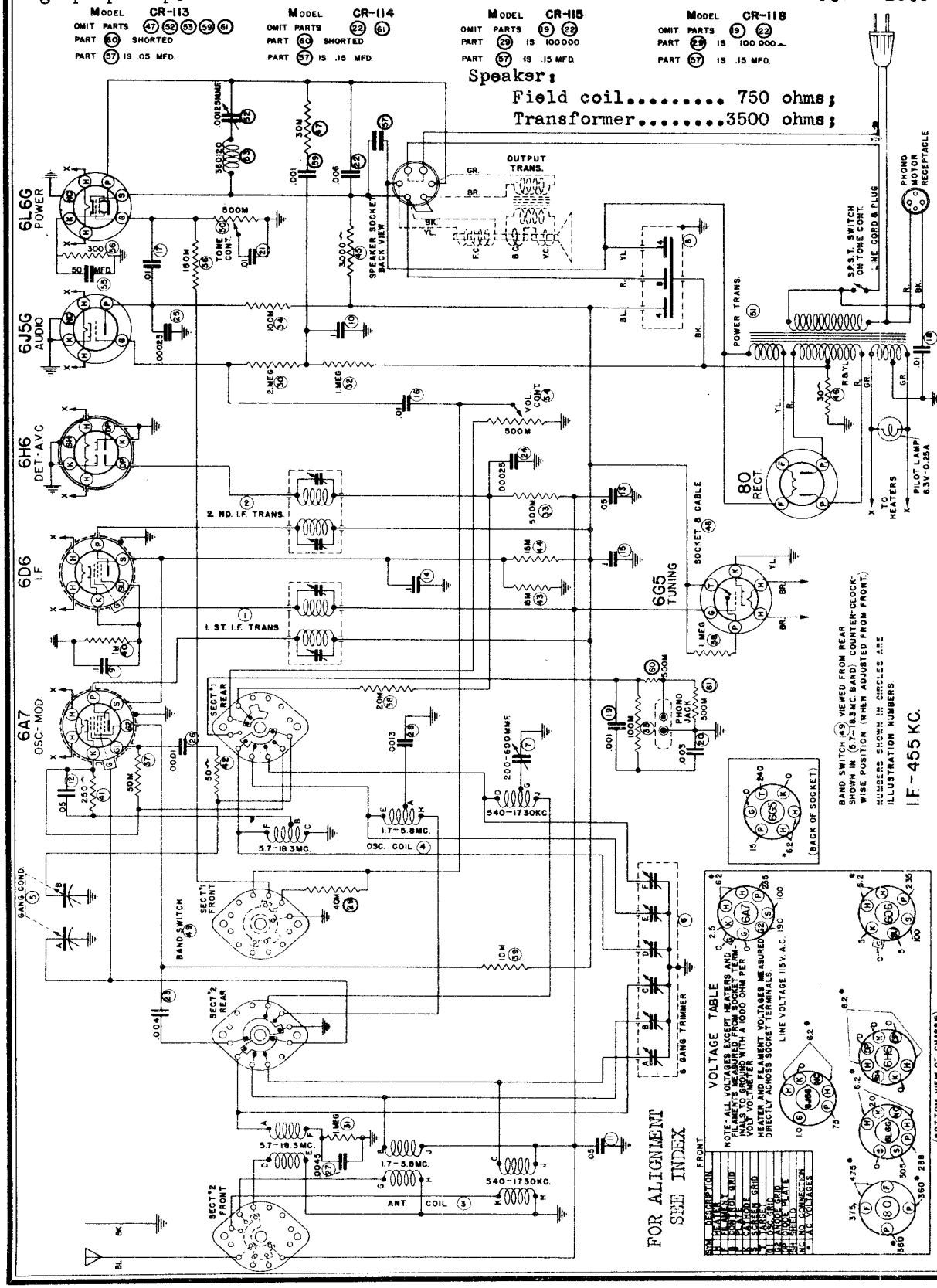
MODEL CR-114
OMIT PARTS (22) (61)
PART (60) SHORTED
PART (57) IS .15 MFD.

MODEL CR-115
OMIT PARTS (19) (22)
PART (29) IS 100000
PART (57) IS .15 MFD.

MODEL CR-118
OMIT PARTS (9) (22)
PART (29) IS 100 000~
PART (57) IS .15 MFD.

Speaker:
Field coil..... 750 ohms;
Transformer.....3500 ohms;

Primary voltage.....117 V. AC;
Power consumption..... 80 watts;
Power output..... 6 watts;




# MAGNAVOX RADIO CHASSIS CR-113, 114, 115, 118, 125

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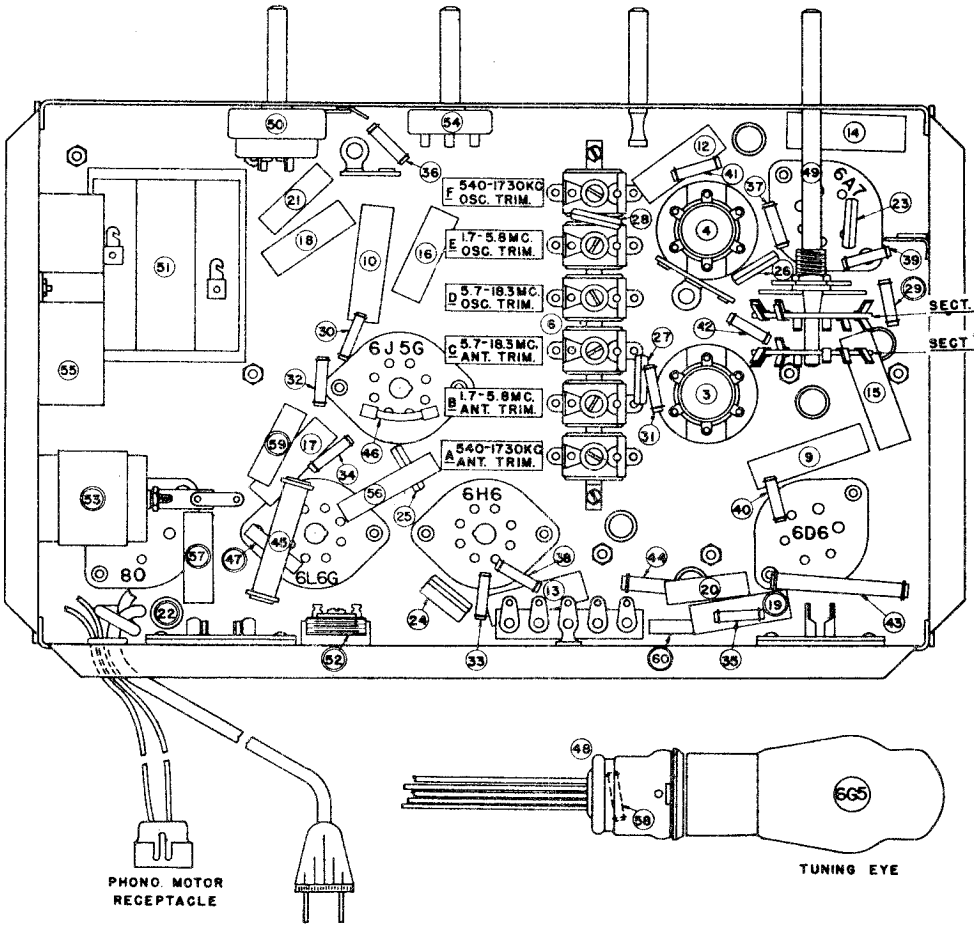
CHASSIS CR113,-114,-115
CR118,-125
Socket,Trimmers,Chassis

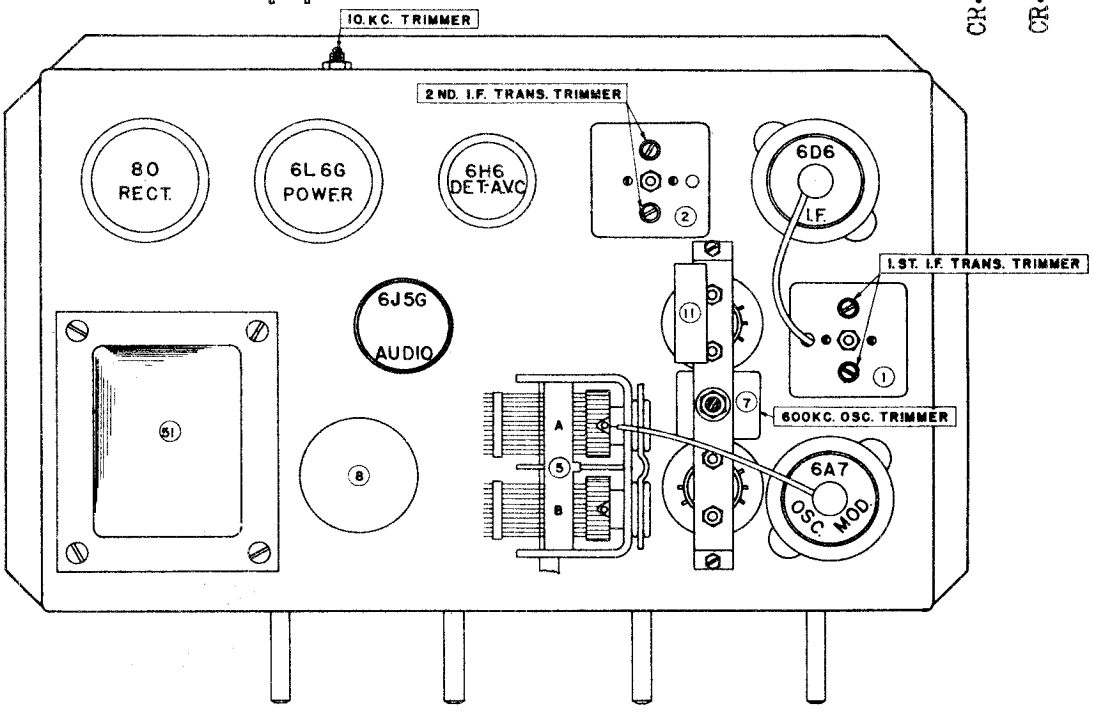
# THE MAGNAVOX CO., INC.

It is important that EXACT replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.










CR-113 -- Used in Concerto combination.
Omit items 47, 52, 53, 59 and 61.
Item 60 is shorted.
Item 57 is .05 mfd.

CR-114 -- Has brackets for mounting in Chairside combination.
Omit items 22 and 61.

CR-115 -- Has brackets for mounting in Duette combination.
Omit items 19 and 22.
Item 29 is 100,000 ohms.
Item 57 is .15 mfd.

CR-118 -- Has brackets for mounting in Berkeley combination.
Omit items 19 and 22.
Item 29 is 100,000 ohms.
Item 57 is .15 mfd.

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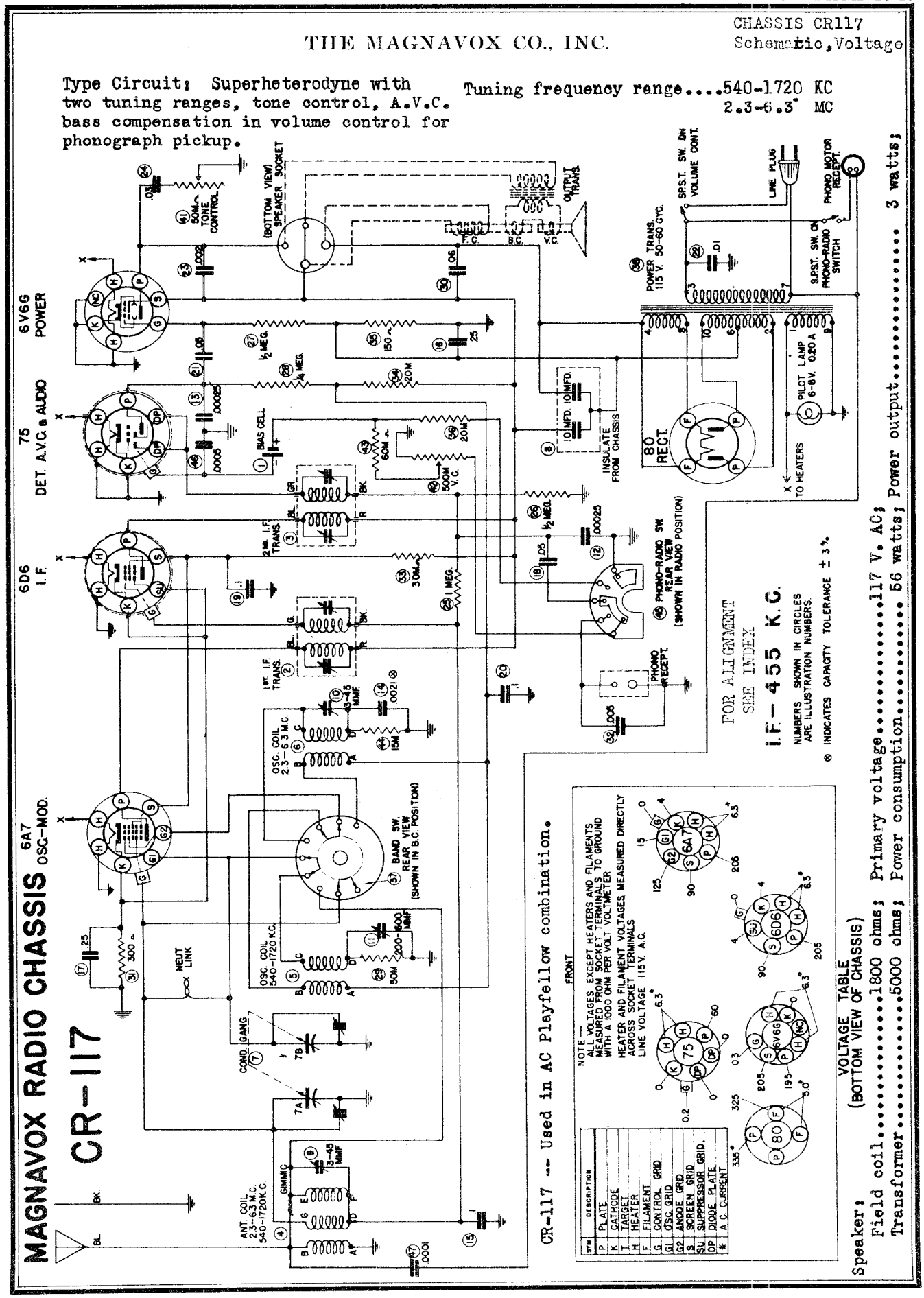
THE MAGNAVOX CO., INC.

CHASSIS CR117
Schematic, Voltage

Type Circuit: Superheterodyne with two tuning ranges, tone control, A.V.C. bass compensation in volume control for phonograph pickup.

Tuning frequency range....540-1720 KC
2.3-6.3 MC


MAGNAVOX RADIO CHASSIS CR-117
6A7 OSC.-MOD.
6D6 I.F.
75 DET. A.V.C. & AUDIO
6V6G POWER
80 RECT.
FOR ALIGNMENT SEE INDEX
I.F. - 455 K.C.
NUMBERS SHOWN IN CIRCLES ARE ILLUSTRATION NUMBERS.
⊗ INDICATES CAPACITY TOLERANCE ± 3%.
CR-117 -- Used in AC Playfellow combination.
VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)
Speaker:
Field coil.....1800 ohms; Primary voltage.....117 V. AC;
Transformer.....5000 ohms; Power consumption..... 56 watts; Power output..... 3 watts;
POWER TRANS. 115 V. 50-60 CYC.
SPST. SW. ON VOLUME CONT.
LINE PLUG
PHONO MOTOR RECEPT.
S.P.S.T. SW. ON PHONO-RADIO SWITCH
PILOT LAMP 6-8 V. 0.20 A
TO HEATERS
BIAS CELL
INSULATE FROM CHASSIS
PHONO-RADIO SW. REAR VIEW (SHOWN IN RADIO POSITION)
PHONO RECEPT.
BAND SW. REAR VIEW (SHOWN IN B.C. POSITION)
OSC. COIL 2.3-6.3 M.C.
OSC. COIL 540-1720 K.C.
ANT. COIL 2.3-6.3 M.C.
ANT. COIL 540-1720 K.C.
COND. GANG
NEUT. LINK
1ST. I.F. TRANS.
2ND. I.F. TRANS.
OUTPUT TRANS.
SPEAKER SOCKET
F.C.
B.C.
V.C.
NOTE — ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER
HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS
LINE VOLTAGE 115 V. A.C.
STM DESCRIPTION
P PLATE
K CATHODE
T TARGET
H HEATER
F FILAMENT
G CONTROL GRID
G1 OSC. GRID
G2 ANODE GRID
S SCREEN GRID
SU SUPPRESSOR GRID
DP DIODE PLATE
* A.C. CURRENT

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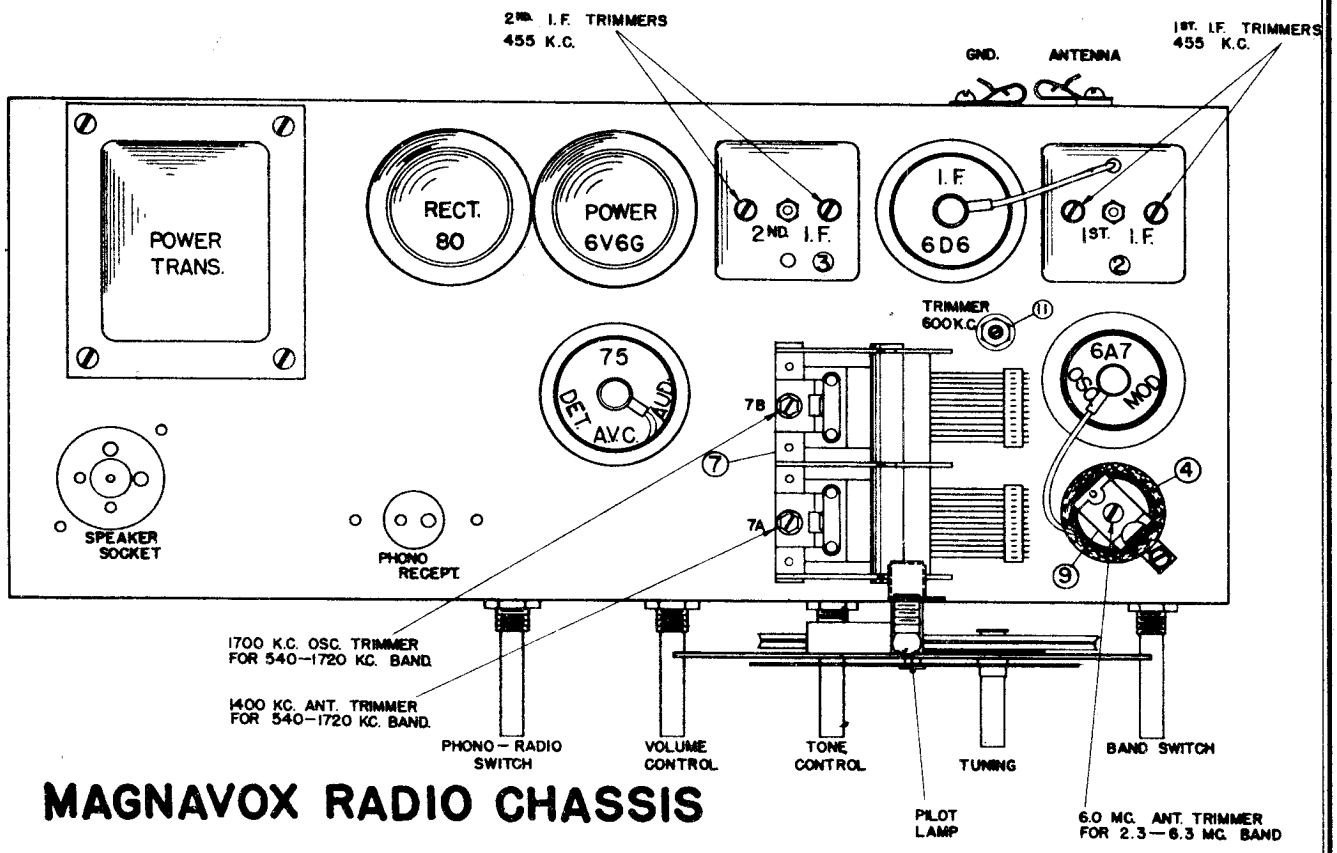
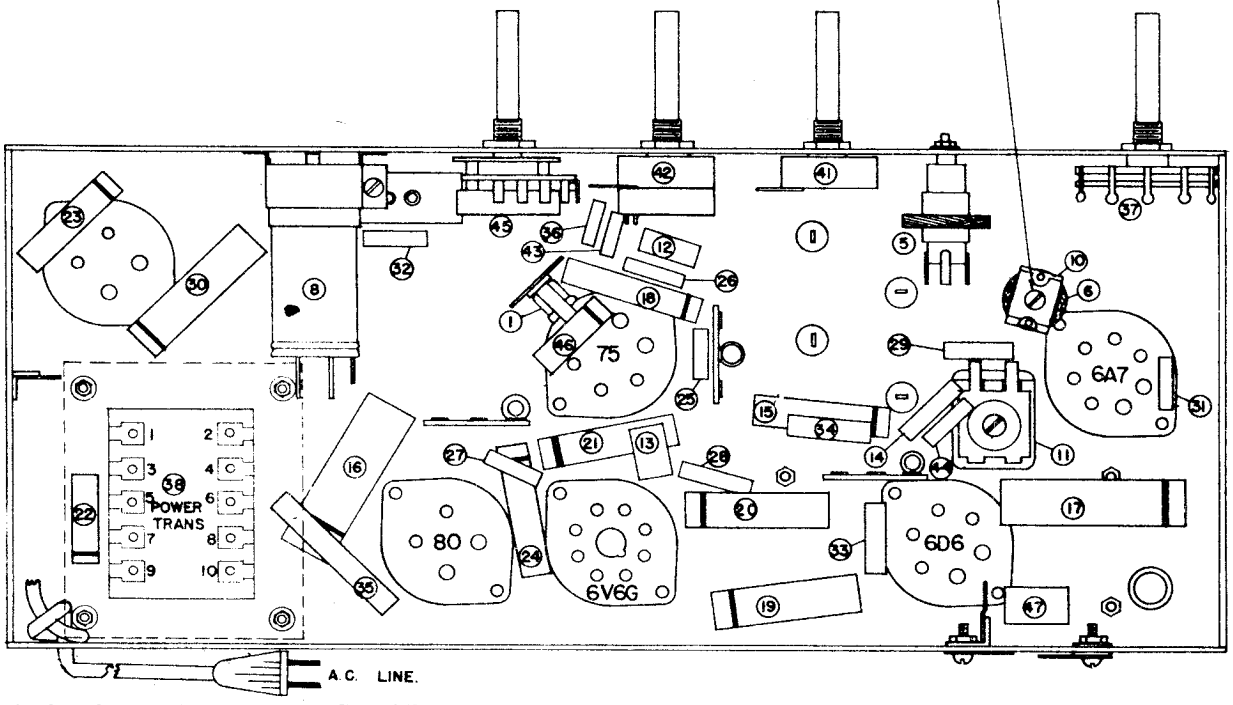
CHASSIS CR117
Socket,Trimmers
Chassis

THE MAGNAVOX CO., INC.




# MAGNAVOX RADIO CHASSIS

# CR-117




It is important that **EXACT** replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

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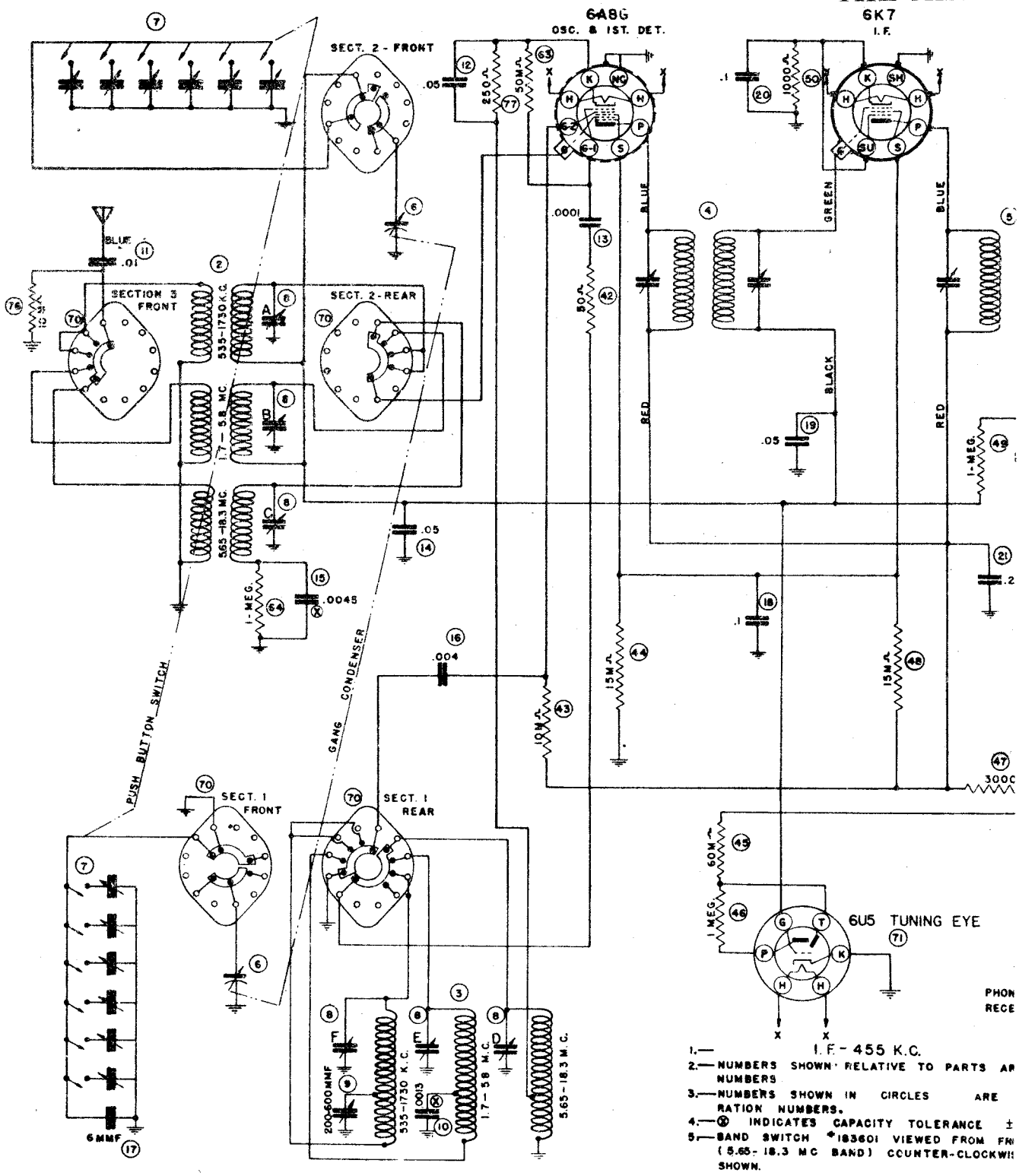


# MAGNAVOX RADIO
# CR-121
## CHASSIS

Primary voltage.....117 V. AC; Intermediate freque
Power consumption.....100 watts; Tuning frequency ra
Power output..... 12 watts;
Speaker:
Field Coil.....1000 ohms; Type Circuit: Supe
Transformer.....8000 ohms; tuning ranges, treb
A.V.C., bass compen
trol for phonograph

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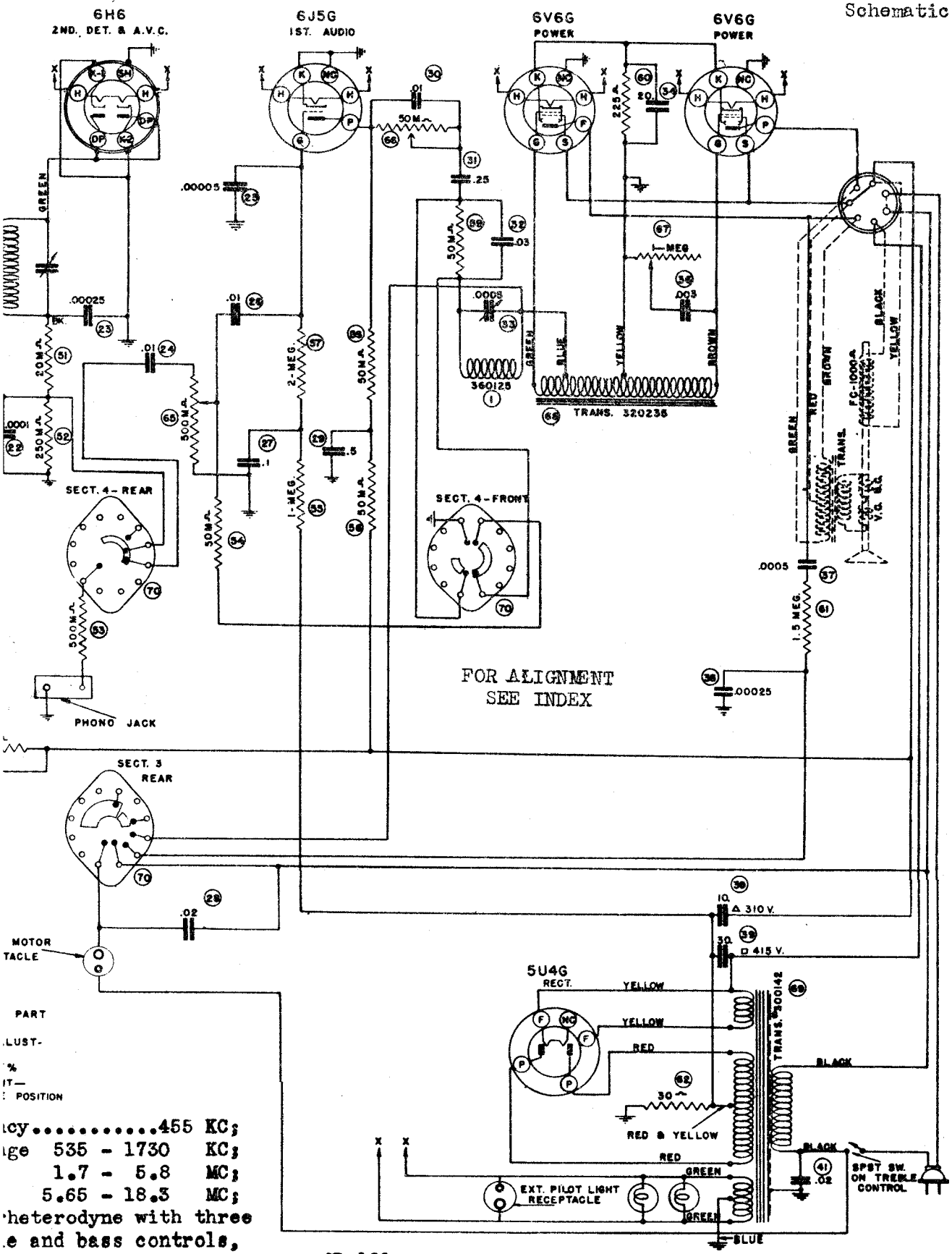
VOX CO., INC.

CHASSIS CR121
Schematic



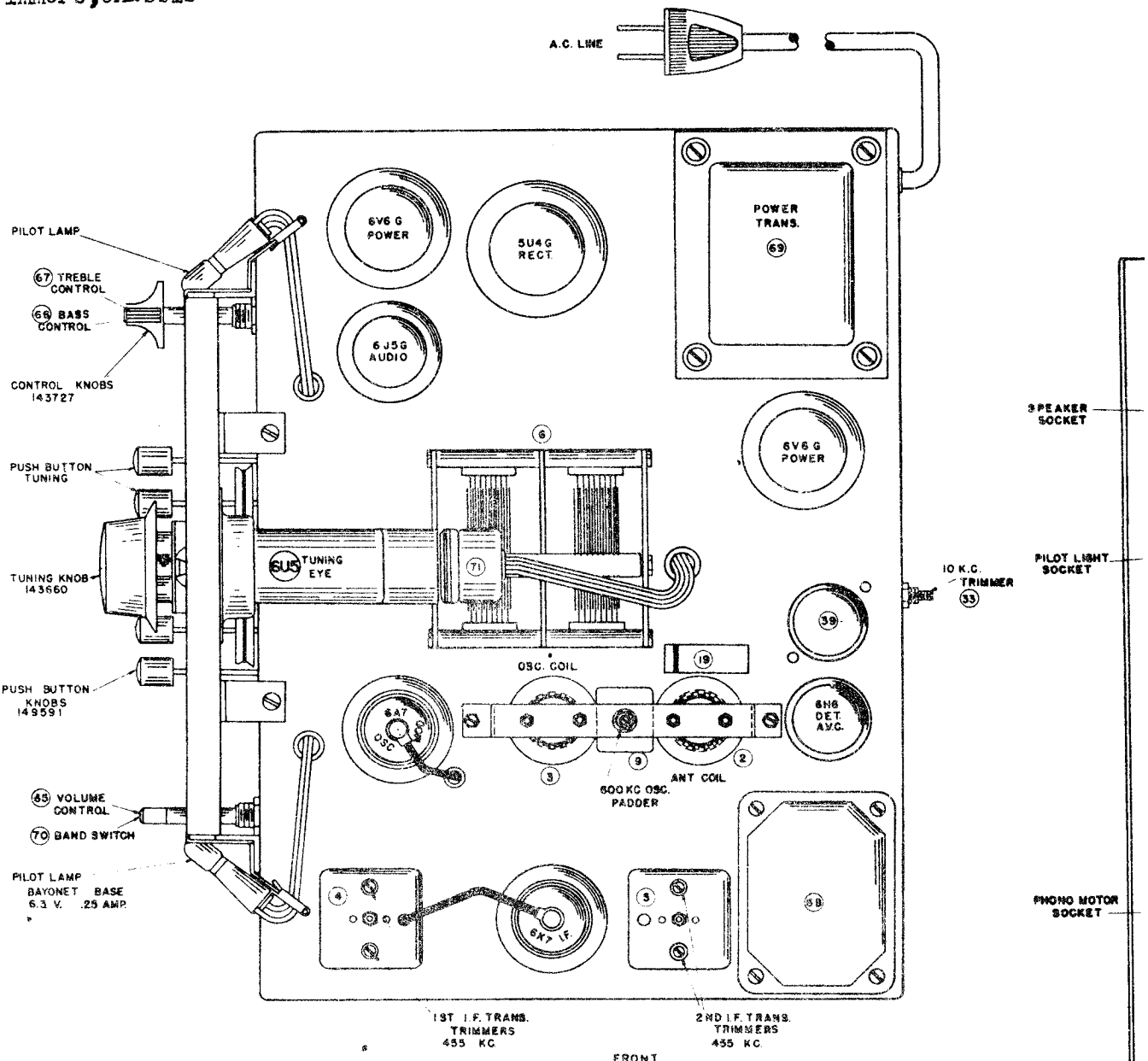

PART
LUST-
%
IT—
POSITION

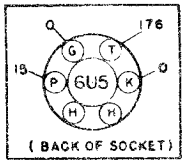
cy.....455 KC;
ge 535 - 1730 KC;
1.7 - 5.8 MC;
5.65 - 18.3 MC;
heterodyne with three
e and bass controls,
ation in volume con-
pickup.

CR-121 -- Used in AC Hepplewhite Manual combination.
Used in AC Berkeley combination.

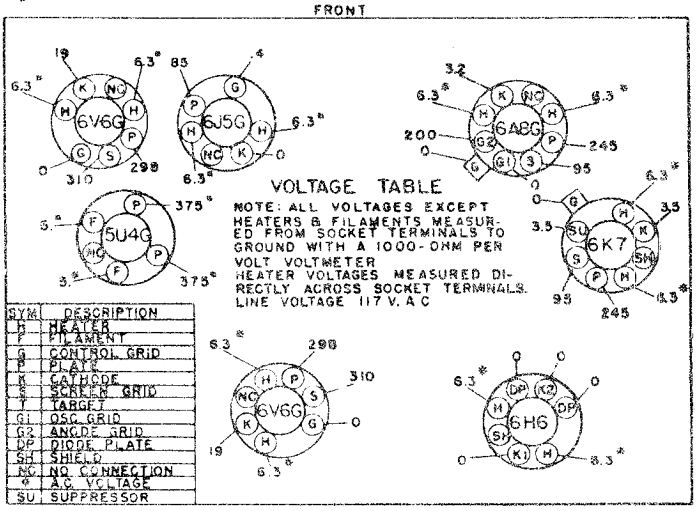
CHASSIS CR121
Voltage, Socket
Trimmers, Chassis

THE MAGNA




FRONT




| SYM. | DESCRIPTION |
|---|---|
| H | HEATER |
| F | FILAMENT |
| G | CONTROL GRID |
| P | PLATE |
| K | CATHODE |
| SG | SCREEN GRID |
| T | TARGET |
| G1 | OSC. GRID |
| G2 | ANODE GRID |
| DP | DIODE PLATE |
| SH | SHIELD |
| NC | NO CONNECTION |
| * | A.C. VOLTAGE |
| SU | SUPPRESSOR |

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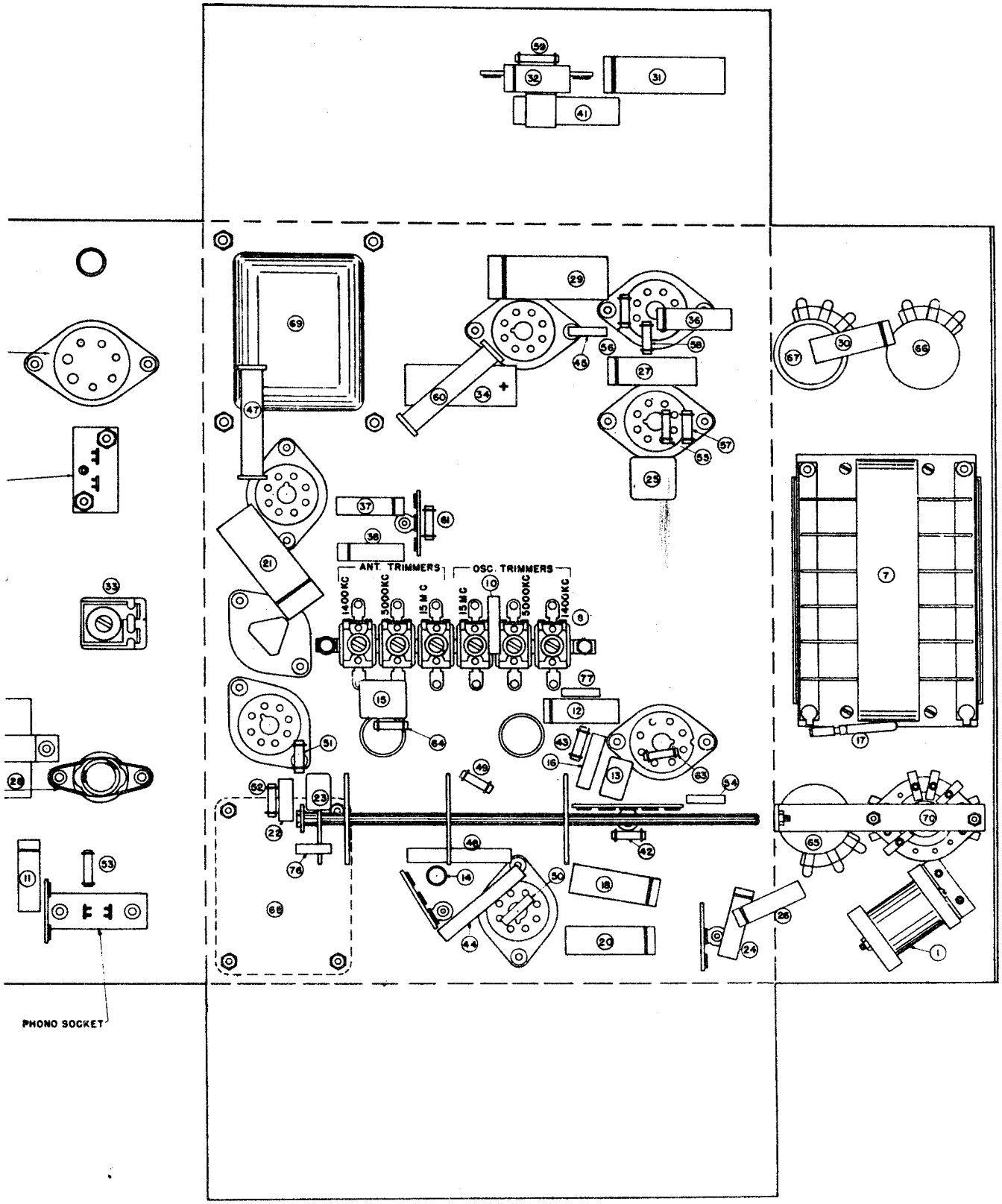
VOX CO., INC.

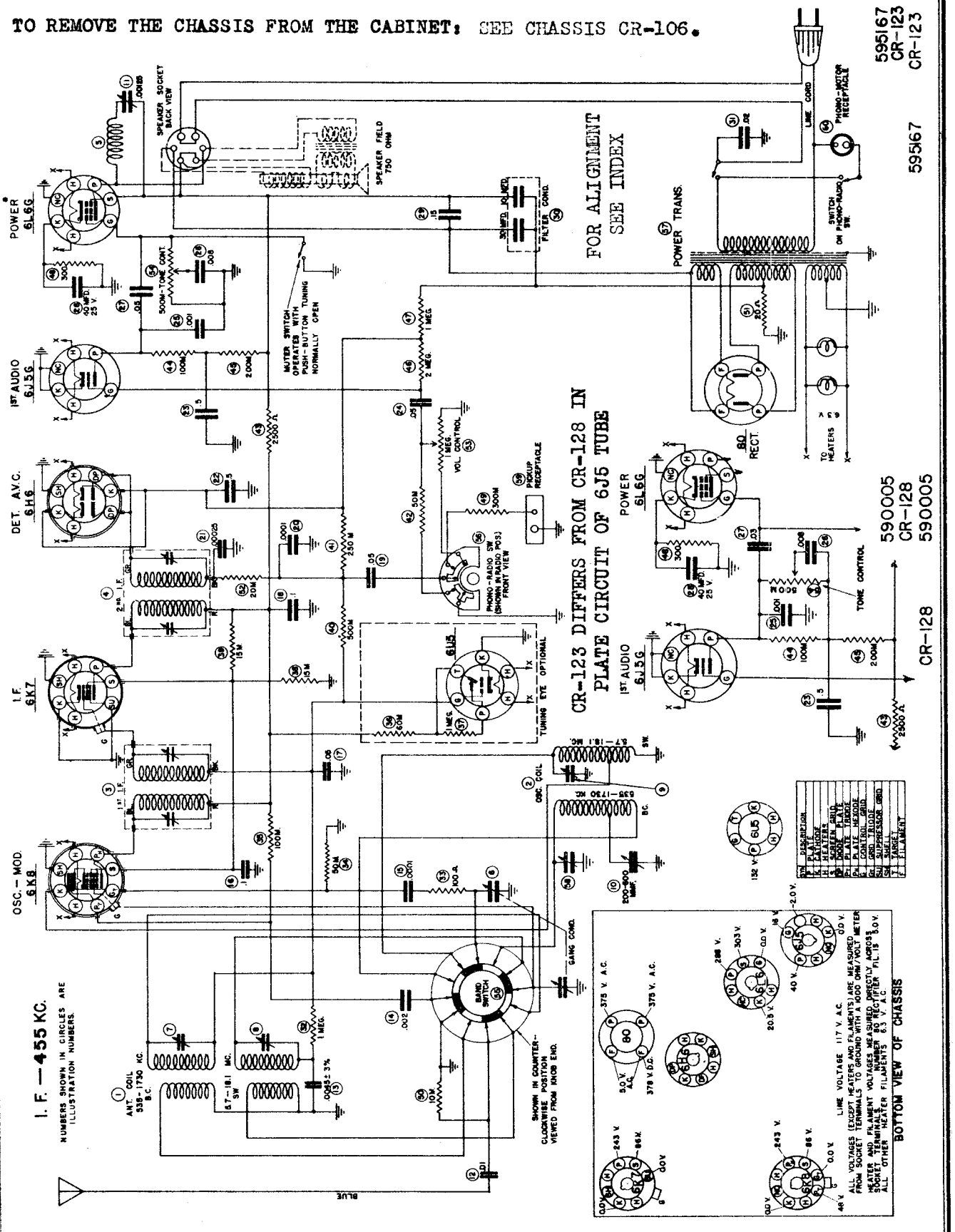



It is important that **EXACT** replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

CHASSIS CR123, CR128
Schematic, Voltage

# THE MAGNAVOX CO., INC.

**TO REMOVE THE CHASSIS FROM THE CABINET:** SEE CHASSIS CR-106.

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CHASSIS CR123,CR128
Socket,Trimmers
Chassis,Notes

# THE MAGNAVOX CO., INC.




# CR-123, 128

It is important that **EXACT** replacement parts be used when necessary and these parts must be located in exactly the same way that the original part was located and connected. This applies particularly to ground points.

Intermediate frequency.....455 KC; Speaker: Primary voltage.....117 V. AC;
Tuning frequency range: 535 - 1730 KC; Field Coil.... 750 ohms; Power consumption..... 90 watts;
5.7 - 18.1 MC; Transformer...3500 ohms; Power output..... 6 watts;

Circuit: Superheterodyne with two tuning ranges, treble control, A. V. C.; bass compensation in volume control for phonograph pickup; push-button condenser-type tuner.

CR-123 -- Used in Concerto, Chairside and Hepplewhite combinations. Same as CR-128 except: Item 61 is eliminated. Item 27 is .03 mfd.

CR-128 -- Used in Hepplewhite automatic combination.

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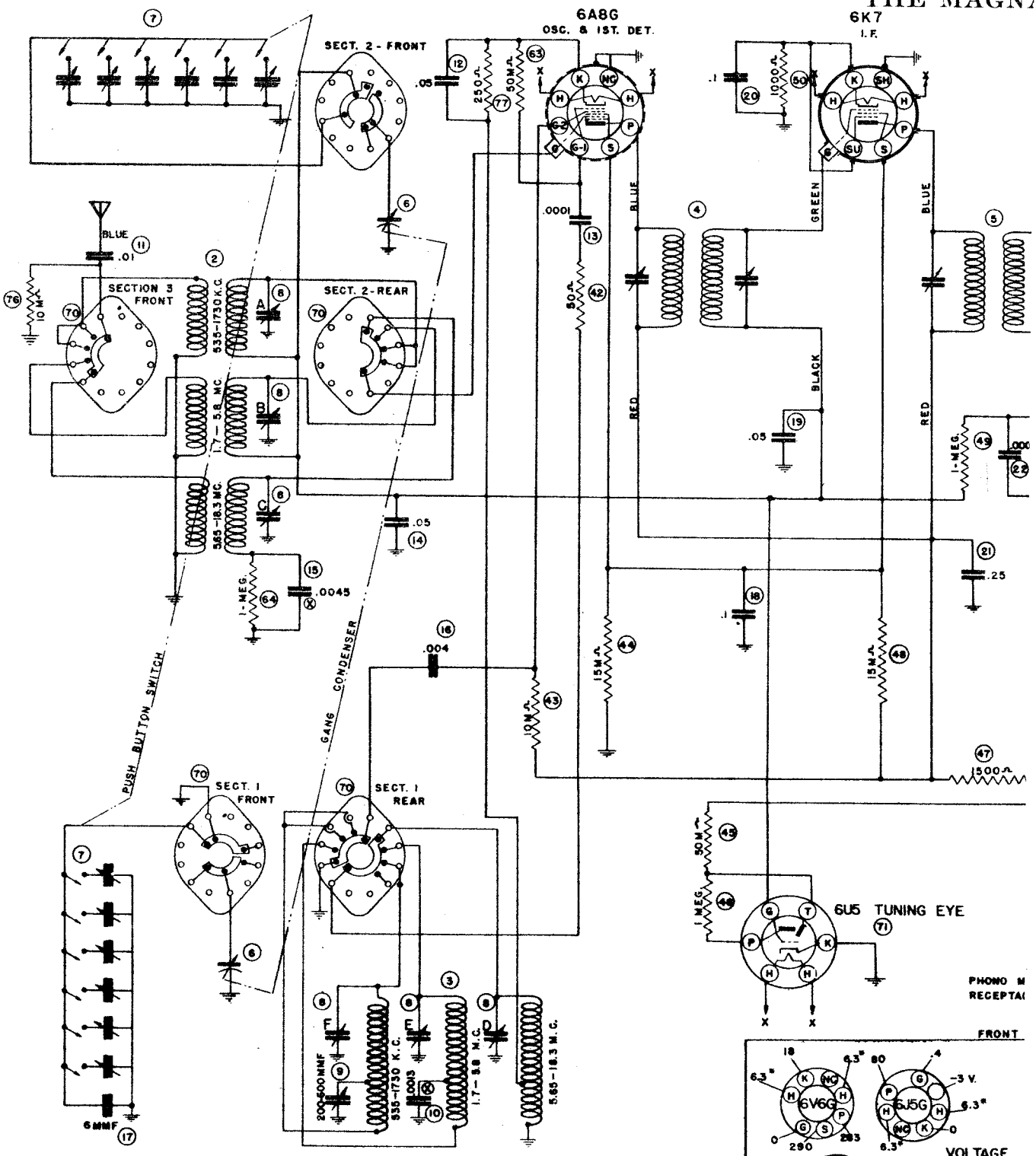



# MAGNAVOX RADIO CHASSIS
# CR-124

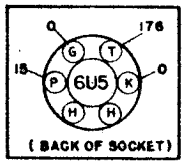
1.— I.F. - 455 K.C.

2.— NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.

3.— NUMBERS SHOWN IN CIRCLES ARE ILLUSTRATION NUMBERS.

4.— Ⓧ INDICATES CAPACITY TOLERANCE ±5%

5.— BAND SWITCH *183601 VIEWED FROM FRONT— (5.85- 18.3 MC BAND) COUNTER-CLOCKWISE POSITION SHOWN.

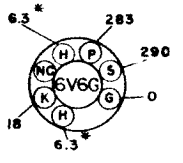



FOR ALIGNMENT SEE INDEX




NOTE: ALL VOLT/ HEATERS & FILA ED FROM SOCKET GROUND WITH A VOLT VOLTMETER HEATER VOLTAGES RECTLY ACROSS LINE VOLTAGE II

| SYM | DESCRIPTION |
|---|---|
| H | HEATER |
| F | FILAMENT |
| G | CONTROL GRID |
| P | PLATE |
| K | CATHODE |
| G2 | SCREEN GRID |
| T | TARGET |
| G1 | OSC. GRID |
| G2 | ANODE GRID |
| DP | DIODE PLATE |
| SH | SHIELD |
| NC | NO CONNECTION |
| * | A.C. VOLTAGE |
| SU | SUPPRESSOR |

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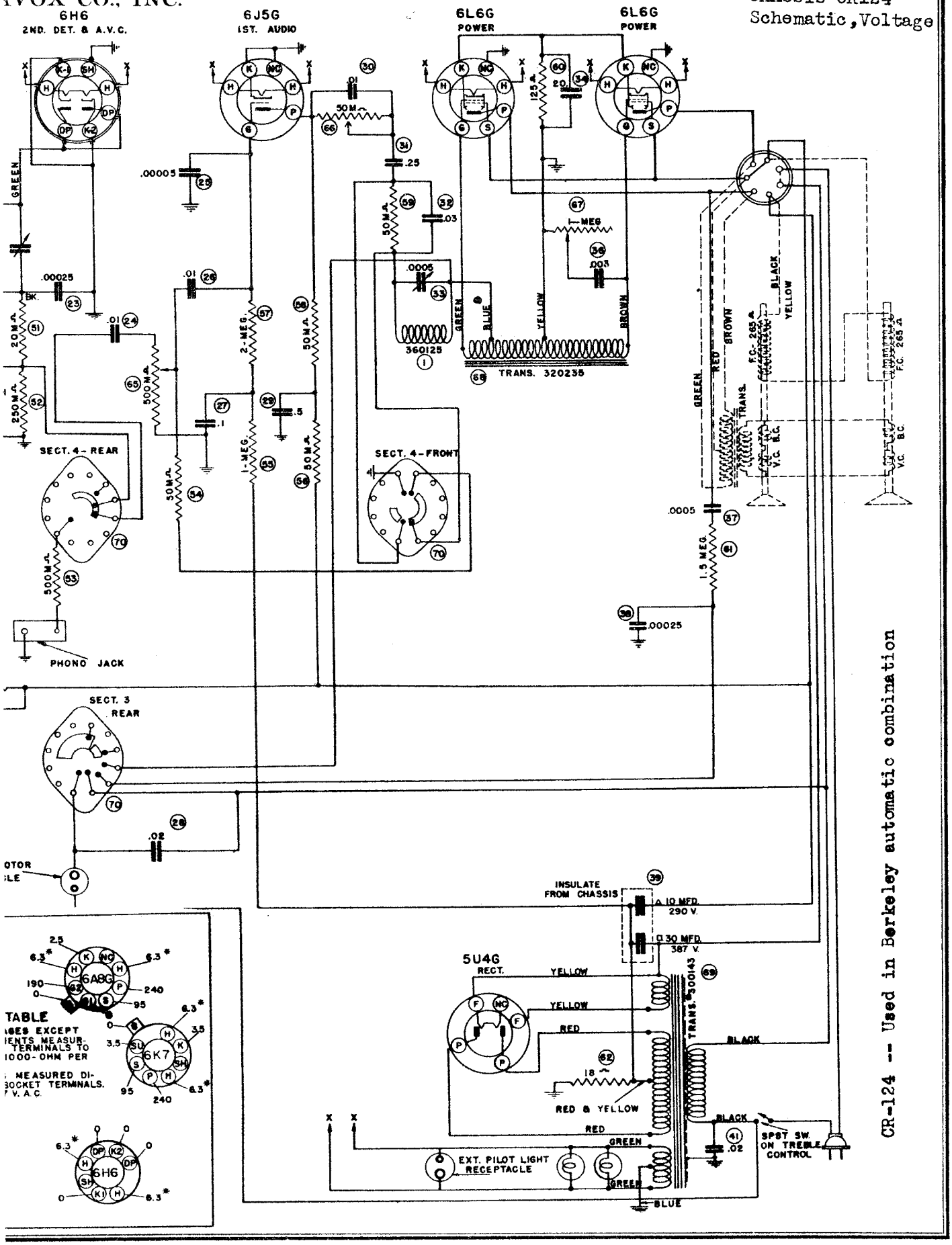
AVOX CO., INC.

CHASSIS CR124
Schematic, Voltage




CR-124 -- Used in Berkeley automatic combination

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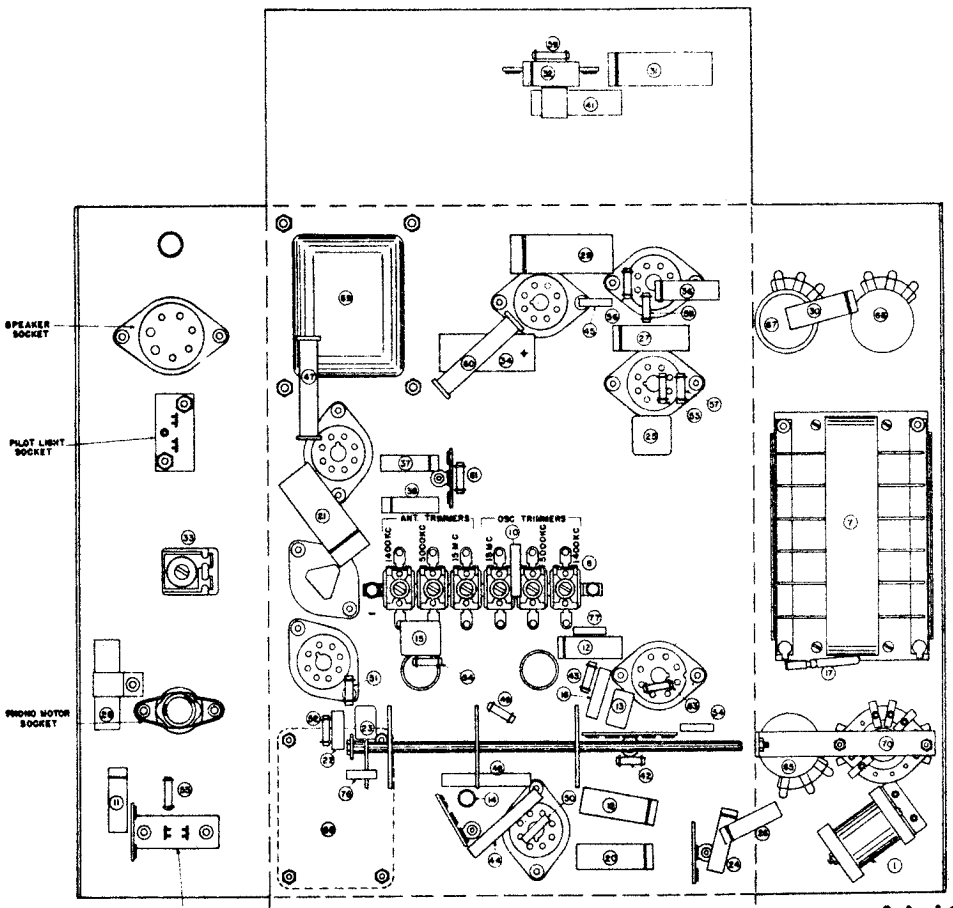


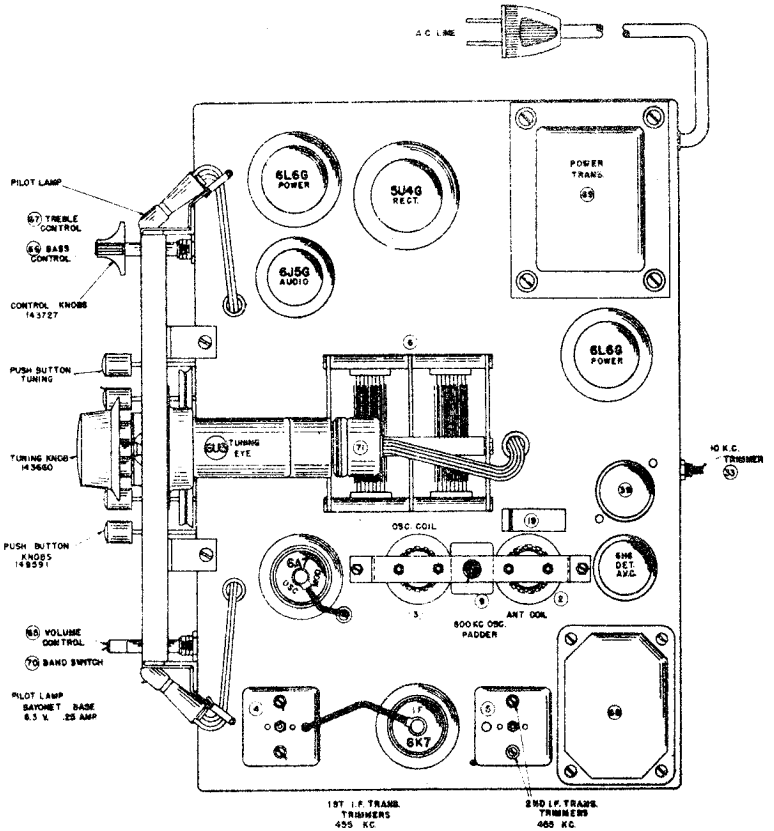


Primary voltage.....117 V. AC;
Power consumption.....165 watts;
Power output..... 17 watts;
Circuit: Superheterodyne with three tuning ranges, treble and bass controls A.V.C., bass compensation in volume control for phonograph pickup.

Speaker (302):
Field Coil.....250 ohms ;
Transformer.....10M ohms ;

Speaker (12C131):
Field Coil.....250 ohms ;
Transformer..... None

# ALIGNMENT PROCEDURE

It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device be used when aligning the receiver.

TUNING FREQUENCY RANGE: 535 - 1730 KC; 1.7 - 5.8 and 5.65 - 18.3 MC.

FOLLOW ALIGNMENT PROCEDURE OF MAGNAVOX CHASSIS CR-106.

## 10 K.C. FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser as the rear center of the chassis.

MODEL CR 117

## ALIGNING THE I.F. STAGES AT 455 KILOCYCLES

1. Connect the ground lead of the test oscillator to the chassis or radio ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .00025 mfd. series condenser. DO NOT REMOVE THE GRID CLIP.
2. Set the test oscillator to EXACTLY 455 kilocycles and turn the receiver volume to maximum setting.
3. Peak each of the second I.F. transformer trimmer condensers.
4. Peak each of the first I.F. transformer trimmer condensers.

To insure most accurate trimmer setting, repeat the above adjustment several times, always using the lowest possible test oscillator output consistent with readable output meter scale deflection.

## ALIGNING THE 540-1720 KILOCYCLE BAND

1. Remove the test oscillator lead from the grid of the 6A7 tube and attach it to the receiver antenna lead (blue) through a .00025 mfd. series condenser.
2. Check tuning dial adjustment by turning the gang condenser until plates are completely meshed, at which point the dial pointer must be exactly even with the last line at the low frequency end of the dial calibration.
3. Set the receiver and test oscillator frequency to EXACTLY 1700 kilocycles.
4. Adjust the oscillator trimmer "7B" Fig. 2, for maximum output as indicated on the output meter.
5. Set the receiver and test oscillator frequency to EXACTLY 1400 kilocycles.
6. Adjust the antenna trimmer "7A" Fig. 2, for maximum output, as indicated on the output meter.
7. Now set the receiver and test oscillator frequency to 600 kilocycles, and adjust the oscillator padder condenser "11" Fig. 2, accessible from the top of the chassis, for maximum output.

## ALIGNING THE 2.3-6.3 MEGACYCLE BAND

1. Substitute a 400 ohm resistor for the .00025 mfd. condenser in series with the antenna lead.
2. Adjust the band selector switch for short-wave band and tune the receiver and test oscillator frequency to EXACTLY 6.3 megacycles.
3. Now adjust the 6.3 megacycle oscillator trimmer "10" Fig. 2, for maximum deflection on the output meter.
4. Set the receiver and test oscillator frequency to EXACTLY 6 megacycles, and adjust the 6 MC antenna trimmer "9" Fig. 2, for maximum deflection on the output meter.

MODELS CR 123, CR 128

## ALIGNING THE I.F. AT 455 KILOCYCLES

1. Connect the ground lead of the test oscillator to the chassis or radio ground lead. Connect the other lead of the test oscillator to the grid of the 6K8 tube through a .00025 Mfd. series condenser. DO NOT REMOVE THE GRID CLIP.
2. Set the test oscillator to EXACTLY 455 kilocycles and turn the receiver volume to maximum setting.
3. Peak each of the second I.F. transformer trimmer condensers.
4. Peak each of the first I.F. transformer trimmer condensers.

## ALIGNING THE 535-1730 KILOCYCLE BAND

1. Remove the test oscillator lead from the grid of the 6K8 tube and connect it to the receiver antenna lead (blue) through a .00025 Mfd. series condenser.
2. Check the tuning dial adjustment by turning the gang condenser until the plates are completely meshed, at which point the dial pointer must be exactly even with the last line at the low frequency end of the dial calibration.
3. Adjust the band selector switch for operation on the 535-1730 kilocycle (broadcast) band.
4. Set the test oscillator frequency and receiver dial to EXACTLY 1400 kilocycles. Adjust the 1400 kilocycle oscillator trimmer and the antenna trimmer to bring in the 1400 kilocycle test oscillator signal to maximum output.
5. Set the test oscillator and receiver frequency to 600 kilocycles. While rocking the gang condenser slightly to the right and to the left, adjust the 600 kilocycle oscillator padder for maximum output.

## ALIGNING THE 5.7-18.1 MEGACYCLE BAND

1. Substitute a 400 ohm resistor for the .00025 Mfd. condenser in series with the antenna lead.
2. Adjust the band selector switch to the 5.7-18.1 megacycle (foreign) band, tune the receiver and test oscillator frequency to EXACTLY 15 megacycles and adjust the 15 megacycle oscillator trimmer and antenna trimmer for maximum output as indicated on the output meter.

While adjusting the oscillator trimmer, two peaks may be noticed, in which case care must be taken so that the proper peak is used for aligning the receiver at 15 megacycles. Always back off the trimmer to minimum capacity, then screw down the trimmer until the second peak (if more than one is noticed) which is the correct one, is tuned in.

## 10 K.C. FILTER ADJUSTMENT

With the tone control set for maximum treble response, tune the receiver to a point between two stations of about the same signal strength on adjacent channels. If a 10,000 cycle heterodyne is heard as the beat note between the two carriers, it may be eliminated by retuning the 10 KC output filter by means of the 10 KC trimmer condenser at the rear center of the chassis.



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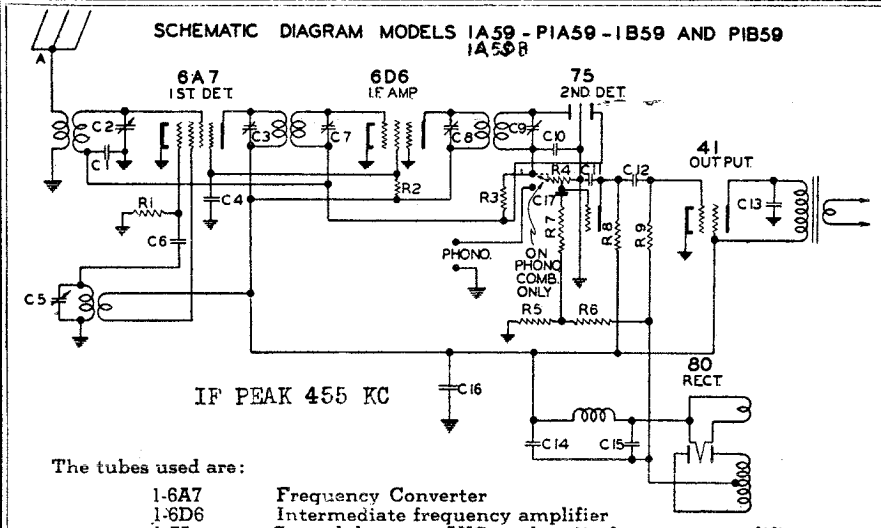
## SCHEMATIC DIAGRAM MODELS 1A59 - P1A59 - 1B59 AND P1B59 1A59B

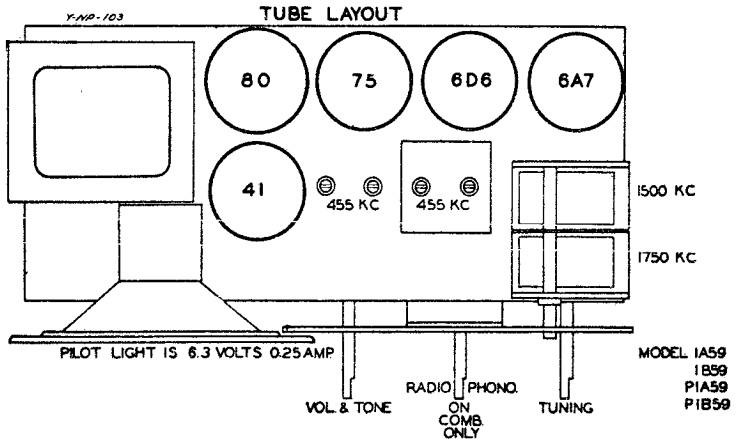


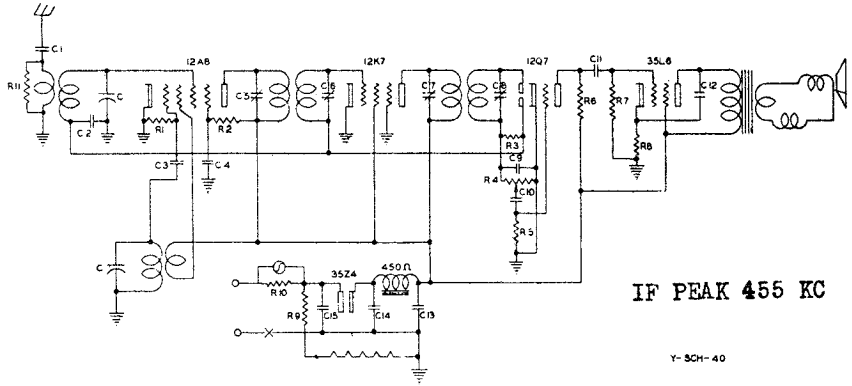

The tubes used are:

| | |
|---|---|
| 1-6A7 | Frequency Converter |
| 1-6D6 | Intermediate frequency amplifier |
| 1-75 | Second detector, AVC, and audio frequency amplifier |
| 1-41 | Output |
| 1-80 | Rectifier |

PARTS LIST FOR MODEL NO. 1A59

| Schematic Location | Part No. | Description |
|---|---|---|
| C1 | C-15752 | .05 mfd. 200V |
| C4,C16 | C-15756 | .05 mfd. 400V |
| C12,C17 | C-15754 | .01 mfd. 400V |
| C13 | C-25 | .006 mfd. 400V |
| C2,C5 | Y-CV-30 | Gang condenser |
| C3,C7 | Y-CT-1 | 1st I. F. Trimmer |
| C8,C9 | Y-CT-23 | 2nd I. F. Trimmer |
| C10 | CM-30 | 250 mmf. Mica |
| C11 | CM-31 | 100 mmf. Mica |
| C6 | CM-29 | 50 mmf. Mica |
| C14,C15 | Y-CE-51 | 8 8 mfd. 300V Electrolytic |
| R1 | R-15511 | 50K ½W 20% |
| R2 | R-83 | 35K 1W 20% |
| R3 | R-15500 | 2 meg ¼W 20% |
| R5 | R-82 | 35 ohms ¼W 20% |
| R6 | R-27 | 250 ohms ½W 20% |
| R7 | R-15517 | 1 meg ¼W 20% |
| R8 | R-15520 | 500K ¼W 20% |
| R9 | R-82 | 400K ¼W 20% |
| R4 | Y-VC-30 | Volume Control |

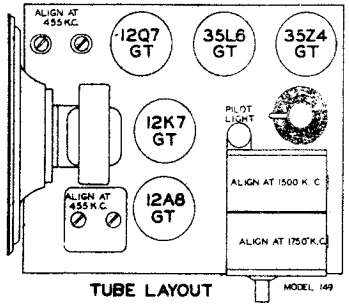



PARTS LIST FOR MODELS 149-W, 149-I, 149-N

| Schematic Location | Part No. | Description |
|---|---|---|
| C1,C11 | C-15754 | Tubular cond. .01 mfd. 400V |
| C2,C4 | C-15752 | Tubular cond. .05 mfd. 200V |
| C3 | CM-29 | Mica cond. 50 mmf. 30% |
| C9 | CM-30 | Mica cond. 250 mmf. 30% |
| C10 | C-15774 | Tubular cond. .002 mfd. 400V |
| C12,C15 | C-15760 | Tubular cond. .02 mfd. 400V |
| C5,C6 | Y-CT-18 | Trimmer cond. 1st I. F. Trans. |
| C7,C8 | Y-CT-23 | Trimmer cond. 2nd I. F Trans. |
| C13,C14 | Y-CE-50 | Electr. 16 mfd. 24 mfd. 150V |
| R1 | R-15511 | Carbon resistor 50K ½W 20% |
| R2 | R-15516 | Carbon resistor 15K ½W 20% |
| R3 | R-15500 | Carbon resistor 2 meg. ¼W 20% |
| R4 | Y-VC-29 | Volume Control |
| R5 | R-79 | Carbon resistor 1 meg ¼W 20% |
| R6,R7 | R-15520 | Carbon resistor 500K ¼W 20% |
| R8 | R-80 | Carbon res. 110 ohm ½W 20% |
| R9 | R-86 | Flexible res 70 ohm 2W 20% |
| R11 | R-15531 | Carbon res. 10K ohm ¼W 20% |
| R10 | R-85 | Carbon res 35 ohm 1W 20% Pilot Lite Mazda #40 .15 amp. |
| Y-CR-16 | | Antenna Coil |
| Y-CR-17 | | Oscillator Coil |
| Y-CI-31 | | 1st I. F Transformer |
| Y-CI-32 | | 2nd I. F. Transformer |
| Y-SP-37 | | Speaker |
| Y-CV-27 | | Variable Condenser |

## TUBE LOCATION CHART




TUBE LAYOUT

This receiver is a 5-tube, super-heterodyne using two double purpose tubes.

It operates on either AC or DC current, of 105 to 125 volts. It receives stations lying between 535 and 1750 Kilocycles. This includes standard broadcast and most police stations.

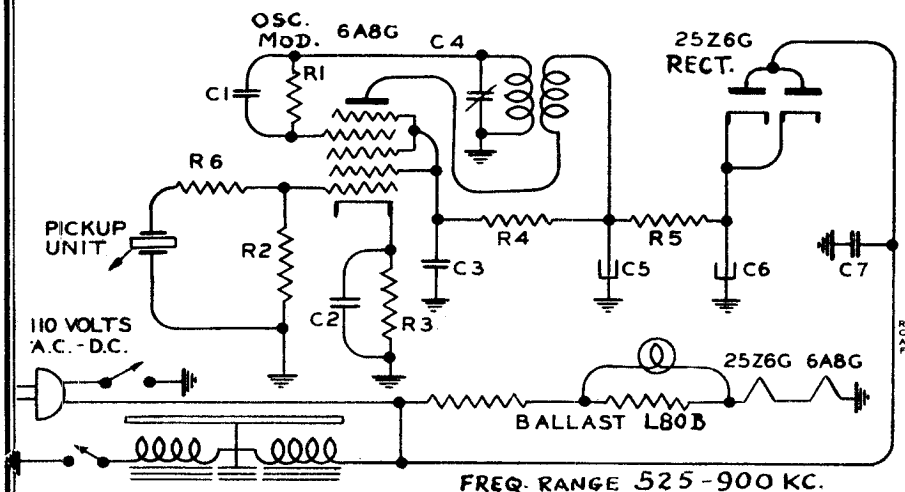
The tubes used are:

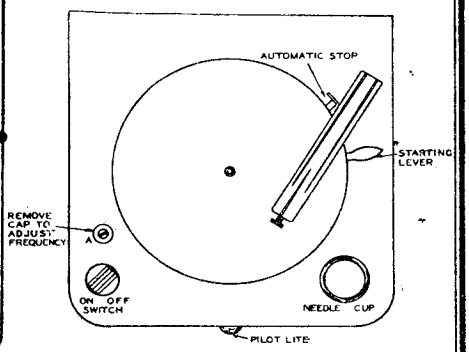
| | |
|---|---|
| 1-12A8GT | Combined oscillator and first detector |
| 1-12K7GT | Intermediate frequency amplifier |
| 1-12Q7GT | Second detector, automatic volume control, gas gate, and audio amplifier |
| 1-35L6GT | Beam power output |
| 1-35Z4GT | Rectifier |

MODEL 3PW Record Player
Schematic, Socket

# MAJESTIC RADIO & TELEV CORP.

MODEL 651
Schematic, Socket
Trimmers, Alignment



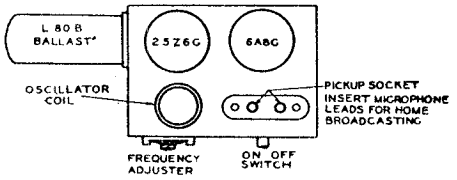



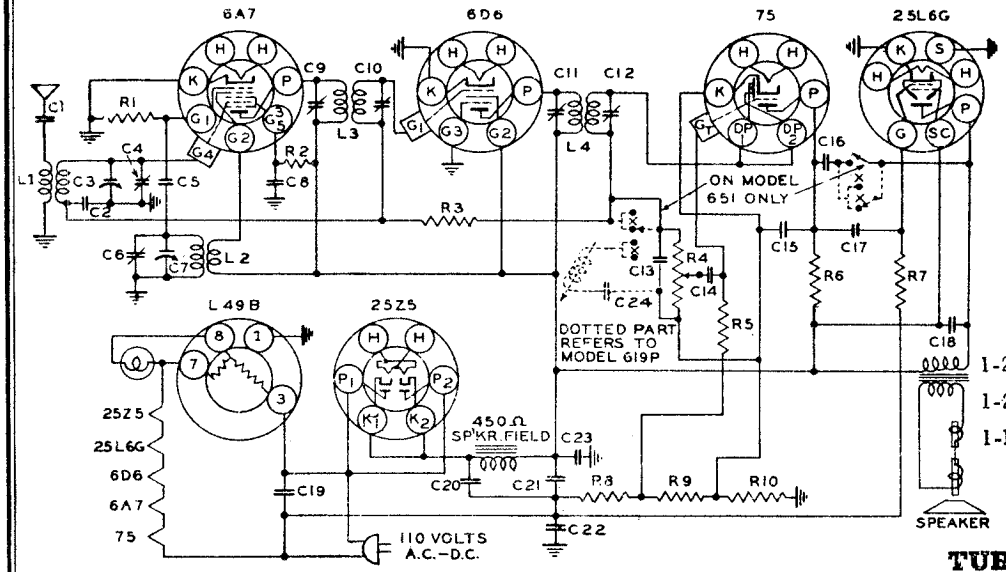

## RECORD PLAYER MODEL 3-PW

REPLACEMENT PARTS LIST FOR MODEL 3-PW

| Schematic Location | Part No. | Description |
|---|---|---|
| R4,R5 | R-2 | Carbon resistor 5K ¼W 20% |
| R1 | R-65 | Carbon resistor 10K ¼W 20% |
| R3 | R-15542 | Carbon resistor 1K ¼W 20% |
| R6 | R-15512 | Carbon resistor 250K ¼W 20% |
| R2 | R-15515 | Carbon resistor 100K ¼W 20% |
| C5,C6 | CE-47 | Elect. cond. 8.16 mfd. 150V |
| C4 | Y-CT-6- | Adj. padder cond. |
| C7 | C-15757 | Paper cond. .1 mfd. 400V |
| C2,C3 | C-15761 | Paper cond. .1 mfd. 200V |
| C1 | CM-15929 | Mica cond. 50 mmf. 20% |

## TUBE LOCATION CHART




The tubes used are:

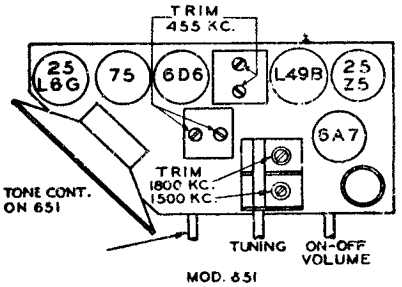
1-6A7 Frequency Converter
1-6D6 Intermediate frequency amplifier
1-75 Second detector, AVC, and audio driver
1-25L6G Beam power output
1-25Z5 Rectifier
1-L49B Plug-in ballast resistor

IF PEAK 455 KC

REPLACEMENT PARTS LIST FOR MODEL 651

| Schematic Location | Part No. | Description | Schematic Location | Part No. | Description |
|---|---|---|---|---|---|
| C1,C14,C17 | C-15754 | Tubular cond. .01 mfd 400V | R1 | R-15511 | Carbon resistor 50K ¼W 20% |
| C2,C8,C23 | C-15752 | Tubular cond. .05 mfd, 200V | R2 | R-15516 | Carbon resistor 15K ¼W 20% |
| C18 | C-15760 | Tubular cond. .02 mfd. 400V | R3 | R-15500 | Carbon resistor 2 meg. ¼W 20% |
| C19 | C-15757 | Tubular cond. .1 mfd, 400V | R5 | R-15517 | Carbon resistor 1 Meg ¼W 20% |
| C24 | C-15750 | Tubular cond. .25 mfd. 400V | R6 | R-15512 | Carbon resistor 250K ¼W 20% |
| C5 | CM-15929 | Mica cond. 50 mmf. | R7 | R-15528 | Carbon resistor 400K ¼W 20% |
| C15 | CM-15928 | Mica cond 250 mmf. | R8 | | Candohn 50 ohms |
| C13,C16 | CM-15918 | Mica cond. 100 mmf. | R9 | Y-RC-8 | Candohn 20 ohms |
| C3 | Y-CV-22 | Variable cond.(Signal Section) | R10 | | Candohn 50 ohms |
| C7 | | Variable cond.(Osc. Section) | R4 | Y-VC-21 | Volume control 500K ohms |
| C4 | | Trimmer cond. (Signal Section) | L1 | Y-CS-33 | Antenna Coil |
| C6 | | Trimmer cond. (Osc. Section) | L2 | Y-CS-46 | Oscillator Coil |
| C9 C10 | Y-CT-1 | Trimmer cond 1st I. F. Trans. | L3 | Y-CI-15 | 1st I. F Transformer |
| C11 C12 | Y-CT-1 | Trimmer cond. 2nd I. F. Trans. | L4 | Y-CI-28 | 2nd I. F. Transformer |
| C20 | | Electr. cond. 40 mfd 150WV | | | |
| C21 | Y-CE-46 | Electr. cond 16 mfd. 150WV | | | |
| C22 | | Electr cond. 20 mfd 25WV | | | |

## TUBE LOCATION CHART

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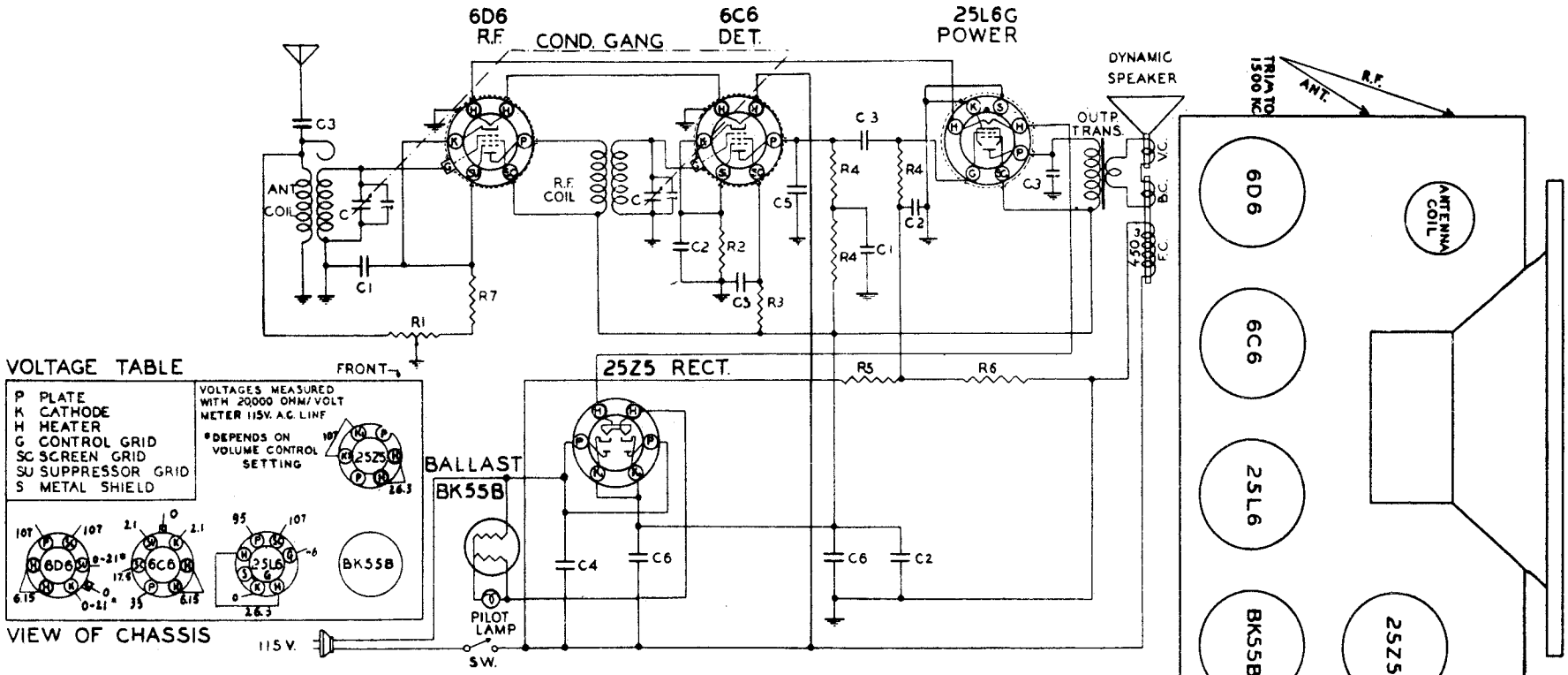



# MAJESTIC RADIO & TELEV. CORP.

MODELS 51B, 51P, 51W
Chassis 151
Schematic, Voltage
Socket, Trimmers

## REPLACEMENTS PARTS LIST—MODEL 51

| Schematic Location | Part No. | Description |
|---|---|---|
| C | Y-CV-2 | Condenser Variable Gang |
| C1 | C-15761 | Cond. Tub. .1 MFD 200 V. |
| C2 | C-15751 | Cond. Tub. .25 MFD 200 V. |
| C3 | C-15754 | Cond. Tub. .01 MFD 400 V. |
| C4 | C-15757 | Cond. Tub. .1 MFD 400 V. |
| C5 | CM-15939 | Cond. Mica 1000 MMF 20% |
| C6 | Y-CE-2 | Cond. Dry Electrolytic 20 MFD 175 V. |
| R1 | Y-VC-2 | Volume Control 50,000 Ohms |
| R2 | R-3 | Resistor Carbon 18,000 Ohms 1/4W 20% |
| R3 | R-15559 | Resistor Carbon 3 Megohms 1/4W 20% |
| R4 | R-15512 | Resistor Carbon 250,000 Ohms 1/4W 20% |
| R5 | R-15528 | Resistor Carbon 400,000 Ohms 1/4W 20% |
| R6 | R-8 | Resistor Car. 120,000 Ohms 1/4W 10% |
| R7 | R-22 | Resistor Carbon 450 Ohms 1/4W 20% |
| | Y-CR-1 | Antenna Coil |
| | Y-CR-2 | R. F. Coil |
| | Y-SP-2 | Dynamic Speaker 5½" |
| | Y-PA-10 | Pilot Light Indicator |

## TUBES

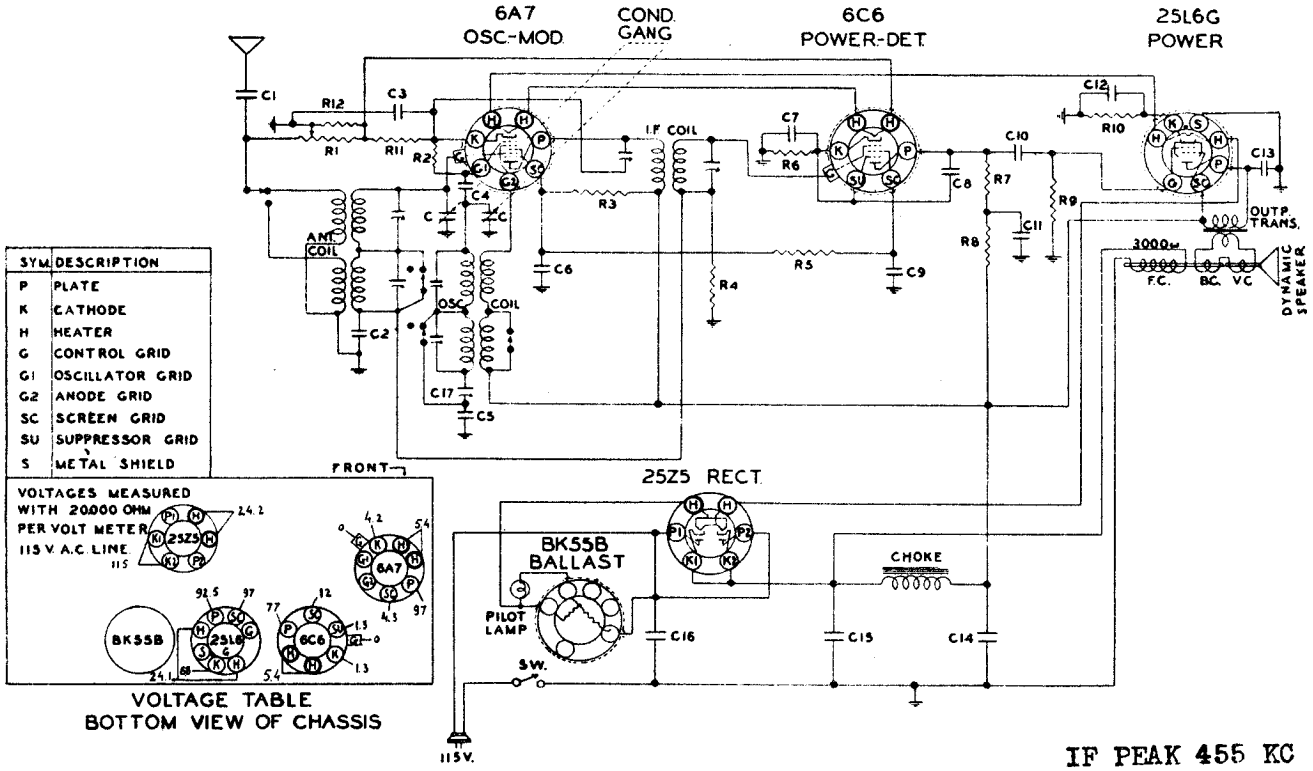
The following tube numbers are employed:

| Tube | Purpose | Kind |
|---|---|---|
| 6D6 | Radio frequency amplifier | GLASS |
| 6C6 | Power detector | GLASS |
| 25L6G | Beam Power Output | GLASS |
| 25Z5 | Rectifier | GLASS |
| YTU9 (BK55B) | Line Ballast Tube | METAL |

This receiver is a 5 tube AC-DC compact type radio receiver employing tuned radio frequency circuit. The tuning range covers all frequencies between 528 kilocycles and 1750 kilocycles (171 meters to 565 meters). These frequencies cover the standard broadcast band and in addition police calls and some amateur transmitters. This receiver is designed to operate on 50-60 cycle AC or DC at voltages between 105 and 130. These are standard voltages used practically all over the United States and in some foreign countries. The audio power output of the receiver is a maximum of 2 watts. The receiver should not be connected to any power line having higher voltage than mentioned above. On DC operation reverse plug if receiver does not commence operating one minute after switch is turned on. On AC operation reversal of the plug in some cases may reduce hum.

MODELS 55B,55P,55W
Chassis 155
Schematic,Socket
Trimmers,Alignment

# MAJESTIC RADIO & TELEV. CORP.



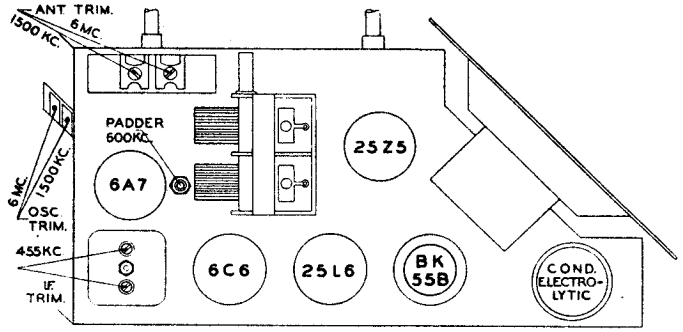

VOLTAGE TABLE
BOTTOM VIEW OF CHASSIS

IF PEAK 455 KC

## REPLACEMENTS PARTS LIST—MODEL 55

| Schematic Location | Part No. | Description |
|---|---|---|
| C | Y-CV-3 | Condenser Variable Gang |
| C1, C3, C9, C10 | C-15754 | Condenser Tubular .01 Mfd. 400 V. |
| C2, C6 | C-15752 | Condenser Tubular .05 Mfd. 200 V. |
| C7 | C-15751 | Condenser Tubular .25 Mfd. 200 V. |
| C11 | C-15761 | Condenser Tubular .1 Mfd. 200 V. |
| C13 | C-4 | Condenser Tubular .025 Mfd. 400 V. |
| C16 | C-15757 | Condenser Tubular .1 Mfd. 400 V. |
| C4 | CM-15929 | Condenser Mica 50 Mmf —20% |
| C5 | CM-15942 | Condenser Mica 1710 Mmf. 5% |
| C8 | CM-15928 | Condenser Mica 250 Mmf. 20% |

| Schematic Location | Part No. | Description |
|---|---|---|
| C12, C14, C15 | Y-CE-4 | Condenser Electrolytic Dry 12 Mfd. 25 V. / Condenser Electrolytic Dry 16 Mfd. 150 V. / Condenser Electrolytic Dry 35 Mfd. 150 V. |
| C17 | Y-CP-16472 | Condenser Padder |
| R1 | Y-VC-2 | Volume Control 50,000 Ohms |
| R2, R3 | R-15511 | Resistor Carbon 50,000 Ohms ¼ W. 20% |
| R4 | R-15559 | Resistor Carbon 3 Meg. ¼ W. 20% |
| R5 | R-7 | Resistor Carbon 1½ Meg. ¼ W. 20% |
| R6 | R-11 | Resistor Carbon 18,000 Ohms ¼ W. 10% |
| R7 | R-15517 | Resistor Carbon 1 Meg. ¼ W. 20% |
| R8 | R-15512 | Resistor Carbon ¼ Meg. ¼ W. 20% |
| R9 | R-15520 | Resistor Carbon ½ Meg. ¼ W. 20% |




CHASSIS LAYOUT
MODEL 55.

| Schematic Part Location No. | | Description |
|---|---|---|
| R10 | R-12 | Res. Car. 170 Ohms ½ W. 10% |
| R11 | R-22 | Res. Car. 450 Ohms ¼ W. 20% |
| R12 | R-15564 | Res. Car. 1,500 Ohms ¼ W. 20% |
| | Y-CK-4 | Filter Choke |
| | Y-CS-1 | Antenna Coil |
| | Y-CS-8 | Oscillator Coil |
| | Y-CI-11 | I. F. Coil |
| | Y-SP-4 | Dynamic Speaker 5½" |
| | SPA-2 | Speaker V. C. and Cone |
| | SPA-3 | Speaker Transformer |
| | P-16885 | Pilot Lamp |

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In a super-heterodyne it is very important when realigning the receiver, to use the same frequencies as are used at the factory. Alignment is best accomplished by using an output meter across the voice coil and aligning for maximum. The I. F. frequency is 455 K. C. The short wave must be aligned before the broadcast band. This is done at only one frequency, 6 megacycles. On the broadcast band the alignment frequencies are 1500 and 600 K. C. 1500 K. C. is the first to be aligned using the shunt trimmers. When aligning 600 K. C., adjust the series pad, rocking the gang condenser to assure proper alignment.

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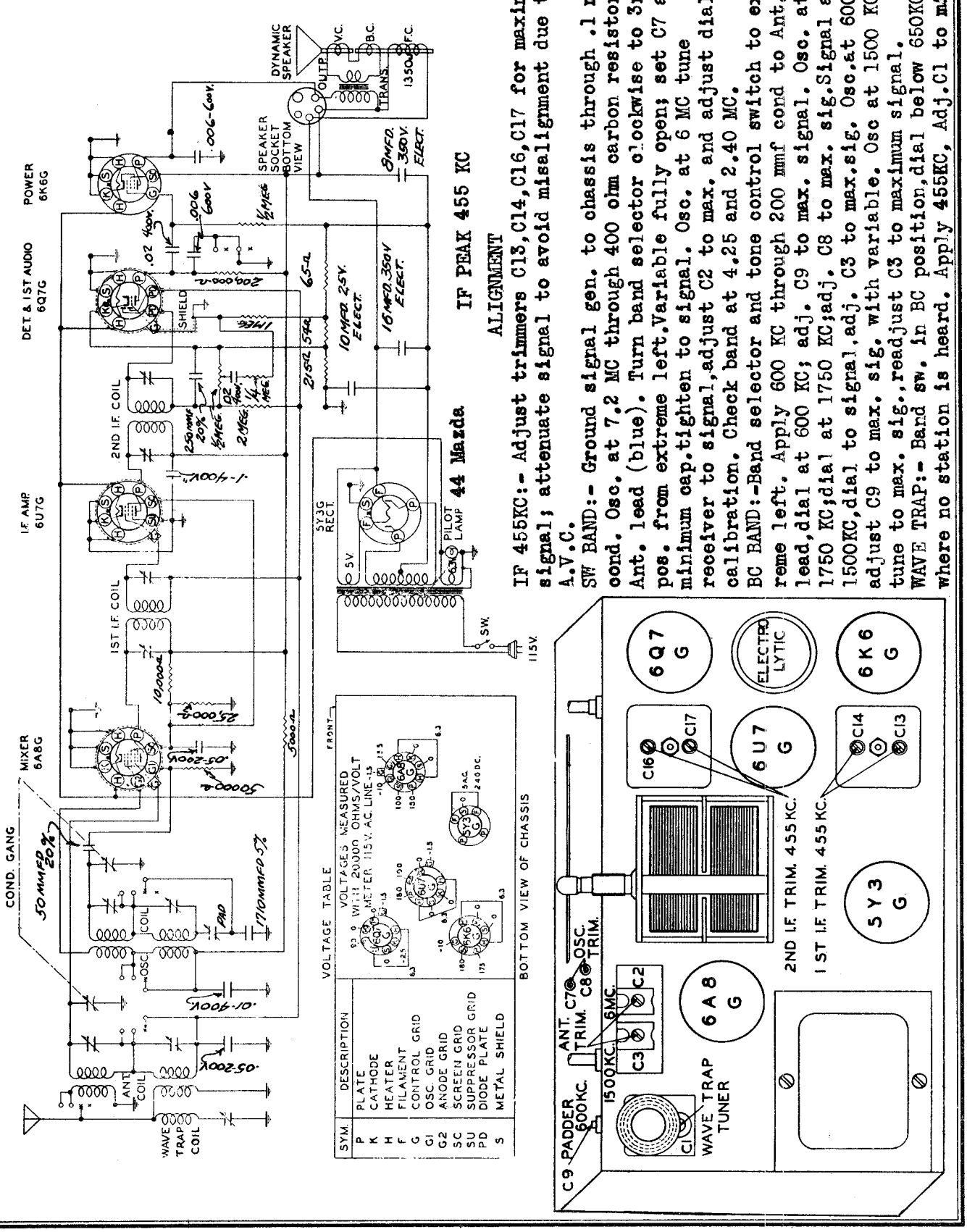
Socket, Trimmers
Alignment

# MAJESTIC RADIO & TELEV. CORP.

MODEL 56
Chassis 156
Schematic, Voltage




**IF PEAK 455 KC**

**ALIGNMENT**

**IF 455KC:- Adjust trimmers C13,C14,C16,C17 for maximum signal; attenuate signal to avoid misalignment due to A.V.C.**

**SW BAND:- Ground signal gen. to chassis through .1 mf cond. Osc. at 7.2 MC through 400 ohm carbon resistor to Ant. lead (blue). Turn band selector clockwise to 3rd pos. from extreme left.Variable fully open; set C7 at minimum cap.tighten to signal. Osc. at 6 MC tune receiver to signal,adjust C2 to max. and adjust dial calibration. Check band at 4.25 and 2.40 MC.**

**BC BAND:-Band selector and tone control switch to extreme left. Apply 600 KC through 200 mmf cond to Ant. lead,dial at 600 KC; adj. C9 to max. signal. Osc. at 1750 KC;dial at 1750 KC;adj. C8 to max. sig.Signal at 1500KC,dial to signal,adj. C3 to max.sig. Osc.at 600 KC adjust C9 to max. sig. with variable. Osc at 1500 KC, tune to max. sig.,readjust C3 to maximum signal.**

**WAVE TRAP:- Band sw. in BC position,dial below 650KC where no station is heard. Apply 455KC, Adj.C1 to min.**

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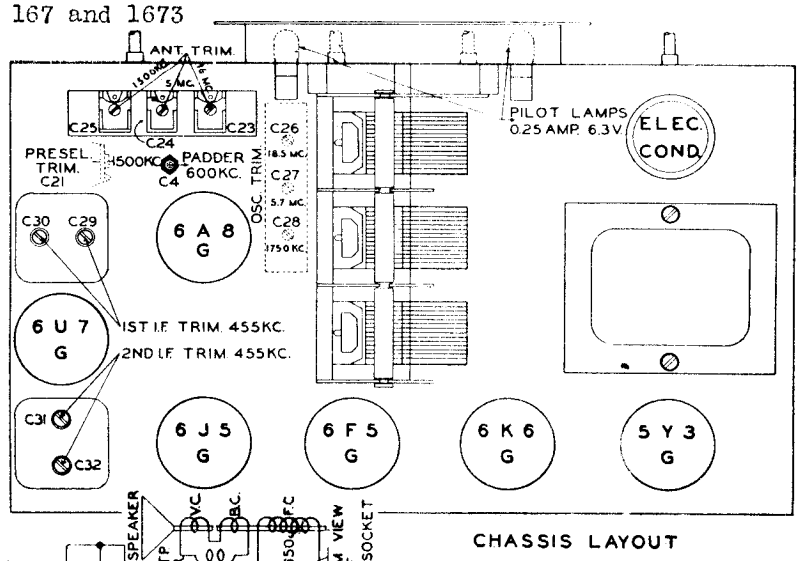
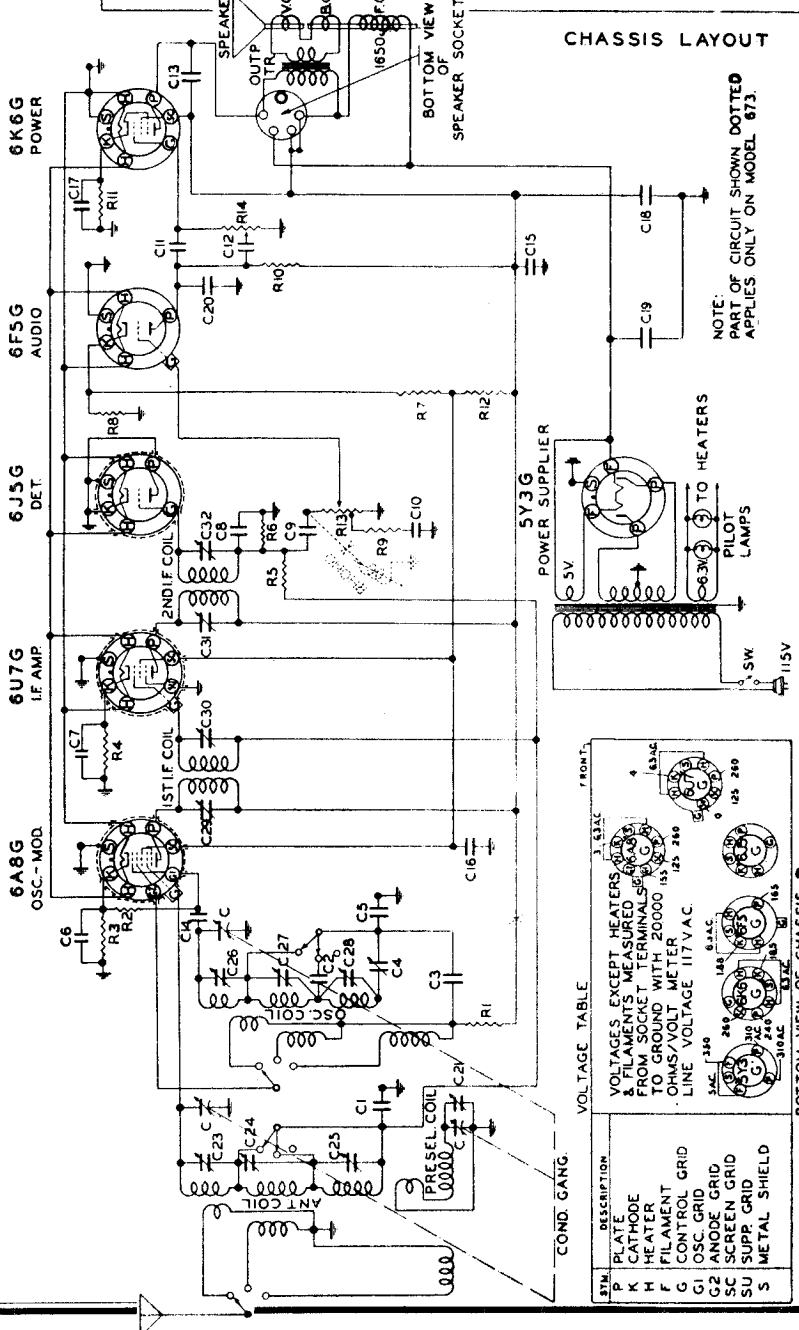
MODELS 67,68,670,671
672,673
Chassis 167 and 1673

# MAJESTIC RADIO & TELEV. CORP.

Schematic, Voltage
Socket, Trimmers
Alignment




CHASSIS LAYOUT




## IF PEAK 455 KC

Correct alignment is extremely important. The receiver is properly aligned at the factory and should not be disturbed unless it is absolutely necessary. The procedure is as follows: Turn wave change switch to broadcast position (full counter clock wise) and rotate variable condenser until it is about 50% engaged. Apply a 455 KC signal to the grid of 6A8G mixer tube through a tubular condenser on the order of .1 MFD. Referring to chassis layout, adjust C30, C29, C31 and C32 for maximum signal using of course some sort of indicating device such as an AC volt meter or output meter across the voice coil of the speaker. It may be necessary to apply a very strong signal to "find" the signal until alignment is approached. It is advisable to maintain as low a signal imput as conveniently possible in order to minimize the possibility of misalignment resulting from A.V.C. and overload effects. If a squeal is heard while tuning, rotate the gang condenser slightly and it should disappear. Naturally, the ground side of the generator should be connected to the chassis either directly or through the .1 MFD. condenser.

## SHORT WAVE BAND

Rotate the wave band switch to full clock wise position. Connect high side of generator output to antenna lead through a 400 ohm dummy antenna. Completely disengage variable condenser. Apply 18.5 meg. signal. Unscrew trimmer C26 to a minimum capacity, slowly turn the screw so that the trimmer capacity increases until the signal is heard. Apply 16 meg. signal, rotate gang condenser until this signal is heard. Adjust C23 for maximum response. It may be found advisable to "rock" generator frequency back and forth through signal to offset detuning effect from inter action between input and oscillator circuits at high frequencies. Check alignment through medium of sensitivity at 11 meg. and 6

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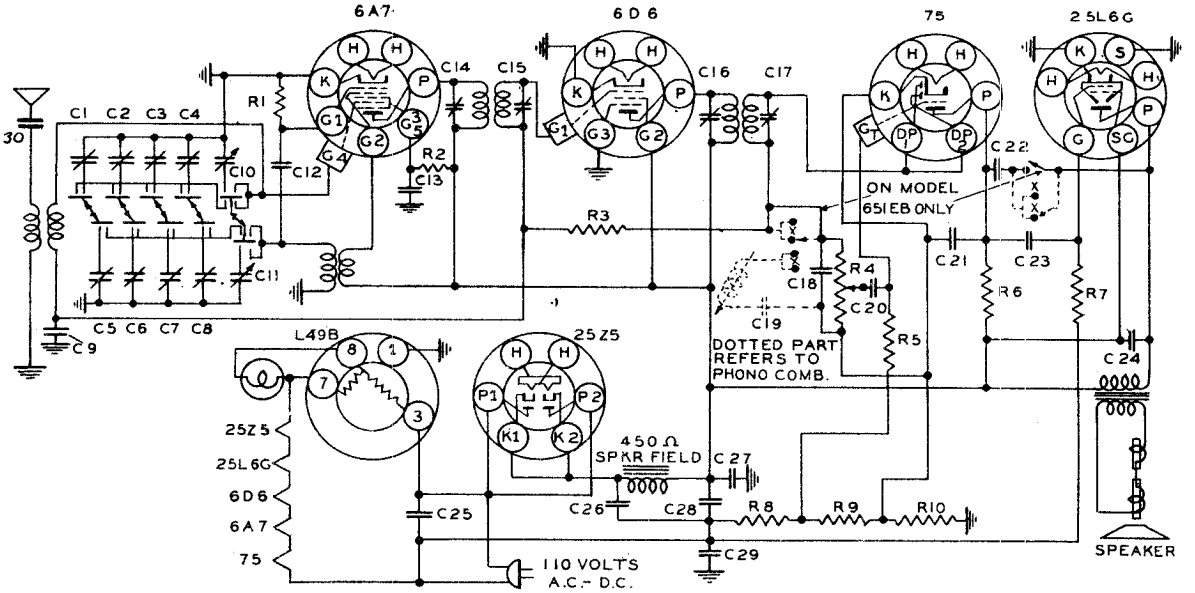
# MAJESTIC RADIO & TELEV. CORP.

MODEL 651-EB
Schematic, Tuner




## REPLACEMENT PARTS LIST—MODEL 651-EB

| Schematic Location | Part No. | Description |
|---|---|---|
| C20,C23,C30 | C-15754 | Tubular cond. .01 mfd. 400 V |
| C24 | C-15760 | Tubular cond. .02 mfd. 400V |
| C9,C13,C27 | C-15752 | Tubular cond. .05 mfd. 200V |
| C25 | C-15757 | Tubular cond. .1 mfd. 400V |
| C19 | C-15750 | Tubular cond. .25 mfd. 400V |
| C12 | CM-15929 | Mica cond. 50 mmf. Type "O" |
| C18,C22 | CM-15918 | Mica cond. 100 mmf. Type "O" |
| C21 | CM-15928 | Mica cond. 250 mmf. Type "O" |

| Schematic Location | Part No. | Description |
|---|---|---|
| C14,C15 | Y-CT-1 | Trimmer cond. 1st I.F. |
| C16,C17 | Y-CT-1 | Trimmer cond. 2nd I.F. |
| C10,C11 | Y-CV-24 | Variable 2 gang condenser |
| C26 | Y-CE-46 | Elect. cond. 40 mfd. 150 WV |
| C28 | | Elect. cond. 16 mfd. 150 WV |
| C29 | | Elect. cond. 20 mfd. 25 WV |
| C1,C2,C3,C4 C5,C6,C7,C8 | Y-CT-20 | Trimmer cond. strip |

| Schematic Location | Part No. | Description |
|---|---|---|
| R1 | R-15511 | Carbon resistor 50K ¼ W 20% |
| R2 | R-15516 | Carbon resistor 15K ¼ W 20% |
| R3 | R-15500 | Carbon resistor 2meg ¼ W 20% |
| R5 | R-15517 | Carbon resistor 1meg ¼ W 20% |
| R6 | R-15512 | Carbon resistor 250K ¼ W 20% |
| R7 | R-15528 | Carbon resistor 400K ¼ W 20% |
| R8 | Y-RC-8 | Candohm 50 ohms |
| R9 | | Candohm 20 ohms |
| R10 | | Candohm 50 ohms |
| R4 | Y-VC-21 | Volume control 500K |

I.F. PEAK 455 KC.

The tubes used are:

| | |
|---|---|
| 1-6A7 | Frequency Converter |
| 1-6D6 | Intermediate frequency amplifier |
| 1-75 | Second detector, AVC, and audio driver |
| 1-25L6G | Beam power output |
| 1-25Z5 | Rectifier |
| 1-L49B | Plug-in ballast resistor |

## ADJUSTMENT OF PUSH BUTTONS

1—Determine which four stations you desire to set up on the push buttons.

2—Determine the frequency of these stations.

3—Determine the proper push button on which these stations should be set up from the following table.

No. 1 Push button is for manual tuning.
No. 2 " " is for stations lying between 540 and 920 KC's.
No. 3 " " is for stations lying between 540 and 920 KC's.
No. 4 " " is for stations lying between 750 and 1200 KC's.
No. 5 " " is for stations lying between 850 and 1550 KC's.

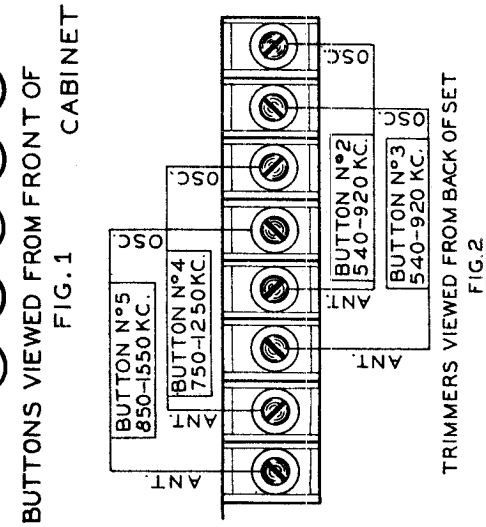
4—Push the proper push button.

5—Using an insulated screw driver adjust the oscillator trimmer corresponding to the proper push button as shown in Fig. 2 until your station is tuned in with best tonal response.

6—Adjust the antenna trimmer corresponding to the proper push button until the station already heard is received with maximum volume.

7—Repeat steps 4, 5, and 6 for the other push buttons.

It may be desirable to check the push buttons occasionally for proper adjustment as extreme climatic variations may affect the push buttons set on high frequency stations.




PUSH BUTTONS VIEWED FROM FRONT OF CABINET
FIG. 1




TRIMMERS VIEWED FROM BACK OF SET
FIG. 2

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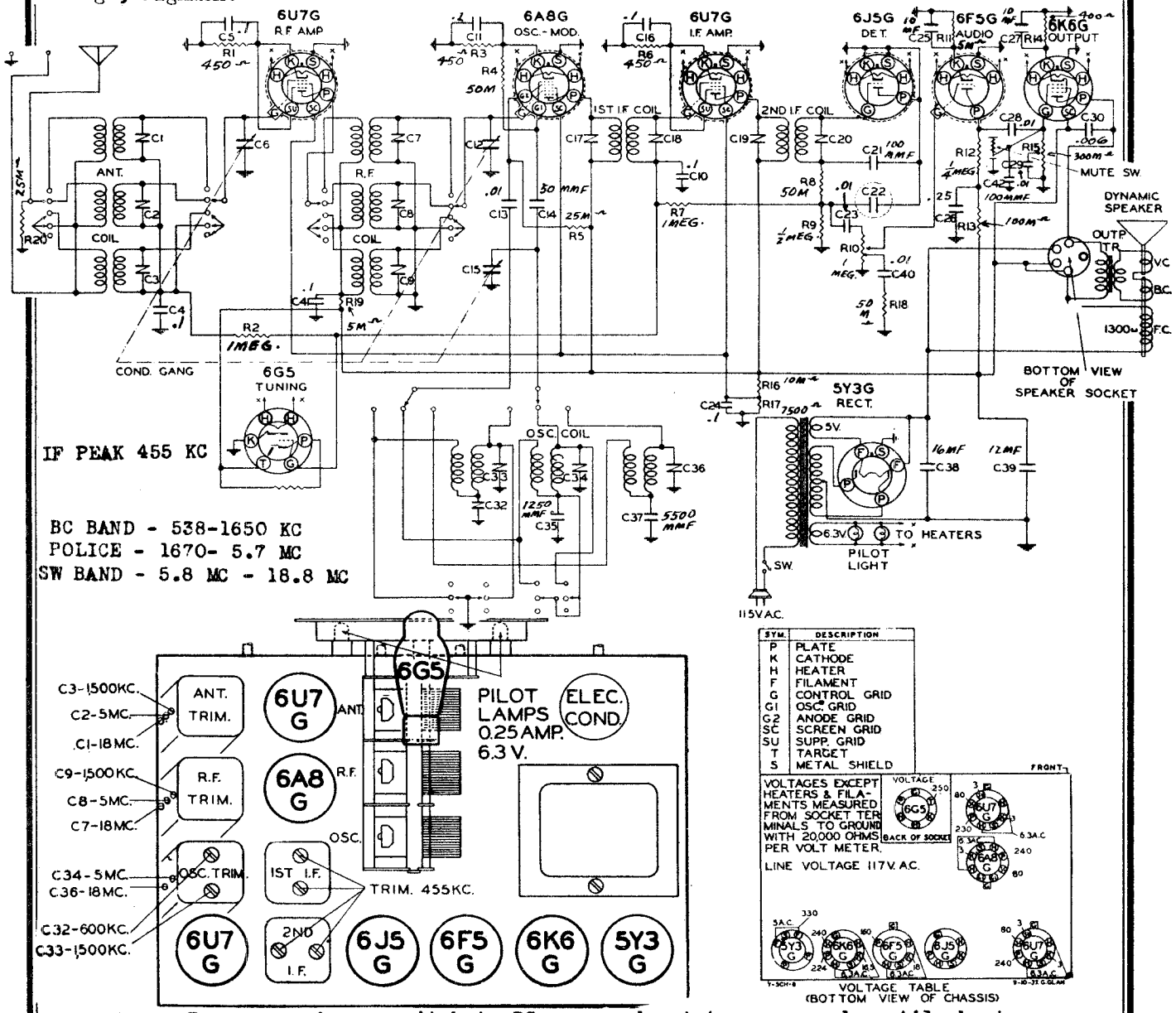
Chassis 1870
Schematic, Socket, Trimmers MAJESTIC RADIO & TELEV. CORP.
Voltage, Alignment







| SYM. | DESCRIPTION |
|---|---|
| P | PLATE |
| K | CATHODE |
| H | HEATER |
| F | FILAMENT |
| G | CONTROL GRID |
| G1 | OSC. GRID |
| G2 | ANODE GRID |
| SC | SCREEN GRID |
| SU | SUPP. GRID |
| T | TARGET |
| S | METAL SHIELD |


VOLTAGES EXCEPT HEATERS & FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH 20,000 OHMS PER VOLT METER.
LINE VOLTAGE 117V. A.C.
VOLTAGE
FRONT
BACK OF SOCKET
6.3A.C.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

ALIGNMENT - Turn wave change switch to BC pos. and rotate var. cond. until about 50 percent engaged. Apply a 455 KC sig. to 6A8G thru a .1 mf cond. Adjust trimmers marked "Trim 455 KC" for maximum signal.

SHORT WAVE BAND - Rotate wave band switch to full clockwise pos. Connect high side of gen. o.p. to ant. lead thru 400 ohm dummy ant. Set dial at 18 MC - Apply 18 MC signal. Adj. C36 trim. to min. cap., slowly turn screw so trim. cap. increases until signal is heard. Apply 18 MC sig. and adj. C7 and C1 for max. - Check align. thru medium of sensitivity at 11 meg. and 6 meg. resp. - When align. at 18 MC the C7 trim. may indicate 2 maxima. Maxima obtained with trimmer tighter is the desired one. Check by leaving gang cond. set and shifting to higher freq. : 19 meg. where image should appear. If properly aligned it should require about 10 times six. volt. for image to give same O.P. as real signal.

POLICE BAND - Shift waveband switch to middle pos. - Apply 5 MC sig. - Dial at 5 Mc. - Adj. C34 trim. as previous band until max. sig. is heard. Apply 5 meg. sig. and adj. Check alignment at 3.5 and 2 MC resp. Check for image same as previous band.

BROADCAST BAND - Use a 200 mmf cond. for dummy ant. on this band. Shift wave band sw. to full counter clockwise. Adj. trims. C3 and C9 to medium tight pos. - Dial at 600 KC. Apply 600 KC sig. and adj. padder C32 for max. - Dial at 1500 KC and 1500 KC sig. adj. C33 for same. Then adj. trims. C3 and C9 for max. - Shift gang to 600 KC and apply 600 KC sig. - Adjust C4 for max. sig. - Recheck 1500 KC trimming.

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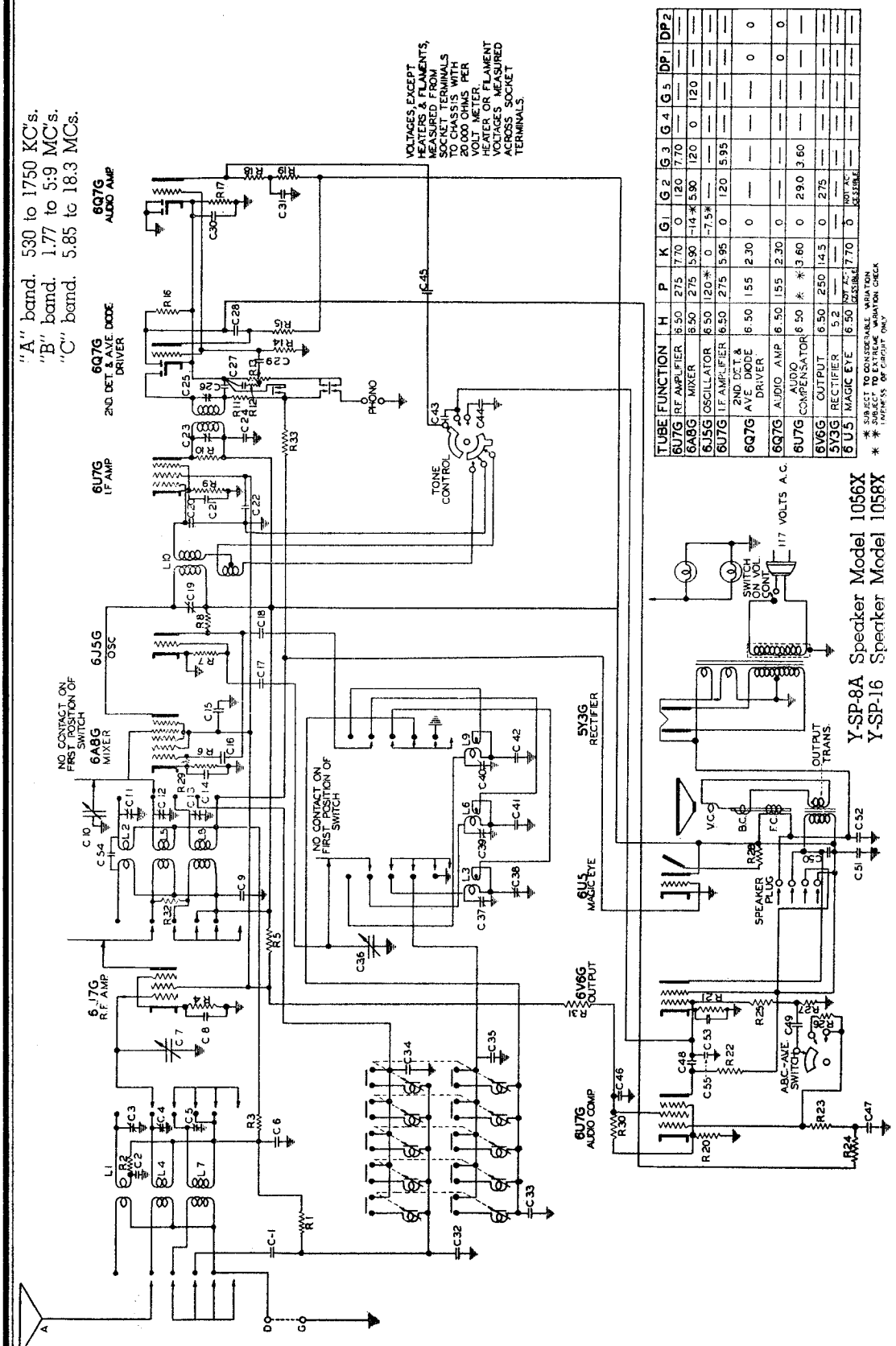
# MAJESTIC RADIO & TELEV. CORP.

MODELS 1056X, 1058X
Schematic, Voltage


"A" band. 530 to 1750 KC's.
"B" band. 1.77 to 5.9 MC's.
"C" band. 5.85 to 18.3 MCs.
VOLTAGES, EXCEPT HEATERS & FILAMENTS, MEASURED FROM SOCKET TERMINALS TO CHASSIS WITH 20,000 OHMS PER VOLT METER. HEATER OR FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS.
6Q7G AUDIO AMP
6Q7G 2ND DET & AVE DIODE DRIVER
6U7G I.F AMP
6J5G OSC
6A8G MIXER
6J7G R.F. AMP
6V6G OUTPUT
5Y3G RECTIFIER
6U5 MAGIC EYE
6U7G AUDIO COMP
NO CONTACT ON FIRST POSITION OF SWITCH
TONE CONTROL
PHONO
SPEAKER PLUG
OUTPUT TRANS.
SWITCH ON VOL CONT.
117 VOLTS A.C.
ABC-AVE SWITCH
Y-SP-8A Speaker Model 1056X
Y-SP-16 Speaker Model 1058X

| TUBE | FUNCTION | H | P | K | G1 | G2 | G3 | G4 | G5 | DP1 | DP2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 6U7G | RF AMPLIFIER | 6.50 | 275 | 7.70 | 0 | 120 | 7.70 | 0 | — | — | — |
| 6A8G | MIXER | 6.50 | 275 | 5.90 | -14 * | 5.90 | 120 | 0 | 120 | — | — |
| 6J5G | OSCILLATOR | 6.50 | 120 * | 0 | -7.5 * | — | — | — | — | — | — |
| 6U7G | I.F. AMPLIFIER | 6.50 | 275 | 5.95 | 0 | 120 | 5.95 | — | — | — | — |
| 6Q7G | 2ND DET. & AVE. DIODE DRIVER | 6.50 | 155 | 2.30 | 0 | — | — | — | — | 0 | 0 |
| 6Q7G | AUDIO AMP. | 6.50 | 155 | 2.30 | 0 | — | — | — | — | 0 | 0 |
| 6U7G | AUDIO COMPENSATOR | 6.50 | * | * 3.60 | 0 | 290 | 3.60 | — | — | — | — |
| 6V6G | OUTPUT | 6.50 | 250 | 14.5 | 0 | 275 | — | — | — | — | — |
| 5Y3G | RECTIFIER | 5.2 | — | — | — | — | — | — | — | — | — |
| 6U5 | MAGIC EYE | 6.50 | NOT AC ACCESSIBLE | 7.70 | 0 | NOT AC ACCESSIBLE | — | — | — | — | — |

* SUBJECT TO CONSIDERABLE VARIATION
** SUBJECT TO EXTREME VARIATION CHECK HARNESS OR CIRCUIT ONLY

IF PEAK 455 KC

The tubes used are:

| | | | |
|---|---|---|---|
| 1 - 6 U 7 G | R. F. amplifier | 1 - 6 U 7 G | AVE and ABC |
| 1 - 6 A 8 G | Modulator | 1 - 6 Q 7 G | Driver |
| 1 - 6 J 5 G | Oscillator | 1 - 5 Y 3 G | Rectifier |
| 1 - 6 U 7 G | I. F. amplifier | 1 - 6 V 6 G | Beam power output |
| 1 - 6 Q 7 G | 2nd det. and AVE amp. | 1 - 6 U5 | Tuning indicator |

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MODELS 1056X,1058X
Socket,Trimmers,
Parts List,Notes
Alignment

# MAJESTIC RADIO & TELEV. CORP.

| Schematic Location | Part Number | Description |
|---|---|---|
| C7 C10 C36 | Y-CV 7 | Variable condenser |
| C32 | CM-27 | 2000 MMF 3% silver condensers |
| C34 | CM-24 | 484 MMF 1% silver condensers |
| C33 | CM-26 | 710 MMF 1% silver condensers |
| C35 | CM-25 | 274 MMF 1% silver condensers |
| C2 C9 C18 | C-5 | .01 MFD 400 Volt R. F. type |
| C1 C8 C14 | C-6 | .05 MFD 200 Volt R. F. type |
| C21 | C-15761 | .1 MFD 200 Volt |
| C22 C46 | C-15757 | .1 " 400 " |
| C29 C49 | C-15754 | .01 " 400 " |
| C44 C48 C50 | C-15759 | .006 " 600 " |
| C24 C31 | C-15750 | .25 " 400 " |
| C47 | C-9 | .15 " 200 " |
| C27 | C-15772 | .02 " 200 " |
| C6 C15 C45 | C-15756 | .05 " 400 " |
| C16 | CM-15928 | 250 MMF Mica Condenser |
| C17 | CM-15929 | 50 " " " |
| C42 | CM-9 | 5500 " " " |
| C41 | CM-6 | 1350 " " " |
| C43 | CM-15939 | 1000 " " " |
| C26 C28 C55 | CM-15918 | 100 " " " |
| C54 | CM-10 | 10 " " " |
| C38 | Y-CT-4 | Padding Condenser |
| C3 C4 C5 C11 C12 C13 | Y-CT-3 | Trimmer Condenser |
| C 37 C39 C40 | Y-CE-10 | 16+16 MFD 400 Volt. 10 MFD - 25 Volt electrolytic cond. |
| C51 C52 C53 | CE-25 | 10 MFD 25 Volt |
| C30 C20 C23 C25 | Y-CT-2 | Trimmer I. F. |
| R13 | Y-VC-5 | Volume Control |
| R25 R27 | 15512 | 250K ¼W 20% |
| R4 | 15543 | 1000 ¼W 20% |
| R1 R2 R3 R19 | 15515 | 100K ¼W 20% |
| R5 | R-26 | 10K 3W 10% |
| R6 | 15571 | 500 ohm ¼W 10% |
| R7 R11 R29 | 15511 | 50K ¼W 20% |
| R8 | 15501 | 25K 1W 20% |
| R9 R72 | 15519 | 700 ohm ¼W 10% |
| R10 R18 | 15549 | 300K ¼W 20% |
| R12 | 15557 | 20K ¼W 20% |
| R14 R16 R23 R26 R33 | 15517 | 1M ¼W 20% |
| R31 | 15513 | 20K ½W 20% |
| R15 R22 | 15528 | 400K ¼W 20% |
| R17 | R-40 | 4K ¼W 20% |
| R20 | R-76 | 400 ohm ¼W 10% |
| R21 | 15584 | 250 ohm 1W 10% |
| R24 | 15500 | 2M ¼W 20% |
| R30 | 15576 | 5K ¼W 20% |
| R32 | 15530 | 2500 ¼W 20% |
| R28 | | 1M connected internal in magic eye socket |
| | Y-B9 | Tone control |
| R13 | Y-B-11 | ABC-AVE switch |
| | Y-VC-5 | Volume control |
| | Y-B-43 | Band switch |

FOR PHONOGRAPH AND
TUNER DATA,SEE INDEX




CHASSIS LAYOUT
(BOTTOM VIEW)




CHASSIS LAYOUT
(TOP VIEW)

**Antenna**

There are three terminals on back of chassis marked A D G. Terminal A is for use with ordinary outdoor antennas from 30 to 50 feet in length. Terminal G is for connection to a suitable ground such as a water pipe, although radiators or other type grounds are often used successfully. Terminal D is to used in combination with A when a doublet type antenna is used and under these conditions there should be no connection between terminals D and G.

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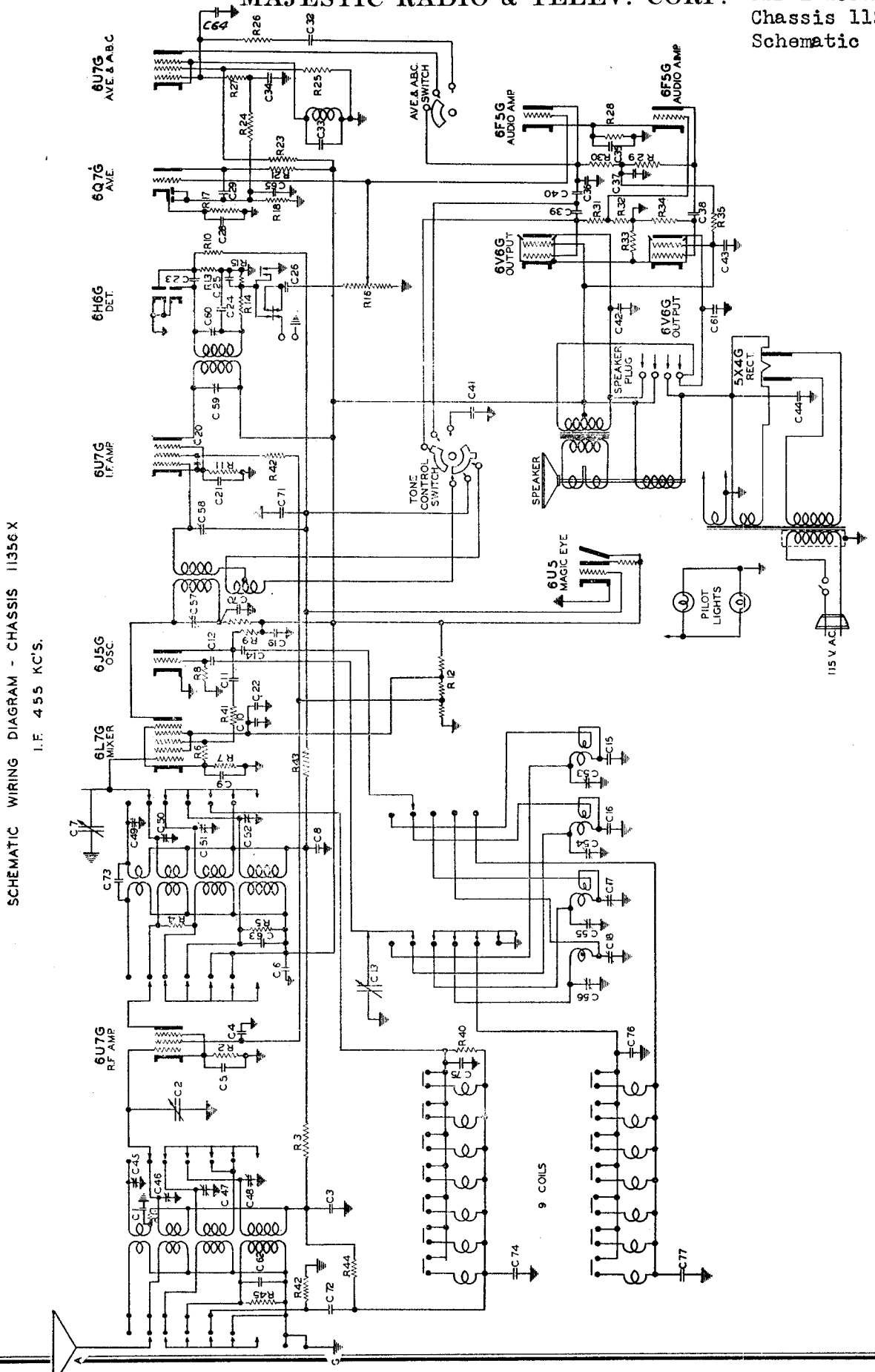
# MAJESTIC RADIO & TELEV. CORP.

MODEL 1356X
Chassis 11356X
Schematic




SCHEMATIC WIRING DIAGRAM - CHASSIS 11356X

I.F. 455 KC'S.

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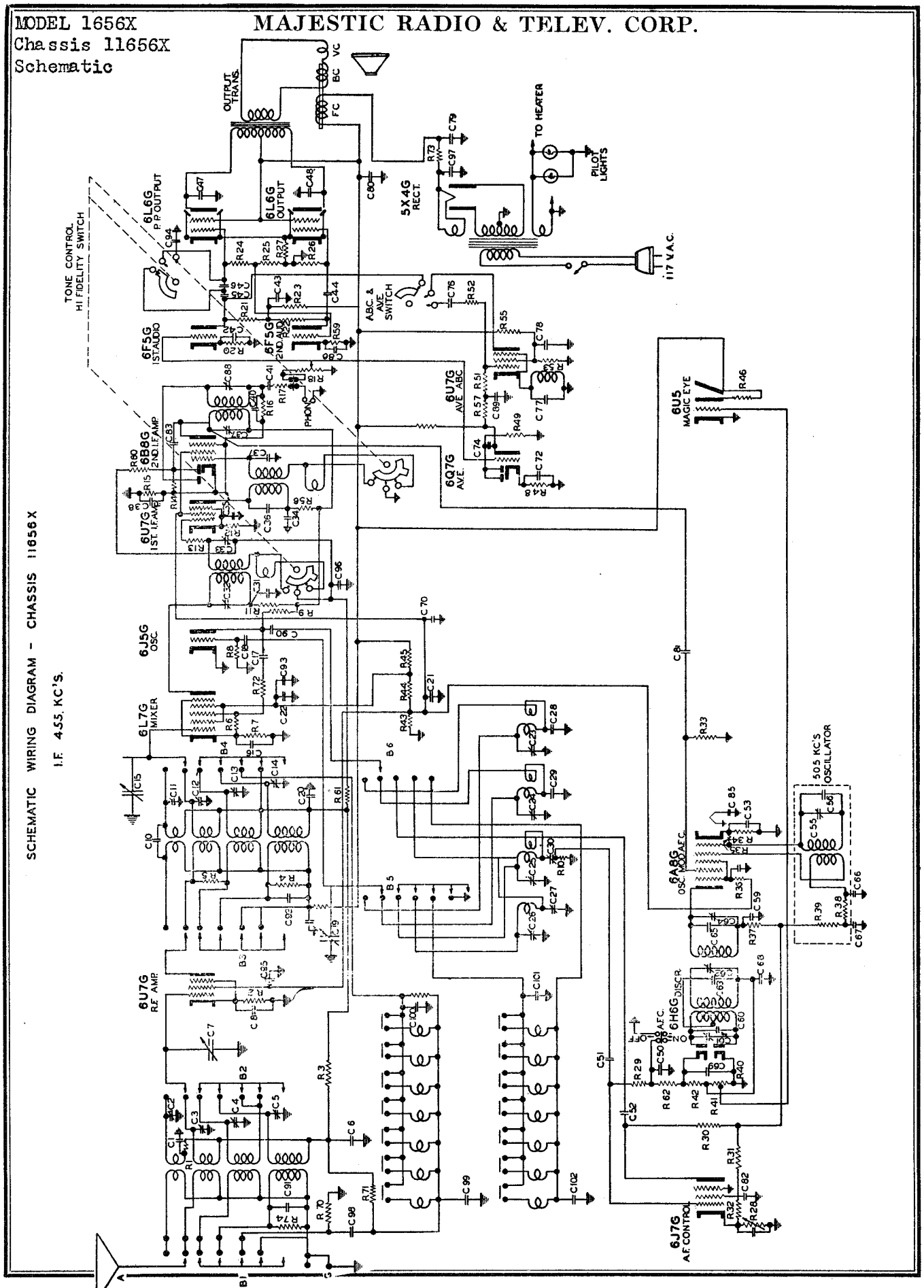
MODEL 1656X
Chassis 11656X
Schematic

# MAJESTIC RADIO & TELEV. CORP.

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MODELS 1056X,1058X
Phono.,Tuner Data

# MAJESTIC RADIO & TELEV. CORP.

MODEL 1356X
MODEL 1656X
Socket,Trimmers
Phono.,Tuner Data
Alignment

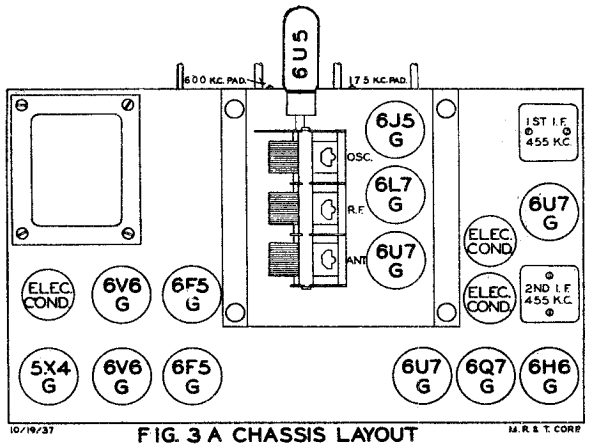



FIG. 3 A CHASSIS LAYOUT
TOP VIEW
MODEL 1356X

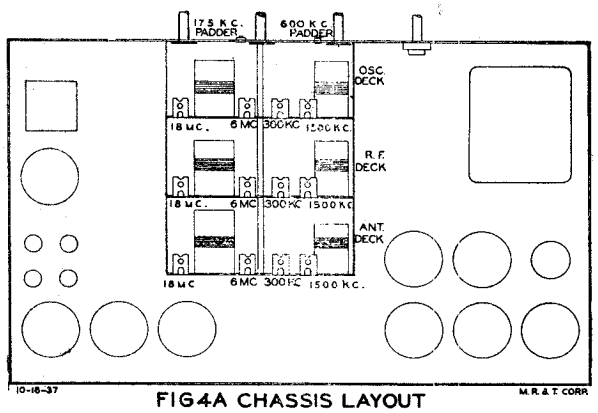



FIG4A CHASSIS LAYOUT
BOTTOM VIEW MODEL 1356X

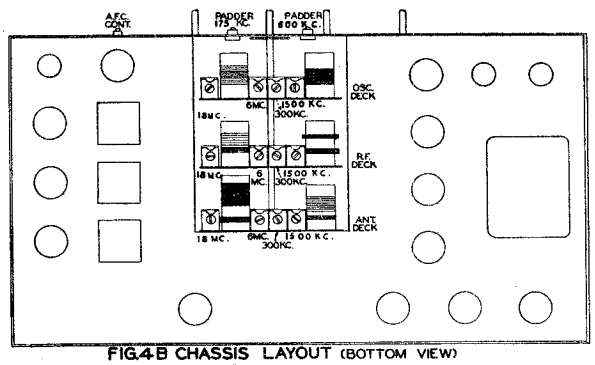



FIG.4B CHASSIS LAYOUT (BOTTOM VIEW)
MODEL 1656X

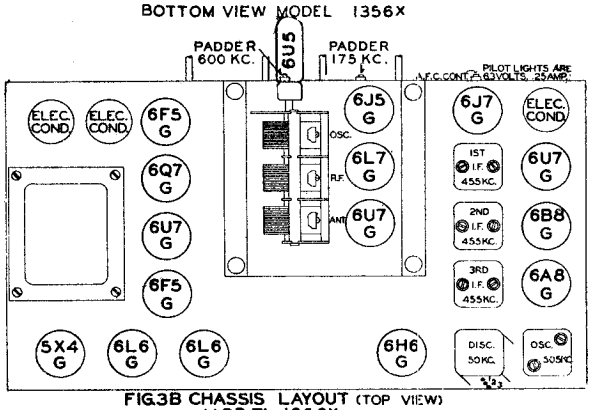



FIG.3B CHASSIS LAYOUT (TOP VIEW)
MODEL 1656X

MODELS 1056X,1058X,1356X,1656X

**PHONOGRAPH**—For phonograph, you can use the MAJESTIC Wireless record player, Model 3 PW, or any standard record player. When using a standard record player, plug in the pick-up tips in the jacks marked "PHONO" at the rear of the receiver. If you get undue hum, reverse these pick-up tips. Push the push-button marked "PHONO" and adjust the Volume, Tone, Volume Expansion and Bass Compensation by means of the controls on the receiver.

**AUTOMATIC FREQUENCY CONTROL**—Model 1656X.

When tuning manually on the broadcast or "A" band, the station may be pulled and held into proper tuning by using the AFC. This is done by pushing the first button from the left. If the station is approximately tuned, the AFC will do the rest and insure proper tuning.

This should be used only on local or strong stations as the AFC will cause the set to tune itself to the strongest stations within its range.

To release the AFC, push the AFC button slightly upward. This will cause it to come out in the same manner as the "PHONO" button.

**SETTING UP OF PUSH BUTTONS**

To adjust the push buttons, turn the band switch knob, the second one from the left, all the way to the left, to the position marked "E" on the cabinet. Going to the back of the receiver, adjust the coil marked No. in figure two (2), by turning the screw in the center of the coil by means of a screw driver, until the station you desire to hear is heard with maximum volume and best tone.

It is desirable to turn the tone control to high fidelity when listening on the push-buttons.

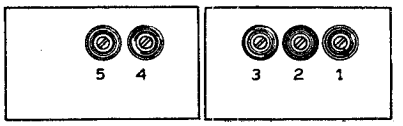
Only local or strong stations should be set up on the push-buttons.

| Push button Number | Model 1356X | Model 1656X |
|---|---|---|
| 1 is for stations lying between | 1250 and 1750 KC's | AFC |
| 2 " " " " " | 950 and 1560 KC's | 1250 and 1750 KC's |
| 3 " " " " " | 950 and 1560 KC's | 950 and 1560 KC's |
| 4 " " " " " | 680 and 1110 KC's | 950 and 1560 KC's |
| 5 " " " " " | 680 and 1110 KC's | 680 and 1110 KC's |
| 6 " " " " " | 680 and 1110 KC's | 680 and 1110 KC's |
| 7 " " " " " | 540 and 720 KC's | 680 and 1110 KC's |
| 8 " " " " " | 540 and 720 KC's | 680 and 1110 KC's |
| 9 " " " " " | 540 and 720 KC's | 540 and 720 KC'c |
| 10 " " " " " | PHONO | 540 and 720 KC'c |
| 11 " " " " " | | 540 and 720 KC'c |
| 12 " " " " " | | PHONO |

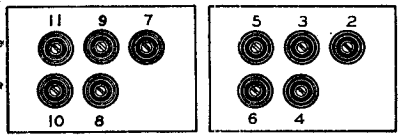
When the buttons are set up and the wave band switch is turned all the way to the left, counter clockwise, pushing any one of the buttons will cause the receiver to receive the station set up on that particular button.

**WARNING**

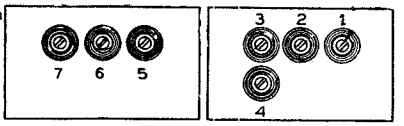
When operating this set on " RADIO," make certain that the phonograph push-button is out. If it is not, pushing slightly upwards on this push-button will cause it to be released and come out.



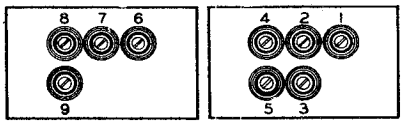

1056 X




MODEL 1656X




1058 X




1356 X

| Push-Button Number | 1056X | 1058X |
|---|---|---|
| 1 | 980 KC's to 1600 KC's | 980 KC's to 1600 KC's |
| 2 | 680 KC's to 1150 KC's | 980 KC's to 1600 KC's |
| 3 | 680 KC's to 1150 KC's | 680 KC's to 1150 KC's |
| 4 | 540 KC's to 880 KC's | 680 KC's to 1150 KC's |
| 5 | 540 KC's to 880 KC's | 680 KC's to 1150 KC's |
| 6 | Phonograph | 540 KC's to 880 KC's |
| 7 | | 540 KC's to 880 KC's |
| 8 | | Phonograph |

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MODEL 1356X
MODEL 1656X
Parts Lists

# MAJESTIC RADIO & TELEV. CORP.

## Replacement Parts List For Chassis 1656X

| Schematic location | Part Number | Description |
|---|---|---|
| C7, C15, C19 | Y-CV-7 | Condenser 3 gang variable |
| C68, C69 | C-15772 | " Tubular .02 mfd 200 V |
| C1, C9, C90, C98 | C-5 | " " .01 mfd 400 V |
| C6 C8, C16, C22, C95, C20 | C-6 | " " .05 mfd 200 V (H.F.) |
| C31, C34, C58, C59, C66, C67 | C-15757 | " " .1 mfd 400 V |
| C35, C38, C78, C84, C96 | C-15761 | " " .1 mfd 200 V |
| C89 | C-15770 | " " .2 mfd 200 V |
| C21 | C-15775 | " " .5 mfd 200 V |
| C76 | C-15771 | " " .004 mfd 600 V |
| C47, C48 | C-15 | " " .002 mfd 800 V |
| C85 | C-14 | " " .5 mfd 120 V |
| C94 | C-15759 | " " .006 mfd 600 V |
| C70 | C-15750 | " " .25 mfd 400 V |
| C77 | C-9 | " " .15 mfd 200 V |
| C46 | C-15767 | " " .001 mfd 600 V |
| C41, C44, C45, C50 | C-15760 | " " .02 mfd 400 V |
| C49, C53, C74, C82 | C-15756 | " " .05 mfd 400 V |
| C51 | CM-11 | " Mica 500 mmf 10% |
| C56 | CM-16 | " " 150 mmf 10% |
| C60, C83, C85 | CM-15917 | " " 650 mmf 5% |
| C18, C57, C81, C83, C91 | CM-15919 | " " 50 mmf 10% |
| C28 | CM-9 | " " 5500 mmf 5% |
| C29 | CM-6 | " " 1350 mmf 5% |
| C17, C75, C92 | CM-7 | " " 250 mmf 5% |
| C10 | CM-10 | " " 10 mmf 5% |
| C52, C40 | CM-15906 | " " 100 mmf 10% |
| C99 | CM-27 | " " 2000 mmf silver plated |
| C100 | CM-24 | " " 484 mmf silver plated |
| C101 | CM-25 | " " 274 mmf silver plated |
| C102 | CM-26 | " " 710 mmf silver plated |
| C42, C72, C86 | CE-25 | " Tubular Dry Elec. 10 mfd 25 V |
| C43 | CE-27 | " Tubular Dry Elec. 4 mfd 300 V |
| C97 | CE-22 | " Tubular Dry Elec. 28 mfd 400 V |
| C79 | CE-15 | " Wet Electrolytic |
| C80 | CE-13 | " Wet Electrolytic |
| C93 | B-17042 | " Wet Electrolytic |
| C54, C55 | Y-CT-5 | " Air trimmer |
| C2, C3, C4, C11, C12, C13, C23, C24, C25 | Y-CT-3 | " Trimmer 3-30 mmf |
| C5, C14, C26 | Y-CT-7 | " Trimmer 40-100 mmf |
| C30 | Y-CT-4 | " Trimmer |
| C27 | Y-CT-6 | " Trimmer |
| C61, C62, C64 | Y-CP-3 | " Padder |
| C32, C33, C36, C37, C87, C88 | Y-CT-2 | I. F. Trimmer |
| R13 | R-39 | Carbon Resistor 750K ¼ W 20% |
| R10 | R-41 | " " 75 ohm ¼ W 10% |
| R9 | R-15501 | " " 25K 1 W 20% |
| R8, R17, R23 ,R35 | R-15511 | " " 50K ¼ W 20% |
| R4, R5 | R-15530 | " " 2500 ohm ¼ W 10% |
| R2, R7 | R-15610 | " " 900 ohm ¼ W 10% |
| R1, R3, R6, R21, R71 | R-15515 | " " 100K ¼ W 20% |
| R30, R31, R32 | R-15510 | " " 20K ¼ W 20% |
| R14, R42, R49, R52, R57, R60, R61 | R-15517 | " " 1 meg. ¼ W 20% |
| R16, R24, R26, R29, R40, R41 | R-15520 | " " 500K ¼ W 20% |
| R11, R53, R56 | R-2 | " " 5000 ohm ¼ W 20% |
| R12 | R-15519 | Carbon Resistor 700 ohms ¼ W 10% |
| R15, R34 | R-15551 | " " 250 ohms ¼ W 10% |
| R36 | R-15566 | " " 2000 ohms ¼ W 10% |
| R33, R62 | R-15500 | " " 2 Meg. ¼ W 20% |
| R22, R51, R58 | R-15512 | " " 250K ¼ W 20% |
| R20, R38, R39, R54, R59 | R-15556 | " " 10000 ohms ¾ W 10% |
| R37, R48 | R-15617 | " " 3000 ohms ¼ W 20% |
| R25 | R-16 | " " 8000 ohms ¼ W 20% |
| R55 | R-15524 | " " 50K 1 W 10% |
| R72 | R-15601 | " " 100 ohms ¼ W 20% |
| R73 | R-78 | " " 150 ohms 4 W 20% |
| R74 | R-15570 | " " 2000 ohms ¼ W 20% |
| R28 | Y-PA-12 | Variable resistor 1000 ohms |
| R18 | Y-VC-9 | Volume control 1 meg |
| R27 | Y-RC-5 | Camdohm resistor |
| R43, R44, R45 | Y-RC-3 | Camdohm resistor |
| R46 | | 1 MEG. Internal connection in magic eye socket |
| R70 | R-15542 | Carbon resistor 1000 ohms ¼ W 20% |
| B1, B2, B3, B4, B5, B6, B7 | B-45 | Band Switch |
| B8, B9, | Y-B-8 | Tone control and Hi. Fidelity switch |
| B10 | Y-B-11 | A.B.C. and A.V.E. switch |
| | Y-CK-5 | A.B.C. filter choke |
| | Y-TP-8 | Power Transformer |
| | Y-SP-10 | Speaker 12" |
| | Y-CI-8 | 1st and 2nd I.F. coil assembly |
| | Y-CI-7 | 3rd I.F. coil assembly |
| | Y-CI-9 | Discriminator coil assembly |
| | Y-CI-10 | Oscillator coil assembly |
| | AM-88 | Antenna bank assembly |
| | AM-89 | R. F. bank assembly |
| | AM-90 | Oscillator bank assembly |
| | SPA-18 | Speaker voice coil and cone |
| | SPA-19 | Speaker transformer |
| | ES-7 | Escutcheon |
| | DC-3 | Dial crystal |
| | 2-P-16589 | Pilot light Mazda No. 51 |

## Replacement Parts List for Chassis 1356X

| Schematic Location | Part Number | Description |
|---|---|---|
| C2, C7, C13 | Y-CV-7 | Cond. 3 gang variable |
| C3, C4, C5, C8, C9, C10 | C-6 | " tubular .05 mf. 200 V (H. F.) |
| C1, C6, C14 | C-5 | " " .01 mf 400 V (H. F.) |
| C19 | C-15750 | " " .25 mf 400 V |
| C32 | C-15771 | " " .004 mf 600 V |
| C26, C38, C40 | C-15760 | " " .02 mf 400 V |
| C39 | C-15767 | " " .001 mf 600 V |
| C20, C29, C70 | C-15756 | " " .05 mf 400 V |
| C21 | C-15761 | " " .1 mf 200 V |
| C33 | C-9 | " " .15 mf 200 V |
| C42, C61 | C-11 | " " .001 mf 800 V |
| C41 | C-15759 | " " .006 mf 600 V |
| C34 | C-15770 | " " .2 mf 200 V |
| C71 | C-15752 | " " .05 mf 200 V |
| C72 | C-15754 | " " .01 mf 400 V |
| C73 | CM-10 | " Mica 10 mmf 5% |
| C74 | CM-27 | " " 2000 mmf silver plated |
| C75 | CM-24 | " " 484 mmf silver plated |
| C76 | CM-25 | " " 274 mmf silver plated |
| C77 | CM-26 | " " 710 mmf silver plated |
| C16 | CM-6 | " " 1350 mmf 5% |
| C15 | CM-9 | " " 5500 mmf 5% |
| C12, C23, C36, C62, C65 | CM-15919 | " " 50 mmf 10% |
| C24, C25 | CM-15918 | " " 100 mmf 20% |
| C11, C63, C64 | CM-15928 | " " 250 mmf 20% |
| C45, C46, C47 | Y-CT-3 | " Antenna trim 3-30 mmf |
| C49, C50, C51 | | " R. F. trim 3-30 mmf |
| C53, C54, C55 | | " Oscillator trim 3-30 mmf |
| C48 | Y-CT-7 | " Antenna trim 40-100 mmf |
| C52 | | " R. F. trim 40-100 mmf |
| C56 | | " Oscillator trim 40-100 mmf |
| C57, C58 | Y-CT-2 | " 1st I. F. trimmer |
| C59, C60 | | " 2nd I. F. trimmer |
| C43 | Y-CE-13 | " Wet Electrolytic 40 mf 300 V |
| C44 | Y-CE-15 | " Wet Electrolytic 30 mf 415 V |
| C35, C22, C28 | Y-CE-23 | Cond. Dry Electrolytic 20 mf 25 V / 20 mf 200 V / 10 mf 25 V |
| C37 | CE-26 | Cond. Tubular Dry Elec. 4 mf. 300 V |
| C17 | Y-CT-4 | Cond. Variable Padder 200-600 mmf |
| C18 | Y CT-6 | Cond. Variable Padder 100-300 mmf. |
| R8, R14, R35 | R-15511 | Resistor Carbon 50K ¼ W 20% |
| R9 | R-15501 | " " 25K 1 W 20% |
| R1, R3, R6, R30, R44 | R-15515 | " " 100K ¼ W 20% |
| R2, R7 | R-15610 | " " 900 ohms ¼ W 10% |
| R4, R5 | R-15530 | " " 2500 ohms ¼ W 10% |
| R11 | R-15537 | " " 400 ohms ¼ W 10% |
| R15 | R-15520 | " " 500K ¼ W 20% |
| R18, R24, R26, R10, R13, R40 | R-15517 | " " 1 meg ¼ W 20% |
| R27, R43, R21, R29 | R-15512 | " " 250K ¼ W 20% |
| R17 | R-15611 | " " 3000 ohms ¼ W 10% |
| R23 | R-21 | " " 75K 1 W 10% |
| R28 | R-40 | " " 4000 ohms ¼ W 10% |
| R31, R34 | R-15554 | " " 500K ¼ W 10% |
| R32 | R-33 | " " 8000 ohms ¼ 10% |
| R33 | R-15607 | Resistor Carbon 250 ohms 2 W 10% |
| R25 | R-2 | " " 5000 ohms ¼ W 20% |
| R12 | Y-RC-9 | " Camdohm 7000, 2250, 5800 ohms |
| R16 | Y-VC-9 | Volume control 1 meg. |
| R45 | R-15570 | 2000 ohms ¼ W 20% |
| R41 | R-15601 | Resistor Carbon 100 ohms ¼ W 20% |
| R42 | R-15542 | " " 1000 ohms ¼ W 20% |
| | AM-88 | Antenna bank assembly |
| | AM-89 | R. F. bank assembly |
| | AM-90 | Oscillator bank assembly |
| | Y-CI-6 | 1st I. F. coil assembly |
| | Y-CI-5 | 2nd I. F. coil assembly |
| | B45 | Band switch |
| | Y-B-9 | Tone and High Fidelity switch |
| | Y-B-11 | A.B.C. - A.V.E. switch |
| | Y-SP-9 | Dynamic speaker 12" |
| | SPA-16 | Speaker voice coil and cone |
| | SPA-17 | Speaker transformer |
| | Y-TP-7 | Power transformer |
| | DC-3 | Dial crystal |
| | ES-16 | Escutcheon |
| | Y-CK-5 | Filter choke (A.V.E. - A.B.C.) |

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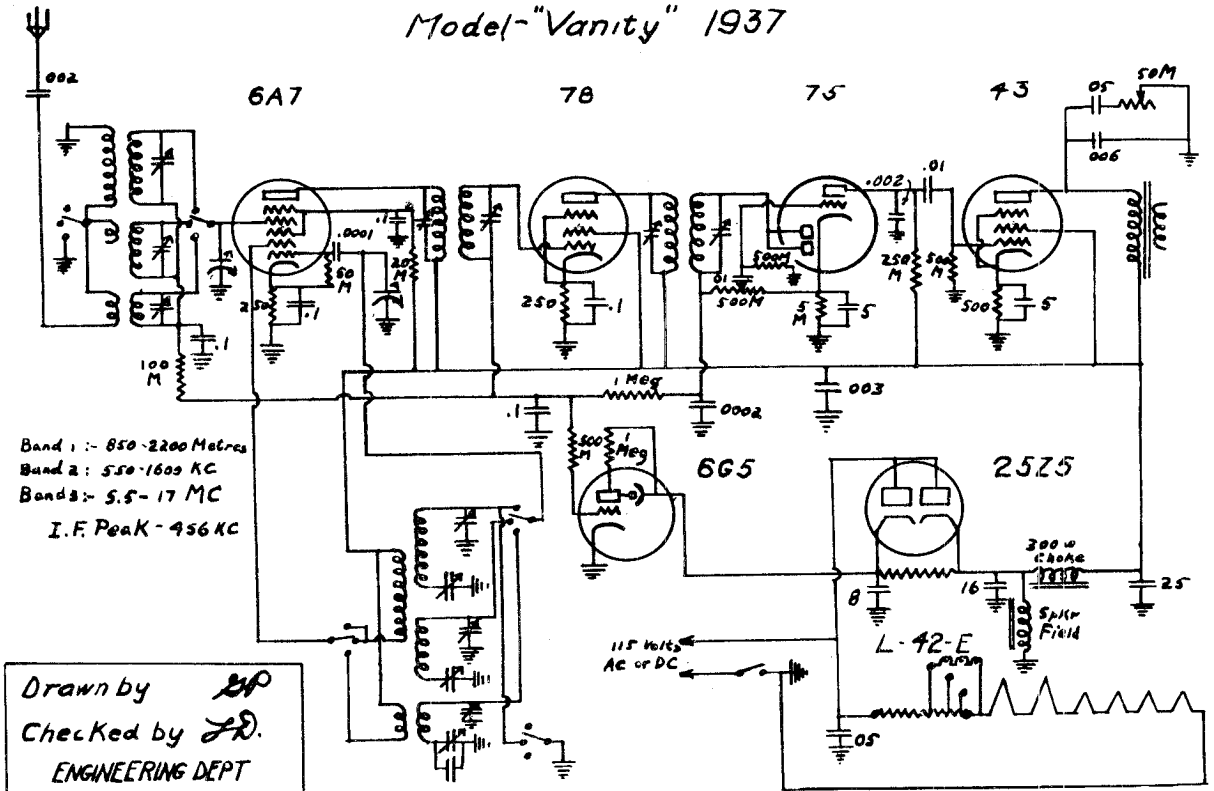
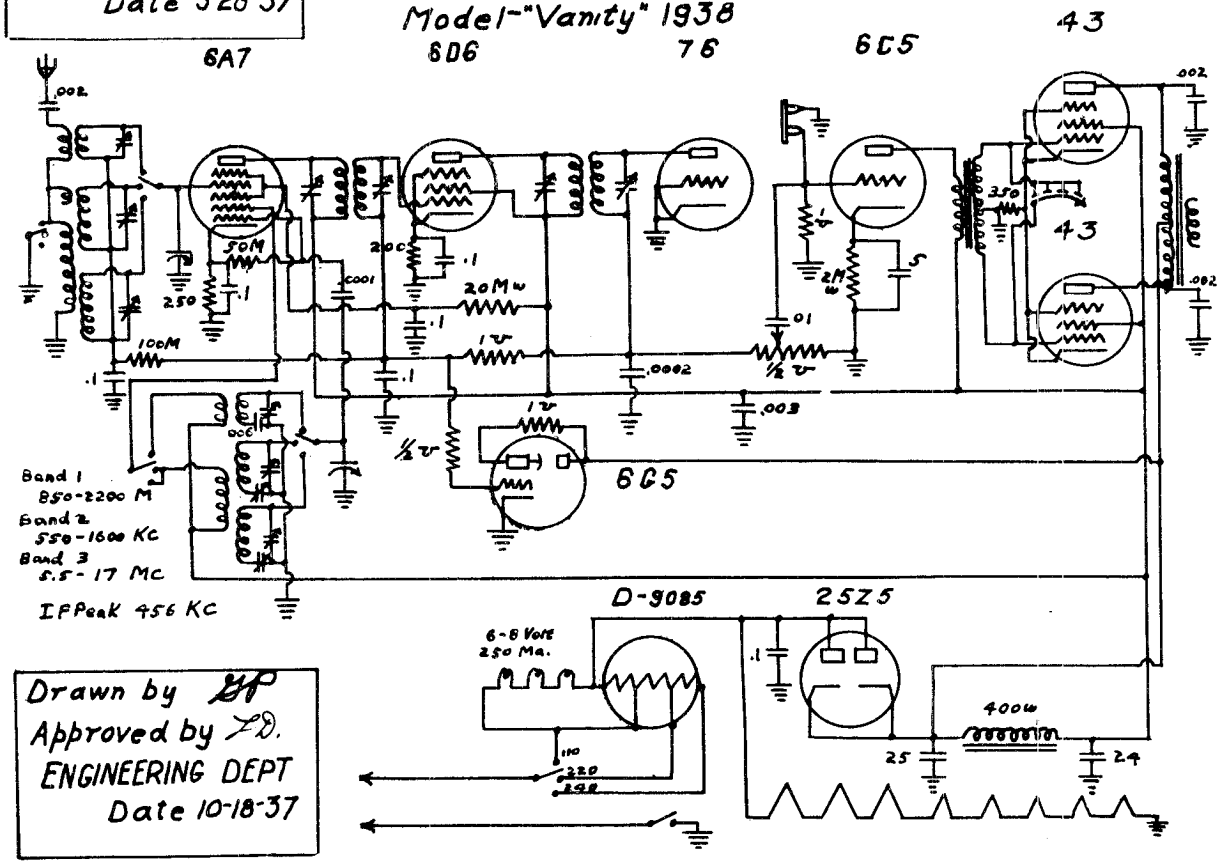
# MARCONIPHONE INC.

MODEL Vanity 1937
MODEL Vanity 1938
Schematics

## Model-"Vanity" 1937




## Model-"Vanity" 1938

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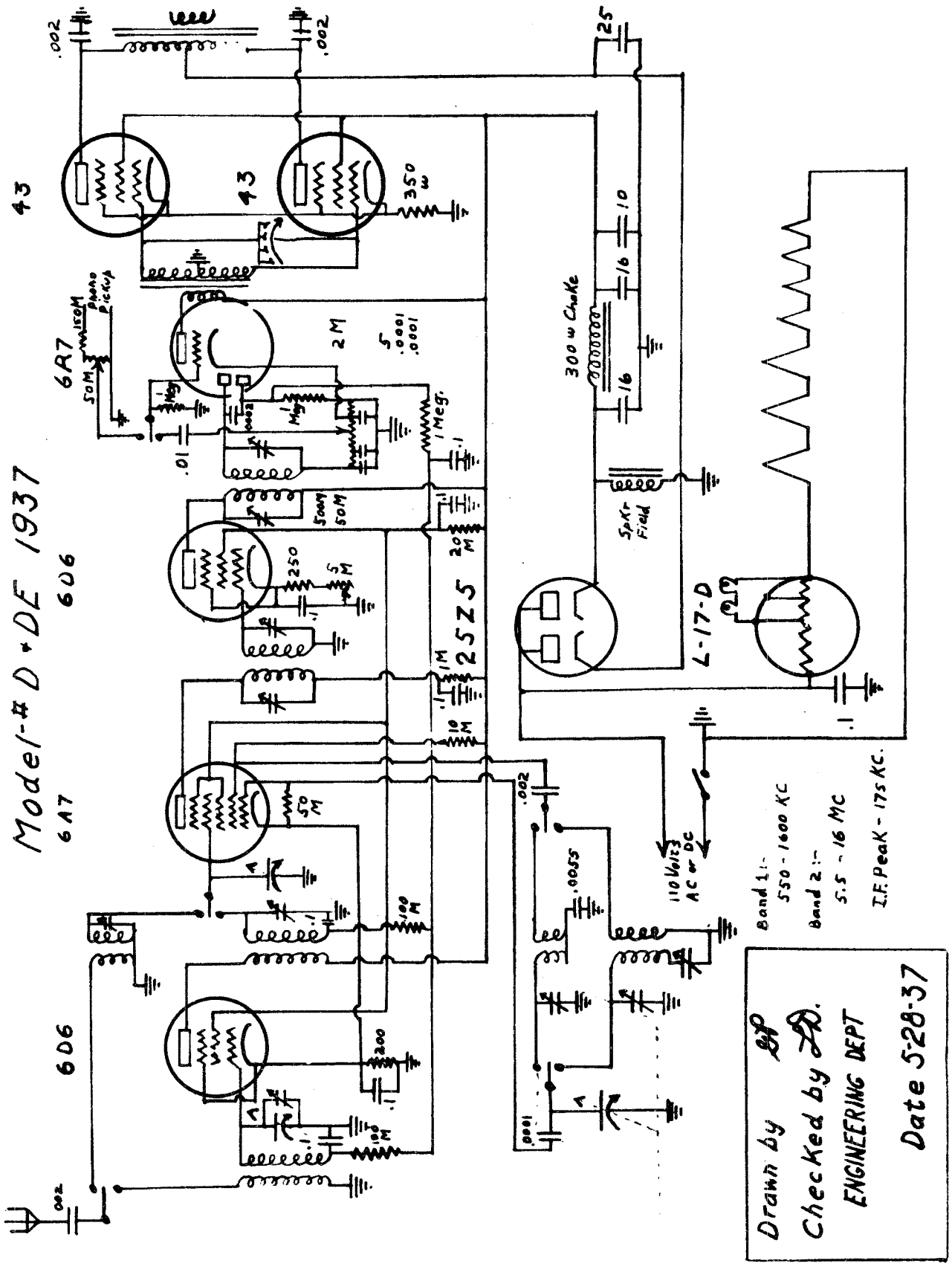
MODELS D,DE 1937
Schematic

# MARCONIPHONE INC.

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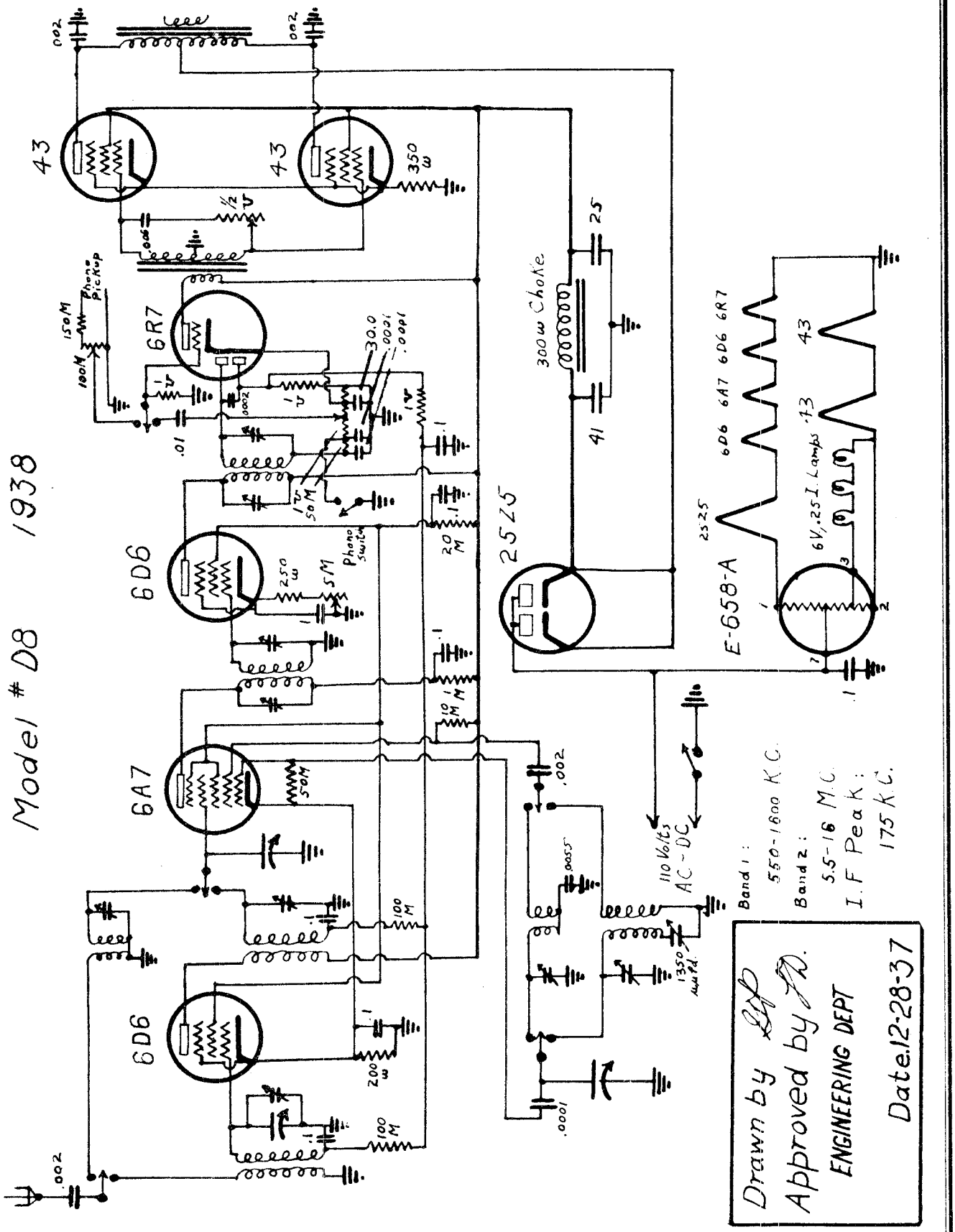
MODEL D8, 1938
Schematic

# MARCONIPHONE INC.

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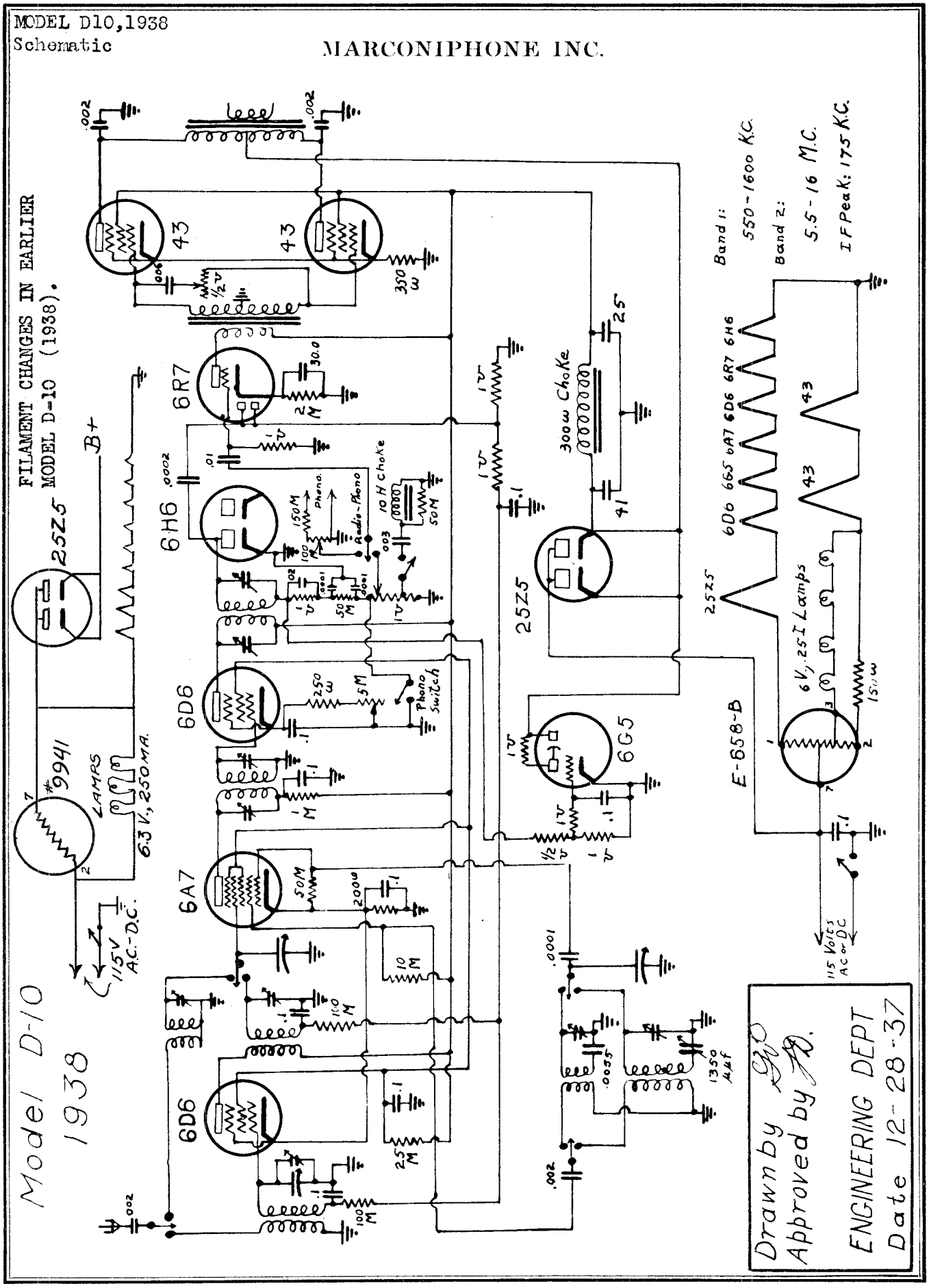
MODEL D10,1938
Schematic

# MARCONIPHONE INC.

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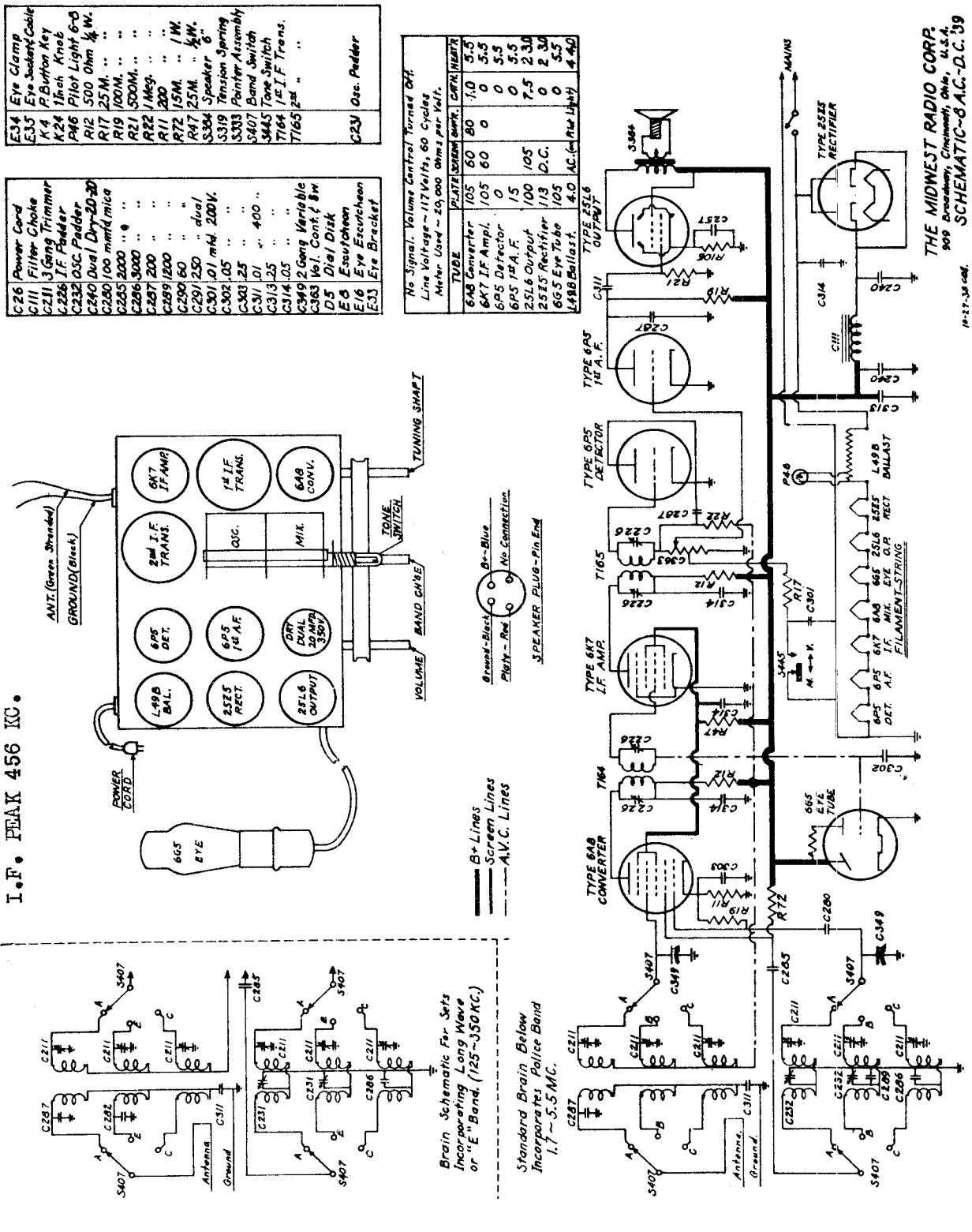
# MID-WEST RADIO CORP.

MODEL 8 AC-DC '39
Schematic, Socket
Voltage


I.F. PEAK 456 KC.
THE MIDWEST RADIO CORP.
909 Broadway, Cincinnati, Ohio, U.S.A.
SCHEMATIC-8 A.C.-D.C. '39
10-17-38 cal.
C26 Power Cord
C111 Filter Choke
C211 3 Gang Trimmer
C226 I.F. Padder
C232 OSC. Padder
C240 Dual Dry 20-20
C280 100 mmfd. mica
C285 2200 " "
C286 3000 " "
C287 200 " "
C289 1200 " "
C290 60 " "
C291 250 " dual
C301 .01 mfd. 200V.
C302 .05 " "
C303 .25 " "
C311 .01 " 400 "
C313 .25 " "
C314 .05 " "
C349 2 Gang Variable
C363 Vol. Cont. & Sw
D5 Dial Disk
E8 Escutcheon
E16 Eye Escutcheon
E33 Eye Bracket
E34 Eye Clamp
E35 Eye Socket Cable
K4 P. Button Key
K24 1 Inch Knob
P46 Pilot Light 6-8
R12 500 Ohm 1/4 W.
R17 25 M. " "
R19 100 M. " "
R21 500 M. " "
R22 1 Meg. " "
R11 200 " 1 W.
R72 1.5 M. " 1/4 W.
R47 2.5 M. " 1/4 W.
S304 Speaker 6"
S319 Tension Spring
S333 Pointer Assembly
S407 Band Switch
S445 Tone Switch
T164 1st I.F. Trans.
T165 2nd " "
C23V Osc. Padder
No Signal. Volume Control Turned Off.
Line Voltage - 117 Volts, 60 Cycles
Meter Used - 20,000 ohms per Volt.
TUBE | PLATE | SCREEN | GRID | CATH. | HEATR.
6A8 Converter | 105 | 60 | 80 | 1.0 | 5.5
6K7 I.F. Amp. | 105 | 60 | 0 | 0 | 5.5
6P5 Detector | 0 | | | 0 | 5.5
6P5 1st A.F. | 15 | | | 0 | 5.5
25L6 Output | 100 | 105 | | 7.5 | 2.3.0
25Z5 Rectifier | 113 | D.C. | | 0 | 2.3.0
6G5 Eye Tube | 105 | | | 0 | 5.5
L498 Ballast | 4.0 | A.C. (on rear light) | | | 4.40
ANT. (Green Stranded)
GROUND (Black)
POWER CORD
665 EYE
6K7 I.F. AMP.
2nd I.F. TRANS.
6P5 DET.
6P5 1st A.F.
ORT. DUAL 2-GANG 350 KC
L498 BAL.
25Z5 RECT.
25L6 OUTPUT
1st I.F. TRANS.
OSC.
MIX.
6A8 CONV.
TUNING SHAFT
TONE SWITCH
BAND CH'GE
VOLUME
Ground-Black
Plate-Red
B+-Blue
No Connection
SPEAKER PLUG-Pin End
B+ Lines
Screen Lines
A.V.C. Lines
Brain Schematic For Sets Incorporating Long Wave or "E" Band. (125-350 KC.)
Standard Brain Below Incorporates Police Band 1.7-5.5 MC.
Antenna
Ground
TYPE 6A8 CONVERTER
TYPE 6K7 I.F. AMP.
TYPE 6P5 DETECTOR
TYPE 6P5 1st A.F.
TYPE 25L6 OUTPUT
TYPE 25Z5 RECTIFIER
665 EYE TUBE
L498 BALLAST
MAINS
M. ↔ V.
FILAMENT-STRING
6P5 DET. 6P5 A.F. 6K7 I.F. AMP. 6A8 CONV. 665 EYE 25L6 OUTPUT 25Z5 RECT.

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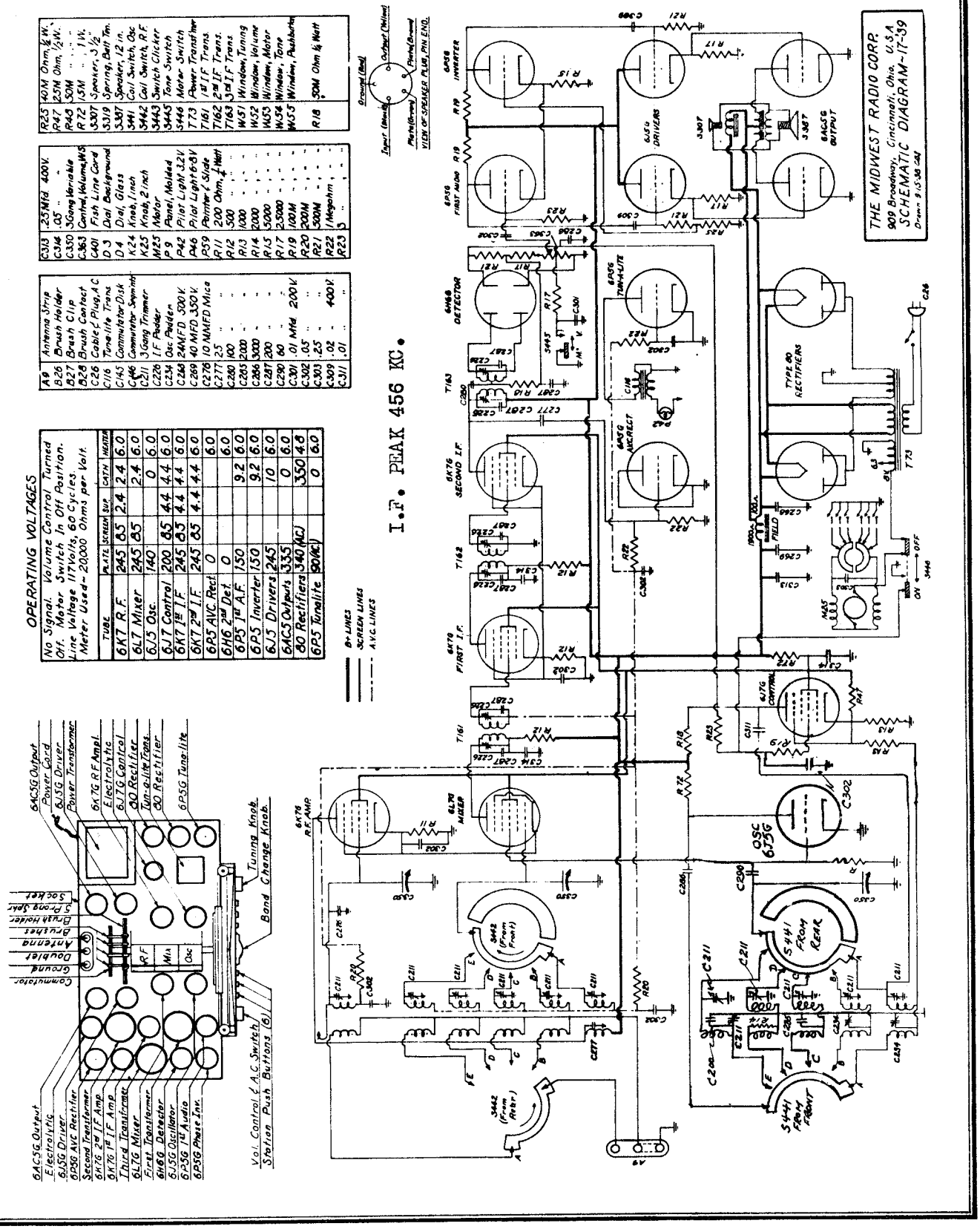
MODEL 17-'39
Schematic, Socket
Voltage

# MID-WEST RADIO CORP.


THE MIDWEST RADIO CORP.
909 Broadway, Cincinnati, Ohio, U.S.A.
SCHEMATIC DIAGRAM-17-'39
I.F. PEAK 456 KC.
B+ LINES
SCREEN LINES
A.V.C. LINES
OPERATING VOLTAGES
No Signal. Volume Control Turned Off. Motor Switch In Off Position. Line Voltage 117 Volts, 60 Cycles. Meter Used ~ 20,000 Ohms per Volt.
TUBE | PLATE | SCREEN | BIAS | CATH | HEATER
6K7 R.F. | 245 | 85 | 2.4 | 2.4 | 6.0
6L7 Mixer | 245 | 85 | | 2.4 | 6.0
6J5 Osc. | 140 | | | 0 | 6.0
6J7 Control | 200 | 85 | 4.4 | 4.4 | 6.0
6K7 1st I.F. | 245 | 85 | 4.4 | 4.4 | 6.0
6K7 2nd I.F. | 245 | 85 | 4.4 | 4.4 | 6.0
6P5 AVC Rect. | 0 | | | | 6.0
6H6 2nd Det. | 0 | | | | 6.0
6P5 1st A.F. | 150 | | | 9.2 | 6.0
6P5 Inverter | 150 | | | 9.2 | 6.0
6J5 Drivers | 245 | | | 10 | 6.0
6AC5 Outputs | 335 | | | 0 | 6.0
80 Rectifiers | 340 (AC) | | | 350 | 4.8
6P5 Tunalite | 90 (AC) | | | 0 | 6.0
A9 Antenna Strip
B26 Brush Holder
B27 Brush Clip
B28 Brush Contact
C26 Cable, Plug, AC
C116 Tune-lite Trans
C145 Commutator-Disk
C146 Commutator-Segments
C211 3 Gang Trimmer
C228 I.F. Padder
C234 Osc. Padder
C260 2MFD 300 V.
C269 40 MFD 350 V.
C276 10 MMFD Mica
C277 .25 " "
C280 100 " "
C285 2000 " "
C286 3000 " "
C287 200 " "
C290 60 " "
C301 .01 Mfd 200 V.
C302 .05 " "
C303 .25 " 400 V.
C309 .02 " "
C311 .01 " "
C313 .25 Mfd 400 V.
C314 .05 " "
C350 3 Gang Variable
C363 Control, Volume, M/S
C401 Fish Line Cord
D3 Dial Background
D4 Dial, Glass
K24 Knob, 1 inch
K25 Knob, 2 inch
M23 Motor
P9 Panel, Molded
P42 Pilot Light 3.2 V
P46 Pilot Light 6.8 V
P59 Pointer & Slide
R11 200 Ohm, 1/4 Watt
R12 500 " "
R13 1000 " "
R14 2000 " "
R15 5000 " "
R17 25000 " "
R19 100 M " "
R20 200 M " "
R21 500 M " "
R22 1 Megohm " "
R23 5 " "
R25 .40 M Ohm, 1/2 W.
R47 .25 M Ohm, 1/2 W.
R43 .50 M " " 1 W.
R72 .15 M " " 1 W.
S307 Speaker, 3 1/2
S319 Spring, Bell Tm.
S337 Speaker, 12 in.
S441 Coil Switch, Osc
S442 Coil Switch, R.F.
S443 Switch Clicker
S445 Tone Switch
S446 Motor Switch
T73 Power Transformer
T161 1st I.F. Trans.
T162 2nd I.F. Trans.
T163 3rd I.F. Trans
W51 Window, Tuning
W52 Window, Volume
W53 Window, Motor
W54 Window, Tone
W55 Window, Rubberoid
R18 .50 M Ohm 1/2 Watt
Ground (Red)
Aerial (Black)
Output (Yellow)
Plate (Green)
Plate (Brown)
VIEW OF SPEAKER PLUG, PIN END.
6AC5G Output
Power Card
6J5G Driver
Power Transformer
6K7G R.F. Amp.
Electrolytic
6J7G Control
80 Rectifier
Tune-lite Trans.
80 Rectifier
6P5G Tune-lite
6AC5G Output
Electrolytic
6J5G Driver
6P5G AVC Rectifier
Second Transformer
6K7G 2nd I.F. Amp.
6K7G 1st I.F. Amp.
Third Transformer
6L7G Mixer
First Transformer
6H6G Detector
6J5G Oscillator
6P5G 1st Audio
6P5G Phase Inv.
Commutator
Ground
Doublet
Antenna
Brushes
Brush Holder
5 Prong Spkr.
Socket
R.F.
Mix
Osc
Tuning Knob
Band Change Knob
Vol. Control & A.C. Switch
Station Push Buttons (6)

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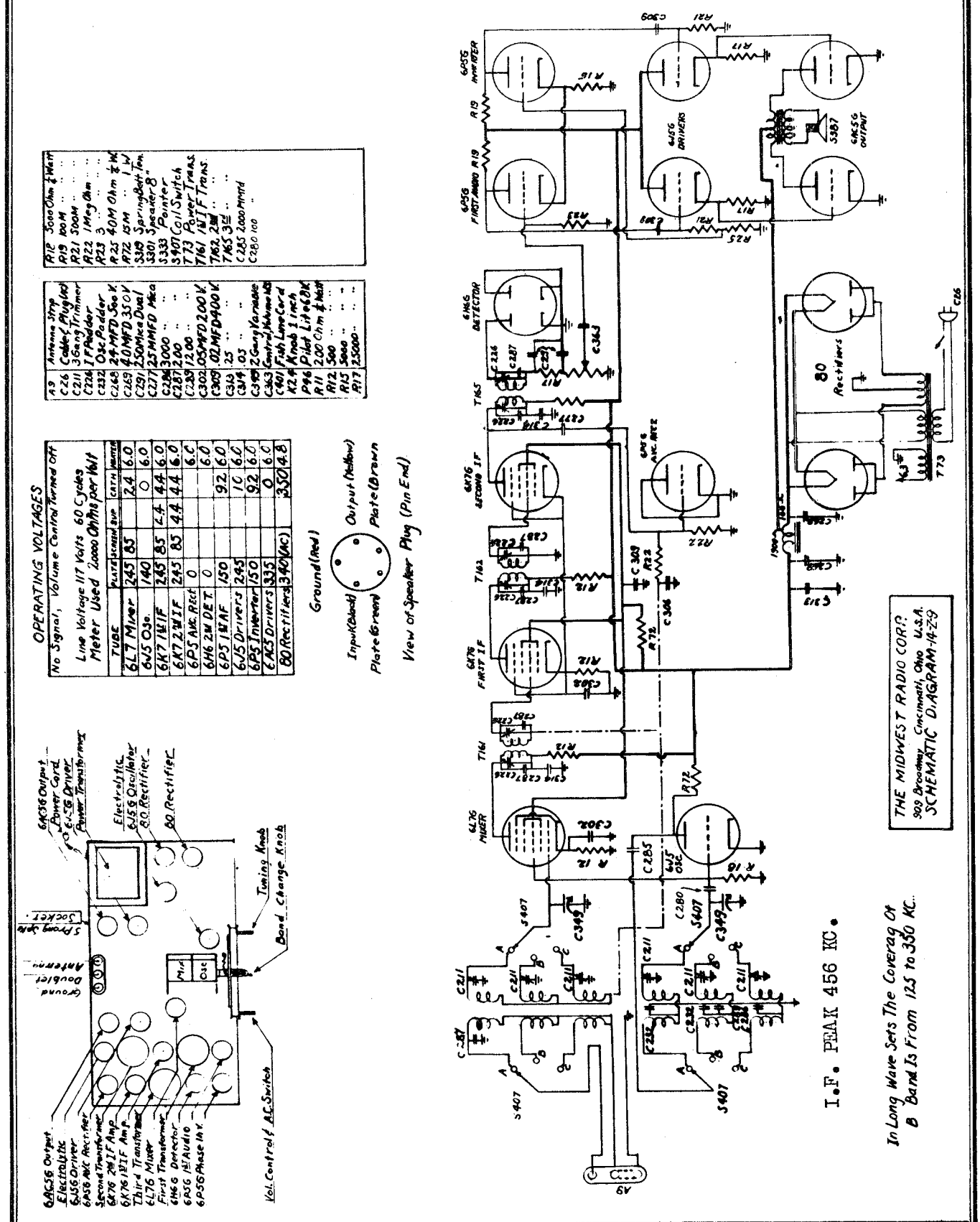
# MID-WEST RADIO CORP.

MODEL 14-Z-9
Schematic, Voltage
Socket


OPERATING VOLTAGES
No Signal, Volume Control Turned Off
Line Voltage 117 Volts 60 Cycles
Meter Used 2000 Ohms per Volt
TUBE | Plate | Screen | Cath. | Heater
6L7 Mixer | 245 | 85 | 2.4 | 6.0
6J5 Osc. | 140 | | 0 | 6.0
6K7 1st IF | 245 | 85 | 2.4 | 4.4 | 6.0
6K7 2nd IF | 245 | 85 | 4.4 | 4.4 | 6.0
6P5 AVC Rect. | 0 | | | | 6.0
6H6 2nd DET. | 0 | | | | 6.0
6P5 1st AF | 150 | | | 9.2 | 6.0
6J5 Drivers | 245 | | | 10 | 6.0
6P5 Inverter | 150 | | | 9.2 | 6.0
6A5 Drivers | 335 | | | 0 | 6.0
80 Rectifiers | 340(AC) | | | 350 | 4.8
Ground (Red)
Input (Black)
Output (Yellow)
Plate (Green)
Plate (Brown)
View of Speaker Plug (Pin End)
A9 Antenna Strip
C26 Cable, Plugged
C211 3-Gang Trimmer
C224 I.F. Padder
C232 Osc. Padder
C268 .24 MFD 500 V.
C269 .40 MFD 350 V.
C291 .250 Mica Dual
C277 .25 MMFD Mica
C296 3000 ..
C287 2.00 ..
C239 12.00 ..
C302 .05 MFD 200 V.
C305 .02 MFD 400 V.
C343 .25 ..
C314 .03 ..
C349 2-Gang Variable
C363 Control, Volume
C401 Fish Line Cord
K24 Knob 1 inch
P96 Pilot Lite 6.8V
R11 200 Ohm ½ Watt
R12 500 ..
R15 3000 ..
R17 25000 ..
R18 3000 Ohm ½ Watt
R19 100 M ..
R21 500 M ..
R22 1 Meg Ohm ..
R23 3 ..
R25 .40 M Ohm ½ W.
R72 15 M .. 1 W.
S35 Spring Bat Jam.
S301 Speaker 8"
S333 Pointer
S407 Coil Switch
T73 Power Trans.
T161 1st I.F. Trans.
T162 2nd ..
T165 3rd ..
C285 2000 M.M.F.D.
C280 100 ..
6A56 Output
Power Card
6J5G Driver
Power Transformer
Electrolytic
6J5G Oscillator
80 Rectifier
80 Rectifiers
Tuning Knob
Band Change Knob
Ground
Doublet
Antenna
Socket
Osc.
Mid
Vol. Control & A.C. Switch
6A56 Output
Electrolytic
6J56 Driver
6A56 Mix. Rectifier
Second Transformer
6K7 2nd I.F. Amp.
6K7 1st I.F. Amp.
Third Transformer
6L7 Mixer
First Transformer
6H6 Detector
6P5 1st Audio
6P5 Phase Inv.
6P5 AVC Rect.
6A5 Drivers
6A5 Output
THE MIDWEST RADIO CORP.
909 Broadway, Cincinnati, Ohio U.S.A.
SCHEMATIC DIAGRAM 4-29
I.F. PEAK 456 KC.
In Long Wave Sets The Coverage Of
B Band Is From 125 to 350 KC.

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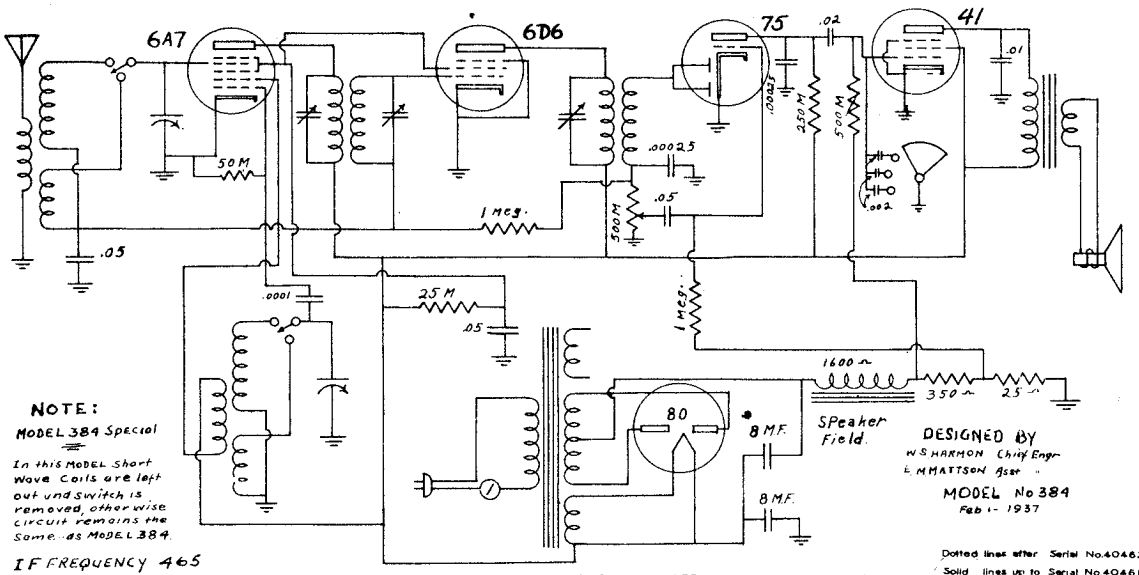
MODEL 3749
Schematics

# MISSION-BELL RADIO MFG. CO., INC.

MODEL 384
384 Special
MODEL 386
Above, Below
Serial No. 40461



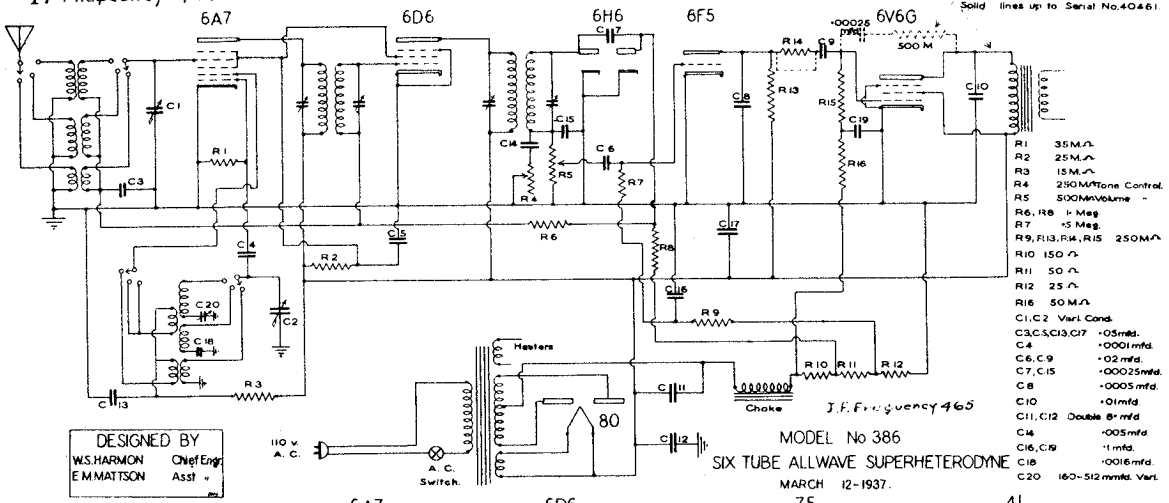

NOTE:
MODEL 384 Special

In this MODEL Short Wave Coils are left out and switch is removed, otherwise circuit remains the same as MODEL 384.

IF FREQUENCY 465

DESIGNED BY
W.S.HARMON Chief Engr.
E.M.MATTSON Asst. "

MODEL No 384
Feb 1- 1937



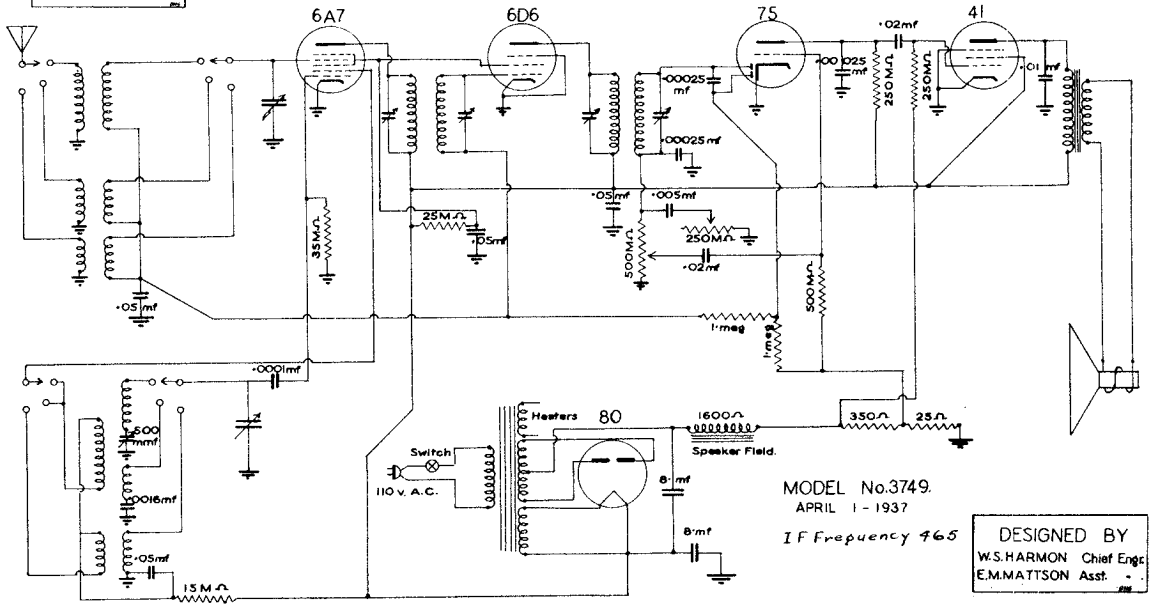

Dotted lines after Serial No.40462.
Solid lines up to Serial No.40461

R1 35M.Ω
R2 25M.Ω
R3 15M.Ω
R4 250M/Tone Control.
R5 500M/Volume "
R6, R8 1 Meg.
R7 .5 Meg.
R9, R13, R14, R15 250M.Ω
R10 150 Ω
R11 50 Ω
R12 25 Ω
R16 50 M.Ω
C1, C2 Vari. Cond.
C3, C5, C13, C17 .05 mfd.
C4 .0001 mfd.
C6, C9 .02 mfd.
C7, C15 .00025 mfd.
C8 .0005 mfd.
C10 .01 mfd.
C11, C12 Double 8 mfd
C14 .005 mfd.
C16, C19 .1 mfd.
C18 .0016 mfd.
C20 160-512 mmfd. Vari.

DESIGNED BY
W.S.HARMON Chief Engr.
E.M.MATTSON Asst. "

I.F. Frequency 465

MODEL No 386
SIX TUBE ALLWAVE SUPERHETERODYNE
MARCH 12-1937.




MODEL No.3749.
APRIL 1 - 1937
IF Frequency 465

DESIGNED BY
W.S.HARMON Chief Engr.
E.M.MATTSON Asst. "

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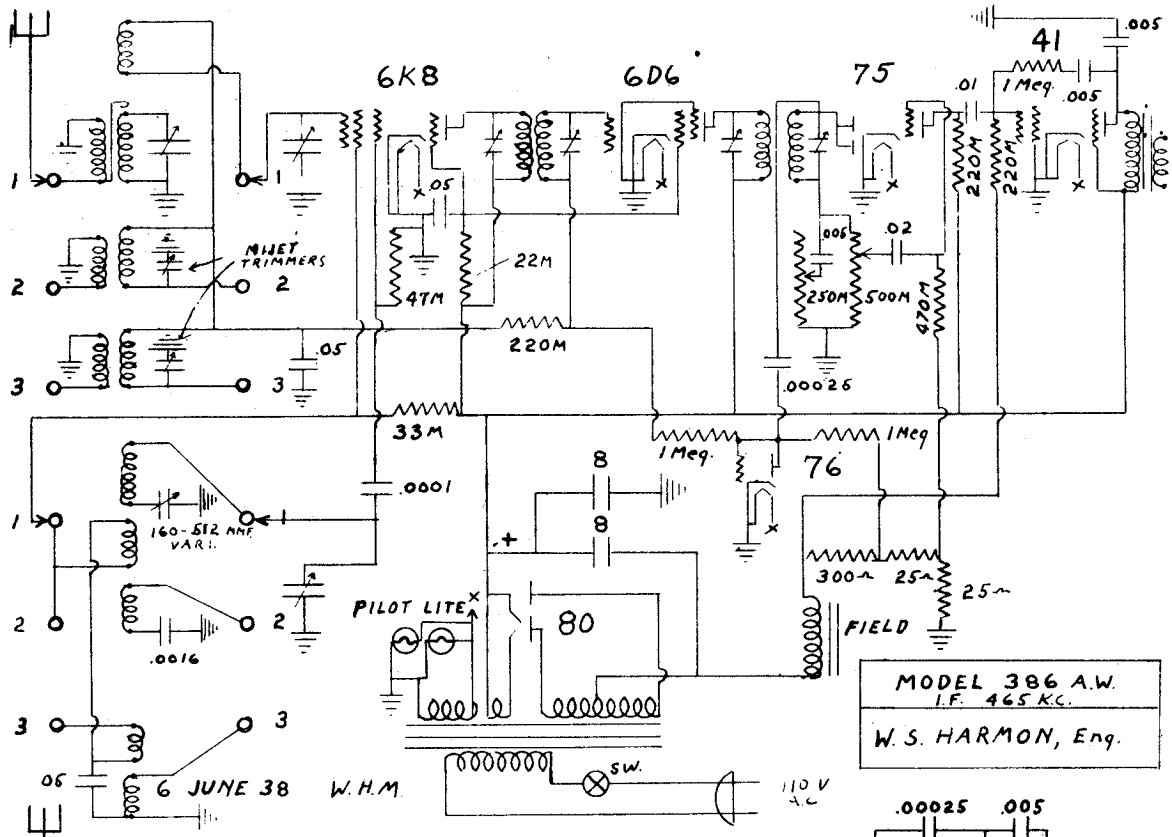
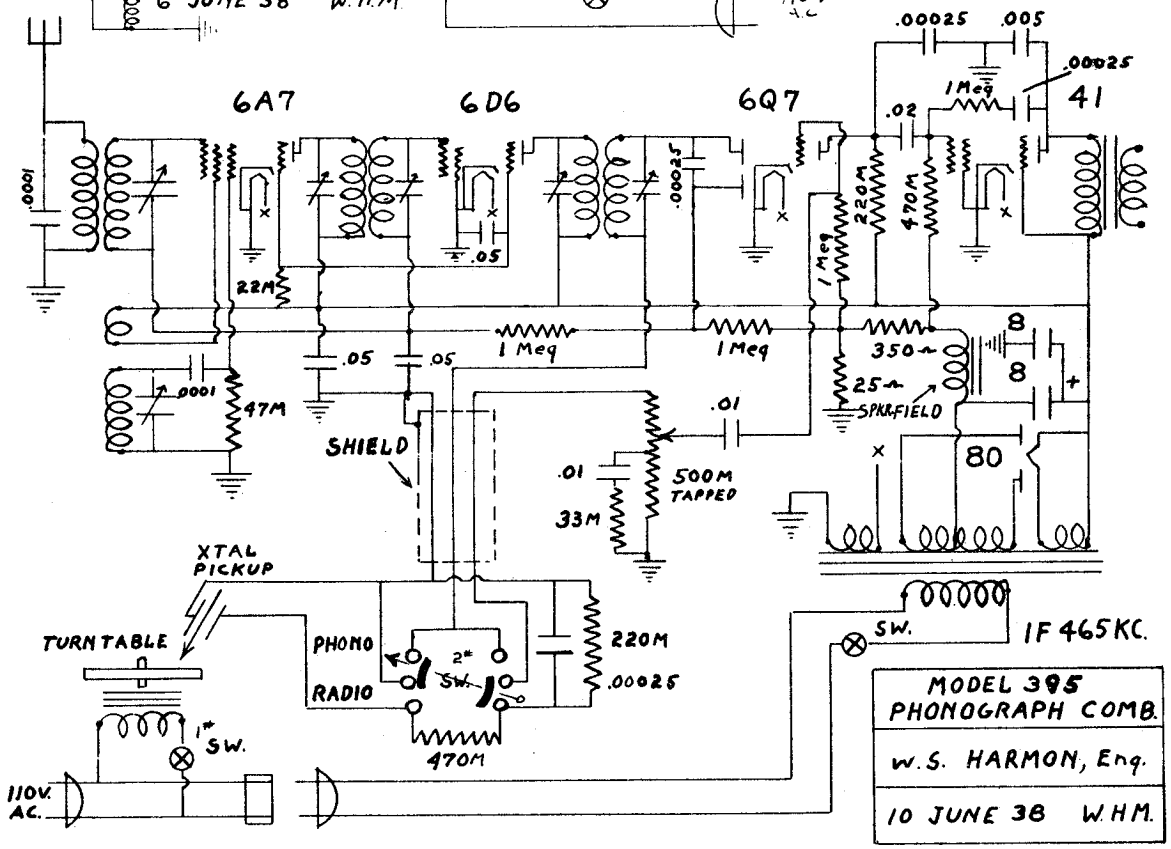
MODEL 386 AW
MODEL 395
Schematics

# MISSION-BELL RADIO MFG. CO., INC.

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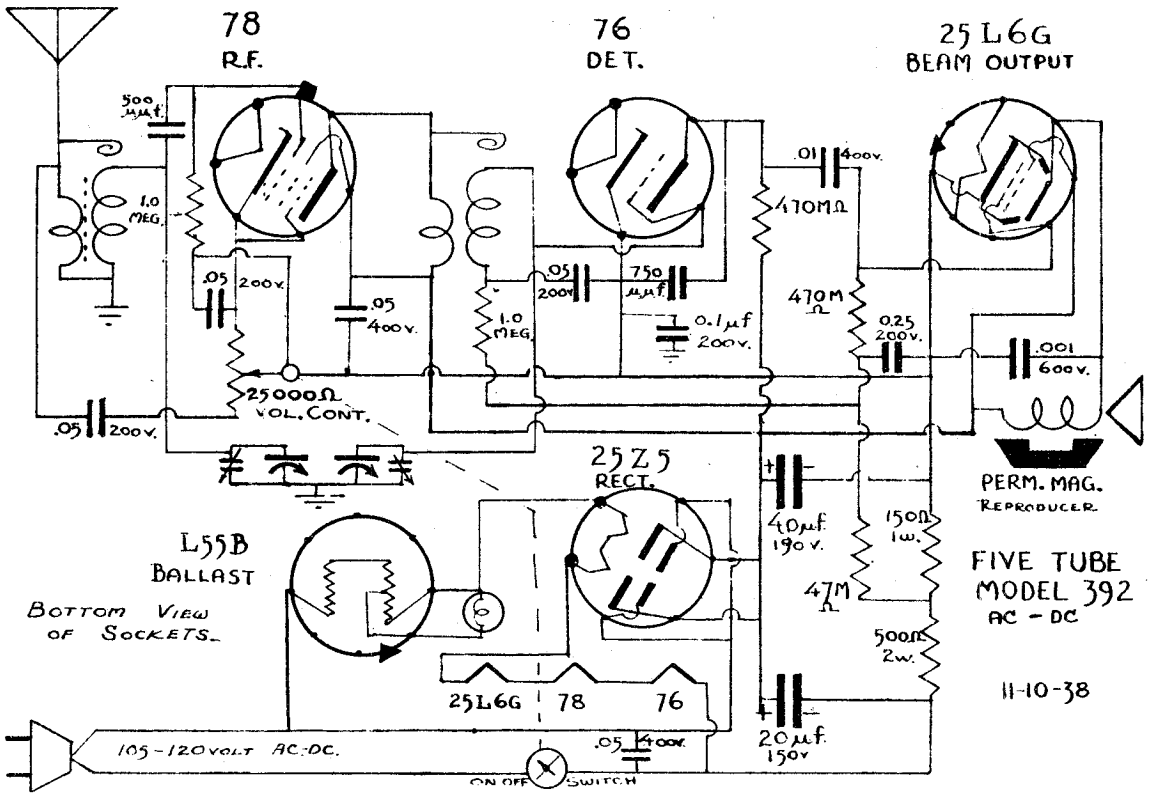
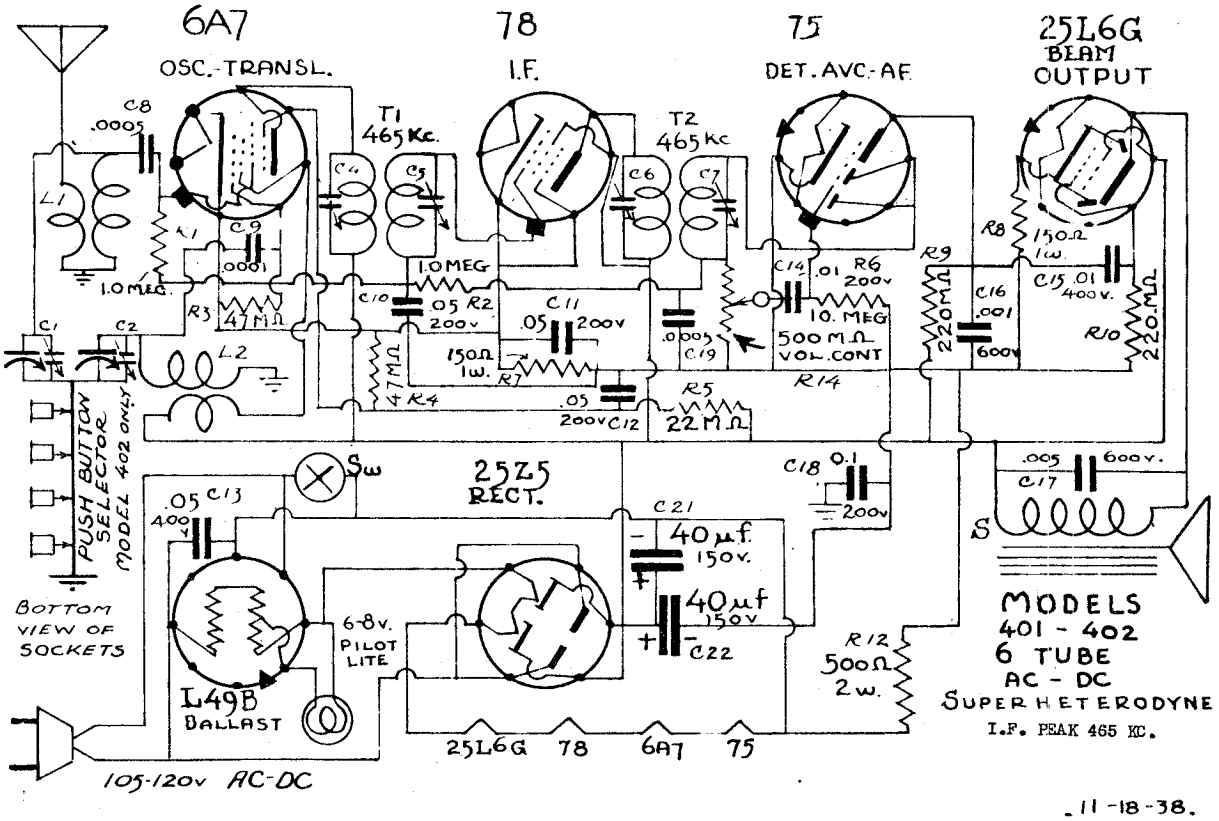
# MISSION-BELL RADIO MFG. CO., INC.

MODEL 392
MODELS 401,402
Schematics

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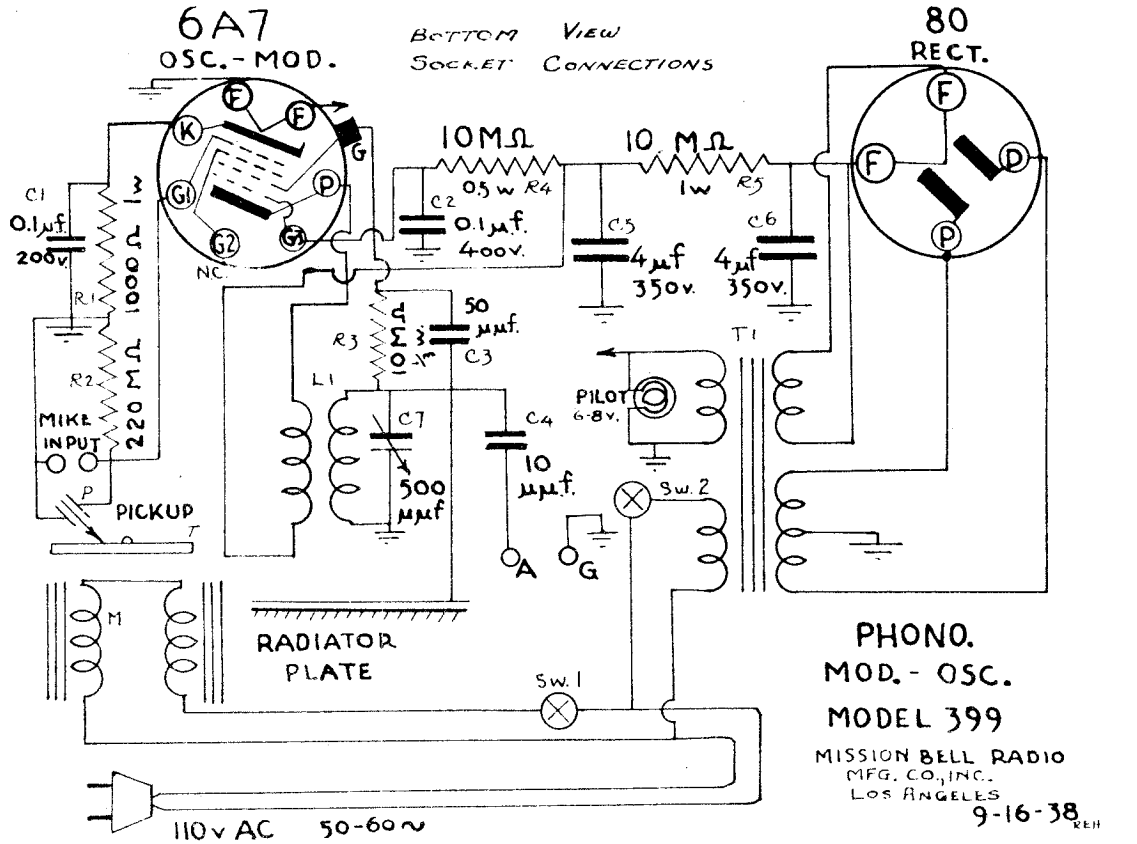
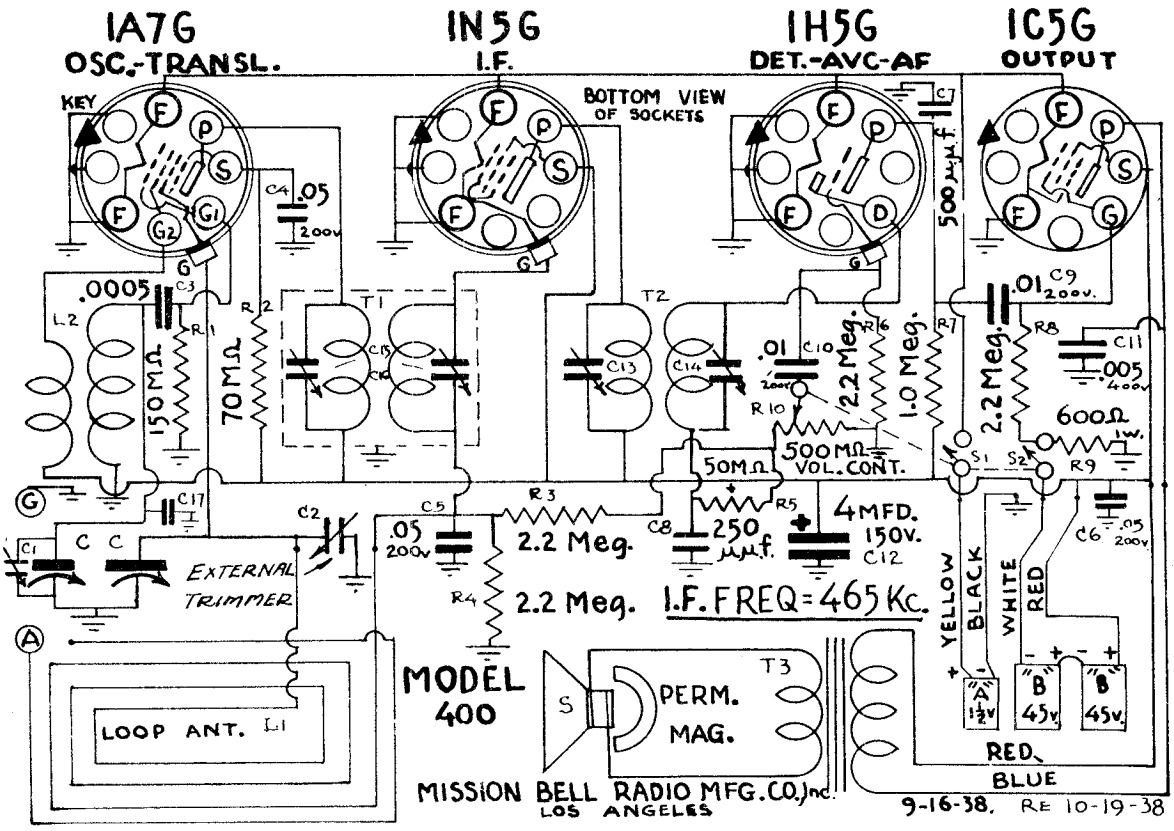
MODEL 399 Phono. Osc.
MODEL 400
Schematics

# MISSION-BELL RADIO MFG. CO., INC.

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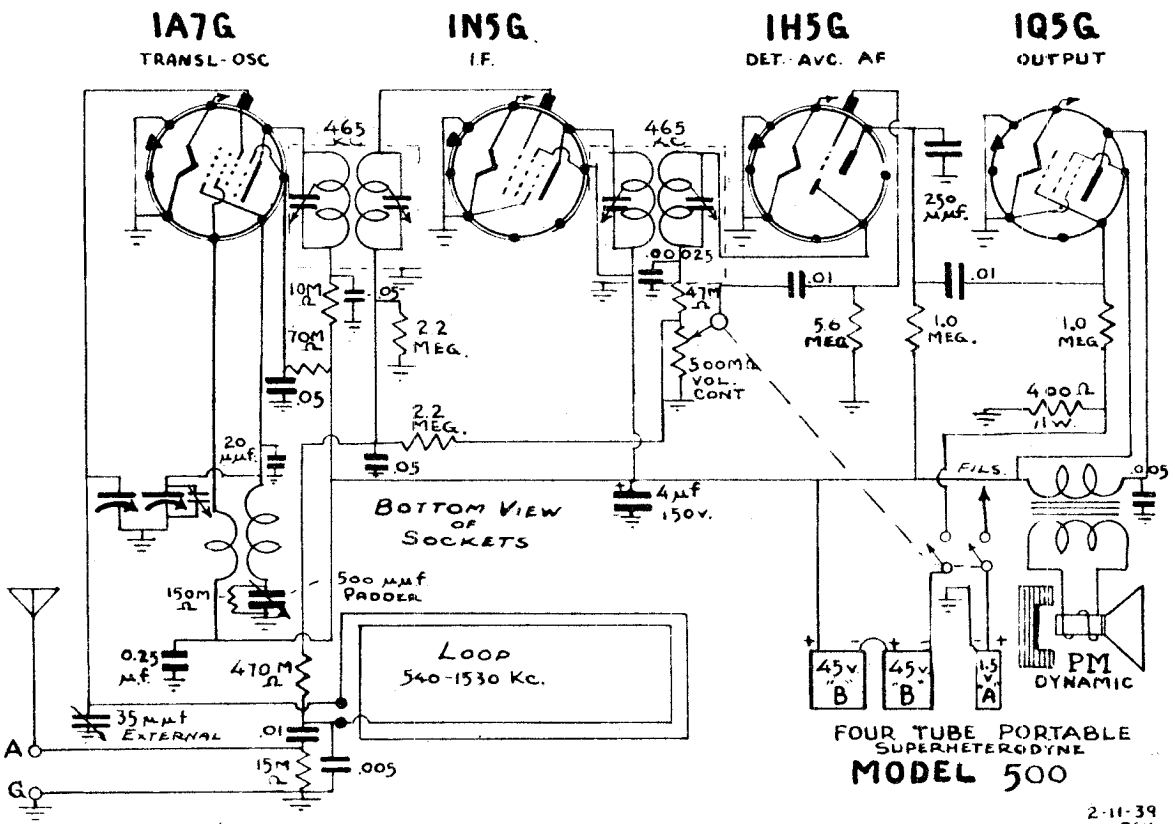
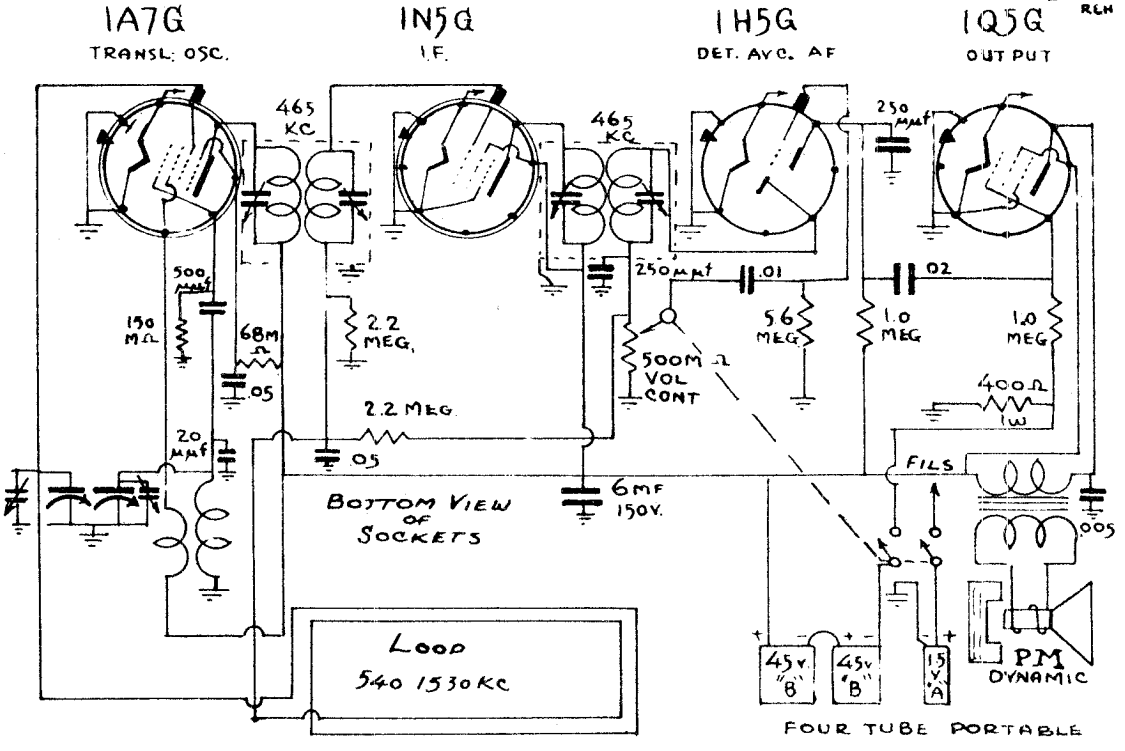
# MISSION-BELL RADIO MFG. CO., INC.

MODEL 500
MODEL 501
Schematics




2-11-39 RCH




4 28 39

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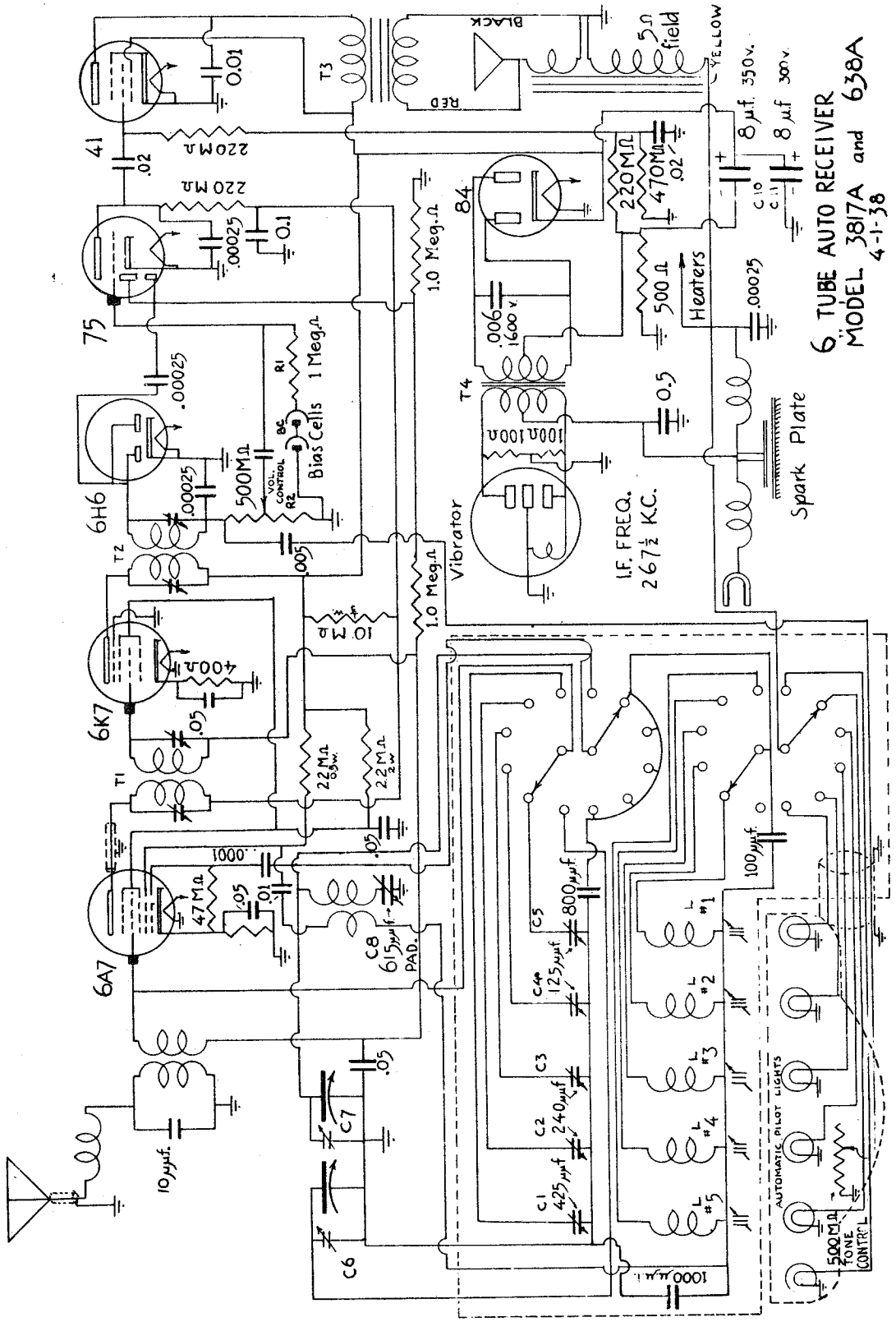
MODELS 638A, 3817A
Schematic

# MISSION-BELL RADIO MFG. CO., INC.

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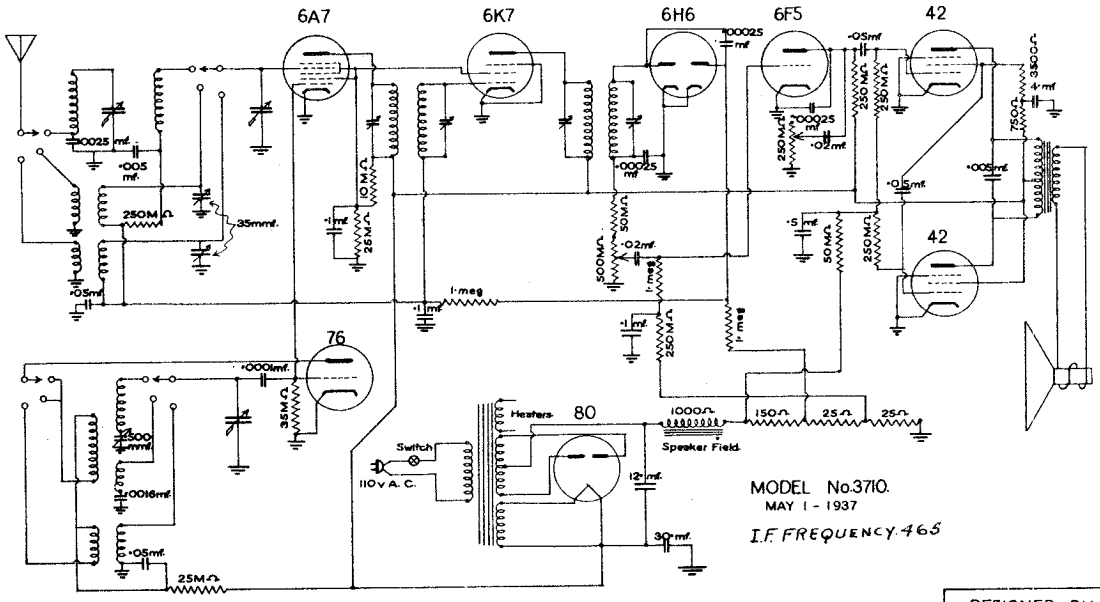
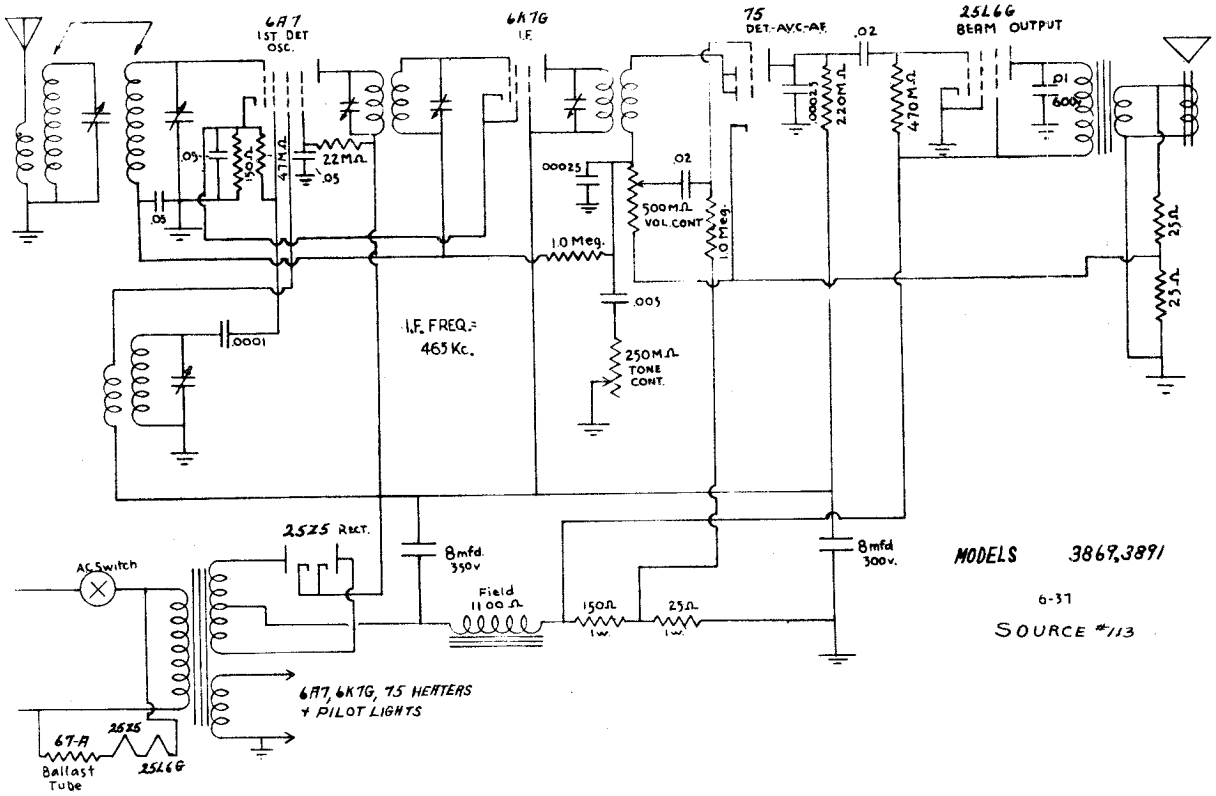
# MISSION-BELL RADIO MFG. CO., INC.

MODEL 3710
MODELS 3869,3891
Schematics




DESIGNED BY
W.S. HARMON Chief Engr.
E.M.MATTSON Asst.

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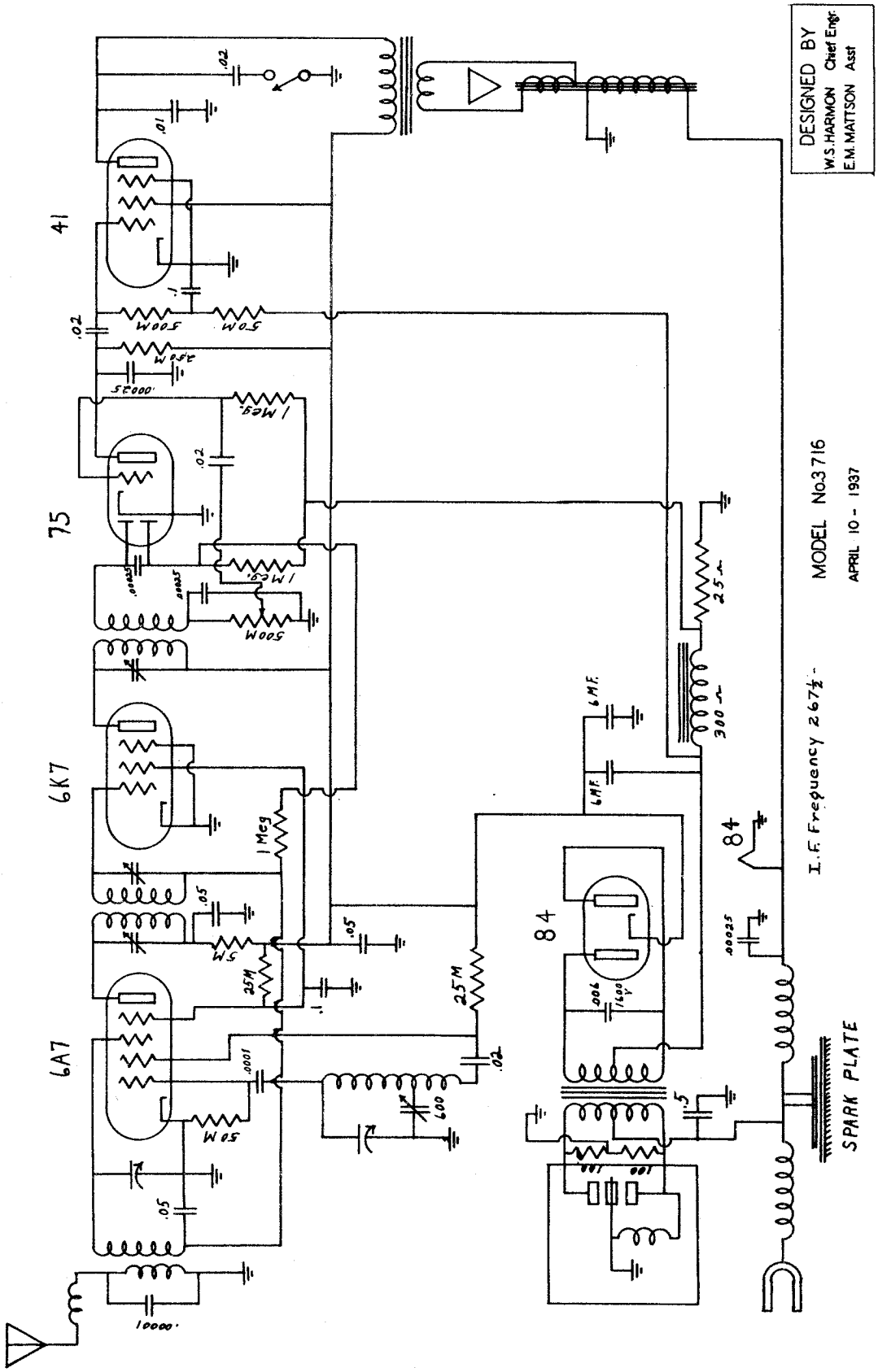
MODEL 3716
Schematic

# MISSION-BELL RADIO MFG. CO., INC.

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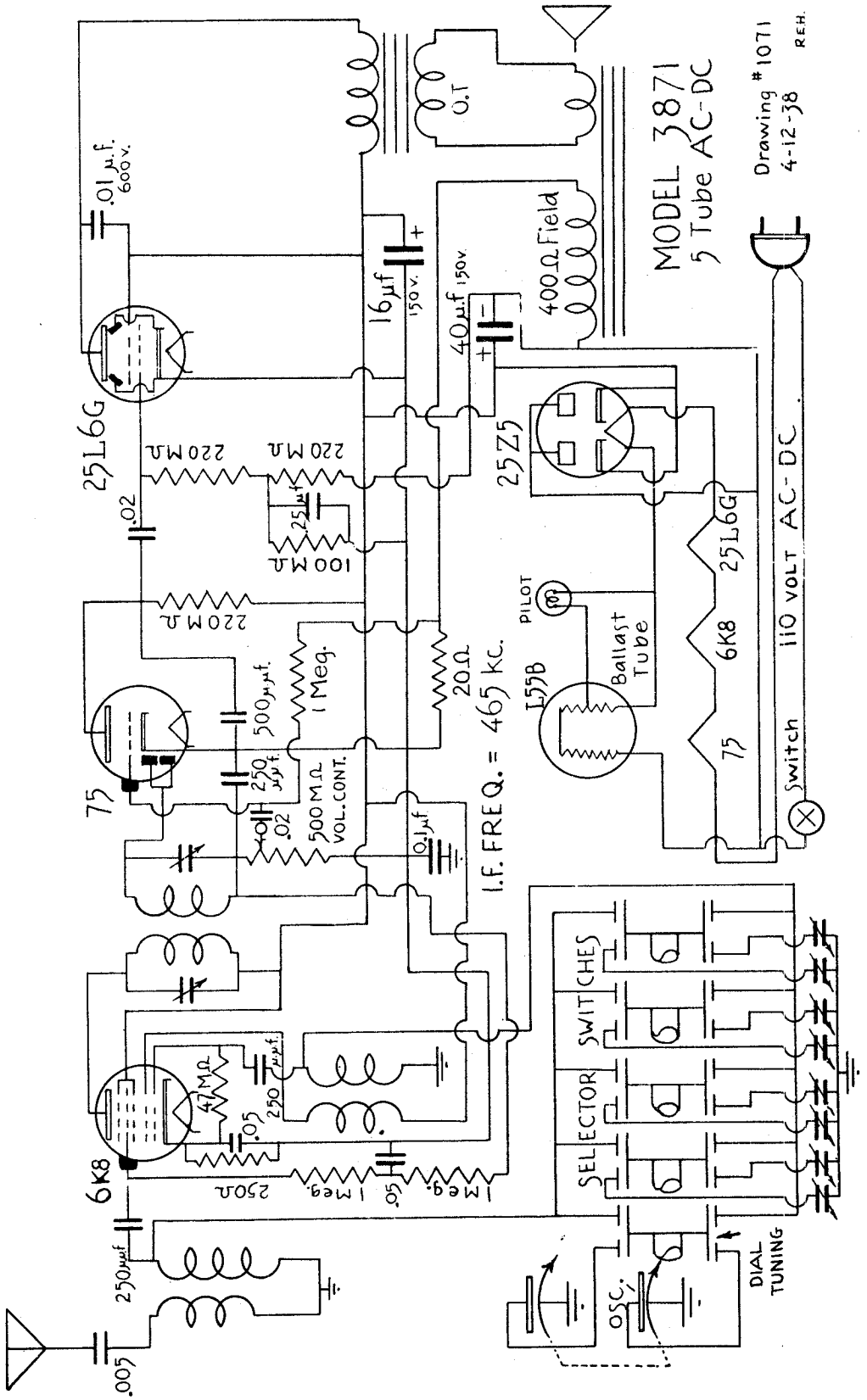
# MISSION-BELL RADIO MFG. CO., INC.

MODEL 3871
Schematic

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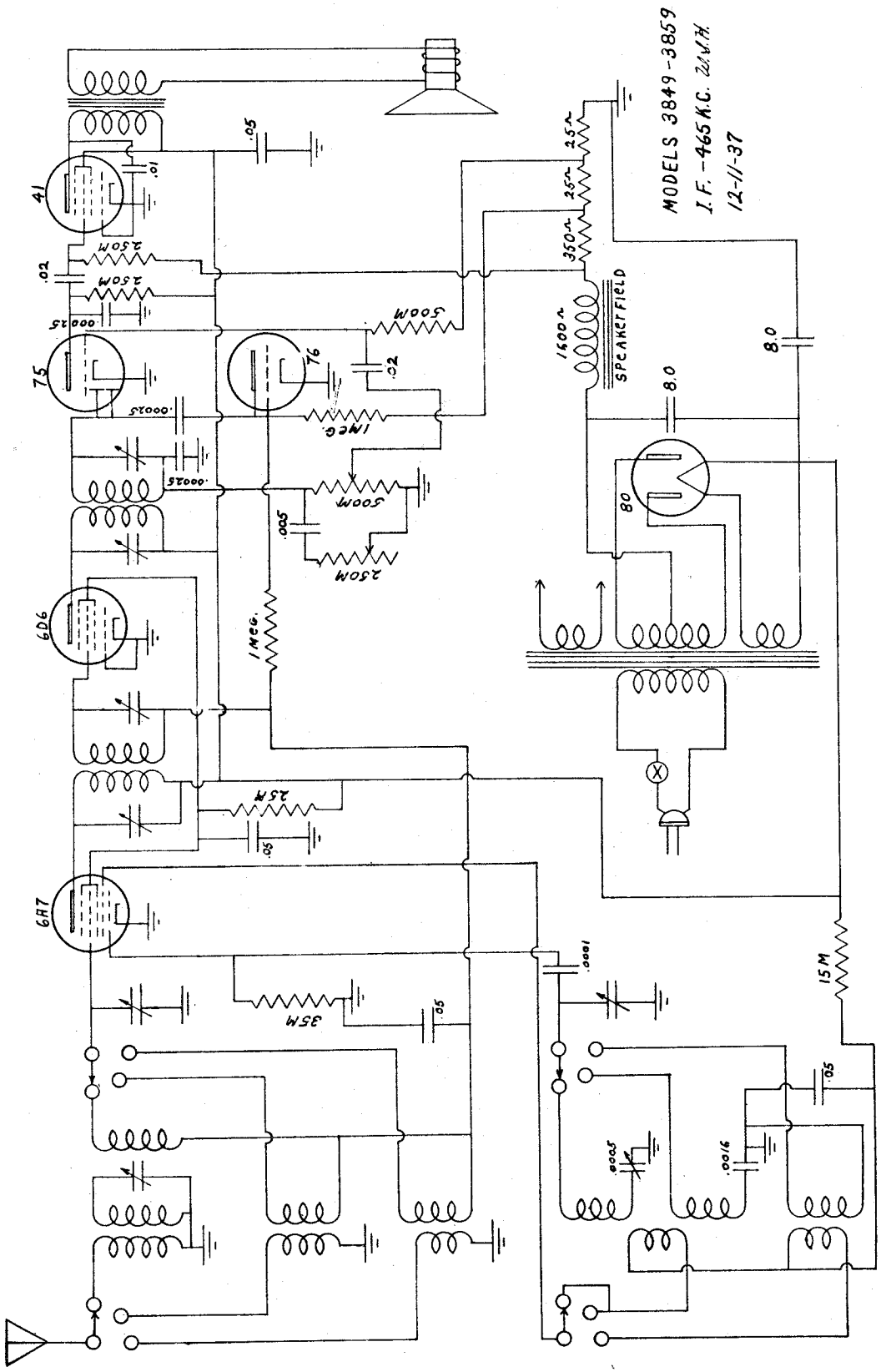
MODELS 3849,3859
Schematic

# MISSION-BELL RADIO MFG. CO., INC.

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Schematic, Socket Trimmers, Alignment

MONTGOMERY-WARD & CO.

MODELS 62-123, 62-131 62-133, 62-142, 62-144 62-152, 62-158

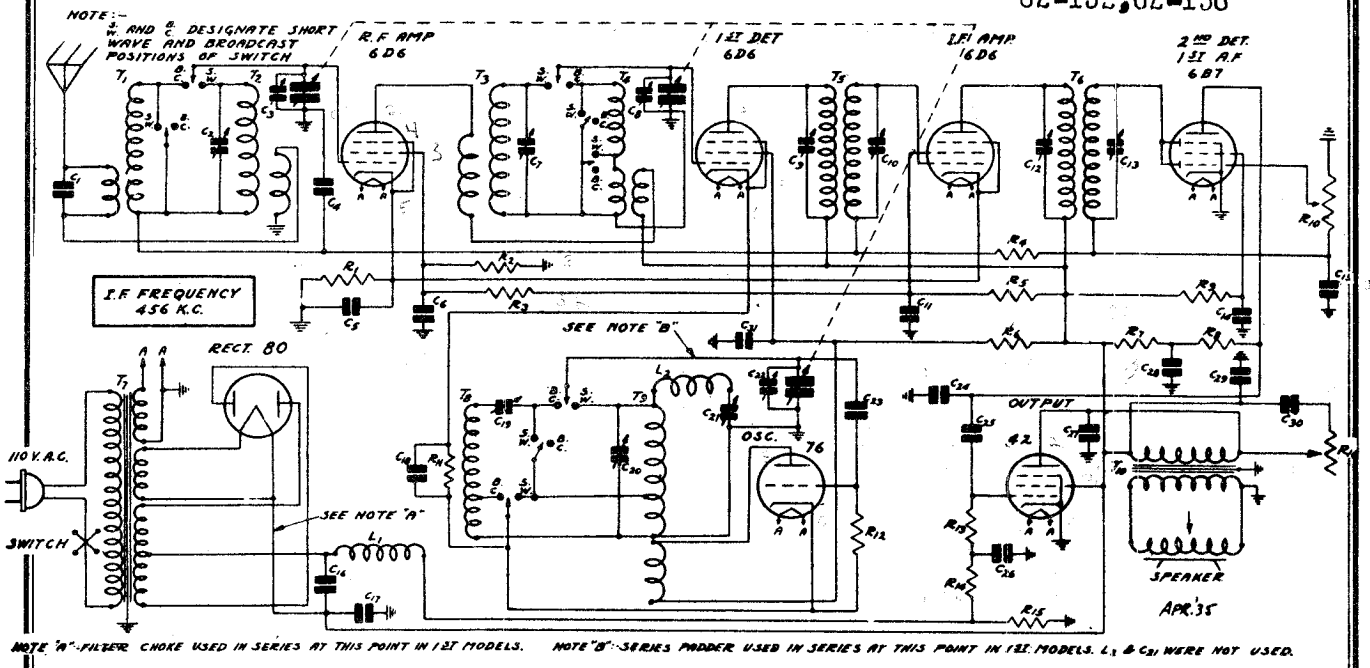
NOTE:- S. AND B. C. DESIGNATE SHORT WAVE AND BROADCAST POSITIONS OF SWITCH
R.F. AMP 6D6
1ST DET 6D6
I.F. AMP 6D6
2ND DET. 1ST A.F. 6B7
I.F. FREQUENCY 456 K.C.
RECT. 80
SEE NOTE "B"
OSC. 76
OUTPUT
42
110 V. A.C.
SWITCH
SEE NOTE "A"
SPEAKER
APR. '35
NOTE "A"-FILTER CHOKE USED IN SERIES AT THIS POINT IN 1ST MODELS. NOTE "B"-SERIES PADDER USED IN SERIES AT THIS POINT IN 1ST MODELS. L3 & C21 WERE NOT USED.

Fig. 1—Schematic Circuit Diagram

## Condenser Alignment

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment. A signal generator that will provide an accurately calibrated signal of 456 K. C. and accurately calibrated signals over the broadcast and short wave bands, 530-1740 K. C. and 5.8-18.3 M. C., is required. An output indicating meter is also necessary. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

### Intermediate Frequency Adjustment

Set the signal generator for 456 K. C. Connect the antenna lead of the signal generator to the grid of the 1st detector through a .05 mfd. condenser. Turn the tuning condenser rotor until the plates are completely out. The ground lead from the signal generator goes to the ground lead of the receiver. The volume control should be at the maximum position. Attenuate the signal so that A. V. C. action is not obtained.

Then adjust the four I. F. trimmer condensers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and are in the round I. F. cans—See Fig. 2. The openings to the trimmer condensers are covered over by a small cover plate which is held in position by a screw. Loosen these screws until the cover plates can be swung around.

### Broadcast Band Adjustment

The broadcast short wave switch should be in the broadcast position. Set the signal generator for 1740 K. C. Turn the rotor to the full open position. The antenna lead from the signal generator is in this instance connected to the antenna lead of the receiver. Attenuate the signal so that A. V. C. action is not obtained. Adjust the oscillator broadcast trimmer until maximum output is obtained. This trimmer is on the tuning condenser and its location is shown in Fig. 2.

Then set the signal generator for 1500 K. C. Turn the rotor until maximum output is obtained. Loosen the pointer screw and set the pointer at the 1500 K. C. mark on broadcast band scale. Retighten pointer screw. Then adjust the antenna and 1st detector broadcast trimmers until maximum output is obtained.

Next set the signal generator for 600 K. C. and adjust the 600 K. C. trimmer. The adjusting screw is reached through a hole in the front panel of the chassis as shown in Fig. 2. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over

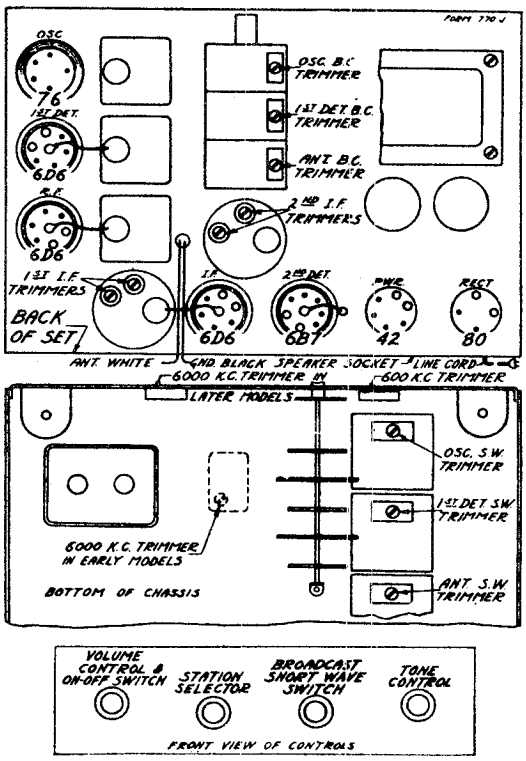


Fig. 2—Tube Arrangement and Location of Trimmers

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this setting at the same time adjusting the 600 K. C. trimmer screw until the highest output is obtained.

## Short Wave Band Adjustment

CAUTION—After the broadcast band alignment as described above has been made, do not change the adjustment of any of the broadcast band trimmers.

Turn the broadcast short wave switch to the short wave position. Turn the rotor to the full open position. As explained above, the volume control should be at the maximum position and the signal should be attenuated to prevent A. V. C. action. Set the signal generator for 18,300 K. C. Then adjust the oscillator short wave trimmer for maximum output. This trimmer is reached from under the chassis and its position is shown in Fig. 2.

Next set the signal generator for 15,000 K. C. Turn the rotor until the dial pointer is at the 15,000 K. C. mark on the short wave portion of the dial scale. Then adjust the antenna and 1st detector short wave trimmers until maximum output is obtained.

In aligning the short wave band of the receiver, it will be noted that the signal will be heard with the signal generator set at two points 912 K. C. apart. That is, if the receiver is tuned to 15,000 K. C. a signal will be heard when the signal generator is set at 15,000 K. C. and again at approximately 15,912 K. C. This is due to image reception or the fact that a 456 K. C. beat is obtained when the signal is 456 K. C. lower than the receiver oscillator and also when the signal is 456 K. C. higher than the receiver oscillator. Care should be taken to see that the receiver is tracked with the signal generator adjusted to the lower of the two frequencies at which a signal is heard, in order that the oscillator in the receiver will be 456 K.C. higher in frequency than the signal.

Next set the signal generator for 6000 K. C. and adjust the 6000 K. C. trimmer. In the first models of this receiver, this condenser was located at the point shown in Fig. 2 in dashed lines. In the later models it is reached through a hole in the front panel of the chassis as shown in the same illustration. Turn the tuning condenser rotor until maximum output is obtained. Then turn the rotor slowly back and forth over this setting, at the same time adjusting the 6000 K. C. trimmer screw until the highest output is obtained. In the early models this adjustment is broad while in the later models it is more critical.

## Caution

The can of electrolytic condenser C16 is not at ground potential. Therefore in any work on the chassis, care should be taken not to touch this can and any other grounded point such as the other electrolytic condenser can.

## Replacing Drive Cord

Remove chassis from cabinet.

Take off the pilot light assembly by lifting off the two sockets and spring clips.

Detach the large pointer by removing the screw at the center of the dial.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis.

Then lay the complete dial assembly face downward in front of the chassis. It is not necessary to remove the volume control and tone control collars which hold the indicator cords of these two controls in position.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 3.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 3. Insert one end of the drive cord from the outside through the hole in the eyelet in the drive drum.

### Voltages at Sockets

LINE VOLTAGE — 115
ANTENNA SHORTED TO GROUND

| Type of Tube | Function | Across Fila. or Heater | Plate to Cath. | Screen to Cath. | Control Grid to Cath. | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 6D6 | R. F. | 6.3 | 246 | 100 | 3.6(1) | 5.3 |
| 6D6 | 1st Det. | 6.3 | 237 | 97 | 8.0(2) | 3.4 |
| 76 | Osc. | 6.3 | 115 | | 0 | 4.8 |
| 6D6 | I. F. | 6.3 | 246 | 130 | 3.6(1) | 8.3 |
| 6B7 | 2nd Det. | 6.3 | 50(3) | 40(3) | 0 | 2.7 |
| 42 | Power | 6.3 | 230 | 245 | 17.0(4) | 33.0 |
| 80 | Rectifier | 5.0 | | | | 37.0 per plate |

(1) Cathode to ground
(2) Subject to variation
(3) Read with 1,000,000 ohm meter
(4) As read across R15

Tie the end of the cord which has been inserted in the hole to one end of the tension spring.

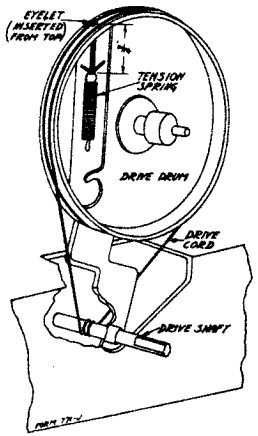


Fig. 3—Drive Cord Replacement

Wrap the cord in a clockwise direction (facing front of chassis) around the drive drum approximately one-half turn.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one-half times around the drive shaft as shown in Fig. 3.

Then bring this cord up from the drive shaft and wrap it around the drive drum approximately one and one fifth turns in a clockwise direction until it is up to the hole in this drum as illustrated.

Insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring, when hanging free, should be approximately ¾" from the flange of the drum as shown in Fig. 3. Cut off the surplus length of cord after it is knotted.

Then secure the other end of the tension spring over the spur on the drive drum.

Replace the dial assembly and pointer.

Replace the pilot light assembly after which the chassis may be reinstalled in the cabinet.

## Changes in Early Models

There are two points at which the early models of this receiver differ from the present models. These points are indicated in Fig. 1 and described below.

## Power Unit

In the early models a separate filter choke was used in series at the point indicated in note A in Fig. 1. The values of the two filter condensers C16 and C17 were less than as used at present. The values of the old and new condensers are shown in the parts list. A different power transformer was also used with the early filter system and this is likewise shown in the parts list.

**The two power transformers are not interchangeable and care must be taken in ordering for replacement purposes to order the correct one.** The original chassis can be identified by the separate filter choke.

## Short Wave Oscillator

Referring to Fig. 1 it will be noted that there is a tracking coil L2 and a trimmer condenser C21 connected in series between the short wave oscillator coil and ground. In the first models of this receiver these two units, which are required for tracking the short wave oscillator, are not used. Instead a series padding condenser was used at the point in the circuit indicated by note B in Fig. 1.

**At the time this change was made a change was also made in the oscillator assembly and care must be taken in ordering for replacement purposes to order the correct one.** Early models with the original oscillator assembly have no spot of paint or a green spot of paint on the 80 socket rivet. Later models with the new oscillator assembly and new tracking system have a red spot of paint on the 80 socket rivet.

## Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty-cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty-cycle power supply. However, the reverse is not true, the sixty-cycle receiver cannot be operated from a twenty-five cycle power supply.

A 110-220 Volt, 40-60 cycle Power Transformer is also available for this model.

## REPAIR PARTS LIST FOR 7 TUBE BROADCAST AND SHORT WAVE RECEIVER

When ordering parts be sure and give the part number. Also give the series number which will be found in the License Notice label. If there is a spot of paint on the chassis, give this color.

| Part No. | Item | List Price |
|---|---|---|
| P-1441 | Double Mounting Strip | .10 |
| P-1421 | Single Mounting Strip | .10 |
| P-2060 | Knob Small | .20 |
| P-2062 | Knob Large | .20 |
| P-10337 | Small Tone & Volume Control Disc | .10 |
| P-20912 | Pointer, Large | .20 |
| P-2012 | Pilot Light Bulb 6-8 volt | .15 |
| P-10272 | Rubber Mounting Feet | .10 |
| P-10820 | Glass Crystal | .15 |
| P-20875 | Crystal Retainer Rhg | .10 |
| P-2090 | 6" Speaker Mantel Sets L1 - 1250 ohm | 6.00 |
| P-2091 | 8" Speaker Console Sets L1 - 1250 ohm | 6.75 |
| | 8" Black Drive Cord (V. C. or T. C. Ind.) | .05 |
| | 29" Black Drive Cord (Cond. Drive) | .10 |
| P-2136 | Pilot Lamp Socket & Clip Assembly | .10 |
| P-2101 | Broadcast-Short Wave Switch | 1.88 |

| Part No. | Item | List Price |
|---|---|---|
| P-1885 | No. 6D6 Socket | $ .15 |
| P-2022 | No. 76 Socket | .15 |
| P-1944 | No. 6B7 Socket | .15 |
| P-1884 | No. 42 Socket | .15 |
| P-2025 | No. 80 Socket | .15 |
| P-1637 | Speaker Socket | .10 |
| P-40445 | Tube Shield for 6D6 & 6B7 Tubes | .15 |
| P-40444 | Tube Shield for 76 Tube | .15 |
| P-40443 | Tube Shield Bases | .10 |
| *P-50634 | Power Transformer 115 Volts, 60 Cycles | 4.00 |
| *P-50635 | Power Transformer 115 Volts, 25 Cycles | 4.50 |
| *P-50636 | Power Transformer 115-230 Volts, 40-60 Cycles | 3.25 |
| †P-50646 | Power Transformer 115 Volts, 60 Cycles | 3.25 |
| †P-50647 | Power Transformer 115 Volts, 25 Cycles | 4.50 |
| †P-50648 | Power Transformer 115-230 Volts, 40-60 Cycles | 3.75 |
| *P-50637 | Filter Reactor | .85 |
| P-50599 A | Output Transformer T 10 | 1.15 |
| P-5176 | Antenna R.F. Trans. less can T1 & T2 | 1.80 |
| P-5177 | Inter-Stage R. F. Trans. less can T1 & T4 | 1.73 |
| *P-5178 | Oscillator Coil Assembly Less can T8 & T9 | 1.70 |
| †P-5181 | Oscillator Coil Assembly Less can T8 & T9 | 1.70 |
| P-40433 | Cans for the above Assemblies | .15 |
| †P-5190 | High Frequency Oscillator Tracking Coil L2 | .33 |
| P-5179 | 1st I. F. Assembly Complete with Can T5 | 2.15 |
| P-5180 | 2nd I. F. Assembly Complete with Can T6 | 2.15 |
| P-30342-A | Grid Cap Only | .10 |
| P-70702 | AC Cord & Plug | .70 |
| P-1504 | 8 Terminal Mounting Strip | .10 |

| Part No. | Code | Resistance | Watts | Type | List Price |
|---|---|---|---|---|---|
| P-98016 | R1 | 200 ohm | .2 | Flex. Wire Wound | $ .15 |
| P-B93303 | R2 | 30,000 ohm | .5 | Carbon | .20 |
| P-B94602 | R3 | 6,000 ohm | .5 | Carbon | .15 |
| P-A95205 | R4 | 2.0 megohm | .2 | Carbon | .15 |
| P-98020 | R5 16,000 ohm / R6 25,000 ohm | | 1.5 / 1.0 | Armored wire wound | .65 |
| P-A94203 | R7 | 20,000 ohm | .2 | Carbon | .15 |
| P-B94603 | R8 | 60,000 ohm | .5 | Carbon | .15 |
| P-B94254 | R9 | 250,000 ohm | .5 | Carbon | .15 |
| P-96014 | R10 | 500,000 ohm | | Vol. Control & Switch | 1.05 |
| P-A94252 | R11 | 2,500 ohm | .2 | Carbon | .15 |
| P-A94104 | R12 | 100,000 ohm | .2 | Carbon | .15 |
| P-A95504 | R13 | 500,000 ohm | .2 | Carbon | .20 |
| P-A94104 | R14 | 100,000 ohm | .2 | Carbon | .15 |
| P-98015 | R15 | 235 ohm | 2.0 | Flex. Wire Wound | .15 |
| P-97011 | R16 | 150,000 ohm | | Tone Control | .75 |

| Part No. | Code | Capacity | Volts | Type | List Price |
|---|---|---|---|---|---|
| P-80919 | C1 | .00025 mfd. | | Moulded | $ .20 |
| P-2102 | C2 | 3-40 mmfd. | | Ant. S.W. Trimmer | .15 |
| | C3 | (See 3 Gang Cond.) | | Gang Trimmer | |
| P-80862 | C4 | .05 mfd. | 200V. | Tubular | .15 |
| P-80888 | C5 | .25 mfd. | 200V. | Tubular | .25 |
| P-80890 | C6 | .05 mfd. | 400V. | Tubular | .20 |
| P-2102 | C7 | 3-40 mmfd. | | 1st Det.S.W. Trim. | .15 |
| | C8 | (See 3 Gang Cond.) | | Gang Trimmer | |
| P-1386-B | C9 90±30 mmfd. / C10 90±30 mmfd. | | | Dual Trimmer Part of I. F. Assem. | |
| P-81034 | C11 | .25 mfd. | 300V. | Tubular | .30 |
| P-1386-B | C12 90±30 mmfd. / C13 90±30 mmfd. | | | Dual Trimmer Part of I. F. Assem. | |
| P-81040 | C14 | .25 mfd. | 400V. | Tubular | .35 |
| P-80977 | C15 | .0001 mfd. | | Moulded | .20 |
| †P-81043 | C16 | 18.0 mfd. | 300V. | Electrolytic Wet | 1.30 |
| *P-80916 | C16 | 8.0 mfd. | 450V. | Electrolytic Wet | 1.35 |
| *P-81032 | C17 | 8.0 mfd. | 500V. | Electrolytic Wet | 1.30 |
| †P-81042 | C17 | 14.0 mfd. | 400V. | Electrolytic Wet | 1.45 |
| P-80862 | C18 | .05 mfd. | 200V. | Tubular | .15 |
| P-2112 | C19 | 300-500 mmfd. | | 600 K.C. Trimmer | .45 |
| P-2102 | C20 | 3-40 mmfd. | | Osc. S.W. Trimmer | .15 |
| †P-1685 | C21 | 70±30 mmfd. | | 6000 K.C. Trimmer | .35 |
| | C22 | (See 3 Gang Cond.) | | Gang Trimmer | |
| P-81005 | C23 | .000035 mfd. | | Moulded | .15 |
| P-80914 | C24 | .002 mfd. | 600V. | Tubular | .20 |
| P-80981 | C25 | .01 mfd. | 400V. | Tubular | .25 |
| P-81044 | C26 | .03 mfd. | 400V. | Tubular | .15 |
| P-80914 | C27 | .002 mfd. | 600V. | Tubular | .20 |
| P-81033 | C28 | .25 mfd. | 400V. | Tubular | .35 |
| P-80887 | C29 | .1 mfd. | 400V. | Tubular | .20 |
| P-80890 | C30 | .05 mfd. | 400V. | Tubular | .20 |
| P-80887 | C31 | .1 mfd. | 400V. | Tubular | .20 |
| P-81027-B | 3 Gang Condenser | | | | 3.35 |
| *P-2113 | | 600-1200 mmfd. | | 6000 K.C. Trimmer | .61 |

* Used in early Models. See Article on changes in this Manual
† Used in Later Models. See Article on changes in this Manual

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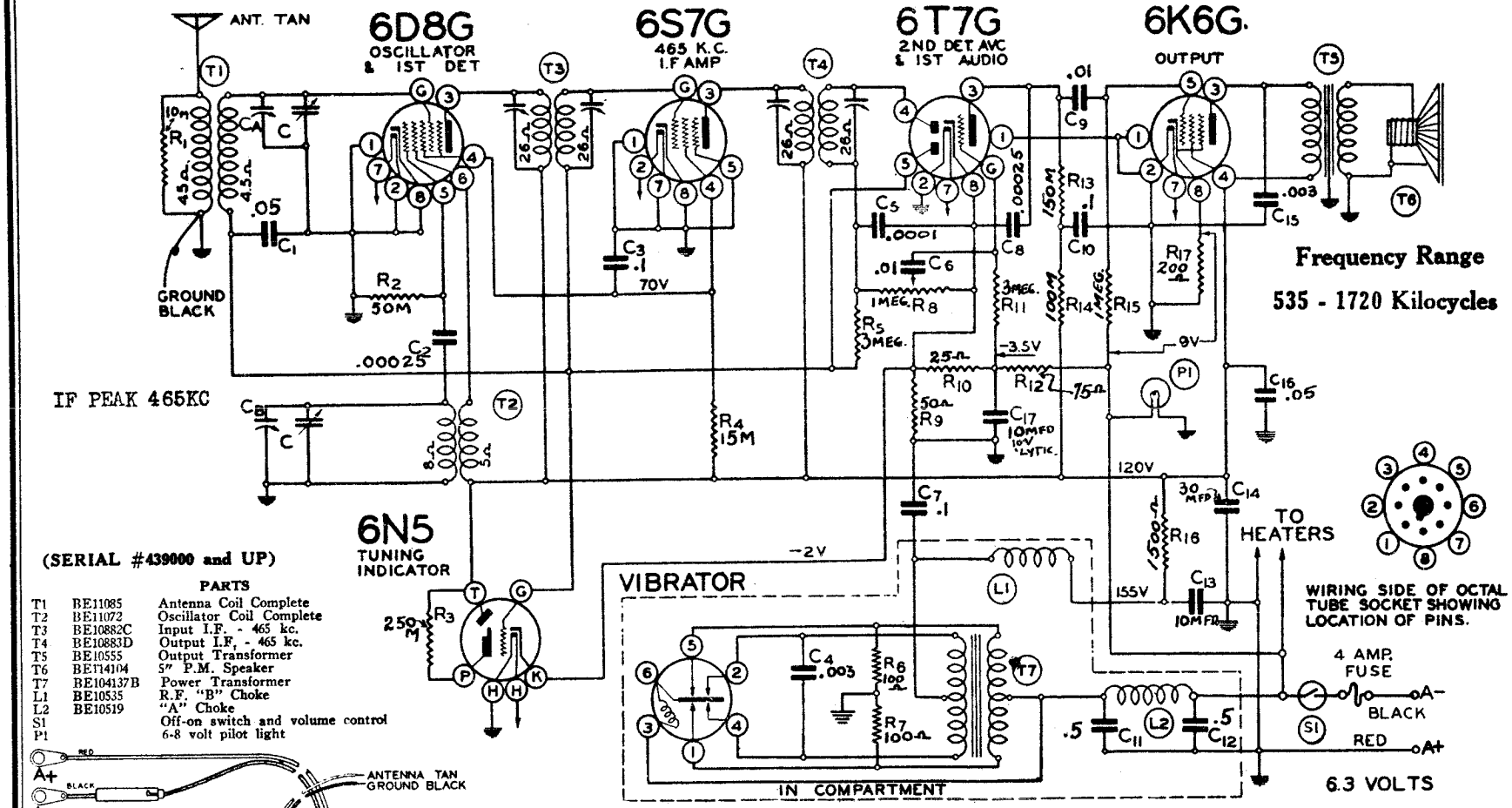


(SERIAL #439000 and UP)

PARTS

| | | |
|---|---|---|
| T1 | BE11085 | Antenna Coil Complete |
| T2 | BE11072 | Oscillator Coil Complete |
| T3 | BE10882C | Input I.F. - 465 kc. |
| T4 | BE10883D | Output I.F. - 465 kc. |
| T5 | BE10555 | Output Transformer |
| T6 | BE114104 | 5" P.M. Speaker |
| T7 | BE104137B | Power Transformer |
| L1 | BE10535 | R.F. "B" Choke |
| L2 | BE10519 | "A" Choke |
| S1 | | Off-on switch and volume control |
| P1 | | 6-8 volt pilot light |

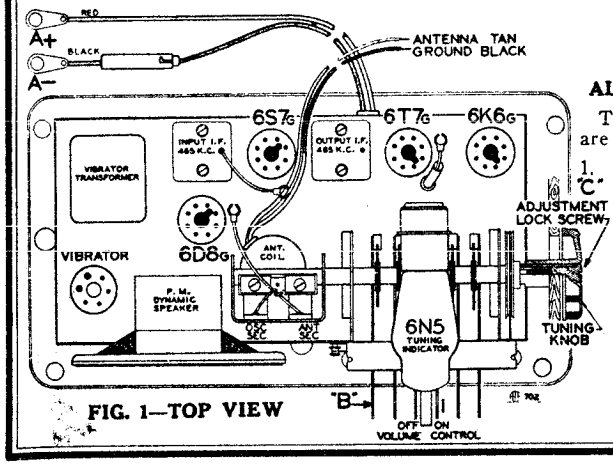


FIG. 1—TOP VIEW

**ALIGNING I.F. TRANSFORMERS: (465 K.C.):**

These I.F. transformers have two adjustments, both of which are accessible from the top of chassis (see Fig. 1).

1. With volume control full on (extreme right of its rotation), and with the variable condenser set to approximately 1400 kilocycles, make the following adjustments:

(a) Connect external oscillator set at 465 kilocycles, in series with .1 mfd. condenser, to the control grid cap of the type 6S7G tube, and adjust the output I.F. transformer (No. 108-83D) to resonance.

(b) Move oscillator output clip from grid of 6S7G to grid of 6D8G and adjust input I.F. transformer (No. 108-82C) to resonance.

(c) With oscillator still connected to 6D8G, readjust output I.F. transformer (108-83D) if necessary.

**R.F. ALIGNMENT: (535-1720 K.C.):**

1. With gang condenser in its minimum capacity position, plates entirely out of mesh, connect an external oscillator in series with a 200 mmf. condenser to the antenna lead and chassis ground and make the following adjustments:

(a) With external oscillator set at 1720 kilocycles, adjust oscillator trimmer to resonance. This adjustment is on the top of rear section of variable gang condenser. (See Fig. 1).

(b) Re-set external oscillator to 1400 kilocycles, rotate condenser, pick up oscillator signal and adjust antenna trimmer to resonance. (Top of front section of gang condenser).

(c) Check sensitivity at 600 and 1000 kilocycles.

MODELS 62-280,62-282,62-284
MODELS 62-323,62-353
MODEL 62-324
MODEL 62-453
MODEL 62-459
MODELS 62-501,62-502
MODELS 62-504,62-505
TUNER DATA

# MONTGOMERY WARD & CO

MODEL 62-552
MODEL 62-553
MODELS 62-558,62-1558,62-2558
MODEL 62-601
MODELS 93BR508A,93BR509A
MODEL 93BR564A
Tuner Data

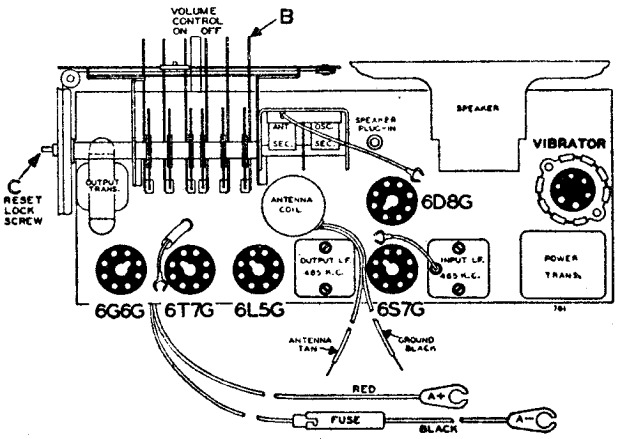


**FIG. 1—TOP VIEW**

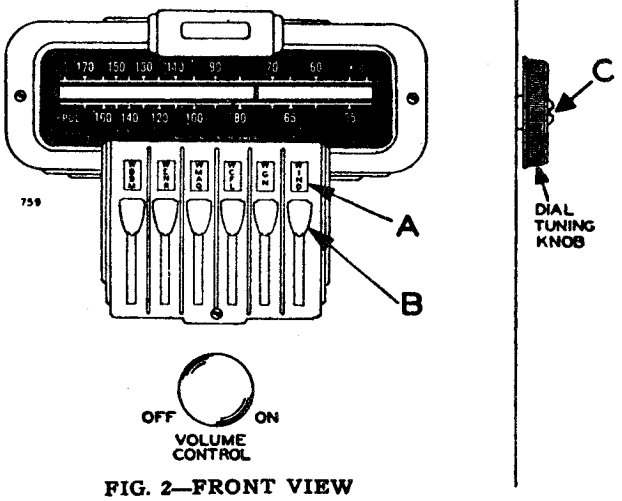


**FIG. 2—FRONT VIEW**

## OPERATION:

The two control knobs in sequence from left to right are (see Fig. No. 2)

Knob 1, Volume Control and On-Off Switch.
Knob 2, Tuning Knob. (Side of Cabinet).

## KNOB 1. VOLUME CONTROL AND "ON"-"OFF" SWITCH ARE COMBINED:

When turning on, a click will be heard and the dial will light. Wait approximately 45 seconds for the tubes to heat up. Turn knob all the way to the left to turn set off.

## KNOB 2. MANUAL TUNING:

This radio may be used to tune in stations either by the conventional manual method or by using the Automatic levers. The tuning range of the radio is from 535 to 1735 kilocycles, the dial being calibrated in channel numbers. It covers all standard broadcast channels and one police band.

To convert channel numbers to kilocycles, add one zero. For example, 170 is 1700 kilocycles.

## PROCEDURE FOR SETTING THE AUTOMATIC LEVERS:

There are six levers on the dial by means of which six stations may be selected, (See "B," Fig. 2).

Press down any one of the six Automatic levers. Holding it down, tune in by means of tuning knob No. 2 any one of your favorite stations. Turn the tuning knob very slowly back and forth until signal is clearest. The stations will then be accurately tuned in.

Release this lever and press down any other Automatic lever. Hold this lever down and tune in by means of knob No. 2 another favorite station.

Follow this procedure until stations have been set on all the levers. Hold tuning knob securely with left hand to prevent it from turning and with a coin or screw driver, tighten the special locking screw ("C") in the center of the tuning knob, (See Fig. 2).

This screw will lock in place all stations you have selected on the Automatic levers. (Note: Locking Screw "C" is loose when radio is shipped from factory).

If you should desire to change any station you selected to another, hold the tuning knob securely and loosen locking screw ("C") one or two turns; select the new station as explained.

**BE SURE TO RETIGHTEN THE LOCKING SCREW, otherwise the stations will not stay adjusted to the levers.**

Above each Automatic lever an opening in the escutcheon is provided for inserting station call letters, (See "A," Fig. 2).

Punch the correct station call letter tabs from the set of sheets supplied and insert them into the rectangular openings in the escutcheon above each of the levers. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

The Automatic Tuner dial is now set up for quick tuning. Press down on the lever and your favorite station is selected.

## TYPICAL TUNING DATA

The procedure for setting the Automatic Levers is the same for all the above mentioned models. However, the number of Automatic Levers may differ.

The locking screw "C" and automatic levers shown in both figs 1 and 2 are for the Model 62-552 receiver. However, this is a typical receiver.

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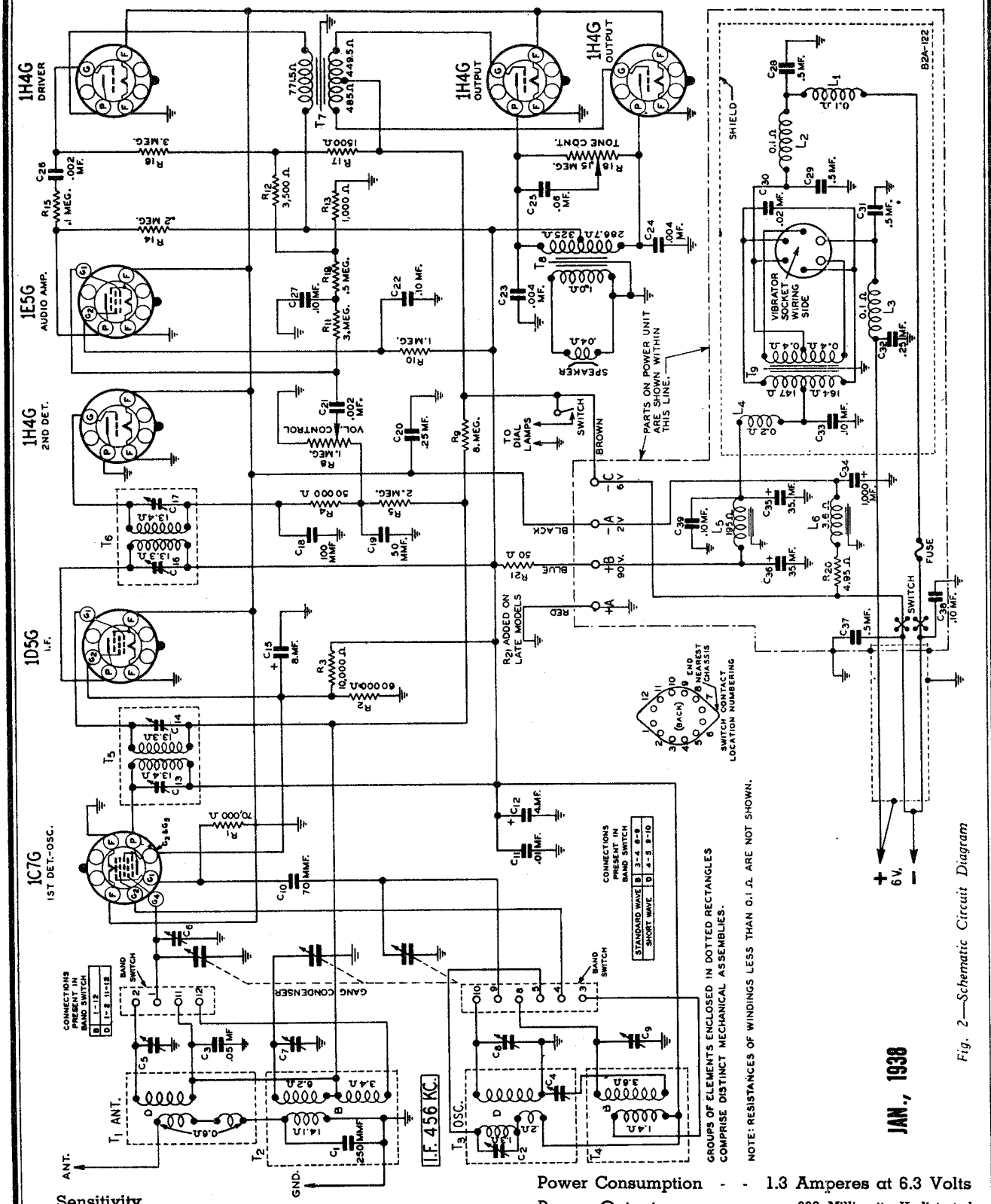
# MONTGOMERY-WARD & CO.

MODELS 62-292, 62-294
62-373, 62-374
Schematic




GROUPS OF ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω. ARE NOT SHOWN.

JAN., 1938

*Fig. 2—Schematic Circuit Diagram*

**Sensitivity**

B Range.....13.5 Microvolts Average
D Range.....21.0 Microvolts Average

**Tuning Frequency Range**

B Range..... 528 to 1730 KC
D Range.....5750 to 18300 KC

Power Consumption - - 1.3 Amperes at 6.3 Volts
Power Output - - - - - 360 Milliwatts Undistorted
725 Milliwatts Maximum
Selectivity - - 35 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - - 456 KC
Speaker - - - - 6" P.M. Dynamic—Mantel Models
8" P.M. Dynamic—Console Models

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# ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

| STEP (Follow Order as Given) | BAND SWITCH SETTING | DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | TRIMMERS ADJUSTED See Illustration | PROCEDURE INITIAL STEPS | PROCEDURE ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| I.F. | Range B | .1 mf. | 456 KC | Grid of 1st Det. | 1st I.F. (C13) & (C14)<br>2nd I.F. (C16) & (C17) | Turn Rotor to Full Open | Adjust to Maximum Output |
| RANGE B<br>1730 KC | Range B | 200 mmf. | 1730 KC | Antenna Lead | Oscillator Range B (C9) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1500 KC | Range B | 200 mmf. | 1500 KC | Antenna Lead | 1st Ant. Range B (C7)<br>2nd Ant. Range B (C6) | Turn Rotor to Max. Output<br>Set Indicator to 1500 KC—<br>See Note A | Adjust to Maximum Output |
| 600 KC | Range B | 200 mmf. | 600 KC | Antenna Lead | 600 KC (C4) | Turn Rotor to Max. Output | Adjust to Maximum Output<br>Rock Rotor—See Note B |
| RANGE D<br>18300 KC | Range D | 400 Ohm | 18300 KC | Antenna Lead | Oscillator Range D (C8) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 15000 KC | Range D. | 400 Ohm | 15000 KC | Antenna Lead | Ant. Range D (C5) | Turn Rotor to Max. Output | Adjust to Maximum Output<br>Rock Rotor—See Note B |
| 6000 KC | Range D | 400 Ohm | 6000 KC | Antenna Lead | 6000 KC (C2) | Turn Rotor to Max. Output | Adjust to Maximum Output<br>Rock Rotor—See Note B |

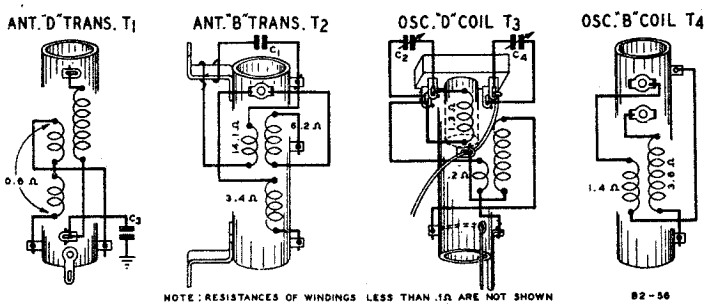


*Fig. 6—Coil Terminal Arrangement and D.C. Resistance of Windings*

NOTE A—In sets using the finger tip tuning dial, remove the retaining ring which holds the dial scale in position. Readjust rotor to maximum output. Hold the station selector ring and turn the dial scale until the pointer is at the 1500 KC mark. Replace the retaining ring.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

**Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.**

After each range is completed, repeat the procedure as a final check.

After alignment of Range D has been completed, do not make any adjustments of the Range B trimmers. If this is done, it will be necessary to realign Range D.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

## VOLTAGES AT SOCKETS

**Volume Control: Maximum** — **Antenna Shorted to Ground**
**Readings taken with 1000 Ohm-per-volt meter.** — **Band Switch in Standard Wave Position**

| TUBE | FUNCTION | VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated) Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Control Grid Bias |
|---|---|---|---|---|---|---|---|---|
| 1C7G | 1st Det.—Osc. | 0 | 103 | 66 | | 103 | 2 | |
| 1D5G | I.F. | 0 | 103 | 66 | | | 2 | |
| 1H4G | 2nd Det. | 0 | 0 | | | | 2 | |
| 1E5G | Audio Amp. | 0 | 40(1) | 19(1) | | | 2 | 1.0 Across R13 |
| 1H4G | Driver | 0 | 100 | | | | 2 | 4.5 Across R12 & 13 |
| 1H4G | Output | 0 | 102 | | 6 | | 2 | 6 —C to Ground |

(1) As read on 1000 volt scale.

A synchronous type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

If, after a new 2 section dry electrolytic condenser has been installed, vibrator hash is encountered, reverse the connections of the 2 sections.

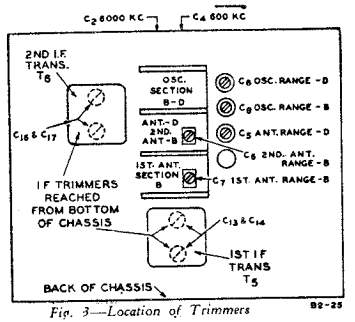
C2 6000 KC
C4 600 KC
2ND I.F. TRANS. T6
OSC. SECTION B-D
ANT.-D 2ND. ANT.-B
1ST. ANT. SECTION B
C16 & C17
C8 OSC. RANGE - D
C9 OSC. RANGE - B
C5 ANT. RANGE - D
C6 2ND. ANT. RANGE - B
C7 1ST. ANT. RANGE - B
C13 & C14
1ST I.F. TRANS T5
I.F TRIMMERS REACHED FROM BOTTOM OF CHASSIS
BACK OF CHASSIS
B2-25

*Fig. 3—Location of Trimmers*

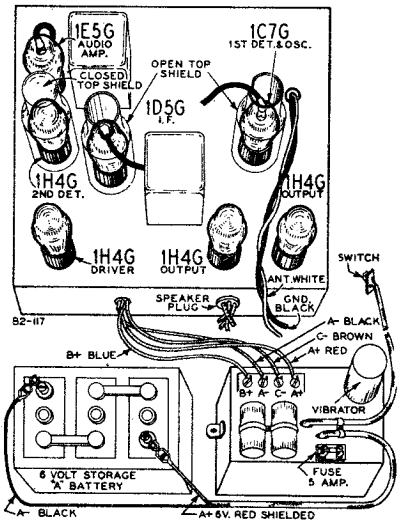


*Fig. 5—Tube Arrangement and Battery Connections*

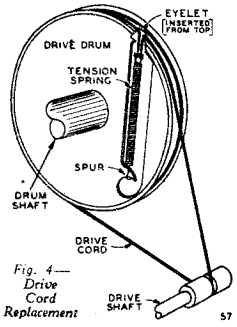


*Fig. 4—Drive Cord Replacement*

Schematic, Voltage
Socket, Trimmers

# MONTGOMERY WARD & CO.

MODELS 62-323, 62-353
Series A, Issue A
Ser. 8J305400 up
Issue B, Ser. 9B613100 up

Power Consumption ..... 55 Watts (at 115 Volts 60 Cycles)
Power Output ..... 1.5 Watts Undistorted, 3.2 Watts Maximum

CERTAIN PARTS ARE DIFFERENT IN THE TWO ISSUES. THESE DIFFERENCES ARE SHOWN BELOW.

| | FOR ISSUE "A" ONLY | | FOR ISSUE "B" ONLY |
|---|---|---|---|
| FREQUENCY RANGE | 540 to 1720 Kilocycles<br>5.45 to 18.3 Megacycles | | |
| C2 | .00009 Mica | BE12949 | |
| C3 | .00304 x 600 v. | BE10077 | |
| C4 | SW. Antenna Trimmer 2-25 mfd. | BE12439 | |
| C5 | B.C. Antenna Trimmer 1-10 mmfd. | BE12453 | |
| C6 | .05 x 400 v. | BE10022 | |
| C7 | SW. Oscillator Trimmer 2-25 mmfd. | BE12439 | |
| C8 | B.C. Oscillator Trimmer 2-25 mmfd. | BE12453 | |
| C9 | .00005 Mica | BE12938 | |
| C10 | .002 x 600 v. | BE10025 | |
| C11 | 350 mmfd. W.C. B.C. Series Pad | BE12451B | |
| C12 | .0041 Compression Type (Short Wave Osc. Pad) | BE129112 | |
| C13 | BE10053 | .25 x 400 v. | |
| C14 | BE12939 | .00005 Mica | |
| C15 | BE10011 | .01 x 400 v. | |
| C16 | BE1292 | .0005 Mica | |
| C17 | BE10011 | .01 x 400 v. | |
| C18 | BE10013 | .05 x 400 v. | |
| C19 | BE11963B | 8 mfd.—350 w. v. lytic | |
| C20 | BE11963B | 12 mfd.—350 w. v. lytic | |
| C21 | BE10089 | .008 x 800 v. | |
| | C5 and C8 in same unit. C18 and C19 in same unit. | | |
| T1 | BE11193C | SW. BC. Antenna Coil Complete | |
| T2 | BE11089 | SW. BC. Oscillator Coil Complete | |
| T3 | BE10810SG | Input I. F.—465 kc. | |
| T4 | BE10810SD | Output I. F.—465 kc. | |
| T5 | BE10575 | Output Transformer | |
| T6 | BE104124B | Power Transformer | |
| T7 | BE114125 | 6" Speaker Dynamic (1500 ohm field) | |
| S1 | BE12554 | Band Switch | |
| S2 | BE10126 | Off-on Switch on volume control | |
| P1 | BE10794 | 6.3 v. Pilot Light T-44 | |
| CA | | Adjustable Capacitor | |
| CB | BE13017 | Adjustable Capacitor 10M ohm—½ w. | |
| R5 | | | |
| R10 | BE130233 | 60 ohm—½ w. | |
| R5 | BE13065 | 30M ohm—1 w. | |
| R10 | BE13020 | 40 ohm—½ w. | |

FOR SETTING UP PUSH BUTTONS, SEE INDEX.

REPAIR PARTS
Series A Issue A
(Serial No. 8J305400 and up)
Series A, Issue B
(Serial No. 9B613100 and up)

THE FOLLOWING PARTS ARE COMMON TO BOTH ISSUES A AND B:

| | | | |
|---|---|---|---|
| | RESISTORS | | |
| R1 | BE13041 | 800 ohm—½ w. | |
| R2 | BE13017 | 10M ohm—½ w. | |
| R3 | BE13020 | 100M ohm—½ w. | |
| R4 | BE13012 | 50M ohm—½ w. | |
| R6 | BE13031 | 1500 ohm—½ w. | |
| R7 | BE13042 | 20M ohm—½ w. | |
| R8 | BE1304 | 3 megohm—½ w. | |
| R9 | BE101126 | 1 megohm control (volume) | |
| R11 | BE1304 | 3 megohm—½ w. | |
| R12 | BE13020S | 40 ohm—½ w. | |
| R13 | BE1309 | 200M ohm—½ w. | |
| R14 | BE13019 | 1 megohm—½ w. | |
| R15 | BE130232 | 25M ohm—½ w. | |
| R16 | BE130110 | 1 Megohm (in Tuning Eye Socket) | |
| R17 | BE13024 | 2M ohm—½ w. | |
| C | BE10274 | 2 gang variable condenser | |
| C1 | BE12987 | .000105 Mica | |

I. F. Frequency 465 Kilocycles

NOTE: Circuit diagram and voltage chart indicate connections and voltage measurements for the cathode-ray tuning eye tube type 6U5. This data only applies to the model 62-323; the model 62-353 is not equipped with a cathode-ray tuning eye.

FIG. 1—TOP VIEW

Feb. 39

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## MODELS 62-323, and 62-353 Series A, Issues A & B
## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6K8 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short wave (Extreme right rotation) | Set dial at 17 MC | Trimmer (C 7) (See Fig. 3) | Short wave Oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short wave (Extreme right rotation) | Dial set at 17 MC | Trimmer (C 4) (See Fig. 3) | Short wave Antenna | Adjust to maximum output |
| BROAD-CAST BAND | 1720 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer (C 8) (See Fig. 3) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set dial at 1400 Kc. | Trimmer (C 5) (See Fig. 3) | Broadcast Antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set dial at 600 Kc. | Trimmer (C 11) (See Fig. 3) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| IMAGE REJECTION ADJUST-MENTS | 2100 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Pick up signal at 1170 Kc. on dial | Wire capacitor (CB) (See circuit diagram) | Image rejection | Adjust by twisting for minimum output. (See note "B") |
| | 2630 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Pick up signal at 1700 Kc. on dial | Wire capacitor (CA) (See circuit diagram) | Image rejection | Adjust by moving for minimum output. (See note "C") |

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

- Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.
- After each band is completed, repeat the procedure as a final check.

ISSUE "A" ONLY.

NOTE "B" 2100KC is the image frequency of 1170 KC. Adjust wire capacity (CB) by twisting the two wires until a minimum output is obtained.

NOTE "C" 2630KC is the image frequency of 1700KC. Adjust wire capacity (CA) by moving the wire either toward or away from the antenna coil winding until a minimum output is obtained on the output meter.

### SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 115 volts on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 110, 130, and 230 volts.

### ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded

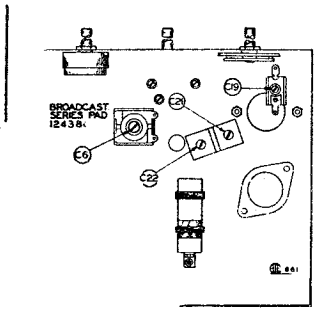



FIG. 3—BOTTOM VIEW SHOWING TRIMMERS

## ALIGNMENT PROCEDURE MODEL 62-380 Series A

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf., and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6A8 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set dial at 17 MC. | Trimmer—Top of rear section of gang. (See Fig. 1) | Short wave Oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Dial set at 17 MC. | Trimmer (C19) (See Fig. 3) | Short wave Antenna | Adjust to maximum output |
| BROAD-CAST BAND | 1720 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer (C22) (See Fig. 3) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set dial at 1400 Kc. | (Trimmer (C21) (See Fig. 3) | Broadcast Antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set dial at 600 Kc. | Trimmer (C6) (See Fig. 3) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

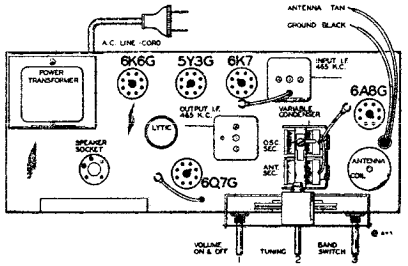
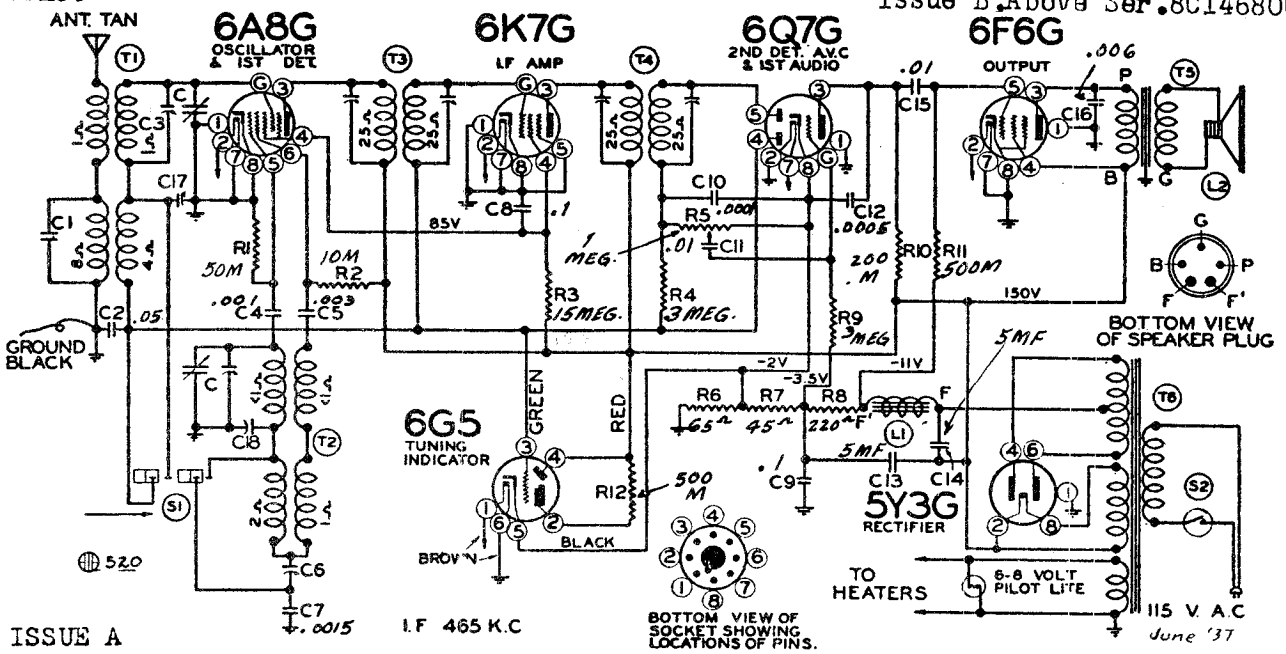



FIG. 1—TOP VIEW

Schematic, Voltage, Trimmers, Alignment Socket

# MONTGOMERY WARD & CO.

MODELS 62-306, 62-406
Issue A, Above Ser. 7E659000
Issue B, Above Ser. 8C146800




ISSUE A

**PARTS (SERIAL No. 7E659000 and UP)**

ISSUE B **PARTS (SERIAL No. 8C146800 and UP)**

IF ALIGNMENT - 465 KC

Vol. Control full on, variable condenser in minimum capacity position: Adjust to resonance 2 trimmers at 465 KC, thru a .1 mf. condenser.

SHORT WAVE ALIGNMENT - 2000 to 7000 KC

Dial at 6 MC, adjust to resonance the SW oscilator trimmer (at top of rear variable gang condenser) and SW Antenna trimmer No. 1 (Fig. 1) at 6 M.C., thru a .1 mf. condenser and 400 ohm resistor series.

BROADCAST ALIGNMENT- 535 to 1720 KC

Gang condenser in minimum capacity position; signal generator in series with a 200 mmf condenser and 20 ohm resistor series;-

(a) Adjust oscilator trimmer No. 3 Fig.3. to resonance at 1720 KC.
(b) Adjust Antenna trimmer No. 2 Fig. 3, to resonance at 1400 Kc.
(c) Adjust Padder No. 4 Fig. 3, to resonance at 600 KC.
(d) Repeat adjustments a & c until sensitivity is at maximum.
(e) Check for tracking & sensitivity at 1400, 1000 and 600 KC.

DO NOT BEND PLATES OF CONDENSER TO CORRECT TRACKING.

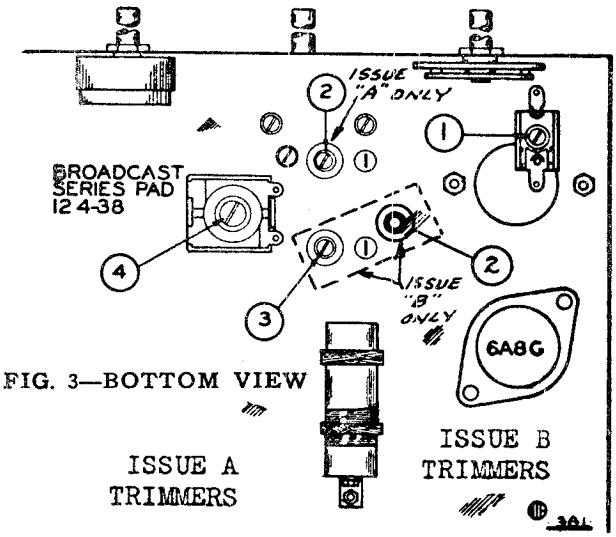



FIG. 3—BOTTOM VIEW

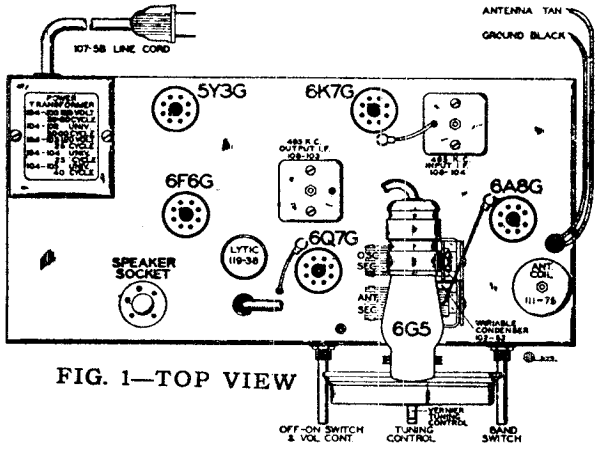



FIG. 1—TOP VIEW

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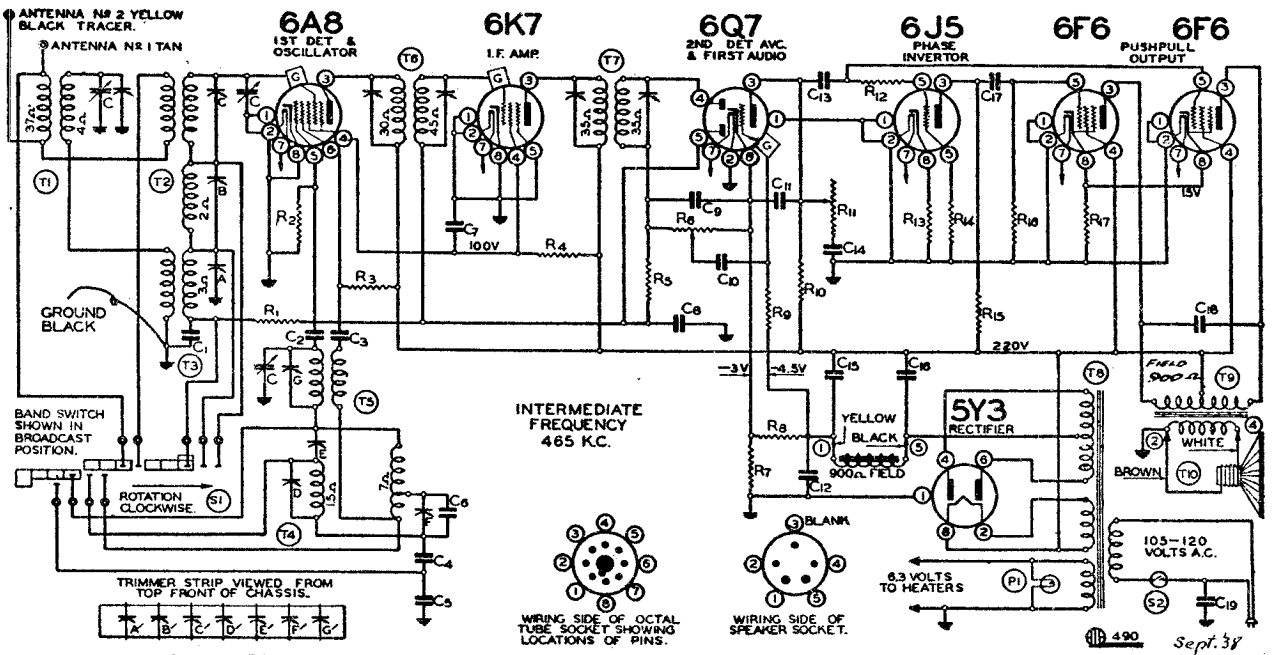
MODEL 62-324
Schematic, Voltage

# MONTGOMERY WARD & CO.

Socket, Trimmers
Alignment




**PARTS (Serial No. 8H261200 and up)**

**RESISTORS**

| | | |
|---|---|---|
| R1 | 130-103 | 100M ohm - 1/3 w. 10% |
| R2 | 130-12 | 50M ohm - 1/3 w. 20% |
| R3 | 130-123 | 15M ohm - 1/2 w. 10% |
| R4 | 130-196 | 30M ohm - 1 w. 10% |
| R5 | 130-4 | 3 megohm - 1/3 w. 20% |
| R6 | 101-104 | 1 megohm volume control |
| R7 | 130-198 | 40 ohm - 1/2 w. 10% |
| R8 | 130-197 | 20 ohm - 1/3 w. 10% |
| R9 | 130-4 | 3 megohm - 1/3 w. 20% |
| R10 | 130-103 | 100M ohm - 1/3 w. 10% |
| R11 | 101-105 | 300M ohm - tone control |
| R12 | 130-163 | 400M ohm - 1/3 w. 10% |
| R13 | 130-22 | 5M ohm - 1/3 w. 20% |
| R14 | 130-103 | 100M ohm - 1/3 w. 10% |
| R15 | 130-12 | 50M ohm - 1/3 w. 20% |
| R16 | 130-102 | 500M ohm - 1/3 w. 10% |
| R17 | 130-195 | 250 ohm - 1.2 w. 10% |

**CONDENSERS**

| | | |
|---|---|---|
| C | 102-62 | 3 gang variable |
| C1 | 100-22 | .05 x 200 v. 25% |
| C2 | 129-67 | .00004 Mica 10% |
| C3 | 100-25 | .002 x 600 v. 25% |
| C4 | 129-83 | .0027 Mica 2-1/2% |
| C5 | 129-84 | .003 Mica 2-1/2% |
| C6 | 129-88 | .0006 Mica 5% |
| C7 | 100-39 | .1 x 400 v. 20% |
| C8 | 100-26 | .02 x 400 v. 25% |
| C9 | 129-5 | .0001 Mica 20% |
| C10 | 100-26 | .02 x 400 v. 25% |
| C11 | 129-2 | .0005 Mica 20% |
| C12 | 100-20 | .1 x 200 v. 25% |
| C13 | 100-26 | .02 x 400 v. 25% |
| C14 | 100-57 | .006 x 600 v. + 10 - 20% |
| C15 | 103-14 | 16 mfd. lytic 275 w.v. Reg. |
| C16 | 103-6 | 8 mfd. lytic 350 w.v. |
| C17 | 100-26 | .02 x 400 v. 25% |
| C18 | 100-37 | .003 x 600 v. 10% |
| C19 | 100-61 | .02 x 600 v. bakelite 20% |

FOR TUNER DATA SEE INDEX

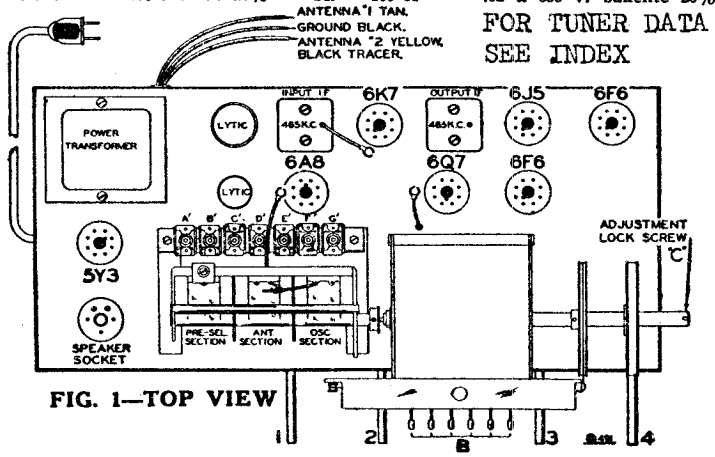



FIG. 1—TOP VIEW

I.F.-Vol.contr.full on; Var.at 1400KC. At 465KC-.1 mfd.dummy to grid cap of 6K7 tube,align output I.F.;signal to 6A8 grid cap,align input I.F.
B.C.BAND-Sw.in B.C.pos.;Var.at min.cap.;200mfd.and 20 ohm series resistor dummy to tan ant. lead. At 1750KC adjust trimmer E' to resonance. At 1400KC,trimmer A' and PRE-SEL section of var. to resonance. At 600KC trimmer F' to resonance. Repeat all adjustments of the band. Check sensitivity at 1000 KC.
S.W.BAND-.1 mfd.cond. in series with 400 ohm resistor as dummy;band sw. in S.W. pos. At 17MC,dial at 17MC,adjust G'and C' to resonance. At 6 MC check sensitivity For band coverage check set at 18,1 and 5,5 MC.
MIDDLE BAND- Band sw. at middle wave pos.Dummy as for S.W. adjustments. At 5000 KC, dial at 5000 KC, adjust D'and B' to resonance. At 1900KC check sensitivity; then recheck B.C.Band alignment.

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Socket, Trimmers Alignment

# MONTGOMERY-WARD & CO.

MODEL 62-364 Schematic Voltage

**After the antenna is connected, tune in a weak signal at approximately 1400 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 1400 KC trimmer up or down until maximum output is obtained.**

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Adjust the trimmer of the oscillator section of the gang condenser until maximum output is obtained. See Fig. 4 for location of this trimmer.

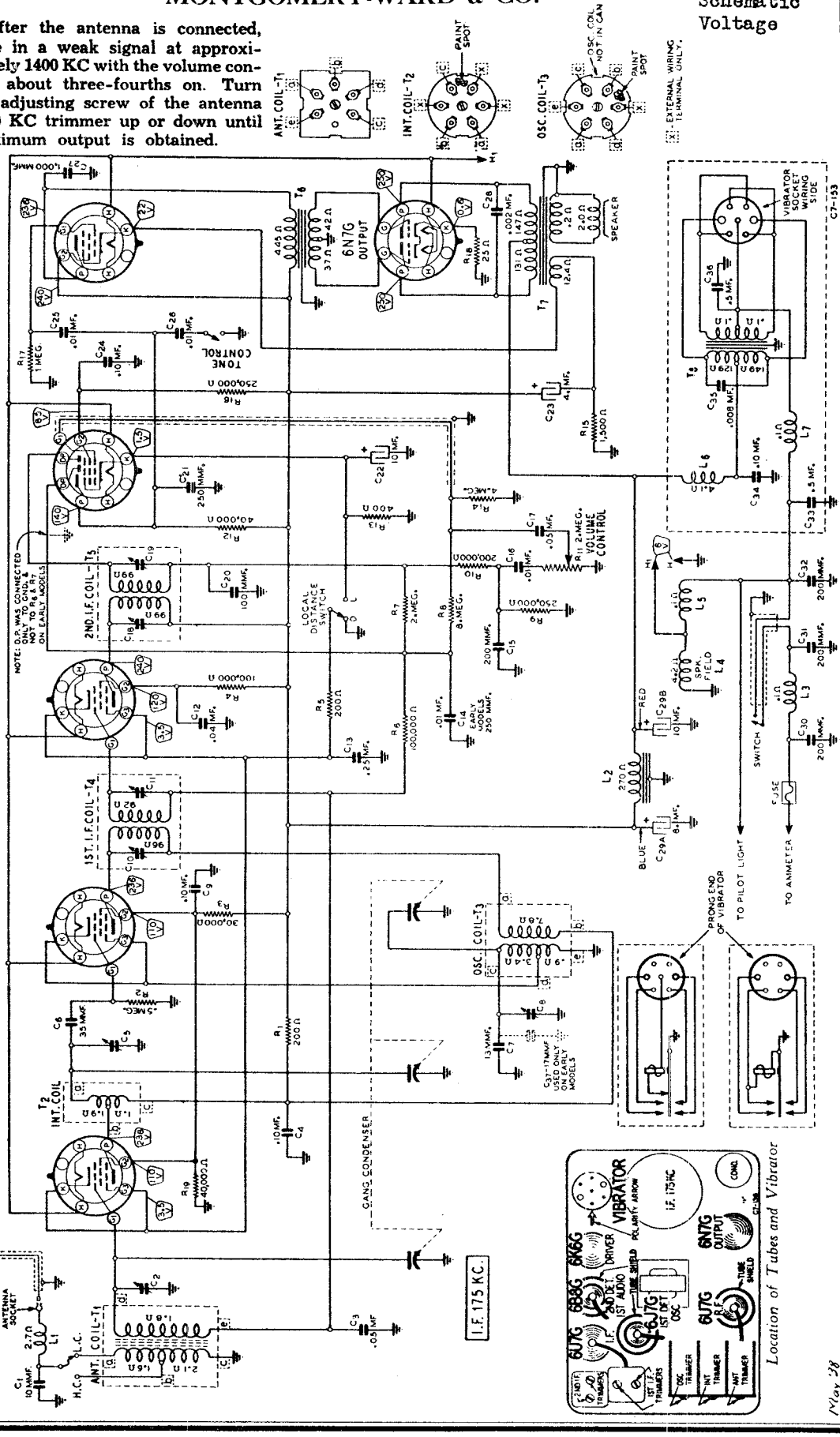
Set the signal generator for 1400 KC. Turn the rotor of the tuning condenser carefully until maximum output is obtained. Adjust the interstage and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the interstage section (middle) of the tuning condenser. Connect the ground lead of the signal generator to the chassis. Set the volume control at maximum and the L-D switch in the distance position. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC. Then adjust the 4 IF trimmers until maximum output is obtained.

Insert the antenna cable plug in the antenna socket on the chassis. Now refer to the antenna capacity changeover socket

If the jumper is inserted between the HC holes of this socket and the entire 60-inch shielded cable (70 mmf.) is being used, connect the antenna wire at the other end through a 120 mmf. condenser to the antenna post of the signal generator.

If the jumper is inserted between the LC holes of this socket, the antenna cable has been cut as explained in the instructions. If cut in half (30-inch length), the capacity of the antenna cable is approximately 35 mmf. Connect the antenna wire, in this case, through a 25 mmf. condenser to the antenna post of the signal generator.

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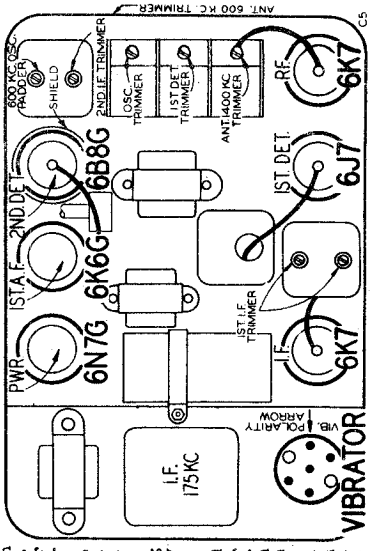
MODEL 62-369
Schematic, Socket

# MONTGOMERY-WARD & CO.

Trimmers, Alignment

Power Consumption - - - 8.25 Amperes at 6.3 Volts
Power Output - - - - - - - - - 6 Watts Undistorted
Sensitivity - - - 0.8 Microvolt at 1 Watt Output
Selectivity - - - 45 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - - - - 528 to 1581 KC
Speaker - - - 6" Dynamic




Location of Tubes and Vibrator.

## Alignment and Calibration

Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. Connect the ground lead of the signal generator to the chassis. The chassis should be in the case. Set the volume control at maximum and the L-D switch in the distance position. Attenuate the signal from the signal generator to prevent the leveling off action of the AVC. Then adjust the three I.F. trimers until maximum output is obtained - See Fig. 2.

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

Set the signal generator for 1400 KC. Carefully turn the rotor of the tuning condenser until maximum output is obtained. Adjust the 1st detector and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Set the signal generator for 600 KC. Connect the output through a .05 mf. condenser to the control grid of the 6K7 R. F. tube. Rock the tuning condenser rotor and adjust the 600 KC oscillator padder (See Fig. 2) until the peak of greatest intensity is obtained.

Leave the signal generator set for 600 KC and re-connect the output to the shielded antenna lead through a 120 mmf. condenser. Adjust the 600 KC antenna trimmer to maximum. (This trimmer is reached from outside of the case - See Fig. 1.)

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

**Adjusting Antenna 600 KC Trimmer** - After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained.

**Calibrating the Radio** - To calibrate the radio, tune in a station of known frequency. Remove the dial lamp assembly from the back of the dial unit. The calibration screw is at the bottom of the dial lamp tube. Hold the tuning knob. Insert a fine blade screwdriver and turn this screw so that the POINTER travels in a clockwise direction until it is at the frequency of the station being received.

Schematic Circuit Diagram.

NOTE 'A'-WHEN C36 IS USED IT IS IN THE 2ND I.F. CAN.

WHEN GANG CONDENSER No 14A65 IS USED 600 KC PADDER C38 IS NOT USED.

NOTE:-RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN.

JULY, 1938

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# MONTGOMERY-WARD & CO.

MODELS 62-370, 62-470, 62-700
Schematic, Voltage, Socket
Coils, Phono

JUNE, 1938

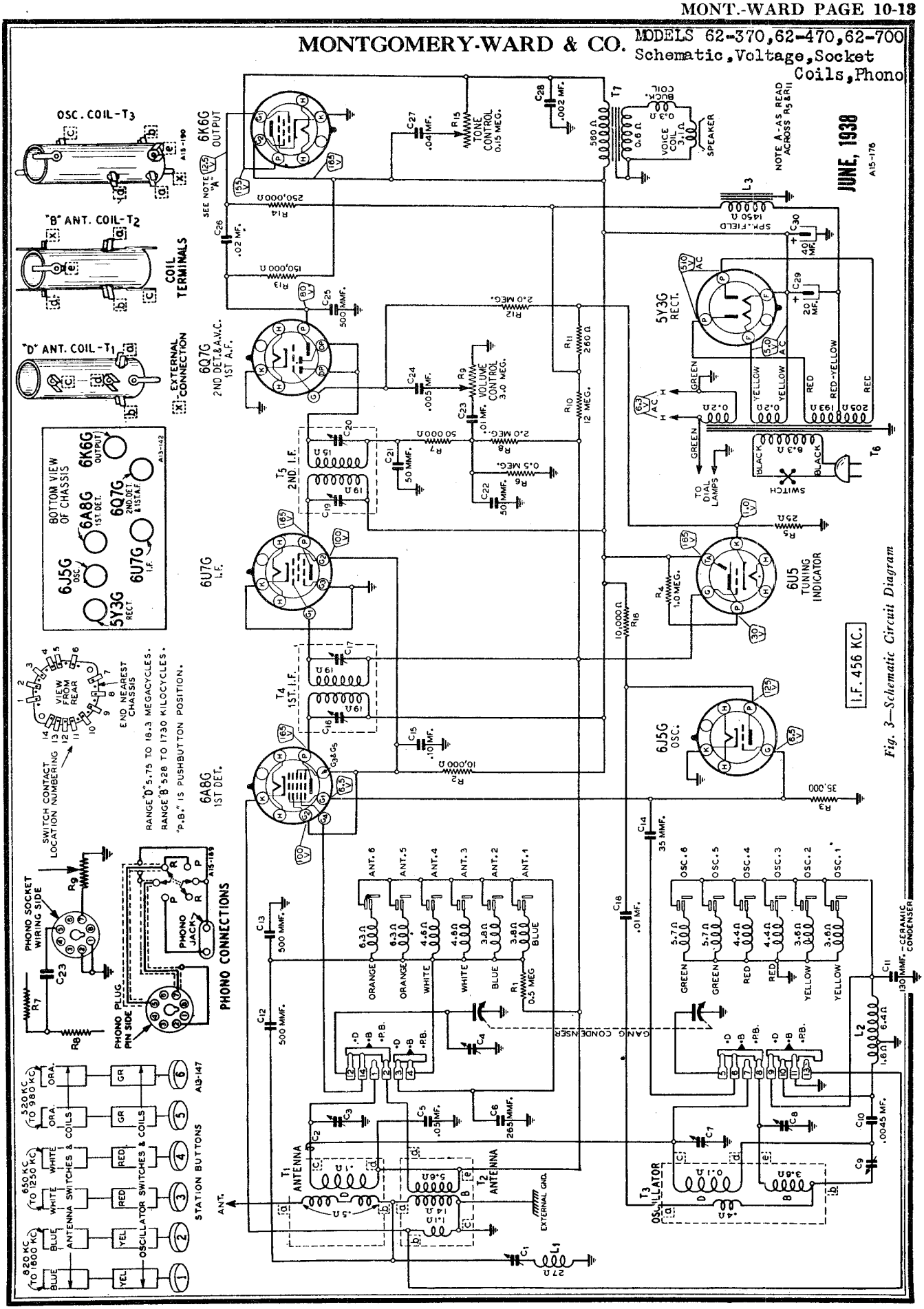


*Fig. 3—Schematic Circuit Diagram*

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MODELS 62-370,62-470,62-700
Alignment,Trimmers

# MONTGOMERY WARD & CO.

Power Consumption - 50 Watts (At 117 volts 60 cycles)
Power Output - - - - - - - 1.0 Watts Undistorted, 2.0 Watts Maximum
Selectivity - - 38 KC Broad at 1000 times Signal
Sensitivity
B Range (Manual Tuning).....15 Microvolts Average
B Range (Automatic Tuning).....15 Microvolts Average
D Range .....25 Microvolts Average

Intermediate Frequency - - - - - - 456 KC
Speaker - - - - - - - - - 6" or 8" Dynamic
Tuning Frequency Range
B Range (Manual Tuning).... 528 to 1730 KC (Kilocycles)
D Range (Manual Tuning)....5750 to 18300 KC (Kilocycles)
Buttons 1 and 2 (Automatic Tuning).....820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning).....650 to 1250 KC
Buttons 5 and 6 (Automatic Tuning).....520 to 980 KC

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| **I. F.** | | | | | |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 1st I.F. (C16) & (C17)<br>2nd I.F. (C19) & (C20) |
| **RANGE B** | | | | | |
| 1730 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C8) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output<br>Set Indicator to 1500 KC—See Note A | Ant. Range B (C4) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C9)<br>Rock Rotor—See Note B |
| **WAVE TRAP** | | | | | |
| 456 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to 600 KC<br>Adjust Sig. Gen.—See Note C | Wave Trap (C1)<br>Adjust for MINIMUM Output |
| **RANGE D** | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C7) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C3)<br>Rock Rotor—See Note B |
| **PERMEABILITY TUNING UNIT** | | BUTTON DEPRESSED (Band Switch in Push Button Position) | | TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book | ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D |
| 1100 KC | Antenna Lead | 200 mmf. | No. 1 | Setting Screw No. 1 | Antenna Coil No. 1 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 2 | Setting Screw No. 2 | Antenna Coil No. 2 |
| 850 KC | Antenna Lead | 200 mmf. | No. 3 | Setting Screw No. 3 | Antenna Coil No. 3 |
| 850 KC | Antenna Lead | 200 mmf. | No. 4 | Setting Screw No. 4 | Antenna Coil No. 4 |
| 700 KC | Antenna Lead | 200 mmf. | No. 5 | Setting Screw No. 5 | Antenna Coil No. 5 |
| 700 KC | Antenna Lead | 200 mmf. | No. 6 | Setting Screw No. 6 | Antenna Coil No. 6 |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

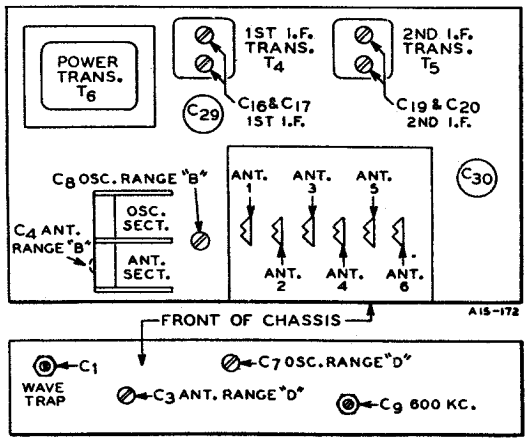


*Fig. 2—Location of Trimmers*

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MODELS 62-370, 62-470, 62-700; 62-902, 62-905; 62-704 to 62-712

# Procedure for Setting the Station Buttons

## Selecting the Stations to be Set

There are 6 buttons on the push button tuning dial by means of which 6 stations may be set for quick tuning. They are numbered 1 to 6 in Fig. 2.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

## Frequencies Covered by Each Button

The frequency range of each station button is shown in Fig. 2. Any station within the range of a button may be set. Although, in some cases, it may be possible to set a certain station on several buttons, it is better to set the stations so that the kilocycle numbers decrease from buttons 1 to 6.

## Setting a Station Button

Select a station from the list you have prepared, preferably the station with the highest kilocycle number, and tune in this station with the tuning knob in the usual way. Determine what program is being broadcast.

At each side of the escutcheon plate is an escutcheon screw—See Fig. 2. Remove the escutcheon plate by unscrewing these two screws. Be careful to avoid scratching the plate.

When this is done, the setting screws above the six buttons will be exposed.

Turn the band switch knob to the PUSH BUTTON TUNING position —See Fig. 2. The station tuned in previously will probably disappear.

If the kilocycle number of the station tuned in is within the range of button No. 1, push this button in. The same station or a different station may be heard.

With a small screw driver, slowly turn the setting screw above button No. 1 in or out until the desired station (the one previously tuned in) is heard. Turning the screw in (clockwise) will tune in stations with higher kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with lower kilocycle numbers. Be sure not to tune in some other station broadcasting the same program. Using the tuning eye as a guide, *accurately* tune in this station. The station is now set on this button.

To determine whether the correct station has been set, turn the band switch knob back to the BROADCAST position. The same station should be heard (provided the tuning knob has not been turned). If it is not, turn the band switch knob to the PUSH BUTTON TUNING position again and retune with the setting screw.

Remove the station call letter tab from the sheets provided and push the tab all the way to the bottom of the rectangular space above the correct station button opening in the escutcheon plate. Then cover the call letter tab with one of the clear celluloid tabs.

Proceed in the same manner to set stations on any of the remaining buttons. Use blank tabs above buttons on which stations are not set.

After all of the stations have been set, carefully replace the escutcheon plate.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons. The old call letter tab may be removed by sticking a pin through the notch in the celluloid tab and through the call letter tab.

MODELS 62-370 etc.

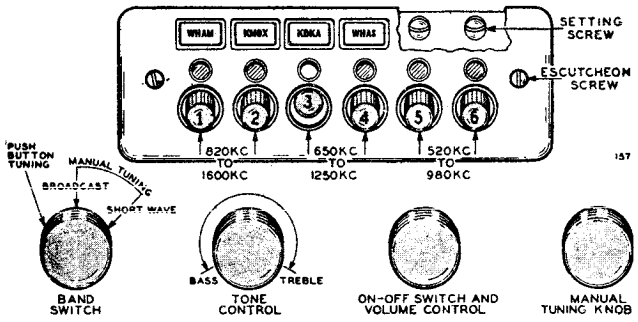



*Fig. 2—Location of Controls and Push Buttons*

MODELS 93BR560A etc.

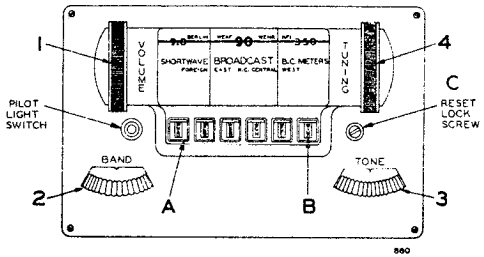



**FIG. 2 — FRONT VIEW**

MODELS 93BR560A, 93BR657A, 93BR713A

# PROCEDURE FOR SETTING THE AUTOMATIC TUNER PUSHBUTTONS

**NOW, PROCEED AS FOLLOWS:—**

**Unlock the tuner mechanism.**
(NOTE:—The automatic tuner mechanism is locked **tight** when radio is shipped from the factory.)

1. Remove the snap-in button from the dial escutcheon plate on the front panel of the radio **(see "C," Reset Lock Screw, Fig. 2).** If the snap-in button will not come out easily using your fingers, pry it off with a screwdriver or a **knife,** being careful not to mar the finish on the escutcheon plate.

2. **Unlock the tuner mechanism** by inserting a screwdriver through the hole in the panel. **Press in** and **loosen the locking screw** by turning **it to the right** as far as it will turn **without forcing.**
You will note that as the locking screw is turned it **will** turn easily until the dial reaches its stop and then a slight amount of force will be required to **actually start unlocking** the tuner mechanism. Beyond this point, the **locking** screw will turn quite easily again until the tuner mechanism is **completely unlocked.** At this point do not force the locking screw any further. The tuner mechanism is now **unlocked.**

### SETTING PUSHBUTTONS:

1. Press **in all the way** any one of the automatic tuner pushbuttons. **Holding it in firmly,** press on the Dial Tuning Control, No. 4, and tune in the station indicated on the station call letter tab on this pushbutton. You will note that in order to tune the station, the Dial Tuning Control will have to be pressed slightly. Move the Dial Tuning Control very slowly up and down (while **still holding the automatic tuner pushbutton in firmly),** noting the width of the shadow on the screen of the cathode-ray tuning eye. **Minimum** width on the tuning eye indicates **the ideal** tuning position (resonance). The station will then be clearest and accurately tuned in.
2. Press in another tuner pushbutton. **Holding it in firmly,** press on the Dial Tuning Control and carefully tune in the station indicated on the call letter tab on this pushbutton.
3. Follow this procedure until you have selected all of your favorite stations. (NOTE:—If the dial mechanism works hard or has a tendency to slip when setting up a station for one of the pushbuttons, it is due to the tuner mechanism **not being unlocked all the way.** Loosen the reset locking screw. The Dial Tuning Control **should turn the dial drum freely with a pushbutton pushed in).**

### LOCKING THE TUNER MECHANISM

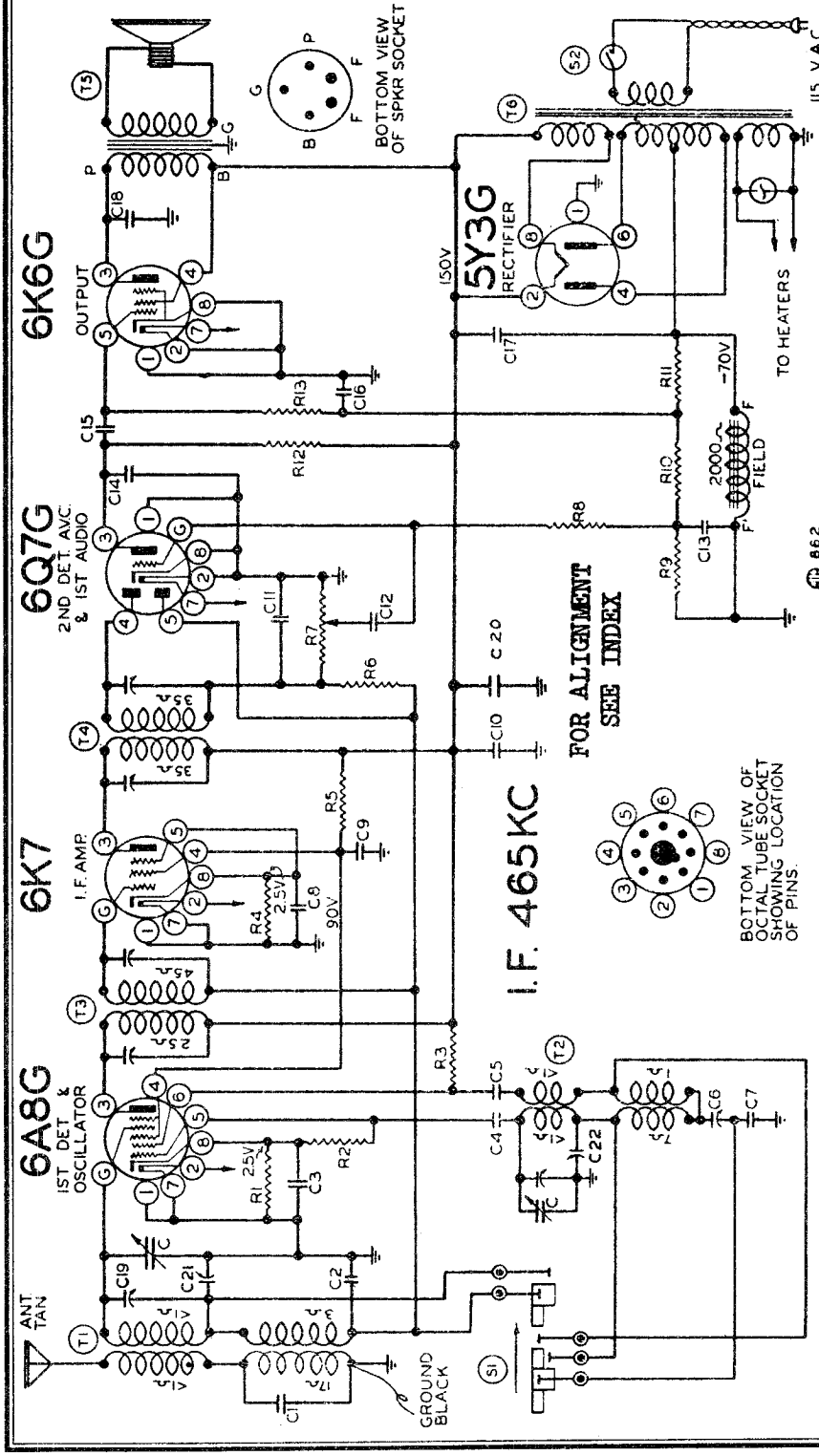
1. **To lock the tuner mechanism** insert a screwdriver through the hole in the escutcheon panel and press in and turn the **reset locking screw to the left,** until it cannot be turned any further **without forcing it.**
2. This will lock the tuner mechanism and all the **stations** that have been set up on the pushbuttons will **be locked** in place for automatic tuning.
**Press in** any one of the pushbuttons and—YOUR FAVORITE STATION IS SELECTED.

MODEL 62-380
Series A
Ser.9C618200 up
Schematic,Voltage
Socket

# MONTGOMERY WARD & CO.

| BAND SWITCH | BAND | FREQUENCY RANGE |
|---|---|---|
| Extreme Right Rotation | Short Wave | 5.5 to 18.1 MC. |
| Extreme Left Rotation | Broadcast | 535 to 1720 KC. |

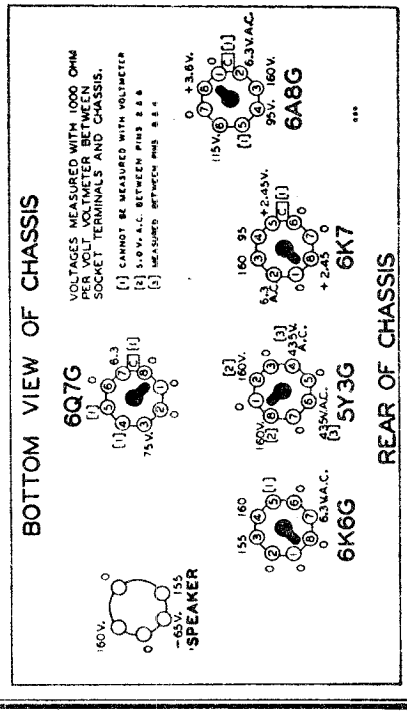
Power Consumption.....55 Watts (At 115 volts 50-60 cycles)
Power Output.....750 Watts Undistorted, 1.6 Watts Maximum
Intermediate Frequency.....465 KC.




## PARTS (SERIAL No. 9C618200 and UP)

| | | RESISTORS |
|---|---|---|
| R1 | BE13083 | 300 ohm—½ w.—10% |
| R2 | BE13012 | 50M ohm—½ w.—20% |
| R3 | BE13017 | 10M ohm—½ w.—20% |
| R4 | BE13093 | 450 ohm—½ w.—10% |
| R5 | BE13049 | 15M ohm—½ w.—20% |
| R6 | BE1304 | 3 megohm—½ w.—20% |
| R7 | BE10171 | 1 megohm Volume control |
| R8 | BE1304 | 3 megohm—½ w.—20% |
| R9 | BE130176 | 20M ohm—½ w.—10% |
| R10 | BE13080 | 150M ohm—½ w.—10% |
| R11 | BE13046 | 800M ohm—½ w.—10% |
| R12 | BE1309 | 200M ohm—½ w.—20% |
| R13 | BE1303 | 500M ohm—½ w.—20% |

| | | CONDENSERS |
|---|---|---|
| C | BE10243B | 2 gang variable condenser |
| C1 | BE1295 | .0001 Mica |
| C2 | BE10022 | .05 x 200 v.—25% |
| C3 | BE10020 | .1 x 200 v.—25% |
| C4 | BE12939 | .00005—20%—Mica |
| C5 | BE10025 | .002 x 600 v.—20% |
| C6 | BE12438 | 600 mmf. Series Pad Adj. |
| C7 | BE12954 | .003—2½% Mica |
| C8 | BE10020 | .1 x 200 v.—25% |
| C9 | BE1001 | .1 x 400 v.—50-10% |
| C10 | BE11938 | 5.0 mfd.—250 w. v. 'Lytic |
| C11 | BE1295 | .0001—20% Mica |
| C12 | BE10011 | .01 x 400 v.—25% |
| C13 | BE10020 | .1 x 200 v.—25% |
| C14 | BE1292 | .005—20% Mica |
| C15 | BE10026 | .02 x 400 v.—25% |
| C16 | BE10020 | .1 x 200 v.—25% |
| C17 | BE11938 | 5.0 mfd.—250 w. v. 'Lytic |
| C18 | BE10037 | .003 x 600 v.—10% |
| C19 | BE12439B | 2-25 mmf. Adj. Cond. |
| C20 | BE10013 | .05 x 400 v.—25% |
| C21 | BE12430C | Adj. Cond. 1-10 mmf. |
| C22 | BE12430C | Adj. Cond. 2-20 mmf. |
| | | C21—C22 in same unit |
| T1 | BE11183 | Ant. Coil |
| T2 | BE11066B | Osc. Coil |
| T3 | BE108105B | Input I. F.—465 kc. |
| T4 | BE108106B | Output I. F.—465 kc. |
| T5 | BE11461 | 6" Dynamic Speaker (2000 ohm field) |
| T6 | BE10460B | Power Transformer |
| S1 | BE12537 | Wave Band Switch |
| S2 | | On-off switch on volume control |

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# MONTGOMERY WARD & CO.

MODELS 62-386, 62-636, 62-646
Schematic, Voltage, Alignment
Resistances

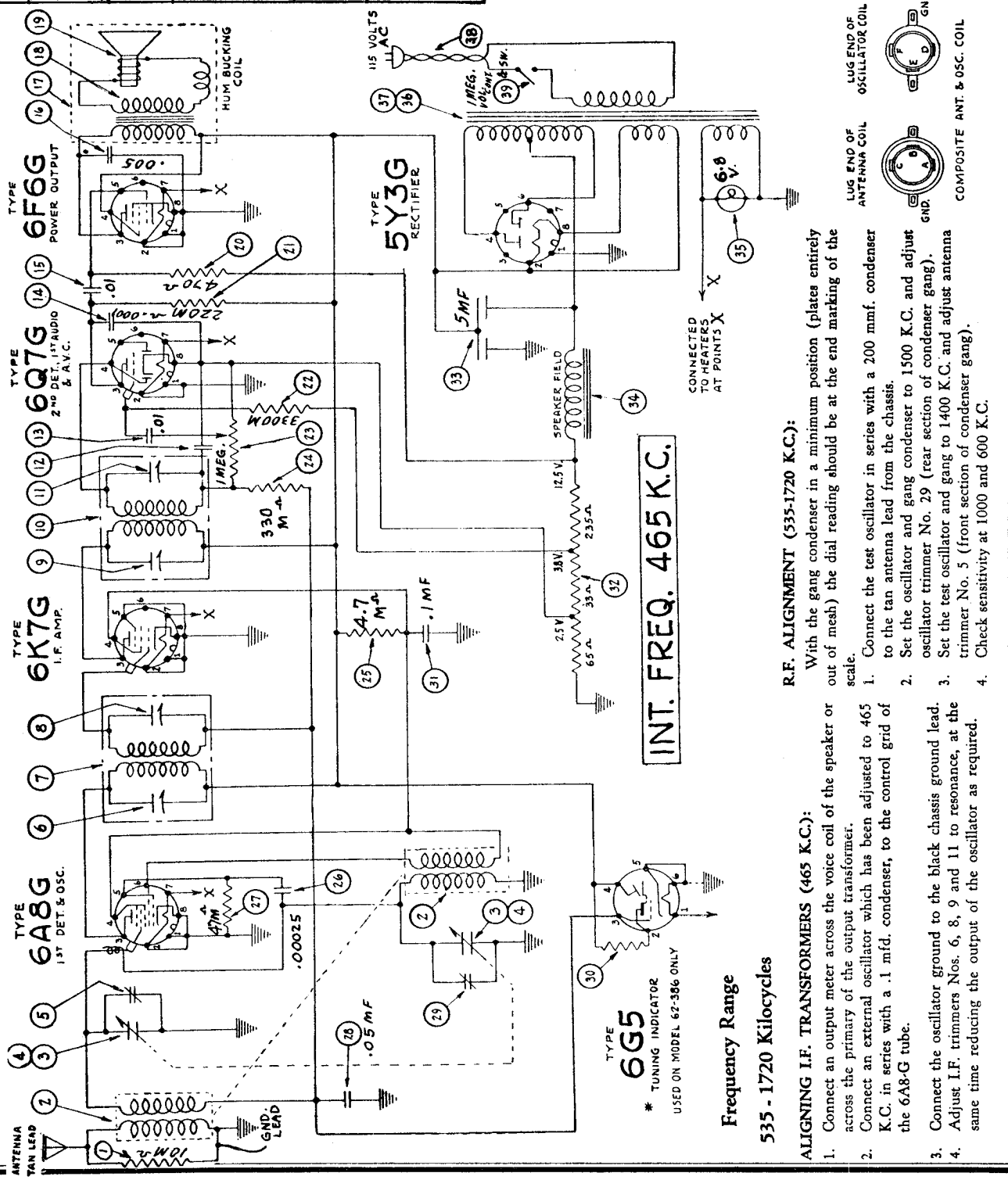
## WINDING RESISTANCE

| PART | FUNCTION | PRIMARY | | SECONDARY | |
|---|---|---|---|---|---|
| | | OHMS | IDENT. | OHMS | IDENT. |
| 2 | ANT. COIL | 19 | A TO GND. | 4.5 | B TO C |
| 2 | OSC. COIL | 2.0 | D TO E | 4.0 | F TO GND. |
| 7 | 1ST I.F. COIL | 18.5 | GREEN TO RED & YEL | 18.5 | RED TO BLUE |
| 10 | 2ND I.F. COIL | 18.5 | GREEN TO RED & YEL | 18.5 | RED TO BLUE |
| 18 | OUTPUT TR. | 550 | 3 TO 4 6F6G SOCK. | .5 | |
| 19 | VOICE COIL | 3.5 | | | |
| 34 | SPKR. FIELD | 1700 | YELLOW TO BLACK | | |
| 36 | PWR. TRANS. | 15 | 3 ON RECT. SOCK. TO SW. | 558 | 4 TO 6 RECT. SOCK. |
| | 5 V. SEC. | | | .2 | 2 TO 8 " " |
| | 6.3 V. SEC. | | | .25 | 2 TO 7 6Q7G SOCK. |
| 37 | PWR. TRANS. | | | | |

## SOCKET VOLTAGES

NOTE: ALL VOLTAGES READ WITH 1000 OHM PER VOLT VOLTMETER FOR 115 V. LINE

| TUBE | STAGE | FIL. | PIN NO. | PLATE | PIN NO. | SCREEN | PIN NO. |
|---|---|---|---|---|---|---|---|
| 6A8G | DET.-OSC. | 6.3 | 2 TO 7 | PLATE 125 OSC. 155 | 1 TO 3 | 100 | 1 TO 4 |
| 6K7G | I.F. AMPLIFIER | 6.3 | 2 TO 7 | 155 | 1 TO 3 | 100 | 1 TO 4 |
| 6Q7G | 2ND. DET. 1ST A.F. | 6.3 | 2 TO 7 | 75 | 1 TO 3 | 100 | 1 TO 4 |
| 6F6G | OUTPUT A.F. | 6.3 | 2 TO 7 | 148 | 1 TO 3 | 155 | 1 TO 4 |
| 5Y3G | RECTIFIER | 5.0 | 2 TO 8 | | | | |
| 6G5 | TUNING INDICATOR | 6.3 | 1 TO 6 | 155 | 6 TO 4 | | |




### ALIGNING I.F. TRANSFORMERS (465 K.C.):

1. Connect an output meter across the voice coil of the speaker or across the primary of the output transformer.
2. Connect an external oscillator which has been adjusted to 465 K.C. in series with a .1 mfd. condenser, to the control grid of the 6A8-G tube.
3. Connect the oscillator ground to the black chassis ground lead.
4. Adjust I.F. trimmers Nos. 6, 8, 9 and 11 to resonance, at the same time reducing the output of the oscillator as required.

### R.F. ALIGNMENT (535-1720 K.C.):

With the gang condenser in a minimum position (plates entirely out of mesh) the dial reading should be at the end marking of the scale.

1. Connect the test oscillator in series with a 200 mmf. condenser to the tan antenna lead from the chassis.
2. Set the oscillator and gang condenser to 1500 K.C. and adjust oscillator trimmer No. 29 (rear section of condenser gang).
3. Set the test oscillator and gang to 1400 K.C. and adjust antenna trimmer No. 5 (front section of condenser gang).
4. Check sensitivity at 1000 and 600 K.C.

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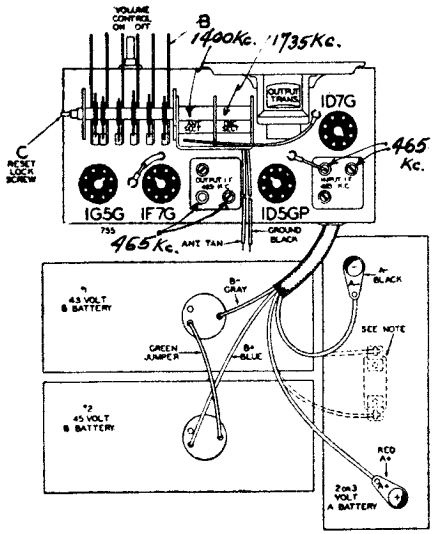
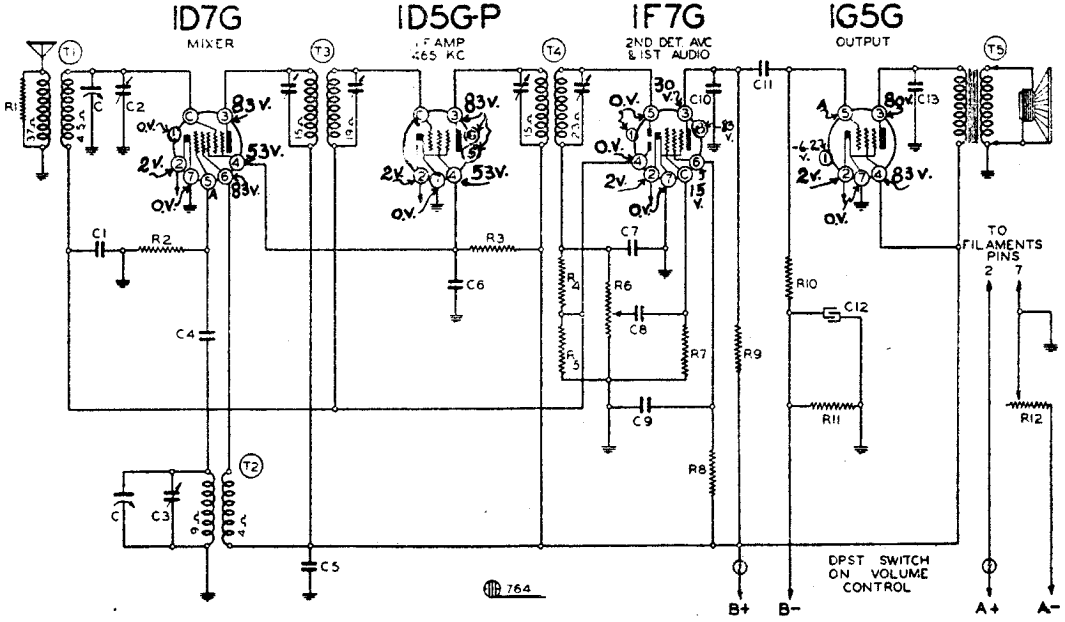
MODEL 62-453, Series A MONTGOMERY WARD & CO. MODEL 62-459
Ser. 489500 up MODEL 62-552
Schematic, Voltage MODEL 62-553
Socket, Trimmers MODEL 62-601
Alignment Alignment




Dec. '38

FIG. 1—TOP VIEW




D.C. VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
VOLUME CONTROL AT MIN., ANT. GROUNDED.
2 VOLT "A" AND 90 VOLT "B" BATTERIES
A- CANNOT BE READ WITH VOLTMETER

The following batteries are required:

2—45 Volt "B" Batteries.

1—3 Volt Dry "A" Battery or 2 Volt Storage Battery.

**Check the Position of the Knob on the Back of the Radio Before Making any Battery Connections**

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

## PARTS (SERIAL No. 489,500 and UP)

### RESISTORS

| | | |
|---|---|---|
| R1 | BE13021 | 20M ohm—½ w. |
| R2 | BE13012 | 50M ohm—½ w. |
| R3 | BE13017 | 10M ohm—½ w. |
| R4 | BE13038 | 2 megohm—½ w. |
| R5 | BE13038 | 2 megohm—½ w. |
| R6 | BE101155 | 1 megohm—volume control |
| R7 | BE13019 | 1 megohm—½ w. |
| R8 | BE13019 | 1 megohm—½ w. |
| R9 | BE1309 | 200M ohm—½ w. |
| R10 | BE13019 | 1 megohm—½ w. |
| R11 | BE13093 | 450 ohm—½ w. |
| R12 | BE101156 | 3.2 ohm rheostat |

### CONDENSERS

| | | |
|---|---|---|
| C | BE10287B | 2 gang variable condenser |
| C1 | BE1009 | .05 x 200 v. |
| C2 | | Antenna Trimmer |
| C3 | | Oscillator Trimmer |
| C4 | BE12912 | .00025 mica |
| C5 | BE10064 | .25 x 200 v. |
| C6 | BE10020 | .1 x 200 v. |
| C7 | BE1295 | .0001 mica |
| C8 | BE10011 | .01 x 400 v. |
| C9 | BE1009 | .05 x 200 v. |
| C10 | BE1292 | .0005 mica |
| C11 | BE10011 | .01 x 400 v. |
| C12 | BE11952 | 25 mfd. x 25 w. v. lytic |
| C13 | BE10071 | .004 x 600 v. |

### PARTS

| | | |
|---|---|---|
| T1 | BE111114 | Antenna Coil |
| T2 | BE11095 | Oscillator Coil |
| T3 | BE108111E | Input I. F.—465 kc. |
| T4 | BE108112D | Output I. F.—465 kc. |
| T5 | BE114145 | 5" P. M. Speaker |

FOR ADJUSTMENT OF AUTOMATIC TUNING LEVERS, SEE INDEX.

THIS ALIGNMENT APPLIES ALSO TO MODELS 62-459, 62-553, 62-601, and 62-552.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of last I.F. Tube | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of first I.F. (Mixer Tube). | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1735 Kc. | 200 mmf. | Antenna Lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna Lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Antenna Broadcast | Adjust to maximum output |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC. After each band is completed, repeat the procedure as a final check.

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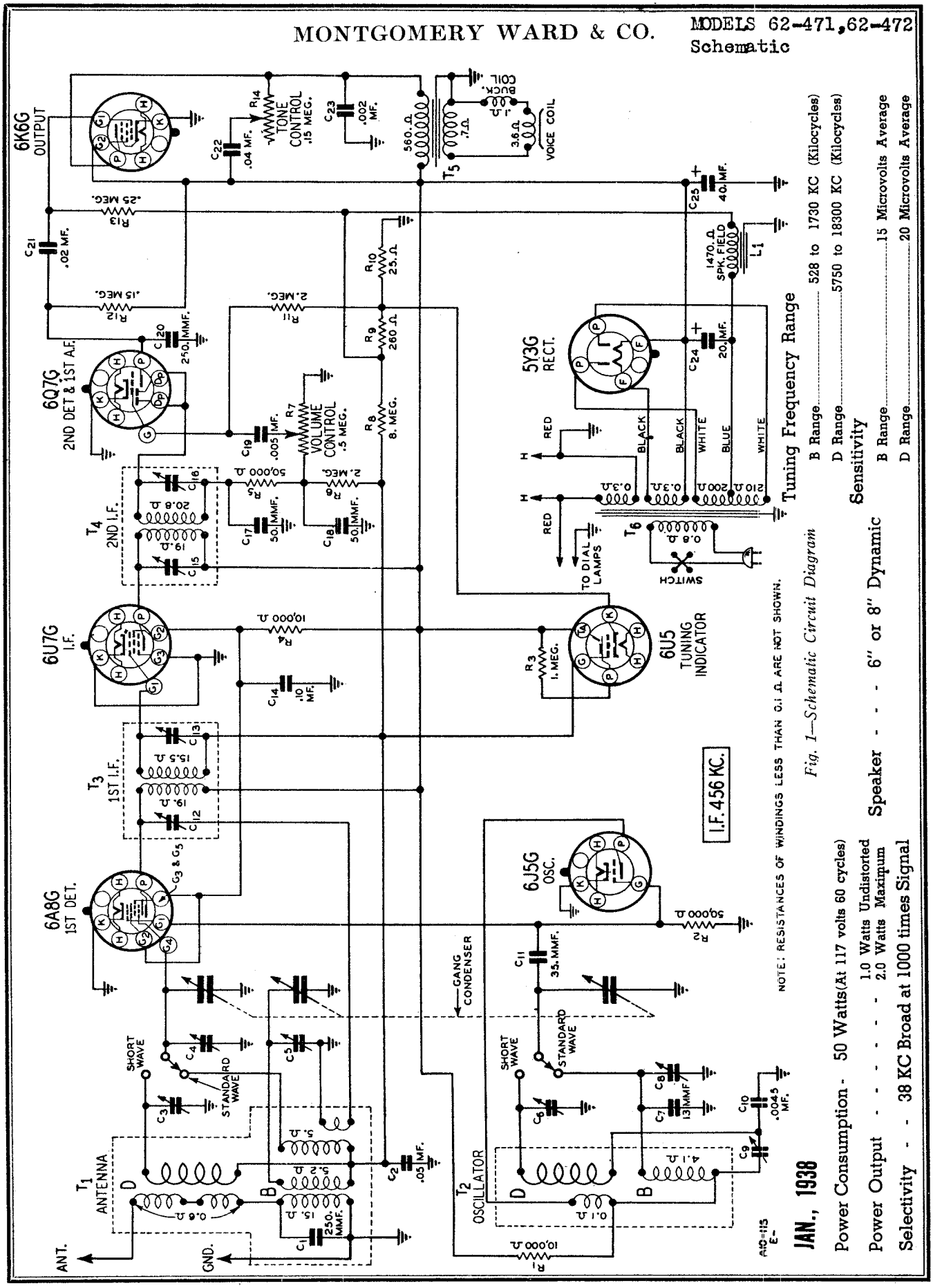
# MONTGOMERY WARD & CO.

## MODELS 62-471, 62-472
Schematic




NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN.

*Fig. 1—Schematic Circuit Diagram*

**JAN., 1938**

Power Consumption - 50 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 1.0 Watts Undistorted
2.0 Watts Maximum

Selectivity - - 38 KC Broad at 1000 times Signal

Speaker - - - 6" or 8" Dynamic

Tuning Frequency Range

| | |
|---|---|
| B Range | 528 to 1730 KC (Kilocycles) |
| D Range | 5750 to 18300 KC (Kilocycles) |

Sensitivity

| | |
|---|---|
| B Range | 15 Microvolts Average |
| D Range | 20 Microvolts Average |

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MODELS 62-471,62-472
Socket,Trimmers,Tuner
Alignment,Voltage
Drive Cord Data

# MONTGOMERY-WARD & CO.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An all Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| STEP (Follow Order as Given) | BAND SWITCH SETTING | DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | TRIMMERS ADJUSTED See Illustration | PROCEDURE INITIAL STEPS | PROCEDURE ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| I.F. | | | | | | | |
| 456 KC | Range B | .1 mf. | 456 KC | Grid of 1st Det. | 1st I.F. (C12) & (C13) 2nd I.F. (C15) & (C16) | Turn Rotor to Full Open | Adjust to Maximum Output |
| RANGE B | | | | | | | |
| 1730 KC | Range B | 200 mmf. | 1730 KC | Antenna Lead | Oscillator Range B (C8) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1500 KC | Range B | 200 mmf. | 1500 KC | Antenna Lead | 1st Ant. Range B (C5) 2nd Ant. Range B (C4) | Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A | Adjust to Maximum Output |
| 600 KC | Range B | 200 mmf. | 600 KC | Antenna Lead | 600 KC (C9) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor— See Note B |
| RANGE D | | | | | | | |
| 18300 KC | Range D | 400 Ohm | 18300 KC | Antenna Lead | Oscillator Range D (C6) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 15000 KC | Range D | 400 Ohm | 15000 KC | Antenna Lead | Ant. Range D (C3) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor— See Note B |

**Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.**

After each range is completed, repeat the procedure as a final check.

After alignment of Range D has been completed, do not make any adjustments of the Range B trimmers. If this is done, it will be necessary to realign Range D.

NOTE A—After the 1500 KC adjustment is made, the dial indicator should be at the 1500 KC mark on the dial scale. If it is not, the position of the indicator on the drive cord must be changed. This procedure, however, should not be followed unless it is absolutely necessary as there is danger of breaking the clamp which holds the indicator in place. If the indicator must be moved, loosen the clamp at the back which holds it in place, move the indicator to the correct position, and bend the clamp back into place again.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

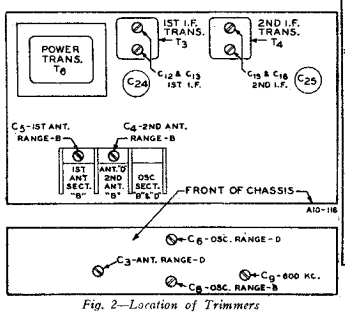


*Fig. 2—Location of Trimmers*

## VOLTAGES AT SOCKETS

**Line Voltage: 117—Volume Control: Maximum.**
**Readings taken with a 1000 Ohm-per-volt meter.**
**Antenna Shorted to Ground.**
**Position of Band Switch: Standard Wave.**

| TUBE | FUNCTION | VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated) Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 |
|---|---|---|---|---|---|---|---|---|---|
| 6A8G | 1st Det. | 0 | 6.1(1) | 165 | 90 | 6.5 | 90 | 6.1(1) | 0 |
| 6J5G | Osc. | 0 | 6.1(1) | 125 | | 6.5 | | 6.1(1) | 0 |
| 6U7G | I.F. | 0 | 6.1(1) | 165 | 90 | 0 | | 6.1(1) | 0 |
| 6Q7G | 2nd Det. & 1st. Audio | 0 | 6.1(1) | 80 | | | | 6.1(1) | 0(2) |
| 6K6G | Output | 0 | 6.1(1) | 155 | 165 | 12.5(3) | | 6.1(1) | 0 |
| 5Y3G | Rectifier | 0 | 4.7(4) | | 480(5) | | 480(5) | | 4.7(4) |
| 6U5 | Tuning Indicator | Plate to Ground 35 | | Target to Ground 165 | | Cathode to Ground 1 | | Across Heater 6.1 A.C. | |

(1) A.C. voltage read across heater terminals 2 and 7.
(2) Bias (1.2 volts) as read across R10.
(3) Bias voltage as read across R9 and R10.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

### Replacing Drive Cords

Three drive cords, Nos. 1, 2, and 3, as shown in Fig. 5, are used. To replace any of these cords, proceed as follows:

**Cord No. 1**

Turn the gang condenser to full open position.

Turn the drive shaft so that the holes for the cord are vertical. The positions of the drive shaft and drive drum are shown in Fig. 5.

Tie a double knot in one end of the cord. From the bottom of hole (A) in the drive shaft, thread the other end of the cord through the hole.

Slide a ½ inch length of fabric tubing on the cord, placing it near the free end. Fasten the shorter of the two springs used to the free end of the cord, making the distance between the two knots 2 7/8 inches.

Starting at the point where the cord leaves hole (A), wind it around the shaft ¾ of a turn as shown in Fig. 5. Bring the end up to the wide groove (B) in the drive drum and wind on 2¼ turns, progressing toward the edge of the groove. Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut, and hook the spring to the pin at (D).

**Cord No. 2**

The gang condenser and tuning shaft should be in the same position as explained for Cord No. 1.

Tie a double knot in one end of the cord. From the top of hole (E) in the drive shaft, thread the other end of the cord through the hole.

Slide a ½ inch length of fabric tubing on the cord, placing it near the free end. Tie a slip knot with a small loop in the free end of the cord so that the length of the cord is 12 inches between the knots.

Starting at the point where the cord leaves hole (E), wind it around the shaft 3¼ turns as shown in Fig. 5. Do not attempt to wind the cord on the drive drum, but put the loop in the slip knot over pin (G). Rotate the drive drum clockwise about ½ a turn. This will unwind the cord on the drive shaft at (E).

Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut. While holding the cord on the wide flange, rotate the drive drum counterclockwise. The cord will be pulled into position in the groove.

**Cord No. 3**

The gang condenser and drive drum should be in the same position as explained for Cord No. 1.

Tie one end of the cord on hook (H).

Slide a ½ inch length of fabric tubing over the cord. Place this tubing approximately 13½ inches from the end of the cord to be attached to the spring.

Tie the other end of the cord to the longer of the two springs used. The length of the cord between the knots should be 34⅜ inches.

Pass the cord through slot (J) in groove (P) of the drive drum. Bring the cord up to pulley (K), around the other pulleys as shown in Fig. 5, and down to groove (P). After passing the cord around the drive drum ½ turn in groove (P), fasten the spring to hook (Q).

**Attaching Dial Pointer**—Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. After the pointer has been moved to the correct position, clamp it tightly over the fabric tubing on the cord—See Fig. 5.

### Lever Tuning Assembly Adjustments

**Pressure of Spacers on Heart Cams** — The heart cams must rotate freely relative to the shaft spacers when the tightening lever is in the "loose" position and must not rotate relative to the shaft spacers when this lever is in the "tight" position.

Pressure of the spacers against the heart cams is determined by the position of nut (R) on the threaded shaft—See Fig. 5. If, after the tightening lever is turned to the "tight" position, the cams can turn relative to the shaft, this nut must be tightened.

Bend back the ears of washer (S)—See Fig. 5, and tighten nut (R) about ½ turn. Bend the ears of the washer down again on nut (R). Tighten the tightening lever and see if the cams are sufficiently tight.

In general, nut (R) should be at such a position on the threaded shaft that the stop on the tightening lever moves to about ⅛ inch from the end of the slot in the tightening washers when a reasonable amount of pressure is exerted on this lever.

**Connection between Gang Condenser and Cam Shaft**—One screw only should be used in the universal joint connection between the condenser shaft and the cam shaft. If 2 screws are used, considerably more pressure must be exerted on the station levers to rotate the cam shaft.

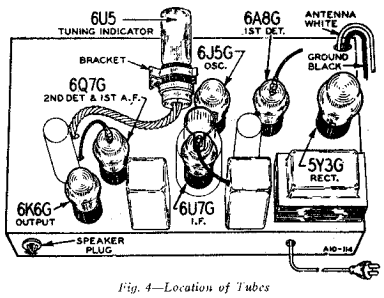


*Fig. 4—Location of Tubes*

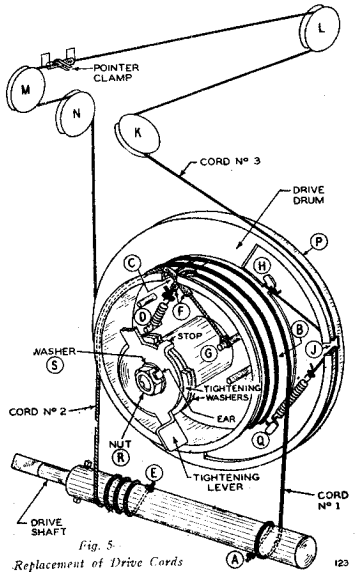


*Fig. 5. Replacement of Drive Cords*

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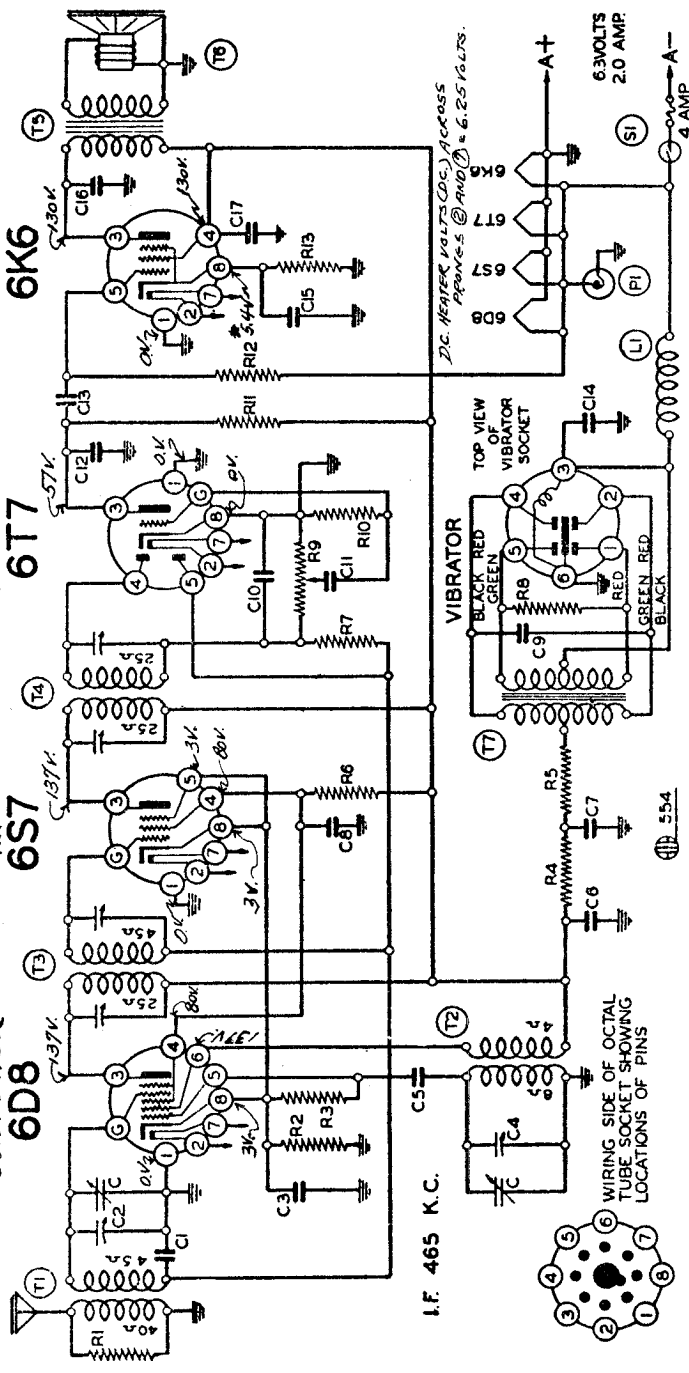
Schematic, Voltage
Socket, Trimmers

# MONTGOMERY WARD & CO.

MODEL 62-459
Series A

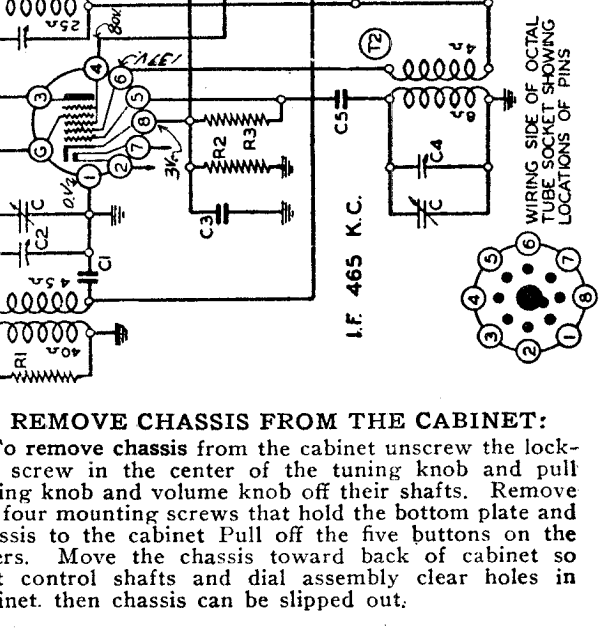



**In case of difficulty, the fuse contained in the metal fuse receptacle should be checked. A 4 ampere Type 3AG fuse (Part No. BE13179) should be used.**

## VOLTAGES AT SOCKETS

Supply Voltage 6.3 DC—Volume Control: Maximum
Readings taken with 1000 ohm-per-volt meter
Antenna Shorted to Ground

Power Consumption.....2 Amperes at 6.3 Volts
Power Output.....4 Watts Undistorted, 1 Watt Maximum




### RESISTORS

| | | | | | |
|---|---|---|---|---|---|
| R1 | BE13021 | 20M ohm—½ w. | C5 | BE12912 | .00025—mica |
| R2 | BE13081 | 250 ohm—½ w. | C6 | BE11957 | 15 mfd.—150 w. v |
| R3 | BE13012 | 50M ohm—½ w. | C7 | BE11958 | 30 mfd.—150 w. v. |
| R4 | BE13084 | 200 ohm—½ w. | C8 | BE10022 | .05 x 200 v. |
| R5 | BE13084 | 200 ohm—½ w. | C9 | BE10068 | .003 x 1400 |
| R6 | BE130149 | 15M ohm—½ w. | C10 | BE12912 | .00025—Mica |
| R7 | BE130170 | 3 megohm—½ w. | C11 | BE10011 | .01 x 400 v. |
| R8 | BE13084 | 200 ohm—½ w. | C12 | BE1292 | .0005—Mica |
| R9 | BE101107 | 500M ohm Volume control | C13 | BE10011 | .01 x 400 v. |
| | | | C14 | BE10031 | .5 x 120 w. v. |
| | | | C15 | BE11957 | 15 mfd. 25 w. v. |
| R10 | BE130225 | 15 megohm—⅓ w. | C16 | BE10019 | .006 x 600 v. |
| R11 | BE1309 | 200M ohm—⅓ w. | C17 | BE10020 | .1 x 200 v. |
| R12 | BE1303 | 500M ohm—⅓ w. | | | C6 and C 15 in same unit |
| R13 | BE13024 | 400 ohm—½ w. | | | |

### CONDENSERS

| | | | |
|---|---|---|---|
| C | BE10267B | 2 gang variable condenser | |
| C1 | BE1009 | .05 x 200 v. Antenna trimmer on gang condenser | |
| C2 | | | |
| C3 | BE10022 | .05 x 200 v. Oscillator trimmer on gang condenser | |
| C4 | | | |

### PARTS

| | |
|---|---|
| BE11192 | Antenna Coil Complete |
| BE11073 | Oscillator Coil Complete |
| BE10896E | Input I. F.—465 kc. Complete |
| BE10895D | Output I. F.—465 kc. Complete |
| BE10570 | Output Transformer |
| BE114118 | 5" P. M. Speaker |
| BE104137 | Power Transformer |
| BE10568 | "A" Choke— |
| BE10789 | Pilot light—Type 40—6.3 v.—.15 amp. |
| | Off-on switch on volume control |
| BE1268 | Vibrator |

## FOR ALIGNMENT PROCEDURE AND SETTING AUTOMATIC TUNING LEVERS, SEE INDEX.

## TO REMOVE CHASSIS FROM THE CABINET:

**To remove chassis** from the cabinet unscrew the locking screw in the center of the tuning knob and pull tuning knob and volume knob off their shafts. Remove the four mounting screws that hold the bottom plate and chassis to the cabinet Pull off the five buttons on the levers. Move the chassis toward back of cabinet so that control shafts and dial assembly clear holes in cabinet. then chassis can be slipped out.

Jan. '39

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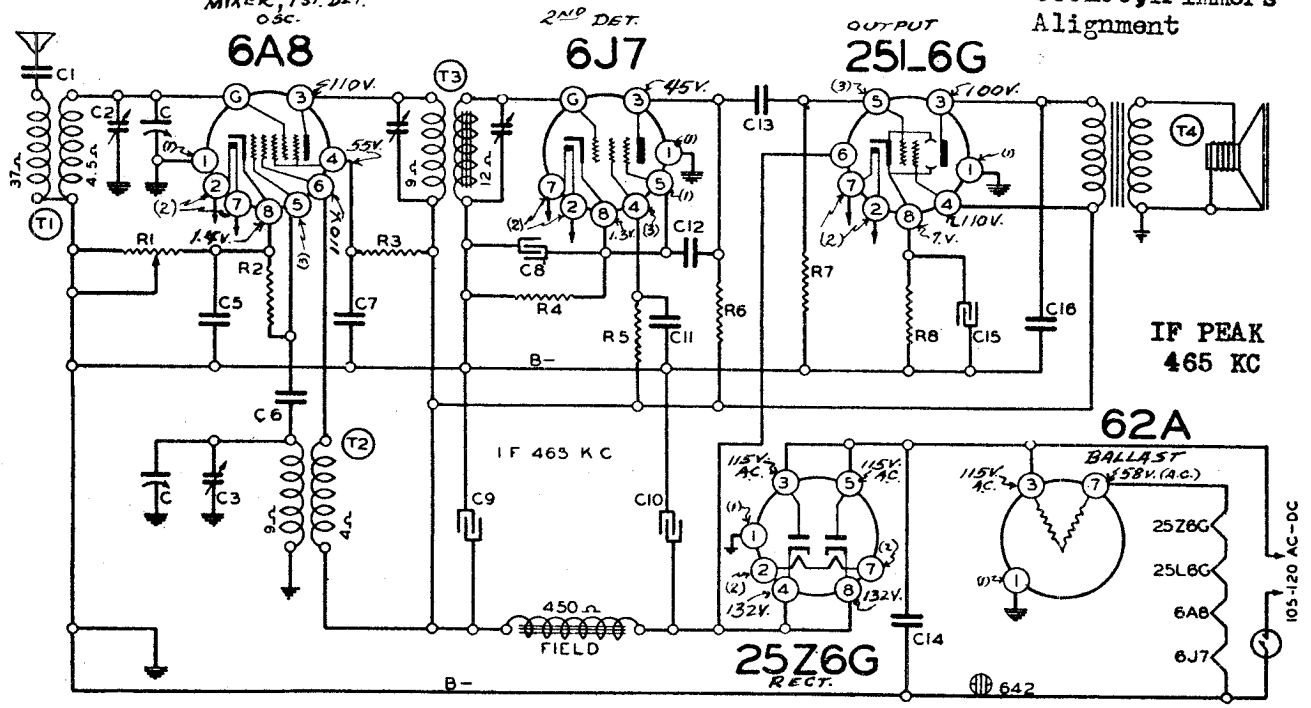
MODELS 62-501, 62-502
Series A, Ser. 286700 up

# MONTGOMERY WARD & CO.

Schematic, Voltage
Socket, Trimmers
Alignment




Power Consumption ..... 45 Watts
Power Output ..... 800 Milliwatts Undistorted, 1300 Milliwatts Maximum
Intermediate Frequency ..... 465 K.C.

Sept. '38

D.C. VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B-, WITH LINE VOLTAGE OF 115 VOLTS A.C. OR D.C.
NOTE: TERMINALS MARKED "0" ARE B- POINTS.

VOL. CONT. ON FULL ANTENNA GROUNDED

(1) NO READING (CONNECTED TO CHASSIS)
(2) 6.3 V.A.C. READ BETWEEN TERMINALS 2&7 OF SAME SOCKET
(3) CANNOT BE READ WITH VOLTMETER

## PARTS (Serial 286,700 and UP)

### RESISTORS

| | | |
|---|---|---|
| R1 | BE101138 | 20M ohm volume control |
| R2 | BE13012 | 50M ohm—⅓ w. |
| R3 | BE130194 | 35M ohm—⅓ w. |
| R4 | BE130252 | 6M ohm—⅓ w. |
| R5 | BE13038 | 2 megohm—⅓ w. |
| R6 | BE13045 | 250M ohm—⅓ w. |
| R7 | BE1303 | 500M ohm—⅓ w. |
| R8 | BE130251 | 160 ohm—⅓ w. |

### CONDENSERS

| | | |
|---|---|---|
| C | BE10287 | 2 gang variable condense |
| C1 | BE1292 | .0005 mica |
| C2 | | Antenna Trimmer |
| C3 | | Oscillator Trimmer |
| C5 | BE1009 | .05 x 200 v. |
| C6 | BE12912 | .00025 mica |
| C7 | BE1009 | .05 x 200 v. |
| C8 | BE11971 | 5 mfd. x 25 v. lytic |
| C9 | BE11970 | 30 mfd. x 150 v. lytic |
| C10 | BE11970 | 30 mfd. x 150 v. lytic |
| C11 | BE10020 | .1 x 200 v. |
| C12 | BE1292 | .0005 mica |
| C13 | BE10026 | .02 x 400 v. |
| C14 | BE1001 | .1 x 400 v. |
| C15 | BE11970 | 40 mfd. x 25 w. v. lytic |
| C16 | BE10095 | .035 x 400 v. |

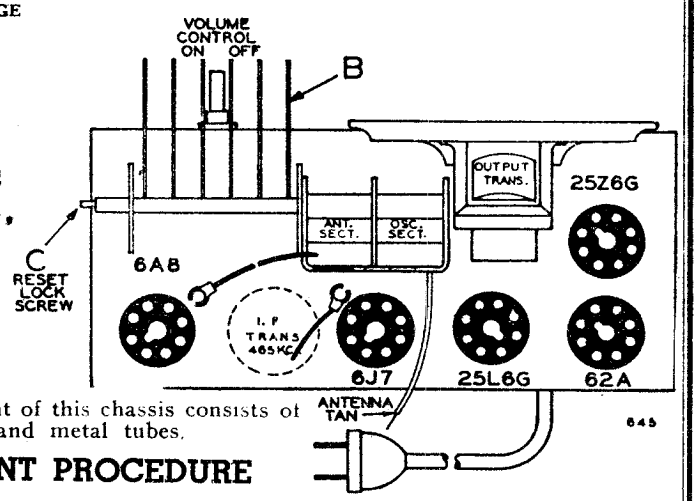
C9, C10 and C15 in one unit, part no. BE11970

### PARTS

| | | |
|---|---|---|
| T1 | BE111110 | Antenna Coil |
| T2 | BE11095 | Oscillator Coil |
| T3 | BE108123 | I. F. Transformer—465 kc. |
| T4 | BE114130 | 5 inch Dynamic Speaker |

**FREQUENCY RANGE**
530 to 1720 K.C.

FOR SETTING THE AUTOMATIC TUNING LEVERS, SEE INDEX.




The tube complement of this chassis consists of octal base glass and metal tubes.

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 100 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6A8 | Rotor full open (Plates out of mesh) | Two trimmers | I. F. | Adjust to maximum output |
| BROADCAST BAND | 1720 Kc. | 100 mmf. | Antenna Lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 100 mmf. | Antenna Lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang | Broadcast Antenna | Adjust to maximum output |

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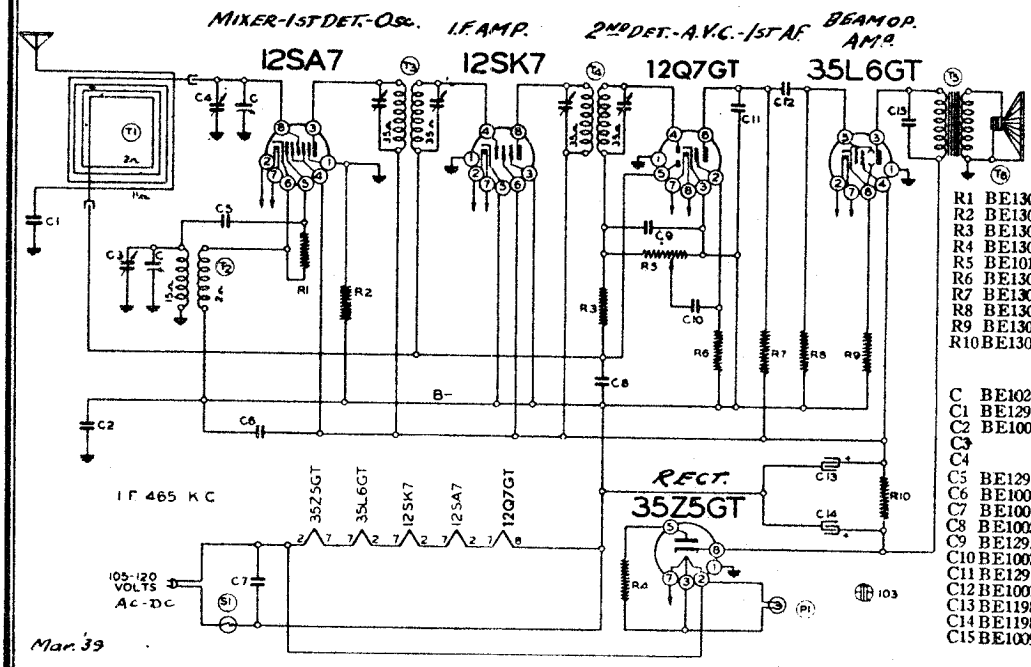
Schematic, Voltage
Socket, Trimmers
Alignment, Changes

# MONTGOMERY WARD & CO.

MODELS 62-504, 62-505
Series A, Issues A, B
Ser. 623100 up




## PARTS (Serial No. 623,100 and UP) ISSUES A AND B

### RESISTORS

| | | |
|---|---|---|
| R1 | BE13021 | 20M ohm—½ w. |
| R2 | BE130100 | 150M ohm—½ w. |
| R3 | BE1304 | 3 megohm—½ w. |
| R4 | BE130215 | 25 ohm—½ w. |
| R5 | BE101164 | 1 megohm—volume control |
| R6 | BE130225 | 15 megohm—½ w. |
| R7 | BE13011 | 250M ohm—½ w. |
| R8 | BE1303 | 500M ohm—½ w. |
| R9 | BE130166 | 150 ohm—½ w. |
| R10 | BE130199 | 1500 ohm—1 watt |

### CONDENSERS

| | | |
|---|---|---|
| C | BE102102 | 2 gang variable condenser |
| C1 | BE1292 | .0005 Mica |
| C2 | BE10091 | .15 x 400 v. |
| C3 | | Osc. Trimmer on Gang |
| C4 | | Ant. Trimmer on Gang |
| C5 | BE12912 | .00025 mica |
| C6 | BE1009 | .05 x 200 v. |
| C7 | BE1001 | .1 x 400 v. |
| C8 | BE10022 | .05 x 200 v. |
| C9 | BE1295 | .0001 mica |
| C10 | BE10071 | .004 x 600 v. |
| C11 | BE12912 | .00025 mica |
| C12 | BE10011 | .01 x 400 v. |
| C13 | BE11982 | 30 mfd. lytic |
| C14 | BE11982 | 30 mfd. lytic |
| C15 | BE10095 | .035 x 400 v. |
| | | C13 and C14 in same unit |

### PARTS

| | | |
|---|---|---|
| T1 | BE120268 | Loop Antenna |
| T2 | BE110113 | Oscillator Coil |
| T3 | BE108140B | Input I. F. |
| T4 | BE108141 | Output I. F. |
| T5 | BE10587 | Output Transformer |
| T6 | BE114157 | 4" P. M. Speaker |
| S1 | | Off-on switch on vol. control |
| P1 | BE107249 | 6.3 volt Pilot Light |

FOR SETTING AUTOMATIC TUNING LEVERS, SEE INDEX

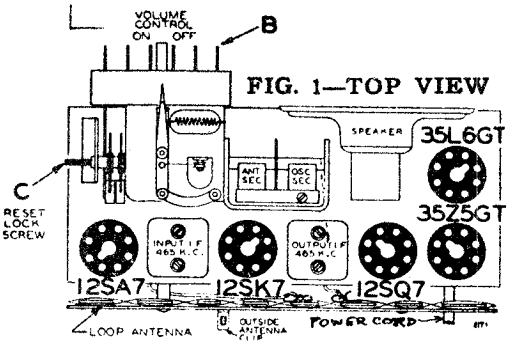
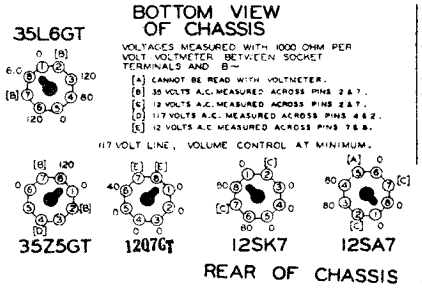



FIG. 1—TOP VIEW


BOTTOM VIEW OF CHASSIS
35L6GT
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND B-
[A] CANNOT BE READ WITH VOLTMETER.
[B] 35 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
[C] 12 VOLTS A.C. MEASURED ACROSS PINS 2 & 7.
[D] 117 VOLTS A.C. MEASURED ACROSS PINS 4 & 2.
[E] 12 VOLTS A.C. MEASURED ACROSS PINS 7 & 8.
117 VOLT LINE, VOLUME CONTROL AT MINIMUM.
35Z5GT
12Q7GT
12SK7
12SA7
REAR OF CHASSIS

## Frequency Range 540-1650 Kilocycles
I. F. Frequency 465 K. C.

**NOTE:- In ISSUE A, a 12SQ7 is used as 2nd Det.-A.V.C.-1st. Audio; Resistor, R 10, part BE 130282, 2000 ohm 1 watt, and P1, part BE 10794, 6.8 v. Pilot Light are used. For all other parts see parts list.**

## ALIGNMENT PROCEDURE

**Do not remove the back cover of the radio which contains the loop antenna from the chassis.** It is important during alignment that the same distance between the loop antenna and the chassis be maintained as when the chassis is installed in the cabinet.

Slight adjustments to the oscillator and antenna circuits can be made without removing the chassis from the cabinet through two holes which are provided on the bottom of the cabinet.

The two adjustments on the variable gang condenser can be reached with a long insulated type screw driver through these two holes.

- Volume control—Maximum all adjustments.
- Connect B - of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 12SA7 | Rotor full open (Plates out of mesh) | Four Trimmers on Top (See Fig. 1) | Output and Input I.F. | Adjust to maximum output |
| BROAD-CAST BAND | 1650 Kc. | .1 MFD. | Grid of 12SA7 | Rotor full open (Plates out of mesh) | Trimmer—Bottom of rear section of gang (See Bottom of Radio) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | See Note "A" | | Set dial at 1400 Kc. | Trimmer—Bottom of front section of gang (See Bottom of Radio) | Broadcast Antenna | Adjust to maximum output |

NOTE "A" Lay the output lead from the generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the generator.

| | |
|---|---|
| Power Consumption | 40 Watts |
| Power Output | 1.3 Watts Undistorted, 2.5 Watts Maximum |
| Intermediate Frequency | 465 K.C. |

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# MODELS 62-551, 62-1551
# 62-2551
# MONTGOMERY WARD & CO.

Series A, Ser. 8L475800 up

Schematic, Voltage, Socket
Trimmers, Alignment

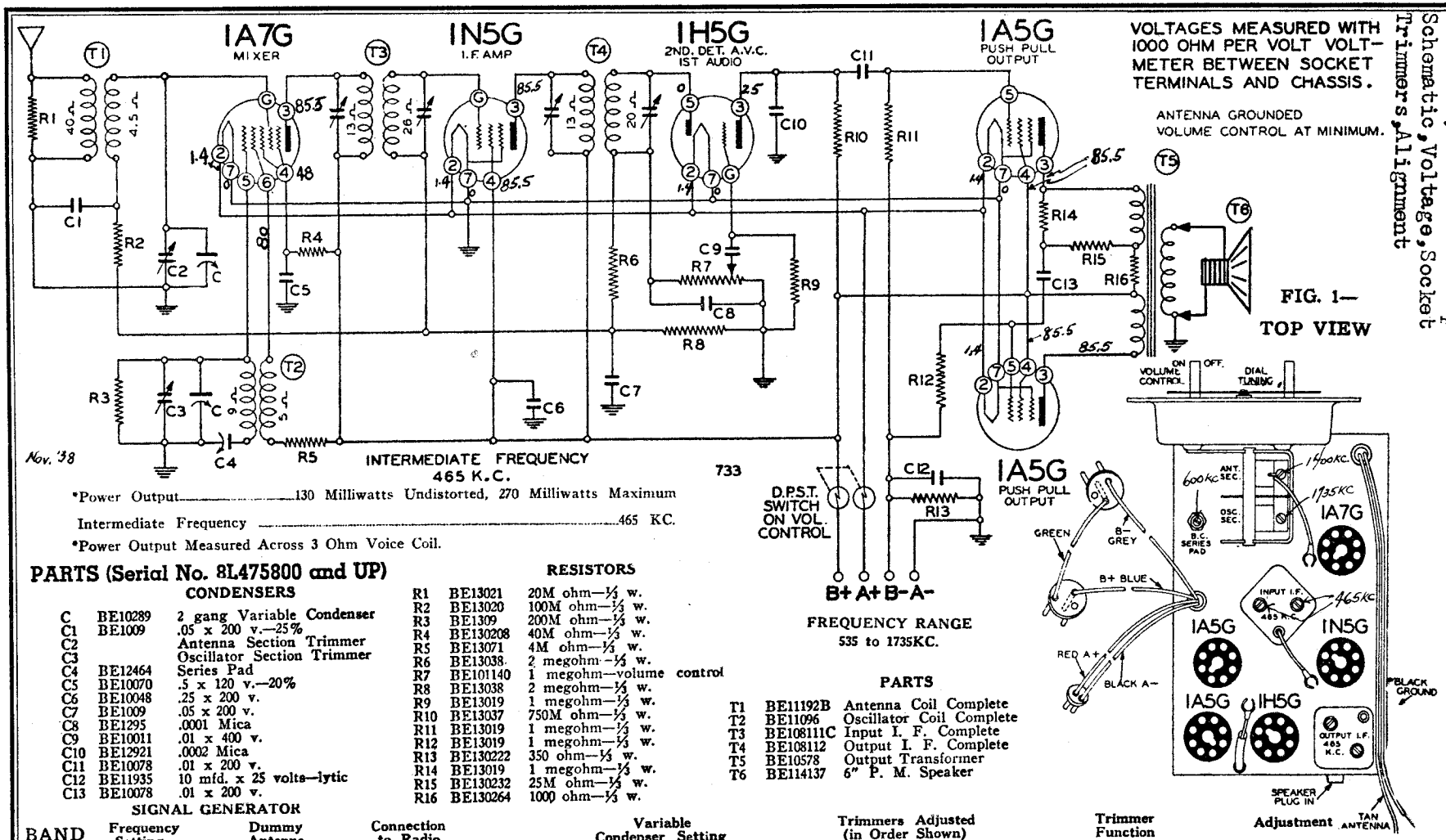


FIG. 1—
TOP VIEW

*Power Output.....130 Milliwatts Undistorted, 270 Milliwatts Maximum

Intermediate Frequency .....465 KC.

*Power Output Measured Across 3 Ohm Voice Coil.

## PARTS (Serial No. 8L475800 and UP)

### CONDENSERS

| | | |
|---|---|---|
| C | BE10289 | 2 gang Variable Condenser |
| C1 | BE1009 | .05 x 200 v.—25% |
| C2 | | Antenna Section Trimmer |
| C3 | | Oscillator Section Trimmer |
| C4 | BE12464 | Series Pad |
| C5 | BE10070 | .5 x 120 v.—20% |
| C6 | BE10048 | .25 x 200 v. |
| C7 | BE1009 | .05 x 200 v. |
| C8 | BE1295 | .0001 Mica |
| C9 | BE10011 | .01 x 400 v. |
| C10 | BE12921 | .0002 Mica |
| C11 | BE10078 | .01 x 200 v. |
| C12 | BE11935 | 10 mfd. x 25 volts—lytic |
| C13 | BE10078 | .01 x 200 v. |

### RESISTORS

| | | |
|---|---|---|
| R1 | BE13021 | 20M ohm—½ w. |
| R2 | BE13020 | 100M ohm—½ w. |
| R3 | BE1309 | 200M ohm—½ w. |
| R4 | BE130208 | 40M ohm—½ w. |
| R5 | BE13071 | 4M ohm—½ w. |
| R6 | BE13038 | 2 megohm—½ w. |
| R7 | BE101140 | 1 megohm—volume control |
| R8 | BE13038 | 2 megohm—½ w. |
| R9 | BE13019 | 1 megohm—½ w. |
| R10 | BE13037 | 750M ohm—½ w. |
| R11 | BE13019 | 1 megohm—½ w. |
| R12 | BE13019 | 1 megohm—½ w. |
| R13 | BE130222 | 350 ohm—½ w. |
| R14 | BE13019 | 1 megohm—½ w. |
| R15 | BE130232 | 25M ohm—½ w. |
| R16 | BE130264 | 1000 ohm—½ w. |

FREQUENCY RANGE
535 to 1735KC.

### PARTS

| | | |
|---|---|---|
| T1 | BE11192B | Antenna Coil Complete |
| T2 | BE11096 | Oscillator Coil Complete |
| T3 | BE108111C | Input I. F. Complete |
| T4 | BE108112 | Output I. F. Complete |
| T5 | BE10578 | Output Transformer |
| T6 | BE114137 | 6" P. M. Speaker |

### SIGNAL GENERATOR

| BAND | Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1N5G I.F. Tube | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1A7G | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROADCAST BAND | 1735 Kc. | 200 mmf. | Antenna lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Antenna Broadcast | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Set dial at 600 Kc. | B.C. Series Pad (See Fig. 1) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

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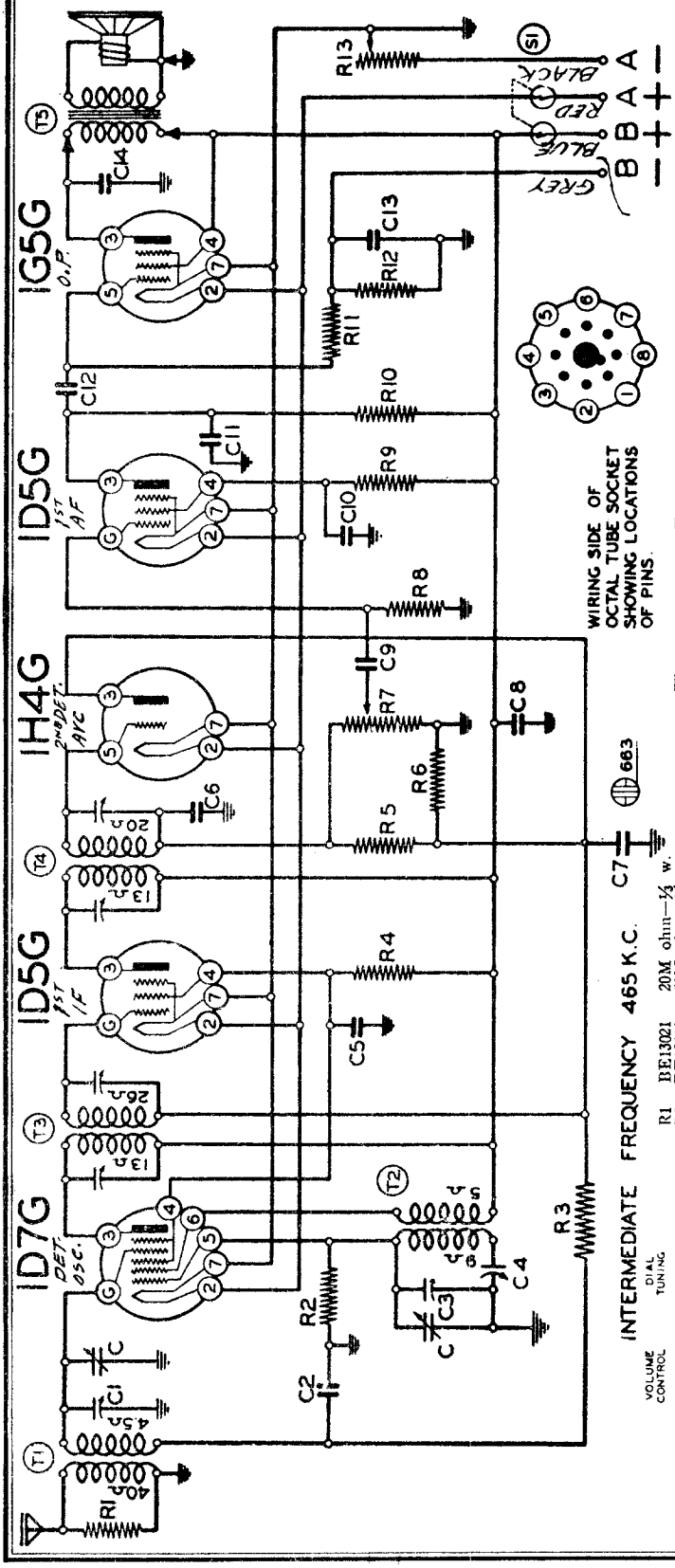
Schematic, Voltage Socket, Trimmers

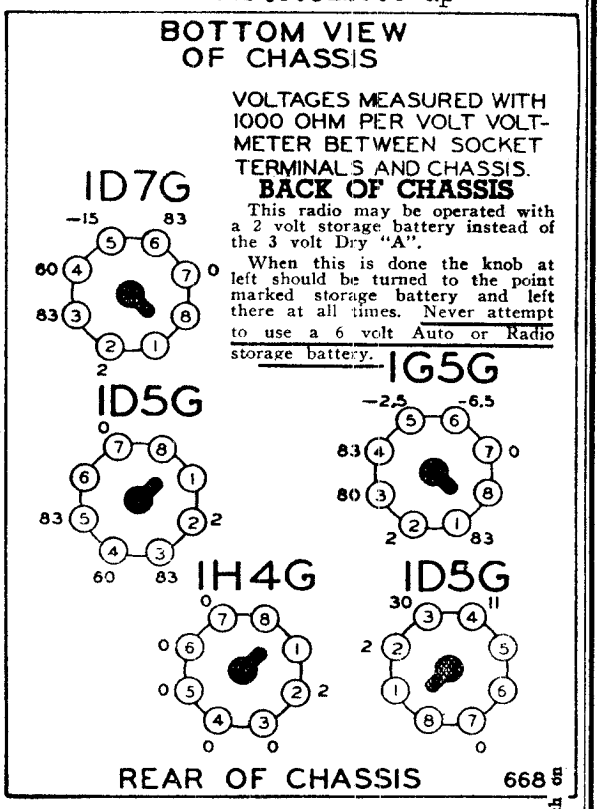
MONTGOMERY WARD & CO.

MODELS 62-550, 62-1550
62-2550, Series A
Ser. 8J312900 up

# 5 TUBE
## Broadcast Band 2-Volt Battery Operated Superheterodyne Receiver

**Frequency Range—535 - 1735 Kilocycles**




This radio may be operated with a 2 volt storage battery instead of the 3 volt Dry "A".

When this is done the knob at left should be turned to the point marked storage battery and left there at all times. Never attempt to use a 6 volt Auto or Radio storage battery.

FIG. 3

### PARTS (SERIAL No. 8J312900 and UP)

| | | | |
|---|---|---|---|
| **RESISTORS** | | | |
| R1 | BE13021 | 20M ohm—½ w. | |
| R2 | BE13012 | 50M ohm—½ w. | |
| R3 | BE13020 | 100M ohm—½ w. | |
| R4 | BE13017 | 10M ohm—½ w. | |
| R5 | BE13038 | 2 megohm—½ w. | |
| R6 | BE13038 | 2 megohm—½ w. | |
| R7 | BE100140 | 1 megohm Volume Control | |
| R8 | BE13019 | 1 megohm—½ w. | |
| R9 | BE13019 | 1 megohm—½ w. | |
| R10 | BE13309 | 200 M ohm—½ w. | |
| R11 | BE13019 | 1 megohm—½ w. | |
| R12 | BE13093 | 450 ohm—½ w. | |
| R13 | BE10179 | Filament Rheostat (4.75 ohms) | |
| | | **CONDENSERS** | |
| C | BE10289 | Two Gang Variable Condenser | |
| C1 | | Antenna Section Trimmer | |
| C2 | BE1009 | .05 x 200 v. | |
| | | Oscillator Section Trimmer | |
| C3 | | Series Pad | |
| C4 | BE12464 | .05 x 200 v. | |
| C5 | BE10022 | .0001 Mica | |
| C6 | BE1295 | .05 x 200 v. | |
| C7 | BE1009 | .25 x 200 v. | |
| C8 | BE10048 | .01 x 400 v. | |
| C9 | BE11011 | .05 x 200 v. | |
| C10 | BE1009 | .0005 Mica | |
| C11 | BE1292 | .01 x 400 v. | |
| C12 | BE10011 | .25 mid. 25 v. Lytic Condenser | |
| C13 | BE11935 | .004 x 600 v. | |
| C14 | BE10071 | **PARTS** | |
| T1 | BE11192B | Antenna Coil Complete | |
| T2 | BE11096 | Oscillator Coil Complete | |
| T3 | BE108111C | Input I.F. Complete | |
| T4 | BE108112 | Output I.F. Complete | |
| T5 | BE11476 | 6 in. P. M. Speaker | |
| S1 | | Double Pole Double Throw Switch Volume Control. | |

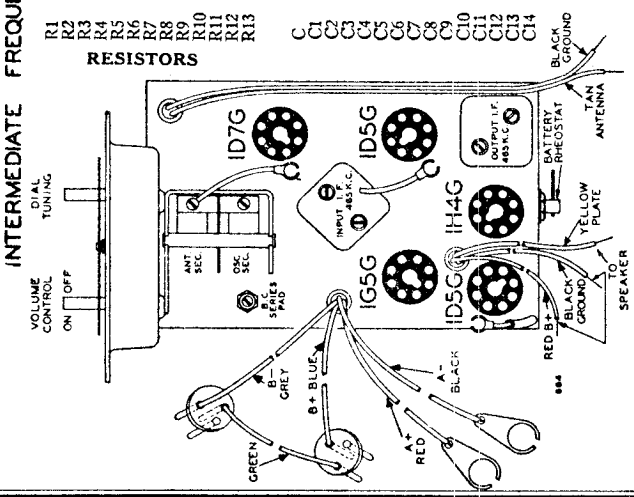



FIG 1—TOP VIEW

Sept. '38

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MODELS 62-550, 62-1550
62-2550
MODELS 93WG602, 93WG603
Alignment

# MONTGOMERY WARD & CO.

MODELS 62-558, 62-1558
62-2558
MODEL 62-653
Alignment, Trimmers

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

MODELS 62-550, 62-1550, 62-2550
Series A

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (In Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1D5G I.F. Tube | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1D7G | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1735 Kc. | 200 mmf. | Antenna lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Antenna Broadcast | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Set dial at 600 Kc. | B.C. Series Pad (See Fig. 1) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

FREQUENCY RANGE
535 to 1725KC.

Power Output ..... 150 Milliwatts Undistorted, 250 Milliwatts Maximum

Intermediate Frequency ..... 465 KC.

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

MODELS 62-558, 62-1558, 62-2558
Series A, Issue A

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (In Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1N5G 2nd I. F. | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1N5G 1st I. F. | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Interstage I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1A7G Mixer | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 Mc. | Trimmer C6—Top of front section of gang (See Fig. 1) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 Mc. | Trimmer C2 (See Fig. 4) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 6 Mc. | Trimmer C7 (See Fig. 4) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| BROAD-CAST BAND | 1750 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer C8 (See Fig. 4) | Broadcast oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 1500 Kc. | Trimmer C3 (See Fig. 4) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer C9 (See Fig. 4) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

## ALIGNMENT PROCEDURE Model 62-653

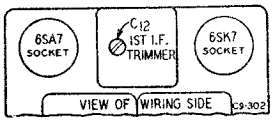



*Fig. 6—Location of 1st I.F. Trimmer in Tuning Unit*

Remove grille and speaker from speaker unit.

Remove the chassis from tuning unit case in accordance with the article under "General Installation Items" in this manual.

Set the signal generator for 456 KC and connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6SA7 1st detector tube (prong No. 8). Connect the ground lead of the signal generator to the tuning unit chassis. Set the volume control at maximum and the Local-Distance switch to the distance position. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC.

Then adjust the 4 I.F. trimmers until maximum output is obtained. Three of the trimmers are in the speaker unit—See Fig. 2. One trimmer is at the top of the tuning unit —See Fig. 6.

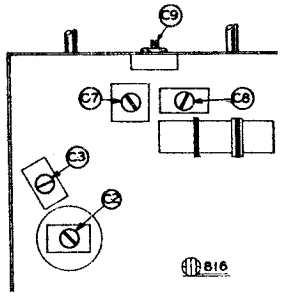
Insert the antenna cable plug in the antenna socket on the tuning unit. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 25 mmf., use a 35 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

Set the signal generator for 1560 KC. Turn the tuning knob until the iron cores are as far out of the tuning coils as they will go. Then adjust the oscillator trimmer C6 (Fig. 1) until maximum output is obtained.

Set the signal generator for 1000 KC. Turn the tuning knob until maximum output is obtained. Adjust interstage trimmer C7 and antenna trimmer C2 for maximum output—See Fig. 1.

Reassemble the radio and install it in the automobile. Insert the car antenna cable. Tune in a weak signal near 1000 KC and readjust the antenna trimmer C2 for maximum output.

**Calibration**—If it is necessary to calibrate the radio, remove the chassis from the tuning unit case—See article on that subject in this manual. Accurately tune in a signal of known frequency near 1000 KC. Loosen the set screw of the large gear that drives the dial drum. Turn the dial drum until the indicator line is at the frequency of the station tuned in. Tighten the set screw and reassemble.




MODELS 62-558, 62-1558
62-2558
Series A

## ALIGNMENT PROCEDURE Models 93WG602 and 93WG603

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes. Connect Ground Post of Signal Generator to B—(12SK7—Prong No. 3) in Chassis.

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration) |
|---|---|---|---|---|
| 456 KC | Signal Grid of 1st Det. Connect at Stator of Large Gang Section. | .1 mf. | Turn Rotor to full open | 1st I.F. (C7) & (C8) 2nd I.F. (C9) & (C10) |
| 1730 KC | Signal Grid of 1st Det. | .1 mf. | Turn Rotor to full open | Oscillator (C2) |
| 1500 KC | None—See Note | | Turn Rotor to max. output | Antenna (C3) |

CALIBRATION—If it is necessary to calibrate the radio, remove the back cover. Turn the tuning control drum until the 2 set screws on the dial hub near the volume control can be reached with a screwdriver. Loosen the 2 set screws by turning them about 1/8th turn in a counter-clockwise direction. Tune in an 800 KC signal. Hold the tuning control motionless and at the same time turn the dial drum until the dial is in calibration. Then slowly turn the tuning control drum until the 2 set screws can be reached and re-tightened with a screwdriver. Check to see that the dial has remained in calibration.

Dummy Antenna—.1 mf.

NOTE—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Secure the back in place on the cabinet. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

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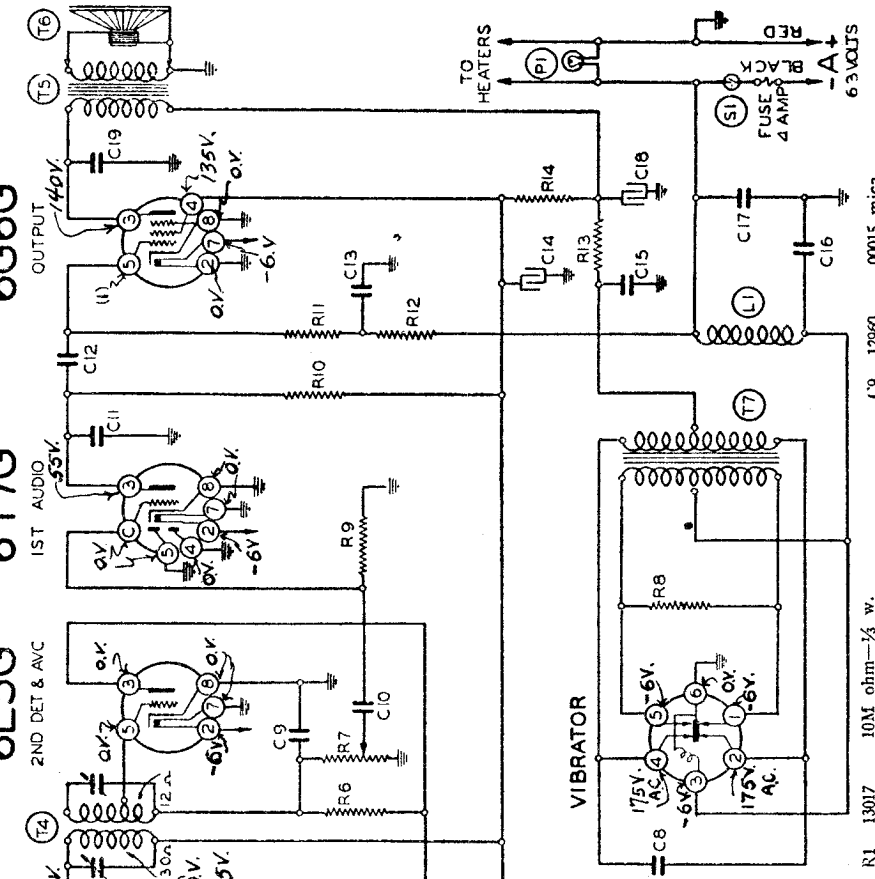
MONTGOMERY WARD & CO.

MODEL 62-552, Series A
Schematic, Voltage
Socket, Trimmers
Alignment




FOR ALIGNMENT AND TUNER DATA, SEE INDEX

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.

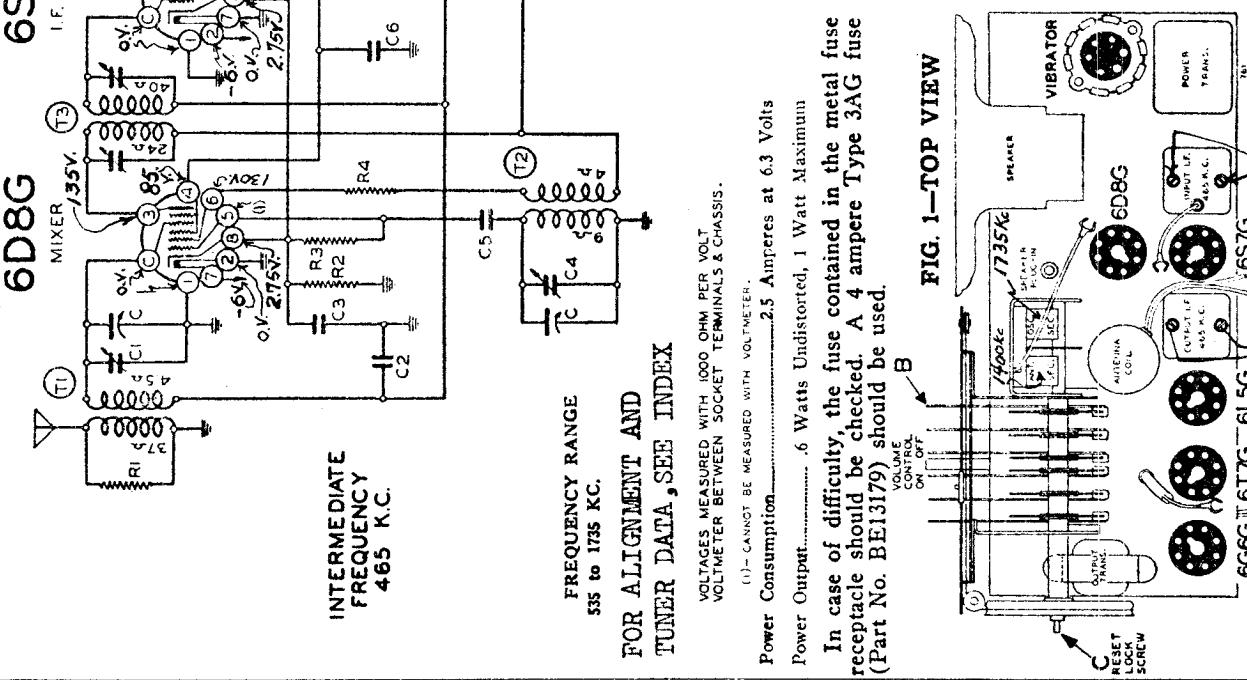
(1)—CANNOT BE MEASURED WITH VOLTMETER.

Power Consumption.....2.5 Amperes at 6.3 Volts

Power Output.....6 Watts Undistorted, 1 Watt Maximum

In case of difficulty, the fuse contained in the metal fuse receptacle should be checked. A 4 ampere Type 3AG fuse (Part No. BE13179) should be used.

FIG. 1—TOP VIEW




| | | | |
|---|---|---|---|
| R1 | 13017 | 10M ohm—½ w. | |
| R2 | 13097 | 200 ohm—½ w. | |
| R3 | 13012 | 50M ohm—½ w. | |
| R4 | 13092 | 1000 ohm—½ w. | |
| R5 | 130157 | 12M ohm—½ w. | |
| R6 | 1304 | 3 megohm—½ w. | |
| R7 | 101126 | 1 megohm—volume control | |
| R8 | 13097 | 200 ohm—½ w. | |
| R9 | 130225 | 15 megohm—½ w. | |
| R10 | 13011 | 250M ohm—½ w. | |
| R11 | 130102 | 500M ohm—½ w. | |
| R12 | 130103 | 100M ohm—½ w. | |
| R13 | 130168 | 100 ohm—½ w. | |
| R14 | 13092 | 1000 ohm—½ w. | |

**CONDENSERS**

| | | | |
|---|---|---|---|
| C | 10294 | 2 gang variable condenser | |
| C1 | | Antenna Trimmer | |
| C2 | 1009 | .05 x 200 v. | |
| C3 | 10048 | .25 x 200 v. | |
| C4 | | Oscillator Trimmer | |
| C5 | 1295 | .0001 mica | |
| C6 | 10020 | .1 x 200 v. | |
| C7 | 10020 | .1 x 200 v. | |
| C8 | 10068 | .003 x 1400 v. | |
| C9 | 12960 | .00015 mica | |
| C10 | 10011 | .01 x 400 v. | |
| C11 | 1292 | .005 mica | |
| C12 | 10011 | .01 x 400 v. | |
| C13 | 10020 | .1 x 200 v. | |
| C14 | 11959C | 10 mfd. lytic—200 w. v. | |
| C15 | 10020 | .1 x 200 v. | |
| C16 | 10040 | .5 x 120 v. | |
| C17 | 10040 | .5 x 120 v. | |
| C18 | 11959C | 30 mfd. lytic—200 w. v | |
| C19 | 10019 | .006 x 600 v. | |
| | | C14 and C18 in same unit | |

**PARTS**

| | | |
|---|---|---|
| T1 | 11185C | Antenna Coil |
| T2 | 110103 | Oscillator Coil |
| T3 | 108129B | Input I. F. Coil—465 kc. |
| T4 | 108130B | Output I. F. Coil—465 kc. |
| T5 | 10569B | Output Transformer |
| T6 | 114143 | 6" P. M. Speaker |
| T7 | 104137D | Power Transformer |
| L1 | 10568 | "A" Choke |
| P1 | 10789 | 6.3 volt pilot light T40—150 ma. |
| S1 | | Off-on switch on volume control |

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## PARTS (Serial No. 8M502000 and up)

### RESISTORS

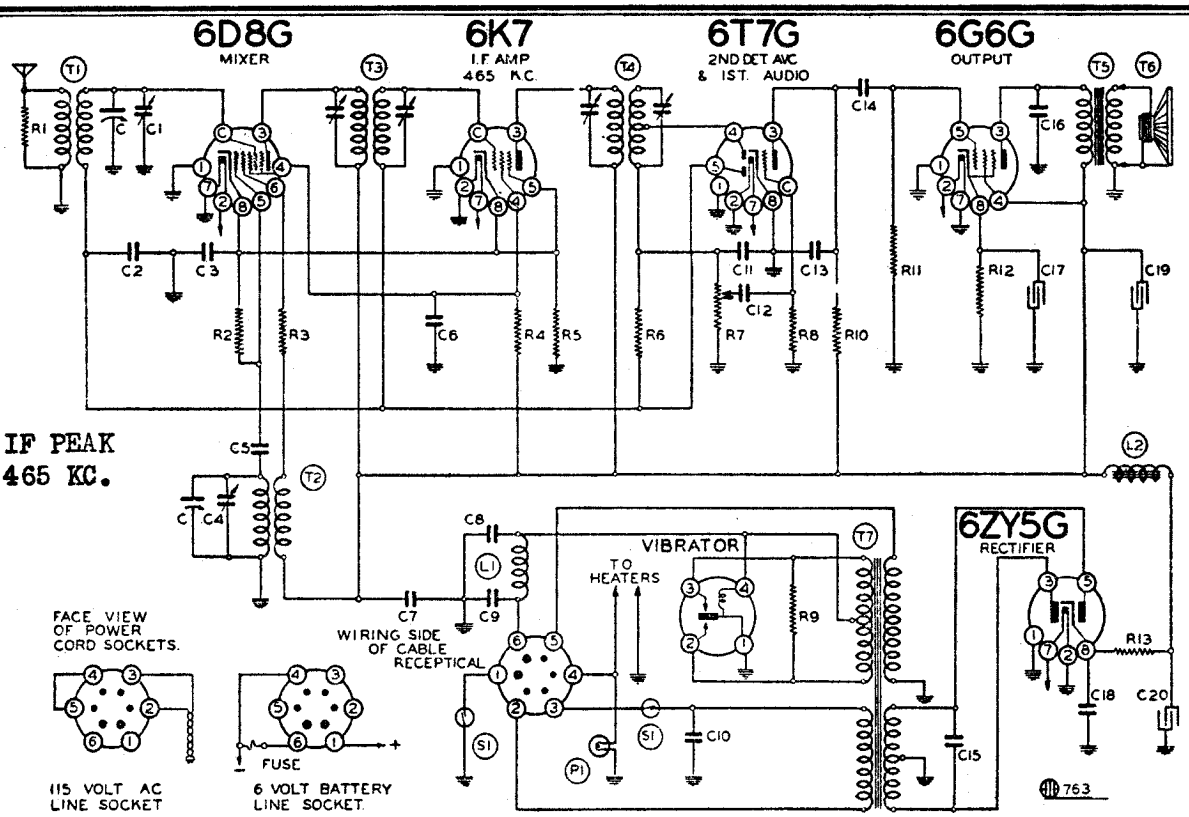
| | | |
|---|---|---|
| R1 | BE13017 | 10M ohm—⅓ w. |
| R2 | BE13012 | 50M ohm—⅓ w. |
| R3 | BE13092 | 1000 ohm—⅓ w. |
| R4 | BE130157 | 12M ohm—⅓ w. |
| R5 | BE13097 | 200 ohm—⅓ w. |
| R6 | BE1304 | 3 megohm—⅓ w. |
| R7 | BE101150 | 1 megohm volume control |
| R8 | BE130225 | 15 megohm—⅓ w. |
| R9 | BE13097 | 200 ohm—⅓ w. |
| R10 | BE130266 | 200M ohm—⅓ w. |
| R11 | BE130102 | 500M ohm—⅓ w. |
| R12 | BE13093 | 450 ohm—⅓ w. |
| R13 | BE130168 | 100 ohm—⅓ w. |

### CONDENSERS

| | | |
|---|---|---|
| C | BE10294 | 2 gang variable condenser |
| C1 | | Antenna Trimmer |
| C2 | BE1009 | .05 x 200 v. |
| C3 | BE10064 | .25 x 200 v. |
| C4 | | Oscillator Trimmer |
| C5 | BE1295 | .0001 mica |
| C6 | BE10020 | .1 x 200 v. |
| C7 | BE10020 | .1 x 200 v. |
| C8 | BE10040 | .5 x 120 v |
| C9 | BE10040 | .5 x 120 v. |
| C10 | BE10011 | .01 x 400 v. |
| C11 | BE12960 | .00015 mica |
| C12 | BE10011 | .01 x 400 v. |
| C13 | BE1292 | .0005 mica |
| C14 | BE1009 | .05 x 200 v. |
| C15 | BE10073 | .008 x 1200 v. |
| C16 | BE10019 | .006 x 600 v. |
| C17 | BE11979 | 20 mfd. x 25 w. volt |
| C18 | BE10020 | .1 x 200 v. |
| C19 | BE11979 | 16 mfd. x 200 w. volt |
| C20 | BE11979 | 16 mfd. x 200 w. volt |

### PARTS

| | | |
|---|---|---|
| T1 | BE11185C | Antenna Coil |
| T2 | BE110108 | Oscillator Coil |
| T3 | BE108129 | Input I. F. Coil—465 kc. |
| T4 | BE108130 | Output I. F. Coil—465 kc. |
| T5 | BE10569B | Output Transformer |
| T6 | BE114143 | 6" P. M. Speaker |
| T7 | BE104114B | Power Transformer |
| S1 | | Off-on switch on volume control |
| P1 | BE10789 | 6.3 v. Pilot Light T40-150 ma. |
| L1 | BE10568 | "A" Choke |
| L2 | BE10530G | "B" Choke |

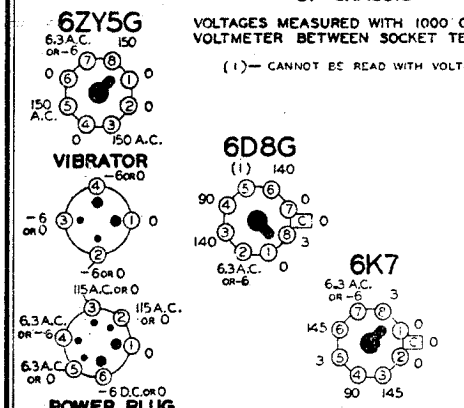



Power Consumption.....40 Watts (at 115 Volts 50/60 Cycles) or 2.5 Amperes at 6.3 Volts

Power Output.....6 Watts Undistorted, 1 Watt Maximum

**FREQUENCY RANGE**
**535 to 1735 KC.**

**BOTTOM VIEW OF CHASSIS**




VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.

(1)— CANNOT BE READ WITH VOLTMETER.

1. For 6 volt storage battery operation: Use cable No. BE107128C.
2. For 105-115 volts, 60 cycle operation:
   (a) Use special cable No. BE107129.
   (b) Plug receptacle of cable into power socket on chassis.

FOR ALIGNMENT SEE INDEX

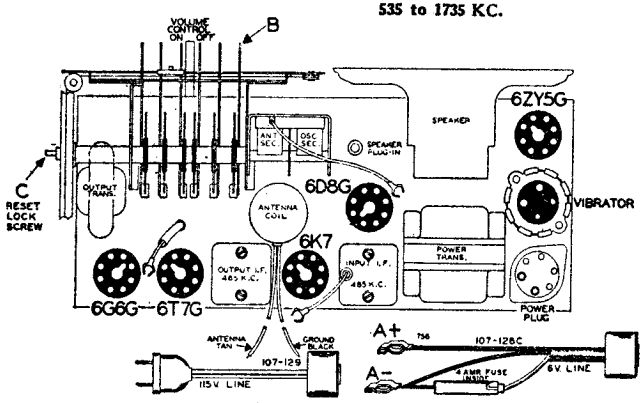



FIG. 1—TOP VIEW

Dec. '38

Socket, Trimmers
Alignment

MODEL 62-554
Schematic, Voltage

# MONTGOMERY WARD & CO.
# SPECIFICATIONS

Power Consumption - 6.25 Amperes at 6.3 Volts

Power Output - - - - - 1.5 Watts Undistorted

Sensitivity - - 1.5 Microvolts at .5 Watt Output

Selectivity - 42 KC Broad at 1000 Times Signal

Tuning Frequency Range - - - 540 to 1560 KC

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - 6" Electro-Dynamic

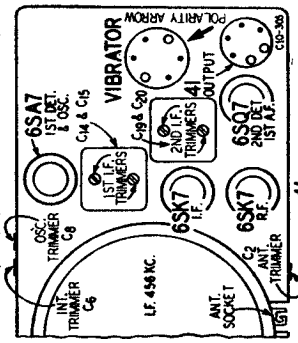



*Fig. 2—Tube and Vibrator Location*

**FOR SETTING PUSH BUTTONS, SEE INDEX.**

IF ALIGNMENT
Adjust at 456 KC through 0.05 mfd. condenser.

RC ALIGNMENT
Adjust oscillator trimmer C8 at 1560 KC.
Adjust C6 and C2 trimmers at 1000 KC.

FOR CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION OF VOLUME VIII

*Schematic Circuit Diagram*

I.F. 456 KC

## Battery Cable and Fuse

The battery connection is made at the ammeter. The end of the battery cable with the connecting lug is secured to one of the posts at the back of the ammeter in the instrument panel. The other end of the cable with the fuse receptacle connects to the battery cable from the radio after the fuse has been inserted.

A 9 ampere automobile fuse is used.

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# Procedure for Setting the Station Buttons

TYPICAL TUNING DATA (FOR NUMBER OF BUTTONS AND LOCATION OF LOCKING SCREWS -SEE FIGURES).

There are 5 buttons on the automatic tuning dial by means of which 5 stations may be set.

Any button may be used for any station you can receive.

Depress the manual tuning button AND KEEP IT DEPRESSED DURING THE ENTIRE SETTING OPERATION AS DESCRIBED BELOW. See Fig. 1 for location of buttons. Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial until the stop is reached.

**UNLOCK THE TUNING MECHANISM** by inserting a SMALL HANDLE screwdriver, as shown in Fig. 1, in the locking screw opening at the bottom of the tuning unit. Loosen the locking screw by turning it counter-clockwise as far as it will go.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

Insert a celluloid reinforcement tab half-way in the slot at the front of station button No. 1—See Fig. 3.

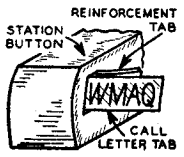


*Fig. 3—Inserting Station Tab*

Remove the correct station call letter tab for button No. 1 from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.

After the stations are set and the mechanism is locked, tune in each of them by depressing the proper button. If any of them does not appear to be properly tuned in after the button has been depressed, reset the station for that button following the procedure outlined above. Changing the setting of one button will not affect the setting of the others.

KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the first (left hand) station button. Both will remain depressed.

Select the first station from the list you have made and tune in this station by means of the manual tuning knob.

TURN THE MANUAL TUNING KNOB CAREFULLY BACK AND FORTH UNTIL THE ABOVE MENTIONED STATION IS ACCURATELY TUNED IN TO THE LOUDEST POINT. This station is now set on button No. 1.

**CAUTION**—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Next KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the second station button FIRMLY AND GENTLY. Then proceed to set the second station on your list in the same manner as described above.

Then continue to set any additional stations on your list on the remaining buttons.

After all desired stations have been set, release any station button which is depressed as follows: KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, push in the OFF button a slight amount—only enough to release any station button which is depressed. Should the OFF button be pushed all the way in to the depressed position, no harm will be done except that the dial will not be illuminated.

Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial, until the stop is reached.

**NOW LOCK THE TUNING MECHANISM** by inserting the SMALL HANDLE screwdriver, as shown in Fig. 1, in the locking screw opening. Turn the locking screw in a clockwise direction until it is tight. DO NOT tighten too much to avoid stripping the threads.

MODEL 62-554 ONLY

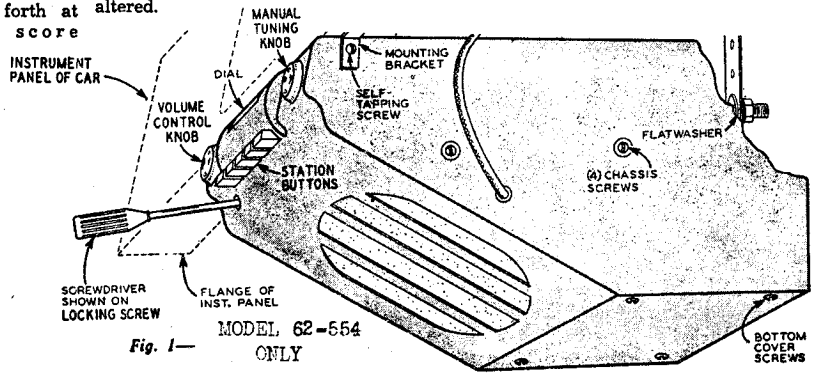


*Fig. 1—* MODEL 62-554 ONLY

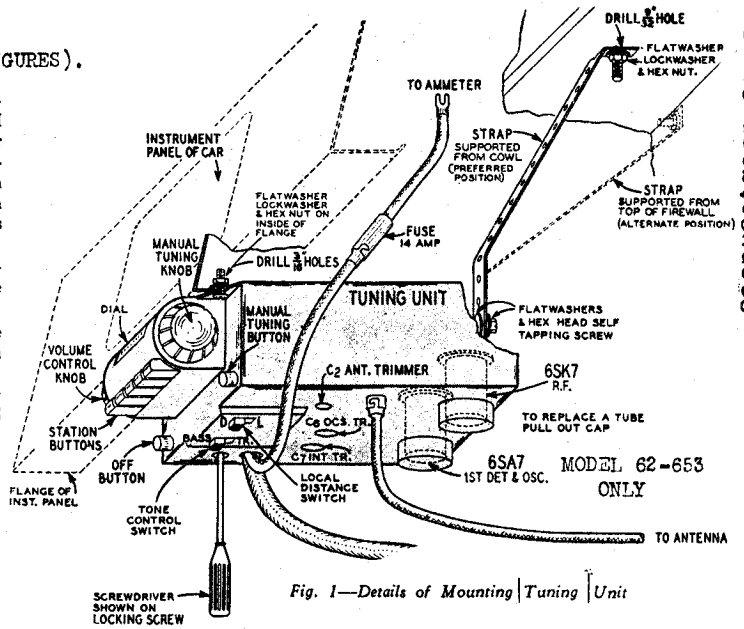


*Fig. 1—Details of Mounting Tuning Unit*

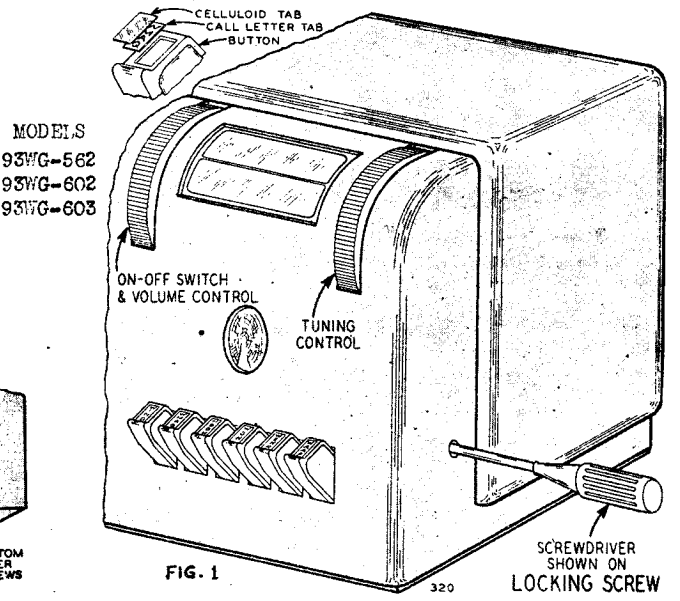


FIG. 1

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Schematic, Voltage
Socket, Alignment
Trimmers

MONTGOMERY WARD & CO.

MODELS 62-555, 62-557
62-2555, 62-2557

# SPECIFICATIONS

**Input Voltages and Currents**

"A" Battery.....1.5 Volts—.30 Amperes
"B" Battery.....90 Volts—12 to 15 Ma.

Power Output - - - 140 Milliwatts Undistorted
Selectivity - - 41 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - - 456 KC.
Speaker - - - - - - - - - 6" P.M. Dynamic
Tuning Frequency Range - - - 540 to 1600 KC.
Sensitivity (For .05 Watt Output)
Table Model.....10.5 Microvolts Average
Portable Model.....20 Microvolts Per Meter Average

JAN., 1939

Dummy Antennas—.1 mf. and 200 mmf.

NOTE—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Secure the back in place on the cabinet. Connections for the output meter may be made through the opening for the outside antenna and ground connecting posts. This opening is at the bottom of the cabinet near the back. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

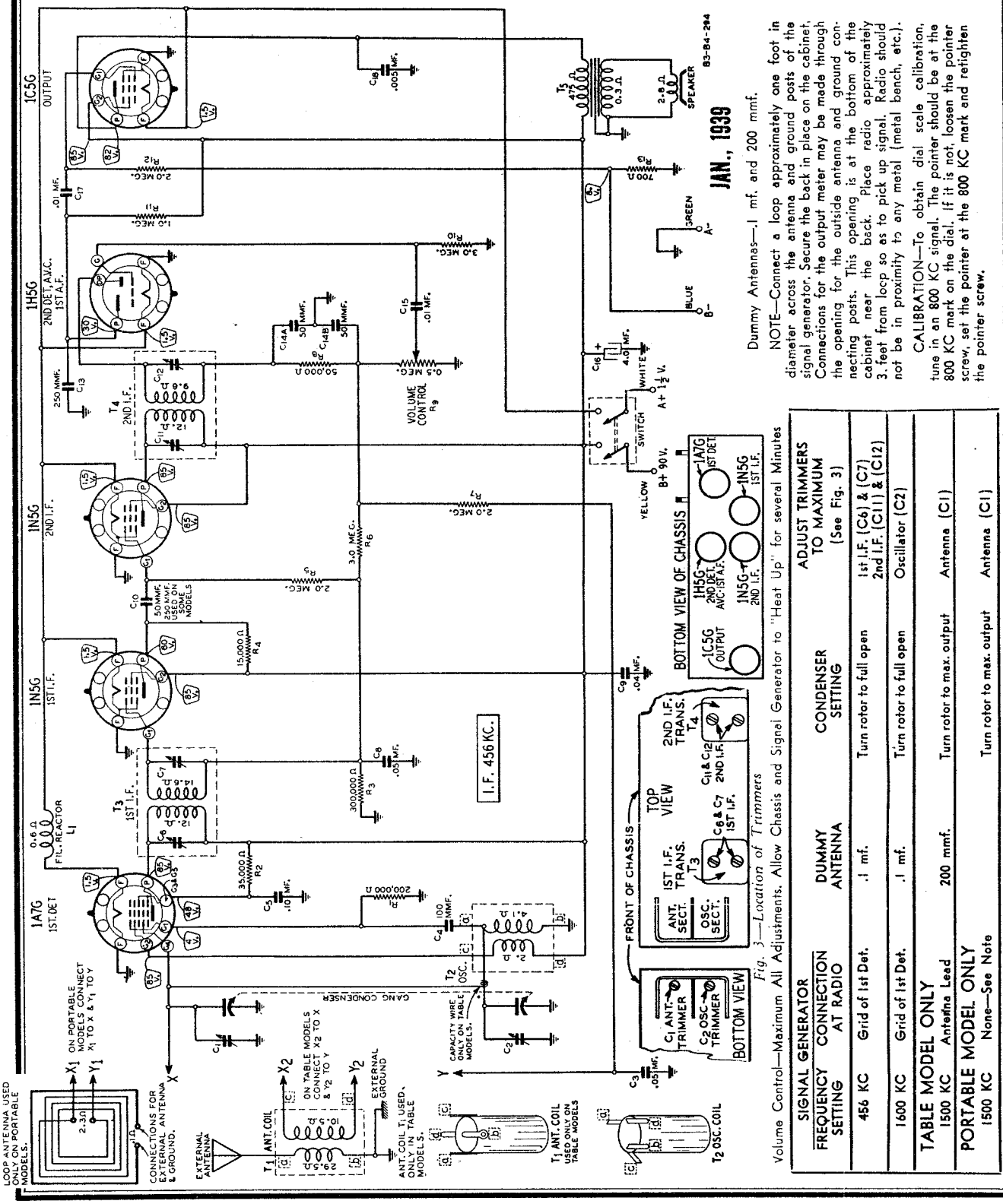
1C5G OUTPUT
1H5G 2ND DET. A.V.C. 1ST A.F.
1N5G 2ND I.F.
1N5G 1ST I.F.
1A7G 1ST DET
I.F. 456 KC.
BOTTOM VIEW OF CHASSIS
TOP VIEW
FRONT OF CHASSIS
ADJUST TRIMMERS TO MAXIMUM (See Fig. 3)
SPEAKER
VOLUME CONTROL
SWITCH
GANG CONDENSER
EXTERNAL ANTENNA
EXTERNAL GROUND
LOOP ANTENNA USED ONLY ON PORTABLE MODELS.
CONNECTIONS FOR EXTERNAL ANTENNA & GROUND.
ON PORTABLE MODELS CONNECT X1 TO X & Y1 TO Y
ON TABLE MODELS CONNECT X2 TO X & Y2 TO Y
ANT. COIL T1 USED ONLY IN TABLE MODELS.
T1 ANT. COIL USED ONLY ON TABLE MODELS
T2 OSC. COIL
CAPACITY WIRE ON PORTABLE MODELS.

*Fig. 3—Location of Trimmers*

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (See Fig. 3) |
|---|---|---|---|---|
| 456 KC | Grid of 1st Det. | .1 mf. | Turn rotor to full open | 1st I.F. (C6) & (C7) 2nd I.F. (C11) & (C12) |
| 1600 KC | Grid of 1st Det. | .1 mf. | Turn rotor to full open | Oscillator (C2) |
| **TABLE MODEL ONLY** | | | | |
| 1500 KC | Antenna Lead | 200 mmf. | Turn rotor to max. output | Antenna (C1) |
| **PORTABLE MODEL ONLY** | | | | |
| 1500 KC | None—See Note | | Turn rotor to max. output | Antenna (C1) |

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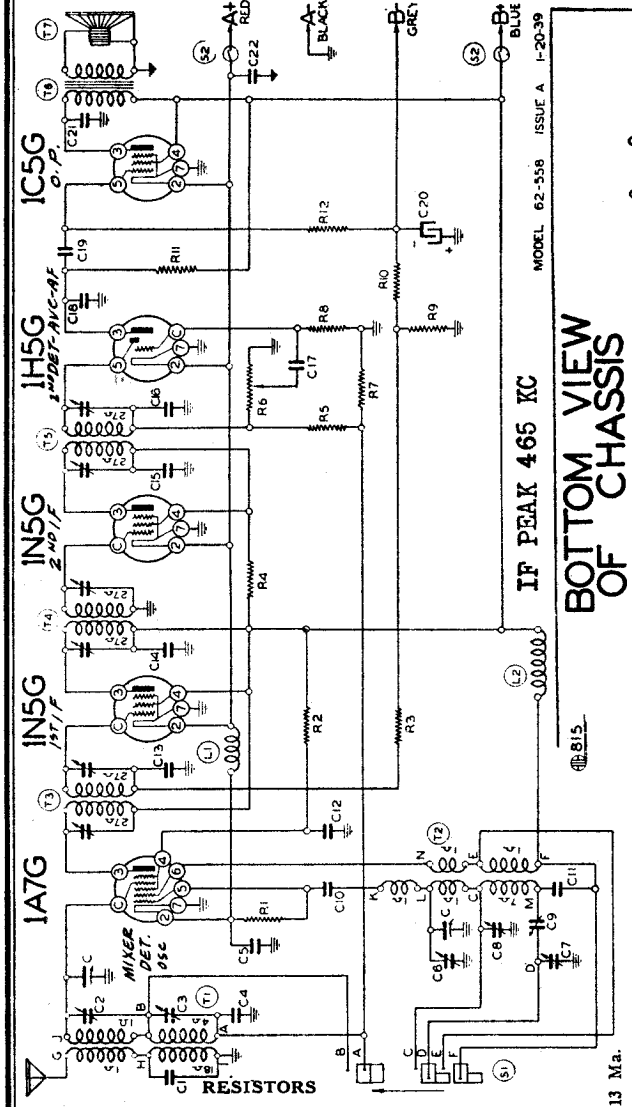
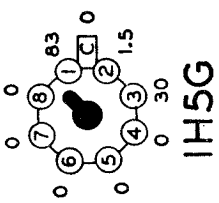
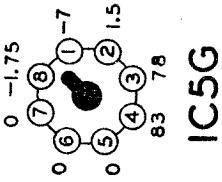
Schematic, Voltage
Socket, Trimmers

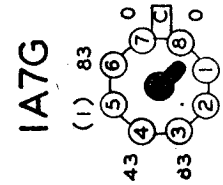
# MONTGOMERY WARD & CO.

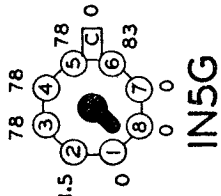
MODELS 62-558, 62-1558
62-2558
Series A, Issue A
Ser. 591000 up

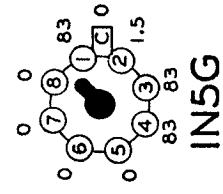


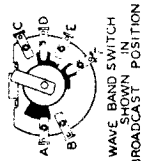




VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.

(1) CANNOT BE READ WITH VOLTMETER.

FOR ALIGNMENT AND TUNER DATA, SEE INDEX

REAR OF CHASSIS

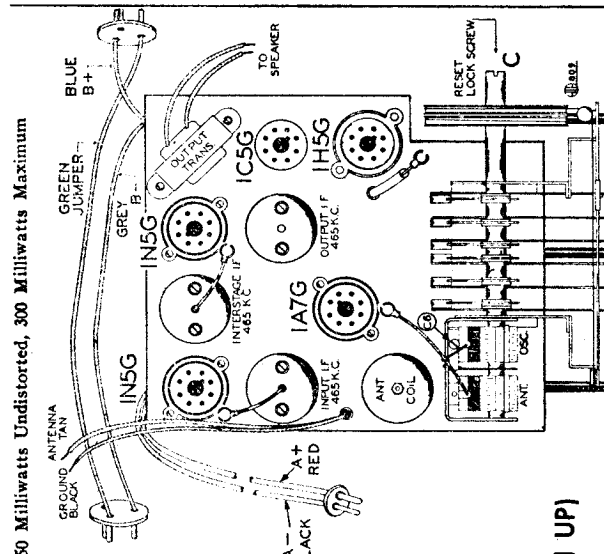


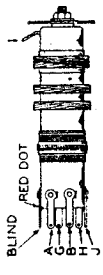

FIG 1—TOP VIEW

## RESISTORS

| | | |
|---|---|---|
| R1 | BE130266 | 200M ohm—½ w. |
| R2 | BE13094 | 50M ohm—½ w. |
| R3 | BE13019 | 1 megohm—½ w. |
| R4 | BE130193 | 3M ohm—½ w. |
| R5 | BE13038 | 2 megohm—½ w. |
| R6 | BE101160 | 250M ohm—volume control |
| R7 | BE130271 | 4 megohm—½ w. |
| R8 | BE13019 | 1 megohm—½ w. |
| R9 | BE130270 | 180 ohm—½ w. |
| R10 | BE13093 | 450 ohm—½ w. |
| R11 | BE1303 | 500M ohm—½ w. |
| R12 | BE13019 | 1 megohm—½ w. |

## CONDENSERS

| | | |
|---|---|---|
| C | BE10299 | 2-gang variable condenser |
| C1 | BE12940 | .0001 mica |
| C2 | BE12455 | S.W. Antenna Adj. Trimmer |
| C3 | BE12439 | B.C. Antenna Adj. Trimmer |
| C4 | BE10022 | .05 x 200 v. |
| C5 | BE10064 | .25 x 200 v. |
| C6 | | S.W. Osc. Adj. Trimmer on gang |
| C7 | BE12994 | S.W. Adj. Series pad .003 w.c. |
| C8 | BE12439 | B.C. Osc. Adj. Trimmer |
| C9 | BE12438 | B.C. Adj. Series Pad 580 mmf. W.C. |
| C10 | BE129135 | .00005 mica |
| C11 | BE1009 | .05 x 200 v. |
| C12 | BE10020 | .1 x 200 v. |
| C13 | BE10059 | .05 x 200 v. |
| C14 | BE10050 | .25 x 200 v. |
| C15 | BE10020 | .1 x 200 v. |
| C16 | BE12912 | .00025 mica |
| C17 | BE10019 | .006 x 600 v. |
| C18 | BE12921 | .0002 mica |
| C19 | BE10011 | .01 x 400 v. |
| C20 | BE11952 | 20 mfd. lytic w. v. 25 |
| C21 | BE10071 | .004 x 600 v. |
| C22 | BE1006 | .25 x 200 v. |




Power Consumption.....150 Milliwatts Undistorted, 300 Milliwatts Maximum
Power Output.....“A” 300 Ma., “B” 13 Ma.

## PARTS

| | | |
|---|---|---|
| T1 | BE111117 | Antenna Coil Complete |
| T2 | BE110106 | Oscillator Coil Complete |
| T3 | BE108133 | Input I. F. 465 kc. complete |
| T4 | BE108135 | Interstage I. F.—465 kc. complete |
| T5 | BE108134 | Output I. F. — 465 kc. complete |
| T6 | BE114115 | 6” P. M. Speaker |
| L1 | BE10568 | “A” Choke |
| L2 | BE1233 | R. F. “B” Choke |
| S1 | BE12573 | Wave Band Switch |
| S2 | | D.P. S.T. Switch on Volume Control |
| T7 | BE10569 | Output Transformer |

## REPAIR PARTS

(SERIAL No. 591000 and UP)

| BAND SWITCH | FREQUENCY RANGE | |
|---|---|---|
| Extreme Right Rotation | 5.7 to 18.1 MC. | |
| Extreme Left Rotation | 530 to 1750 KC. | |

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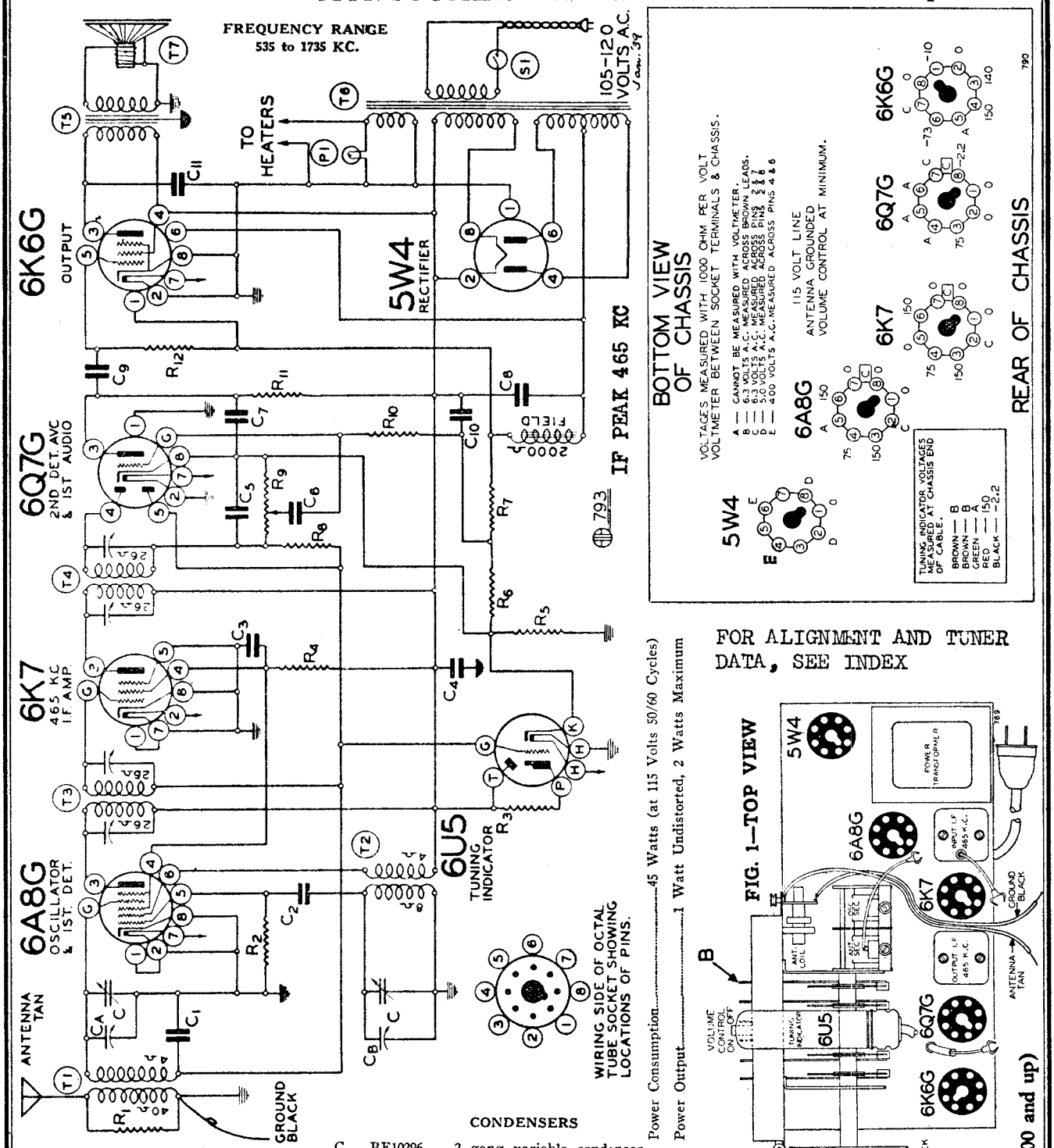
Schematic, Voltage Socket, Trimmers

# MONTGOMERY WARD & CO.

MODEL 62-601, Series A
Ser. 545900 up




Power Consumption.....45 Watts (at 115 Volts 50/60 Cycles)

Power Output.....1 Watt Undistorted, 2 Watts Maximum

## RESISTORS

| | | | |
|---|---|---|---|
| R1 | BE13017 | 10M ohm—⅓ w. | |
| R2 | BE13012 | 50M ohm—⅓ w. | |
| R3 | BE130186 | 250M ohm—1/10 w. | |
| R4 | BE13021 | 20M ohm—⅓ w. | |
| R5 | BE10635 | 65 ohm Resistor Strip | |
| R6 | BE10635 | 45 ohm Resistor Strip | |
| R7 | BE10635 | 220 ohm Resistor Strip | |
| R8 | BE130170 | 3 megohm—⅓ w. | |
| R9 | BE101158 | 1 megohm—Volume control | |
| R10 | BE130170 | 3 megohm—⅓ w. | |
| R11 | BE1309 | 200M ohm—⅓ w | |
| R12 | BE130118 | 600M ohm—⅓ w | |

R5, R6 and R7 in same unit

## CONDENSERS

| | | |
|---|---|---|
| C | BE10296 | 2 gang variable condenser |
| CA | | Antenna Trimmer on Gang |
| CB | | Oscillator Trimmer on Gang |
| C1 | BE1009 | .05 x 200 v. |
| C2 | BE12912 | .00025 Mica |
| C3 | BE1001 | .1 x 400 v. |
| C4 | BE10013 | .05 x 400 v. |
| C5 | BE1295 | .0001 Mica |
| C6 | BE10011 | .01 x 400 v. |
| C7 | BE1292 | .0005 Mica |
| C8 | BE11947BC | 5.0 mfd. 250 w. v. lytic |
| C9 | BE10011 | .01 x 400 v. |
| C10 | BE11947BC | 5.0 mfd. 250 w. v. lytic |
| C11 | BE10019 | .006 x 600 v. |

C8 and C10 in same unit

## PARTS

| | | |
|---|---|---|
| T1 | BE111102 | Antenna Coil Complete |
| T2 | BE11072 | Oscillator Coil Complete |
| T3 | BE10882D | Input I. F.—465 kc. |
| T4 | BE10883D | Output I. F.—465 kc. |
| T5 | BE10555 | Output Transformer |
| T6 | BE104100B | Power Transformer |
| T7 | BE114152 | 6" Dynamic Speaker (2000 ohm field) |
| S1 | | Off-on Switch on Volume Control |
| P1 | BE10794 | 6-8 volt pilot light type 44 |

PARTS (Serial No. 545,900 and up)

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MODELS 62-651,62-652
MODELS 62-654,62-655,62-1654,
62-2654,62-2655 ,62-1655,
MODELS 62-656,62-1656,62-2656
MODELS 62-750,62-751

# MONTGOMERY WARD & CO.

Tuner Data

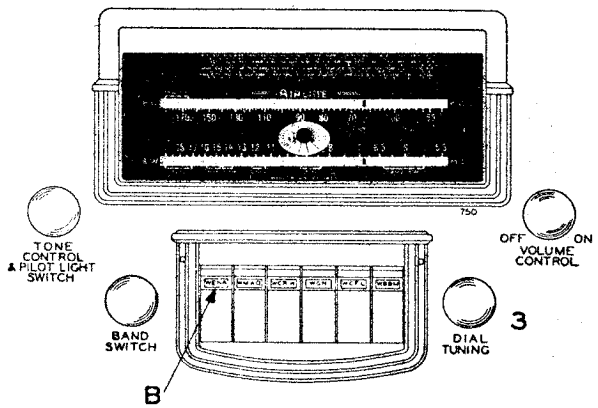


FIG. 2—FRONT VIEW

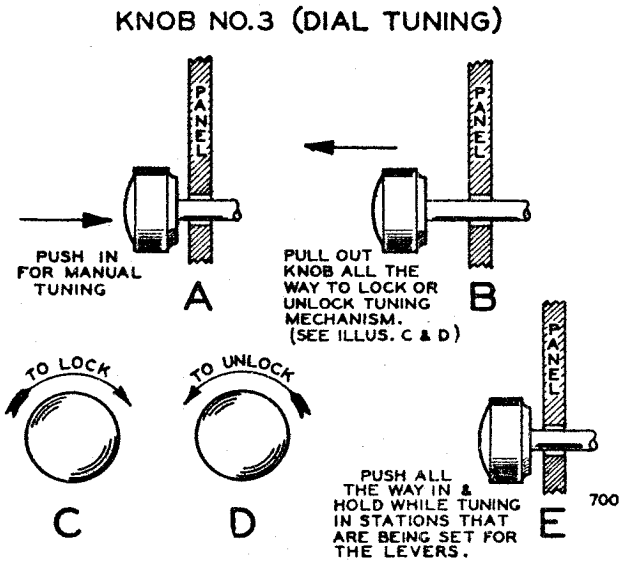
KNOB NO.3 (DIAL TUNING)
PANEL
PUSH IN FOR MANUAL TUNING
A
PULL OUT KNOB ALL THE WAY TO LOCK OR UNLOCK TUNING MECHANISM. (SEE ILLUS. C & D)
B
TO LOCK
TO UNLOCK
C
D
PUSH ALL THE WAY IN & HOLD WHILE TUNING IN STATIONS THAT ARE BEING SET FOR THE LEVERS.
E
700

FIG. 3

## PROCEDURE FOR SETTING THE AUTOMATIC TUNER LEVERS:

**IMPORTANT**—Read carefully before setting the automatic levers.

There are six levers by means of which six stations may be selected. Make a list of local stations or stations you tune in regularly; any number up to and including six.

Punch out from the set of station call letter tabs supplied, the call letters of the stations you have selected.

On the front of each automatic tuner lever button an opening is provided for inserting the call letter tabs.

Insert the call letter tabs in the rectangular openings of each of the automatic tuner buttons. One of the small celluloid tabs supplied should be inserted into place over each of the station call letter tabs.

## NOW, PROCEED AS FOLLOWS:—

1. Pull the dial tuning knob **all the way out** (See Illus. "B," Fig. 3), and rotate the tuning knob to the **left** (counterclockwise) until it cannot be turned any further (See Illus. "D," Fig. 3). This will unlock the automatic tuner mechanism. **(NOTE:—Automatic tuner mechanism is locked TIGHT when radio is shipped from the factory.)**

2. Press **down all the way** any one of the automatic tuner levers. Holding it down **firmly**, press in on the dial tuning knob No. 3 and tune in the station indicated on the station call letter tab on this lever. You will note that in order to tune the station, the dial tuning knob will have to be **pressed in** (See Illus. "E," Fig. 3). Turn the dial tuning knob very slowly back and forth **(while still holding the automatic tuner lever in downward position)**, noting the width of the shadow on the screen of the cathode-ray tuning indicator. Minimum width on the tuning indicator indicates the ideal tuning position (resonance). The station will then be clearest and accurately tuned in.

3. Press down another automatic tuner lever. Holding it down **firmly**, press in on the dial tuning knob and carefully tune in the station indicated on the call letter tab on this lever.

4. Follow this procedure until you have selected all of your favorite stations.

5. Pull the dial tuning knob **all the way out** (See Illus. "B," Fig. 3) and rotate the tuning knob to the **right** (clockwise) until it cannot be turned any further (See Illus. "C," Fig. 3). This will lock the automatic tuner mechanism and the stations you have set up for automatic tuning will be locked in place. After you have locked the tuner mechanism, push the dial tuning knob in.

6. If you should desire to change any station you selected to another, pull the dial tuning knob all the way **out** and rotate the knob to the left (counterclockwise) and unlock the tuner mechanism. Select the new station as explained. (NOTE:—If the dial mechanism works hard when setting up a new station for one of the automatic tuner levers, it is due to the tuner mechanism not being unlocked all the way. Pull the dial tuning knob out all the way and rotate the knob to the left (counterclockwise) until it will turn no further. The dial mechanism should work freely with the tuner lever pressed down).

7. After you have selected the new station, pull the dial tuning knob all the way **out** and rotate the knob to the **right** (clockwise) to lock the tuner mechanism. Be sure the knob is turned until it will turn no further, then **press** the dial tuning knob **in.**

8. The automatic tuner levers are now set up for quick tuning. Press down the lever key and—YOUR FAVORITE STATION IS SELECTED!

The **important** steps to remember when setting up stations on the tuner levers for automatic tuning are:

1. **To unlock** the tuner mechanism pull the dial tuning knob **all the way out.** You may find it necessary to rotate the knob slightly when pulling it out to make certain that the gears mesh properly. Rotate the dial tuning knob to the left (counterclockwise) as far as it will turn without forcing.

2. **To set a lever,** press down **all the way** and **hold** in this position while tuning in by means of the dial tuning knob the station you want this lever to be tuned to. (NOTE:—you will notice that it will be necessary to keep pressing in on the dial tuning knob while tuning in the station as a spring tends to push the knob out.) Set all the levers in the same manner before locking the mechanism.

3. **To lock** the tuner mechanism pull the dial tuning knob **all the way out.** Rotate the dial tuning knob to the right as far as it will turn making certain that it is tight, but it is not necessary to use force.

4. After locking or unlocking the tuner mechanism always return the dial tuning knob to its normal position **(pushed in).**

TYPICAL TUNING DATA

The procedure for setting the Automatic Levers is the same for all the above mentioned models. However, the number of Automatic Levers may differ.

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Schematic, Socket, Trimmers

MODELS 62-651, 62-652

# MONTGOMERY WARD & CO. Series A, Ser. 8M498700 up

## PARTS (SERIAL No. 8M498700 and UP)

### CONDENSERS

| | | |
|---|---|---|
| C | BE10292C | 2 gang variable condenser |
| C1 | BE10012 | .003 x 600 w. |
| C2 | BE12469 | B. C. Antenna Trimmer |
| C3 | BE129132 | .000125 mica |
| C4 | BE129131 | .002775 mica |
| C5 | BE12469 | S. W. Antenna Trimmer |
| C6 | BE12466 | .00045 Series Pad B. C. |
| C7 | BE12466 | .0015 Series Pad S. W. |
| C8 | BE10020 | .1 x 200 v. |
| C9 | BE12470 | S. W. Oscillator Trimmer |
| C10 | BE12470 | B. C. Oscillator Trimmer |
| C11 | BE12938 | .00005 mica |
| C12 | BE10025 | .002 x 600 v. |
| C13 | BE10020 | .1 x 200 v. |
| C14 | BE10020 | .1 x 200 v. |
| C15 | BE1295 | .0001 mica |
| C16 | BE10020 | .1 x 200 v. |
| C17 | BE11959C | 10 mfd. lytic |
| C18 | BE10068 | .003 x 1400 v. |
| C19 | BE1009 | .05 x 200 v. |
| C20 | BE10012 | .003 x 600 v. |
| C21 | BE10020 | .1 x 200 v. |
| C22 | BE1292 | .0005 mica |
| C23 | BE10076 | .02 x 400 v. |
| C24 | BE10019 | .006 x 600 v. |
| C25 | BE1009 | .05 x 200 v. |
| C26 | BE10031 | .5 x 120 v. |
| C27 | BE10040 | .5 x 120 v. |
| C28 | BE10089 | .008 x 800 v. |
| C29 | BE11959C | .30 mfd. lytic |

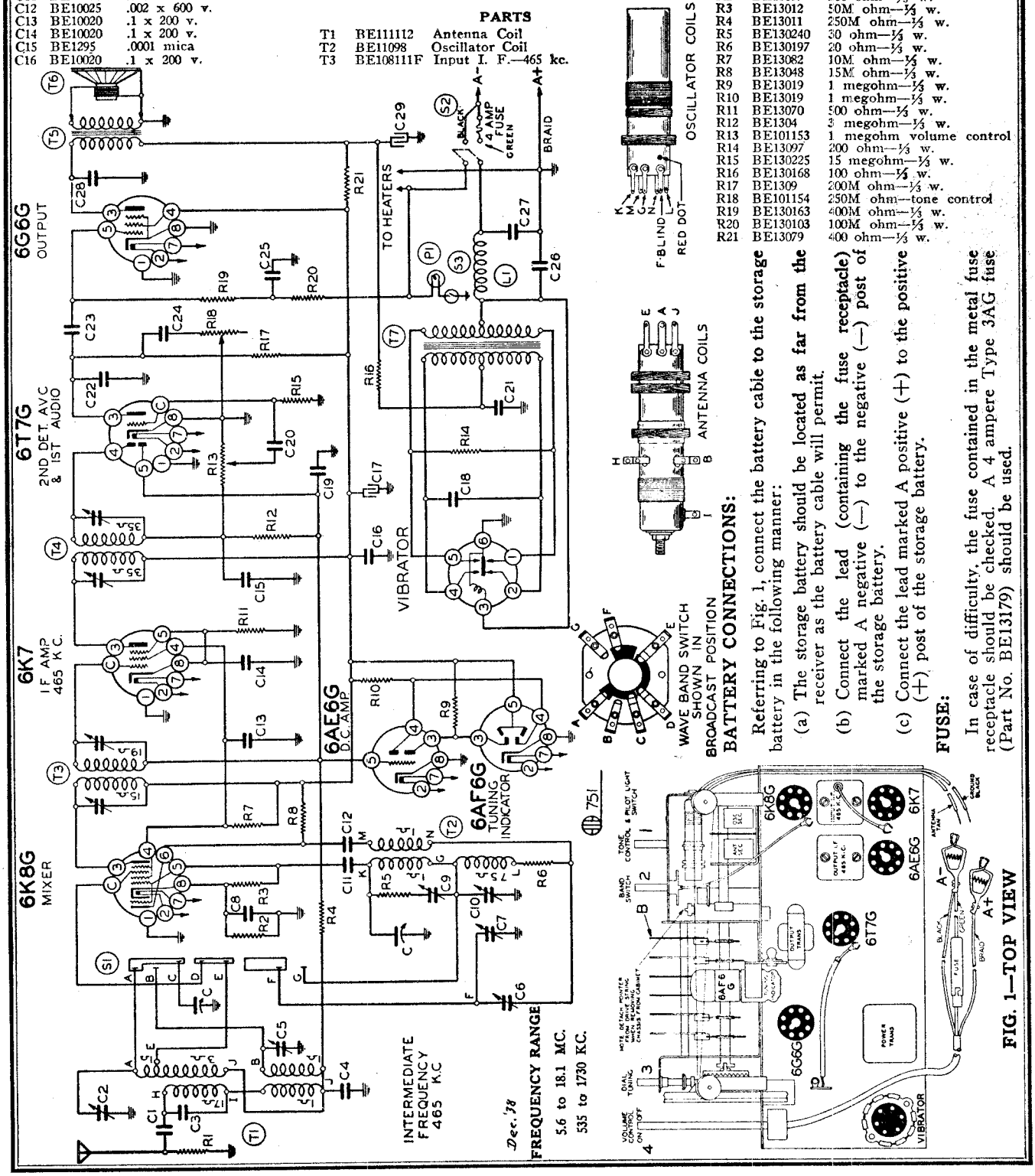
C17 - C29 in same unit

### PARTS

| | | |
|---|---|---|
| T1 | BE111112 | Antenna Coil |
| T2 | BE11098 | Oscillator Coil |
| T3 | BE108111F | Input I. F.—465 kc. |
| T4 | BE108106-O | Output I. F.—465 kc. |
| T5 | BE10569C | Output Transformer |
| T6 | BE114143 | 6 in. P. M. Speaker (62-651) |
| T6 | BE114139 | 8 in. P. M. Speaker (62-652) |
| T7 | BE104137E | Power Transformer |
| L1 | BE10568 | "A" Choke |
| S1 | BE12568 | Band Switch |
| S2 | | Off-on Switch on Volume Control |
| S3 | | Push button pilot light switch on tone control |
| P1 | BE10789 | 6.3 volt pilot light—T40—150 ma. |

### RESISTORS

| | | |
|---|---|---|
| R1 | BE13017 | 10M ohm—½ w. |
| R2 | BE13097 | 200 ohm—⅓ w. |
| R3 | BE13012 | 50M ohm—½ w. |
| R4 | BE13011 | 250M ohm—⅓ w. |
| R5 | BE130240 | 30 ohm—⅓ w. |
| R6 | BE130197 | 20 ohm—⅓ w. |
| R7 | BE13082 | 10M ohm—½ w. |
| R8 | BE13048 | 15M ohm—⅓ w. |
| R9 | BE13019 | 1 megohm—⅓ w. |
| R10 | BE13019 | 1 megohm—⅓ w. |
| R11 | BE13070 | 500 ohm—⅓ w. |
| R12 | BE1304 | 3 megohm—⅓ w. |
| R13 | BE101153 | 1 megohm volume control |
| R14 | BE13097 | 200 ohm—⅓ w. |
| R15 | BE130225 | 15 megohm—⅓ w. |
| R16 | BE130168 | 100 ohm—½ w. |
| R17 | BE1309 | 200M ohm—⅓ w. |
| R18 | BE101154 | 250M ohm—tone control |
| R19 | BE130163 | 400M ohm—⅓ w. |
| R20 | BE130103 | 100M ohm—⅓ w. |
| R21 | BE13079 | 400 ohm—⅓ w. |




## BATTERY CONNECTIONS:

Referring to Fig. 1, connect the battery cable to the storage battery in the following manner:

(a) The storage battery should be located as far from the receiver as the battery cable will permit.

(b) Connect the lead (containing the fuse receptacle) marked A negative (—) to the negative (—) post of the storage battery.

(c) Connect the lead marked A positive (+) to the positive (+) post of the storage battery.

## FUSE:

In case of difficulty, the fuse contained in the metal fuse receptacle should be checked. A 4 ampere Type 3AG fuse (Part No. BE13179) should be used.




FIG. 1—TOP VIEW

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MODELS 62-651,62-652
MODELS 62-654,62-655
62-1654,62-2654,62-2655
Voltage,Alignment,Trimmers

# MONTGOMERY WARD & CO.

MODELS 62-750,62-751
Alignment,Trimmers

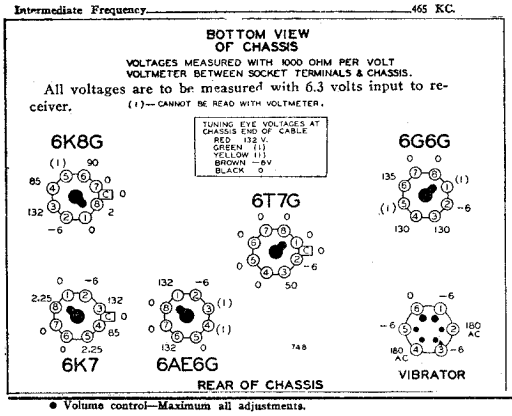
| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6K8G | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1730 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer (C10) (See Fig. 4) | Broadcast oscillator | Adjust to maximum output |
| | 1500 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 1500 Kc. | Trimmer (C2) (See Fig. 4) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer (C6) (See Fig. 4) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 Mc. | Trimmer (C9) (See Fig. 4) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Dial Set at 17 Mc. | Trimmer (C5) (See Fig. 4) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 6 Mc. | Trimmer (C7) (See Fig. 4) | Short Wave Oscillator series pad | Adjust to maximum rock dial. (See note "A") |

**NOTE "A"** Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

Power Consumption ..... 28 Amperes at 6.3 Volts
Power Output ..... .6 Watts Undistorted, 1.1 Watts Maximum
Intermediate Frequency ..... 465 KC.



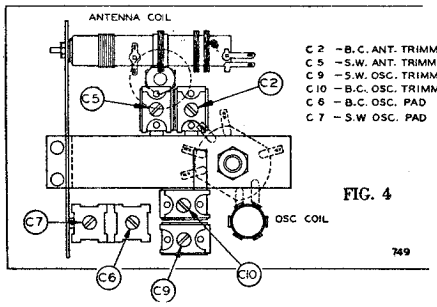




FIG. 4

ALIGNMENT SOCKET VOLTAGE TRIMMERS
MODELS 62-651 62-652 Series A

ALIGNMENT TRIMMERS
MODELS 62-750 62-751

To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 1, top view).

NOTE:—On the side of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1D5G-P 2nd I. F. | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1D5G-P 1st I. F. | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Interstage I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1C7G Mixer | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1730 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer C8 (See Fig. 4) | Broadcast oscillator | Adjust to maximum output |
| | 1500 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 1500 Kc. | Trimmer C2 (See Fig. 4) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer C11 (See Fig. 4) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 Mc. | Trimmer C7 (See Fig. 4) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 Mc. | Trimmer C5 (See Fig. 4) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 6 Mc. | Trimmer C6 (See Fig. 4) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "A") |

**NOTE "A"** Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

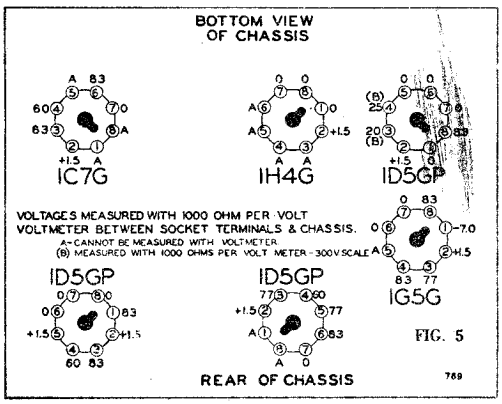



FIG. 5

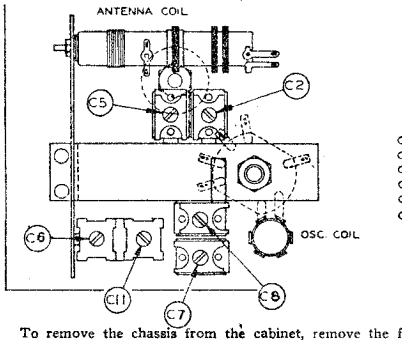



FIG. 4

To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 1, top view).

NOTE:—On the side of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

MODELS 62-654, -655, -1654, -1655, -2654, -2655 Series A

FOR TUNER DATA SEE INDEX

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MODEL 62-653
Schematic, Voltage
Socket, Trimmers

# MONTGOMERY WARD & CO.
# SPECIFICATIONS

Power Consumption - 6.8 Amperes at 6.3 Volts
Power Output - - - - - 3 Watts Undistorted
Sensitivity - - 1.5 Microvolts at .5 Watt Output
(L-D Switch in Distance Position)

Selectivity - 39 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - 540 to 1560 KC
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - - - - 6" Electro-Dynamic

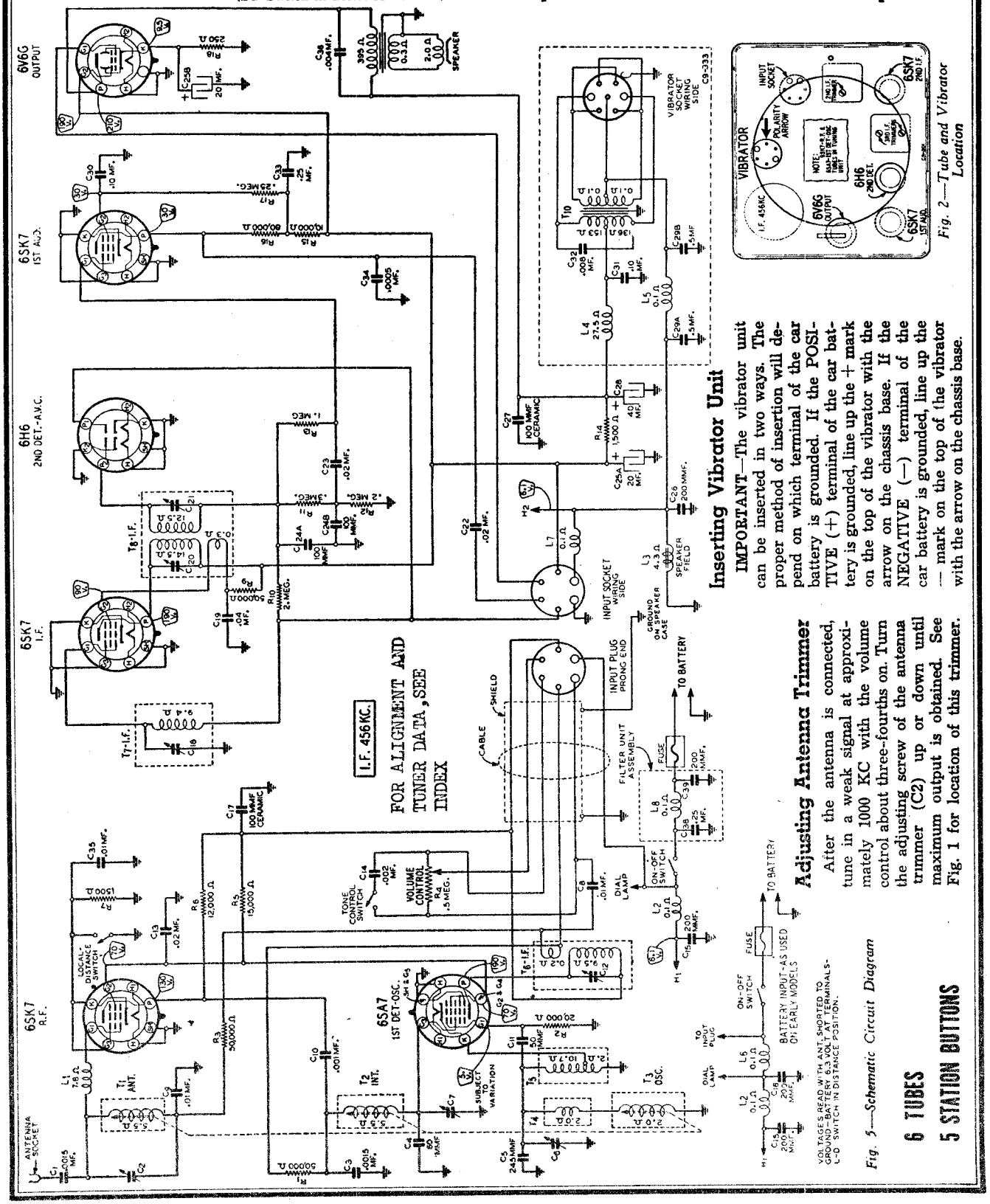


*Fig. 5—Schematic Circuit Diagram*




*Fig. 2—Tube and Vibrator Location*

## Inserting Vibrator Unit

IMPORTANT—The vibrator unit can be inserted in two ways. The proper method of insertion will depend on which terminal of the car battery is grounded. If the POSITIVE (+) terminal of the car battery is grounded, line up the + mark on the top of the vibrator with the arrow on the chassis base. If the NEGATIVE (—) terminal of the car battery is grounded, line up the — mark on the top of the vibrator with the arrow on the chassis base.

## Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1000 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (C2) up or down until maximum output is obtained. See Fig. 1 for location of this trimmer.

**6 TUBES**
**5 STATION BUTTONS**

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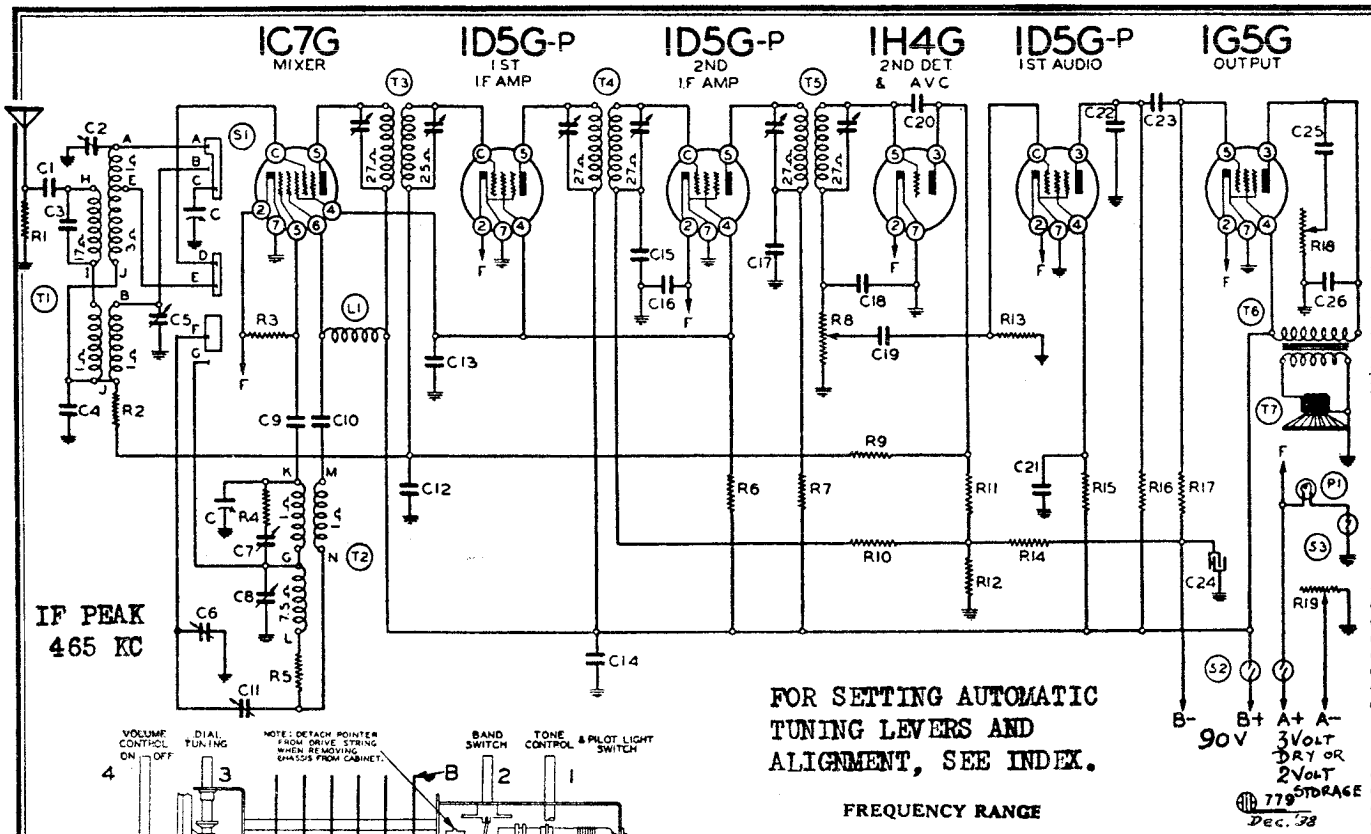
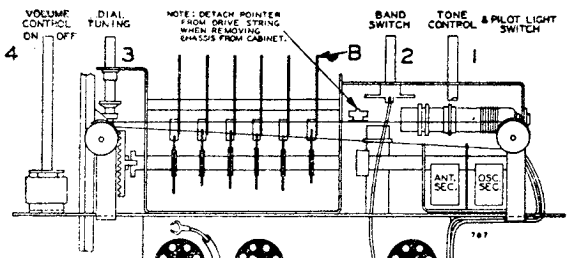
MODELS 62-654,62-655 MONTGOMERY WARD & CO. Schematic, Socket
62-1654,62-1655 Trimmers
62-2654,62-2655
Series A
Ser. 509200 up




FOR SETTING AUTOMATIC TUNING LEVERS AND ALIGNMENT, SEE INDEX.

**FREQUENCY RANGE**

5.6 to 18.1 MC.
535 to 1730 KC.



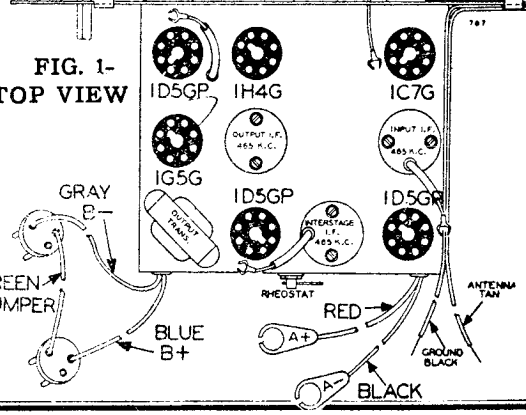
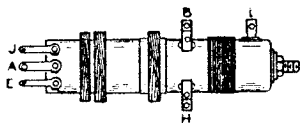
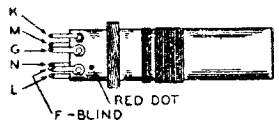



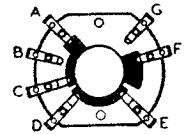

FIG. 1- -TOP VIEW




ANTENNA COILS




OSCILLATOR COILS




WAVE BAND SWITCH SHOWN IN BROADCAST POSITION

**Power Consumption—**

250 Milliwatts Maximum
.179 Milliwatts Undistorted,

**Power Output—**

"A"—480 Ma., "B"—19 Ma.

NOTE:—The letter "P" indicates that the 1D5G Tube used is a Pentode. It is important that only this type 1D5G-P be used in this radio.

## PARTS
## (SERIAL No. 509200 and UP)

### RESISTORS

| | | |
|---|---|---|
| R1 | BE13017 | 10M ohm—⅓ w. |
| R2 | BE1309 | 200M ohm—⅓ w. |
| R3 | BE13012 | 50M ohm—⅓ w. |
| R4 | BE130197 | 20 ohm—⅓ w. |
| R5 | BE130197 | 20 ohm—⅓ w. |
| R6 | BE130265 | 8M ohm—⅓ w. |
| R7 | BE13043 | 2500 ohm—⅓ w. |
| R8 | BE101152 | 250M ohm—volume control |
| R9 | BE13019 | 1 megohm—⅓ w. |
| R10 | BE13019 | 1 megohm—⅓ w. |
| R11 | BE13019 | 1 megohm—⅓ w. |
| R12 | BE13083 | 300 ohm— ⅓ w. |
| R13 | BE130225 | 15 megohm—⅓ w. |
| R14 | BE130168 | 100 ohm—⅓ w. |
| R15 | BE13019 | 1 megohm—⅓ w. |
| R16 | BE1303 | 500M ohm—⅓ w. |
| R17 | BE13019 | 1 megohm—⅓ w. |
| R18 | BE101151 | 1 megohm tone control |
| R19 | BE101112 | 3.2 ohm—rheostat |

### CONDENSERS

| | | |
|---|---|---|
| C | BE10292C | 2 Gang Variable |
| C1 | BE10078 | .01 x 200 v. |
| C2 | BE12469 | B.C. Antenna Trimmer |
| C3 | BE129132 | .000125 mica |
| C4 | BE129131 | .002775 mica |
| C5 | BE12469 | S.W. Antenna Trimmer |
| C6 | BE12466 | S.W. Oscillator Series Pad |
| C7 | BE12470 | S.W. Oscillator Trimmer |
| C8 | BE12470 | B.C. Oscillator Trimmer |
| C9 | BE12939 | .00005 mica |
| C10 | BE10025 | .002 x 600 v. |
| C11 | BE12466 | B.C. Oscillator Series Pad |
| C12 | BE10026 | .02 x 400 v. |
| C13 | BE10048 | .25 x 200 v. |
| C14 | BE10048 | .25 x 200 v. |
| C15 | BE10022 | .05 x 200 v. |
| C16 | BE10048 | .25 x 200 v. |
| C17 | BE10020 | .1 x 200 v. |
| C18 | BE12912 | .00025 mica |
| C19 | BE1007 | .005 x 600 v. |
| C20 | BE12939 | .00005 mica |
| C21 | BE10020 | .1 x 200 v. |
| C22 | BE1295 | .0001 mica |
| C23 | BE10086 | .02 x 400 v. |
| C24 | BE11952 | 25 mfd.-25 w. v. lytic |
| C25 | BE10011 | .01 x 400 v. |
| C26 | BE10071 | .004 x 600 v. |

### PARTS

| | | |
|---|---|---|
| T1 | BE111112 | Antenna Coil |
| T2 | BE11098B | Oscillator Coil |
| T3 | BE108128 | Input I. F.—465 Kc. |
| T4 | BE108127 | Interstage I. F.—465 Kc. |
| T5 | BE10879E | Output I. F.—465 Kc. |
| T6 | BE10569 | Output Transformer |
| T7 | BE114115 | 6" P. M. Speaker (62-654) |
| T7 | BE114146 | 8" P. M. Speaker (62-655) |
| L1 | BE1233 | R. F. Choke |
| S1 | BE12568 | Wave Band Switch |
| S2 | | Off-on switch on volume control |
| S3 | | Push-in switch on tone control |

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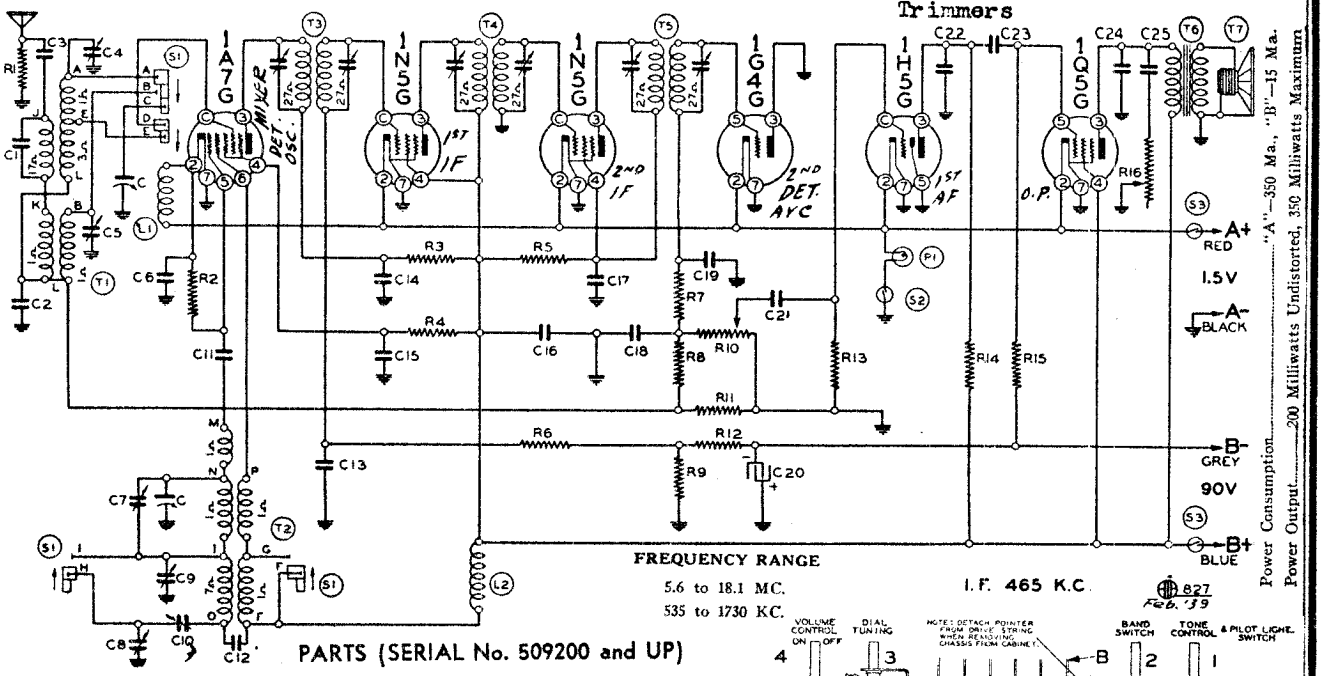
MODELS 62-656,62-1656,62-2656

# MONTGOMERY WARD & CO. Series A,Ser.509200 up Schematic,Voltage,Socket Trimmers




## PARTS (SERIAL No. 509200 and UP)

### RESISTORS

| | | |
|---|---|---|
| R1 | BE13017 | 10M ohm—½ w. |
| R2 | BE130266 | 200M ohm—½ w. |
| R3 | BE13043 | 2500 ohm—½ w. |
| R4 | BE13094 | 50M ohm—½ w. |
| R5 | BE13043 | 2500 ohm—½ w. |
| R6 | BE13019 | 1 megohm—½ w. |
| R7 | BE13094 | 50M ohm—½ w. |
| R8 | BE13038 | 2 megohm—½ w. |
| R9 | BE130166 | 150 ohm—½ w. |
| R10 | BE101152 | 250M ohm—volume control |
| R11 | BE1304 | 3 megohm—½ w. |
| R12 | BE13097 | 200 ohm—½ w. |
| R13 | BE13019 | 1 megohm—½ w. |
| R14 | BE1303 | 500M ohm—½ w. |
| R15 | BE13019 | 1 megohm—½ w. |
| R16 | BE101151 | 1 megohm tone control |

### CONDENSERS

| | | |
|---|---|---|
| C | BE10292C | 2 Gang Variable Condenser |
| C1 | BE129132 | .000125 mica |
| C2 | BE129131 | .002775 |
| C3 | BE10078 | .01 x 200 v. |
| C4 | BE12469 | B.C. Antenna Trimmer |
| C5 | BE12469 | S.W. Antenna Trimmer |
| C6 | BE10048 | .25 x 200 v. |
| C7 | BE12470 | S.W. Oscillator Trimmer |
| C8 | BE12479 | .00136 W.C. S.W. Series Pad |
| C9 | BE12470 | B. C. Oscillator Trimmer |
| C10 | BE12479 | .00049 W.C. B.C. Series Pad |
| C11 | BE12939 | .00005 mica |
| C12 | BE1009 | .05 x 200 v. |
| C13 | BE10022 | .05 x 200 v. |
| C14 | BE10048 | .25 x 200 v. |
| C15 | BE10020 | .1 x 200 v. |
| C16 | BE10048 | .25 x 200 v. |
| C17 | BE10020 | .1 x 200 v. |
| C18 | BE12912 | .00025 mica |
| C19 | BE1295 | .0001 mica |
| C20 | BE11952 | 25 mfd.—25 w.v. lytic |
| C21 | BE1007 | .005 x 600 v. |
| C22 | BE1295 | .0001 mica |
| C23 | BE10026 | .02 x 400 v. |
| C24 | BE10071 | .004 x 600 v. |
| C25 | BE10011 | .01 x 400 v. |

### PARTS

| | | |
|---|---|---|
| T1 | BE111112 | Antenna Coils |
| T2 | BE110108 | Oscillator Coils |
| T3 | BE108128 | Input I.F. Coil—465 kc. |
| T4 | BE108127 | Interstage I.F. Coil—465 kc. |
| T5 | BE108134B | Output I.F. Coil—465 kc. |
| T6 | BE10569 | Output Transformer |
| T7 | BE114115 | 6” Speaker—P.M. |
| T7 | BE114146 | 8” Speaker—P.M. |
| S1 | BE12575 | Wave Band Switch |
| S2 | | Pilot Light Switch on tone control |
| S3 | | Off-On Switch on Volume Control |
| P1 | BE107243 | 1½ v. pilot light |
| L1 | BE10568 | “A” Choke |
| L2 | BE1233 | R.F. “B” Choke |

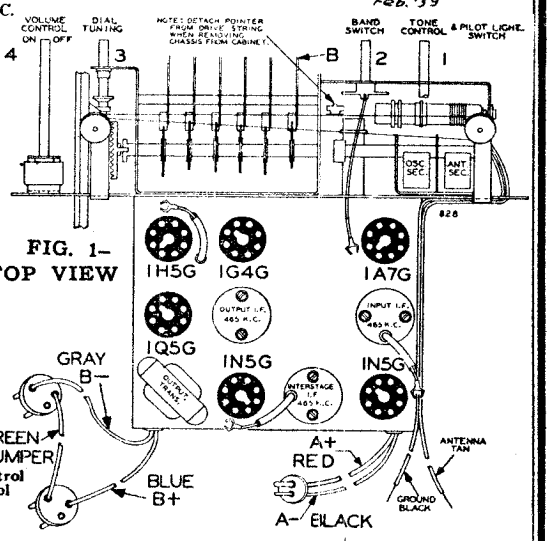
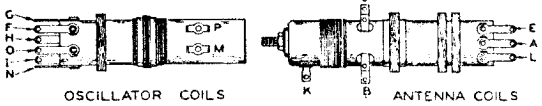
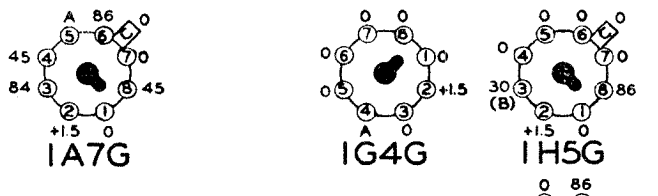



FIG. 1—TOP VIEW

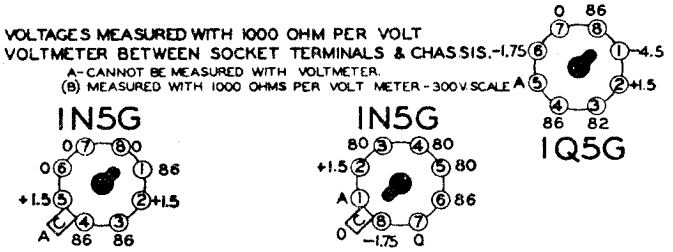



FOR SETTING AUTOMATIC TUNING LEVERS SEE INDEX

## BOTTOM VIEW OF CHASSIS

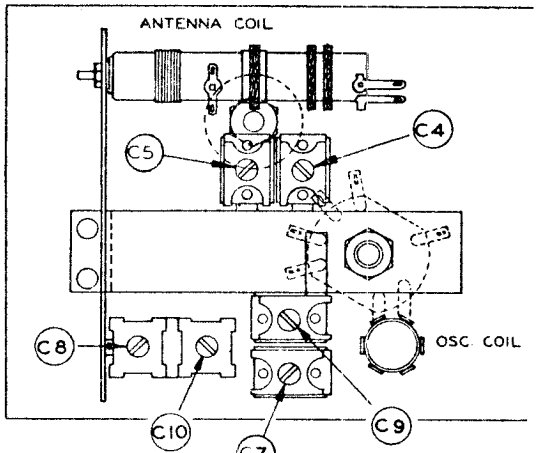



VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.
A—CANNOT BE MEASURED WITH VOLTMETER.
(B) MEASURED WITH 1000 OHMS PER VOLT METER—300 V. SCALE




REAR OF CHASSIS

829




C4 —B.C. ANT. TRIMMER
C5 —S.W. ANT. TRIMMER
C7 —S.W. OSC. TRIMMER
C9 —B.C. OSC. TRIMMER
C10 —B.C. OSC. PAD
C8 —S.W. OSC. PAD

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# MODELS 62-656, 62-1656, 62-2656
# MODELS 93BR454A, 93BR1455A MONTGOMERY WARD & CO.
# MODEL 93BR713A
# Alignment

## MODELS 62-656, 62-1656, 62-2656
### Series A

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

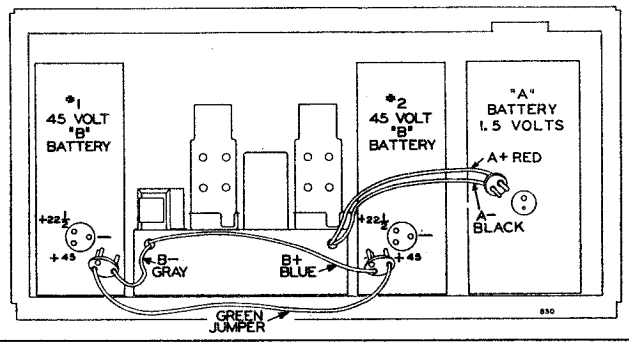
The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., and 200 mmf. and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1N5G 2nd I. F. | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1N5G 1st I. F. | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Interstage I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1A7G Mixer | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set dial at 17 Mc. | Trimmer C7 (See Fig. 4) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set dial at 17 Mc. | Trimmer C5 (See Fig. 4) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set dial at 6 Mc. | Trimmer C8 (See Fig. 4) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| BROAD-CAST BAND | 1730 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer C9 (See Fig. 4) | Broadcast oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set dial at 1400 Kc. | Trimmer C6 (See Fig. 4) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set dial at 600 Kc. | Trimmer C10 (See Fig. 4) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |

| BAND SWITCH | BAND | FREQUENCY RANGE |
|---|---|---|
| Extreme Right Rotation | Short Wave | 5.6 to 18.1 MC. |
| Extreme Left Rotation | Broadcast | 535 to 1730 KC. |

Power Consumption......"A"—350 Ma., "B"—15 Ma.
Power Output.....200 Milliwatts Undistorted, 350 Milliwatts Maximum
Intermediate Frequency.....465 K.C.




NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

#### Connecting A Battery

First—Place the A Battery in the cabinet as shown.
NEXT—Insert the special two-prong connector plug into the socket on the A batteries as shown in illustration.

#### Connecting B Batteries

First—Place both B Batteries in the cabinet exactly as shown.
NEXT—Insert the special three-prong connector plugs into the sockets on the B batttries as shown in illustration.

NOTE: The above procedure and illustration pertains to the new style B batteries which have sockets; however, the old style B batteries which have terminals can be used by connecting them as follows.

FIRST—Remove the special plugs by cutting the wires off at the plugs.

NEXT—Connect gray colored B minus (—) wire to minus (—) terminal of battery on left side of receiver (marked Battery No. 1 in illustration).

NEXT—Connect one end of green connecting wire to plus (+45) terminal of battery No. 1 and other end to the minus (—) terminal of Battery No. 2.

NOW—Connect blue B plus (+) wire to the plus (+45) terminal of Battery No. 2.

## MODELS 93BR-454A & 93BR-1455A

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1A7G Tube | Rotor full open (Plates out of mesh) | Four trimmers on top (See Fig. 1) | Output and input I. F. | (See Note "A") Adjust to maximum output |
| BROAD-CAST BAND | 1650 Kc. | 200 mmf. | Grid of 1A7G Tube | Rotor full open (Plates out of mesh) | Trimmer (C3) front section of gang (See Fig. 4) | Oscillator | (See Note "A") Adjust to maximum output |
| | 1400 Kc. | | See Note "C" | Set dial at 1400 Kc. | Trimmer (C2) rear section of gang (See Fig. 4) | Antenna | (See Note "B") Adjust to maximum output |

NOTE "A" — A 1 megohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer, (C3). The loop antenna must be disconnected from the chassis.

NOTE "B" — Remove the 1 megohm resistor from the loop antenna leads; mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust trimmer (C2). (See note "C")

NOTE "C" — Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

FREQUENCY RANGE
545 to 1650 KC.

Power Output.....200 Milliwatts Undistorted, 300 Milliwatts Maximum
Intermediate Frequency.....465 KC.

## CHASSIS No. 93BR713A

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6SK7 | Broadcast | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6SA7 | Broadcast | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1730 Kc. | 200 mmf. | Antenna lead | Broadcast | Rotor full open (Plates out of mesh) | Trimmer (C13) (See Fig. 4) | Broadcast oscillator | Adjust to maximum output |
| | 1500 Kc. | 200 mmf. | Antenna lead | Broadcast | Set Dial at 1500 Kc. | Trimmer (C7) (See Fig. 3) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast | Set Dial at 600 Kc. | Trimmer (C10) (See Fig. 3) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| | 465 Kc. | 200 mmf. | Antenna lead | Broadcast | Set Dial at 600 Kc. | Trimmer (C1) (See Fig. 4) | I. F. Wave Trap | Adjust for minimum output |
| IMAGE ADJUSTMENT | 2430 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Pick up signal at 1500 Kc. on dial | Trimmer (C6) (See Figs. 1 and 4) | Image rejection | Adjust for minimum output (See note "B") |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave | Set Dial at 17 Mc. | Trimmer (C12) (See Fig. 4) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave | Dial Set at 17 Mc. | Trimmer (C8) (See Fig. 3) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave | Set Dial at 6 Mc. | Trimmer (C11) (See Fig. 3) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "A") |

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

NOTE "B" 1500 KC. is the image frequency of 2430 KC. Adjust Trimmer (C6) until a minimum output is obtained. Trimmer (C6) is mounted on the bottom of the chassis.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

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Schematic, Voltage
Socket, Trimmers

# MONTGOMERY WARD & CO.

MODELS 62-702, 62-703
Series A, Issue B
Ser. 8H262200 up

| BAND SWITCH | BAND | FREQUENCY RANGE |
|---|---|---|
| Extreme Right Rotation | Short Wave | 5.65 to 18.3 MC. |
| Extreme Left Rotation | Broadcast | 535 to 1720 KC. |

Power Consumption ..... 45 Watts (At 115 volts 50-60 cycles)
Power Output ..... 1.6 Watts Undistorted, 3 Watts Maximum
Selectivity ..... 58 KC. Broad at 1000 KC. 1000 Times Signal Strength
Intermediate Frequency ..... 465 KC.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 110, 130, and 230 volts.

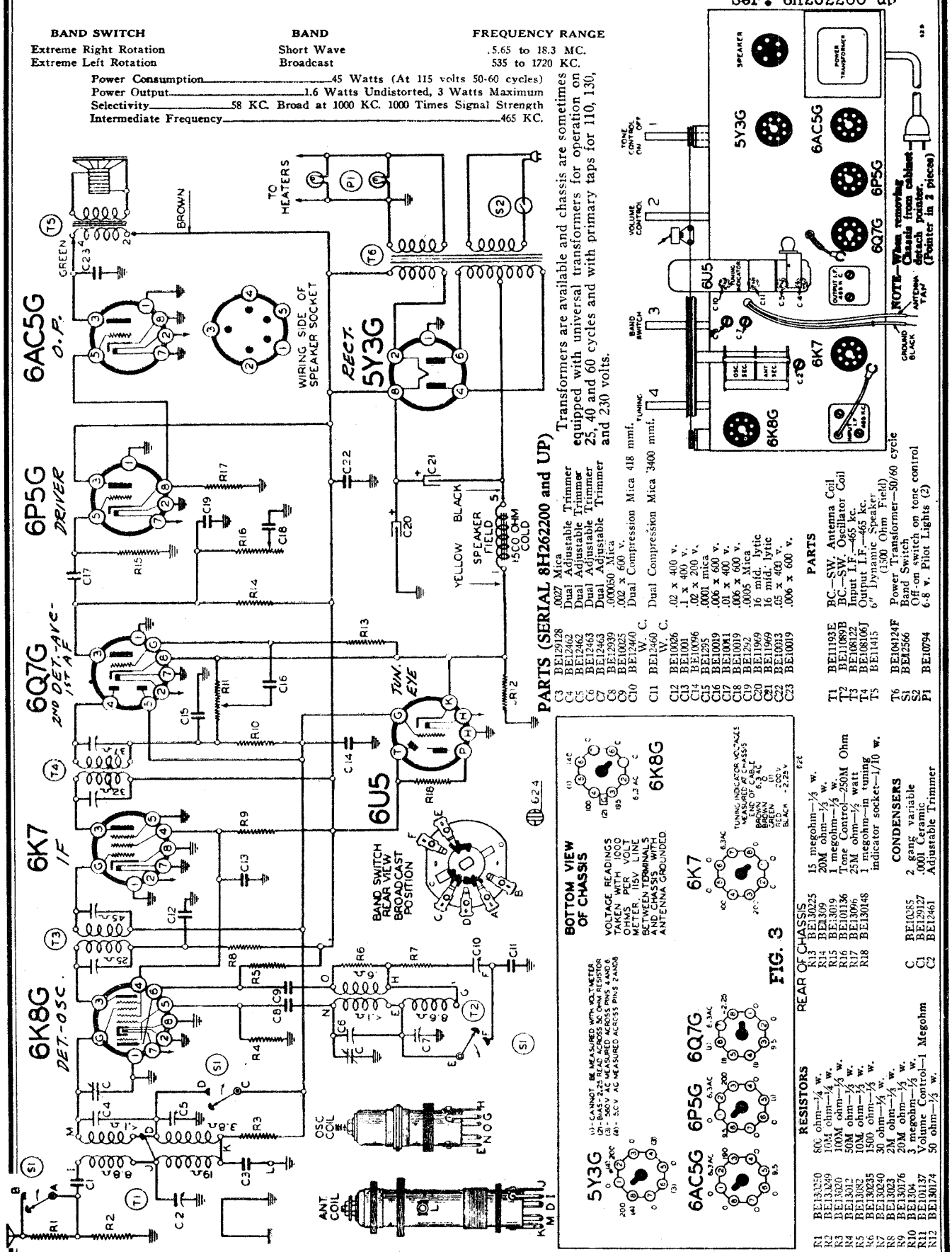


FIG. 3

## PARTS (SERIAL 8H262200 and UP)

| | | | |
|---|---|---|---|
| C3 | BE129128 | .0027 Mica | |
| C4 | BE12462 | Dual Adjustable Trimmer | |
| C5 | BE12462 | Dual Adjustable Trimmer | |
| C6 | BE12463 | Dual Adjustable Trimmer | |
| C7 | BE12463 | Dual Adjustable Trimmer | |
| C8 | BE12939 | .000050 Mica | |
| C9 | BE10025 | .002 x 600 v. | |
| C10 | BE12460 | Dual Compression Mica 418 mmf. | |
| | W. C. | | |
| C11 | BE12460 | Dual Compression Mica 3400 mmf. | |
| | W. C. | | |
| C12 | BE10026 | .02 x 400 v. | |
| C13 | BE1001 | .1 x 400 v. | |
| C14 | BE10096 | .02 x 200 v. | |
| C15 | BE1295 | .0001 mica | |
| C16 | BE10019 | .006 x 600 v. | |
| C17 | BE10001 | .01 x 400 v. | |
| C18 | BE10019 | .006 x 600 v. | |
| C19 | BE1292 | .0005 Mica | |
| C20 | BE11969 | 16 mid. lytic | |
| C21 | BE11969 | 16 mid. lytic | |
| C22 | BE10033 | .05 x 400 v. | |
| C23 | BE10019 | .006 x 600 v. | |

### PARTS

| | | |
|---|---|---|
| T1 | BE11193E | BC—SW, Antenna Coil |
| T2 | BE11089B | BC—SW, Oscillator Coil |
| T3 | BE108122 | Input I.F.—465 kc. |
| T4 | BE108106J | Output I.F.—465 kc. |
| T5 | BE11415 | 6" Dynamic Speaker (1500 Ohm Field) |
| T6 | BE104124F | Power Transformer—50/60 cycle |
| S1 | BE12566 | Band Switch |
| S2 | | Off-on switch on tone control |
| P1 | BE10794 | 6.8 v. Pilot Lights (2) |

### RESISTORS

| | | |
|---|---|---|
| R1 | BE130250 | 800 ohm—¼ w. |
| R2 | BE130249 | 10M ohm—¼ w. |
| R3 | BE13020 | 100M ohm—⅓ w. |
| R4 | BE13012 | 50M ohm—⅓ w. |
| R5 | BE13082 | 10M ohm—⅓ w. |
| R6 | BE130235 | 1500 ohm—⅓ w. |
| R7 | BE130240 | 30 ohm—¼ w. |
| R8 | BE13023 | 2M ohm—¼ w. |
| R9 | BE130176 | 20M ohm—⅓ w. |
| R10 | BE1304 | 3 megohm—⅓ w. |
| R11 | BE10137 | Volume Control—1 Megohm |
| R12 | BE130174 | 50 ohm—⅓ w. |
| R13 | BE130225 | 15 megohm—⅓ w. |
| R14 | BE1309 | 20M ohm—⅓ w. |
| R15 | BE13019 | 1 megohm—⅓ w. |
| R16 | BE110136 | Tone Control—250M Ohm |
| R17 | BE13096 | 25M ohm—½ watt |
| R18 | BE130148 | 1 megohm—in tuning indicator socket—1/10 w. |

### CONDENSERS

| | | |
|---|---|---|
| C | BE10355 | 2 gang variable |
| C1 | BE129127 | .0001 Ceramic |
| C2 | BE12461 | Adjustable Trimmer |

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MODELS 62-702, 62-703
Series A, Issue B
Alignment

# MONTGOMERY WARD & CO.

MODEL 62-901
Alignment, Trimmers
Dial Data, Phono.

MODELS 62-702, 62-703 Series A Issue B

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6K8 | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Set Dial at 17 MC | Trimmer (C 6) Top of Chassis (See Fig. 1) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave (Extreme right rotation) | Dial Set at 17 MC | Trimmer (C 4) (See Fig. 1) | Short Wave antenna | Adjust to maximum output |
| BROAD-CAST BAND | 1720 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Rotor full open (Plates out of mesh) | Trimmer (C 7) (See Fig. 1) | Broadcast oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 1400 Kc. | Trimmer (C 9) (See Fig. 1) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Set Dial at 600 Kc. | Trimmer (C 10) (See Fig. 1) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| IMAGE REJECTION ADJUST-MENTS | 2330 Kc. | 200 mmf. | Antenna lead | Broadcast (Extreme left rotation) | Pick up signal at 1400 kc. on dial | Trimmer (C2) (See Fig. 1) | Image rejection | Adjust for minimum output. (See note "B") |

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

NOTE "B" 1400KC is the image frequency of 2330KC. Adjust Trimmer (C2) until a minimum output is obtained.

NOTE "C" Trimmer (C11) is preadjusted at factory and should not be tampered with.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

MONTGOMERY WARD MODEL 62-901

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| I. F. 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15) |
| WAVE TRAP 456 KC | Antenna Lead | 200 mmf. | B Range | 600 KC | Wave Trap (C5) Adjust for MINIMUM Output |
| RANGE B 1730 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C11) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | Ant. Range B (C3) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C9) Rock Rotor—See Note B |
| RANGE D 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C8) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C1) Rock Rotor—See Note B |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

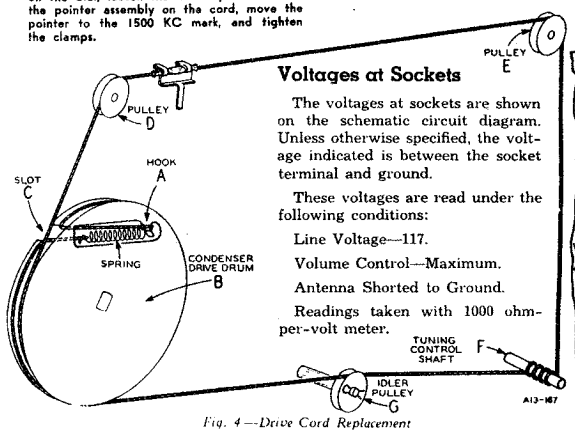


Fig. 4—Drive Cord Replacement

### Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:

Line Voltage—117.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter.

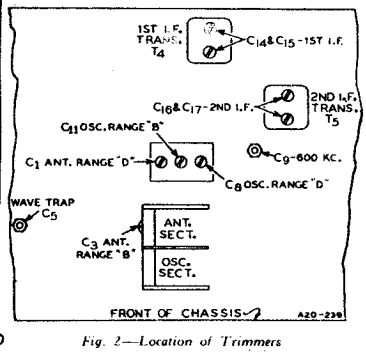


Fig. 2—Location of Trimmers

### Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Slide a 1¾ inch length of fabric tubing on the cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 48½ inches.

Arrange to keep the gang condenser in the completely closed position.

Place the looped end of the drive cord over hook A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E as shown. See that the fabric tubing is now between pulleys D and E. Continue cord down to shaft F and wind 2¼ turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.

**DIAL POINTER ATTACHMEN**—Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. Clamp pointer tightly over the fabric tubing on the cord—See Fig. 4.

### Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram—Fig. 3. On the back panel of the chassis base is a round knock-out 1-9/64 inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (See parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

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MONTGOMERY WARD & CO. MODELS 62-704 to 62-712 inc.
Schematic, Voltage

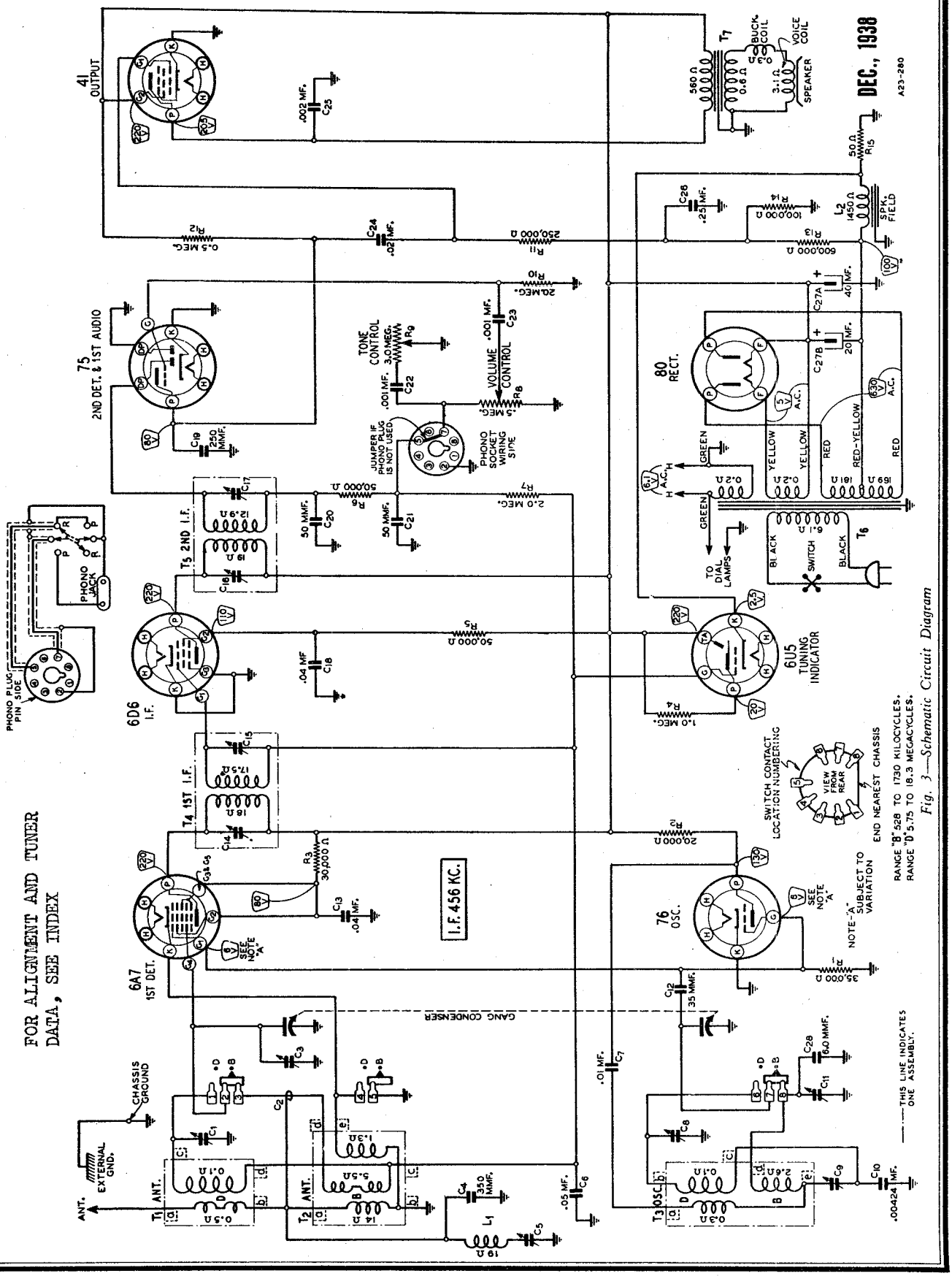


*Fig. 3—Schematic Circuit Diagram*

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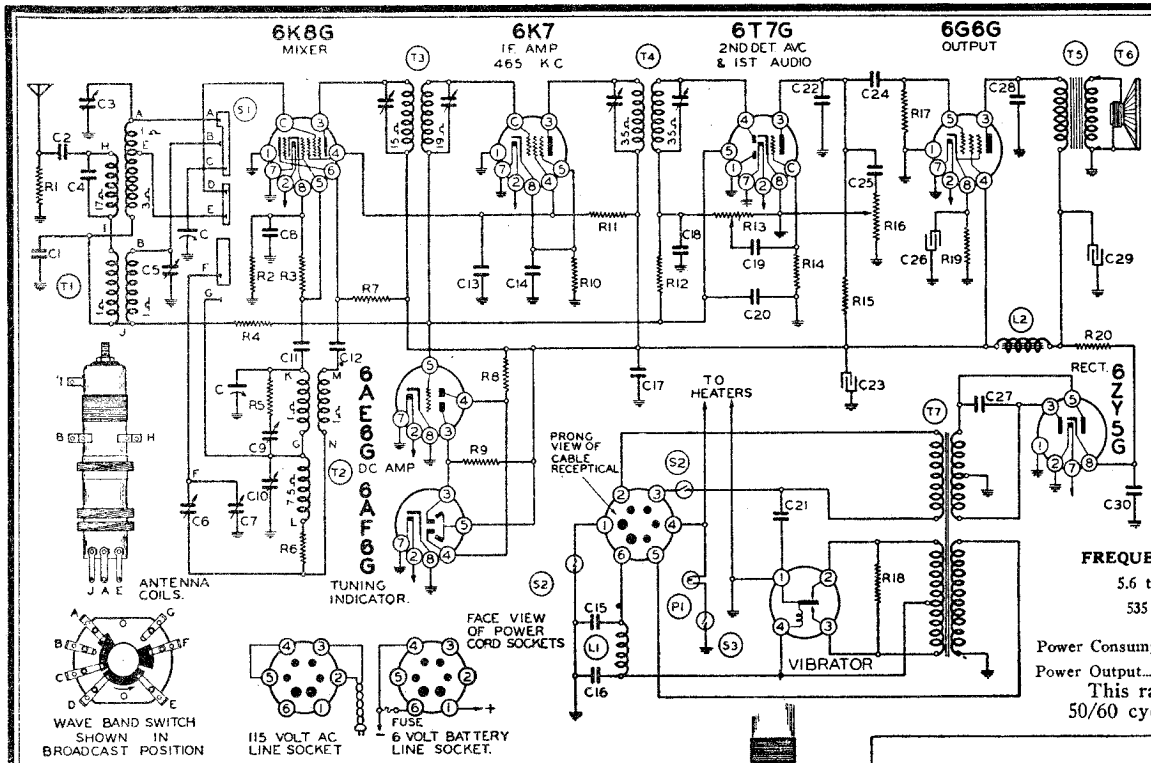
**MODELS 62-750,62-751**
**Series A,Ser.8M499800 up**
**Schematic,Voltage**
**Socket,Trimmers**



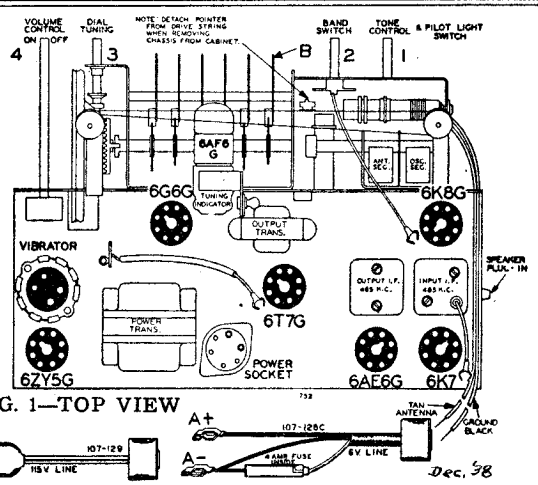




FIG. 1—TOP VIEW

FOR TRIMMERS, ALIGNMENT PROCEDURE, AND SETTING AUTOMATIC TUNING LEVERS, SEE INDEX.

**FREQUENCY RANGE**
5.6 to 18.1 MC.
535 to 1730 KC.

Power Consumption.....40 Watts (At 115 volts 50-60 cycles), or 3.3 amperes at 6.3 volts
Power Output.....6 Watts Undistorted, 1 Watt Maximum
This radio is designed to operate from either 105-125 volts 50/60 cycle A.C. supply or a 6 volt storage battery.

## PARTS (SERIAL No. 8M499800 and UP)

| | | |
|---|---|---|
| R1 | BE13017 | 10M ohm—⅓ w. |
| R2 | BE13097 | 200 ohms—⅓ w. |
| R3 | BE13094 | 50M ohm—⅓ w. |
| R4 | BE13011 | 250M ohm—⅓ w. |
| R5 | BE130240 | 30 ohms—⅓ w. |
| R6 | BE130197 | 20 ohms—⅓ w. |
| R7 | BE13048 | 15M ohm—⅓ w. |
| R8 | BE13068 | 1 megohm—⅓ w. |
| R9 | BE13068 | 1 megohm—⅓ w |
| R10 | BE13079 | 400 ohms—⅓ w |
| R11 | BE13082 | 10M ohms—⅓ w |
| R12 | BE1304 | 3 megohm—⅓ w. |
| R13 | BE101153 | 1 megohm volume control |
| R14 | BE130225 | 15 megohm—⅓ w |
| R15 | BE13011 | 250M ohm—⅓ w. |
| R16 | BE101154 | 250M ohm tone control |
| R17 | BE1303 | 500M ohm—⅓ w. |
| R18 | BE13097 | 200 ohms—⅓ w. |
| R19 | BE13093 | 450 ohms—⅓ w. |
| R20 | BE130168 | 100 ohms—⅓ w. |

### CONDENSERS

| | | |
|---|---|---|
| C | BE10292C | 2 gang variable condenser |
| C1 | BE129131 | .002775 mica |
| C2 | BE10012 | .003 x 600 v. |
| C3 | BE12469 | BC Antenna Trimmer |
| C4 | BE129132 | .000125 mica |
| C5 | BE12469 | S. W. Antenna Trimmer |
| C6 | BE12466 | B. C. Series Pad |
| C7 | BE12466 | S. W. Series Pad |
| C8 | BE10020 | .1 x 200 v. |
| C9 | BE12470 | S. W. Oscillator Trimmer |
| C10 | BE12470 | B. C. Oscillator Trimmer |
| C11 | BE12938 | .00005 mica |
| C12 | BE10025 | .002 x 600 v. |
| C13 | BE10020 | .1 x 200 v. |
| C14 | BE10020 | .1 x 200 v. |
| C15 | BE10040 | .5 x 120 v. |
| C16 | BE10040 | .5 x 120 v. |
| C17 | BE10020 | .1 x 200 v. |
| C18 | BE12960 | .00015 mica |
| C19 | BE10019 | .006 x 600 v. |
| C20 | BE10019 | .006 x 600 v. |
| C21 | BE10011 | .01 x 400 v. |
| C22 | BE1292 | .0005 mica |
| C23 | BE11979B | 16 mfd. lytic—200 w. v. |
| C24 | BE10026 | .02 x 400 v. |
| C25 | BE10019 | .006 x 600 v. |
| C26 | BE11979B | 20 mfd.—25 w. v. lytic |
| C27 | BE10073 | .008 x 1200 v. |
| C28 | BE10019 | .006 x 600 v. |
| C29 | BE11979B | 16 mfd. lytic—200 w. v. |
| C30 | BE10020 | .1 x 200 v. |

C23, C26 and C29 in same unit

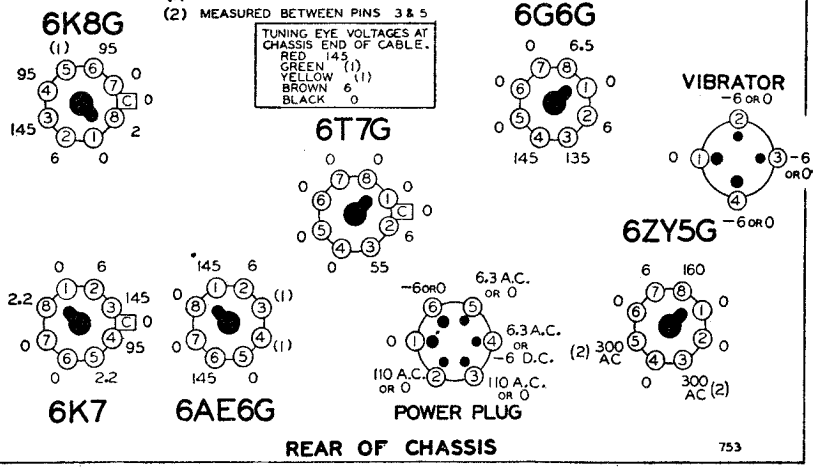
| | | |
|---|---|---|
| T1 | BE111112 | Antenna Coil |
| T2 | BE11098 | Oscillator Coil |
| T3 | BE108111F | Input I. F.—465 kc. |
| T4 | BE108106 | "O" Output I. F.—465 kc. |
| T5 | BE10569C | Output Transformer |
| T6 | BE114143 | 6 in. P. M. speaker—62-750 |
| T6 | BE114139 | 8 in. P. M. speaker—62-751 |
| T7 | BE104114C | Power Transfomer |
| L1 | BE10568 | "A" Choke |
| L2 | BE10530H | "B" Choke |
| S1 | BE12568 | Wave Band Switch |
| S2 | | L.P.S.T. Switch on volume control |
| S3 | | Push in switch on tone control |
| P1 | BE10789 | 6.3 volt pilot light T40—150 ma. |

## BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS & CHASSIS.

(1) CANNOT BE READ WITH VOLTMETER.
(2) MEASURED BETWEEN PINS 3 & 5

TUNING EYE VOLTAGES AT CHASSIS END OF CABLE.
RED 145
GREEN (1)
YELLOW (1)
BROWN 6
BLACK 0

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# MONTGOMERY WARD & CO.

MODELS 62-752,62-753
Schematic,Voltage
Socket,Trimmers,Notes

Power Consumption - 1.45 Amperes at 32 Volts DC
Power Output - - - - - - - .17 Watts Undistorted, .40 Watts Maximum
Selectivity - - 30 KC Broad at 1000 times Signal
Sensitivity (For .05 watt output)
B Range .....6.0 Microvolts Average
D Range .....6.0 Microvolts Average
Intermediate Frequency - - - - - - - 456 KC
Speaker - - - - - 6" or 8" Electro-Dynamic
Tuning Frequency Range
B Range ..... 528 to 1730 KC (Kilocycles)
D Range ..... 5750 to 18300 KC (Kilocycles)

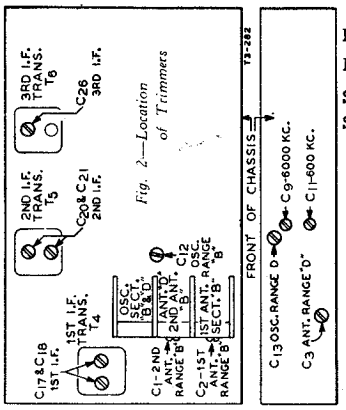



Fig. 2—Location of Trimmers

## Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the line voltage varies, a variable resistor may be required.

## Starting Current

When first turned on for a few seconds the drain is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant.

## Polarity of Power Supply

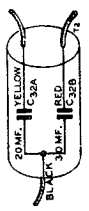
There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

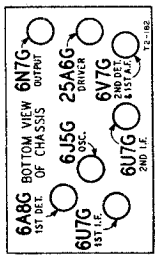
## Caution

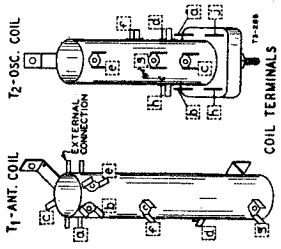
**If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.**

**Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 dial lamps.**

# 32 Volt Power Supply



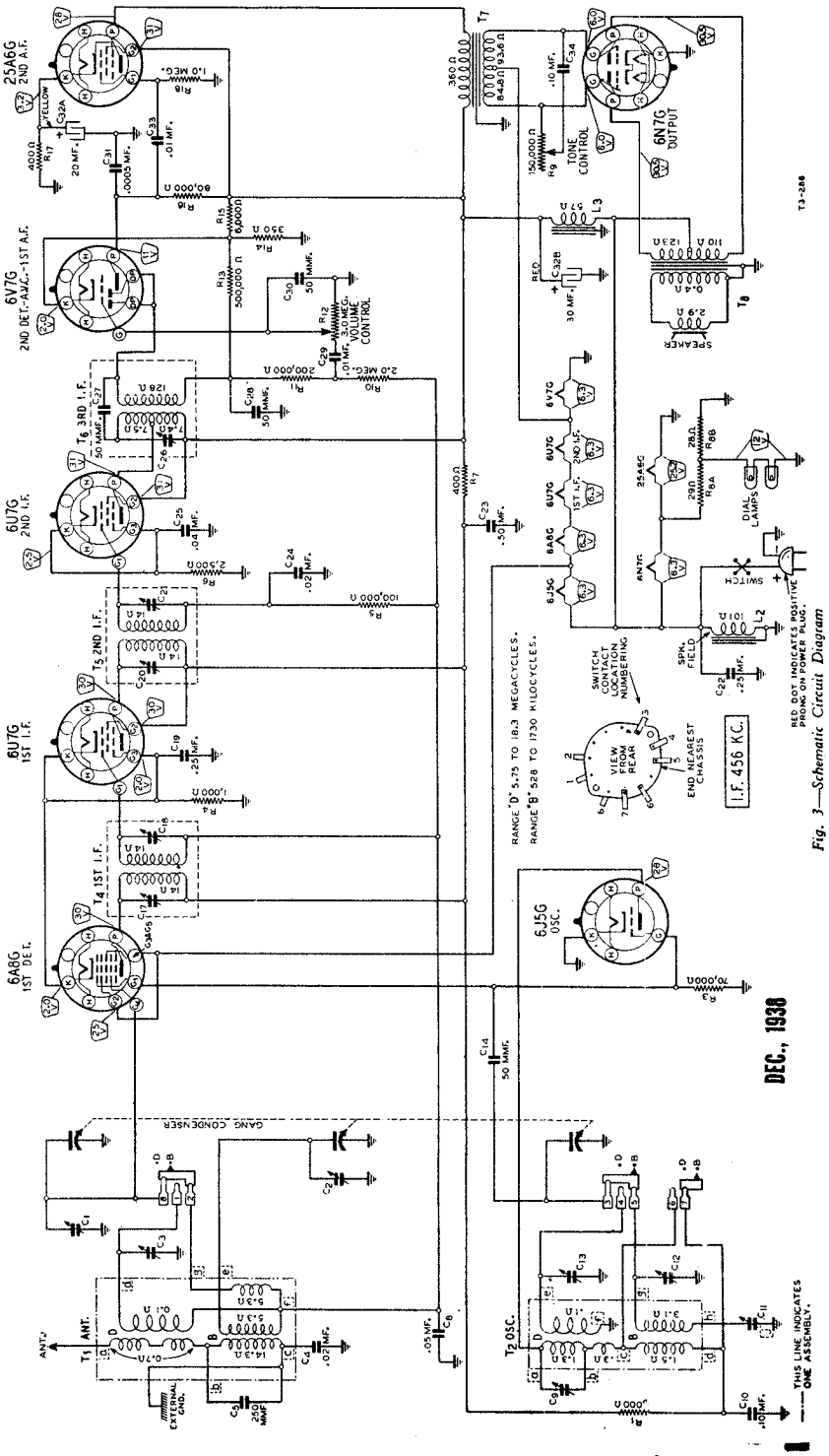




Fig. 3—Schematic Circuit Diagram

DEC., 1938

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MODELS 62-752 and 62-753

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
|---|---|---|---|---|---|
| I. F. | | | | | 1st I.F. (C17) & (C18) 2nd I.F. (C20) & (C21) 3rd I.F. (C26) |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | |
| RANGE B | | | | | |
| 1730 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C12) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | 1st Ant. Range B (C2) 2nd Ant. Range B (C1) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C11) Rock Rotor—See Note B |
| RANGE D | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C13) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C3) Rock Rotor—See Note B |
| 6000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | 6000 KC (C9) Rock Rotor—See Note B |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTE A—If the pointer is not at 1500 KC on the dial, hold the drive cord and move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

**Dial Pointer Attachment**—Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale.

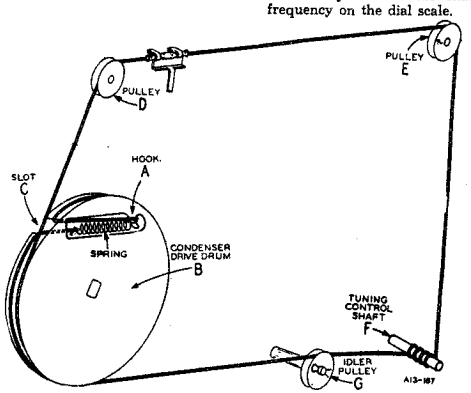


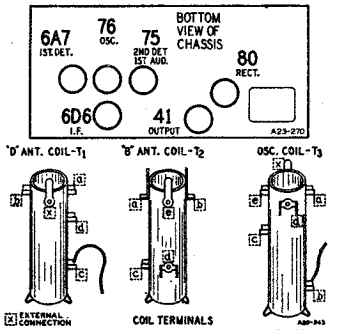

*Fig. 4—Drive Cord Replacement*

### Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 49¾ inches.

Arrange to keep the gang condenser in the completely closed position.

Place the looped end of the drive cord over hook A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E as shown. Continue cord down to shaft F and wind 4 turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.




MODELS 62-704 to 62-712

Tuning Frequency Range

B Range..... 528 to 1730 KC (Kilocycles)
D Range..... 5750 to 18300 KC (Kilocycles)

Sensitivity (For 0.5 watt output)

B Range..... 30 Microvolts Average
D Range..... 50 Microvolts Average

Power Consumption - - 60 Watts (At 117 volts 60 cycles)

Power Output - - - - - - 1.5 Watts Undistorted 3.0 Watts Maximum

Selectivity - - 45 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - 6", 8" or 10" Dynamic

FOR DRIVE CORD REPLACEMENT AND RACK AND PANEL ASSEMBLY SEE MODEL 62--005

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER OR DIAL SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| I. F. | | | | | 2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15) |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | |
| WAVE TRAP | | | | | Wave Trap (C5) |
| 456 KC | Antenna Lead | 200 mmf. | B Range | 600 KC | Adjust for MINIMUM Output |
| RANGE B | | | | Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A.. | |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor until dial pointer is at 1500 KC | Oscillator Range B (C11) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Leave Rotor at above setting | Ant. Range B (C3) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C9) Rock Rotor—See Note B |
| RANGE D | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C8) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C1) Rock Rotor—See Note B |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

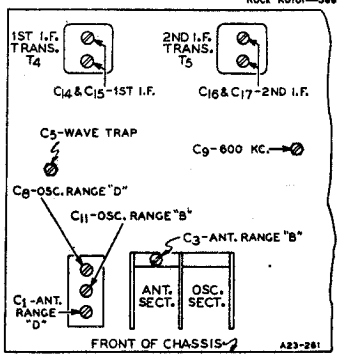

1ST I.F. TRANS. T4
2ND I.F. TRANS. T5
C14 & C15 - 1ST I.F.
C16 & C17 - 2ND I.F.
C5 - WAVE TRAP
C9 - 600 KC.
C8 - OSC. RANGE "D"
C11 - OSC. RANGE "B"
C3 - ANT. RANGE "B"
C1 - ANT. RANGE "D"
ANT. SECT.
OSC. SECT.
FRONT OF CHASSIS
A23-261

*Fig. 2—Location of Trimmers*

MODEL 62-901, Issues A, B

# MONTGOMERY WARD & CO. Schematic, Voltage Socket, Changes

## SPECIFICATIONS

Power Consumption - - 60 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - - 3.0 Watts Undistorted
4.0 Watts Maximum

Selectivity - - 40 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - - - - 10" Dynamic

Tuning Frequency Range

B Range..... 528 to 1730 KC (Kilocycles)

D Range.....5750 to 18300 KC (Kilocycles)

Sensitivity (For 0.5 watt output)

B Range.....25 Microvolts Average

D Range.....40 Microvolts Average

### "B" Issue Models

The issue letter is the last letter of the chassis number on the chassis number label.

In "B" issue models, the screen grid circuits of the 1st Detector and I.F. tubes are supplied through separate resistors as shown in the schematic.

If distortion is encountered at high signal levels in the "A" issue models, change the screen grid circuits of the 1st Detector and I.F. tubes according to the schematic.

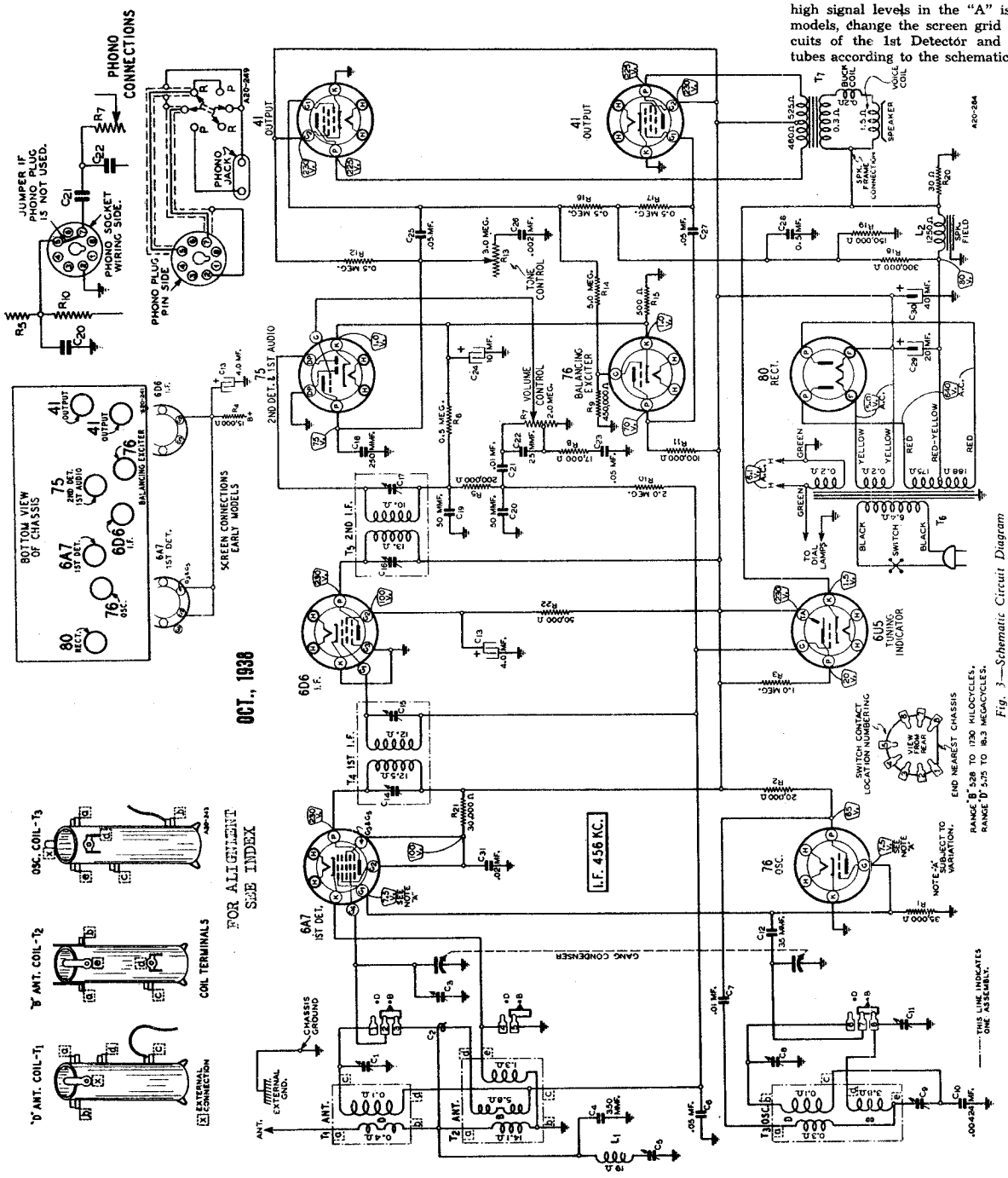



*Fig. 3—Schematic Circuit Diagram*

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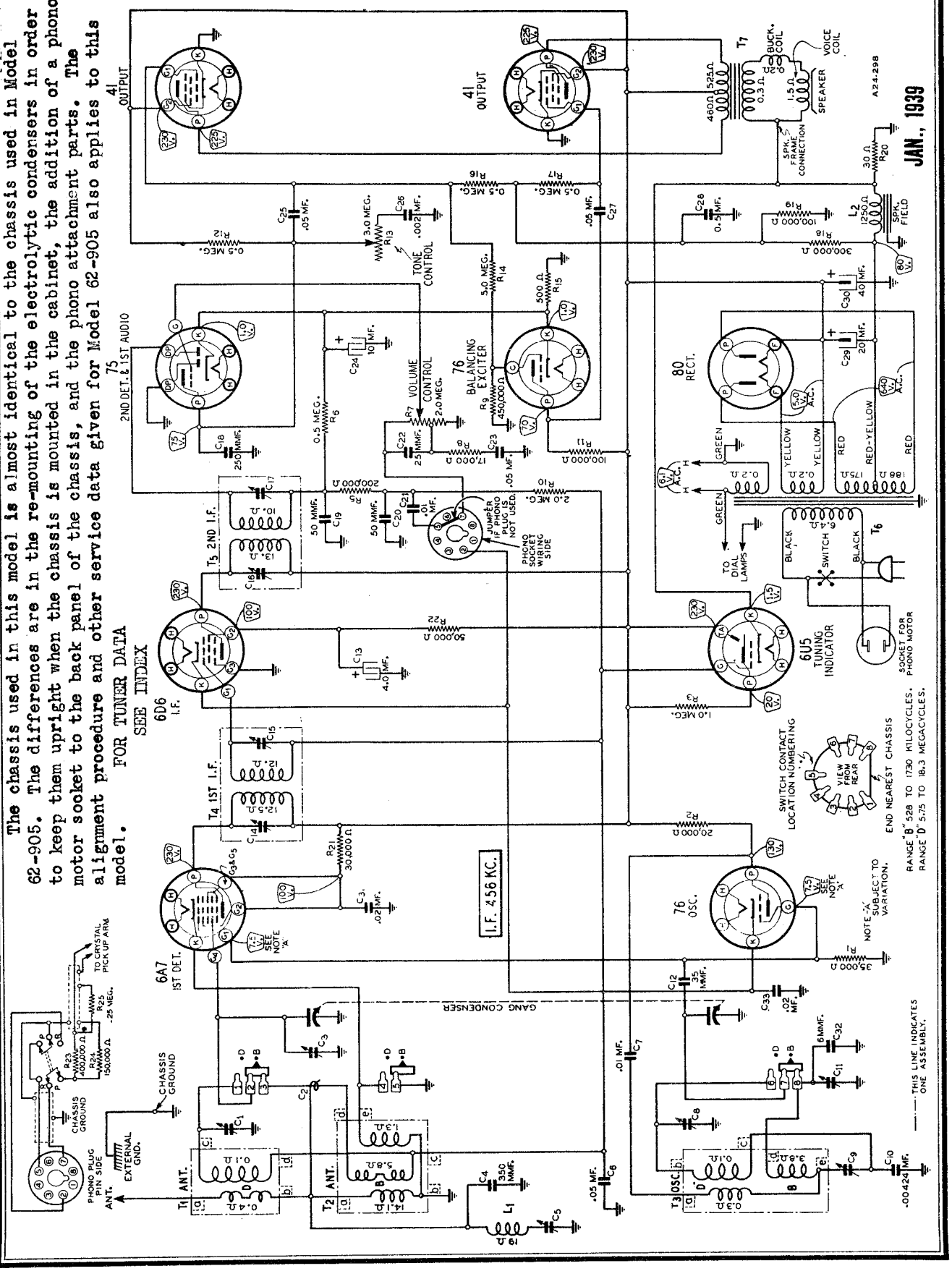
MODEL 62-902
Schematic, Voltage
Notes, Phono.

# MONTGOMERY WARD & CO.

**The chassis used in this model is almost identical to the chassis used in Model 62-905. The differences are in the re-mounting of the electrolytic condensers in order to keep them upright when the chassis is mounted in the cabinet, the addition of a phono motor socket to the back panel of the chassis, and the phono attachment parts. The alignment procedure and other service data given for Model 62-905 also applies to this model.**

FOR TUNER DATA SEE INDEX

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MODELS 62-704 to 62-712 inc.
Drive Data

MONTGOMERY WARD & CO.

MODEL 62-902
MODEL 62-905
Alignment, Trimmers
Drive Data

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER OR DIAL SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| I. F. 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15) |
| WAVE TRAP 456 KC | Antenna Lead | 200 mmf. | B Range | 600 KC | Wave Trap (C5) Adjust for MINIMUM Output |
| RANGE B | | | | Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A. | |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor until dial pointer is at 1500 KC | Oscillator Range B (C11) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Leave Rotor at above setting | Ant. Range B (C3) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C9) Rock Rotor—See Note B |
| RANGE D 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C8) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C1) Rock Rotor—See Note B |

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

# General Service Data

### Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the other end to the tension spring, leaving a distance of 64⅛ inches between the knots.

Turn the gang condenser to the full open position. Secure the free end of the spring over hook A—See Fig. 4. Turn the gang condenser to the completely closed position.

Pass the cord through slot B and, around the drive shaft spool, progressing away from the chassis. Pass cord up and over the drive drum. Guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. Hook the cord in slot B and turn the gang condenser to the completely closed position. Unhook the cord from slot B and pass over pulleys C, D, and E as shown. Pass the cord in front of idler pulley F. Wind 2½ turns counter-clockwise (from front of chassis) around the drive shaft spool, progressing away from the chassis. Pass cord up and over the drive drum. Guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. If necessary, stretch the tension spring and pull the drive cord taut. Pass drive cord through slot B and secure the loop to the tension spring at point G.

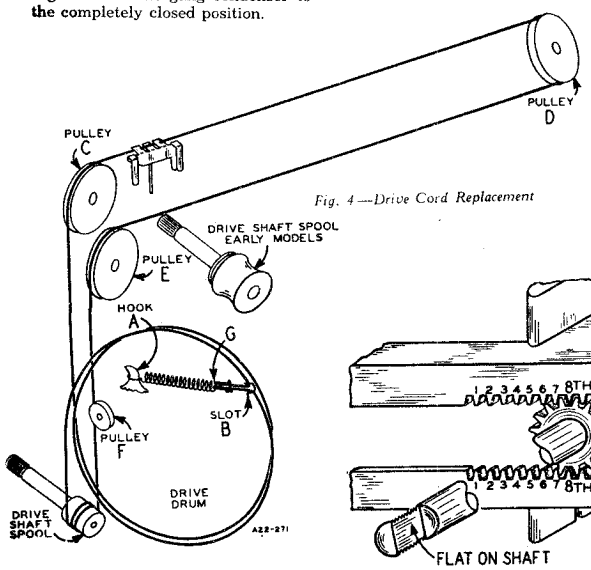


*Fig. 4—Drive Cord Replacement*

EARLY MODELS—In the early models using a larger drive shaft spool (See Fig. 4), there should be a distance of 65½ inches between the knots.

DIAL POINTER ATTACHMENT—Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale

### Rack and Pinion Assembly

If it is ever necessary to re-assemble the automatic tuning unit, proceed as follows: The pinion gear shaft should be held in such a position that the flat portion is vertical or turned slightly counter-clockwise from the vertical as shown in Fig. 5.

The lower rack should be meshed with the pinion gear so that the 8th tooth from the front on each side of the rack is in line with the axis of the pinion gear shaft—See Fig. 5. The upper rack should then be lined up with the lower rack and meshed with the pinion gear. The 8th tooth from the front on each side of the upper rack will then line up with the axis of the pinion gear shaft.

The rear and side brackets can then be mounted on the rack and pinion assembly.

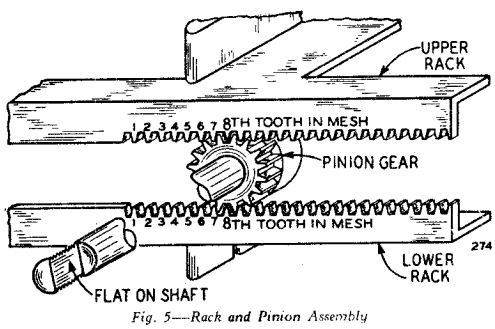


*Fig. 5—Rack and Pinion Assembly*

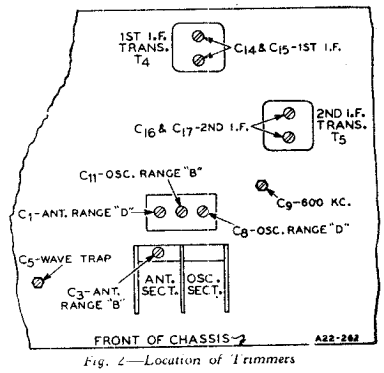


*Fig. 2—Location of Trimmers*

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MODEL 62-905
Schematic, Socket
Coils, Voltage

# MONTGOMERY-WARD & CO.

## SPECIFICATIONS

Power Consumption - - 65 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 3.0 Watts Undistorted
4.0 Watts Maximum

Selectivity - - 40 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - - - - 10" Dynamic

Tuning Frequency Range

B Range..... 528 to 1730 KC (Kilocycles)

D Range.....5750 to 18300 KC (Kilocycles)

Sensitivity (For 0.5 watt output)

B Range.....25 Microvolts Average

D Range.....40 Microvolts Average

**Twenty-Five Cycle Models**

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

**Voltages at Sockets**

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:
Line Voltage—117.

Volume Control—Maximum.
Antenna Shorted to Ground.
Readings taken with 1000 ohm-per-volt meter.

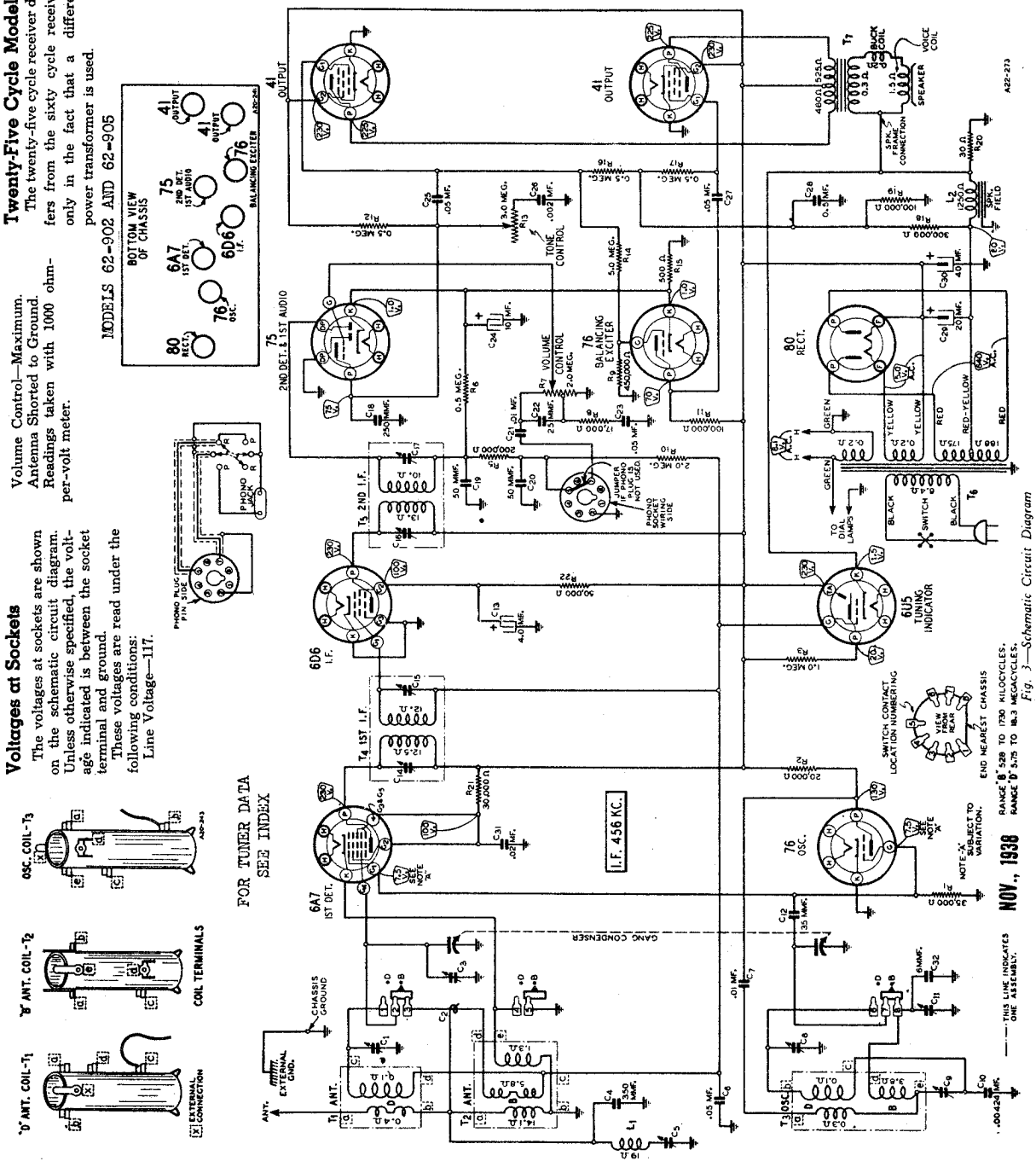


*Fig. 3—Schematic Circuit Diagram*

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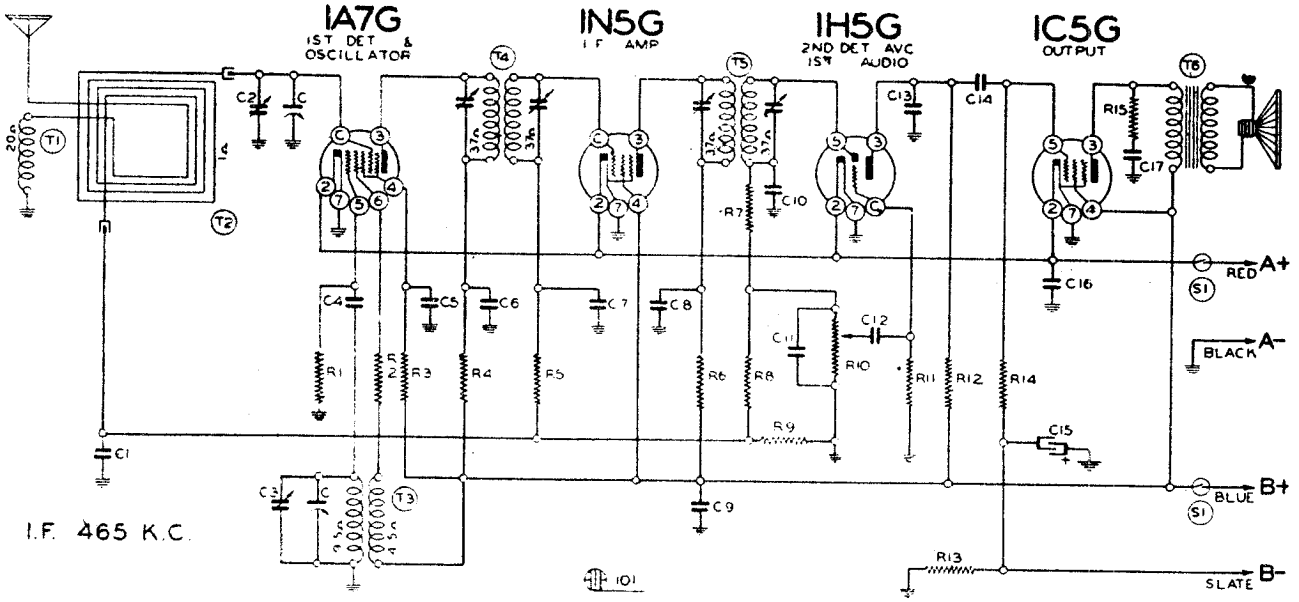
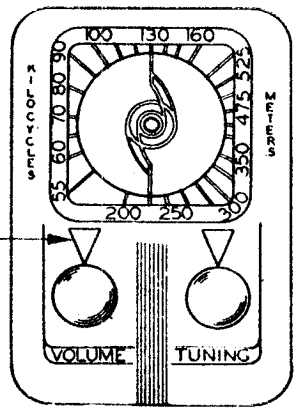
MONTGOMERY WARD & CO.

MODELS 93BR454A, 93BR1455A
Series A
Schematic, Voltage, Socket
Trimmers

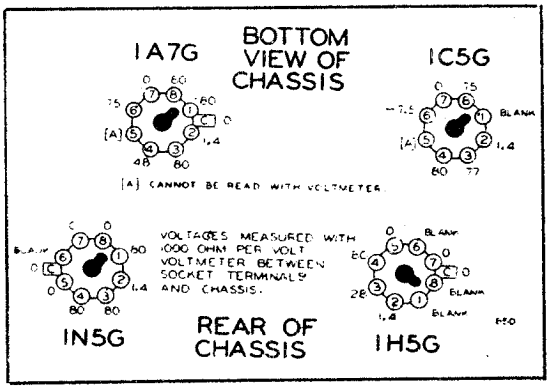



| Schematic Ref. No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | BE1309 | 200M ohm—½ w. |
| R2 | BE13071 | 4M ohm—½ w. |
| R3 | BE130208 | 40M ohm—½ w. |
| R4 | BE13026 | 1000 ohm—½ w. |
| R5 | BE13020 | 100M ohm—½ w. |
| R6 | BE13026 | 1000 ohm—½ w. |
| R7 | BE13040 | 19M ohm—½ w. |
| R8 | BE13038 | 2 megohm—½ w. |
| R9 | BE13038 | 2 megohm—½ w. |
| R10 | BE101163 | 1 megohm volume control |
| R11 | BE13038 | 2 megohm—½ w. |
| R12 | BE1303 | 500M ohm—½ w. |
| R13 | BE130283 | 750 ohm—½ w. |
| R14 | BE13019 | 1 megohm—½ w. |
| R15 | BE130218 | 5M ohm—½ w. |
| | | **CONDENSERS** |
| C | BE102103 | 2 gang variable condenser |
| C1 | BE10022 | .05 x 200 v. |
| C2 | | Loop ant. trimmer on gang |
| C3 | | Oscillator trimmer on gang |

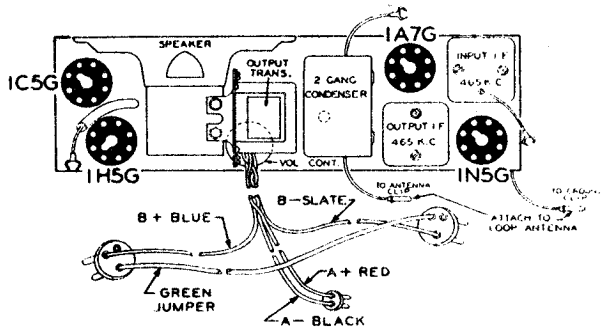
| Schematic Ref. No. | Part No. | Description |
|---|---|---|
| C4 | BE12912 | .00025 mica |
| C5 | BE10022 | .05 x 200 v. |
| C6 | BE10078 | .01 x 200 v. |
| C7 | BE10078 | .01 x 200 v. |
| C8 | BE10078 | .01 x 200 v |
| C9 | BE10064 | .25 x 200 v. |
| C10 | BE1295 | .0001 mica |
| C11 | BE1295 | .0001 mica |
| C12 | BE10078 | .01 x 200 v. |
| C13 | BE12912 | .00025 mica |
| C14 | BE10078 | .01 x 200 v. |
| C15 | BE11935 | 25 mfd. 25 w v. lytic |
| C16 | BE10056 | .5 x 200 v. |
| C17 | BE10012 | .003 x 600 v. |
| | | **PARTS** |
| T1 | BE1236 | Antenna load coil (on loop) |
| T2 | BE120257 | Loop antenna coil (complete) |
| T3 | BE110110 | Oscillator coil |
| T4 | BE108142 | Input I. F. coil |
| T5 | BE108143 | Output I. F. coil |
| T6 | BE114158 | 5" P. M. Speaker |
| S1 | | Off-on switch D.P.S.T. on vol. control |

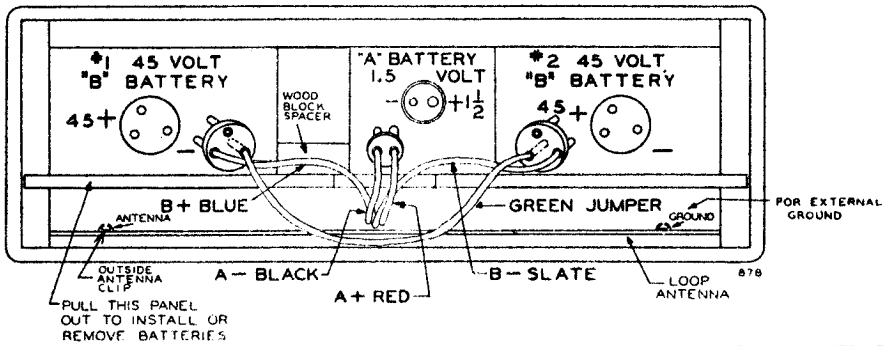



GREEN INDICATES OFF
RED INDICATES ON




FOR ALIGNMENT SEE INDEX



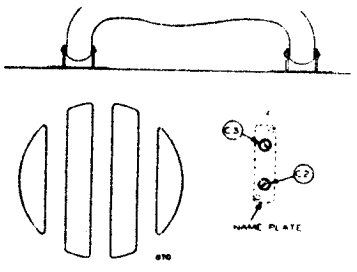




FIGURE 4

©John F. Rider, Publisher

MODELS 93BR460A, 93BR1460A

Schematic, Voltage, Socket MONTGOMERY WARD & CO.

Trimmers

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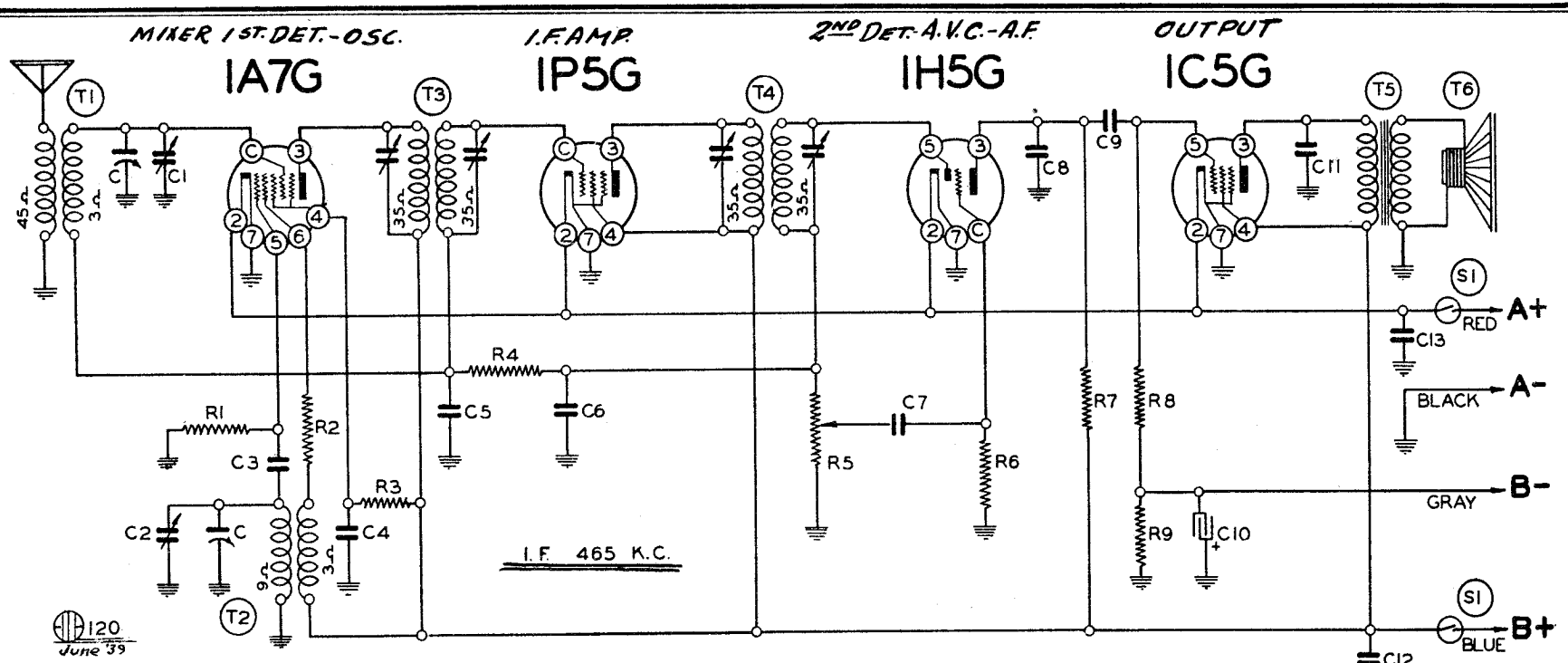


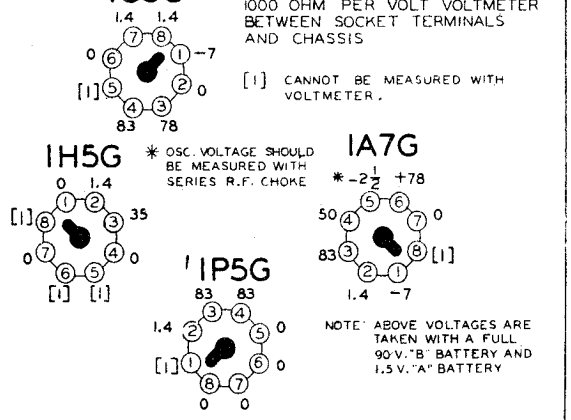

### RESISTORS

| | | |
|---|---|---|
| R1 | BE130266 | 200M ohm—⅓ w. |
| R2 | BE13018 | 4M ohm—⅓ w. |
| R3 | BE1307 | 40M ohm—⅓ w. |
| R4 | BE1304 | 3 megohm—⅓ w. |
| R5 | BE101175 | 1 megohm volume control |
| R6 | BE130257 | 5 megohm—⅓ w. |
| R7 | BE1303 | 500M ohm—⅓ w. |
| R8 | BE13019 | 1 megohm—⅓ w. |
| R9 | BE130200 | 700 ohm—⅓ w. |

### CONDENSERS

| | | |
|---|---|---|
| C | BE102110 | 2 gang variable condenser |
| C1 | | Antenna Trimmer on gang |
| C2 | | Oscillator trimmer on gang |
| C3 | BE12912 | .00025 mica |
| C4 | BE1009 | .05 x 200 v. |
| C5 | BE1009 | .05 x 200 v. |
| C6 | BE1295 | .0001 mica |
| C7 | BE10012 | .003 x 600 v. |
| C8 | BE1295 | .0001 mica |
| C9 | BE10011 | .01 x 400 v. |
| C10 | BE11975 | 10 mfd. x 25 w. v. |
| C11 | BE10012 | .003 x 600 v. |
| C12 | BE10064 | .25 x 200 v. |
| C13 | BE10020 | .1 x 200 v. |
| T1 | BE111132 | Antenna Coil |
| T2 | BE110122 | Oscillator Coil |
| T3 | BE108151B | Input I. F. - 465 kc. |
| T4 | BE108153 | Output I. F. - 465 kc. |
| T5 | BE10591 | Output Transformer |
| T6 | BE114166 | 5" P. M. Speaker |
| S1 | | Off-on switch on Volume control |

## BOTTOM VIEW OF CHASSIS




VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS

[1] CANNOT BE MEASURED WITH VOLTMETER.

* OSC. VOLTAGE SHOULD BE MEASURED WITH SERIES R.F. CHOKE

NOTE: ABOVE VOLTAGES ARE TAKEN WITH A FULL 90 V. "B" BATTERY AND 1.5 V. "A" BATTERY

## REAR OF CHASSIS

924

FOR ALIGNMENT SEE INDEX

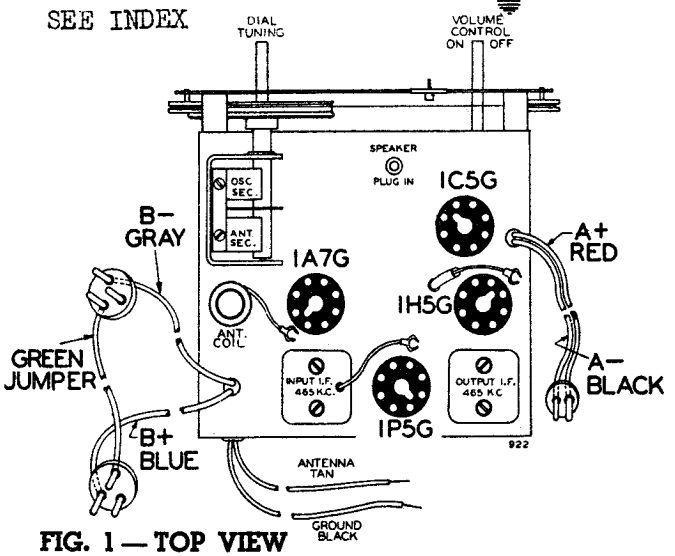
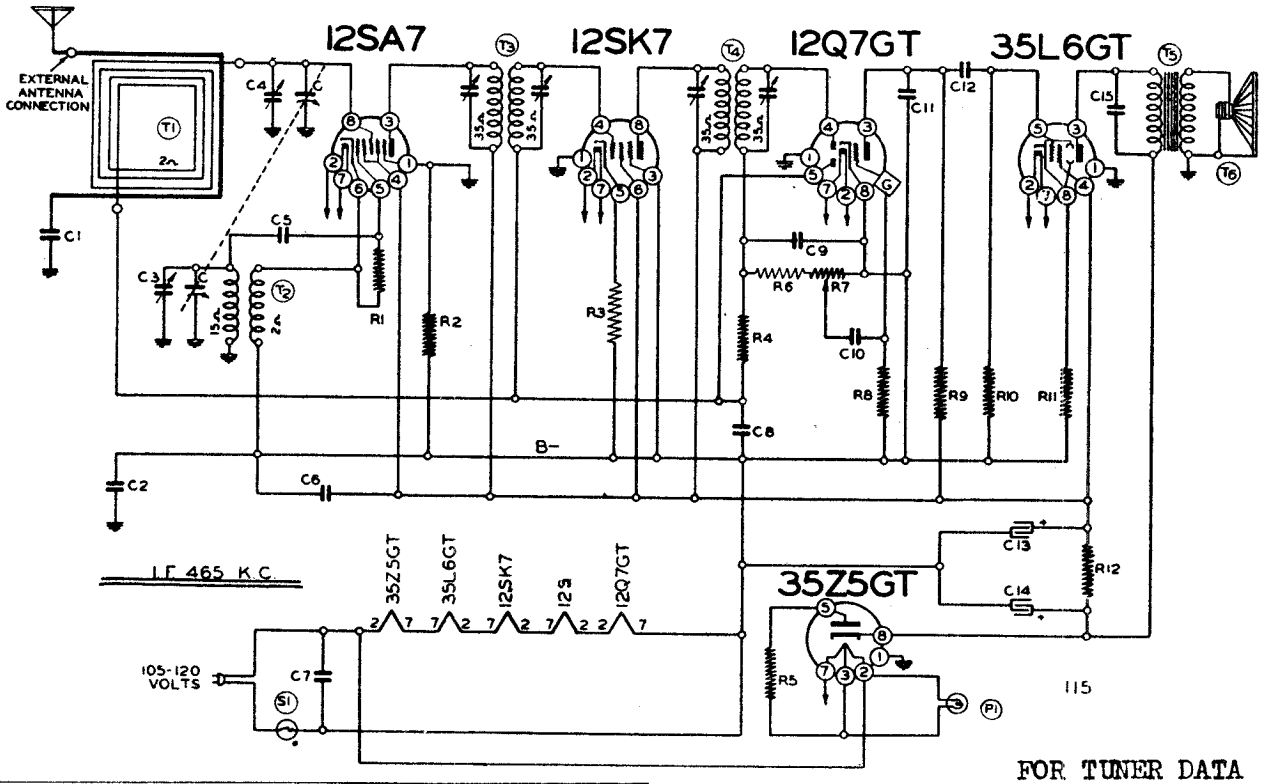



FIG. 1 — TOP VIEW

# MONTGOMERY WARD & CO.

MODELS 93BR508A, 93BR509A
Schematic, Voltage, Socket
Trimmers




FOR TUNER DATA SEE INDEX.

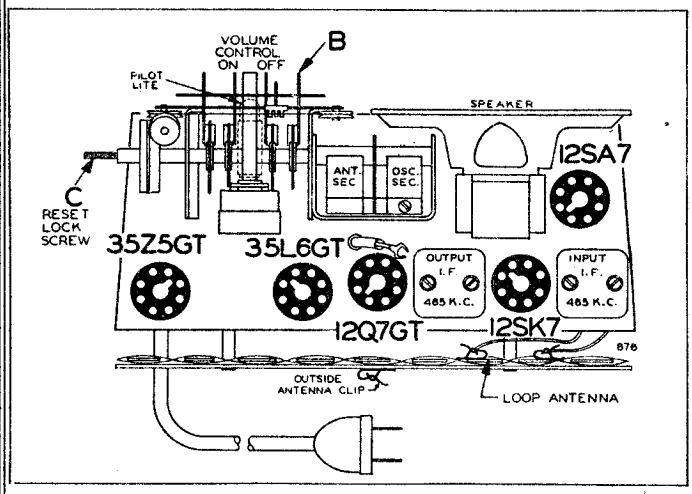
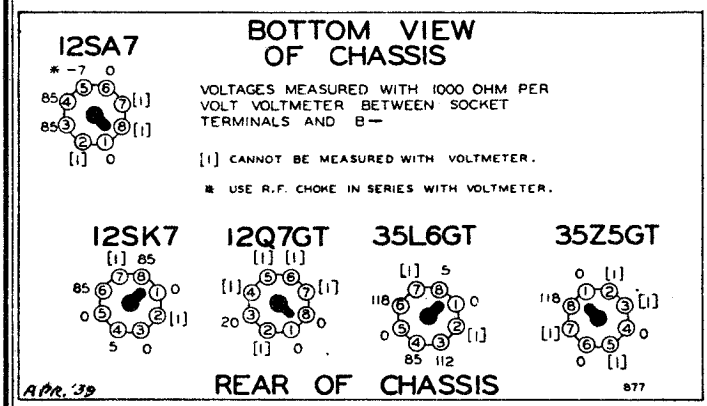



**FIG. 1—TOP VIEW**




| Schematic Ref. No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | BE130176 | 20M ohm—⅓ w.—10% |
| R2 | BE1309 | 200M ohm—⅓ w. |
| R3 | BE130203 | 40 ohm—⅓ w.—10% |
| R4 | BE1304 | 3 megohm—⅓ w. |
| R5 | BE130215 | 25 ohm—⅓ w. |
| R6 | BE1301 | 25M ohm—⅓ w. |
| R7 | BE101170 | 1 megohm—volume control |
| R8 | BE130257 | 5 megohm—⅓ w. |
| R9 | BE1303 | 500M ohm—⅓ w. |
| R10 | BE1303 | 500M ohm—⅓ w. |
| R11 | BE130166 | 150 ohm—⅓ w. |
| R12 | BE130199 | 1500 ohm—1 watt |
| | | **CONDENSERS** |
| C | BE102107 | 2 gang variable condenser |
| C1 | BE10011 | .01 x 400 v. |
| C2 | BE10091 | .15 x 400 v. |
| C3 | | Osc. Trimmer on Gang |
| C4 | | Antenna Trimmer on Gang |
| C5 | BE12921 | .0002 mica |
| C6 | BE1009 | .05 x 200 v. |
| C7 | BE1001 | .1 x 400 v. |
| C8 | BE1009 | .05 x 200 v. |
| C9 | BE1295 | .0001 mica |
| C10 | BE10025 | .002 x 600 v. |
| C11 | BE12912 | .00025 mica |
| C12 | BE100106 | .004 x 600 v. |
| C13 | BE11987 | 30 mfd. lytic |
| C14 | BE11987 | 30 mfd. lytic |
| C15 | BE10026 | .02 x 400 v. |
| | | C13 and C14 in same unit |
| | | **PARTS** |
| T1 | BE111128 | Loop Antenna |
| T2 | BE110116 | Oscillator Coil |
| T3 | BE108140E | Input I. F. |
| T4 | BE108141B | Output I. F. |
| T5 | BE10589 | Output Transformer |
| T6 | BE114160 | 5" P. M. Speaker |
| S1 | | Off-on switch on vol. control |
| P1 | BE107249 | 6-8 v. pilot light T-47 |

The tube complement of this chassis consists of the following octal base glass and metal tube.

The type and function of each tube is as follows.

1—Type 12SA7 Mixer, First Detector-oscillator.
1—Type 12SK7 I. F. Amplifier.
1—Type 12Q7GT Second Detector, A.V.C. and First Audio.
1—Type 35L6GT Beam Output Amplifier.
1—Type 35Z5GT High Vacuum Rectifier.

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MODELS 93BR508A, 93BR509A
MODEL 93BR564A
Alignment

# MONTGOMERY WARD & CO.

## CHASSIS No. 93-BR-508A and 93-BR-509A

**Power Consumption** - - - - - - - - - 40 Watts
**Power Output** - - - 800 Milliwatts Undistorted
**Sensitivity (for .05 Watts Output)** - 250 Microvolts Per Meter at 1000 KC. (For Loop Antenna)

**Selectivity** - 70 KC Broad at 1000 Times Signal at 1000 KC
**Tuning Frequency Range** - - - - - 540 to 1650 KC
**Intermediate Frequency** - - - - - - - - - - 465 KC
**Speaker** - - - - - - - - - - - 5 in. P. M. Dynamic

## ALIGNMENT PROCEDURE

**IMPORTANT: See Aligning Instructions on Page 4.**

- Volume control—Maximum all adjustments.
- Connect B of radio chassis to ground post of signal generator through .1 Mfd. condenser.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver
- Dummy antennas—.1 Mfd.

| BAND | SIGNAL GENERATOR Frequency Setting | SIGNAL GENERATOR Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (In Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 12SK7 I. F. Tube | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | (See Note "A") Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 12SA7 | Rotor full open (Plates out of mesh). | Two trimmers on top (See Fig. 1) | Input I. F. | (See Note "A") Adjust to maximum output |
| BROAD-CAST BAND | 1650 Kc. | .1 MFD. | Grid of 12SA7 | Rotor full open (Plates out of mesh) | Trimmer—Bottom of rear section of gang (See Bottom of Radio) | Oscillator | (See Note "A") Adjust to maximum output |
| | 1400 Kc. | (See Note "B" and "C") | | Set dial at 1400 Kc. | Trimmer—Bottom of front section of gang (See Bottom of Radio) | Antenna | (See Note "B") Adjust to maximum output |

NOTE "A" — A 200M ohm resistor must be connected between the two loop antenna leads from the chassis when aligning the I. F. transformers and setting the oscillator trimmer. The loop antenna must be disconnected from the chassis.

NOTE "B" — Remove the 200M ohm resistor from the loop antenna leads; mount the chassis and the loop antenna in the cabinet, connect the loop antenna to the chassis. Adjust the antenna trimmer through hole in bottom of cabinet.

NOTE "C" — Lay the output lead from the signal generator in back of the loop antenna. Turn up the output of the generator, picking up the energy in the loop antenna without any electrical connection from the signal generator.

MODEL 93BR508A
" 93BR509A

## ALIGNMENT PROCEDURE Model No. 93BR-564A

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | SIGNAL GENERATOR Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (In Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 I. F. Tube | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6D8G | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1730 Kc. | 200 mmf. | Antenna Lead | Rotor full open (Plates out of mesh) | Trimmer—Top of rear section of gang (See Fig. 1) | Broadcast Oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna Lead | Set dial at 1400 Kc. | Trimmer—Top of front section of gang (See Fig. 1) | Antenna Broadcast | Adjust to maximum output |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC. After each band is completed, repeat the procedure as a final check.

**Power Consumption - - - - - 40 Watts (at 117 Volts 50/60 Cycles)**
**Power Output - - - - - - - - - - - - .6 Watts Undistorted**
**Sensitivity (for .05 Watts Output) - - - - - 25 Microvolts Average**

**Selectivity - 45 KC Broad at 1000 Times Signal at 1000 KC**
**Tuning Frequency Range - - - - - - - - - 535 to 1735 KC**
**Intermediate Frequency - - - - - - - - - - - 465 KC**
**Speaker - - - - - - - - - - - - 6 in. P. M. Dynamic**

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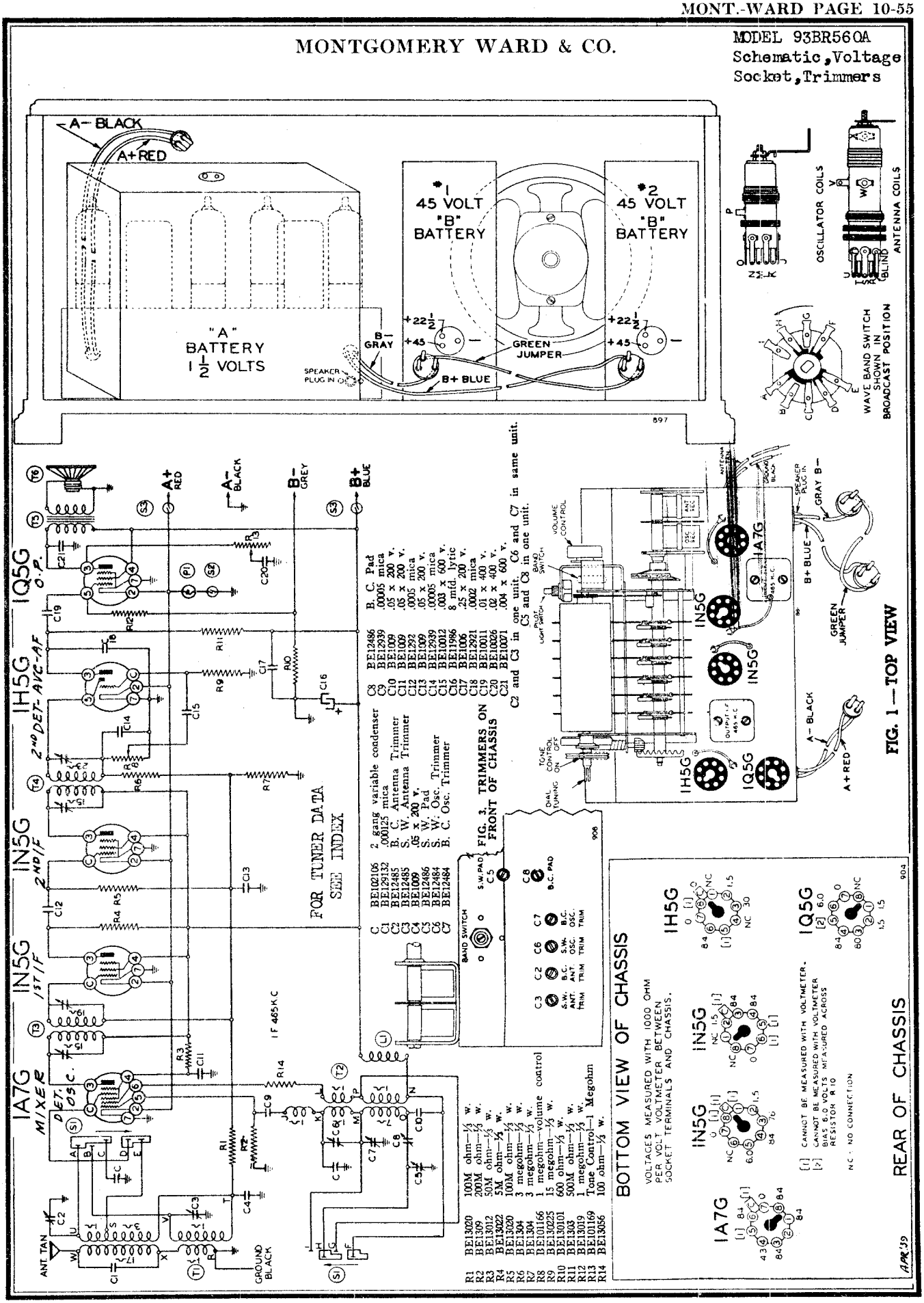
# MONTGOMERY WARD & CO.

MODEL 93BR560A
Schematic, Voltage
Socket, Trimmers




| | | | | | |
|---|---|---|---|---|---|
| R1 | BE13020 | 100M ohm—½ w. | C | BE102106 | 2 gang variable condenser |
| R2 | BE1309 | 200M ohm—½ w. | C1 | BE129132 | .000125 mica |
| R3 | BE13012 | 50M ohm—½ w. | C2 | BE12485 | B. C. Antenna Trimmer |
| R4 | BE13022 | 5M ohm—½ w. | C3 | BE12485 | S. W. Antenna Trimmer |
| R5 | BE13020 | 100M ohm—½ w. | C4 | BE1008 | .05 x 200 v. |
| R6 | BE1304 | 3 megohm—½ w. | C5 | BE12486 | S. W. Pad |
| R7 | BE1304 | 3 megohm—½ w. | C6 | BE12484 | S. W. Osc. Trimmer |
| R8 | BE101166 | 1 megohm—Volume control | C7 | BE12484 | B. C. Osc. Trimmer |
| R9 | BE130225 | 15 megohm—½ w. | C8 | BE12486 | B. C. Pad |
| R10 | BE130101 | 600 ohm—½ w. | C9 | BE12939 | .00005 mica |
| R11 | BE1303 | 500M ohm—½ w. | C10 | BE1009 | .05 x 200 v. |
| R12 | BE13019 | 1 megohm—½ w. | C11 | BE1009 | .05 x 200 v. |
| R13 | BE101169 | Tone Control—1 Megohm | C12 | BE1292 | .0005 mica |
| R14 | BE13056 | 100 ohm—½ w. | C13 | BE1009 | .05 x 200 v. |
| | | | C14 | BE12939 | .00005 mica |
| | | | C15 | BE11012 | .003 x 600 v. |
| | | | C16 | BE11986 | 8 mfd. lytic |
| | | | C17 | BE1006 | .25 x 200 v. |
| | | | C18 | BE12921 | .0002 mica |
| | | | C19 | BE10011 | .01 x 400 v. |
| | | | C20 | BE10026 | .02 x 400 v. |
| | | | C21 | BE10071 | .004 x 600 v. |

C2 and C3 in one unit. C6 and C7 in same unit. C5 and C8 in one unit.

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MODELS 93BR460A, 93BR1460A
Alignment, Battery Data

# MONTGOMERY WARD & CO.

MODEL 93BR560A
Alignment

## Chassis No. 93BR560A

**Power Consumption** - - - "A" Battery 300 MA; "B" Battery 11 MA.
**Power Output** - - - - - - - - - - - 190 Milliwatts, Undistorted
**Sensitivity (for .05 Watts)** - {Broadcast Band—10 Microvolts Average / Short Wave Band—20 Microvolts Average
**Selectivity** - - - 35 Kc. Broad at 1000 Times Signal at 1000 Kc.
**Tuning Range** - Broadcast 535—1720 Kc.; Shortwave 5.6—18.3 Mc.
**Intermediate Frequency** - - - - - - - - - - - 465 Kc.
**Speaker** - - - - - - - - - - - - 6 in. P. M. Dynamic

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning.

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1N5G 2nd I. F. | Broadcast | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1A7G Mixer | Broadcast | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output (See Note "A") |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave | Set Dial at 17 Mc. | Trimmer C6 (See Fig. 3) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave | Set Dial at 17 Mc. | Trimmer C3 (See Fig. 3) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave | Set Dial at 6 Mc. | Trimmer C5 (See Fig. 3) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "B") |
| BROAD-CAST BAND | 1720 Kc. | 200 mmf. | Antenna lead | Broadcast | Rotor full open (Plates out of mesh) | Trimmer C7 (See Fig. 3) | Broadcast oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Broadcast | Set Dial at 1500 Kc. | Trimmer C2 (See Fig. 3) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast | Set Dial at 600 Kc. | Trimmer C8 (See Fig. 3) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "B") |

NOTE "A" Do not re-adjust the trimmers on the output I. F. Transformer.

NOTE "B" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

## Model No. 93BR-460A and 93BR-1460A

**Power Consumption** - - - "A" Battery 260 MA; "B" Battery 11.5 MA.
**Power Output** - - - - - - - - - - - 150 Milliwatts, Undistorted
**Sensitivity (for .05 Watts)** - - - - - - - - 45 Microvolts Average
**Selectivity** - - - 45 Kc. Broad at 1000 Times Signal at 1000 Kc.
**Tuning Range** - - - - - - - - - - - - - 535 to 1730 Kc.
**Intermediate Frequency** - - - - - - - - - - - - 465 Kc.
**Speaker** - - - - - - - - - - - - - 5 in. P. M. Dynamic

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

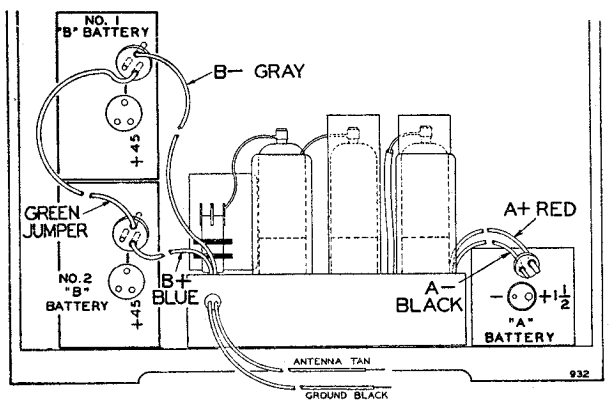
The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 1P5G I. F. Tube | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 1A7G | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROAD-CAST BAND | 1730 Kc. | 200 mmf. | Antenna lead | Rotor full open (Plates out of mesh) | Trimmer—Top of front section of gang (See Fig. 1) | Oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Set dial at 1400 Kc. | Trimmer—Top of rear section of gang (See Fig. 1) | Antenna | Adjust to maximum output |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.




**STEP 1—CONNECTING "A" BATTERY:**

First—Place the "A" Battery in the cabinet as shown, (alongside right hand side of the radio chassis).

NEXT—Insert the special two-prong connector plug into the socket on the "A" battery as shown in illustration.

**STEP 2—CONNECTING "B" BATTERIES:**

First—Place both "B" Batteries in the cabinet exactly as shown (alongside left hand side of the radio chassis).

NEXT—Insert the special three-prong connector plugs into the sockets on the "B" batteries as shown in illustration.

NOTE: The above procedure and illustration pertains to the new style "B" batteries which have sockets; however, the old style "B" batteries which have terminals can be used by connecting them as follows:

FIRST—Remove the special plugs by cutting the wires off at the plugs.

NEXT—Connect gray colored B minus (—) wire to minus (—) terminal of "B" battery (marked Battery No. 1 in illustration).

NEXT—Connect one end of green connecting wire to plus (+45) terminal of battery No. 1 and other end to the minus (—) terminal of Battery No. 2.

NOW—Connect blue B plus (+) wire to the plus (+45) terminal of Battery No. 2

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MONTGOMERY WARD & CO.

MODEL 93WG562
Schematic, Socket
Alignment, Trimmers

# SPECIFICATIONS

Power Consumption - 2.2 Amperes at 6.3 Volts

Power Output - - - - - - - - .5 Watt Undistorted
1.0 Watt Maximum

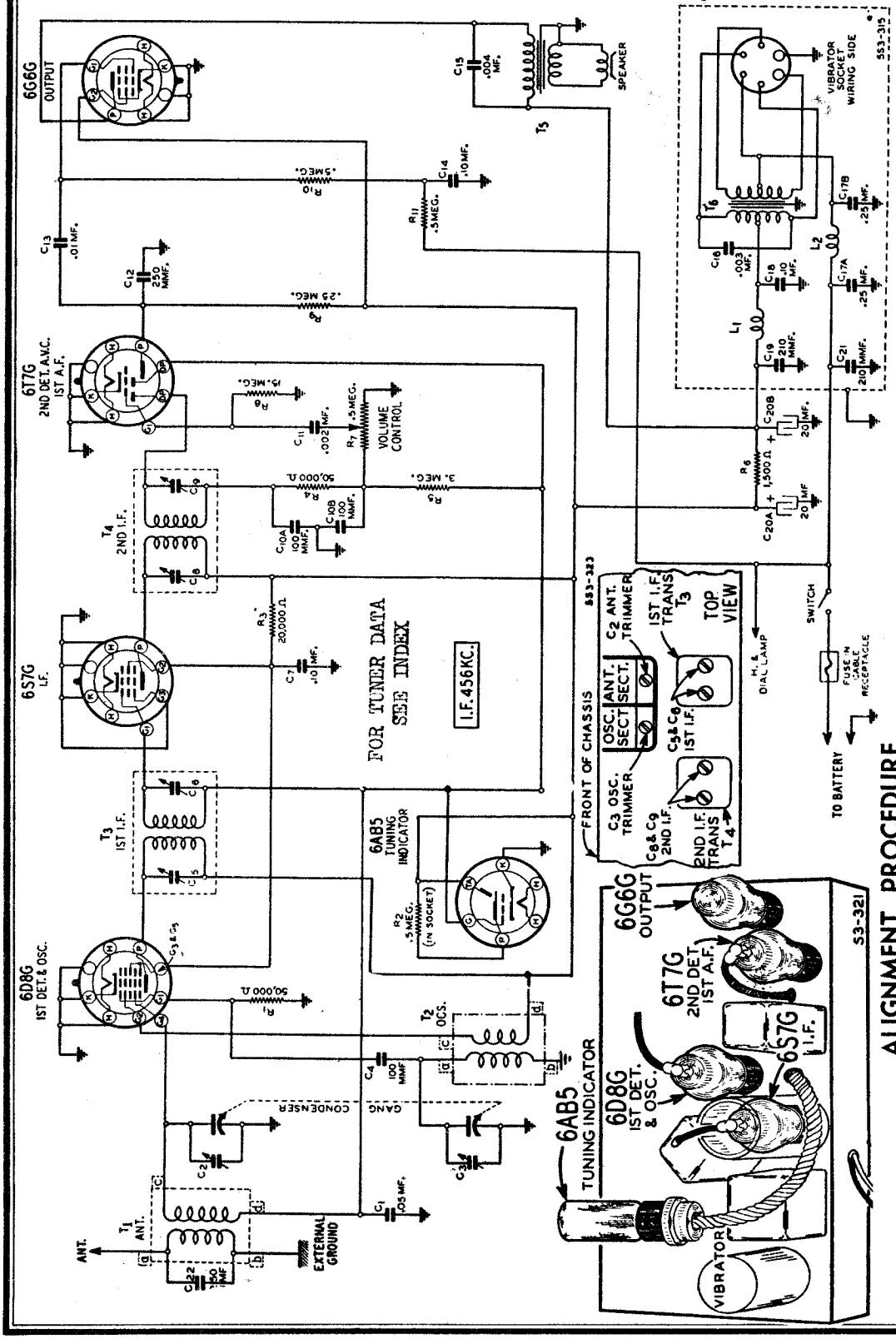
Selectivity - 41 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - - - 5" P. M. Dynamic

Tuning Frequency Range - - 528 to 1730 KC.

Sensitivity (For .05 Watt Output) 15 Microvolts Average




CALIBRATION—If it is necessary to calibrate the radio, accurately tune in a signal of known frequency near 800 KC and note distance and direction dial is off calibration. Remove chassis from cabinet. Loosen the 2 set screws in the hub at the side of the dial drum nearest the center of the chassis. Turn the dial drum the necessary amount in required direction. Place the chassis back in the cabinet and see if it is in calibration. If it is, remove the chassis, tighten the set screws and reassemble.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes.

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration) |
|---|---|---|---|---|
| 456 KC | Signal Grid of 1st Det. | .1 mf. | Turn rotor to full open | 1st I.F. (C5) & (C6)<br>2nd I.F. (C8) & (C9) |
| 1730 KC | Grid of 1st Det. | .1 mf. | Turn rotor to full open | Oscillator (C3) |
| 1500 KC | Antenna Lead | 200 mmf. | Turn rotor to max. output | Antenna (C2) |

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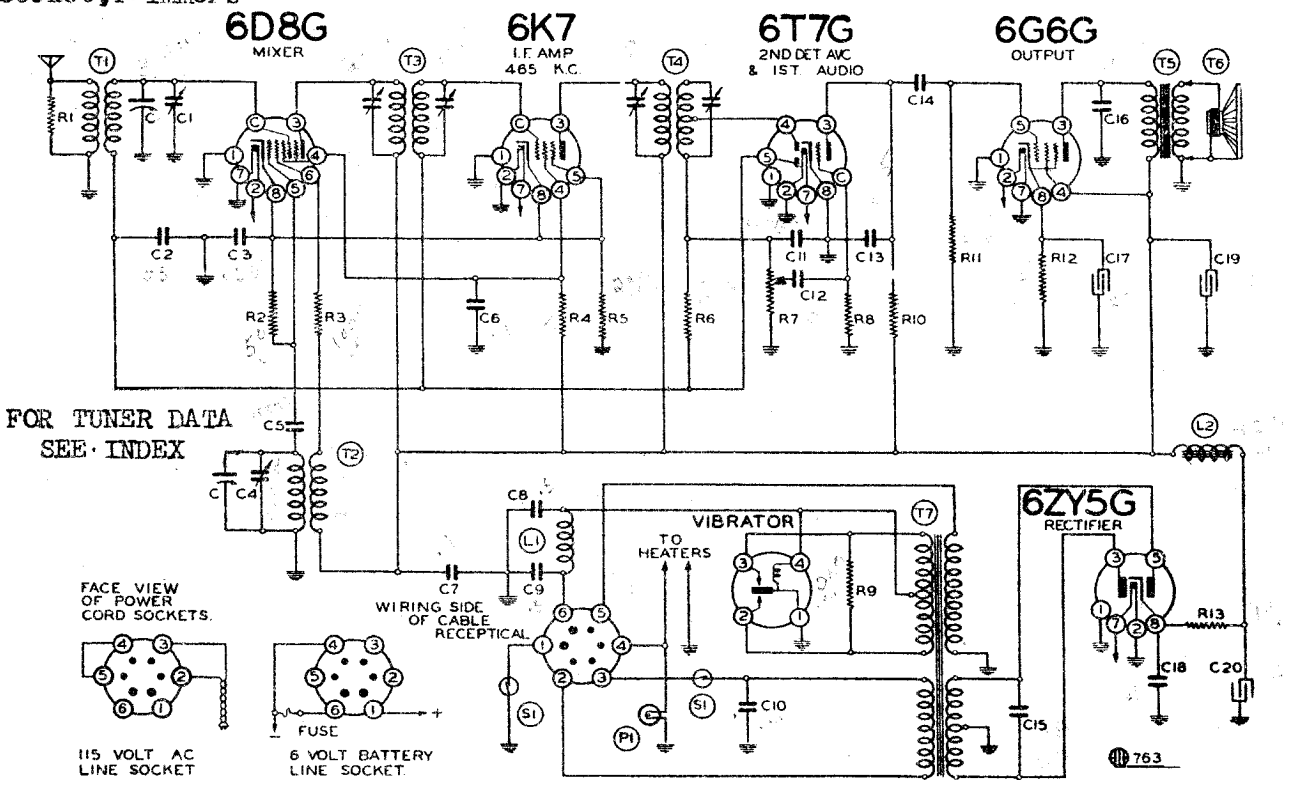
MODEL 93BR564A
Schematic, Voltage
Socket, Trimmers

# MONTGOMERY WARD & CO.



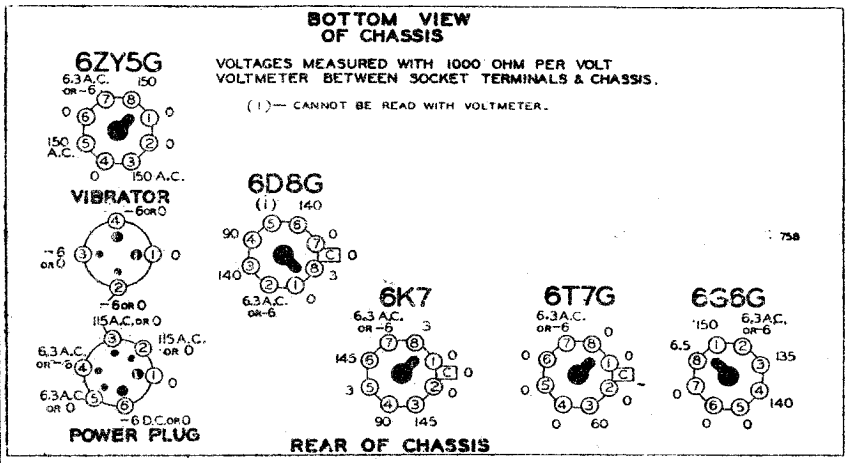




FIG. 3

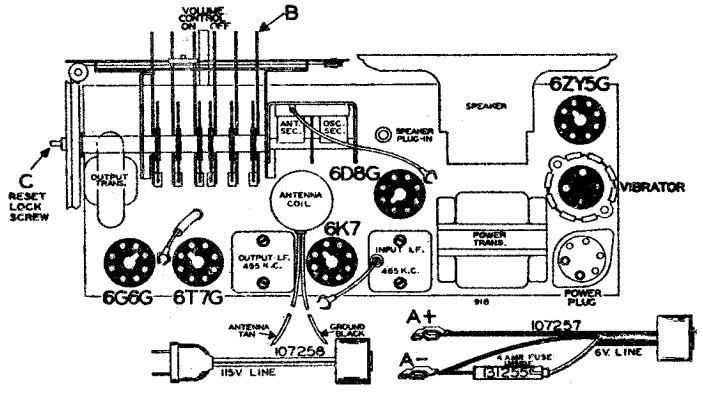



FIG. 1—TOP VIEW

| Schematic Reference No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | BE13017 | 10M ohm—½ w. |
| R2 | BE13012 | 50M ohm—½ w. |
| R3 | BE13092 | 1000 ohm—½ w. |
| R4 | BE130157 | 12M ohm—½ w. |
| R5 | BE13097 | 200 ohm—½ w. |
| R6 | BE1304 | 3 megohm—½ w. |
| R7 | BE101150 | 1 megohm volume control |
| R8 | BE130225 | 15 megohm—½ w. |
| R9 | BE13097 | 200 ohm—½ w. |
| R10 | BE130266 | 200M ohm—½ w. |
| R11 | BE130102 | 500M ohm—½ w. |
| R12 | BE13093 | 450 ohm—½ w. |
| R13 | BE130168 | 100 ohm—½ w. |
| | | **CONDENSERS** |
| C | BE102113 | 2 gang variable condenser. |
| C1 | | Antenna Trimmer |
| C2 | BE1009 | .05 x 200 v. |
| C3 | BE10064 | .25 x 200 v. |
| C4 | | Oscillator Trimmer |
| C5 | BE1295 | .0001 mica |
| C6 | BE10020 | .1 x 200 v. |
| C7 | BE10020 | .1 x 200 v. |
| C8 | BE10040 | .5 x 120 v. |
| C9 | BE10040 | .5 x 120 v. |
| C10 | BE10011 | .01 x 400 v. |
| C11 | BE12960 | .00015 mica |
| C12 | BE10011 | .01 x 400 v. |
| C13 | BE1292 | .0005 mica |
| C14 | BE1009 | .05 x 200 v. |
| C15 | BE10073 | .008 x 1200 v. |
| C16 | BE10019 | .006 x 600 v. |
| C17 | BE11979 | 20 mfd. x 25 w. volt |
| C18 | BE10020 | .1 x 200 v. |
| C19 | BE11979 | 16 mfd. x 200 w. volt |
| C20 | BE11979 | 16 mfd. x 200 w. volt |
| | | **PARTS** |
| T1 | BE11185C | Antenna Coil |
| T2 | BE110103 | Oscillator Coil |
| T3 | BE108129 | Input I. F. Coil—465 kc. |
| T4 | BE108130 | Output I. F. Coil—465 kc. |
| T5 | BE10569B | Output Transformer |
| T6 | BE114143B | 6" P. M. Speaker |
| T7 | BE104114B | Power Transformer |
| S1 | | Off-on switch on volume control |
| P1 | BE107249 | 6.3 v. Pilot Light Type 47 |
| L1 | BE10568 | "A" Choke |
| L2 | BE10530G | "B" Choke |

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# MONTGOMERY WARD & CO.
# SPECIFICATIONS

MODELS 93WG602, 93WG603
Schematic, Voltage
Socket, Trimmers

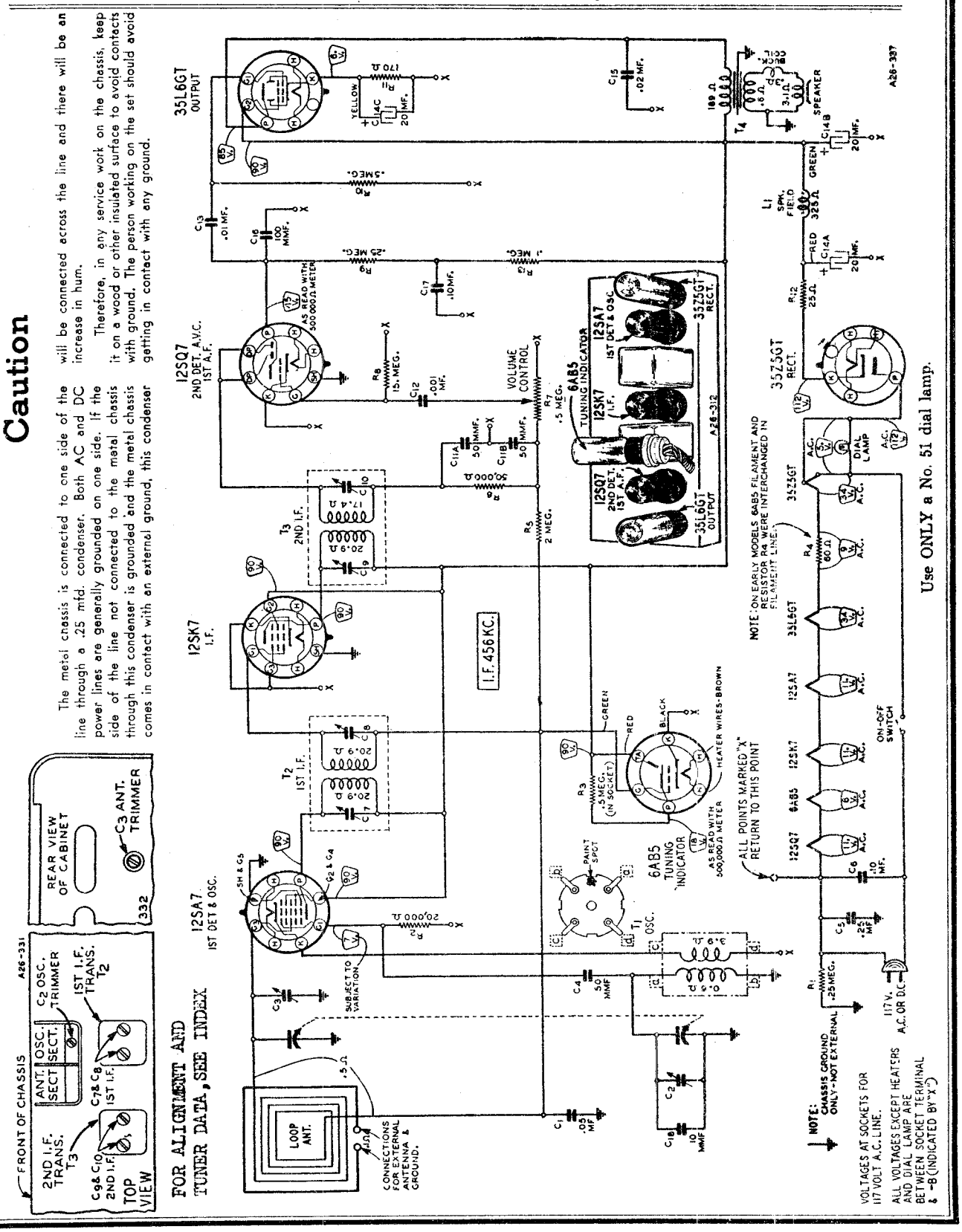
Power Consumption - 28 Watts (At 117 volts AC Supply)
Power Output - - - - - - - .8 Watt Undistorted
Selectivity - - 50 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - - 456 KC

Speaker - - - - - - - - - 5" Electro Dynamic
Tuning Frequency Range - - - 528 to 1730 KC
Sensitivity - - - 40 Microvolts per Meter Average
(For .05 Watt Output)

## Caution

The metal chassis is connected to one side of the line through a .25 mfd. condenser. Both AC and DC power lines are generally grounded on one side. If the side of the line not connected to the metal chassis through this condenser is grounded and the metal chassis comes in contact with an external ground, this condenser will be connected across the line and there will be an increase in hum.

Therefore, in any service work on the chassis, keep it on a wood or other insulated surface to avoid contacts with ground. The person working on the set should avoid getting in contact with any ground.


35L6GT OUTPUT
12SQ7 2ND DET. A.V.C. 1ST A.F.
12SK7 I.F.
12SA7 1ST DET & OSC.
6AB5 TUNING INDICATOR
35Z5GT RECT.
VOLUME CONTROL
1.F. 456 KC.
FOR ALIGNMENT AND TUNER DATA, SEE INDEX
REAR VIEW OF CABINET
C3 ANT. TRIMMER
FRONT OF CHASSIS
ANT. SECT
OSC. SECT.
C2 OSC. TRIMMER
1ST I.F. TRANS. T2
2ND I.F. TRANS. T3
C7 & C8 1ST I.F.
C9 & C10 2ND I.F.
TOP VIEW
LOOP ANT.
CONNECTIONS FOR EXTERNAL ANTENNA & GROUND.
SUBJECT TO VARIATION
PAINT SPOT
ON-OFF SWITCH
SPEAKER
DIAL LAMP
ALL POINTS MARKED "X" RETURN TO THIS POINT
HEATER WIRES-BROWN
CHASSIS GROUND ONLY - NOT EXTERNAL
117 V. A.C. OR D.C.
NOTE: ON EARLY MODELS 6AB5 FILAMENT AND RESISTOR R4 WERE INTERCHANGED IN FILAMENT LINE.
VOLTAGES AT SOCKETS FOR 117 VOLT A.C. LINE.
ALL VOLTAGES EXCEPT HEATERS AND DIAL LAMP ARE BETWEEN SOCKET TERMINAL & -B (INDICATED BY "X")
Use ONLY a No. 51 dial lamp.

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MODEL 93BR713A
Schematic, Voltage
Socket, Trimmers

# MONTGOMERY WARD & CO.

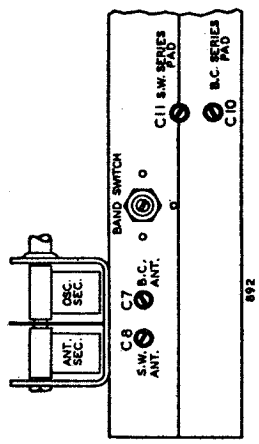



Fig. 3. FRONT VIEW

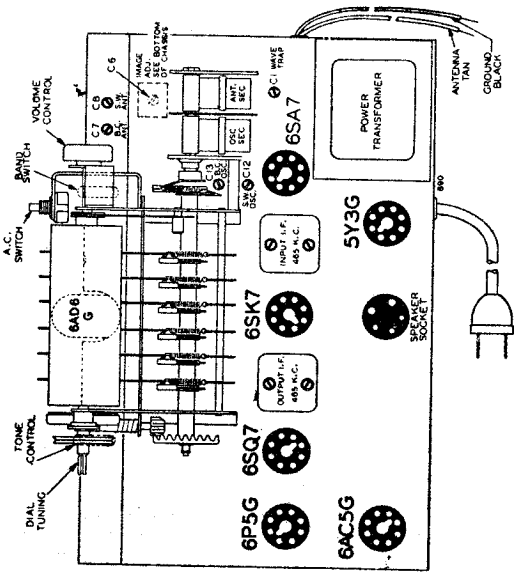



FIG. 1—TOP VIEW

**Power Consumption - - - - - - - - - - - 65 Watts**
**Power Output - - - - - - 2.5 Watts Undistorted**
**Sensitivity (for .5 Watts Output) - - 60 Microvolts Average**
**Selectivity - 45 KC Broad at 1000 Times Signal at 1000 KC**
**Tuning Frequency Range - - - - - - - - - - -

MONTGOMERY WARD & CO.

MODEL 93BR657A
Schematic, Voltage
Socket, Trimmers
MODEL 62-381 S.P.U.
Schematic

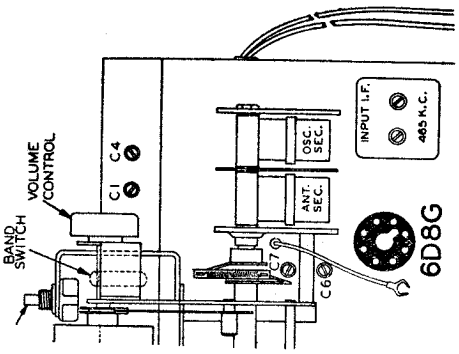



FIG. 6—TOP OF CHASSIS

FOR TUNER DATA SEE INDEX

6 TUBE 6 VOLT 2 BAND -OR- 7 TUBE A.C. WITH 62-381 A. C. POWER UNIT

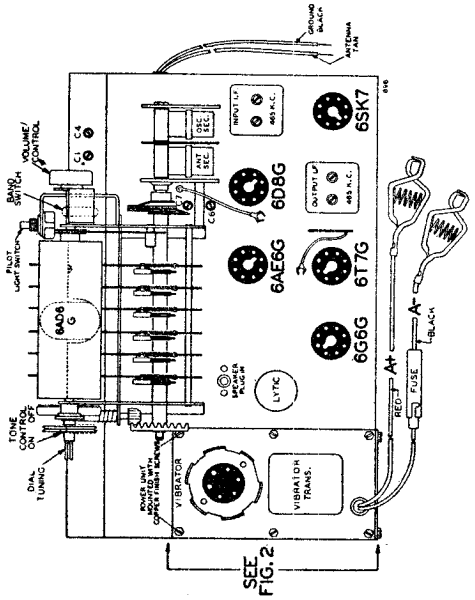
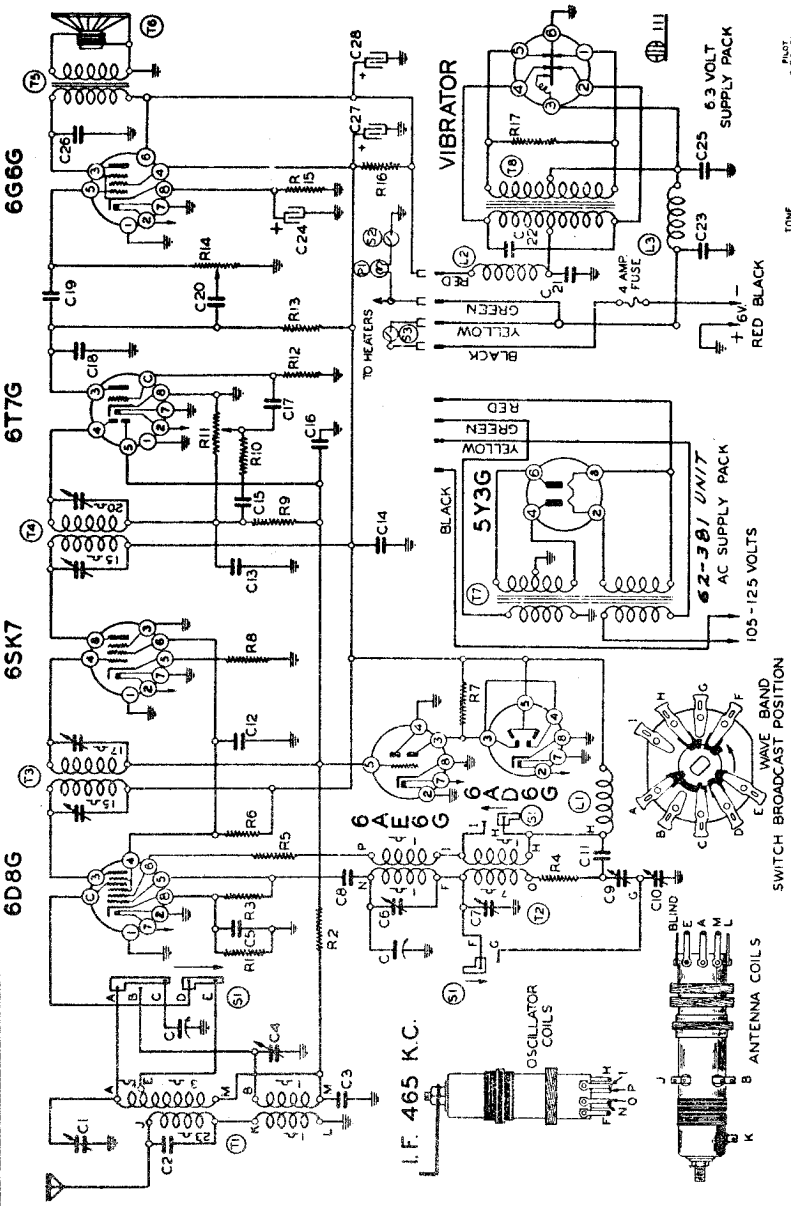



FIG. 1—TOP VIEW

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# Chassis No. 98BR657A

**Power Consumption** - - - - - - - - - - - **2.5 Amp. at 6.3 Volts**

**Power Output** - - - - - - - - - - - - - **.6 Watts Undistorted**

**Sensitivity (for .05 Watts Output)** - **Broadcast 10 Microvolts Average**
**Shortwave 20 Microvolts Average**

**Selectivity** **35 KC Broad at 1000 Times Signal at 1000 KC**

**Tuning Frequency Range** - - - - - - - **535 to 1730 KC**
**5.6 to 18.3 MC**

**Intermediate Frequency** - - - - - - - - - - **465 KC**

**Speaker** - - - - - - - - - - - - **6 in. P. M. Dynamic**

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

- The following equipment is required for aligning:
- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Position of Band Switch | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6SK7 | Broadcast | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6D8G | Broadcast | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave | Set Dial at 17 Mc. | Trimmer (C6) (See Fig. 6) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave | Set Dial at 17 Mc. | Trimmer (C4) (See Fig. 5) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave | Set Dial at 6 Mc. | Trimmer (C10) (See Fig. 5) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| BROAD-CAST BAND | 1730 Kc. | 200 mmf. | Antenna lead | Broadcast | Rotor full open (Plates out of mesh) | Trimmer (C7) (See Fig. 6) | Broadcast oscillator | Adjust to maximum output |
| | 1500 Kc | 200 mmf. | Antenna lead | Broadcast | Set Dial at 1500 Kc. | Trimmer (C1) (See Fig. 5) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast | Set Dial at 600 Kc. | Trimmer (C9) (See Fig. 5) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |

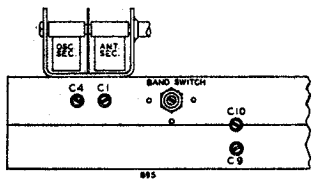



**FIG. 5—FRONT OF CHASSIS**

**NOTE "A"** Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attentuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

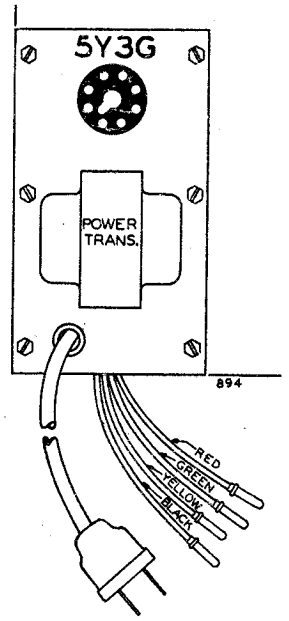



**FIG. 2—MODEL 62-381 A. C. POWER UNIT**

## Model 62-381 Power Unit

**(For 105-125 Volt 50/60 Cycle A. C. Operation)**

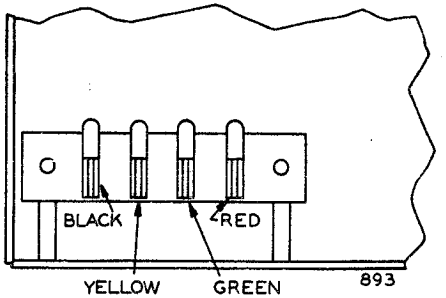



**FIG. 3—CONNECTOR STRIP ON CHASSIS FOR POWER UNIT**

**TUBES:**

The following complement of this chassis consists of the following octal base glass and metal tubes:

The type and function of each tube is as follows:

1—Type 6D8G First Detector-oscillator.
1—Type 6SK7 Remote Cut-Off Pentode, I. F. Amplifier (465 K. C.).
1—Type 6T7G Duplex Diode Triode Second Detector, A.V.C. and First Audio.
1—Type 6G6G Output Amplifier.
1—Type 6AE6G D. C. Amplifier.
1—Type 6AD6G Cathode-Ray Tuning Eye.

NOTE:—If the 62-381 A. C. power unit is installed in place of the 6 volt power unit, the tube complement of the radio will consist of one more tube:

1—Type 5Y3G Rectifier.

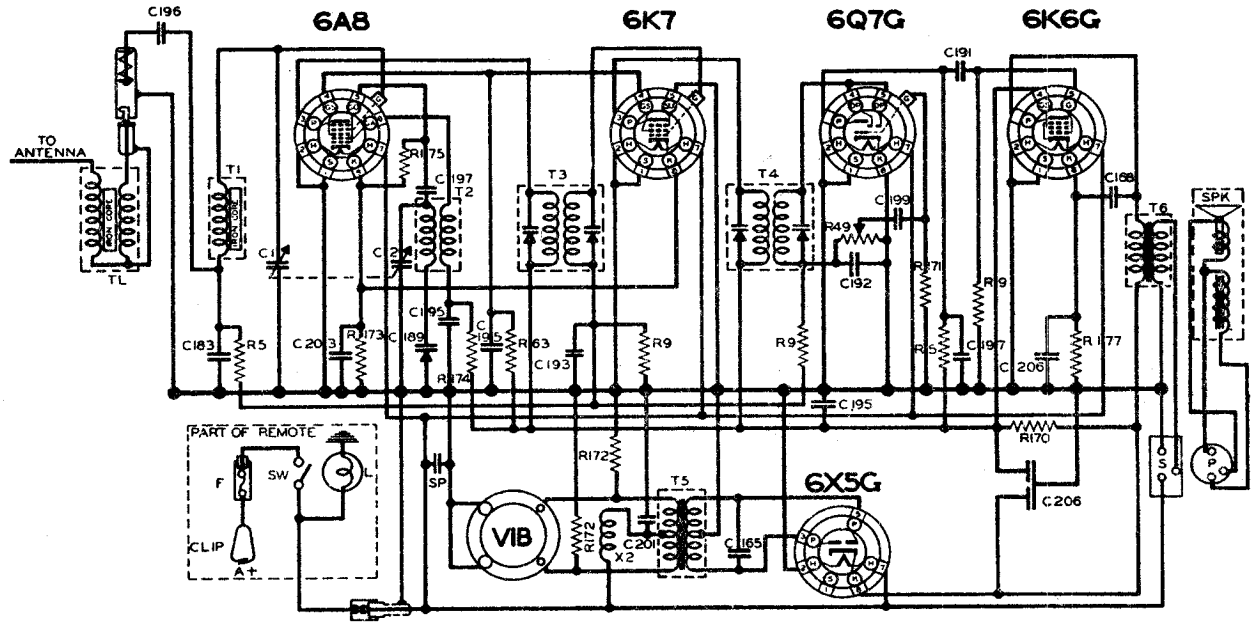
| No. | Part No. | Description |
|---|---|---|
| | | **RESISTORS** |
| R1 | BE13083 | 300 ohm—½ w. |
| R2 | BE13020 | 100M ohm—½ w. |
| R3 | BE13012 | 50M ohm—½ w. |
| R4 | BE130286 | 20 ohm—½ w. |
| R5 | BE130168 | 100 ohm—½ w. |
| R6 | BE13048 | 15M ohm—½ w. |
| R7 | BE13019 | 1 megohm—½ w. |
| R8 | BE13097 | 200 ohm—½ w. |
| R9 | BE1304 | 3 megohm—½ w. |
| R10 | BE13012 | 50M ohm—½ w. |
| R11 | BE101166 | 1 Megohm volume control |
| R12 | BE130225 | 15 megohm—½ w. |
| R13 | BE1305 | 300M ohm—½ w. |
| R14 | BE101171 | 500M ohm tone control |
| R15 | BE13070 | 500 ohm—½ w. |
| R16 | BE130199 | 1500 ohm—1 watt |
| R17 | BE130285 | 200 ohm—½ w. |
| | | **CONDENSERS** |
| C | BE102106B | 2 gang variable condenser |
| C1 | BE12475 | BC Antenna Trimmer |
| C2 | BE129132 | .000125 mica |
| C3 | BE1009 | .05 x 200 |
| C4 | BE12475 | S. W. Antenna Trimmer |
| C5 | BE10020 | .1 x 200 v. |
| C6 | BE12476 | S. W. Oscillator Trimmer |
| C7 | BE12476 | B. C. Oscillator Trmmer |
| C8 | BE12938 | .00005 Mica |
| C9 | BE12488 | B. C. Series Pad |
| C10 | BE12488 | S. W. Series Pad |
| C11 | BE10020 | .1 x 200 v. |
| C12 | BE10020 | .1 x 200 v. |
| C13 | BE1295 | .0001 Mica |
| C14 | BE10020 | .1 x 200 v. |
| C15 | BE1295 | .0001 mica |
| C16 | BE10026 | .02 x 400 v. |
| C17 | BE10019 | .006 x 600 v. |
| C18 | BE1292 | .0005 mica |
| C19 | BE10026 | .02 x 400 v. |
| C20 | BE10019 | .006 x 600 v. |
| C21 | BE10020 | .1 x 200 v. |
| C22 | BE10068 | .003 x 1400 v. |
| C23 | BE10040 | .5 x 120 v. |
| C24 | BE11985 | 20 mfd.—25 w. v. lytic |
| C25 | BE10040 | .5 x 120 v. |
| C26 | BE10019 | .006 x 600 v. |
| C27 | BE11985 | 30 mfd.—200 w. v. lytic |
| C28 | BE11985 | 30 mfd.—200 w. v. lytic C24, 27, 28 in same unit |
| | | **PARTS** |
| T1 | BE111121 | Antenna Coil |
| T2 | BE110117 | Oscillator Coil |
| T3 | BE108111-I | Input I. F. |
| T4 | BE108112E | Output I. F. |
| T5 | BE10569C | Output Transformer |
| T6 | BE114162J | 6 in. P. M. Speaker |
| T7 | BE104165 | AC Power Transformer |
| T8 | BE104164 | Vibrator Transformer |
| | BE12616 | Vibrator |
| L1 | BE1233 | R. F. Choke |
| L2 | BE1233 | R. F. Choke |
| L3 | BE10568 | "A" Choke |
| S1 | BE12576 | Wave Band Switch |
| S2 | BE12577 | Pilot Light Switch |
| S3 | | Off-on switch on tone control |
| P1 | BE10789 | Pilot light 6.3 v.—150 ma.—T-40 |

Schematics
Voltage

# NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 7A, Chassis RE44
MODEL 44C, Chassis RE46

## ARVIN CAR RADIO CHASSIS RE44




| RESISTORS | | | |
|---|---|---|---|
| P | OHMS | W | PART NO |
| 5 | 500K | 1/4 | 17-2070 |
| 9 | 1M | 1/4 | 17-2080 |
| 49 | 500K | VC | 17-14538 |
| 63 | 25K | 1/4 | 17-14091 |
| 170 | 800 | 1 | 17-14287 |
| 171 | 15M | 1/4 | 17-14288 |
| 172 | 100 | 1/4 | 17-14289 |
| 173 | 200 | 1/4 | 17-14290 |
| 174 | 20K | 1/4 | 17-14291 |
| 175 | 40K | 1/4 | 17-14292 |
| 177 | 650 | 1/4 | 17-14296 |

| CONDENSERS | | | | |
|---|---|---|---|---|
| C | CAPACITY | VOLT | PART NO | |
| 1 | TWO GANG VARIABLE | | 29-18254 | |
| 2 | | | | |
| 165 | .005 | 1200 | 17-14230 | |
| 183 | .003 | 600 | 17-14294 | |
| 189 | .0005 | MO | 17-14266 | |
| 191 | .01 | 400 | 17-14272 | |
| 192 | .00025 | 600 | 17-14273 | |
| 193 | .05 | 200 | 17-14274 | |
| 195 | .05 | 400 | 17-14275 | |
| 196 | .1 | 200 | 17-14277 | |
| 197 | .0001 | 600 | 17-14278 | |
| 199 | .02 | 200 | 17-14283 | |
| 201 | .5 | 150 | 17-14285 | |
| 203 | .2 | 200 | 17-18242 | |
| 206 | 10-10MFD | 300 | 17-14287 | |
| 208 | 20MFD. | 15 | | |
| 188 | .002 | 400 | 17-14234 | |

| CHOKES & TRANSFORMERS | | |
|---|---|---|
| T-N | TYPE | PART NO |
| 1 | ANTENNA COIL | 00-16219 |
| 2 | OSCILLATOR COIL | 00-16220 |
| 3 | FIRST I.F. COIL | 00-16283 |
| 4 | SECOND I.F. COIL | 00-16284 |
| 5 | POWER TRANS. | 00-16285 |
| 6 | OUTPUT TRANS | 00-16286 |
| X | CHOKES | |
| 2 | SUPPRESSION CHOKE | 29-13459 |

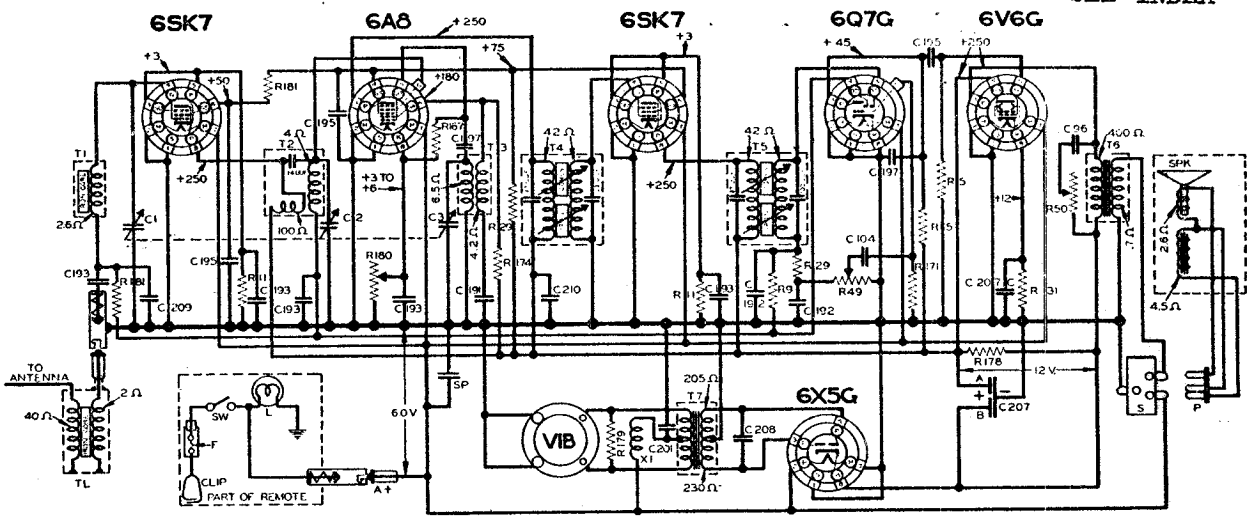
| MISCELLANEOUS UNITS | | |
|---|---|---|
| SYMBOL | DESCRIPTION | PART NO |
| F | FUSE - 20 AMP | 17-2228 |
| L | DIAL LIGHT BULB - MAZDA NO. 51 | 17-13904 |
| P | SPEAKER PLUG | 17-4780 |
| S | SPEAKER SOCKET | 17-15631 |
| SPK | SPEAKER ASSEMBLY | 17-13370 |
| SW | POWER SWITCH | |
| TL | TRANSMISSION LINE | 00-16233 |
| SP | SPARK PLATE | |
| VIB | VIBRATOR | 17-14747 |

I.F. PEAK 455 K.C
FREQUENCY RANGE 1575 TO 540 K.C
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA

MODEL 7A

## ARVIN CAR RADIO CHASSIS RE46

FOR ANTENNA DATA SEE INDEX




| | | | |
|---|---|---|---|
| R5--500K | R171--15M | C96--.05-600v. | C207A) 10mfd.-400v. |
| R9--1M | R174--20K | C104-.01-200v. | C207B |
| R11-2K | R178-1200 | C191-.01-400v. | C207C 20mfd.-25v. |
| R29-50K | R179--100 | C192-.00025-200v. | C208--.005-1600v. |
| R31-260 | R180-2000 | C193-.05-200v. | C209-.001725-600v. |
| R49-500K | R181-100K | C195-.05-400v. | C210--.1-400v. |
| R50-100K | A111/4 W. | C197-.0001-600v. | F-fuse-20 amp. |
| R167-60K | but R31-1/2. | C201-.5-150v. | L-Mazda No.51 |

INTERMEDIATE FREQUENCY 170 K.C.
FREQUENCY RANGE 1570 TO 540 K.C.
NOBLITT-SPARKS INDUSTRIES, INC.,
COLUMBUS, INDIANA.

MODEL 44C

NOTE - ALL VOLTAGES GIVEN FOR "A" INPUT OF 6 VOLTS. ALLOWE 10% ON ALL VOLTAGES & RESISTANCES OF WINDING.

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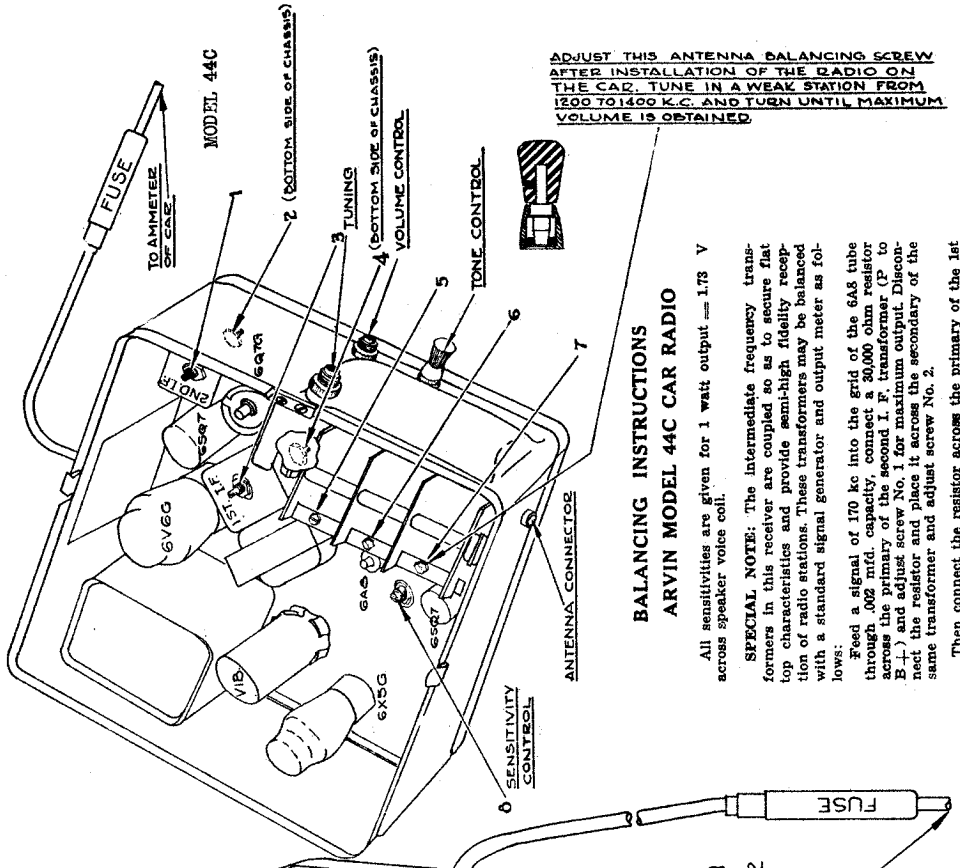
MODEL 7A, Chassis RE44
MODEL 44C, Chassis RE46

# NOBLITT-SPARKS INDUSTRIES, INC.

Alignment, Socket Sensitivity Trimmers




## BALANCING INSTRUCTIONS
## ARVIN MODEL 44C CAR RADIO

All sensitivities are given for 1 watt output = 1.73 V across speaker voice coil.

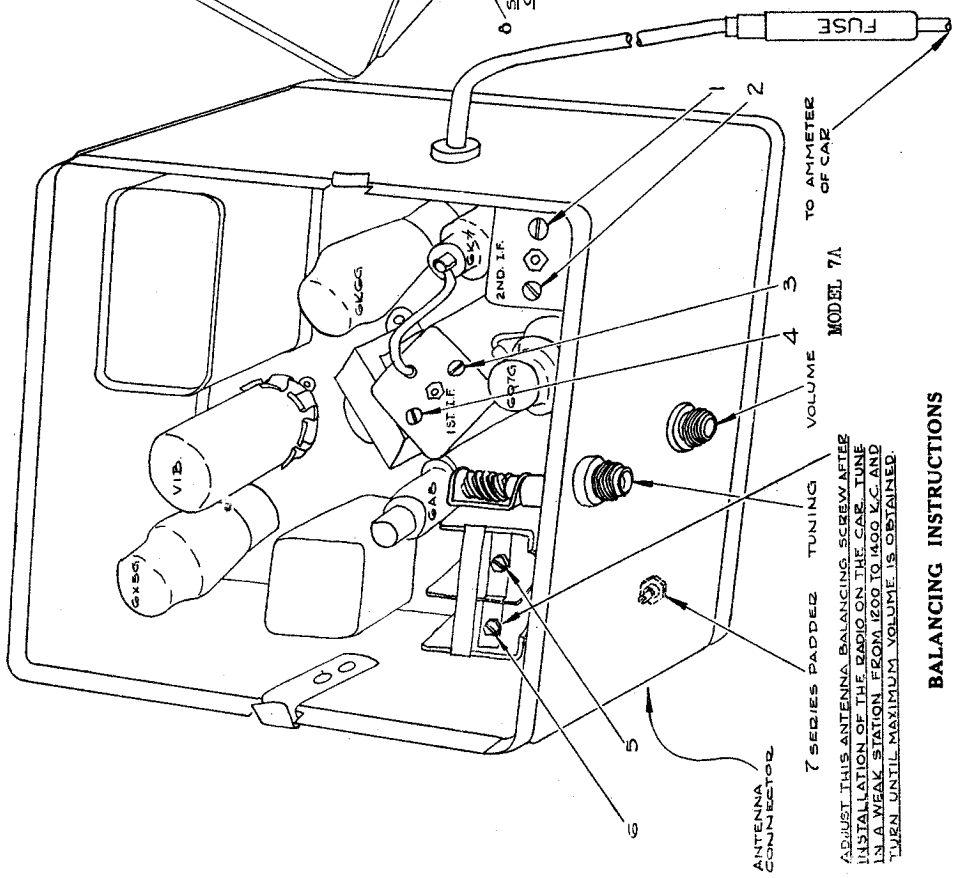
**SPECIAL NOTE:** The intermediate frequency transformers in this receiver are coupled so as to secure flat top characteristics and provide semi-high fidelity reception of radio stations. These transformers may be balanced with a standard signal generator and output meter as follows:

Feed a signal of 170 kc into the grid of the 6A8 tube through .002 mfd. capacity, connect a 30,000 ohm resistor across the primary of the second I. F. transformer (P to B+) and adjust screw No. 1 for maximum output. Disconnect the resistor and place it across the secondary of the same transformer and adjust screw No. 2.

Then connect the resistor across the primary of the 1st I. F. transformer and adjust screw No. 3 and then after placing the resistor across the secondary, adjust screw No. 4.

| Operation No. | Connect Bal. Oscillator To | Bal. Oscillator Frequency | Adjust Padder No. | Dial Setting | Sensitivity |
|---|---|---|---|---|---|
| 1 (See note above) | 6A8 Grid | 170 kc | 1, 2, 3 & 4 | Condenser Closed | 700 uv |
| 2 | Ant. Coupler | 1570 kc | 5 | Condenser Open | — |
| 3 | Through 20 uuf | 1400 kc | 6 & 7 | 1400 kc | 5 uv |
| *4 | Through 20 uuf | 600 kc | 8 | 600 kc | 3.5 uv |

*Operation No. 4 adjusts bias on 6A8 to obtain 5 uv sensitivity; for metropolitan areas this sensitivity may be set as low as 10 uv, and in mountainous areas as high as 1 uv. to secure the most satisfactory reception.




## BALANCING INSTRUCTIONS
## ARVIN MODEL 7A CAR RADIO

All sensitivities given for ½ watt output equals 1.4 V. across Voice Coil

| Operation No. | Connect Bal. Oscillator To | Bal. Oscillator Frequency | Adjust Padder No. | Dial Setting | Sensitivity |
|---|---|---|---|---|---|
| 1 | 6A8 Grid | 455 | 1, 2, 3 and 4 | 550 KC | 50 uv |
| 2 | Ant. Coupler | 1400 | 5 | 1400 | |
| 3 | Through 20 uuf | 1400 | 6 | 1400 | 10 uv |
| 4 | " | 600 | 7 | 600 | 10 uv |

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MODELS 828AT,838AT
Alignment,Tuner Data
Sensitivity

# NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 7A
MODEL 8A
MODEL 44C
Antenna Data

## ARVIN 828AT-838AT AUTOMATIC DIAL TUNING INDICATOR

This receiver should first be removed from its carton and the cabinet carefully cleaned with a soft rag to remove packing lint.

The hook bolts or clips which secure the chassis to the cabinet to hold it rigidly during shipment should next be removed. One will be found on each side of the chassis. Do not confuse these with the brackets which suspend the chassis through rubber grommets. These latter brackets should not be molested unless it is necessary to service the receiver.

The receiver may be prepared for operation by connecting an antenna lead at "A" on the rear terminal strip and connecting a ground lead at "G", leaving the jumper from "D" to "G" in place; or by removing the jumper and connecting the transmission line lead from an Arvin all-wave antenna kit. (Black lead to "D" and red lead to "A".) Plug the line cord into a suitable receptacle.

Make a list of ten stations in your locality which you desire to set up on the station selector, arranging this list so that the stations appear in the order of their frequencies. Cut the call letters of these stations from the sheets supplied with this receiver, leaving a white tab on each end of the piece cut out.

The receiver is placed in operation by turning the right-hand knob in a clockwise direction. This knob also functions as a tone control. The second knob to the left should be turned to the maximum counter-clockwise or manual tuning position.

Tune in the first station on your list, using the tuning indicator to determine whether station is properly tuned in. Change the Manual-Automatic Tuning switch to the automatic tuning position. Unless one of the buttons about to be adjusted happens to be set at this point the receiver will now appear to be inoperative. (In event a button does happen to be set at the proper point—no adjustment is necessary. If the pilot light is not in proper rotation, the sockets may be exchanged from the rear.) Looking at the rear of the dial and on the side toward which the pointer is now pointing, locate the button in the circular slot whose lead goes to the lowest pilot light on that side of the dial. Loosen this button by means of a turn in the counter-clockwise direction and slide the button in its track slowly until a point is reached where the receiver operates. The correct location for this button is directly behind the brass strip carried by the arm behind the plate on which the buttons are mounted. If this correct location cannot be attained by sliding the button in the particular track it now occupies, the button should be slid along this track to the point where it may be taken out and inserted in a track where this adjustment is possible.

The Manual-Automatic Tuning switch should now be returned to the Manual position; the second station on the list tuned in; the Manual-Automatic Tuning switch again thrown to the Automatic Tuning position; the button at the rear of the dial selected whose lead goes to the second pilot light; this button should be loosened, slid along the track and again tightened at the point where the receiver operates.

This same procedure should be continued for each station successively right around the dial, which then completes the set-up.

The switch may now be turned to the Automatic Tuning position. Tune in each station again, placing the proper call letters in each clip, inserting them from the rear of the receiver and at the edge of the dial frame. Push the call letter strips in so that they properly center in each window when viewed from the front.

This Arvin receiver has special advanced features which must be properly understood in order that full benefit may be derived from this fine instrument.

When the receiver is being operated with the Manual-Automatic Tuning switch in the manual position, the receiver tunes sharply and any station within the range of the receiver may be selected at will. Tonal quality to suit the taste of the listener may be obtained by adjustment of the tone control.

On the other hand, when the Manual-Automatic Tuning switch is in the automatic tuning position, the receiver functions in an entirely different manner. Throwing this switch automatically broadens the selectivity characteristics of the receiver.

It should be noted that this broad selectivity will only function satisfactorily on the louder stations, that is, those which are normally selected for use on the Arvin-Station-Selector. (This broadened selectivity is not practical in the manual tuning position because of inter-station interference which would inevitably result.)

Should the listener so desire, this increased fidelity can be compensated for by readjusting the setting of the tone control.

When this receiver is being operated on the police-amateur or foreign-short wave band, tuning should always be done manually and no attempt made to utilize the station selector feature which has been set up for the broadcast band.

## BALANCING INSTRUCTIONS
## MODELS 828AT and 838AT

**SENSITIVITY:**

A. Broadcast Band—50 Microvolts Minimum
B. Police Band—75 Microvolts Minimum
C. Short Wave Band—100 Microvolts Minimum

**NOTE: Standard output is considered 500 milliwatts which is equal to 1.12 R.M.S. AC volts across the voice coil of the speaker. Sensitivity is determined by the amount of input in microvolts required to produce 1.12 volts at the voice coil. Measurement may be made with any AC voltmeter or output meter.**

**The intermediate frequency transformers embodied in the circuit of Arvin Models 828AT-838AT are of the semi-permatune type, the only adjustment being variable iron cores in the fields of the transformers. It is advisable before attempting to rebalance the intermediate stages of this receiver, therefore, to check the overall intermediate frequency stage sensitivity. This may be accomplished by connecting the 455 K. C. output of a standard signal generator to the grid cap of the 6A8G tube after removing the grid clip. Connection should be made through a standard 200 uuf. dummy antenna. Check sensitivity and perform all balancing procedure with the automatic tuning in the "off" position. The intermediate frequency sensitivity should be at least 75 microvolts for 50 milliwatts output. If the I. F. sensitivity is within the limits prescribed the following instructions for balancing may then be followed.**

**If the I. F. sensitivity is low then adjust screws 1, 2, 3 and 4 for maximum output.**

1. **Connect the signal generator to the A and G terminals on the rear of the radio. Rotate the condenser until it is fully in mesh (maximum clockwise position.) The dial pointer should point to the center of the station window which is alongside 550 kilocycles (55 on the American broadcast band.)**
2. **Rotate dial pointer to 1,400 K. C. Set band switch to Broadcast Position. Adjust padder No. 5 to resonance. Adjust padder No. 6 for maximum output.**
3. **Rotate dial pointer to 600 K. C. With 600 K. C. input from the signal generator adjust padder No. 7 for resonance.**
4. **Set band switch to mid-band position. Rotate dial pointer to 5.0 megacycles. With 5,000 K. C. input from signal generator adjust padder No. 8 for resonance. Adjust padder No. 9 for maximum output.**
5. **Set band switch to short-wave band position. Rotate dial pointer to 15.0 megacycles. With 15 megacycles input from signal generator turn padder No. 10 to the extreme clockwise position. Then rotate padder screw counter-clockwise selecting the second resonance point reached. Then adjust padder No. 11 for maximum output.**

## ARVIN MODELS 7A, 8A, AND 44C, ANTENNAS A22, A23 and A24

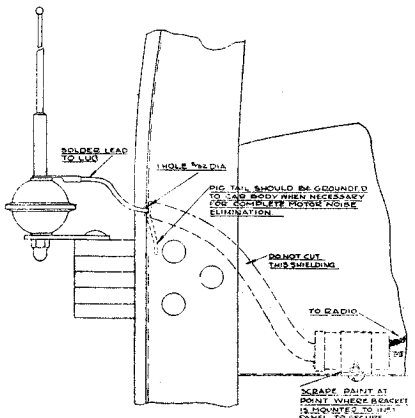
SOLDER LEAD TO LUG
1 HOLE 3/32 DIA
PIG TAIL SHOULD BE GROUNDED TO CAR BODY WHEN NECESSARY FOR COMPLETE MOTOR NOISE ELIMINATION
DO NOT CUT THIS SHIELDING
TO RADIO
SCRAPE PAINT AT POINT WHERE BRACKET IS MOUNTED TO INSURE GOOD GROUND

**FIG-1**
INSTALLATION FOR DOOR HINGE ANTENNA

**Antenna:**

Arvin antennae A22, A23 and A24 are recommended for use with the Arvin Model 7A Radio. These antennae are supplied with special connector shield cups to provide for good motor noise elimination.

The use of UNDER CAR or built in ROOF TYPE ANTENNA is not recommended nor will satisfactory reception be obtained if this type antennae is used.

The Phantom Filter should be mounted as shown in Figure 1 if a door hinge type antenna is used. Fig 2 illustrates the proper connections for the side cowl type Arvin Antenna and the Arvin Phantom Filter.

**Installation:**

A clear space, preferably above the steering column, approximately 8½" square and free of obstructions is required for mounting the model 7A radio chassis.

Remove the cap screw in the rear of the radio chassis and insert the stud, (supplied in the hardware envelope) in its place. Drill a ½" hole in the center of the space selected for the chassis.

Scrape the paint from the motor side of the dash around the ½" hole to secure a good ground for the mounting stud.

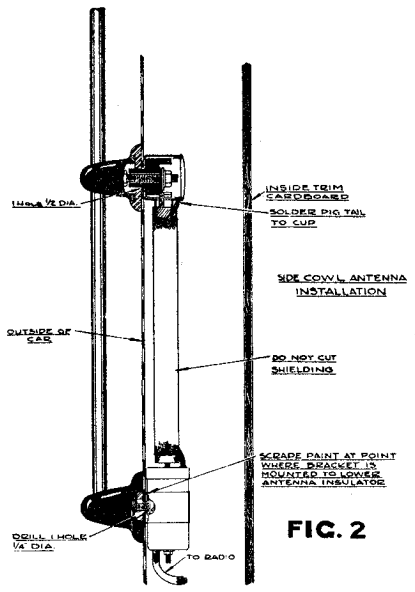
1 HOLE 1/2 DIA
INSIDE TRIM CARDBOARD
SOLDER PIG TAIL TO CUP
SIDE COWL ANTENNA INSTALLATION
OUTSIDE OF CAR
DO NOT CUT SHIELDING
SCRAPE PAINT AT POINT WHERE BRACKET IS MOUNTED TO LOWER ANTENNA INSULATOR
DRILL 1 HOLE 1/4 DIA
TO RADIO

**FIG. 2**

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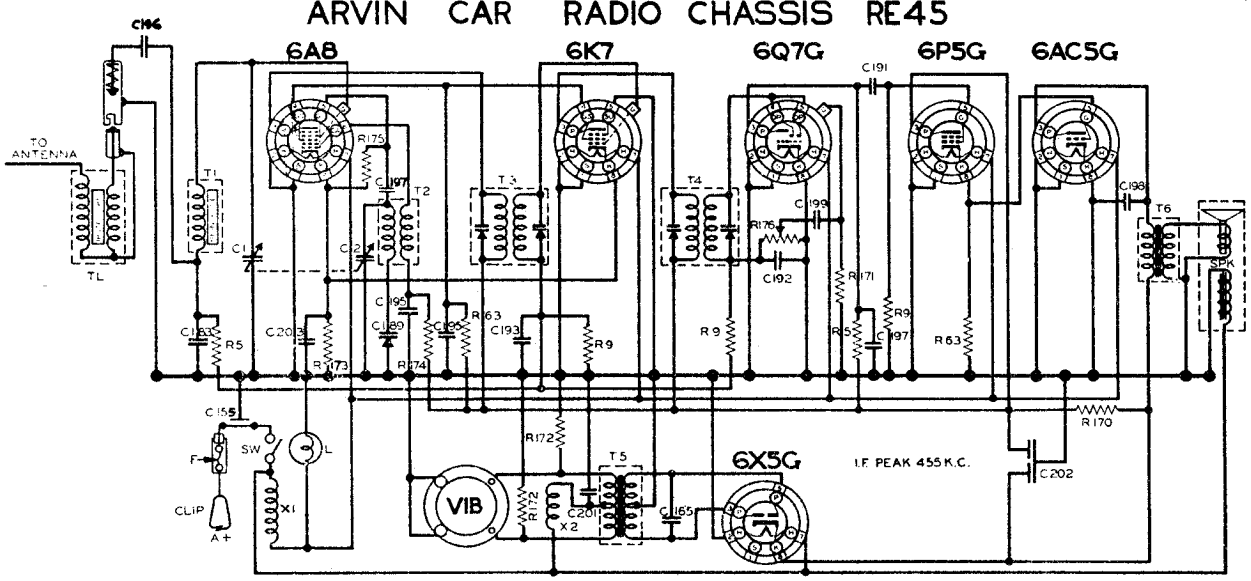
MODEL 8A
Chassis RE 45
Schematic

# NOBLITT-SPARKS INDUSTRIES, INC.

Alignment
Socket
Trimmers

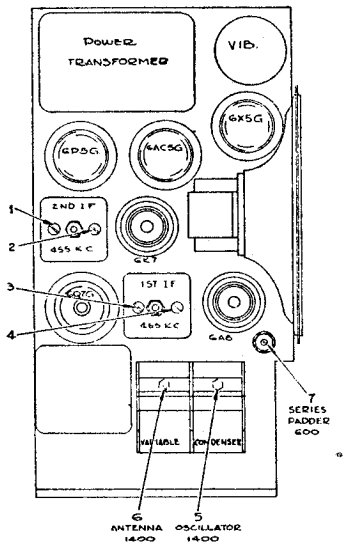
## ARVIN CAR RADIO CHASSIS RE45




## BALANCING INSTRUCTIONS:

All sensitivities given for ½ watt output = 1.4 V. across Voice Coil

| Operation No. | Connect Bal. Oscillator to | Bal. Oscillator Frequency | Adjust Padder No. | Dial Setting | Sensitivity |
|---|---|---|---|---|---|
| 1 | 6A8 Grid | 455 | 1, 2, 3 & 4 | 550 KC | 50 uv |
| 2 | Ant. Coupler Through 20 uuf | 1400 | 5 | 1400 | |
| 3 | " | 1400 | 6 | 1400 | 10 uv |
| 4 | " | 600 | 7 | 600 | 10 uv |




### RESISTORS:

| Ref. No. | Part No. | Description |
|---|---|---|
| R5 | 17-2070 | 500,000 ohm, ¼ W. |
| R9 | 17-2080 | 1,000,000 ohm, ¼ W. |
| R63 | 17-14091 | 25,000 ohm, ¼ W. |
| R170 | 17-14287 | 800 ohm, 1 W. |
| R171 | 17-14288 | 15,000,000 ohm, ¼ W. |
| R172 | 17-14289 | 100 ohm, ¼ W. |
| R173 | 17-14290 | 200 ohm, ¼ W. |
| R174 | 17-14291 | 20,000 ohm, ¼ W. |
| R175 | 17-14292 | 40,000 ohm, ¼ W. |
| R176 | 17-16225 | 500,000 ohm, vol. control |

### CONDENSERS:

| Ref. No. | Part No. | Description |
|---|---|---|
| C182 | 29-16217 | Tuning Condenser |
| C155 | 17-14217 | .0002 mfd. 600 V. |
| C165 | 17-14230 | .005 mfd. 1200 V. |
| C183 | 17-14294 | .003 mfd. 600 V. |
| C189 | 17-14266 | .0005 mfd. padder |
| C191 | 17-14272 | .01 mfd., 400 V. |
| C192 | 17-14273 | .00025 mfd., 600 V. |
| C193 | 17-14274 | .05 mfd., 200 V. |
| C195 | 17-14276 | .05 mfd., 400 V. |
| C196 | 17-14277 | .1 mfd., 200 V. |
| C197 | 17-14278 | .0001 mfd., 600 V. |
| C198 | 17-14279 | .005 mfd., 400 V. |
| C199 | 17-14283 | .02 mfd., 200 V. |
| C201 | 17-14285 | .5 mfd. -150 V. |
| C202 | 17-15286 | 10-10 mfd., 300 V. |
| C203 | 17-16242 | 2 mfd., 200 V. |

### COILS and TRANSFORMERS:

| | | |
|---|---|---|
| T—1 | 00-16219 | Antenna Coil |
| T—2 | 00-16220 | Oscillator Coil |
| T—3 | 00-16221 | 1st. I. F. Trans. |
| T—4 | 00-16222 | 2nd I. F. Trans. |
| T—5 | 00-16223 | Power Transformer |
| T—6 | 00-16224 | Output Transformer |
| X—1 | 20-13458 | Suppression Choke |
| X—2 | 29-13459 | Suppression Choke |
| TL | 00-16233 | Phantom Filter |

FREQUENCY RANGE 1575 TO 540 K.C.
NOBLITT-SPARKS INDUSTRIES, INC,
COLUMBUS, INDIANA

FOR ANTENNA DATA
SEE INDEX

### MISCELLANEOUS:

| Part No. | Description |
|---|---|
| 17-16213 | Speaker Assembly (5¼") |
| 37-13423 | Rear Mounting Bracket |
| 61-16230 | Dial Glass |
| 26-16212 | Dial Pointer |
| 29-13583 | 24" Dial Cord |
| 17-14747 | Vibrator. |
| 29-16024 | Tuning & Volume Knob |
| 29-16232 | Push Button Knobs |
| 10-5145 | Mounting Screw $\frac{5}{16}$x1½" |
| 10-5141 | Mounting Screw No. 10 x ¾" |
| 29-3219 | Instruction Sheet |
| 29-3150 | Call Letter Sheets |
| 23-16249 | Ford Mounting Spacer |



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MODEL 578B
Alignment, Voltage Data

MODEL 9A
Voltage

NOBLITT-SPARKS INDUSTRIES, INC.

**MODEL 9A SOCKET VOLTAGES**

| Tube | Heater | Cathode | Suppressor Grid | Screen Grid | Plate | Oscillator Grid | Anode Grid | Diode Plates | Control Grid |
|---|---|---|---|---|---|---|---|---|---|
| 78 | 6.3 | 0 | 0 | 75 | 175 | ..... | ..... | ..... | 3.4 |
| 6A7 | 6.3 | 0 | ..... | 75 | 175 | 4-7 | 135 | ..... | 3.4 |
| 78 | 6.3 | 3.2 | 0 | 75 | 175 | ..... | ..... | ..... | 0 |
| 75 | 6.3 | 0 | ..... | ..... | 90 | ..... | ..... | 2.0 | 1.6 |
| 41 | 6.3 | 0 | ..... | 175 | 172 | ..... | ..... | ..... | 17.0 |
| 84 | 6.3 | 195 | ..... | ..... | 215 A. C. | ..... | ..... | ..... | ..... |

Socket voltages given in table are for an input of 5.8 volts at the tubes in the receiver. 5.8 volts is the average obtained in various cars after allowing for drop in car wiring.

FOR OTHER SERVICING DATA ON THESE MODELS SEE INDEX

## MODEL 578B ARVIN RADIO

**TUBES:** 1C7G—1st Detector-Oscillator
1D5G—I. F. Amplifier
1H6G—2nd Detector
1G5G—Audio Output Amplifier

FREQUENCY RANGE: 540 to 1,725 Kilocycles

POWER OUTPUT: 300 Milliwatts

SPEAKER:
6″ Permanent Magnet Dynamic
3 ohm voice coil—400 cycles

VOLTAGE AND POWER CONSUMPTION:
"A" Battery—360 milliamperes at 2.1 volts
"B" Battery—12-15 milliamperes at 90 volts

SENSITIVITY:
1000 KC.—100 Microvolts for 50 milliwatts output
456 KC.—200 Microvolts for 50 milliwatts output

**COIL RESISTANCES**

| | | | |
|---|---|---|---|
| Antenna Coil Primary | 14.5 Ω | 1st I. F. Secondary | 14 Ω |
| Antenna Coil Secondary | 4.4 Ω | 2nd I. F. Primary | 14 Ω |
| Oscillator Coil Primary | 4.5 Ω | 2nd I. F. Secondary | 14 Ω |
| Oscillator Coil Secondary | 4.7 Ω | Output Transformer Primary | 800 Ω |
| 1st I. F. Primary | 14 Ω | Output Transformer Secondary | .3 Ω |

**POINT TO POINT RESISTANCES**

**1C7G**

| | |
|---|---|
| Filament | 0 Ω |
| Filament | ∞ |
| Screen to B+ | 15,000 Ω |
| Oscillator Grid | 50,000 Ω |
| Anode Grid to B+ | 0 Ω |
| Control Grid | 2,500,000 Ω |
| Plate to B | 15 Ω |

**1D5G**

| | |
|---|---|
| Filament | 0 Ω |
| Filament | ∞ |
| Screen to B+ | 15,000 Ω |
| Plate to B+ | 15 Ω |
| Control Grid | 2,500,000 Ω |

**1H6G**

| | |
|---|---|
| Filament | 0 Ω |
| Filament | ∞ |
| Plate to B+ | 250,000 Ω |
| Diode Plates | 500,000 Ω |
| †Grid | 500,000 Ω |

**1G5G**

| | |
|---|---|
| Filament | 0 Ω |
| Filament | ∞ |
| Screen to B+ | 800 Ω |
| Grid | 1,000,400 Ω |

† Volume control in full-on position.

**SOCKET VOLTAGES**
**MODEL 578B**

| Tube | Filament | Plate | Screen Grid | Oscillator *Grid | Anode Grid | Diode *Plates | Control *Grid |
|---|---|---|---|---|---|---|---|
| 1C7G | 2.1 | 84 | 45 | 3-6V | 84 | ..... | 0 |
| 1D5G | 2.1 | 84 | 45 | ..... | ..... | ..... | 0 |
| 1H6G | 2.1 | 35 | ..... | ..... | ..... | 0 | 0 |
| 1G5G | 2.1 | 84 | 84 | ..... | ..... | ..... | —6 |

* Measured with a vacuum tube voltmeter. 600 to 1500 K. C.

No signal applied to receiver; with 100,000 microvolts to input diode voltage approximately 12 volts.

## BALANCING INSTRUCTIONS

CONNECT an output meter or A. C. Voltmeter across the speaker coil leads.

1. Connect the signal generator to the grid cap of the 1C7G tube and with an input of 456 K. C. adjust padders 1, 2, 3 and 4 for maximum output.
2. Connect the signal generator through a standard 200 micromicrofarad dummy antenna to the antenna (green) lead wire on the rear of the chasis. Ground the generator to the (black) ground wire.
3. Rotate the tuning condenser to the wide open position. Check the dial pointer to see that it is parallel to the horizontal line across the dial face.
4. Rotate the dial pointer to 1,400 K. C. and with an input of that frequency adjust padder No. 5 to resonance. Adjust padder No. 6 for maximum output.
5. Rotate the dial pointer to 600 K. C. and with an input of that frequency adjust the series padder No. 7 to resonance.
6. Return to 1,400 K. C. and recheck the settings of padders No. 5 and No. 6.

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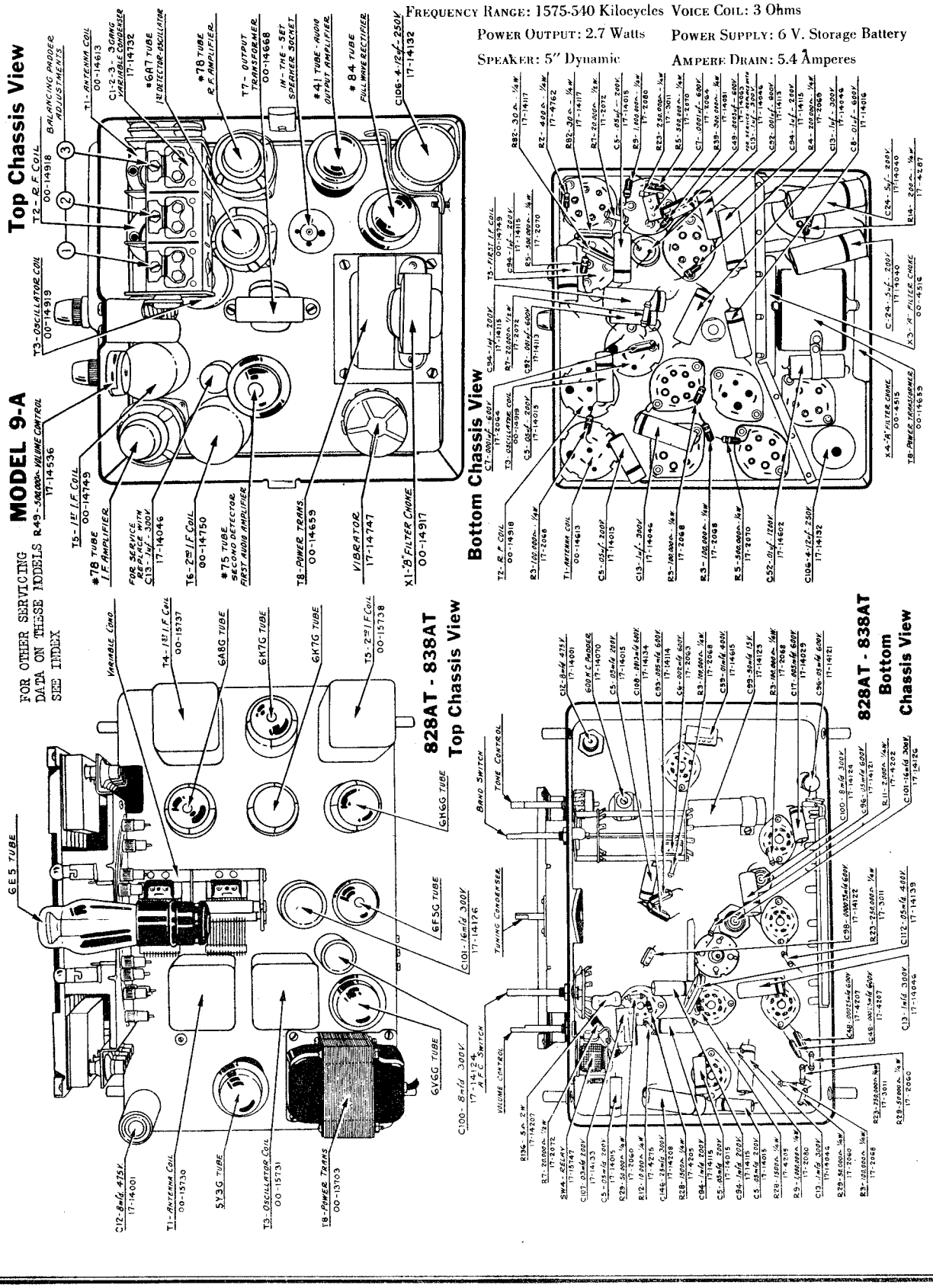
MODEL 9A
MODELS 828AT,838AT NOBLITT-SPARKS INDUSTRIES, INC.
Socket,Trimmers
Chassis


MODEL 9-A
FREQUENCY RANGE: 1575-540 Kilocycles VOICE COIL: 3 Ohms
POWER OUTPUT: 2.7 Watts POWER SUPPLY: 6 V. Storage Battery
SPEAKER: 5" Dynamic AMPERE DRAIN: 5.4 Amperes
Top Chassis View
Bottom Chassis View
828AT - 838AT Top Chassis View
828AT - 838AT Bottom Chassis View
FOR OTHER SERVICING DATA ON THESE MODELS SEE INDEX

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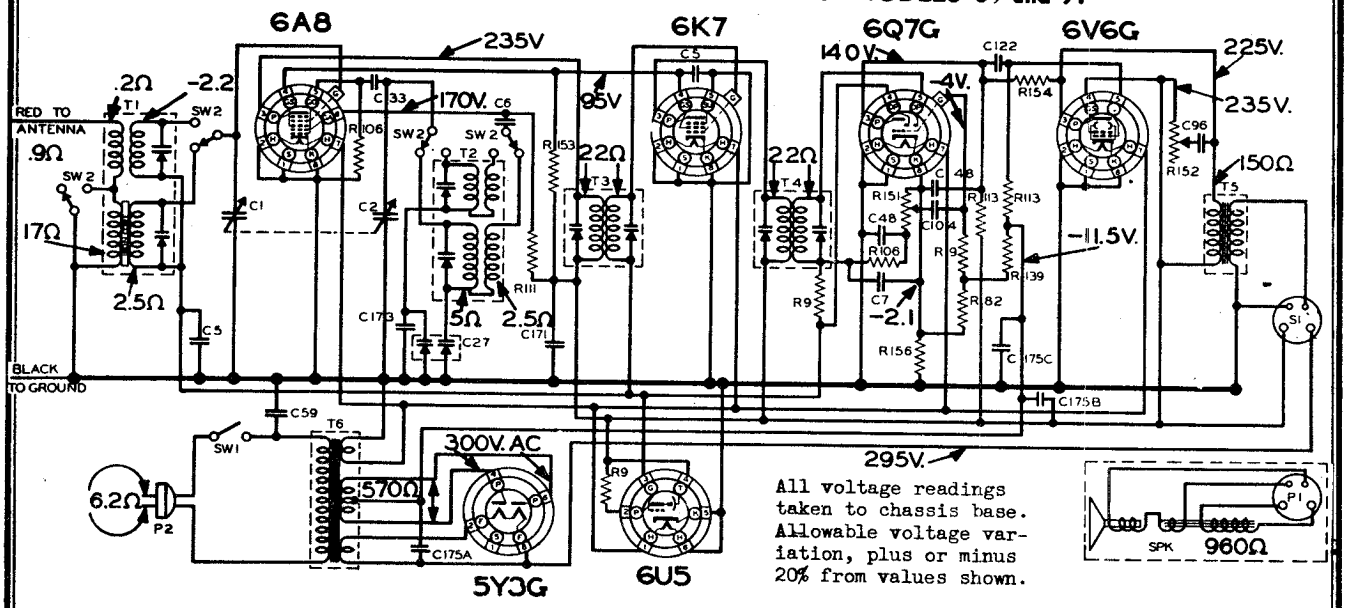
Alignment, Trimmers
Sensitivity

# NOBLITT-SPARKS INDUSTRIES, INC.

MODELS 89, 91
Chassis RE27
Schematic, Voltage

## ARVIN RADIO CHASSIS RE27 — RADIO MODELS 89 and 91




All voltage readings taken to chassis base. Allowable voltage variation, plus or minus 20% from values shown.

### RESISTORS

| Ref. No. | Part No. | Description | Price |
|---|---|---|---|
| R9 | 17-2080 | 1,000,000 ohm, 1/4 Watt | .20 |
| R82 | 17-14117 | 30 ohm, 1/4 watt | .20 |
| R106 | 17-14171 | 50,000 ohm, 1/4 watt | .20 |
| R111 | 17-14176 | 20,000 ohm, 1/4 watt | .20 |
| R113 | 17-14178 | 250,000 ohm, 1/4 watt | .20 |
| R139 | 17-14219 | 100 ohm, 1 watt | .30 |
| R153 | 17-14243 | 30,000 ohm, 1/2 watt | .20 |
| R154 | 17-14244 | 1,500,000 ohm, 1/4 watt | .20 |
| R156 | 17-14246 | 35 ohm, 1/4 watt | .20 |

### CONDENSERS

| Ref. No. | Part No. | Description | Price |
|---|---|---|---|
| C6 | 17-2063 | .002 mfd. 600V | .25 |
| C7 | 17-2064 | .0001 mfd. 600V | .25 |
| C122 | 17-2189 | .01 mfd. 400 V | .35 |
| C104 | 17-4206 | .01 mfd. 200 V | .30 |
| C48 | 17-4207 | .00025 mfd. 600 V | .25 |
| C27 | 17-13077 | Series Padder | .60 |
| C5 | 17-14015 | .05 mfd. 200 V | .30 |
| C33 | 17-14047 | .00005 mfd. 600 V | .25 |
| C96 | 17-14121 | .05 mfd 600 V | .40 |
| C171 | 17-14238 | .1 mfd. 400 V | .40 |
| C173 | 17-14247 | .003 mfd. 600V | .25 |
| C175 A,B,& C | 17-14249 | 10-10 mfd.450V 20 mfd. 25V | 3.00 |
| C59 | 17-14615 | .01 mfd. 400V | .35 |
| C1,2 & 3 | 17-16005 | Tuning Condenser | 4.00 |

### COILS AND TRANSFORMERS

| Ref. No. | Part No. | Description | Price |
|---|---|---|---|
| T6 | 00-15995 | Power Transformer | 4.50 |
| T5 | 00-15996 | Output Transformer | 1.75 |
| T1 & 2 | 00-15997 | Antenna & Oscillator Coil Assembly | 3.00 |
| T3 | 00-15998 | 1st I.F. Transformer | 1.50 |
| T4 | 00-15999 | 2nd I.F. Transformer | 1.50 |

### SPEAKER, DIAL PARTS, CABINET & MISCELLANEOUS

| Part No. | Description | Price |
|---|---|---|
| 29-3188 | Instruction sheet | .02 |
| 28-5186 | Dial Drive Pulley ( rubber ) | .10 |
| 17-13249 | Speaker socket | .15 |
| 29-13583 | Dial Drive Cord | .10 |
| 34-13660 | Dial Drive Cord Spring | .05 |
| 17-13875 | Tuning Eye Cable | .60 |
| 17-13904 | Dial Light (M-51) | .15 |
| 17-15791E | 110 V. Line Cord | .40 |
| 29-15981A | Dial Pointer | .15 |
| 61-16000 | Dial Glass | 1.00 |
| 17-16007 | Band Switch | .75 |
| 17-16008 | Volume Control | .75 |
| 17-16009 | Tone Control | 1.00 |
| 29-16013 | Knob (Pushbutton) | .10 |
| 41-16030 | Electric Eye Escutcheon | .25 |
| 41-16031 | Escutcheon Plate (Dial) | 1.50 |
| 41-16032 | Escutcheon Plate (Pushbutton) | .35 |
| 17-16047 | Speaker 8" | 6.50 |
| 27-16115 | Cabinet Model 89 | 15.00 |
| 27-16122 | Cabinet Model 91 | 30.00 |
| 29-16123 | Knob (Tuning and volume) | .15 |

### BALANCING INSTRUCTIONS

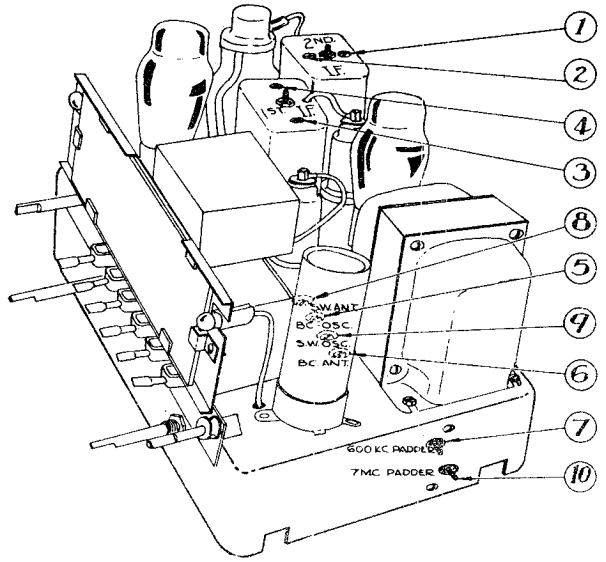
ARVIN MODELS 89, 91 - - RE27 CHASSIS

All sensitivities given for 200 milliwatts output = .78 V across voice coil

| Operation No. | Connect Sig. Generator To | Input Frequency | Adjust Padder No. | Dial Setting | Band Switch Position | Sensitivity |
|---|---|---|---|---|---|---|
| 1 | 6A8 Grid | 455 KC | 1,2,3,& 4 | 600 KC | Broadcast | 70 uv |
| *2 | Antenna Wire | 1400 KC | 5 | 1400 KC | Broadcast | ------- |
| 3 | Antenna Wire | 1400 KC | 6 | 1400 KC | Broadcast | 25 uv |
| **4 | Antenna Wire | 600 KC | 7 | 600 KC | Broadcast | 40 uv |
| 5 | Antenna Wire | 15 MC | 8 | 15 MC | Short Wave | ------- |
| 6 | Antenna Wire | 15 MC | 9 | 15 MC | Short Wave | 120 uv |
| 7 | Antenna Wire | 7 MC | 10 | 7 MC | Short Wave | 150 uv |

* Dial pointer should be parallel with horizontal line across center of dial with tuning condenser in closed position (maximum capicity) before proceeding with adjustments.

** After balancing 600 KC padder, return and recheck the adjustments of padders 5& 6

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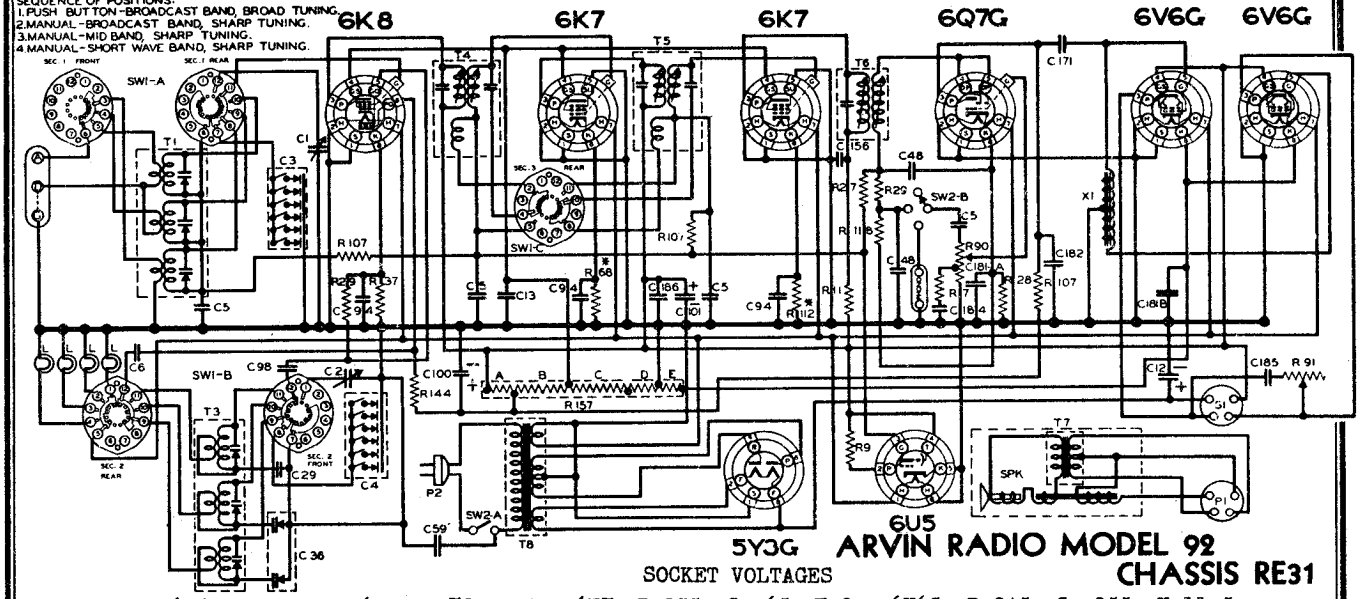
MODEL 92
Chassis RE31
Schematic, Alignment

# NOBLITT-SPARKS INDUSTRIES, INC.

Trimmers
Sensitivity




## ARVIN RADIO MODEL 92 CHASSIS RE31

SOCKET VOLTAGES

6K8: P-255; Gs-65; Po-70; K-2. 6K7: P-255; Gs-65; K-2. 6V6G: P-245; Gs-255; K-11.5
5Y3G:P-380AC; P-380AC; K-300. 6K7; P-255;Gs-65; K-5. 6Q7: P-115; K-2.
6V6G: P-245; Gs-255; K-11.5. 6U5: *P-255; T-255; K-0.

* Through 1 megohm resistor. Voltage Divider:A=1650; B=6310; C=4230; D=145; E=170.
Speaker Field = 600 ohms.

RESISTORS

| Ref. No. | Part No. | Description | Price |
|---|---|---|---|
| R29 | 17-2060 | 50,000 ohm, 1/4 watt | .20 |
| R7 | 17-2072 | 20,000 ohm, 1/4 watt | .20 |
| R9 | 17-2080 | 1,000,000 ohm, 1/4 watt | .20 |
| R11 | 17-4202 | 2,000 ohm, 1/4 watt | .20 |
| R28 | 17-4205 | 1,500 ohm,1/4 watt | .20 |
| R68 | 17-4290 | 8,000 ohm, 1/4 watt | .20 |
| R27 | 17-4788 | 2,000 ohm, 1/4 watt | .20 |
| R37 | 17-14033 | 300 ohm, 1/4 watt | .20 |
| R107 | 17-14172 | 100,000 ohm, 1/4 watt | .20 |
| R112 | 17-14177 | 500 ohm, 1/4 watt | .20 |
| R118 | 17-14183 | 300,000 ohm, 1/4 watt | .20 |
| R144 | 17-14231 | 40,000 ohm, 1/4 watt | .20 |
| R157 | 17-14251A | 12,500 ohm tapped res. | 1.50 |

CONDENSERS

| Ref. No. | Part No. | Description | Price |
|---|---|---|---|
| C6 | 17-2063 | .002 mfd. 600V | .25 |
| C48 | 17-4207 | .00025 mfd. 600V | .25 |
| C5 | 17-14015 | .05 mfd. 200V | .30 |
| C12 | 17-14001 | 8 mfd. 475 V | .75 |
| C29 | 17-14022 | .005 mfd. 600 V | .35 |
| C13 | 17-14046 | .1 mfd. 300 V. | .35 |
| C36 | 17-14054 | Series Padder Condenser | .75 |
| C156 | 17-4397 | .05 mfd. 400 V. | .35 |
| C94 | 17-14115 | .1 mfd. 200 V. | .40 |
| C98 | 17-14122 | .000075 mfd. 600 V. | .30 |
| C100 | 17-14124 | 8 mfd. 300 V. | .75 |
| C101 | 17-14126 | 16 mfd. 300 V. | .90 |
| C171 | 17-14238 | .1 mfd. 400 V. | .40 |
| C181 A&B | 17-13280 | 4 mfd. 15V. 50 mfd. 25V. | 1.25 |
| C182 | 17-14261 | .0002 mfd. 600 V. | .25 |
| C184 | 17-14263 | .03 mfd. 200 V. | .30 |
| C185 | 17-14265 | .03 mfd. 600 V. | .40 |
| C59 | 17-14615 | .01 mfd. 400 V. | .35 |
| C1&2 | 17-15965 | Tuning Condenser | 4.50 |
| C3&4 | 17-15967 | Six section Push button condenser assembly | 5.50 |

COILS & TRANSFORMERS

| | | | |
|---|---|---|---|
| X1 | 00-15966 | Input Choke (Audio) | 2.20 |
| T8 | 00-15972 | Power Transformer | 5.00 |
| T7 | 17-16050 | Output Transformer | 2.00 |
| T1 | 00-16078 | Antenna Transformer | 2.60 |
| T3 | 00-16079 | Oscillator Coil | 2.75 |
| T4 | 00-16080 | 1st I. F. Transformer | 1.75 |
| T5 | 00-16081 | 2nd I. F. Transformer | 1.75 |
| T6 | 00-16082 | 3rd I. F. Transformer | 1.50 |

SPEAKER, DIAL PARTS, CABINET & MISCELLANEOUS

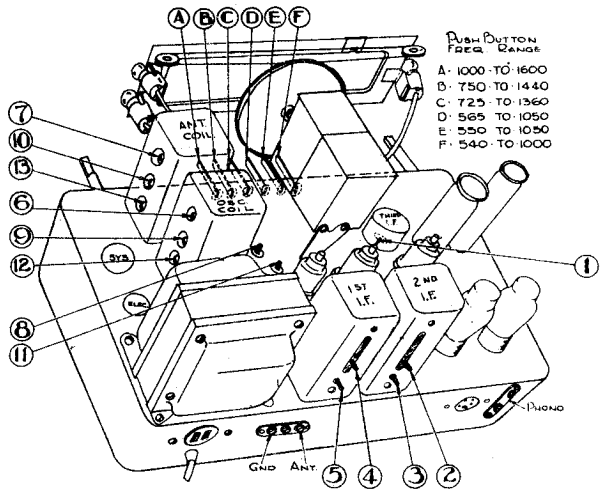
| | | | | | |
|---|---|---|---|---|---|
| 61-16017 | Dial Glass (Broadcast) | .75 | 29-3167 | Call letter sheets | .40 |
| 61-16018 | Dial Glass (Mid Band) | .50 | 29-3189 | Carton | 1.50 |
| 61-16019 | Dial Glass (Short Wave) | .50 | 29-3190 | Instruction Sheet | .02 |
| 41-16030 | Escutcheon (Tuning Eye) | .35 | 17-13249 | Speaker Socket | .15 |
| 41-16051 | Escutcheon (Dial) | 1.75 | 29-13583 | Dial Drive Cord, 38" | .25 |
| 41-16052 | Escutcheon (Push Button) | .65 | 17-13761 | 110 V Outlet Socket | .65 |
| 29-16057 | Knob (Push Button) | .10 | 17-13795 | Volume Control | .75 |
| 29-16085 | Dial Pointer | .20 | 17-13796 | Tone Control | .75 |
| 17-16125 | Speaker (12") | 7.50 | 17-15731 | Line Cord & Plug | .40 |
| 27-16126 | Cabinet | 50.00 | 17-15952 | Band Switch | 2.50 |
| 29-16127 | Knob (Tuning,Volume,etc) | .15 | 17-16014 | AC, Phono-Radio Switch | .90 |

BALANCING INSTRUCTIONS

(All sensitivities given for 1 watt output = 1.73 V. across voice coil)

| Operation No. | Connect Sig. Generator To | Input Frequency | Adjust Padder No. | Dial Setting | Band Switch Position | Sensitivity (Minimum) |
|---|---|---|---|---|---|---|
| 1 | 6K8 Grid | 455 kc | 1,2,3,4,& 5 | 600 kc | Broadcast | 75 uv |
| *2 | Antenna Term. | 1400 kc | 6 | 1400 kc | Broadcast | ------ |
| 3 | Antenna Term. | 1400 kc | 7 | 1400 kc | Broadcast | 50 uv |
| **4 | Antenna Term. | 600 kc | 8 | 600 kc | Broadcast | 50 uv |
| 5 | Antenna Term. | 5.0 mc | 9 | 5.0 mc | Mid-Band | ------ |
| 6 | Antenna Term. | 5.0 mc | 10 | 5.0 mc | Mid-Band | 75 uv |
| 7 | Antenna Term. | 2 mc | 11 | 2 mc | Mid-Band | 75 uv |
| 8 | Antenna Term. | 15 mc | 12 | 15 mc | Short Wave | ------ |
| 9 | Antenna Term. | 15 mc | 13 | 15 mc | Short Wave | 120 uv |

* Dial pointer should line up with end of broadcast band dial calibration with tuning condenser fully closed.
** After balancing 600 kc padder, return and recheck the adjustments of padders 6 & 7.
* NOTE: Signal generator should be connected to A & G terminals on rear of radio chassis. D & G terminals should be connected together.

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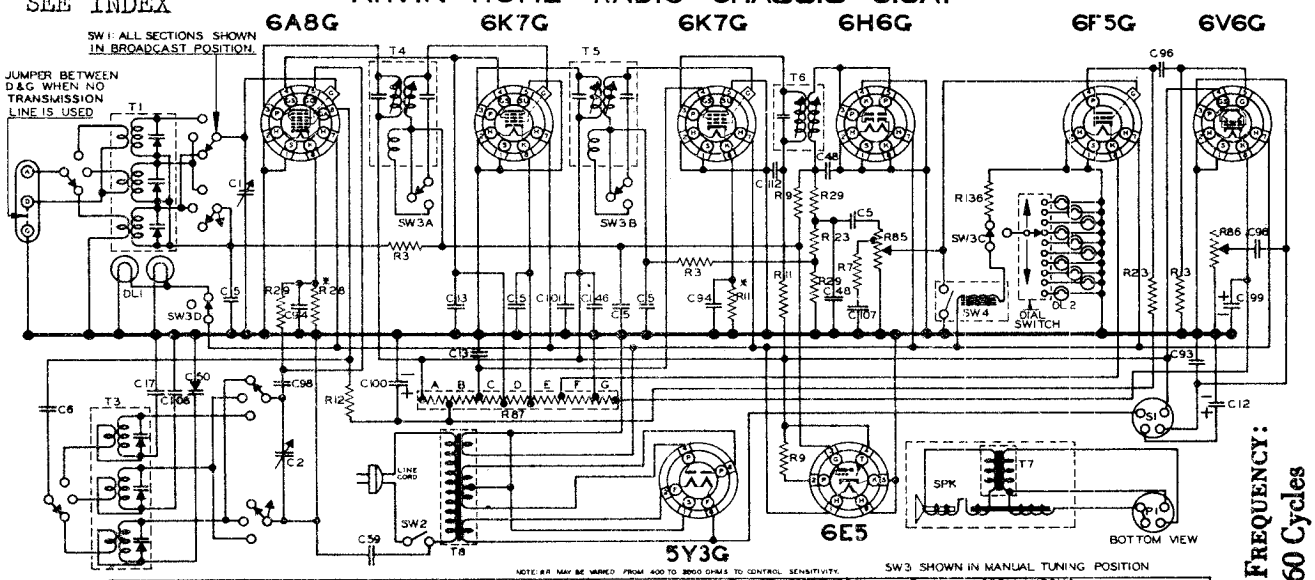
# NOBLITT-SPARKS INDUSTRIES, INC.

MODELS 828AT, 838AT
Chassis 818AT
Schematic, Voltage
Resistances

FOR OTHER DATA
SEE INDEX

## SCHEMATIC CIRCUIT DIAGRAM
## ARVIN HOME RADIO CHASSIS 818AT




NOTE: R87 A-1666 OHMS, B-4285 " , C-1860 " , D-3890 " , E-225 " , F-55 " , G-240 "

NOTE: R87 MAY BE VARIED FROM 400 TO 2000 OHMS TO CONTROL SENSITIVITY.

SW3 SHOWN IN MANUAL TUNING POSITION

**RESISTORS**

| R | OHM | W | PART NO |
|---|---|---|---|
| 3 | 100K | ½ | 17-2088 |
| 7 | 20K | ½ | 17-2072 |
| 9 | 1M | ½ | 17-2080 |
| 11 | 2K | ½ | 17-4202 |
| 12 | 10K | ½ | 17-4275 |
| 23 | 253K | ½ | 17-3011 |
| 26 | 1500 | ½ | 17-4205 |
| 29 | 36K | ½ | 17-3088 |
| 85 | 500K | VC | 17-13718 |
| 86 | 100K | TC | 17-13713 |
| 87 | TAPPED | | 17-14121 SEE NOTE |
| 134 | 5 | 2 | 17-14207 |

| R | OHM | W | PART NO |
|---|---|---|---|

**CONDENSERS**

| C | CAPACITY | VOLT | PART NO |
|---|---|---|---|
| 1 | TWO-GANG | | 17-14871 |
| 2 | VARIABLE | | |
| 5 | .05 | 200 | 17-14015 |
| 9 | .002 | 600 | 17-2063 |
| 12 | 8 ELECT. | 475 | 17-14001 |
| 13 | .1 | 300 | 17-14346 |
| 17 | .003 *1% | 600 | 17-14029 |
| 48 | .00625 | 600 | 17-4207 |
| 50 | .0006MMFD. | | 17-14370 |
| 59 | .01 | 400 | 17-14815 |
| 93 | .005 | 600 | 17-14114 |
| 94 | .1 | 200 | 17-14143 |
| 96 | .05 | 600 | 17-14121 |
| 99 | .000075 | 600 | 17-14122 |

| C | CAPACITY | VOLT | PART NO |
|---|---|---|---|
| 99 | 30 ELECT. | 15 | 17-14123 |
| 100 | 8 ELECT. | 300 | 17-14124 |
| 101 | .05 REG. | 200 | 17-14126 |
| 107 | .03 | 200 | 17-14133 |
| 108 | .0003 ±2% | 600 | 17-14134 |
| 112 | .05 | 400 | 17-14130 |
| 148 | .25 | 300 | 17-14206 |

**TRANSFORMERS**

| T | TYPE | PART NO |
|---|---|---|
| 1 | ANTENNA COIL | 00-15730 |
| 2 | | |
| 3 | OSCILLATOR COIL | 00-15731 |
| 4 | FIRST I.F. TRANS. | 00-15737 |
| 5 | SECOND I.F. TRANS. | 00-15738 |
| 6 | THIRD I.F. TRANS. | 00-15739 |
| 7 | OUTPUT TRANS 838AT | 17-15733 |
| 7 | OUTPUT TRANS 828AT | 17-15731 |
| 8 | POWER TRANS. | 00-15709 |

**MISCELLANEOUS**

| SYMBOL | DESCRIPTION | PART NO |
|---|---|---|
| SPK | 2" SPEAKER FOR MODEL 838AT | 17-15734 |
| SPK | 10" SPEAKER FOR MODEL 828AT | 17-13720 |
| SI | SPEAKER SOCKET | 17-13249 |
| P1 | SPEAKER PLUG | SEE SPK |
| DL1 | DIAL LIGHT | 17-13604 |
| DL2 | DIAL LIGHT | 17-15346 |
| SW1 | BAND SWITCH | 17-13728 |
| SW2 | LINE SWITCH - SEE R81 | 17-13713 |
| SW3 | MANUAL-AUTOMATIC TUNING SWITCH | 17-15745 |
| SW4 | RELAY | 17-15747 |

I.F. PEAK 455 K.C.
3 BANDS: BALANCE 15 M.C. PAD 60 M.C.
BALANCE 4.7 M.C. CHECK 2.0 M.C.
BALANCE 1.5 0 M.C. CHECK 6.0 M.C.

VOLTAGE AND FREQUENCY:
110 Volts, 60 Cycles

**WATTS POWER CONSUMPTION: 75 Watts** **POWER OUTPUT: 5 Watts**

## MODEL 838AT-828AT SOCKET VOLTAGES (Input Voltage 110 V. RMS)

| Tube | Heaters | Plate | Screen | Cathode | Osc. Grid | Anode Grid | Suppressor Grid |
|---|---|---|---|---|---|---|---|
| 6A8G | 6.3 | 252 | 85 | 3.4 | —5 to —20 V. | 155 | ..... |
| 6K7G | 6.3 | 252 | 85 | 5.8 | ..... | ..... | 0 |
| 6K7G | 6.3 | 252 | 114 | 3.1 | ..... | ..... | 0 |
| 6H6G | 6.3 | ..... | ..... | 0 | ..... | ..... | ..... |
| 6F5G | 6.3 | 105 | ..... | 1.0 | ..... | ..... | ..... |
| 6V6G | 6.3 | 240 | 252 | 10.8 | ..... | ..... | ..... |
| 5Y3G | 5.0 | 365AC | ..... | 325 | ..... | ..... | ..... |
| 6E5 | 6.3 | 150 | ..... | 0 | ..... | ..... | ‡ |

‡ AVC voltage developed approximately 30 volts with 100,000 microvolts input to antenna. Reading taken with a vacuum tube voltmeter.

## POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise stated. * Volume control in pull on position. All shell terminals grounded to chassis.

**6A8G**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 1,500 Ω |
| Oscillator Grid | 51,500 Ω |
| Anode Grid to B+ | 11,666 Ω |
| Screen to B+ | 7,811 Ω |
| Plate to B+ | 12.0 Ω |
| Control Grid | 1,450,000 Ω |

**6K7G**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 280 Ω |
| Suppressor | 0 Ω |
| Screen to B+ | 7,811 Ω |
| Plate to B+ | 12.0 Ω |
| Control Grid | 1,350,000 Ω |

**6K7G**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 200,000 Ω |
| Suppressor | 0 Ω |
| Screen to B+ | 5,951 Ω |
| Plate to B+ | 2,000 Ω |
| Control Grid | 150,000 Ω |

**6H6G**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 0 Ω |
| Plate | 350,000 Ω |
| Plate | 350,000 Ω |
| Cathode | 0 Ω |

**6F5G**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 55 Ω |
| *Control Grid | 500,000 Ω |
| Plate to B+ | 250,000 Ω |

**6V6G**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 240 Ω |
| Control Grid | 100,000 Ω |
| Screen Grid to B+ | 0 Ω |
| Plate to B+ | 760 Ω |
| Screen | 12,200 Ω |

**6E5**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 0 Ω |
| Control Grid | 1,450,000 Ω |
| Plate to B+ | 1,000,000 Ω |
| Target to B+ | 0 Ω |

**5Y3G**

| | |
|---|---|
| Filament to B+ | 1,000 Ω |
| Filament | 12,000 Ω |
| Plate | 155 Ω |
| Plate | 145 Ω |
| Plate to Plate | 300 Ω |

*R87 tapped as follows: A—1,666; B—4,285; C—1,860; D—3,890; E—225; F—55; G—240.

## COIL, TRANSFORMER AND SPEAKER RESISTANCES

**T1—Antenna Coil**

| | |
|---|---|
| Broadcast Primary | 18.5 Ω |
| Broadcast Secondary | 3.5 Ω |
| Mid-Band Primary | .1 Ω |
| Mid-Band Secondary | .07 Ω |
| Short-Wave Primary | .05 Ω |
| Short-Wave Secondary | .02 Ω |

**T3—Oscillator Coil**

| | |
|---|---|
| Broadcast Primary | .15 Ω |
| Broadcast Secondary | .27 Ω |
| Mid-Band Primary | .08 Ω |
| Mid-Band Secondary | .06 Ω |
| Short-Wave Primary | .08 Ω |
| Short-Wave Secondary | .01 Ω |

**T4—1st I. F. Transformer**

| | |
|---|---|
| Primary | 12.0 Ω |
| Secondary | 12.0 Ω |

**T5—2nd I. F. Transformer**

| | |
|---|---|
| Primary | 12.0 Ω |
| Secondary | 12.0 Ω |

**T6—3rd I. F. Transformer**

| | |
|---|---|
| Primary | 64.0 Ω |
| Secondary | 64.0 Ω |

**T7—Output Transformer (828AT)**

| | |
|---|---|
| Primary | 760 Ω |
| Secondary | .1 Ω |

**T7—Output Transformer (838AT)**

| | |
|---|---|
| Primary | 760 Ω |
| Secondary | .1 Ω |

**T8—Power Transformer**

| | |
|---|---|
| 110 V. Primary | 6.5 Ω |
| 6 V. Secondary | .05 Ω |
| 5 V. Secondary | .05 Ω |
| Hi-Volt Secondary | 155-0-145 Ω |

**SPK—Speaker (828AT or 838AT**

| | |
|---|---|
| Field | 1,000 Ω |

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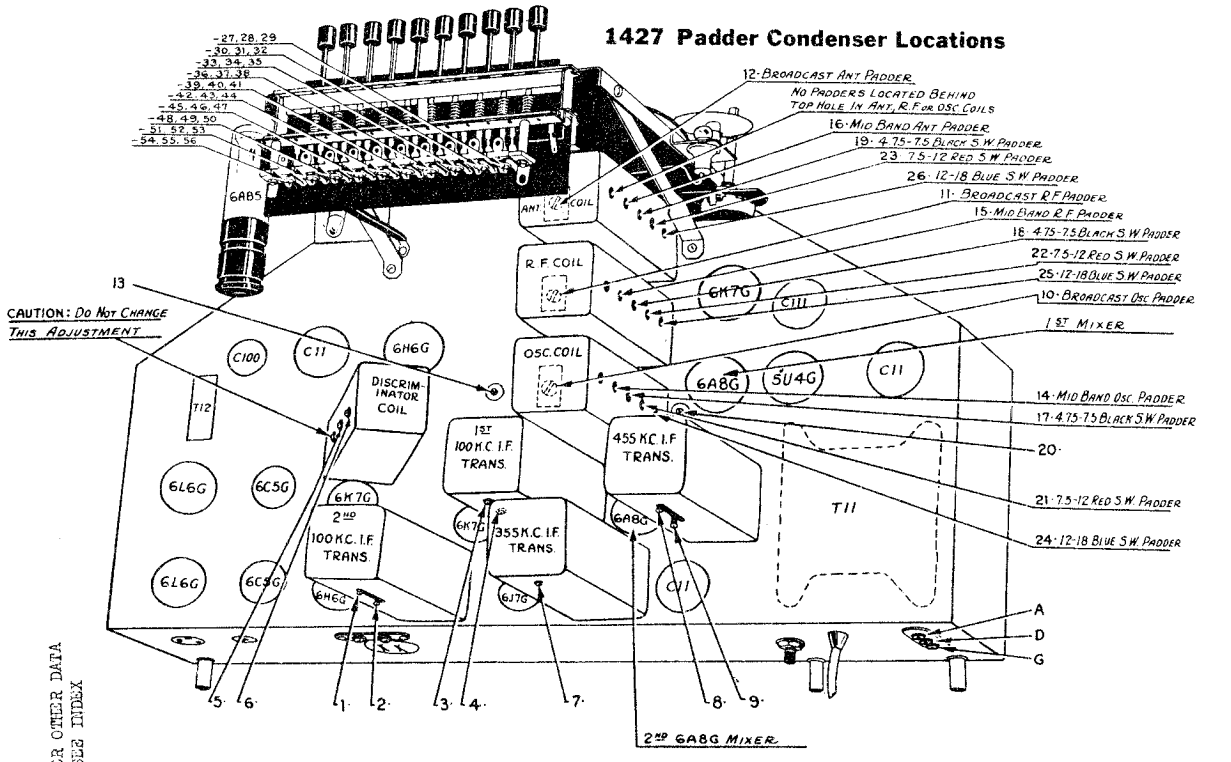
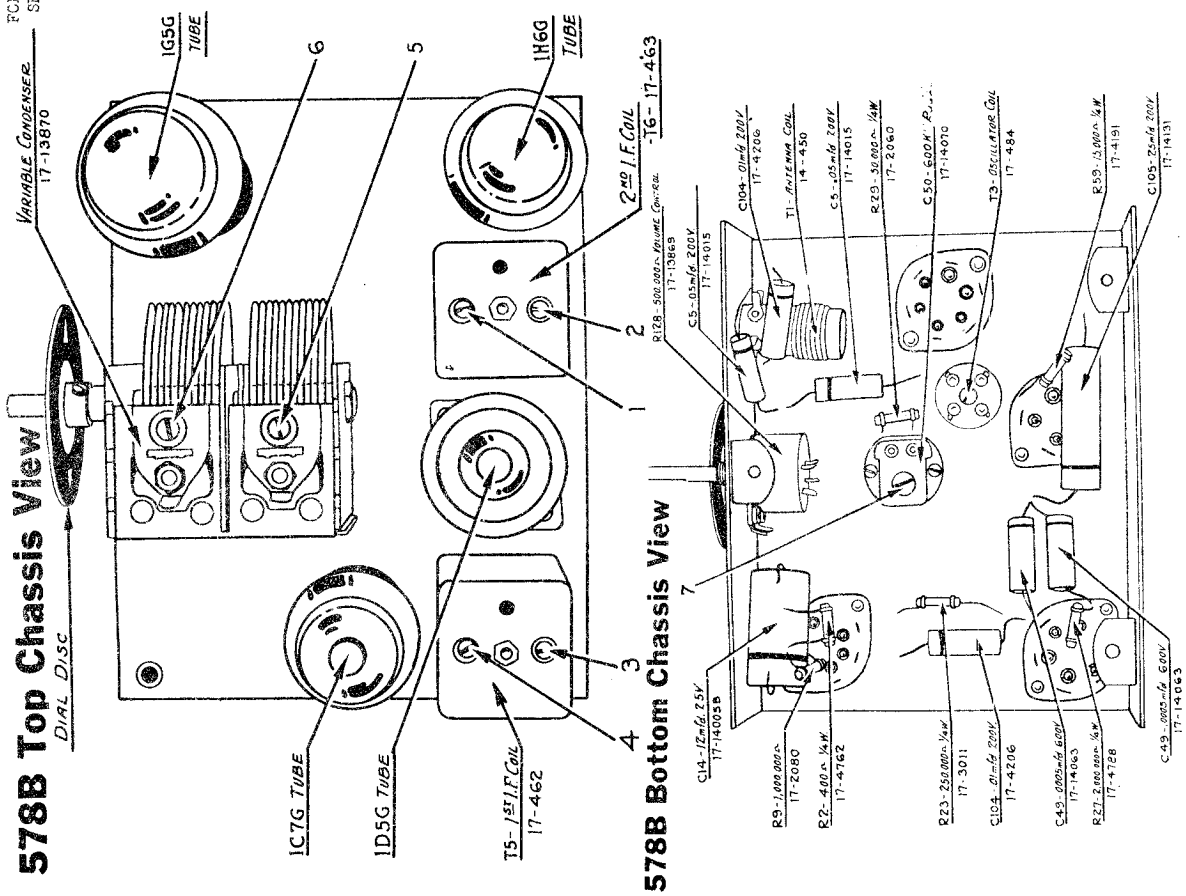
MODEL 578B
Socket, Trimmers
Chassis

# NOBLITT-SPARKS INDUSTRIES, INC.

MODEL 1427, 1427D
Trimmers, Socket


1427 Padder Condenser Locations
12-BROADCAST ANT PADDER
NO PADDERS LOCATED BEHIND TOP HOLE IN ANT, R.F. OR OSC COILS
16-MID BAND ANT PADDER
19-4.75-7.5 BLACK S.W. PADDER
23-7.5-12 RED S.W. PADDER
26-12-18 BLUE S.W. PADDER
11-BROADCAST R.F. PADDER
15-MID BAND R.F. PADDER
18-4.75-7.5 BLACK S.W. PADDER
22-7.5-12 RED S.W. PADDER
25-12-18 BLUE S.W. PADDER
10-BROADCAST OSC. PADDER
1ST MIXER
14-MID BAND OSC. PADDER
17-4.75-7.5 BLACK S.W. PADDER
20-
21-7.5-12 RED S.W. PADDER
24-12-18 BLUE S.W. PADDER
CAUTION: DO NOT CHANGE THIS ADJUSTMENT
2ND 6A8G MIXER
FOR OTHER DATA SEE INDEX

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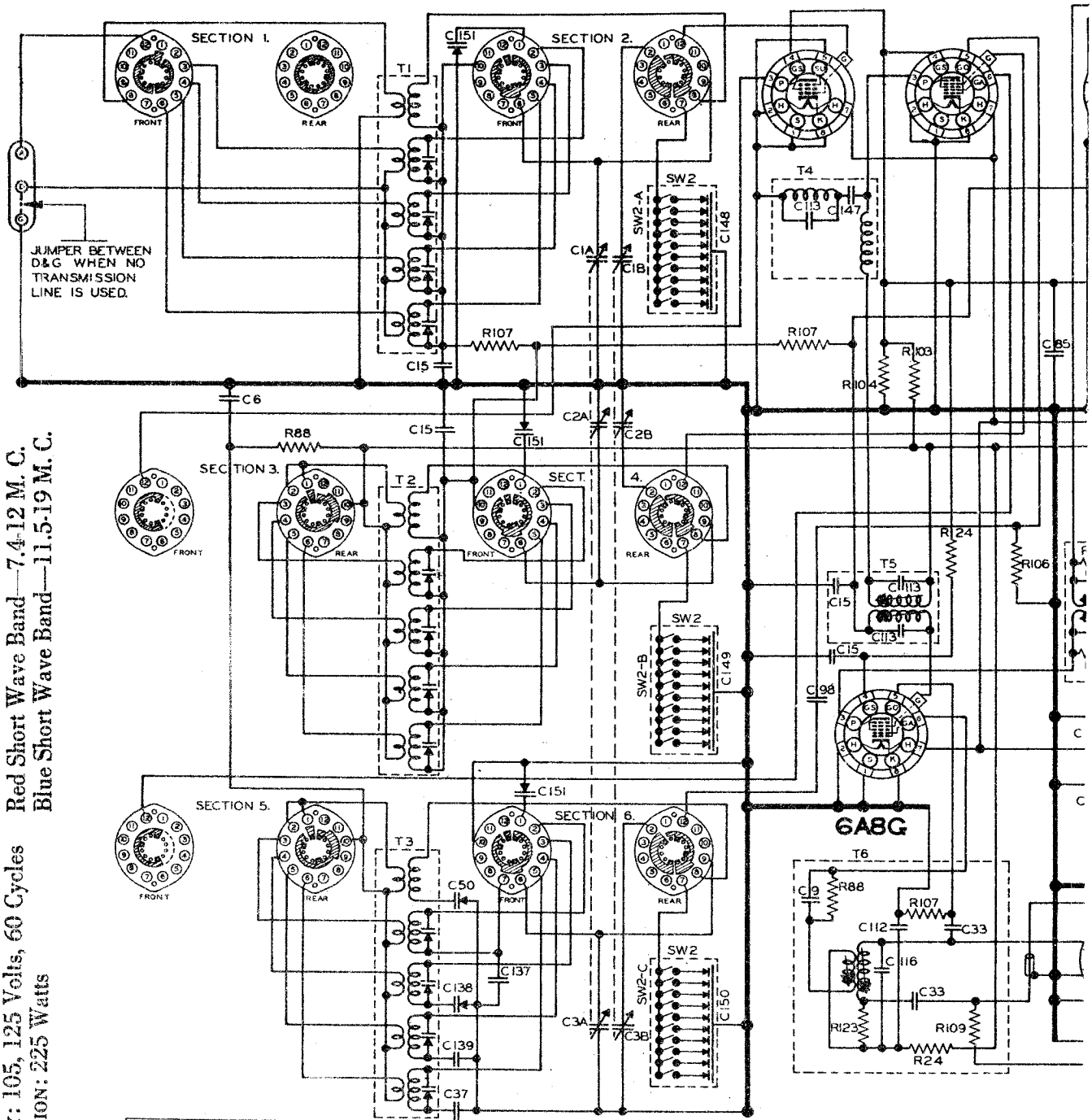


Power Output: 30 Watts
Voltage and Frequency: 105, 125 Volts, 60 Cycles
Watts Power Consumption: 225 Watts

Black Short Wave Band—4.6-7.5 M. C.
Red Short Wave Band—7.4-12 M. C.
Blue Short Wave Band—11.5-19 M. C.

## RESISTORS

| R | OHM | W | PART NO. | R | OHM | W | PART NO. |
|---|---|---|---|---|---|---|---|
| 9 | 1M | ½ | 17-2080 | 117 | 20K | 1 | 17-14162 |
| 11 | 2K | ¼ | 17-4202 | 116 | 300K | ¼ | 17-14183 |
| 13 | 75K | ½ | 17-2087 | 123 | 100 | ½ | 17-14168 |
| 24 | 1K | ¼ | 17-2085 | 130 | 10K | ⅓ | 17-14197 |
| 32 | 3K | ½ | 17-2090 | 131 | 30K | ⅓ | 17-14198 |
| 88 | 18K | ½ | 17-14135 | | | | |
| 90 | 500K | VC | 17-13795 | | | | |
| 91 | 100K | TC | 17-13796 | | | | |
| 92 | 150 | 2 | 17-14141 | | | | |
| 97 | 600 | VAR | 17-14157 | | | | |
| 102 | 250-2W | TAP | 17-14163 | | | | |
| 103 | 8K | 10 | 17-14164 | | | | |
| 104 | 10K | 2 | 17-14165 | | | | |
| 105 | 50K | ½ | 17-14169 | | | | |
| 106 | 50K | ½ | 17-1471 | | | | |
| 107 | 100K | ½ | 17-14172 | | | | |
| 108 | 200K | ½ | 17-14173 | | | | |
| 109 | 500K | ½ | 17-14174 | | | | |
| 111 | 25K | ½ | 17-14176 | | | | |
| 112 | 500 | ½ | 17-14177 | | | | |
| 113 | 250K | ½ | 17-14178 | | | | |

## CONDENSERS

| C | CAPACITY | VOLT | PART NO. |
|---|---|---|---|
| 1A | LARGE SECTION | VARIABLE CONDENSER | 17-15723 |
| 1B | SMALL ONE | | |
| 2A | LARGE SECTION | | |
| 2B | SMALL TWO | | |
| 3A | LARGE SECTION | | |
| 3B | SMALL THREE | | |
| 6 | .002 | 600 | 17-2063 |
| 7 | .0001 | 600 | 17-2064 |
| 9 | .001 | 600 | 17-4292 |
| 11 | 15 | 475 | 17-14002 |
| 15 | .05 | 200 | 17-14036 |
| 33 | .00005 | 600 | 17-14047 |
| 37 | .004 | 600 | 17-14053 |
| 48 | .00025 | 600 | 17-4207 |
| 50 | PADDER | 800 | 17-14070 |
| 59 | .01 | 400 | 17-14615 |
| 85 | 1 | 400 | 17-14101 |
| 88 | .02 | 600 | 17-14105 |
| 89 | .05 | 600 | 17-14106 |
| 98 | .000075 | 600 | 17-14122 |
| 100 | 8.0 | 300 | 17-14124 |

| C | CAPACITY | VOLT | PART NO. |
|---|---|---|---|
| 109 | .25 | 200 | 17-14136 |
| 110 | 1 | 200 | 17-14137 |
| 112 | .05 | 400 | 17-14139 |
| 113 | .0002 | 600 | 17-14143 |
| 114 | .0003 | 600 | 17-14146 |
| 115 | .00007 | 600 | 17-14149 |
| 116 | .0005 | 600 | 17-14151 |
| 117 | .0004 | 600 | 17-14142 |
| 125 | .00001 | 600 | 17-14166 |
| 132 | 30 REG. | 300 | 17-14192 |
| 133 | .03 | 200 | 17-14193 |
| 136 | .04 | 600 | 17-14196 |
| 137 | .0015 | 600 | 17-14199 |
| 138 | PADDER | 600 | 17-14200 |
| 139 | .00155 | 600 | 17-14201 |
| 147 | .0005 | 600 | 17-1325 |
| 148 | STRIP OF 10 PADDERS | | 17-14209 |
| 149 | STRIP OF 10 PADDERS | | 17-14210 |
| 150 | STRIP OF 10 PADDERS | | 17-14211 |
| 151 | 15-35 M.M.F. PADDER | | 17-11216 |

| C | CAPACITY | VOLT | PART NO. |
|---|---|---|---|

## TRANSFORMERS

| T | TYPE | PART NO. |
|---|---|---|
| 1 | ALLWAVE ANT. COIL | 00-13658 |
| 2 | ALLWAVE R.F. COIL | 00-13659 |
| 3 | ALLWAVE OSC. COIL | 00-13660 |
| 4 | 455 K.C. BAND PASS | 00-13653 |
| 5 | 455 K.C. I.F. COIL | 00-13779 |
| 6 | 355 K.C. OSC. COIL | 00-13782 |
| 7 | 100 K.C. I.F. INPUT | 00-13780 |
| 8 | 100 K.C. I.F. OUTPUT | 00-13781 |
| 9 | 100 K.C. DISCRIMINATOR | 00-13783 |
| 10 | OUTPUT TRANS. | 17-13786 |
| 11 | POWER TRANS. | 00-13706 |
| 12 | INPUT TRANS. | 00-13652 |
| 13 | OUTPUT TRANS. | 17-14973 |

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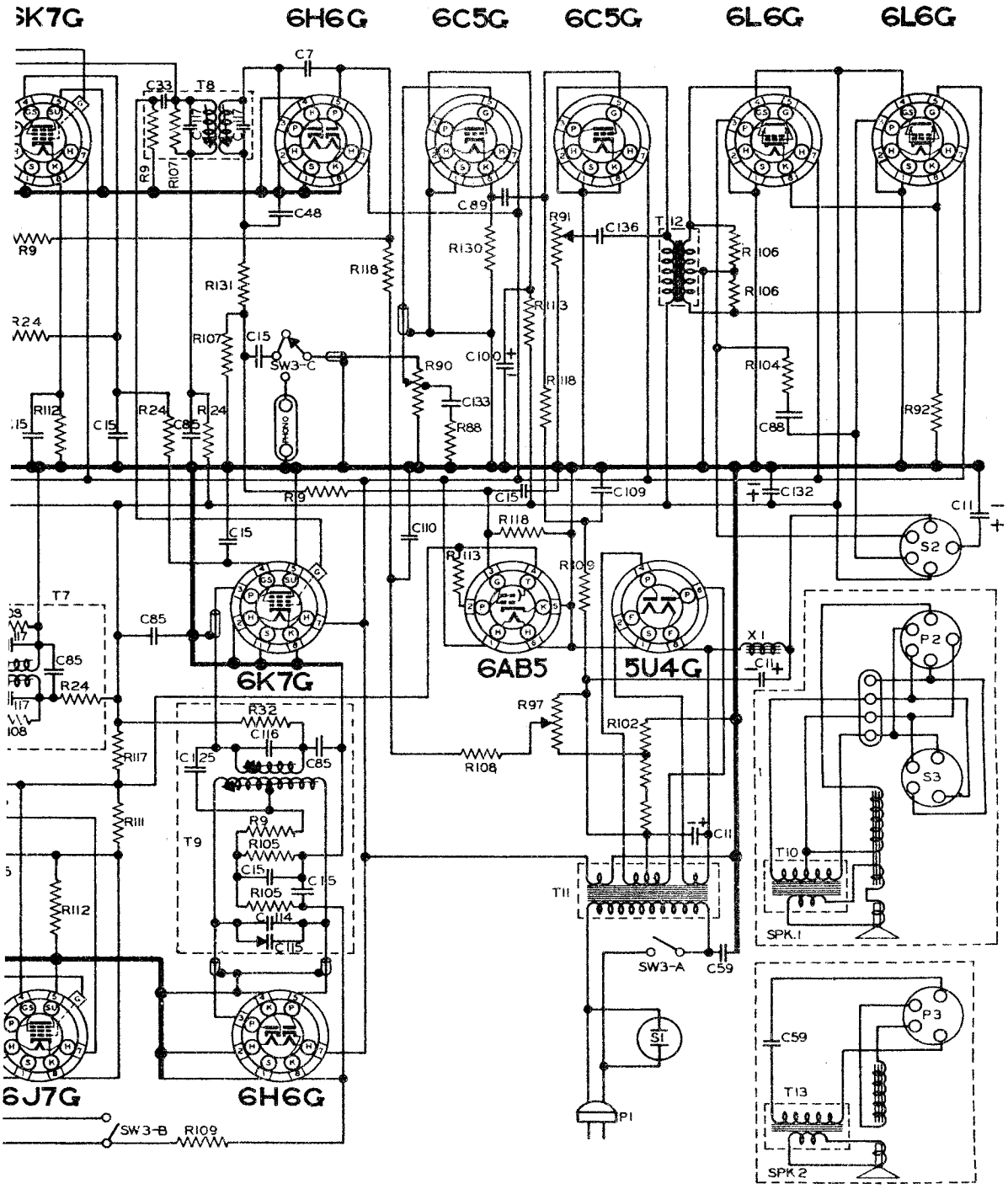
NDUSTRIES, INC.

MODELS 1427, 1427D
Schematic, Alignment




FREQUENCY RANGE:
Broadcast Band—540-1,600 K. C.
Mid Band—1,600-5,000 K. C.

# SCHEMATIC CIRCUIT DIAGRAM
# ARVIN HOME RADIO CHASSIS 1427 & 1427D

| CHOKES | | |
|---|---|---|
| | TYPE | PART NO. |
| | "B" CHOKE | 00-13861 |

| MISCELLANEOUS UNITS | | |
|---|---|---|
| SYMBOL | DESCRIPTION | PART NO. |
| SW1 | BAND SWITCH ASSEMBLY | 17-13572 |
| SW2 ABC | PUSH BUTTON SWITCH (LESS PADDERS) | 17-13561 |
| SW2 | PUSH BUTTON SWITCH ASSY (WITH PADDERS) | 29-13576 |
| SW3 | AC-AFC & PHONO "ON-OFF" SWITCH | 17-13813 |
| S1 | AC RECEPTACLE | 17-13761 |
| S2 | SPEAKER SOCKET | 17-4153 |
| S3 | SPEAKER SOCKET (PART OF SPK 1) | SEE BELOW |
| P1 | PLUG & LINE CORD ASSEMBLY | 17-13791 |
| P2 | SPEAKER PLUG (PART OF SPK 1) | SEE BELOW |
| P3 | SPEAKER PLUG (PART OF SPK 2) | SEE BELOW |
| SPK 1 | DYNAMIC SPEAKER 12" | 17-13787 |
| SPK 2 | DYNAMIC SPEAKER 6" | 17-13785 |

"A" BAND - .535 TO 1.600 M.C. - BALANCE AT 1.400 M.C.
CHECK AT 1.000 M.C. - PAD AT .600 M.C.
"B" BAND - 1.575 TO 4.750 M.C. - BALANCE AT 4.2 M.C.
CHECK AT 3.0 M.C. - CHECK AT 1.8 M.C.
"C" BAND - 4.725 TO 7.40 M.C. - BALANCE AT 7.0 M.C.
CHECK AT 6.0 M.C. - PAD AT 5.0 M.C.
"D" BAND - 7.35 TO 11.6 M.C. - BALANCE AT 11.0 M.C.
CHECK AT 9.5 M.C. - CHECK AT 8.0 M.C.
"E" BAND - 11.5 TO 18.2 M.C. - BALANCE AT 17.0 M.C.
CHECK AT 15.0 M.C. - CHECK AT 12.0 M.C.

FIRST I.F. PEAK 455 K.C.
SECOND I.F. PEAK 100 K.C.
SECOND OSCILLATOR 355 K.C.

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# MODEL 1427

## SOCKET VOLTAGES

All readings taken to ground unless otherwise specified. Allow speaker to remain connected.

| Tube | Heater | Plate | Screen | Cathode | Suppressor | ‡ Grid | Anode Grid | Osc. Grid | Target |
|---|---|---|---|---|---|---|---|---|---|
| 6K7G | 6.3 | 250 | 95 | 0 | 0 | 3.6 | ..... | ..... | ..... |
| 6A8G | 6.3 | 250 | 95 | 0 | ..... | 3.6 | 150 | —17 | ..... |
| 6A8G | 6.3 | 250 | 90 | 0 | ..... | 3.4 | 165 | —4 | ..... |
| 6K7G | 6.3 | 250 | 90 | 4.2 | 0 | 6.1 | ..... | ..... | ..... |
| 6K7G | 6.3 | 250 | 90 | 0 | 0 | .7 | ..... | ..... | ..... |
| 6J7G | 6.3 | 250 | 90 | 4.5 | 0 | 5.5 | ..... | ..... | ..... |
| 6H6G | 6.3 | ..... | ..... | ‡ .5 | ..... | ..... | ..... | ..... | ..... |
| 6H6G | 6.3 | ..... | ..... | 0 | ..... | ..... | ..... | ..... | ..... |
| 6C5G | 6.3 | 75 | ..... | 3.5 | ..... | 0 | ..... | ..... | ..... |
| 6C5G | 6.3 | 250 | ..... | 0 | ..... | 3.4 | ..... | ..... | ..... |
| 6L6G | 6.3 | 245 | 250 | 16 | ..... | 0 | ..... | ..... | ..... |
| 6L6G | 6.3 | 245 | 250 | 16 | ..... | 0 | ..... | ..... | ..... |
| 5U4G | 5.0 | 330 | ..... | 325 | ..... | ..... | ..... | ..... | ..... |
| 6AB5 | 6.3 | *250 | ..... | 0 | ..... | 6.8 | ..... | ..... | 250 |

‡ Measured with a vacuum tube voltmeter.
* Through 1,000,000 Ω Resistor.

## POINT TO POINT RESISTANCES

All readings taken to ground unless otherwise specified. Allow speaker to remain connected.

**6K7G—R. F.**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 0 Ω |
| Suppressor Grid | 0 Ω |
| Screen Grid to B+ | 8,000 Ω |
| Control Grid | 1,700,000 Ω |
| Plate to B+ | 3.6 Ω |

**6A8G—First Mixer**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 0 Ω |
| Oscillator Grid | 50,000 Ω |
| Oscillator Anode to B+ | 18,000 Ω |
| Screen to B+ | 8,000 Ω |
| Plate to B+ | 106 Ω |
| Control Grid | 1,600,000 Ω |

**6A8G—Second Mixer**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 0 Ω |
| Oscillator Grid | 100,000 Ω |
| Oscillator Anode to B+ | 19,000 Ω |
| Screen to B+ | 9,000 Ω |
| Control Grid | 1,500,000 Ω |

**6J7G—Controlled Oscillator**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 500 Ω |
| Suppressor Grid | 0 Ω |
| Screen Grid to B+ | 20,000 Ω |
| Plate to B+ | 1,100 Ω |
| Control Grid | 1,100,000 Ω |

**6C5—First Audio**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 10,000 Ω |
| *Control Grid | 500,000 Ω |
| Plate to B+ | 250,000 Ω |

* Volume control pull on position.

**6K7G—I. F. Amplifier**

| | |
|---|---|
| Heater | .0 Ω |
| Heater | .05 Ω |
| Cathode | 500 Ω |
| Suppressor Grid | 0 Ω |
| Screen Grid to B+ | 9,000 Ω |
| Plate to B+ | 1,000 Ω |
| Control Grid | 31.5 Ω |

**6AB5—Electric Eye**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 0 Ω |
| Target to B+ | 0 Ω |
| Grid | 1,100,000 Ω |
| Plate to B+ | 300,000 Ω |

**6K7G—A. F. C. Amplifier**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 0 Ω |
| Suppressor Grid | 0 Ω |
| Screen Grid to B+ | 10,000 Ω |
| Plate to B+ | 3,000 Ω |
| Control Grid | 1,000,000 Ω |

**6HG6—Detector A. V. C.**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 0 Ω |
| Diode Plate | 130,000 Ω |
| Diode Plate | 500,000 Ω |
| Cathode | 0 Ω |

**5U4G**

| | |
|---|---|
| Filament to B+ | 1,700 Ω |
| Filament to Ground | 19,700 Ω |
| Plate | 90 Ω |
| Plate | 95 Ω |
| Plate to Plate | 185 Ω |

**6H6G—A. F. C. Bias Rectifier**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 0 Ω |
| Plate | 1,050,000 Ω |
| Cathode | 1,000,000 Ω |
| Plate | 1,050,000 Ω |
| Plate to Plate | 36.5 Ω |

**6C5—Second Audio**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 0 Ω |
| Control Grid | 800,000 Ω |
| Plate to B+ | 2,000 Ω |

**6L6G—Power Output Transformer**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 150 Ω |
| Screen Grid to B+ | 0 Ω |
| Plate to B+ | 190 Ω |
| Control to Grid | 2,200 Ω |

**6L6G—Power Output**

| | |
|---|---|
| Heater | 0 Ω |
| Heater | .05 Ω |
| Cathode | 150 Ω |
| Screen Grid to B+ | 0 Ω |
| Plate to B+ | 220 Ω |
| Control Grid | 2,000 Ω |

## COIL, TRANSFORMER AND SPEAKER RESISTANCES

**T1—Antenna Coil**

| | |
|---|---|
| B. C. Primary | 19.0 Ω |
| B. C. Secondary | 3.6 Ω |
| Mid-Band Pri. | .6 Ω |
| Mid-Band Sec. | .17 Ω |
| Black S. W. Band Pri. | .5 Ω |
| Black S. W. Band Sec. | .2 Ω |
| Red S. W. Band Pri. | .3 Ω |
| Red S. W. Band Sec. | .02 Ω |
| Blue S. W. Band Pri. | .35 Ω |
| Blue S. W. Band Sec. | .015 Ω |

**T2—R. F. Coil**

| | |
|---|---|
| B. C. Primary | 2.7 Ω |
| B. C. Secondary | 3.6 Ω |
| Mid-Band Pri. | .4 Ω |
| Mid-Band Sec. | .2 Ω |
| Black S. W. Band Pri. | .4 Ω |
| Black S. W. Band Sec. | .2 Ω |
| Red S. W. Band Pri. | .3 Ω |
| Red S. W. Band Sec. | .2 Ω |
| Blue S. W. Band Pri. | .2 Ω |
| Blue S. W. Band Sec. | .2 Ω |

**T3—Oscillator Coil**

| | |
|---|---|
| B. C. Primary | 1.9 Ω |
| B. C. Secondary | .4 Ω |
| Mid-Band Pri. | .17 Ω |
| Mid-Band Sec. | .23 Ω |
| Black S. W. Band Pri. | .05 Ω |
| Black S. W. Band Sec. | .05 Ω |
| Red S. W. Band Pri. | .035 Ω |
| Red S. W. Band Sec. | .03 Ω |
| Blue S. W. Band Pri. | .02 Ω |
| Blue S. W. Band Sec. | .015 Ω |

**T4—455 K. C. Band Pass Filter**

| | |
|---|---|
| Shunt Coil | 14.5 Ω |
| Plate Coil | 100 Ω |

**T5—455 K. C. I. F. Trans.**

| | |
|---|---|
| Primary | 6.4 Ω |
| Secondary | 6.4 Ω |

**T6—355 K. C. Osc. Coil**

| | |
|---|---|
| Primary | 20,000 Ω |
| Secondary | 1,100 Ω |

**T7—100 K. C. First I. F. Trans.**

| | |
|---|---|
| Primary | 1,000 Ω |
| Secondary | 31.5 Ω |

**T8—100 K. C. Second I. F. Trans.**

| | |
|---|---|
| Primary | 31.5 Ω |
| Secondary | 31.5 Ω |

**T9—100 K. C. Discriminator Coil**

| | |
|---|---|
| Primary | 3,000 Ω |
| Secondary (Tapped) | 36.5 Ω |

**T10—Output Trans. 12" Spk.**

| | |
|---|---|
| Primary | 550 Ω |
| Secondary | .4 Ω |

**T11—Power Transformer**

| | |
|---|---|
| 110 Volt Primary | 2.0 Ω |
| Hi-Volt Secondary | 90-0-95 Ω |
| 5 Volt Secondary | .04 Ω |
| 6 Volt Secondary | .05 Ω |

**T12—Audio Input Transformer**

| | |
|---|---|
| Primary | 2,000 Ω |
| Secondary | 2,000-0-2,200 Ω |

**T13—Output Trans. 6" Spk.**

| | |
|---|---|
| Primary | 1,200 Ω |
| Secondary | .6 Ω |

**X-1—B Filter Choke**

| | |
|---|---|
| X-1 B Filter Choke | 1,000 Ω |

**Spk—1 12" Speaker**

| | |
|---|---|
| Speaker Voice Coil | 8 Ω-400 cycles |
| Speaker Field | 235 Ω |

**Spk—2 6" Speaker**

| | |
|---|---|
| Speaker Voice | 4 Ω-400 cycles |
| Speaker Field | 550 Ω |

## Coils Listed Below Contain Other Circuit Parts Not Shown on Chassis Plan Views.

**T4—455 K. C. Band Pass Filter**
*(Contains the Following Parts)*

| | | |
|---|---|---|
| 1-C113 | .0002 mfd. 600 V | 17-14143 |
| 1-C147 | .0005 mfd. 600 V | 17-14215 |

**T5—455 K. C. I. F. Trans. 00-13779**
*(Contains the Following Parts)*

| | | |
|---|---|---|
| 2-C113 | .0002 mfd. 600 V | 17-14143 |
| 2-C15 | .05 mfd. 200 V | 17-14036 |

**T6—355 K. C. Osc. Coil 00-13782**
*(Contains the Following Parts)*

| | | |
|---|---|---|
| 1-R24 | 1,000 Ω ¼ w | 17-2065 |
| 1-R123 | 100 Ω ¼ w | 17-14188 |
| 1-R109 | 500,000 Ω ¼ w | 17-14174 |
| 2-C33 | .00005 mfd. 600 V | 17-14047 |
| 1-C116 | .0005 mfd. 600 V | 17-14151 |
| 1-C112 | .05 mfd. 400 V | 17-14139 |
| 1-R107 | 100,000 Ω ¼ w | 17-14172 |
| 1-C9 | .001 mfd. 600 V | 17-4292 |
| 1-R88 | 18,000 Ω ¼ w | 17-14135 |

**T7—100 K. C. Input Trans. 00-13780**
*(Contains the Following Parts)*

| | | |
|---|---|---|
| 2-R108 | 2,000,000 Ω ¼ w | 17-14173 |
| 2-C117 | .0004 mfd. 600 V | 17-14142 |
| 1-C85 | .1 mfd. 400 V | 17-14101 |
| 1-R24 | 1,000 Ω ¼ w | 17-2065 |

**T8—100 K. C. I. F. Output Trans. 00-13781**
*(Contains the Following Parts)*

| | | |
|---|---|---|
| 2-C117 | .0004 mfd. 600 V | 17-14142 |
| 1-R9 | 1,000,000 Ω ¼ w | 17-2080 |
| 1-R107 | 100,000 Ω ¼ w | 17-14172 |

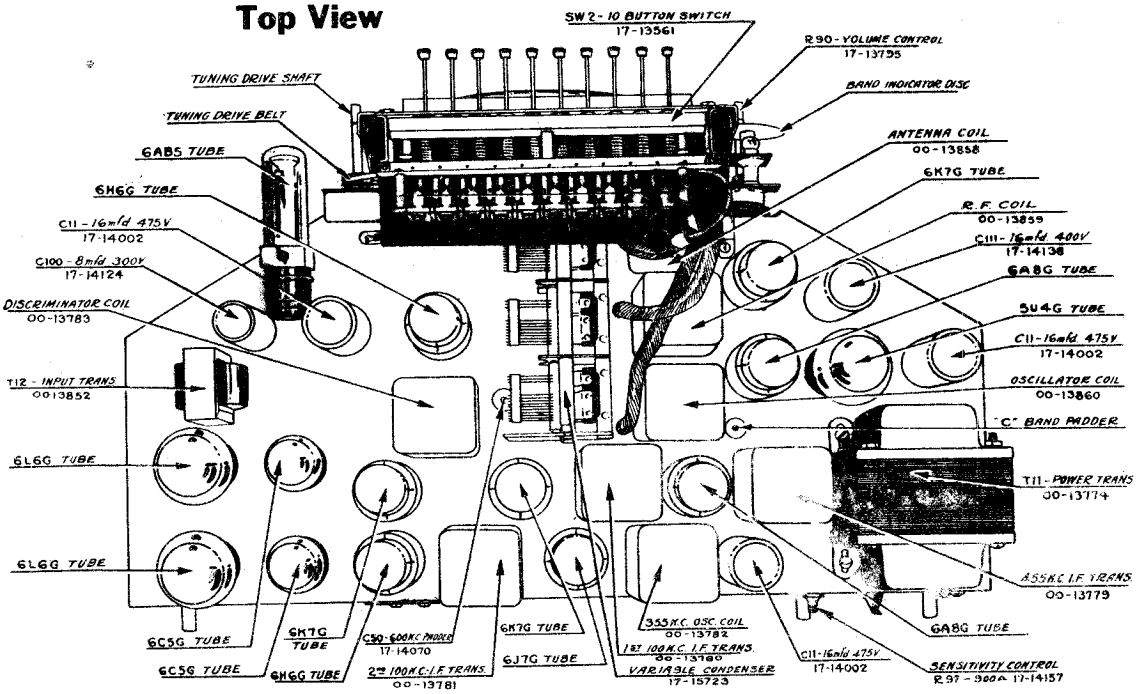
**T9—100 K. C. Discriminator Coil 00-13783**
*(Contains the Following Parts)*

| | | |
|---|---|---|
| 1-C115 | .00007 mfd. 600 V | 17-14149 |
| 1-C114 | .0003 mfd. 600 V | 17-14148 |
| 2-R105 | 50,000 Ω ¼ w | 17-14169 |
| 2-C15 | .05 mfd. 200 V | 17-14036 |
| 1-R9 | 1,000,000 Ω ¼ w | 17-2080 |
| 1-C85 | .1 mfd. 400 V | 17-14101 |
| 1-C125 | .00001 mfd. 600 V | 17-14166 |
| 1-C116 | .0005 mfd. 600 V | 17-14151 |
| 1-R32 | 3,000 Ω ¼ w | 17-2090 |

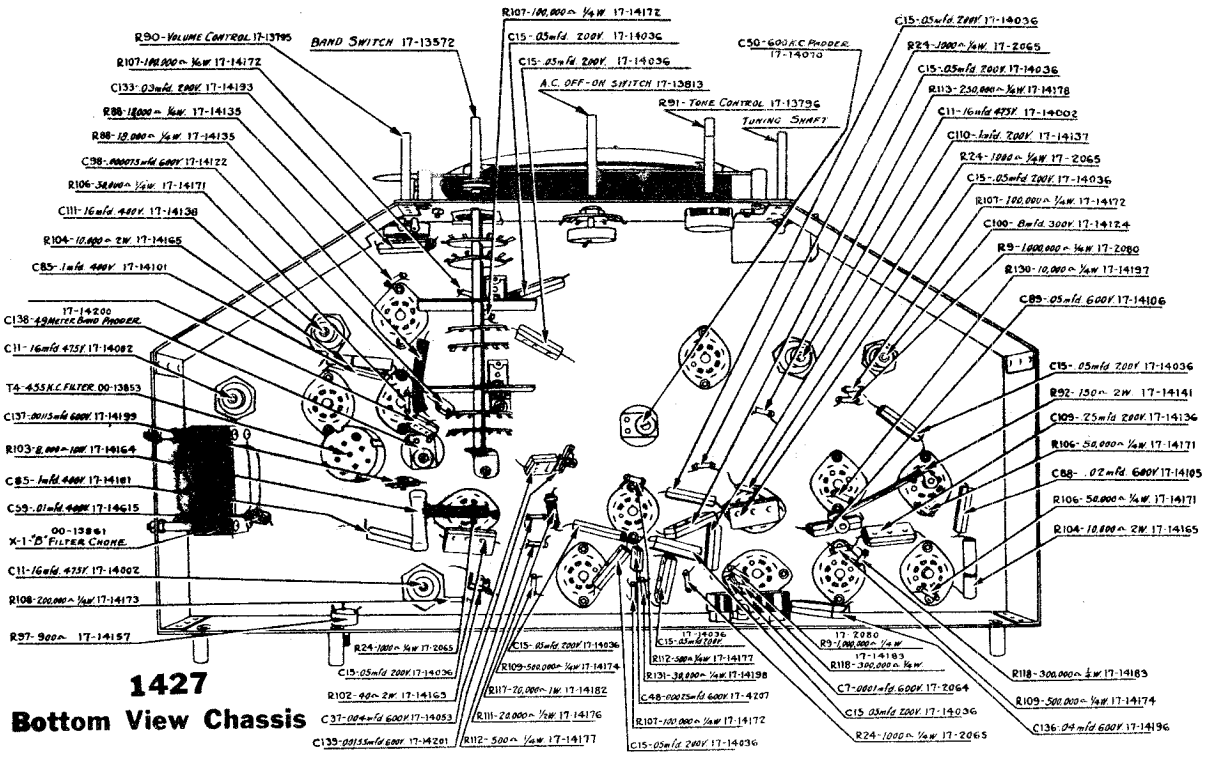
MODELS 1427,1427D
Chassis Views

NOBLITT-SPARKS INDUSTRIES, INC.

## Model -- 1427 Chassis
### Top View




### 1427
### Bottom View Chassis

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# OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982083
Early, Late
Schematic

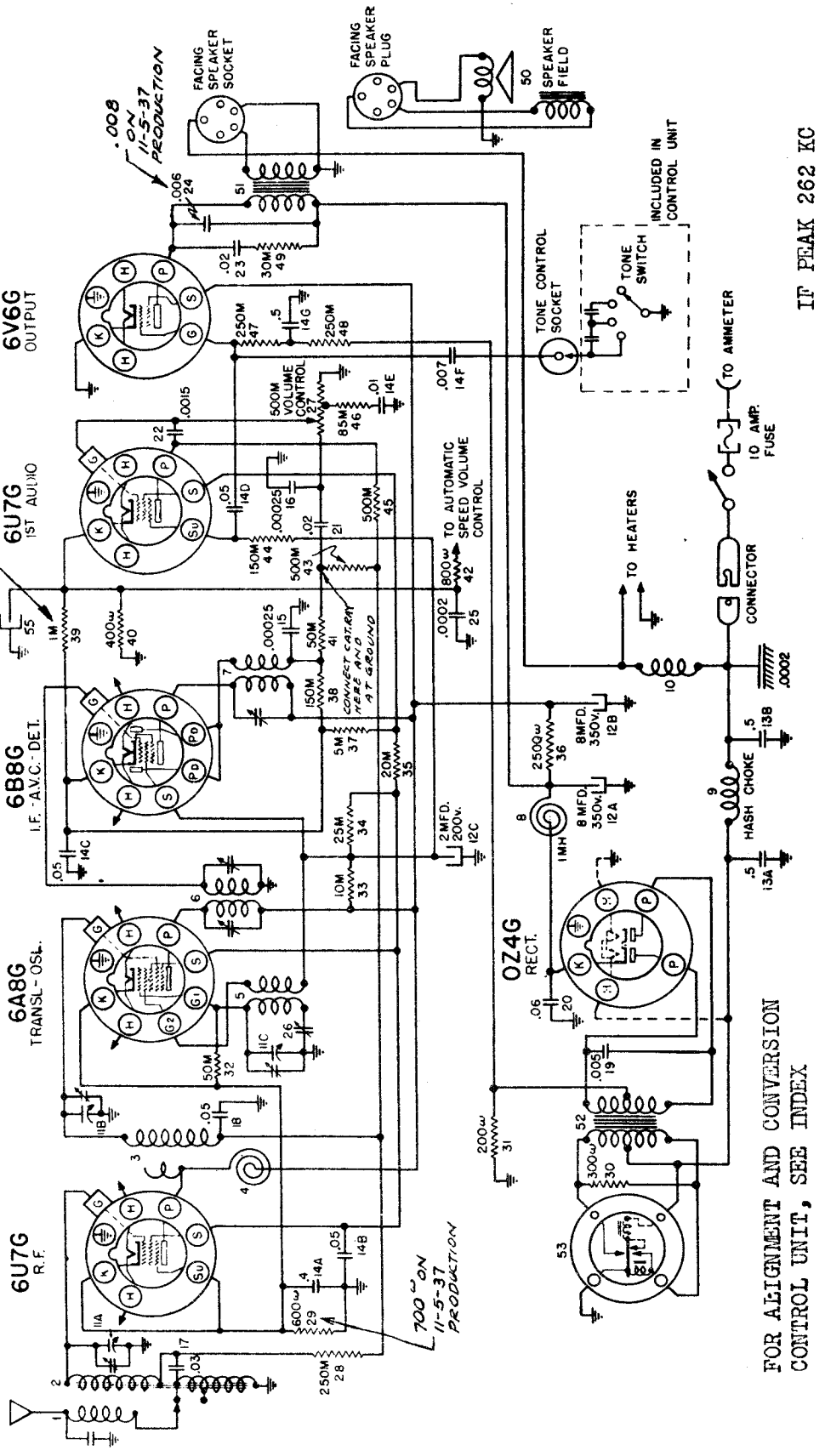


FIG. 1 MODEL 982083 - CIRCUIT DIAGRAM

IF PEAK 262 KC

FOR ALIGNMENT AND CONVERSION CONTROL UNIT, SEE INDEX

The Oldsmobile Model 982083 is a six tube single unit receiver with variable tone control. This receiver was designed specifically for 1938 Model Oldsmobiles and is equipped with an instrument panel tuning control having a variable tone control in addition to the tuning and volume controls.

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MODEL 982083
Early, Late
Socket, Trimmers
Chassis
Condenser Schematic

# OLDSMOBILE DIV.—GEN. MOTORS

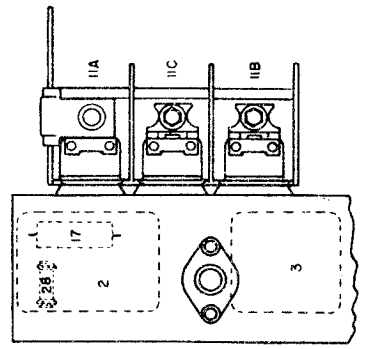


FIG. 3 GANG CONDENSER

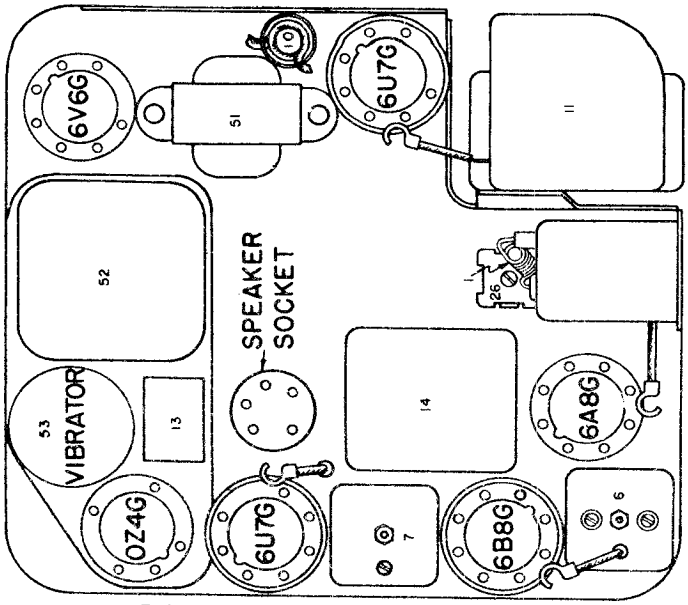


FIG. 2 PARTS LAYOUT - TOP VIEW

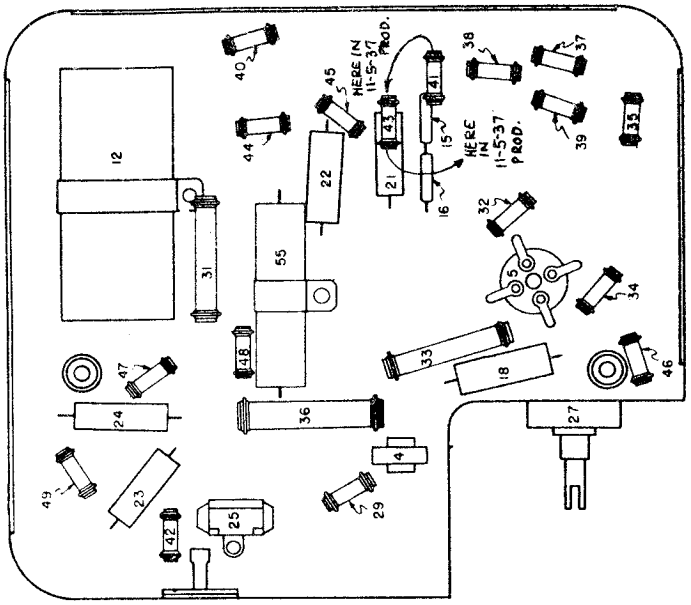


FIG. 4 PARTS LAYOUT-BOTTOM VIEW

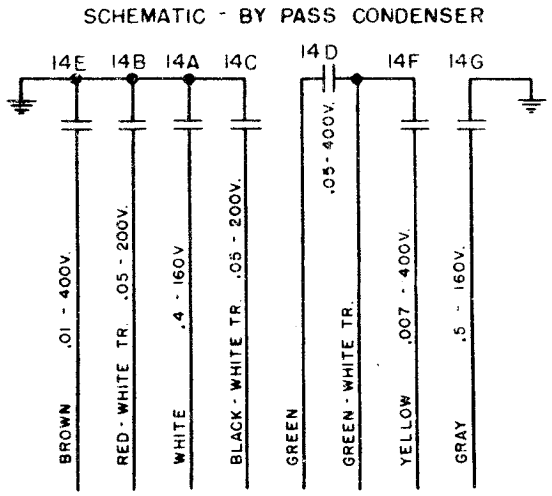


FIG. 6

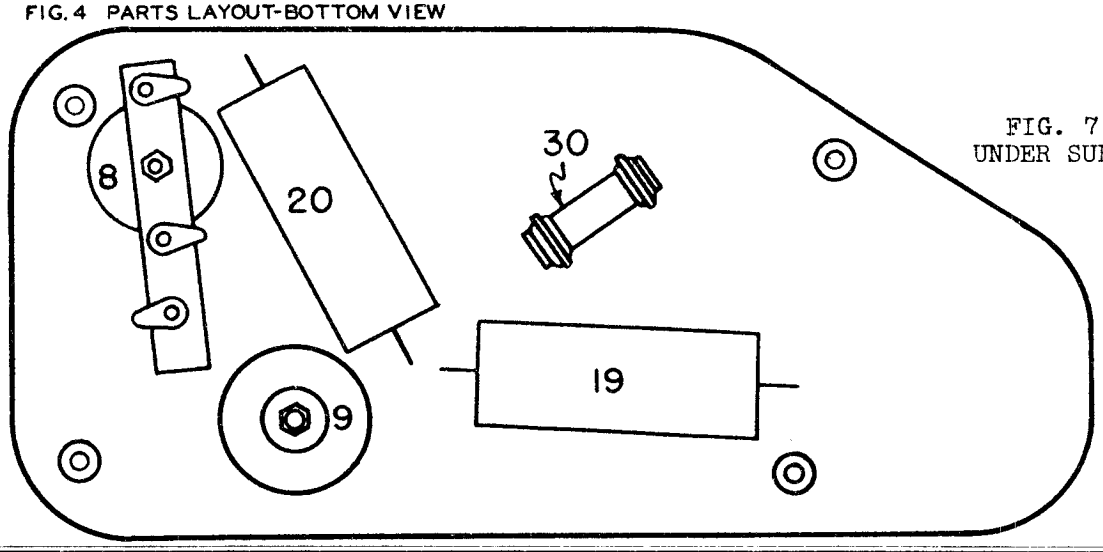


FIG. 7 PARTS UNDER SUB. PANEL

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Remote Cont.Head
Details,Parts

# OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982083
MODEL 982085

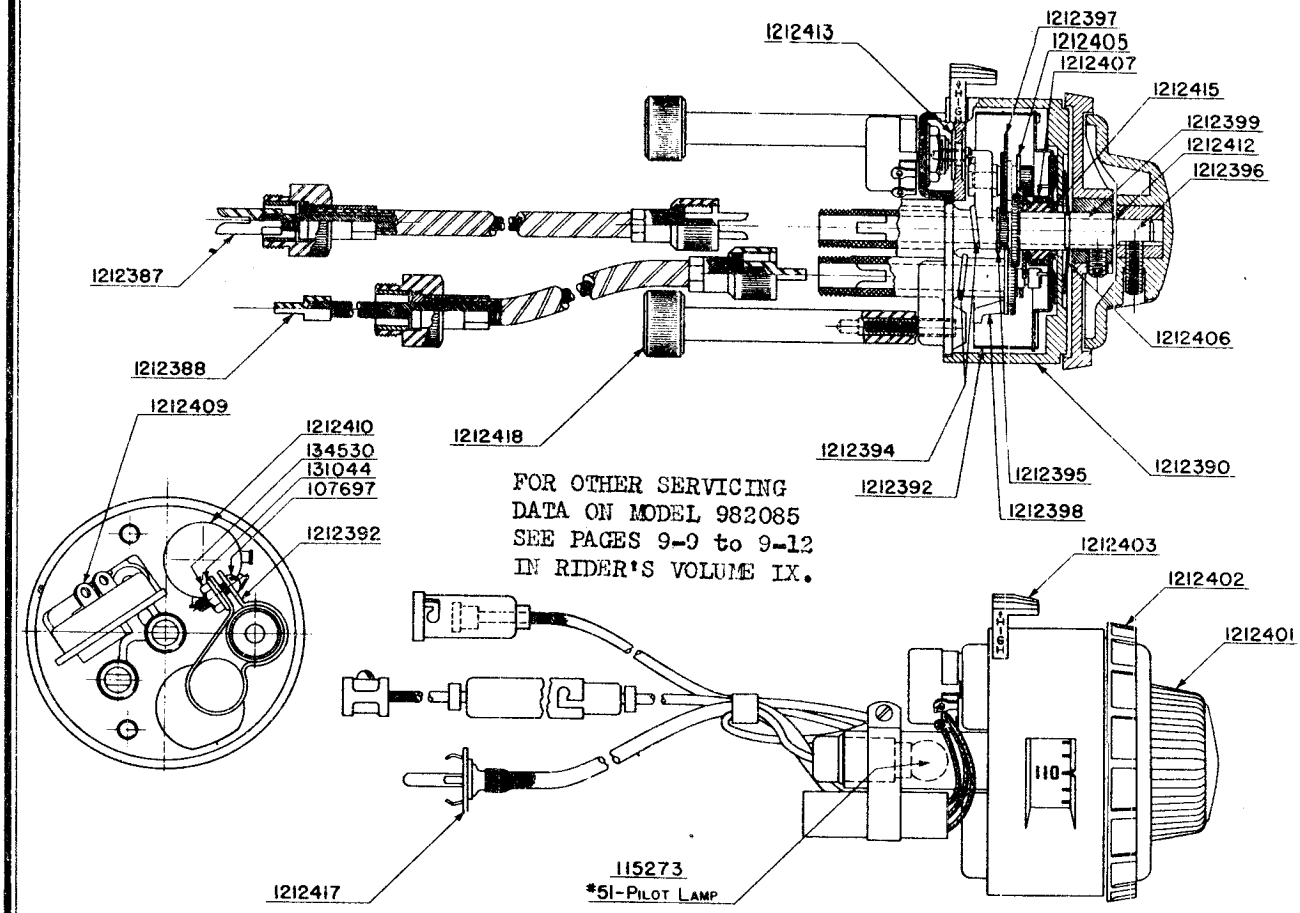


FIG. 8 REMOTE CONTROL HEAD

| | | | |
|---|---|---|---|
| 409976 | Control Unit Complete . | Standard ..... | |
| 1212484 | Base ..... | Control Assembly ..... | |
| 1212387 | Cable Assembly Flexible | Station Selector ..... | |
| 1212388 | Cable Assembly Flexible | Volume Control ..... | |
| 1212392 | Clamp ..... | Lead ..... | |
| 1212393 | Clip ..... | Shaft Retaining ..... | |
| 1212394 | Clutch Dial Assembly .. | ..... | |
| 1212397 | Gear and Shaft Assembly | Idler Driving and Dial Drive ..... | |
| 1212396 | Gear and Shaft ..... | Dial Drive (Driving Pinion) ..... | |
| 1212398 | Gear and Shaft ..... | Off-On Volume (Driving) ..... | |
| 1212399 | Gear and Shaft ..... | Off-On Volume (Driven) ..... | |
| 1212401 | Knob ..... | Station Selector ..... | |
| 1212402 | Knob ..... | Off-On and Volume Control ..... | |
| 1212403 | Knob ..... | Tone Control ..... | |
| 115275 | Lamp No. 51 Miniature Bayonet Base ..... | Pilot Light ..... | |
| 134530 | Nut 6/32 ..... | Lead Clamp Mtg. ..... | |
| 1212405 | Plate ..... | Gear Retaining ..... | |
| 1212482 | Screw 4/36 x 3/16 ..... | Binder Head ..... | |
| 107697 | Screw 6/32 x 3/8 R.H. . | Lead Clamp Mtg. ..... | |
| 1212406 | Spring ..... | Case Retaining ..... | |
| 1212407 | Spring ..... | Dial Tension ..... | |
| 1212418 | Stud ..... | Control Unit Mtg. ..... | |
| 1212409 | Switch ..... | Off-On ..... | |
| 1212410 | Switch ..... | Tone Control 4 Positions ..... | |
| 1212413 | Washer ..... | Knob Retaining ..... | |
| 1212414 | Washer ..... | Off-On and Volume Shaft Retaining ... | |
| 131044 | Washer Lock ..... | Lead Clamp Mtg. ..... | |

| | | | |
|---|---|---|---|
| 1212395 | Washer Plain ..... | Pinion Gear and Shaft Mtg. | |
| 1212415 | Washer Plain ..... | Dial Drive Bushing Mtg. .. | |
| 1212417 | Cable and Plug Assy. .. | Tone Control | |
| 1212390 | Case Control Unit ..... | Escutcheon .. | |
| 1212480 | Condenser Dual ..... | Tone Control | |
| 121841 | Washer ..... | No. 8 Lock .. | |

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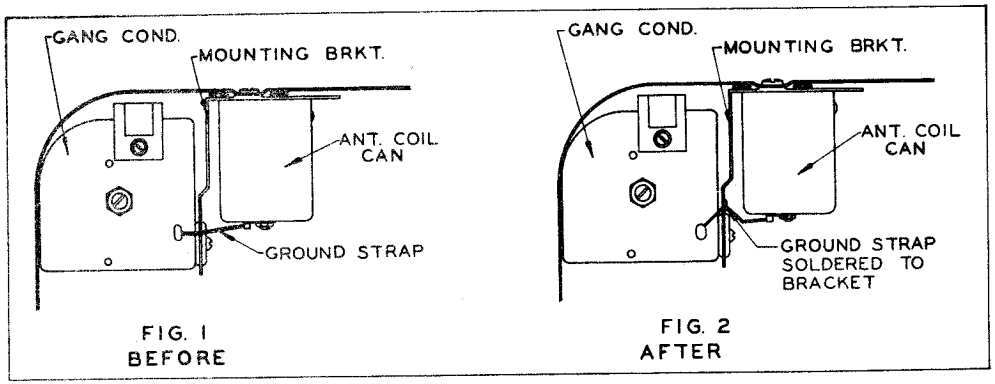


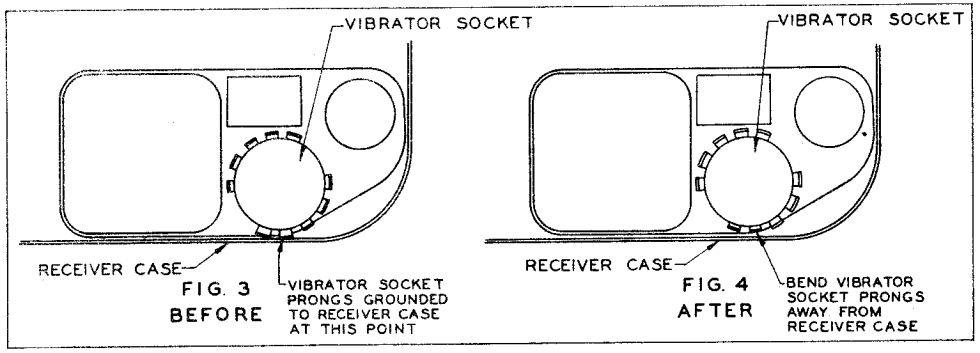


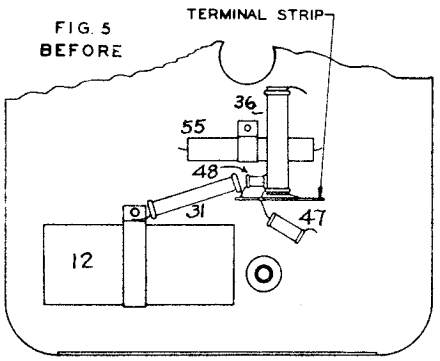


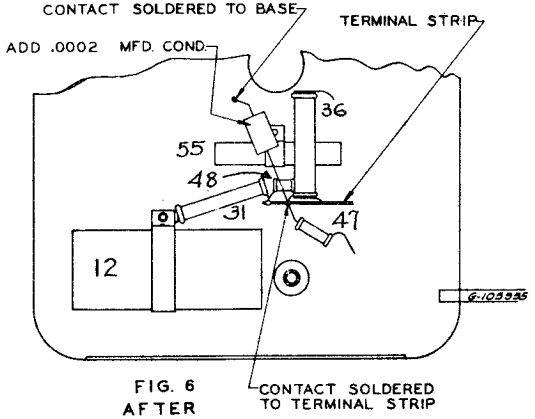


SUBJECT--VIBRATOR "HASH" NOISE

Caution: Only radios that have a vibrator hash noise should have this correction made. If there is no hash noise and these changes are made to prevent hash development, it will only tend toward driving hash noise into the radio.

CORRECTION

The following procedure to correct vibrator hash is:

Deluxe Model - 982084 ONLY

1. The Bond that grounds the Gang Condenser to the Antenna Coil can should be held against the Gang Condenser bracket and soldered. This is shown in Figure 1 before change, and Figure 2 after change.

2. Vibrator prongs may be contacting the receiver case as shown in Figure 3. Bend vibrator prongs away from receiver case as shown in Figure 4.

3. Tighten power supply mounting nuts.

Standard Model - 982083 ONLY

1. Ground the Gang Condenser can as shown in Figure 2.

2. Bend vibrator prongs away from receiver case as shown in Figure 4.

3. Tighten power supply mounting nuts.

4. Remove the receiver from the car and add a .0002 MFD condenser from the small terminal strip to ground. Solder one end of condenser to the same terminal that the two small resistors are soldered to and solder the other end of the condenser to the chassis ground, as shown in Figure 6.

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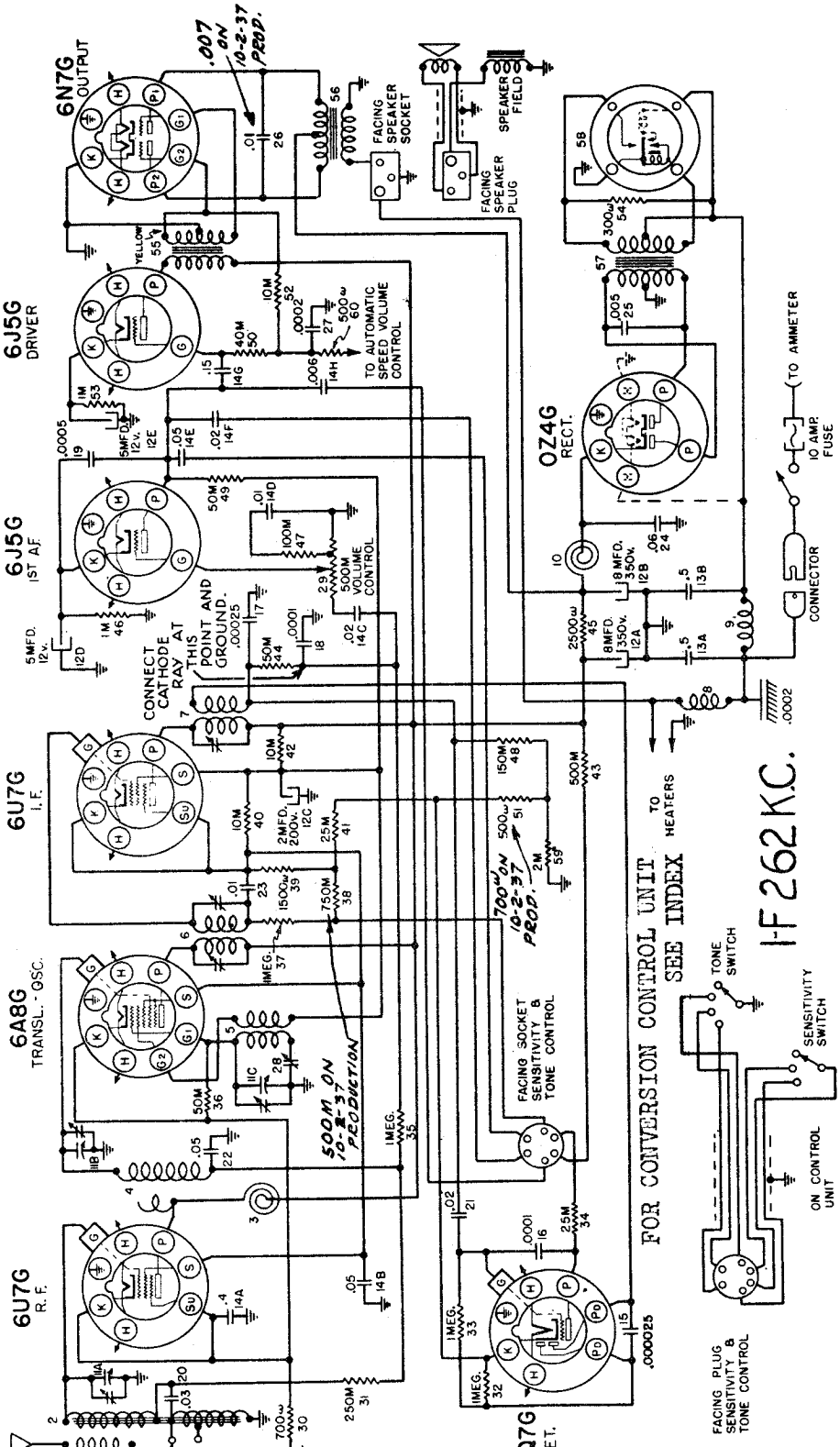
# OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982084
Early, Late
Schematic, Notes




The Oldsmobile Model 982084 is an eight tube Dash Speaker DeLuxe Receiver, with tone and sensitivity controls. This receiver was designed specifically for 1938 Oldsmobiles and is equipped with an instrument panel tuning control having a sensitivity switch and variable tone control in addition to the tuning and volume controls.

The antenna circuit is directly coupled to the antenna in contrast with the capacity coupled circuit used in some previous Oldsmobile Models. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the band (1400 K.C.) instead of at the low frequency end as with the capacity coupled sets. There are two taps provided on the Antenna Coil. One for use with the Running Boards Antenna and the other for use with overhead (Roof) type Antennas.

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MODEL 982084
Early, Late

# OLDSMOBILE DIV.—GEN. MOTORS

Socket, Trimmers
Chassis

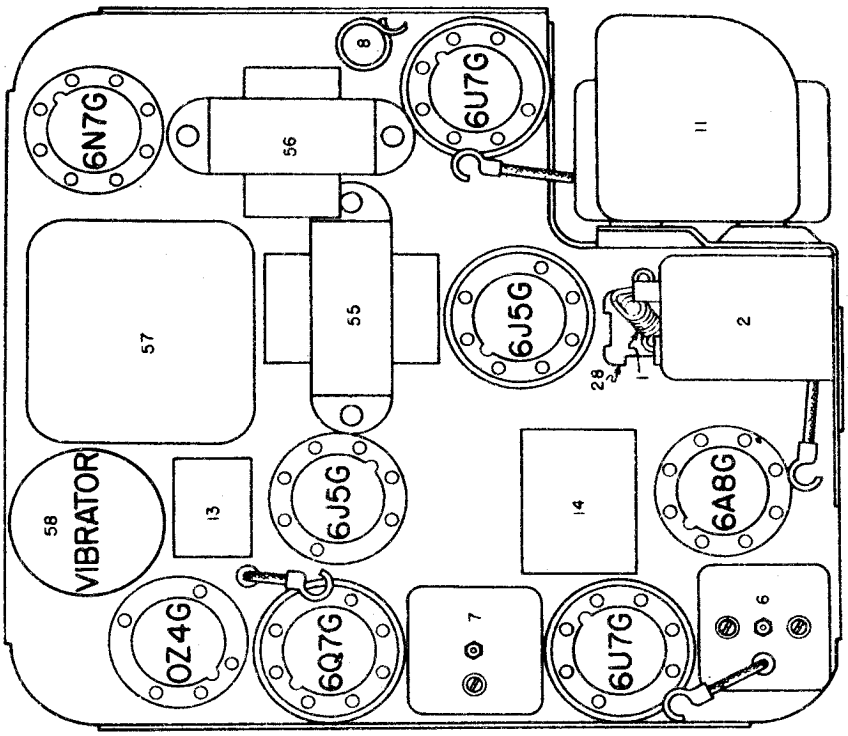


FIG. 2 PARTS LAYOUT-TOP VIEW

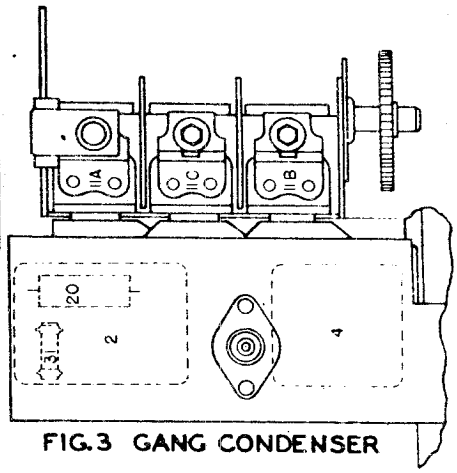


FIG. 3 GANG CONDENSER

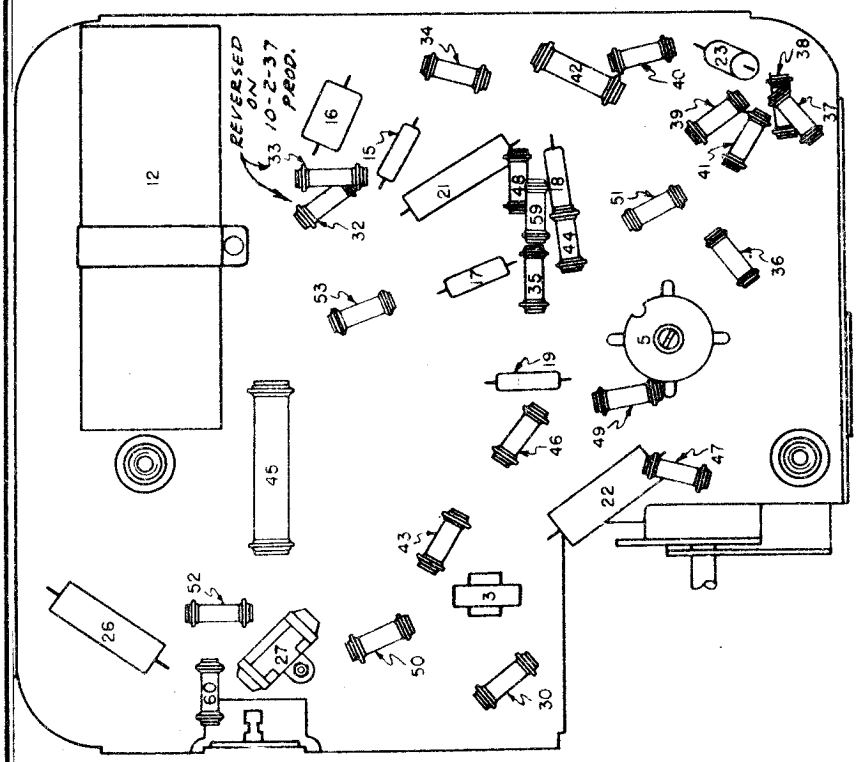


FIG. 4 PARTS LAYOUT-BOTTOM VIEW

FIG. 2-3-4 PARTS LAYOUT

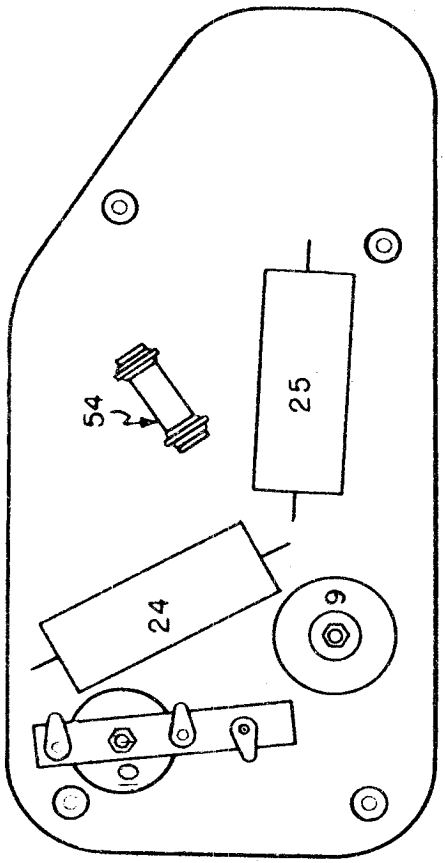


FIG. 7 PARTS UNDER SUB. PANEL

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1. Aligning I-F Stages at 262 Kilocycles:

IMPORTANT: The sensitivity switch on the tuning control should be in the "Distance" position when aligning the receiver, or the cable from the control unit to the receiver disconnected.

a. Connect the signal lead of the test oscillator to the grid cap of the 6A8G Tube through a .1 mfd. condenser, leaving the tube's grid clip in place.

b. Connect the ground lead of the test oscillator to the chassis frame.

c. Connect the output meter across the plate prongs of the output tube. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D.C. Voltages.

d. Set the test oscillator to exactly 262 K.C.

e. Adjust the trimmers on the I-F coils (Illustration 6 and 7, Figure 2) for maximum output. These adjustments should be repeated several times and during alignment, the test oscillator output should be kept to as low a value as is consistant with obtaining a readable indication on the output meter.

2. Aligning at 1520 Kilocycles:

a. Leave the test oscillator leads connected the same as for aligning the I-F circuits.

b. Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

c. Set the test oscillator to 1520 Kilocycles.

d. Adjust the parallel trimmer for the oscillator section of the condenser gang (Illustration 11C, Figure 3) for maximum output. (It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the entire high frequency end of the dial.)

3. Aligning at 540 Kilocycles:

a. Leave test oscillator leads connected the same as before.

b. Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

c. Set the test oscillator to 540 K.C.

d. Adjust the oscillator padding condenser (Illustration 28, Figure 2) located on the mounting plate of the receiver to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles:

a. Remove the signal lead of the test oscillator from the grid of the Translator tube and connect to the antenna terminal of the receiver THROUGH A .00055 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .00055 mfd. mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly. Some test oscillators have this condenser included and if the capacity is correct, it will not be necessary to use an external series condenser.)

b. Set the test oscillator to 1400 K.C.

c. Turn the condenser rotor plates until the frequency is tuned in with maximum output.

d. Adjust the R-F parallel trimmer on the condenser gang (Illustration 11B) and the antenna compensating condenser which is the parallel trimmer on the Condenser Gang (Illustration 11A, Figure 3).

5. Aligning at 600 Kilocycles:

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

a. Set the test oscillator on 600 K.C.

b. Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

c. Maintain a low output signal from the test oscillator and readjust the oscillator gang tuning shaft back and forth through the signal.

d. This operation should be continued until no further increase in output can be obtained.

NOTE: If the entire alignment procedure has been accomplished correctly, the receiver should be very nearly uniformly sensitive over the entire frequency range.

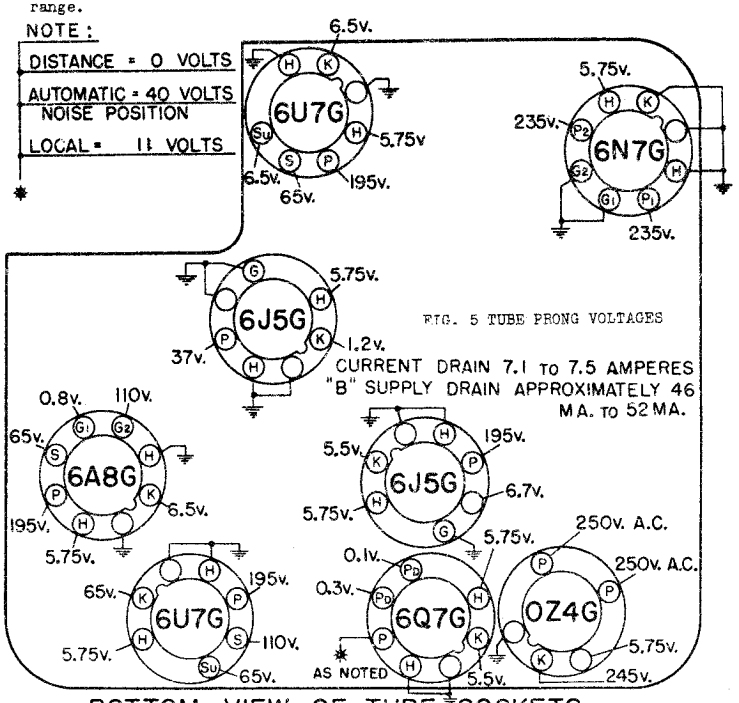


FIG. 5 TUBE PRONG VOLTAGES

CURRENT DRAIN 7.1 TO 7.5 AMPERES
"B" SUPPLY DRAIN APPROXIMATELY 46 MA. TO 52 MA.

BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6 VOLTS

MODEL 982084
Early, Late

# OLDSMOBILE DIV.—GEN. MOTORS

Remote Cont. Head Assembly, Details Condenser Schematic

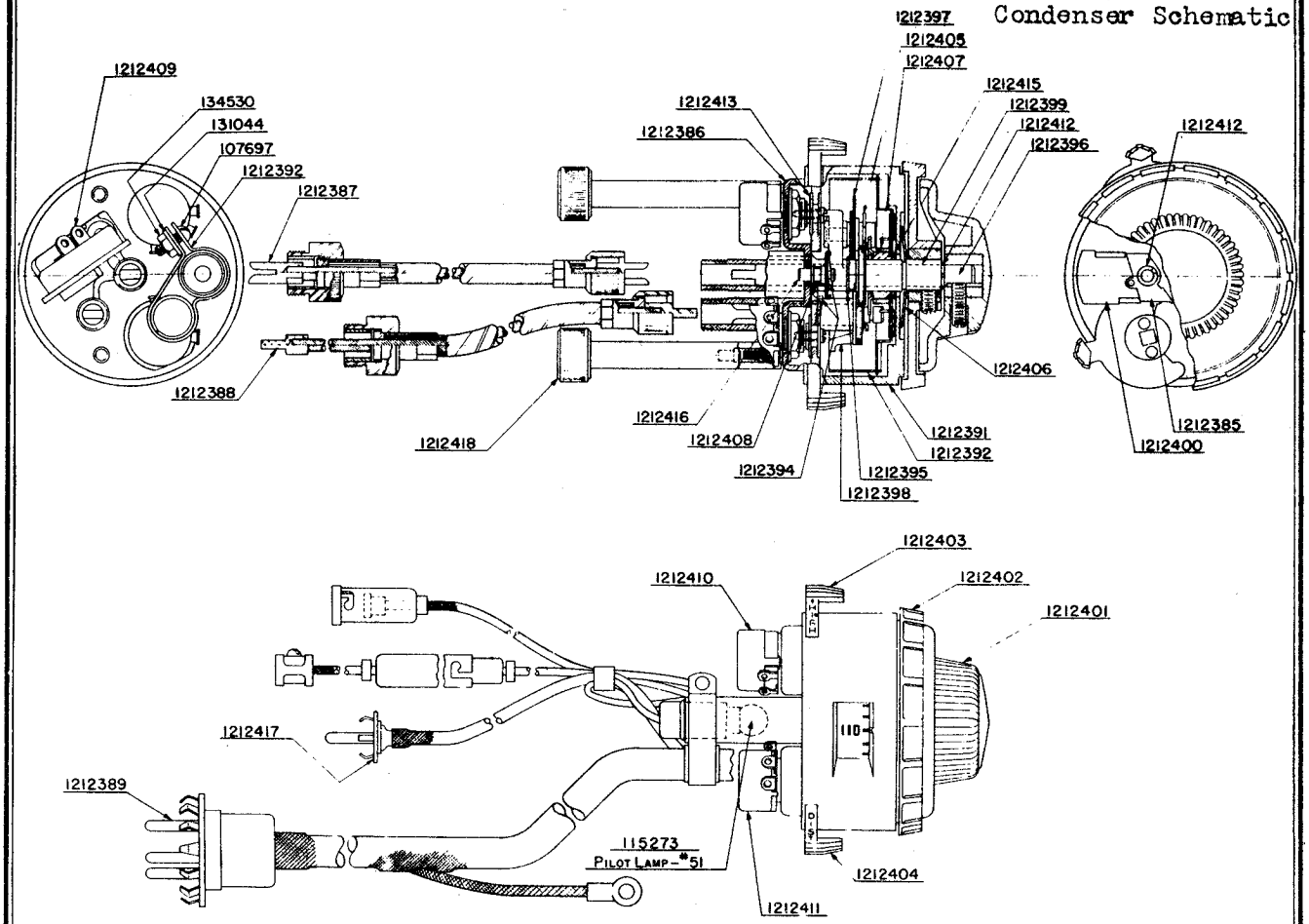


FIG. 8 REMOTE CONTROL HEAD

FIG. 7--#1212439 CONDENSER BLOCK CONNECTIONS

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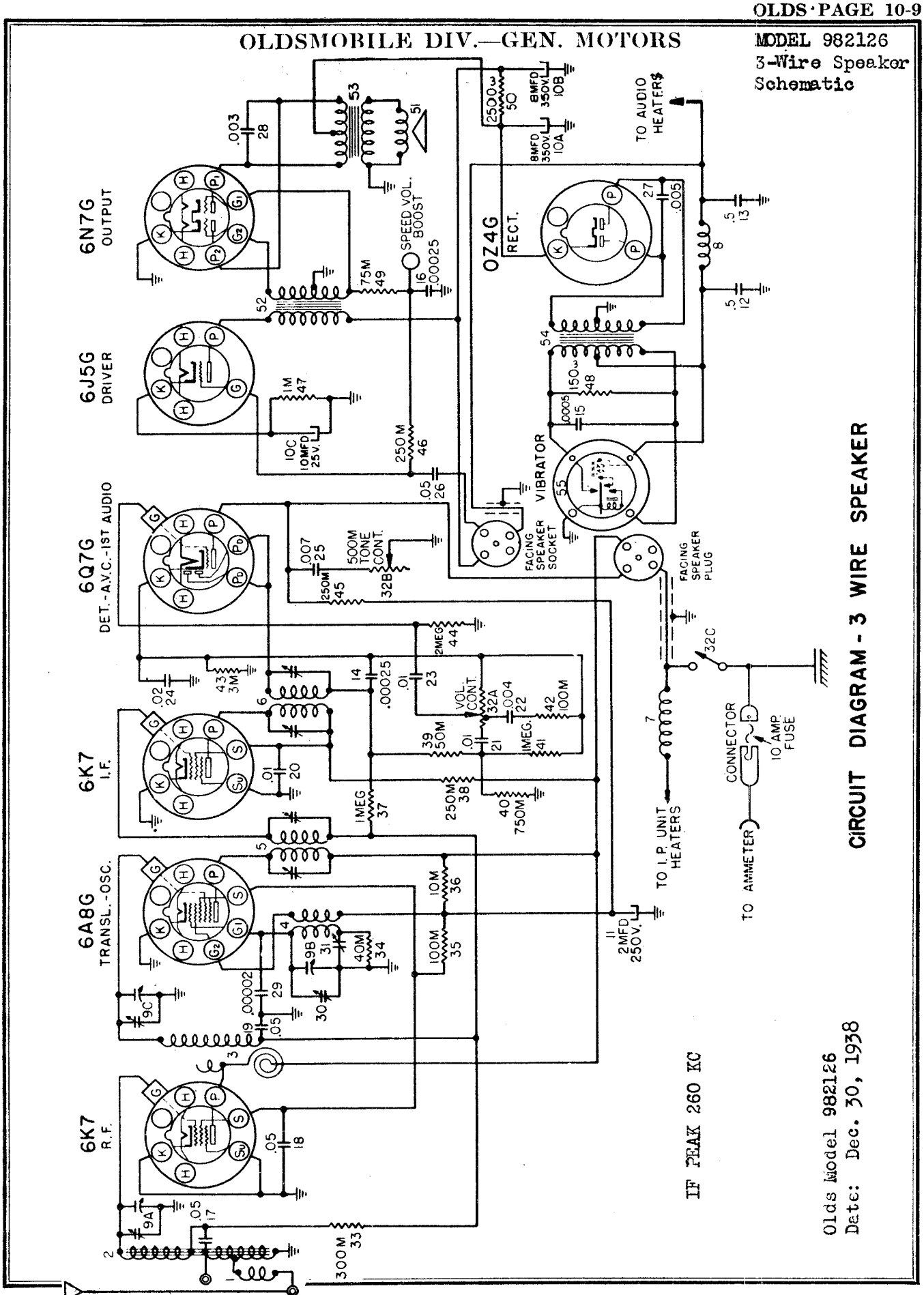


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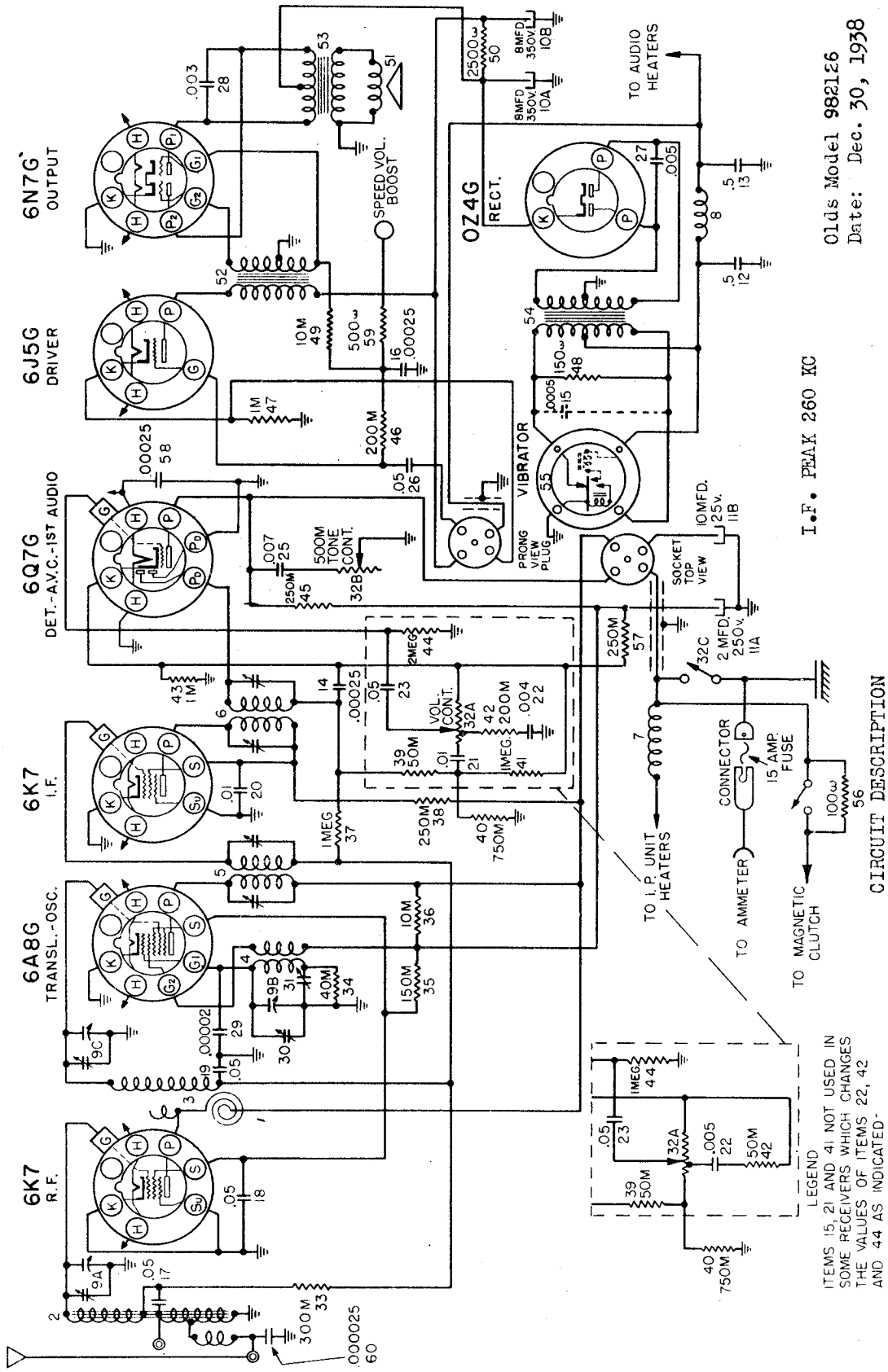
MODEL 982126
4-Wire Speaker
Schematic

# OLDSMOBILE DIV.—GEN. MOTORS




Olds Model 982126
Date: Dec. 30, 1938

I.F. PEAK 260 KC

## CIRCUIT DESCRIPTION

The circuit used in this receiver is the conventional superheterodyne type and does not employ regeneration.

An Automatic Speed Volume Control, which increases volume with car speed, is incorporated in the receiver.

CIRCUIT DIAGRAM OLDS MODEL 982126
4 PRONG CABLE SPEAKER

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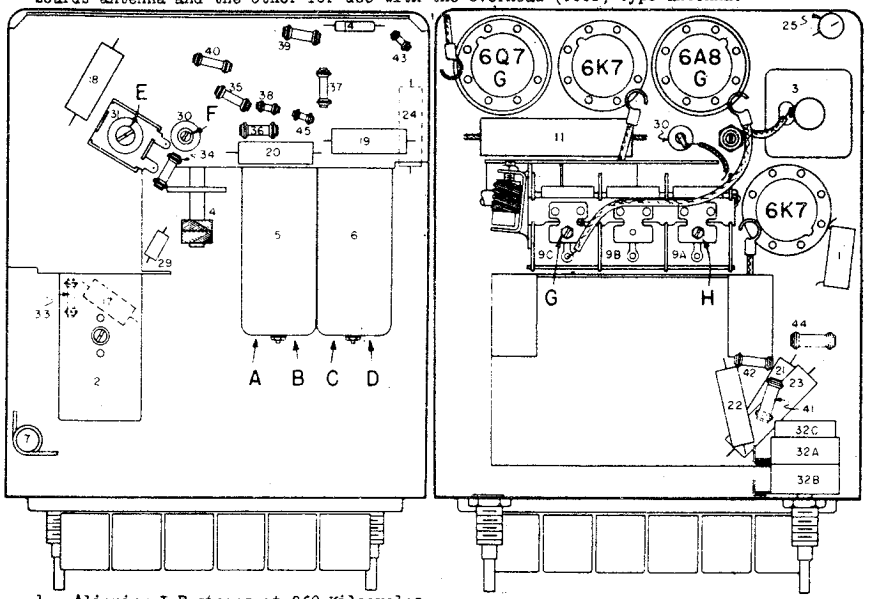
ANTENNA CIRCUIT

The antenna circuit is directly coupled to the antenna. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the high frequency end of the band (1400 K.C.) There are two antenna receptacles provided on the receiver. One for use with the running boards antenna and the other for use with the overhead (roof) type antenna.




1. Aligning I-F stages at 260 Kilocycles

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A8G Tube through a .1 mfd. condenser, leaving the tube's grid clip in place

(b) Connect the ground lead of the test oscillator to the chassis frame.

(c) Connect the output meter across the plate prongs of the output tube. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D. C. voltages.

(d) Set the test oscillator to exactly 260 Kilocycles.

(e) Adjust the trimmers "A", "B", "C" and "D" on the I-F Transformers for maximum output. (See parts layout). These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1560 Kilocycles

(a) Leave the test oscillator leads connected as for aligning the I-F Circuits.

(b) Turn the Rotor plates of the gang condenser (Illustration #9) all the way out and against the high frequency stop.

(c) Set the test oscillator to 1560 kilocycles.

(d) Adjust the condenser "F" for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the high frequency end of the dial.)

3. Aligning at 540 Kilocycles

(a) Leave the test oscillator leads connected the same as before.

(b) Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

(c) Set the test oscillator to 540 kilocycles.

(d) Adjust the oscillator padding condenser "E" for maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles

(a) Remove the signal lead of the test oscillator from the grid of the 6A8G tube and connect to the Running Board Antenna receptacle of the receiver THROUGH a .00045 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .00045 mfd. mica condenser be used when aligning the antenna stage of these receivers and that the lead from the test oscillator is in the correct terminal in order that this circuit can be made to track properly.)

(b) Set the test oscillator to 1400 K.C.

(c) Turn the condenser rotor plates until this frequency is tuned in with Maximum output.

(d) Adjust the R-F Parallel trimmer "G" on the condenser gang and the antenna compensating condenser "H" which is the parallel trimmer on the Condenser Gang.

5. Aligning at 600 Kilocycles

The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

(a) Set the test oscillator at 600 K. C.

(b) Turn the Condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

(c) Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser "E" while rocking the variable condenser gang tuning shaft back and forth through the signal.

(d) This operation should be continued until no further increase in output can be obtained.

NOTE: If the entire alignment procedure has been accomplished accurately, the receiver should be very nearly uniformly sensitive over the entire frequency range.

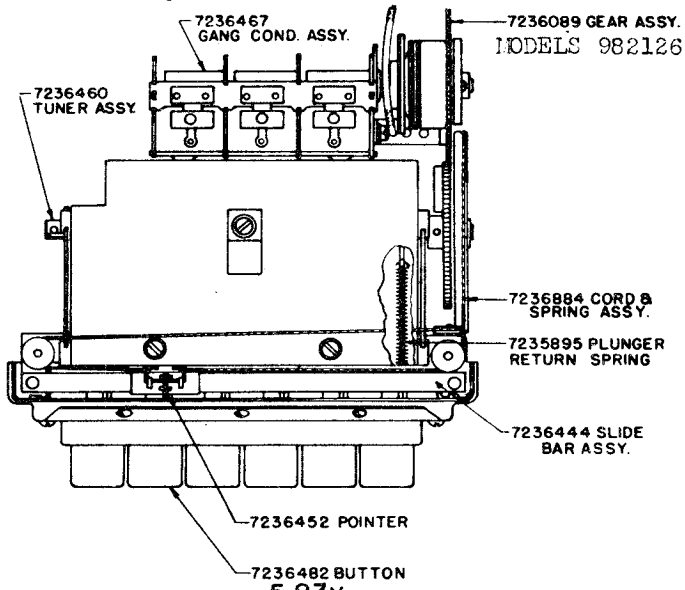
Model 982126
Date: Dec. 30, 1938.

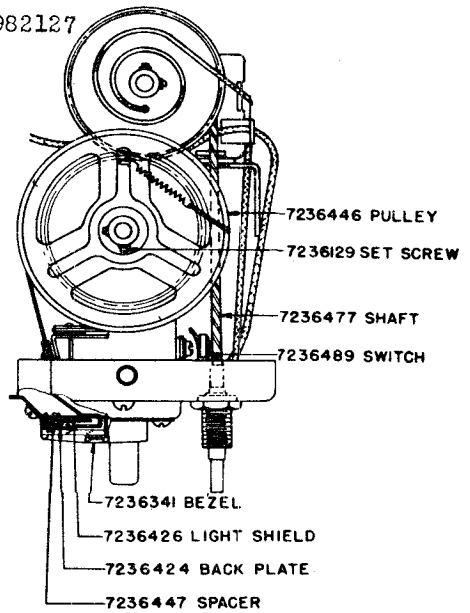
MODEL 982126
Voltage, Chassis
Control Assembly

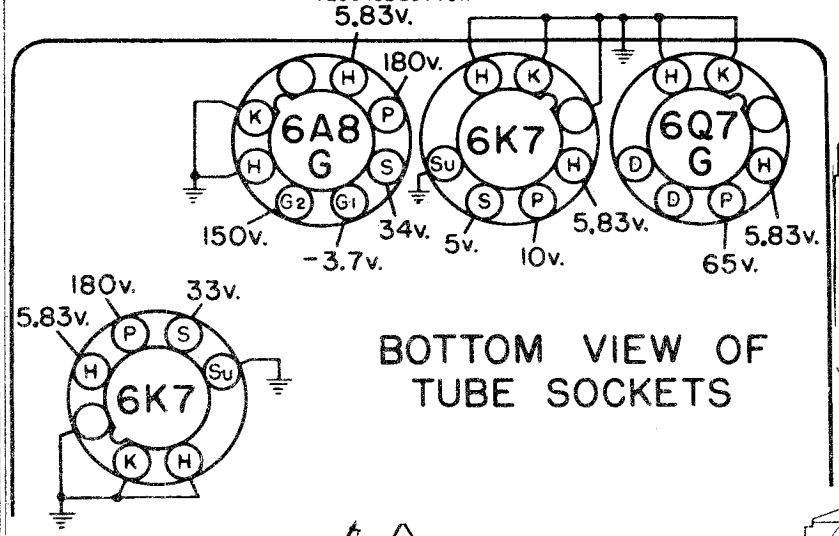
# OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982127
Control Assembly

MODELS 982126 AND 982127



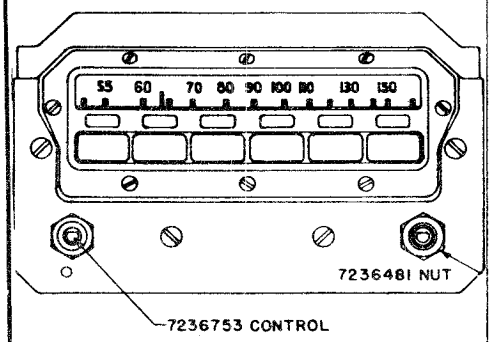



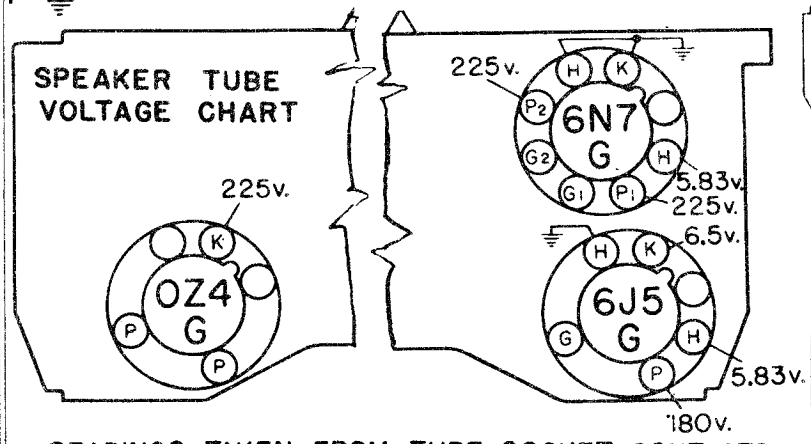




BOTTOM VIEW OF TUBE SOCKETS

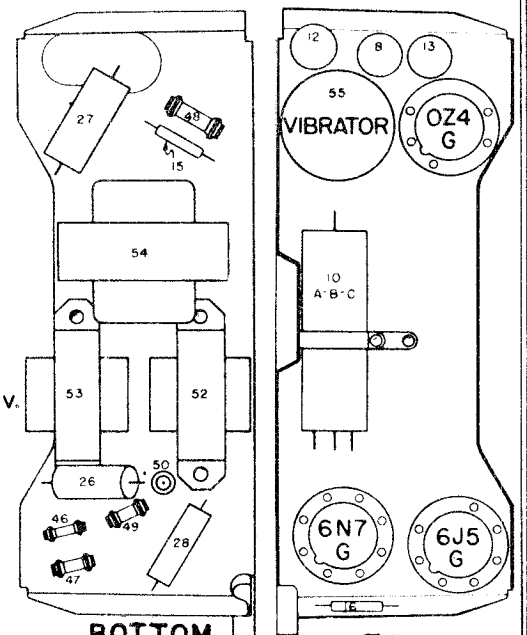



SPEAKER TUBE VOLTAGE CHART




READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT;
"A" BATTERY 6 VOLTS.

CURRENT DRAIN 6.7 TO 7.6 AMPERES.
"B" SUPPLY DRAIN APPROXIMATELY




SPEAKER LAYOUT PARTS

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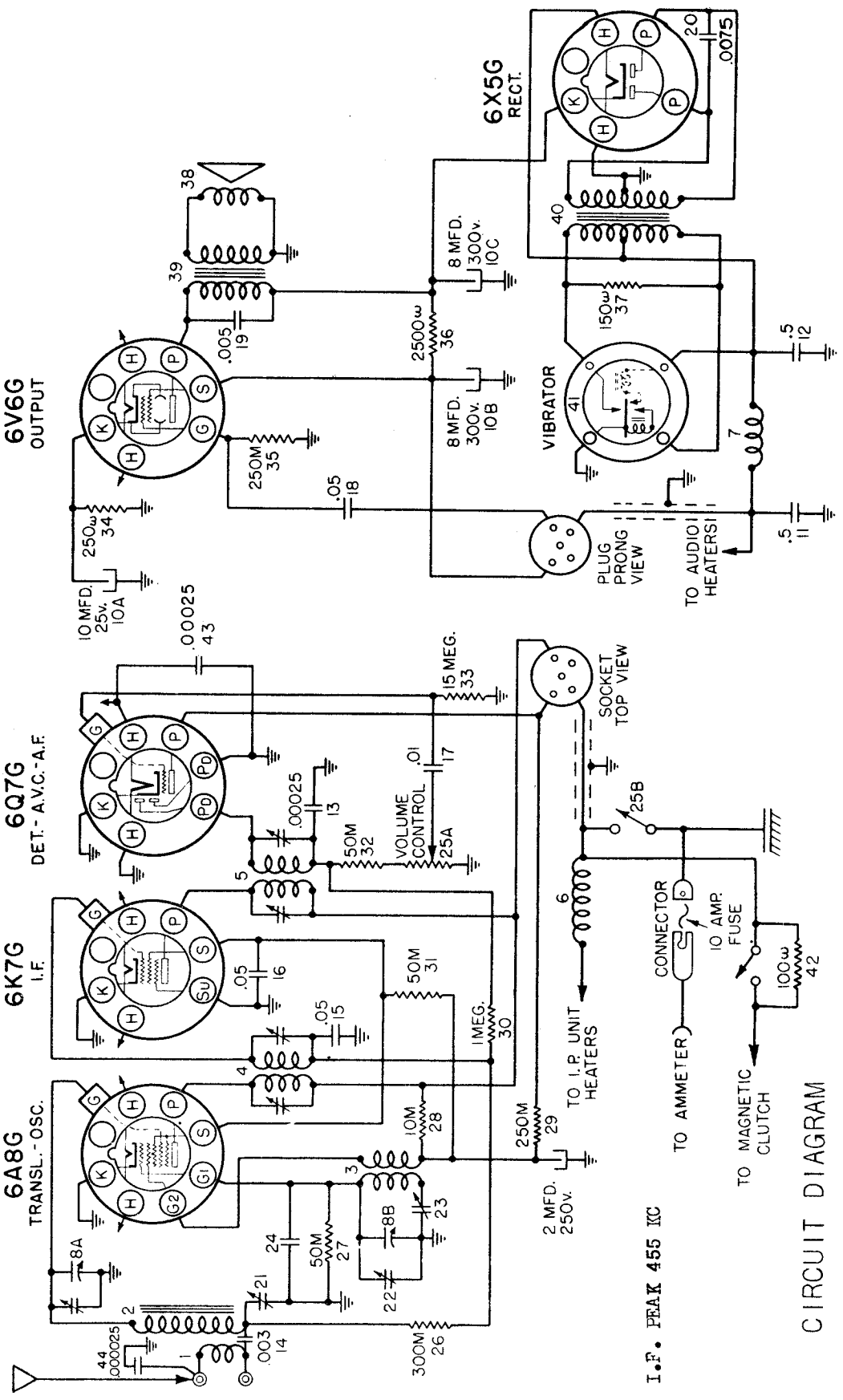
OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982127
Schematic




CIRCUIT DIAGRAM

OLDS MODEL 982127

Olds Model 982127
Date: April 20, 1939

The antenna circuit is capacity coupled to the antenna. A small adjustable condenser is provided for adjusting the antenna circuit to the antenna. This adjustment is made near the low frequency end of the band (600 K.C.) There are two antenna receptacles provided on the receiver. One for use with the Running Boards Antenna and the other for use with Side Cowl Mounted type Antenna.

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MODEL 982127
Socket, Trimmers
Alignment

# OLDSMOBILE DIV.—GEN. MOTORS

1. Aligning I-F Stage at 455 Kilocycles

(a) Connect the signal lead of the test oscillator to the grid cap of the 6A8G Tube through a .1 mfd. condenser, leaving the tube's grid clip in place.

(b) Connect the ground lead of the test oscillator to the chassis frame.

(c) Connect the output meter from the plate prong of the output tube to ground. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D. C. Voltages.

(d) Set the test oscillator to exactly 455 K.C.

(e) Turn volume control to maximum.

(f) Adjust the trimmers "A", "B", "C" and "H" on the I-F Transformers for maximum output. (See parts layout) These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistent with obtaining a readable indication on the output meter.

2. Aligning at 1520 Kilocycles

(a) Leave the test oscillator leads connected the same as for aligning the I-F Circuits.

(b) Turn the Rotor plates of the gang condenser (Illus. #8) all the way out and against the high frequency stop.

(c) Set the test oscillator to 1520 kilocycles.

(d) Adjust the condenser "F" for maximum output. (It is very important that this frequency be set accurately as a slight missetting will cause the receiver to be out of track over the entire high frequency end of the dial.)

3. Aligning at 540 Kilocycles

(a) Leave test oscillator leads connected the same as before.

(b) Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

(c) Set the test oscillator to 540 K.C.

(d) Adjust the oscillator padding condensor "E" for maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning the Antenna Stage

(a) Remove the signal lead of the test oscillator from the grid of the 6A8G tube and connect to the Running Board Antenna receptacle of the receiver THROUGH a .0004 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .0004 mfd. mica condenser be used when aligning the antenna stage of these receivers and that the lead from the test oscillator is in the correct receptacle in order that this circuit can be made to track properly.

(b) Set the test oscillator to 600 K.C.

(c) Adjust antenna trimmer condenser "D" for maximum output.

(d) Set the test oscillator to 1400 K.C.

(e) Turn the condenser rotor plates until this frequency is tuned in with maximum output.

(f) Adjust the Parallel trimmer "C" on the condenser gang for maximum output.

5. Aligning at 600 Kilocycles

The oscillator padding condensor was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator padding condensor at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

(a) Set the test oscillator at 600 K.C.

(b) Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

(c) Maintain a low output signal from the test oscillator and readjust the oscillator padding condenser "E" while rocking the variable condenser gang tuning shaft back and forth through the signal.

(d) This operation should be continued until no further increase in output can be obtained.

NOTE: If the entire alignment procedure has been accomplished correctly, the receiver should be very nearly uniformly sensitive over the entire frequency range.




LOCATION OF PARTS - OLDS MODEL 982127 Note: For tuning head mechanism parts, refer to Olds Model Radio 982126.

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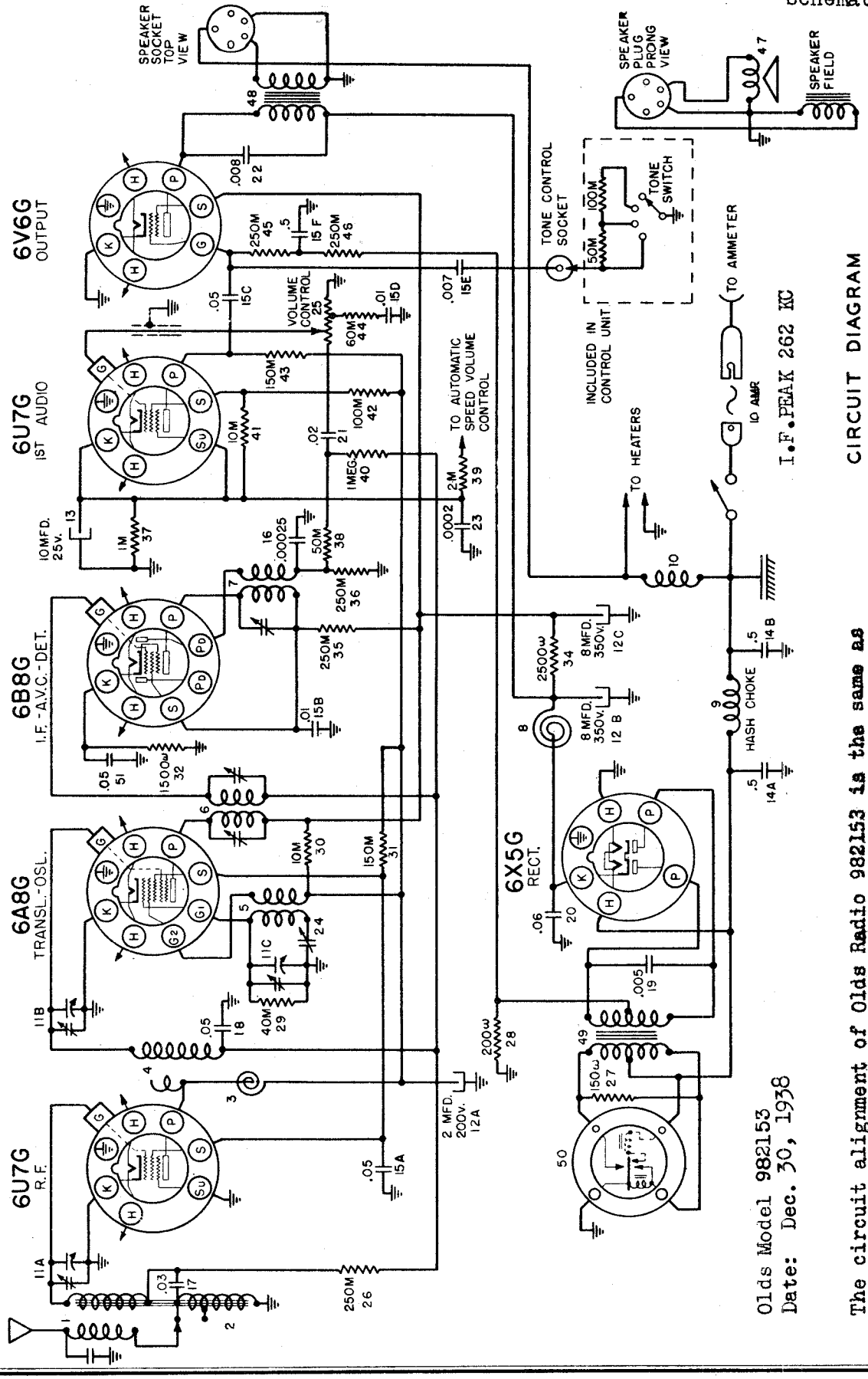
# OLDSMOBILE DIV.—GEN. MOTORS

MODEL 982153
Schematic




CIRCUIT DIAGRAM
OLDS RADIO-982153

Olds Model 982153
Date: Dec. 30, 1938

The circuit alignment of Olds Radio 982153 is the same as Olds Radio 982083 FOR CONVERSION CONTROL UNIT SEE INDEX

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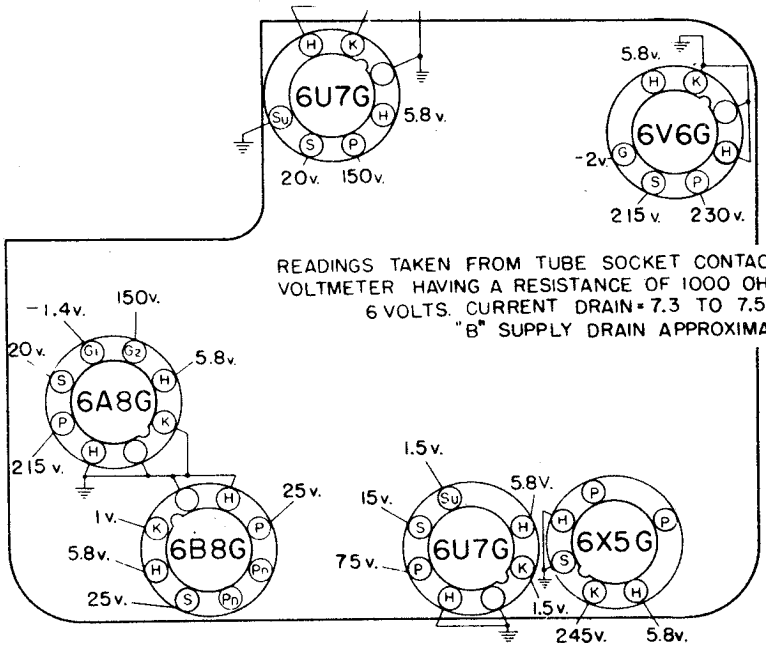
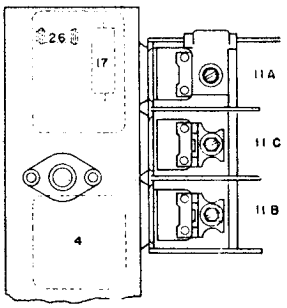
MODEL 982153
Voltage,Chassis
Socket,Trimmers

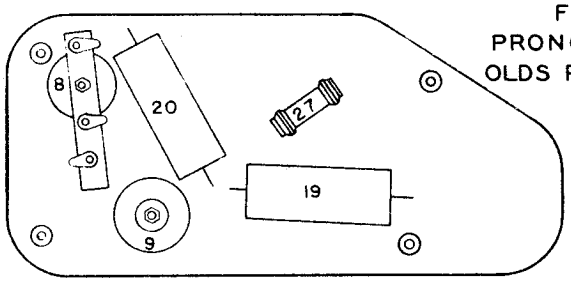
# OLDSMOBILE DIV.—GEN. MOTORS



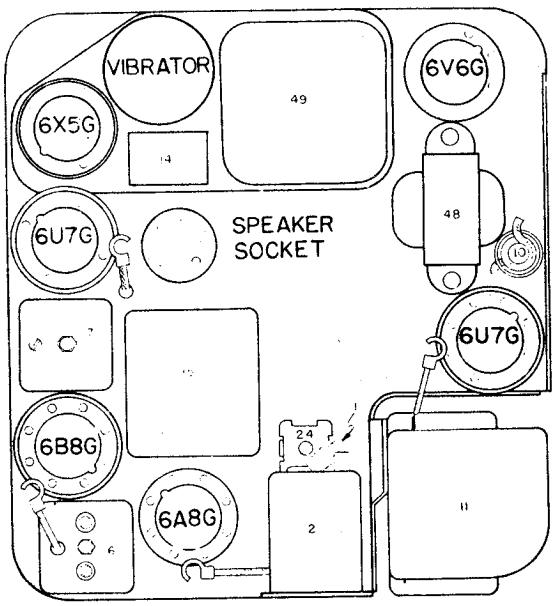

BOTTOM VIEW OF TUBE SOCKETS

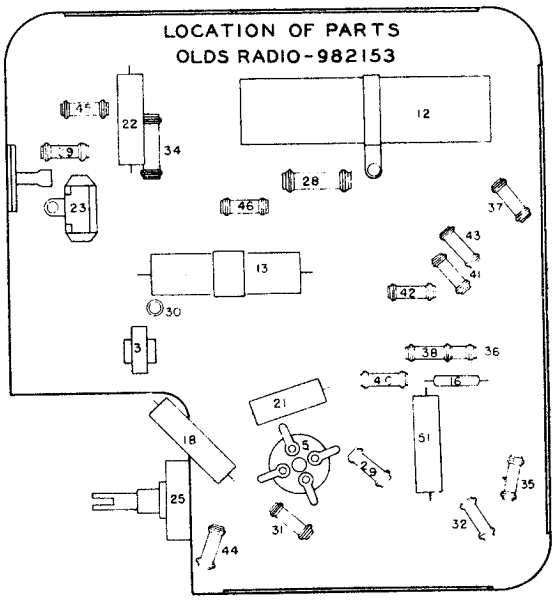
FIG. 3
PRONG VOLTAGES
OLDS RADIO-982153




POWER SUPPLY UNIT LOCATION OF PARTS
RADIO 982153

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1. Aligning I-F Stages at 262 Kilocycles:

   a. Connect the signal lead of the test oscillator to the grid cap of the 6A8G tube through a .1 mfd. condenser, leaving the tube's grid clip in place.

   b. Connect the ground lead of the test oscillator to the chassis frame.

   c. Connect the output meter from the plate prong of the 6V6G to ground. Care should be taken when connecting the output meter to insert a series condenser to protect the meter from D.C. voltages.

   d. Set the test oscillator to exactly 262 K.C.

   e. Adjust the trimmers on the I-F coils (Illustration 6 and 7, Figure 2) for maximum output. These adjustments should be repeated several times and during alignment the test oscillator output should be kept to as low a value as is consistant with obtaining a readable indication on the output meter.

2. Aligning at 1520 Kilocycles:

   a. Leave the test oscillator leads connected the same as for aligning the I-F circuits.

   b. Turn the rotor plates of the gang condenser all the way out and against the high frequency stop.

   c. Set the test oscillator to 1520 kilocycles.

   d. Adjust the parallel trimmer for the oscillator section of the condenser gang (Illustration 11C, Figure 3) for maximum output. (It is very important that this frequency be set accurately as a slight mis-setting will cause the receiver to be out of track over the entire high frequency end of the dial.

3. Aligning at 540 Kilocycles:

   a. Leave test oscillator leads connected the same as before.

   b. Turn the rotor plates of the gang condenser all the way into mesh so that they rest against the low frequency stop.

   c. Set the test oscillator to 540 K.C.

   d. Adjust the oscillator padding condenser (Illustration 26, Figure 2) located on the mounting plate of the receiver to maximum output. (This adjustment sets the low frequency tuning range of the receiver to 540 K.C.)

4. Aligning at 1400 Kilocycles:

   a. Remove the signal lead of the test oscillator from the grid of the Translator tube and connect to the antenna terminal of the receiver THROUGH A .00055 mfd. MICA CONDENSER connected in place of the .1 mfd. condenser previously used. (It is very important that a .00055 mfd. mica condenser be used in aligning the antenna stage of these receivers in order that this circuit can be made to track properly. Some test oscillators have this condenser included and if the capacity is correct, it will not be necessary to use an external series condenser.)

   b. Set the test oscillator to 1400 K.C.

   c. Turn the condenser rotor plates until the frequency is tuned in with maximum output.

   d. Adjust the R-F parallel trimmer on the condenser gang (Illustration 11-B) and the antenna compensating condenser which is the parallel trimmer on the Condenser Gang (Illustration 11-A, Figure 3).

5. Aligning at 600 Kilocycles:

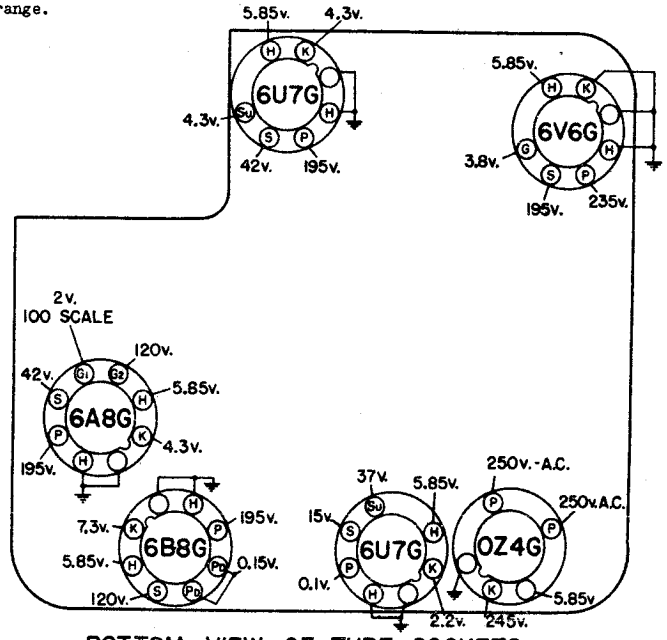
   The oscillator padding condenser was previously adjusted at 540 K.C., however, it is necessary in most cases to repeak the oscillator tracking condenser at 600 K.C. in order to make the receiver track properly and to secure full sensitivity.

   a. Set the test oscillator on 600 K.C.

   b. Turn the condenser rotor plates until the signal from the test oscillator is tuned in with maximum output.

   c. Maintain a low output signal from the test oscillator and readjust the oscillator tracking condenser (Illustration 26, Figure 2) while rocking the variable condenser gang tuning shaft back and forth through the signal.

   d. This operation should be continued until no further increase in output is obtained. Note if the entire alignment procedure has been accomplished correctly, the receiver should be very nearly uniformly sensitive over the entire frequency range.




BOTTOM VIEW OF TUBE SOCKETS

READINGS TAKEN FROM TUBE SOCKET CONTACTS TO GROUND WITH A D.C. VOLTMETER HAVING A RESISTANCE OF 1000 OHMS PER VOLT; "A" BATTERY 6 VOLTS. CURRENT DRAIN=6.6 TO 6.8 AMPS. "B" SUPPLY DRAIN APPROXIMATELY 50 TO 54 M.A.

FIG. 5 TUBE PRONG VOLTAGES - MODEL 982083

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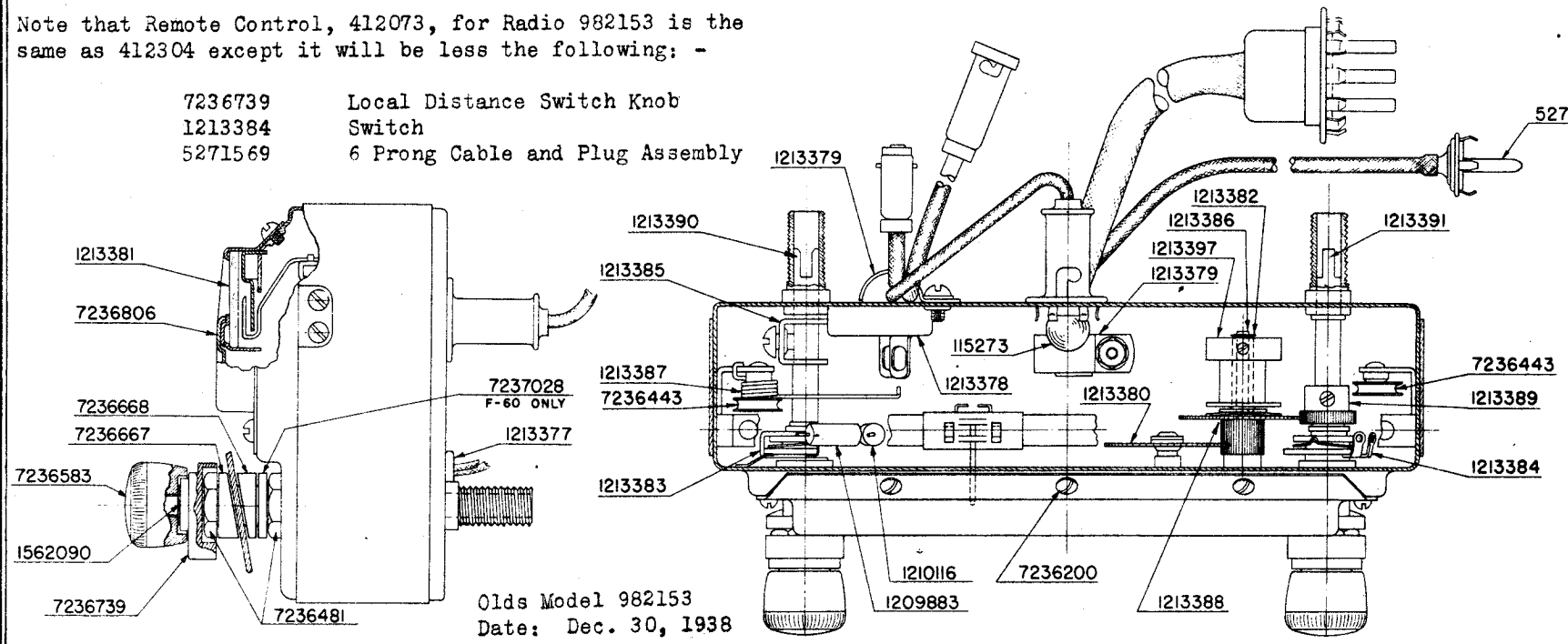
CONVERSION CONTROL UNIT 412304.

| | | |
|---|---|---|
| 1213385 | Arm Assembly | Off-On Switch Actuating |
| 7236806 | Bezel Assembly | |
| 5271383 | Cable & Plug Assembly | Tone Control |
| | Cable & Plug Assembly | Tone Control |
| 1213379 | Clamp | Cable Retaining |
| 1213382 | Clip | Pulley Retaining |
| 1213381 | Dial Glass | Station Indicator |
| 1213388 | Gear Assembly | Idler & Pinion |
| 1213389 | Gear Assembly | Driving Pinion |
| 1213380 | Gear & Bushing Assy. | Driven |
| 1213377 | Grommet | Cable Insulating |
| 115273 | Lamp #51 | Pilot Light |
| 7236583 | Knob | Station Selector & Volume |
| 7236739 | Knob | Tone Control & Local Distant Switch |
| 7236481 | Nut 7/16-28 Hex | Control Mounting |
| 1213397 | Pulley Assembly | Dial Drive |
| 7236443 | Pulley | Wood |
| 1210116 | Resistor | Insulated 50,000 ohms, 1/2 Watt |
| 1209883 | Resistor | Insulated 100,000 ohms, 1/2 Watt |
| 7236200 | Screw 4-36 x 3/16 | Bezel Mounting |
| 1213391 | Shaft | Station Selector |
| 1213390 | Shaft | Volume Control |
| 1213387 | Spring | Dial Pointer - String Tension |
| 1213386 | Stud | Idler Gear |
| 1213378 | Switch | Off-On |
| 1213383 | Switch | Tone Control |
| 1213384 | Switch | Local Distance |

CONVERSION CONTROL UNIT 412304
INCLUDED IN PACKAGE 982123
USED IN CONNECTION WITH RECEIVER
982083-4-5

Note that Remote Control, 412073, for Radio 982153 is the same as 412304 except it will be less the following: -

| | |
|---|---|
| 7236739 | Local Distance Switch Knob |
| 1213384 | Switch |
| 5271569 | 6 Prong Cable and Plug Assembly |




Olds Model 982153
Date: Dec. 30, 1938

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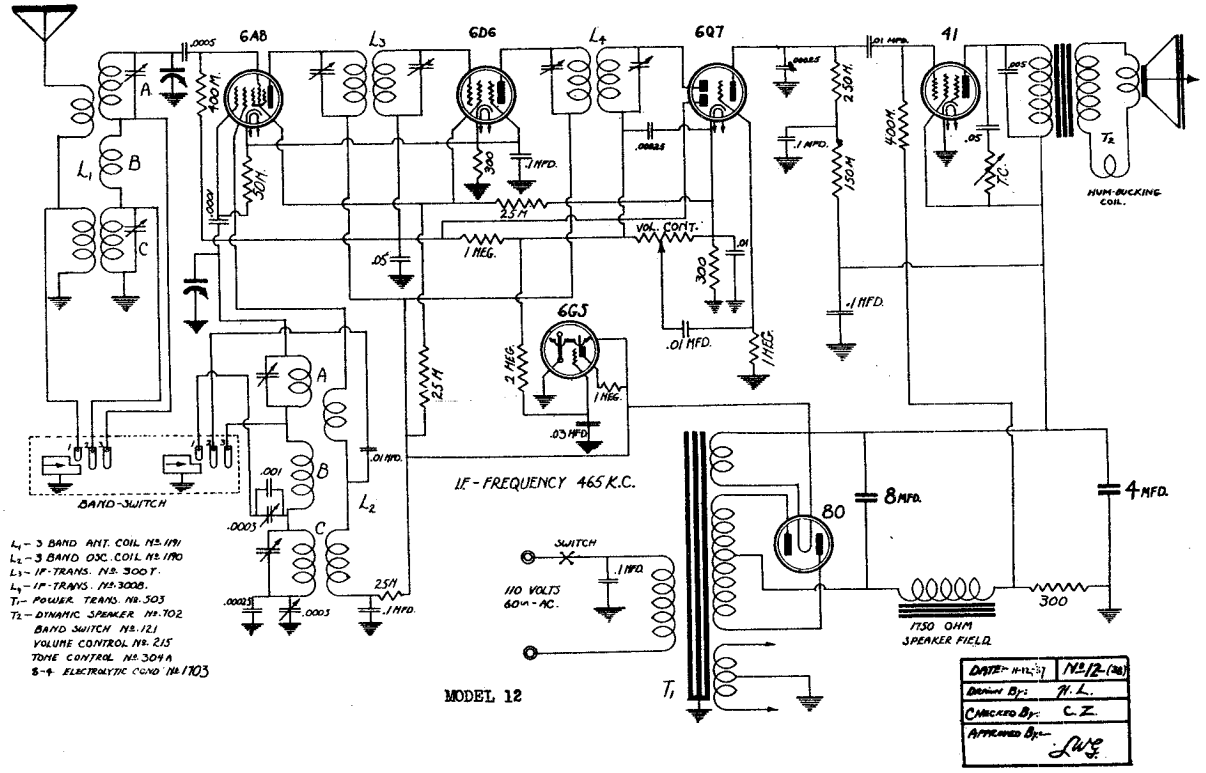
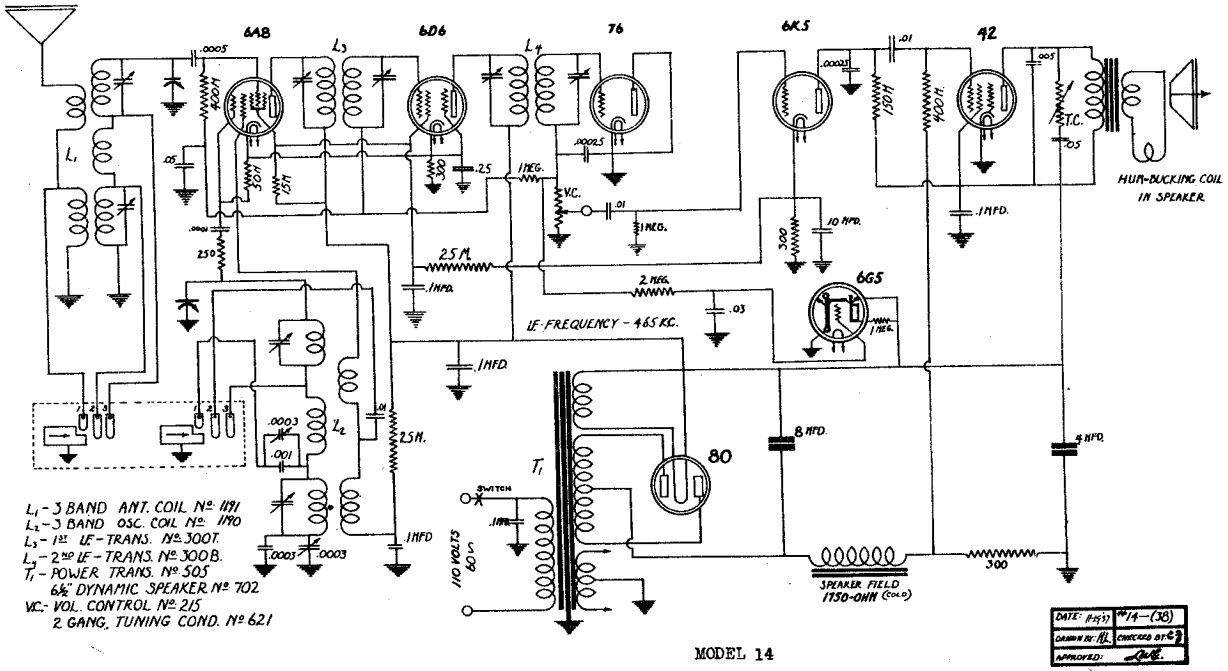
# PACIFIC RADIO CORP.

MODEL 12
MODEL 14
Schematics




MODEL 12


6A8
6D6
76
6K5
42
6G5
80
I.F. FREQUENCY - 465 KC.
HUM-BUCKING COIL IN SPEAKER
110 VOLTS 60~
SPEAKER FIELD 1750-OHM (COLD)
L1 - 3 BAND ANT. COIL No. 1191
L2 - 3 BAND OSC. COIL No. 1190
L3 - 1st I.F. - TRANS. No. 3007.
L4 - 2nd I.F. - TRANS. No. 3008.
T1 - POWER TRANS. No. 505
6½" DYNAMIC SPEAKER No. 702
VC - VOL. CONTROL No. 215
2 GANG, TUNING COND. No. 621

MODEL 14

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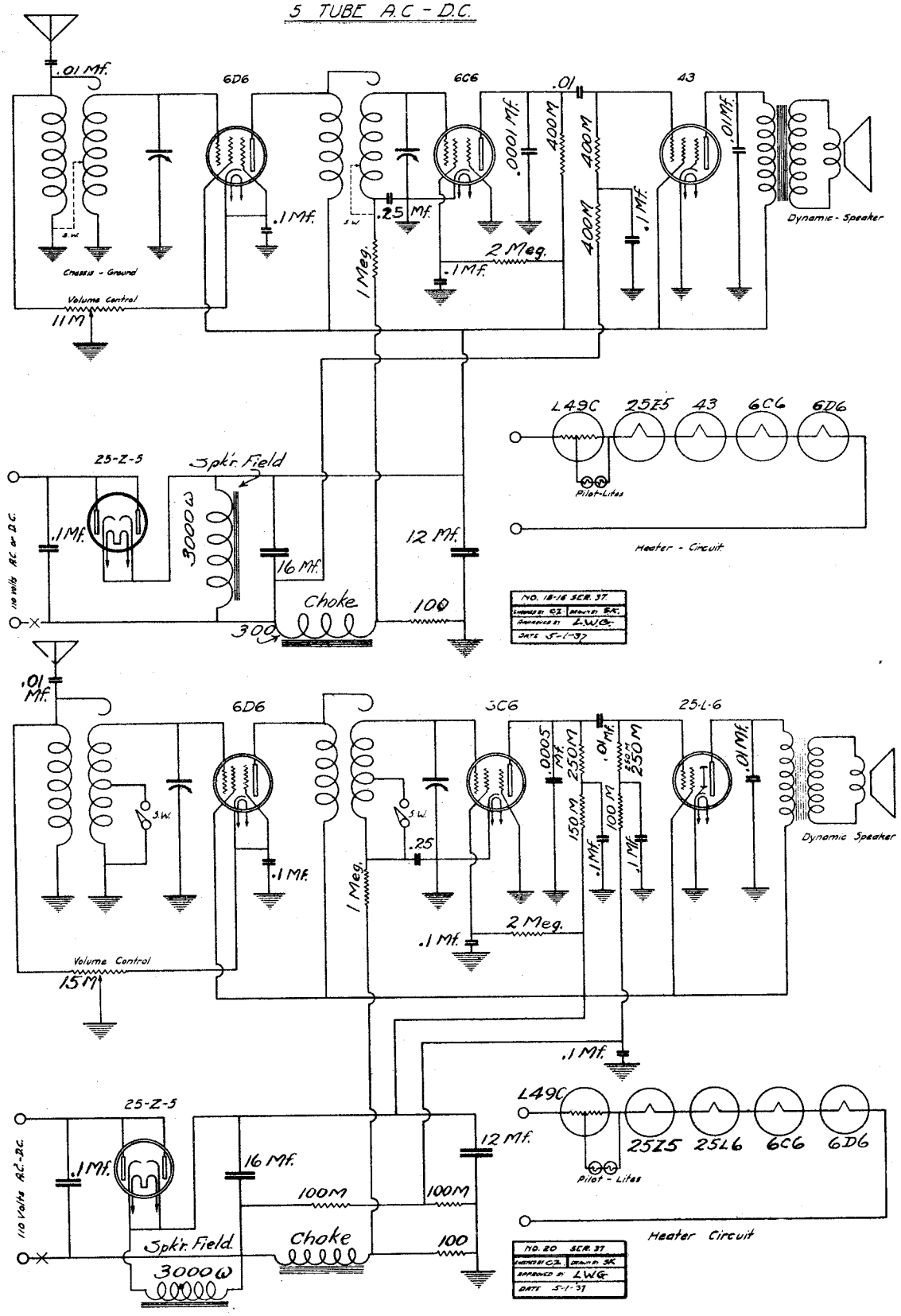
MODELS 15,16 Ser.37
MODEL 20,Ser.37
Schematics

# PACIFIC RADIO CORP.

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# PACIFIC RADIO CORP.

MODEL 25
Schematic
Alignment




*INTERMEDIATE FREQUENCY:* Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

*BROADCAST BAND:* Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

*SHORT WAVE:* Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.

This receiver is designed to operate over two tuning ranges.
from 540 K.C. to 1730 and
from 5800 K.C. to 18000 K.C.

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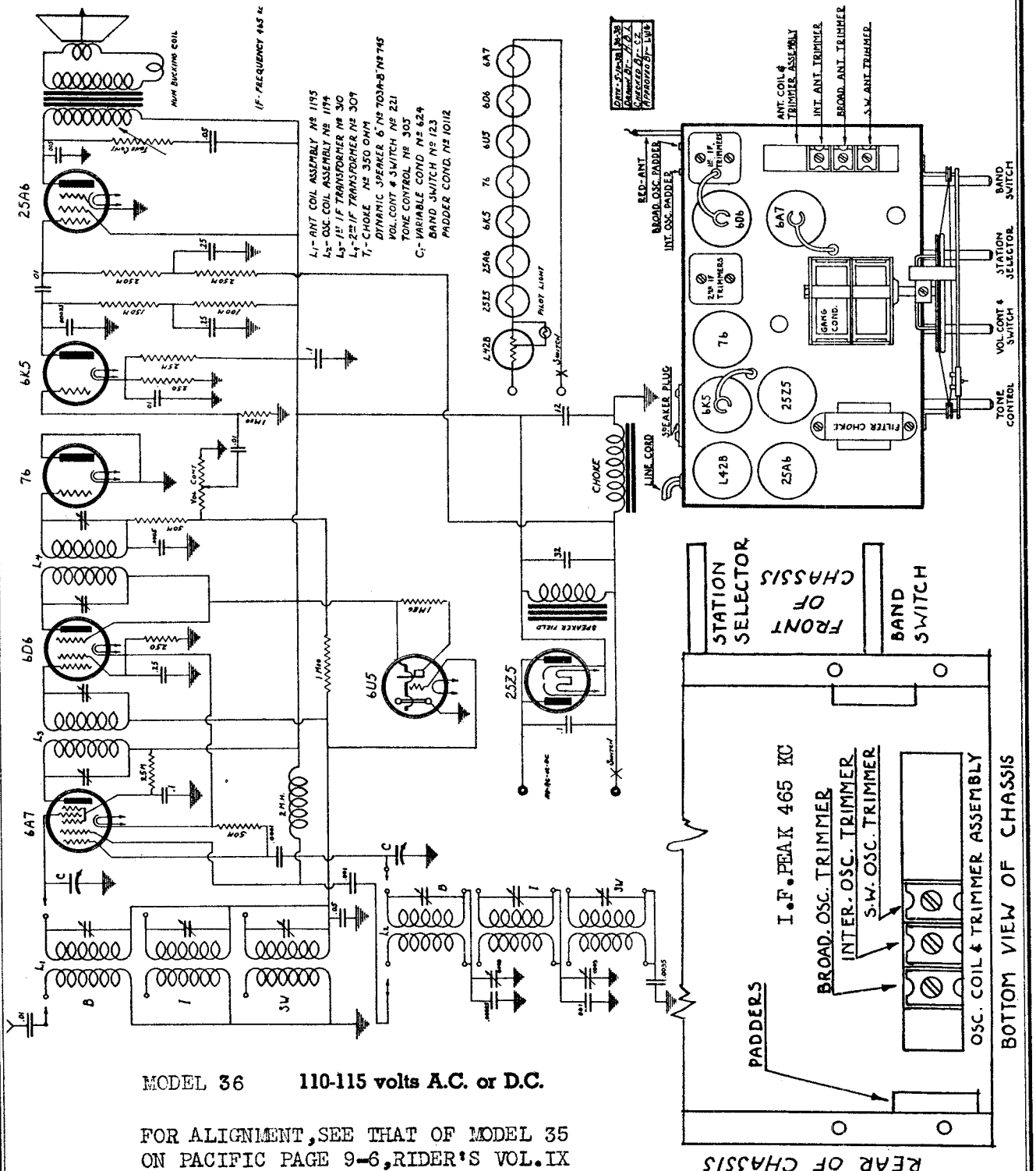
MODEL 36
Schematic, Socket
Trimmers

# PACIFIC RADIO CORP.




MODEL 36 **110-115 volts A.C. or D.C.**

FOR ALIGNMENT, SEE THAT OF MODEL 35 ON PACIFIC PAGE 9-6, RIDER'S VOL. IX

| *SWITCH POSITION* | *BAND* | *RANGE IN KILOCYCLES* |
|---|---|---|
| **Left** | **Broadcast** | **540— 1710 KC** |
| **Center** | **Intermediate** | **1710— 5800 KC** |
| **Right** | **Short Wave (foreign)** | **5800—17500 KC** |

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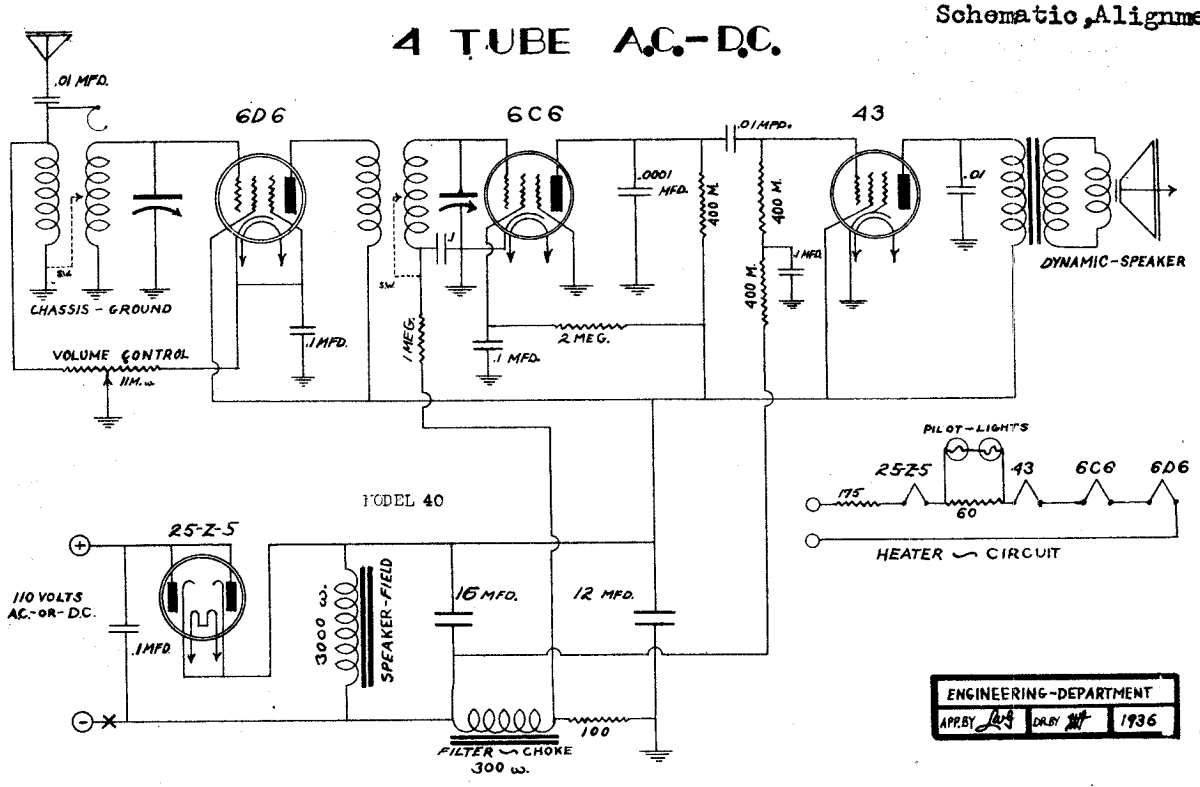
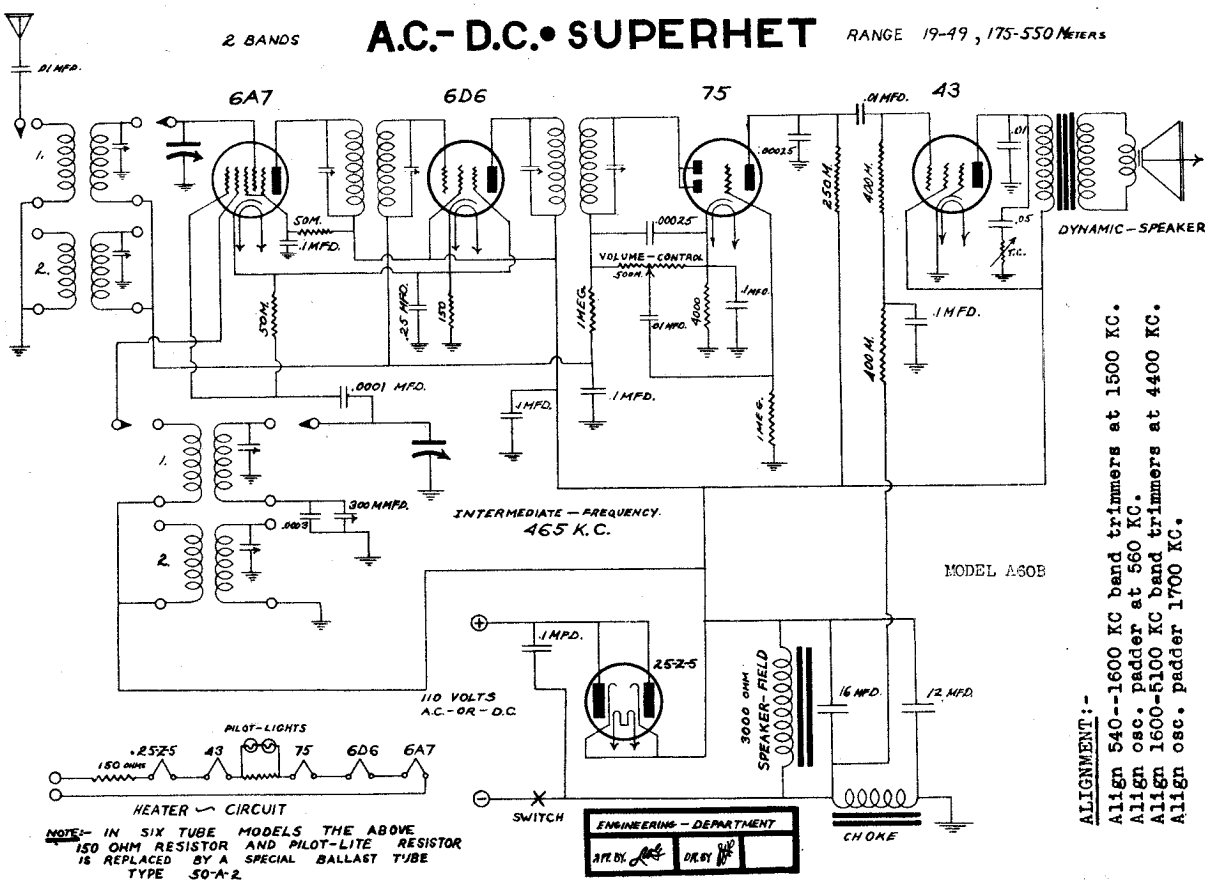
MODEL 40
Schematic
MODEL A60B
Schematic, Alignment

# PACIFIC RADIO CORP.

## 4 TUBE A.C.-D.C.




## 2 BANDS A.C.-D.C. • SUPERHET RANGE 19-49, 175-550 METERS




NOTE:- IN SIX TUBE MODELS THE ABOVE 150 OHM RESISTOR AND PILOT-LITE RESISTOR IS REPLACED BY A SPECIAL BALLAST TUBE TYPE 30-A-2

ALIGNMENT:-
Align 540--1600 KC band trimmers at 1500 KC.
Align osc. padder at 560 KC.
Align 1600-5100 KC band trimmers at 4400 KC.
Align osc. padder 1700 KC.

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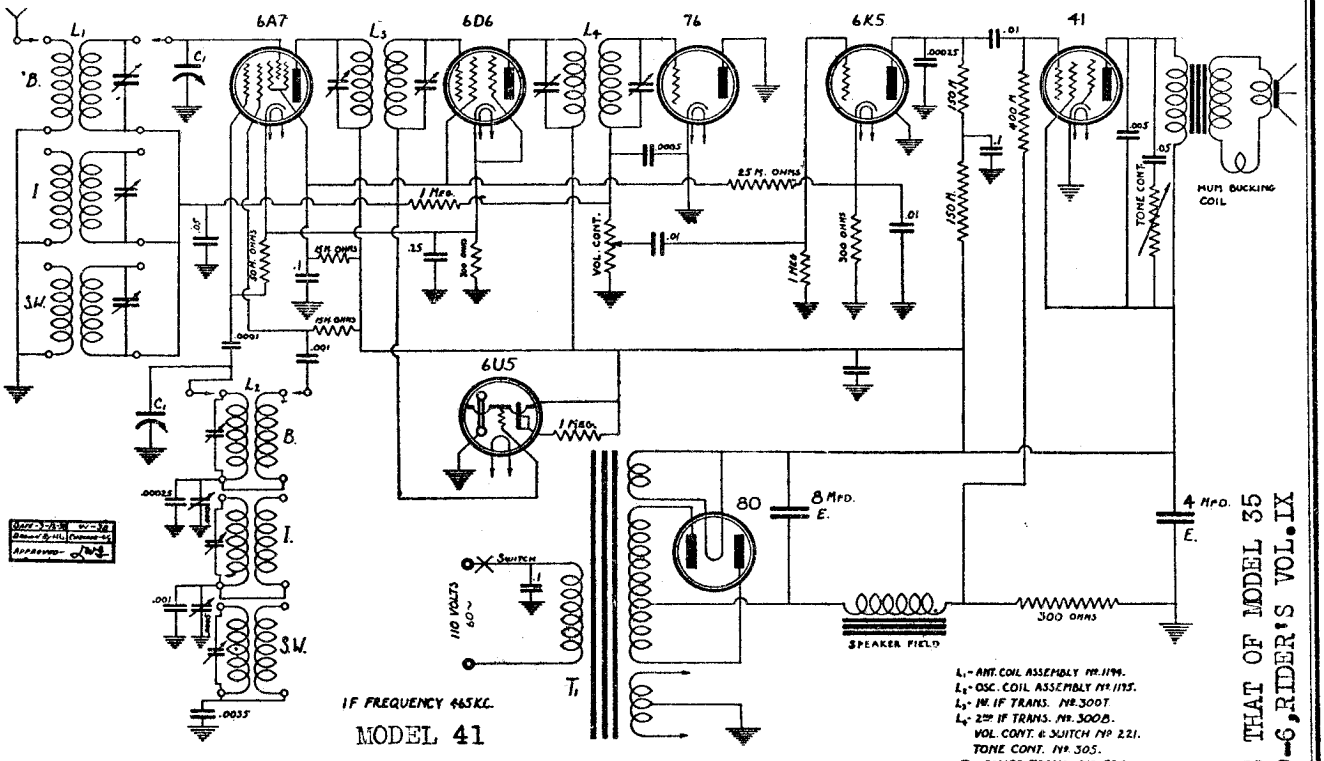
MODEL 41
Schematic, Socket
Trimmers

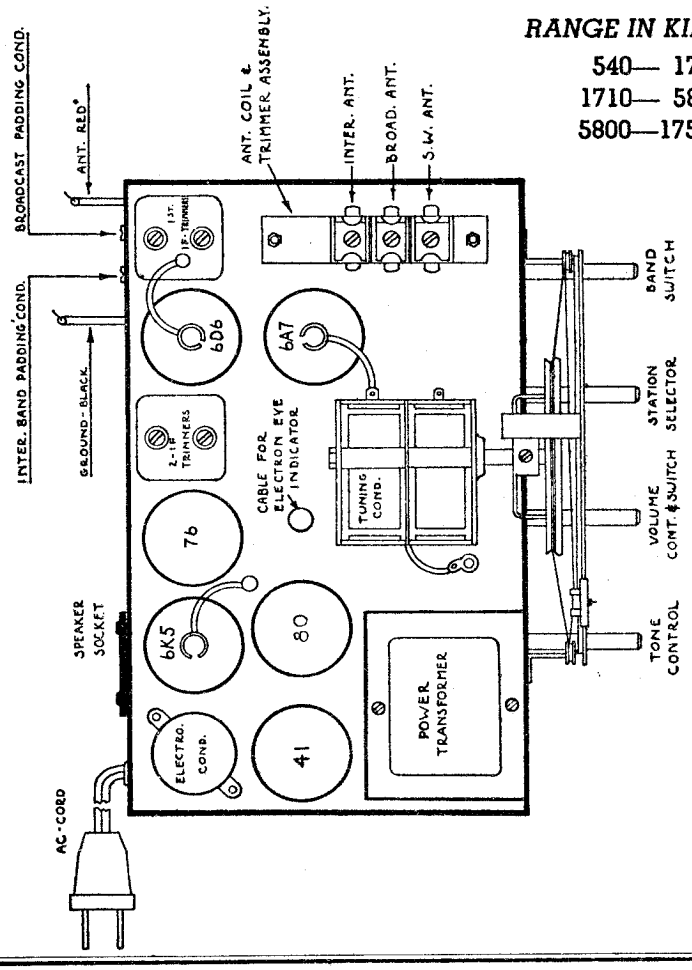
# PACIFIC RADIO CORP.

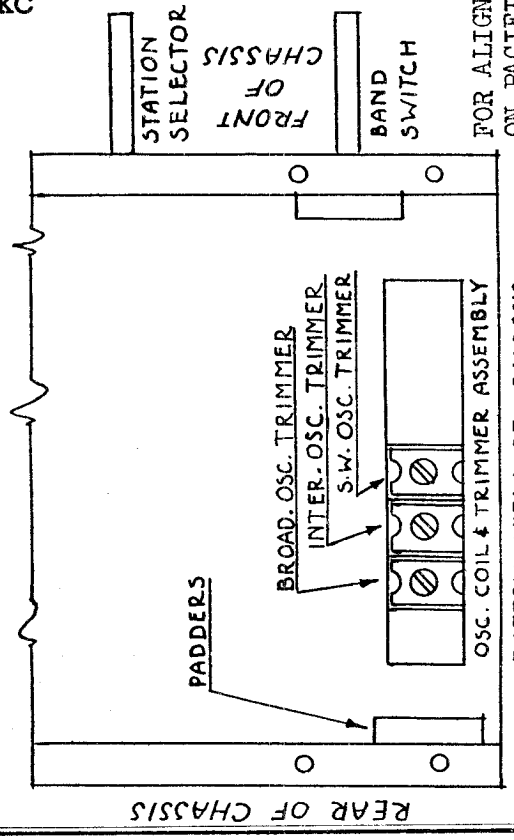



L1 - ANT. COIL ASSEMBLY Nº 1194.
L2 - OSC. COIL ASSEMBLY Nº 1195.
L3 - 1st IF TRANS. Nº 3001.
L4 - 2nd IF TRANS. Nº 3008.
VOL. CONT. & SWITCH Nº 221.
TONE CONT. Nº 305.
T1 - POWER TRANS. Nº 529.
DYNAMIC SPEAKER 6" Nº 702A.
DYNAMIC SPEAKER 8" Nº 703.
E - ELECTROLYTIC FILTER COND. Nº 1118
BAND SWITCH Nº 123.
C - GANG COND. Nº 624.

## RANGE IN KILOCYCLES

540— 1710 KC
1710— 5800 KC
5800—17500 KC




BOTTOM VIEW OF CHASSIS

FOR ALIGNMENT, SEE THAT OF MODEL 35 ON PACIFIC PAGE 9-6, RIDER'S VOL. IX

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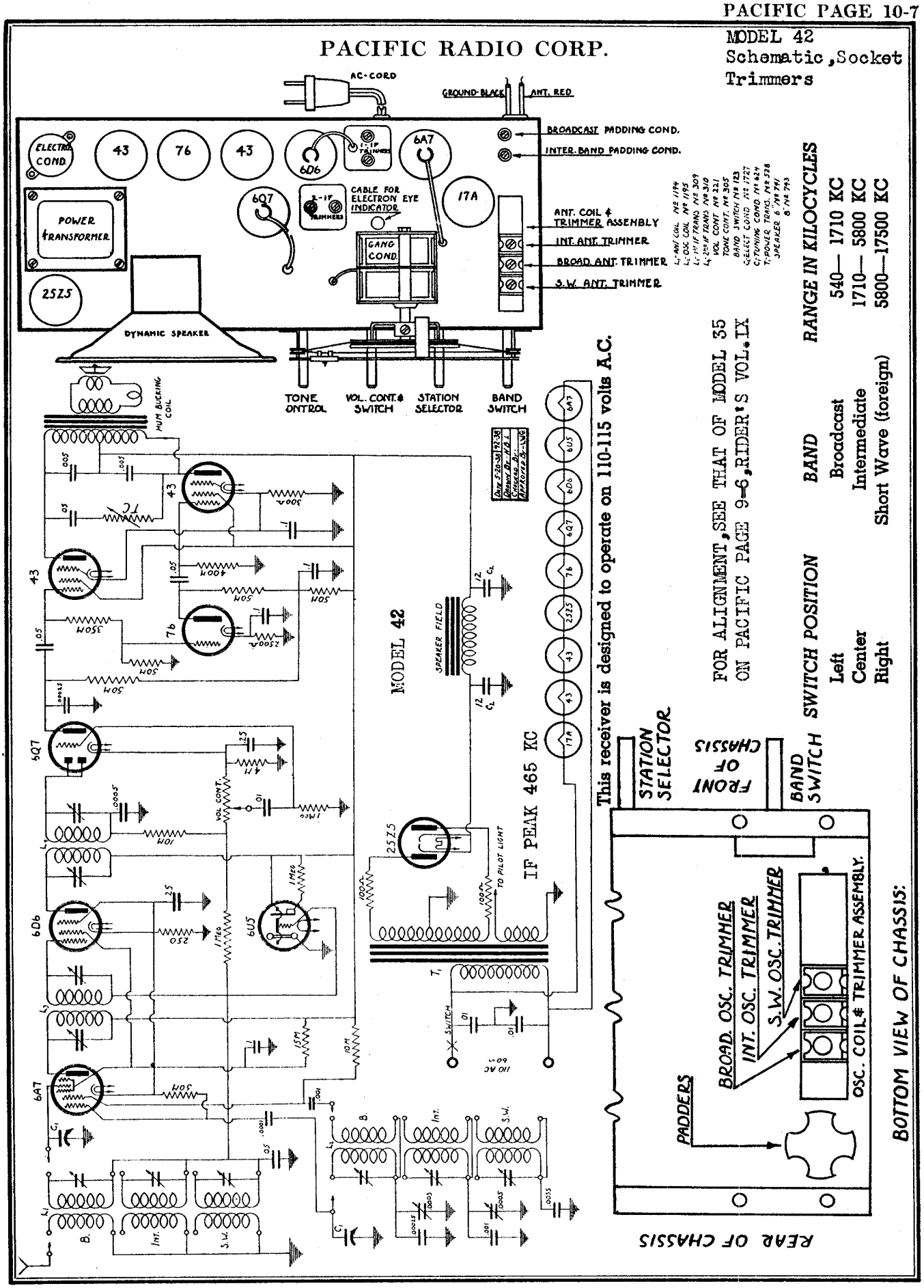
# PACIFIC RADIO CORP.

MODEL 42
Schematic, Socket Trimmers

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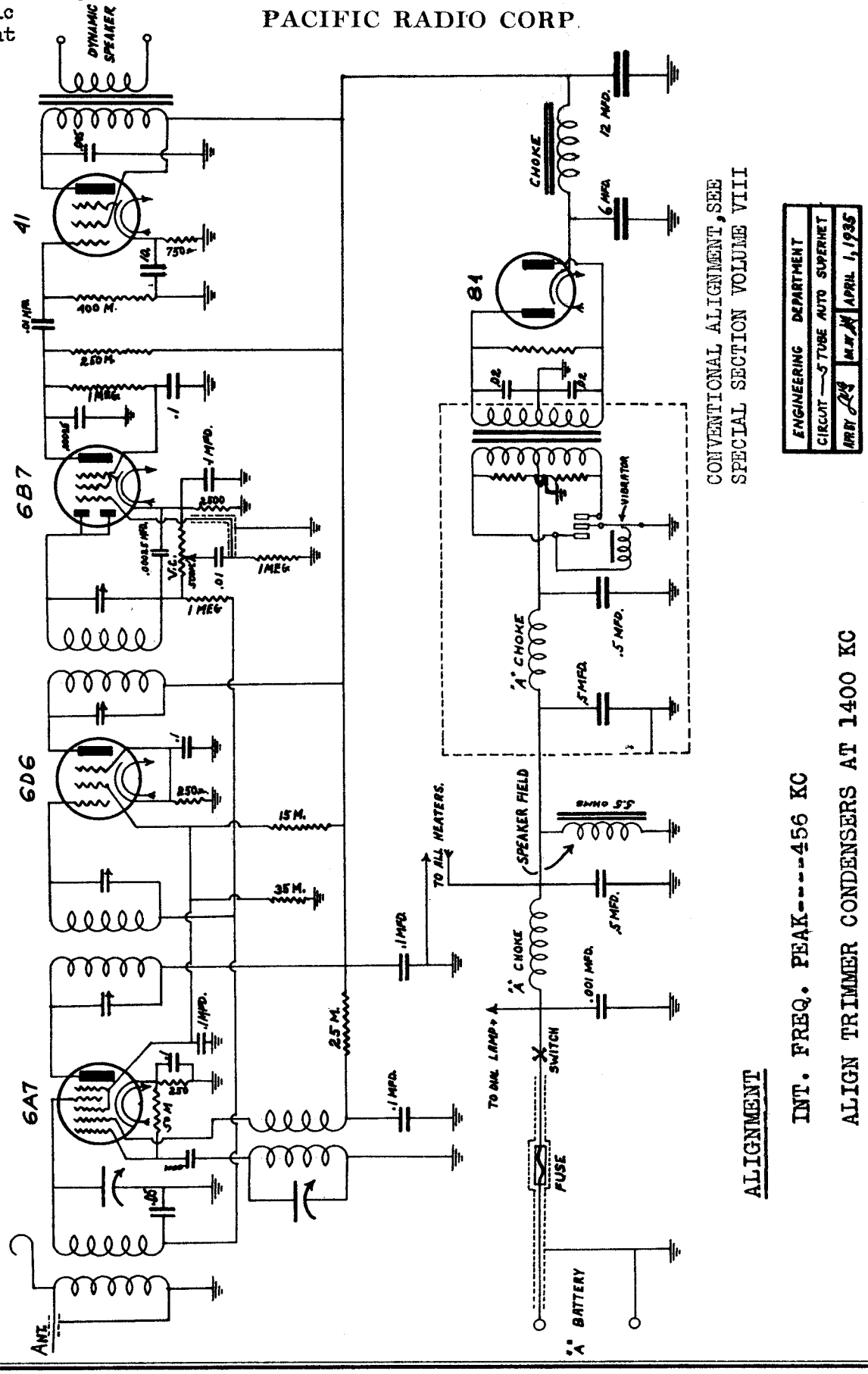
MODEL 101, Early 1935
Schematic
Alignment

PACIFIC RADIO CORP.

# 5 TUBE AUTO RADIO




CONVENTIONAL ALIGNMENT, SEE
SPECIAL SECTION VOLUME VIII

ENGINEERING DEPARTMENT
CIRCUIT — 5 TUBE AUTO SUPERHET
APRIL 1, 1935

## ALIGNMENT

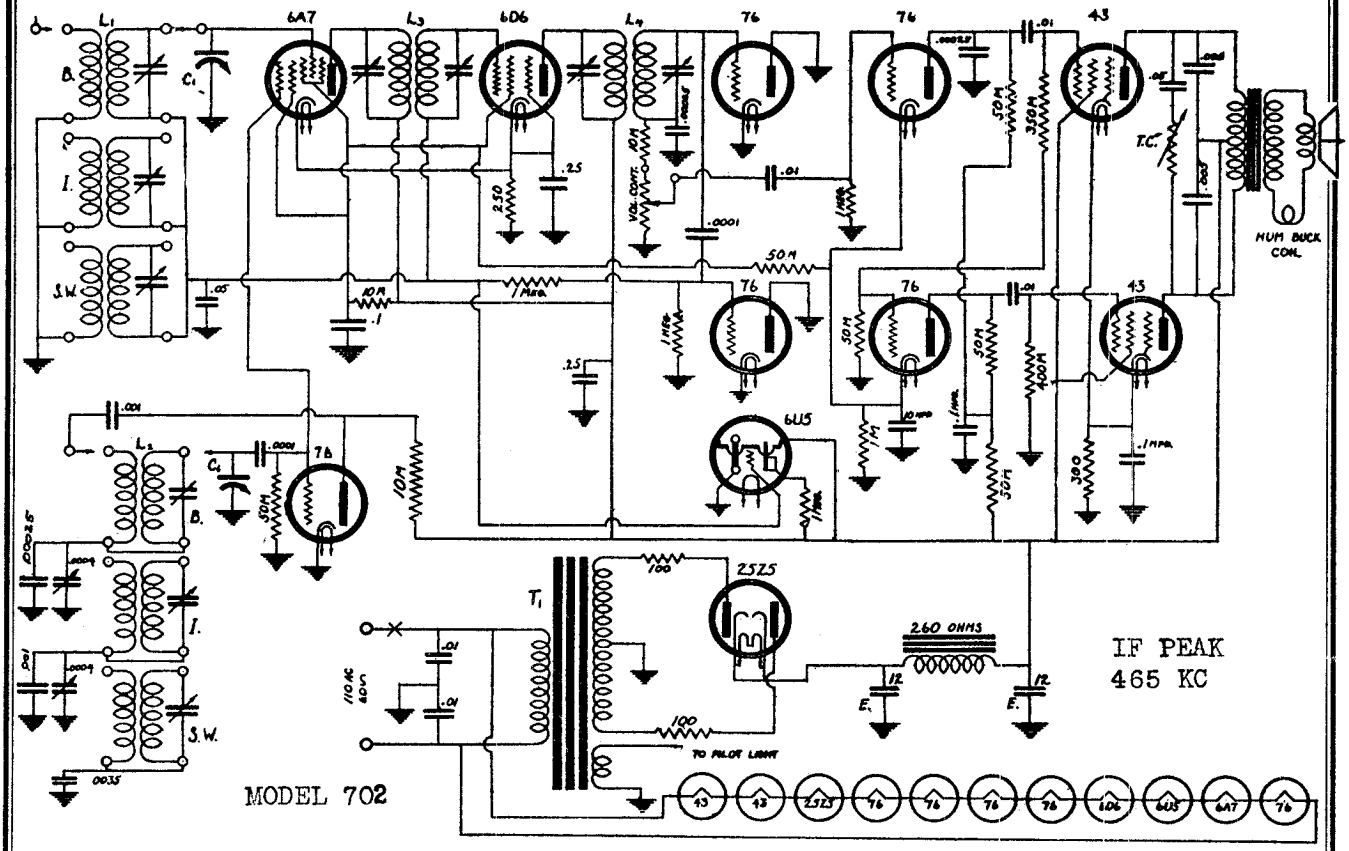
INT. FREQ. PEAK----456 KC

ALIGN TRIMMER CONDENSERS AT 1400 KC

©John F. Rider, Publisher

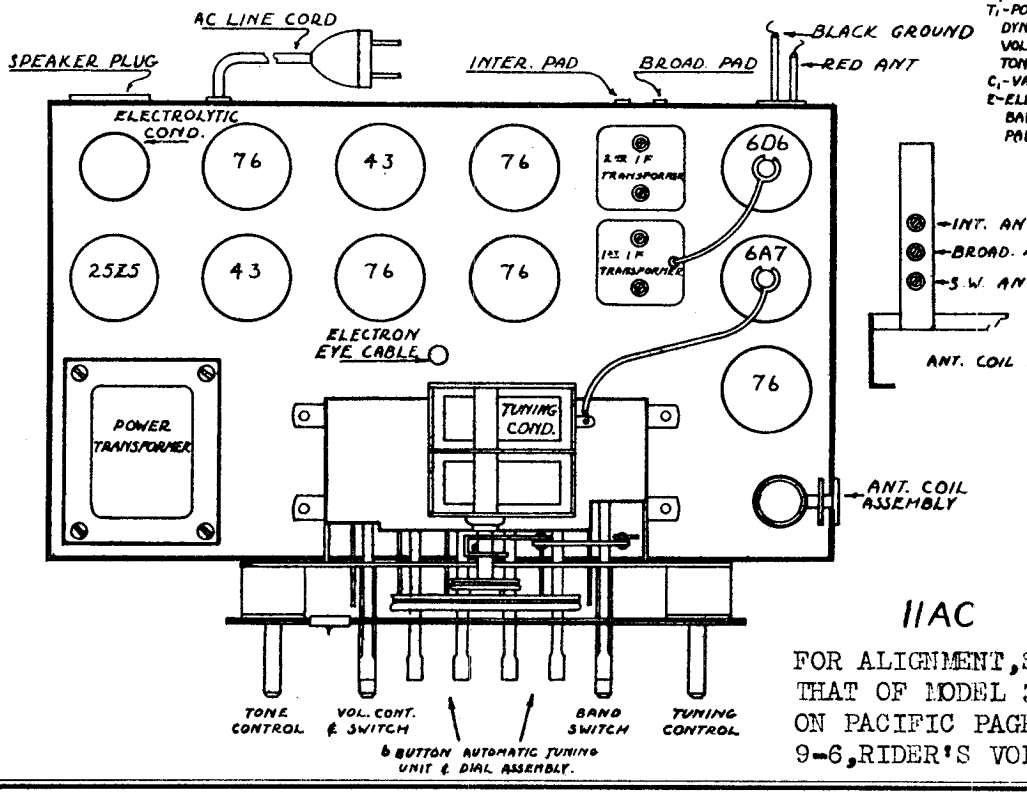
# PACIFIC RADIO CORP.

MODEL 702
Schematic, Socket
Trimmers




**This receiver is designed to operate on 110-115 volts A.C. 60 cycles.**

$L_1$-ANT. COIL ASSEMBLY NO. 1194.
$L_2$-OSC. COIL ASSEMBLY NO. 1195.
$L_3$-1ST IF TRANSFORMER NO. 309.
$L_4$-2ND IF TRANSFORMER NO. 310.
$T_1$-POWER TRANSFORMER NO. 528.
DYNAMIC SPEAKER 6" NO. 741 8" NO. 742.
VOL. CONT. & SWITCH NO. 221.
TONE CONTROL NO. 305.
$C_1$-VARIABLE COND. NO. 624.
E-ELECTROLYTIC FILTER COND. NO. 1169.
BAND SWITCH NO. 123.
PADDER COND. NO. 1012.




| BAND | RANGE IN KILOCYCLES |
|---|---|
| Broadcast | 540— 1710 KC |
| Intermediate | 1710— 5800 KC |
| Short Wave (foreign) | 5800—17500 KC |

11AC

FOR ALIGNMENT, SEE THAT OF MODEL 35 ON PACIFIC PAGE 9-6, RIDER'S VOL. IX

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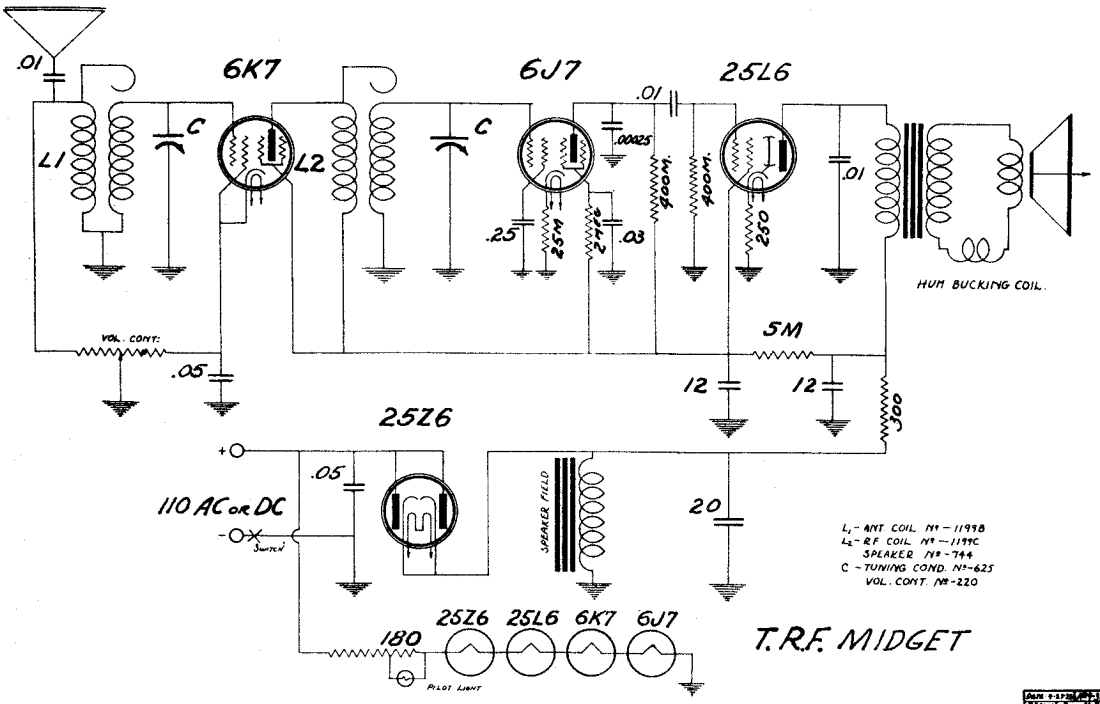
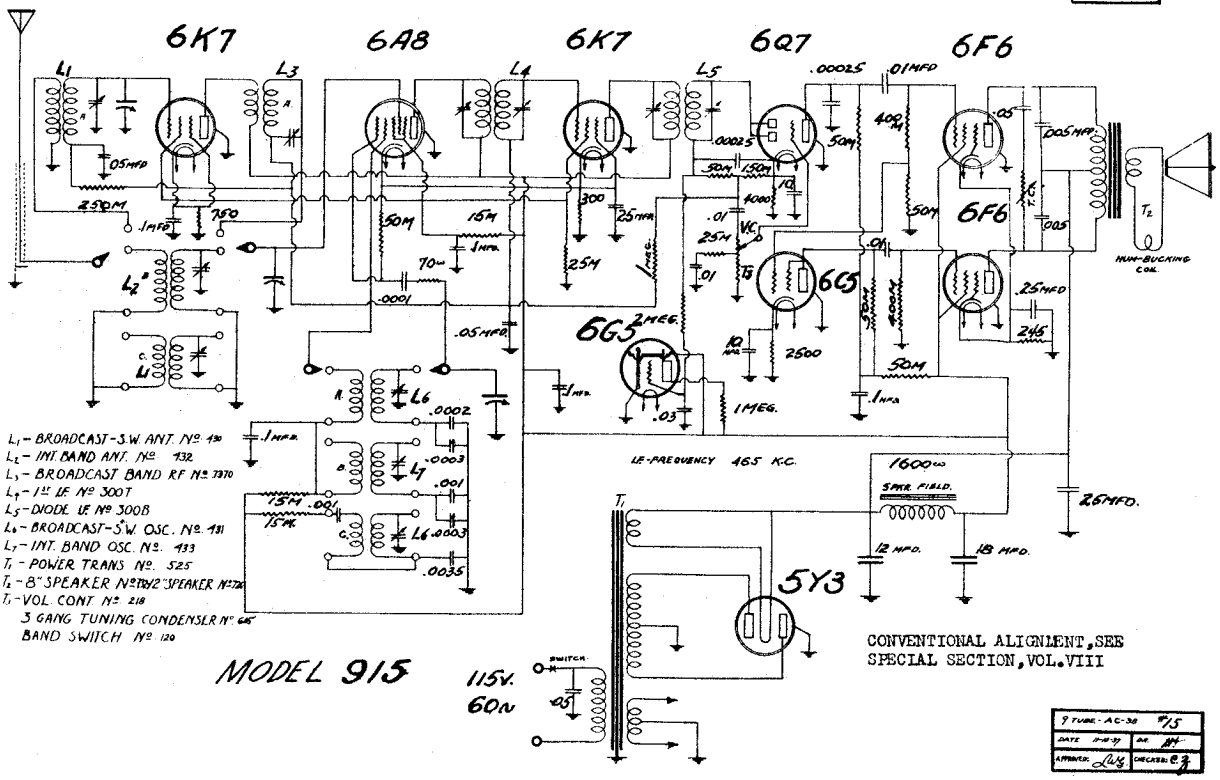
MODEL TRF Midget
Schematic
MODEL 915
Schematic, Alignment

# PACIFIC RADIO CORP.





6K7
6A8
6K7
6Q7
6F6
6G5
5Y3
L1 - BROADCAST - S.W. ANT. No. 130
L2 - INT. BAND ANT. No. 132
L3 - BROADCAST BAND R.F. No. 7370
L4 - 1st I.F. No. 300T
L5 - DIODE I.F. No. 300B
L6 - BROADCAST - S.W. OSC. No. 131
L7 - INT. BAND OSC. No. 133
T1 - POWER TRANS No. 525
T2 - 8" SPEAKER No. 7342 SPEAKER No. 726
T3 - VOL. CONT. No. 218
3 GANG TUNING CONDENSER No. 665
BAND SWITCH No. 120
I.F. FREQUENCY 465 K.C.
MODEL 915
115V. 60N
CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION, VOL. VIII

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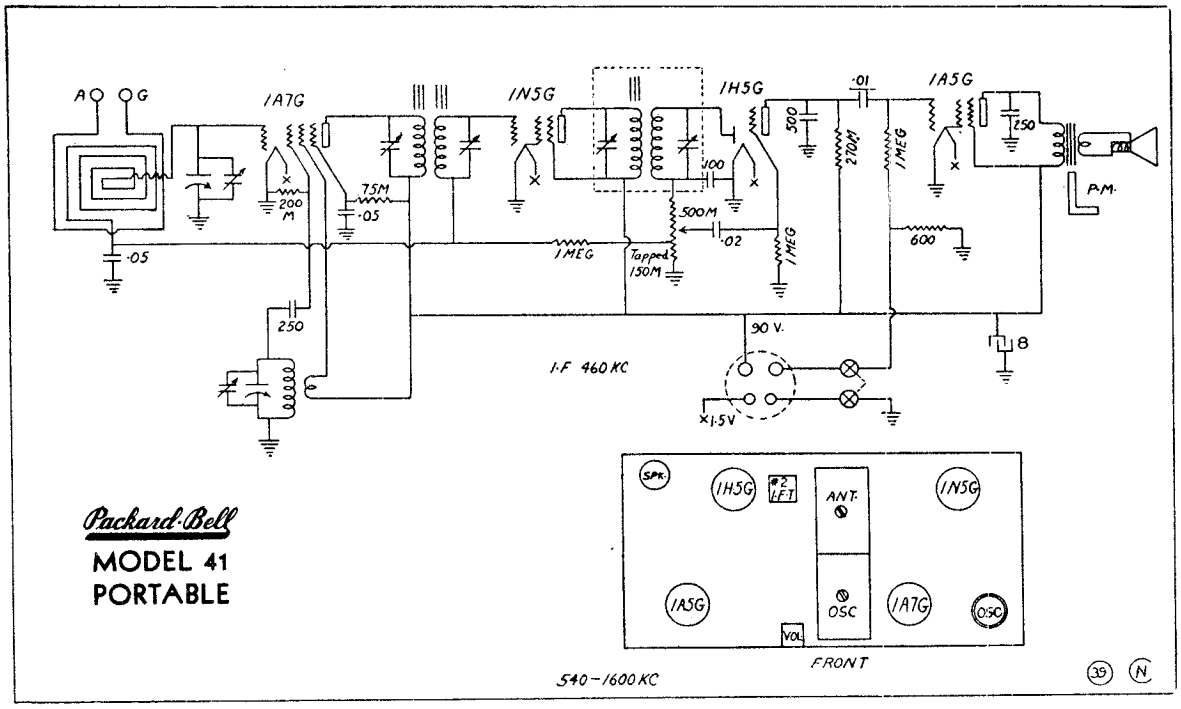
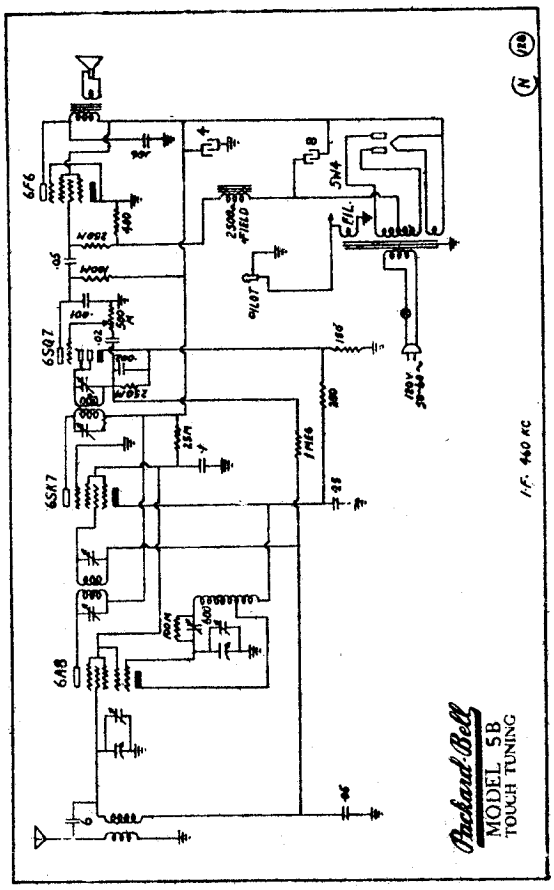
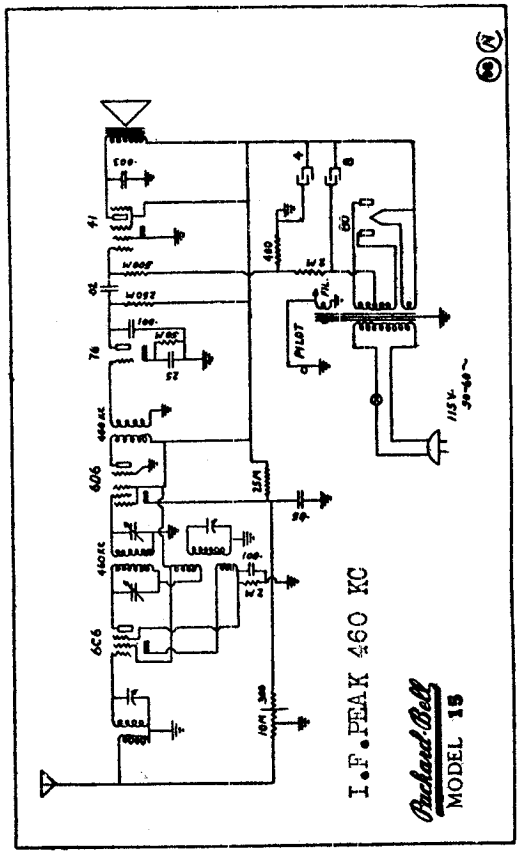
MODEL 41
Schematic, Socket
Trimmers

# PACKARD BELL CO.

MODEL 5B
MODEL 15
Schematics

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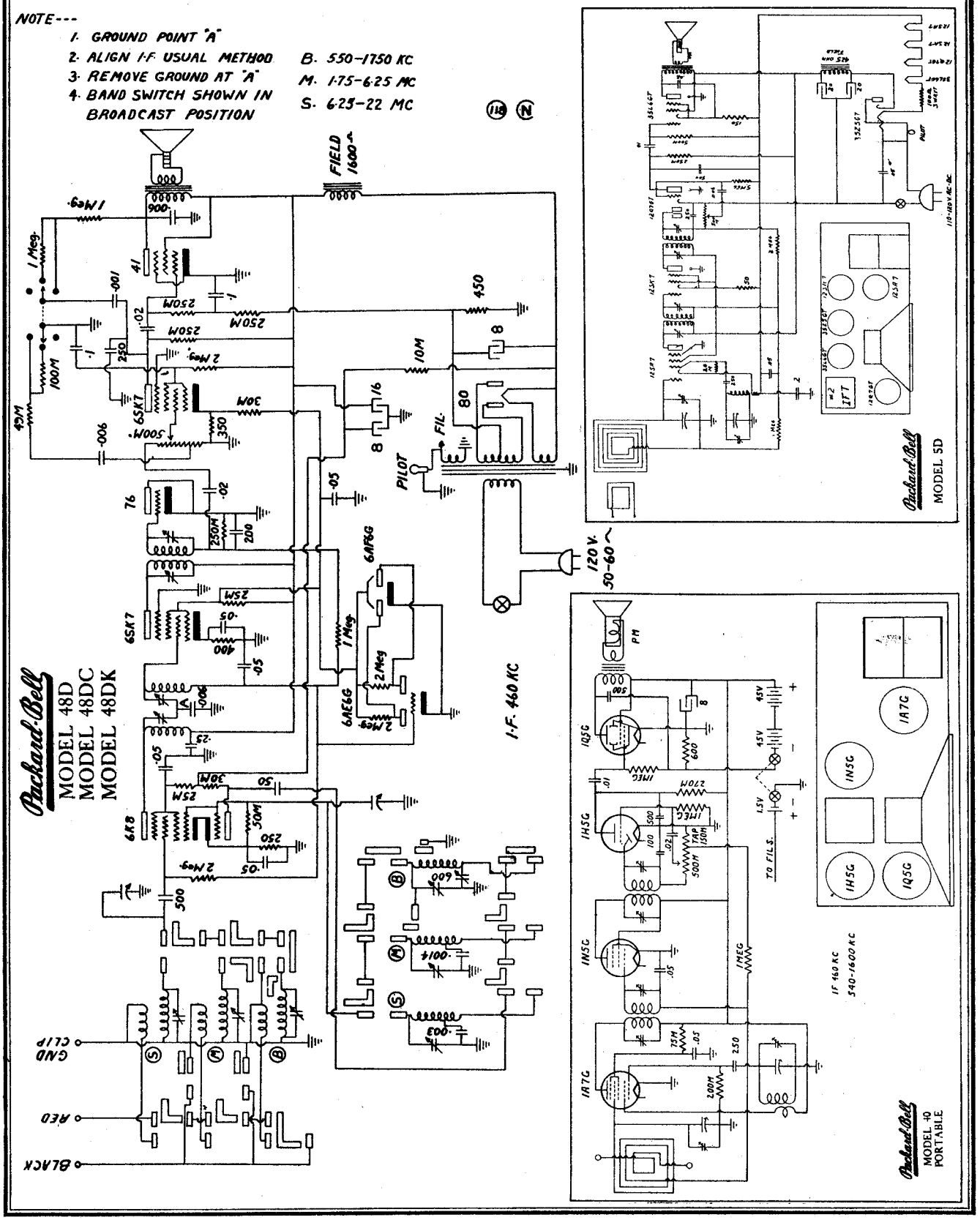
MODEL 5D
MODEL 40 Portable
Schematics, Socket
MODELS 48D, 48DC, 48DK
Schematic

# PACKARD BELL CO.

NOTE---
1. GROUND POINT "A"
2. ALIGN I.F. USUAL METHOD
3. REMOVE GROUND AT "A"
4. BAND SWITCH SHOWN IN BROADCAST POSITION

B. 550-1750 KC
M. 1.75-6.25 MC
S. 6.25-22 MC

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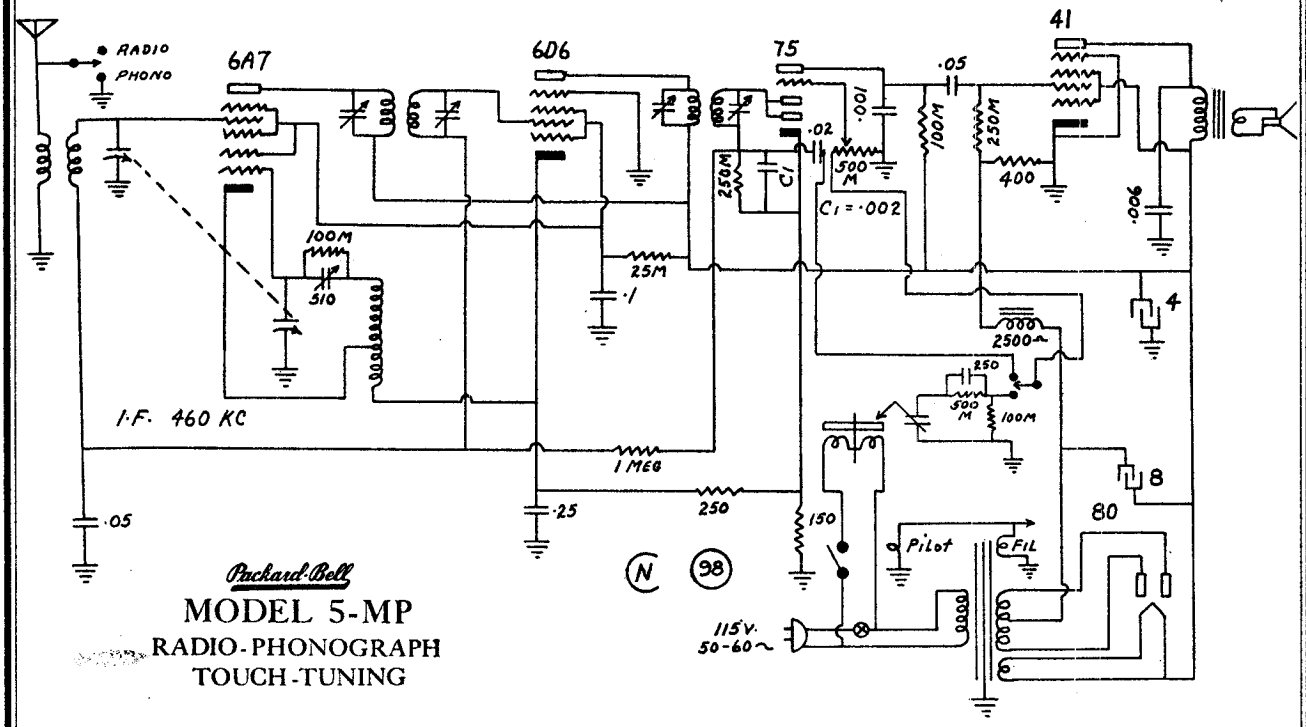
PACKARD BELL CO.

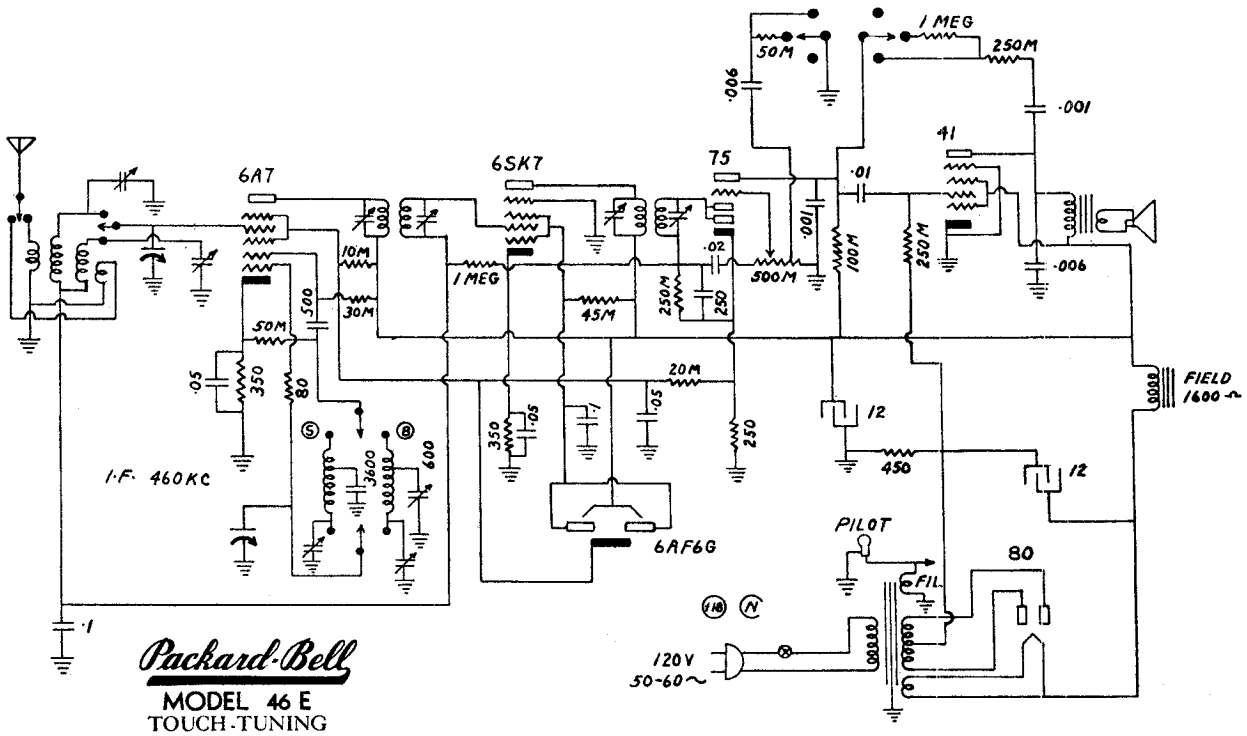
MODEL 5MP
MODEL 46E
Schematics




Packard-Bell

MODEL 5-MP

RADIO-PHONOGRAPH
TOUCH-TUNING




Packard-Bell

MODEL 46 E

TOUCH-TUNING

B 540-1750 KC

S 5.7-18.5 MC

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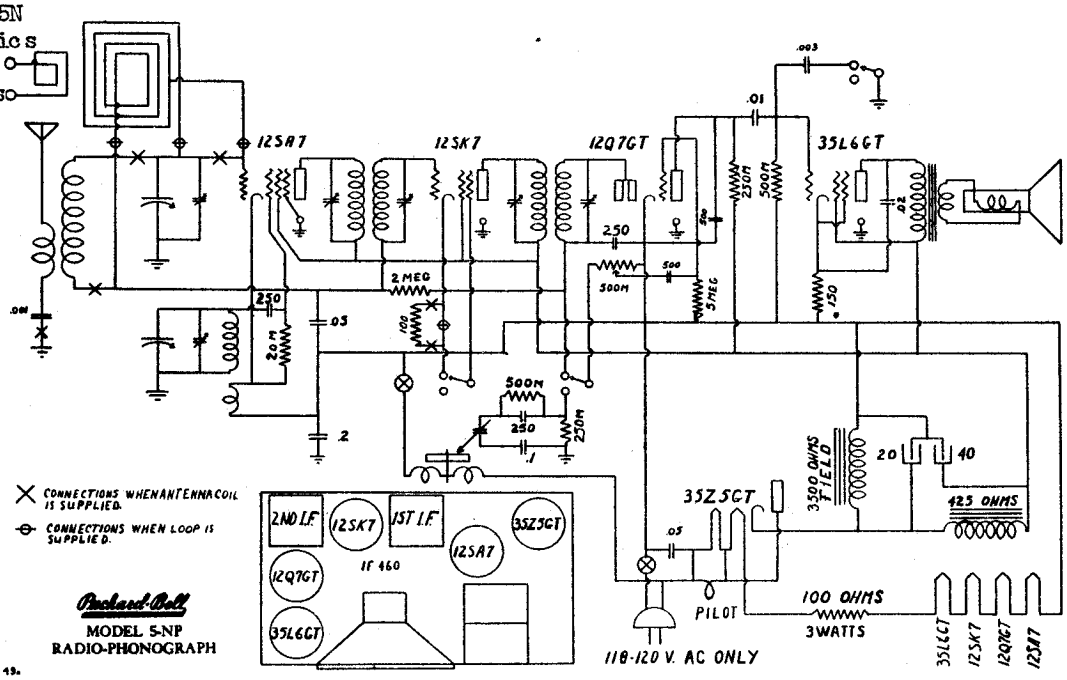
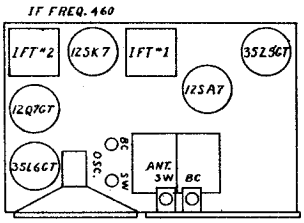
MODEL 5N
MODEL 5NP
MODEL 35N
Schematics
Socket
Trimmers

# PACKARD BELL CO.



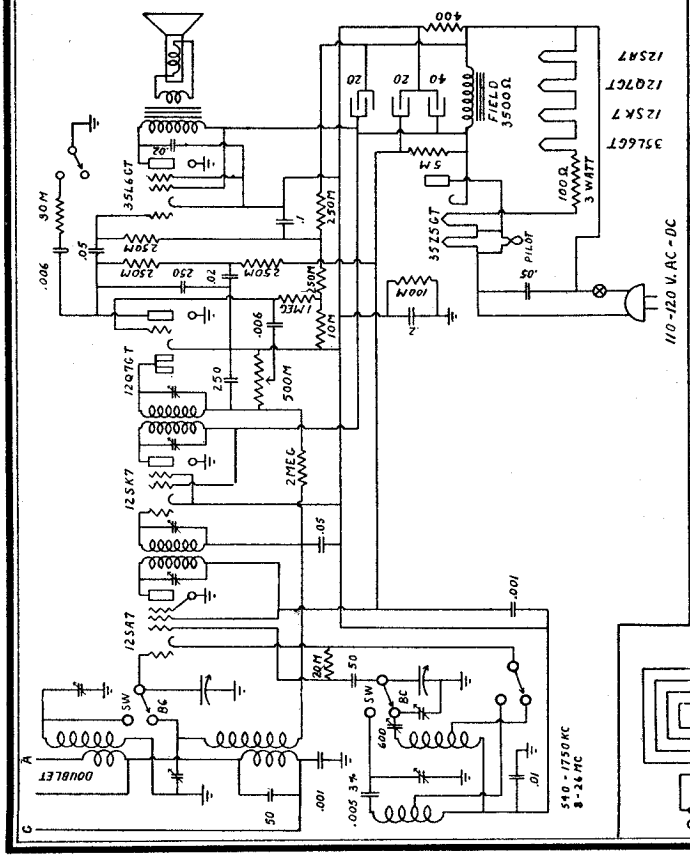

Packard-Bell
MODEL 5-NP
RADIO-PHONOGRAPH

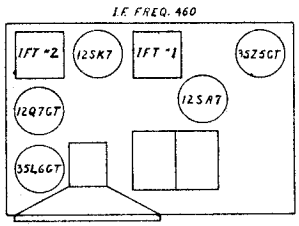
49.



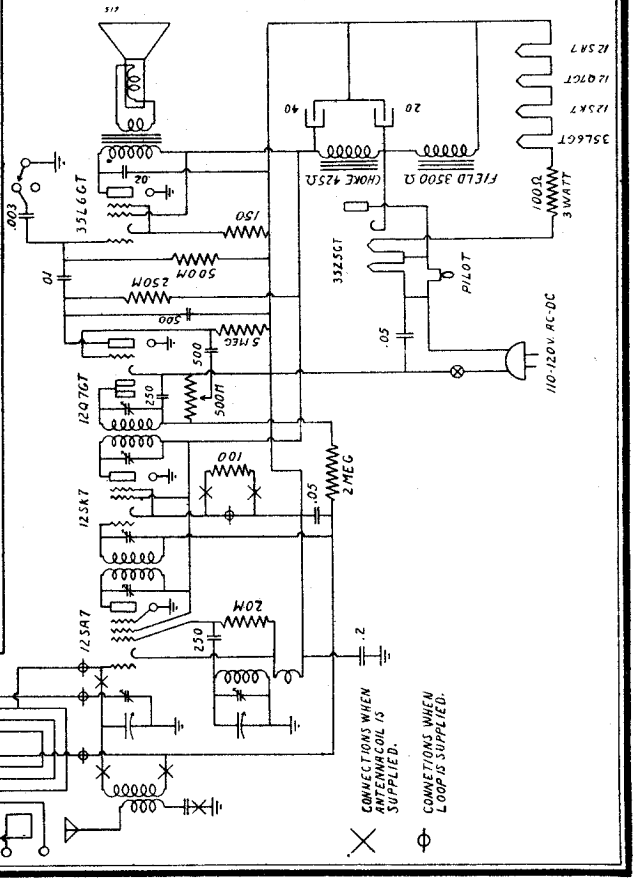

Packard-Bell
MODEL 35-N

539




Packard-Bell
MODEL 5-N

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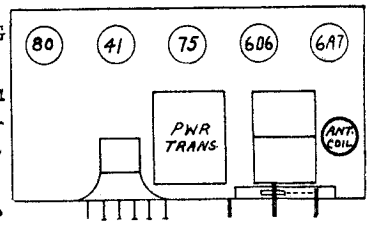
# PACKARD BELL CO.





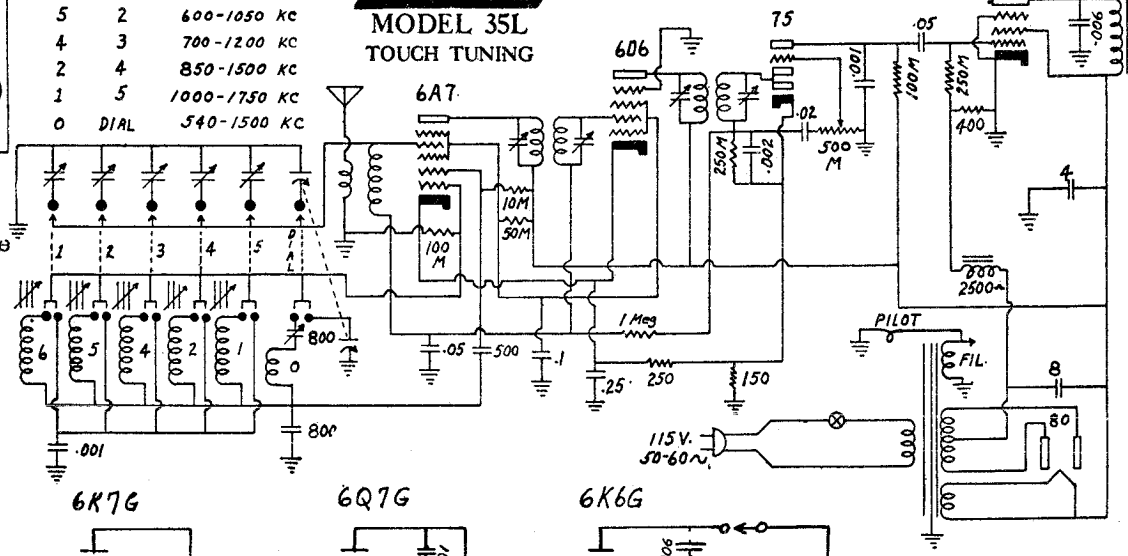
TOUCH TUNING PROCEDURE. Station with lowest frequency is assigned to Button No.1. Push this to "IN" position, select station by turning Osc. screw No.1 for maximum volume and adjust further with Ant.Trimmer screw No.1. Set other four buttons in the same way with their respective adjustments. Do not use button marked "Dial" to change from manual tuning; just push button for station desired.

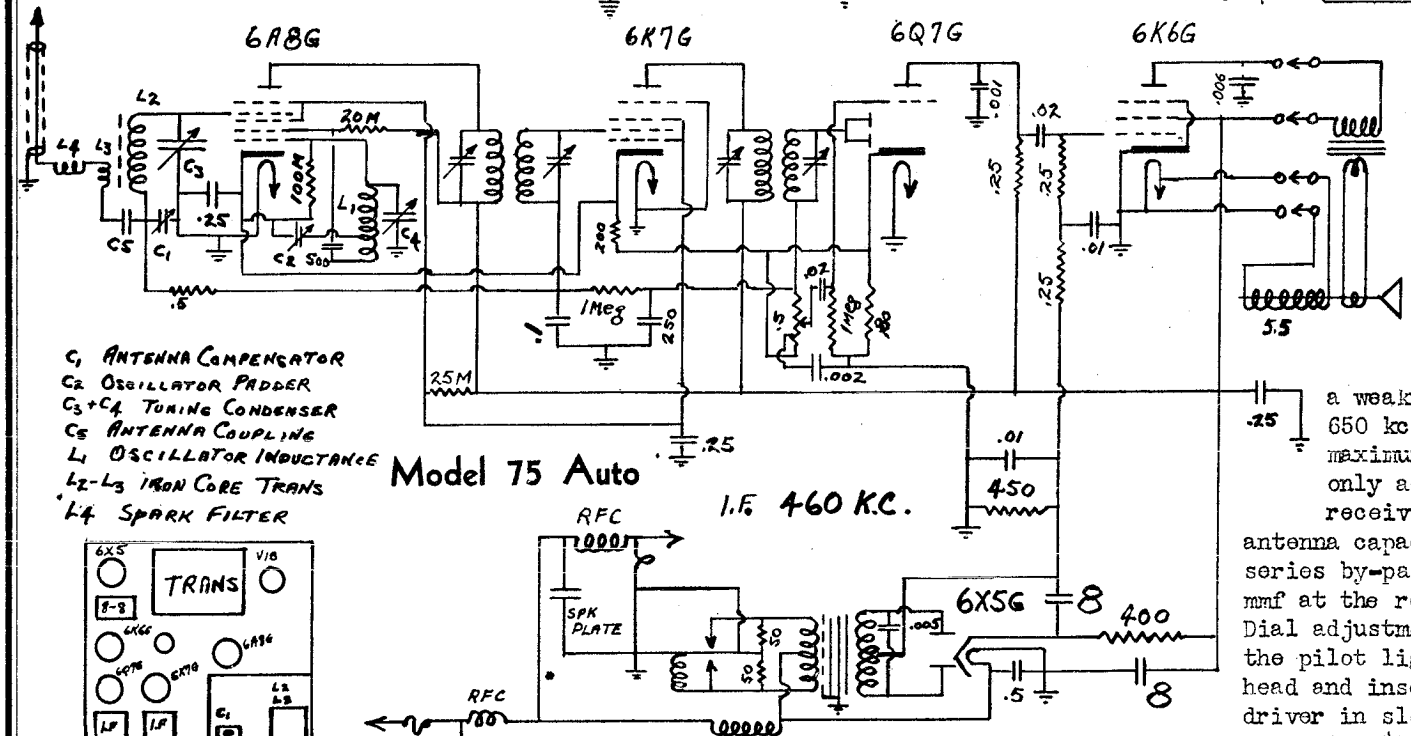



| COIL | BUTTON | RANGE |
|---|---|---|
| 6 | 1 | 540-1000 KC |
| 5 | 2 | 600-1050 KC |
| 4 | 3 | 700-1200 KC |
| 2 | 4 | 850-1500 KC |
| 1 | 5 | 1000-1750 KC |
| 0 | DIAL | 540-1500 KC |

## Packard-Bell MODEL 35L TOUCH TUNING

IF PEAK 460 KC.



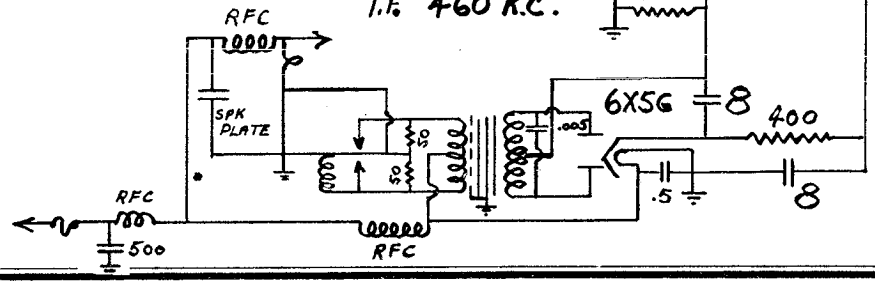




C1 Antenna Compensator
C2 Oscillator Padder
C3+C4 Tuning Condenser
C5 Antenna Coupling
L1 Oscillator Inductance
L2-L3 Iron Core Trans
L4 Spark Filter

## Model 75 Auto

I.F. 460 K.C.

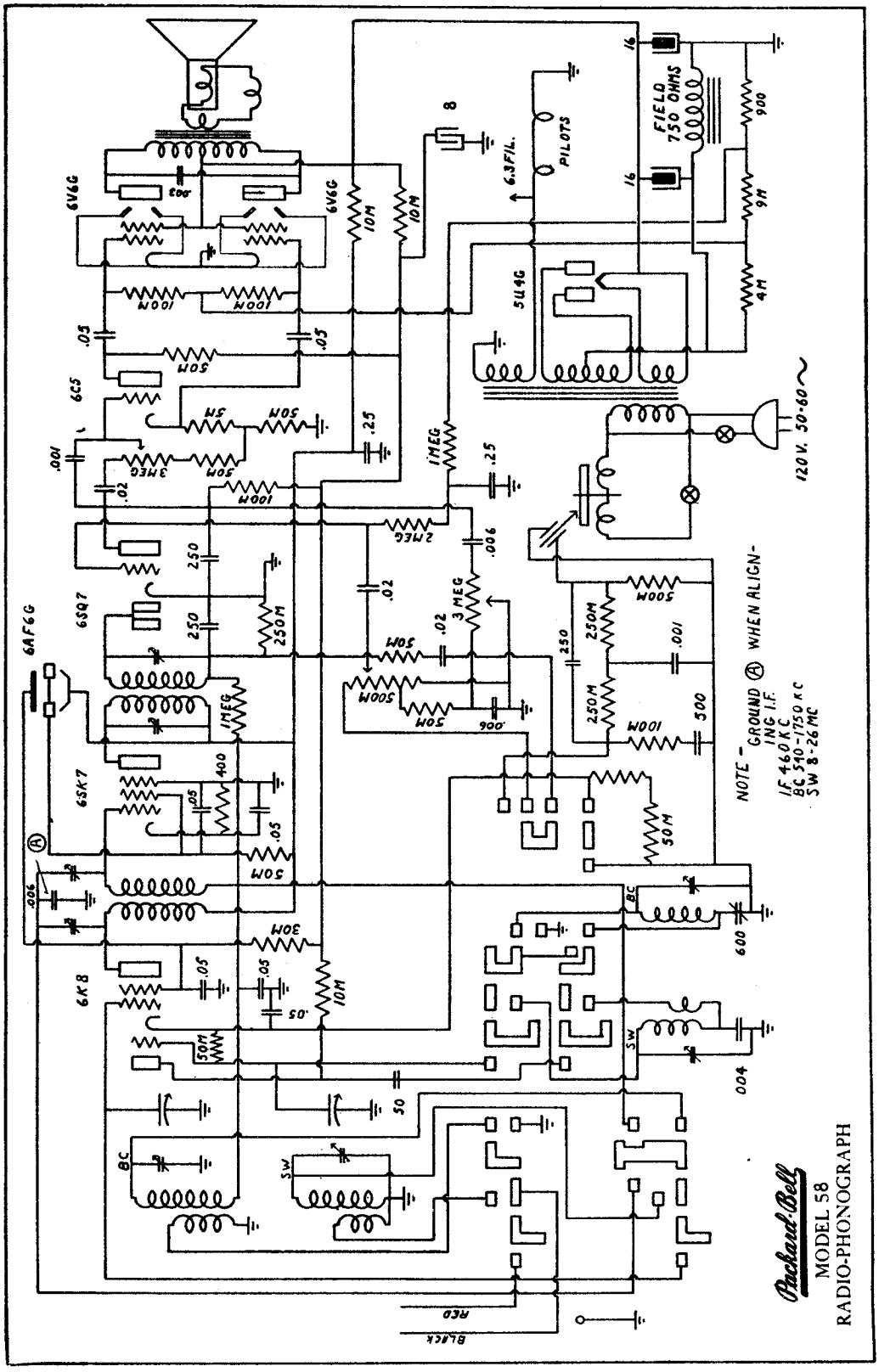



Ant.Trimmer is in front corner of box. To trim remove button in box. Turn station knob until stop is reached; Adjust pointer to the right hand stop line on dial face. Tune in a weak signal between 550 and 650 kc and adjust trimmer for maximum volume. This is the only adjustment to match the receiver to the antenna. If antenna capacity is too high, use a series by-pass condenser, 250-500 mmf at the receiver and shield it. Dial adjustment is made by removing the pilot light in rear of control head and inserting a small screwdriver in slot, turning pointer to desired setting.

MODEL 58
Schematic

# PACKARD BELL CO.

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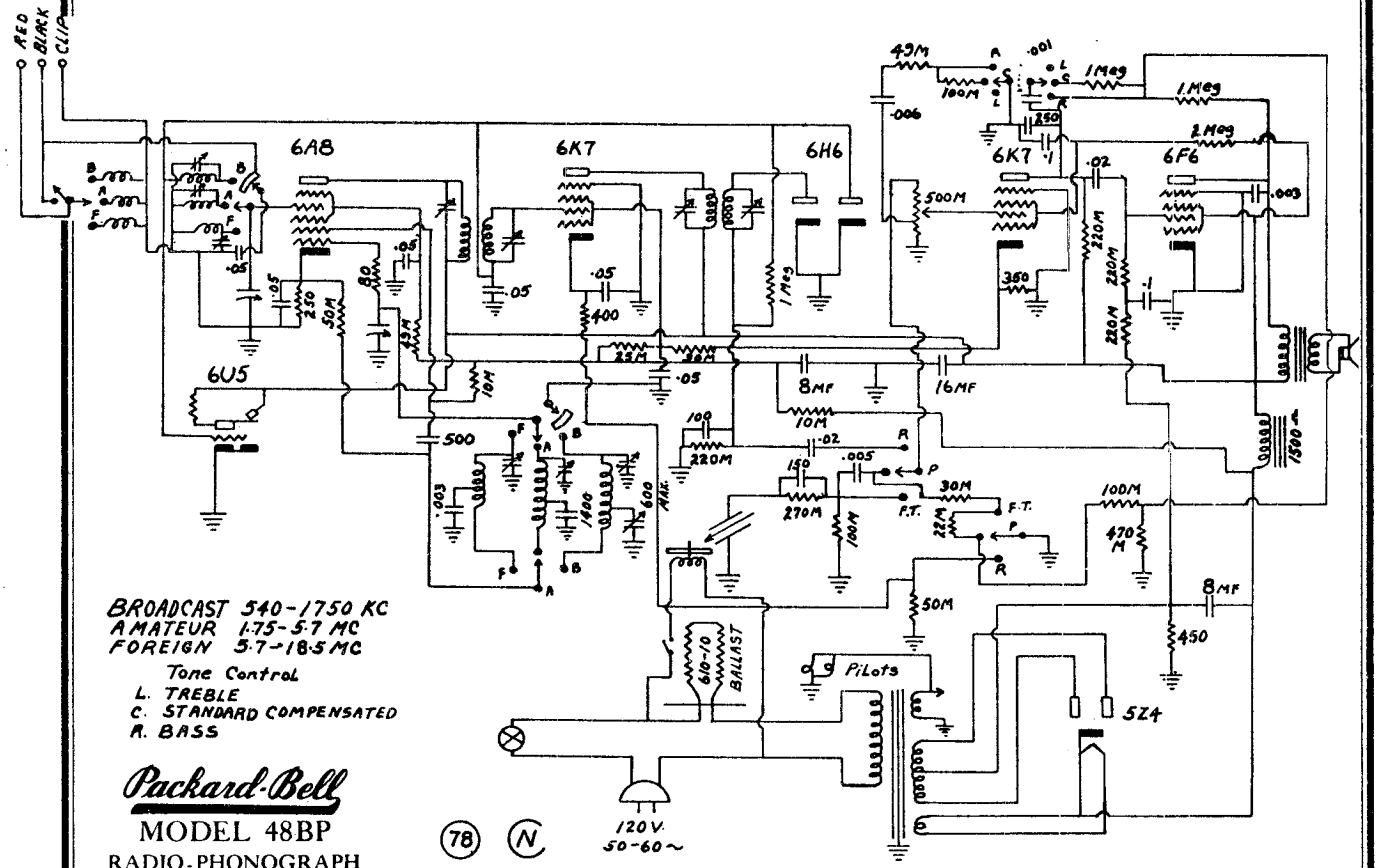
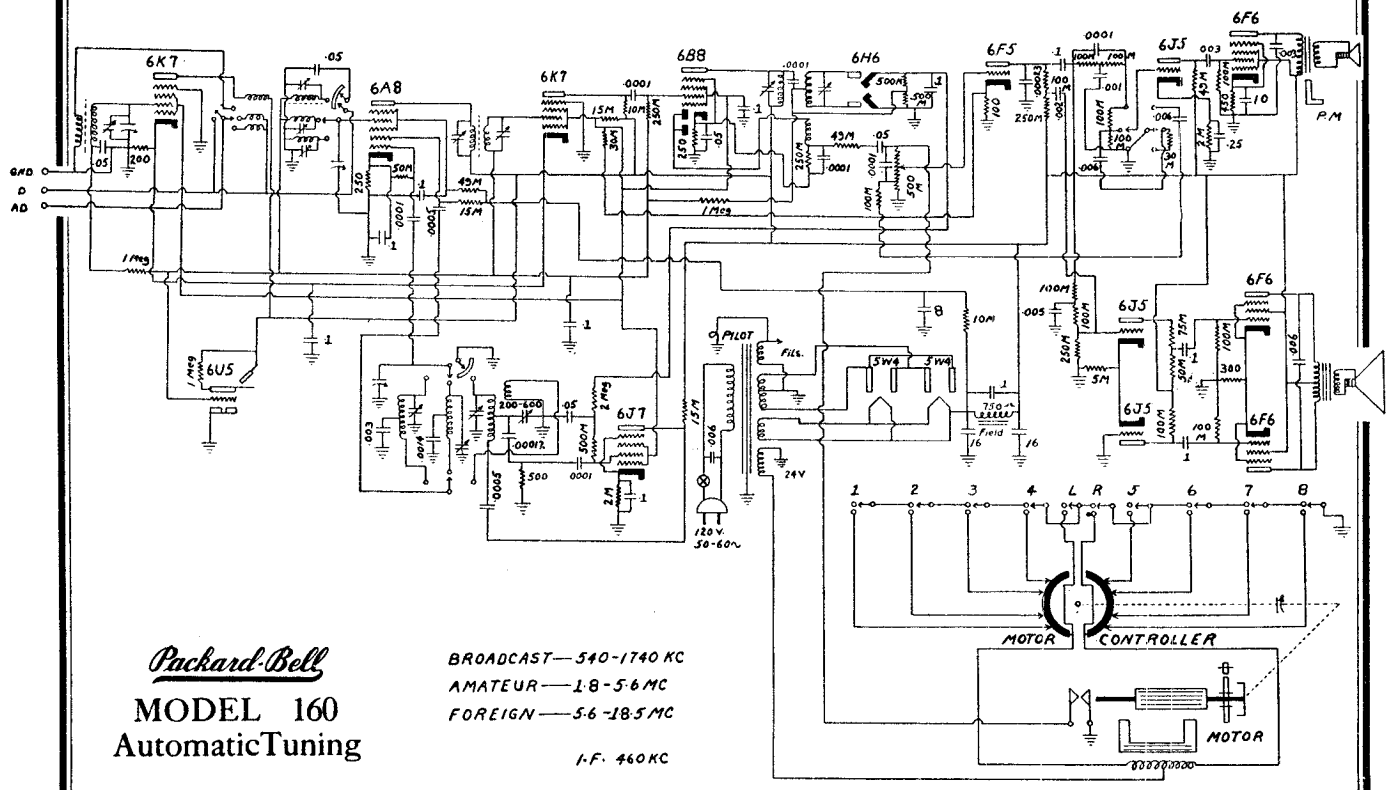
# PACKARD BELL CO.

MODEL 48BP
MODEL 160
Schematics

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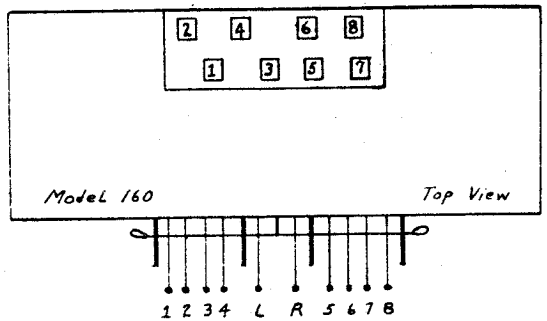
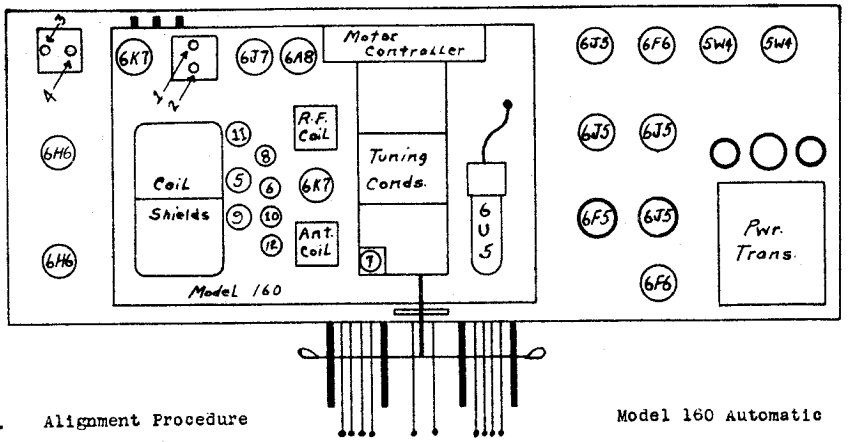



Model 160 Automatic

The automatic frequency control in the Model 160 Packard-Bell Radio is so adjusted that it does not interfere with the normal selectivity of the receiver. Any station that can be received without automatic frequency control can also be received with it. The only instances where A.F.C. will give preference to a more powerful station is where the stronger station will be heard in the background of the weaker one. From this it is obvious that an A.F.C. switch is unnecessary. This eliminates a control which would have been confusing to most people.

INSTRUCTION FOR SETTING MARKERS ON CONTROLLER. To begin with, in setting the motor controller (located at center-rear of chassis) one must first determine what stations are desired on the eight station keyboard. To do this examine the stationized dial and determine the location of stations related to each side of dial center. This done, it is then necessary to allot a sufficient number of sliders (station markers) corresponding to push-button switches on station keyboard of receiver panel below large dial.

Let us take for example a choice which would give us 5 stations between center and left hand side of dial, and 3 between center and right hand side of dial. We then consider push-button switches to correlate in numerical order with stations chosen as follows: KECA, KGFJ, KKKD, KNX, KFWB, KHJ, KMPC, and KFI, giving KECA No. 1 position, others following consecutively, completing with KFI as No. 8. Considering push-buttons on panel from left to right as reading from 1 to 8, a correct sequence will result for control sliders at rear of chassis. Control sliders are set up to correspond with buttons in correct numerical order, (that is, on rear slider rail you will find 4 buttons, and on front slider rail 4 buttons). Buttons or sliders on front are odd numbers, i.e., 1-3-5-7, and on rear rail are the even numbers, i.e., 2-4-6-8. Looking from rear the right hand slider corresponds to left front panel push button looking from the front.

OPERATION: Starting with KECA, push button No. 1 until it locks. We then reach back and push slider No. 1 back and forth until dial pointer comes to rest at KECA as marked on dial. Follow this procedure for all other stations.

The buttons marked R and L are used to tune in stations not set up on the keyboard. For example: If one is listening to KHJ and decides to change to KFOX then all that is necessary is to press the button L down until pointer turns to KFOX, then release the button and the pointer will stop. Or if one is listening to KHJ and wants to change to KEHE just press the button R down and hold until the pointer gets to KEHE, then release. In other words button R controls the motor to the right and button L to the left.

Alignment Procedure — Model 160 Automatic

Turn the dial (manually) to 1740 kc position (plates of tuning condenser completely unmeshed) and set the volume control at maximum. Turn the band switch to broadcast position. Short the cathode of 6H6 tube (now connected to 2 meg.resistor) to chassis so that the automatic frequency control action will be nullified during alignment. Connect the output lead of the signal generator to the control grid of the 6A8 tube through a .006 condenser and set dial of generator to 460 kc. Adjust I.F. trimmers 1-2-3 and 4 until maximum output is obtained, meanwhile maintaining as low a value of signal as will allow obtaining of accurate adjustment.

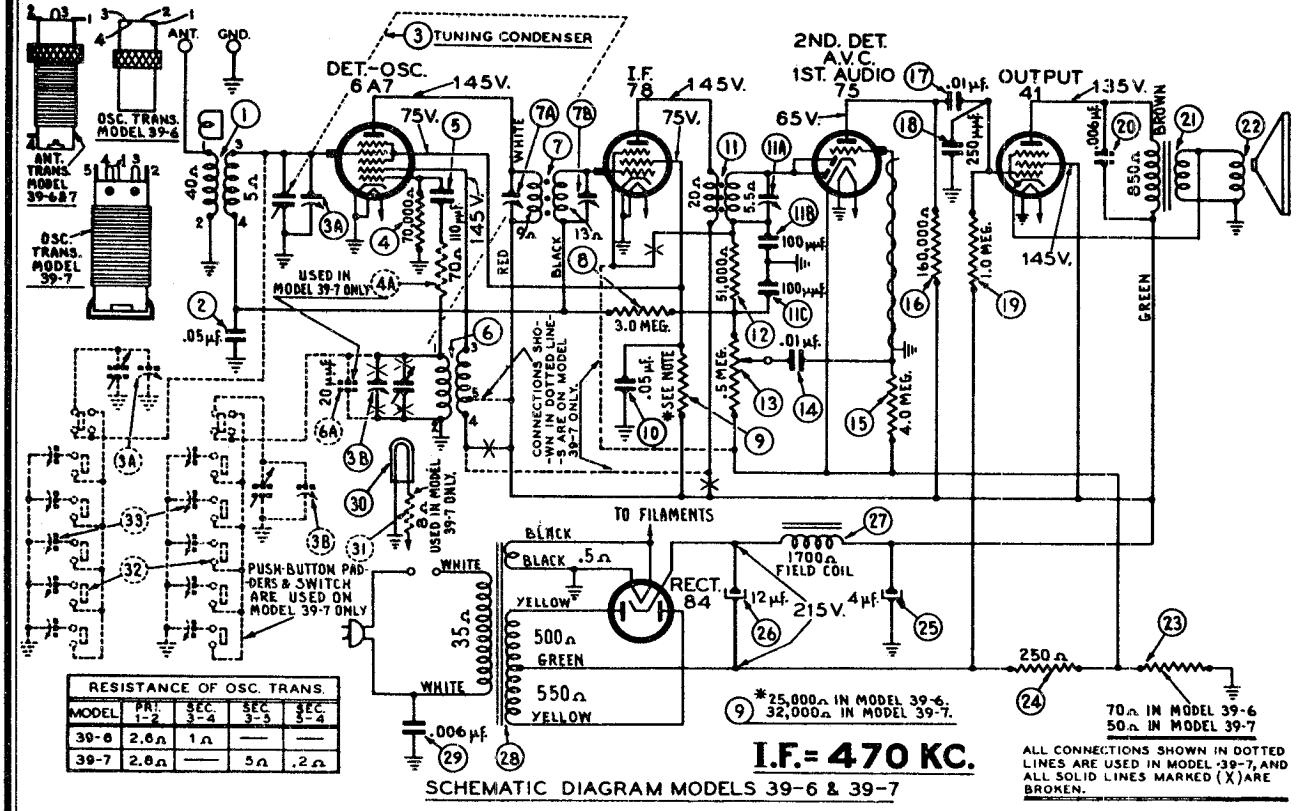
Now tune signal generator to 1740 kc and connect output lead through .006 condenser to antenna post of receiver. Turn dial pointer of receiver to horizontal position and adjust oscillator trimmer 5, antenna trimmer 7 and first detector trimmer 6 for maximum output. Next tune the generator to 600 kc. Turn dial pointer of radio to point of maximum signal and adjust trimmer 8 for increase in signal. At the same time rock the tuning condenser back and forth through resonance while adjusting the padder until maximum output is obtained. This should occur when the receiver dial is set at approximately 600 kc. Now tune back across the dial and if not exactly on kc at the high frequency end readjust trimmers 5-6 and 7 for correction. Do not attempt to play this receiver with only one speaker as there are two audio channels and the tone quality will be very poor unless both speakers are used.

Band Number 2. (1.8 to 5.6 Mc) Turn knob of waveband switch to Amateur position. Tune signal generator to 5.5 mc and set radio dial to 5.5 position. Adjust oscillator trimmer 9 and antenna trimmer 10 for maximum output. There is no R.F. stage on the Amateur and Foreign bands.

Band Number 3. (5.6 to 18.5Mc) Turn knob of waveband switch to Foreign position. Tune signal generator to 18 mc and connect output lead to antenna post through a 200 MMfd condenser and a 400 ohm resistor. Set volume control at maximum. Turn radio dial to 18 mc and adjust oscillator trimmer 11 and first detector trimmer 12 for maximum output. After completing alignment of all bands then disconnect 6H6 cathode jumper so that the AFC will be active again. The discriminator circuit is adjusted at the factory and should not be touched under any circumstances.

MODELS 39-6,39-7,Code 121
Schematic,Voltage
Socket,Trimmers

# PHILCO RADIO & TELEV. CORP.




| RESISTANCE OF OSC. TRANS. | | | | |
|---|---|---|---|---|
| MODEL | PRI. 1-2 | SEC. 3-4 | SEC. 3-5 | SEC. 3-4 |
| 39-6 | 2.6Ω | 1Ω | — | — |
| 39-7 | 2.6Ω | — | 5Ω | .2Ω |

SCHEMATIC DIAGRAM MODELS 39-6 & 39-7

## *Models 39-6, 39-7, Code 121*

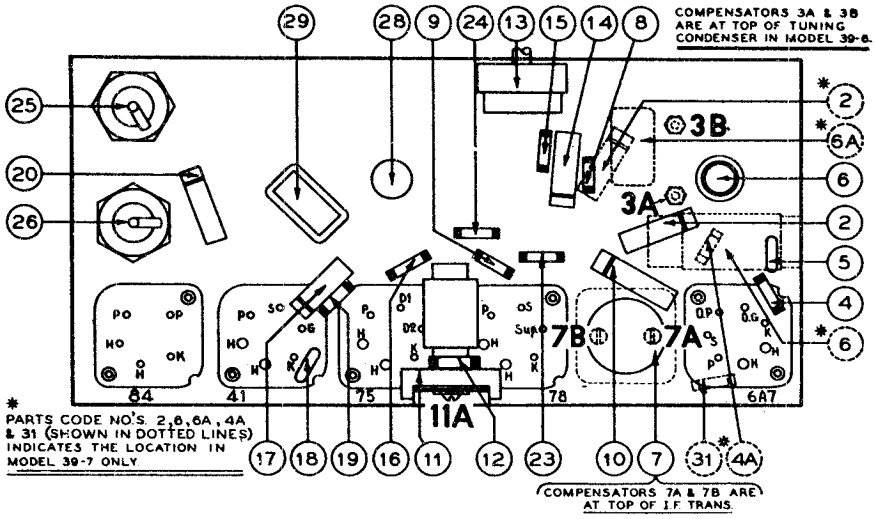

COMPENSATORS 3A & 3B ARE AT TOP OF TUNING CONDENSER IN MODEL 39-6.
3B
3A
7B
7A
11A
84
41
75
78
6A7
* PARTS CODE NO'S. 2, 6, 6A, 4A & 31 (SHOWN IN DOTTED LINES) INDICATES THE LOCATION IN MODEL 39-7 ONLY.
COMPENSATORS 7A & 7B ARE AT TOP OF I.F. TRANS.

**Fig. 2. Part Locations, Underside of Chassis**

**FREQUENCY RANGE:** 530 to 1720 K.C.

**INTERMEDIATE FREQUENCY:** 470 K.C.

**PHILCO TUBES USED:** 6A7, First Detector Oscillator; 78, I.F. Amplifier; 75, Second Detector, A.V.C., First Audio; 41, Audio Output and 84, Rectifier.

**POWER SUPPLY:** 115 V., 50 to 60 cycle A.C.
Power Transformers are available for operation on 115 V., 25 to 40 cycles A.C.

**POWER CONSUMPTION:** 30 watts.

**AUDIO OUTPUT:** One (1) watt.

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# Alignment of Compensators

**EQUIPMENT REQUIRED:**

(1) Signal Generator; Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K.C. is the correct instrument for this purpose.

(2) Output Meter, Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended.

(3) Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3164.

**OUTPUT METER:** The Philco 027 Output Meter is connected to the plate and screen terminals of the type 41 tube and adjusted for the 0 to 30 V.A.C. scale. After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on Fig. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

| *Schem. No.* | *Description* | *Part No.* |
|---|---|---|
| 6A* | Silver Mica Cond. (20 mfd.) (39-7) | 30-1123 |
| 7 | 1st I.F. Trans. Assy. (39-6) | 32-3120 |
| | 1st I.F. Trans. Assy. (39-7) | 32-3121 |
| 8 | Resistor (3.0 meg., ½ watt) | 33-350339 |
| 9 | Resistor (25,000 ohms, ½ watt) (39-6) | 33-325339 |
| | Resistor (32,000 ohms, ½ watt) (39-7) | 33-332339 |
| 10 | Tubular Cond. (.05 mfd.) | 30-4444 |
| 11 | 2nd I.F. Trans. Assy. | 32-2674 |
| 12 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 13 | Volume Control (.5 meg.) | 33-5254 |
| 14 | Tubular Cond. (.01 mfd.) | 30-4479 |
| 15 | Resistor (4.0 meg., ½ watt) | 33-540339 |
| 16 | Resistor (160,000 ohms, ½ watt) | 33-416339 |
| 17 | Tubular Cond. (.01 mfd.) | 30-4169 |
| 17 | Tubular Cond. (.01 mfd.) (39-7) | 30-4572 |
| 18 | Mica Cond. (250 mmfd.) | 30-1032 |
| 19 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 20 | Tubular Cond. (.006 mfd.) | 30-4125 |
| 21 | Output Trans. (Speaker 36-1461) | |
| 22 | Cone and Voice Coil Assy. (Speaker 36-1461) | 36-4095 |
| 23 | Resistor (70 ohms, ½ watt), Model 39-6 | 33-070339 |
| | Resistor (50 ohms, ½ watt), Model 39-7 | 33-050339 |
| 24 | Resistor (250 ohms, ½ watt) | 33-125339 |
| 25 | Electrolytic Cond. (4 mfd., 300 V.) | 30-2327 |
| 26 | Electrolytic Cond. (12 mfd., 300 V.) | 30-2328 |
| 27 | Field Coil (Replace Speaker 36-1461) | |
| 28 | Power Trans. (115 V., 50 to 60 cycles) | 32-7979 |

| *Schem. No.* | *Description* | *Part No.* |
|---|---|---|
| 1 | Ant. Trans. (39-6) | 32-2583 |
| 1 | Ant. Trans. (39-7) | 32-3039 |
| 2 | Tubular Cond. (.05 mfd.) | 30-4519 |
| 3 | Tuning Cond. (39-6) | 31-2335 |
| 3 | Tuning Cond. (39-7) | 31-2338 |
| 4 | Resistor (70,000 ohms, ½ watt) | 33-370339 |
| 4A* | Resistor (70 ohms, ½ watt) (39-7) | 33-070339 |
| 5 | Mica Cond. (110 mfd.) | 30-1031 |
| 6 | Oscillator Trans. (39-6) | 32-3021 |
| | Oscillator Trans. (39-7) | 32-2122 |
| 29 | Condenser (.006, moulded) | 30-4423 |
| 30 | Pilot Lamp | 34-2064 |
| 31* | Pilot Lamp Resistor (8 ohms, ½ watt) | 33-980331 |
| 32* | Push-Button Switch | 42-1477 |
| 33* | Padder Strip Assy. | 31-6290 |

* *Indicates parts used on Model 39-7 only.*

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**TYPE OF CIRCUIT:** Models 39-6, code 121; and 39-7, code 121, employ a five-tube A.C. operated superheterodyne circuit, covering standard broadcast frequencies; Automatic Volume Control, and Pentode Audio Output. In general the two models are similar but differ in their tuning mechanisms and cabinets.

Model 39-6 is manually tuned and is assembled in cabinet type C.

Model 39-7, code 121, in addition to being manually tuned, is equipped with six Electric Automatic Push-Buttons. Five push-buttons are used for selecting any one of five stations in the standard broadcast range, and one push-button for changing to manual tuning. The procedure for adjusting the push-buttons for reception of stations will be found in the instructions supplied with each set.

| Operation in Order | SIGNAL GENERATOR | | | RECEIVER | | | Special Instructions |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna Note A | Dial Setting | Dial Setting | Control Setting | Adjust Compensators in Order | |
| 1 | 6A7 | .1 mf. | 470 K.C. | 580 K.C. | Vol. Cont. Max. | 11A, 7B, 7A | Adjust for max. output |
| 2 | Ant. Lead | 100 mf. | 1550 K.C. | 1550 K.C. | Vol. Cont. Max. | 3B, 3A | Adjust for max. output Note A, B |

**NOTE A**—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B**—DIAL CALIBRATION: With the tuning condenser in "maximum capacity" position (plates fully meshed), set the dial pointer between the two horizontal lines at the low frequency end of the scale (550 K.C.).

# REPLACEMENT PARTS
## Model 39-17; Codes 121 & 122

| Schem. No. | Description | Part No. |
|---|---|---|
| 1 | Antenna Transformer | 32-3039 |
| 2 | Condenser (.05 mf. tubular) | 30-4519 |
| 3 | Tuning Condenser Assembly | 31-2265 |
| 4 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 5 | Condenser (110 mmf. mica) | 30-1031 |
| 6 | Condenser (25 mmf., silver plated mica) | 30-1112 |
| 7 | Oscillator Transformer | 32-3040 |
| 8 | Resistor (3.0 megohm) | 33-530339 |
| 9 | Condenser (.03 mf. tubular) | 30-4449 |
| 10 | Resistor (40,000 ohms, ½ watt) | 33-340339 |
| 11 | 1st I. F. Transformer Assembly | 32-3075 |
| 12 | 2nd I. F. Transformer Assembly | 32-2944 |
| 13 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 14 | Volume Control and On-Off Switch | 33-5276 |
| 15 | Condenser (.01 mf. tubular) | 30-4479 |
| 16 | Condenser (mica), 250 mmf. | 30-1032 |
| 17 | Condenser (.01 mf. tubular) | 30-4572 |
| 18 | Resistor (16,000 ohms, ½ watt) | 33-316339 |
| 19 | Resistor (1.0 megohm, ½ watt) | 33-510339 |
| 20 | Resistor (4.0 megohm, ½ watt) | 33-540339 |
| 21 | Condenser (.01 mf. tubular) | 30-4572 |
| 22 | Output Transformer | 32-7980 |
| 23 | Cone and Voice Coil Assembly for Speaker (Part No. 36-1426-1) | 36-4083 |
| | (Part No. 36-1426-3) | 36-4085 |
| | Cone and Voice Coil Assembly for Speaker (Part No. 36-1440) | 36-4086 |
| 24 | Resistor (250 ohms, wire wound) | 33-125431 |
| 25 | Resistor (70 ohms, ½ watt) | 33-070339 |
| 26 | †Field Coil for Speaker (Pt. No. 36-1426) | |
| | †Field Coil for Speaker (Pt. No. 36-1440) | |
| 27 | Condenser (12 mf. electrolytic) | 30-2319 |
| 28 | Condenser (4 mf. electrolytic) | 30-2236 |
| 29 | Condenser (.03 mf. tubular) | 30-4449 |
| 30 | Power Transformer (115 volts, 50-60 cycles) | 32-7974 |
| 31 | Condenser (.01 mf.—.01 mf., bakelite) | 3903DG |
| 32 | Pilot Lamp | 34-2064 |
| 33 | Pilot Lamp | 34-2064 |

## MISCELLANEOUS PARTS

| Description | Part No. |
|---|---|
| Automatic Tuning Unit (complete) | 31-2282 |
| Bezel Assembly (dial) | 40-6364 |
| Bezel Gasket (dial) | 27-9174 |
| Bezel (push buttons) | 28-5929 |
| Bezel Gasket (push buttons) | 27-9218 |
| Bezel Clamp (dial) | 28-5153 |
| Cable and Plug (power) | L-2778 |
| Dial and Frame Assembly | 31-2283 |
| Dial Tuning Drum Assembly | 31-2281 |
| Dial Tuning Cord Assembly | 31-2275 |
| Dial Tuning Spring (cord) | 28-8919 |
| Clip (Mtg. R. F. Coils) | 28-5002 |
| Clip (Mtg. R. F. Coils) | 28-5003 |
| Escutcheon Plate (extension shafts, F cabinet) | 56-1051 |
| Escutcheon Pin | W-950 |
| Knob (Tuning) | 27-4750 |
| Knob (Volume) | 27-4753 |
| Pilot Lamp Socket Assembly | 38-9612 |
| Pointer (dial) | 28-5934 |
| Push-Buttons | 27-4749 |
| Shaft Extension (Volume) | 38-9640 |
| Shaft Extension (Tuning) | 28-6928 |
| Sleeve-long Tuning Shaft Extension (F Cabinet) | 28-6935 |
| Sleeve-short Tuning Shaft (T and F Cabinet) | 28-6887 |
| Spring-retaining Volume Shaft | 28-8915 |
| Socket (6 prong) | 27-6036 |
| Socket (7 prong) | 27-6107 |
| Socket (5 prong) | 27-6035 |
| Speaker (F Cabinet) | 36-1440 |
| *Speaker (T Cabinet) optional | 36-1426-1 / 36-1426-3 |
| Tab Kit | 40-6391 |

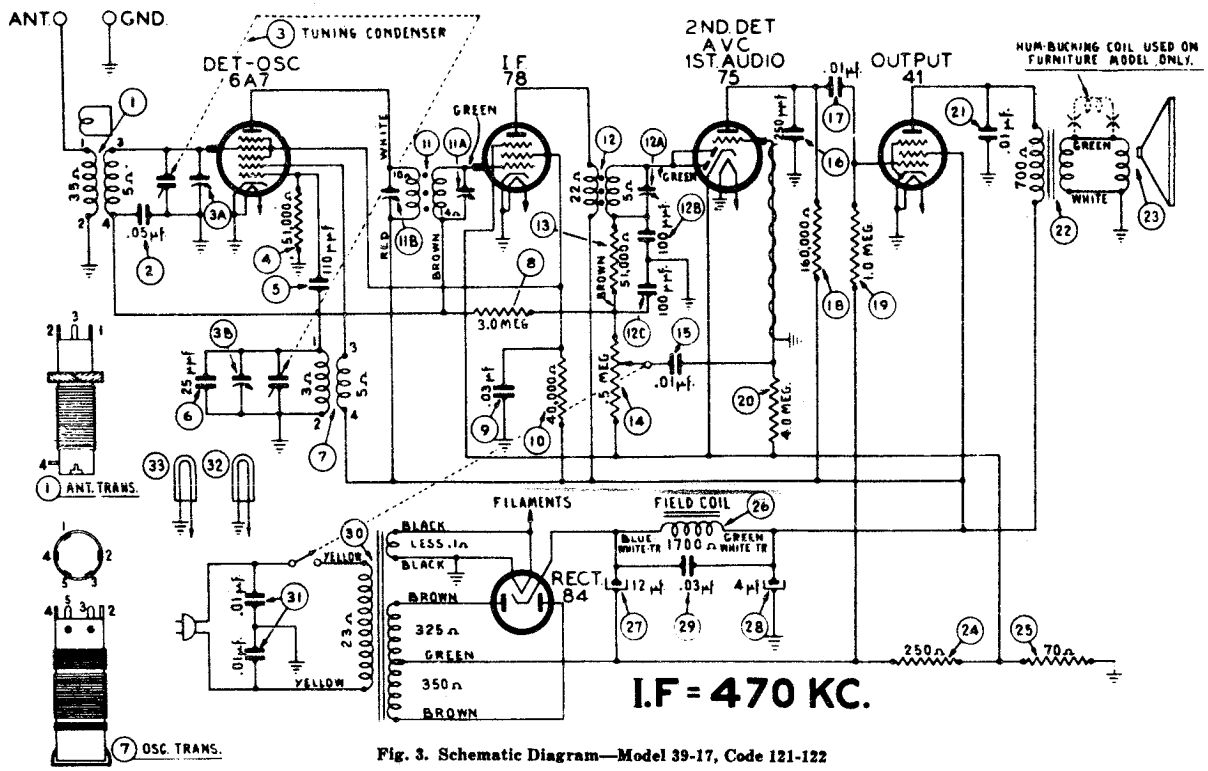
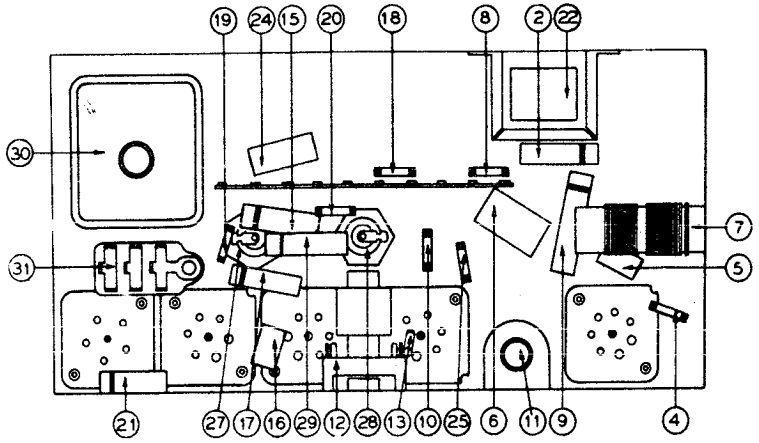



Fig. 3. Schematic Diagram—Model 39-17, Code 121-122



† Replace Speaker.

* When ordering Speaker or Cone assembly specify which of the small numbers (-1 or -3) following the part number is required.

Fig. 4. Part Locations, Underside of Chassis

June 1938

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MODEL 39-17
Codes 121,122
Socket,Trimmers,
Alignment,Voltage

PHILCO RADIO & TELEV. CORP.

# SPECIFICATIONS

**TYPE OF CIRCUIT:** A. C. operated; superheterodyne circuit, covering standard broadcast band (540 K. C. to 1720 K. C.); Automatic Volume Control; and pentode output.

Codes 121 and 122 chassis of this model are similar with the exception of Speaker and Cabinet.

The receiver is designed to operate from a "Philco Utility Aerial," part No. 45-2450. This aerial system should be used to obtain maximum performance from the receiver.

**POWER SUPPLY:** Voltage—115 volts. Frequency—50-60 cycles. Power consumption—40 watts.

**INTERMEDIATE FREQUENCY:** 470 K. C.

**TUNING RANGE:** 540 to 1720 K. C.

**AUDIO OUTPUT:** 2 watts.

**PHILCO TUBES USED:** Five tubes: 1-6A7, 1st detector and oscillator; 1-78, I. F.; 1-75, 2nd detector, Automatic Volume Control, and 1st audio; 1-41, Output; and 1-84, Rectifier.

**TUNING MECHANISM:** Pulley and cable drive for Manual tuning. Push-Button for Automatic Tuning. The procedure for adjusting and operating the Automatic Tuning Push-Buttons will be found in the instructions supplied with each set.

**CABINETS:** Code 121 chassis in type "T" cabinet.
Code 122 chassis in type "F" cabinet.




Fig. 1. Socket Voltage—Underside of Chassis View

The voltages indicated by arrows were measured with a Philco 027 Circuit Tester, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.




Fig. 2. Locations of Compensators

## Alignment of Compensators

**EQUIPMENT REQUIRED:** (1) Signal Generator: Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose. (2) Output meter, Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended (3) Philco Fiber Handle Screw Driver, part No. 27-7059, and Fiber Wrench, part No. 3164.

**OUTPUT METER:** The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 41 tube Set the meter to use the 0-30 volt scale.

| Operations In Order | Signal Generator | | | Receiver | | | Special Instructions |
|---|---|---|---|---|---|---|---|
| | Output Connections To Receiver | Dummy Antenna (Note A) | Dial Setting | Dial Setting | Control Settings | Adjust Compensators In Order | |
| 1 | 6A7 Grid | .1 mf. | 470 K. C. | 580 K. C. | Vol. Cont. (Max.) | (12A) (11A) (11B) | |
| 2 | Ant. Ter. | 100 mmf. | 1550 K. C. | 1550 K. C. | Vol. Cont. (Max.) | (3B) (3A) | See Note B |

**NOTE A**—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B—DIAL CALIBRATION:** In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the push button unit disconnected from the gang, the pointer is to be set on the extreme left edge of the index line (low frequency end of the scale) with the gang closed. The gang is then opened until the pointer is at the right edge of the index line and, with the push button shaft at its closed stop, the push button coupling is tightened on the gang shaft.

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# REPLACEMENT PARTS
## Model 39-18, Codes 121 & 122

| Schem. No. | Description | Part No. |
|---|---|---|
| 1 | Condenser (.001 mfd. tubular) | 30-4453 |
| 2 | Antenna Transformer | 32-3039 |
| 3 | Tuning Condenser Assembly | 31-2265 |
| 4 | Condenser (.15 mfd. tubular) | 30-4505 |
| 5 | Condenser (.05 mfd. tubular) | 30-4519 |
| 6 | Resistor (120,000 ohms, ½ watt) | 33-412339 |
| 7 | Condenser (110 mmf., mica) | 30-1031 |
| 8 | Condenser (25 mmf., silver plated mica) | 30-1112 |
| 9 | Oscillator Transformer | 32-3040 |
| 10 | Condenser (.5 mf., tubular) | 30-4551 |
| 11 | 1st I. F. Transformer Assembly | 32-3075 |
| 12 | 2nd I. F. Transformer Assembly | 32-2944 |
| 13 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 14 | Resistor (2.0 megohms, ½ watt) | 33-520339 |
| 15 | Resistor (2.0 megohms, ½ watt) | 33-520339 |
| 16 | Condenser (.02 mf., tubular) | 30-4516 |
| 17 | Resistor (25,000 ohms, ½ watt) | 33-325339 |
| 18 | Volume Control and On-Off Switch | 33-5276 |
| 19 | Condenser (.1 mf., tubular) | 30-4499 |
| 20 | Condenser (.01 mf., tubular) | 30-4572 |
| 21 | Resistor (4.0 megohms, ½ watt) | 33-540339 |
| 22 | Condenser (.01 mf., tubular) | 30-4572 |
| 23 | Resistor (190,000 ohms, ½ watt) | 33-419339 |
| 24 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 25 | Condenser (.1 mf., tubular) | 30-4499 |
| 26 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 27 | Resistor (190,000 ohms, ½ watt) | 33-419339 |
| 28 | Condenser (.02 mf., tubular) | 30-4215 |
| 29 | Output Transformer | 32-7986 |
| 30 | Cone and Voice Coil Assembly (Speaker Part No. 36-1444-1) | 36-4083 |
| | (Speaker Part No. 36-1444-3) | 36-4085 |
| | Cone and Voice Coil Assembly (Speaker Part No. 36-1445) | 36-4086 |
| 31 | Resistor (1400 ohms, ½ watt) | 33-214339 |
| 32 | Condenser (20 mf., electrolytic) | 30-2245 |
| 33 | Condenser (40 mf., electrolytic) | 30-2332 |
| 34 | Condenser (.05 mf., tubular) | 30-4444 |
| 35 | Resistor (300 ohms, wire wound) | 33-130431 |
| 36 | Resistor (28 ohms, ½ watt) | 33-028339 |
| 37 | †Field Coil for Speaker (Pt. No. 36-1444) | |
| | †Field Coil for Speaker (Pt. No. 36-1445) | |
| 38 | Pilot Lamp | 34-2068 |
| 39 | Pilot Lamp | 34-2068 |
| 40 | Condenser (.03 mf., tubular) | 30-4449 |

* When ordering Speaker or Cone assembly specify which of the small numbers (-1 or -3) following the part number is required.
† Replace Speaker.

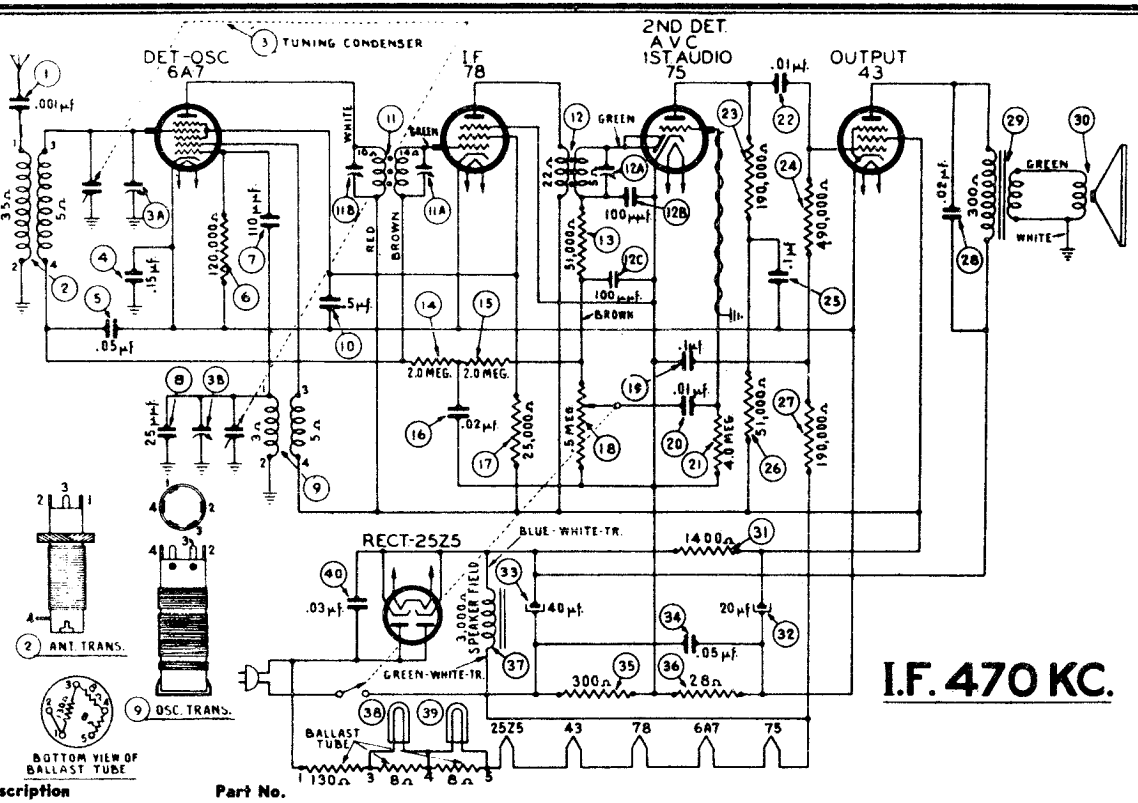


Fig. 3. Schematic Diagram, Model 39-18, Code 121-122

| Description | Part No. |
|---|---|
| Dial Tuning Spring (cord) | 28-8919 |
| Clip (Mtg. R. F. Coils) | 28-5002 |
| Clip (Mtg. R. F. Coils) | 28-5003 |
| Escutcheon Plate (extension shafts, F Cabinet) | 56-1051 |
| Escutcheon Pin | W-950 |
| Felt (Dial Lamps) | 27-9222 |
| Knob (Tuning) | 27-4750 |
| Knob (Volume) | 27-4753 |
| Mtg. Rubber (Tuning Condenser) | 27-4596 |
| Pilot Lamp Socket Assembly | 38-9649 |
| Pointer | 28-5934 |
| Push-Button | 27-4749 |
| Screw (Tuning Knob) | 28-6882 |
| Shaft Extension (Volume, F Cabinet) | 38-9640 |
| Shaft Extension (Tuning, F Cabinet) | 28-6928 |
| Sleeve-long Tuning Shaft Extension (F Cabinet) | 28-6935 |
| Sleeve-short Tuning Shaft (T and F Cabinet) | 28-6887 |
| Spring-retaining Volume Ext. Shaft | 28-8915 |
| *Speaker (T Cabinet, code 121) | 36-1444-3 |
| optional | 36-1444-1 |
| Speaker (F Cabinet) | 36-1445 |
| Socket (5 prong) | 27-6035 |
| Socket (6 prong) | 27-6036 |
| Socket (7 prong) | 27-6107 |
| Tab Kit (Stations) | 40-6391 |

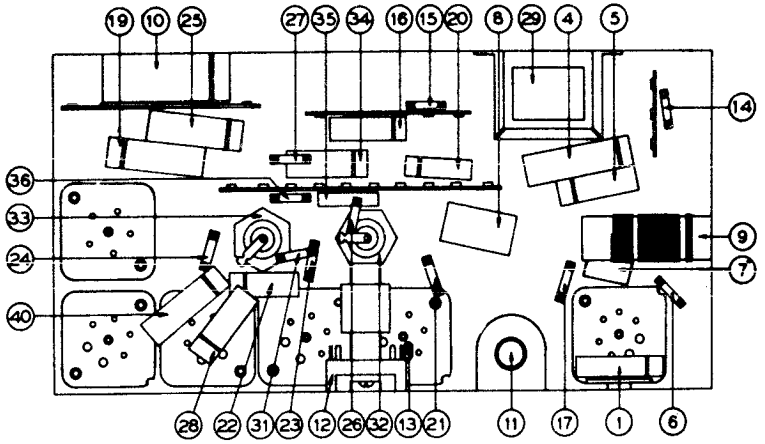

Fig. 4. Part Locations, Underside of Chassis

MODEL 39-18
Codes 121,122
Socket,Trimmers

Alignment,Voltage

# PHILCO RADIO & TELEV. CORP.
# SPECIFICATIONS

**TYPE OF CIRCUIT:** A. C. - D. C. operated; superhetrodyne circuit, covering standard broadcast (540 K. C. to 1720 K. C.) frequency; Automatic Volume Control; and pentode output.

Codes 121 and 122 chassis of this model are similar with the exception of Speaker and Cabinet.

The receiver is designed to operate from a "Philco Utility Aerial," part No. 45-2450. This aerial system should be used to obtain maximum performance from the receiver.

**POWER SUPPLY:** Voltage—115 volts A. C. or D. C. Power consumption—55 watts.

**INTERMEDIATE FREQUENCY:** 470 K. C.

**TUNING RANGE:** 540 to 1720 K. C.

**PHILCO TUBES USED:** 1—6A7, 1st detector and oscillator; 1—78, I. F.; 1—75, 2nd detector, Automatic Volume Control, and 1st audio; 1—43, Output; 1—25Z5, Rectifier; and 1—BKV51DJ, ballast tube.

**TUNING MECHANISM:** Pulley and cable drive for Manual tuning. Push-Button for Automatic Tuning. The procedure for adjusting and operating the Automatic Tuning Push-Buttons will be found in the instructions supplied with each set.

**CABINETS:** Code 121 chassis in type "T" cabinet.
Code 122 chassis in type "F" cabinet.

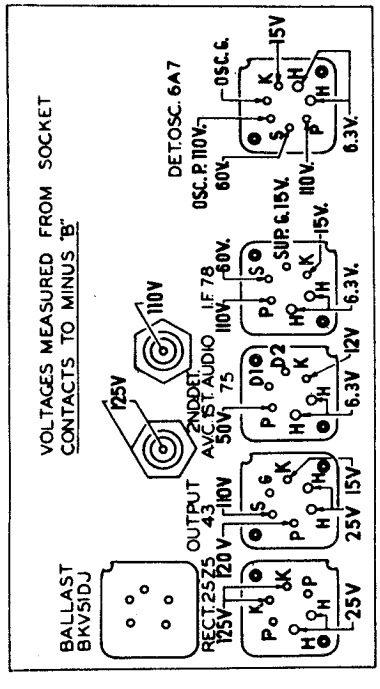


Fig. 1. Socket Voltage—Underside of Chassis View

The voltages indicated by arrows were measured with a Philco 027 Circuit Tester, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.

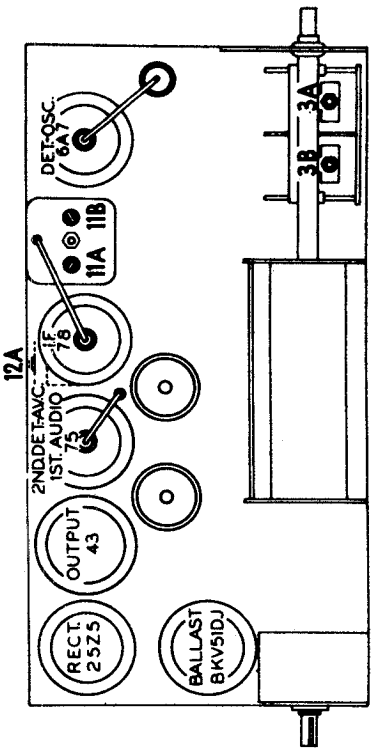


Fig. 2. Locations of Compensators

## Alignment of Compensators

**EQUIPMENT REQUIRED:**

(1) Signal Generator; Philco Model 077 Signal Generator, which has a fundamental frequency range from 115 to 36,000 KC., is the correct instrument for this purpose.

(2) Output meter; Philco Model 027 Circuit Tester incorporates a sensitive output meter and is recommended.

(3) Philco Fiber Handle Screw Driver, part No. 27-7059 and Fiber Wrench, part No. 2164.

(4) Philco Set Transformer, part No. 32-2763.

**OUTPUT METER:**

The Philco 027 Output Meter is connected to the plate and cathode terminals of the Type 43 tube. Set the meter to use the 0-30 volt scale.

| Operations in Order | Signal Generator | | | Receiver | | | Special Instructions |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna (Note A) | Dial Setting | Dial Setting | Control Settings | Adjust Compensators in Order | |
| 1 | 6A7 Grid | .1 mf. | 470 KC | 580 KC | Vol. Cont. Max. | (12A) (11A) (11B) | See Note B |
| 2 | Ant. Ter. | 100 mmf. | 1550 KC | 1550 KC | Vol. Cont. Max. | (3B) (3A) | See Note C<br>See Note D |

**NOTE A**—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B**—Insert the signal generator output lead into the "Med" jack and the ground lead into the "Gnd" jack of the signal generator. Connect the other end of the output lead to terminal No. 1 on the Set Transformer, part No. 32-2763, and the cable ground to terminal No. 2. Nos. 3 and 4 terminals of Set Transformer are then connected to the chassis and 6A7 grid respectively of the receiver with short pieces of wire. Insert the 0.1 mf. in series with the No. 4 lead which connects to the grid.

**NOTE C—DIAL CALIBRATION:** In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the push button unit disconnected from the gang, the pointer is to be set on the extreme left edge of the index line (low frequency end of the scale) with the gang closed. The gang is then opened until the pointer is at the right edge of the index line and, with the push-button shaft at its closed stop, the push-button coupling is tightened on the gang shaft.

**NOTE D**—Insert the signal generator output lead into the "Med" jack and the ground lead into the "Gnd" jack of the signal generator. Connect the other end of the output lead to terminal No. 1 on the Set Transformer, part No. 32-2763, and the cable ground to terminal No. 2. Nos. 3 and 4 terminals of Set Transformer are then connected to the chassis and antenna lead respectively of the receiver with short pieces of wire. Insert the 100 mmf. in series with the No. 4 lead which connects to the antenna lead.

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# REPLACEMENT PARTS
## Model 39-19, Codes 121 & 122

| Schem. No. | Description | Part No. |
|---|---|---|
| 1 | Antenna Transformer (Range 2) | 32-2822 |
| 2 | Antenna Transformer (Range 1) | 32-2821 |
| 3 | Condenser (.05 mf. tubular) | 30-4519 |
| 4 | Tuning Condenser Assembly | 31-2273 |
| 5 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 6 | Oscillator Transformer (Ranges 1 and 2) | 32-3036 |
| 7 | Resistor (20 ohms, ½ watt) | 33-020339 |
| 8 | Compensator (two sections) | 31-6257 |
| 9 | Condenser (370 mmf., silver plated mica) | 30-1110 |
| 10 | Condenser (3500 mmf., mica) | 30-1094 |
| 11 | Condenser (250 mmf., mica) | 30-1032 |
| 12 | Resistor (5000 ohms, ½ watt) | 33-250339 |
| 13 | 1st I. F. Transformer Assembly | 32-3075 |
| 14 | 2nd I. F. Transformer Assembly | 32-2944 |
| 15 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 16 | Condenser (.03 mf. tubular) | 30-4449 |
| 17 | Resistor (32,000 ohms, ½ watt) | 33-332339 |
| 18 | Resistor (10,000 ohms, 1 watt) | 33-310439 |
| 19 | Resistor (1.0 meg., 3 watts) | 33-510339 |
| 20 | Volume Control and On-Off Switch | 33-5276 |
| 21 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 22 | Condenser (110 mmf., mica) | 30-1031 |
| 23 | Condenser (250 mmf., mica) | 30-1032 |
| 24 | Condenser (.01 mf. tubular) | 30-4572 |
| 25 | Resistor (99,000 ohms, ½ watt) | 33-399339 |
| 26 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 27 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 28 | Condenser (.1 mf., tubular) | 30-4499 |
| 29 | Condenser (.01 mf., tubular) | 30-4479 |
| 30 | Resistor (4.0 meg., ½ watt) | 33-540339 |
| 31 | Condenser (8 mf.-4 mf., electrolytic) | 30-2323 |
| 32 | Condenser (.01 mf., tubular) | 30-4572 |
| 33 | Output Transformer | 32-7980 |
| 34 | Cone and Voice Coil Assembly (Speaker Part No. 36-1426-1) | 36-4083 |
| | Part No. 36-1426-3 | 36-4085 |
| | Cone and Voice Coil Assembly (Speaker Part No. 36-1449) | 36-4086 |
| 35 | †Field Coil for Speaker (Part No. 36-1426) | |
| | †Field Coil for Speaker (Part No. 36-1449) | |
| 36 | Condenser (8 mf. electrolytic) | 30-2319 |
| 37 | Resistor (250 ohms, wire wound) | 33-125431 |
| 38 | Resistor (70 ohms, ½ watt) | 33-070339 |
| 39 | Power Transformer, 115 v., 50-60 cycles | 32-7974 |
| 40 | Condenser (.01 mf.-.01 mf., bakelite) | 3903-DG |
| 41 | Pilot Lamp | 34-2064 |
| 42 | Pilot Lamp | 34-2064 |
| 43 | Wave Switch | 42-1449 |

† Replace Speaker.

| Description | Part No. |
|---|---|
| Automatic Tuning Unit (complete) | 31-2282 |
| Bezel Assembly (dial) | 40-6364 |
| Bezel Gasket (dial) | 27-9174 |
| Cable and Plug (power) | L 2778 |
| Cable Speaker (F Cabinet) | 41-3431 |
| Dial and Frame Assembly | 31-2298 |
| Dial Tuning Drum Assembly | 31-2281 |
| Dial Tuning Cord Assembly | 31-2275 |
| Dial Tuning Spring (cord) | 28-8919 |
| Clip (mtg. R. F. coils) | 28-5002 |
| Clip (mtg. R. F. coils) | 28-5003 |
| Escutcheon Plate (extension shafts, F Cabinet) | 56-1051 |
| Escutcheon Pins | W-950 |
| Knob (Tuning) | 27-4750 |
| Knob (Volume) | 27-4753 |
| Knob (Wave Switch) | 27-4754 |
| Pilot Lamp Socket Assembly | 38-9612 |
| Pointer (Dial) | 28-5934 |
| Push-Button | 27-4749 |
| Screw Tuning Knob | 28-6882 |
| Shaft Extension (Volume and Wave Switch) | 38-9640 |
| Shaft Extension (Tuning) | 28-6928 |
| Sleeve-Long-Tuning Shaft Extension (F Cabinet) | 28-6935 |
| Sleeve-Short-Tuning Shaft (T and F Cabinet) | 28-6887 |
| *Speaker (T Cabinet—code 121) | 36-1426-3 |
| optional | 36-1426-1 |
| Speaker (F Cabinet—code 122) | 36-1449 |
| Spring-Retaining Volume Shaft | 28-8915 |

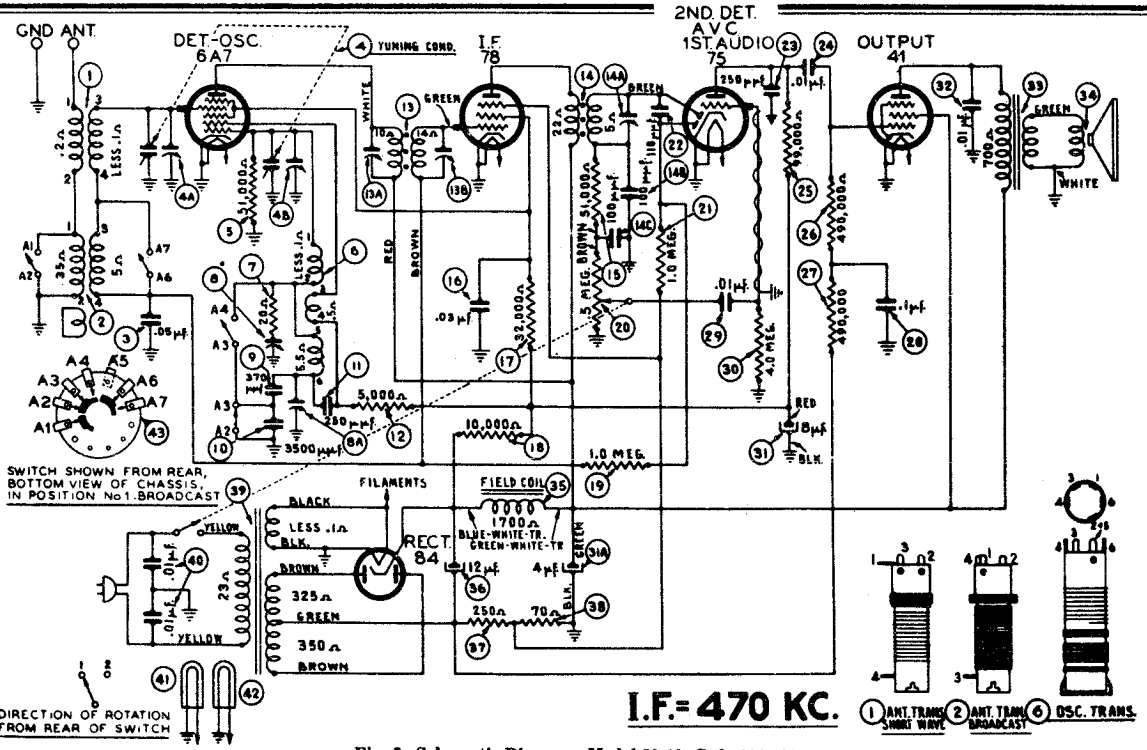
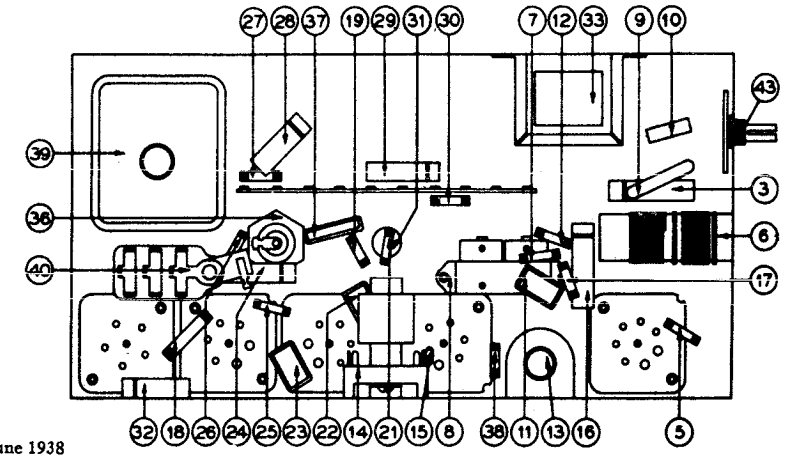



Fig. 3. Schematic Diagram, Model 39-19, Code 121-122



June 1938

Fig. 4. Part Locations, Underside of Chassis

* When ordering Speaker or Cone assembly specify which of the small numbers (-1 or -3) following the part number is required.

MODEL 39-19
Codes 121,122
Socket,Trimmers

# PHILCO RADIO & TELEVISION CORP. Alignment,Voltage

# SPECIFICATIONS

**TYPE OF CIRCUIT:** A. C. operated; superhetrodyne circuit with two tuning ranges, covering standard broadcast (540 K. C. to 1720 K. C.) and short wave (5.6 M. C. to 18.0 M. C.) frequencies; Automatic Volume Control; and pentode output.

Codes 121 and 122 chassis of this model are similar with the exception of Speaker and Cabinet.

The receiver is designed to operate from a "Philco Utility Aerial," part No. 45-2450. This aerial system should be used to obtain maximum performance from the receiver.

**POWER SUPPLY:** Voltage—115 volts. Frequency—50-60 cycles. Power consumption—40 watts.

**INTERMEDIATE FREQUENCY:** 470 K. C.

**TUNING RANGES:** 540 K. C. to 1720 K. C. 5.5 M. C. to M. C. 19.0

**AUDIO OUTPUT:** 2 watts.

**PHILCO TUBES USED:** Five tubes: 1-6A7, 1st detector and oscillator; 1-78, I. F.; 1-75, 2nd detector, Automatic Volume Control, and 1st audio; 1-41, Output; and 1-84, Rectifier.

**TUNING MECHANISM:** Pulley and cable drive for Manual Tuning. Push-Button for Automatic Tuning. The procedure for adjusting and operating the Automatic Tuning Push-Buttons will be found in the instructions supplied with each set

**CABINETS:** Code 121 chassis in type "T" cabinet
Code 122 chassis in type "F" cabinet

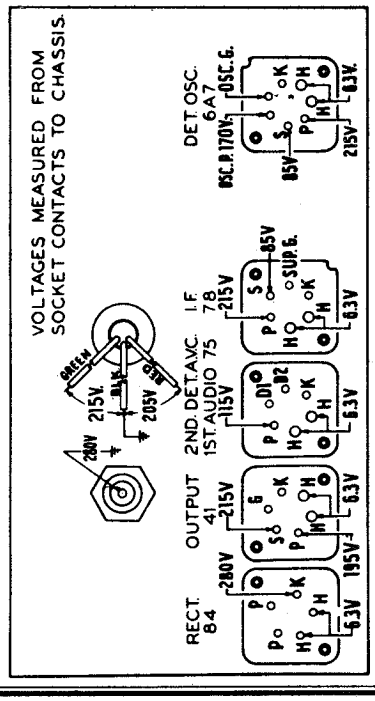



Fig. 1. Socket Voltage—Underside of Chassis View
The voltages indicated by arrows were measured with a Philco 027 Circuit Tester, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.

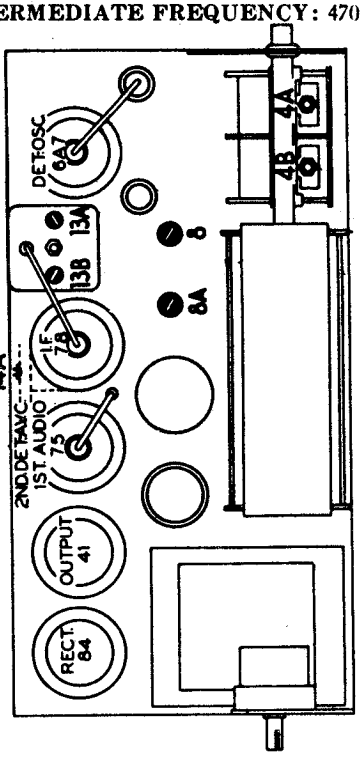



Fig. 2. Locations of Compensators

## ALIGNMENT OF COMPENSATORS

**EQUIPMENT REQUIRED:** (1) Signal Generator. Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose. (2) Output meter: Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended. (3) Philco Fiber Handle Screw Driver, part no. 27-7059 and Fiber Wrench, part no. 3104.

**OUTPUT METER:** The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 41 tube. **Set the meter to use the 0-30 volt scale.**

| Operations In Order | Signal Generator | | | Receiver | | | Special Instructions |
|---|---|---|---|---|---|---|---|
| | Output Connections To Receiver | Dummy Antenna (Note A) | Dial Setting | Dial Setting | Control Settings | Adjust Compensators In Order | |
| 1 | 6A7 Grid | .1mf | 470 KC | 580 KC | Vol. Cont. (max.) | (14A) (13B) (13A) | |
| 2 | Ant. Ter. | 100mmf | 18 MC | 18 MC | " | (4B) | Note B |
| 3 | " | " | 1550 KC | 1550 KC | " | (8) (4A) | |
| 4 | " | " | 580 KC | 580 KC | " | (8A) | Roll Tuning Condenser |
| 5 | " | " | 1550 KC | 1550 KC | " | (8) | |

**NOTE A**—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B—DIAL CALIBRATION:** In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the push button unit disconnected from the gang, the pointer is to be set on the extreme left edge of the index line (low frequency end of the scale) with the gang closed. The gang is then opened until the pointer is at the right edge of the index line and, with the push button shaft at its closed stop, the push button coupling is tightened on the gang shaft.

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PHILCO RADIO & TELEV. CORP.

MODEL 39-25, Code 121
Schematic

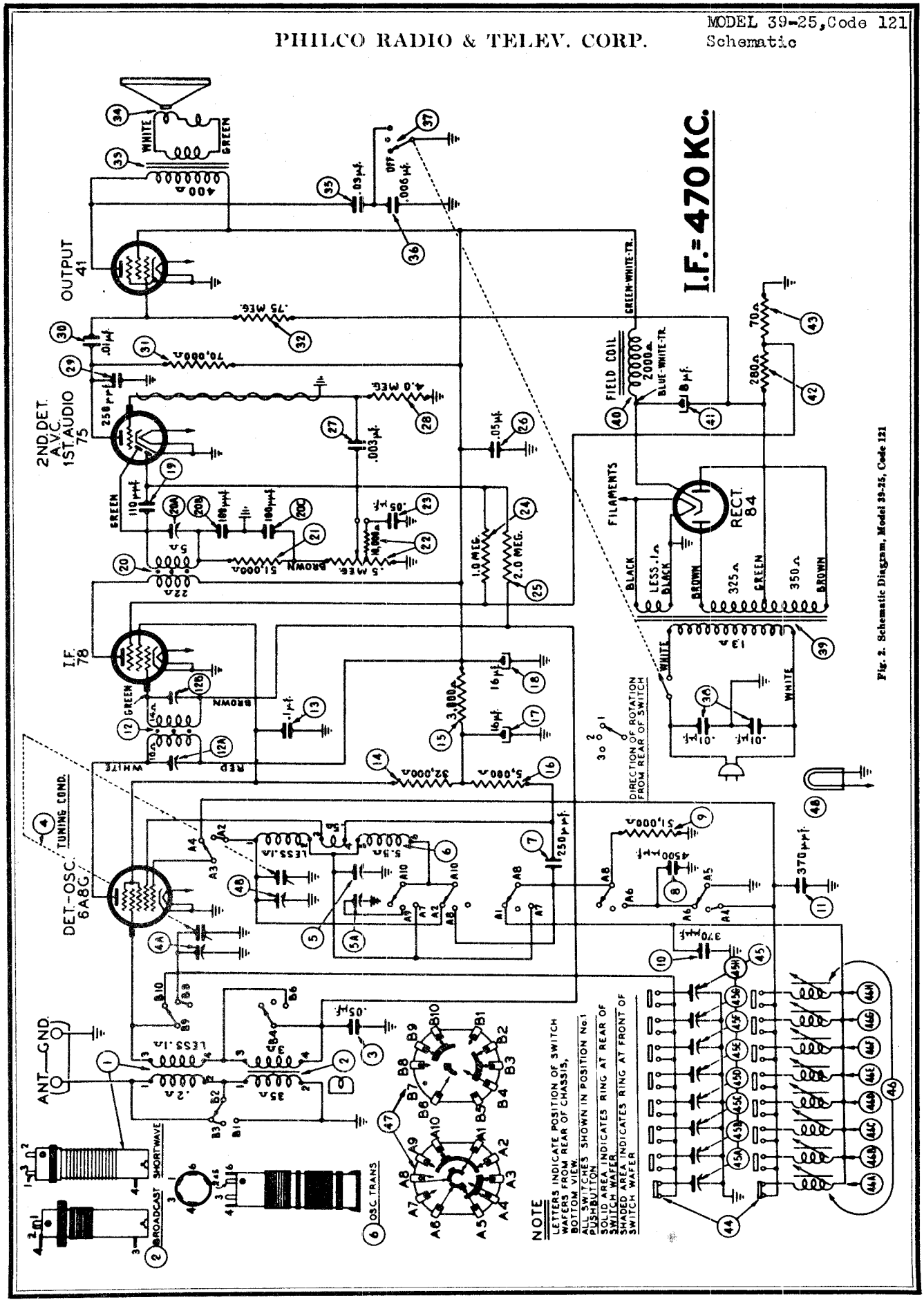


Fig. 2. Schematic Diagram, Model 39-25, Code 121

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**TYPE OF CIRCUIT:** A. C. operated; superheterodyne circuit with two tuning ranges, covering standard broadcast (540 K. C. to 1720 K. C.) and short wave (4.9 M. C. to 18.0 M. C.) frequencies: Automatic Volume Control; and pentode output.

The receiver is designed to operate from a "Philco Safety Aerial," part No. 40-6371. This aerial system should be used to obtain maximum performance from the receiver.

**POWER SUPPLY:** Voltage—115 volts. Frequency 50-60 cycles. Power consumption 45 watts.

**INTERMEDIATE FREQUENCY:** 470 K. C.

**TUNING RANGES:** 540 K. C. to 1720 K. C.; 4.9 M. C. to 18.0 M. C.

**PHILCO TUBES USED:** 1-6A8G, 1st detector and oscillator; 1-78, I. F.; 1-75, 2nd detector, Automatic Volume Control, and 1st audio; 1-41, Output; and 1-84, Rectifier.

**TUNING MECHANISM:** Pulley and cable drive for Manual tuning. Electric Push-Button for Automatic tuning.

**CABINETS:** Types "T" and "XF."

## Alignment of Compensators

**EQUIPMENT REQUIRED:** (1) Signal Generator; Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose. (2) Output meter, Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended. (3) Philco Fiber Handle Screw Driver, part No. 27-7059, and Fiber Wrench, part No. 3164.

**OUTPUT METER:** The Philco 027 Output Meter is connected to the plate and cathode terminals of the Type 41 tube. Set the meter to use the 0-30 volt scale. After connecting the output meter adjust compensators in the order as given below.

| Operations in Order | Signal Generator | | | Receiver | | | Special Instructions |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna (Note A) | Dial Setting | Dial Setting | Control Settings | Adjust Compensators in Order | |
| 1 | 6A8G Grid | .1 mf. | 470 KC | 580 KC | Vol. Cont. max. | (20A) (12B) (12A) | |
| 2 | Ant. Ter. | 100 mmf. | 18.0 MC | 18.0 MC | Vol. Cont. max. | (4B) | See Note B |
| 3 | Ant. Ter. | 100 mmf. | 1550 KC | 1550 KC | Vol. Cont. max. | (5) (4A) | |
| 4 | Ant. Ter. | 100 mmf. | 580 KC | 580 KC | Vol. Cont. max. | (5A) | |
| 5 | Ant. Ter. | 100 mmf. | 1550 KC | 1550 KC | Vol. Cont. max. | (5) | |

**NOTE A**—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B—DIAL CALIBRATION:** In order to adjust the receiver correctly the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser closed, set the dial pointer on the extreme left index line at the low frequency end of the scale.

These detailed instructions have been prepared to make sure the correct procedure is followed in setting the stations on the Philco Electric Push-Button Tuning models. The work requires the use of a Philco Model 077 Station Setter and a part No. 27-7059 Insulated Screw Driver.

(A) Select eight of the most popular stations received in the locality and remove their call letters from the call letter sheets supplied. Place the call letters in the windows above the buttons, making sure that each respective button covers the frequency of the station for which it is to be used. The frequency range of the circuits are as follows:

| Circuits | Frequency Range |
|---|---|
| 1 and 2 | 540 to 1030 kilocycles |
| 3 and 4 | 670 to 1160 kilocycles |
| 5 and 6 | 900 to 1470 kilocycles |
| 7 and 8 | 1170 to 1600 kilocycles |

These numbers are stamped on the unit as seen from the rear. Looking at the front of the cabinet the numbers read from left to right.

(B) Connect the aerial and ground to the "ANT" and "GND" terminals of the receiver.

(C) Turn the receiver Tuning Range Selector to position two ("Manual Tuning") and tune the receiver to the station to be set on the first button.

(D) Plug the output leads of the Station Setter into the "High" and "Gnd" jacks, and turn the output controls to maximum. Turn the modulation control to "Modulation Off." Connect the output lead of the Station Setter to the "ANT" and "GND" terminals of the receiver and tune to the frequency of the station being received. As the indicator is slowly tuned through the frequency of the station there will be two points at which a high pitched swish will be heard, one above and one below the frequency of the station. When the indicator is on the frequency of the station, minimum high pitched swish will be heard.

(E) Set the modulation control of the Station Setter for "Modulation On." The modulated signal of the Station Setter will then be heard through the receiver.

(F) Turn the receiver Tuning Range Selector to position one (Automatic Tuning) and push in the first button. Using the Part No. 27-7059 Insulated Screw Driver, turn the number 1 "OSC" screw until the modulated signal of the Station Setter is tuned in to maximum volume. Then adjust the number 1 "ANT" screw for maximum signal.

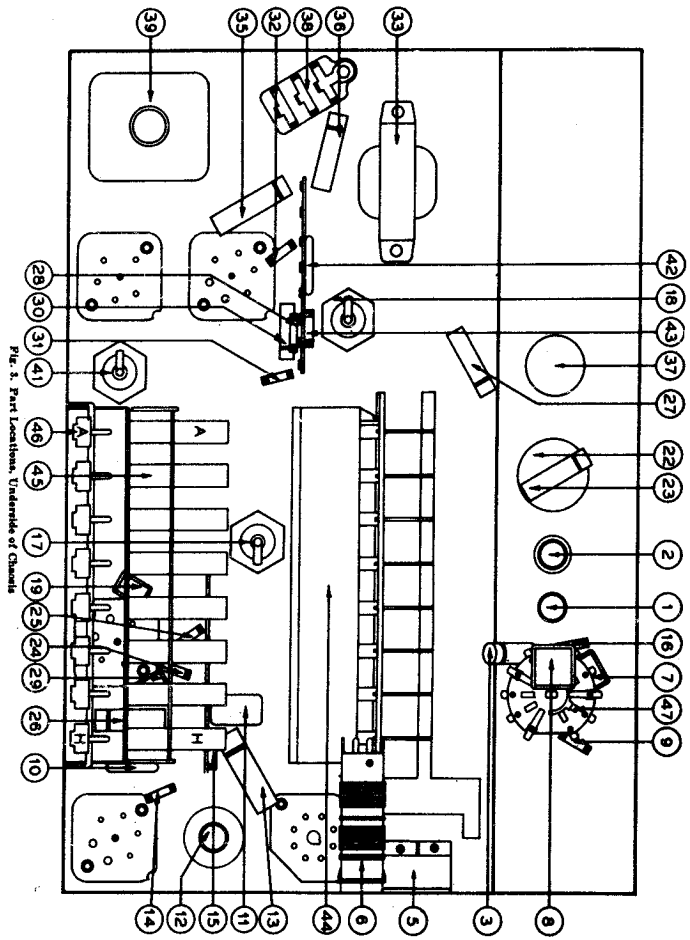


Fig. 3. Part Locations, Underside of Chassis

(G) Remove the output lead of the Philco Station Setter from the "ANT" terminal of the receiver and turn its indicator off the frequency of the station. The program of the desired station will then be heard on the receiver.

(H) With the volume of the receiver low, slowly turn the number 1 "OSC" back and forth until maximum output is received. Repeat the same procedure for the number 1 "ANT" screw.

After setting up the first station, the same procedure given under (C) to (H) is used for the other stations.

# PHILCO RADIO & TELEV. CORP.

MODEL 39-25
Code 121
Socket, Trimmers
Voltage, Parts

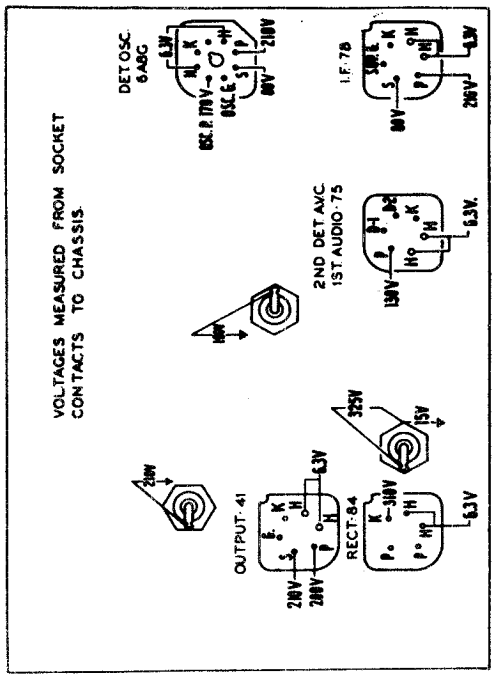


Fig. 1. Socket Voltage—Underside of Chassis

The voltages indicated by arrows were measured with a Philco 027 Circuit Tester, which contains a sensitive voltmeter. Volume Control at minimum—Tuning Condenser set for no signal—line voltage 115 A. C.

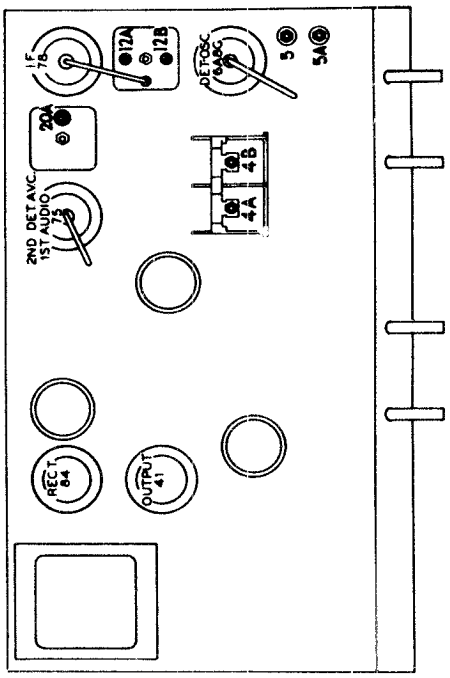


Fig. 4. Locations of Compensators

# REPLACEMENT PARTS—MODEL 39-25, CODE 121

| Schem. No. | Description | Part No. |
|---|---|---|
| 1 | Antenna Transformer (short wave) | 32-3027 |
| 2 | Antenna Transformer (broadcast) | 32-3026 |
| 3 | Tubular Condenser (.05 mf.) | 30-4519 |
| 4 | Tuning Condenser Assembly | 31-2267 |
| 5 | Dual Padder Unit | 31-6255 |
| 6 | Oscillator Transformer | 32-3028 |
| 7 | Condenser (250 mmf., mica) | 30-1032 |
| 8 | Condenser (4500 mmf., mica) | 30-1109 |
| 9 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 10 | Condenser (370 mmf., silver plated mica) | 30-1110 |
| 11 | Condenser (370 mmf., silver plated mica) | 30-1110 |
| 12 | 1st I. F. Transformer Assembly | 32-3018 |
| 13 | Condenser (.1 mf., tubular) | 30-4455 |
| 14 | Resistor (32,000 ohms, ½ watt) | 33-332339 |
| 15 | Resistor (3000 ohms, ½ watt) | 33-230339 |
| 16 | Resistor (5000 ohms, ½ watt) | 33-250339 |
| 17 | Electrolytic Condenser (16 mf., 250 V.) | 30-2331 |
| 18 | Electrolytic Condenser (16 mf., 250 V.) | 30-2331 |
| 19 | Condenser (110 mmf., mica) | 30-1031 |
| 20 | 2nd I. F. Transformer Assembly | 32-3030 |
| 21 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 22 | Volume Control (500,000 ohms) | 33-5289 |
| 23 | Condenser (.05 mf., tubular) | 30-4444 |
| 24 | Resistor (1 meg., ½ watt) | 33-510339 |
| 25 | Resistor (2 megs., ½ watt) | 33-520339 |
| 26 | Condenser (.05 mf., tubular) | 30-4518 |
| 27 | Condenser (.003 mf., tubular) | 30-4469 |
| 28 | Resistor (4.0 megs., ½ watt) | 33-540339 |
| 29 | Condenser (250 mmf., mica) | 30-1032 |
| 30 | Condenser (.01 mf., tubular) | 30-4572 |
| 31 | Resistor (70,000 ohms, ½ watt) | 33-370339 |
| 32 | Resistor (750,000 ohms, ½ watt) | 33-475339 |
| 33 | Output Transformer | 32-7978 |
| 34 | Voice Coil and Cone Assembly (for "T" Speaker, part No. 36-1439) | 36-4087 |
| | (for "XF" Speaker, part No. 36-1437) | 36-4088 |
| 35 | Condenser (.03 mf., tubular) | 30-4449 |
| 36 | Condenser (.006 mf., tubular) | 30-4445 |
| 37 | Tone Control and On-Off Switch | 42-1443 |
| 38 | Condenser (.01 mf.-.01 mf., bakelite) | 3903-DG |
| 39 | Power Transformer | 32-7976 |
| 40 | *Field Coil for Speaker, part No. 36-1439 | |
| | *Field Coil for Speaker, part No. 36-1437 | |
| 41 | Electrolytic Condenser (8 mf., 400 V.) | 30-2330 |

| Schem. No. | Description | Part No. |
|---|---|---|
| 42 | Resistor (280 ohms, wire wound) | 33-128431 |
| 43 | Resistor (70 ohms, ½ watt) | 33-070339 |
| 44 | Push-Button Switch | 42-1446 |
| 45 | Compensator Strip Assembly | 31-6256 |
| 45A | Compensator, No. 1, 540-1030 K. C. | 31-6274 |
| 45B | Compensator, No. 2, 540-1030 K. C. | 31-6274 |
| 45C | Compensator, No. 3, 670-1160 K. C. | 31-6276 |
| 45D | Compensator, No. 4, 670-1160 K. C. | 31-6276 |
| 45E | Compensator, No. 5, 900-1470 K. C. | 31-6278 |
| 45F | Compensator, No. 6, 900-1470 K. C. | 31-6278 |
| 45G | Compensator, No. 7, 1170-1600 K. C. | 31-6280 |
| 45H | Compensator, No. 8, 1170-1600 K. C. | 31-6280 |
| 46 | Electric Tuning Coil Assembly (complete) | 32-3031 |
| 46A | Osc. Coil, No. 1, 540-1030 K. C. | 32-3042 |
| 46B | Osc. Coil, No. 2, 540-1030 K. C. | 32-3042 |
| 46C | Osc. Coil, No. 3, 670-1160 K. C. | 32-3042 |
| 46D | Osc. Coil, No. 4, 670-1160 K. C. | 32-3042 |
| 46E | Osc. Coil, No. 5, 900-1470 K. C. | 32-3041 |
| 46F | Osc. Coil, No. 6, 900-1470 K. C. | 32-3041 |
| 46G | Osc. Coil, No. 7, 1170-1600 K. C. | 32-3041 |
| 46H | Osc. Coil, No. 8, 1170-1600 K. C. | 32-3041 |
| 47 | Range Switch | 42-1445 |
| 48 | Pilot Lamp | 34-2210 |
| | Bezel Assembly | 40-6365 |
| | Bezel Gasket | 27-9175 |
| | Bezel Screw | W-1834 |
| | Cable (speaker) | 41-3443 |
| | Cable (power) | L-2778 |
| | Dial Scale | 27-5403 |
| | Dial Spring | 28-8908 |
| | Dial Pointer | 28-5941 |
| | Dial Drive Cord Assembly | 31-2269 |
| | Dial Drive Spring | 28-8913 |
| | Dial Tuning Shaft Assembly | 31-2260 |
| | Dial Tuning Drum | 31-2281 |
| | Knob | 27-4332 |
| | Socket (5 Prong) | 27-6035 |
| | Socket (6 Prong) | 27-6036 |
| | Socket (7 Prong) | 27-6099 |
| | Pilot Lamp Socket Assembly | 38-9607 |
| | Pushbutton | 27-4759 |
| | Speaker (T Cabinet) | 36-1439 |
| | Speaker (XF Cabinet) | 36-1437 |

* Replace Speaker.

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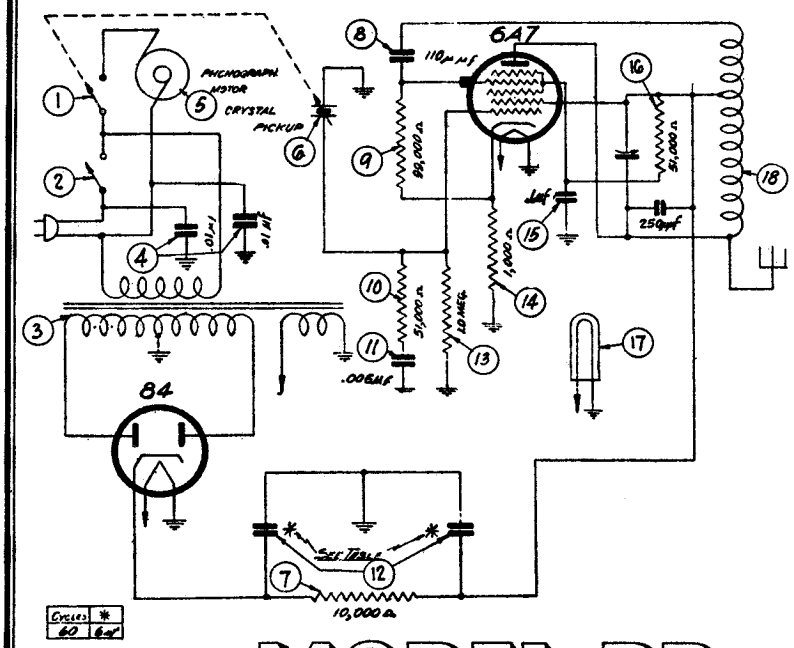
MODEL RP-1,Code 122
Wireless Record Player PHILCO RADIO & TELEV. CORP.
Schematic,Instructions



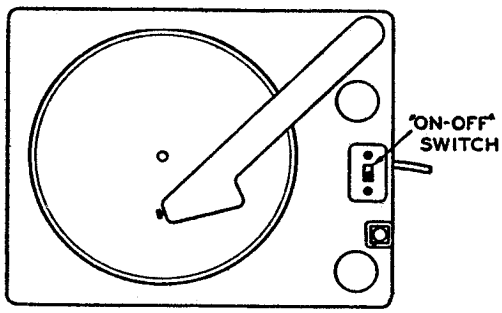




DIAGRAM A

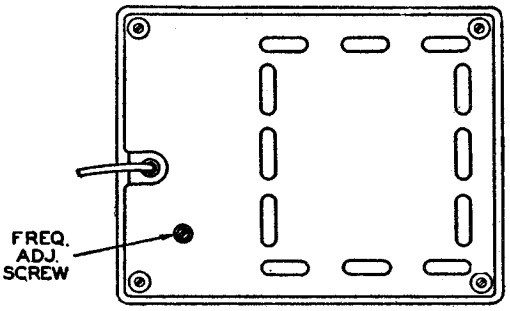



DIAGRAM B

# MODEL RP-1

**CODE - 122**

## WIRELESS RECORD PLAYER

The Model RP-1 is a remote type record player which can be used in conjunction with any standard broadcast receiver to reproduce phonograph records.

To place unit in operation:

First. Remove all packing material, being sure to save the small envelope attached to the tone arm. This envelope contains needles, needle screw, and rubber bumper.

Second. Lift off record turn-table and remove motor support tape by carefully pulling out tack and cutting the tape. Replace turn-table.

Third. Disengage tone arm (pickup") by rolling rubber locking ring down along arm rest and pushing sideways on tone arm. **Do not lift arm vertically when locked.**

Fourth. Place rubber bumper (contained in small envelope attached to tone arm) between the jaws of the arm rest, large end up. This forms a suitable rest for tone arm when not in use.

Fifth. Insert needle as far as possible into the tone arm head, and tighten securely with the needle screw, which should be inserted in the head of the tone arm. **A Philco needle (like furnished) is recommended for best results.**

Sixth. Check to make sure your electric supply agrees with that specified on the name label located on under side of cabinet and insert line cord plug into a convenient power outlet.

If in doubt as to the electric supply, check with your local power company.

The unit is now ready for operation. Place record on turn-table and slide "Off-On Switch" (Diagram "A") to "On" position; this will be indicated by pilot light in tone arm.

After allowing sufficient time for tubes to warm up, place tone arm on record; this automatically starts motor.

Next go to your radio and tune to approximately 540 KC (54 on most dials), at which setting the phonograph signal will be picked up. Volume can be regulated by the radio receiver's volume control in the normal way.

At the end of the record, return the tone arm to rest position, which will automatically turn motor off. It is not necessary to slide "Off-On Switch" to the "Off" position between records.

If interference from broadcast stations is encountered the frequency of the unit can be changed to any other frequency between 530 KC and 580 KC by adjusting the small screw indicated in Diagram "B." Turning screw clockwise lowers the frequency, counter-clockwise raises the frequency. **This adjustment is best made while the unit is in operation.**

If hum is experienced it may be necessary to reverse the power plug of the record player, the radio, or both. In some cases it may be advisable to use the same receptacle for record player and radio.

No definite rule can be established for the relative location of the record player to your radio; individual trial will establish best location. However, in general, satisfactory operation may be obtained up to a distance of fifty (50) feet, provided local noise conditions are not too severe.

**IMPORTANT . . . Do not attempt to force tone arm past stops.**

### MODEL RP-1-122 WIRELESS RECORD PLAYER

| Schem. No. | Description | Philco Part No. |
|---|---|---|
| 1 | Motor Switch and Plate Assembly | 42-1486 |
| 2 | Master Switch | 42-1406-2 |
| 3 | Power Transformer | 32-8043 |
| 4 | Line Condenser (.01-.01 mf., 600 v.) | 3903-DC |
| 5 | Motor | 35-2021 |
| 6 | Crystal Pickup | 35-2022 |
| 7 | Filter Resistor (10,000 ohms, ½ watt) | 33-310344 |
| 8 | Oscillator Grid Condenser (110 mmf) | 30-1031 |
| 9 | Oscillator Grid Resistor (99,000 ohms, ½ watt) | 33-3993-4 |
| 10 | Comp. Resistor (51,000 ohms, ½ watt) | 33-351344 |
| 11 | Comp. Condenser (.006 mf., 200 v.) | 30-4467 |
| 12 | Electrolytic Condenser (6 mf.-6 mf., 150 v.) | 30-2388 |
| 13 | Grid Resistor (1 meg., ½ watt) | 33-510344 |
| 14 | Cathode Bias Resistor (1000 ohms, ½ watt) | 33-210344 |
| 15 | Screen By-Pass (.1 mf., 200 v.) | 30-4499-S |
| 16 | Screen Resistor (51,000 ohms, ½ watt) | 33-351344 |
| 17 | Pilot Light (6-8 v., 250 amp.) | 34-2064 |
| 18 | Oscillator Coil and Padder Assembly | 32-3218 |

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PHILCO RADIO & TELEVISION CORP.

MODELS 39-30,39-35
Code 121
Schematic

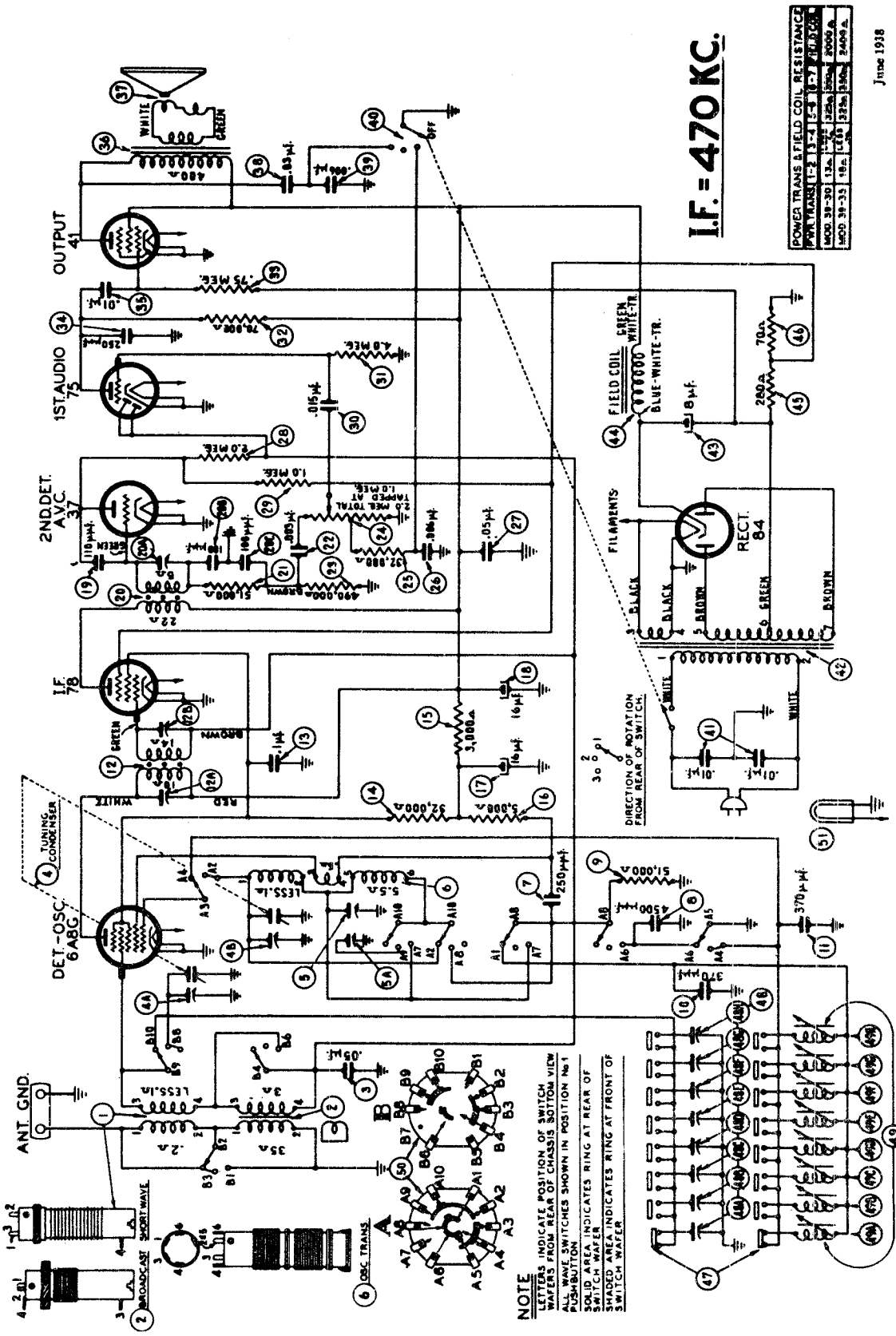


Fig. 2. Schematic Diagram—Models 39-30; 39-35, Code 121

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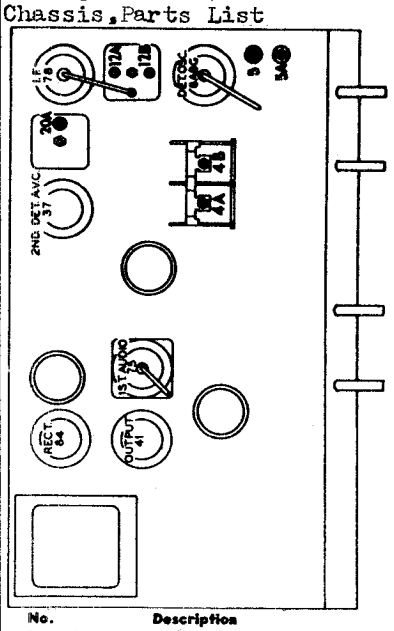
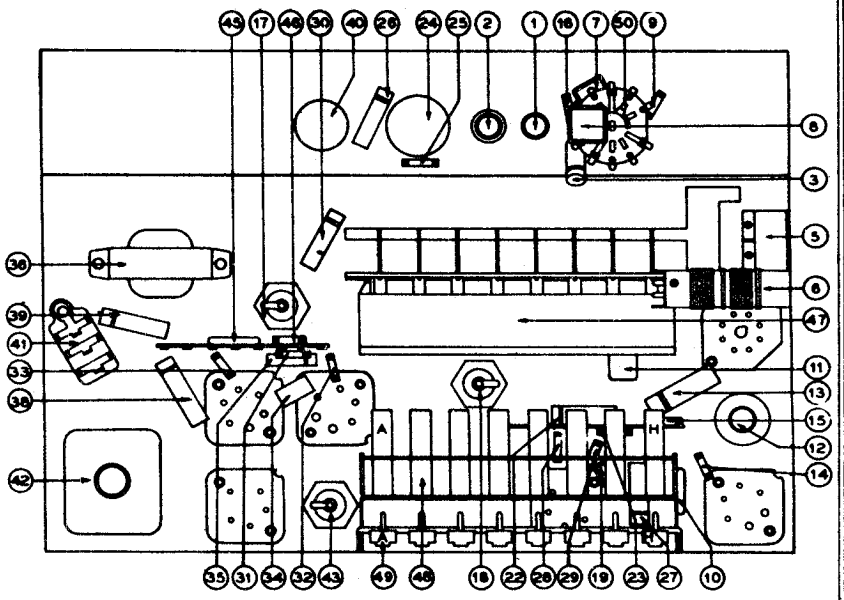
MODELS 39-30, 39-35, CODE 121
Voltage, Socket, Trimmers PHILCO RADIO & TELEVISION CORP.
Chassis, Parts List





MODELS 39-35, 39-30, CODE 121.
Fig. 4. Locations of Compensators—Top of Chassis

| No. | Description | Part No. |
|---|---|---|
| 1 | Antenna Transformer (short wave) | 32-3027 |
| 2 | Antenna Transformer (broadcast) | 32-3026 |
| 3 | Condenser (.05 mf., tubular) | 30-4519 |
| 4 | Tuning Condenser Assembly | 31-2267 |
| 5 | Dual Padder Unit | 31-6255 |
| 6 | Oscillator Transformer | 32-3028 |
| 7 | Condenser (250 mmf., mica) | 30-1032 |
| 8 | Condenser (4500 mmf., mica) | 30-1109 |
| 9 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 10 | Condenser (370 mmf., silver plated mica) | 30-1110 |
| 11 | Condenser (370 mmf., silver plated mica) | 30-1110 |
| 12 | 1st I. F. Transformer Assembly | 32-3018 |
| 13 | Condenser (.1 mf., tubular) | 30-4455 |
| 14 | Resistor (32,000 ohms, ½ watt) | 33-332339 |
| 15 | Resistor (3000 ohms, ½ watt) | 33-230339 |
| 16 | Resistor (5000 ohms, ½ watt) | 33-250339 |
| 17 | Electrolytic Condenser (16 mf., 250 V.) | 30-2331 |
| 18 | Electrolytic Condenser (16 mf., 250 V.) | 30-2331 |
| 19 | Condenser (110 mmf., mica) | 30-1031 |
| 20 | 2nd I. F. Transformer Assembly | 32-3030 |
| 21 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 22 | Condenser (.003 mf., tubular) | 30-4469 |
| 23 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 24 | Volume Control (2.0 megs) | 33-5275 |
| 25 | Resistor (32,000 ohms, ½ watt) | 33-332339 |
| 26 | Condenser (.006 mf., tubular) | 30-4467 |
| 27 | Condenser (.05 mf., tubular) | 30-4518 |
| 28 | Resistor (2.0 meg., ½ watt) | 33-520339 |
| 29 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 30 | Condenser (.015 mf., tubular) | 30-4515 |
| 31 | Resistor (4.0 megs., ½ watt) | 33-540339 |
| 32 | Resistor (70,000 ohms, ½ watt) | 33-370339 |
| 33 | Resistor (750,000 ohms, ½ watt) | 33-475339 |
| 34 | Condenser (250 mf., mica) | 30-1032 |
| 35 | Condenser (.01 mf., tubular) | 30-4572 |
| 36 | Output Transformer | 32-7978 |
| 37 | †Cone and Voice Coil Assembly | |
| | for 39-30 T, speaker pt. No. 36-1439-3 | 36-4091 |
| | for 39-30 T, speaker pt. No. 36-1439-2 | 36-4087 |
| | for 39-35 XX, speaker pt. No. 36-1438-2 | 36-4089 |
| 38 | Condenser (.03 mf., tubular) | 30-4449 |
| 39 | Condenser (.006 mf., tubular) | 30-4445 |
| 40 | Tone Control and On-Off Switch | 42-1444 |
| 41 | Condenser (.01 mf. - .01 mf., bakelite) | 3903 DG |
| 42 | Power Transformer: 115 V., 60 cycle: | |
| | for 39-30 | 32-7976 |
| | for 39-35 | 32-7977 |
| 43 | Electrolytic Condenser (8 mf., 400 V.) | 30-2330 |
| 44 | *Field Coil for Speaker, part No. 36-1439 | |
| | *Field Coil for Speaker, part No. 36-1438 | |
| 45 | Resistor (280 ohms, wire wound) | 33-128431 |
| 46 | Resistor (70 ohms, ½ watt) | 33-070339 |
| 47 | Push-Button Switch | 42-1446 |
| 48 | Padder Strip Assembly | 31-6256 |
| 48A | Compensator, No. 1, 540 — 1030 KC. | 31-6274 |
| 48B | Compensator, No. 2, 540 — 1030 KC. | 31-6274 |
| 48C | Compensator, No. 3, 670 — 1160 KC. | 31-6276 |
| 48D | Compensator, No. 4, 670 — 1160 KC. | 31-6276 |
| 48E | Compensator, No. 5, 900 — 1470 KC. | 31-6278 |
| 48F | Compensator, No. 6, 900 — 1470 KC. | 31-6278 |
| 48G | Compensator, No. 7, 1170 — 1600 KC. | 31-6280 |
| 48H | Compensator, No. 8, 1170 — 1600 KC. | 31-6280 |
| 49 | Electric Push-Button Coil Assembly | 32-3031 |
| 49A | Osc. Coil, No. 1, 540 — 1030 KC. | 32-3042 |
| 49B | Osc. Coil, No. 2, 540 — 1030 KC. | 32-3042 |
| 49C | Osc. Coil, No. 3, 670 — 1160 KC. | 32-3042 |
| 49D | Osc. Coil, No. 4, 670 — 1160 KC. | 32-3042 |
| 49E | Osc. Coil, No. 5, 900 — 1470 KC. | 32-3041 |
| 49F | Osc. Coil, No. 6, 900 — 1470 KC. | 32-3041 |
| 49G | Osc. Coil, No. 7, 1170 — 1600 KC. | 32-3041 |
| 49H | Osc. Coil, No. 8, 1170 — 1600 KC. | 32-3041 |
| 50 | Wave Switch | 42-1445 |
| 51 | Pilot Lamp | 34-2210 |
| | Pilot Lamp Socket Assembly | 38-9607 |
| | Push-Button | 27-4759 |
| | Speaker (T Cabinet 39-30) optional | 36-1439-3, 36-1439-2 |
| | Speaker (XX Cabinet 39-35) | 36-1438 |
| | Socket (5 Prong) | 27-6035 |
| | Socket (6 Prong) | 27-6036 |
| | Socket (7 Prong) | 27-6099 |
| | Tab Kit | 40-6392 |

Fig. 3. Parts Locations—Underside of Chassis

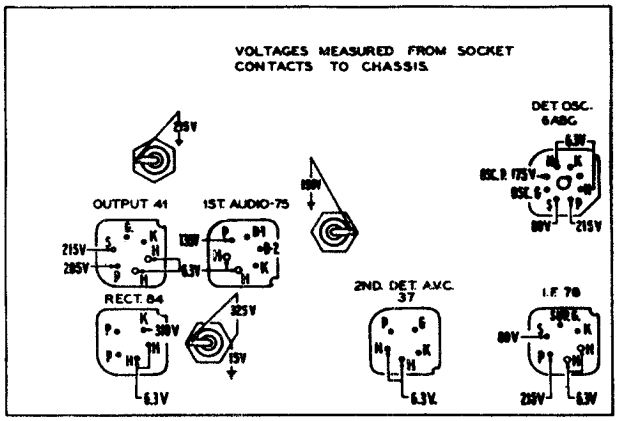



Fig. 1. Socket Voltages—Underside of Chassis

The voltages indicated by arrows were measured with a Philco 027 Circuit Tester which contains an accurate voltmeter. Volume control at minimum, range switch in broadcast position, line voltage 115 A. C.

**TYPE OF CIRCUIT:** A. C. operated; superheterodyne circuit with two tuning ranges, covering standard broadcast (540 K. C. to 1720 K. C.) and short-wave (4.9 M. C. to 18.0 M. C.) frequencies; Automatic Volume Control; and pentode output.

The receiver is designed to operate from a "Philco Safety Aerial," Part No. 40-6371. This aerial system should be used to obtain maximum performance from the receiver.

**POWER SUPPLY:** Voltage, 115 volts. Frequency, 50-60 cycles. Power consumption 45 watts.

**INTERMEDIATE FREQUENCY:** 470 K. C.

**TUNING RANGES:** 540 K. C. to 1720 K. C.; 4.9 M. C. to 18.0 M. C.

**PHILCO TUBES USED:** 1-6A8G, 1st detector and oscillator; 1-78, I. F.; 1-37, 2nd detector, Automatic Volume Control; 1-75, first audio; 1-41, output; and 1-84, Rectifier.

**TUNING MECHANISM:** Pulley and cable drive for Manual tuning. Electric Push-Button for Automatic tuning.

**CABINETS:** Types: "T" for 39-30 and "XX" for 39-35.

* Replace Speaker
† Model T Cabinet uses two optional speakers. The part numbers of the speakers are the same with the exception of a dash number (-2 or -3) following the part number. When ordering a Cone and Voice Coil Assembly, the part number as indicated must be specified.

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MODEL S-1622 PHILCO RADIO & TELEVISION CORP. MODELS 39-30,39-35
Alignment,Socket,Trimmers Code 121
Alignment

## ALIGNMENT
## MODELS 39-30,39-35(CODE 121);S1622.

***Equipment*** — Fully charged heavy duty storage battery or 6-volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

***General*** — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

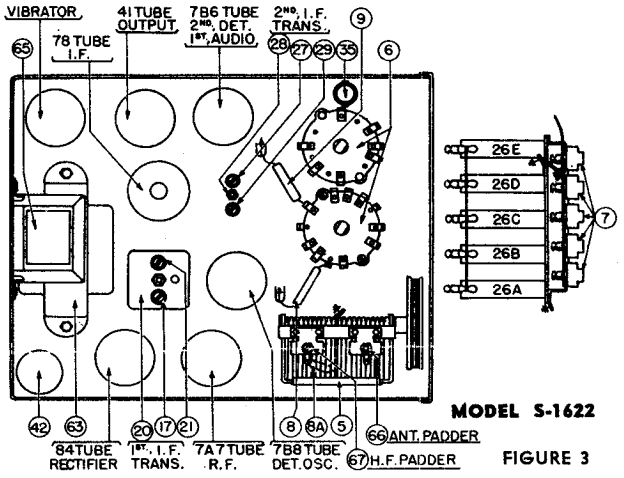

FIGURE 3

## MODELS 39-30, 39-35, CODE 121.

| Operations | Signal Generator | | | Receiver | | | Special Instructions |
|---|---|---|---|---|---|---|---|
| | Output Connections To Receiver | Dummy Antenna (Note A) | Dial Setting | Dial Setting | Control Settings | Adjust Compensators In Order | |
| 1 | 6A8G Grid | .1 mf. | 470 K. C. | 580 K. C. | Vol. Cont. Max. | (20A) (12B) (12A) | |
| 2 | Ant. Ter. | 100 mmf. | 18.0 M. C. | 18.0 M. C. | Vol. Cont. Max. | (4B) | See Note B |
| 3 | Ant. Ter. | 100 mmf. | 1550 K. C. | 1550 K. C. | Vol. Cont. Max. | (5) (4A) | |
| 4 | Ant. Ter. | 100 mmf. | 580 K. C. | 580 K. C. | Vol. Cont. Max. | (5A) | |
| 5 | Ant. Ter. | 100 mmf. | 1550 K. C. | 1550 K. C. | Vol. Cont. Max. | (5) | |

**NOTE A**—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure

**NOTE B—DIAL CALIBRATION:** In order to adjust the receiver correctly the dial pointer must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: With the tuning condenser closed, set the dial pointer on the extreme left index line at the low frequency end of the scale.

MODEL S-1622

| OPERATION | SIGNAL GENERATOR | | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| | FREQUENCY | CONNECTION | | | |
| 1 | Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning. | | | | |
| 2 | 470 K.C. | To Antenna Receptacle on Radio | 35 Mmfd. See Note 1 | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | (29) (27) (21) (17) |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | 35 Mmfd. See Note 1 | Note 2 | (67) |
| 4 | 1500 K.C. | To Antenna Receptacle on Radio | 35 Mmfd. See Note 1 | Set Tuning Condenser at 1500 K.C. | (66) Note 3 |

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 35 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

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MODELS 39-30,39-35
MODELS 40-150,40-155
MODEL 40-160
MODELS 40-180,40-185,40-190
MODELS 40-195,40-200

# PHILCO RADIO & TELEV. CORP.

MODEL 108
Tuner Data
MODELS 40-120,40-125
Alignment,Trimmers

**EQUIPMENT REQUIRED:** MODELS 40-120,40-125.

(1) Signal Generator; Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose.

(2) Output Meter; Philco Models 027 or 028 Vacuum Tube Voltmeters and Circuit Testers incorporate a sensitive output meter and are recommended.

(3) Philco Fiber Handle Screw Driver, Part No. 45-2610. Aligning adapter Part No. 45-2767.

**OUTPUT METER:** The Philco 027 or 028 Output Meter is connected to the plate and screen terminals of the type 35A5 tube and adjusted for the 0 to 30 V. A. C. scales.

**VACUUM TUBE VOLTMETER:** To use the vacuum tube voltmeter as an alignment indicator make the following connections:

Remove the 7C6 tube from its socket and insert the aligning adapter, Part No. 45-2767, then replace the tube in the adapter. Connect the negative terminal of the vacuum tube voltmeter to the wire which protrudes from the side of the adapter. Attach the positive terminal of the voltmeter to the chassis. The positive terminal is connected to the chassis.

After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on Fig. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

| Operations in Order | SIGNAL GENERATOR | | | RECEIVER | | | SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna Note A | Dial Setting | Dial Setting | Control Settings | Adjust Compensators in Order | |
| 1 | 7C7 See Note C | .1 mf. | 455 K. C. | 580 K. C. | Vol. Cont. Max. | 14A, 14B, 15A | Push "IN" Manual Button Model 40-125 |
| 2 | Ant. Ter. | 10 mmf. | 1600 K. C. | 1600 K. C. | Vol. Cont. Max. | 2B | See Note B See Note C |
| 3 | Ant. Ter. | 10 mmf. | 1400 K. C. | 1400 K. C. | Vol. Cont. Max. | 2A | |

NOTE A — The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (High side). Use the capacity or resistance as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To do this, proceed as follows: Turn the tuning condenser to the maximum capacity position (plates fully meshed). With the condenser in this position, the tuning pointer is set horizontal at the low frequency end of the scale (540 K. C.).

NOTE C — Compensators 2A and 2B are at the top of the tuning condenser. Compensator 2A is on the front section and compensator 2B on the rear section. When padding the I. F. the signal generator can be attached to the 7C7 grid on the front section of the tuning condenser.

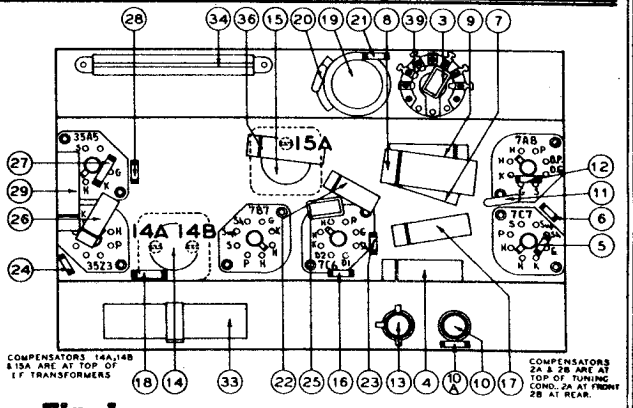


***Fig. 1***

## Adjusting Push Button Tuning - MODELS 39-30,39-35,108 (CODE 121); 40-150,40-155; 40-160; 40-195,40-200;40-180,40-185,40-190.(FOR BUTTON ADJUSTMENT FREQUENCIES FOR MODELS 39-30,39-35, & 108 (CODE 121); SEE PARTS LISTS OF THESE MODELS).

In order to adjust the electric push buttons accurately for reception of broadcast stations, a vacuum tube voltmeter such as Philco Model 027 and 028 should be used. In addition, an insulated padding screw driver part No. 45-2610 and Loktal aligning adapter part No. 45-2767 are required. With this equipment at hand proceed as follows:

Insert the station call letters into the windows above the buttons. The station with the lowest frequency is placed in the first button on the left and the highest frequency is placed in the button on the extreme right. Each push button is adjusted by two set screws located on the rear of the push button unit. Each set of screws is numbered and covers a frequency range as follows:

### MODEL 40-160

| Push Button | Frequency Range |
|---|---|
| 1 | 540-1000 K.C. |
| 2 | 650-1100 K.C. |
| 3 | 740-1300 K.C. |
| 4 | 900-1500 K.C. |
| 5 | 1100-1600 K.C. |

### MODELS 40-195, 40-200

| Push-Button | Frequency Range |
|---|---|
| 1, 2, 3 | 540-1030 K. C. |
| 4, 5 | 670-1160 K. C. |
| 6, 7, 8 | 900-1600 K. C. |

### MODELS 40-150,40-155,40-180,40-185,40-190.

| Push-Button | Frequency Range |
|---|---|
| 1, 2, 3 | 540-1060 K. C. |
| 4, 5 | 650-1110 K. C. |
| 6, 7 | 920-1600 K. C. |

Looking at the front of the cabinet, the first button on the left is adjusted by set screw No. 1. The next push button by set screw No. 2 and the remaining push buttons in order.

1. Remove the 7C6 A. F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the chassis.

2. Turn the receiver on and set the tuning range disc to "Broadcast" (Manual Tuning).

3. Set up the Model 077 Station Setter about 3 feet from the receiver and connect a loop constructed out of about 6 feet of wire to the high and ground output jacks of the signal generator. Turn the output controls to maximum and set the modulation control to "MOD. ON". Manually tune in the first station to be set up on push button No. 1. After doing this set the indicator of the 077 Signal Generator to the frequency of the station being received. As the indicator approaches the frequency of the station a whistle will be heard; leave the indicator at this point. Turn the receiver tuning range disc to "Push Button" and press in No. 1 button. Using the insulated screw driver turn the No. 1 "Osc." screw until the broadcast station identified by the signal generator is heard; at this point, turn the indicator of the signal generator away from the frequency of the station. Readjust No. 1 "Osc." and "Ant." screws for maximum deflection of the vacuum tube voltmeter pointer. Station No. 1 is now adjusted properly. After setting up the first station the same procedure as outlined above is used for the remaining stations.

When this model is to be set up to receive the sound of a television program tuned in by the special type Philco television sets or when it is to be used in conjunction with a Philco Record Player, push-button No. 1 should be used. To tune in these programs, the same procedure as given for ordinary broadcast stations as outlined above is used.

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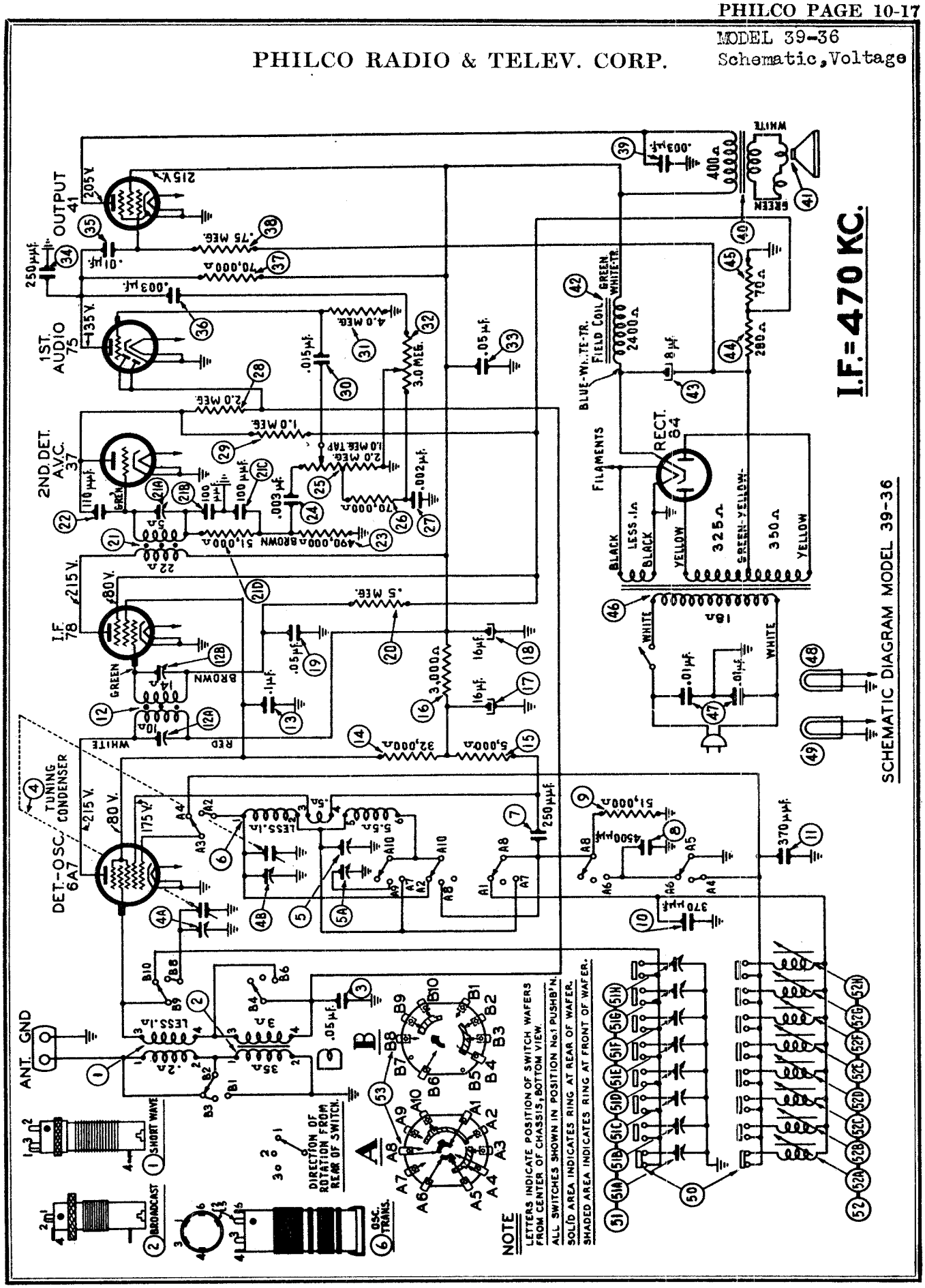
PHILCO RADIO & TELEV. CORP.

MODEL 39-36
Schematic, Voltage

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MODEL 39-36
Alignment, Socket Trimmers, Chassis Tuner Chassis, Parts

PHILCO RADIO & TELEV. CORP.

## SPECIFICATIONS

**TYPE CIRCUIT:** Philco Model 39-36, code 121 is a six tube, A.C. operated superheterodyne circuit with two tuning ranges covering standard broadcast (540-1720 K.C.) and shortwave (5 M.C. to 18.0 M.C.) frequencies. In addition, the receiver employs Electric Automatic Push-Button Tuning for automatically selecting any of eight standard broadcast stations, continuously variable tone control, automatic volume control, and pentode audio output.

**POWER SUPPLY:** 115 V., 60 cycle A.C. 42 watts. For operation on 115V., 25 to 40 cycles, A.C. current or 220 V. 50 to 60 cycles A.C. current, different power transformers are required, and can be obtained from your distributor.

**INTERMEDIATE FREQUENCY:** 470 K.C.

**PHILCO TUBES USED:** 6A7, First Detector Oscillator, 78, I.F. Amplifier; 37, Second Detector-A.V.C.; 75, First Audio; 41, Audio Output and 84, Rectifier.

**CONTROLS:** The new Philco Disc Controls are used on this model for adjusting tuning, volume, tone and frequency range.

**CABINETS:** Type XX.

## Alignment of Compensators

**EQUIPMENT REQUIRED:**

(1) Signal Generator; Philco Model 077.
(2) Output Meter, Philco 027 Circuit Tester.
(3) Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3164.

**OUTPUT METER:** The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 41 tube. After connecting the Output Meter, adjust compensators in the order as given in tabulations below. Locations of the compensators are shown in Fig. 1.

| Operations | SIGNAL GENERATOR | | | RECEIVER | | | Special Instructions |
|---|---|---|---|---|---|---|---|
| | Output Connections To Receiver | Dummy Antenna (Note A) | Dial Setting | Dial Setting | Control Settings | Adjust Compensators in Order | |
| 1 | 6A7 Grid. | .1 mf. | 470 K.C. | 580 K.C. | Vol Cont. Max. Range Switch (Brdcst.) | (21A) (12B) (12A) | |
| 2 | Ant. Ter. | 100mmf. | 18.0 M.C. | 18.0 M.C. | Vol. Cont., Max. Range Switch (S.W.) | (4B) | See Note B, C |
| 3 | Ant. Ter. | 100mmf. | 1550 K.C. | 1550 K.C. | Vol. Cont. Max. Range Switch (Brdcst.) | (5) (4A) | |
| 4 | Ant. Ter. | 100mmf. | 580 K.C. | 580 K.C. | Vol. Cont Max. Range Switch (Brdcst.) | (5A) | |
| 5 | Ant. Ter. | 100mmf. | 1550 K.C. | 1550 K.C. | Vol. Cont. Max. | (5) | |

**NOTE A**—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B**—Dial Calibration: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown in Service Bulletin No. 305.

**NOTE C**—Compensators (4A) and (4B) are located on top of the tuning condenser. Compensator (4B) is the first one from the tuning drum side.

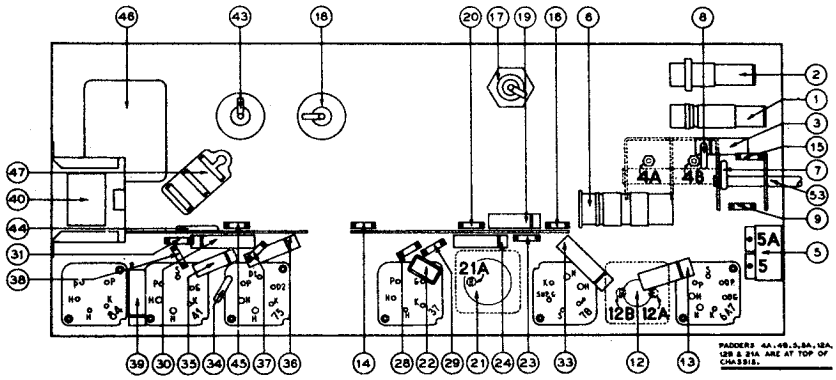


Fig. 1.—Part Locations—Underside of Chassis

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## Replacement Parts

| Schem. No. | Description | Part No. |
|---|---|---|
| 1 | Ant. Trans. (S.W.) | 32-3027 |
| 2 | Ant. Trans. (B.C.) | 32-3026 |
| 3 | Tubular Cond. (.05 mf.) | 30-4519 |
| 4 | Tuning Cond. Assy. | 31-2346 |
| 5 | Dual Padder Unit | 31-6255 |
| 6 | Oscillator Trans. | 32-3028 |
| 7 | Mica Cond. (250 mmf.) | 30-1032 |
| 8 | Mica Cond. (4500 mmf.) | 30-1109 |
| 9 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 10 | Condenser (Silver Mica)—370 mmf. | 30-1110 |
| 11 | Condenser (Silver Mica)—370 mmf. | 30-1110 |
| 12 | 1st I.F. Trans. Assy. | 32-3018 |
| 13 | Tubular Cond. (.1 mf.) | 30-4455 |
| 14 | Resistor (32,000 ohms) ½ watt | 33-332339 |
| 15 | Resistor (5,000 ohms) ½ watt | 33-250339 |
| 16 | Resistor (3,000 ohms) ½ watt | 33-230339 |
| 17 | Electro. Cond. (16 mf.)—250 Volts | 30-2331 |
| 18 | Electro. Cond. (16 mf.)—250 Volts | 30-2370 |
| 19 | Tubular Cond. (.05 mf.) | 30-4519 |
| 20 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 21 | 2nd I.F. Trans. Assy. | 32-3129 |
| 21A | Compensator Part of 21 | |
| 21B | Condenser Part of 21A | |
| 21C | Condenser Part of 21A | |
| 21D | Resistor (51,000 ohms—½ watt) | 33-351339 |
| 22 | Mica Cond. (110 mmf.) | 30-1031 |
| 23 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 24 | Tubular Cond. (.003 mf.) | 30-4580 |
| 25 | Volume Control (2 meg.) | 33-5286 |
| 26 | Resistor (70,000 ohms) | 33-370339 |
| 27 | Tubular Cond. (.002 mf.) | 30-4597 |
| 28 | Resistor (2.0 meg., ½ watt) | 33-520339 |
| 29 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 30 | Tubular Cond. (.015 mf.) | 30-4515 |
| 31 | Resistor (4.0 meg., ½ watt) | 33-540339 |
| 32 | Tone Control (9.0 meg.) | 33-5287 |
| 33 | Tubular Cond. (.05 mf.) | 30-4518 |
| 34 | Mica Cond. (250 mmf.) | 30-1032 |
| 35 | Tubular Cond. (.01 mf.) | 30-4573 |
| 36 | Tubular Cond. (.003 mf.) | 30-4582 |
| 37 | Resistor (70,000 ohms, ½ watt) | 33-370339 |
| 38 | Resistor (.75 meg. ½ watt) | 33-475339 |
| 39 | Tubular Cond. (.003 mf.) | 30-4469 |
| 40 | Output Trans. for Speaker Part No. 36-1438 | 32-7978 |
| 41 | Cone and Voice Coil Assy. for Speaker Part No. 36-1438-2 | 36-4089 |
| 42 | Field Coil, Replace Speaker Part No. 36-1438-2 | |
| 43 | Electro. Cond. (8 mf.—400 V.) | 30-2371 |
| 44 | Resistor (280 ohms) | 33-128431 |
| 45 | Resistor (70 ohms, ½ watt) | 33-070339 |
| 46 | Power Trans. 115V. (50 to 60 cycles) | 32-7977 |
| 46A | Power Trans. 115 V. (25 to 40 cycles) | |
| 47 | Bakelite Cond. (.01 mf.—.01 mf.) | S903DG |
| 48 | Pilot Lamp (Dial) | 34-2064 |
| 49 | Pilot Lamp (Dial) | 34-2064 |
| 50 | Push Button Switch | 42-1462 |
| 51 | Compensator Assy. | 31-6256 |
| 51A | Compensator No 1 (540-1030 K.C.) | |
| 51B | Compensator No. 2 (540-1030 K.C.) | |
| 51C | Compensator No. 3— 670-1160 K.C. | |
| 51D | Compensator No. 4— 670-1160 K.C. | |
| 51E | Compensator No. 5— 900-1470 K.C. | |
| 51F | Compensator No. 6— 900-1470 K.C. | |
| 51G | Compensator No 7—1170-1600 K.C. | |
| 51H | Compensator No 8—1170-1600 K.C. | |
| 52 | Electric Push-Button Coil Assy. | 32-3031 |
| 52A | Osc. Coil No 1— 540-1030 K.C. | 32-3042 |
| 52B | Osc. Coil No. 2— 540-1030 K.C. | 32-3042 |
| 52C | Osc. Coil No. 3— 670-1160 K.C. | 32-3042 |
| 52D | Osc. Coil No 4— 670-1160 K.C. | 32-3042 |
| 52E | Osc. Coil No. 5— 900-1470 K.C. | 32-3041 |
| 52F | Osc. Coil No. 6— 900-1470 K.C. | 32-3041 |
| 52G | Osc. Coil No. 7—1170-1600 K.C. | 32-3041 |
| 52H | Osc. Coil No. 8—1170-1600 K.C. | 32-3041 |
| 53 | Wave Switch | 42-1478 |

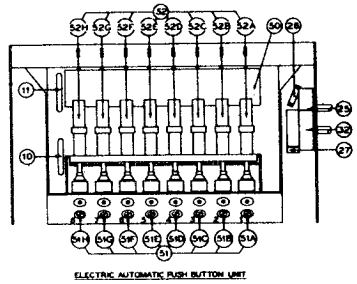


Fig. 2.—Part Locations—Push Button Unit

FOR PUSH-BUTTON ADJUSTMENTS SEE INDEX

## Miscellaneous Parts

| Description | Part No. |
|---|---|
| Bezel | 56-1104 |
| Bracket and Bearing (Tuning Drum) | 38-9662 |
| Cable (Power) | L-2778 |
| Coupling (Tuning Condenser) | 31-2291 |
| Dial | 27-5452 |
| Dial Pointer | 56-1033 |
| Dial Drive Cord (Tuning) | 31-2315 |
| Dial Drive Cord (Pointer) | 31-2316 |
| Disc Control (Tuning) | 27-4766 |
| Disc Control Range Switch | 27-4767 |
| Disc Control (Tone) | 27-4764 |
| Disc Control (Volume) | 27-4765 |
| Drum (Tuning Condenser) | 38-9716 |
| Push-Buttons | 27-4759 |
| Socket (5 prong) | 27-4035 |
| Socket (6 prong) | 27-4036 |
| Socket (7 prong) | 27-4099 |
| Spring (Dial Drive Cord) | 28-8913 |
| Speaker | 36-1438-2 |

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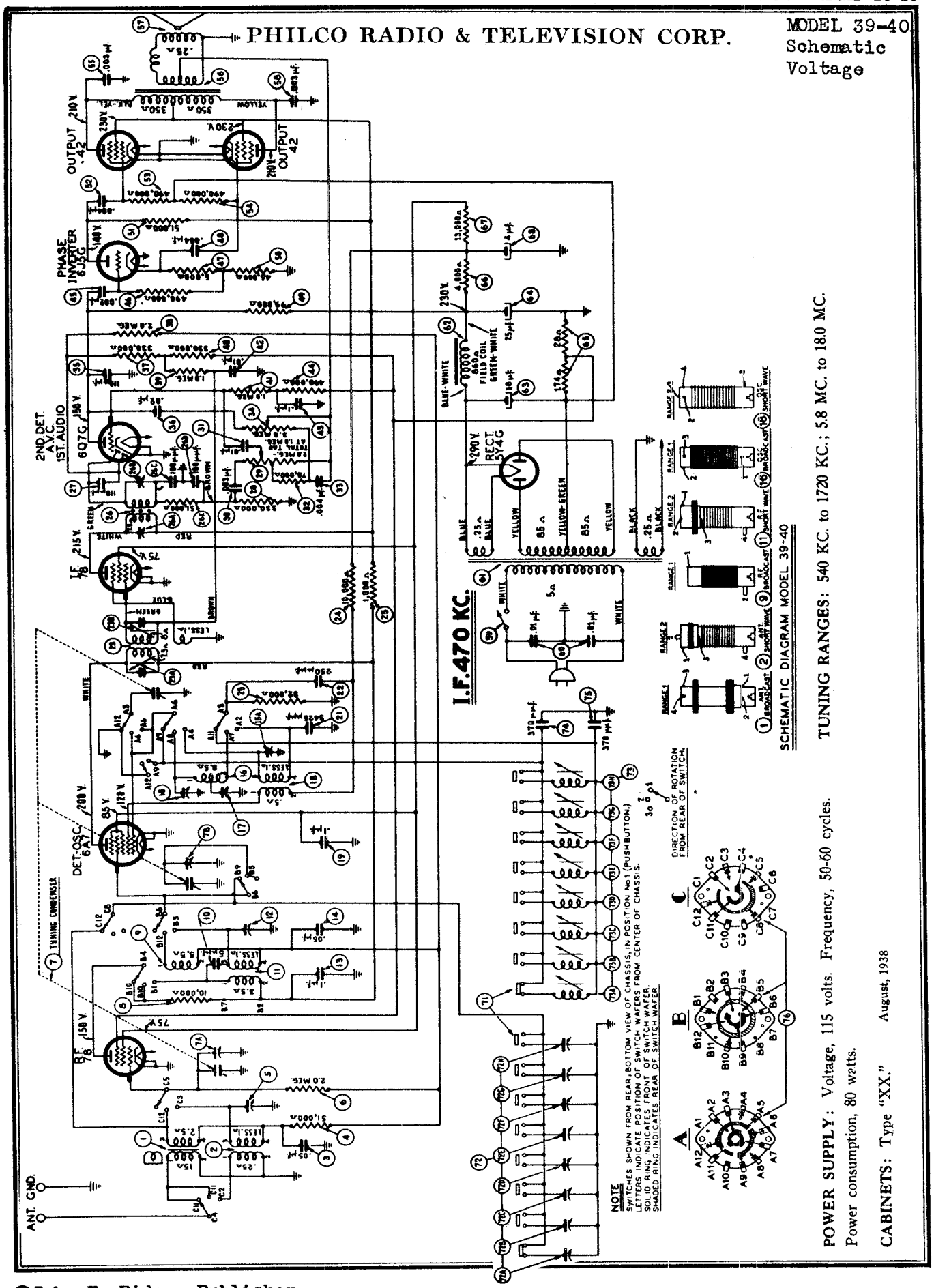


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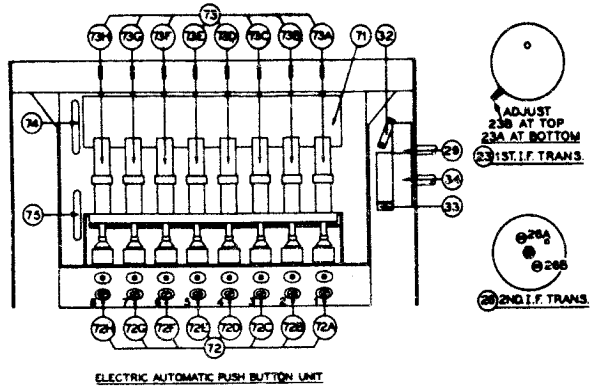
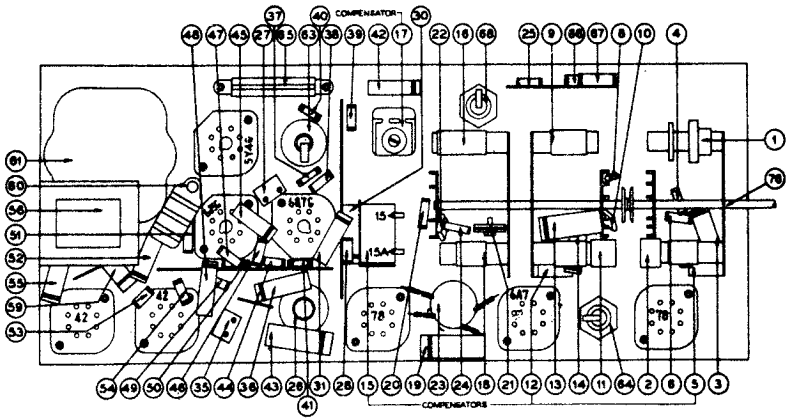
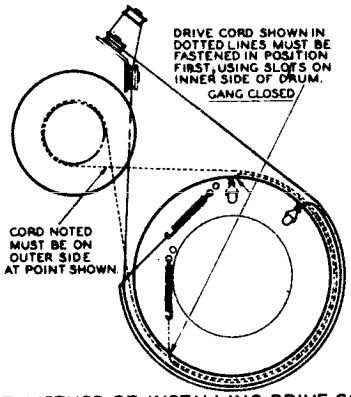
# Replacement Parts
## Model 39-40, Code 121




ELECTRIC AUTOMATIC PUSH BUTTON UNIT



PART LOCATIONS UNDERSIDE OF CHASSIS MODEL 39-40


DRIVE CORD SHOWN IN DOTTED LINES MUST BE FASTENED IN POSITION FIRST, USING SLOTS ON INNER SIDE OF DRUM.
GANG CLOSED
CORD NOTED MUST BE ON OUTER SIDE AT POINT SHOWN

CORRECT METHOD OF INSTALLING DRIVE CORDS ON TUNING CONDENSER DRUM

Copyright 1938,
Philco Radio & Television Corp.
Phila., Pa.

| Schem. No. | Description | Part No. |
|---|---|---|
| 1 | Antenna Transformer (Range 1, Brdcst.) | 32-3056 |
| 2 | Antenna Transformer (Range 2) | 32-3055 |
| 3 | Condenser (.05 mf tubular) | 30-4519 |
| 4 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 5 | Compensator (Range 2, S. W.) | 31-6212 |
| 6 | Resistor (2.0 megohms, ½ watt) | 33-520339 |
| 7 | Tuning Condenser | 31-2296 |
| 8 | Resistor (10,000 ohms, ½ watt) | 33-310339 |
| 9 | R. F. Transformer (Range 1, Brdcst.) | 32-2379 |
| 10 | Condenser (5 mmf mica) | 30-1083 |
| 11 | R. F. Transformer (Range 2, S. W.) | 32-3046 |
| 12 | Compensator (Range 2, S. W.) | 31-6212 |
| 13 | Condenser (.1 mf tubular) | 30-4455 |
| 14 | Condenser (.05 mf tubular) | 30-4519 |
| 15 | Compensator (two sections) | 31-6093 |
| 16 | Oscillator Transformer (Range 1, Brdcst.) | 32-2120 |
| 17 | Compensator | 31-6230 |
| 18 | Oscillator Transformer (Range 2, S. W.) | 32-3051 |
| 19 | Condenser (.1 mf tubular) | 30-4455 |
| 20 | Resistor (32,000 ohms, ½ watt) | 33-332339 |
| 21 | Condenser (3425 mmf mica) | 31-6263 |
| 22 | Condenser (250 mmf mica) | 30-1032 |
| 23 | 1st I. F. Transformer Assembly | 32-3079 |
| 24 | Resistor (10,000 ohms, ½ watt) | 33-310339 |
| 25 | Resistor (1000 ohms, ½ watt) | 33-210339 |
| 26 | 2nd I. F. Transformer | 32-2582 |
| 27 | Condenser (110 mmf mica) | 30-1031 |
| 28 | Resistor (330,000 ohms, ½ watt) | 33-433339 |
| 29 | Volume Control (2.0 megohms) | 33-5286 |
| 30 | Condenser (.003 mf tubular) | 30-4580 |
| 31 | Condenser (.01 mf tubular) | 30-4581 |
| 32 | Resistor (70,000 ohms, ½ watt) | 33-370339 |
| 33 | Condenser (.004 mf tubular) | 30-4578 |
| 34 | Tone Control (3.0 megohms) | 33-5287 |
| 35 | Condenser (110 mmf mica) | 30-1031 |
| 36 | Condenser (.02 mf tubular) | 30-4481 |
| 37 | Resistor (330,000 ohms, ½ watt) | 33-433339 |
| 38 | Resistor (2.0 megohms, ½ watt) | 33-520339 |
| 39 | Resistor (1.0 megohm, ½ watt) | 33-510339 |
| 40 | Resistor (330,000 ohms, ½ watt) | 33-433339 |
| 41 | Resistor (1.0 megohm, ½ watt) | 33-510339 |
| 42 | Condenser (.01 mf tubular) | 30-4581 |
| 43 | Condenser (.1 mf tubular) | 30-4455 |
| 44 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 45 | Condenser (.002 mf tubular) | 30-4579 |
| 46 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 47 | Resistor (5000 ohms, ½ watt) | 33-250339 |
| 48 | Condenser (.004 mf tubular) | 30-4578 |
| 49 | Resistor (99,000 ohms, ½ watt) | 33-399339 |
| 50 | Resistor (45,000 ohms, ½ watt) | 33-345339 |
| 51 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 52 | Condenser (.004 mf tubular) | 30-4578 |
| 53 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 54 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 55 | Condenser (.003 mf tubular) | 30-4469 |
| 56 | Output Transformer | 32-7981 |
| 57 | Cone and Voice Coil Assembly for Speaker (Part No. 36-1450) | 36-4089 |
| 58 | Condenser (.003 mf tubular) | 30-4469 |
| 59 | A. C. Switch | 42-1467 |
| 60 | Condenser (.01 mf to .01 mf bakelite) | 3903DG |
| 61 | Pwr. Trnsfrmr., 115 v., 60 cycle | 32-7998 |
| 62 | Field Coil, Replace Speaker | 36-1450 |
| 63 | Elect. Condenser (18 mf) | 30-2335 |
| 64 | Elect. Condenser (25 mf), 250 | 30-2333 |
| 65 | B. C. Resistor | 33-3358 |
| 66 | Resistor (4000 ohms, ½ watt) | 33-240339 |
| 67 | Resistor (13,000 ohms, ½ watt) | 33-313339 |
| 68 | Elect. Condenser (4 mf), 250 | 30-2334 |
| 69 | Pilot Lamp .. Dial | 34-2064 |
| 70 | Pilot Lamp | 34-2064 |
| 71 | Push-Button Switch | 42-1462 |
| 72 | Padder Strip Assem., Complete | 31-6259 |
| 72A | Compensator No. 1 (540-1030 KC.) | |
| 72B | Compensator No. 2 (540-1030 KC.) | |
| 72C | Compensator No. 3 (670-1160 KC.) | |
| 72D | Compensator No. 4 (670-1160 KC.) | |
| 72E | Compensator No. 5 (900-1470 KC.) | |
| 72F | Compensator No. 6 (900-1470 KC.) | |
| 72G | Compensator No. 7 (1100-1600 KC.) | |
| 72H | Compensator No. 8 (1100-1600 KC.) | |
| 73 | Coil Strip Assembly (8 coils) | 32-3031 |
| 73A | Coil No. 1 (540-1030 KC.) | 32-3042 |
| 73B | Coil No. 2 (540-1030 KC.) | 32-3042 |
| 73C | Coil No. 3 (670-1160 KC.) | 32-3042 |
| 73D | Coil No. 4 (670-1160 KC.) | 32-3042 |
| 73E | Coil No. 5 (900-1470 KC.) | 32-3041 |
| 73F | Coil No. 6 (900-1470 KC.) | 32-3041 |
| 73G | Coil No. 7 (1100-1600 KC.) | 32-3041 |
| 73H | Coil No. 8 (1100-1600 KC.) | 32-3041 |
| 74 | Condenser (370 mmf silver mica) | 30-1110 |
| 75 | Condenser (370 mmf silver mica) | 30-1110 |
| 76 | Wave Switch | 42-1461 |
| | Bezel | 56-1104 |
| | Bezel Gasket | 27-9245 |
| | Bearing (Drum Shaft) | 56-1036 |
| | Cable (Power) | L-2778 |
| | Cable (Speaker) | 41-3430 |
| | Coupling (Tuning Condenser) | 31-2291 |
| | Dial (Scale) | 27-5421 |
| | Dial Clamp | 56-1034 |
| | Dial Gasket | 27-9224 |
| | Dial Gasket | 27-9225 |
| | Dial Pointer | 56-1033 |
| | Dial Drive Cord (Tuning) | 31-2315 |
| | Dial Drive Cord. Pointer | 31-2316 |
| | Dial Drive Cord Spring | 28-8913 |
| | Disc Control (Tuning) | 27-4766 |
| | Disc Control (Range Switch) | 38-9702 |
| | Disc (Tone Control) | 27-4764 |
| | Disc (Volume Control) | 27-4765 |
| | Drum Assembly (Tuning Condenser) | 38-9661 |
| | Drum Bracket and Bearing (Tuning Condenser) | 38-9662 |
| | Shaft (Control Drums) | 28-6924 |
| | Socket Assembly Dial Lamp | 38-9694 |
| | Socket Assembly-Dial Lamp | 38-9695 |
| | Socket (6-prong), 78-tube | 27-6036 |
| | Socket (6-prong), Octal | 27-6086 |
| | Socket (7-prong), Octal | 27-6053 |
| | Socket (7-prong), 6A7-tube | 27-6107 |
| | Speaker | 36-1450 |
| | Tab Kit | 40-6392 |

## Miscellaneous Parts

| | |
|---|---|
| Grommet (Mtg. Push-Button Switch) | 27-4610 |
| Grommet (Mtg. Tuning Unit Assy.) | 3914 |
| Grommet (Mtg. Tuning Unit Assy.) | 3915 |
| Nut (A. C. Switch) | W-1757 |
| Nut (Speaker Mtg.) | W-124 |
| Screw (Mtg. Chassis) | W-1345 |
| Screw (Bezel) | W-1834 |
| Washer (Speaker Mtg.) | 27-7467 |
| Washer Rubber (Mtg. Chassis) | 27-4571 |
| Washer (A. C. Switch) | W-894 |

MODEL 39-40
MODEL 39-45
Alignment, Tuner Data

# PHILCO RADIO & TELEVISION CORP.

MODEL 39-36
Tuner Data

## ADJUSTING ELECTRIC PUSH-BUTTON TUNING FOR MODELS 39-36, 39-40, AND 39-45

In order to set the Electric Push-Buttons correctly for each station, the procedure as given below should be carefully followed. Accurate adjustment of the buttons requires the use of a Philco Model 077 Station Setter and a part No. 27-7059 insulated screw driver.

(A) Select eight of the most popular stations received in the locality and remove their call letters from the call letter sheets supplied. Place the call letters in the windows above the buttons, making sure that each button covers the frequency of the station for which it is to be used. Two adjustment screws for each button are located on the rear of the push-button unit. Each set of screws is numbered and covers a frequency range as follows:

| Push-Button | Frequency Range |
|---|---|
| 1 and 2 | 540-1030 KC. |
| 3 and 4 | 670-1160 KC. |
| 5 and 6 | 900-1470 KC. |
| 7 and 8 | 1100-1600 KC. |

Looking at the front of the cabinet, the first button on the left is adjusted by set screw No. 1, the next button by set screw No. 2, and the remaining buttons in the same order.

(B) Connect the aerial and ground to the "ANT" and "GND" terminals of the receiver.

(C) Turn the receiver Tuning Range Selector to position 2 (Broadcast) and tune the receiver to the station to be set on the first button.

(D) Plug the output leads of the Station Setter into the "High" and "Gnd" jacks, and turn the output controls to maximum.

Turn the modulation control to "Modulation On." Connect the output lead of the station setter to the "ANT" and "GND" terminals of the receiver and tune to the frequency of the station being received. As the indicator is slowly tuned through the frequency of the station, there will be two points at which a whistle will be heard, one above and one below the frequency of the station. When the indicator is on the frequency of the station the whistle will be eliminated and the modulated signal of the station setter will then be clearly heard through the receiver.

(E) Turn the receiver Tuning Range Selector to position 1 (Push-Button) and press in the first button. Using the part No. 27-7059 insulated screw driver, turn the No. 1 "OSC" screw until the broadcast station identified by the station setter signal is tuned to Maximum Volume.

(F) Remove the output lead of the station setter from the "ANT" terminal of the receiver and turn the indicator of the Station Setter off the frequency of the station. The program of the desired station will then be heard in the receiver without the modulated signal.

(G) With the volume of the receiver low, slowly turn the No. 1 "OSC" screw back and forth until maximum output is received. Repeat the same procedure for the No. 1 "ANT" screw.

After setting up the first station, the same procedure given under (C) to (G) is used for the other stations.

## ALIGNMENT OF MODEL 39-40

| Operations | SIGNAL GENERATOR | | | RECEIVER | | | Special Instructions |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna (Note A) | Dial Setting | Dial Setting | Control Setting | Adjust Compensators to Max. Reading | |
| 1 | 6A7 | .1 mf | 470 KC. | 580 KC. | Vol. Max. Range Switch Broadcast | 26B, 26A, 23B, 23A | |
| 2 | Ant. Ter. | 150 mmf | 1550 KC. | 1550 KC. | " | 15, 7B, 7A | See Note B and C |
| 3 | Ant. Ter. | 150 mmf | 580 KC. | 580 KC. | " | 17 | Roll Tuning Condenser |
| 4 | Ant. Ter. | 150 mmf | 1550 KC. | 1550 KC. | " | 15 | |
| 5 | Ant. Ter. | 400 ohms | 18.0 MC. | 18.0 MC. | Range Switch S. W. | 15A, 12, 5 | |

**NOTE A**—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B**—Dial Calibration. In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the ext eme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown on page 3.

**NOTE C**—Compensators (7A) and (7B) are located on top of the tuning condenser. Compensator (7A) is the first one from the tuning drum side.

## ALIGNMENT OF MODEL 39-45

| Operation | SIGNAL GENERATOR | | | RECEIVER | | | Special Instructions |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna (Note A) | Dial Setting | Dial Setting | Control Setting | Adjust Compensators to Max. Reading | |
| 1 | 6A7 | .1 mf | 470 KC. | 470 KC. | Vol. Max. Range Switch Broadcast | 30B, 30A, 27B, 27A | |
| 2 | Antenna | 150 mmf | 1550 KC. | 1550 KC. | " | 21, 8B, 8A | See Note B and C |
| 3 | Antenna | 150 mmf | 580 KC. | 580 KC. | " | 22 | Roll Tuning Condenser |
| 4 | Antenna | 150 mmf | 1550 KC. | 1550 KC. | " | 21 | |
| 5 | Antenna | 400 ohms | 5.0 MC. | 5.0 MC. | Range Switch Police | 21A | |
| 6 | Antenna | 400 ohms | 18.0 MC. | 18.0 MC. | Range Switch S. W. | 21B, 14, 4 | |

**NOTE A**—The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

**NOTE B**—Dial Calibration: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown on page 3.

**NOTE C**—Compensators (8A) and (8B) are located on top of the tuning condenser. Compensator (8A) is the first one from the tuning drum side.

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MODEL 39-71
Schematic, Voltage, Socket Alignment, Trimmers, Parts
Chassis

# PHILCO RADIO & TELEV. CORP.

| Operations in Order | SIGNAL GENERATOR | | | RECEIVER | | | Special Instructions |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna (Note A) | Dial Setting | Dial Setting | Control Settings | Adjust Compensators in Order | |
| 1 | 1A7G Grid | .1 mfd. | 470 K. C. | 580 K. C. | Vol. Cont. Max. | 12A, 11B, 11A | Note C |
| 2 | Ant. & Grd. Terminals | 400 ohms | 1550 K. C. | 1550 K. C. | Vol. Cont. Max. | 2B, 2A | Note B<br>Note C |

**NOTE A** — The "Dummy Antenna" consists of a condenser or resistor connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

**NOTE B** — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial proceed as follows: Turn the tuning condenser to maximum capacity (plates fully meshed). With tuning condenser in this position set the pointer to the small "black dot" at the low frequency end of the dial scale.

**NOTE C** — To adjust the I. F. compensators, remove the back from the cabinet, which is held in place by four screws. The chassis is then taken out by removing the four screws and two corks underneath the cabinet, and the Tuning and Volume knobs. The I. F. compensators are located on top of the I. F. transformers.

When adjusting the Antenna (2A) and Oscillator (2B) compensators, the chassis must be assembled in the cabinet with the batteries and loop in place. The Signal Generator output lead with the "Dummy Antenna" is then connected to the terminals marked "Ant" and "Grd" underneath the cabinet. The antenna and oscillator compensators are then adjusted through the holes in the bottom of the cabinet.

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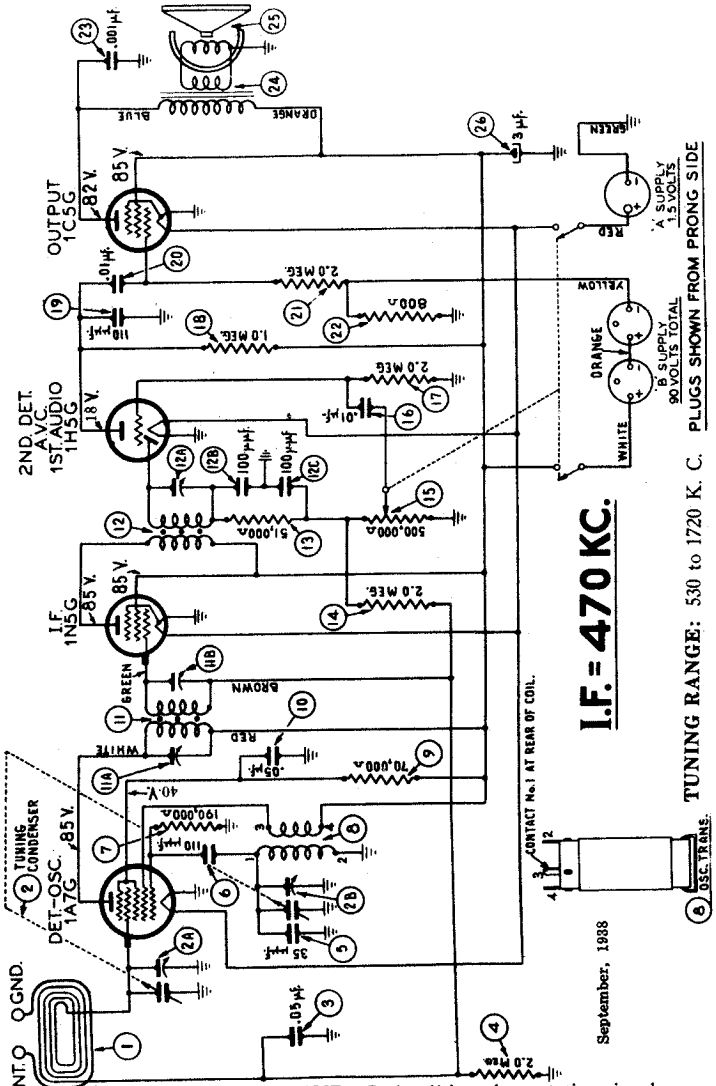
**BATTERIES REQUIRED:** One (1) Philco "A" Pack, Part No. 41-8017; two (2) Philco "B" Packs, Part No. 41-8018.

**BATTERY DRAIN:** "A" — 240 Ma.; "B" 8.5 Ma. Total current with no signal.




**AERIAL AND GROUND:** In localities where station signals are weak, an aerial and ground may be necessary. A terminal strip will be found underneath the cabinet marked "Ant" "Grd" for this purpose.

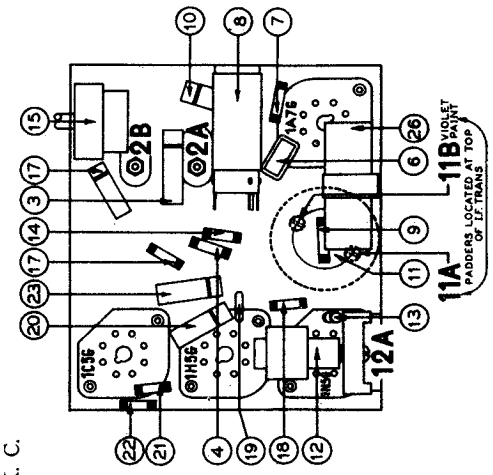



Fig. 1. Compensator and Part Locations Underside of Chassis

## Replacement Parts

| Code No. | Description | Part No. |
|---|---|---|
| 1 | Loop Assy. | 40-6421 |
| 2 | Tuning Cond. | 31-2322 |
| 3 | Tubular Cond. (.05 mf.) | 30-4519 |
| 4 | Resistor (2 megohm) | 33-5203.39 |
| 5 | Mica Cond. (35 mmf.)—mounted on top of tuning condenser | 30-1095 |
| 6 | Mica Cond. (110 mmf.) | 30-1031 |
| 7 | Resistor (190,000 ohms) | 33-4193.39 |
| 8 | Oscillator Trans. | 32-3118 |
| 9 | Resistor (70,000 ohms) | 33-3703.39 |
| 10 | Tubular Cond. (.05 mf.) | 30-4444 |
| 11 | 1st I. F. Trans. Assy. | 32-3103 |
| 12 | 2nd I. F. Trans. Assy. | 32-3081 |
| 13 | Resistor (51,000 ohms) | 33-3513.39 |
| 14 | Resistor (2 megohms) | 33-5203.39 |
| 15 | Volume Control & Switch | 33-5301 |
| 16 | Tubular Cond. (.01 mf.) | 30-4572 |
| 17 | Resistor (2 megohm) | 33-5203.39 |
| 18 | Resistor (1 megohm) | 33-5103.39 |
| 19 | Mica Cond. (110 mmf.) | 30-1031 |
| 20 | Tubular Cond. (.01 mf.) | 30-4572 |
| 21 | Resistor (2 megohm) | 33-5203.39 |
| 22 | Resistor (800 ohms) | 33-1803.39 |
| 23 | Tubular Cond. (.001 mf.) | 30-4201 |
| 24 | Output Trans. for Speaker No. 36-1451-3 | |
| 25 | Voice Coil Assy. for Speaker No. 36-1451-3 | 36-4090 |
| 26 | Electrolytic Cond. (3 mf.) | 30-2359 |
| | Bezel Window | 27-5434 |
| | Dial | 31-2321 |
| | Dial Pointer | 28-5185 |
| | Dial Drive Cord Assy. | 31-2323 |
| | Dial Tuning Shaft & Brkt. Assy. | 31-2324 |
| | Escutcheon (knobs) | 56-1252 |
| | Escutcheon (screws) | W-2129 |
| | Knob (Tuning, Volume) | 27-4131 |
| | Loop Antenna Condenser) | 40-6421 |
| | Pulley (Tuning Condenser) | 28-6662 |
| | Socket (6 prong) | 27-6086 |
| | Socket (7 prong) | 27-6087 |
| | Spring (Dial Cord) | 28-8751 |
| | Speaker | 36-1451 |

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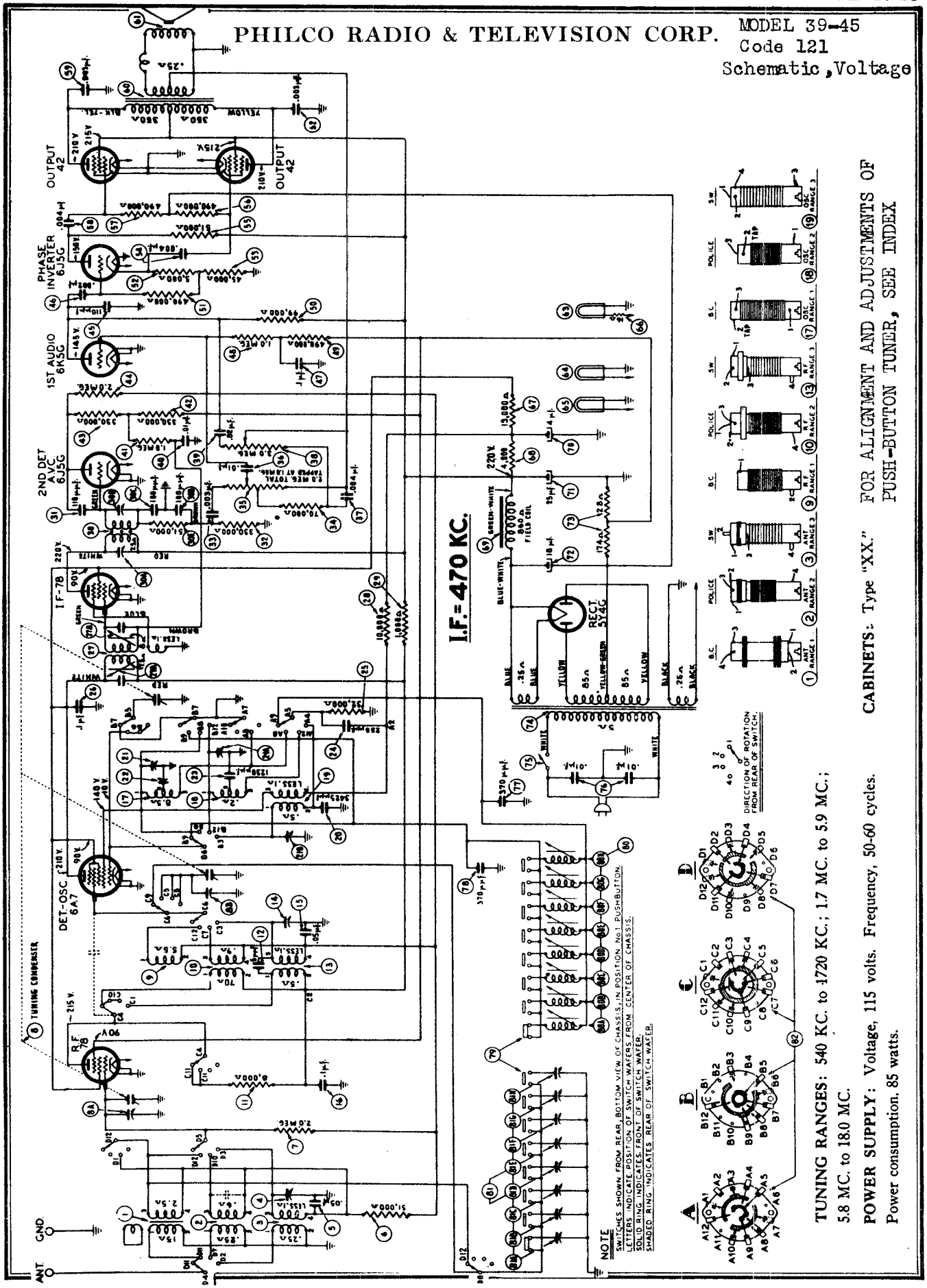
# PHILCO RADIO & TELEVISION CORP.

MODEL 39-45
Code 121
Schematic, Voltage




**TUNING RANGES:** 540 KC. to 1720 KC.; 1.7 MC. to 5.9 MC.; 5.8 MC. to 18.0 MC.

**POWER SUPPLY:** Voltage, 115 volts. Frequency, 50-60 cycles. Power consumption, 85 watts.

**CABINETS:** Type "XX."

FOR ALIGNMENT AND ADJUSTMENTS OF PUSH-BUTTON TUNER, SEE INDEX

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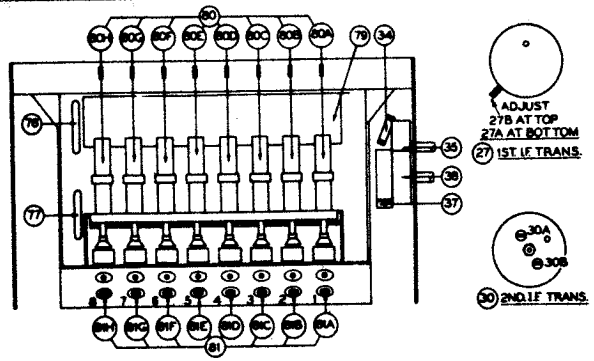
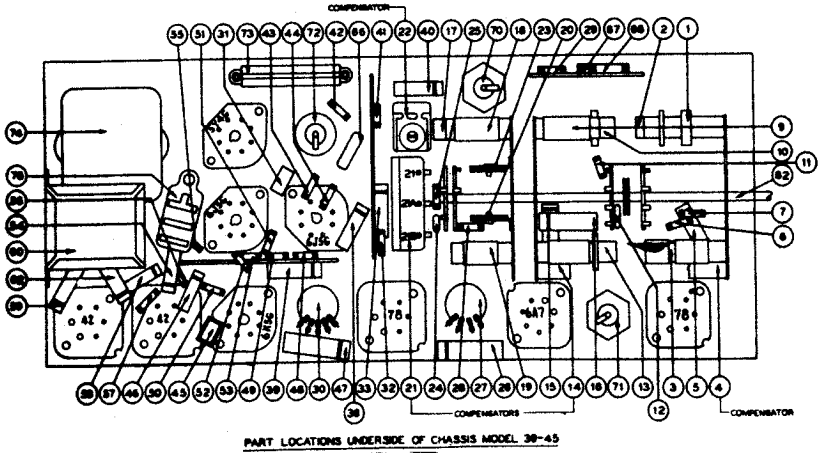
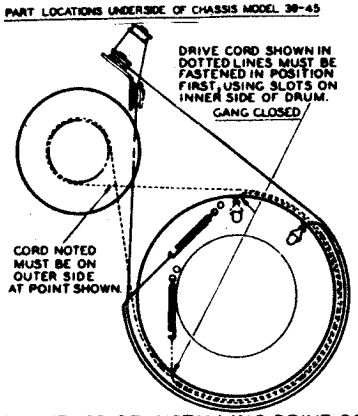



ELECTRIC AUTOMATIC PUSH BUTTON UNIT



PART LOCATIONS UNDERSIDE OF CHASSIS MODEL 39-45


DRIVE CORD SHOWN IN DOTTED LINES MUST BE FASTENED IN POSITION FIRST, USING SLOTS ON INNER SIDE OF DRUM.
GANG CLOSED
CORD NOTED MUST BE ON OUTER SIDE AT POINT SHOWN.

CORRECT METHOD OF INSTALLING DRIVE CORDS ON TUNING CONDENSER DRUM

Copyright 1938,
Philco Radio & Television Corp.
Phila., Pa.

August, 1938

# Replacement Parts
## Model 39-45, Code 121

| Schem. No. | Description | Part No. |
|---|---|---|
| 1 | Ant. Trans. (Range 1), B. C.... | 32-3056 |
| 2 | Ant. Trans. (Range 2), Police.. | 32-3053 |
| 3 | Ant. Trans. (Range 3), S. W... | 32-3055 |
| 4 | Ant. Compensator (Range 3)... | 31-6212 |
| 5 | Tubular Cond. (.05 mf)..... | 30-4519 |
| 6 | Resistor (51,000 ohms)..... | 33-351339 |
| 7 | Resistor (2.0 megohms)..... | 33-520339 |
| 8 | Tuning Cond. ..... | 31-2296 |
| 9 | R. F. Trans. (Range 1), B. C.... | 32-2379 |
| 10 | R. F. Trans. (Range 2), Police.. | 32-3054 |
| 11 | Resistor (8000 ohms)..... | 33-280339 |
| 12 | Mica Cond. (5 mmf)..... | 30-1083 |
| 13 | R. F. Trans. (Range 3), S. W... | 32-3046 |
| 14 | R. F. Compensator (Range 3)... | 31-6212 |
| 15 | Tubular Cond. (.05 mf)..... | 30-4519 |
| 16 | Tubular Cond. (.1 mf)..... | 30-4455 |
| 17 | Osc. Trans. (Range 1), B. C.... | 32-2120 |
| 18 | Osc. Trans. (Range 2), Police... | 32-3052 |
| 19 | Osc. Trans. (Range 3), S. W.... | 32-3051 |
| 20 | Tracking Condenser, Semifixed (3425 mmf) ..... | 31-6263 |
| 21 | Osc. Compensator (Broadcast) .. | 31-6266 |
| 21A | Osc. Compensator (Police, Part of 21)..... | 31-6266 |
| 21B | Osc. Compensator.....(s.w. part of 21) | |
| 22 | Osc. Compensator ..... | 31-6230 |
| 23 | Tracking Condenser, Semifixed (1230 mmf) ..... | 31-6262 |
| 24 | Mica Cond. (250 mmf) ..... | 30-1032 |
| 25 | Resistor (32,000 ohms) ..... | 33-332339 |
| 26 | Tubular Cond. (.1 mf)..... | 30-4455 |
| 27 | 1st I. F. Trans. Assy..... | 32-3079 |
| 28 | Resistor (10,000 ohms)..... | 33-310339 |
| 29 | Resistor (1000 ohms) ..... | 33-210339 |
| 30 | 2nd I. F. Trans. Assy..... | 32-2582 |
| 31 | Mica Cond. (110 mmf)..... | 30-1031 |
| 32 | Resistor (330,000 ohms)..... | 33-433339 |
| 33 | Tubular Cond. (.003 mf)..... | 30-4580 |
| 34 | Resistor (70,000 ohms)..... | 33-370339 |
| 35 | Volume Control ..... | 33-5286 |
| 36 | Tubular Cond. (.01 mf)..... | 30-4169 |
| 37 | Tubular Cond. (.004 mf)..... | 30-4578 |
| 38 | Tone Control ..... | 33-5287 |
| 39 | Tubular Cond. (.02 mf)..... | 30-4481 |
| 40 | Tubular Cond. (.01 mf)..... | 30-4169 |
| 41 | Resistor (1.0 megohm)..... | 33-510339 |
| 42 | Resistor (330,000 ohms)..... | 33-433339 |
| 43 | Resistor (330,000 ohms)..... | 33-433339 |
| 44 | Resistor (2.0 megohms) ..... | 33-520339 |
| 45 | Mica Cond. (110 mmf)..... | 30-1031 |
| 46 | Tubular Cond. (.002 mf)..... | 30-4579 |
| 47 | Tubular Cond. (.1 mf)..... | 30-4455 |
| 48 | Resistor (1.0 megohm)..... | 33-510339 |
| 49 | Resistor (490,000 ohms)..... | 33-449339 |
| 50 | Resistor (99,000 ohms)..... | 33-399339 |
| 51 | Resistor (490,000 ohms)..... | 33-449339 |
| 52 | Resistor (5000 ohms) ..... | 33-250339 |
| 53 | Resistor (45,000 ohms)..... | 33-345339 |
| 54 | Tubular Cond. (.004 mf)..... | 30-4578 |
| 55 | Resistor (51,000 ohms)..... | 33-351339 |
| 56 | Resistor (490,000 ohms)..... | 33-449339 |
| 57 | Resistor (490,000 ohms)..... | 33-449339 |
| 58 | Tubular Cond. (.004 mf)..... | 30-4578 |
| 59 | Tubular Cond. (.003 mf)..... | 30-4469 |
| 60 | Output Trans. ..... | 32-7981 |
| 61 | Cone and Voice Coil Assy. for Speaker (Part No. 36-1450)... | 36-4089 |
| 62 | Tubular Cond. (.003 mf)..... | 30-4469 |
| 63 | Pilot Lamp Dial ..... | 34-2210 |
| 64 | Pilot Lamp Dial ..... | 34-2210 |
| 65 | Pilot Lamp Power..... | 34-2210 |
| 66 | Resistor (16 ohms) ..... | 33-016431 |
| 67 | Resistor (13,000 ohms)..... | 33-313439 |
| 68 | Resistor (4000 ohms) ..... | 33-240339 |
| 69 | Field Coil, Replace Speaker (Part No. 36-1450)..... | |
| 70 | Electrolytic Cond. (4 mf)..... | 30-2334 |
| 71 | Electrolytic Cond. (25 mf)..... | 30-2333 |
| 72 | Electrolytic Cond. (18 mf)..... | 30-2335 |
| 73 | B. C. Resistor ..... | 33-3358 |
| 74 | Power Trans. (115v., 60 cycle). | 32-7998 |
| 75 | A. C. Switch ..... | 42-1467 |
| 76 | Bakelite Cond. (.01 to .01 mfd). | 3903DG |
| 77 | Silver Mica Cond. (370 mmf)... | 30-1110 |
| 78 | Silver Mica Cond. (370 mmf)... | 30-1110 |
| 79 | Push-Button Switch ..... | 42-1462 |
| 80 | Push-Button Osc. Trans. Assy. (8 coils) ..... | 32-3031 |
| 80A | Coil No. 1 (540-1030 KC.)..... | 32-3042 |
| 80B | Coil No. 2 (540-1030 KC.)..... | 32-3042 |
| 80C | Coil No. 3 (670-1160 KC.)..... | 32-3042 |
| 80D | Coil No. 4 (670-1160 KC.)..... | 32-3042 |
| 80E | Coil No. 5 (900-1470 KC.)..... | 32-3041 |
| 80F | Coil No. 6 (900-1470 KC.)..... | 32-3041 |
| 80G | Coil No. 7 (1100-1600 KC.)..... | 32-3041 |
| 80H | Coil No. 8 (1100-1600 KC.)..... | 32-3041 |
| 81 | Padder Strip ..... | 31-6259 |
| 81A | Comp. No. 1 (540-1030 KC.) | |
| 81B | Comp. No. 2 (540-1030 KC.) | |
| 81C | Comp. No. 3 (670-1160 KC.) | |
| 81D | Comp. No. 4 (670-1160 KC.) | |
| 81E | Comp. No. 5 (900-1470 KC.) | |
| 81F | Comp. No. 6 (900-1470 KC.) | |
| 81G | Comp. No. 7 (1100-1600 KC.) | |
| 81H | Comp. No. 8 (1100-1600 KC.) | |
| 82 | Wave Switch ..... | 42-1451 |

## Miscellaneous Parts

| | |
|---|---|
| Bezel ..... | 56-1092 |
| Bezel Gasket ..... | 27-9245 |
| Bearing (Drum Shaft)..... | 56-1036 |
| Cable (Power) ..... | L-2778 |
| Cable (Speaker) ..... | 41-3430 |
| Coupling (Tuning Condenser)... | 31-2291 |
| Dial (Scale) ..... | 27-5404 |
| Dial Clamp ..... | 56-1034 |
| Dial Gasket ..... | 27-9224 |
| Dial Gasket ..... | 27-9225 |
| Dial Pointer ..... | 56-1033 |
| Dial Drive Cord (Tuning) ..... | 31-2315 |
| Dial Drive Cord Pointer..... | 31-2316 |
| Dial Drive Cord Spring ..... | 28-8913 |
| Disc Control (Tuning)..... | 27-4766 |
| Disc Control (Range Switch)... | 38-9702 |
| Disc (Tone Control)..... | 27-4764 |
| Disc (Volume Control)..... | 27-4765 |
| Drum Assembly (Tuning Condenser) ..... | 38-9661 |
| Drum-Bracket and Bearing (Tuning Condenser) ..... | 38-9662 |
| Shaft Control Drums ..... | 28-6924 |
| Socket Assembly Dial Lamp.... | 38-9694 |
| Socket Assembly Dial Lamp.... | 38-9695 |
| Socket Pilot Lamp. | 38-9696 |
| Socket (6-prong) (78-tube)..... | 27-6036 |
| Socket (6-prong) (Octal)..... | 27-6086 |
| Socket (7-prong) (Octal)..... | 27-6053 |
| Socket (7-prong) (6A7-tube) ... | 27-6107 |
| Speaker ..... | 36-1450 |
| Tab Kit ..... | 40-6392 |
| Mounting Parts | |
| Grommet | |
| (Mtg. Push-Button Switch)... | 27-4610 |
| (Mtg. Tuning Unit Assy.).... | 3914 |
| (Mtg. Tuning Unit Assy.).... | 3915 |
| Nut (A. C. Switch)..... | W-1757 |
| Nut (Speaker Mtg.) ..... | W-124 |
| Screw (Mtg. Chassis)..... | W-1345 |
| Screw (Bezel) ..... | W-1834 |
| Washer (Speaker Mtg.)..... | 27-7467 |
| Washer Rubber (Mtg. Chassis). | 27-4571 |
| Washer (A. C. Switch) ..... | W-894 |

PHILCO RADIO & TELEV. CORP.

MODELS 39-70,Code 121,
39-75,Code 121,122
Schematic,Socket,Trimmers
Chassis

# Alignment Notes

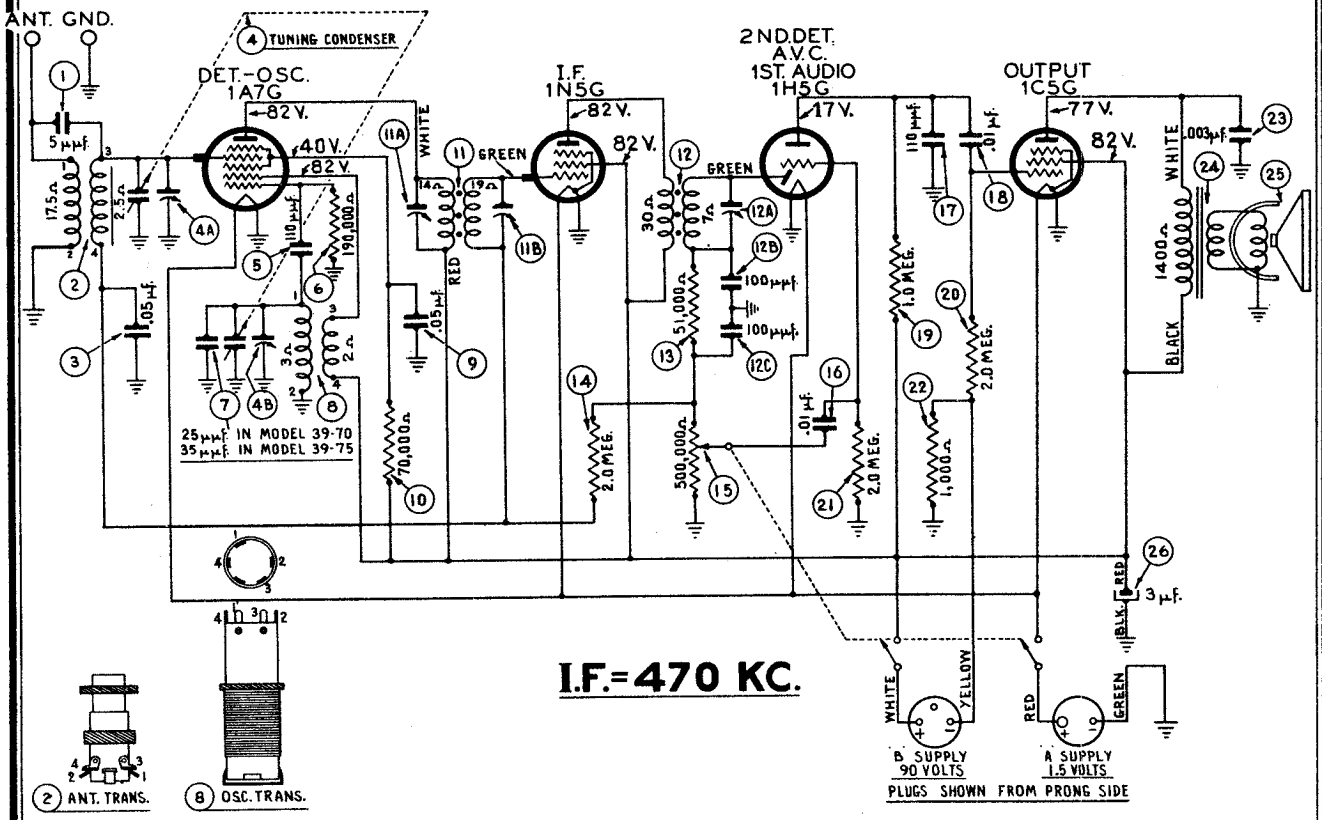
**NOTE A**—The "Dummy Antenna" consists of a condenser or resistor connected in series with the signal generator output lead (high side). Use the capacity or resistance as specified in each step of the above procedure.

**NOTE B**—DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser.

**Model 39-70 and 39-80**—To adjust the dial proceed as follows: Turn the tuning condenser to maximum capacity (plates fully meshed). With the tuning condenser in this position, set the pointer horizontally across the dial.

**Model 39-75**—With the tuning condenser in the maximum capacity position (plates fully meshed), loosen the coupling screws connecting the push-button unit to the condenser. The pointer is then set on the extreme left edge of the index line (low frequency end of the scale) with the tuning condenser fully closed. The gang is then opened until the pointer is at the right edge of the index line. The push-button shaft is then turned counter-clockwise to its "stop." With the tuning condenser and push-button shaft in these positions tighten the coupling set screws.

**NOTE C**—The locations of the compensators in Models 39-70, 39-75 and 39-80 are shown in Figs. (1), (2) and (3) respectively.




SCHEMATIC DIAGRAM MODEL 39-70 & 39-75

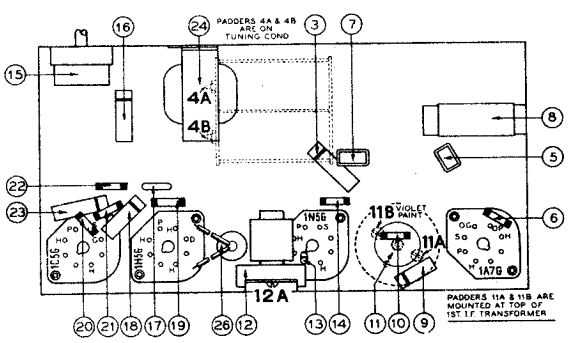



Fig. 1. Compensator and Part Locations
Model 39-70, Code 121
Underside of Chassis

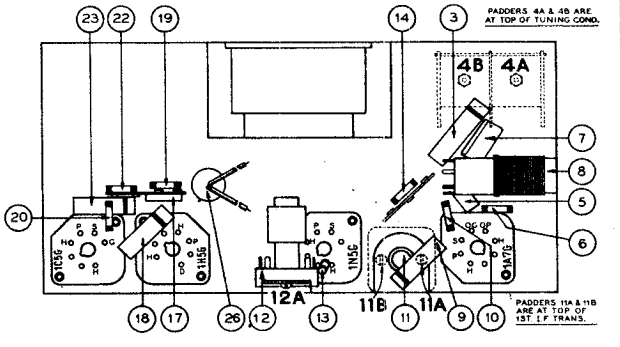



Fig. 2. Compensator and Part Locations
Model 39-75, Code 121-122
Underside of Chassis

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MODELS 39-70,Code 121,
39-75,Code 121,122
Alignment,Parts List
MODEL 39-80,Code 121
Alignment

PHILCO RADIO & TELEV. CORP.

## REPLACEMENT PARTS

### Models 39-70, Code 121, and 39-75, Codes 121-122

| Schem. No. | Description | Part No. |
|---|---|---|
| 1 | Condenser (5 mmf. mica) (Part of No. 2) | 30-1097 |
| 2 | Antenna Transformer (Includes No. 1) | 32-3080 |
| 3 | Condenser (.05 mf. tubular) | 30-4519 |
| 4 | Tuning Condenser Assembly, 39-70 | 31-2300 |
| | Tuning Condenser Assembly, 39-75 | 31-2265 |
| 5 | Condenser (110 mmf. mica) | 30-1031 |
| 6 | Resistor (190,000 ohms, ½ watt) | 33-419339 |
| 7 | Condenser (25 mmf. mica), 39-70 | 30-1067 |
| | Condenser (35 mmf. silver plated mica), 39-75 | 30-1113 |
| 8 | Oscillator Transformer, 39-70 | 32-3019 |
| | Oscillator Transformer, 39-75 | 32-3083 |
| 9 | Condenser (.05 mf. tubular) | 30-4444 |
| 10 | Resistor (70,000 ohms, ½ watt) | 33-370339 |
| 11 | 1st I. F. Transformer Assembly, 39-70 | 32-2841 |
| | 1st I. F. Transformer Assembly, 39-75 | 32-3078 |
| 12 | 2nd I. F. Transformer Assembly | 32-3081 |
| 13 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 14 | Resistor (2.0 megohms, ½ watt) | 33-520339 |
| 15 | Volume Control and On-Off Switch, 39-70 | 33-5290 |
| | Volume Control and On-Off Switch, 39-75 | 33-5291 |
| 16 | Condenser (.01 mf. tubular) | 30-4572 |
| 17 | Condenser (110 mmf. mica) | 30-1031 |
| 18 | Condenser (.01 mf. tubular) | 30-4572 |
| 19 | Resistor (1.0 megohm, ½ watt) | 33-510339 |
| 20 | Resistor (2.0 megohms, ½ watt) | 33-520339 |
| 21 | Resistor (2.0 megohms, ½ watt) | 33-520339 |
| 22 | Resistor (1000 ohms, ½ watt) | 33-210339 |
| 23 | Condenser (.003 mf. tubular) | 30-4469 |
| 24 | Output Transformer | 32-7995 |
| *25 | Cone and Voice Coil Assemblies— | |
| | 39-70 "B" Spkr. Pt. No. 36-1435 | 36-4090 |
| | 39-70 "F" Spkr. Pt. No. 36-1447 | 36-4092 |
| | 39-75 "B" Spkr. Pt. No. 36-1442 | 36-4090 |
| | 39-75 "F" Spkr. Pt. No. 36-1447 | 36-4092 |
| 26 | Electrolytic Condenser (3 mf.) | 30-2346 |

## MISCELLANEOUS PARTS

### Model 39-70, Code 121

| | |
|---|---|
| Bezel Window | 27-5417 |
| Cable (Battery) | 41-3427 |
| Dial | 27-5416 |
| Dial Drive Cord | 31-2317 |
| Dial Drive Spring | 28-8751 |
| Dial Pointer | 28-5468 |
| Knob | 27-4332 |
| On-Off Indicator Parts— | |
| Hub and Lever | 38-9658 |
| Toggle Link and Brkt. Assy. | 38-9700 |
| Spring (Toggle Link and Brkt. Assy.) | 28-8925 |
| Snap Fastener | 56-1156 |
| Pulley (Tuning Condenser) | 28-6662 |
| Pulley Screw (Tuning Condenser) | W-1400 |
| Shaft Assy. (Tuning) | 31-2290 |
| *Speaker ("B" Cabinet) | 36-1435 |
| *Speaker ("F" Cabinet) | 36-1447 |

### Model 39-75, Code 121-122

| | |
|---|---|
| Automatic Tuning Unit Complete | 31-2282 |
| Bezel (Dial) | 40-6364 |
| Bezel Gasket (Dial) | 27-9174 |
| Bezel (Push-Button) | 28-5929 |
| Bezel Gasket (Push-Button) | 27-9218 |
| Dial | 27-5420 |
| Dial Pointer | 28-5934 |
| Dial Drive Cord | 31-2275 |
| Dial Drive Cord Spring | 28-8919 |
| Dial Drive Drum (Tuning Condenser) | 31-2281 |
| Knob (Volume) | 27-4753 |
| Knob (Tuning) | 27-4750 |
| Knob Screw (Tuning) | 28-6882 |
| Push-Button | 27-4749 |
| Push-Button Spring | 28-8918 |
| Sleeve—Short (Tuning Shaft, Code 121-122) | 28-6887 |
| *Speaker (T Cabinet) | 36-1442 |
| Socket (1A7G) | 27-6099 |
| Socket (6 prong) | 27-6086 |
| Socket (7 prong) | 27-6087 |

### Model 39-75, Code 122

| | |
|---|---|
| Extension Shaft (Volume) | 38-9640 |
| Extension Shaft (Tuning) | 28-6928 |
| Extension Sleeve—Long (Tuning Shaft) | 28-6935 |
| Socket (Speaker) | 27-6115 |
| *Speaker (Code 122) | 36-1447 |
| Spring (Retaining Vol. Knob) | 28-8915 |

## Specifications

**TYPE OF CIRCUIT:** Models 39-70, 39-75 and 39-80 are four tube battery operated superheterodyne receivers covering standard broadcast and state police stations. The receivers employ the new Philco Farm Radio Tubes, which require exceptionally low current for operation, Automatic Volume Control, and a Philco Speaker designed especially for battery radio. In general these models are similar but differ in their tuning mechanisms, speakers and cabinets.

Model 39-70 is manually tuned and is assembled in cabinet types "F" (floor model) and "B" (table model).

Model 39-75, codes 121 and 122 is equipped with automatic push-button and manual tuning. The automatic tuning mechanism contains six push-buttons for selecting any of six stations in the standard broadcast band. The procedure for adjusting and operating the push-buttons will be found in the instructions supplied with each set.

Code 122 of this model is assembled in cabinet type "F" (floor model) and "B" (table model).

Model 39-80 is manually tuned and is assembled in cabinet type "B" (table model) and cabinet type "XF" (floor model).

In addition to the new Philco speaker in Model 39-80 a sound chamber is also built into the cabinet. This sound chamber reinforces the sound produced by the speaker and results in greater clarity of tone and intensity of sound output. Bass compensation is also included in the volume control circuit.

**TUNING RANGE:** 530 to 1720 K. C.

**INTERMEDIATE FREQUENCY:** 470 K. C.

**PHILCO TUBES:** One 1A7G, First Detector and Oscillator; one 1N5G, I. F. Amplifier; one 1H5G, Second Detector; First Audio and Automatic Volume Control, and one 1C5G (1A5G Model 39-80) Pentode Output.

**BATTERIES REQUIRED:** One (1) Philco "A" Pack, Part No. 41-8014; one (1) Philco "B" Pack, Part No. 41-8015.

**INSTALLING BATTERIES:** The batteries are arranged in the cabinet in such a manner that they form part of the sound chamber air column.

It is very essential, therefore, that the following instructions be carefully observed when installing the batteries. Remove the back from the cabinet after removing the wood screws which hold it in place. Place the small "A" Pack in the left side (looking at the cabinet from the rear) of the cabinet, three inches in from the rear with the slanting portion facing the front of the cabinet. Place the long "B" Pack along the rear of the cabinet with the socket for the battery cable plug at the top towards the front.

Observe the arrangement of pins on the plugs of the battery cable and the corresponding holes in the sockets of the batteries, so you will be sure to insert them correctly. Insert plug with two prongs into the small "A" Pack and the plug with three prongs into the large "B" Pack.

Replace the back on the cabinet with the wood screws, making sure all of them are screwed in tight.

**BATTERY DRAIN:**
Models 39-70 and 39-75.. "A"—(250 M. A.) "B"—(8½ M. A.)
Model 39-80 ..... "A"—(200 M. A.) "B"—(6½ M. A.)

**AERIAL AND GROUND:** In order to obtain the highest amount of sensitivity from these receivers the Philco Farm Radio Aerial, Part No. 40-6383, should be used. This aerial is accurately designed to match the tuned antenna circuit in the receiver so that maximum performance will be obtained.

A good ground connection to the nearest water pipe or any other good ground source is also required.

**CABINET DIMENSIONS:**

| Model | Height | Width | Depth |
|---|---|---|---|
| 39-70B | 13⅞" | 11⅞" | 6¼" |
| 39-70F | 37⅛" | 23" | 9⅝" |
| 39-75T | 33⅞" | 23" | 6⅝" |
| 39-75F | 37⅞" | 23" | 9⅝" |
| 39-80B | 17⅛" | 17 3/16" | 9 1/16" |
| 39-80XF | 39⅛" | 24¼" | 12½" |

## Alignment of Compensators

**OUTPUT METER:** The Philco 027 Output Meter is connected to the plate and screen terminals of the type 1C5G tube in Models 39-70 and 39-75 (1A5G Model 39-80) and adjusted for the 0 to 30 V. A. C. scale. After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on page 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

**EQUIPMENT REQUIRED:**

(1) Signal Generator: Philco Model 077 Signal Generator which has a fundamental frequency range from 115 to 36,000 K. C. is the correct instrument for this purpose.

(2) Output Meter, Philco Model 027 Circuit Tester, incorporates a sensitive output meter and is recommended.

(3) Philco Fiber Handle Screw Driver, Part No. 27-7059, and Fiber Wrench, Part No. 3164.

### PROCEDURE FOR MODELS 39-70 AND 39-75

| Operations in Order | Signal Generator: Output Connections to Receiver | Signal Generator: Dummy Antenna Note A | Signal Generator: Dial Setting | Receiver: Dial Setting | Receiver: Control Setting | Receiver: Adjust Compensators | Receiver: Special Instructions |
|---|---|---|---|---|---|---|---|
| 1 | 1A7G Grid | .1 mfd. | 470 K. C. | 580 K. C. | Vol. Max. | 12A, 11B, 11A | |
| 2 | Ant. (White) | 225 mfd. | 1550 K. C. | 1550 K. C. | Vol. Max. | 4B, 4A | Note B Note C |

### PROCEDURE FOR MODEL 39-80

| Operations in Order | Signal Generator: Output Connections to Receiver | Signal Generator: Dummy Antenna Note A | Signal Generator: Dial Setting | Receiver: Dial Setting | Receiver: Control Setting | Receiver: Adjust Compensators | Receiver: Special Instructions |
|---|---|---|---|---|---|---|---|
| 1 | 1A7G Grid | .1 mfd. | 470 K. C. | 580 K. C. | Vol. Max. | 13A, 12B, 12A | |
| 2 | Ant. (White) | 225 mfd. | 1550 K. C. | 1550 K. C. | Vol. Max. | 4B, 4A | Note B Note C |

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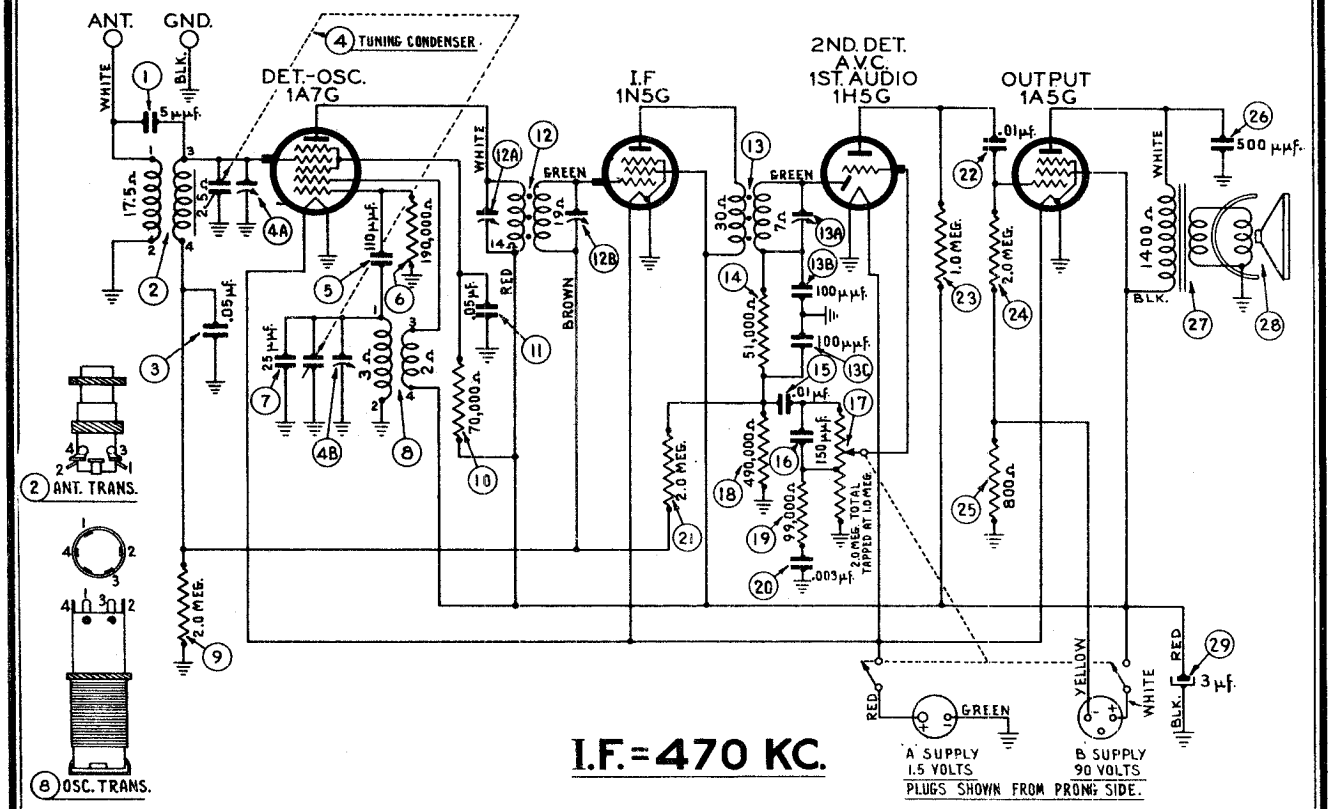
MODEL 39-80, Code 121
Schematic, Socket
Trimmers, Chassis
Parts List




SCHEMATIC DIAGRAM MODEL 39-80

## Replacement Parts Model 39-80, Code 121

| Schem. No. | Description | Part No. |
|---|---|---|
| 1 | Condenser (mica, 5 mmf.—Part of No. 2) | 30-1097 |
| 2 | Antenna Trans. | 32-3080 |
| 3 | Condenser (tubular, .05 mf.) | 30-4519 |
| 4 | Tuning Cond. | 31-2300 |
| 5 | Condenser (mica, (110 mmf.) | 30-1031 |
| 6 | Resistor (190,000 ohms, ½ watt) | 33-419339 |
| 7 | Condenser (mica, 25 mmfd.) | 30-1067 |
| 8 | Oscillator Trans. | 32-3019 |
| 9 | Resistor (2.0 meg., ½ watt) | 33-520339 |
| 10 | Resistor (70,000 ohms, ½ watt) | 33-370339 |
| 11 | Condenser (tubular, .05 mf.) | 30-4444 |
| 12 | 1st I. F. Trans. Assy. | 32-2841 |
| 13 | 2nd I. F. Trans. Assy. | 32-3081 |
| 14 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 15 | Condenser (tubular, .01 mf.) | 30-4572 |
| 16 | Condenser (mica, 150 mmf.) | 30-1033 |
| 17 | Volume Control and On-Off Switch | 33-5238 |
| 18 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 19 | Resistor (99,000 ohms, ½ watt) | 33-399339 |
| 20 | Condenser (tubular, .003 mf.) | 30-4580 |
| 21 | Resistor (2.0 meg., ½ watt) | 33-520339 |
| 22 | Condenser (tubular, .01 mf.) | 30-4479 |
| 23 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 24 | Resistor (2.0 meg., ½ watt) | 33-520339 |
| 25 | Resistor (800 ohms, ½ watt) | 33-180339 |
| 26 | Condenser (mica, 500 mmf.) | 30-1114 |
| 27 | Output Trans. | 32-7984 |
| 28 | Cone Assy. for Speaker 36-1410 | 36-4093 |
| | Cone Assy. for Speaker 36-1436 | 36-4094 |
| 29 | Electrolytic Condenser (3 mfd.) | 30-2346 |
| | Bezel Assy. | 40-6374 |
| | Bezel Screw | W-1834 |
| | Brkt. (Mtg. Set in XF Cabinet) | 56-1058 |
| | Cable (Battery) | 41-3437 |
| | Dial | 27-5413 |
| | Dial Pointer | 56-1091 |
| | Dial Drive Cord | 31-2318 |
| | Dial Drive Cord Spring | 28-8751 |

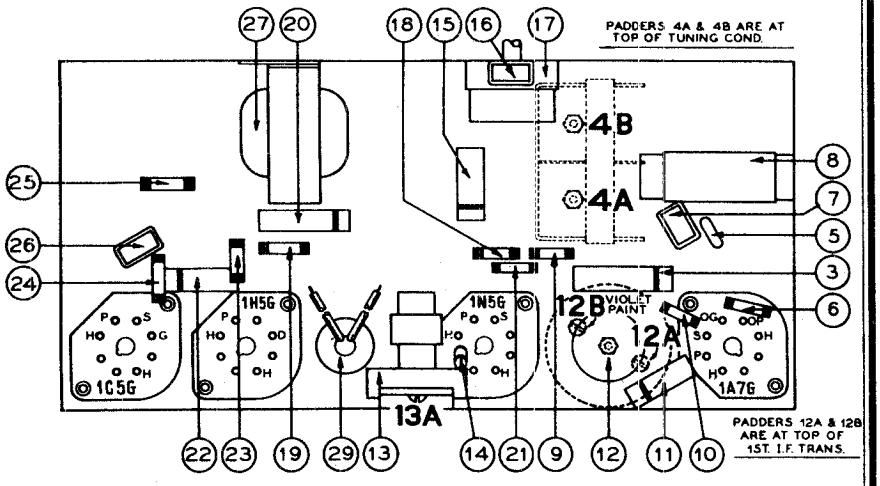



**Fig. 3. Compensator and Part Locations**
**Model 39-80, Code 121**
**Underside of Chassis**

| Description | Part No. |
|---|---|
| Knob | 27-4604 |
| On-Off Indicator Parts— | |
| Hub and Lever | 38-9658 |
| Toggle Link and Brkt. Assy. | 38-9701 |
| Spring (Toggle Assy.) | 28-8925 |
| Snap Fastener | 56-1156 |
| Pulley (Tuning Condenser) | 28-6662 |
| Pulley Screw (Tuning Condenser) | W-1400 |
| Shaft Assy. (Tuning) | 31-2290 |
| *Speaker (B Cabinet) | 36-1410 |
| *Speaker (XF Cabinet) | 36-1436 |
| Socket (6 prong) | 27-6086 |
| Socket (7 prong) | 27-6087 |
| Socket (Speaker) | 27-6115 |

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MODELS 40-120, 40-125
Schematic, Voltage
Parts List

# PHILCO RADIO & TELEV. CORP.

May, 1939.

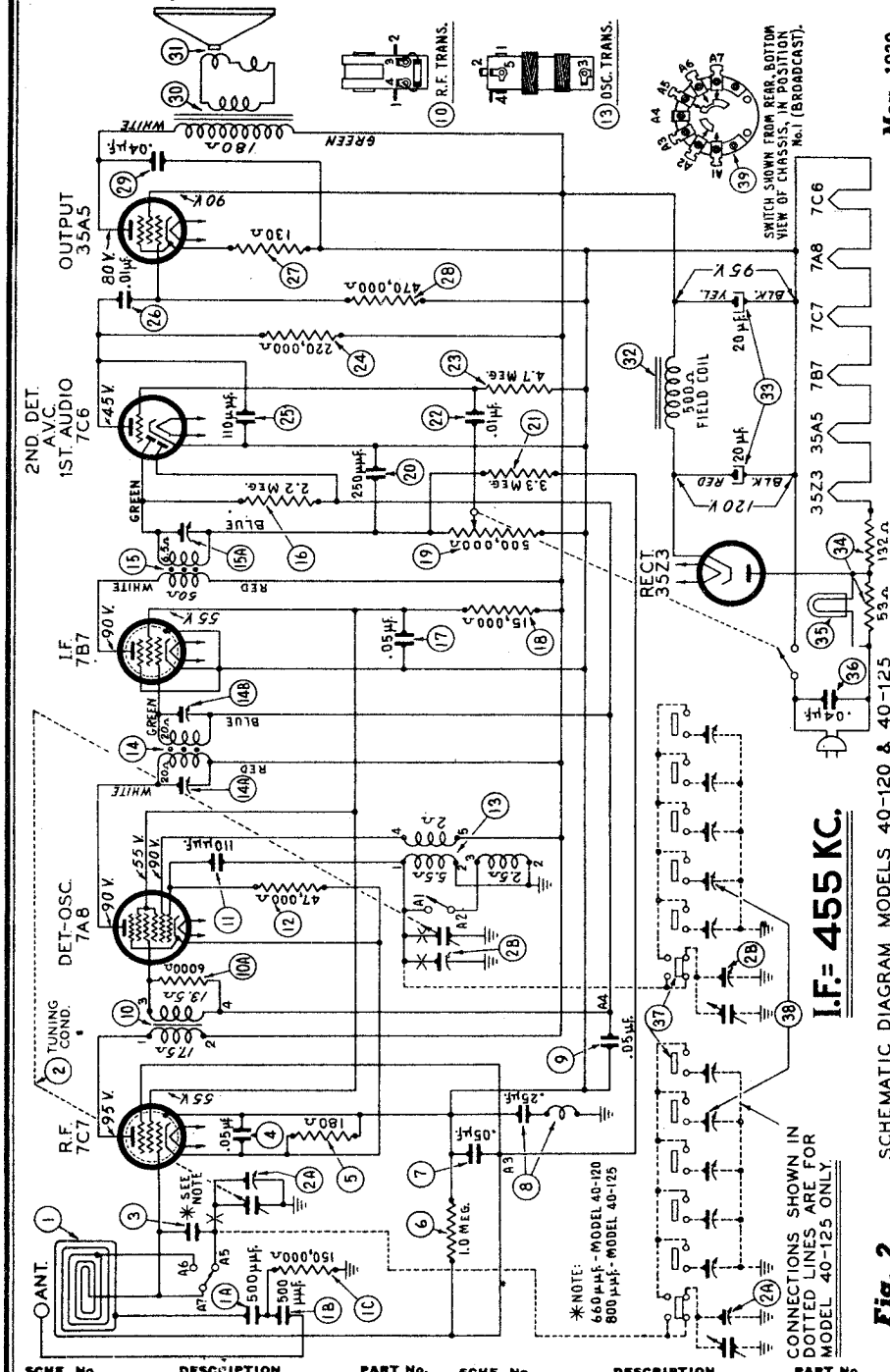
ANT.
R.F. 7C7
DET-OSC. 7A8
I.F. 7B7
2ND DET. AVC. 1ST AUDIO 7C6
OUTPUT 35A5
RECT. 35Z3
R.F. TRANS.
OSC. TRANS.
TUNING COND.
FIELD COIL
I.F.= 455 KC.
SCHEMATIC DIAGRAM MODELS 40-120 & 40-125
*NOTE: 660 μμf. - MODEL 40-120
800 μμf. - MODEL 40-125
CONNECTIONS SHOWN IN DOTTED LINES ARE FOR MODEL 40-125 ONLY.
SWITCH SHOWN FROM REAR, BOTTOM VIEW OF CHASSIS, IN POSITION No. 1 (BROADCAST).

*Fig. 2*

## TYPE OF CIRCUIT: FOR ALIGNMENT, SEE INDEX

Models 40-120 and 40-125 are six (6) tube super-heterodyne receivers employing the new Philco built-in super aerial system which eliminate an outside aerial, and Philco High-Efficiency Loktal tubes. In addition, other features of design are: two tuning ranges; special high gain R. F. stage; automatic volume control and a Beam power audio output stage. In general, these models are similar but differ in their tuning mechanisms and cabinets.

Model 40-120 is dial tuned and assembled in cabinet type "C".

Model 40-125 is equipped with six electric push buttons for automatically selecting stations in addition to dial tuning. Five push buttons are used for stations one of which can be used in combination with a Special type PHILCO TELEVISION receiver for reception of television sound programs. The sixth push button selects dial tuning. The procedure for adjusting and operating push button tuning will be found in the instructions supplied with each receiver. Instructions for setting up the television push button is supplied with Philco Television Receivers. This model is assembled in special type "C" cabinet.

**TUNING RANGE:** 540 to 1600 K. C. 1.6 to 3.3 M. C.
**INTERMEDIATE FREQUENCY:** 455 K. C.
**POWER SUPPLY:** 115 volts A. C. or D. C. current.
**POWER CONSUMPTION:** 28 watts.
**AUDIO OUTPUT:** 1 watt.
**PHILCO TUBES USED:**
7C7, R. F.; 7A8, oscillator and first detector; 7B7, I. F.; 7C6, second detector, first audio; 35A5, output; 35Z3, rectifier.

**CABINET DIMENSIONS:**

| | Height | Width | Depth |
|---|---|---|---|
| Model 40-120 | 6 9/16 | 1 1/8 | 6 5/16 |
| Model 40-125 | 7 7/16 | 11 | 6 5/8 |

| SCHE. No. | DESCRIPTION | PART No. |
|---|---|---|
| 1 | Loop Antenna Assy. (Model 40-120) | 38-9889 |
| | (Model 40-125) | 38-9890 |
| 1A | Mica Cond. (500 mmfd.) | 30-1114 |
| 1B | Mica Cond. (500 mmfd.) | 30-1114 |
| 1C | Resistor (150,000 ohms, ½ watt) | 33-415339 |
| 2 | Tuning Cond. Assy. (Model 40-120) | 31-2388 |
| | (Model 40-125) | 31-2397 |
| 3 | Mica Cond. | |
| | (660 mmfd., Model 40-120) | 30-1136 |
| | (800 mmfd., Model 40-125) | 30-1135 |
| 4 | Tubular Cond. (.05 mfd.) | 30-4519 |
| 5 | Resistor (180 ohms, ½ watt) | 33-118339 |
| 6 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 7 | Tubular Cond. (.05 mfd.) | 30-4519 |
| 8 | Tubular Cond. & Choke Assy. (.25 mfd.) | 38-9851 |
| 9 | Tubular Cond. (.05 mfd.) | 30-4519 |
| 10 | R. F. Trans. Assy. | 32-3273 |
| 10A | Resister (6000 ohms, ½ watt) | 33-260339 |
| 11 | Mica Cond. (110 mmfd.) | 30-1130 |
| 12 | Resistor (47,000 ohms, ½ watt) | 33-347339 |
| 13 | Oscillator Trans. (Model 40-120) | 32-3255 |
| | (Model 40-125) | 32-3256 |
| 14 | 1st I. F. Trans. Assy. | 32-3237 |
| 15 | 2nd I. F. Trans. Assy. | 32-3238 |
| 16 | Resistor (2.2 meg., ½ watt) | 33-522339 |
| 17 | Tubular Cond. (.05 mfd.) | 30-4519 |
| 18 | Resistor (15,000 ohms, ½ watt) | 33-315339 |
| 19 | Volume Control & On-Off Switch | 33-5306 |
| 20 | Mica Cond. (250 mmfd.) | 30-1074 |
| 21 | Resistor (3.3 meg., ½ watt) | 33-533339 |
| 22 | Tubular Cond. (.01 mfd.) | 30-4479 |
| 23 | Resistor (4.7 meg., ½ watt) | 33-547339 |
| 24 | Resistor (220,000 ohms, ½ watt) | 33-422339 |
| 25 | Mica Cond. (110 mmfd.) | 30-1130 |
| 26 | Tubular Cond. (.01 mfd.) | 30-4572 |
| 27 | Resistor (130 ohms, ½ watt) | 33-113336 |
| 28 | Resistor (470,000 ohms, ½ watt) | 33-447339 |
| 29 | Tubular Cond. (.04 mfd.) | 30-4119 |
| 30 | Output Trans. | |
| | (Spkr. Part No. 36-1469-1) | 32-8047 |
| | (Spkr. Part No. 36-1469-9) | 32-8044 |
| 31 | Cone & Voice Coil Assy. | |
| | (Spkr. Part No. 36-1469-1) | 36-4115 |
| | (Spkr. Part No. 36-1469-9) | 36-4113 |
| 32 | Field Coil (Replace Spkr. Part No. 36-1469) | |
| 33 | Electrolytic Cond. (20-20 mfd.) | 30-2403 |
| 34 | Filament Resistor | 33-3375 |
| 35 | Pilot Lamp | 34-2068 |
| 36 | Tubular Cond. (.04 mfd.) | 30-4119 |
| 37 | Push Button Switch (Model 40-125) | 42-1512 |
| 38 | Padder Strip (Model 40-125) | 31-6312 |
| 39 | Wave Switch | 42-1505 |
| | Cable & Plug (Power Supply) | L-3199 |
| | Cabinet (Model 40-120) | 10389A |
| | Clip (Coil Mtg.) | 28-5002 |
| | Dial | 27-5517 |
| | Drive Cord Assy. | 31-2387 |
| | Drive Shaft Assy. | 31-2370 |
| | Knobs (Volume-Tuning-Wave Switch) | 27-4809 |
| | Pilot Lamp Socket Assy. | 38-9825 |
| | Pointer (Dial) | 27-4845 |
| | Pointer (Knob) | 56-1465 |
| | Spring (Drive Cord Assy.) | 28-8954 |
| | Speaker Assy. | 36-1469 |
| | Sockets (Loktal) | 55-0575 |

**MISCELLANEOUS PARTS—MODEL 40-125**

| | |
|---|---|
| Cabinet | 10390A |
| Escutcheon Plate (Pushbutton) | 28-5742 |
| Escutcheon Pins | W-1074 |
| Knobs (Pushbutton) | 27-4824 |
| Tab (Dial) | 27-5526 |
| Tab Kit | 40-6473 |

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Schematic, Socket, Trimmers

# PHILCO RADIO & TELEV. CORP.

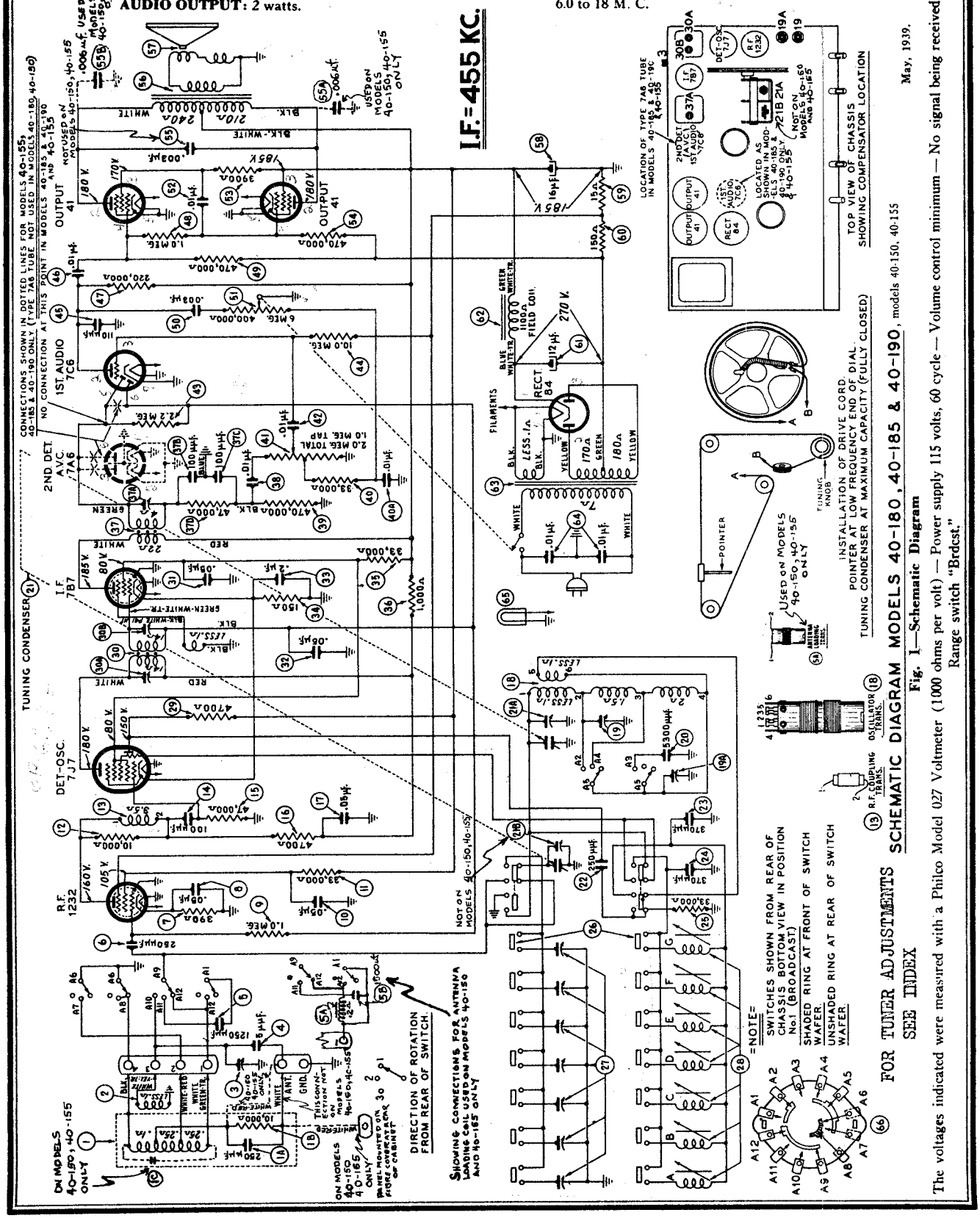
MODELS 40-150, 40-155
MODELS 40-180, 40-185
40-190

**POWER SUPPLY:** 115 Volts, 25 and 60 cycle AC.

**POWER CONSUMPTION:** 60 watts.

**AUDIO OUTPUT:** 2 watts.

**FREQUENCY TUNING RANGES:** Three.
540 to 1550 K. C.
1.5 to 3.4 K. C.
6.0 to 18 M. C.


I.F. = 455 KC.
TUNING CONDENSER
DET-OSC. 7J7
I.F. 7B7
2ND DET. AVC. 7A6
1ST AUDIO 7C6
OUTPUT 41
RECT. 84
R.F. 1232
OSCILLATOR TRANS.
R.F. COUPLING TRANS.
POINTER
TUNING KNOB
FILAMENTS
FIELD COIL
ON MODELS 40-180, 40-185 ONLY
NOT ON MODELS 40-150, 40-155
USED ON MODELS 40-150, 40-155 ONLY
DIRECTION OF ROTATION FROM REAR OF SWITCH
SHOWING CONNECTIONS FOR ANTENNA LOADING COIL USED ON MODELS 40-150 AND 40-185 ONLY
NOTE= SWITCHES SHOWN FROM REAR OF CHASSIS BOTTOM VIEW IN POSITION No.1 (BROADCAST)
SHADED RING AT FRONT OF SWITCH WAFER
UNSHADED RING AT REAR OF SWITCH WAFER

LOCATION OF TYPE 7A8 TUBE IN MODELS 40-185 & 40-190

TOP VIEW OF CHASSIS SHOWING COMPENSATOR LOCATION

INSTALLATION OF DRIVE CORD. POINTER AT LOW FREQUENCY END OF DIAL. TUNING CONDENSER AT MAXIMUM CAPACITY (FULLY CLOSED)

**Fig. 1—Schematic Diagram**

**SCHEMATIC DIAGRAM MODELS 40-180, 40-185 & 40-190**, models 40-150, 40-155

May, 1939.

FOR TUNER ADJUSTMENTS SEE INDEX

The voltages indicated were measured with a Philco Model 027 Voltmeter (1000 ohms per volt) — Power supply 115 volts, 60 cycle — Volume control minimum — No signal being received — Range switch "Brdcst."

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MODELS 40-150,40-155
MODELS 40-180,40-185,40-190
Alignment

# PHILCO RADIO & TELEV. CORP.

**TYPE OF CIRCUIT:** {Models 40-150 and 40-155 / Models 40-180, 40-185 and 40-190} are Electric Push-button and dial tuned radios incorporating the new Philco Built-in Super Aerial system which eliminates an outside aerial and reduces local static interference to a minimum. The models are also designed to receive the sound of a television program tuned in by special type Philco Television Sets.

PHILCO BUILT-IN SUPER AERIAL SYSTEM—Included in the built-in super aerial system is a statically shielded loop for broadcast band reception and a short wave receiving loop. A feature of the built-in broadcast band statically shielded loop is that it may be turned to the position in which it picks up a minimum amount of interference, or if interference is not present the loop may be set in the position where best reception is obtained.

In general, these models are similar with the exception of the number of tubes used and cabinet design. Model 40-180 employs a seven tube receiver. Models 40-185 and 40-190 employ eight tube receivers assembled in different type cabinets.

Each model is equipped with eight electric tuning push buttons for automatically selecting stations. Six of the push buttons are used for broadcast stations, one for selecting dial tuning and one push button may be set up for use with a Philco wireless Record Player or the sound program tuned in by special Philco Television Sets.

Model 40-150 employs seven (7) tubes and Model 40-155, eight (8) tubes.

## Aligning of Compensating Condensers

### Equipment Required

(1) *Signal Generator.* In order to properly adjust this receiver an accurately calibrated signal generator such as Philco Model 077 is required. This signal generator covers a frequency range of 540 to 36,000 K. C. (2) *Indicating Device.* To obtain maximum signal strength and accurate adjustment of the padders a vacuum tube voltmeter and circuit tester such as Philco Models 027 and 028 is recommended. When using the vacuum tube voltmeter, an aligning adapter, Philco Part No. 45-2767, is necessary for connecting to the A. V. C. circuit. These testers also contain an audio output meter which may also be used as an indicating device. (3) *Aligning Tools.* Fiber handle screw driver, Philco Part No. 45-2610, and fiber wrench, Philco Part No. 7696.

## Connecting Aligning Instruments

**VACUUM TUBE VOLTMETER**—To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. Adjusting I. F. Circuit.

Remove the 1232 R. F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the wire (light color) which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the black wire.

2. Adjusting R. F. Circuit.

To adjust the R. F. circuit, the aligning adaptor is inserted in the 7C6 A. F. tube socket. The vacuum tube voltmeter remains connected to the adaptor as given in the above paragraph.

With the voltmeter connected in this manner a very sensitive indication of the A. V. C. voltage is obtained when the padders are adjusted. If an audio output meter is used, connect it to the plate and socket terminals of the 41 output tube and adjust the output meter for the 0 to 30 A. C. scale.

After connecting the aligning indicator, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram, page No. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

**SIGNAL GENERATOR:** When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiver loop from the cabinet. It is necessary when adjusting the padders that the receiver be left in the cabinet.

## Models 40-150, 40-155 40-180 – 185 – 190

| | SIGNAL GENERATOR | | RECEIVER | | | |
|---|---|---|---|---|---|---|
| *Operations* | *Output Connections* | *Dial Frequency* | *Dial Frequency* | *Control Settings* | *Adjust Compensators for Max. Signal* | *Remarks* |
| 1 | High Side to No. 1 Ter. Loop Panel | I. F. 455 K. C. | 580 K. C. No Signal | Range Sw. "Brdcst." Volume "Max." Push-Button "Dial" | 37A, 30, 30A | See Note A. |
| 2 | Use Loop on Generator | 18 M. C. | 18 M. C. | Range Sw. "SW." Volume "Max." Push-Button "Dial." | 21A | Note B. Note D. |
| 3 | Use Loop on Generator | 1400 K. C. | 1400 K. C. | Range Sw. "Brdcst." Volume "Max." | 19A, 21B | |
| 4 | Use Loop on Generator | 580 K. C. | 580 K. C. | Range Sw. "Brdcst." Volume "Max." | 19 | Roll Cond. Note C. |
| 5 | Use Loop on Generator | 1400 K. C. | 1400 K. C. | Range Sw. "Brdcst." Volume "Max." | 19A, 21B | Roll Cond. Note C. |
| 6 | Use Loop on Generator | 18 M. C. | 18 M. C. | Range Sw. "SW." | 3 | Roll Cond. Note C. |

**NOTE A**—A "Dummy Antenna" consisting of a .1 mfd. condenser is connected in series with the signal generator output lead (high side).

**NOTE B—DIAL CALIBRATION:** In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in the schematic diagram.

**NOTE C**—When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

**NOTE D**—To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 910 K. C. below the frequency being used on any high frequency range.

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Socket, Trimmers
Chassis, Parts

# PHILCO RADIO & TELEV. CORP.

MODELS 40-150, 40-155
MODELS 40-180, 40-185
40-190

**PHILCO TUBES USED:**

MODEL 40-150, 40-180—1232, R. F.; 7J7, Converter; 7B7, I. F.; 7C6, Second Detector and First Audio; two 41, Audio Power Outputs; 84, Rectifier.

MODEL 40-155, 40-185 AND 40-190—1232, R. F.; 7J7, Converter; 7B7, I. F.; 7A6, Detector; 7C6, First Audio; two 41, Power Outputs; 84, Rectifier.

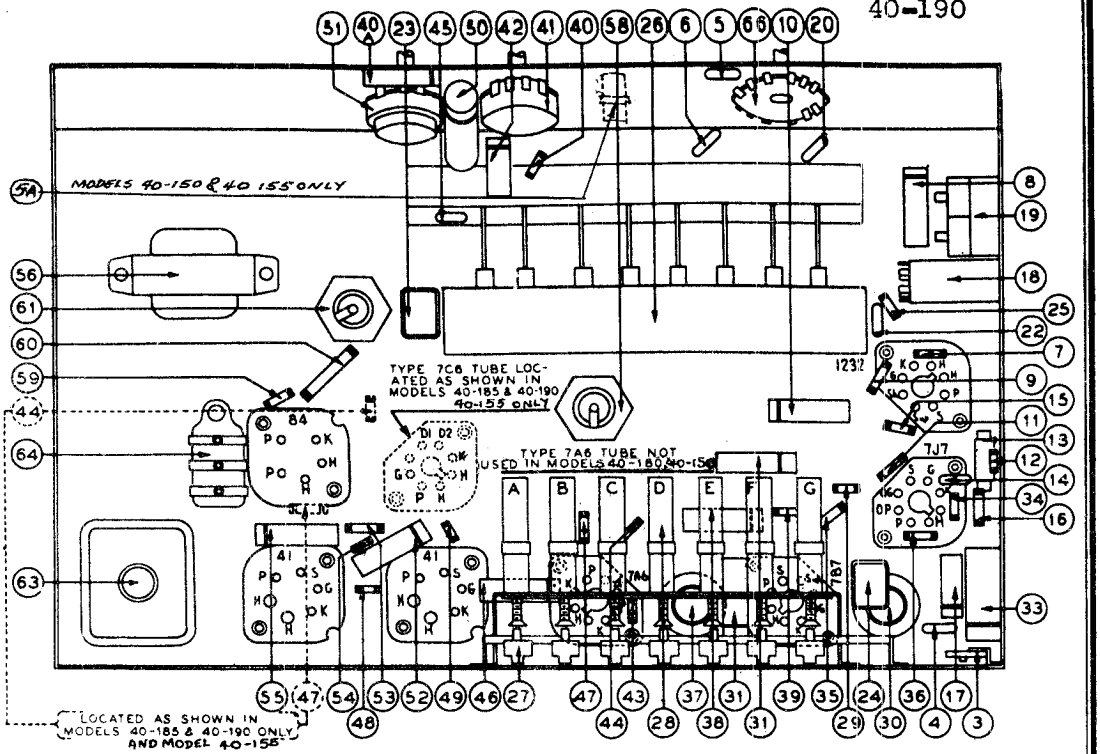
MODELS 40-150 & 40-155 ONLY
TYPE 7C6 TUBE LOCATED AS SHOWN IN MODELS 40-185 & 40-190 40-155 ONLY
TYPE 7A6 TUBE NOT USED IN MODELS 40-180, 40-150
LOCATED AS SHOWN IN MODELS 40-185 & 40-190 ONLY AND MODEL 40-155

Fig. 2—Part locations underside of chassis

## Replacement Parts—Models 40-180, 40-185, 40-190

| Sch. No. | Description | Part No. |
|---|---|---|
| 1 | Loop Ass'y (Broadcast) | 38-9880 |
| 1A | Mica Cond. (250 mmfd.) | 61-0033 |
| 1B | Resistor (10,000 ohms, ½ watt) | 33-310339 |
| 2 | Loop Ass'y (Short Wave) | 38-9884 |
| 3 | Compensator | 31-6308 |
| 4 | Mica Cond. (5 mmfd.) | 30-1097 |
| 5 | Mica Cond. (1250 mmfd.) | 5886 |
| 6 | Mica Cond. (250 mmfd.) | 61-0033 |
| 7 | Resistor (390 ohms, ½ watt) | 33-139339 |
| 8 | Tubular Cond. (.05 mfd.) | 30-4444 |
| 9 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 10 | Tubular Cond. (.05 mfd.) | 30-4123 |
| 11 | Resistor (33,000 ohms, ½ watt) | 33-333339 |
| 12 | Resistor (10,000 ohms, ½ watt) | 33-310339 |
| 13 | R. F. Coupling Trans. | 32-3194 |
| 14 | Mica Cond. (100 mmfd.) | 30-1128 |
| 15 | Resistor (47,000 ohms, ½ watt) | 33-347339 |
| 16 | Resistor (4700 ohms, ½ watt) | 33-247339 |
| 17 | Tubular Cond. (.05 mfd.) | 30-4123 |
| 18 | Oscillator Trans. | 32-3195 |
| 19 | Compensator (2 Section) | 31-6298 |
| 20 | Mica Cond. (5300 mmfd.) | 30-1134 |
| 21 | Tuning Cond. Ass'y | 31-2391 |
| 22 | Mica Cond. (250 mmfd.) | 61-0033 |
| 23 | Silver Mica Cond. (370 mmfd.) | 30-1110 |
| 24 | Silver Mica Cond. (370 mmfd.) | 30-1110 |
| 25 | Resistor (33,000 ohms, ½ watt) | 33-333339 |
| 26 | Push Button Switch | 42-1489 |
| 27 | Padder Strip (Push Buttons) | 31-6299 |
| 28 | Coil Strip Ass'y | |
| 28A | Coil No. 1 | |
| 28B | Coil No. 2 (540-1060 K. C.) | 32-3042 |
| 28C | Coil No. 3 | |
| 28D | Coil No. 4 | |
| 28E | Coil No. 5 (650-1110 K. C.) | 32-3042 |
| 28F | Coil No. 6 | |
| 28G | Coil No. 7 (920-1600 K. C.) | 32-3041 |
| 29 | Resistor (4700 ohms, ½ watt) | 33-247339 |
| 30 | 1st I. F. Trans. Ass'y | 32-3245 |
| 31 | Tubular Cond. (.05 mfd.) | 30-4123 |
| 32 | Tubular Cond. (.05 mfd.) | 30-4519 |
| 33 | Tubular Cond. (.2 mfd.) | 30-4536 |
| 34 | Resistor (150 ohms, ½ watt) | 33-115339 |
| 35 | Resistor (33,000 ohms, ½ watt) | 33-333339 |
| 36 | Resistor (1000 ohms, ½ watt) | 33-210339 |
| 37 | 2nd I. F. Trans. Ass'y | 32-3246 |
| 38 | Tubular Cond. (.01 mfd.) | 30-4479 |
| 39 | Resistor (470,000 ohms, ½ watt) | 33-447339 |
| 40 | Resistor (33,000 ohms, ½ watt) | 33-333339 |
| 40A | Tubular Cond. (.01 mfd.) | 30-4479 |
| 41 | Volume Control (2.0 meg.) | 33-5275 |
| 42 | Tubular Cond. (.01 mfd.) | 30-4479 |
| 43 | Resistor (2.2 megs., ½ watt) | 33-522339 |
| 44 | Resistor (10.0 megs., ½ watt) | 33-610339 |
| 45 | Mica Cond. (110 mmfd.) | 30-1130 |
| 46 | Tubular Cond. (.01 mfd.) | 30-4572 |
| 47 | Resistor (220,000 ohms, ½ watt) | 33-422339 |
| 48 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 49 | Resistor (470,000 ohms, ½ watt) | 33-447339 |
| 50 | Tubular Cond. (.003 mfd.) | 30-4469 |
| 51 | Tone Control & On-Off Switch | 33-5314 |
| 52 | Tubular Cond. (.01 mfd.) | 30-4572 |
| 53 | Resistor (3900 ohms, ½ watt) | 33-239339 |
| 54 | Resistor (470,000 ohms, ½ watt) | 33-447339 |
| 55 | Tubular Cond. (.003 mfd.) | 30-4469 |
| 56 | Output Trans. | 32-8053 |
| 57 | Cone & Voice Coil Ass'y | |
| | (Spkr. Part No. 36-1479-2) | 36-4089 |
| | (Spkr. Part No. 36-1479-4) | 36-4111 |
| 58 | Electrolytic Cond. (16 mfd., 200 V.) | 30-2406 |
| 59 | Resistor (15 ohms, ½ watt) | 33-015351 |
| 60 | Resistor (150 ohms, 1 watt) | 33-115451 |
| 61 | Electrolytic Cond. (12 mfd., 350 V.) | 30-2405 |
| 62 | Field Coil (Replace Spkr., Part No. 36-1479) | |
| 63 | Power Trans. (115 Volts, 50 to 60 Cycle) | 32-8052 |
| 64 | Line Cond. (Bakelite, .01-.01 mfd.) | 3903-DG |
| 65 | Pilot Lamp | 34-2210 |
| 66 | Wave Switch | 42-1490 |
| | Speaker | 36-1479 |

## Models 40-150, 40-155

**Parts listed below apply to Models 40-150, 40-155 only. For parts not found below refer to list for Models 40-180, 40-185 and 40-190 above.**

| Sch. No. | Description | Part No. |
|---|---|---|
| 1 | Loop Ass'y (Broadcast) | 38-9894 |
| 1C | Compensator Ass'y | 31-6318 |
| 4 | Mica Cond. (5 mmfd.) | 30-1120 |
| 5B | Mica Cond. (1500 mmfd.) | 7139 |
| 5A | Ant. Loading Trans. | 32-3290 |
| 8 | Tubular Cond. (.05 mfd.) | 30-4519 |
| 21 | Tuning Cond. Ass'y | 31-2401 |
| 33 | Tubular Cond. (.2 mfd.) | 30-4587 |
| 38 | Tubular Cond. (.01 mfd.) | 30-4581 |
| 40A | Tubular Cond. (.01 mfd.) | 30-4581 |
| 42 | Tubular Cond. (.01 mfd.) | 30-4581 |
| 55B | Tubular Cond. (.006 mfd.) | 30-4504 |
| 55A | Tubular Cond. (.006 mfd.) | 30-4504 |
| 57 | Cone and Voice Coil Ass'y (Spkr. Part No. 36-1483-2) | |
| 62 | Field Coil (Replace Spkr. Part No. 36-1483) | |
| 63 | Power Trans. (110 Volts, 60 Cycles) | 32-8065 |
| Speaker | | 36-1483 |

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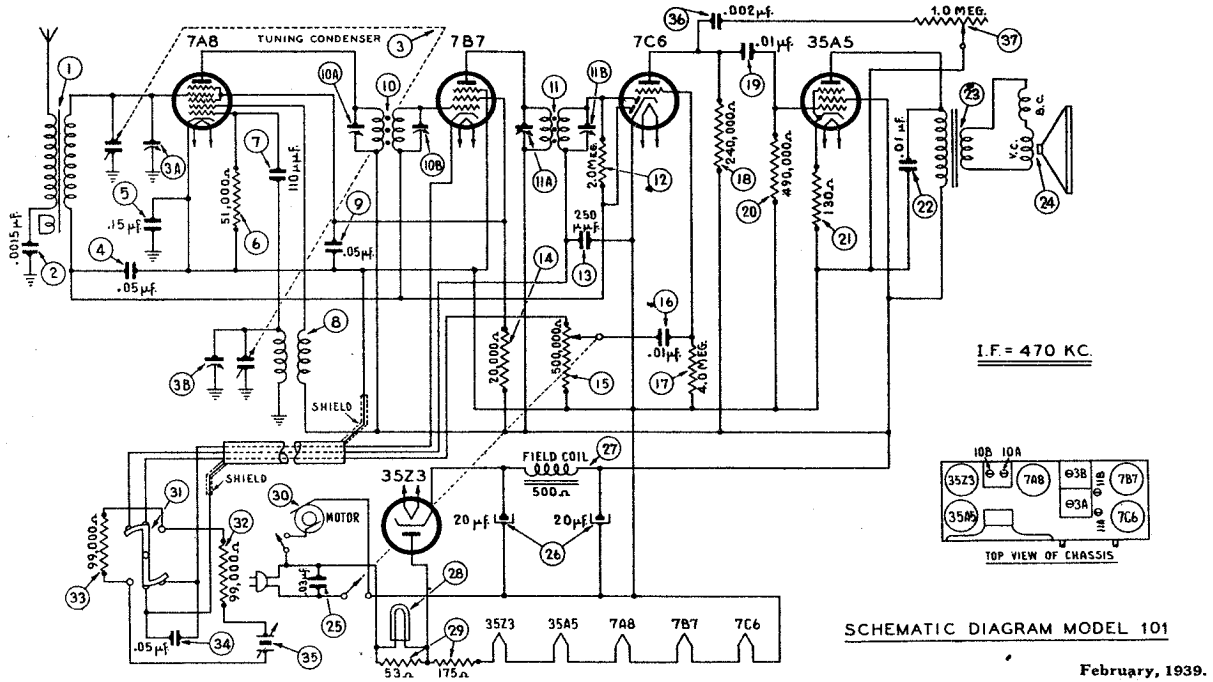
MODEL 101
Schematic, Socket, Trimmers
Alignment, Parts

# PHILCO RADIO & TELEV. CORP.




February, 1939.

Model 101 is a combination Phonograph and Radio Receiver. The phonograph section is designed to play 10 or 12 inch standard records (78 R. P. M.) and includes a manually operated crystal pickup and Turntable Motor.

The radio receiver employs an A. C. or D. C. operated superheterodyne circuit covering standard broadcast and police stations. (540 to 1720 K. C.)

**POWER SUPPLY:** Radio, 115 volts A. C. or D. C. Phonograph, 115 volts — 60 cycles **only.**

**POWER CONSUMPTION:** 57 watts.

**INTERMEDIATE FREQUENCY:** 470 K. C.

**PHILCO TUBES USED:** Five tubes; 1-7A8, first detector oscillator; 1-7B7, I. F. amplifier; 1-7C6, 2nd detector; A. V. C., first audio; 1-35A5, audio output, and 1-35Z3, rectifier.

## ALIGNMENT OF COMPENSATORS

| Operations in Order | SIGNAL GENERATOR | | | | RECEIVER | | SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna Note A | Dial Setting | Dial Setting | Control Settings | Adjust Compensators | |
| 1 | Ant. Section of Gang | .004 mfd. | 470 K. C. | 540 K. C. | Vol. Max. Tone Treble | 11A, 11B, 10A, 10B and 11B | Adjust for max. output |
| 2 | Ant. | 100 mmfd. | 1500 K. C. | 1500 K. C. | Vol. Max. Tone Treble | 3B, 3A | Adjust for max. output |

| Sche. No. | Description | Part No. | Sche. No. | Description | Part No. |
|---|---|---|---|---|---|
| 1 | Ant. Trans. | 32-3151 | 21 | Resistor (130 ohms, ½ watt) | 33-113339 |
| 2 | Tubular Cond. (.0015 mfd., 200 V.) | 30-4555 | 22 | Tubular Cond. (.01 mfd., 400 V.) | 30-4572 |
| 3 | Tuning Cond. | 31-2354 | 23 | Output Trans. (for speaker 36-1469-1) | 32-8047 |
| 4 | Tubular Cond. (.05 mfd., 400 V.) | 30-4519 | | Output Trans. (for speaker 36-1469-9) | 32-8044 |
| 5 | Tubular Cond. (.15 mfd., 400 V.) | 30-4505 | 24 | Speaker | 36-1469 |
| 6 | Resistor (51,000 ohms, ½ watt) | 33-351339 | 25 | Tubular Cond. (.03 mfd., 400 V.) | 30-4449 |
| 7 | Mica Cond. (110 mmfd.) | 30-1031 | 26 | Electrolytic Cond. (20-20 mfd., 150 V.) | 30-2382 |
| 8 | Osc. Trans. | 32-3152 | 27 | Field Coil (Replace Speaker 36-1469) | |
| 9 | Tubular Cond. (.05 mfd., 400 V.) | 30-4519 | 28 | Pilot Lamp | 34-2068 |
| 10 | 1st I. F. Trans. | 32-3149 | 29 | Line Resistor | 33-3367 |
| 11 | 2nd I. F. Trans. | 32-3150 | 30 | Phono Motor | 35-1158 |
| 12 | Resistor (2.0 megohms, ½ watt) | 33-520339 | 31 | Radio Phono Switch | 42-1500 |
| 13 | Mica Cond. (250 mmfd.) | 30-1032 | 32 | Resistor (99,000 ohms, ½ watt) | 33-399339 |
| 14 | Resistor (20,000 ohms, ½ watt) | 33-320339 | 33 | Resistor (99,000 ohms, ½ watt) | 33-399339 |
| 15 | Volume Control (500,000 ohms) | 33-5306 | 34 | Tubular Cond. (.05 mfd., 400 V.) | 30-4519 |
| 16 | Tubular Cond. (.01 mfd., 200 V.) | 30-4479 | 35 | Crystal Pickup | 415-1027 |
| 17 | Resistor (4.0 megohms, ½ watt) | 33-540339 | | Tone Arm and Crystal Pickup complete | 35-2026 |
| 18 | Resistor (240,000 ohms, ½ watt) | 33-424339 | 36 | Tubular Cond. (.002 mfd., 400 V.) | 30-4579 |
| 19 | Tubular Cond. (.01 mfd., 400 V.) | 30-4572 | 37 | Tone Control | 33-5320 |
| 20 | Resistor (490,000 ohms, ½ watt) | 33-449339 | 38 | Motor Switch | 42-1498 |

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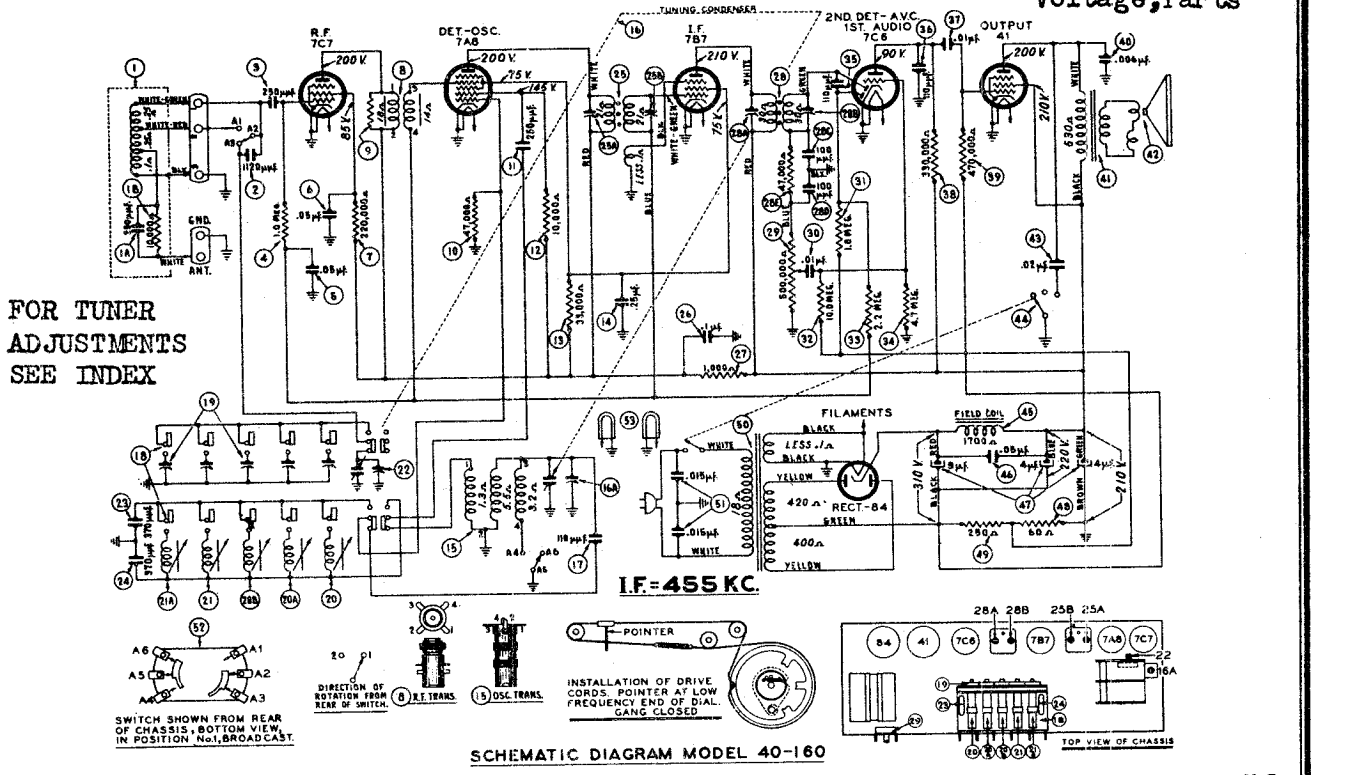
# PHILCO RADIO & TELEV. CORP.

**MODEL 40-160**
**Schematic, Socket Trimmers, Chassis Voltage, Parts**




SCHEMATIC DIAGRAM MODEL 40-160

May, 1939

**Power Supply:** 115 V., 25 and 60 Cyc. A. C.
**Power Consumption:** 45 watts.
**Frequency Tuning Ranges:** (Two) 540 to 1550 K.C. 1500 to 3350 K.C.
**Intermediate Frequency:** 455 K.C.
**Audio Output:** 2 watts.

| Sch. No. | Description | Part No. |
|---|---|---|
| 1 | Loop Ass'y | 38-9897 |
| 1A | Mica Cond. (250 mmfd.) | 61-0033 |
| 1B | Resistor (10,000 ohms, ½ watt) | 33-310339 |
| 2 | Mica Cond. (1120 mmfd.) | 30-1140 |
| 3 | Mica Cond. (250 mmfd.) | 61-0033 |
| 4 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 5 | Tubular Cond. (.05 mfd.) | 30-4519 |
| 6 | Tubular Cond. (.05 mfd.) | 30-4123 |
| 7 | Resistor (220,000 ohms, ½ watt) | 33-422339 |
| 8 | R. F. Trans. | 32-3283 |
| 9 | Resistor (6800 ohms, ½ watt) | 33-268339 |
| 10 | Resistor (470,000 ohms, ½ watt) | 33-447339 |
| 11 | Mica Cond. (250 mmfd.) | 61-0033 |
| 12 | Resistor (10,000 ohms, ½ watt) | 33-310339 |
| 13 | Resistor (33,000 ohms, ½ watt) | 33-333339 |
| 14 | Tubular Cond. (.25 mfd.) | 30-4448 |
| 15 | Oscillator Trans. | 32-3212 |
| 16 | Tuning Cond. | 31-2374 |
| 17 | Mica Cond. (110 mmfd.) | 30-1130 |
| 18 | Push Button Switch | 42-1493 |
| 19 | Padder Strip and Bracket Assy. | 31-6325 |
| 20 | Coil No. 1—540-1000 K.C. | |
| 20A | Coil No. 2—650-1100 K.C. | 32-3042 |
| 20B | Coil No. 3—740-1300 K.C. | |
| 21 | Coil No. 4—900-1500 K.C. | |
| 21A | Coil No. 5—1100-1600 K.C. | 32-3041 |
| 22 | Compensator | 31-6308 |
| 23 | Silver Mica Cond. (370 mmfd.) | 30-1110 |
| 24 | Silver Mica Cond. (370 mmfd.) | 30-1110 |
| 25 | 1st I.F. Trans. | 32-3210 |
| 26 | Tubular Cond. (.1 mfd.) | 30-4455 |
| 27 | Resistor (1000 ohms, ½ watt) | 33-210339 |
| 28 | 2nd I.F. Trans. Assy. | 32-3211 |
| 29 | Volume Control | 33-5319 |
| 30 | Tubular Cond. (.01 mfd.) | 30-4572 |
| 31 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 32 | Resistor (10.0 meg., ½ watt) | 33-610339 |
| 33 | Resistor (2.2 meg., ½ watt) | 33-522339 |
| 34 | Resistor (4.7 meg., ½ watt) | 33-547339 |
| 35 | Mica Cond. (110 mmfd.) | 30-1130 |
| 36 | Mica Cond. (110 mmfd.) | 30-1130 |
| 37 | Tubular Cond. (.01 mfd.) | 30-4572 |
| 38 | Resistor (330,000 ohms, ½ watt) | 33-433339 |
| 39 | Resistor (470,000 ohms, ½ watt) | 33-447339 |
| 40 | Tubular Cond. (.006 mfd.) | 30-4504 |
| 41 | Output Trans. | 32-8056 |
| 42 | Cone and Voice Coil Assy. (Spkr. Part No. 36-1480-3) | 36-4086 |
| 43 | Tubular Cond. (.02 mfd.) | 30-4599 |
| 44 | Tone Control and On-Off Switch | 42-1520 |
| 45 | Field Coil (Replace Spkr. Part No. 36-1480) | |
| 46 | Tubular Cond. (.05 mfd.) | 30-4123 |
| 47 | Electrolytic Cond. (8-4-4 mfd.) | 30-2400 |
| 48 | Resistor (60 ohms, ½ watt) | 33-060339 |
| 49 | Resistor (250 ohms, ½ watt) | 33-125339 |
| 50 | Power Trans. | 32-8055 |
| 51 | Line Cond. (.015-.015 mfd.) | 3903-DG |
| 52 | Wave Switch | 42-1494 |
| 53 | Pilot Lamps | 34-2064 |

**MISCELLANEOUS PARTS**

| Description | Part No. |
|---|---|
| Bezel | 27-4842 |
| Cabinet | 10398A |
| Cable and Plug (Power Supply) | L-3199 |
| Clip (Coil Mtg.) | 28-5002 |
| Dial | 27-5506 |
| Drive Cord Assy. (Pointer) | 31-2382 |
| Drive Cord Assy. (Tuning Cond.) | 31-2400 |
| Escutcheon (Push Button) | 27-4843 |
| Insulating Bushing (Insulate Drive Shaft) | 27-9437 |
| Knobs (Tuning, Tone, Volume, Wave Switch) | 27-4332 |
| Knobs (Push Buttons) | 27-4824 |
| Pilot Lamp Socket Assy. | 38-9908 |
| Pointer | 56-1479 |
| Reflector (Pilot Lamp) | 27-9455 |
| Rubber Hose (Tuning Cond. Drive) | 27-9432 |
| Spring (Tuning, Drive Cord) | 28-8751 |
| Spring (Pointer, Drive Cord) | 28-8953 |
| Spring (Drive Shaft, Grounding) | 28-8955 |
| Screw (Bezel Mtg.) | W-1834 |
| Speaker | 36-1480 |
| Socket (Type 84 Tube) | 27-6035 |
| Socket (Type 41 Tube) | 27-6036 |
| Socket (Loktal, Type 7A8 Tube) | 27-6129 |
| Socket (Loktal, Type 7C7, 7B7, 7C6 Tubes) | 27-6131 |
| Tab (Dial) | 27-5528 |
| Tab (Television) | 27-9451 |
| Tab Kit | 40-6474 |
| Tuning Shaft | 56-6052 |
| Tuning Drive Drum Assy. | 38-9883 |
| Washer ("C" Type, Tuning Shaft) | 28-2043 |

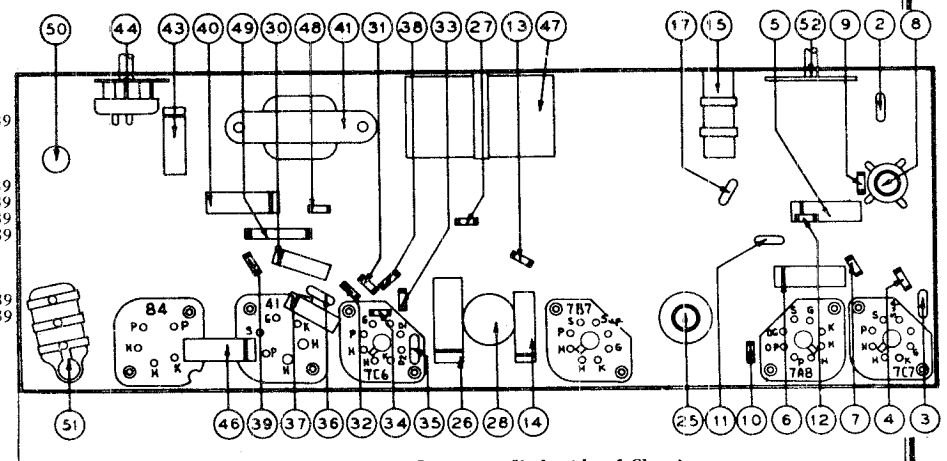



Fig. 2—Part Locations, Underside of Chassis

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MODEL 108, Code 121
Socket, Trimmers, Chassis
Tuner Unit Chassis
Alignment

PHILCO RADIO & TELEV. CORP.

MODEL 40-160
Alignment

# MODEL 40-160. Aligning of Compensating Condensers

## Equipment Required

(1) Signal Generator. In order to properly adjust this receiver an accurately calibrated signal generator such as Philco Model 077 is required. This signal generator covers a frequency range of 540 to 36,000 K.C. (2) Indicating Device. To obtain maximum signal strength and accurate adjustment of the padders a vacuum tube voltmeter and circuit tester such as Philco Models 027 and 028 is recommended. These testers also contain an audio output meter which may be used as an indicating device. (3) Aligning Tools. Fiber handle screw driver Philco Part No. 45-2610 and when using the vacuum tube voltmeter for adjusting the set, an aligning adaptor Part No. 45-2767 is required.

## Connecting Aligning Instruments

VACUUM TUBE VOLTMETER: To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. Adjusting I.F.: Remove the 7C7 R.F. tube from its socket and insert the aligning adaptor in the socket, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the light colored wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the black wire.

2. Adjusting R.F. Padders: To adjust the R.F. padders, insert the aligning adaptor in the 7C6 socket and place the tube in the adaptor. The vacuum voltmeter remains connected to the adaptor as given in the Adjusting I.F. above.

With the voltmeter connected in this manner a very sensitive indication of the output voltage is obtained when the padders are adjusted. If an audio output meter is used, connect it to the plate and socket terminals of the 41 type tube and adjust the output meter for the 0 to 30 A.C. scale.

After connecting the output meter, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram page No. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

SIGNAL GENERATOR: When adjusting the I.F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R.F. padders a loop antenna is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiver loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

| SIGNAL GENERATOR | | | RECEIVER | | | | |
|---|---|---|---|---|---|---|---|
| Operations in Order | Output Connections to Receiver | Dial Setting | Dial Setting | Control Setting | adjust compensators | | Special Instructions |
| 1 | High Side to No. 1 Ter. Loop Panel | 455 K.C. | 580 K.C. | Vol. Max. Range Switch "Broadcast." Dial push button "In" | 28A 28B | 25A 25B | See Paragraph on Signal Generator Above |
| 2 | Use Loop on Generator | 1500 K.C. | 1500 K.C. | Vol. Max. Range Switch "Broadcast" | 16A | 22 | Note A |

NOTE A—Dial Calibration: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Schematic Diagram.

MANY OF THE PARTS IN THIS PHILCO, SUCH AS CONDENSERS AND RESISTORS, ARE HELD TO MUCH CLOSER TOLERANCE THAN STANDARD REPLACEMENT PARTS. GENUINE PHILCO REPLACEMENT PARTS MUST BE USED TO OBTAIN SATISFACTORY PERFORMANCE OF THIS MODEL.

# MODEL 108, CODE 121. ALIGNMENT OF COMPENSATORS

**EQUIPMENT REQUIRED:**

(1) Signal Generator; Philco Model 077.

(2) Output Meter, Philco 027 Vacuum Tube Voltmeter and Circuit Tester.

(3) Philco Fiber Handle Screw Driver, Part No. 27 - 7059, and Fiber Wrench, Part No. 3164.

**OUTPUT METER:** The Philco 027 Output Meter is connected to the plate and cathode terminals of the type 41 tube. The Vacuum Tube Voltmeter can also be used in aligning the receiver by connecting the Negative terminal through a one megohm Resistor to the 6A7 grid. The Positive terminal is connected to the chassis. After connecting the Output Meter, adjust compensators in the order as given in tabulation below. Locations of the compensators are shown in Fig. 1.

| Operations in Order | SIGNAL GENERATOR | | | | RECEIVER | | SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna Note A | Dial Setting | Dial Setting | Control Settings | Adjust Compensators in Order | |
| 1 | 6A7 Grid | .1 mf. | 470 K. C. | 580 K. C. | *Vol. Cont. Max. Range Sw. (Brdcst) | (21A) (12B) (12A) | |
| 2 | Ant. Ter. | 100 mmf. | 18.0 M. C. | 18.0 M. C. | Vol. Cont. Max. Range Sw. (S. W.) | (4B) | See Note B, C |
| 3 | Ant. Ter. | 100 mmf. | 1550 K. C. | 1550 K. C. | Vol. Cont. Max. Range Sw. (Brdcst) | (5) (4A) | |
| 4 | Ant. Ter. | 100 mmf. | 580 K. C. | 580 K. C. | Vol. Cont. Max. Range Sw. (Brdcst) | (5A) | |
| 5 | Ant. Ter. | 100 mmf. | 1550 K. C. | 1550 K. C. | Vol. Cont. Max. | (5) | |

NOTE A — The "Dummy Antenna" consists of a condenser connected in series with the signal generator output lead (high side). Use the capacity as specified in each step of the above procedure.

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly, the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable is shown in Service Bulletin No. 305.

NOTE C — Compensators (4A) and (4B) are located on top of the tuning condenser. Compensator (4B) is the first one from the tuning drum side.

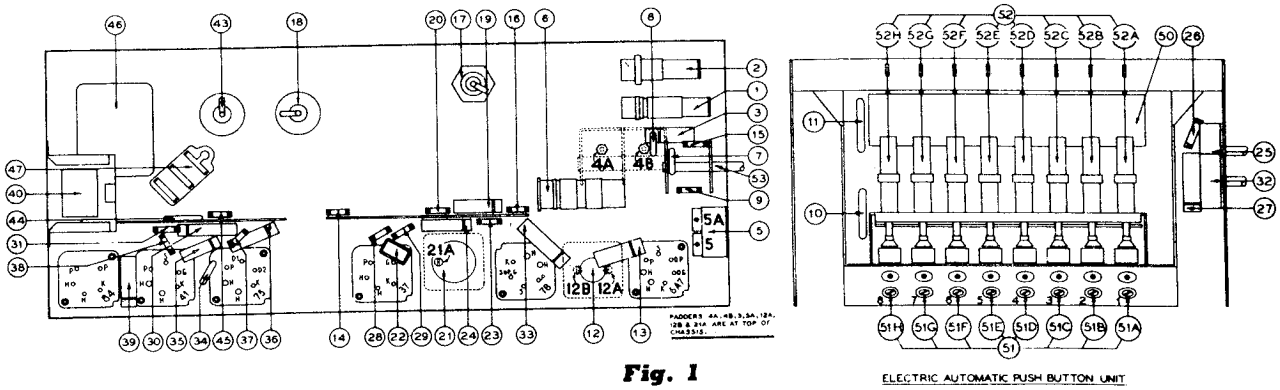


***Fig. 1***

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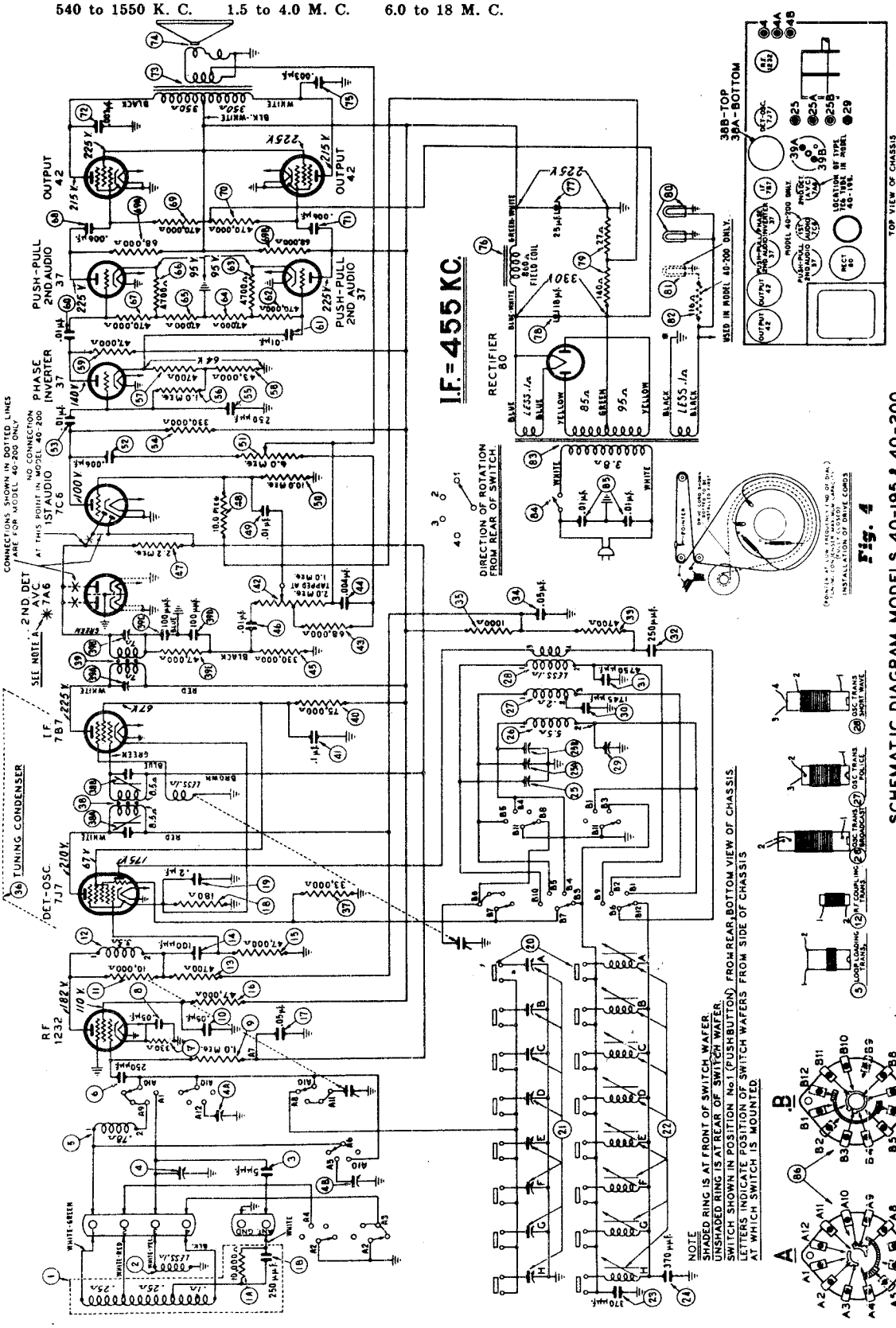
# PHILCO RADIO & TELEV. CORP.

MODELS 40-195, 40-200
Schematic, Voltage, Socket
Trimmers

**POWER SUPPLY:** 115 Volts, 25 and 60 cycle A. C.
**POWER CONSUMPTION:** 110 watts.
**FREQUENCY TUNING RANGES:** (Three)
540 to 1550 K. C. 1.5 to 4.0 M. C. 6.0 to 18 M. C.

**INTERMEDIATE FREQUENCY:** 455 K. C.
**AUDIO OUTPUT:** 5 watts.


I.F. = 455 KC.
RECTIFIER 80
OUTPUT 42
PUSH-PULL 2ND AUDIO 37
PHASE INVERTER 37
1ST AUDIO 7C6
2ND DET AVC 7A6
I.F. 7B7
DET.-OSC. 7J7
R.F. 1232
TUNING CONDENSER
DIRECTION OF ROTATION FROM REAR OF SWITCH
SEE NOTE A
NOTE A
TYPE 7A6 TUBE IS NOT USED IN MODEL 40-195
NOTE
SHADED RING IS AT FRONT OF SWITCH WAFER.
UNSHADED RING IS AT REAR OF SWITCH WAFER.
SWITCH SHOWN IN POSITION No. 1 (PUSHBUTTON) FROM REAR, BOTTOM VIEW OF CHASSIS.
LETTERS INDICATE POSITION OF SWITCH WAFERS FROM SIDE OF CHASSIS AT WHICH SWITCH IS MOUNTED.
TOP VIEW OF CHASSIS SHOWING COMPENSATION LOCATION
38B-TOP 38A-BOTTOM
MOD. IN MODEL 40-200 ONLY.
CONNECTIONS SHOWN IN DOTTED LINES ARE FOR MODEL 40-200 ONLY
NO CONNECTION AT THIS POINT IN MODEL 40-200

**SCHEMATIC DIAGRAM MODELS 40-195 & 40-200**

***Fig. 1 — Schematic Diagram***

FOR TUNER ADJUSTMENTS, SEE INDEX

***Fig. 4***

The voltages indicated were measured with a Philco Model 027 Voltmeter (1000 ohms per volt) — Power supply 115 volts, 60 cycle — Volume control minimum — No signal being received — Range switch "Brdcst."

May, 1939.

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MODELS 40-195,40-200
Chassis,Tuner Unit Chassis
Parts List

# PHILCO RADIO & TELEV. CORP.

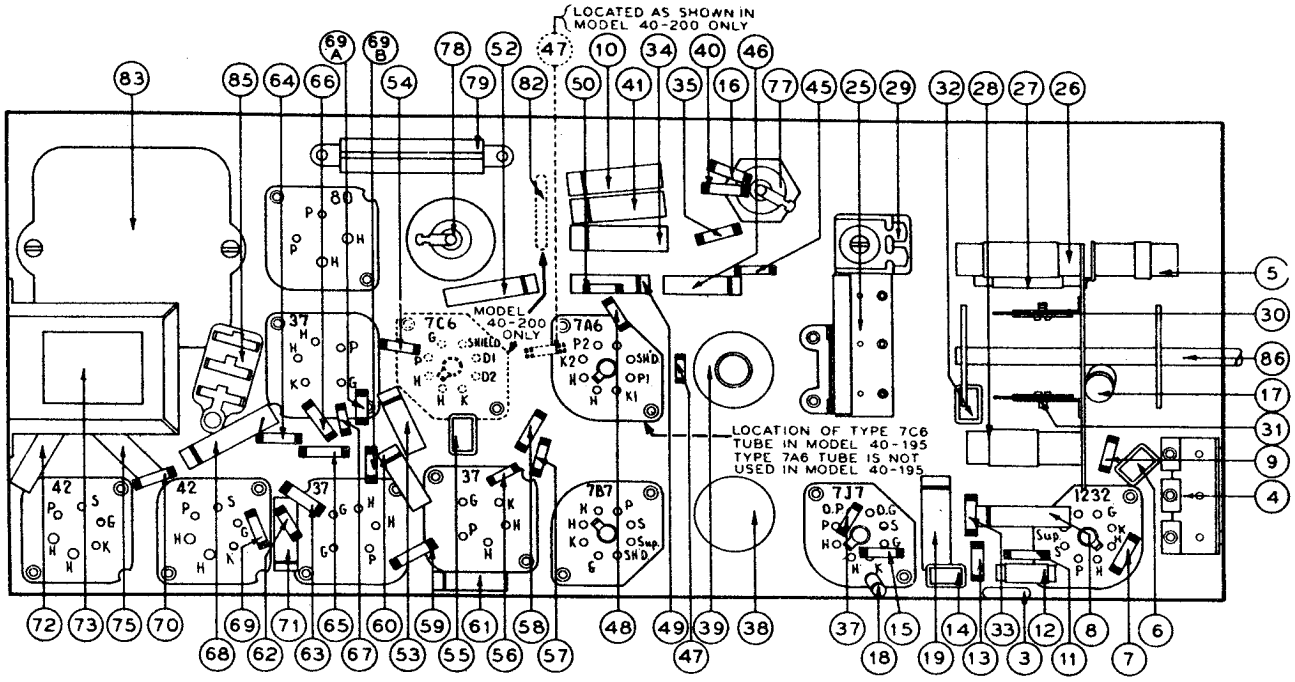
LOCATED AS SHOWN IN MODEL 40-200 ONLY
MODEL 40-200 ONLY
LOCATION OF TYPE 7C6 TUBE IN MODEL 40-195 TYPE 7A6 TUBE IS NOT USED IN MODEL 40-195

*Fig. 2*

## Replacement Parts
## Models 40-195 and 40-200

| SCHE. No. | DESCRIPTION | PART No. | LIST PRICE |
|---|---|---|---|
| 1 | Loop Assy. (Broadcast) | 38-9881 | |
| 1A | Resistor (10,000 ohms, ½ watt) | 33-310339 | .17 |
| 1B | Mica Cond. (250 mmfd.) | 61-0033 | .20 |
| 2 | Loop Assy. (Short Wave) | 38-9867 | |
| 3 | Mica Cond. (5 mmfd.) | 30-1097 | .20 |
| 4 | Compensator (3 section) | 31-6306 | |
| 4A | Part of No. 4 | | |
| 4B | Part of No. 4 | | |
| 5 | Loop Loading Coil | 32-3252 | |
| 6 | Mica Cond. (250 mmfd.) | 61-0033 | .20 |
| 7 | Resistor (330 ohms, ½ watt) | 33-133339 | .17 |
| 8 | Tubular Cond. (.05 mfd.) | 30-4444 | .15 |
| 9 | Resistor (1.0 meg., ½ watt) | 33-510339 | .17 |
| 10 | Tubular Cond. (.05 mfd.) | 30-4518 | .15 |
| 11 | Resistor (10,000 ohms, ½ watt) | 33-310339 | .17 |
| 12 | R. F. Coupling Coil | 32-3194 | |
| 13 | Resistor (4700 ohms, ½ watt) | 33-247339 | .17 |
| 14 | Mica Cond. (100 mmfd.) | 30-1128 | .15 |
| 15 | Resistor (47,000 ohms, ½ watt) | 33-347339 | .17 |
| 16 | Resistor (47,000 ohms, ½ watt) | 33-347339 | .17 |
| 17 | Tubular Cond. (.05 mfd.) | 30-4519 | .15 |
| 18 | Resistor (180 ohms, ½ watt) | 33-118339 | .17 |
| 19 | Tubular Cond. (.2 mfd.) | 30-4587 | .20 |
| 20 | Push Button Switch | 42-1515 | |
| 21 | Compensator Strip | 31-6313 | |
| | Compensator | | |
| 21A | No. 1 (540-1030 K.C.) | Part of 31-6313 | |
| 21B | No. 2 (540-1030 K.C.) | | |
| 21C | No. 3 (540-1030 K.C.) | | |
| 21D | No. 4 (670-1160 K.C.) | | |
| 21E | No. 5 (670-1160 K.C.) | | |
| 21F | No. 6 (900-1600 K.C.) | | |
| 21G | No. 7 (900-1600 K.C.) | | |
| 21H | No. 8 (900-1600 K.C.) | | |
| 22 | Coil Strip (Complete) | | |
| 22A | Coil No. 1 (540-1030 K.C.) | 32-3042 | .50 |
| 22B | Coil No. 2 (540-1030 K.C.) | 32-3042 | .50 |
| 22C | Coil No. 3 (540-1030 K.C.) | 32-3042 | .50 |
| 22D | Coil No. 4 (670-1160 K.C.) | 32-3042 | .50 |
| 22E | Coil No. 5 (670-1160 K.C.) | 32-3042 | .50 |
| 22F | Coil No. 6 (900-1600 K.C.) | 32-3041 | .50 |
| 22G | Coil No. 7 (900-1600 K.C.) | 32-3041 | .50 |
| 22H | Coil No. 8 (900-1600 K.C.) | 32-3041 | .50 |
| 23 | Silvered Mica Cond. (370 mmfd.) | 30-1110 | .45 |
| 24 | Silvered Mica Cond. (370 mmfd.) | 30-1110 | .45 |
| 25 | Compensator (3 section) | 31-6092 | .60 |
| 25A | Part of No. 25 | | |
| 25B | Part of No. 25 | | |
| 26 | Broadcast Oscillator Coil | 32-3240 | |
| 27 | Police Oscillator Coil | 32-3052 | .75 |
| 28 | Short Wave Oscillator Coil | 32-3242 | |
| 29 | Compensator | 31-6230 | .40 |
| 30 | Tracking Cond. (1745 mmfd.) | 31-6307 | |
| 31 | Tracking Cond. (4750 mmfd.) | 31-6306 | |
| 32 | Mica Cond. (250 mmfd.) | 61-0033 | .20 |
| 33 | Resistor (4700 ohms, ½ watt) | 33-247339 | .17 |
| 34 | Tubular Cond. (.05 mfd.) | 30-4518 | .15 |
| 35 | Resistor 1000 ohms, ½ watt) | 33-210339 | .17 |
| 36 | Tuning Cond. Assy. | 31-6289 | |
| 37 | Resistor (33,000 ohms, ½ watt) | 33-333339 | .17 |
| 38 | 1st I. F. Trans. Assy. | 32-3243 | |
| 39 | 2nd I. F. Trans. Assy. | 32-3250 | |
| 39A | Part of No. 39 | | |
| 39B | Part of No. 39 | | |
| 39C | Part of No. 39 | | |
| 39D | Part of No. 39 | | |
| 39E | Resistor (47,000 ohms, ½ watt) (Part of No. 39) | 33-347339 | .17 |
| 40 | Resistor (75,000 ohms, ½ watt) | 33-375339 | .17 |
| 41 | Tubular Cond. (.1 mfd.) | 30-4458 | .20 |
| 42 | Volume Control (2 meg.) | 33-8286 | 1.00 |
| 43 | Resistor (68,000 ohms, ½ watt) | 33-368339 | .17 |
| 44 | Tubular Cond. (.004 mfd.) | 30-4334 | .15 |
| 45 | Resistor (330,000 ohms, ½ watt) | 33-433339 | .17 |
| 46 | Tubular Cond. (.01 mfd.) | 30-4572 | .15 |
| 47 | Resistor (2.2 meg., ½ watt) | 33-522339 | .17 |
| 48 | Resistor (10.0 meg., ½ watt) | 33-610339 | .17 |
| 49 | Tubular Cond. (.01 mfd.) | 30-4572 | .15 |
| 50 | Resistor (10.0 meg., ½ watt) | 33-610339 | .17 |
| 51 | Tone Control (6 meg.) | 33-5325 | |
| 52 | Tubular Cond. (.006 mfd.) | 30-4445 | .15 |
| 53 | Tubular Cond. (.01 mfd.) | 30-4572 | .15 |
| 54 | Resistor (330,000 ohms, ½ watt) | 33-433339 | .17 |
| 55 | Mica Cond. (250 mmfd.) | 61-0033 | .20 |
| 56 | Resistor (1.0 meg., ½ watt) | 33-510339 | .17 |
| 57 | Resistor (4700 ohms, ½ watt) | 33-247339 | .17 |
| 58 | Resistor (43,000 ohms, ½ watt) | 33-343339 | .17 |
| 59 | Resistor (47,000 ohms, ½ watt) | 33-347339 | .17 |
| 60 | Tubular Cond. (.01 mfd.) | 30-4572 | .15 |
| 61 | Tubular Cond. (.01 mfd.) | 30-4572 | .15 |
| 62 | Resistor (470,000 ohms, ½ watt) | 33-447339 | .17 |
| 63 | Resistor (4700 ohms, ½ watt) | 33-247339 | .17 |
| 64 | Resistor (47,000 ohms, ½ watt) | 33-347339 | .17 |
| 65 | Resistor (47,000 ohms, ½ watt) | 33-347339 | .17 |
| 66 | Resistor (4700 ohms, ½ watt) | 33-247339 | .17 |
| 67 | Resistor (470,000 ohms, ½ watt) | 33-447339 | .17 |
| 68 | Tubular Cond. (.006 mfd.) | 30-4583 | .15 |
| 69 | Resistor (470,000 ohms, ½ watt) | 33-447339 | .17 |
| 70 | Resistor (470,000 ohms, ½ watt) | 33-447339 | .17 |
| 71 | Tubular Cond. (.006 mfd.) | 30-4583 | .15 |
| 72 | Tubular Cond. (.003 mfd.) | 30-4469 | .20 |
| 73 | Output Trans. | 32-7981 | 1.80 |
| 74 | Cone and Voice Coil Assy. (for Speaker 36-1450-2) | 36-4089 | 2.50 |
| | (for Speaker 36-1450-4) | 36-4111 | 2.50 |
| 75 | Tubular Cond. (.003 mfd.) | 30-4469 | .20 |
| 76 | Field Coil (Replace Spkr. No. 36-1450) | | |
| 77 | Electrolytic Con. (25 mfd., 250V.) | 30-2333 | 1.00 |
| 78 | Electrolytic Con. (18 mfd., 400V.) | 30-2335 | 1.35 |
| 79 | B. C. Resistor | 33-3376 | |
| 80 | Pilot Lamps | 34-2064 | .09 |
| 81 | Pilot Lamps | 34-2210 | .18 |
| 82 | Resistor (16 ohms, pilot lamp) | 33-016431 | .20 |
| 83 | Power Trans. (110V, 60 cycle) | 32-8059 | |
| 84 | A. C. Switch | 42-1517 | |
| 85 | Line Con. (.01-.01 mfd., Bakelite) | 3903-DG | .30 |
| 86 | Wave Switch | 42-1507 | |

## Miscellaneous Parts
## Model 40-200

| | | | |
|---|---|---|---|
| | Bezel Ass'y | 40-6490 | |
| | Bearing (Drum Shaft) | 56-1036 | .10 |
| | Cable and Plug (Power Supply) | L-2778 | .40 |
| | Cable (Speaker) | 41-3430 | .50 |

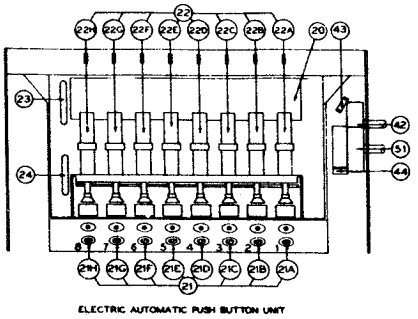


*Fig. 3*

| SCHE. No. | DESCRIPTION | PART No. | LIST PRICE |
|---|---|---|---|
| | Coupling Assy. (Tuning Cond.) | 31-2291 | .35 |
| | Dial | 27-5513 | |
| | Dial Clamp | 56-1034 | .05 |
| | Dial Gasket | 27-9224 | .01 |
| | Drive Cord Assy. (Pointer) | 31-2316 | .25 |
| | Drive Cord Assy. (Tuning Cond.) | 31-2350 | .20 |
| | Disc Control (Tuning) | 27-4766 | |
| | Disc Control (Volume) | 27-4765 | .30 |
| | Disc Control (Tone) | 27-4764 | .30 |
| | Disc Control (Wave Switch) | 27-4767 | .15 |
| | Drum Assy. (Tuning Cond.) | 38-9716 | .60 |
| | Drum Bracket & Bearing Assy. | 38-9662 | .10 |
| | Pointer (Dial) | 56-1033 | .15 |
| | Pilot Light Jewel | 27-4777 | .10 |
| | Knobs (Push Buttons) | 27-4852 | |
| | Shaft (Control Drums) | 28-6924 | .05 |
| | Spring (Drive Cord) | 28-8913 | .05 |
| | Socket Assy. (Dial Lamp) | 38-9694 | .20 |
| | Socket Assy. (Dial Lamp) | 38-9695 | .20 |
| | Socket Assy. (Pilot Lamp) | 38-9696 | .40 |
| | Socket (5 Prong, 37-Tube) | 27-6035 | .11 |
| | Socket (6 Prong, 42-Tube) | 27-6036 | .11 |
| | Socket (6 Prong, 80-Tube) | 27-6044 | .10 |
| | Socket (Loktal, 7J7-Tube) | 27-6139 | |
| | Socket (Loktal, 7A6, 7C6, Tubes) | 27-6131 | |
| | Speaker | 36-1450 | 9.00 |
| | Tab Kit | 40-6475 | |
| | Phono Tab | 27-9418 | |
| | Dial Tab | 27-5530 | |
| | MOUNTING PARTS | | |
| | Grommet (Push Button Sw. Mtg.) | 27-4586 | .03 |
| | Grommet (Tuning Unit Assy. Mtg.) | 3914 | .02 |
| | Grommet (Tuning Unit Assy. Mtg.) | 3915 | .02 |
| | Screw (Bezel Mtg.) | W-1834 | .90 Per C. |
| | Nut (Spkr. Mtg.) | W-124 | .35 Per C. |
| | Screw (Loop Mtg. Rail) | W-546 | .45 Per C. |

***Prices subject to change without notice***

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# PHILCO RADIO & TELEV. CORP.

MODELS 40-195, 40-200
Alignment

**TYPE OF CIRCUIT:** Models 40-195 and 40-200 are Electric Push-Button and dial tuned radios incorporating the new Philco Built-in Super Aerial system which eliminates an outside aerial and reduces local static interference to a minimum. These models are also designed to receive the sound of a television program tuned in by special type Philco Television Sets.

**PHILCO BUILT-IN SUPER AERIAL SYSTEM:**

Included in the built-in aerial system is a statically shielded loop for broadcast band reception and a short wave receiving loop. The feature of the built-in broadcast band statically shielded loop is that it may be turned to the position in which it picks up a minimum amount of interference, or if interference is not present the loop may be set in the position where best reception is obtained.

In general, both radios are similar with the exception of the number of tubes used and cabinet design. Models 40-195 and 40-200 employ ten and eleven tubes respectively.

Each receiver is equipped with eight electric tuning push buttons for automatically selecting stations. Seven of the push buttons are used for broadcast stations and one push button (left hand push button preferably) may be set up for use with a Philco wireless Record Player or the sound programs tuned in by Special Philco Television sets.

**PHILCO TUBES USED:** Model 40-195

1232, R. F.; 7J7, Converter; 7B7, I. F.; 7C6, Second Detector, A. V. C., and First Audio; 37, Phase Inverter; two 37, Drivers; two 42, Audio Power Outputs; 80, Rectifier.

Model 40-200

1232, R. F.; 7J7, Converter; 7B7, I. F.; 7A6 Detector A. V. C.; 7C6 First Audio; 37, Phase Inverter; two 37, Audio Drivers; two 42, Power Outputs; 80, Rectifier.

| CABINET DIMENSIONS: | Height | Width | Depth |
|---|---|---|---|
| Model 40-195 type "XX"..... | 38" | 29½" | 13¾" |
| Model 40-200 type "RX"..... | 36⅜" | 34⅝" | 14⅜" |

## Aligning of Compensating Condensers

### Equipment Required

(1) Signal Generator. In order to properly adjust this receiver an accurately calibrated signal generator such as Philco Model 077 is required. This signal generator covers a frequency range of 540 to 36,000 K. C. (2) Indicating Device, to obtain maximum signal strength and accurate adjustment of the padders a vacuum tube voltmeter and circuit tester such as Philco Models 027 and 028 is recommended. When using the vacuum tube voltmeter, an aligning adaptor Philco part No. 45-2767 is necessary for connecting to the A. V. C. circuit. These testers also contain an audio output meter which may also be used as an indicating device. (3) Aligning Tools, fiber handle screw driver Philco part No. 45-2610 and fiber wrench Philco part No. 7696.

## Connecting Aligning Instruments

**VACUUM TUBE VOLTMETER** — To use the vacuum tube voltmeter as an alignment indicator make the following connections:

1. ADJUSTING I. F. CIRCUIT:

Remove the 1232 R. F. tube from its socket and insert the aligning adaptor, then replace the tube in the adaptor. Connect the negative terminal of the vacuum tube voltmeter to the wire which protrudes from the side of the adaptor. Attach the positive terminal of the voltmeter to the chassis.

2. ADJUSTING R. F. CIRCUIT:

To adjust the R. F. circuit, the aligning adaptor is inserted in the 7C6 A. F. tube socket. The vacuum tube voltmeter remains connected to the adaptor as given in the above paragraph.

With the voltmeter connected in this manner a very sensitive indication of the A. V. C. voltage is obtained when the padders are adjusted. If an audio output meter is used, connect it to the plate and socket terminals of the 42 type tube and adjust the output meter for the 0 to 30 A. C. scale.

After connecting the aligning indicator, adjust the compensators in the order as shown in the tabulation below. Locations of the compensators are shown on the schematic diagram page No. 2. If the output meter pointer goes off scale when adjusting the compensators, reduce the strength of the signal from the generator.

**SIGNAL GENERATOR:** When adjusting the I. F. padders, the high side of the signal generator is connected through a .1 mfd. condenser to terminal No. 1 of the loop terminal panel at the rear of the chassis. The ground or low side of the signal generator is connected to the chassis of the receiver.

When aligning the R. F. padders a loop is made from a few turns of wire and connected to the signal generator output terminals; the loop is then placed two or three feet from the loop in the cabinet. Do not remove the receiving loop from the cabinet. It is necessary when adjusting the padders, that the receiver be left in the cabinet.

| Operations in Order | SIGNAL GENERATOR | | | RECEIVER | | | SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna Note A | Dial Setting | Dial Setting | Control Setting | Adjust Compensators in Order See Fig. | |
| 1 | High Side to No. 1 Ter. Loop Panel | .1 mfd. | 455 K. C. | 580 K. C. | Vol. Max. Range Switch "Brdcst." | 39B, 39A 38B, 38A | See Note A |
| 2 | Use Loop on Generator | | 1500 K. C. | 1500 K. C. | Vol. Max. Range Switch "Brdcst." | 29B, 4B | See Note B |
| 3 | Use Loop on Generator | | 580 K. C. | 580 K. C. | Vol. Max. Range Switch "Brdcst." | 29 | Roll Tuning Condenser Note C |
| 4 | Use Loop on Generator | | 1500 K. C. | 1500 K. C. | Vol. Max. Range Switch "Brdcst." | 25B, 4B | |
| 5 | Use Loop on Generator | | 3.5 M. C. | 3.5 M. C. | Vol. Max. Range Switch "Police" | 25A, 4A | |
| 6 | Use Loop on Generator | | 18.0 M. C. | 18.0 M. C. | Vol. Max. Range Switch "S. W." | 25, 4 | Check Image Signal Note D |

NOTE A — A "Dummy Antenna" consisting of a .1 mfd. condenser is connected in series with the signal generator output lead (high side).

NOTE B — DIAL CALIBRATION: In order to adjust the receiver correctly the dial must be aligned to track properly with the tuning condenser. To adjust the dial, proceed as follows: With the tuning condenser closed (maximum capacity), set the dial pointer on the extreme left index line at the low frequency end of the broadcast scale. The arrangement of the drive cable in this position is shown in Fig. 4.

NOTE C — When adjusting the low frequency compensator of Range One (Broadcast) or the antenna and R. F. compensators of the high frequency tuning ranges; the receiver Tuning Condenser must be adjusted (rolled) as follows: First tune the compensator for maximum output, then vary the tuning condenser of the receiver for maximum output. Now turn the compensator slightly to the right or left and again vary the receiver tuning condenser for maximum output. This procedure of first setting the compensator and then varying the tuning condenser is continued until there is no further gain in output reading.

NOTE D — To accurately adjust the high frequency oscillator compensator to the fundamental instead of the image signal, turn the oscillator compensator to the maximum capacity position (clockwise). From this position slowly turn the compensator counter-clockwise until a second peak is obtained on the output meter. Adjust the compensator for maximum output at this second peak.

If the above procedure is correctly performed, the image signal will be found (much weaker) by turning the receiver dial 910 K. C. below the frequency being used on any high frequency range.

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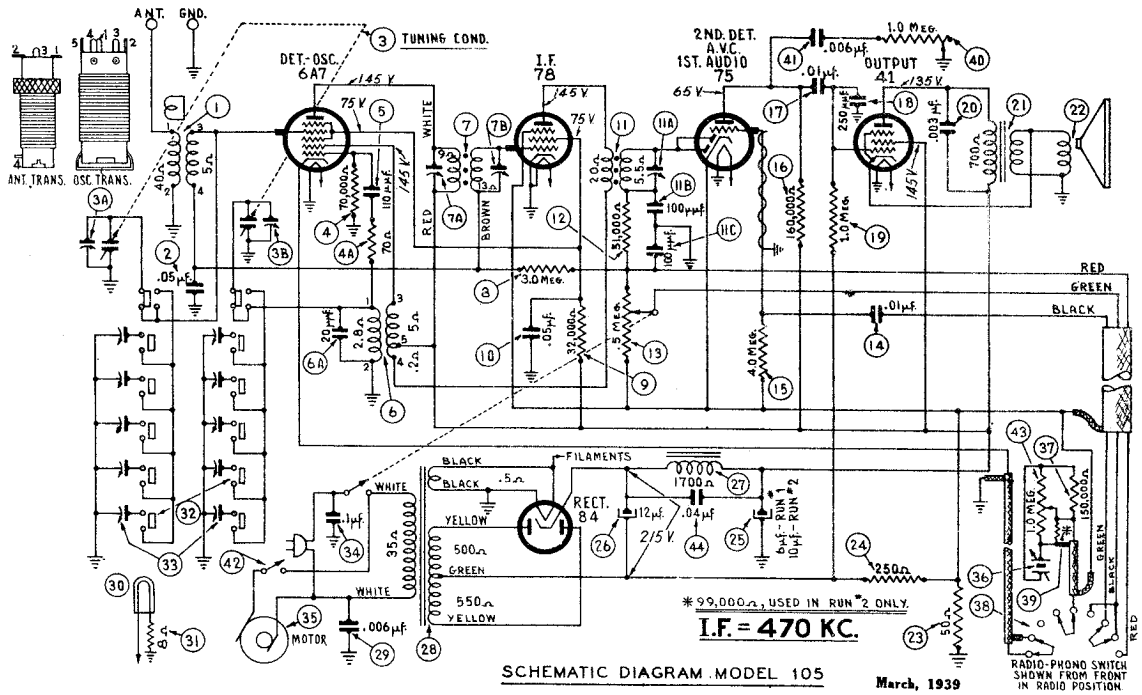
MODEL 105
Schematic, Voltage, Socket

# PHILCO RADIO & TELEV. CORP.

Trimmers, Chassis, Parts
Alignment




SCHEMATIC DIAGRAM MODEL 105

March, 1939

**POWER SUPPLY:** 115 V., 60 cycle A. C. **POWER CONSUMPTION:** 57 watts. **AUDIO OUTPUT:** One (1) watt.

Model 105 is a combination Phonograph and Electric Automatic Tuning Radio Receiver. The phonograph is designed to play 10 or 12 inch standard records (78 R. P. M.) and consists of a semi-automatically operated crystal pickup and Turntable Motor.

The radio receiver consists of a five tube A. C. operated superheterodyne circuit, covering standard broadcast frequencies (530 to 1720 K. C.) with Automatic Volume Control and Pentode Audio Output. In addition to being manually tuned, there are six Electric Automatic Push Buttons. Five push buttons are used for selecting any one of five stations and one for changing to manual tuning. The procedure for adjusting the push buttons for reception of stations will be found in the instructions supplied with each receiver.

NOTE — DIAL CALIBRATION: With the tuning condenser in "maximum capacity" position (plates fully meshed), set the dial pointer between the two horizontal lines at the low frequency end of the scale (550 K. C.).

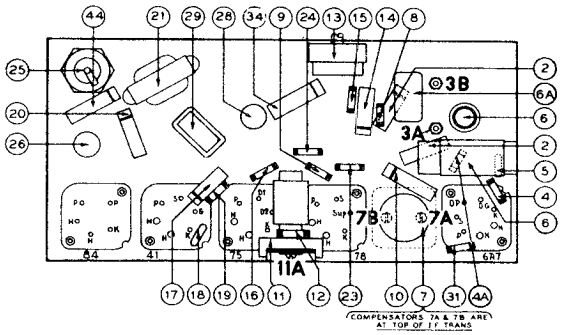



***Fig. 1***

PART LOCATIONS — UNDERSIDE OF CHASSIS

## ALIGNMENT OF COMPENSATORS

| Operations in Order | SIGNAL GENERATOR | | | | RECEIVER | | SPECIAL INSTRUCTIONS |
|---|---|---|---|---|---|---|---|
| | Output Connections to Receiver | Dummy Antenna Note A | Dial Setting | Dial Setting | Control Setting | Adjust Compensators in Order | |
| 1 | 6A7 | .1 mf. | 470 K. C. | 580 K. C. | Vol. Cont. Max. | 11A, 7B, 7A | *Adjust for max. output |
| 2 | Ant. Lead | 100 mf. | 1550 K. C. | 1550 K. C. | Vol. Cont. Max. | 3B, 3A | Adjust for max. output. Note A, B |

| Sche. No. | Description | Part No. |
|---|---|---|
| 1 | Ant. Trans. | 32-3039 |
| 2 | Tubular Cond. (.05 mfd.) | 30-4519 |
| 3 | Tuning Cond. | 31-2338 |
| 4 | Resistor (70,000 ohms, ½ watt) | 33-370339 |
| 4A | Resistor (70 ohms, ½ watt) | 33-070339 |
| 5 | Mica Cond. (110 mmfd.) | 30-1031 |
| 6 | Osc. Trans. | 32-2122 |
| 6A | Mica Cond. (20 mmfd., silver cap) | 30-1123 |
| 7 | 1st I. F. Trans. Assy. | 32-3121 |
| 8 | Resistor (3.0 meg., ½ watt) | 33-530339 |
| 9 | Resistor (32,000 ohms, ½ watt) | 33-332339 |
| 10 | Tubular Cond. (.05 mfd.) | 30-4444 |
| 11 | 2nd I. F. Trans. Assy. | 32-2674 |
| 12 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 13 | Volume Control (.5 meg.) | 33-5254 |
| 14 | Tubular Cond. (.01 mfd.) | 30-4479 |
| 15 | Resistor (4.0 meg., ½ watt) | 33-540339 |
| 16 | Resistor (160,000 ohms, ½ watt) | 33-416339 |
| 17 | Tubular Cond. (.01 mfd.) | 30-4572 |
| 18 | Mica Cond. (250 mmfd.) | 30-1032 |
| 19 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 20 | Tubular Cond. (.003 mfd.) | 30-4582 |
| 21 | Output Trans. | 32-7980 |
| 22 | Cone & Voice Coil Assy. { Run #1 Speaker No. 36-1440-3 / Run #2 Speaker No. 36-1473 } | 36-4086 / 36-4120 |
| 23 | Resistor (50 ohms, ½ watt) | 33-050339 |
| 24 | Resistor (250 ohms, ½ watt) | 33-125339 |
| 25 | Electrolytic Cond. { Run #1, 6 mfd., 450 V. / Run #2, 10 mfd., 450 V. } | 30-2265 / 30-2091 |
| 26 | Electrolytic Cond. (12 mfd., 300 V.) | 30-2404 |
| 27 | Field Coil { Replace Speaker Part No. 36-1440, Run #1 / Replace Speaker Part No. 36-1473, Run #2 } | |
| 28 | Power Trans.. (115 V., 50-60 cycles) | 32-7979 |
| 29 | Condenser (.006 mfd., moulded) | 30-4423 |
| 30 | Pilot Lamp | 34-2064 |
| 31 | Pilot Lamp Resistor (8 ohms, ½ watt) | 33-980331 |
| 32 | Push Button Switch | 42-1477 |
| 33 | Padder Strip Assy. | 31-6290 |
| 34 | Tubular Cond. (.1 mfd.) | 30-4122 |
| 35 | Phono Motor | 35-1158 |
| 36 | Crystal Pickup without mtg. parts | 35-2031 |
| | Crystal Pickup complete with mtg. parts | 35-2027 |
| 37 | Resistor (150,000 ohms, ½ watt) | 33-415339 |
| 38 | Radio Phono Switch | 42-1502 |
| *39 | Resistor (99,000 ohms, ½ watt) used in Run 2 only | 33-399339 |
| 40 | Tone Control (1.0 meg.) | 33-5320 |
| 41 | Tubular Cond. (.006 mfd.) | 30-4591 |
| 42 | Motor Switch | 42-1498 |
| 43 | Phono Volume Control (1.0 meg.) | 33-5323 |
| 44 | Tubular Cond. (.04 mfd.) | 30-4119 |

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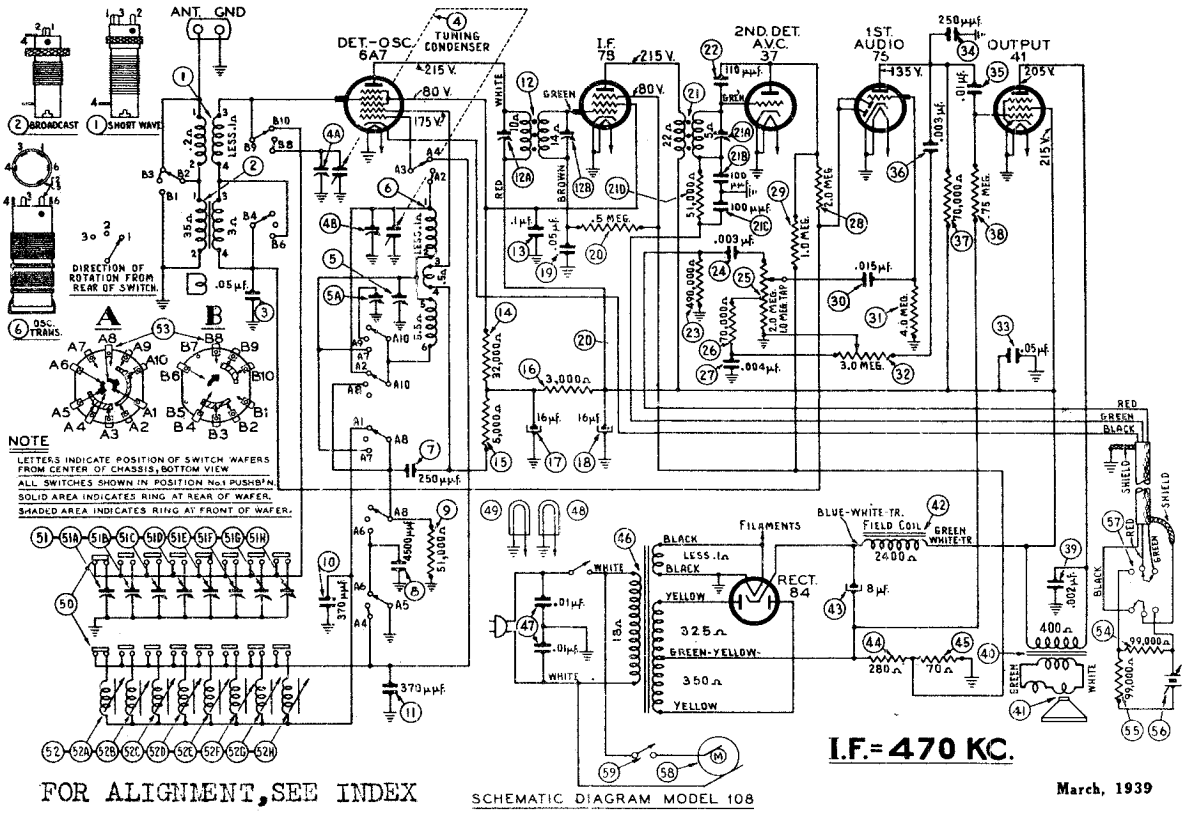
# PHILCO RADIO & TELEV. CORP.

MODEL 108, Code 121
Schematic, Voltage
Parts




FOR ALIGNMENT, SEE INDEX

SCHEMATIC DIAGRAM MODEL 108

March, 1939

**ADJUSTING ELECTRIC PUSH BUTTON TUNING:- For frequency ranges of buttons see parts 51A through 51H in parts list. For adjusting procedure see INDEX.**

**POWER SUPPLY:** 115 V., 60 cycle A. C. 69 watts.
**INTERMEDIATE FREQUENCY:** 470 K. C.

**PHILCO TUBES USED:** 6A7, First Detector Oscillator; 78, I. F. Amplifier; 37, Second Detector, A. V. C.; 75, First Audio; 41, Audio Output and 84, Rectifier.

| Sche. No. | Description | Part No. |
|---|---|---|
| 1 | Ant. Trans. (S. W.) | 32-3027 |
| 2 | Ant. Trans. (B. C.) | 32-3026 |
| 3 | Tubular Cond. (.05 mf.) | 30-4519 |
| 4 | Tuning Cond. Assy. | 31-2346 |
| 5 | Dual Padder Unit | 31-6255 |
| 6 | Osc. Trans. | 32-3028 |
| 7 | Mica Cond. (250 mmf.) | 30-1032 |
| 8 | Mica Cond. (4500 mmf.) | 30-1109 |
| 9 | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 10 | Condenser (Silver Mica) (370 mmf.) | 30-1110 |
| 11 | Condenser (Silver Mica) (370 mmf.) | 30-1110 |
| 12 | 1st I. F. Trans. Assy. | 32-3018 |
| 13 | Tubular Cond. (.1 mf.) | 30-4455 |
| 14 | Resistor (32,000 ohms, ½ watt) | 33-332339 |
| 15 | Resistor (5,000 ohms, ½ watt) | 33-250339 |
| 16 | Resistor (3,000 ohms, ½ watt) | 33-230339 |
| 17 | Electro. Cond. (16 mf.) 250 volts | 30-2331 |
| 18 | Electro. Cond. (16 mf.) 250 volts | 30-2370 |
| 19 | Tubular Cond. (.05 mf.) | 30-4519 |
| 20 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 21 | 2nd I. F. Trans. Assy. | 32-3129 |
| 21A | Compensator Part of 21 | |
| 21B | Condenser Part of 21A | |
| 21C | Condenser Part of 21A | |
| 21D | Resistor (51,000 ohms, ½ watt) | 33-351339 |
| 22 | Mica Cond. (110 mmf.) | 30-1031 |
| 23 | Resistor (490,000 ohms, ½ watt) | 33-449339 |
| 24 | Tubular Cond. (.003 mf.) | 30-4580 |
| 25 | Volume Control (2 meg.) | 33-5286 |
| 26 | Resistor (70,000 ohms) | 33-370339 |
| 27 | Tubular Cond. (.004 mf.) | 30-4334 |
| 28 | Resistor (2.0 meg., ½ watt) | 33-520339 |
| 29 | Resistor (1.0 meg., ½ watt) | 33-510339 |
| 30 | Tubular Cond. (.015 mf.) | 30-4515 |
| 31 | Resistor (4.0 meg., ½ watt) | 33-540339 |
| 32 | Tone Control (3 meg.) | 33-5287 |
| 33 | Tubular Cond. (.05 mf. | 30-4518 |
| 34 | Mica Cond. (250 mmf.) | 30-1032 |
| 35 | Tubular Cond. (.01 mf.) | 30-4572 |
| 36 | Tubular Cond. (.003 mf.) | 30-4582 |
| 37 | Resistor (70,000 ohms, ½ watt) | 33-370339 |
| 38 | Resistor (75 meg., ½ watt) | 33-475339 |
| 39 | Tubular Cond. (.002 mf.) | 30-4177 |
| 40 | Output Trans. for Speaker Part No. 36-1438-2 | 32-7978 |
| 41 | Cone and Voice Coil Assy. for Speaker Part No. 36-1438-2 | 36-4089 |
| 42 | Field Coil, Replace Speaker Part No. 36-1438-2 | |
| 43 | Electro. Cond. (8 mf. 400 V.) | 30-2371 |
| 44 | Resistor (280 ohms) | 33-128431 |
| 45 | Resistor (70 ohms, ½ watt) | 33-070339 |
| 46 | Power Trans. (115 V. 50 to 60 cycles) | 32-7977 |
| 47 | Bakelite Cond. (.01 mf. .01 mf.) | 3903DG |
| 48 | Pilot Lamp (Dial) | 34-2064 |
| 49 | Pilot Lamp (Dial) | 34-2064 |
| 50 | Push Button Switch | 42-1462 |
| 51 | Compensator Assy. | 31-6256 |
| 51A | Compensator No. 1 (540-1030 K. C.) | |
| 51B | Compensator No. 2 (540-1030 K. C.) | |
| 51C | Compensator No. 3 (670-1160 K. C.) | |
| 51D | Compensator No. 4 (670-1160 K. C.) | |
| 51E | Compensator No. 5 (900-1470 K. C.) | |
| 51F | Compensator No. 6 (900-1470 K. C.) | |
| 51G | Compensator No. 7 (1170-1600 K. C.) | |
| 51H | Compensator No. 8 (1170-1600 K. C.) | |
| 52 | Electric Push Button Coil Assy. | 32-3031 |
| 52A | Osc. Coil No. 1 (540-1030 K.C.) | 32-3042 |
| 52B | Osc. Coil No. 2 (540-1030 K.C.) | 32-3042 |
| 52C | Osc. Coil No. 3 (670-1160 K.C.) | 32-3042 |
| 52D | Osc. Coil No. 4 (670-1160 K.C.) | 32-3042 |
| 52E | Osc. Coil No. 5 (900-1470 K.C.) | 32-3041 |
| 52F | Osc. Coil No. 6 (900-1470 K.C.) | 32-3041 |
| 52G | Osc. Coil No. 7 (1170-1600 K.C.) | 32-3041 |
| 52H | Osc. Coil No. 8 (1170-1600 K.C.) | 32-3041 |
| 53 | Wave Switch | 42-1478 |
| 54 | Resistor (99,000 ohms, ½ watt) | 33-399339 |
| 55 | Resistor (99,000 ohms, ½ watt) | 33-399339 |
| 56 | Crystal Pickup (without mtg. Parts) | 35-2031 |
| | Crystal Pickup (complete with mtg. Parts) | 35-2027 |
| 57 | Radio Phono Switch | 42-1509 |
| 58 | Phono Motor (115 volt, 60 cycle) | 35-1158 |
| 59 | Motor Switch | 42-1498 |
| | Bezel | 56-1104 |
| | Bracket & Bearing (Tuning Drum) | 38-9662 |
| | Cable (Power) | L-2778 |
| | Coupling (Tuning Condenser) | 31-2291 |
| | Dial | 27-5452 |
| | Drive Cord Assy. (Tuning) | 31-2315 |
| | Drive Cord Assy. (Pointer) | 31-2316 |
| | Disc Control (Tuning) | 27-4766 |
| | Disc Control (Range Switch) | 27-4767 |
| | Disc Control (Tone) | 27-4764 |
| | Disc Control (Volume) | 27-4765 |
| | Drum & Shaft (Tuning Cond.) | 38-9716 |
| | Needle Screw | 218-1047 |
| | Nut ("T" Type Motor Mtg.) | W-1758 |
| | Knob (Pushbutton) | 27-4758 |
| | Pointer | 56-1033 |
| | Screw (Pickup Mtg.) | W-2027 |
| | Screw (Motor Mtg.) | W-599 |
| | Screw (Chassis Mtg.) | W-454 |
| | Sleeve (Motor Mtg.) | 28-5274 |
| | Spring (Drive Cord Assy.) | 28-8913 |
| | Spring (Pushbutton) | 56-1238 |
| | Socket (5 prong) | 27-6035 |
| | Socket (6 prong) | 27-6036 |
| | Socket (7 prong) | 27-6099 |
| | Speaker | 36-1438-2 |
| | Turntable | 315-1007 |
| | Washer (Rubber coupling, Turntable shaft) | 315-1002 |
| | Washer (Metal coupling, Turntable shaft) | 315-1003 |
| | Washer (Rubber, Motor Mtg., top) | 3915 |
| | Washer (Rubber, Motor Mtg., bottom) | 27-4818 |

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MODEL 936
Schematic, Socket
Trimmers, Chassis
Parts

PHILCO RADIO & TELEV. CORP.

# PHILCO MODEL 936

## I.F. = 470 KC

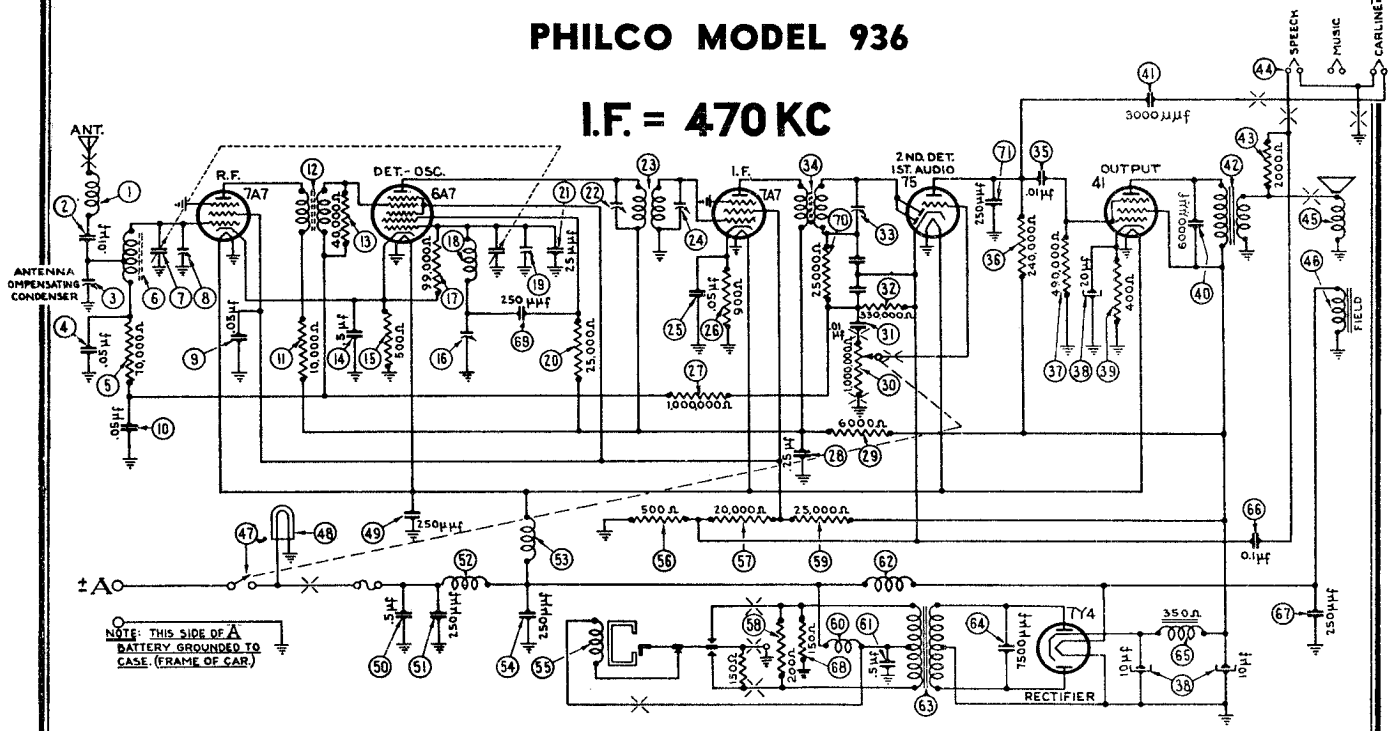


FIGURE 2

FOR ALIGNMENT, SEE INDEX

## MODEL 936 PARTS LIST

| No. | Description | Part No. |
|---|---|---|
| (1) | Antenna Choke | 32-1956 |
| (2) | Condenser (.01 mfd.) | 30-4479 |
| (3) | Antenna Compensator | 31-6248 |
| (4) | Condenser (.05 mfd.) | 30-4444 |
| (5) | Resistor (70,000 ohms) | 33-370257 |
| (6) | Antenna Transformer | 65-0085 |
| (7) | Tuning Condenser | 63-0016 |
| (8) | First Padder (on Tun. Cond.) | |
| (9) | Condenser (.05 mfd.) | 30-4569 |
| (10) | Condenser (.05 mfd.) | 30-4444 |
| (11) | Resistor (10,000 ohms) | 33-310337 |
| (12) | R. F. Transformer | 65-0009 |
| (13) | Resistor (40,000 ohms) | 33-340237 |
| (14) | Condenser (.5 mfd.) | 30-4565 |
| (15) | Resistor (500 ohms) | 33-150438 |
| (16) | Low Frequency Padder | 31-6230 |
| (17) | Resistor (99,000 ohms) | 33-399337 |
| (18) | Oscillator Transformer | 65-0052 |
| (19) | Second Padder (on Tun. Cond.) | |
| (20) | Resistor (25,000 ohms) | 33-325337 |
| (21) | Condenser (25 mmfd.) | 30-1108 |
| (22) | Padder (Pri. 1st I. F. Trans.) | |
| (23) | First I. F. Transformer | 65-0044 |
| (24) | Padder (Sec. 1st I. F. Trans.) | |
| (25) | Condenser (.05 mfd.) | 30-4444 |
| (26) | Resistor (900 ohms) | 33-190438 |
| (27) | Resistor (1,000,000 ohms) | 33-510257 |
| (28) | Condenser (.25 mfd.) | 30-4448 |
| (29) | Resistor (6,000 ohms) | 33-260337 |
| (30) | Vol. Control (1,000,000 ohms) and On-Off Switch | 33-5268 |
| (31) | Condenser (.01 mfd.) | 61-0014 |
| (32) | Resistor (330,000 ohms) | 33-433337 |
| (33) | Padder (Sec. 2nd I. F. Trans.) | |
| (34) | Second I. F. Transformer | 65-0045 |
| (35) | Condenser (.01 mfd.) | 30-4501 |
| (36) | Resistor (240,000 ohms) | 33-424337 |
| (37) | Resistor (490,000 ohms) | 33-449337 |
| (38) | Filter Condenser (10-10-20 mfd.) | 61-0028 |

| No. | Description | Part No. |
|---|---|---|
| (39) | Resistor (400 ohms) | 33-140438 |
| (40) | Condenser (6,000 ohms) | 30-4024 |
| (41) | Condenser (3,000 mmfd.) | 30-4469 |
| (42) | Output Transformer | 65-0048 |
| (43) | Resistor (2,000 ohms) | 33-220447 |
| (44) | Reception Control | 412-1004 |
| (45) | Cone and Voice Coil Kit | 91-0028 |
| (46) | Field Coil | Not Replaceable |
| (47) | On-Off Switch and Vol. Control (1,000,000 ohms) | 33-5268 |
| (48) | Pilot Lamp | 34-2040 |
| (49) | Condenser (250 mmfd.) | 61-0033 |
| (50) | Condenser (.5 mfd.) | 30-4474 |
| (51) | Condenser (250 mmfd.) | 61-0033 |
| (52) | "A" Choke | 65-0057 |
| (53) | Filament Choke | 65-0057 |
| (54) | Condenser (250 mmfd.) | 61-0033 |
| (55) | Vibrator | 41-3398 |
| (56) | Resistor (500 ohms) | 33-150438 |
| (57) | Resistor (20,000 ohms) | 33-320337 |
| (58) | Resistor (200 ohms) | 33-120347 |
| (59) | Resistor (25,000 ohms) | 33-325437 |
| (60) | Vibrator Choke | 32-2483 |
| (61) | Condenser (.5 mfd.) | 30-4565 |
| (62) | Choke | 32-1374 |
| (63) | Power Transformer | 65-0046 |
| (64) | Condenser (7,500 mmfd.) | 30-4567 |
| (65) | Filter Choke | 32-7959 |
| (66) | Condenser (.01 mfd.) | 30-4499 |
| (67) | Condenser (250 mmfd.) | 61-0033 |
| (68) | Resistor (150 ohms) | 33-115337 |
| (69) | Condenser (250 mmfd.) | 61-0034 |
| (70) | Resistor (25,000 ohms) | 33-325314 |
| (71) | Condenser (250 mmfd.) | 30-1032 |
| | Control Unit | 85-0058 |
| | Dial | 55-0304 |
| | Tuning and Volume Knob | 27-4725 |
| | Distributor Resistor | 33-1196 |
| | Interference Condenser | 30-4007 |
| | Control Mtg. Bracket | 28-5790 |

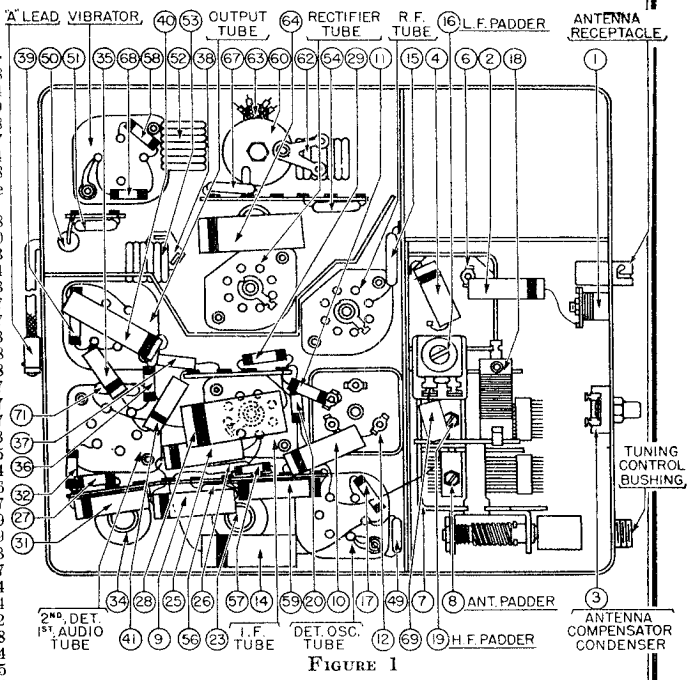


FIGURE 1

| No. | Description | Part No. |
|---|---|---|
| | Reception Control Mtg. Bracket | 28-5852 |
| | Flexible Shaft | 57-0631 |
| | "T" Bolt | 28-6161 |
| | Nut | W518 |

JANUARY 5, 1939

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Trimmers, Chassis Parts

# PHILCO RADIO & TELEV. CORP.

MODEL 937 Schematic, Socket

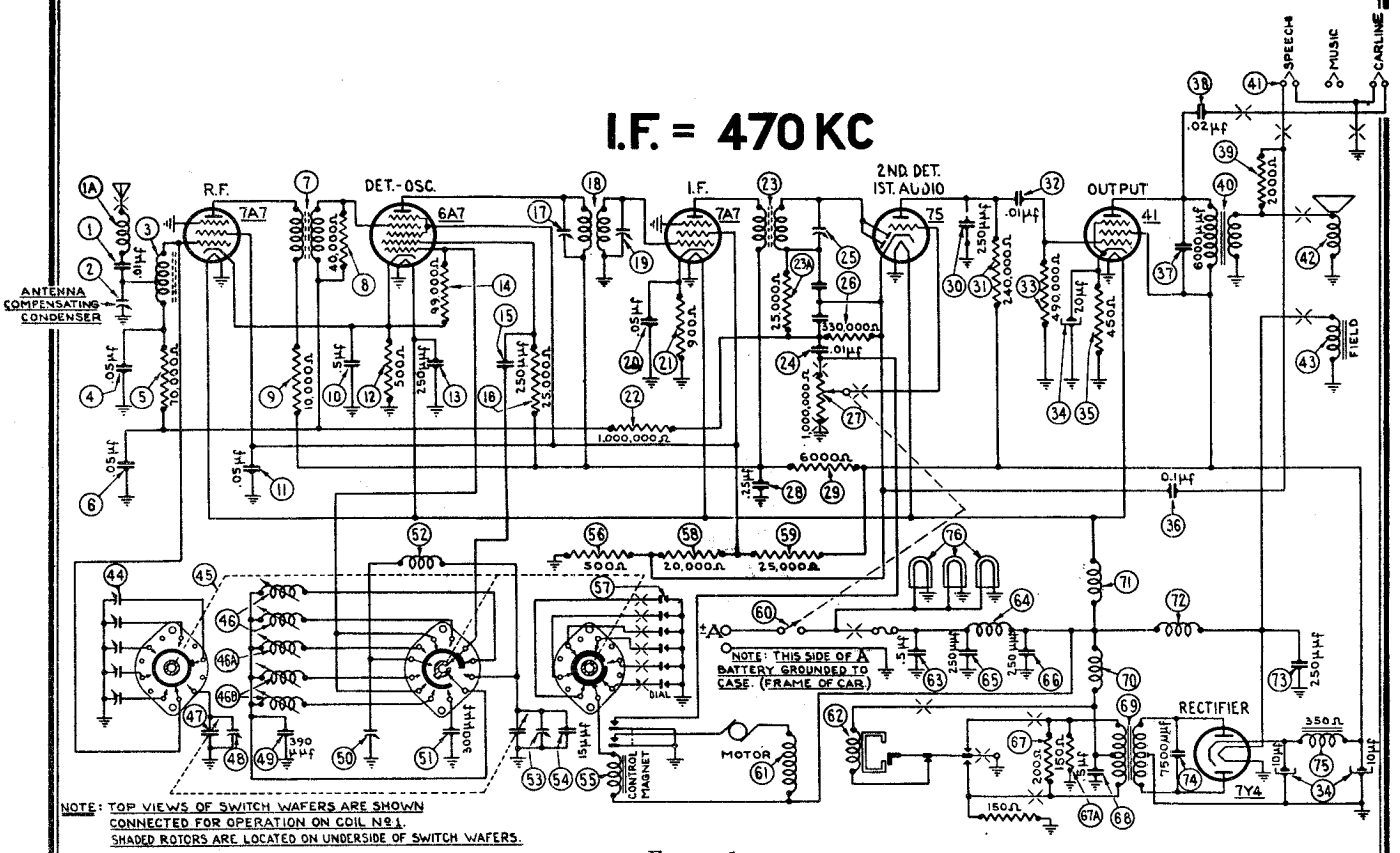


FIGURE 1

## MODEL 937 PARTS LIST

| No. | Description | Part No. |
|---|---|---|
| (1) | Condenser (.01 mfd.) | 30-4479 |
| (1a) | Antenna Choke | 77-0161 |
| (2) | Antenna Compensating Condenser | Part of (43) |
| (3) | Antenna Transformer | 65-0085 |
| (4) | Condenser (.05 mfd.) | 30-4444 |
| (5) | Resistor (70,000 ohms) | 33-370257 |
| (6) | Condenser (.05 mfd.) | 30-4444 |
| (7) | R. F. Transformer | 65-0009 |
| (8) | Resistor (40,000 ohms) | 33-339137 |
| (9) | Resistor (10,000 ohms) | 33-310337 |
| (10) | Condenser (.5 mfd.) | 30-4565 |
| (11) | Condenser (.05 mfd.) | 30-4569 |
| (12) | Resistor (500 ohms) | 33-150438 |
| (13) | Condenser (250 mmfd.) | 61-0033 |
| (14) | Resistor (99,000 ohms) | 33-399337 |
| (15) | Condenser (250 mmfd.) | 61-0033 |
| (16) | Resistor (25,000 ohms) | 33-325337 |
| (17) | Padder (Pri. 1st I. F. Trans.) | |
| (18) | First I. F. Transformer | 65-0044 |
| (19) | Padder (Sec. 1st I. F. Trans.) | |
| (20) | Condenser (.05 mfd.) | 30-4444 |
| (21) | Resistor (900 ohms) | 33-190438 |
| (22) | Resistor (1,000,000 ohms) | 33-510257 |
| (23) | Second I. F. Transformer | 65-0045 |
| (23a) | Resistor (25,000 ohms) | 33-325337 |
| (24) | Condenser (.01 mfd.) | 61-0014 |
| (25) | Padder (Sec. 2nd I. F. Trans.) | |
| (26) | Resistor (330,000 ohms) | 33-433337 |
| (27) | Vol. Control (1,000,000 ohms) and On-Off Switch | 33-5268 |
| (28) | Condenser (.25 mfd.) | 30-4448 |
| (29) | Resistor (6,000 ohms) | 33-260337 |
| (30) | Condenser (250 mmfd.) | 30-1032 |
| (31) | Resistor (240,000 ohms) | 33-424337 |
| (32) | Condenser (.01 mfd.) | 30-4501 |
| (33) | Resistor (490,000 ohms) | 33-449337 |
| (34) | Filter Condenser (10-10-20 mfd.) | 61-0028 |
| (35) | Resistor (450 ohms) | 33-145337 |
| (36) | Condenser (.1 mfd.) | 30-4499 |
| (37) | Condenser (6,000 mmfd.) | 30-4024 |
| (38) | Condenser (.02 mfd.) | 30-4495 |
| (39) | Resistor (2,000 ohms) | 33-220447 |
| (40) | Output Transformer | 65-0048 |
| (41) | Reception and Push Button Control | 77-0179 |
| (42) | Cone Kit | 91-0028 |
| (43) | Field Coil | Not Replaceable |
| (44) | Antenna Padder Assembly | 77-0172 |
| (45) | Wafer Switch | 77-0180 |
| (46) | Oscillator Transformer (High Freq.) | 65-0088 |
| (46a) | Oscillator Transformer (Med. Freq.) | 65-0089 |
| (46b) | Oscillator Transformer (Low Freq.) | 65-0090 |
| (47) | Tuning Condenser | 63-0016 |
| (48) | First Padder (on Tun. Cond.) | |
| (49) | Silver Cap Condenser (390 mmfd.) | 61-0031 |
| (50) | Low Frequency Padder | 31-6230 |
| (51) | Silver Cap Condenser (330 mmfd.) | 61-0003 |
| (52) | Oscillator Transformer | 65-0052 |
| (53) | Second Padder (on Tun. Cond.) | |
| (54) | Condenser (15 mmfd.) | 61-0038 |
| (55) | Motor and Relay Assembly | 77-0178 |
| (56) | Resistor (500 ohms) | 33-150438 |
| (57) | Push Button and Reception Control Assembly | 77-0179 |
| (58) | Resistor (20,000 ohms) | 33-320337 |
| (59) | Resistor (25,000 ohms) | 33-325437 |
| (60) | On-Off Switch and Volume Control (1,000,000 ohms) | 33-5268 |
| (61) | Motor | 83-0001 |
| (62) | Vibrator | 41-3398 |
| (63) | Condenser (.5 mfd.) | 30-4474 |
| (64) | "A" Choke | 65-0057 |
| (65) | Condenser (250 mmfd.) | 61-0033 |
| (66) | Condenser (250 mmfd.) | 61-0033 |
| (67) | Resistor (200 ohms) | 33-120347 |
| (67a) | Resistor (150 ohms) | 33-115347 |
| (68) | Condenser (.5 mfd) | 30-4565 |
| (69) | Power Transformer | 65-0046 |
| (70) | Vibrator Choke | 32-2483 |
| (71) | Filament Choke | 65-0057 |
| (72) | Choke | 32-1374 |
| (73) | Condenser (250 mmfd.) | 61-0033 |

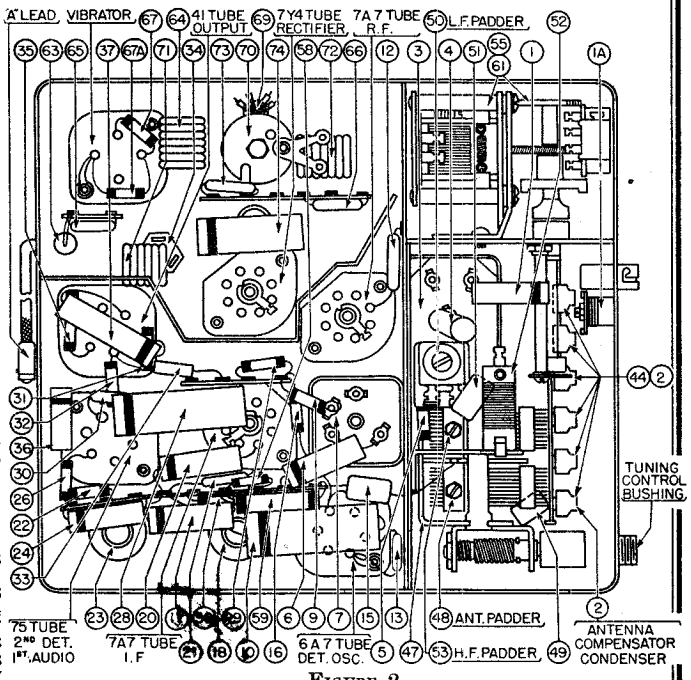


FIGURE 2

| No. | Description | Part No. |
|---|---|---|
| (74) | Condenser (7,500 mmfd.) | 30-4567 |
| (75) | Filter Choke (350 ohms) | 32-7959 |
| (76) | Pilot Lamp | 34-2040 |
| | Call Letter Kit | 81-0088 |
| | Tuning Control (Manual) | 85-0060 |
| | Bracket (Automatic Control Mtg.) | 57-0638 |
| | Distributor Resistor | 33-1196 |
| | Interference Condenser | 30-4007 |
| | Dial | 55-0304 |
| | Tuning and Volume Knob | 27-4689 |

JANUARY 3, 1939

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## MODEL 937 — ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

***Equipment*** — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

***General*** — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

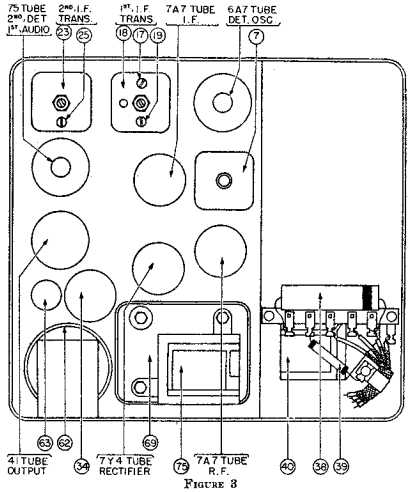


FIGURE 3

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| 1 | PRESS THE RETURN TO DIAL BUTTON UNTIL STATIONS CAN BE TUNED IN BY MANUAL TUNING. ADJUST THE ANTENNA COMPENSATOR ② TWO TURNS FROM TIGHT | | | | |
| 2 | 470 K.C. | To Grid of 6A7 Tube | .1 Mfd. | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | ㉕ ⑱ ⑰ |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | See Note 1 | Note 2 | ⑲ |
| 4 | 1400 K.C. | To Antenna Receptacle on Radio | See Note 1 | Set Tuning Condenser at 1400 K.C. | ⑧ Note 4 |
| 5 | 980 K.C. | To Antenna Receptacle on Radio | See Note 1 | Set Tuning Condenser at 580 K.C. | ⑯ Note 3 |
| 6 | 1580 K.C. | To Antenna Receptacle on Radio | See Note 1 | Note 2 | ⑲ |
| 7 | 1400 K.C. | To Antenna Receptacle on Radio | See Note 1 | Set Tuning Condenser at 1400 K.C. | ⑧ Note 4 |
| 8 | 1200 to 1400 K.C. | Note 5 | Note 5 | Note 5 | ③ |

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 50 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

NOTE 5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the antenna compensator ② (See Figure 2) for maximum signal.

## MODEL 936 — ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

***Equipment*** — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

***General*** — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

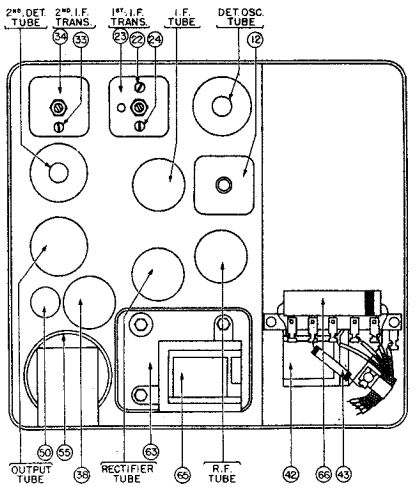


FIGURE 3

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| 1 | ADJUST THE ANTENNA COMPENSATOR ③ TWO TURNS FROM TIGHT | | | | |
| 2 | 470 K.C. | To Grid of 6A7 Tube | .1 Mfd. | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | ㉝ ㉔ ㉒ |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | See Note 1 | Note 2 | ⑱ |
| 4 | 1400 K.C. | To Antenna Receptacle on Radio | See Note 1 | Set Tuning Condenser at 1400 K.C. | ⑧ Note 4 |
| 5 | 580 K.C. | To Antenna Receptacle on Radio | See Note 1 | Set Tuning Condenser at 580 K.C. | ⑯ Note 3 |
| 6 | 1580 K.C. | To Antenna Receptacle on Radio | See Note 1 | Note 2 | ⑲ |
| 7 | 1400 K.C. | To Antenna Receptacle on Radio | See Note 1 | Set Tuning Condenser at 1400 K.C. | ⑧ Note 4 |
| 8 | 1200 to 1400 K.C. | Note 5 | Note 5 | Note 5 | ③ |

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 50 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

NOTE 5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the antenna compensator ③ (See Figure 2) for maximum signal.

# PHILCO RADIO & TELEV. CORP.

## MODEL 938K
## Schematic, Chassis Parts

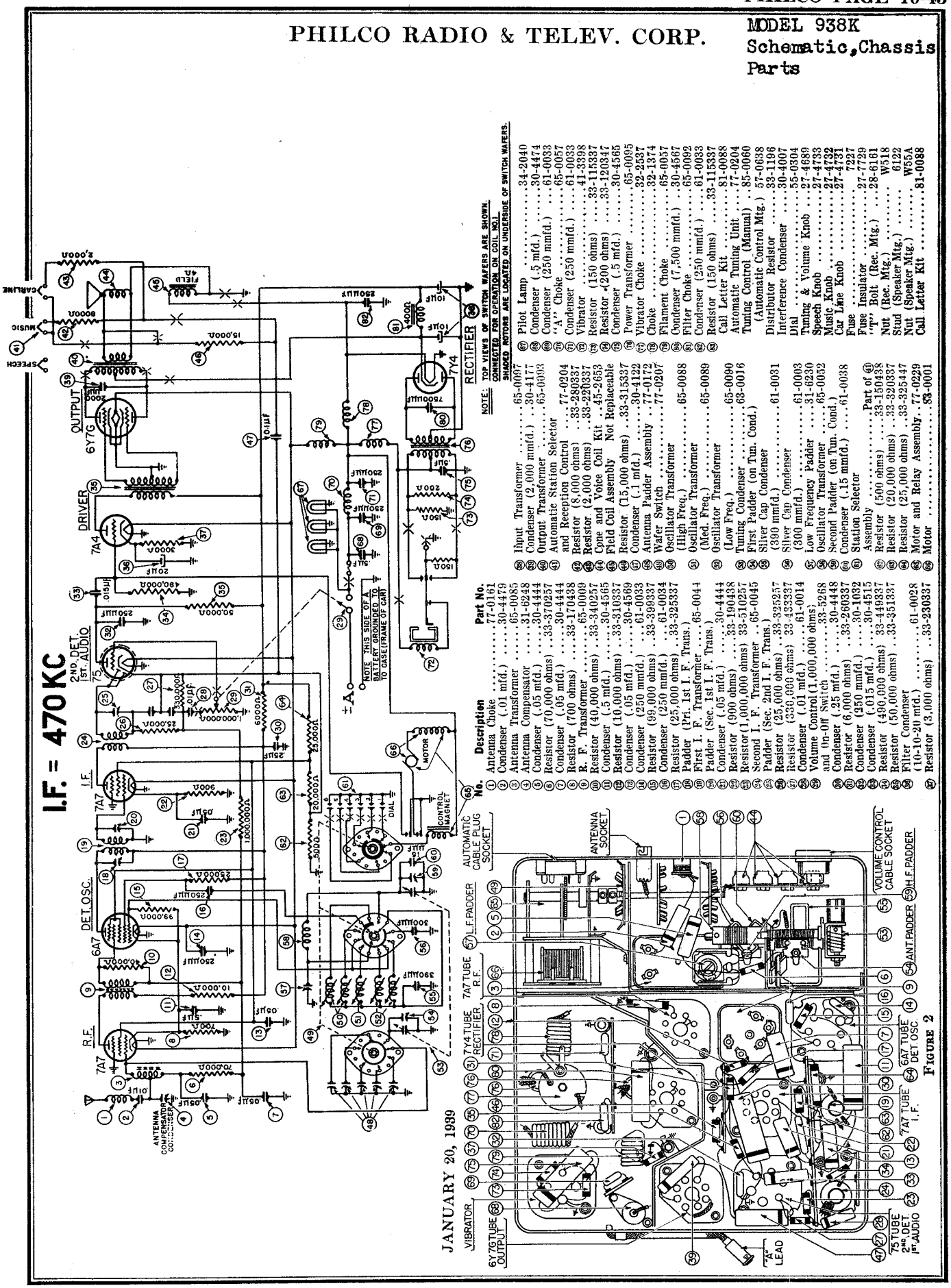


FIGURE 2

NOTE: TOP VIEWS OF SWITCH WAFERS ARE SHOWN. CONNECTED FOR OPERATION ON COIL NO.1. SHADED ROTORS ARE LOCATED ON UNDERSIDE OF SWITCH WAFERS.

| No. | Description | Part No. |
|---|---|---|
| ① | Antenna Choke | 77-0161 |
| ② | Condenser (.01 mfd.) | 30-4479 |
| ③ | Antenna Transformer | 65-0085 |
| ④ | Antenna Compensator | 31-6248 |
| ⑤ | Condenser (.05 mfd.) | 30-4444 |
| ⑥ | Resistor (70,000 ohms) | 33-370257 |
| ⑦ | Condenser (.05 mfd.) | 30-4444 |
| ⑧ | Resistor (700 ohms) | 33-170438 |
| ⑨ | R. F. Transformer | 65-0009 |
| ⑩ | Resistor (40,000 ohms) | 33-340257 |
| ⑪ | Condenser (.5 mfd.) | 30-4565 |
| ⑫ | Resistor (10,000 ohms) | 33-310337 |
| ⑬ | Condenser (.05 mfd.) | 30-4569 |
| ⑭ | Condenser (250 mmfd.) | 61-0033 |
| ⑮ | Resistor (99,000 ohms) | 33-399337 |
| ⑯ | Condenser (250 mmfd.) | 61-0034 |
| ⑰ | Resistor (25,000 ohms) | 33-325337 |
| ⑱ | Padder (Pri. 1st I. F. Trans.) | |
| ⑲ | First I. F. Transformer | 65-0044 |
| ⑳ | Padder (Sec. 1st I. F. Trans.) | |
| ㉑ | Condenser (.05 mfd.) | 30-4444 |
| ㉒ | Resistor (900 ohms) | 33-190438 |
| ㉓ | Resistor (1,000,000 ohms) | 33-510257 |
| ㉔ | Second I. F. Transformer | 65-0045 |
| ㉕ | Padder (Sec. 2nd I. F. Trans.) | |
| ㉖ | Resistor (25,000 ohms) | 33-325257 |
| ㉗ | Resistor (330,000 ohms) | 33-433337 |
| ㉘ | Condenser (.01 mfd.) | 61-0014 |
| ㉙ | Volume Control (1,000,000 ohms) and On-Off Switch | 33-5268 |
| ㉚ | Condenser (.25 mfd.) | 30-4448 |
| ㉛ | Resistor (6,000 ohms) | 33-260337 |
| ㉜ | Condenser (350 mmfd.) | 30-1032 |
| ㉝ | Condenser (.015 mfd.) | 30-4515 |
| ㉞ | Condenser (.25 mfd.) | 30-4449337 |
| ㉟ | Resistor (490,000 ohms) | 33-351337 |
| ㊱ | Resistor (50,000 ohms) | 33-350337 |
| ㊲ | Filter Condenser (10-10-20 mfd.) | 61-0028 |
| ㊳ | Resistor (3,000 ohms) | 33-230337 |
| ㊴ | Input Transformer | 65-0097 |
| ㊵ | Condenser (2,000 mmfd.) | 30-4177 |
| ㊶ | Output Transformer | 65-0093 |
| ㊷ | Automatic Station Selector and Reception Control | 77-0204 |
| ㊸ | Resistor (8,000 ohms) | 33-280337 |
| ㊹ | Resistor (2,000 ohms) | 33-220337 |
| ㊺ | Cone and Voice Coil Kit | 45-2653 |
| ㊻ | Field Coil Assembly Not Replaceable | |
| ㊼ | Resistor (15,000 ohms) | 33-315337 |
| ㊽ | Condenser (.1 mfd.) | 30-4122 |
| ㊾ | Antenna Padder Assembly | 77-0172 |
| ㊿ | Wafer Switch | 77-0207 |
| (51) | Oscillator Transformer (High Freq.) | 65-0088 |
| (52) | Oscillator Transformer (Med. Freq.) | 65-0089 |
| (53) | Oscillator Transformer (Low Freq.) | 65-0090 |
| (54) | Tuning Condenser | 63-0016 |
| (55) | First Padder (on Tun. Cond.) Silver Cap Condenser (390 mmfd.) | 61-0031 |
| (56) | Silver Cap Condenser (300 mmfd.) | 61-0003 |
| (57) | Low Frequency Padder | 31-6230 |
| (58) | Oscillator Transformer | 65-0052 |
| (59) | Second Padder (on Tun. Cond.) | |
| (60) | Condenser (.15 mmfd.) | 61-0038 |
| (61) | Station Selector Assembly | Part of ㊵ |
| (62) | Resistor (500 ohms) | 33-150438 |
| (63) | Resistor (20,000 ohms) | 33-320337 |
| (64) | Resistor (25,000 ohms) | 33-325447 |
| (65) | Motor and Relay Assembly | 77-0229 |
| (66) | Motor | 83-0001 |
| (67) | Pilot Lamp | 34-2040 |
| (68) | Condenser (.5 mfd.) | 30-4474 |
| (69) | Condenser (250 mmfd.) | 61-0033 |
| (70) | "A" Choke | 65-0057 |
| (71) | Condenser (250 mmfd.) | 61-0033 |
| (72) | Vibrator | 41-3398 |
| (73) | Resistor (150 ohms) | 33-115337 |
| (74) | Resistor (200 ohms) | 33-120347 |
| (75) | Condenser (.5 mfd.) | 30-4565 |
| (76) | Power Transformer | 65-0095 |
| (77) | Vibrator Choke | 32-2537 |
| (78) | Choke | 32-1374 |
| (79) | Filament Choke | 65-0057 |
| (80) | Condenser (7,500 mmfd.) | 30-4567 |
| (81) | Filter Choke | 65-0092 |
| (82) | Condenser (250 mmfd.) | 61-0033 |
| (83) | Resistor (150 ohms) | 33-115337 |
| | Cal Letter Kit | 81-0088 |
| | Automatic Tuning Unit | 77-0204 |
| | Tuning Control (Manual) (Automatic Control Mtg.) | 85-0060 |
| | Distributor Resistor | 57-0638 |
| | Interference Condenser | 33-1196 |
| | Dial | 30-4007 |
| | Tuning & Volume Knob | 55-0304 |
| | Speech Knob | 27-4689 |
| | Music Knob | 27-4733 |
| | Knob | 27-4732 |
| | Car Line Knob | 27-4731 |
| | Fuse | 7927 |
| | Fuse Insulator | 27-7729 |
| | "T" Bolt (Rec. Mtg.) | 28-6161 |
| | Nut (Rec. Mtg.) | W518 |
| | Stud (Speaker Mtg.) | 6122 |
| | Nut (Speaker Mtg.) | W55A |
| | Cal Letter Kit | 81-0088 |

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MODEL 938K
Socket, Trimmers
Alignment

PHILCO RADIO & TELEV. CORP.

# Alignment MODEL 938K

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

*Equipment* — Fully charged heavy duty storage battery or 6 volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

*General* — The output meter must be connected by means of an adapter to the plate of the type 6Y7G output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

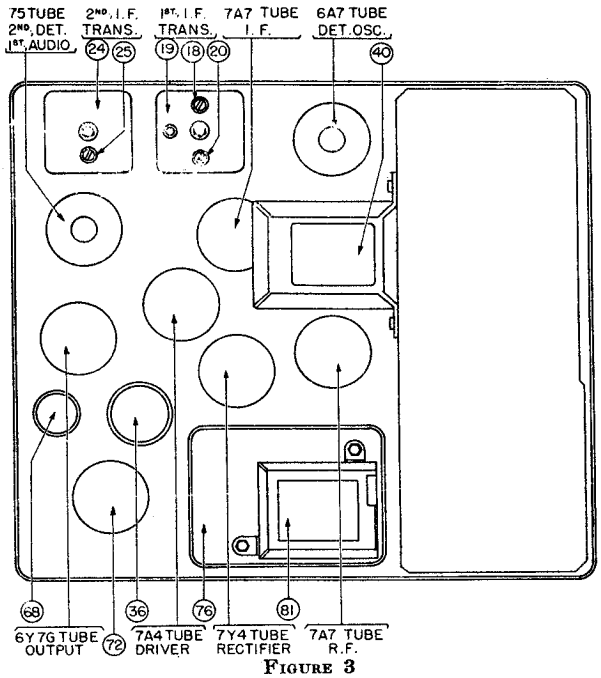


FIGURE 3

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| 1 | PRESS THE RETURN TO DIAL BUTTON UNTIL STATIONS CAN BE TUNED IN BY MANUAL TUNING. ADJUST THE ANTENNA COMPENSATOR ④ TWO TURNS FROM TIGHT. | | | | |
| 2 | 470 K.C. | To Grid of 6A7 Tube | .1 Mfd. | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | ㉕ ⑳ ⑱ |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | See Note 1 | Note 2 | ⑲ |
| 4 | 1400 K.C. | To Antenna Receptacle on Radio | See Note 1 | Set Tuning Condenser at 1400 K.C. | ㉔ Note 4 |
| 5 | 580 K.C. | To Antenna Receptacle on Radio | See Note 1 | Set Tuning Condenser at 580 K.C. | ㉗ Note 3 |
| 6 | 1580 K.C. | To Antenna Receptacle on Radio | See Note 1 | Note 2 | ⑲ |
| 7 | 1400 K.C. | To Antenna Receptacle on Radio | See Note 1 | Set Tuning Condenser at 1400 K.C. | ㉔ Note 4 |
| 8 | 1200 to 1400 K.C. | Note 5 | Note 5 | Note 5 | ④ |

Make all adjustments for maximum reading on the output meter.

1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 50 Mmfd. Condenser in series between the signal generator and the antenna lead.

2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

5 — When installing the radio in the car, follow the installation instructions carefully. Tune in a weak broadcast signal between 1200 and 1400 Kilocycles on the control scale. Remove the plug button on the end of the radio and adjust the antenna compensator ④ (See Figure 2) for maximum signal.

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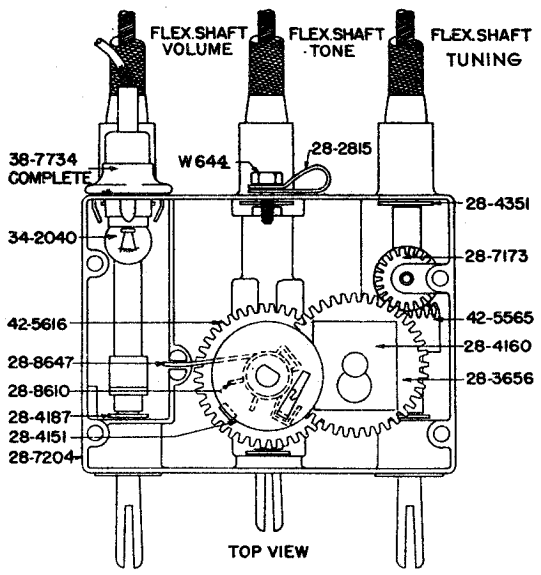
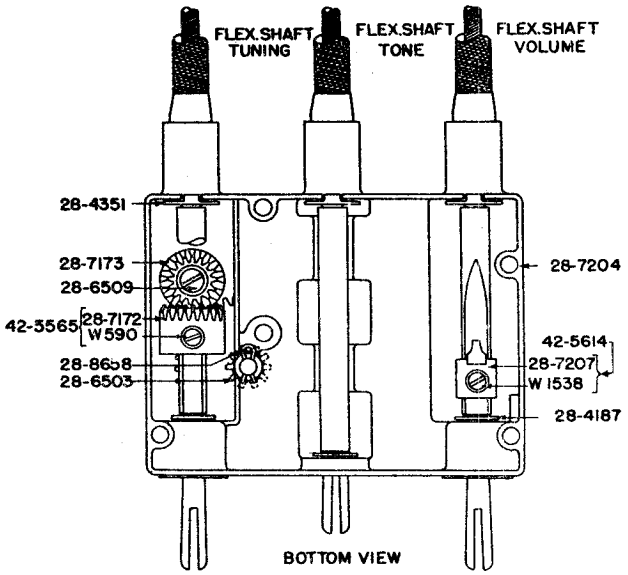
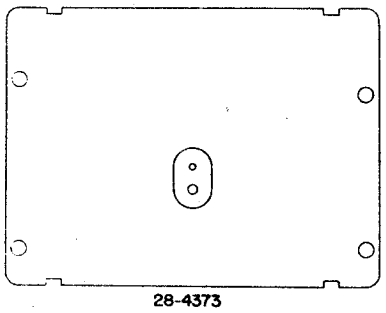
PHILCO RADIO & TELEV. CORP.

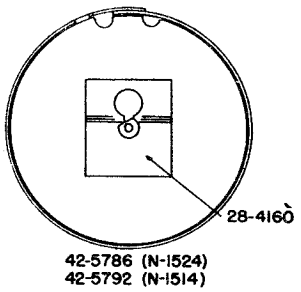
MODELS N-1514, N-1524
Nash Controls Details

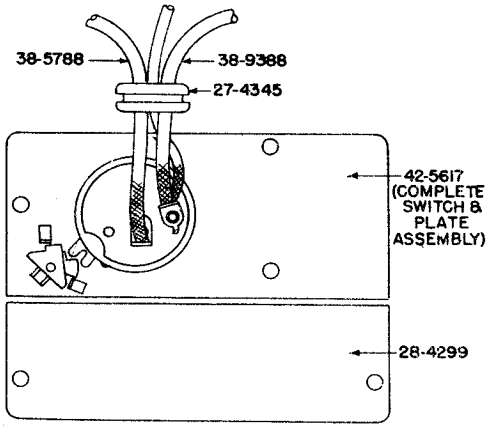
## NASH CONTROLS — MODELS N-1514 — N-1524

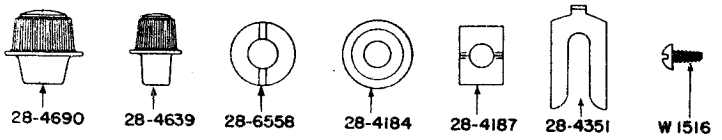


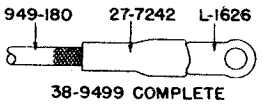



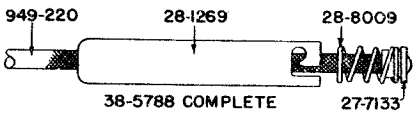





28-8813 TUNING CONTROL SHAFT (N-1524)
28-8815 TUNING CONTROL SHAFT (N-1514)
28-8814 VOLUME CONTROL SHAFT (N-1524)
28-8816 VOLUME CONTROL SHAFT (N-1514)
28-8798 TONE CONTROL SHAFT (N-1524)
28-8817 TONE CONTROL SHAFT (N-1514)

## PARTS LIST AND PRICES (Prices Subject to Change Without Notice)

| Part No. | Description | List Price |
|---|---|---|
| L-1626 | Lug | $ .02 |
| W-590 | Screw ....per 100 | 2.00 |
| W-644 | Screw ....per 100 | 1.50 |
| W-1516 | Screw ....per 100 | 1.30 |
| W-1538 | Screw ....per 100 | 1.80 |
| 27-4345 | Grommet | .02 |
| 27-7133 | Terminal | .01 |
| 27-7242 | Sleeve ....per 100 | .40 |
| 28-1269 | Fuse Housing | .01 |
| 28-2650 | Washer ....per 100 | .45 |
| 28-2815 | Clamp | .01 |
| 28-3656 | Gear | .02 |
| 28-4151 | Friction Washer | .02 |
| 28-4160 | Spring | .01 |
| 28-4184 | Knob Base | .02 |
| 28-4187 | Washer | .01 |

* Prices not available at this time.

| Part No. | Description | List Price |
|---|---|---|
| 28-4299 | Cover | .03 |
| 28-4351 | Shaft Retainer | .01 |
| 28-4373 | Cover | .10 |
| 28-4639 | Tone Knob | * |
| 28-4690 | Tuning & Volume Knob | * |
| 28-6503 | Gear | .05 |
| 28-6509 | Screw | .03 |
| 28-6558 | Gland Nut | .25 |
| 28-7172 | Miter Gear | .10 |
| 28-7173 | Miter Idler Gear | .10 |
| 28-7204 | Housing | .50 |
| 28-7207 | Switch Arm | .05 |
| 28-8009 | Spring ....per 100 | .50 |
| 28-8610 | Spring | .03 |
| 28-8647 | Anti-back Lash Spring | .02 |
| 28-8658 | Spring | .03 |

| Part No. | Description | List Price |
|---|---|---|
| 28-8798 | Tone Shaft (N-1524) | 1.00 |
| 28-8813 | Tuning Shaft (N-1524) | 1.00 |
| 28-8814 | Volume Shaft (N-1524) | 1.00 |
| 28-8815 | Tuning Shaft (N-1514) | 1.00 |
| 28-8816 | Volume Shaft (N-1514) | 1.00 |
| 28-8817 | Tone Shaft (N-1514) | 1.00 |
| 34-2040 | Pilot Lamp | .09 |
| 38-5788 | "A" Lead | * |
| 38-7734 | Pilot Lamp Assembly | .35 |
| 38-9388 | "A" Lead | .20 |
| 42-5565 | Miter Gear Assembly | .15 |
| 42-5614 | Switch Arm Assembly | .15 |
| 42-5616 | Drum Shaft & Gear | .10 |
| 42-5617 | On-Off Switch | .40 |
| 42-5786 | Dial Assembly (N-1524) | .35 |
| 42-5792 | Dial Assembly (N-1514) | .40 |

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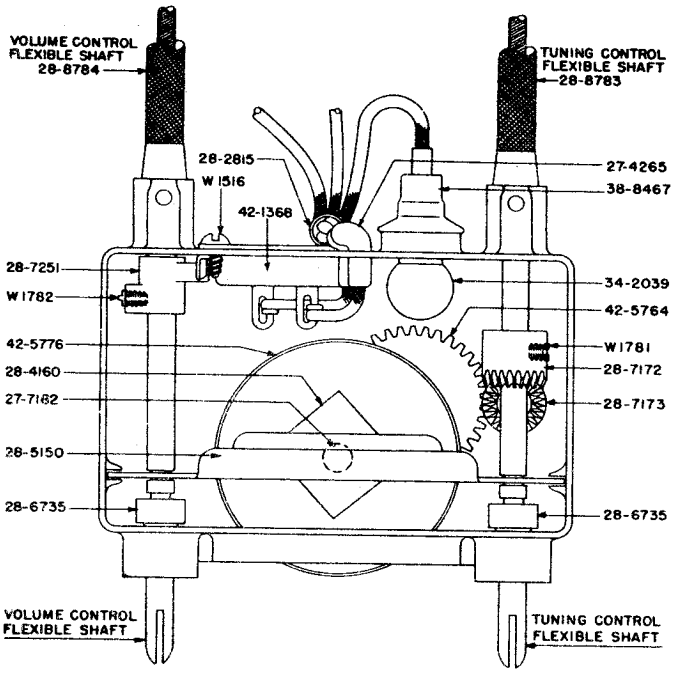
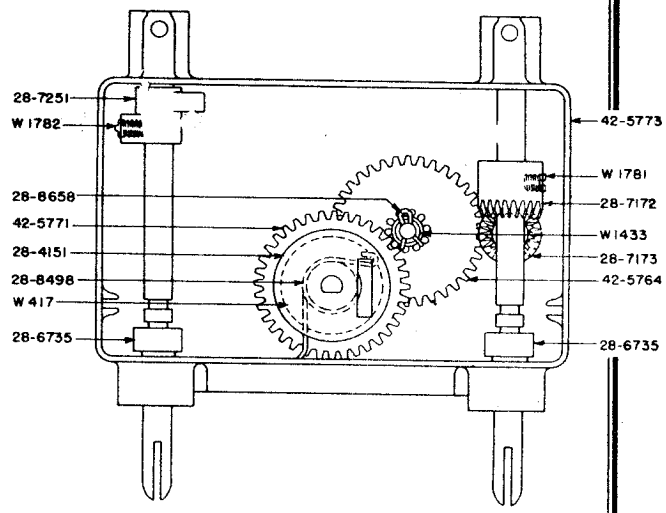
MODEL P-1517 Packard
Controls Details

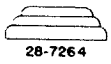
# PHILCO RADIO & TELEV. CORP.

## PACKARD MODEL P-1517 CONTROL UNIT

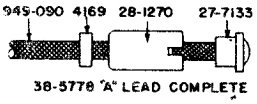


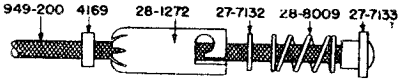
27-4688


28-7264

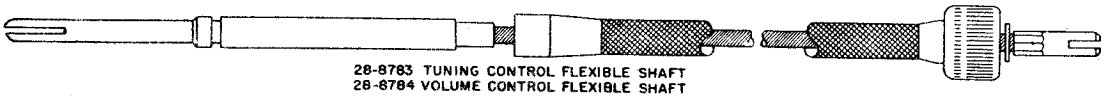
28-6773



38-5778 "A" LEAD COMPLETE



38-7993 "A" LEAD COMPLETE


28-8783 TUNING CONTROL FLEXIBLE SHAFT
28-8784 VOLUME CONTROL FLEXIBLE SHAFT

## PARTS LIST AND PRICES
(Prices Subject to Change Without Notice)

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| W-417 | Washer ..... per 100 | $.50 |
| W-1433 | Washer ..... per 100 | .15 |
| W-1516 | Screw ..... per 100 | 1.30 |
| W-1781 | Set Screw ..... per 100 | 2.00 |
| W-1782 | Set Screw ..... per 100 | 2.50 |
| 4169 | Washer ..... per 100 | 1.20 |
| 27-4265 | Sleeve ..... per 100 | 1.25 |
| 27-4688 | Tuning and Volume Knob ..... | .20 |
| 27-7132 | Washer ..... per 100 | .40 |
| 27-7133 | Ferrule ..... | .01 |
| 28-1270 | Housing ..... | .01 |
| 28-1272 | Housing ..... per 100 | .85 |
| 28-2815 | Clamp ..... | .01 |
| 28-4151 | Washer ..... | .02 |
| 28-4160 | Spring ..... | .01 |
| 28-5149 | Cover ..... | .10 |
| 28-5150 | Shaft Retaining Plate ..... | .05 |
| 28-6735 | Bushing ..... | * |
| 28-6773 | Gland Nut ..... | .15 |

* Prices not available at this time.

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 28-7172 | Miter Drive Gear ..... | .10 |
| 28-7173 | Miter Gear ..... | .10 |
| 28-7182 | Felt Washer ..... per 100 | .30 |
| 28-7251 | Switch Lever ..... | .15 |
| 28-7264 | Knob Base ..... | .20 |
| 28-8009 | Spring ..... per 100 | .50 |
| 28-8498 | Anti Back Lash Spring ..... | .10 |
| 28-8658 | Spring ..... | .03 |
| 28-8783 | Tuning Control Flex. Shaft ..... | 1.00 |
| 28-8784 | Volume Control Flex. Shaft ..... | 1.00 |
| 34-2039 | Pilot Lamp ..... | .09 |
| 38-5778 | "A" Lead ..... | .10 |
| 38-7993 | "A" Lead ..... | .20 |
| 38-8467 | Pilot Lamp Assembly ..... | .30 |
| 42-1368 | On-Off Switch ..... | .35 |
| 42-5764 | Intermediate Gear Assembly ..... | .20 |
| 42-5771 | Drum Shaft and Gear Assembly ..... | .15 |
| 42-5773 | Housing and Stud Assembly ..... | .85 |
| 42-5776 | Dial Assembly ..... | .35 |

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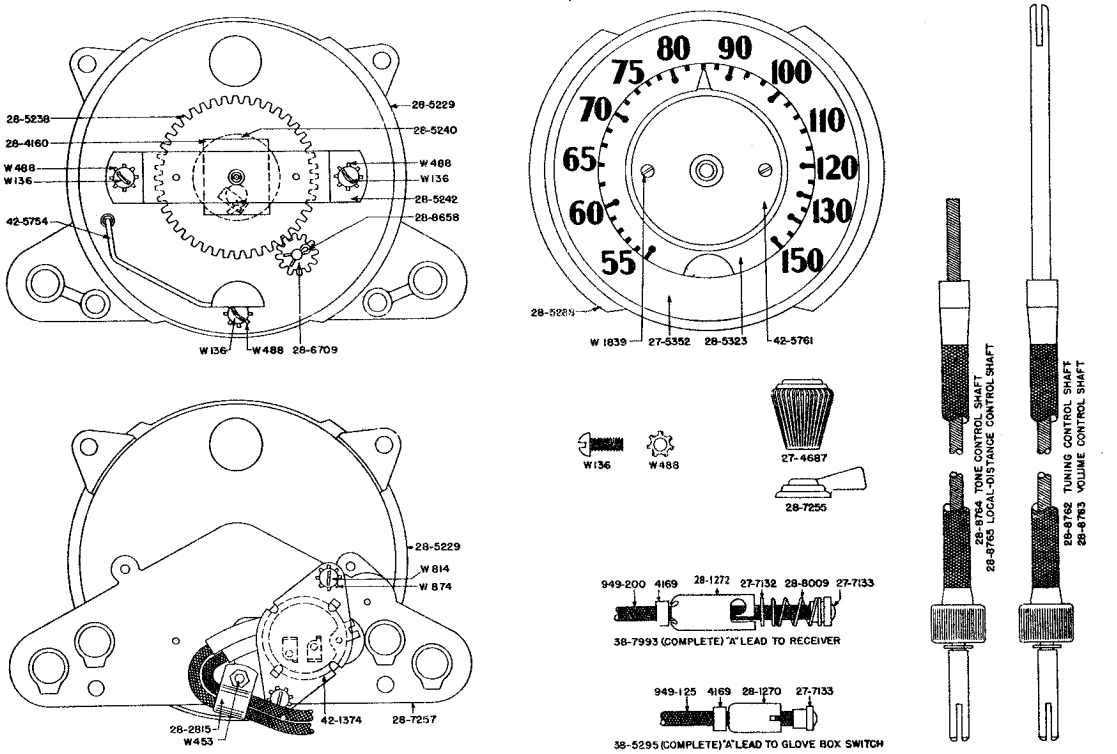
MODEL P-1535 Packard

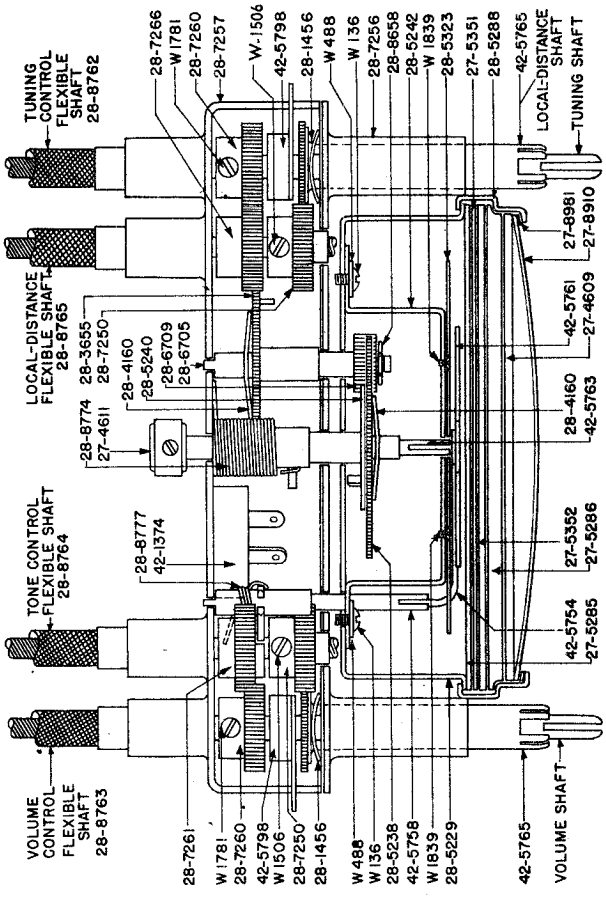
# PHILCO RADIO & TELEV. CORP. Controls Details

## PACKARD CONTROL MODEL P-1535




NOVEMBER 24, 1937

## PACKARD MODEL P-1535 CONTROL




## PARTS LIST AND PRICES

(Prices Subject to Change Without Notice)

| PART NUMBER | DESCRIPTION | | LIST PRICE | |
|---|---|---|---|---|
| 4189 | Rubber Washers | per 100 | $1.30 | |
| W-136 | Screw | per 100 | 1.80 | |
| W-488 | Screw | per 100 | 1.80 | |
| W-488 | Lockwasher | per 100 | .35 | |
| W-775 | Button | per 100 | 1.30 | |
| W-814 | Screw | per 100 | .75 | |
| W-1506 | Lockwasher | per 100 | .60 | |
| W-1781 | Set Screw | per 100 | 1.60 | |
| W-1839 | Screw | per 100 | 2.00 | |
| 949-125 | Wire | per 100 | 1.25 | |
| 949-200 | Wire | | * | |
| 27-4609 | Gasket | | .10 | |
| 27-4611 | Pointer Knob | | * | |
| 27-4687 | Tuning and Volume Knob | | * | |
| 27-5285 | Pointer | | .50 | |
| 27-5286 | Glass Retainer | | * | |
| 27-5351 | Gasket | per 100 | 2.00 | |
| 27-5352 | Dial Face Glass | | .40 | |
| 27-7132 | Washer | per 100 | .40 | |
| 27-7133 | Terminal | | .01 | |
| 27-8910 | Glass | | .25 | |
| 27-8981 | Front Gasket | | * | |
| 28-1270 | Housing | | .01 | |
| 28-1272 | Housing | per 100 | .81 | |
| 28-1456 | Spring Washer | per 100 | .75 | |
| 28-2815 | Clamp | per 100 | .01 | |
| 28-3655 | Drive Gear | | * | |
| 28-4160 | Friction Spring | | .01 | |
| 28-5239 | Dial Cover | | * | |
| 28-5238 | Dial Gear (large) | | * | |

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 28-5240 | Washer | * * |
| 28-5242 | Bracket | * * |
| 28-5288 | Bracket | .40 |
| 28-5323 | Face | .10 |
| 28-5705 | Intermediate Gear | * * |
| 28-6709 | Dial Gear (small) | * * |
| 28-7250 | Gear | .10 |
| 28-7255 | Tone and Local Distance Knob | .35 |
| 28-7256 | Control Shaft Cover | * |
| 28-7257 | Back Housing | * |
| 28-7260 | Gear | * * * * |
| 28-7261 | Switch Gear | * * * * |
| 28-7266 | Idler Gear | * * * * |
| 28-8009 | Spring | .50 |
| 28-8658 | Spring | .005 |
| 28-8763 | Volume Shaft | 1.00 |
| 28-8764 | Tone Control | 1.00 |
| 28-8765 | Local Distance Shaft | 1.00 |
| 28-8774 | Antenna Backwash Spring | 1.00 |
| 28-8777 | Spring | * |
| 28-5295 | "A" Lead | .15 |
| 38-7993 | "A" Lead | .20 |
| 42-1374 | On-Off Switch | .75 |
| 42-5754 | Signal Panel Assembly | * * |
| 42-5758 | Signal Panel Shaft | * * |
| 42-5761 | Pointer Assembly | * * |
| 42-5763 | Pointer Shaft Assembly | .25 |
| 42-5765 | Control Shaft Assembly | .20 |
| 42-5798 | Pinion Gear Assembly | * |

*Prices not available at this time.

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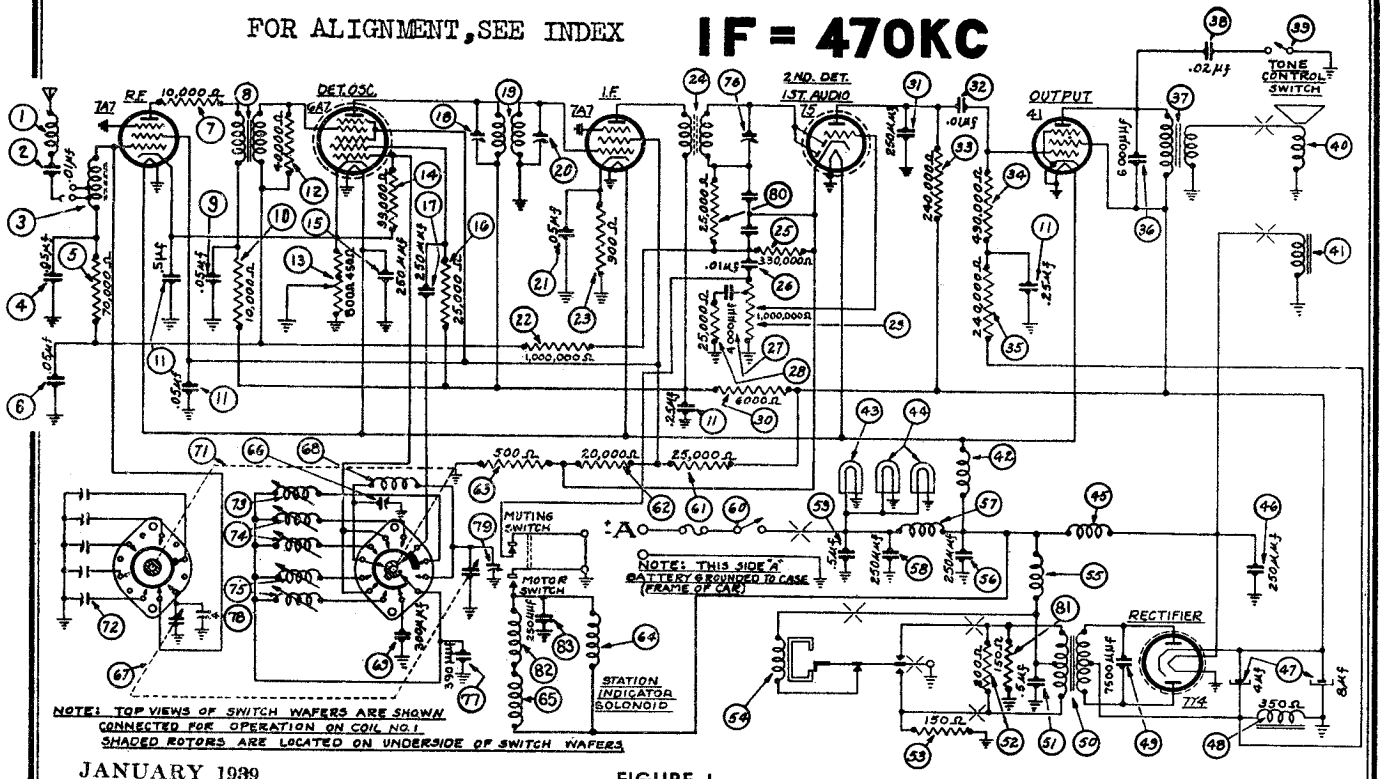
MODEL S-1616 Studebaker
Schematic, Chassis
Parts

# PHILCO RADIO & TELEV. CORP.

FOR ALIGNMENT, SEE INDEX

**IF = 470KC**


R.F.
DET. OSC.
I.F.
2ND. DET. 1ST. AUDIO
OUTPUT
TONE CONTROL SWITCH
MUTING SWITCH
MOTOR SWITCH
STATION INDICATOR SOLENOID
RECTIFIER
NOTE: THIS SIDE "A" BATTERY IS GROUNDED TO CASE (FRAME OF CAR)
NOTE: TOP VIEWS OF SWITCH WAFERS ARE SHOWN CONNECTED FOR OPERATION ON COIL NO. 1
SHADED ROTORS ARE LOCATED ON UNDERSIDE OF SWITCH WAFERS

JANUARY 1939

FIGURE 1

## PARTS LIST

| No. | Description | Part No. |
|---|---|---|
| 1 | Antenna Choke | 65-0062 |
| 2 | Condenser (.01 mfd.) | 61-0014 |
| 3 | Antenna Transformer | 65-0047 |
| 4 | Condenser (.05 mfd.) | 30-4444 |
| 5 | Resistor (70,000 ohms) | 33-370337 |
| 6 | Condenser (.05 mfd.) | 30-4444 |
| 7 | Resistor (10,000 ohms) | 33-310337 |
| 8 | R. F. Transformer | 65-0009 |
| 9 | Condenser (.05 mfd.) | 30-4123 |
| 10 | Resistor (10,000 ohms) | 33-310337 |
| 11 | Condenser (.05-.25-.25-.5 mfd.) | 61-0016 |
| 12 | Resistor (40,000 ohms) | 33-340137 |
| 13 | Sensitivity Control | 33-5264 |
| 14 | Resistor (99,000 ohms) | 33-399337 |
| 15 | Condenser (250 mmfd.) | 61-0033 |
| 16 | Resistor (25,900 ohms) | 33-325337 |
| 17 | Condenser (250 mmfd.) | 30-1038 |
| 18 | Padder (Pri. 1st I. F. Trans.) | |
| 19 | First I. F. Transformer | 65-0044 |
| 20 | Padder (Sec. 1st I. F. Trans.) | |
| 21 | Condenser (.05 mfd.) | 30-4444 |
| 22 | Resistor (1,000,000 ohms) | 33-510337 |
| 23 | Resistor (900 ohms) | 33-190438 |
| 24 | Second I. F. Transformer | 65-0045 |
| 25 | Resistor (330,000 ohms) | 33-433337 |
| 26 | Condenser (.01 mfd.) | 61-0014 |
| 27 | Condenser (4,000 mmfd.) | 61-0020 |
| 28 | Resistor (25,000 ohms) | 33-325337 |
| 29 | Volume Control & Switch (1,000,000 ohms) | 67-0014-1 opt. 67-0014-2 |
| 30 | Resistor (6,000 ohms) | 33-260337 |
| 31 | Condenser (250 mmfd.) | 61-0033 |
| 32 | Condenser (.01 mfd.) | 30-4169 |
| 33 | Resistor (240,000 ohms) | 33-424337 |
| 34 | Resistor (240,000 ohms) | 33-424337 |
| 35 | Condenser (6,000 mmfd.) | 30-4024 |
| 36 | Output Transformer | 65-0048 |
| 37 | Condenser (.02 mfd.) | 30-4495 |
| 38 | Tone Control Switch | 42-1140 |
| 39 | Cone & Voice Coil Kit | 91-0047 |
| 40 | Field Coil | Not Replaceable |
| 41 | Filament Choke | 65-0057 |
| 42 | Pilot Lamp | 34-2040 |
| 43 | Pilot Lamp | 34-2040 |
| 44 | Choke | 32-1374 |
| 45 | Condenser (250 mmfd.) | 61-0033 |
| 46 | Filter Condenser (4-8 mfd.) | 61-0018 |
| 47 | Filter Choke | 32-7959 |
| 48 | Condenser (7,500 mmfd.) | 30-4567 |
| 49 | Power Transformer | 65-0046 |
| 50 | Condenser (.5 mfd.) | 30-4565 |
| 51 | Resistor (200 ohms) | 33-120337 |
| 52 | Resistor (150 ohms) | In Vibrator |
| 53 | Vibrator | 41-3398 |
| 54 | Vibrator Choke | 32-2537 |
| 55 | Condenser (250 mmfd.) | 61-0033 |
| 56 | "A" Choke | 65-0057 |
| 57 | Condenser (250 mmfd.) | 61-0033 |
| 58 | Condenser (.5 mfd.) | 30-4474 |
| 59 | On-Off Switch and Volume Control | 67-0014-1 opt. 67-0014-2 |
| 61 | Resistor (25,000 ohms) | 33-325437 |
| 62 | Resistor (20,000 ohms) | 33-320337 |
| 63 | Resistor (500 ohms) | 33-150438 |
| 64 | Solenoid | 77-0227 |
| 65 | Impulse Motor | 77-0259 |
| 66 | Low Frequency Padder | 31-6230 |
| 67 | Tuning Condenser | 63-0011 |
| 68 | Oscillator Transformer | 65-0058 |
| 69 | Silver Cap Condenser (300 mmfd.) | 61-0003 |
| 71 | Selector Switch | 77-0198 |
| 72 | Antenna Padder Assembly | 77-0126 |
| 73 | Oscillator Transformer (High Freq.) | 65-0049 |
| 74 | Oscillator Transformer (Med. Freq.) | 65-0050 |
| 75 | Oscillator Transformer (Low Freq.) | 65-0051 |
| 76 | Padder (Sec. 2nd I. F. Trans.) | |
| 77 | Silver Cap Condenser (390 mmfd.) | 61-0031 |
| 78 | First Padder (on Tun. Cond.) | Part of Ant. Padder Assy. |
| 79 | Second Padder (on Tun. Cond.) | |
| 80 | Resistor (25,000 ohms) | 33-325337 |
| 81 | Resistor (150 ohms) | 33-115337 |
| 82 | Choke | 32-1644 |
| 83 | Condenser (250 mmfd.) | 61-0033 |
| | Dial Assembly | 85-0079 |
| | Tone Control and Automatic Drum | 415-1009 |
| | Automatic Push Button (Commander) | 55-0100 |
| | Automatic Push Button (President) | 55-0172 |
| | Tuning and Volume Knob (President) | 27-4689 |
| | Tuning and Volume Knob (Commander) | 55-0102 |
| | Flexible Shaft | 57-0467 |

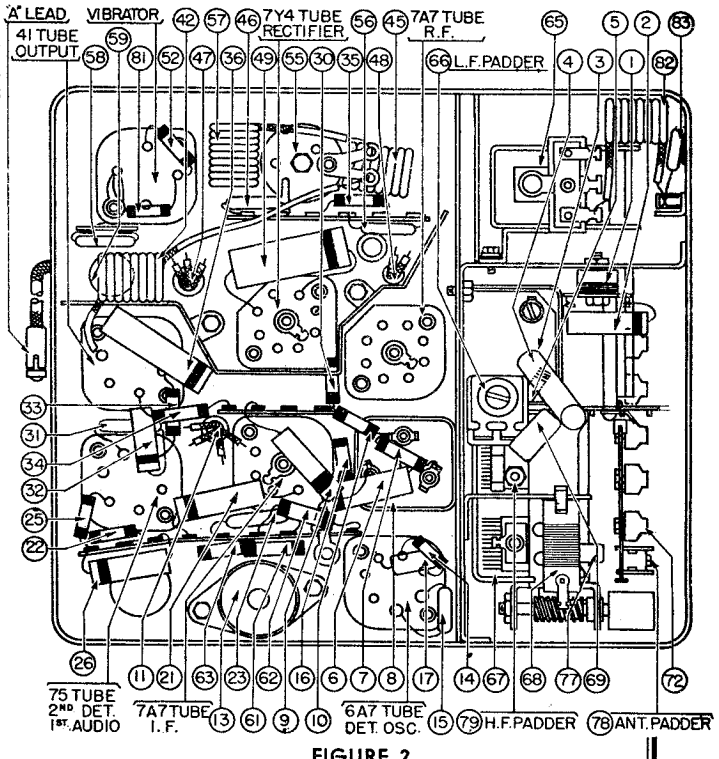



FIGURE 2

| Description | Part No. |
|---|---|
| Call Letter Kit | 81-0052 |
| Condenser and Lug Assy. | 30-1087 |
| Interference Condenser | 30-4007 |
| Distributor Resistor | 32-2250 |
| "T" Bolt (Rec. Mtg.) | 28-6161 |
| Nut (Rec. Mtg.) | W518 |
| Automatic Cable | 95-0030 |
| Tone and Volume Cable | 95-0076 |

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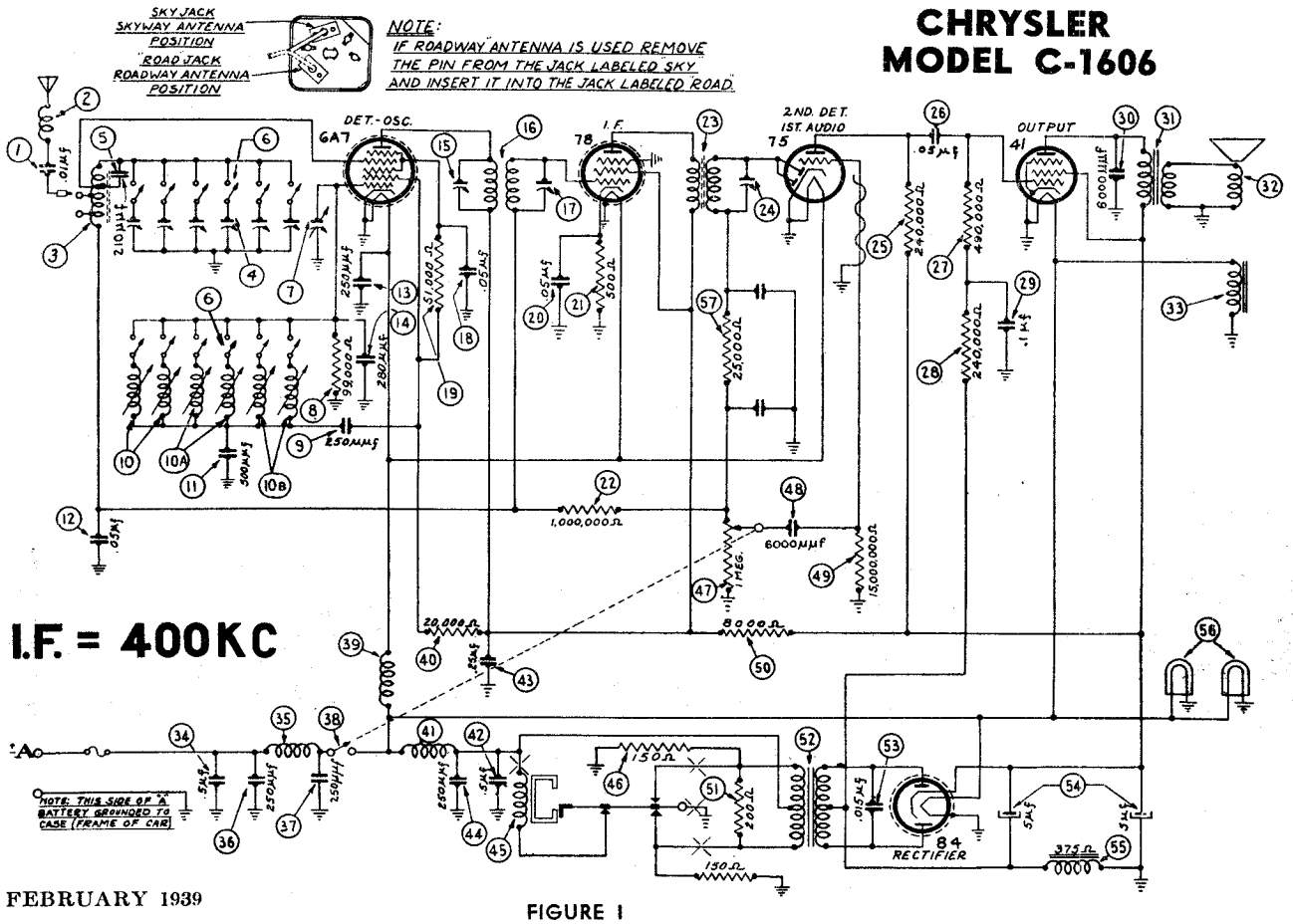
# PHILCO RADIO & TELEV. CORP.

MODEL C-1606 Chrysler
Schematic, Chassis
Parts List




FEBRUARY 1939

FIGURE 1

## MODEL C-1606 PARTS LIST

| No. | Description | Part No. |
|---|---|---|
| ① | Condenser (.01 mfd.) | 61-0014 |
| ② | Antenna Choke | 65-0102 |
| ③ | Antenna Transformer | 65-0120 |
| ④ | Antenna Padder Assembly | 77-0141 |
| ⑤ | Condenser (210 mmfd.) | 61-0044 |
| ⑥ | Automatic Switch | 85-0046 |
| ⑦ | Variator | 63-0019 |
| ⑧ | Resistor (99,000 ohms) | 33-399337 |
| ⑨ | Condenser (250 mmfd.) | 61-0034 |
| ⑩ | Oscillator Transformers | 65-0125 |
| ⑩a | Oscillator Transformers | 65-0126 |
| ⑩b | Oscillator Transformers | 65-0127 |
| ⑪ | Condenser (500 mmfd.) | 61-0027 |
| ⑫ | Condenser (.05 mfd.) | 30-4444 |
| ⑬ | Condenser (250 mmfd.) | 61-0033 |
| ⑭ | Condenser (280 mmfd.) | 61-0043 |
| ⑮ | Padder (Pri. 1st I. F. Trans.) | |
| ⑯ | First I. F. Transformer | 65-0118 |
| ⑰ | Padder (Sec. 1st I. F. Trans.) | |
| ⑱ | Condenser (.05 mfd.) | 30-4444 |
| ⑲ | Resistor (51,000 ohms) | 33-351337 |
| ⑳ | Condenser (.05 mfd.) | 30-4444 |
| ㉑ | Resistor (500 ohms) | 33-150438 |
| ㉒ | Resistor (1,000,000 ohms) | 33-510337 |
| ㉓ | Second I. F. Transformer | 65-0119 |
| ㉔ | Padder (Sec. 2nd I. F. Trans.) | |
| ㉕ | Resistor (240,000 ohms) | 33-424337 |
| ㉖ | Condenser (.05 mfd.) | 30-4123 |
| ㉗ | Resistor (490,000 ohms) | 33-449337 |
| ㉘ | Resistor (240,000 ohms) | 33-424437 |
| ㉙ | Condenser (.1 mfd.) | 61-0023 |
| ㉚ | Condenser (6,000 mmfd.) | 30-4504 |
| ㉛ | Output Transformer | 65-0071 |
| ㉜ | Cone Kit | 91-0043 |
| ㉝ | Field Coil | Not Replaceable |
| ㉞ | Condenser (.5 mfd.) | 30-4565 |
| ㉟ | "A" Choke | 32-1374 |
| ㊱ | Condenser (250 mmfd.) | 61-0033 |
| ㊲ | Condenser (250 mmfd.) | 61-0033 |

| No. | Description | Part No. |
|---|---|---|
| ㊳ | On-Off Switch and Volume Control | 67-0010 |
| ㊴ | Filament Choke | 32-1604 |
| ㊵ | Resistor (20,000 ohms) | 33-320337 |
| ㊶ | Vibrator Choke | 65-0075 |
| ㊷ | Condenser (.5 mfd.) | 30-4565 |
| ㊸ | Condenser (.25 mfd.) | 30-4446 |
| ㊹ | Condenser (250 mmfd.) | 61-0033 |
| ㊺ | Vibrator | 41-3398 |
| ㊻ | Resistor (150 ohms) | 33-115337 |
| ㊼ | Volume Control (1,000,000 ohms) and On-Off Switch | 67-0010 |
| ㊽ | Condenser (6,000 mmfd.) | 30-4445 |
| ㊾ | Resistor (15,000,000 ohms) | 33-615347 |
| ㊿ | Resistor (8,000 ohms) | 33-280337 |
| (51) | Resistor (200 ohms) | 33-120337 |
| (52) | Power Transformer | 65-0072 |
| (53) | Condenser (.015 mfd.) | 61-0030 |
| (54) | Filter Condenser (5-5 mfd.) | 61-0022 |
| (55) | Filter Choke | 65-0073 |
| (56) | Pilot Lamps | 34-2064 |
| (57) | Resistor (25,000 ohms) | 33-325237 |
| | Tuning and Volume Knob | 55-0164 |
| | Push Button Knob | 55-0206 |
| | Station Tab Holder | 57-0227FA7 |
| | Push Button Bezel | 57-0327FA7 |
| | Oscillator Coil Bezel | 57-0508FA3 |
| | Oscillator Coil Bezel Cover | 57-0509FA7 |
| | Fuse | 45-2559 |
| | Call Letter Kit | 81-0025 |
| | Fuel Gauge Resistor | 67-0011 |
| | Interference Condenser | 30-4490 |
| | Antenna Lead (Cowl) | 95-0065 |
| | Bracket (Set Mtg.) | 57-0502FA1 |
| | Bolt (Set Mtg.) | 97-0034 |
| | Nut (Set Mtg.) | W55 |
| | Bolt | 97-0024 |
| | Nut | W1667 |

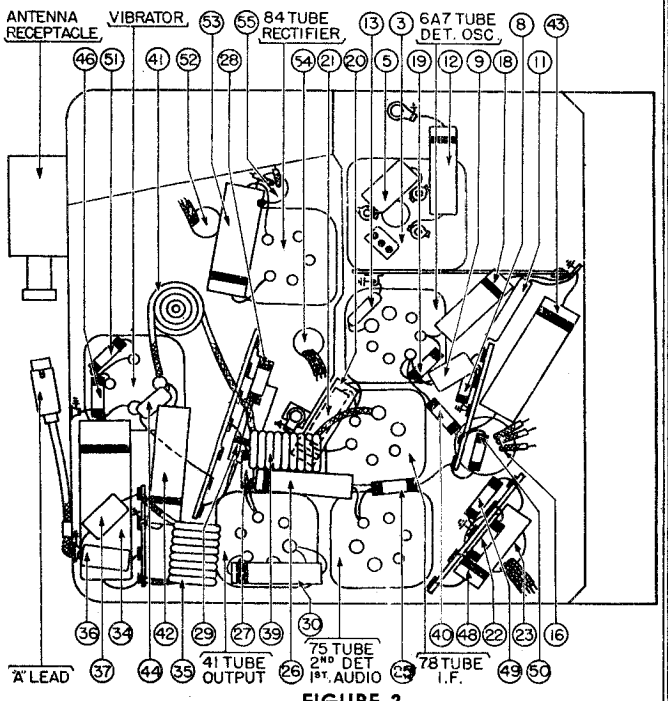



FIGURE 2

MODEL C-1606
Chrysler

# PHILCO RADIO & TELEVISION CORP.

Socket, Trimmers, Tuner
Alignment

## ADJUSTMENTS MODEL C-1606

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

***Equipment*** — Fully charged heavy duty storage battery or 6-volt power pack, 077A or 177 Philco Set Tester, 27-7159 Padding screw driver.

***General*** — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

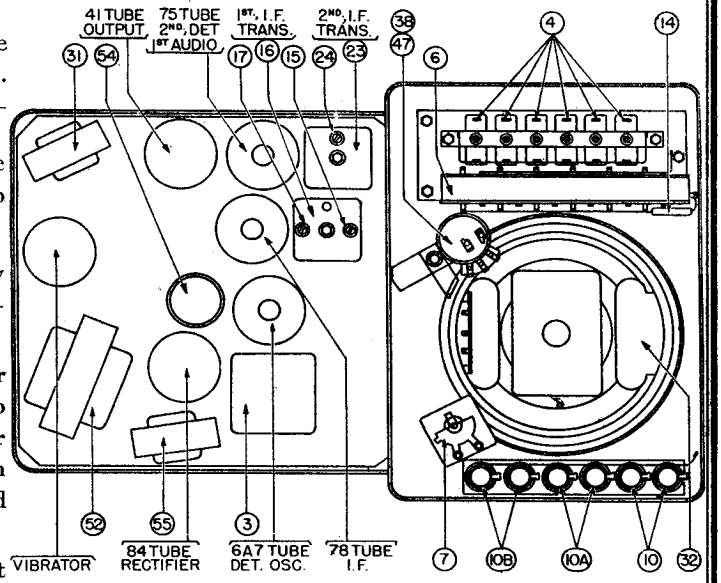



FIGURE 3

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| 1 | 400 K.C. | To Grid of 6A7 Tube | .5 Mfd. | Turn Variator to the Indexed Position | (24) (17) (15) |
| 2 | 950 to 1500 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Press Push Button No. 1 and adjust No. 1 Antenna Padder and No. 1 Oscillator Coil (Fig. 4) | Note 2 Fig. 4 |
| 3 | 950 to 1500 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Press Push Button No. 2 and adjust No. 2 Antenna Padder and No. 2 Oscillator Coil (Fig. 4) | Note 2 Fig. 4 |
| 4 | 750 to 1250 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Press Push Button No. 3 and adjust No. 3 Antenna Padder and No. 3 Oscillator Coil (Fig. 4) | Note 2 Fig. 4 |
| 5 | 750 to 1250 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Press Push Button No. 4 and adjust No. 4 Antenna Padder and No. 4 Oscillator Coil (Fig. 4) | Note 2 Fig. 4 |
| 6 | 550 to 950 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Press Push Button No. 5 and adjust No. 5 Antenna Padder and No. 5 Oscillator Coil (Fig. 4) | Note 2 Fig. 4 |
| 7 | 550 to 950 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Press Push Button No. 6 and adjust No. 6 Antenna Padder and No. 6 Oscillator Coil (Fig. 4) | Note 2 Fig. 4 |

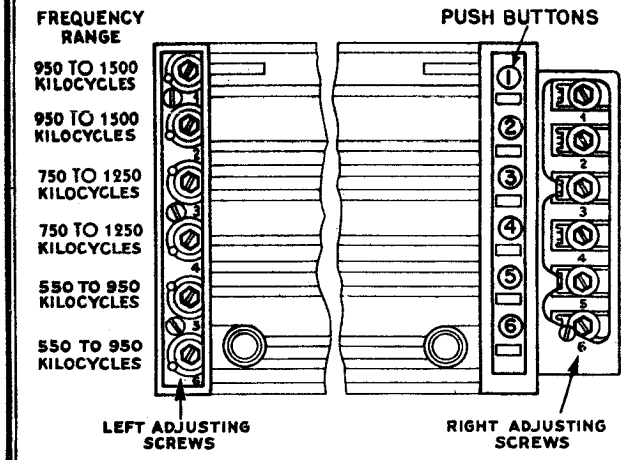



FIGURE 4

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 25 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the cowl antenna is used follow the above procedure. Be sure the lead to the antenna transformer is plugged into the "SKY" socket of the Antenna Transformer.

*When the undercar is used, connect the antenna lead, Part No. 41-3191 to the antenna receptacle in the Radio. Connect a 250 Mmfd. condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is plugged into the "ROAD" socket of the antenna transformer.

NOTE 2 — The antenna padder screw is on the right, the oscillator coil screw is on the left (see Figure 4).

ALL ADJUSTMENTS MUST BE REPEATED.

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PHILCO RADIO & TELEV. CORP.

MODEL C-1608 Chrysler
Schematic, Chassis
Parts

# CHRYSLER MODEL C-1608 SINGLE UNIT DELUXE CAR RADIO

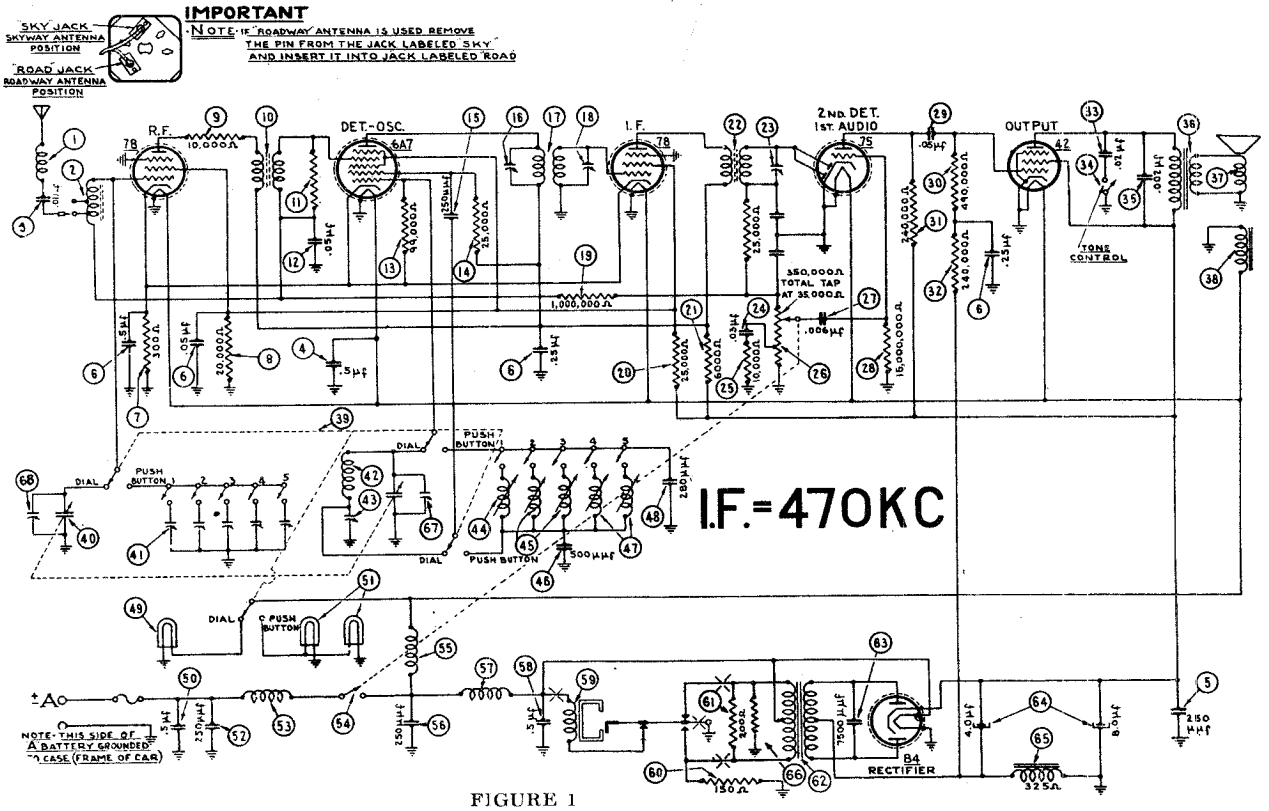


FIGURE 1

## PARTS LIST

| No. | Description | Part No |
|---|---|---|
| 1 | Antenna Choke | 65-0026 |
| 2 | Antenna Transformer | 65-0021 |
| 3 | Condenser (.01 mfd.) | 61-0014 |
| 4 | Condenser (.5 mfd.) | 30-4565 |
| 5 | Condenser (250 mmfd.) | 61-0033 |
| 6 | Condenser — (.05-.25-.25-.5 mfd.) | 61-0008 |
| 7 | Resistor (300 ohms) | 33-130338 |
| 8 | Resistor (20,000 ohms) | 33-320337 |
| 9 | Resistor (10,000 ohms) | 33-310337 |
| 10 | R. F. Transformer | 65-0009 |
| 11 | Resistor (39,000 ohms) | 33-339137 |
| 12 | Condenser (.05 mfd.) | 30-4444 |
| 13 | Resistor (99,000 ohms) | 33-399337 |
| 14 | Resistor (25,000 ohms) | 33-325437 |
| 15 | Condenser (250 mmfd.) | 61-0034 |
| 16 | Padder (Pri. 1st I. F. Trans.) | |
| 17 | First I. F. Transformer | 65-0041 |
| 18 | Padder (Sec. 1st I. F. Trans.) | |
| 19 | Resistor (1,000,000 ohms) | 33-510337 |
| 20 | Resistor (25,000 ohms) | 33-325437 |
| 21 | Resistor (6,000 ohms) | 33-260337 |
| 22 | Second I. F. Transformer | 65-0043 |
| 23 | Padder (Sec. 2nd I. F. Transformer) | |
| 24 | Condenser (.03 mfd.) | 30-4449 |
| 25 | Resistor (10,000 ohms) | 33-310337 |
| 26 | Volume Control (350,000 ohms) & On-Off Switch | 67-0003 |
| 27 | Condenser (6,000 mmfd.) | 30-4467 |
| 28 | Resistor (15,000,000 ohms) | 33-615347 |
| 29 | Condenser (.05 mfd.) | 30-4518 |
| 30 | Resistor (490,000 ohms) | 33-449337 |
| 31 | Resistor (240,000 ohms) | 33-424337 |
| 32 | Resistor (240,000 ohms) | 33-424337 |
| 33 | Condenser (.02 mfd.) | 30-4419 |
| 34 | Tone Control Switch | 85-0010 |
| 35 | Condenser (2,000 mmfd.) | 30-4177 |
| 36 | Output Transformer | 65-0020 |
| 37 | Cone & Voice Coil Kit | 91-0028 |
| 38 | Field Coil ..... Not Replaceable | |
| 39 | Push Button Switch Assy. | 85-0011 |
| 40 | Tuning Condenser (manual) | 63-0009 |
| 41 | Antenna Push Button Padders | 77-0091 |
| 42 | Oscillator Transformer | 65-0031 |
| 43 | Low Freq. Padder | 31-6230 |
| 44 | Oscillator Transformer (High Freq.) | 65-0038 |
| 45 | Oscillator Transformer (Med. Freq.) | 65-0039 |
| 46 | Condenser (500 mmfd.) | 61-0027 |
| 47 | Osc. Transformer (Low Freq.) | 65-0004 |
| 48 | Condenser (280 mmfd.) | 61-0010 |
| 49 | Pilot Lamp | 34-2039 |
| 50 | Condenser (.5 mfd.) | 30-4565 |
| 51 | Pilot Lamps | 34-2040 |
| 52 | Condenser (250 mmfd.) | 61-0033 |
| 53 | "A" Choke | 32-1644 |
| 54 | Volume Control On-Off Switch | 67-0003 |
| 55 | Filament Choke | 65-0037 |
| 56 | Condenser (250 mmfd.) | 61-0033 |
| 57 | Vibrator Choke | 65-0034 |
| 58 | Condenser (.5 mfd.) | 30-4465 |
| 59 | Vibrator | 41-3170 |
| 60 | Resistor (150 ohms) | 33-115337 |
| 61 | Resistor (200 ohms) | 33-120337 |
| 62 | Power Transformer | 65-0033 |
| 63 | Buffer Condenser (7,500 mmfd.) | 30-4567 |
| 64 | Filter Condenser (4-8 mfd.) | 61-0009 |
| 65 | Filter Choke (325 ohms) | 65-0035 |
| 66 | Resistor (150 ohms) | 33-115337 |
| 67 | First Padder on Tun. Cond. | |
| 68 | Second Padder on Tun. Cond. | |
| | Receiver Housing | 77-0096 |
| | Four Prong Socket | 27-6044 |
| | Five Prong Socket | 27-6035 |
| | Six Prong Socket | 27-6036 |
| | Seven Prong Socket | 27-6037 |
| | Fuse | 45-2559 |
| | Tuning & Vol. Knob (P7-8) | 55-0164 |
| | Tuning & Vol. Knob (D11-12) | 55-0170 |
| | Tuning & Vol. Knob (C22) | 55-0168 |
| | Tuning & Vol. Knob (S6) | 55-0166 |
| | Push Button & Spring (S6) | 55-0167 |
| | Push Button & Spring (P7-8) | 55-0165 |
| | Push Button & Spring (C22) | 55-0169 |
| | Push Button & Spring (D11) | 55-0171 |
| | Distributor Resistor Assy. | 38-9562 |
| | Interference Cond. | 30-4490 |
| | Dial Scale | 55-0068 |
| | Glass | 55-0332 |
| | Pointer | 77-0042 |

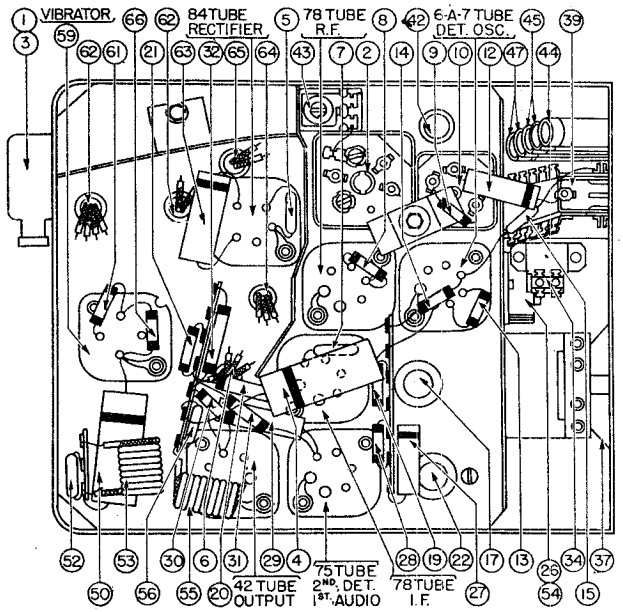


FIGURE 2

OCTOBER, 1938

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# MODEL C-1608

## ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

*Equipment* — Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 27-7159 Padding screw driver.

*General* — The output meter must be connected by means of an adapter to the plate of the type 42 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

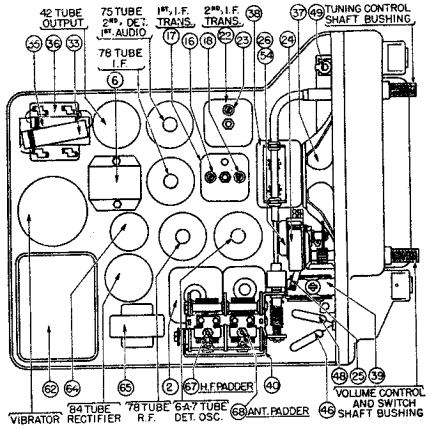


FIGURE 3

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | PADDER ADJUST |
|---|---|---|---|---|---|
| 1 | Press the "DIAL" button and stations can be tuned in by "DIAL" tuning. | | | | |
| 2 | 470 K.C. | To Grid of 6A7 Tube | .5 Mfd. | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | (23) (16) (18) |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Note 2 | (17) |
| 4 | 1400 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (16) Note 4 |
| 5 | 580 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Set Tuning Condenser at 580 K.C. | (18) Note 3 |
| 6 | 1580 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Note 2 | (17) |
| 7 | 1400 K.C. | To Antenna Receptacle on Radio | *25 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (16) Note 4 |

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 25 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the cowl antenna is used follow the above procedure. Be sure the lead to the antenna transformer is plugged into the "SKY" socket of the Antenna Transformer.

*When the undercar is used, connect the antenna lead, Part No. 41-3191 to the antenna receptacle in the Radio. Connect a 250 Mmfd. condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is plugged into the "ROAD" socket of the antenna transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

# MODEL S-1616

### MODEL S-1616

## ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

*Equipment* — Fully charged heavy duty storage battery or 6-volt power pack, 077A or 177 Philco Set Tester, 27-7159 Padding screw driver.

*General* — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

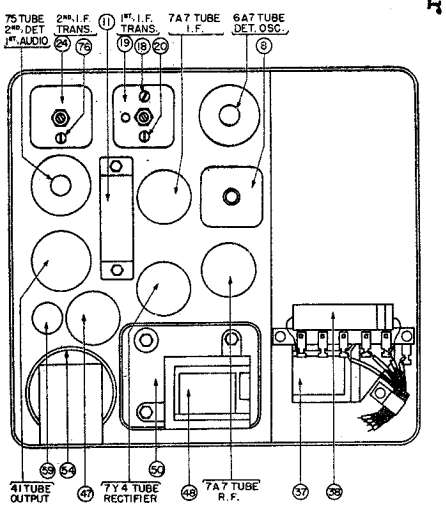


FIGURE 3

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| 1 | Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning. | | | | |
| 2 | 470 K.C. | To Grid of 6A7 Tube | .1 Mfd. | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | (24) (20) (18) |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | 20 Mmfd. See Note 1 | Note 2 | (19) |
| 4 | 1400 K.C. | To Antenna Receptacle on Radio | 20 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (18) Note 4 |
| 5 | 580 K.C. | To Antenna Receptacle on Radio | 20 Mmfd. See Note 1 | Set Tuning Condenser at 580 K.C. | (18) Note 3 |
| 6 | 1580 K.C. | To Antenna Receptacle on Radio | 20 Mmfd. See Note 1 | Note 2 | (19) |
| 7 | 1400 K.C. | To Antenna Receptacle on Radio | 20 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (18) Note 4 |

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 20 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

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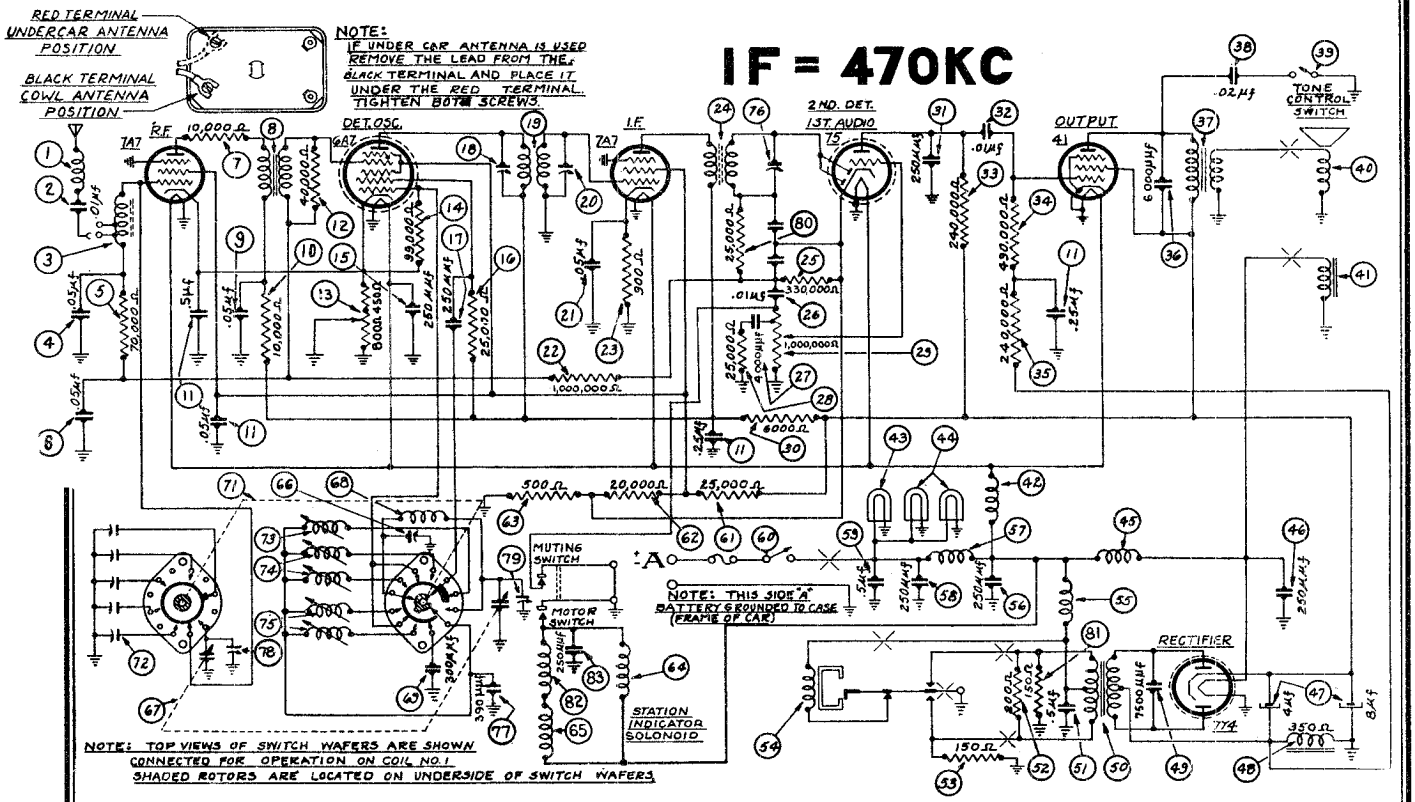
# PHILCO RADIO & TELEV. CORP.

MODEL P-1617 Packard
Schematic, Chassis
Parts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RED TERMINAL UNDERCAR ANTENNA POSITION
BLACK TERMINAL COWL ANTENNA POSITION
NOTE: IF UNDER CAR ANTENNA IS USED REMOVE THE LEAD FROM THE BLACK TERMINAL AND PLACE IT UNDER THE RED TERMINAL. TIGHTEN BOTH SCREWS.
R.F.
DET. OSC.
I.F.
2ND. DET. 1ST. AUDIO
OUTPUT
TONE CONTROL SWITCH
MUTING SWITCH
MOTOR SWITCH
STATION INDICATOR SOLENOID
RECTIFIER
NOTE: THIS SIDE "A" BATTERY GROUNDED TO CASE (FRAME OF CAR)
NOTE: TOP VIEWS OF SWITCH WAFERS ARE SHOWN CONNECTED FOR OPERATION ON COIL NO. 1
SHADED ROTORS ARE LOCATED ON UNDERSIDE OF SWITCH WAFERS

FIGURE 1

## PARTS LIST

| No. | Description | Part No. |
|---|---|---|
| 1 | Antenna Choke | 65-0062 |
| 2 | Condenser (.01 mfd.) | 61-0014 |
| 3 | Antenna Transformer | 65-0047 |
| 4 | Condenser (.05 mfd.) | 30-4444 |
| 5 | Resistor (70,000 ohms) | 33-370337 |
| 6 | Condenser (.05 mfd.) | 30-4444 |
| 7 | Resistor (10,000 ohms) | 33-310337 |
| 8 | R. F. Transformer | 65-0009 |
| 9 | Condenser (.05 mfd.) | 30-4123 |
| 10 | Resistor (10,000 ohms) | 33-310337 |
| 11 | Condenser (.05-.25-.25-.5 mfd.) | 61-0016 |
| 12 | Resistor (40,000 ohms) | 33-340137 |
| 13 | Sensitivity Control | 33-5264 |
| 14 | Resistor (99,000 ohms) | 33-399337 |
| 15 | Condenser (250 mmfd.) | 30-1032 |
| 16 | Resistor (25,000 ohms) | 33-325337 |
| 17 | Condenser (250 mmfd.) | 30-1038 |
| 18 | Padder (Pri. 1st I. F. Trans.) | |
| 19 | First I. F. Transformer | 65-0044 |
| 20 | Padder (Sec. 1st I. F. Trans.) | |
| 21 | Condenser (.05 mfd.) | 30-4444 |
| 22 | Resistor (1,000,000 ohms) | 33-510337 |
| 23 | Resistor (900 ohms) | 33-190438 |
| 24 | Second I. F. Transformer | 65-0045 |
| 25 | Resistor (330,000 ohms) | 33-433337 |
| 26 | Condenser (.01 mfd.) | 61-0014 |
| 27 | Condenser (4,000 mmfd.) | 61-0020 |
| 28 | Resistor (25,000 ohms) | 33-325337 |
| 29 | Volume Control (1,000,000 ohms) | 67-0004-1 |
| 30 | Resistor (6,000 ohms) | 33-260337 |
| 31 | Condenser (250 mmfd.) | 30-1032 |
| 32 | Condenser (.01 mfd.) | 30-4169 |
| 33 | Resistor (240,000 ohms) | 33-424337 |
| 34 | Resistor (490,000 ohms) | 33-449337 |
| 35 | Resistor (240,000 ohms) | 33-424337 |
| 36 | Condenser (6,000 mmfd.) | 30-4024 |
| 37 | Output Transformer | 65-0048 |
| 38 | Condenser (.02 mfd.) | 30-4495 |
| 39 | Tone Control Switch | 42-1140 |
| 40 | Cone & Voice Coil Kit | 91-0047 |
| 41 | Field Coil | Not Replaceable |
| 42 | Filament Choke | 65-0057 |
| 43 | Pilot Lamp | 34-2040 |
| 44 | Pilot Lamp | 34-2040 |
| 45 | Choke | 32-1374 |
| 46 | Condenser (250 mmfd.) | 30-1032 |
| 47 | Filter Condenser (4-8 mfd.) | 61-0018 |
| 48 | Filter Choke | 32-7959 |
| 49 | Condenser (7,500 mmfd.) | 30-4567 |
| 50 | Power Transformer | 65-0046 |
| 51 | Condenser (.5 mfd.) | 30-4565 |
| 52 | Resistor (200 ohms) | 33-120337 |
| 53 | Resistor (150 ohms) | In Vibrator |
| 54 | Vibrator | 41-3170 |
| 55 | Vibrator Choke | 32-2537 |
| 56 | Condenser (250 mmfd.) | 30-1032 |
| 57 | "A" Choke | 65-0057 |
| 58 | Condenser (250 mmfd.) | 30-1032 |
| 59 | Condenser (.5 mfd.) | 30-4474 |
| 60 | On-Off Switch | 77-0175 |
| 61 | Resistor (25,000 ohms) | 33-325437 |
| 62 | Resistor (20,000 ohms) | 33-320337 |
| 63 | Resistor (500 ohms) | 33-150438 |
| 64 | Solenoid | |
| 65 | Impulse Motor | 77-0108 |
| 66 | Low Frequency Padder | 31-6230 |
| 67 | Tuning Condenser | 63-0011 |
| 68 | Oscillator Transformer | 65-0058 |
| 69 | Silver Cap Condenser (300 mmfd.) | 61-0003 |
| 71 | Selector Switch | 77-0198 |
| 72 | Antenna Padder Assembly | 77-0126 |
| 73 | Oscillator Transformer (High Freq.) | 65-0049 |
| 74 | Oscillator Transformer (Med. Freq.) | 65-0050 |
| 75 | Oscillator Transformer (Low Freq.) | 65-0051 |
| 76 | Padder (Sec. 2nd I. F. Trans.) | |
| 77 | Silver Cap Condenser (390 mmfd.) | 61-0031 |
| 78 | First Padder (on Tun. Cond.) | Part of Ant. Padder Assy. |
| 79 | Second Padder (on Tun. Cond.) | |
| 80 | Resistor (25,000 ohms) | 33-325337 |
| 81 | Resistor (150 ohms) | 33-115337 |
| 82 | Choke | 32-1644 |
| 83 | Condenser (250 mmfd.) | 30-1032 |
| | Interference Condenser | 30-4007 |
| | Interference Condenser | 30-4475 |
| | Distributor Resistor | 33-1196 |
| | Push Button | 55-0173 |
| | Push Button Cover | 57-0472 |
| | Tuning & Volume Knob | 27-4687 |

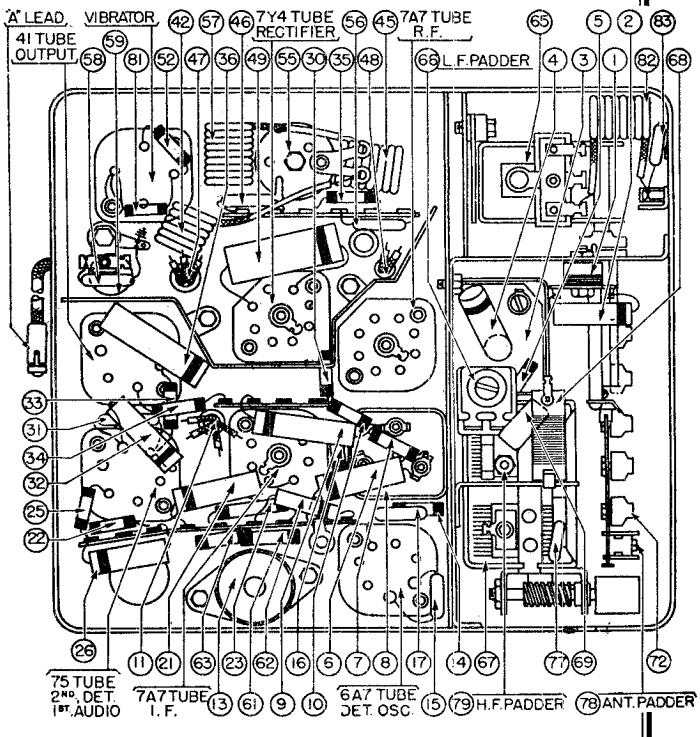


FIGURE 2

| Description | Part No. | Description | Part No. |
|---|---|---|---|
| Knob Base | 28-4184 | Nut | W518 |
| Call Letter Kit | 81-0045 | Station Indicator | 85-0047 |
| "T" Bolt | 28-6268 | | |

DECEMBER, 1938

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# MODEL P-1617

## ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary However, when readjustments are required, the procedure given below must be followed in detail.

*Equipment* — Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 27-7159 Padding screw driver.

*General* — The output meter must be connected by means of an adapter to the plate of the type 41 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

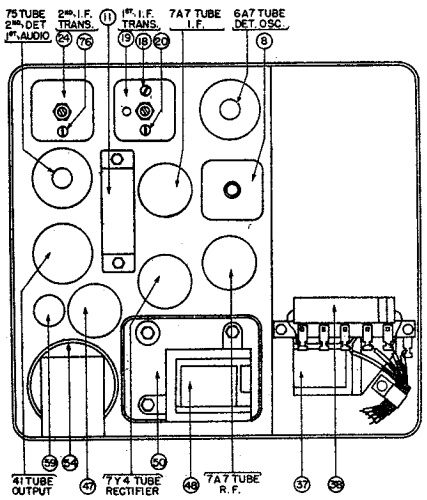


FIGURE 3

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| 1 | Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning | | | | |
| 2 | 470 K.C. | To Grid of 6A7 Tube | .1 Mfd. | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | (78) (82) (18) |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | *20 Mmfd. See Note 1 | Note 2 | (78) |
| 4 | 1400 K.C. | To Antenna Receptacle on Radio | *20 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (78) Note 4 |
| 5 | 580 K.C. | To Antenna Receptacle on Radio | *20 Mmfd. See Note 1 | Set Tuning Condenser at 580 K.C. | (80) Note 3 |
| 6 | 1580 K.C. | To Antenna Receptacle on Radio | *20 Mmfd. See Note 1 | Note 2 | (79) |
| 7 | 1400 K.C. | To Antenna Receptacle on Radio | *20 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (79) Note 4 |

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 20 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the cowl antenna is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the black terminal of the Antenna Transformer.
*When the undercar or roof antenna is used, connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the Radio. Connect a 250 Mmfd condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is connected to the red terminal of the antenna transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

# MODEL P-1630

## ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

*Equipment* — Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 27-7159 Padding screw driver.

*General* — The output meter must be connected by means of an adapter to the plate of the type 42 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

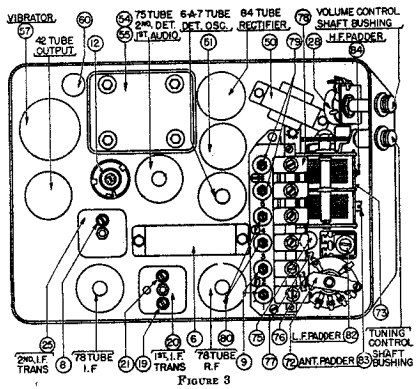


FIGURE 3

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| 1 | Press the return to dial button until stations can be tuned in by manual tuning. | | | | |
| 2 | 470 K.C. | To Grid of 6A7 Tube | .1 Mfd. | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | (6) (18) (21) |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | * 20 Mmfd. See Note 1 | Note 2 | (24) |
| 4 | 1400 K.C. | To Antenna Receptacle on Radio | * 20 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (83) Note 4 |
| 5 | 580 K.C. | To Antenna Receptacle on Radio | * 20 Mmfd. See Note 1 | Set Tuning Condenser at 580 K.C. | (82) Note 3 |
| 6 | 1580 K.C. | To Antenna Receptacle on Radio | * 20 Mmfd. See Note 1 | Note 2 | (84) |
| 7 | 1400 K.C. | To Antenna Receptacle on Radio | * 20 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (83) Note 4 |

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. L-2765, to the antenna receptacle in the radio. Connect a 20 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the cowl antenna is used follow the above procedure. Be sure the lead to the antenna transformer is conncted to the black terminal of the Antenna Transformer.
* When the undercar or roof antenna is used, connect the antenna lead, Part No. 41-3191 to the antenna receptacle in the Radio. Connect a 250 Mmfd. condenser in series between the signal generator and the antenna lead. Be sure the lead to the antenna transformer is connected to the red terminal of the antenna transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

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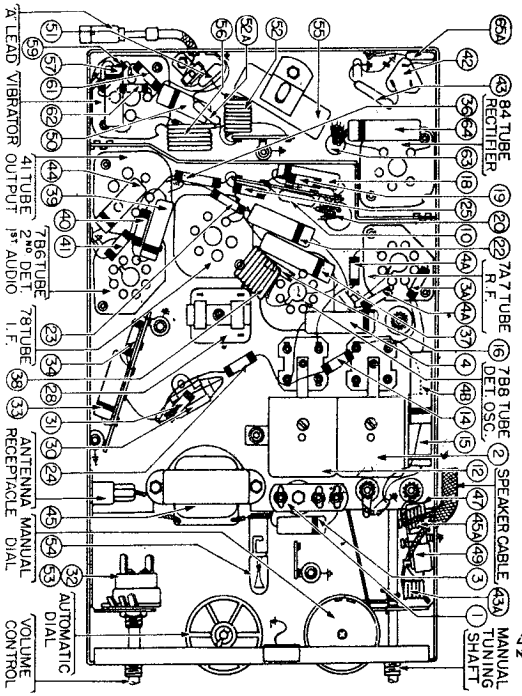
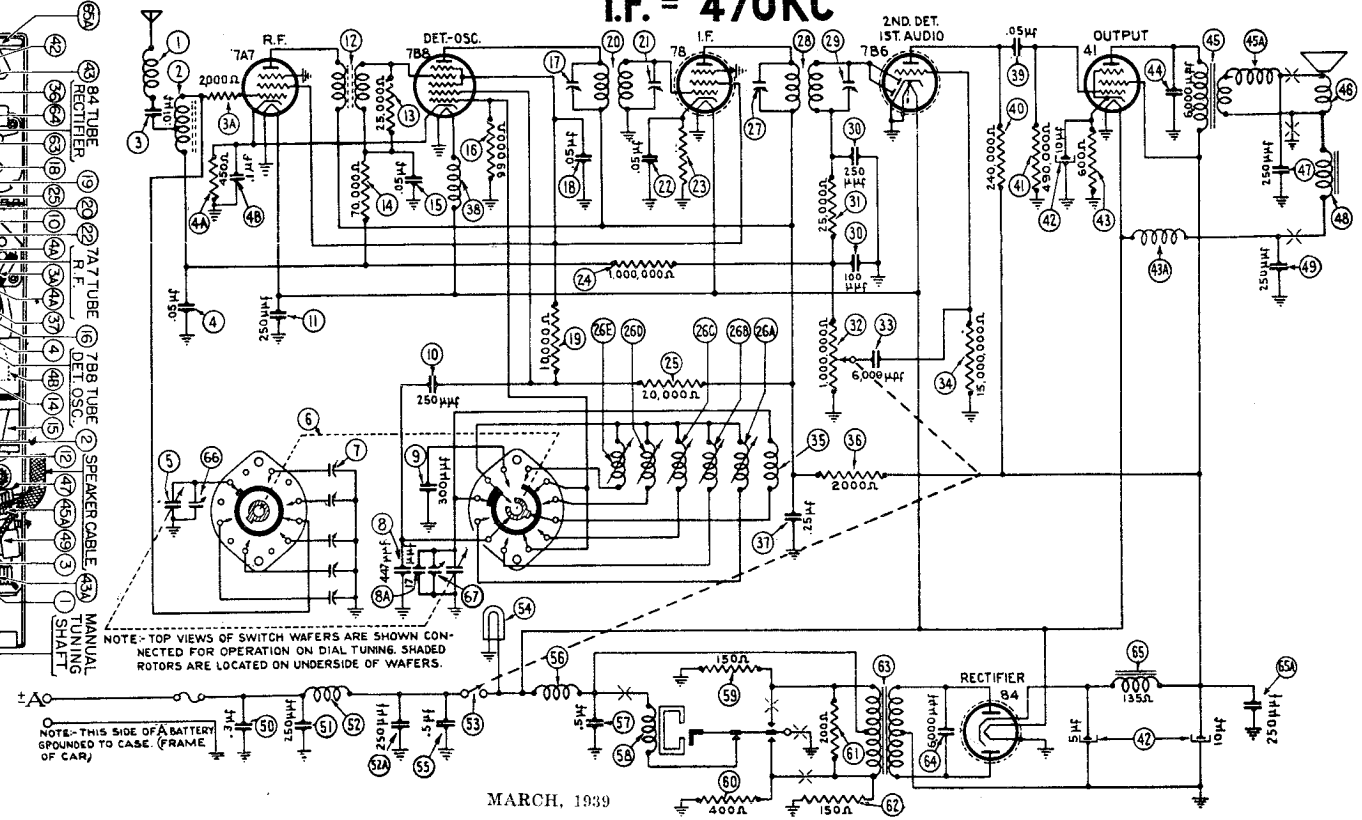
FOR ALIGNMENT, SEE INDEX




# I.F. = 470KC




# STUDEBAKER MODEL S-1622

MARCH, 1939

| No. | Description | Part No. |
|---|---|---|
| 1 | Antenna Choke | 65-0102 |
| 2 | Antenna Transformer | 65-0115 |
| 3 | Condenser (.01 mfd.) | 61-0014 |
| 3a | Resistor (2,000 ohms) | 33-220337 |
| 4 | Condenser (.05 mfd.) | 30-4444 |
| 4a | Resistor (450 ohms) | 33-145438 |
| 4b | Condenser (.1 mfd.) | 30-4499 |
| 5 | Tuning Condenser | 63-0023 |
| 6 | Wafer Switch | 412-1023 |
| 7 | Antenna Padder Assy. | 77-0262 |
| 8 | Silver Mica Condenser (447-mmfd.) | 61-0047 |
| 8a | Condenser (17 mmfd.) | 61-0039 |
| 9 | Silver Mica Condenser (300 mmfd.) | 61-0003 |
| 10 | Condenser (250 mmfd.) | 30-1038 |
| 11 | Condenser (250 mmfd.) | 61-0033 |
| 12 | R. F. Transformer | 65-0114 |
| 13 | Resistor (25,000 ohms) | 33-325337 |
| 14 | Resistor (70,000 ohms) | 33-370337 |
| 15 | Condenser (.05 mfd.) | 30-4444 |
| 16 | Resistor (99,000 ohms) | 33-399337 |
| 17 | Padder (Pri. 1st I. F. Trans.) | |
| 18 | Condenser (.05 mfd.) | 30-4569 |
| 19 | Resistor (10,000 ohms) | 33-310337 |
| 20 | First I. F. Transformer | 65-0148 |
| 21 | Padder (Sec. 1st I. F. Trans.) | |
| 22 | Condenser (.05 mfd.) | 30-4444 |
| 23 | Resistor (1,000 ohms) | 33-210337 |
| 24 | Resistor (1,000,000 ohms) | 33-510337 |
| 25 | Resistor (20,000 ohms) | 33-320337 |
| 26a | Oscillator Transformer | 65-0169 |
| 26b | Oscillator Transformer | 65-0136 |
| 26c | Oscillator Transformer | 65-0137 |
| 26d | Oscillator Transformer | 65-0138 |
| 26e | Oscillator Transformer | 65-0139 |
| 27 | Padder (Pri. 2nd I. F. Trans.) | |
| 28 | Second I. F. Transformer | 65-0149 |
| 29 | Padder (Sec. 2nd I. F. Trans.) | |
| 30 | Condenser (100—250 mmfd.) | 61-0049 |
| 31 | Resistor (25,000 ohms) | 33-325237 |
| 32 | Volume Control (1,000,000 ohms) and On-Off Switch | 67-0015 |
| 33 | Condenser (6,000 mmfd.) | 30-4467 |
| 34 | Resistor (15,000 000 ohms) | 33-615337 |
| 35 | Oscillator Transformer | 65-0134 |
| 36 | Resistor (2,000 ohms) | 33-220427 |
| 37 | Condenser (.25 mfd.) | 30-4446 |
| 38 | Choke | 65-0158 |
| 39 | Condenser (.05 mfd.) | 61-0053 |
| 40 | Resistor (240,000 ohms) | 33-424337 |
| 41 | Resistor (490,000 ohms) | 33-449337 |
| 42 | Filter Condenser (5—10—10 mfd.) | 61-0050 |
| 43 | Resistor (600 ohms) | 33-160338 |
| 43a | Choke | 32-1438 |
| 44 | Condenser (6,000 mmfd.) | 30-4024 |
| 45 | Output Transformer | 65-0147 |
| 45a | Choke | 32-1561 |
| 46 | Cone and Voice Coil | 91-0065 |
| 47 | Condenser (250 mmfd.) | 61-0033 |
| 48 | Field Coil | Not Replaceable |
| 49 | Condenser (250 mmfd.) | 61-0033 |
| 50 | Condenser (.3 mfd.) | 61-0056 |
| 51 | Condenser (250 mmfd.) | 61-0033 |
| 52 | "A" Choke | 32-1644 |
| 52a | Condenser (250 mmfd.) | 61-0033 |
| 53 | On-Off Switch and Volume Control | 67-0015 |
| 54 | Pilot Lamp | 34-2064 |
| 55 | Condenser (.5 mfd.) | 30-4306 |
| 56 | Vibrator Choke | 65-0151 |
| 57 | Condenser (.5 mfd.) | 61-0054 |
| 58 | Vibrator | 41-3398 |
| 59 | Resistor (150 ohms) | 33-115337 |
| 60 | Resistor (400 ohms) | 33-140237 |
| 61 | Resistor (200 ohms) | 33-120337 |
| 62 | Resistor (150 ohms) | 33-115337 |
| 63 | Power Transformer | 65-0152 |
| 64 | Condenser (6,000 mmfd.) | 61-0052 |
| 65 | Filter Choke | 65-0150 |
| 65a | Condenser (250 mmfd.) | 61-0033 |
| 66 | First Padder (on Tun. Cond.) | |
| 67 | Second Padder (on Tun. Cond.) | |
| | Drive Cord | 55-0413 |
| | Dial Dise and Drive Assy. | 77-0233 |
| | Automatic Dial | 55-0197 |
| | Call Letter Kit | 81-0143 |
| | Tuning and Volume Knob | 27-4689 |
| | Push Button | 55-0412 |
| | Mounting Bracket | 57-0667FA3 |
| | Fuse | 45-2559 |
| | "A" Lead | 95-0032 |
| | Complete Speaker | 73-0022 |
| | Interference Condenser | 30-4007 |
| | Distributor Resistor | 33-1196 |
| | Fuse Gauge Resistor | 77-0335 |
| | Steering Post Mtg. Strap | 77-0336 |
| | Bolt | 77-0056FA3 |

MODEL P-1630 Packard
Schematic, Chassis
Parts

# PHILCO RADIO & TELEV. CORP.

## I.F. = 470KC

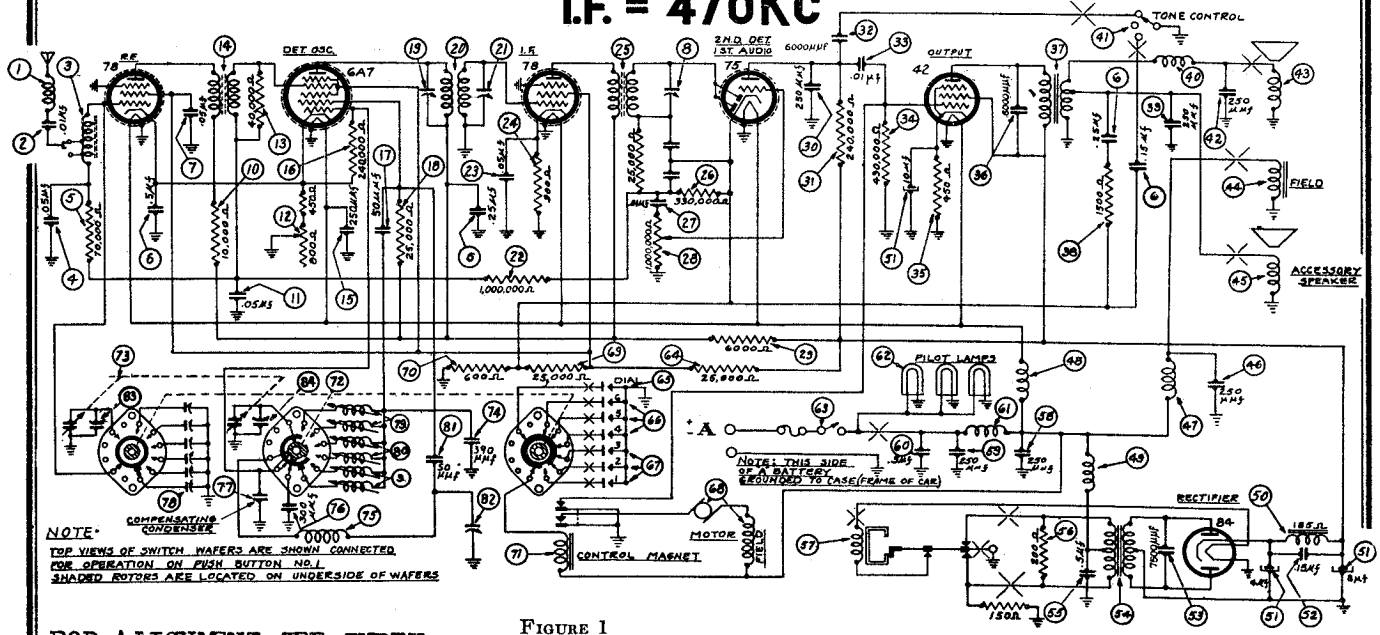



FIGURE 1

FOR ALIGNMENT, SEE INDEX

## PARTS LIST

| No. | Description | Part No. |
|---|---|---|
| ① | Antenna Choke | 32-1956 |
| ② | Condenser (.01 mfd.) | 61-0014 |
| ③ | Antenna Transformer | 65-0008 |
| ④ | Condenser (.05 mfd.) | 30-4569 |
| ⑤ | Resistor (70,000 ohms) | 33-370337 |
| ⑥ | Condenser (.15-.25-.25-.5 mfd.) | 61-0013 |
| ⑦ | Condenser (.05 mfd.) | 30-4123 |
| ⑧ | Padder (Sec. 2nd I. F. Trans.) | |
| ⑨ | Oscillator Transformers (High Freq.) | 65-0004 |
| ⑩ | Resistor (10,000 ohms) | 33-310337 |
| ⑪ | Condenser (.05 mfd.) | 30-4444 |
| ⑫ | Sensitivity Control (1,250 ohms) | 33-5264-4 |
| ⑬ | Resistor (40,000 ohms) | 33-340337 |
| ⑭ | R. F. Transformers | 65-0009 |
| ⑮ | Condenser (250 mmfd.) | 30-1032 |
| ⑯ | Resistor (240,000 ohms) | 33-424337 |
| ⑰ | Condenser (50 mmfd.) | 30-1101 |
| ⑱ | Resistor (25,000 ohms) | 33-325337 |
| ⑲ | Padder (Pri. 1st I. F. Trans.) | |
| ⑳ | First I. F. Transformer | 65-0002 |
| ㉑ | Padder (Sec. 1st I. F. Trans.) | |
| ㉒ | Resistor (1,000,000 ohms) | 33-510337 |
| ㉓ | Condenser (.05 mfd.) | 30-4569 |
| ㉔ | Resistor (900 ohms) | 33-190438 |
| ㉕ | Second I. F. Transformer | 65-0003 |
| ㉖ | Resistor (330,000 ohms) | 33-433337 |
| ㉗ | Condenser (.01 mfd.) | 30-4479 |
| ㉘ | Volume Control (1,000,000 ohms) | 67-0002 |
| ㉙ | Resistor (6,000 ohms) | 33-260337 |
| ㉚ | Condenser (250 mmfd.) | 30-1032 |
| ㉛ | Resistor (240,000 ohms) | 33-424337 |
| ㉜ | Condenser (6,000 mmfd.) | 30-4504 |
| ㉝ | Condenser (.01 mfd.) | 30-4501 |
| ㉞ | Resistor (490,000 ohms) | 33-449337 |
| ㉟ | Resistor (450 ohms) | 33-145438 |
| ㊱ | Condenser (6,000 mmfd.) | 30-4024 |
| ㊲ | Output Transformer | 65-0024 |
| ㊳ | Resistor (1,500 ohms) | 33-215337 |
| ㊴ | Condenser (250 mmfd.) | 30-1032 |
| ㊵ | Choke | 32-1374 |
| ㊶ | Tone Control Switch | 77-0026 |

| No. | Description | Part No. |
|---|---|---|
| ㊷ | Condenser (250 mmfd.) | 30-1032 |
| ㊸ | Cone & Voice Coil | 91-0047 |
| ㊹ | Field Coil Assembly. Not Replaceable | |
| ㊺ | Accessory Speaker | 36-1384 |
| ㊻ | Condenser (250 mmfd.) | 30-1032 |
| ㊼ | Choke | 32-2657 |
| ㊽ | Filament Choke | 32-1604 |
| ㊾ | Vibrator Choke | 32-2537 |
| ㊿ | Filter Choke | 65-0022 |
| (51) | Filter Condenser (4-8-10 mfd.) | 61-0012 |
| (52) | Condenser (.15 mfd.) | 30-4571 |
| (53) | Condenser (7,500 mmfd.) | 30-4567 |
| (54) | Power Transformer | 65-0016 |
| (55) | Condenser (.5 mfd.) | 30-4565 |
| (56) | Resistor (200 ohms) | 33-120337 |
| (57) | Vibrator | 41-3170 |
| (58) | Condenser (250 mmfd.) | 30-1032 |
| (59) | Condenser (250 mmfd.) | 30-1032 |
| (60) | Condenser (.5 mfd.) | 30-4474 |
| (61) | "A" Choke | 32-1644 |
| (62) | Pilot Lamp | 34-2040 |
| (63) | On-Off Switch | 85-0009 |
| (64) | Resistor (25,000 ohms) | 33-325437 |
| (65) | Padder & Bracket Assembly | 77-0017 |
| (66) | Push Button Switch | 77-0024 |
| (67) | Push Button Switch | 77-0024 |
| (68) | Motor | 83-0001 |
| (69) | Resistor (25,000 ohms) | 33-325337 |
| (70) | Resistor (600 ohms) | 33-160438 |
| (71) | Motor & Relay Assembly | 77-0178 |
| (72) | Switch Mechanism Assembly | 77-0034 |
| (73) | Tuning Condenser | 63-0003 |
| (74) | Silver Cap Condenser (390 mmfd.) | 61-0031 |
| (75) | Oscillator Transformer | 65-0007 |
| (76) | Silver Cap Condenser (300 mmfd.) | 61-0003 |
| (77) | Thermel Compensating Condenser | 61-0011 |
| (78) | Antenna Padders | 77-0017 |
| (79) | Oscillator Transformer (Low Freq.) | 65-0006 |
| (80) | Oscillator Transformer (Medium Freq.) | 65-0005 |

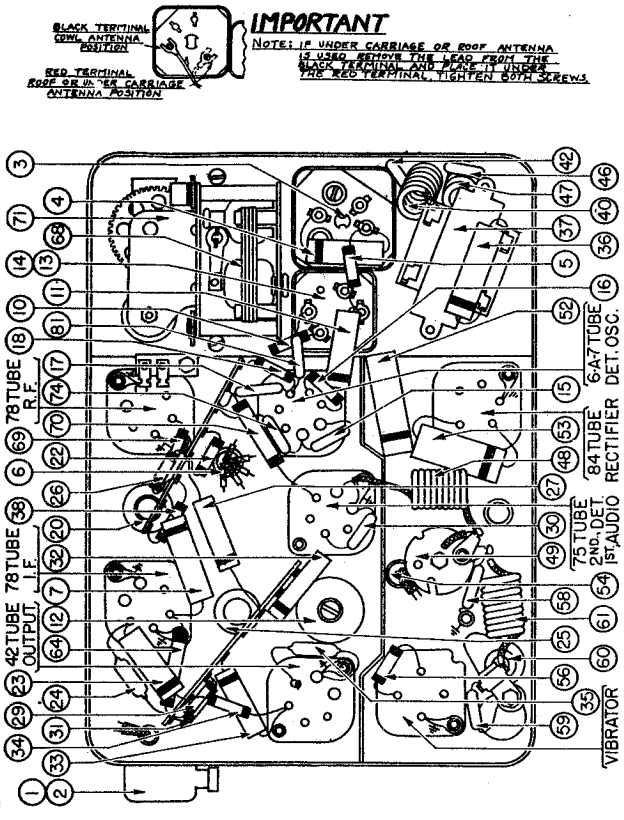

IMPORTANT
NOTE: IF UNDER CARRIAGE OR ROOF ANTENNA IS USED REMOVE THE LEAD FROM THE BLACK TERMINAL AND PLACE IT UNDER THE RED TERMINAL. TIGHTEN BOTH SCREWS.
BLACK TERMINAL COWL ANTENNA POSITION
RED TERMINAL ROOF OR UNDER CARRIAGE ANTENNA POSITION
78 TUBE R.F.
78 TUBE I.F.
42 TUBE OUTPUT
6A7 TUBE DET. OSC.
84 TUBE RECTIFIER
75 TUBE 2ND. DET. 1ST. AUDIO
VIBRATOR

FIGURE 2

| No. | Description | Part No. |
|---|---|---|
| (81) | Condenser (50 mmfd.) | 30-1101 |
| (82) | Low Frequency Padder | 31-6230 |
| (83) | First Padder on Tun. Cond. | |
| (84) | Second Padder on Tun. Cond. | |
| | Interference Condenser | 30-4007 |
| | Interference Condenser | 30-4475 |
| | Distributor Resistor | 33-1196 |
| | Push Buttons | 85-0027 |

| No. | Description | Part No. |
|---|---|---|
| | Return to Dial Switch | 77-0025 |
| | Tone Control Switch | 77-0026 |
| | On-Off Switch | 85-0009 |
| | Tuning & Volume Knob | 27-4687 |
| | Knob Base | 28-4184 |
| | "T" Bolt (Rec. Mtg.) | 28-6268 |
| | Nuts (Rec. Mtg.) | W518 |
| | Call Letter Kit | 81-0018 |

SEPTEMBER, 1938

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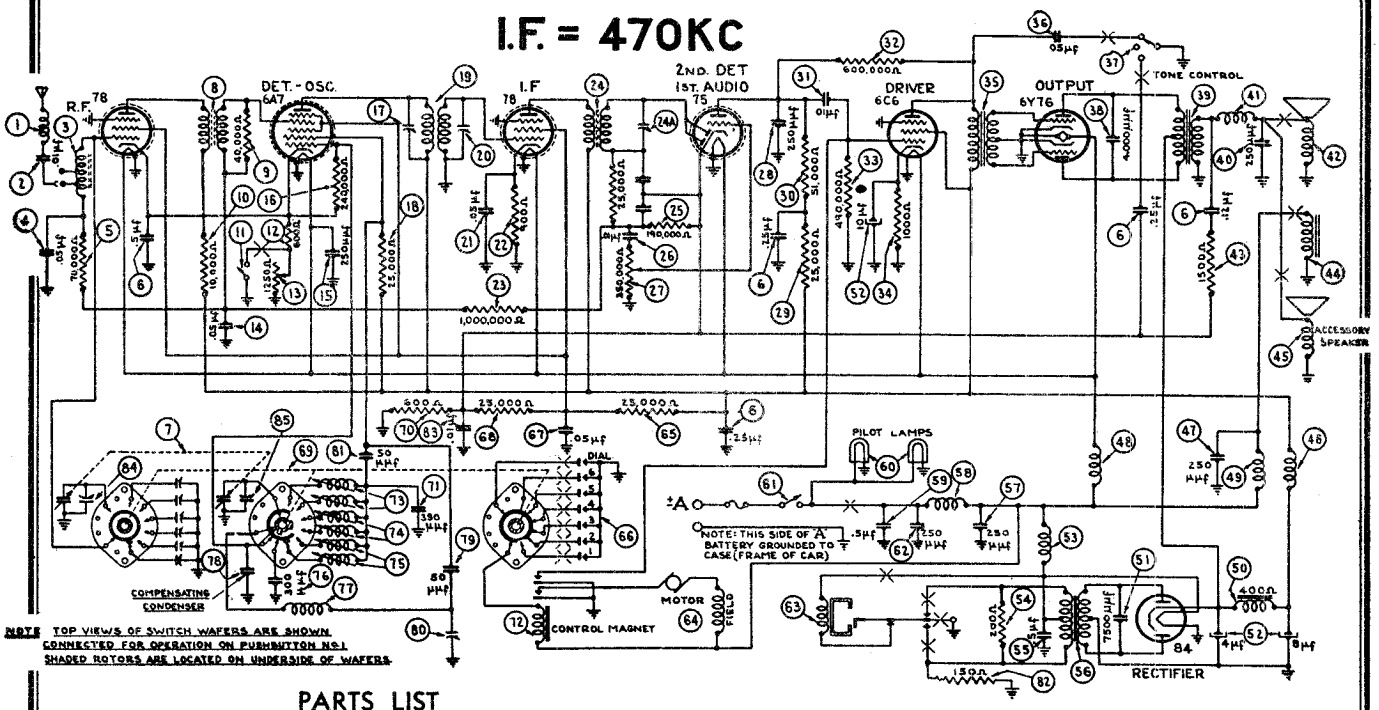
# PHILCO RADIO & TELEV. CORP.

MODEL P-1635 Packard
Schematic, Chassis
Parts

## I.F. = 470KC




## PARTS LIST

| No. | Description | Part No. |
|---|---|---|
| ① | Antenna Choke | 32-1956 |
| ② | Condenser (.01 mfd.) | 61-0014 |
| ③ | Antenna Transformer | 65-0008 |
| ④ | Condenser (.05 mfd.) | 30-4569 |
| ⑤ | Resistor (70,000 ohms) | 33-370337 |
| ⑥ | Condenser (.12-.25-.25-.25-.5 mfd.) | 61-0019 |
| ⑦ | Tuning Condenser | 63-0003 |
| ⑧ | R. F. Transformer | 65-0009 |
| ⑨ | Resistor (40,000 ohms) | 33-339137 |
| ⑩ | Resistor (10,000 ohms) | 33-310337 |
| ⑪ | Local-Distant Switch | 42-1429 |
| ⑫ | Resistor (600 ohms) | 33-160438 |
| ⑬ | Sensitivity Control (1,250 ohms) | 33-5248-4 |
| ⑭ | Condenser (.05 mfd.) | 30-4444 |
| ⑮ | Condenser (250 mmfd.) | 30-1032 |
| ⑯ | Resistor (240,000 ohms) | 33-424337 |
| ⑰ | Padder (Pri. 1st I. F. Trans.) | |
| ⑱ | Resistor (25,000 ohms) | 33-325337 |
| ⑲ | First I. F. Transformer | 65-0002 |
| ⑳ | Padder (Sec. 1st I. F. Trans.) | |
| ㉑ | Condenser (.05 mfd.) | 30-4569 |
| ㉒ | Resistor (900 ohms) | 33-190438 |
| ㉓ | Resistor (1,000,000 ohms) | 33-510337 |
| ㉔ | Second I. F. Transformer | 65-0003 |
| ㉔a | Padder (Sec. 2nd I. F. Trans.) | |
| ㉕ | Resistor (190,000 ohms) | 33-419337 |
| ㉖ | Condenser (.01 mfd.) | 30-4479 |
| ㉗ | Volume Control (350,000 ohms) | 67-0005 |
| ㉘ | Condenser (250 mmfd.) | 30-1032 |
| ㉙ | Resistor (25,000 ohms) | 33-325337 |
| ㉚ | Resistor (51,000 ohms) | 33-351337 |
| ㉛ | Condenser (.01 mfd.) | 30-4501 |
| ㉜ | Resistor (600,000 ohms) | 33-460337 |
| ㉝ | Resistor (490,000 ohms) | 33-449337 |
| ㉞ | Resistor (1,000 ohms) | 33-210337 |
| ㉟ | Input Transformer | 32-7779 |
| ㊱ | Condenser (.05 mfd.) | 30-4012 |
| ㊲ | Tone Control Switch | 42-1430 |
| ㊳ | Condenser (4,000 mmfd.) | 30-4185 |
| ㊴ | Output Transformer | 32-7778 |
| ㊵ | Condenser (250 mmfd.) | 30-1032 |
| ㊶ | Choke | 32-1604 |

| No. | Description | Part No. |
|---|---|---|
| ㊷ | Cone and Voice Coil | 91-0048 |
| ㊸ | Resistor (1,500 ohms) | 33-215337 |
| ㊹ | Field Coil | Not Replaceable |
| ㊺ | Accessory Speaker | 73-0019 |
| ㊻ | "B" Choke | 32-1281 |
| ㊼ | Condenser (250 mmfd.) | 30-1032 |
| ㊽ | Filament Choke | 32-1604 |
| ㊾ | Choke | 32-2657 |
| ㊿ | Filter Choke | 32-7811 |
| (51) | Condenser (7,500 mmfd.) | 30-4567 |
| (52) | Filter Condenser (4-8-10 mfd.) | 61-0012 |
| (53) | Vibrator Choke | 32-2537 |
| (54) | Resistor (200 ohms) | 32-120337 |
| (55) | Condenser (.5 mfd.) | 30-4474 |
| (56) | Power Transformer | 32-7720 |
| (57) | Condenser (250 mmfd.) | 30-1032 |
| (58) | "A" Choke | 32-1644 |
| (59) | Condenser (.5 mfd.) | 30-4474 |
| (60) | Pilot Lamp | 34-2064 |
| (61) | On-Off Switch | 42-1374 |
| (62) | Condenser (250 mmfd.) | 30-1032 |
| (63) | Vibrator | 41-3170 |
| (64) | Motor | 83-0001 |
| (65) | Resistor (25,000 ohms) | 33-325437 |
| (66) | Push Button Switch | 85-0017 |
| (67) | Condenser (.05 mfd.) | 30-4444 |
| (68) | Resistor (25,000 ohms) | 33-325337 |
| (69) | Rotary Switch Assembly | 77-0174 |
| (70) | Resistor (600 ohms) | 33-160438 |
| (71) | Silver Cap Condenser (390 mmfd.) | 61-0031 |
| (72) | Motor and Relay Assembly | 77-0178 |
| (73) | Oscillator Transformer (Low Freq.) | 65-0006 |
| (74) | Oscillator Transformer (Med. Freq.) | 65-0005 |
| (75) | Oscillator Transformer (High Freq.) | 65-0004 |
| (76) | Silver Cap Condenser (300 mmfd.) | 61-0003 |
| (77) | Oscillator Transformer | 65-0007 |
| (78) | Thermel Comp. Condenser | 61-0011 |
| (79) | Condenser (50 mmfd.) | 30-1101 |
| (80) | Low Frequency Padder | 31-6230 |
| (81) | Condenser (50 mmfd.) | 30-1101 |

**IMPORTANT**
NOTE: IF COWL ANTENNA IS USED REMOVE THE LEAD FROM THE RED TERMINAL AND PLACE IT UNDER THE BLK. TERMINAL, TIGHTEN BOTH SCREWS.

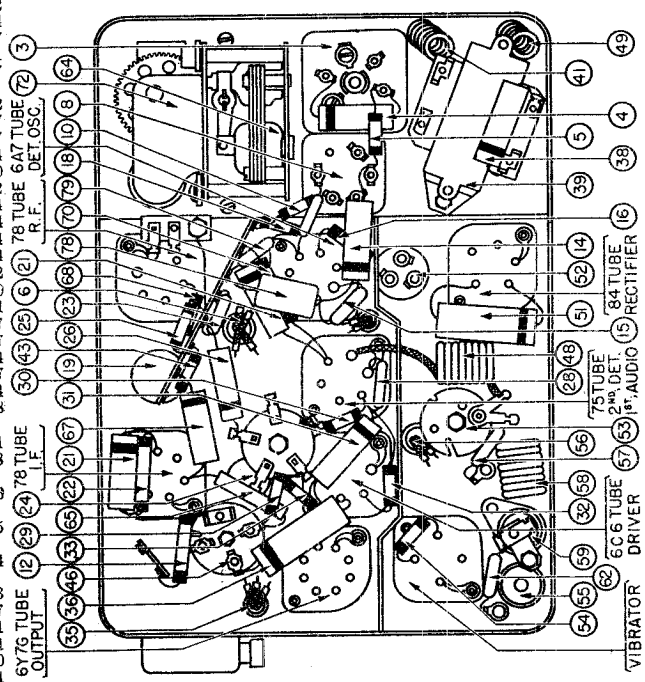



FIGURE 2

| No. | Description | Part No. |
|---|---|---|
| (82) | Resistor (150 ohms) | 33-115337 |
| (83) | Condenser (.01 mfd.) | 30-4479 |
| (84) | First Padder (on Tun. Cond.) | |
| (85) | Second Padder (on Tun. Cond.) | |
| (86) | Resistor (25,000 ohms) | 33-325337 |
| (87) | Antenna Padder Assembly | 77-0017 |
| | Interference Condenser | 30-4007 |
| | Interference Condenser | 30-4475 |
| | Distributor Suppressor | 32-2250 |
| | Push Button | 55-0021 |
| | Return to Manual Button | 55-0096 |

| No. | Description | Part No. |
|---|---|---|
| | Tuning and Volume Knob | 27-4687 |
| | Return to Dial Switch | Part of (66) |
| | Switch Knob | 28-7255 |
| | Call Letter Kit | 81-0024 |
| | "T" Bolt (Set Mtg.) | 28-6161 |
| | Nut (Set Mtg.) | W518 |
| | Stud (Speaker Mtg.) | 28-6088 |
| | Nut (Speaker Mtg.) | W55 |
| | Dial Face Glass | 55-0014 |
| | Pointer | 57-0238 |

DECEMBER 20, 1938

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MODEL P-1635 Packard
Socket, Trimmers
Alignment

# PHILCO RADIO & TELEV. CORP.

## ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

***Equipment*** — Fully charged heavy duty storage battery or 6-volt power pack, 077 or 177 Philco Set Tester, 27-7159 Padding screw driver.

***General*** — The output meter must be connected by means of an adapter to the plate of the type 6Y7G output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attentuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

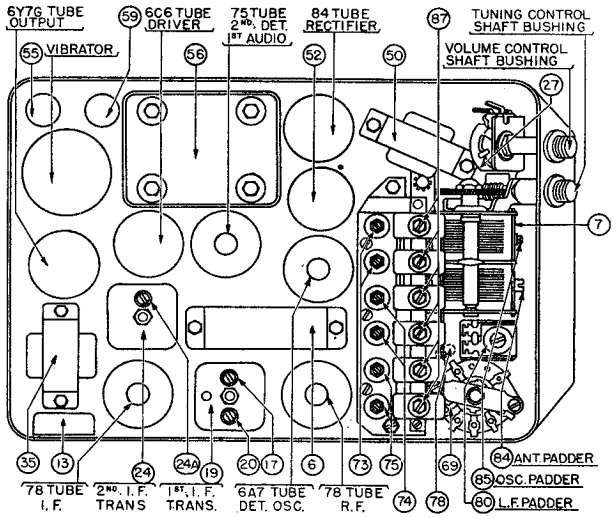


FIGURE 3

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| 1 | Press the return to dial button until stations can be tuned in by manual tuning. | | | | |
| 2 | 470 K.C. | To Grid of 6A7 Tube | .1 Mfd. | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | 24A 20 17 |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | *250 Mmfd. See Note 1 | Note 2 | 85 |
| 4 | 1400 K.C. | To Antenna Receptacle on Radio | *250 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K. C. | 84 Note 4 |
| 5 | 580 K.C. | To Antenna Receptacle on Radio | *250 Mmfd. See Note 1 | Set Tuning Condenser at 580 K. C. | 80 Note 3 |
| 6 | 1580 K.C. | To Antenna Receptacle on Radio | *250 Mmfd. See Note 1 | Note 2 | 85 |
| 7 | 1400 K.C. | To Antenna Receptacle on Radio | *250 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K. C. | 84 Note 4 |

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 250 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the roof or undercarriage antenna is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the red terminal of the Antenna Transformer.

*When the cowl antenna is used, connect the antenna lead, Part No. L-2765, to the antenna receptacle in the Radio. Connect a 20 mmfd. condenser in series with the signal generator and the antenna lead. Be sure the lead to the antenna transformer is connected to the black terminal of the antenna transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.



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PHILCO RADIO & TELEV. CORP.

MODEL F-1640 Ford
Schematic, Chassis
Parts

I.F. PEAK 470 KC.

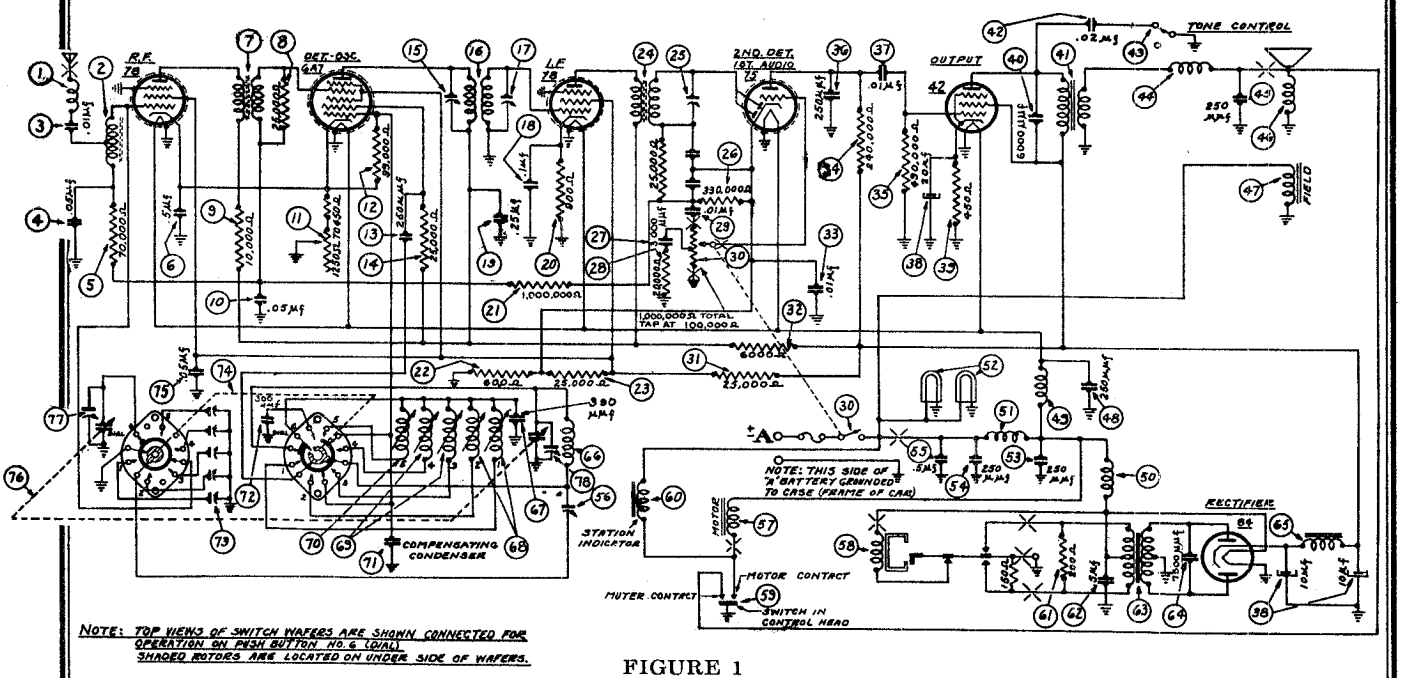
R.F. 78
DET.-OSC. 6A7
I.F. 78
2ND. DET. 1ST. AUDIO 75
OUTPUT
TONE CONTROL
.02 MF
FIELD
1,000,000 Ω TOTAL TAP AT 100,000 Ω
NOTE: THIS SIDE OF "A" BATTERY GROUNDED TO CASE (FRAME OF CAR)
RECTIFIER
STATION INDICATOR
COMPENSATING CONDENSER
MOTOR
MOTOR CONTACT
MUTER CONTACT
SWITCH IN CONTROL HEAD
NOTE: TOP VIEWS OF SWITCH WAFERS ARE SHOWN CONNECTED FOR OPERATION ON PUSH BUTTON NO. 6 (DIAL)
SHADED ROTORS ARE LOCATED ON UNDER SIDE OF WAFERS.

FIGURE 1

# FORD MODEL F-1640 TWO UNIT DELUXE CAR RADIO

NOVEMBER, 1938

## PARTS LIST

| No. | Description | Part No. |
|---|---|---|
| 1 | Antenna Choke | 32-1956 |
| 2 | Antenna Transformer | 65-0079 |
| 3 | Condenser (.01 mfd.) | 61-0014 |
| 4 | Condenser (.05 mfd.) | 30-4569 |
| 5 | Resistor (70,000 ohms) | 33-370337 |
| 6 | Condenser (.5 mfd.) | 61-0035 |
| 7 | R. F. Transformer | 65-0083 |
| 8 | Resistor (25,000 ohms) | 33-325337 |
| 9 | Resistor (10,000 ohms) | 33-310337 |
| 10 | Condenser (.05 mfd.) | 30-4444 |
| 11 | Sensitivity Control | 33-5264-4 |
| 12 | Resistor (99,000 ohms) | 33-399337 |
| 13 | Condenser (250 mmfd.) | 61-0034 |
| 14 | Resistor (25,000 ohms) | 33-325437 |
| 15 | Padder (Pri. 1st I. F. Trans.) | |
| 16 | First I. F. Transformer | 65-0002 |
| 17 | Padder (Sec. 1st I. F. Trans.) | |
| 18 | Condenser (.1 mfd.) | 30-4122 |
| 19 | Condenser (.25 mfd.) | 61-0036 |
| 20 | Resistor (900 ohms) | 33-190438 |
| 21 | Resistor (1,000,000 ohms) | 33-510437 |
| 22 | Resistor (600 ohms) | 33-160438 |
| 23 | Resistor (25,000 ohms) | 33-325437 |
| 24 | Second I. F. Transformer | 65-0003 |
| 25 | Padder (Sec. 2nd I. F. Trans.) | |
| 26 | Resistor (330,000 ohms) | 33-433337 |
| 27 | Condenser (3,000 mmfd.) | 30-4469 |
| 28 | Resistor (20,000 ohms) | 33-320337 |
| 29 | Condenser (.1 mfd.) | 30-4479 |
| 30 | Volume Control (1,000,000 ohms) & On-Off Switch | 67-0008 |
| 31 | Resistor (25,000 ohms) | 33-325437 |
| 32 | Resistor (6,000 ohms) | 33-260337 |
| 33 | Condenser (.01 mfd.) | 30-4479 |
| 34 | Resistor (240,000 ohms) | 33-424337 |
| 35 | Resistor (490,000 ohms) | 33-449347 |
| 36 | Condenser (250 mmfd.) | 30-1032 |
| 37 | Condenser (.01 mfd.) | 30-4501 |
| 38 | Filter Condenser (10-10-20 mfd.) | 61-0028 |
| 39 | Resistor (450 ohms) | 33-145437 |
| 40 | Condenser (6,000 mmfd.) | 30-4024 |
| 41 | Output Transformer | 65-0077 |
| 42 | Condenser (.02 mfd.) | 30-4495 |
| 43 | Tone Control Switch | 42-1406 |
| 44 | Choke | 32-1561 |
| 45 | Condenser (250 mmfd.) | 30-1032 |
| 46 | Cone & Voice Coil | 91-0042 |
| 47 | Field Coil | Not Replaceable |
| 48 | Condenser (250 mmfd.) | 30-1032 |
| 49 | Filament Choke | 32-1604 |
| 50 | Vibrator Choke | 32-2537 |
| 51 | "A" Choke | 32-2477 |
| 52 | Pilot Lamp | 34-2040 |
| 53 | Condenser (250 mmfd.) | 61-0033 |
| 54 | Condenser (250 mmfd.) | 61-0033 |
| 55 | Condenser (.5 mfd.) | 30-4474 |
| 56 | Low Frequency Padder | 63-0017 |
| 57 | Impulse Motor | 77-0148 |
| 58 | Vibrator | 41-3398 |
| 59 | Automatic Control Switch | 77-0171 |
| 60 | Control Mechanism Coil | |
| 61 | Resistor (200 ohms) | 33-120347 |
| 62 | Condenser (.5 mfd.) | 30-4565 |
| 63 | Power Transformer | 65-0016 |
| 64 | Condenser (7,500 mmfd.) | 30-4567 |
| 65 | Filter Choke | 65-0022 |
| 66 | Oscillator Transformer | 65-0052 |
| 67 | Silver Cap Condenser (390 mmfd.) | 61-0031 |
| 68 | Oscillator Transformer (High Freq.) | 65-0049 |
| 69 | Oscillator Transformer (Med. Freq.) | 65-0050 |
| 70 | Oscillator Transformer (Low Freq.) | 65-0051 |
| 71 | Thermol Coupling Condenser | 61-0011 |
| 72 | Silver Cap Condenser (300 mmfd.) | 61-0003 |
| 73 | Antenna Padder Assy. | 77-0035 |
| 74 | Wafer Switch Assy. | 77-0185 |
| 75 | Condenser (.05 mfd.) | 30-4569 |
| 76 | Tuning Condenser | 63-0015 |
| 77 | First Padder (on Tun. Cond.) | |
| 78 | Second Padder (on Tun. Cond.) | |
| | Call Letter Kit | 81-0091 |

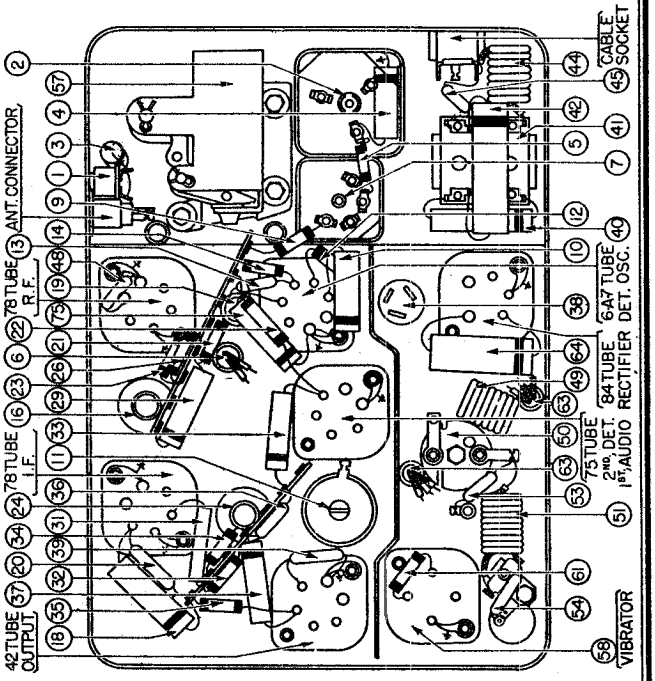


FIGURE 2

| Description | Part No. |
|---|---|
| Flexible Shaft | 57-0425 |
| Dial Assembly | 85-0052 |
| Push Button Knob | 55-0196 |
| Tuning Control Knob | 55-0234 |
| Volume Control Knob | 55-0235 |

| Description | Part No. |
|---|---|
| "Tee" Bolt (Rec. Mtg.) | 28-6161 |
| Nut (Rec. Mtg.) | W518 |
| Hook Bolt (Control Mtg.) | 97-0043 |
| Nut (Control Mtg.) | 97-0048 |
| Antenna Lead | 95-0063 |

The letter "P" is stamped on the left end of the housing near the top cover on all Ford Philco Model F-1640 Radios.

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MODEL F-1640 Ford
Socket, Trimmers
Alignment

# PHILCO RADIO & TELEV. CORP.

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 95-0063, to the antenna receptacle in the radio. Connect a 30 Mmfd. Condenser in series between the signal generator and the antenna lead.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

## ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

*Equipment* — Fully charged heavy duty storage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 27-7159 Padding screw driver.

*General* — The output meter must be connected by means of an adapter to the plate of the type 42 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

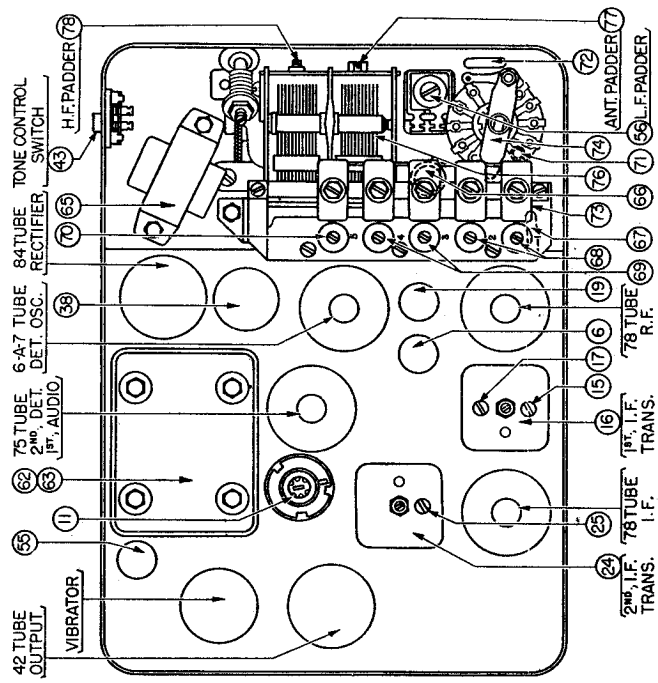


FIGURE 3

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| 1 | Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning | | | | |
| 2 | 470 K.C. | To Grid of 6A7 Tube | .5 Mfd. | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | (25) (15) (17) |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | 30 Mmfd. See Note 1 | Note 2 | (78) |
| 4 | 1400 K.C. | To Antenna Receptacle on Radio | 30 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (77) Note 4 |
| 5 | 580 K.C. | To Antenna Receptacle on Radio | 30 Mmfd. See Note 1 | Set Tuning Condenser at 580 K.C. | (56) Note 3 |
| 6 | 1580 K.C. | To Antenna Receptacle on Radio | 30 Mmfd. See Note 1 | Note 2 | (78) |
| 7 | 1400 K.C. | To Antenna Receptacle on Radio | 30 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (77) Note 4 |

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# PHILCO RADIO & TELEV. CORP.

MODEL L-1660
Lincoln Zephyr
Schematic, Chassis
Parts

## I.F. = 470KC.

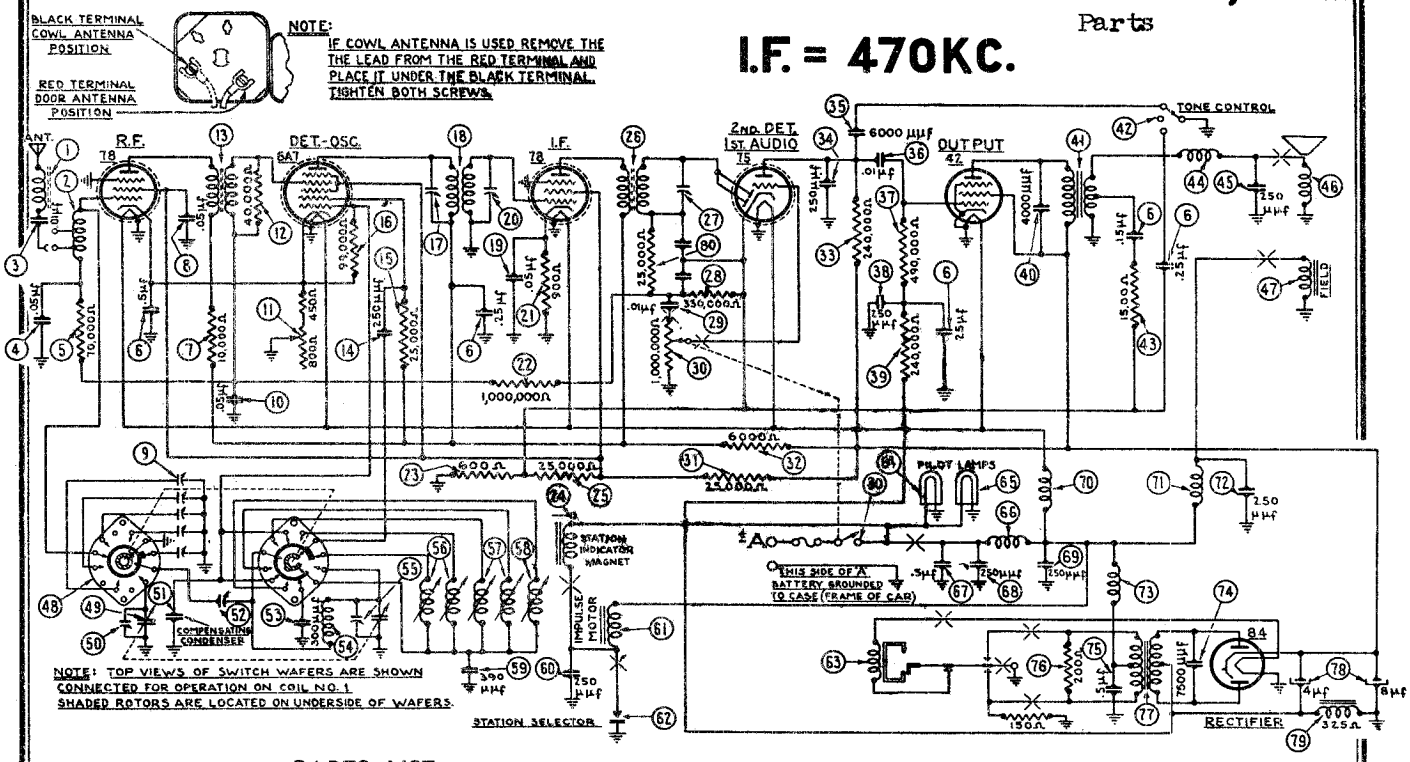


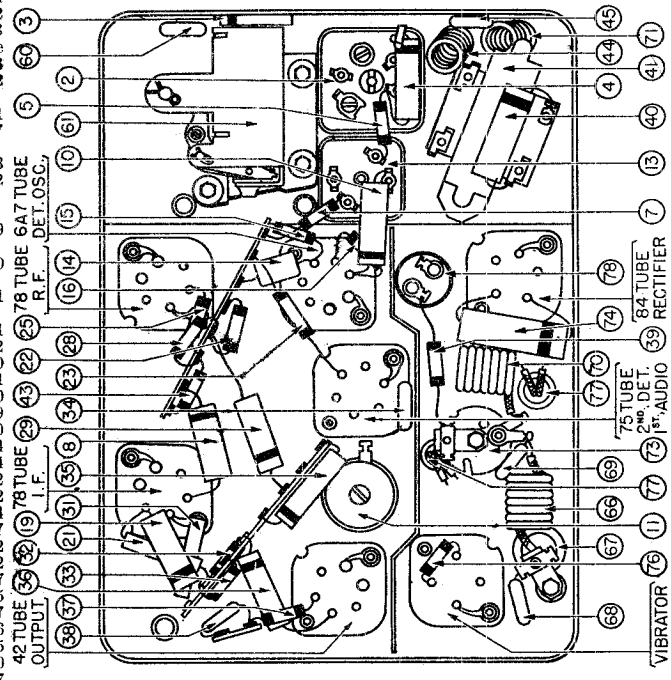

FIGURE 1

## PARTS LIST

| No. | Description | Part No. |
|---|---|---|
| ① | Antenna Choke | 65-0062 |
| ② | Antenna Transformer | 65-0063 |
| ③ | Condenser (.01 mfd.) | 61-0014 |
| ④ | Condenser (.05 mfd.) | 30-4569 |
| ⑤ | Resistor (70,000 ohms) | 33-370337 |
| ⑥ | Condenser (.15-.25-.25-.25-.5 mfd.) | 61-0024 |
| ⑦ | Resistor (10,000 ohms) | 33-310337 |
| ⑧ | Condenser (.05 mfd.) | 30-4444 |
| ⑨ | Antenna Padder Assembly | 77-0035 |
| ⑩ | Condenser (.05 mfd.) | 30-4444 |
| ⑪ | Sensitivity Control | 33-5264-4 |
| ⑫ | Resistor (40,000 ohms) | 33-339137 |
| ⑬ | R. F. Transformer | 65-0009 |
| ⑭ | Condenser (250 mmfd.) | 30-1038 |
| ⑮ | Resistor (25,000 ohms) | 33-325337 |
| ⑯ | Resistor (99,000 ohms) | 33-399337 |
| ⑰ | Padder (Pri. 1st I. F. Trans.) | |
| ⑱ | First I. F. Transformer | 65-0002 |
| ⑲ | Condenser (.05 mfd.) | 30-4569 |
| ⑳ | Padder (Sec. 1st I. F. Trans.) | |
| ㉑ | Resistor (900 ohms) | 33-190438 |
| ㉒ | Resistor (1,000,000 ohms) | 33-510337 |
| ㉓ | Resistor (600 ohms) | 33-160438 |
| ㉔ | Solenoid | |
| ㉕ | Resistor (25,000 ohms) | 33-325337 |
| ㉖ | Second I. F. Transformer | 65-0003 |
| ㉗ | Padder (Sec. 2nd I. F. Trans.) | |
| ㉘ | Resistor (330,000 ohms) | 33-433337 |
| ㉙ | Condenser (.01 mfd.) | 30-4479 |
| ㉚ | Volume Control (1,000,000 ohms) and On-Off Switch | 67-0009 |
| ㉛ | Resistor (25,000 ohms) | 33-325437 |
| ㉜ | Resistor (6,000 ohms) | 33-260337 |
| ㉝ | Resistor (240,000 ohms) | 33-424337 |
| ㉞ | Condenser (250 mmfd.) | 30-1032 |
| ㉟ | Condenser (6,000 mmfd.) | 30-4504 |
| ㊱ | Condenser (.01 mfd.) | 30-4501 |
| ㊲ | Resistor (490,000 ohms) | 33-449337 |
| ㊳ | Condenser (250 mmfd.) | 30-1032 |
| ㊴ | Resistor (240,000 ohms) | 33-424337 |
| ㊵ | Condenser (4,000 mmfd.) | 30-4185 |
| ㊶ | Dutput Transformer | 65-0024 |
| ㊷ | Tone Control Switch | 85-0042 |

| No. | Description | Part No. |
|---|---|---|
| ㊸ | Resistor (1,500 ohms) | 33-215337 |
| ㊹ | Choke | 32-1374 |
| ㊺ | Condenser (250 mmfd.) | 30-1032 |
| ㊻ | Cone and Voice Coil Kit | 91-0053 |
| ㊼ | Field Coil | Not Replaceable |
| ㊽ | Wafer Switch | 77-0203 |
| ㊾ | Tuning Condenser | 63-0012 |
| ㊿ | First Padder (on Tun. Cond.) | |
| (51) | Thermel Compensating Cond. | 61-0011 |
| (52) | Low Frequency Padder | 63-0017 |
| (53) | Silver Cap Condenser (300 mmfd.) | 61-0003 |
| (54) | Oscillator Transformer | 65-0052 |
| (55) | Second Padder (on Tun. Cond.) | |
| (56) | Oscillator Trans. (High Freq.) | 65-0049 |
| (57) | Oscillator Trans. (Med. Freq.) | 65-0050 |
| (58) | Oscillator Trans. (Low Freq.) | 65-0051 |
| (59) | Silver Cap Condenser (390 mmfd.) | 61-0031 |
| (60) | Condenser (250 mmfd.) | 30-1032 |
| (61) | Impulse Motor | 77-0120 |
| (62) | Station Indicator Switch | 85-0041 |
| (63) | Vibrator | 41-3170 |
| (64) | Pilot Lamp | 34-2039 |
| (65) | Pilot Lamp | 34-2040 |
| (66) | "A" Choke | 32-1644 |
| (67) | Condenser (.5 mfd.) | 30-4474 |
| (68) | Condenser (250 mmfd.) | 30-1032 |
| (69) | Condenser (250 mmfd.) | 30-1032 |
| (70) | Filament Choke | 32-1604 |
| (71) | Choke | 32-2657 |
| (72) | Condenser (250 mmfd.) | 30-1032 |
| (73) | Vibrator Choke | 32-2812 |
| (74) | Condenser (7,500 mmfd.) | 30-4567 |
| (75) | Condenser (.5 mfd.) | 30-4565 |
| (76) | Resistor (200 ohms) | 33-120387 |
| (77) | Power Transformer | 65-0016 |
| (78) | Filter Condenser (4-8 mfd.) | 30-2295 |
| (79) | Filter Choke | 32-7910 |
| (80) | Resistor (25,000 ohms) | 33-325337 |
| | Scale Assembly | 85-0040 |
| | Tuning Control Knob | 55-0179 |

FIGURE 2




| No. | Description | Part No. |
|---|---|---|
| | Volume Control Knob | 55-0180 |
| | Push Button Knob | 55-0184 |
| | Tuning Shaft | 57-0491 |
| | Call Letter Kit | 81-0066 |
| | Interference Condenser | 30-4564 |
| | Interference Condenser | 30-4181 |
| | Interference Condenser | 30-4404 |
| | Interference Condenser | 30-4307 |
| | Interference Condenser | 30-4663 |
| | "T" Bolt (Rec. Mtg.) | 28-6641 |
| | Nut (Rec. Mtg.) | 57-0489 |
| | Bolt (Spker. Mtg.) | W1721 |
| | Nut (Spker. Mtg.) | W317 |
| | Automatic Station Selector Drum | 55-0197 |

DECEMBER 1, 1938

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MODEL L-1660 Alignment

Socket, Trimmers

# PHILCO RADIO & TELEV. CORP.

Make all adjustments for maximum reading on the output meter.

NOTE 1 — Connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the radio. Connect a 800 Mmfd. Condenser in series between the signal generator and the antenna lead.

Special Note: — When the tire compartment door antenna is used follow the above procedure. Be sure the lead to the antenna transformer is connected to the red terminal of the Antenna Transformer.
*When the cowl antenna is used, connect the antenna lead, Part No. 41-3191, to the antenna receptacle in the Radio. No dummy capacity is necessary. Be sure the lead to the antenna transformer is connected to the black terminal of the antenna transformer.

NOTE 2 — Turn the condenser rotor plates completely out of mesh as far as they will go.

NOTE 3 — Rock the tuning condenser while adjusting the low frequency padder. Tune the condenser to the signal and adjust the padder for maximum output. Rotate the tuning condenser back and forth slightly for maximum output. Then readjust the padder for maximum output. Repeat this procedure until no further improvement is noticed.

NOTE 4 — When the antenna stage adjustment is made with the Radio installed in the car, the Radio antenna lead must be connected to the car antenna in the usual manner. Connect the signal generator output lead to a wire placed near the car antenna but not connected to it.

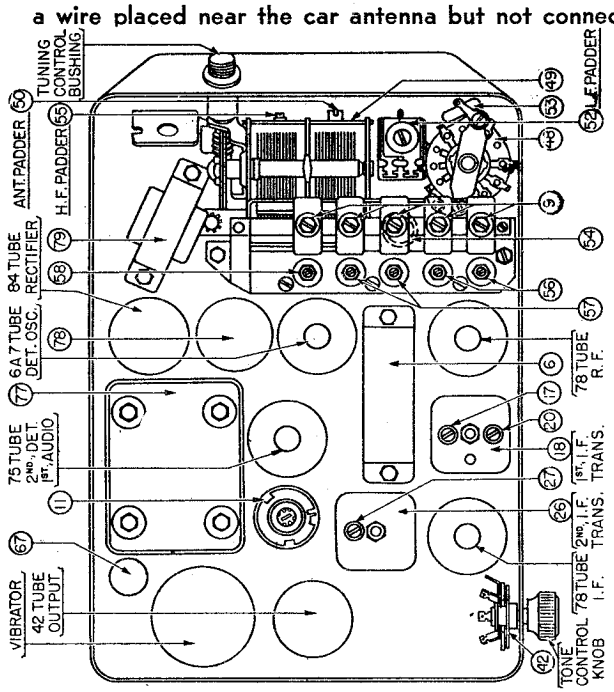


FIGURE 3

## ADJUSTMENTS

All padding adjustments are carefully made at the factory and ordinarily no readjustments are necessary. However, when readjustments are required, the procedure given below must be followed in detail.

***Equipment*** — Fully charged heavy duty shortage battery or 6-volt power pack, 048A or 099 Philco Set Tester, 27-7159 Padding screw driver.

***General*** — The output meter must be connected by means of an adapter to the plate of the type 42 output tube and to the Radio chassis.

With the Radio and signal generator set up for operation at the prescribed frequency, turn the Radio volume control on full and set the signal generator attenuator so that a half scale reading is obtained on the output meter. The signal in the speaker should be audible but not loud.

The shielding on the generator output lead must be connected to the Radio housing.

| OPERATION | SIGNAL GENERATOR FREQUENCY | SIGNAL GENERATOR CONNECTION | DUMMY CAPACITY | SPECIAL INSTRUCTIONS | ADJUST PADDER |
|---|---|---|---|---|---|
| 1 | Press the Automatic Station Selector button until "DIAL" appears in the window and stations can be tuned in by Manual Tuning. | | | | |
| 2 | 470 K.C. | To Grid of 6A7 Tube | .1 Mfd. | Turn Tuning Condenser Plates Out of Mesh as Far as They Will Go. | (27) (21) (17) |
| 3 | 1580 K.C. | To Antenna Receptacle on Radio | *800 Mmfd. See Note 1 | Note 2 | (55) |
| 4 | 1400 K.C. | To Antenna Receptacle on Radio | *800 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (50) Note 4 |
| 5 | 580 K.C. | To Antenna Receptacle on Radio | *800 Mmfd. See Note 1 | Set Tuning Condenser at 580 K.C. | (52) Note 3 |
| 6 | 1580 K.C. | To Antenna Receptacle on Radio | *800 Mmfd. See Note 1 | Note 2 | (55) |
| 7 | 1400 K.C. | To Antenna Receptacle on Radio | *800 Mmfd. See Note 1 | Set Tuning Condenser at 1400 K.C. | (50) Note 4 |

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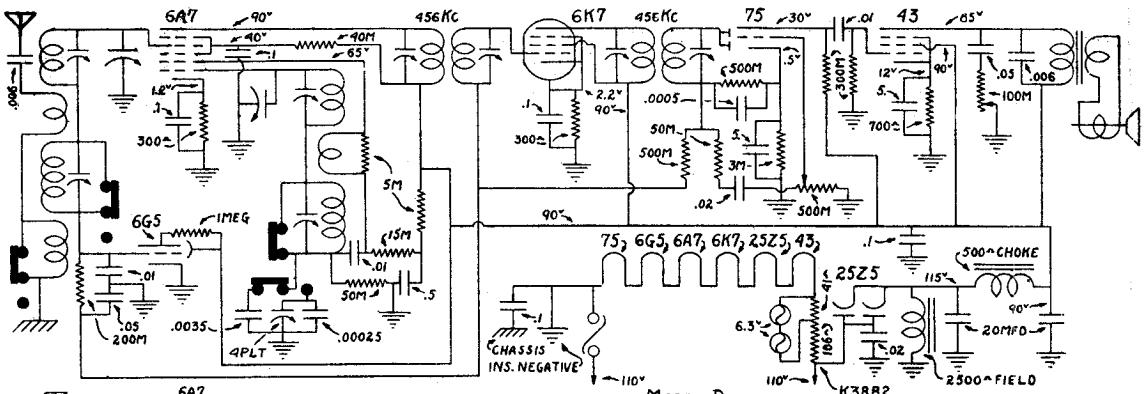
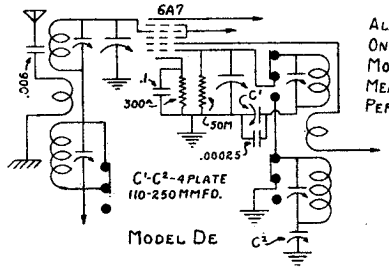
MODEL 930
Wireless Record Player
Schematic

# PILGRIM ELECTRIC CORP.

MODELS D, DE
MODELS GH, GHE
Schematics, Voltage

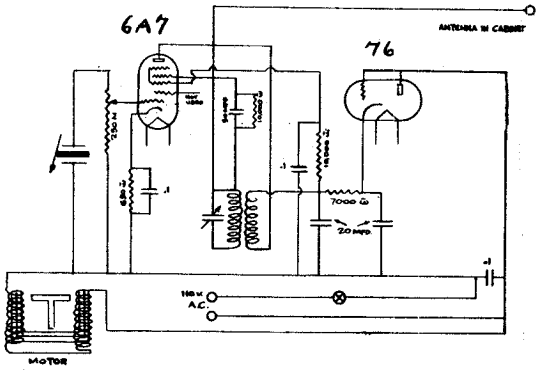


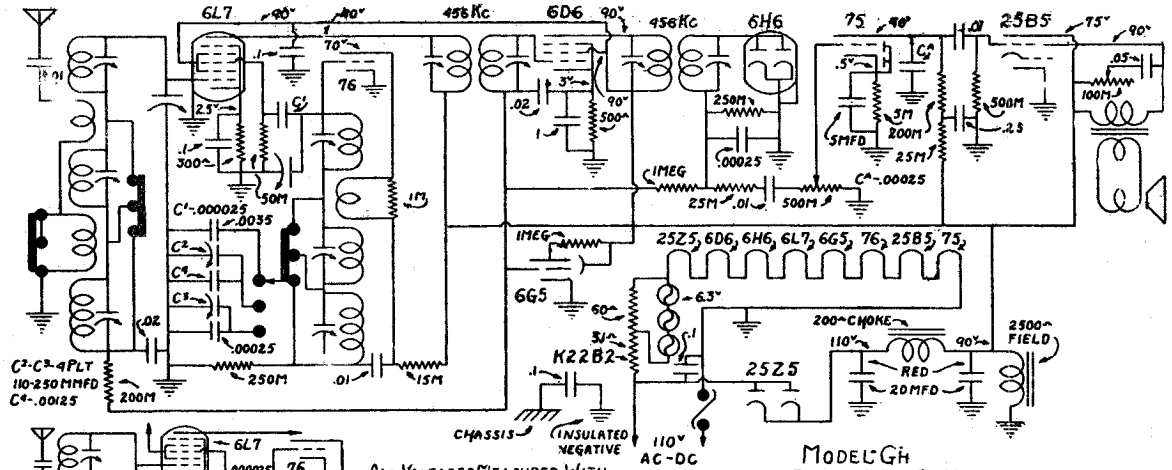



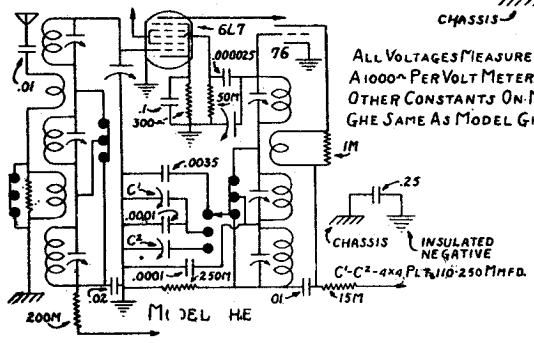

ALL OTHER CONSTANTS ON MODEL DE SAME AS MODEL D. ALL VOLTAGES MEASURED WITH 1000Ω PER VOLT METER.

## MODEL "D"

Pilgrim Model 930 Electric Wireless Record Player




ALL VOLTAGES MEASURED WITH A 1000Ω PER VOLT METER. ALL OTHER CONSTANTS ON MODEL GHE SAME AS MODEL GH.

Model GH
707,001 AND UP

IF PEAK 456 KC

## MODEL "GH"

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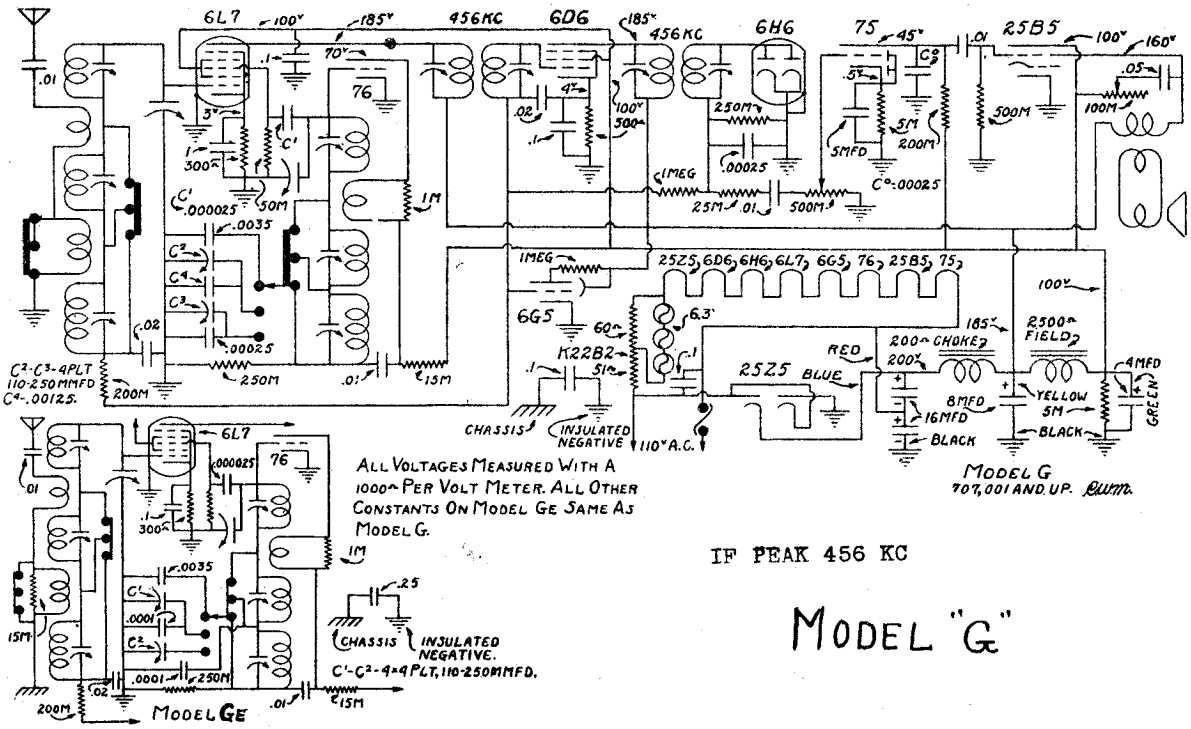
MODELS G,GE
MODELS GB,GF,GBE,GFE
Schematics,Voltage

# PILGRIM ELECTRIC CORP.




ALL VOLTAGES MEASURED WITH A 1000Ω PER VOLT METER. ALL OTHER CONSTANTS ON MODEL GE SAME AS MODEL G.

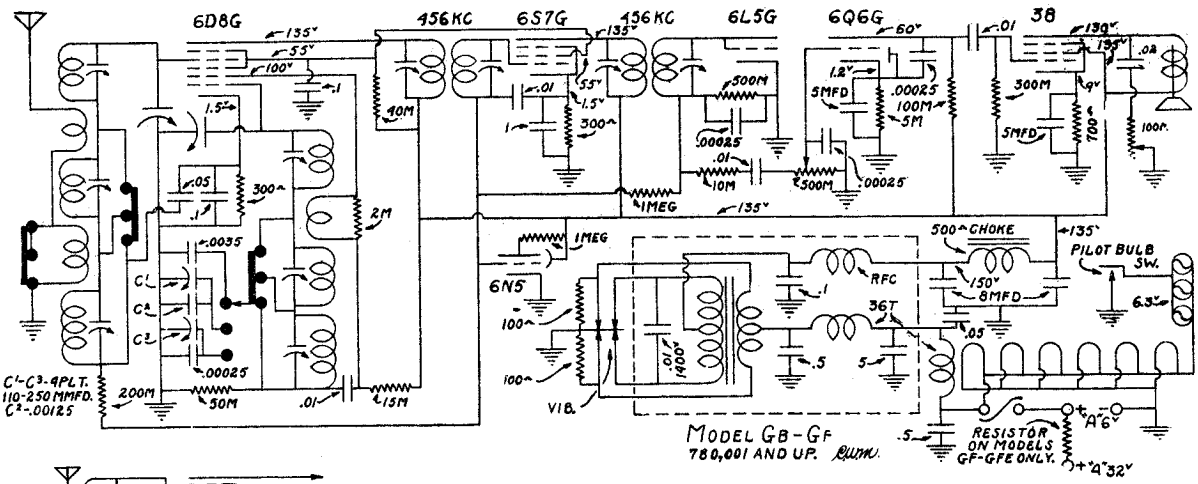
MODEL G
707,001 AND UP. Rum.

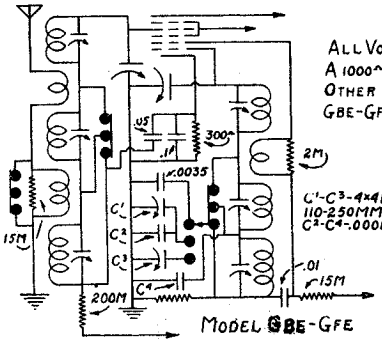
IF PEAK 456 KC

## MODEL "G"




---




ALL VOLTAGES MEASURED WITH A 1000Ω PER VOLT METER. ALL OTHER CONSTANTS ON MODELS GBE-GFE SAME AS MODELS GB-GF.

IF PEAK 456 KC

## MODEL "GB-GF"

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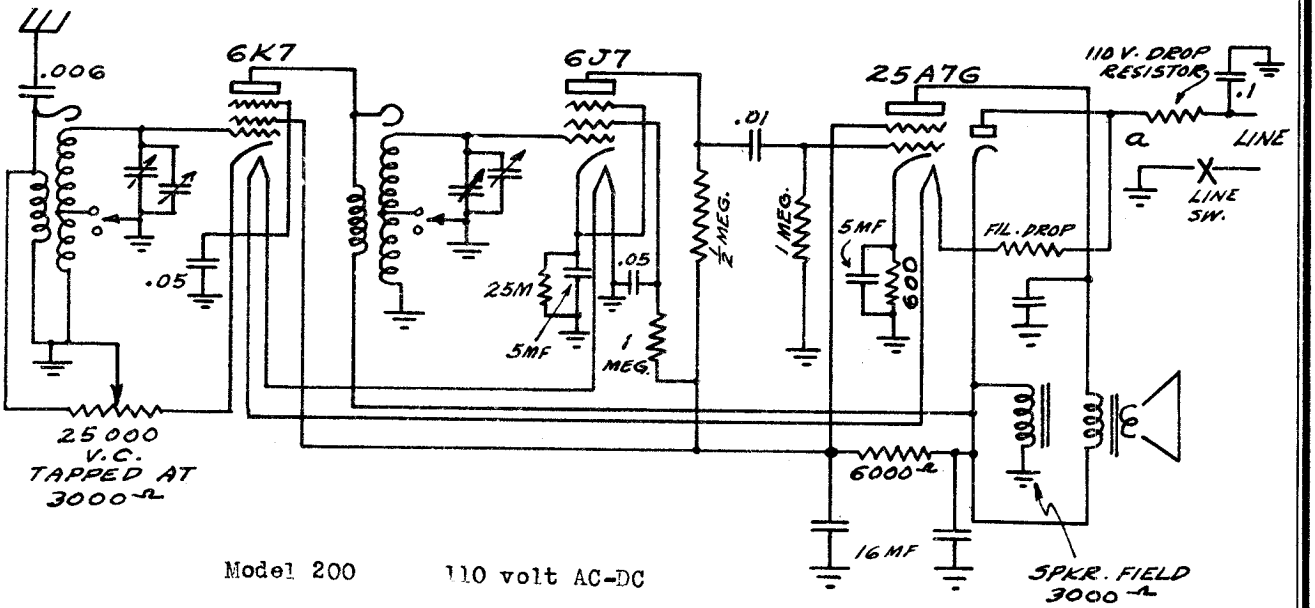
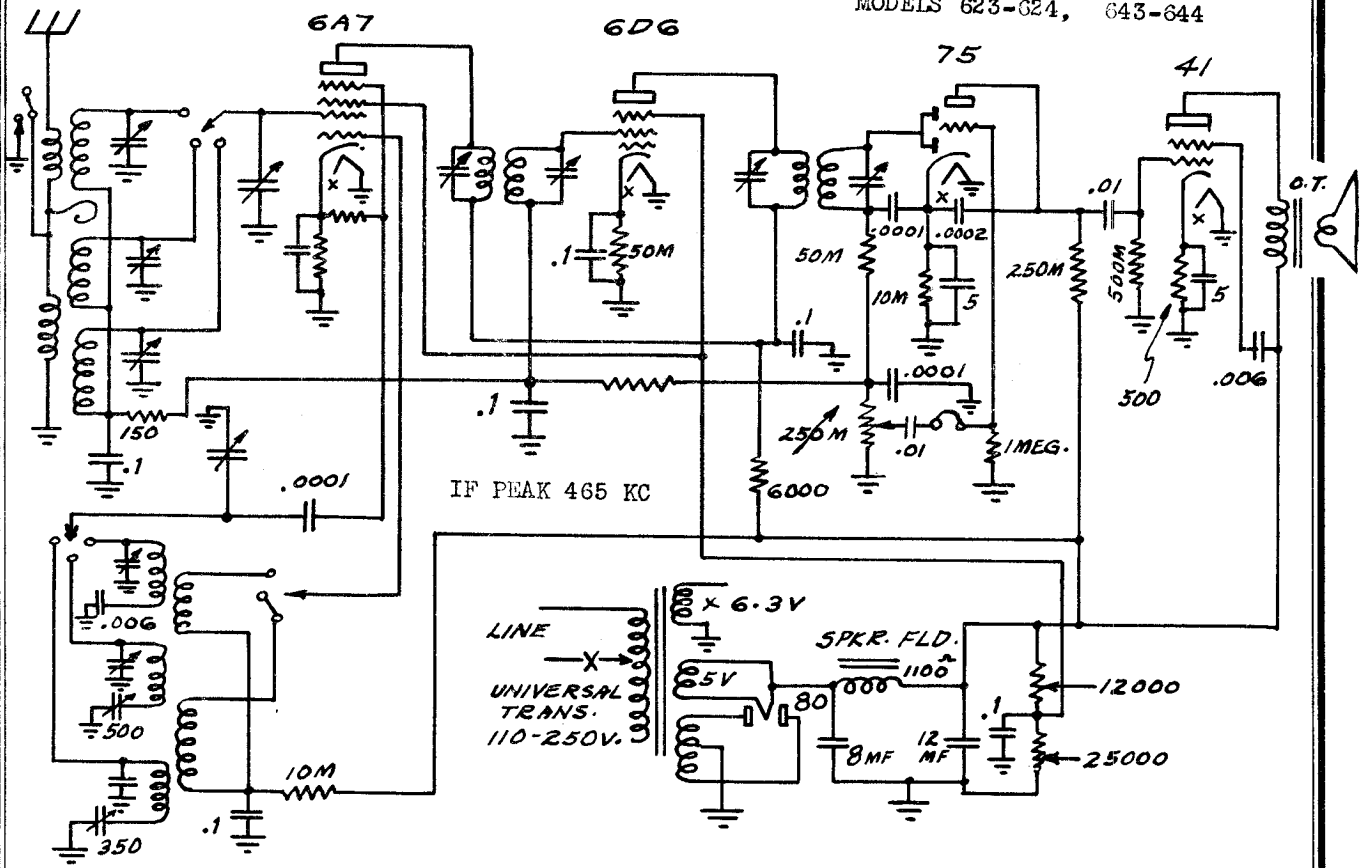
# PILGRIM ELECTRIC CORP.

MODEL 200
MODELS 623,624,643,644
Schematics




Model 200 110 volt AC-DC

MODELS 623-624, 643-644

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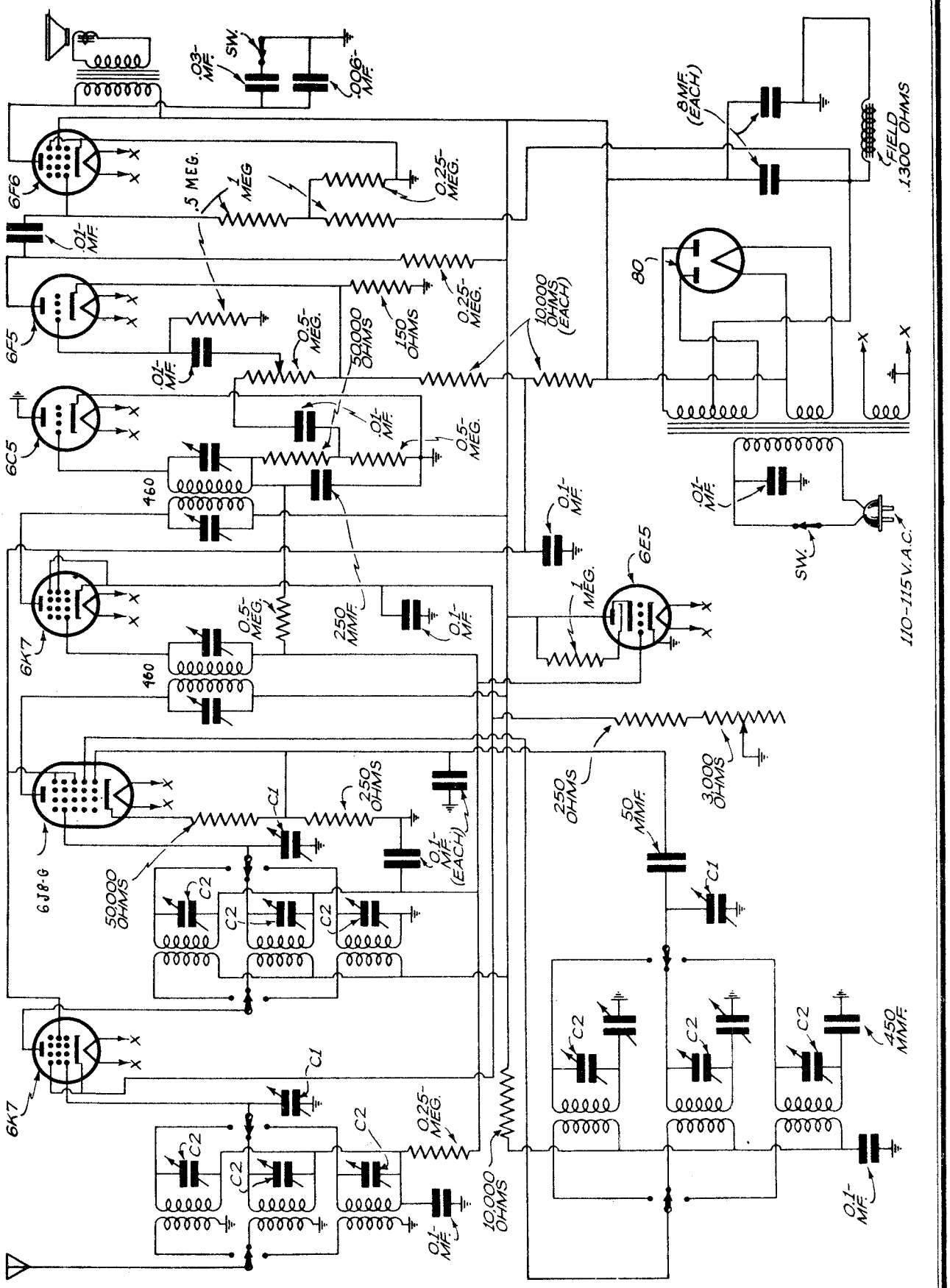
MODEL 860
Schematic

# PILGRIM ELECTRIC CORP.

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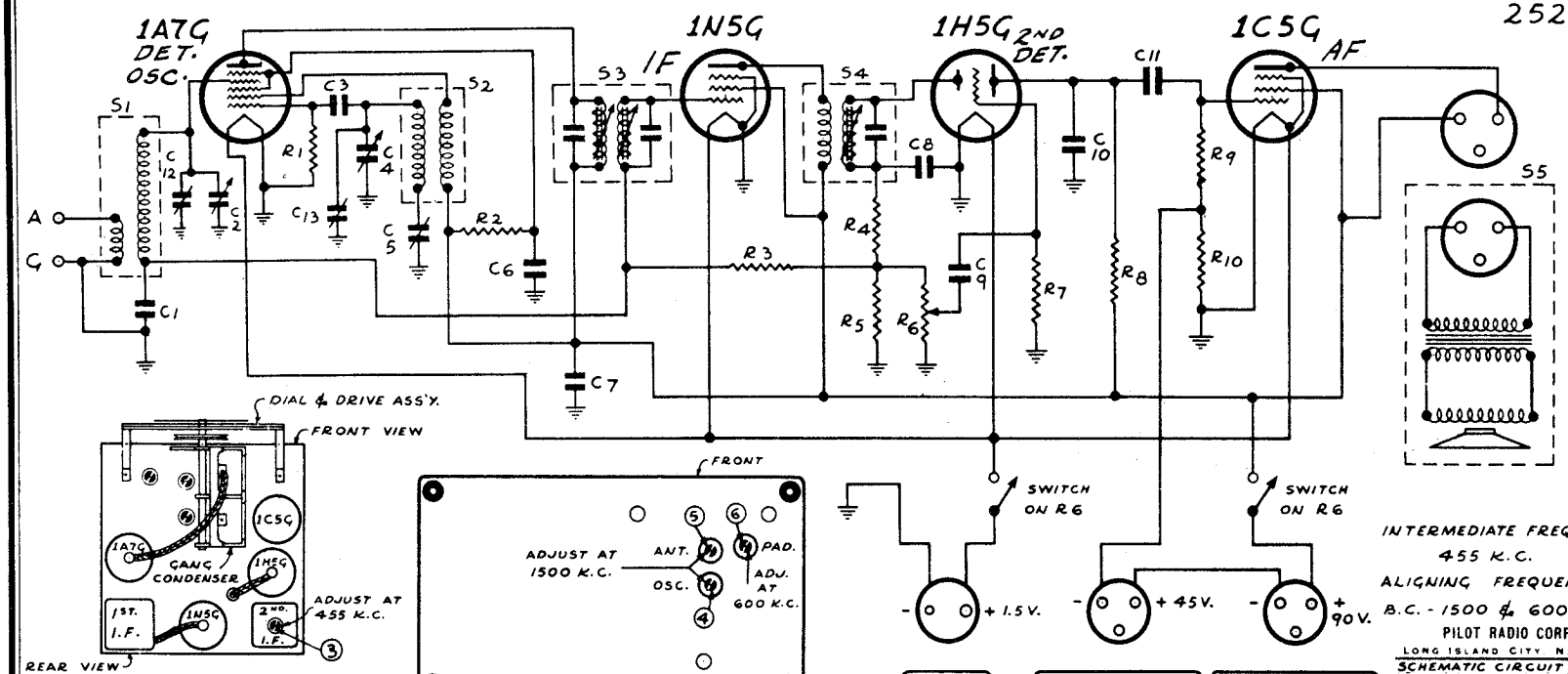
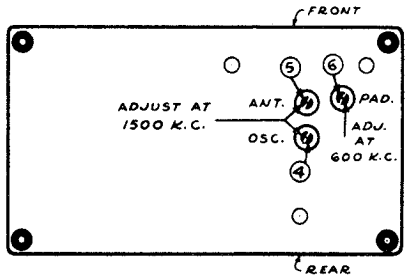
25213-



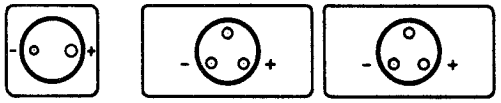




TOP VIEW OF CHASSIS




BOTTOM VIEW OF CABINET
FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION, VOL. VIII

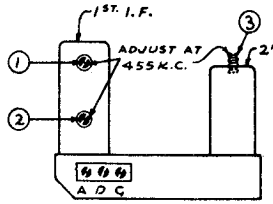


A - BATTERY

B - BATTERIES

INTERMEDIATE FREQUENCY:-
455 K.C.
ALIGNING FREQUENCIES:-
B.C. - 1500 & 600 K.C.

PILOT RADIO CORPORATION
LONG ISLAND CITY N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM
FOR MODEL-H-11
MATERIAL
SCALE
DRAWN BY B.R.
CHECKED BY L.A.C.F.
APPROVED BY
DATE 11-22-38
DRWG NO 25213-

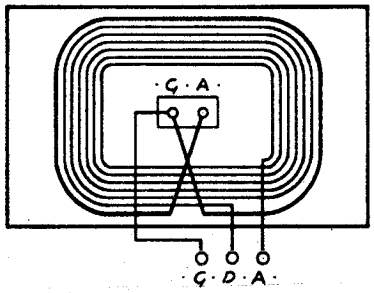



REAR VIEW OF CHASSIS

| CONDENSERS FOR MODEL-H-11 | | |
|---|---|---|
| C1,C6,C9 | 22055-T | .01 MFD. 200 V. PAPER |
| C2,C4 | 79664 | GANG CONDENSER |
| C3 | 280/6-0 | .0001 MFD. MICA |
| C5 | 79431-B | 385 MMFDS. PADDER |
| C7 | 78704 | 4 MFD. 150 V. ELECTRO. |
| C8,C10 | 27701-0 | .00025 MFD. MICA |
| C11 | 22055-W | .01 MFD. 400 V. PAPER |
| C12,C13 | 70969-E | TRIMMER STRIP ASS'Y. |

| RESISTORS FOR MODEL-H-11 | | |
|---|---|---|
| R1 | 13191 | 200,000 OHMS 1/4 WATT |
| R2 | 13241 | 60,000 OHMS 1/4 WATT |
| R3, R5, R7, R9 | 13223 | 3.3 MEGOHMS 1/4 WATT |
| R4 | 13164 | 50,000 OHMS 1/4 WATT |
| R6 | 83763-B | 1 MEGOHM VOL. CONT. & SW. |
| R8 | 13171 | 250,000 OHMS 1/4 WATT |
| R10 | 13028 | 1,000 OHMS 1/4 WATT |

| MISCELLANEOUS FOR MODEL-H-11 | | |
|---|---|---|
| S1 | 68040 | ANTENNA LOOP ASS'Y. |
| S2 | 73243 | OSCILLATOR COIL ASS'Y. |
| S3 | 73192-2-C | 1ST. I.F. TRANSFORMER ASS'Y. |
| S4 | 73244 | 2ND. I.F. " " |
| S5 | 40864 | 5" P.M. SPEAKER. |




CABINET BACK & ANTENNA LOOP ASS'Y.

GENERAL SPECIFICATIONS.

Circuit — Battery-powered Super-Heterodyne, for operation with a conventional antenna, or as a portable receiver with self-contained loop antenna. Permeability tuned IF transformers. Permanent magnet speaker. Automatic volume control, Class A output stage.

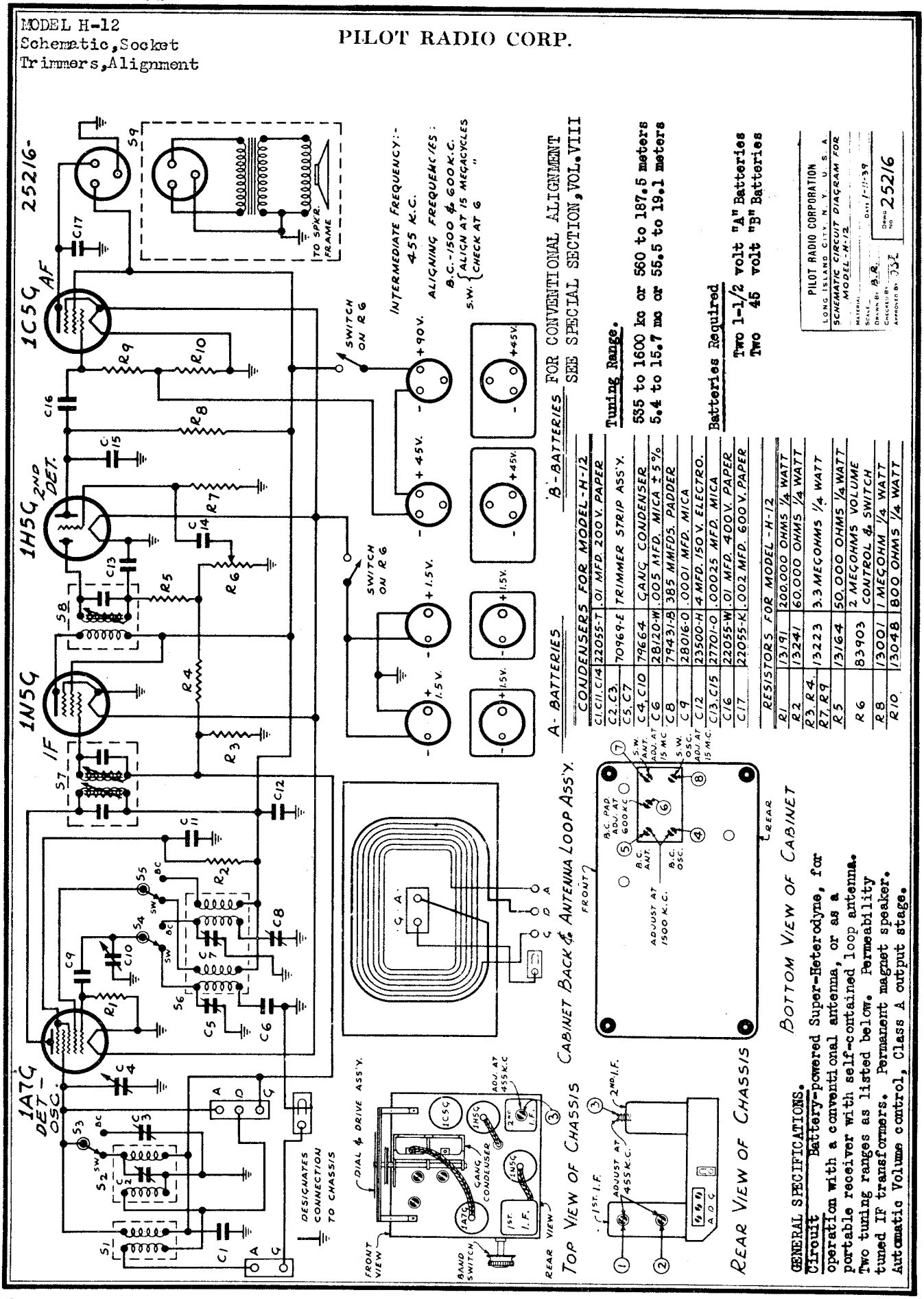
Tuning Range.
535 to 1600 kc or 560 to 187.5 meters

Batteries Required.

One 1-1/2 volt "A" Battery
Two 45 volt "B" Batteries

MODEL H-12
Schematic, Socket
Trimmers, Alignment

# PILOT RADIO CORP.




**GENERAL SPECIFICATIONS.**

**Circuit** Battery-powered Super-Heterodyne, for operation with a conventional antenna, or as a portable receiver with self-contained loop antenna. Two tuning ranges as listed below. Permeability tuned IF transformers. Permanent magnet speaker. Automatic Volume control, Class A output stage.

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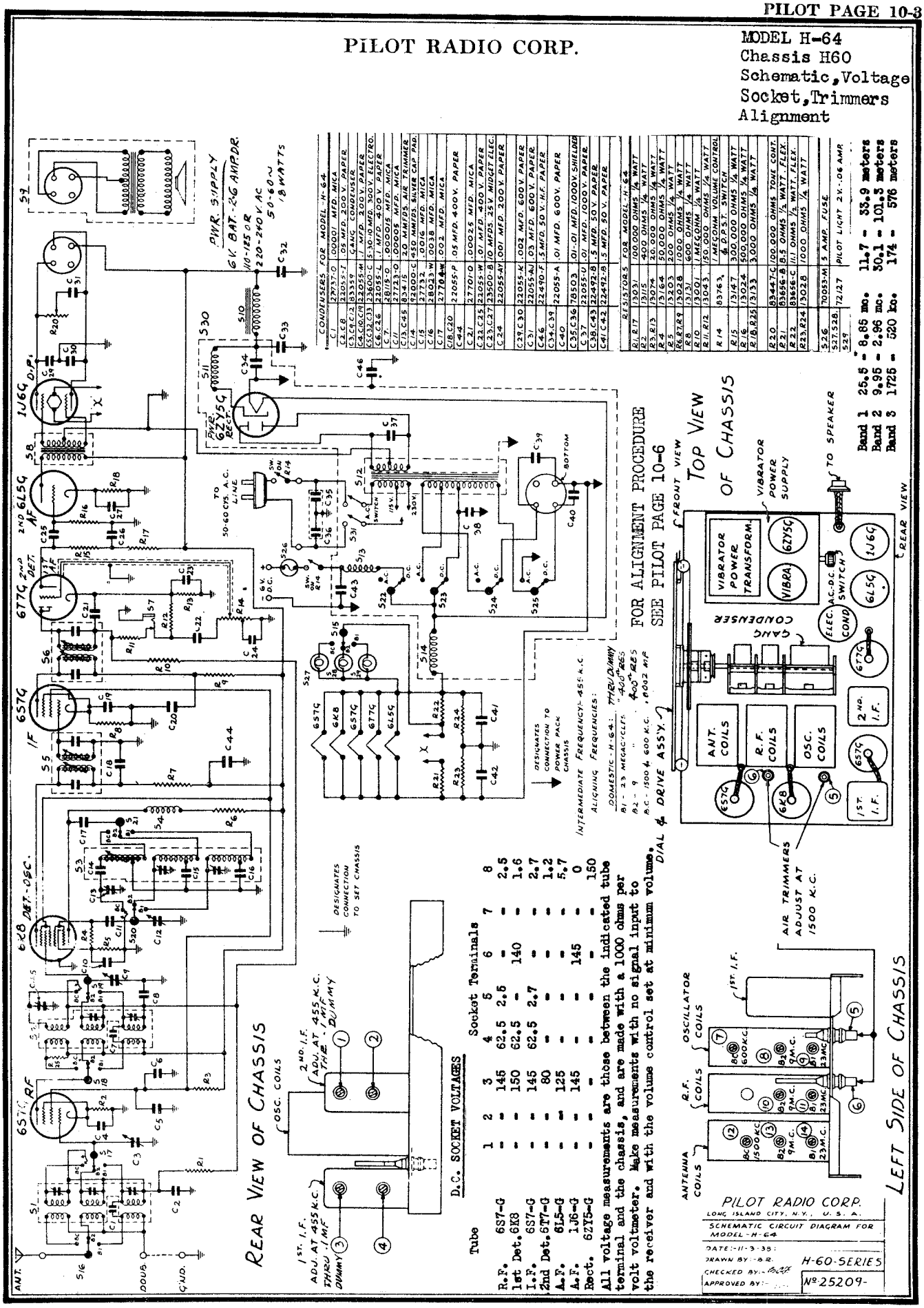
PILOT RADIO CORP.
MODEL H-64
Chassis H60
Schematic, Voltage
Socket, Trimmers
Alignment
PWR. SUPPLY
6 V. BAT. - 2.6 AMPDR.
110-125 OR
220-240 V. AC
50-60 ~
18 WATTS
CONDENSERS FOR MODEL H-64
RESISTORS FOR MODEL H-64
FOR ALIGNMENT PROCEDURE
SEE PILOT PAGE 10-6
TOP VIEW OF CHASSIS
FRONT VIEW
REAR VIEW
VIBRATOR POWER SUPPLY
VIBRATOR POWER TRANSFORM.
GANG CONDENSER
ELEC. AC-DC. COND
AC-DC SWITCH
TO SPEAKER
ANT. COILS
R.F. COILS
OSC. COILS
2 ND. I.F.
1 ST. I.F.
Band 1 25.5 - 8.85 mc. 11.7 - 33.9 meters
Band 2 9.95 - 2.96 mc. 30.1 - 101.3 meters
Band 3 1725 - 520 kc. 174 - 576 meters
REAR VIEW OF CHASSIS
OSC. COILS
ANTENNA COILS
R.F. COILS
OSCILLATOR COILS
1 ST. I.F.
AIR TRIMMERS ADJUST AT 1500 K.C.
LEFT SIDE OF CHASSIS
DIAL & DRIVE ASSY.
INTERMEDIATE FREQUENCY: 455 K.C.
ALIGNING FREQUENCIES:
DOMESTIC - H-64: THRU DUMMY
B1 - 23 MEGACYCLES " 400 CYCLES
B2 - 9 " " "
B.C. - 1500 & 600 K.C. .002 MF
D.C. SOCKET VOLTAGES
Tube 1 2 3 4 5 6 7 8
R.F. 6S7-G - - 145 62.5 2.5 - - 2.5
1st Det. 6K8 - - 150 62.5 - 140 - 1.6
I.F. 6S7-G - - 145 62.5 2.7 - - 2.7
2nd Det. 6T7-G - - 80 - - - - 1.2
A.F. 6L5-G - - 125 - - - - 5.7
A.F. 1J6-G - - 145 - - 145 - 0
Rect. 6Z Y5-G - - - - - - - 150
All voltage measurements are those between the indicated tube terminal and the chassis, and are made with a 1000 ohms per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.
PILOT RADIO CORP.
LONG ISLAND CITY, N.Y., U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL - H-64
DATE: 11-3-38
DRAWN BY: B.R.
CHECKED BY:
APPROVED BY:
H-60-SERIES
Nº 25209-

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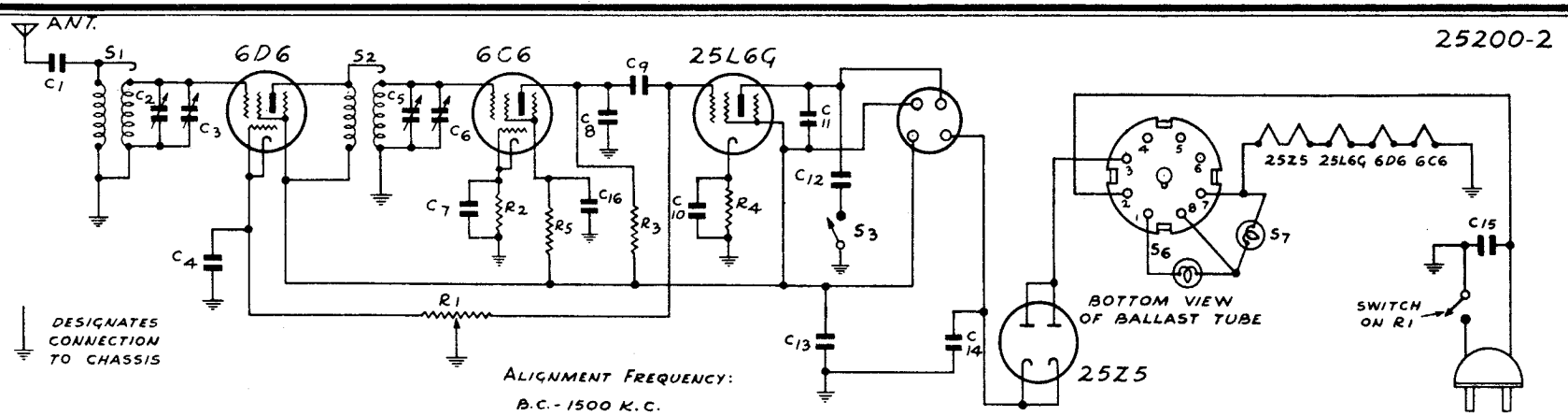
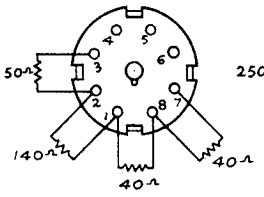
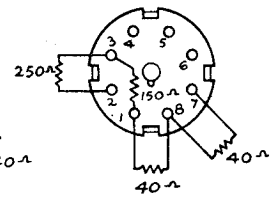
25200-2



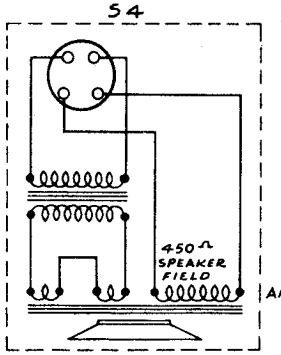

| CONDENSERS FOR MODEL-H-141 | | |
|---|---|---|
| C1 | 27726 | 200 MMFDS. MICA |
| C2, C5 | 70969-E | TRIMMER ASS'Y. |
| C3, C6 | 79664 | GANG CONDENSER |
| C4 | 22055-I | .05 MFD. 200V. PAPER |
| C7, C10 | 23500-B | 10 MFD. 25V. MIDGET TUB |
| C8 | 28016-0 | .0001 MFD. MICA |
| C9 | 22055-W | .01 MFD. 400 V. PAPER |
| C11 | 22055-AJ | .03 MFD. 600V. PAPER |
| C12 | 22055-AB | .1 MFD. 600 V. PAPER |
| C13, C14 | 23500-A | 16 MFD. 150 V. MIDGET TUB |
| C15 | 22055-AF | .05 MFD. 1000 V. PAPER |
| C16 | 22055-Z | .02 MFD. 400 V. PAPER |



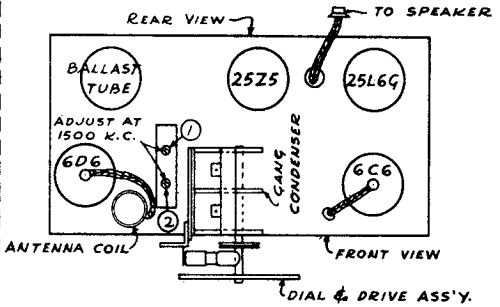

58




59




TOP VIEW OF CHASSIS




| RESISTORS FOR MODEL-H-141 | | |
|---|---|---|
| R1 | 83625 | ½ MEGOHM VOL. CONT. & SW. |
| R2 | 13183 | 36,000 OHMS ¼ WATT |
| R3 | 13024 | 500,000 OHMS ¼ WATT |
| R4 | 13055 | 150 OHMS ½ WATT |
| R5 | 13007 | 2 MEGOHMS ¼ WATT |

| MISCELLANEOUS FOR MODEL-H-141 | | |
|---|---|---|
| S1 | 73214 | ANTENNA COIL ASS'Y. |
| S2 | 73215 | DETECTOR COIL ASS'Y. |
| S3 | 71657-B | TONE CONTROL |
| S4 | 40852 | 5" A.C.-D.C. SPEAKER-450Ω FIELD |
| S6, S7 | 71282 | DIAL LAMP |
| S8 | 81974 | BALLAST TUBE 110/125 V |
| S9 | 81975 | BALLAST TUBE 220/240 V |

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION, VOL. VIII

ALTERATIONS (2) ADDED C16 & R5. - C.O.#2188 - B.R. 8-30-38. FINISH

CLASSIFICATION MODEL-H-141

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO

DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-141
MATERIAL
SCALE
DATE 8-22-38
DRAWN BY B.R.
CHECKED BY
APPROVED BY
DRWG NO 25200-2

D.C. SOCKET VOLTAGES

| | P | SG | Cath |
|---|---|---|---|
| 6D6 | 100 | 100 | 21* |
| 6C6 | -* | 8 | 8 |
| 25L6-G | 95 | 100 | 8 |
| 25Z5 | - | - | 110 |

The above figures are for a supply voltage of 115 volts, on 230 volt operation they will be 10% higher.

* Cannot be measured.

Panel Controls Volume control with On-Off Power Supply switch, Tuning Control, Tone Control.

Maximum Power Output 1.25 Watts with 81974 ballast tube.

1.50 watts with 81975 ballast tube.

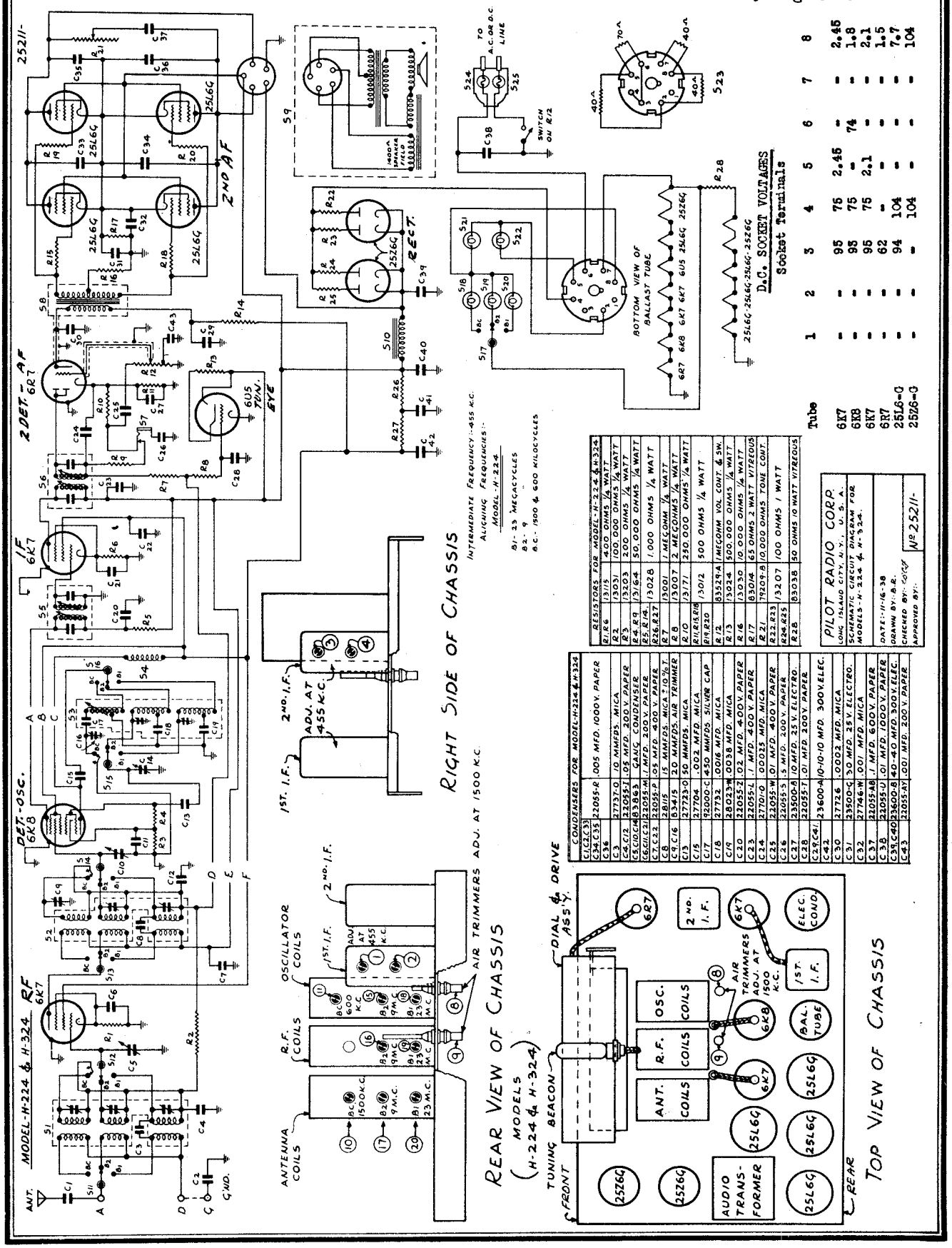
PILOTUBES Required One 6K6 RF Amplifier, one 6C6 Detector, one 25L6-G Output Tube, and one 25Z5 power supply rectifier.

Power Supply

| Voltage | Watts | Ballast Tube |
|---|---|---|
| 110-125 AC or DC | 40 | #81974 |
| 220-240 AC or DC | 90 | #81975 |

# PILOT RADIO CORP.

MODELS H-224, Chassis H-220
H-324, Chassis H-320
Schematic, Voltage, Socket
Trimmers, Alignment




| CONDENSERS FOR MODEL-H-224 & H-324 | | |
|---|---|---|
| C1,C2,C33 | 22055-R | .005 MFD. 1000 V. PAPER |
| C34,C35 | | |
| C36 | | |
| C3 | 27737-O | .10 MMFDS. MICA |
| C4,C12 | 22055-T | .05 MFD. 200 V. PAPER |
| C5,C6,C48 | 3863 | GANG CONDENSER |
| C6,C7,C21 | 22055-M | .1 MFD. 200 V. PAPER |
| C7,C22 | 22055-P | .05 MFD. 400 V. PAPER |
| C8 | 23015 | 15 MMFDS. MICA +10% T |
| C9,C16 | 23415 | 20 MMFDS. AIR TRIMMER |
| C13 | 27723-O | 50 MMFDS. MICA |
| C15 | 27704 | .002 MFD. MICA |
| C17 | 92000-C | 450 MMFDS. SILVER CAP |
| C18 | 27732 | .0016 MFD. MICA |
| C19 | 28023-M | .0038 MFD. MICA |
| C20 | 22055-Z | .02 MFD. 400 V. PAPER |
| C23 | 22055-L | .1 MFD. 400 V. PAPER |
| C24 | 27701-O | .00025 MFD. MICA |
| C25 | 22055-W | .01 MFD. 400 V. PAPER |
| C26 | 22055-S | .5 MFD. 200 V. PAPER |
| C27 | 23500-B | .10 MFD. 25 V. ELECTRO. |
| C28 | 22055-T | .01 MFD. 200 V. PAPER |
| C29,C41 | 23600-A | .10-10 MFD. 300 V. ELEC. |
| C42 | | |
| C30 | 27726 | .0002 MFD. MICA |
| C31 | 23500-C | .30 MFD. 25 V. ELECTRO. |
| C32 | 27746-W | .001 MFD. MICA |
| C37 | 22055-AB | .1 MFD. 600 V. PAPER |
| C38 | 22055-U | .01 MFD. 1000 V. PAPER |
| C39,C40 | 23600-B | 40-40 MFD. 300 V. ELEC. |
| C43 | 22055-N | .001 MFD. 200 V. PAPER |

| RESISTORS FOR MODEL-H-224 & H-324 | | |
|---|---|---|
| R1,R6 | 13115 | 400 OHMS ¼ WATT |
| R2 | 13031 | 100,000 OHMS ¼ WATT |
| R3 | 13203 | 200 OHMS ¼ WATT |
| R4,R9 | 13164 | 50,000 OHMS ¼ WATT |
| R5,R14, R26,R27 | 13028 | 1,000 OHMS ¼ WATT |
| R7 | 13001 | 1 MEGOHM ¼ WATT |
| R8 | 13007 | 2 MEGOHMS ¼ WATT |
| R10 | 13171 | 250,000 OHMS ¼ WATT |
| R11,R15,R16, R19,R20 | 13012 | 500 OHMS ¼ WATT |
| R12 | 83529-A | 1 MEGOHM VOL. CONT. & SW. |
| R13 | 13024 | 500,000 OHMS ¼ WATT |
| R16 | 13030 | 10,000 OHMS ¼ WATT |
| R17 | 83014 | 65 OHMS 2 WATT VITREOUS |
| R21, R22,R23 | 19209-B | 10,000 OHMS TONE CONT. |
| R24,R25 | 13207 | 100 OHMS 1 WATT |
| R28 | 83038 | 50 OHMS 10 WATT VITREOUS |

| Tube | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 6K7 | - | - | 95 | 75 | 2.45 | - | - | 2.45 |
| 6R8 | - | - | 95 | 75 | - | 74 | - | 1.8 |
| 6K7 | - | - | 95 | 75 | 2.1 | - | - | 2.1 |
| 6R7 | - | - | 62 | - | - | - | - | 1.5 |
| 25L6-G | - | - | 94 | 104 | - | - | - | 7.7 |
| 25Z6-G | - | - | - | 104 | - | - | - | 104 |

D.C. SOCKET VOLTAGES
Socket Terminals

| PILOT RADIO CORP. |
|---|
| LONG ISLAND CITY, N.Y., U.S.A. |
| SCHEMATIC CIRCUIT DIAGRAM FOR MODELS - H-224 & H-324. |
| DATE: 11-16-38 |
| DRAWN BY: B.R. |
| CHECKED BY: [illegible] |
| APPROVED BY: |
| № 25211- |

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MODELS H-224, Chassis H-220
H-324, Chassis H-320

# PILOT RADIO CORP.

## Alignment Procedure

PILOTUBES Required.

| | |
|---|---|
| One 6K7 | R.F. Amplifier |
| One 6K8 | 1st Detector-Oscillator |
| One 6K7 | I.F. Amplifier |
| One 6R7 | 2nd Detector-AVC-1st Audio Amplifier |
| Four 25L6-G | Output Tubes |
| Two 25Z6-G | Power Supply Rectifiers |
| One 6U5 | Cathode Ray Tuning Beacon |

Power Supply. A.C. or D.C.

| Voltage | Ballast Tubes | Watts |
|---|---|---|
| 110-125 | 81973 | 110 |

Intermediate Frequency. 455 kc.

Panel Controls. Volume with On-Off switch, Tone, Band Selector Switch, Manual Tuning Control and an 8 key mechanically operated PIANO TUNING mechanism, with key locking knob. The PIANO TUNING mechanism is only on the H-320 series.

TUNING RANGES. The models H-324 and H-224 chassis have the following tuning ranges:

| | | | |
|---|---|---|---|
| Band 1 | 8.72 - 25.5 mc. | or | 11.8 - 34.4 meters |
| Band 2 | 2.96 - 9.95 mc. | or | 30.2 -101.4 meters |
| Band 3 | 520 - 1725 kc. | or | 174 - 577 meters |

Maximum Power Output. 6 watts

### SERVICE DATA

Removal of the chassis from the cabinet, when necessary is done as follows:

1. Remove the power supply cord from the supply outlet.
2. Remove the knobs and felt washers from all shafts on the front of the cabinet. These knobs, except the "locking" knob, are of the "push-on" type.
3. Remove the back of the cabinet.
4. Remove the speaker cord from the socket on the speaker.
5. Remove the four mounting screws located under the cabinet, and carefully slide the chassis out of the cabinet.

### RECEIVER ALIGNMENT

Equipment Required.

1. Signal Generator. One using fundamental frequencies for all the frequencies used in the receiver is preferred.
2. Output Meter. Generally a copper-oxide rectifier meter is the most convenient.

Dummy Antennas. .1 mfd. condenser
.0002 mfd. mica condenser
400 ohm, non-inductive resistor

Alignment Connections.

The posts marked "D" and "G" on the rear of the chassis should be connected to the ground side of the signal generator.

Connect the "hot" post of the signal generator through the .1 mfd. condenser to the grid of the 6K8 detector-oscillator tube or the 6K7 I.F. Amplifier tubes when aligning the I.F. amplifier.

Connect the "hot" post of the signal generator through the 200 mmf. condenser to the post marked "A" on the rear of the chassis when aligning the Long-Wave and Broadcast Bands. Use the same connections for both short-Wave bands, but replace the 200 mmf. condenser with the 400 ohm, non-inductive resistor.

In all measurements, connect the output meter through .1 mfd 600 volt condensers, from plate to plate terminals of the 25L6-G tubes, as this is a push-pull amplifier.

Procedure.

The volume and tone controls should be turned to the extreme clockwise positions, before starting.

The location of all trimmers is shown in the accompanying figure. Always keep the output from the signal generator at the lowest value which will give a readable deflection on the output meter.

I.F. Amplifier Alignment.

Turn the Band Selector Switch to Band 3 and turn the ROTOR dial to the low frequency end.

Connect the output meter as described under "Connections" and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd. condenser. Then proceed with the alignment as follows:

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.
2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the I.F. amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the I.F. amplifier tube, and align the last I.F. transformer. Always finish the alignment with the signal input to the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

R.F. Alignment

Band 3 (Model H-324 and H-224)

Connect the "hot" terminal of the generator to the antenna post marked "A" through the .0002 mfd. condenser.

Set the generator frequency to 1500 kc., and the ROTOR dial to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #8 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut). Then without touching any tuning controls adjust trimmers #9 and #10 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc. and accurately set the ROTOR dial to the 600 kc. mark. Then adjust trimmer #11 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally return and repeat the 1500 kc. adjustments and then tighten the lock nut on trimmers #8 and #9.

Band 2 (Model H-324 & H-224 Short-Wave)

Remove the .0002 mfd. dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator, and the ROTOR dial to 9 mc. Adjust trimmer #15 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmers #16 and #17 for maximum reading of the output meter, while slightly "rocking" the gang condenser. Readjust trimmer #15 if necessary to correct the calibration.

Band 1 (Model H-324 & H-224 Short-Wave)

Connections and dummy antenna are the same as on Band 1 above.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 23 mc. and the ROTOR dial to 23 mc. Adjust trimmer #18 to 23 mc. for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmers #19 and #20 while "rocking" the gang condenser, for maximum reading of the output meter. Reset trimmer #18 so that calibration is correct if necessary.

Image Frequency

All bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Long-Wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, seperated by twice the Intermediate Frequency, set the ROTOR dial to that one which comes in at the higher frequency marking on the ROTOR dial.

Miscellaneous Service Notes.

If a howling noise (sometimes referred to as Microphonic Howl) is heard, it is very probably because the four red screws under the cabinet have not been removed, along with the two narrow metal strips between the chassis and the bottom of the cabinet. These strips and screws are only intended as additional bracing during shipment, and must be removed before the receiver is put in operation.

The howl can also be caused by a defective tube, or when some part of the receiver which is rigidly fastened to the chass rubs against the cabinet. The remedy is obvious.

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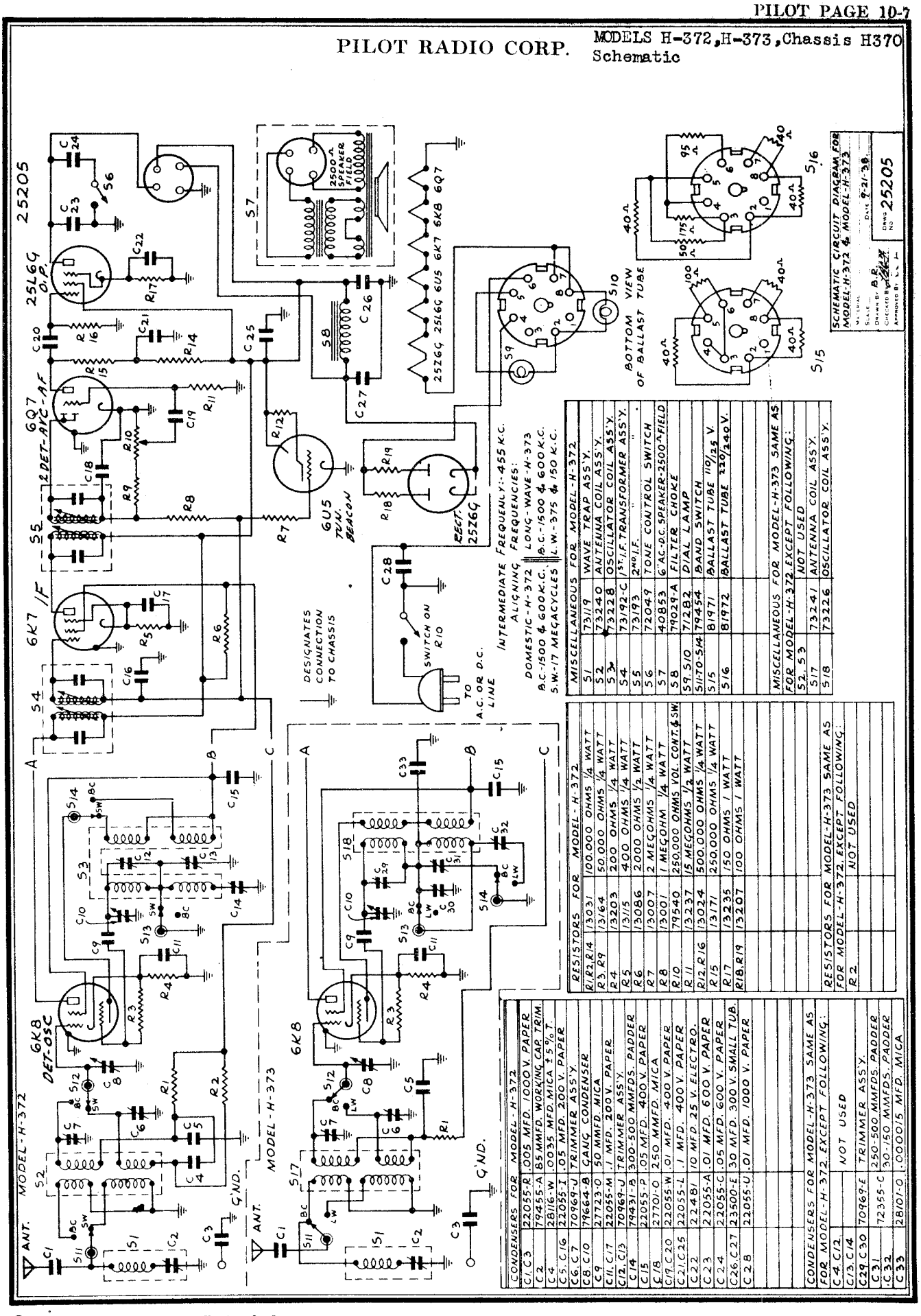
# PILOT RADIO CORP.

MODELS H-372, H-373, Chassis H370
Schematic




| CONDENSERS FOR MODEL-H-372 | | |
|---|---|---|
| C1,C3 | 22055-R | .005 MFD. 1000 V. PAPER |
| C2 | 79455-A | 85 MMFD. WORKING CAP. TRIM. |
| C4 | 28116-W | .0035 MFD. MICA ±5% T. |
| C5, C16 | 22055-I | .05 MFD. 200 V. PAPER |
| C6, C7 | 70969-U | TRIMMER ASS'Y. |
| C8, C10 | 79664-B | GANG CONDENSER |
| C9 | 27723-0 | 50 MMFD. MICA |
| C11, C17 | 22055-M | .1 MFD. 200 V. PAPER |
| C12, C13 | 70969-U | TRIMMER ASS'Y. |
| C14 | 79431-B | 300-500 MMFDS. PADDER |
| C15 | 22055-P | .05 MFD. 400 V. PAPER |
| C18 | 27701-0 | 250 MMFD. MICA |
| C19, C20 | 22055-W | .01 MFD. 400 V. PAPER |
| C21, C25 | 22055-L | .1 MFD. 400 V. PAPER |
| C22 | 22481 | 10 MFD. 25 V. ELECTRO. |
| C23 | 22055-A | .01 MFD. 600 V. PAPER |
| C24 | 22055-C | .05 MFD. 600 V. PAPER |
| C26, C27 | 23500-E | 30 MFD. 300 V. SMALL TUB. |
| C28 | 22055-U | .01 MFD. 1000 V. PAPER |
| CONDENSERS FOR MODEL-H-373 SAME AS FOR MODEL-H-372, EXCEPT FOLLOWING: | | |
| C4, C12 | | NOT USED |
| C13, C14 | | |
| C29, C30 | 70969-E | TRIMMER ASS'Y. |
| C31 | 72355-C | 250-500 MMFDS. PADDER |
| C32 | | 30-150 MMFDS. PADDER |
| C33 | 28101-0 | .000015 MFD. MICA |

| RESISTORS FOR MODEL-H-372 | | |
|---|---|---|
| R1, R2, R14 | 13031 | 100,000 OHMS 1/4 WATT |
| R3, R9 | 13164 | 50,000 OHMS 1/4 WATT |
| R4 | 13203 | 200 OHMS 1/4 WATT |
| R5 | 13115 | 400 OHMS 1/4 WATT |
| R6 | 13086 | 2000 OHMS 1/2 WATT |
| R7 | 13007 | 2 MEGOHMS 1/4 WATT |
| R8 | 13001 | 1 MEGOHM 1/4 WATT |
| R10 | 79540 | 250,000 OHMS VOL. CONT. & SW |
| R11 | 13237 | 15 MEGOHMS 1/2 WATT |
| R12, R16 | 13024 | 500,000 OHMS 1/4 WATT |
| R15 | 13171 | 250,000 OHMS 1/4 WATT |
| R17 | 13235 | 750 OHMS 1 WATT |
| R18, R19 | 13207 | 100 OHMS 1 WATT |
| RESISTORS FOR MODEL-H-373 SAME AS FOR MODEL-H-372, EXCEPT FOLLOWING: | | |
| R2 | | NOT USED |

| MISCELLANEOUS FOR MODEL-H-372 | | |
|---|---|---|
| S1 | 73119 | WAVE TRAP ASS'Y. |
| S2, S3 | 73240 | ANTENNA COIL ASS'Y. |
| S4 | 73228 | OSCILLATOR COIL ASS'Y. |
| S5 | 73192-C | 1ST I.F. TRANSFORMER ASS'Y. |
| S6 | 73193 | 2ND I.F. " " |
| S7 | 72049 | TONE CONTROL SWITCH |
| S8 | 40853 | 6" AC-DC SPEAKER-2500Ω FIELD |
| S9, S10 | 79029-A | FILTER CHOKE |
| S11-TO-S14 | 71282 | DIAL LAMP |
| S15 | 79454 | BAND SWITCH |
| S16 | 81971 | BALLAST TUBE 110/125 V. |
| | 81972 | BALLAST TUBE 220/240 V. |
| MISCELLANEOUS FOR MODEL-H-373 SAME AS FOR MODEL-H-372 EXCEPT FOLLOWING: | | |
| S2, S3 | | NOT USED |
| S17 | 73241 | ANTENNA COIL ASS'Y. |
| S18 | 73226 | OSCILLATOR COIL ASS'Y. |

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MODELS H-372, H-373
Chassis H-370

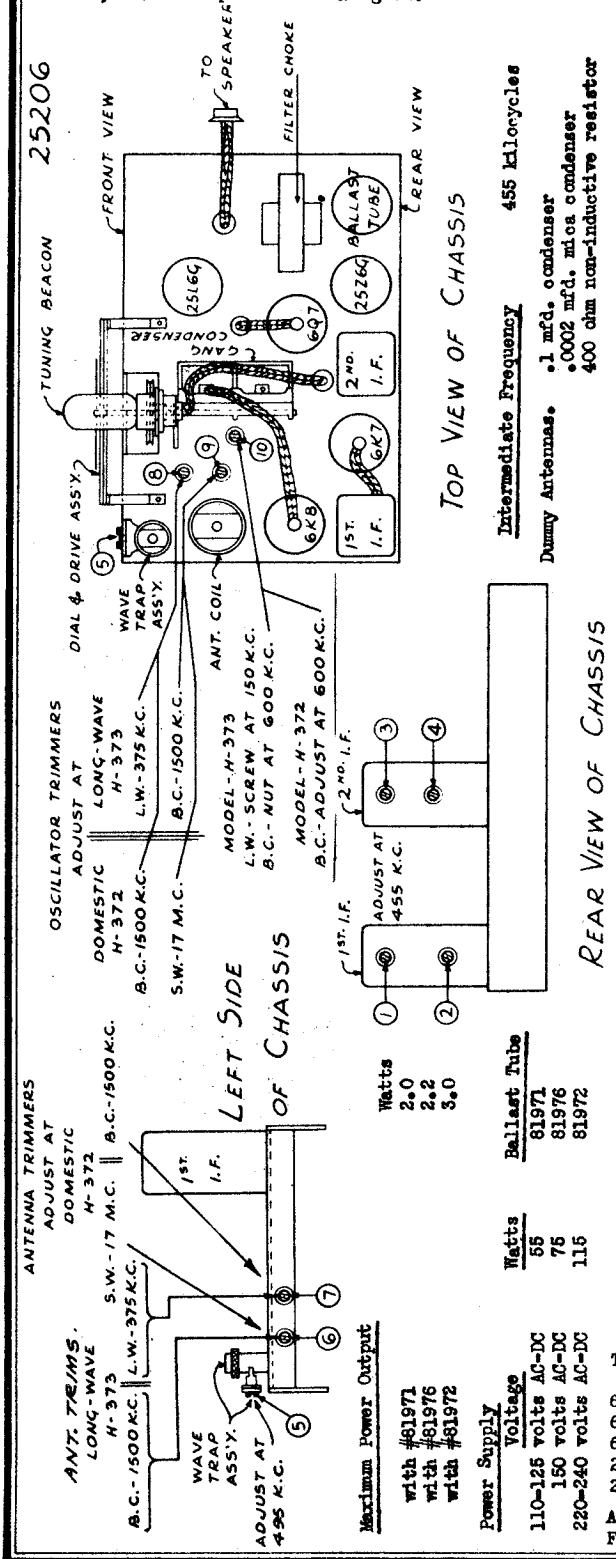
# PILOT RADIO CORP.

Voltage, Socket, Trimmers
Alignment

## IF Amplifier Alignment

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the trimmer screws 1, 2, 3, and 4, (see figure) for maximum reading of the output meter. Keep reducing the generator output as the output meter reading increases. When the reading of the output meter cannot be increased by adjusting the four screws of the IF transformers, the IF amplifier is aligned.




| Watts | Ballast Tube |
|---|---|
| 2.0 | 81971 |
| 2.2 | 81976 |
| 3.0 | 81972 |

| Watts | Maximum Power Output |
|---|---|
| 55 | with #81971 |
| 75 | with #81976 |
| 115 | with #81972 |

| Power Supply Voltage | |
|---|---|
| 110-125 volts | AC-DC |
| 150 volts | AC-DC |
| 220-240 volts | AC-DC |

## R.F. Alignment

**Long Wave Band** (Model H-373)

Connect the "hot" terminal of the generator to the blue antenna wire through the .0002 mfd. condenser.

Set the generator frequency to 375 kilocycles and with the Band Selector Switch set to the Long Wave Band, turn the pointer of the receiver to 375 kilocycles. Adjust trimmer #8 for maximum reading of the output meter. Do likewise with trimmer #7. Then set the generator frequency to 150 kilocycles and the receiver dial pointer to approximately the same frequency. Adjust the screw of trimmer #10 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 375 kilocycle alignment.

**Broadcast, or Medium Wave, Band** (Models H-373 and H-372)

Connections are the same for the alignment of this band as they are for the Long Wave Band.

Set the generator frequency to 1500 kilocycles, and the receiver dial pointer to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #9 of Model H-373, or trimmer #8 of Model H-372 for maximum reading of the output meter. Also adjust trimmer #6 of Model H-373, or trimmer #7 of Model H-372 for maximum reading of the output meter. Next, set the generator frequency to 600 kilocycles. Then with the receiver dial pointer set at approximately the same frequency, adjust trimmer #10 for maximum reading of the output meter while carefully "rocking" the gang condenser. Finally, return and repeat the 1500 kilocycle adjustment.

**Short Wave Band** (Model H-372)

When aligning this band connect the "hot" terminal of the signal generator to the blue antenna wire of the receiver through the 400 ohm resistor.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 17 mc., and also tune the receiver to this frequency, as marked on the dial.

Carefully adjust trimmer #9 for maximum reading of the output meter. Be careful you do not adjust to the "Image Frequency".

Then adjust trimmer #6 for maximum output meter reading, while slightly "rocking" the gang condenser.

Readjust trimmer #9, if necessary, to keep the calibration correct.

**Image Frequency**

The Short Wave Band in model H-372 must be aligned with the oscillator frequency lower than the signal frequency. On the high frequency band, it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, turn the tuning knob so that the dial pointer points to that one which comes in at the lower frequency marking on the dial.

**Wave Trap Alignment**

With the Band Selector Switch set on the Broadcast or Medium Wave position, connect the generator to the blue antenna wire, with the .0002 mfd. condenser. Set the generator frequency to 455 kilocycles and adjust trimmer #5 for minimum reading of the output meter. There must always be sufficient output from the Signal Generator to have a reading on the output meter to make this adjustment.

| Tube | Socket Terminals 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| | D.C. SOCKET VOLTAGES | | | | | | | |
| 6K8 | - | - | 102(130) | 85(110) | - | 85(110) | - | 2.(2.6) |
| 6K7 | - | - | 102(130) | 85(110) | 1.7(2.5) | - | - | 1.7(2.5) |
| 6Q7 | - | - | 45(53) | - | - | - | - | - |
| 25L6-G | - | - | 96(125) | 102(130) | - | - | - | 6.5(8.8) |
| 25Z6-G | - | - | - | 110(145) | - | - | - | 110(145) |

Above figures in parenthesis are for Ballast tube #81972.
Figures not in parenthesis are for ballast tube #81971.

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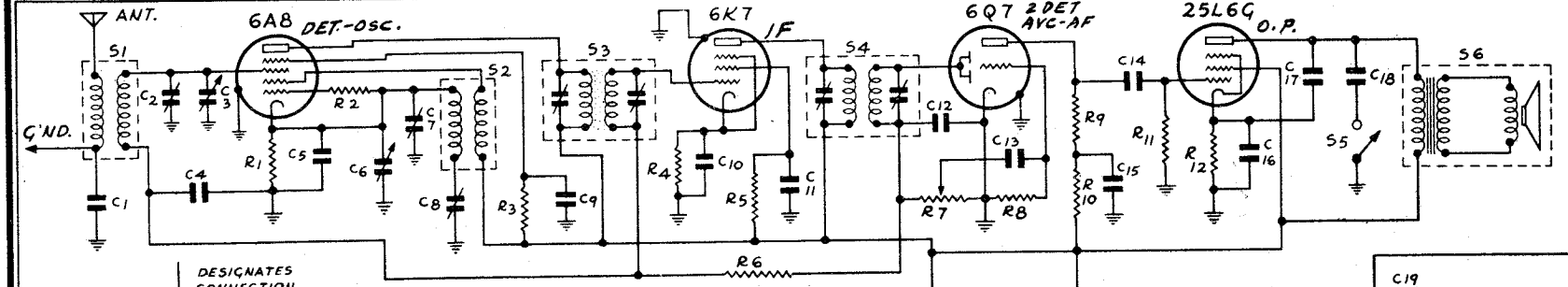
# PILOT RADIO CORP.

MODELS TH-150,H-151
Chassis H-150
Schematic,Voltage
Socket,Trimmers
Alignment

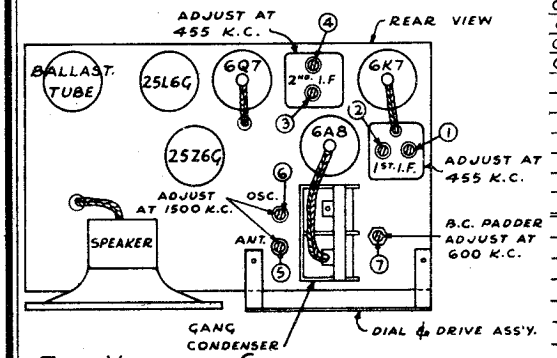



DESIGNATES CONNECTION TO CHASSIS

INTERMEDIATE FREQUENCY :- 455 K.C.

ALIGNING FREQUENCIES:

B.C.-1500 & 600 K.C.




TOP VIEW OF CHASSIS

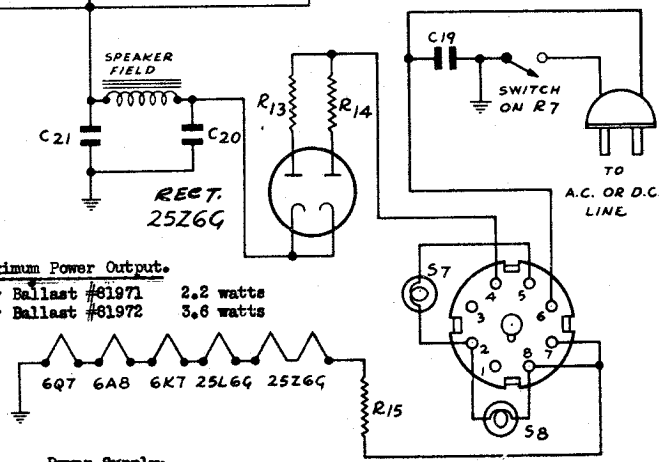
| | | |
|---|---|---|
| S6 | 40860 | 5" A.C.-D.C. SPEAKER-450Ω FIELD |
| S7, S8 | 71282 | DIAL LAMP |
| S9 | 81971 | BALLAST TUBE 110/125 V. |
| S10 | 81972 | BALLAST TUBE 220/240 V. |
| S11 | 81976 | BALLAST TUBE 150 V. |

CONDENSERS FOR MODEL-H-151

| | | |
|---|---|---|
| C1 | 22055-R | .005 MFD. 1000 V. PAPER |
| C2, C7 | 70969-E | TRIMMER ASS'Y. |
| C3, C6 | 79664 | GANG CONDENSER |
| C4, C5, C10 | 22055-I | .05 MFD. 200 V. PAPER |
| C8 | 79431-B | 300-500 MMFDS. PADDER |
| C9, C11 | 22055-Z | .02 MFD. 400 V. PAPER |
| C12 | 27726-0 | .0002 MFD. MICA |
| C13, C14 | 22055-W | .01 MFD. 400 V. PAPER |
| C15, C22 | 22055-L | .1 MFD. 400 V. PAPER |
| C16 | 23500-B | 10 MFD. 25 V. ETCH FOIL ELECT. |
| C17 | 22055-A | .01 MFD. 600 V. PAPER |
| C18 | 22055-AB | .1 MFD. 600 V. PAPER |
| C19 | 22055-C | .05 MFD. 600 V. PAPER |
| C20 | 23500-F | 16 MFD. 300 V. ETCH FOIL ELECT. |
| C21 | 23500-E | 30 MFD. 300 V. ETCH FOIL ELECT. |

RESISTORS FOR MODEL-H-151

| | | |
|---|---|---|
| R1, R4 | 13115 | 400 OHMS 1/4 WATT |
| R2 | 13164 | 50,000 OHMS 1/4 WATT |
| R3 | 13186 | 25,000 OHMS 1/4 WATT |
| R5 | 13074 | 20,000 OHMS 1/4 WATT |
| R6 | 13001 | 1 MEGOHM 1/4 WATT |
| R7 | 79429 | 500,000 OHMS VOL. CONT. & SW. |
| R8 | 13237 | 15 MEGOHMS 1/2 WATT |
| R9 | 13171 | 250,000 OHMS 1/4 WATT |
| R10 | 13031 | 100,000 OHMS 1/4 WATT |
| R11 | 13024 | 500,000 OHMS 1/4 WATT |
| R12 | 13240 | 150 OHMS 1 WATT ±10% T |
| R13 & 14 | 13207 | 100 OHMS 1 WATT |
| R15 | 83656 | 20 OHMS 2 WATT FLEXIBLE |




Maximum Power Output.

For Ballast #81971 2.2 watts
For Ballast #81972 3.6 watts

Power Supply.

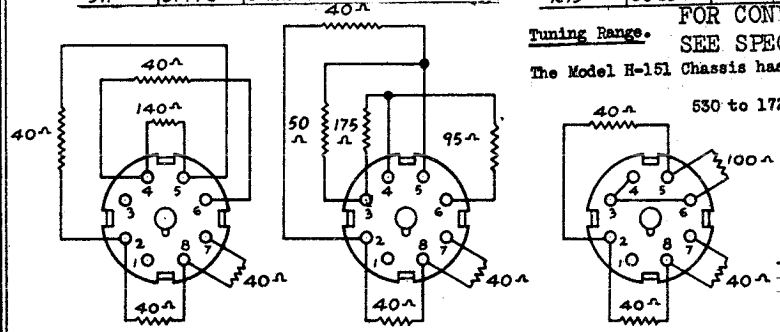
| Voltage | Ballast Tube Number | Watts |
|---|---|---|
| 110 to 125 volts | #81971 | 45 |
| 150 volts | 81976 | 60 |
| 220 to 240 volts | 81972 | 100 |

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION, VOL. VIII

Tuning Range.

The Model H-151 Chassis has the following tuning range:

530 to 1720 kc or 566 to 174 meters




PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-151
MATERIAL
SCALE
DRAWN BY B.R.
CHECKED BY
APPROVED BY
DATE 10-12-38
DRWG NO 25208

D.C. SOCKET VOLTAGES

All voltages are those between the indicated tube terminal and the chassis, and are made with a 1000 ohm per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

Make sure that the AC or DC supply voltage is correct for the Ballast tube being used at the time of measurement.

Socket Terminals

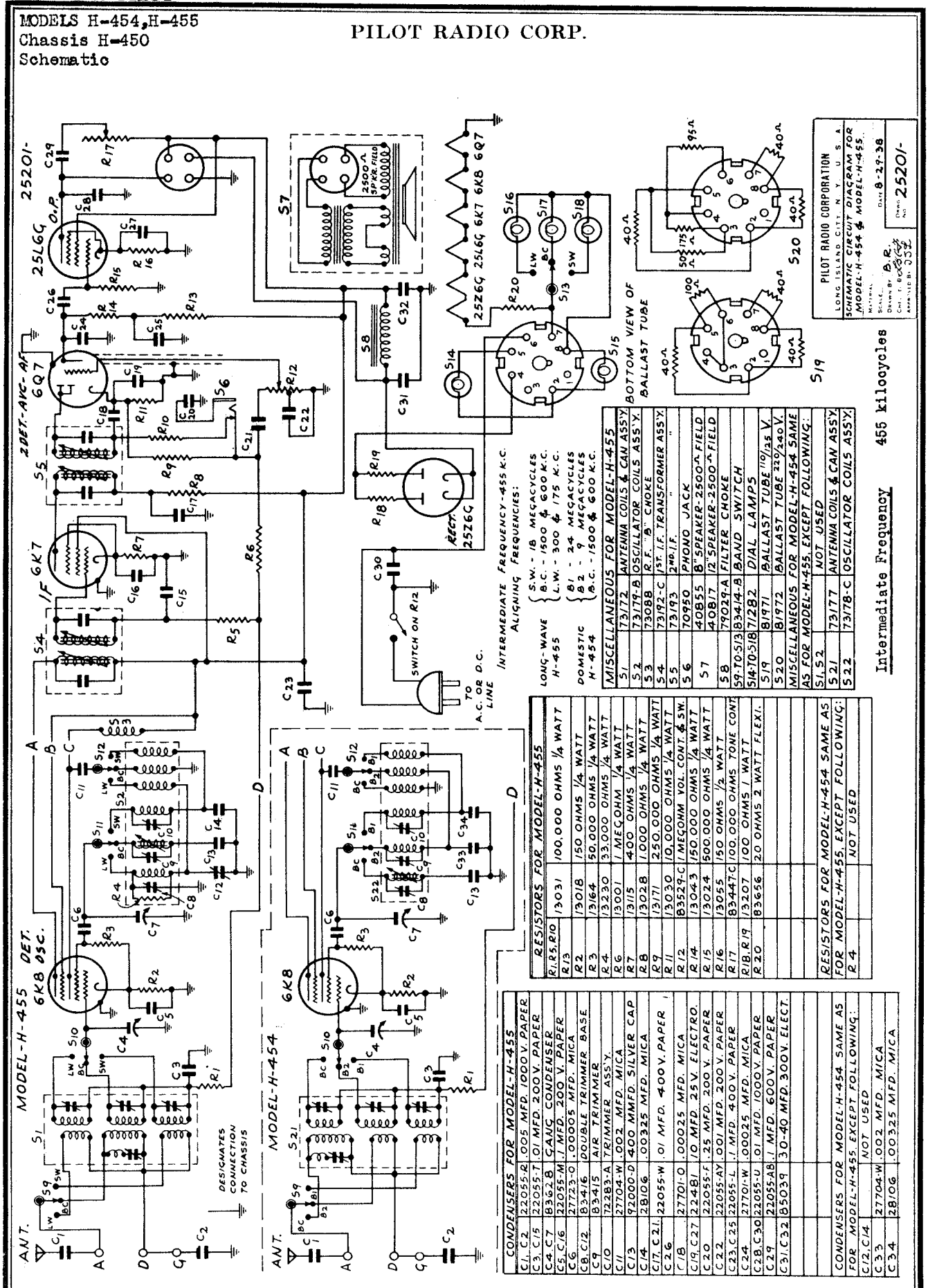
| Tube | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 6A8 | - | - | 95(145) | 52(87) | - | 95(145) | - | 1.7(2.6) |
| 6K7 | - | - | 95(145) | 65(110) | 2.(3.1) | - | - | 2(3.1) |
| 6Q7 | - | - | - | - | - | - | - | - |
| 25L6-G | - | - | 90(135) | 95(145) | - | - | - | .5.7(9.0) |

Figures in parenthesis are for ballast tube #81971

Figures not in parenthesis are for ballast tube #81972

MODELS H-454, H-455
Chassis H-450
Schematic

# PILOT RADIO CORP.




| CONDENSERS FOR MODEL-H-455 | | |
|---|---|---|
| C1, C2 | 22055-R | .005 MFD. 1000 V. PAPER |
| C3, C15 | 22055-T | .01 MFD. 200 V. PAPER |
| C4, C7 | B3628 | GANG CONDENSER |
| C5, C16 | 22055-M | .1 MFD. 200 V. PAPER |
| C6 | 27723-0 | .00005 MFD. MICA |
| C8, C12 | B3416 | DOUBLE TRIMMER BASE |
| C9 | B3415 | AIR TRIMMER |
| C10 | 72283-A | TRIMMER ASS'Y. |
| C11 | 27704-W | .002 MFD. MICA |
| C13 | 92000-D | 400 MMFD. SILVER CAP |
| C14 | 28106 | .00325 MFD. MICA |
| C17, C21 | 22055-W | .01 MFD. 400 V. PAPER |
| C26 | 27701-0 | .00025 MFD. MICA |
| C18 | 22481 | .10 MFD. 25 V. ELECTRO. |
| C19, C27 | 22055-F | .25 MFD. 200 V. PAPER |
| C20 | 22055-AY | .001 MFD. 200 V. PAPER |
| C22 | 22055-L | .1 MFD. 400 V. PAPER |
| C23, C25 | 27701-W | .00025 MFD. MICA |
| C24 | 22055-U | .01 MFD. 1000 V. PAPER |
| C28, C30 | 22055-AB | .1 MFD. 600 V. PAPER |
| C29 | 85039 | 30-40 MFD. 300 V. ELECT. |
| C31, C32 | | |
| CONDENSERS FOR MODEL-H-454 SAME AS FOR MODEL-H-455 EXCEPT FOLLOWING: | | |
| C12, C14 | NOT USED | |
| C33 | 27704-W | .002 MFD. MICA |
| C34 | 28106 | .00325 MFD. MICA |

| RESISTORS FOR MODEL-H-455 | | |
|---|---|---|
| R1, R5, R10 | 13031 | 100,000 OHMS 1/4 WATT |
| R13 | | |
| R2 | 13018 | 150 OHMS 1/4 WATT |
| R3 | 13164 | 50,000 OHMS 1/4 WATT |
| R4 | 13230 | 33,000 OHMS 1/4 WATT |
| R6 | 13001 | 1 MEGOHM 1/4 WATT |
| R7 | 13115 | 400 OHMS 1/4 WATT |
| R8 | 13028 | 1,000 OHMS 1/4 WATT |
| R9 | 13171 | 250,000 OHMS 1/4 WATT |
| R11 | 13030 | 10,000 OHMS 1/4 WATT |
| R12 | 83529-C | 1 MEGOHM VOL. CONT. & SW. |
| R14 | 13043 | 150,000 OHMS 1/4 WATT |
| R15 | 13024 | 500,000 OHMS 1/4 WATT |
| R16 | 13055 | 150 OHMS 1/2 WATT |
| R17 | 83447-C | 100,000 OHMS TONE CONT. |
| R18, R19 | 13207 | 100 OHMS 1 WATT |
| R20 | 83656 | 20 OHMS 2 WATT FLEXI. |
| RESISTORS FOR MODEL-H-454 SAME AS FOR MODEL-H-455 EXCEPT FOLLOWING: | | |
| R4 | NOT USED | |

| MISCELLANEOUS FOR MODEL-H-455 | | |
|---|---|---|
| S1 | 73172 | ANTENNA COILS & CAN ASS'Y. |
| S2 | 73178-B | OSCILLATOR COILS ASS'Y. |
| S3 | 73088 | R.F. "B" CHOKE |
| S4 | 73192-C | 1ST. I.F. TRANSFORMER ASS'Y. |
| S5 | 73193 | 2ND. I.F. " |
| S6 | 70950 | PHONO JACK |
| S7 | 40815 | 8" SPEAKER-2500Ω FIELD |
| | 40817 | 12" SPEAKER-2500Ω FIELD |
| S8 | 79029-A | FILTER CHOKE |
| S9-T0-S13 | B3414-B | BAND SWITCH |
| S14-T0-S18 | 71282 | DIAL LAMPS |
| S19 | 81971 | BALLAST TUBE 110/125 V. |
| S20 | 81972 | BALLAST TUBE 220/240 V. |
| MISCELLANEOUS FOR MODEL-H-454 SAME AS FOR MODEL-H-455, EXCEPT FOLLOWING: | | |
| S1, S2 | NOT USED | |
| S21 | 73177 | ANTENNA COILS & CAN ASS'Y. |
| S22 | 73178-C | OSCILLATOR COILS ASS'Y. |

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# PILOT RADIO CORP.

MODELS H-454,H-455
Chassis H-450
Socket,Trimmers
Voltage

**Power Supply**

| Voltage | Watts | Ballast Tube |
|---|---|---|
| 110 to 125 volts AC-DC | 50 | 81971 |
| 220 to 240 volts AC-DC | 115 | 81972 |

**Circuit** Super-Heterodyne, with Class A output stage. Three tuning ranges as listed below. Permeability tuned IF transformers. Tone compensated volume control. Continuously variable tone control, Automatic Volume Control.

**Maximum power Output**

2.0 watts with 81971 ballast tube
3.4 watts with 81972 ballast tube




**D.C. SOCKET VOLTAGES**

All voltages are those between the indicated tube terminal and the chassis, and are made with a 1000 ohm per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

Make sure that the AC or DC supply voltage is correct for the ballast tube being used at the time of measurement.

Numbers in parentheses indicate use of ballast tube 81972. Socket Terminals

| Tube | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 6K8 | -- | -- | 95(125) | 95(125) | -- | 95(125) | -- | 2.3(3) |
| 6K7 | -- | -- | 88(115) | 95(125) | -- | 3(4) | -- | 3(4) |
| 6Q7 | -- | -- | 60 (80) | -- | -- | -- | -- | 1.(1.) |
| 25L6-G | -- | -- | 91(119) | 95(125) | -- | -- | -- | 6(8.2) |
| 25Z6-G | -- | -- | -- | 110(140) | -- | -- | -- | 110(140) |

**Tuning Ranges** The model H 454 Chassis has the following tuning ranges:

| | | | |
|---|---|---|---|
| Band 1 | 24.8 to 8.3 mc | or | 12.09 to 36.12 meters |
| Band 2 | 9.7 to 2.9 mc | or | 30.9 to 103 meters |
| Band 3 | 1725 to 530 kc | or | 174 to 566 meters |

The model H 455 Chassis has the following tuning ranges:

| | | | |
|---|---|---|---|
| Band 1 | 18.8 to 5.35 mc | or | 15.9 to 56.04 meters |
| Band 2 | 1725 to 530 kc | or | 174 to 566 meters |
| Band 3 | 375 to 145 kc | or | 800 to 2069 meters |

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MODELS H-454,H-455
Chassis H-450

# PILOT RADIO CORP.

Alignment Procedure

IF Amplifier Alignment Turn the Band Selector Switch to Band 3 and turn the receiver dial pointer to the low frequency end.

Connect the output meter as described under "Connections", and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd condenser. Then proceed with the alignment as follows:-

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the IF amplifier tube, and align the last IF transformer. Always finish the alignment with the signal input to the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

Wave Trap Alignment With the Band Selector Switch set on the Broadcast Band, replace the .1 mfd dummy antenna with the .0002 mfd dummy antenna. Set the generator frequency at 455 kc and tune trimmer #11 for minimum reading of the output meter. There must be sufficient output from the signal generator to always have a reading on the output meter; do not allow the meter to go to zero and call that the correct adjustment point.

R.F. Alignment

Band 3 (Model 455 Long-Wave) Connect the "hot" terminal of the generator to the blue wire and clip through the .0002 mfd condenser.

Set the generator frequency to 300 kc and with the Band Selector Switch set to Band 3, turn the receiver dial pointer to 300 kc. Adjust trimmer #5 for maximum reading of the output meter. Do likewise with trimmer #13. Then set the generator frequency to 175 kc and the receiver dial pointer to approximately the same. Adjust trimmer #6 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 300 kc alignment.

Band 2 (Model 455) Band 3 (Model 454) (Standard Broadcast)

Connections are the same for the alignment of this band as they are for the long-wave band.

Set the generator frequency to 1500 kc., and the receiver dial pointer to the same frequency, with the band selector switch set appropriately. Adjust trimmer #7 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut). Then without touching any tuning controls adjust trimmer #12 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc., and accurately set the receiver dial pointer to the 600 kc mark. Then adjust trimmer #15 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally return and repeat the 1500 kc adjustments and then tighten the lock nut on trimmer #7.

Band 1 (Model 455 Short-Wave)

Remove the .0002 mfd dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator frequency to 18 mc and also set the receiver dial pointer to this frequency. Carefully adjust trimmer #8 for maximum reading of the output meter; be careful you do not tune in at the Image Frequency.

Then adjust trimmer #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #8 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2 (Model 454 - Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed, "Image Frequency".

Set the generator and the receiver dial pointer to 9 mc. Adjust trimmer #9 for maximum reading of the output meter; be careful you do not tune in at the Image Frequency.

Then adjust trimmer #13 for maximum reading of the output meter while slightly "rocking" the gang condenser. Readjust trimmer #9 if necessary to correct the calibration.

Band 1 Alignment (Model 454 Short-Wave)

Connections and dummy antenna are the same as on Band 2 of model 554.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 24 mc and the receiver dial pointer to 24 mc. Adjust trimmer #10 to 24 mc for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmer #14 while "rocking" the gang condenser, for maximum reading of the output meter. Reset trimmer #10 so that calibration is correct if necessary.

IMAGE FREQUENCY

All bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the long-wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the image frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the intermediate frequency, set the receiver dial pointer to that one which comes in at the higher frequency marking on the receiver dial pointer.

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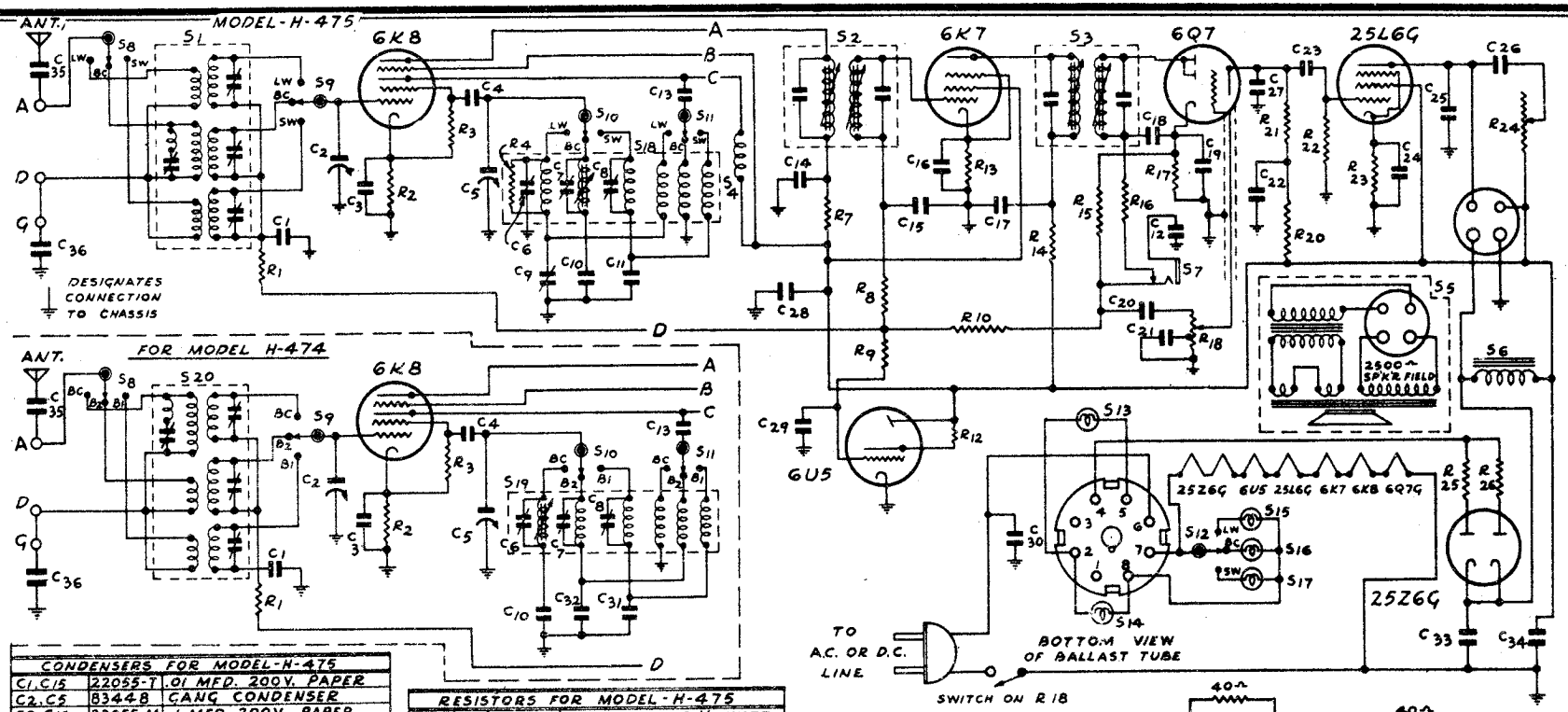
# PILOT RADIO CORP.

MODELS H-474, H-475
Chassis H-470
MODELS H-134, H-135
Chassis H-130
Schematic




| CONDENSERS FOR MODEL-H-475 | | |
|---|---|---|
| C1, C15 | 22055-T | .01 MFD. 200V. PAPER |
| C2, C5 | 83448 | GANG CONDENSER |
| C3, C16 | 22055-M | .1 MFD. 200V. PAPER |
| C4 | 27723-0 | .00005 MFD. MICA |
| C6, C9 | 83416 | DOUBLE TRIMMER BASE |
| C7 | 83415 | AIR TRIMMER |
| C8 | 72283-A | TRIMMER ASS'Y. |
| C10 | 72000-E | 375 MMFD. SILVER CAP |
| C11 | 28106 | .00325 MFD. MICA |
| C12 | 22055-S | .5 MFD. 200 V. PAPER |
| C13 | 27704-W | .002 MFD. MICA |
| C14, C17, C20, C23, C29 | 22055-W | .01 MFD. 400 V. PAPER |
| C18 | 27701-0 | .00025 MFD. MICA |
| C19, C24 | 22481 | 10 MFD. 25 V. ELECTRO. |
| C21 | 22055-AY | .001 MFD. 200 V. PAPER |
| C22, C26, C28 | 22055-L | .1 MFD. 400 V. PAPER |
| C25, C30, C35, C36 | 22055-U | .01 MFD. 1000V. PAPER |
| C27 | 27701-W | .00025 MFD. MICA |
| C33, C34 | 85039 | 30-40 MFD. 300V. ELECT. |
| CONDENSERS FOR MODEL-H-474 SAME AS FOR MODEL-H-475, EXCEPT FOLLOWING: | | |
| C9, C11 | | NOT USED |
| C31 | 27705-W | .003 MFD. MICA |
| C32 | 27716-W | .0015 MFD. MICA |

| RESISTORS FOR MODEL-H-475 | | |
|---|---|---|
| R1, R8, R20 | 13031 | 100,000 OHMS 1/4 WATT |
| R2 | 13203 | 200 OHMS 1/4 WATT |
| R3, R16 | 13164 | 50,000 OHMS 1/4 WATT |
| R4 | 13230 | 33,000 OHMS 1/4 WATT |
| R7, R14 | 13028 | 1,000 OHMS 1/4 WATT |
| R9, R10, R12 | 13001 | 1 MEGOHM 1/4 WATT |
| R13 | 13115 | 400 OHMS 1/4 WATT |
| R15, R22 | 13024 | 500,000 OHMS 1/4 WATT |
| R17 | 13116 | 12,000 OHMS 1/4 WATT |
| R18 | 83529-B | 1 MEGOHM VOL. CONT. & SW. |
| R21 | 13171 | 250,000 OHMS 1/4 WATT |
| R23 | 13055 | 150 OHMS 1/2 WATT |
| R24 | 83447-B | 100,000 OHMS TONE CONT. |
| R25, R26 | 13207 | 100 OHMS 1 WATT |
| RESISTORS FOR MODEL-H-474 SAME AS FOR MODEL-H-475, EXCEPT FOLLOWING | | |
| R4 | | NOT USED |

| MISCELLANEOUS FOR MODEL-H-475 | | |
|---|---|---|
| S1 | 73172 | ANTENNA COILS & CAN ASS'Y. |
| S2 | 73192-A | 1ST. I.F. TRANSFORMER ASS'Y. |
| S3 | 73193 | 2ND. I.F. " " " |
| S4 | 73088 | R.F. "B" CHOKE ASS'Y. |
| S5 | 40816 | 8" SPEAKER-2500Ω FIELD |
| | 40817 | 12" SPEAKER-2500Ω FIELD |
| S6 | 79029-A | FILTER CHOKE |
| S7 | 70950 | PHONO JACK |
| S8-TO-S12 | 83414 | BAND SWITCH |
| S13-TO-S17 | 71282 | DIAL LAMPS |
| S18 | 73179-A | OSCILLATOR COILS ASS'Y. |
| S21 | 81972 | BALLAST TUBE 220/240V. |
| S22 | 81971 | BALLAST TUBE 110/125 V. |
| MISCELLANEOUS FOR MODEL-H-474 SAME AS FOR MODEL-H-475, EXCEPT FOLLOWING | | |
| S1, S18 | | NOT USED |
| S19 | 73178-A | OSCILLATOR COILS ASS'Y. |
| S20 | 73177 | ANTENNA COILS & CAN ASS'Y. |

INTERMEDIATE FREQUENCY - 455 K.C.

ALIGNING FREQUENCIES:

| LONG-WAVE-H-475 | DOMESTIC-H-474 |
|---|---|
| S.W.-18 & 6 MEGACYCLES | B1-24 MEGACYCLES |
| B.C.-1500 & 600 K.C. | B2-9 MEGACYCLES |
| L.W.-300 & 175 K.C. | B.C.-1500 & 600 K.C. |

NOTE: Chassis H-470 has push-button tuner; H-130 does not. Otherwise chassis are the same.

ALTERATIONS (2) REVISED DIAL LAMPS.-B.R.-8-17-38. FINISH

CLASSIFICATION: H-470 SERIES

THIS PRINT SUPERSEDES ALL OTHERS PRIOR TO

DO NOT SCALE THIS PRINT

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.

SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-474 AND FOR MODEL-H-475

MATERIAL

SCALE

DRAWN BY B.R.

CHECKED BY JFR

APPROVED BY

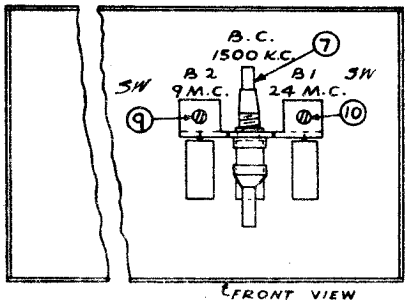
DATE 8-3-38

DRWG NO 25196-2

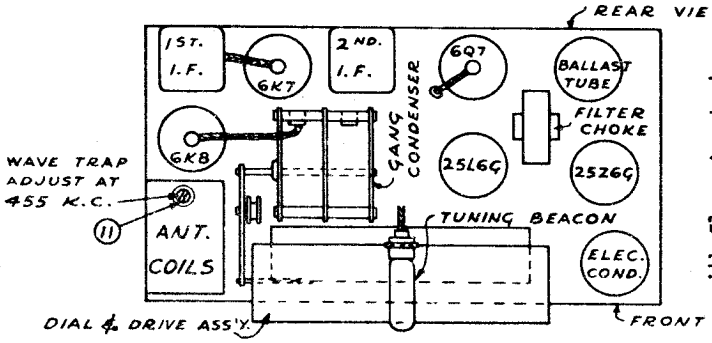
MODELS H-474,H-475
Chassis H-470
MODELS H-134,H-135
Chassis H-130

# PILOT RADIO CORP.

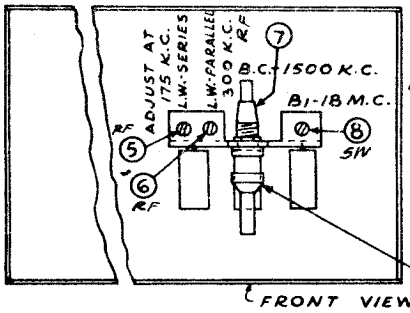
Voltage,Socket
Trimmers,Alignment



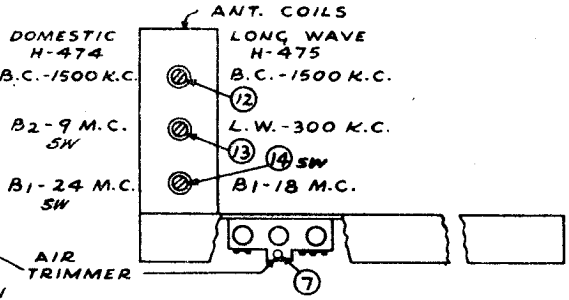

BOTTOM VIEW OF CHASSIS
DOMESTIC-H-474



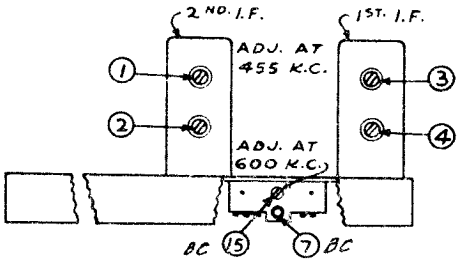

TOP VIEW OF CHASSIS




BOTTOM VIEW OF CHASSIS
LONG WAVE - H-475




FRONT VIEW OF CHASSIS




REAR VIEW OF CHASSIS

Circuit
Stage. Super-Heterodyne, with Class A output tuned IF transformers. Three tuning ranges as listed below. Permeability compensated volume control. Continuously variable tone control. Automatic Volume Control and Cathode Ray Tuning Beacon.

## D.C. SOCKET VOLTAGES

All voltages are those between the indicated tube terminal and the chassis, and are made with a 1000 ohms per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

Make sure that the A.C. supply voltage is correct for the ballast tube being used at the time of measurement.

Figures in parenthesis are for ballast tube #81972, other figures are for ballast tube #81971.

| | Socket Terminals | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Tube | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 6K8 | - | - | 95(125) | 95(125) | - | 95(125) | - | 2.3(3) |
| 6K7 | - | - | 88(115) | 95(125) | - | 3(4) | - | 3(4) |
| 6Q7 | - | - | 60(80) | - | - | - | - | 1.(1.) |
| 25L6-G | - | - | 91(119) | 95(125) | - | - | - | 6(8.2) |
| 25Z6-G | - | - | - | 110(140) | - | - | - | 110(140) |

Power Supply A.C. or D.C.

| Voltage | Ballast Tube | Watts |
|---|---|---|
| 110-125 | #81971 | 50 |
| 220-240 | #81972 | 115 |

Intermediate Frequency 455 kc.

Tuning Ranges The model H-474 chassis has the following tuning ranges:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band 1 | 24.8 | to | 8.3 mc | or | 12.09 | to | 36.1 meters |
| Band 2 | 9.7 | to | 2.9 mc | or | 30.9 | to | 103.4 meters |
| Band 3 | 1725 | to | 530 kc | or | 174 | to | 566 meters |

The model H-475 chassis has the following tuning ranges:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band 1 | 18.8 | to | 5.35 mc | or | 15.95 | to | 56.04 meters |
| Band 2 | 1725 | to | 530 kc | or | 174 | to | 566 meters |
| Band 3 | 375 | to | 145 kc | or | 800 | to | 2068 meters |

Maximum Power Output

With #81971 Ballast Tube 2.0 watts
With #81972 Ballast Tube 3.4 watts

PILOT RADIO CORPORATION
LONG ISLAND CITY N. Y. U. S. A.
TRIMMER LAYOUT
MATERIAL
SCALE
DRAWN BY B.R.
CHECKED BY
APPROVED BY
DATE 8-5-38.
DRWG. NO. 25197

PILOTUBES Required

One 6K8 1st detector-oscillator
One 6K7 IF amplifier
One 6Q7 2nd detector-AVC-1st audio ampl
One 25L6-G Output tube
One 25Z6-G Power supply rectifier
One 6U5 Cathode ray tuning beacon

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MODELS H-134, H-135
Chassis H-130
Alignment Procedure

# PILOT RADIO CORP.

MODELS H-474, H-475
Chassis H-470

Alignment Connections

Connect the Black and Yellow wires together and to the ground post of the signal generator.

Connect the "hot" post of the generator through the correct dummy antenna or condenser to the appropriate point as noted hereafter. In all the measurements to follow, the output meter should be connected to the plate and screen grid terminals of the 25L6-G through .1 mfd. condensers in any convenient manner.

IF Amplifier Alignment Turn the Band Selector Switch to Band 3 and turn the ROTOR dial to the low frequency end.

Connect the output meter as described under "Connections", and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd. condenser. Then proceed with the alignment as follows:-

1. Adjust the Signal Generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4, (see figure) for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the IF amplifier tube, and align the last IF transformer. Always finish the alignment with the signal input to the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

Wave Trap Alignment With the Band Selector Switch set on the Broadcast Band, replace the .1 mfd. dummy antenna with the .0002 mfd. dummy antenna. Set the generator frequency at 455 kc. and tune trimmer #11 for minimum reading of the output meter. There must be sufficient output from the signal generator to always have a reading on the output meter. Do not allow the meter to go to zero and call that the correct adjustment point.

R.F. Alignment

Band 3 (Model H-475 - Long-Wave) Connect the "hot" terminal of the generator to the blue wire and clip through the .0002 mfd. condenser.

Set the generator frequency to 300 kc., and with the Band Selector Switch set to Band 3, turn the ROTOR dial to 300 kc. Adjust trimmer #6 for maximum reading of the output meter. Do likewise with trimmer #13. Then set the generator frequency to 175 kc., and the ROTOR dial to approximately the same. Adjust trimmer #5 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 300 kc. alignment.

Band 2 (Model H-475) Band 3 (Model H-474) (Standard Broadcast)

Connections are the same for the alignment of this band as they are for the Long-Wave Band.

Set the generator frequency to 1500 kc., and the ROTOR dial to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #7 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut). Then without touching any tuning controls adjust trimmer #12 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc. and accurately set the ROTOR dial to the 600 kc. mark. Then adjust trimmer #15 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally, return and repeat the 1500 kc. adjustments and then tighten the lock nut on trimmer #7.

Band 1 (Model H-475 - Short-Wave)

Remove the .0002 mfd. dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator frequency to 18 mc. and also set the ROTOR dial to this frequency. Carefully adjust trimmer #8 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmer #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #8 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2 (Model H-474 - Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator and the ROTOR dial to 9 mc. Adjust trimmer #9 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmer #13 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #9 if necessary to correct the calibration.

Band 1 (Model H-474 - Short-Wave)

Connections and dummy antenna are the same as on Band 1 above.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 24 mc. and the ROTOR dial to 24 mc. Adjust trimmer #10 to 24 mc. for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmer #14, while "rocking" the gang condenser for maximum reading of the output meter. Reset trimmer #10 so that calibration is correct if necessary.

Image Frequency

All bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Long-Wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator, to pick up two signals with the receiver, separated by twice the Intermediate Frequency, set the ROTOR dial to that one which comes in at the higher frequency marking on the ROTOR dial.

Miscellaneous Service Notes

If a howling noise (sometimes referred to as Microphonic howl) is heard, it is very probably because the four red screws under the cabinet have not been removed along with the two narrow metal strips between the chassis and the bottom of the cabinet. These strips and screws are only intended as additional bracing during shipment and must be removed before the receiver is put in operation.

The howl can also be caused by a defective tube, or when some part of the receiver which is rigidly fastened to the chassis rubs against the cabinet. The remedy is obvious.

In replacing or resetting the ROTOR dial, always set the gang condenser at maximum capacity.

To reset the dial, loosen the set screws in the ROTOR dial pinion gear. Then, adjust the dial so that the low frequency end of the calibration line, at the base of the arrow tip, is directly under the indicator wire. Then, tighten the pinion gear set screws.

If it should be necessary to remove the ROTOR dial, first remove the top plate which carries the Tuning Beacon Clamp. Next, remove the bearing plates which hold the dial shaft in place, and lift out the whole dial assembly.

In replacing the dial, be sure to compress the "back lash" springs in the double gear approximately 1/16 of an inch.

Never loosen the set screws which connect the link motion to the gang condenser. If this should be done, the calibration of the receiver will be affected.

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MODELS TH-650, H-651
Chassis H-650
Schematic, Voltage, Socket
Trimmers, Alignment

PILOT RADIO CORP.

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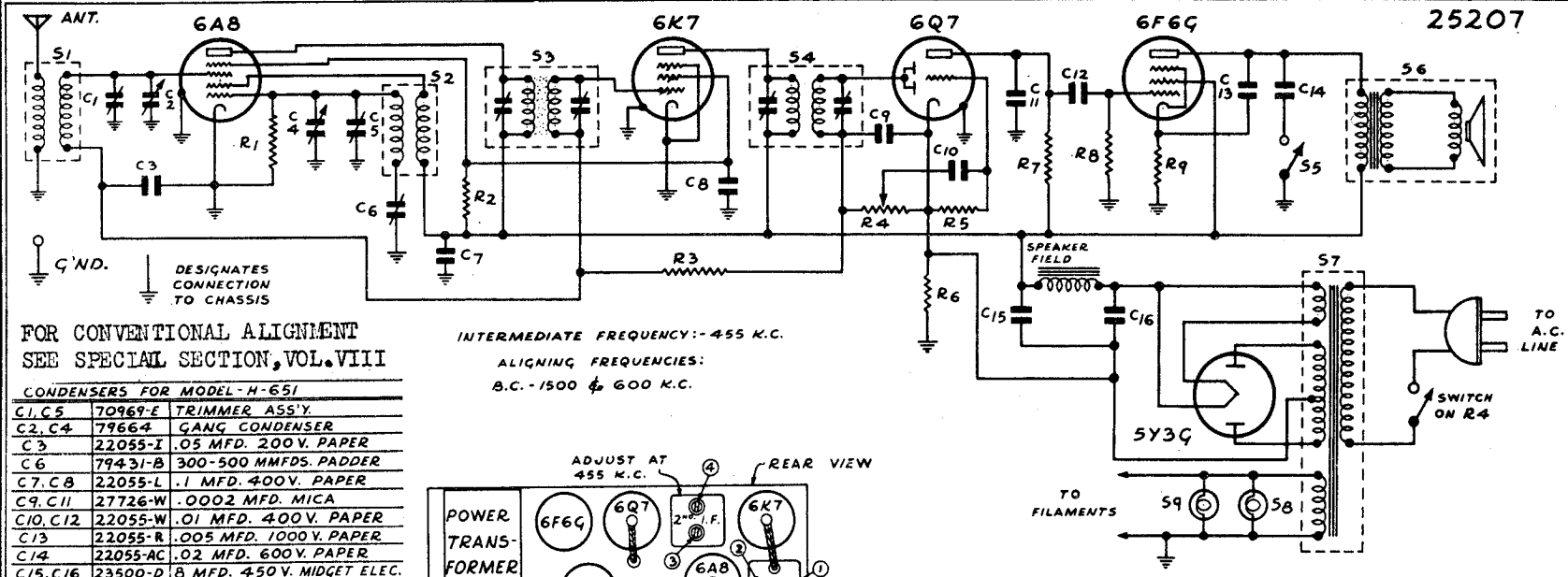



FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION, VOL. VIII

INTERMEDIATE FREQUENCY:- 455 K.C.

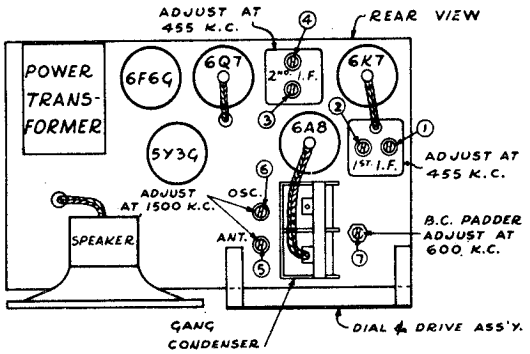
ALIGNING FREQUENCIES:

B.C. - 1500 & 600 K.C.

| CONDENSERS FOR MODEL - H-651 | | |
|---|---|---|
| C1, C5 | 70969-E | TRIMMER ASS'Y. |
| C2, C4 | 79664 | GANG CONDENSER |
| C3 | 22055-I | .05 MFD. 200 V. PAPER |
| C6 | 79431-B | 300-500 MMFDS. PADDER |
| C7, C8 | 22055-L | .1 MFD. 400 V. PAPER |
| C9, C11 | 27726-W | .0002 MFD. MICA |
| C10, C12 | 22055-W | .01 MFD. 400 V. PAPER |
| C13 | 22055-R | .005 MFD. 1000 V. PAPER |
| C14 | 22055-AC | .02 MFD. 600 V. PAPER |
| C15, C16 | 23500-D | 8 MFD. 450 V. MIDGET ELEC. |

| RESISTORS FOR MODEL - H-651 | | |
|---|---|---|
| R1 | 13164 | 50,000 OHMS 1/4 WATT |
| R2 | 13068 | 30,000 OHMS 1/2 WATT |
| R3, R5 | 13001 | 1 MEGOHM 1/4 WATT |
| R4 | 79429 | 500,000 OHMS VOL. CONT. & SW |
| R6 | 13080 | 50 OHMS 1/4 WATT |
| R7 | 13171 | 250,000 OHMS 1/4 WATT |
| R8 | 13024 | 500,000 OHMS 1/4 WATT |
| R9 | 13238 | 400 OHMS 1/2 WATT |

| MISCELLANEOUS FOR MODEL - H-651 | | |
|---|---|---|
| S1 | 73115-B | ANTENNA COIL ASS'Y. |
| S2 | 73200 | OSCILLATOR COIL ASS'Y. |
| S3 | 73108-B | 1ST. I.F. TRANSFORMER ASS'Y. |
| S4 | 73103 | 2ND. I.F. " " |
| S5 | 71657 | TONE CONTROL |
| S6 | 40854 | 5" A.C. SPEAKER 2000 Ω FIELD |
| S7 | 79428-R | PWR. TRANSFOR. 117 V.-60 CY. |
| | 79428-AB | " . " .220 V.-60 CY. |
| | 79428-RA | " . " .115-230 V.-60 CY. |
| | 79428-L | " . " .150 V.-60 CY. |
| S8, S9 | 78889 | DIAL LAMP |




TOP VIEW OF CHASSIS

D.C. SOCKET VOLTAGES

All voltages are those between the indicated tube terminal and the chassis, and are made with a 1000 ohm per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

Make sure that the A.C. supply voltage is correct for the transformer tap being used at the time of measurement.

| Tube | Socket Terminals 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 6A8 | - | - | 185 | 70 | - | 185 | - | - |
| 6K7 | - | - | 185 | 70 | - | - | - | - |
| 6Q7 | - | - | - | - | - | - | - | -2 |
| 6F6-G | - | - | 170 | 185 | - | - | - | 11.5 |
| 5Y3-G | - | - | - | - | - | - | - | 270 |

Maximum Power Output 2 watts

Tuning Range

The Model H-651 Chassis has the following tuning range:

530 to 1720 kc or 566 to 174 meters

Power Supply

| Voltage | Frequency | Watts |
|---|---|---|
| 110 to 125 volts | 60 | 50 |
| 150 volts | 60 | 50 |
| 220 to 240 volts | 60 | 50 |
| 110 to 125 or 220 to 240 volts | 60 | 50 |

TUBES Required

| | |
|---|---|
| One 6A8 | 1st detector-oscillator |
| One 6K7 | IF amplifier |
| One 6Q7 | 2nd detector-AVC-1st audio amplifier |
| One 6F6-G | output tube |
| One 5Y3-G | power supply rectifier |

Total 5 tubes

GENERAL SPECIFICATIONS.

Circuit Super-Heterodyne, with Class A output stage. Tuning range as listed below. Continuously variable tone control and automatic volume control.

PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-651
MATERIAL
SCALE
DRAWN BY B.R.
CHECKED BY
APPROVED BY
DATE 10-7-38.
DRWG. NO. 25207

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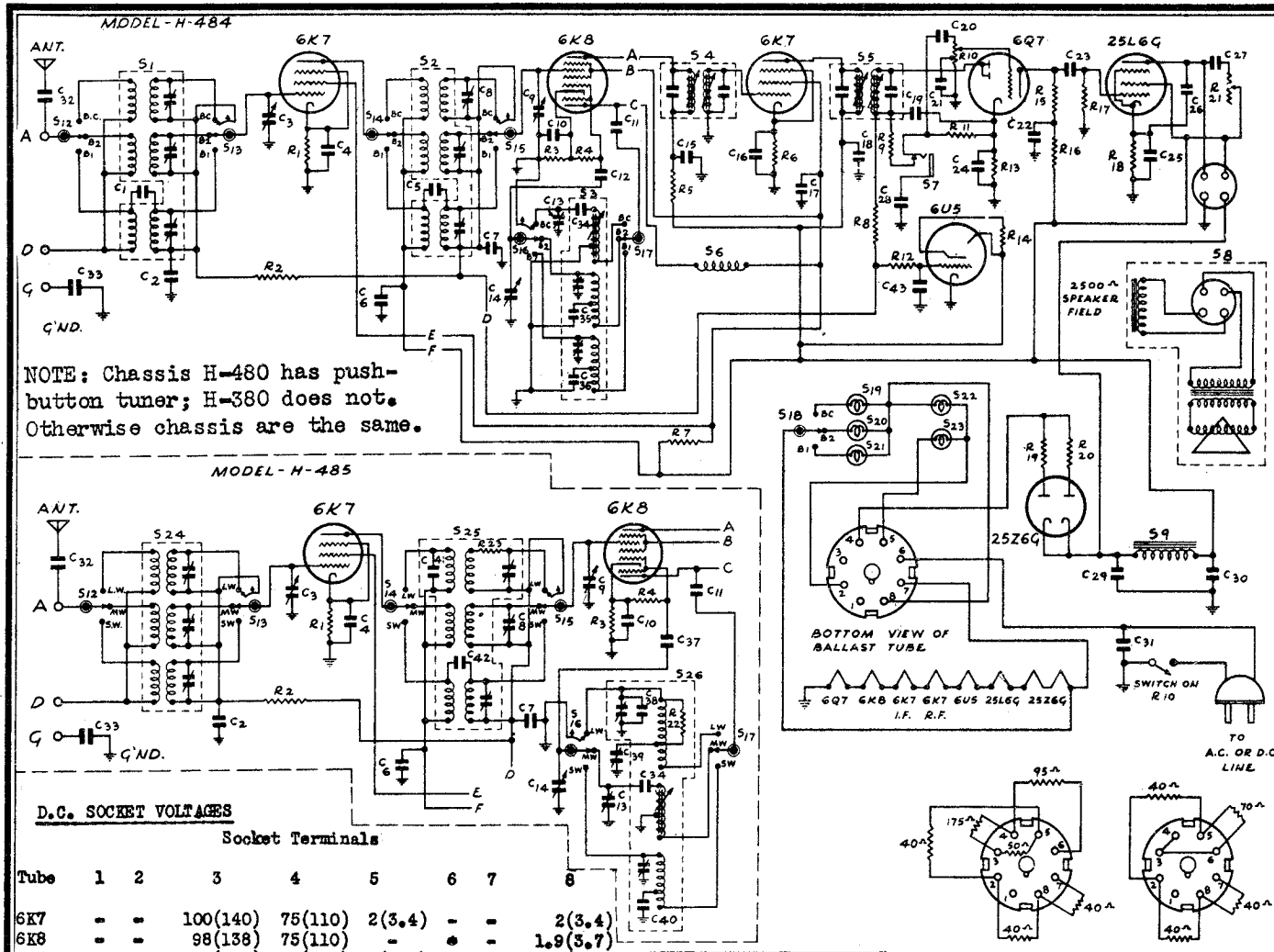
# PILOT RADIO CORP.

## MODELS H-484, H-485
Chassis H-480

## *MODELS H-384, H-385
Chassis H-380

Schematic, Voltage







| CONDENSERS FOR MODEL-H-484 | | |
|---|---|---|
| C1 | 27737-0 | 10 MMFDS. MICA |
| C2, C7 | 22055-I | .05 MFD. 200 V. PAPER |
| C3, C9, C14 | 83542 | 3 GANG CONDENSER |
| C4, C10, C16 | 22055-M | .1 MFD. 200 V. PAPER |
| C5 | 28115 | 15 MMFDS. MICA ±10% |
| C6, C17 | 22055-P | .05 MFD. 400 V. PAPER |
| C8, C13 | 83415 | 20 MMFDS. AIR TRIMMER |
| C11 | 27704 | .002 MFD. MICA |
| C12 | 27723-0 | 50 MMFDS. MICA |
| C15, C23 | 22055-Z | .02 MFD. 400 V. PAPER |
| C18, C22 | 22055-L | .1 MFD. 400 V. PAPER |
| C19 | 27726 | .0002 MFD. MICA |
| C20 | 22055-W | .01 MFD. 400 V. PAPER. |
| C21 | 22055-AY | .001 MFD. 200 V. PAPER |
| C27 | 22055-AB | .1 MFD. 600 V. PAPER |
| C24, C25 | 22481 | 10 MFD. 25 V. ELECTRO. |
| C26 | 22055-A | .01 MFD. 600 V. PAPER |
| C28 | 22055-S | .5 MFD. 200 V. PAPER |
| C29, C30 | 83042 | 30-30 MFD. 300 V. ELECT. |
| C31 | 22055-U | .01 MFD. 1000 V. PAPER |
| C32, C33 | 22055-R | .005 MFD. 1000 V. PAPER |
| C34 | 92000-C | 450 MMFD. SILVER CAP. |
| C35 | 27732 | .0016 MFD. MICA |
| C36 | 28023-W | .0038 MFD. MICA |
| C42 | 22055-T | .01 MFD. 200 V. PAPER |

| CONDENSERS FOR MODEL-H-485 SAME AS FOR MODEL-H-484 EXCEPT FOLLOWING: | | |
|---|---|---|
| C1, C5, C12 | | NOT USED |
| C37 | 28016-0 | 100 MMFDS. MICA |
| C38 | 27736 | 35 MMFDS. MICA |
| C39 | 83514-A | 150 MMFDS. PADDER |
| C40 | 28106 | .00325 MFD. MICA |
| C41 | 27701-0 | .00025 MFD. MICA |
| C42 | 27737-0 | 10 MMFDS. MICA |

| RESISTORS FOR MODEL-H-484 | | |
|---|---|---|
| R1, R6 | 13115 | 400 OHMS 1/4 WATT |
| R2, R16 | 13031 | 100,000 OHMS 1/4 WATT |
| R3 | 13003 | 300 OHMS 1/4 WATT |
| R4, R9 | 13164 | 50,000 OHMS 1/4 WATT |
| R5 | 13028 | 1,000 OHMS 1/4 WATT |
| R7 | 13086 | 2,000 OHMS 1/2 WATT |
| R8 | 13001 | 1 MEGOHM 1/4 WATT |
| R10 | 83529-A | 1 MEGOHM VOL. CONT. & SW. |
| R11 | 13171 | 250,000 OHMS 1/4 WATT |
| R12 | 13007 | 2 MEGOHMS 1/4 WATT |
| R13 | 13030 | 10,000 OHMS 1/4 WATT |
| R14, R17 | 13024 | 500,000 OHMS 1/4 WATT |
| R15 | 13043 | 150,000 OHMS 1/4 WATT |
| R18 | 13235 | 150 OHMS 1 WATT ±5% |
| R19, R20 | 13207 | 100 OHMS 1 WATT |
| R21 | 83447-A | 100,000 OHMS TONE CONT |

| RESISTORS FOR MODEL-H-485 SAME AS FOR MODEL-H-484 EXCEPT FOLLOWING: | | |
|---|---|---|
| R22 | 13148 | 30,000 OHMS 1/4 WATT |
| R23 | 13029 | 250 OHMS 1/4 WATT |

| MISCELLANEOUS FOR MODEL-H-484 | | |
|---|---|---|
| S1 | 73205 | ANTENNA COILS & CAN ASS'Y. |
| S2 | 73207 | R.F. " " " " |
| S3 | 73209 | OSCILLATOR " " " " |
| S4 | 73192-B | 1ST I.F. TRANSFORMER ASS'Y |
| S5 | 73193 | 2ND I.F. " " " |
| S6 | 73088 | R.F. "B" CHOKE ASS'Y. |
| S7 | 70950 | PHONO JACK |
| S8 | 40816 | 8" SPEAKER-2500Ω FIELD |
| | 40817 | 12" SPEAKER-2500Ω FIELD |
| S9 | *9029-A | FILTER CHOKE |
| S10 | 81972 | BALLAST TUBE 220/240 V. |
| S11 | 81973 | BALLAST TUBE 110/125 V. |
| S12 TO S18 | 83438 | BAND SWITCH |
| S19 TO S23 | 71282 | PILOT LIGHTS |

| MISCELLANEOUS FOR MODEL-H-485 SAME AS FOR MODEL-H-484 EXCEPT FOLLOWING: | | |
|---|---|---|
| S1, S2, S3 | | NOT USED |
| S24 | 73204 | ANTENNA COILS & CAN ASS'Y. |
| S25 | 73206 | R.F. " " " " |
| S26 | 73208 | OSCILLATOR " " " " |

D.C. SOCKET VOLTAGES

Socket Terminals

| Tube | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 6K7 | - | - | 100(140) | 75(110) | 2(3.4) | - | - | 2(3.4) |
| 6K8 | - | - | 98(138) | 75(110) | - | * | - | 1.9(3.7) |
| 6K7 | - | - | 100(140) | 75(110) | 2(3.4) | - | - | 2(3.4) |
| 6Q7 | - | - | * | - | - | - | - | 1.05(1.5) |
| 25L6-G | - | - | 98(135) | 100(140) | - | - | - | 6(9) |

Figures in Parenthesis are for 230 volt operation, other figures are for 115 volt operation.

*Cannot be measured.

Power Supply. A.C. or D.C.

| Voltage | Ballast Tubes | Watts |
|---|---|---|
| 110-125 | 81973 | 50 |
| 220-240 | 81972 | 120 |

PILOT RADIO CORP.
LONG ISLAND CITY, N.Y., U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-484 & MODEL-H-485
DATE:- 8-15-38
DRAWN BY:- B.R.
CHECKED BY:-
APPROVED BY:-
No. 25198-

INTERMEDIATE FREQUENCY:- 455 K.C.

ALIGNING FREQUENCIES:

| FOR MODEL-H-484 | FOR MODEL-H-485 |
|---|---|
| B1-23 MEGACYCLES | S.W.-17.6 MEGACYCLES |
| B2-9 " | M.W.-1500 & 600 K.C. |
| B.C.-1500 & 600 K.C. | L.W.-350 & 160 K.C. |

| | | |
|---|---|---|
| 6K7 | R.F. Amplifier | |
| 6K8 | 1st detector-oscillator | |
| 6K7 | IF amplifier | |
| 6Q7 | 2nd detector-AVC-1st Audio amplifier | |
| 25L6-G | Output tube | |
| 25Z6-G | Power supply rectifier | |
| 6U5 | Cathode ray tuning beacon | |

IF Amplifier Alignment. Turn the Band Selector Switch to Band 3 and turn the ROTOR dial to the low frequency end.

Connect the output meter as described under "Connections", and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd. condenser. Then proceed with the alignment as follows:

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

R.F. ALIGNMENT

Band 3 (Model H-485, Long-Wave) Connect the "hot" terminal of the generator to the blue wire and clip through the .0002 mfd. condenser.

Set the generator frequency to 300 kc., and with the Band Selector Switch set to band 3, turn the ROTOR dial to 300 kc. Adjust trimmer #5 for maximum reading of the output meter. Do likewise with trimmer #6 and #7. Then set the generator frequency to 160 kc. and the ROTOR dial to approximately the same. Adjust trimmer #21 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 300 kc. alignment.

Band 2 (Model H-485) Band 3 (Model H-484) (Standard Broadcast)

Connections are the same for the alignment of this band as they are for the Long-Wave Band.

Set the generator frequency to 1500 kc., and the ROTOR dial to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #8 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut). Then without touching any tuning controls adjust trimmers #9 and #10 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc. and accurately set the ROTOR dial to the 600 kc. mark. Then adjust trimmer #11 for maximum reading of the output meter. Do not move the tuning control while making this adjustment. Finally return and repeat the 1500 kc. adjustments and then tighten the lock nut on trimmers #8 and #9.

Band 1 (Model H-485 Short-Wave)

Remove the .0002 mfd. dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency" (SEE MODEL H-151)

Set the generator frequency to 17.6 kc. and also set the ROTOR dial to this frequency. Carefully adjust trimmer #12 for maximum reading of the output meter. Be careful you do not tune in at the image frequency.

Then adjust trimmers #13 and #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #12 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2 (Model H-484 Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator, and the ROTOR Dial to 9 mc. Adjust trimmer #15 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmers #16 and #17 for maximum reading of the output meter, while slightly "rocking" the gang condenser. Readjust trimmer #15 if necessary to correct the calibration.

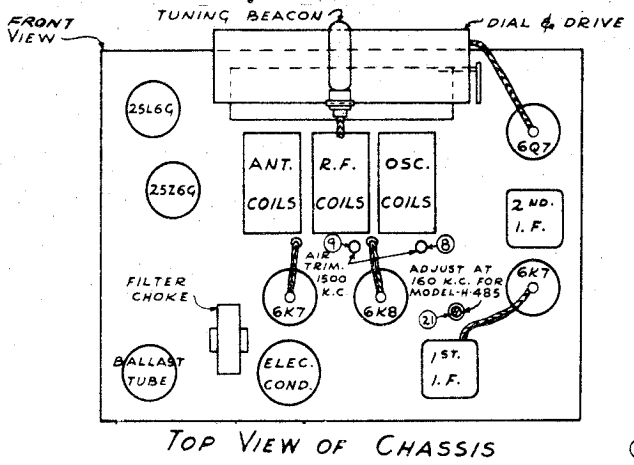
Band 1 (Model H-484 Short-Wave)

Connections and dummy antenna are the same as on Band 1 above

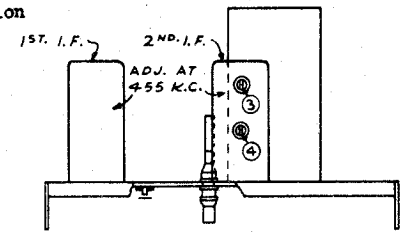
Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 23 mc. and the ROTOR dial to 23 mc. Adjust trimmer #18 to 23 mc. for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmers #19 and #20 while "rocking" the gang condenser, for maximum reading of the output meter. Reset trimmer #18 so that calibration is correct if necessary.

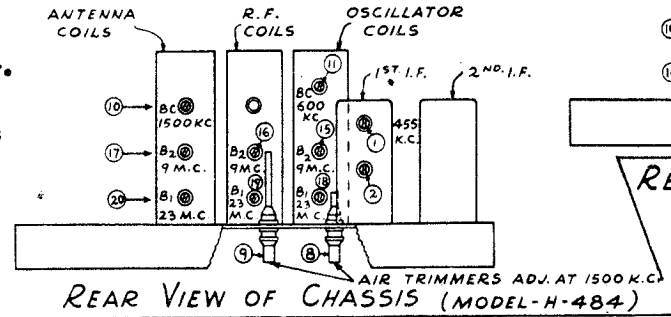
PILOT RADIO CORPORATION
LONG ISLAND CITY, N. Y. U. S. A.
TRIMMER LAYOUT
MATERIAL
SCALE
DRAWN BY B. R.
CHECKED BY
APPROVED BY
DATE 8-17-38
DRWG NO 25199



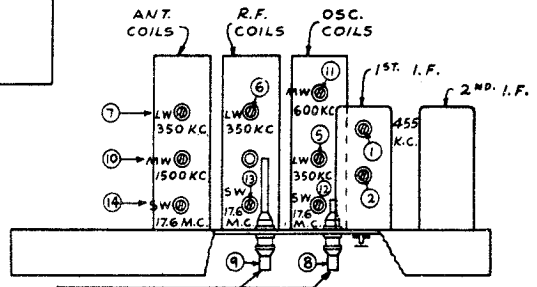

TOP VIEW OF CHASSIS




RIGHT SIDE OF CHASSIS




REAR VIEW OF CHASSIS (MODEL-H-484)




REAR VIEW OF CHASSIS (MODEL-H-485)

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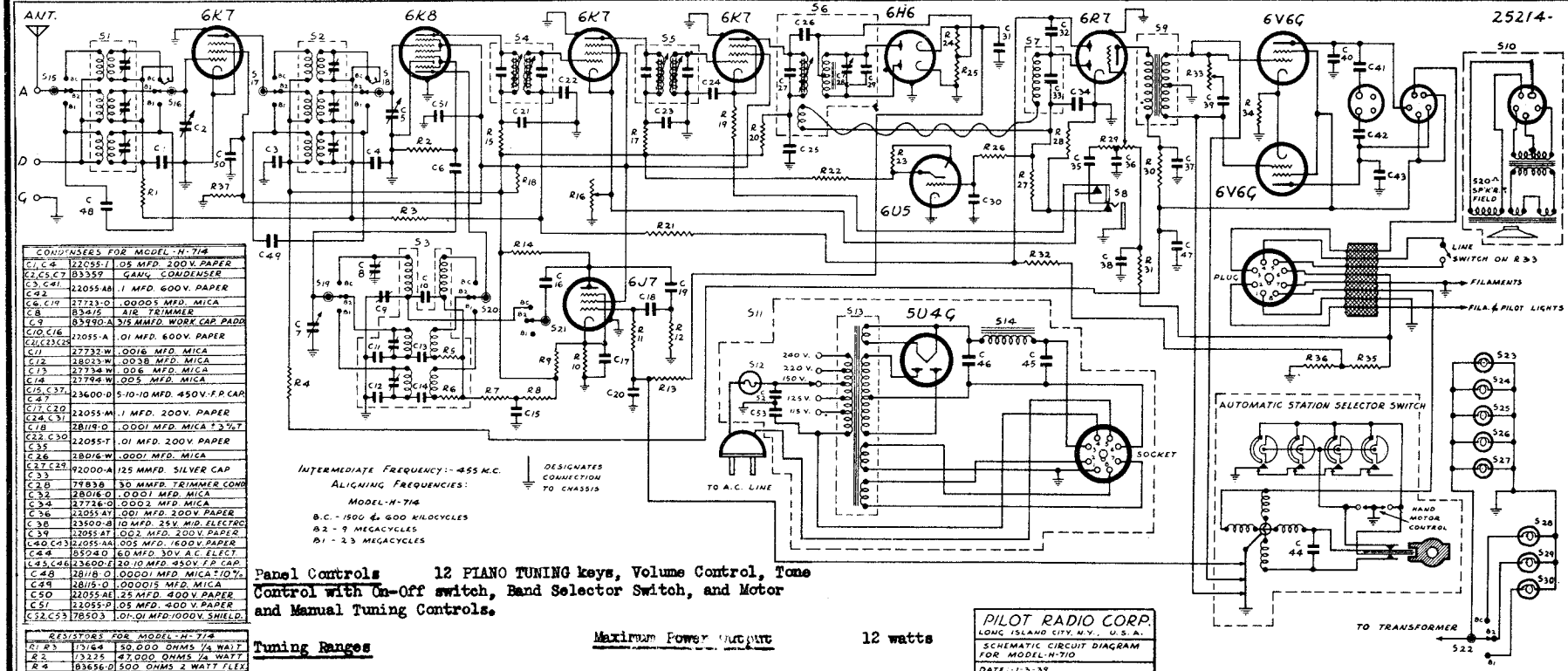



| CONDENSERS FOR MODEL-H-714 | | |
|---|---|---|
| C1, C4 | 22055-I | .05 MFD. 200 V. PAPER |
| C2, C5, C7 | 83359 | GANG CONDENSER |
| C3, C41 | 22055-AB | .1 MFD. 600 V. PAPER |
| C42 | | |
| C6, C19 | 27723-O | .00005 MFD. MICA |
| C8 | 83415 | AIR TRIMMER |
| C9 | 83990-A | 315 MMFD. WORK CAP. PADD |
| C10, C16 | | |
| C21, C23, C25 | 22055-A | .01 MFD. 600 V. PAPER |
| C11 | 27732-W | .0016 MFD. MICA |
| C12 | 28023-W | .0038 MFD. MICA |
| C13 | 27734-W | .006 MFD. MICA |
| C14 | 27794-W | .005 MFD. MICA |
| C15, C37, C47 | 23600-D | 5-10-10 MFD. 450 V.-F.P. CAP. |
| C17, C20 | 22055-M | .1 MFD. 200 V. PAPER |
| C24, C31 | | |
| C18 | 28119-O | .0001 MFD. MICA ± 3% T |
| C22, C30 | 22055-T | .01 MFD. 200 V PAPER |
| C35 | | |
| C26 | 28016-W | .0001 MFD. MICA |
| C27, C29 | 92000-A | 125 MMFD. SILVER CAP |
| C33 | | |
| C28 | 79838 | 30 MMFD. TRIMMER COND |
| C32 | 28016-O | .0001 MFD. MICA |
| C34 | 27726-O | .0002 MFD. MICA |
| C36 | 22055-AY | .001 MFD. 200 V. PAPER |
| C38 | 23500-A | 10 MFD. 25 V. MFD. ELECTRO |
| C39 | 22055-AT | .002 MFD. 200 V. PAPER |
| C40, C43 | 22055-AA | .005 MFD. 1600 V. PAPER |
| C44 | 85040 | 60 MFD. 30 V. A.C. ELECT. |
| C45, C46 | 23600-E | 20-10 MFD. 450 V. F.P. CAP. |
| C48 | 28118-O | .00001 MFD. MICA ± 10% |
| C49 | 28115-O | .000015 MFD. MICA |
| C50 | 22055-AE | .25 MFD. 400 V. PAPER |
| C51 | 22055-P | .05 MFD. 400 V. PAPER |
| C52, C53 | 78503 | .01-.01 MFD/1000 V. SHIELD. |

| RESISTORS FOR MODEL-H-714 | | |
|---|---|---|
| R1, R3 | 13164 | 50,000 OHMS ¼ WATT |
| R2 | 13225 | 47,000 OHMS ¼ WATT |
| R4 | 83656-D | 500 OHMS 2 WATT FLEX. |
| R5, R6, R7 | 13030 | 10,000 OHMS ¼ WATT |
| R8 | 13092 | 30,000 OHMS 1 WATT |
| R9 | 13236 | 50,000 OHMS 2 WATT |
| R10, R12 | 13227 | 620 OHMS ¼ WATT |
| R11, R26 | 13217 | 470,000 OHMS ¼ WATT ±10% |
| R13 | 13223 | 3.3 MEGOHMS ¼ WATT |
| R14 | 13232 | 15,000 OHMS ½ WATT |
| R15, R17 | | |
| R20 | 13028 | 1,000 OHMS ¼ WATT |
| R16 | 83870 | 1500 OHMS SENSITIV. CONT. |
| R19 | 13243 | 1500 OHMS ¼ WATT ±10% |
| R21, R23 | 13001 | 1 MEGOHM ¼ WATT |
| R32 | | |
| R22 | 13200 | 75,000 OHMS ¼ WATT |
| R24, R25 | 13231 | 470,000 OHMS ¼ WATT ±5% |
| R27 | 13051 | 100,000 OHMS ¼ WATT |
| R28 | 13191 | 200,000 OHMS ¼ WATT |
| R29 | 83364 | 1 MEGOHM VOL. CONT. |
| R30 | 13013 | 10,000 OHMS ½ WATT |
| R31 | 13171 | 250,000 OHMS ¼ WATT |
| R33 | 83871 | 750,000 OHMS TONE CONTROL & SWITCH |
| R34 | 83656-E | 190 OHMS 1 WATT FLEX. |
| R35 | 13242 | 40 OHMS 1 WATT ±10% |
| R36 | 13188 | 23 OHMS 1 WATT |
| R37 | 13053 | 10,000 OHMS 1 WATT |
| R18 | 83656-F | 8,000 OHMS 4 WATT FLEX. |

| MISCELLANEOUS FOR MODEL-H-714 | | |
|---|---|---|
| S1 | 73245 | ANTENNA COIL & CAN ASSY. |
| S2 | 73247 | DETECTOR |
| S3 | 73249 | OSCILLATOR |
| S4, S5 | 73166 | I.F. & 2ND TRANSFOR. ASSY. |
| S6 | 73167 | DISCRIMINATOR TRANSFOR. ASSY. |
| S7 | 73168 | AUDIO DET. A.V.C. COUP. COIL ASSY. |
| S8 | 83873 | PHONO JACK |
| S9 | 83877 | PUSH PULL INPUT TRANSFORMER ASSY. |
| S10 | 40865 | 10" SPEAKER 520 Ω FIELD |
| | 40866 | 12" SPEAKER 520 Ω FIELD |
| S11 | 83859 | POWER SUPPLY ASSY. |
| S12 | 70053-E | 3 AMP FUSE |
| S13 | 83890-B | PWR TRANSFO. 50-60 CY. 117 V. |
| | 83891 | PWR TRANSFO. 50-60 CY. UNIV. |
| S14 | 83980 | FILTER CHOKE 100 Ω 3A. |
| S15 TO S22 | 83866 | BAND SWITCH |
| S23 TO S30 | 78889 | DIAL LIGHTS |

**Panel Controls** 12 PIANO TUNING keys, Volume Control, Tone Control with On-Off switch, Band Selector Switch, and Motor and Manual Tuning Controls.

**Tuning Ranges**

| | | | | | |
|---|---|---|---|---|---|
| Band 1 | 25.3 - 8.92 | mc | or | 11.83 - 33.65 | meters |
| Band 2 | 9.88 - 2.97 | mc | or | 30.3 - 100.8 | meters |
| Band 3 | 1730 - 526 | kc | or | 173.4 - 570.3 | meters |

**Maximum Power Output** 12 watts

| PILOT RADIO CORP. LONG ISLAND CITY, N.Y., U.S.A. | |
|---|---|
| SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-710 | |
| DATE:- 1-3-39 | |
| DRAWN BY:- B.B. | |
| CHECKED BY:- G.J. | |
| H-710 SERIES | APPROVED BY: — No. 25214- |

**D.C. SOCKET VOLTAGES**

| Tubes | Socket Terminals 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 6K7 RF | - | - | 240 | 92 | 0 | - | - | 0 |
| 6K8 | - | - | 232 | 92 | 0 | - | - | 0 |
| 6J7 | - | - | 225 | 92 | 4.5 | - | - | 4.5 |
| 6K7 IF | - | - | 230 | 92 | 0 | - | - | 0 |
| 6K7 IF | - | - | 232 | 92 | 5 | - | - | 5 |
| 6H6 | - | - | 0 | 0 | 0 | - | - | 0 |
| 6R7 | - | - | 200 | - | - | - | - | 0 |
| 6V6-G | - | - | 252 | 260 | 0 | - | - | 15 |
| 5U4-G | - | 345 | - | - | - | - | - | 345 |

**Power Supply**

| Voltage | Frequency | Watts |
|---|---|---|
| 117.5 | 60 cycles | 90 |
| 115, 125, 150, 220, 240* | 60 cycles | 90 |

Universal Transformer

* (Not supplied in the United States).

| | |
|---|---|
| 6K7 | R.F. Amplifier |
| 6K8 | 1st Detector-Oscillator |
| 6J7 | Oscillator Frequency Control |
| 6K7 | IF Amplifiers |
| 6H6 | Discriminator |
| 6R7 | 2nd Detector-AVC-1st Audio Amplifier |
| 6V6-G | Output Tubes |
| 5U4-G | Power Supply Rectifier |
| 6U5 | Cathode Ray Tuning Beacon |

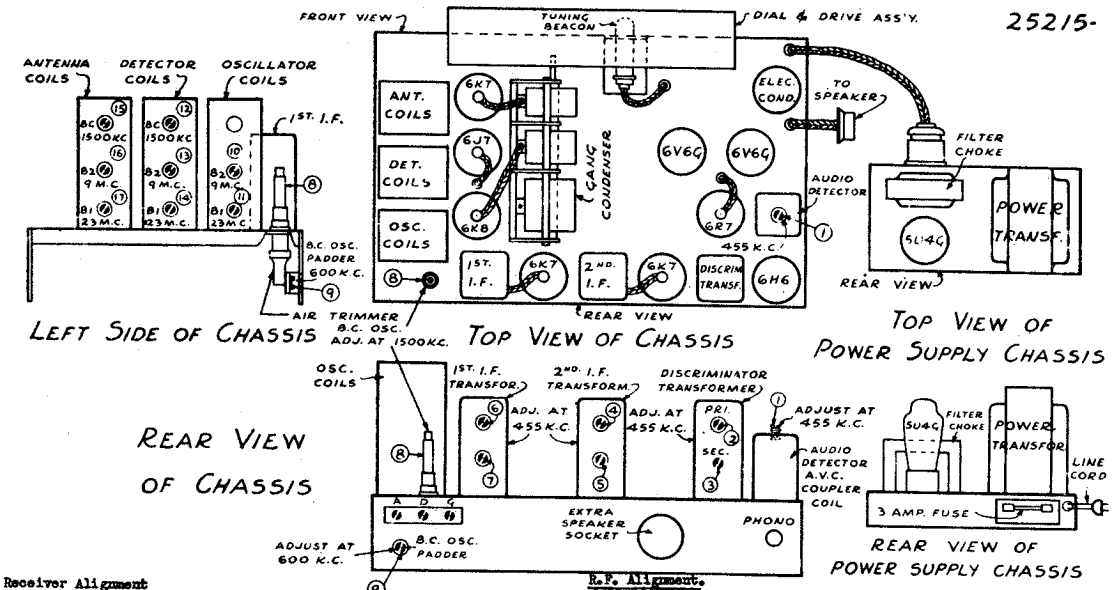
**Circuit** Super-Heterodyne, with push-pull output stage, and with Automatic Frequency Control of the oscillator on the Standard Broadcast Band. An R.F. stage is used on all bands. Iron Core, Permeability Tuned IF and Discriminator Transformers, which use, in addition, Silver-Mica Condensers.

Other features of the Receiver are:-

Continuously variable Tone Control, Tone Compensated Volume Control, Visible Indicators on all controls, Motor operated PIANO TUNING on the Broadcast Band. Manual Tuning is instantly available without extra switching. Motor Tuning, without the keys is also available on all bands. These receivers are supplied with a fuse in the power supply circuit, and a jack is provided for plugging in a high impedance phonograph pick-up. There is also provision for an external speaker.

MODEL H-710
Socket, Trimmers
Alignment

# PILOT RADIO CORP.




Receiver Alignment

1. Signal Generator. One using fundamental frequencies for all the frequencies used in the receiver is preferred.

2. Output meter. Generally a copper-oxide rectifier meter is the most convenient.

3. Dummy Antennas. .1 mfd. condenser
.0002 mfd. mica condenser
400 ohm non-inductive resistor

IF Amplifier Alignment.

Turn the Band Selector Switch to Band 3 and turn the ROTOR dial to the low frequency end.

Connect the output meter as described under "Connections", and connect the "hot" post of the generator to the grid of the 6K8 tube through the .1 mfd. condenser. See that none of the PIANO KEYS is down. Then proceed with the alignment as follows:-

1. Adjust the Signal Generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the screws 1, 2, 4, 5, 6, and 7, (see figure) for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the last IF amplifier tube, and then to the first IF amplifier tube, while aligning the transformers following these tubes. Always finish the alignment with the signal input to the 6K8 tube and, with this connection, readjust all screws in the IF amplifier, except the discriminator trimmer #3.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

If the receiver is placed in a noisy location when the above adjustments are being made, it may be convenient to reduce the sensitivity of the amplifier by means of the sensitivity control.

Discriminator Alignment

CAUTION: The discriminator compensator #3 has been accurately adjusted during manufacture. It will probably never need adjustment, even when tubes are replaced, and for these reasons should never be touched unless there is no doubt about its being out of adjustment, in which case, the following procedure should be followed carefully. The adjustment is quite critical and cannot be done correctly in a hasty manner.

1. Set compensator (3) at the minimum position. This is the setting when the screw slot is vertical and when the red half of the adjusting screw is at the left.

2. Tune the IF amplifier to 455 kc as described under "IF Amplifier Alignment".

3. With the signal generator connected to the grid of the 6K8 tube and with the output of the generator at a low value, note the reading of the output meter. Then very carefully turn compensator (3) until the output meter reading reaches a minimum value. That is the correct setting of this compensator.

It will be necessary to use a screw driver made from some insulating material in making this adjustment. If a metal tool is used, the adjustment will not be correct.

If the adjustment is not correctly made, the oscillator control tube will not function properly. It may even detune the oscillator instead of tuning it.

R.F. Alignment.

Band 3 (Standard Broadcast)

Connect the "hot" terminal of the generator to the post marked "A" on the rear of the chassis through the .0002 mfd. condenser.

Set the generator frequency to 1500 kc., and the ROTOR dial to the same frequency, with the Band Selector Switch set to Band 3. Adjust trimmer #8 for maximum reading of the output meter. (This trimmer is adjusted by drawing the brass rod up or pushing it down with a hooked wire, and with a twisting motion. First loosen the lock nut). Then, without touching the tuning controls, adjust trimmer #12 and trimmer #15 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc., and the ROTOR dial to approximately the same. Adjust trimmer #9 for maximum output reading while "rocking" the gang condenser. Then go back and repeat the 1500 kc. adjustment, and tighten the lock nut on trimmer #8.

Band 2 (Short-Wave) Remove the .0002 mfd. dummy antenna used in aligning Band 3 and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator frequency to 9,000 kc. (9 mc.) and also set the ROTOR dial to this frequency. Carefully adjust the oscillator trimmer #10 for maximum reading of the output meter. Be very careful that this trimmer is not set on the Image Frequency.

After the oscillator is set, trimmers #13 and #16 are adjusted for greatest reading of the output meter, resetting trimmer #10 if necessary to keep the calibration correct.

The adjustments on this band are more critical than the similar ones on the lower frequency bands and must be more carefully made.

The above adjustments, at the high frequency end of the band, are the only ones to be made on this band.

Band 1 (Short-Wave) Connections and dummy antenna are the same as on Band 2.

Set the generator, and the ROTOR dial to 23 mc. Adjust trimmer #11 for maximum reading of the output meter, when the lower frequency peak of the two which can be located coincides with the 23 mc. calibration point on the dial. Then adjust trimmers #14 and #17 while "rocking" the gang condenser, until the maximum reading is obtained on the output meter, resetting trimmer #11 if necessary to keep the calibration correct.

These are the only adjustments on this band.

Image Frequency

All bands in this receiver, except Band 1 must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on Band 3. However, on the two high frequency bands it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, set the dial on Band 2 to that one which comes in at the higher frequency marking on the ROTOR dial. That is, on Band 2 the two frequencies which will be picked up when the generator is set at 9 mc., will be at 9 mc. and at 8 mc. on the ROTOR dial. Adjust the oscillator trimmer so that the 9 mc. frequency one coincides with 9 mc. on the dial. Exactly the reverse is true on Band 1.

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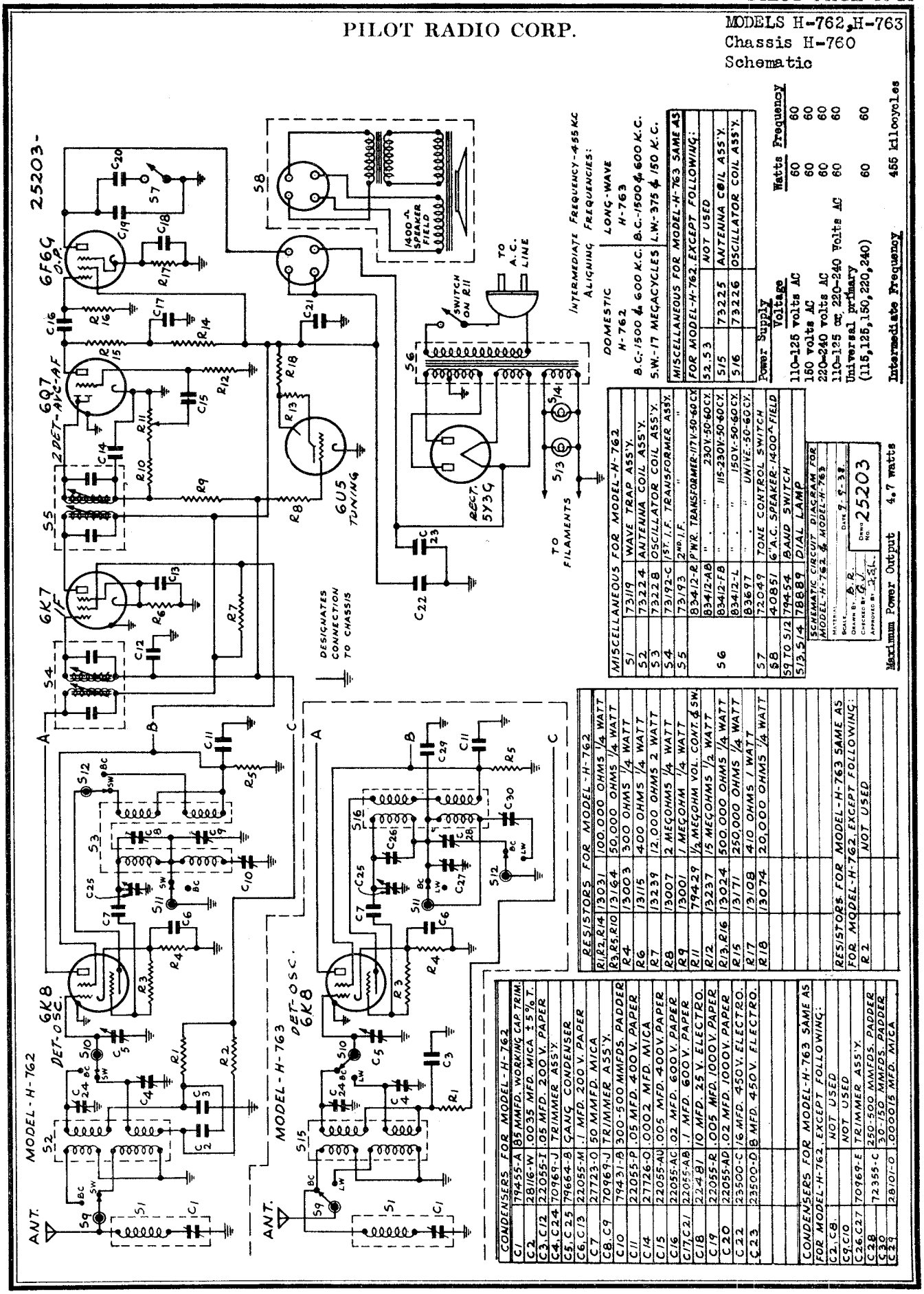
# PILOT RADIO CORP.

MODELS H-762, H-763
Chassis H-760
Schematic




| CONDENSERS FOR MODEL-H-762 | | |
|---|---|---|
| C1 | 79455-A | 85 MMFD. WORKING CAP. TRIM. |
| C2 | 28116-W | .0035 MFD. MICA ± 5% T. |
| C3,C12 | 22055-T | .05 MFD. 200 V. PAPER |
| C4,C24 | 70969-J | TRIMMER ASS'Y. |
| C5,C25 | 79664-B | GANG CONDENSER |
| C6,C13 | 22055-M | .1 MFD. 200 V. PAPER |
| C7 | 27723-0 | 50 MMFD. MICA |
| C8,C9 | 70969-J | TRIMMER ASS'Y. |
| C10 | 79431-B | 300-500 MMFDS. PADDER |
| C11 | 22055-P | .05 MFD. 400 V. PAPER |
| C14 | 27726-0 | .0002 MFD. MICA |
| C15 | 22055-AU | .005 MFD. 400 V. PAPER |
| C16 | 22055-AC | .02 MFD. 600 V. PAPER |
| C17,C21 | 22055-AB | .1 MFD. 600 V. PAPER |
| C18 | 22481 | 10 MFD. 25 V. ELECTRO. |
| C19 | 22055-R | .005 MFD. 1000 V. PAPER |
| C20 | 22055-AD | .02 MFD. 1000 V. PAPER |
| C22 | 23500-C | 16 MFD. 450 V. ELECTRO. |
| C23 | 23500-D | 8 MFD. 450 V. ELECTRO. |

| CONDENSERS FOR MODEL-H-763 SAME AS FOR MODEL-H-762, EXCEPT FOLLOWING: | | |
|---|---|---|
| C2,C8 | | NOT USED |
| C9,C10 | | NOT USED |
| C26,C27 | 70969-E | TRIMMER ASS'Y. |
| C28 | 72355-C | 250-500 MMFDS. PADDER |
| C30 | 28101-0 | 30-150 MMFDS. PADDER |
| C29 | 28101-0 | .000015 MFD. MICA |

| RESISTORS FOR MODEL-H-762 | | |
|---|---|---|
| R1,R2,R14 | 13031 | 100,000 OHMS 1/4 WATT |
| R3,R5,R10 | 13164 | 50,000 OHMS 1/4 WATT |
| R4 | 13003 | 300 OHMS 1/4 WATT |
| R6 | 13115 | 400 OHMS 1/4 WATT |
| R7 | 13239 | 12,000 OHMS 2 WATT |
| R8 | 13007 | 2 MEGOHMS 1/4 WATT |
| R9 | 13001 | 1 MEGOHM 1/4 WATT |
| R11 | 79429 | 1/2 MEGOHM VOL. CONT. & SW. |
| R12 | 13237 | 15 MEGOHMS 1/2 WATT |
| R13,R16 | 13024 | 500,000 OHMS 1/4 WATT |
| R15 | 13171 | 250,000 OHMS 1/4 WATT |
| R17 | 13108 | 410 OHMS 1 WATT |
| R18 | 13074 | 20,000 OHMS 1/4 WATT |

| RESISTORS FOR MODEL-H-763 SAME AS FOR MODEL-H-762, EXCEPT FOLLOWING: | |
|---|---|
| R2 | NOT USED |

| MISCELLANEOUS FOR MODEL-H-762 | | |
|---|---|---|
| S1 | 73119 | WAVE TRAP ASS'Y. |
| S2 | 73224 | ANTENNA COIL ASS'Y. |
| S3 | 73228 | OSCILLATOR COIL ASS'Y. |
| S4 | 73192-C | 1ST I.F. TRANSFORMER ASS'Y. |
| S5 | 73193 | 2ND I.F. " |
| S6 | 83412-AB | 230V-50-60CY. |
| | 83412-FB | 115-230V-50-60CY. |
| | 83412-L | 150V-50-60CY. |
| | 83697 | UNIVE.-50-60CY. |
| S7 | 72049 | TONE CONTROL SWITCH |
| S8 | 40851 | 6" A.C. SPEAKER-1400Δ FIELD |
| S9 TO S12 | 79454 | BAND SWITCH |
| S13,S14 | 78889 | DIAL LAMP |

| MISCELLANEOUS FOR MODEL-H-763 SAME AS FOR MODEL-H-762, EXCEPT FOLLOWING: | | |
|---|---|---|
| S2,S3 | 83412-AB | 230V-50-60CY. |
| | 83412-FB | 115-230V-50-60CY. |
| | 83412-L | 150V-50-60CY. |
| | 83697 | UNIVE.-50-60CY. |
| S4 | 73192-D | 1ST I.F. TRANSFORMER ASS'Y. |
| S5 | 73193 | 2ND I.F. " |
| S6 | 83412-AB | 230V-50-60CY. |
| | 83412-FB | 115-230V-50-60CY. |
| | 83412-L | 150V-50-60CY. |
| | 83697 | UNIVE.-50-60CY. |
| S7 | 72049 | TONE CONTROL SWITCH |
| S8 | 40851 | 6" A.C. SPEAKER-1400Δ FIELD |
| S9 TO S12 | 79454 | BAND SWITCH |
| S13,S14 | 78889 | DIAL LAMP |

| MISCELLANEOUS FOR MODEL-H-763 SAME AS FOR MODEL-H-762 | | |
|---|---|---|
| S2,S3 | 73119 | WAVE TRAP ASS'Y. |
| S4 | 73224 | ANTENNA COIL ASS'Y. |
| S5 | 73228 | OSCILLATOR COIL ASS'Y. |
| S6 | 73192-E | 1ST I.F. TRANSFORMER ASS'Y. |
| | 73193 | 2ND I.F. " |
| | 83412-AB | 230V-50-60CY. |
| | 83412-FB | 115-230V-50-60CY. |
| | 83412-L | 150V-50-60CY. |
| | 83697 | UNIVE.-50-60CY. |
| S7 | 72049 | TONE CONTROL SWITCH |
| S8 | 40851 | 6" A.C. SPEAKER-1400Δ FIELD |
| S9 TO S12 | 79454 | BAND SWITCH |
| S13,S14 | 78889 | DIAL LAMP |

| MISCELLANEOUS FOR MODEL-H-762, EXCEPT FOLLOWING: | | |
|---|---|---|
| S2,S3 | 52,53 | NOT USED |
| S4 | 5/5 | 73225 ANTENNA COIL ASS'Y. |
| S5 | 5/6 | 73226 OSCILLATOR COIL ASS'Y. |

| Power Supply | | Watts | Frequency |
|---|---|---|---|
| Voltage | | | |
| 110-125 volts AC | | 60 | 60 |
| 150 volts AC | | 60 | 60 |
| 220-240 volts AC | | 60 | 60 |
| 110-125 or 220-240 Volts AC Universal primary (115,125,150,220,240) | | 60 | 60 |
| Maximum Power Output | 4.7 watts | Intermediate Frequency | 455 kilocycles |

SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-762 & MODEL-H-763
Material:
Scale:
Drawn By: A. R.
Checked By: G. V.
Approved By: J. A. L.
Date: 7-9-38
Drawing No. 25203

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MODELS H-762,H-763
Chassis H-760

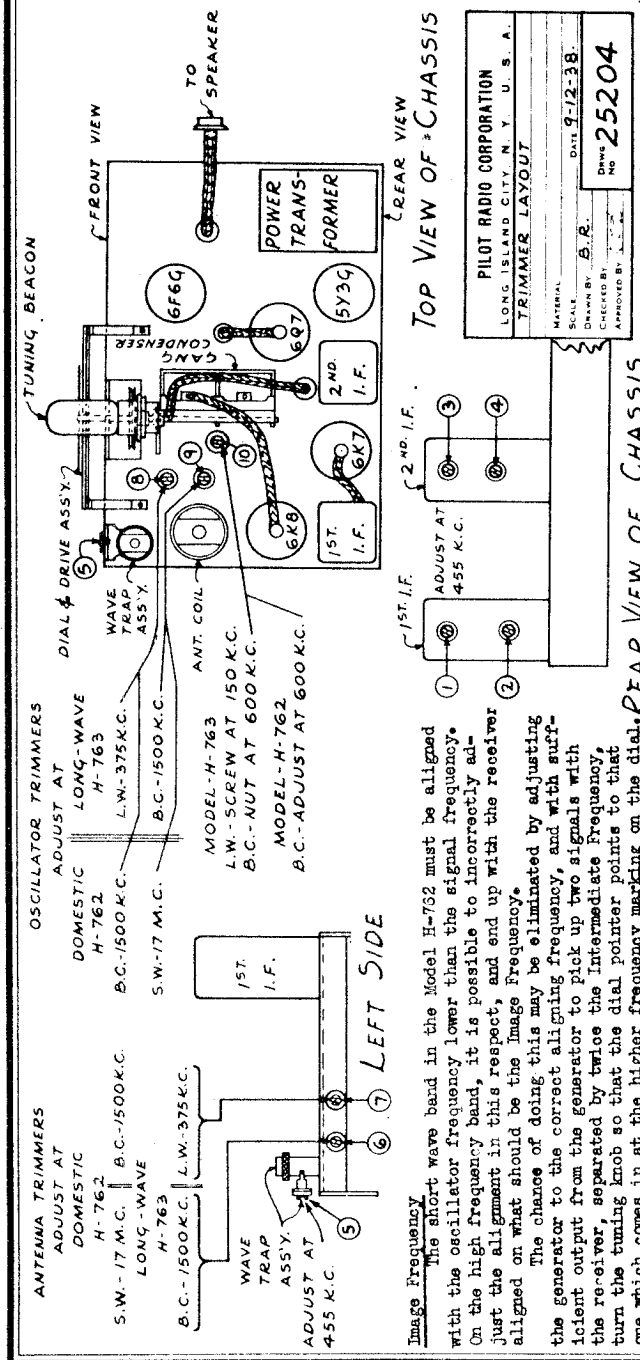
# PILOT RADIO CORP.

Voltage,Socket,Trimmers
Alignment

## D.C. SOCKET VOLTAGES

| Tube | Socket Terminals 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 6K8 | - | - | 240 | 95 | - | 95 | - | 2.8 |
| 6K7 | - | - | 240 | 95 | 3.3 | - | - | 3.3 |
| 6Q7 | - | - | *105 | - | - | - | - | 1.4 |
| 6F6-G | - | - | 225 | 245 | - | - | - | 16. |
| 5Y3-G | - | - | - | - | - | - | 340 | 340 |
| 6U5 | Voltages at the prongs of this tube cannot be measured, however, if the tube is removed from the socket, the voltages on the various terminals may be measured. As all these measured voltages would be measured through a high resistance, except the Cathode which is grounded, none of them are noted here. | | | | | | | |

* Not true value, but as measured with voltmeter.




## IF Amplifier Alignment

Turn the Band Selector Switch to the Broadcast, or Medium Wave Band, and tune the gang condenser to the low frequency end of the dial. That is the condenser plates completely enmeshed.

Connect the output meter as described under "Connections" and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd condenser. Then proceed with the alignment as follows:

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.

2. Adjust the trimmer screws 1, 2, 3, and 4, (see Figure for maximum reading of the output meter. Keep reducing the generator output as the output meter reading increases. When the reading of the output meter cannot be increased by adjusting the four screws of the IF transformers, the IF amplifier is aligned.

If the output of the generator is too great, while aligning the receivers, the alignment will be incorrect. It is very important that this be kept in mind.

It will seldom, if ever, be found necessary to more than touch up the alignment of the IF amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the IF amplifier tube, and then align the last IF amplifier transformer. Always finish the alignment of the IF amplifier with the signal input to the grid of the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

## Wave Trap Alignment

With the Band Selector Switch set on the Broadcast, or Medium Wave, position connect the generator to the blue antenna wire with the .0002 mfd. condenser. Set the generator frequency to 455 kilocycles and adjust trimmer #5 for minimum reading of the output meter. There must always be sufficient output from the signal generator to have a reading on the output meter to make this adjustment.

## R.F. ALIGNMENT

Long Wave Band (Model H-763). Connect the "hot" terminal of the generator to the blue antenna wire through the .0002 mfd. condenser.

Set the generator frequency to 375 kilocycles and with the Band Selector Switch set to the Long Wave Band turn the pointer of the receiver to 375 kilocycles. Adjust trimmer #8 for maximum reading of the output meter. Do likewise with trimmer #7. Then set the generator frequency to 150 kilocycles and the receiver dial pointer to approximately the same frequency. Adjust the screw of trimmer #10 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 375 kilocycle alignment.

Broadcast, or Medium Wave, Band (Models H-763 & H-762)
Connections are the same for the alignment of this band as they are for the Long Wave Band.

Set the generator frequency to 1500 kilocycles, and the receiver dial pointer to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #9 of Model H-763, or trimmer #8 of Model H-762 for maximum reading of the output meter. Also adjust trimmer #6 of Model H-763, or trimmer #7 of Model H-762 for maximum reading of the output meter. Next, set the generator frequency to 600 kilocycles. Then with the receiver dial pointer set at approximately the same frequency, adjust trimmer #10 for maximum reading of the output meter while carefully "rocking" the gang condenser. Finally return and repeat the 1500 kilocycle adjustment.

Short Wave Band (Model H-762)
When aligning this band connect the "hot" terminal of the signal generator to the blue antenna wire of the receiver through the 400 ohm resistor.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 17 mc., and also the receiver to this frequency, as marked on the dial. Carefully adjust trimmer #9 for maximum reading of the output meter. Be careful you do not adjust to the Image Frequency.

Then adjust trimmer #6 for maximum output meter reading, while slightly "rocking" the gang condenser.

Adjust trimmer #9, if necessary, to keep the calibration correct.

**Image Frequency**
The short wave band in the Model H-762 must be aligned with the oscillator frequency lower than the signal frequency. On the high frequency band, it is possible to incorrectly adjust the alignment in this respect, and end up with the receiver aligned on what should be the Image Frequency.

The chance of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, turn the tuning knob so that the dial pointer points to that one which comes in at the higher frequency marking on the dial.

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# PILOT RADIO CORP.

MODELS H-874, H-875
Chassis H-870
MODELS H-974, H-975
Chassis H-970
Schematic, Voltage

| CONDENSERS FOR MODEL H-874 | | |
|---|---|---|
| C1 | 27731-0 | 10 MMFDS. MICA 200 V. PAPER |
| C3, C7 | 22055-I | .05 MFD. 200 V. PAPER |
| C4, C9, C14 | 83542 | 3 GANG CONDENSER |
| C5, C10, C17 | 22055-M | .1 MFD. 200 V. PAPER |
| C6, C8, C16 | 22055-C | .05 MFD. 600 V. PAPER |
| C12 | 28115 | 15 MMFDS. MICA |
| C13 | 83415 | 20 MMFDS. AIR TRIMMER |
| C11 | 27704 | .002 MMFDS. MICA |
| C15 | 27723-0 | 50 MMFDS. MICA |
| C18, C23 | 85038 | 4-8 MFD. 450 V. ELECTRO. |
| C19 | 22055-AC | .02 MFD. 600 V. PAPER |
| C20 | 27726 | .0002 MFD. MICA |
| C21, C24 | 22055-W | .01 MFD. 400 V. PAPER |
| C22 | 22481 | .10 MFD. 25 V. ELECTRO. |
| C25 | 22055-AB | .1 MFD. 600 V. PAPER |
| C26 | 22055-R | .005 MFD. 1000 V. PAPER |
| C27 | 92000-C | 450 MMFD. SILVER CAP |
| C28, C30 | 7045-A | 8-8 MFD. 475 V. ELECTRO. |
| C31, C32 | 78503 | .01-.01-1000 V. PAPER |
| C33 | 27732 | .0016 MFD. MICA |
| C34 | 28023-W | .0038 MFD. MICA |
| C41 | 22055-P | .05 MFD. 400 V. PAPER |
| C42 | 22055-M | .001 MFD. 200 V. PAPER |
| C43 | 22055-T | .01 MFD. 200 V. PAPER |

| CONDENSERS FOR MODEL H-875 SAME AS FOR MODEL H-874 EXCEPT FOLLOWING | | |
|---|---|---|
| CI, C5, C8 | NOT USED | |
| C35 | 27736 | 25 MMFDS. MICA |
| C36 | 83394-B | 150 MMFDS. PADDER |
| C38 | 28106 | .00325 MFD. MICA |
| C39 | 27701-0 | .00025 MFD. MICA |
| C40 | 27737-0 | 10 MMFDS. MICA |
| C37 | 28016-0 | 100 MMFDS. MICA |

| RESISTORS FOR MODEL H-874 | | |
|---|---|---|
| R1, R6, R15 | 13115 | 400 OHMS 1/4 WATT |
| R2, R21 | 13031 | 100,000 OHMS 1/4 WATT |
| R3 | 13003 | 300 OHMS 1/4 WATT |
| R4, R12 | 13164 | 50,000 OHMS 1/4 WATT |
| R5 | 13028 | 1,000 OHMS 1/4 WATT |
| R7 | 13117 | 15,000 OHMS 1/4 WATT |
| R8 | 13234 | 6,000 OHMS 1 WATT |
| R9 | 13233 | 6,000 OHMS 2 WATT |
| R10 | 13068 | 30,000 OHMS 1/4 WATT |
| R11, R16 | 13001 | 1 MEGOHM 1/4 WATT |
| R13 | 13007 | 2 MEGOHMS 1/4 WATT |
| R14 | 13147 | 300,000 OHMS 1/4 WATT |
| R17 | 13199 | 22,000 OHMS 1/4 WATT |
| R18 | 83529-A | 1 MEGOHM VOL. CONT. & SW. |
| R19 | 13171 | 250,000 OHMS 1/4 WATT |
| R20 | 13024 | 500,000 OHMS 1/4 WATT |
| R22, R24 | 13108 | 410 OHMS 1 WATT |
| R23 | 83447-A | 100,000 OHMS TONE CONT. |

| RESISTORS FOR MODEL H-875 SAME AS FOR MODEL H-874 EXCEPT FOLLOWING: | | |
|---|---|---|
| R 25 | 13148 | 30,000 OHMS 1/4 WATT |
| R 26 | 13029 | 250 OHMS 1/4 WATT |

| MISCELLANEOUS FOR MODEL H-874 | | |
|---|---|---|
| MISCELLANEOUS | 73205 | ANTENNA COILS & CAM ASSY. |
| S2 | 73207 | INTERSTAGE " " " |
| S3 | 73209 | OSCILLATOR " " " |
| S4 | 73192-B | 1ST I.F. TRANSFORMER ASSY. |
| S5 | 73193 | 2ND I.F. " " " |
| S6 | 70950 | PHONO JACK |
| S7 | 40849 | 8' A.C. SPEAKER-1400~ FIELD |
| | 40784 | 12' A.C. SPEAKER-1400~ FIELD |
| S8 | 83605 | P.W.R. TRANSF. UNIV. |
| | 83606-R | P.W.R. TRANSF.-117V.-60 CY. |
| | 83607-AB | P.W.R. TRANSF.-230V.-25 CY. |
| S9 | 71031-B | FILTER CHOKE |
| S10 | 72053-2 | 1/4 AMP. FUSE |
| S11 TO S17 | 83438 | BAND SWITCH |
| S18 TO S22 | 78889 | PILOT LIGHTS |

| MISCELLANEOUS FOR MODEL H-875 SAME AS FOR MODEL H-874 EXCEPT FOLLOWING: | | |
|---|---|---|
| S1, S2, S3 | 73204 | ANTENNA COILS & CAM ASSY. |
| S23 | 73206 | INTERSTAGE " " " |
| S24 | 73208 | OSCILLATOR " " " |
| S25 | 73188 | " " " |

**Tuning Ranges**

The model H-874 chassis has the following tuning ranges:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band 1. | 25.55 | to | 8.86 mc | or | 11.75 | to | 33.8 meters |
| Band 2. | 9.95 | to | 2.96 mc | or | 30.13 | to | 101.3 meters |
| Band 3. | 1725 | to | 520 kc. | or | 174 | to | 576 meters |

The model H-875 chassis has the following tuning ranges:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Band 1. | 18.85 | to | 5.5 mc | or | 15.9 | to | 54.5 meters |
| Band 2. | 1725 | to | 520 kc | or | 174 | to | 576 meters |
| Band 3. | 375 | to | 140 kc | or | 800 | to | 2142 meters |

ALIGNING FREQUENCIES:
FOR MODEL-H-874
B1 - 23 MEGACYCLES.
B2 - 9
B3 - 1500 & 600 K.C.
FOR MODEL H-875
S.W. - 17.6 MEGACYCLES.
M.W. - 1500 & 600 K.C.
L.W. - 350 & 150 K.C.

INTERMEDIATE FREQUENCY :- 455 K.C.

Maximum Power Output 5.8 watts

H-870-SERIES

SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-874 & MODEL-H-875
DATE:-7-5-38
DRAWN BY:-B.B.
CHECKED BY:-G.JACOBS
APPROVED BY:- [illegible] W9-25/92-3

① C42. WAS .002 MFD. 200 V. PAPER 8-8-38.
② REVISED. B.B. - 8-16-38. ADDED .01 MFD. 200 V. PAPER

NOTE: Chassis H-870 has push-button tuner; H-970 does not. Otherwise chassis are the same.

Power Supply

| Voltage | Frequency | Watts |
|---|---|---|
| 117.5 | 50-60 | 65 |
| 115, 125, 150, 220, 240* | 50-60 | 65 |

* Universal primary Power Transformer

SOCKET TERMINALS

| Tube | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | |
|---|---|---|---|---|---|---|---|---|---|
| 6K7 | - | - | 250 | 95 | 3.18 | - | - | | 3.18 |
| 6K8 | - | - | 247 | 95 | 5* | 82 | - | | 3.2 |
| 6K7 | - | - | 248 | 95 | 2.83 | - | - | | 2.8 |
| 6Q7 | - | - | 97* | - | - | - | - | | 2.8 |
| 6F6-G | - | - | 240 | 260 | - | - | - | | 17.0 |
| 5Y3-G | - | 395 | - | - | - | - | - | | 395 |

* measurement made on 1000 volt scale.

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MODELS H-874,H-875
Chassis H-870

# PILOT RADIO CORP.

MODELS H-974,H-975
Chassis H-970
Alignment Procedure

PILOT RECEIVERS OF THE H-870 SERIES

SERVICE DATA

Removal of the chassis from the cabinet, when necessary, is done as follows:-

1. Remove the power supply cord from the supply outlet.
2. Remove the knobs and felt washers from all shafts on the front of the cabinet. These knobs, except the "locking" knob, are of the "push-on" type.
3. Remove the speaker cord from the socket on the speaker.
4. Remove the four mounting screws located under the cabinet, and carefully slide the chassis out of the cabinet.

Receiver Alignment — Equipment Required.

1. Signal Generator. One using fundamental frequencies for all the frequencies used in the receiver is preferred.
2. Output Meter. Generally a copper-oxide rectifier meter is the most convenient.
3. Dummy Antennas. .1 mfd. condenser
   .0002 mfd. mica condenser
   400 ohm, non-inductive resistor

Alignment Connections

The posts marked D and G on the rear of the chassis should be connected to the ground side of the signal generator.

Connect the "hot" post of the signal generator through the .1 mfd condenser to the grid of the 6K8 detector-oscillator tube or the 6K7 I.F. amplifier tubes when aligning the I.F. amplifier.

Connect the "hot" post of the signal generator through the 200 mmf condenser to the post marked A on the rear of the chassis when aligning the Long-Wave and Broadcast Bands. Use the same connections for both short-wave bands, but replace the 200 mmf condenser with the 400 ohm non-inductive resistor.

In all measurements connect the output meter, through .1 mfd 600 volt condensers, to the plate and screen terminals of the 6F6-G tube.

Procedure — The volume and tone controls should all be turned to the extreme clockwise positions, before starting.

The location of all trimmers is shown in the accompanying figure. Always keep the output from the signal generator at the lowest value which will give a readable deflection on the output meter.

I.F. Amplifier Alignment — Turn the Band Selector Switch to Band 3 and turn the ROTOR-DIAL to the low frequency end.

Connect the output meter as described under "Connections" and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd condenser. Then proceed with the alignment as follows:-

1. Adjust the signal generator frequency to 455 kilocycles, and adjust the generator output to the lowest value which will give a readable signal on the output meter.
2. Adjust the screws 1, 2, 3, and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the I.F. amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the I.F. amplifier tube, and align the last I.F. transformer. Always finish the alignment with the signal input to the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

R.F. ALIGNMENT

Band 3. (model 875, Long-Wave) — Connect the "hot" terminal of the generator to the blue wire and clip, through the .0002 mfd condenser.

Set the generator frequency to 350 kc., and with the Band Selector Switch set to Band 3 turn the ROTOR-DIAL to 350 kc. Adjust trimmer #5 for maximum reading of the output meter. Do likewise with trimmer #6 and #7. Then set the generator frequency to 160 kc and the ROTOR-DIAL to approximately the same. Adjust trimmer #21 for maximum reading of the output meter, while "rocking" the gang condenser carefully back and forth. Then go back and repeat the 350 kc. alignment.

Band 2. (Model 875) Band 3. (Model 874) (Standard Broadcast)

Connections are the same for the alignment of this band as they are for the Long-Wave Band.

Set the generator frequency to 1500 kc., and the ROTOR-DIAL to the same frequency, with the Band Selector Switch set appropriately. Adjust trimmer #8 for maximum reading of the output meter. (This trimmer is adjusted by moving the brass rod in or out, with a hooked wire, and with a twisting motion. First loosen the lock nut.) Then without touching any tuning controls adjust trimmers #9 and #10 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc. and set the ROTOR-DIAL to the 600 kc. mark. Then adjust trimmer #11 for maximum reading of the output meter, while "rocking" the gang condenser. Finally return and repeat the 1500 kc. adjustments and then tighten the lock nut on trimmers #8 and #9.

Band 1. (Model 875 Short-Wave)

Remove the .0002 mfd dummy antenna used in aligning the lower frequency bands and substitute the 400 ohm resistor.

Before aligning this band refer to the paragraph head "Image Frequency".

Set the generator frequency to 17.6 mc and also set the ROTOR-DIAL to this frequency. Carefully adjust trimmer #12 for maximum reading of the output meter. Be careful you do not tune in at the image frequency.

Then adjust trimmers #13 and #14 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #12 if necessary to keep the calibration correct. These are the only adjustments on this band.

Band 2. (Model 874 Short-Wave)

Connections and dummy antenna same as on Band 1 above.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator, and the ROTOR-DIAL to 9 mc. Adjust trimmer #15 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmers #16 and #17 for maximum reading of the output meter, while slightly "rocking" the gang condenser. Readjust trimmer #15 if necessary to correct the calibration.

Band 1. Alignment (Model 874 Short-Wave)

Connections and dummy antenna are the same as on Band 2 of Model 874.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 23 mc and the ROTOR-DIAL to 23 mc. Adjust trimmer #18 to 23 mc for maximum reading of the output meter. Be careful that the receiver is not adjusted to the Image Frequency. Then adjust trimmers #19 and #20 while "rocking" the gang condenser, for maximum reading of the output meter. Reset trimmer #18 so that calibration is correct if necessary.

Image Frequency

All bands in these two models must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Long-Wave and Broadcast Bands. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency, and with sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, set the ROTOR-DIAL to that one which comes in at the higher frequency marking on the ROTOR-DIAL.

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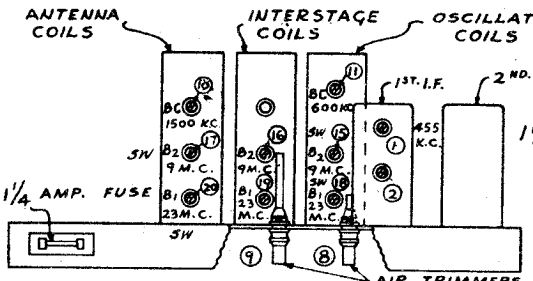
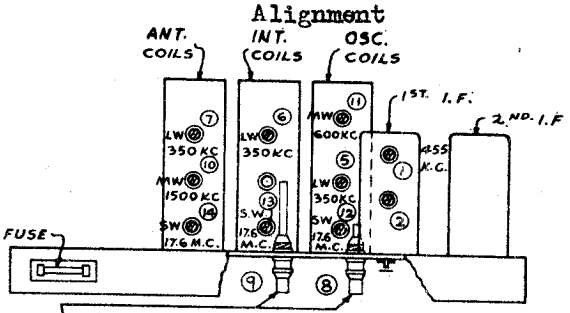
MODELS H-874, H-875
Chassis H-870
MODELS H-974, H-975
Chassis H-970
Socket, Trimmers

# PILOT RADIO CORP.

MODEL T-1252
Schematic, Socket, Trimmers
Alignment

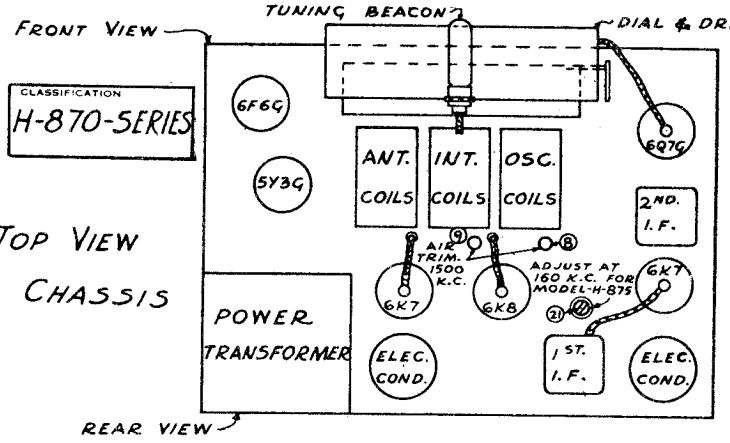



REAR VIEW OF CHASSIS
(MODEL-H-874)

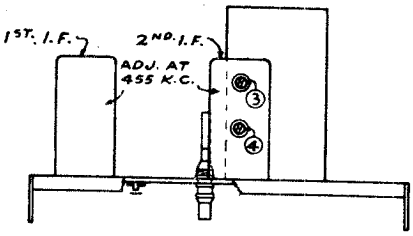



REAR VIEW OF CHASSIS
(MODEL-H-875)

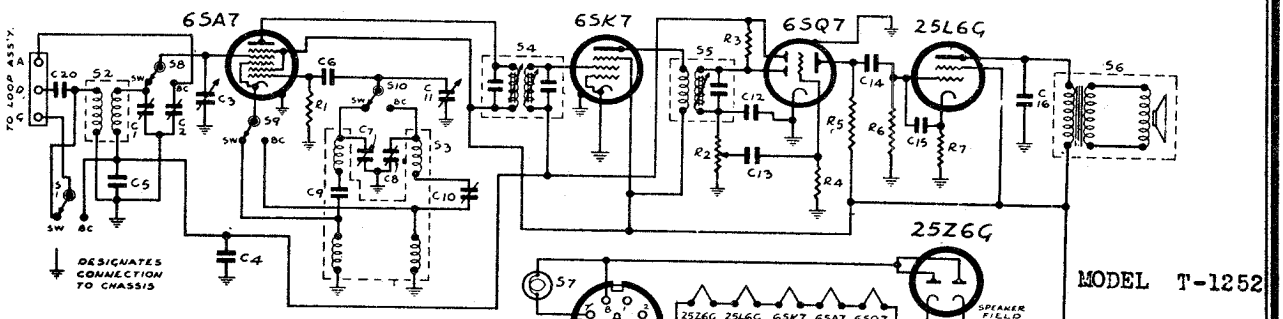
TRIMMER LAYOUT
Material
Scale
Drawn By B.R.
Checked By GJ
Approved By
Date 7-5-38
Drwg No 25193




TOP VIEW OF CHASSIS




RIGHT SIDE OF CHASSIS

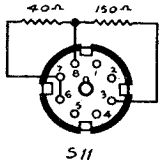


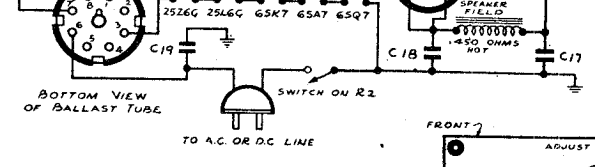

MODEL T-1252

| CONDENSERS FOR MODEL-T-1252 | | |
|---|---|---|
| C1,C2 | 70969-E | TRIMMER ASS'Y. |
| C7,C8 | | |
| C3,C11 | 84037 | GANG CONDENSER |
| C4 | 22055-L | .1 MFD. 400V. PAPER |
| C5 | 22055-T | .01 MFD. 200V. PAPER |
| C6 | 28016-0 | .0001 MFD. MICA |
| C9 | 27794-W | 5000 MMFD. MICA |
| C10 | 79431-B | 385 MMFD. PADDER |
| C12,C15 | 27701-0 | .00025 MFD. MICA |
| C13 | 22055-AU | .005 MFD. 400V. PAPER |
| C14,C16 | 22055-W | .01 MFD. 400V. PAPER |
| C17,C18 | 23500-E | 30 MFD. 300V. MIDGET ELEC. |
| C19 | 22055-AC | .02 MFD. 600V. PAPER |
| C20 | 22055-W | .01 MFD. 400V. PAPER |

| MISCELLANEOUS FOR MODEL-T-1252 | | |
|---|---|---|
| S1 | 84060 | BAND SWITCH |
| S2 | 73263 | S.W. ANTENNA COIL ASS'Y. |
| S3 | 73262 | B.C. & S.W. OSCILLATOR COIL ASS'Y. |
| S4 | 73192-D | 1ST I.F. TRANSFORMER ASS'Y. |
| S5 | 73267 | 2ND I.F. " " |
| S6 | 40869 | 5" SPEAKER |
| S7 | 71282 | PILOT LIGHT |
| S8,S9,S10 | 84060 | BAND SWITCH |
| S11 | 81985 | BALLAST TUBE "0/120V" |

| RESISTORS FOR MODEL-T-1252 | | |
|---|---|---|
| R1 | 13074 | 20,000 OHMS ¼ WATT |
| R2 | 79429-B | 500,000 OHMS VOL CONT. &SW |
| R3,R4 | 13007 | 2 MEGOHMS ¼ WATT |
| R5 | 13147 | 300,000 OHMS ½ WATT |
| R6 | 13024 | 500,000 OHMS ½ WATT |
| R7 | 13018 | 150 OHMS ¼ WATT |

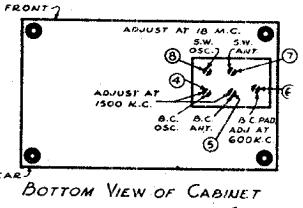


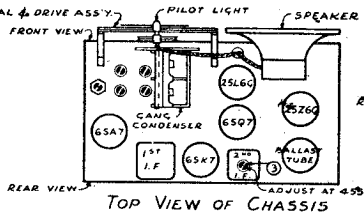

PILOT RADIO CORPORATION
LONG ISLAND CITY, N.Y. U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-T-1252
Dwg. No. 25219-

CONVENTIONAL ALIGNMENT
SEE INDEX

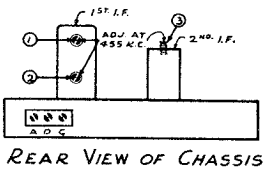
INTERMEDIATE FREQUENCY:-455 K.C.
ALIGNING FREQUENCIES:
B.C. - 1500 & 600 KILOCYCLES.
S.W. - {ALIGN AT 18 MEGACYCLES. CHECK AT 6 "



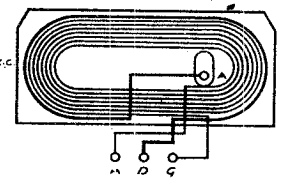

BOTTOM VIEW OF CABINET




TOP VIEW OF CHASSIS




REAR VIEW OF CHASSIS




CABINET BACK & ANTENNA LOOP ASS'Y.

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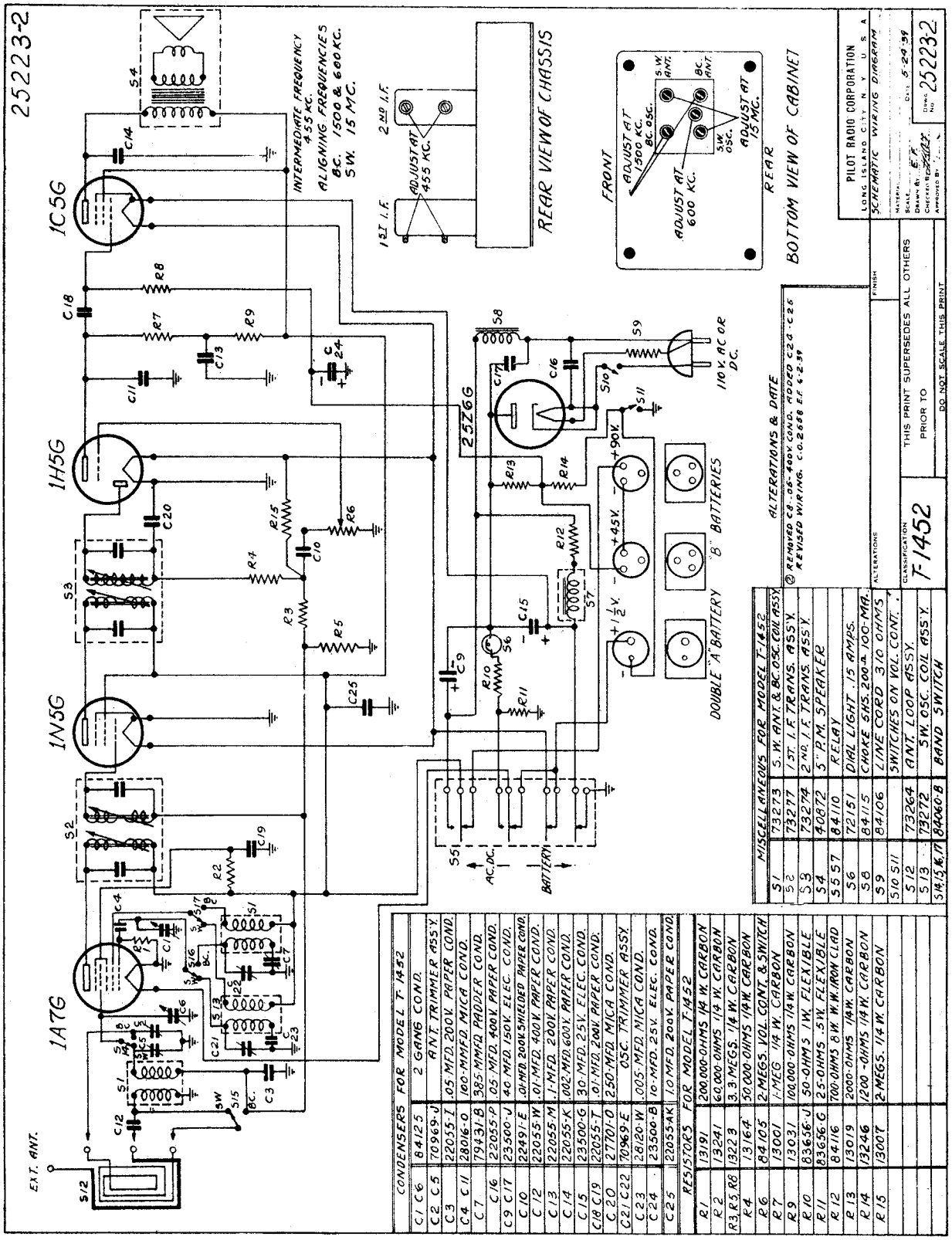
MODEL T-1452
Schematic, Trimmers
Alignment, Changes

# PILOT RADIO CORP.




| CONDENSERS FOR MODEL T-1452 | | |
|---|---|---|
| C1 C6 | 84125 | 2 GANG COND. |
| C2 C5 | 70969-J | ANT. TRIMMER ASS'Y. |
| C3 | 22035-T | .05 MFD. 200 V. PAPER COND. |
| C4 C11 | 28016-0 | 100-MMFD. MICA COND. |
| C7 | 79431-B | 385-MMFD. PADDER COND. |
| C16 | 22055-P | .05 MFD. 400 V. PAPER COND. |
| C9 C17 | 23500-J | 40 MFD. 150 V. ELEC. COND. |
| C10 | 22491-E | .04 MFD. 200 V. SHIELDED PAPER COND. |
| C12 | 22055-W | .01 MFD. 400 V. PAPER COND. |
| C13 | 22055-M | 1 MFD. 200 V. PAPER COND. |
| C14 | 22055-K | .002 MFD. 600 V. PAPER COND. |
| C15 | 23500-G | 30 MFD. 25 V. ELEC. COND. |
| C18 C19 | 22055-T | .01 MFD. 200 V. PAPER COND. |
| C20 | 27701-0 | 250 MFD. MICA COND. |
| C21 C22 | 70969-E | OSC. TRIMMER ASSY. |
| C23 | 28120-W | .005 MFD. MICA COND. |
| C24 | 23500-B | 10 MFD. 25 V. ELEC. COND. |
| C25 | 22055-AK | 1.0 MFD. 200 V. PAPER COND. |

| RESISTORS FOR MODEL T-1452 | | |
|---|---|---|
| R1 | 13191 | 200,000 OHMS 1/4 W. CARBON |
| R2 | 13241 | 60,000 OHMS 1/4 W. CARBON |
| R3 R5 R8 | 13223 | 3.3 MEGS. 1/4 W. CARBON |
| R4 | 13164 | 50,000 OHMS 1/4 W. CARBON |
| R6 | 84105 | 2 MEGS. VOL. CONT. & SWITCH |
| R7 | 13001 | 1 MEG 1/4 W. CARBON |
| R9 | 13031 | 100,000 OHMS 1/4 W. CARBON |
| R10 | 83636-J | 50 OHMS 1 W. FLEXIBLE |
| R11 | 83636-G | 25 OHMS .5 W. FLEXIBLE |
| R12 | 84116 | 700 OHMS 6 W. W.W. IRON CLAD |
| R13 | 13019 | 2000 OHMS 1/4 W. CARBON |
| R14 | 13246 | 1200 OHMS 1/4 W. CARBON |
| R15 | 1300T | 2 MEGS. 1/4 W. CARBON |

| MISCELLANEOUS FOR MODEL T-1452 | | |
|---|---|---|
| S1 | 73273 | S. W. ANT. & BC. OSC. COIL ASS'Y. |
| S2 | 73277 | 1ST. I.F. TRANS. ASS'Y. |
| S3 | 73274 | 2ND. I.F. TRANS. ASS'Y. |
| S4 | 40472 | 5" P.M. SPEAKER |
| S5 S7 | 84110 | RELAY |
| S6 | 72151 | DIAL LIGHT .15 AMPS. |
| S8 | 84115 | CHOKE 5H.S. 200 A. 100 MA. |
| S9 | 84106 | LINE CORD 310 OHMS |
| S10 S11 | | SWITCHES ON VOL. CONT. |
| S12 | 73264 | ANT. LOOP ASS'Y. |
| S13 | 73272 | SW. OSC. COIL ASS'Y. |
| S14, S15, S16 | 84060-B | BAND SWITCH |

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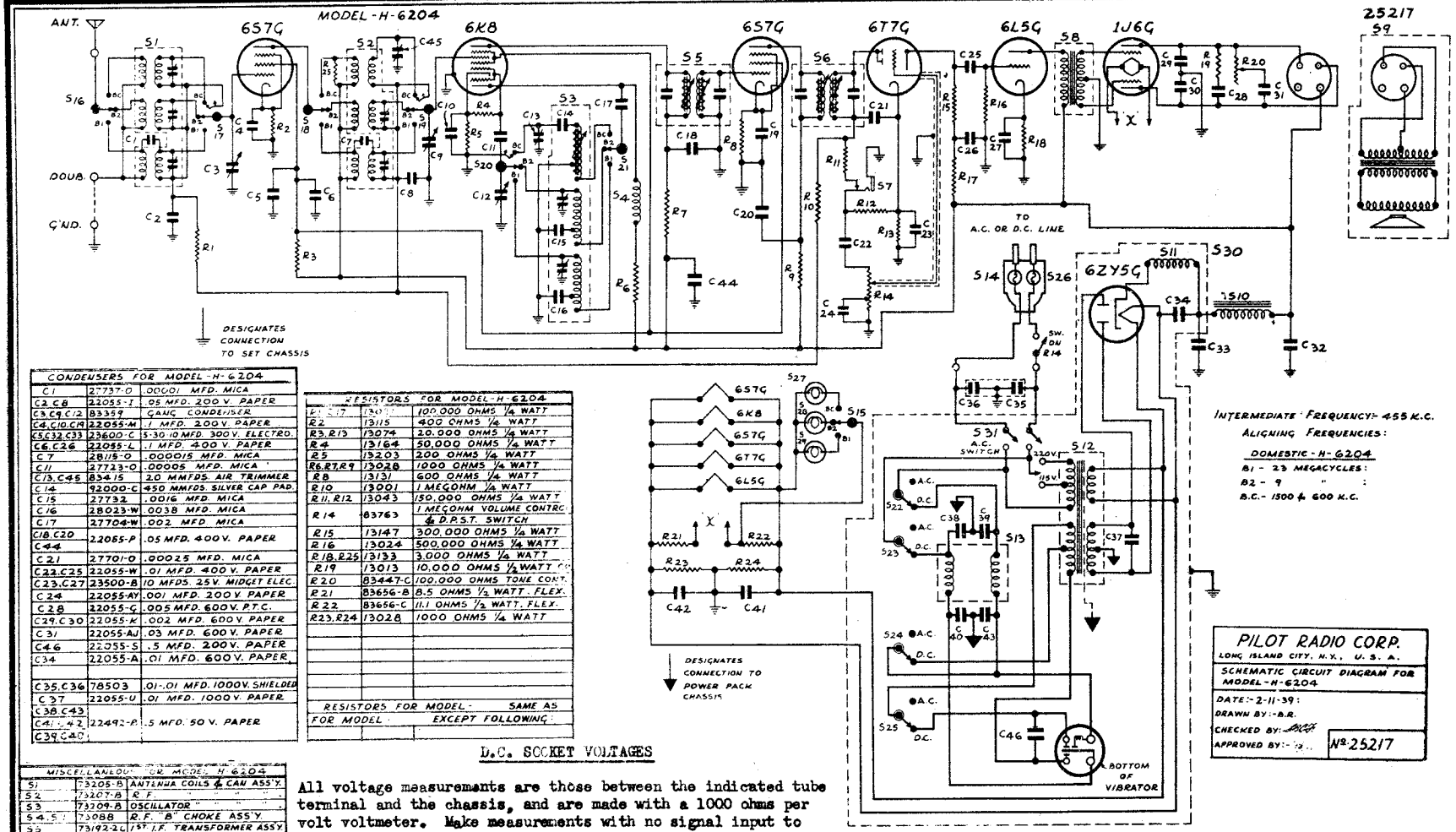
# PILOT RADIO CORP.

MODEL H-6204
Chassis H-6200
Schematic, Voltage




INTERMEDIATE FREQUENCY- 455 K.C.

ALIGNING FREQUENCIES:

DOMESTIC - H-6204

B1 - 23 MEGACYCLES:
B2 - 9 " :
B.C.- 1500 & 600 K.C.

| CONDENSERS FOR MODEL -H-6204 | | |
|---|---|---|
| C1 | 27737-O | .00001 MFD. MICA |
| C2.C8 | 22055-T | .05 MFD. 200 V. PAPER |
| C3.C9.C12 | 83359 | GANG CONDENSER |
| C4.C10.C14 | 22055-M | .1 MFD. 200 V. PAPER |
| C5.C32.C33 | 23600-C | 5-30-10 MFD. 300 V. ELECTRO. |
| C6.C26 | 22055-L | .1 MFD. 400 V. PAPER |
| C7 | 28115-O | .000015 MFD. MICA |
| C11 | 27723-O | .00005 MFD. MICA |
| C13.C45 | 83415 | 20 MMFDS. AIR TRIMMER |
| C14 | 92000-C | 450 MMFDS. SILVER CAP PAD. |
| C15 | 27732 | .0016 MFD. MICA |
| C16 | 28023-W | .0038 MFD. MICA |
| C17 | 27704-W | .002 MFD. MICA |
| C18.C20 C44 | 22055-P | .05 MFD. 400 V. PAPER |
| C21 | 27701-O | .00025 MFD. MICA |
| C22.C25 | 22055-W | .01 MFD. 400 V. PAPER |
| C23.C27 | 23500-B | 10 MFDS. 25 V. MIDGET ELEC. |
| C24 | 22055-AY | .001 MFD. 200 V. PAPER |
| C28 | 22055-G | .005 MFD. 600 V. P.T.C. |
| C29.C30 | 22055-K | .002 MFD. 600 V. PAPER |
| C31 | 22055-AJ | .03 MFD. 600 V. PAPER |
| C46 | 22055-S | .5 MFD. 200 V. PAPER |
| C34 | 22055-A | .01 MFD. 600 V. PAPER |
| C35.C36 | 78503 | .01-.01 MFD. 1000 V. SHIELDED |
| C37 | 22055-U | .01 MFD. 1000 V. PAPER |
| C38.C43 | | |
| C41.C42 | 22492-P | .5 MFD. 50 V. PAPER |
| C39.C40 | | |

| RESISTORS FOR MODEL -H-6204 | | |
|---|---|---|
| R1.R17 | 13401 | 100,000 OHMS 1/4 WATT |
| R2 | 13115 | 400 OHMS 1/4 WATT |
| R3.R13 | 13074 | 20,000 OHMS 1/4 WATT |
| R4 | 13164 | 50,000 OHMS 1/4 WATT |
| R5 | 13203 | 200 OHMS 1/4 WATT |
| R6.R7.R9 | 13028 | 1000 OHMS 1/4 WATT |
| R8 | 13131 | 600 OHMS 1/4 WATT |
| R10 | 13001 | 1 MEGOHM 1/4 WATT |
| R11.R12 | 13043 | 150,000 OHMS 1/4 WATT |
| R14 | 83763 | 1 MEGOHM VOLUME CONTRO. & D.P.S.T. SWITCH |
| R15 | 13147 | 300,000 OHMS 1/4 WATT |
| R16 | 13024 | 500,000 OHMS 1/4 WATT |
| R18.R25 | 13133 | 3,000 OHMS 1/4 WATT |
| R19 | 13013 | 10,000 OHMS 1/2 WATT C. |
| R20 | 83447-C | 100,000 OHMS TONE CONT. |
| R21 | 83656-B | 8.5 OHMS 1/2 WATT. FLEX. |
| R22 | 83656-C | 11.1 OHMS 1/2 WATT. FLEX. |
| R23.R24 | 13028 | 1000 OHMS 1/4 WATT |
| RESISTORS FOR MODEL - FOR MODEL - | | SAME AS EXCEPT FOLLOWING: |

| MISCELLANEOUS FOR MODEL H-6204 | | |
|---|---|---|
| S1 | 73205-B | ANTENNA COILS & CAN ASS'Y. |
| S2 | 73207-B | R.F. " " " |
| S3 | 73209-B | OSCILLATOR " " " |
| S4.S5 | 73088 | R.F. "B" CHOKE ASS'Y |
| S5 | 73192-2L | 1ST I.F. TRANSFORMER ASSY |
| S6 | 73193 | 2ND I.F. " " " |
| S7 | 70950 | PHONO JACK |
| S8 | 83748 | CLASS B INPUT TRANSFORMER |
| S9 | 40859 | 8 P.M. SPEAKER |
| S10 | 79029-A | FILTER CHOKE |
| S12 | 84026 | VIBRATOR PWR. TRANSFORM. |
| S13 | 83744 | R.F. "A" CHOKE |
| S15,S16,S17 | | |
| S18,S19,S20 | 83759 | BAND SWITCH |
| S21 | | |
| S22.S23 | 83745 | A.C.-D.C. SWITCH |
| S24.S25 | | |
| S26.S14 | 70053-C | 1 AMP. FUSE |
| S27.S28 | 72127 | PILOT LIGHT 2V.-.06 AMP. |
| S29 | | |
| S30 | 84021 | VIBRATOR PWR. SUPPLY ASS'Y |
| S31 | 83745 | A.C. LINE SWITCH ON A.C.-D.C. SWIT. |
| MISCELLANEOUS FOR MODEL - FOR MODEL - | | SAME AS EXCEPT FOLLOWING: |

## D.C. SOCKET VOLTAGES

All voltage measurements are those between the indicated tube terminal and the chassis, and are made with a 1000 ohms per volt voltmeter. Make measurements with no signal input to the receiver and with the volume control set at minimum volume.

| Tube | Socket Terminals 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| R.F. 6S7-G | - | - | 145 | 62.5 | 2.5 | - | - | 2.5 |
| 1st Det. 6K8 | - | - | 150 | 62.5 | - | 140 | - | 1.6 |
| I.F. 6S7-G | - | - | 145 | 62.5 | 2.7 | - | - | 2.7 |
| 2nd Det. 6T7-G | - | - | 80 | - | - | - | - | 1.2 |
| A.F. 6L5-G | - | - | 125 | - | - | - | - | 5.7 |
| A.F. 1J6-G | - | - | 145 | - | - | 145 | - | 0 |
| Rect. 6ZY5-G | - | - | - | - | - | - | - | 150 |

The above voltages apply with either the nominal Battery Supply or with the AC supply.

## Tuning Ranges

The model H-6204 chassis has the following ranges:

| | | |
|---|---|---|
| Band 1 | 25.5 - 8.85 mc. | 11.7 - 33.9 meters |
| Band 2 | 9.95 - 2.96 mc. | 30.1 - 101.3 meters |
| Band 3 | 1725 - 520 kc. | 174 - 576 meters |

**Maximum Power Output** 2 watts

**POWER SUPPLY**

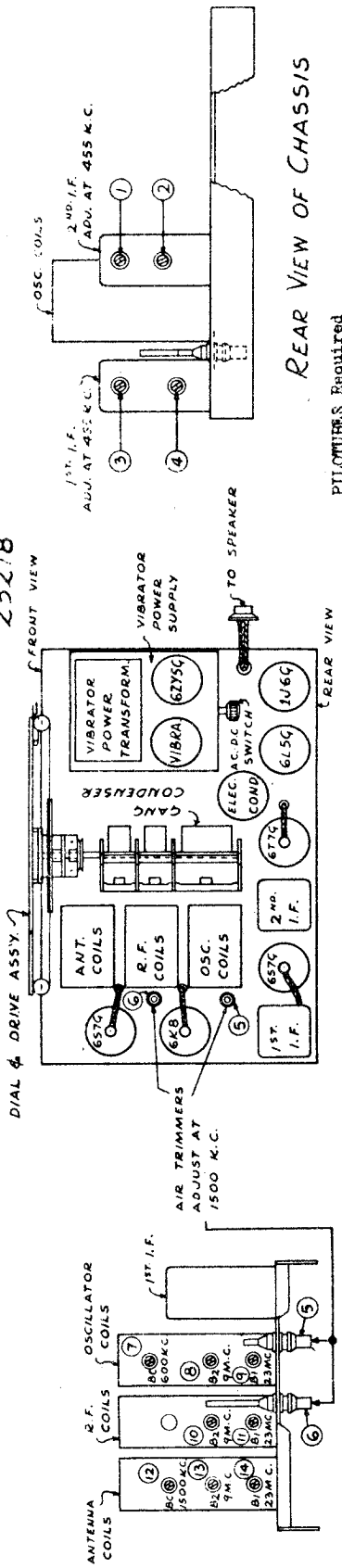
32 volt Storage Battery .5 amperes drain
110-125 or 220-240 volts AC 50-60 cycles 18 Watts

**Intermediate Frequency** 455 kc

PILOT RADIO CORP.
LONG ISLAND CITY, N.Y., U.S.A.
SCHEMATIC CIRCUIT DIAGRAM FOR MODEL-H-6204
DATE:- 2-11-39:
DRAWN BY:- B.R.
CHECKED BY:-
APPROVED BY:-
No. 25217

MODEL H-6204
Chassis H-6200
Socket, Trimmers
Alignment

# PILOT RADIO CORP.




| PILOT TUBES | Required | |
|---|---|---|
| One | 6S7-G | R.F. Amplifier |
| One | 6K8 | 1st detector-oscillator |
| One | 6S7-G | I.F. Amplifier |
| One | 6T7-G | 2nd Detector |
| One | 6L5-G | A.F. Amplifier |
| One | 1J6-G | Output Tube |
| One | 6Z Y5-G | Power Supply Rectifier |

**Miscellaneous Service Notes**

If a howling noise (sometimes referred to as Microphonic howl) is heard, it is probably because the four red screws under the cabinet and the two narrow metal strips between the chassis and the bottom of the cabinet, have not been removed. These strips and screws are only intended as additional bracing during shipment and must be removed before the receiver is put in operation.

The howl can also be caused by a defective tube, or when some part of the receiver which is rigidly fastened to the chassis rubs against the cabinet.

If the vibrator noise becomes loud or objectional, it is probably because the battery connections are not clean, or because the battery is old and its internal resistance is high, or because the vibrator is wearing out.

**I.F. Alignment**

Turn the Band Selector Switch to the Broadcast Band and tune the receiver to the low frequency end of the Band.

Connect the output meter as described under "Connections", and connect the "hot" post of the signal generator to the grid of the 6K8 tube through the .1 mfd. condenser. Then proceed with the alignment as follows:-

1. Adjust the signal generator to 455 kilocycles, and adjust the generator output to the lowest valus which will give a readable signal on the output meter.

2. Adjust the trimmer screws #1, 2, 3 and 4 (see figure), for maximum reading of the output meter. Keep reducing the output from the generator if the output meter reading increases too much.

If the output of the generator to the receiver is too great, the alignment of the receiver will not be correct, as the AVC action will become too great, and the amplifier will appear broad in tuning.

It will seldom, if ever, be found necessary to more than touch up the alignment of the I.F. Amplifier. Of course, if the amplifier adjustment screws have been tampered with, it will probably be necessary to completely realign the amplifier. In this case, connect the generator to the grid of the 6S7-G I.F. tube, and align the last I.F. transformer. Always finish the alignment with the signal input to the 6K8 tube.

A cathode ray oscilloscope is not necessary in making the above adjustments. One may be used, however, if desired.

**R.F. ALIGNMENT**

**Standard Broadcast Band**

Connect the "hot" terminal of the generator to the post marked "A" on the rear of the chassis, through the .0002 mfd. condenser.

Set the generator frequency to 1500 kc., and the dial pointer of the receiver to the same frequency with the Band Selector Switch set appropriately. Adjust trimmer #5 for maximum reading of the output meter. Loosen the lock nut and adjust trimmer by moving the brass rod in or out with a hooked wire, and with a twisting motion. Then without touching the tuning controls adjust trimmers #6 and #12 for maximum reading of the output meter.

Next, set the generator frequency to 600 kc., and move the receiver pointer to the same frequency. Adjust trimmer screw #7 for maximum reading of the output meter, while "rocking" the gang condenser. Finally, repeat the 1500 kc. adjustments, and tighten the lock nuts on trimmers #5 and #6.

**Band #2**

Remove the .0002 mfd. dummy antenna used in aligning the Broadcast Band and substitute the 400 ohm non-inductive resistor in its place.

Before aligning this band refer to the paragraph headed "Image Frequency".

Set the generator frequency to 9 mc. and the receiver dial pointer to the same frequency with the Band Selector Switch set appropriately. Adjust trimmer #8 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency.

Then adjust trimmer #10 for maximum output meter reading, while slightly "rocking" the gang condenser. Readjust trimmer #8 if necessary to correct the calibration, and finally adjust trimmer #13 for maximum output meter reading.

**Band #1**

The connections and Dummy Antenna are the same as used in aligning Band #2.

Before aligning this band, refer to the paragraph headed "Image Frequency".

Set the generator frequency to 23 mc. and the receiver dial pointer to the same frequency. Adjust trimmer #9 for maximum reading of the output meter. Be careful you do not tune in at the Image Frequency. Then adjust trimmer #11, while "rocking" the gang condenser, for maximum reading of the output meter. Readjust trimmer #9, if necessary, to correct the calibration, and then adjust trimmer #14 for maximum reading of the output meter.

**Image Frequency**

All bands in this receiver must be aligned with the oscillator frequency higher than the signal frequency. There can be no error in doing this on the Broadcast Band. However, on the higher frequency bands it is possible to incorrectly adjust the alignment in this respect and end up with the receiver aligned on what should be the Image Frequency.

The chances of doing this may be eliminated by adjusting the generator to the correct aligning frequency. With sufficient output from the generator to pick up two signals with the receiver, separated by twice the Intermediate Frequency, set the receiver dial pointer to that one which comes in at the higher frequency marking on the receiver dial calibration.

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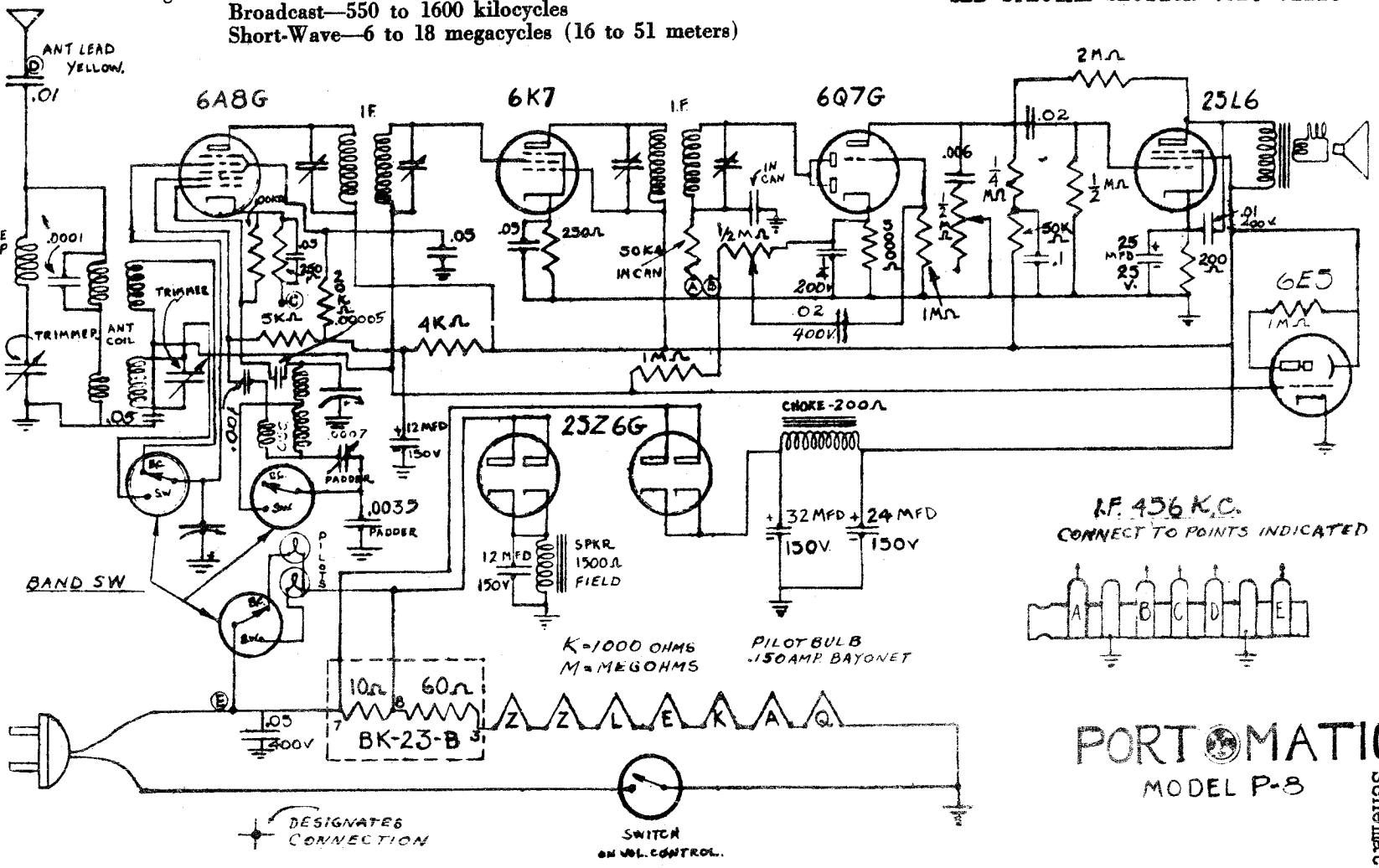
The receiver is designed to operate over the following two tuning ranges:

Broadcast—550 to 1600 kilocycles
Short-Wave—6 to 18 megacycles (16 to 51 meters)

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.




PORT-O-MATIC CORP.

PORT-O-MATIC
MODEL P-8

MODELS 18A, 18C, 18R
8OF, 8OA, 8OC, 21OF,
21OC, 21OR, 212F, 212C
212R. Chassis P-8
Schematic, Alignment

**STANDARD MODEL**
100-125 Volts
AC or DC Current
40-60 Cycles
65 Watts

•

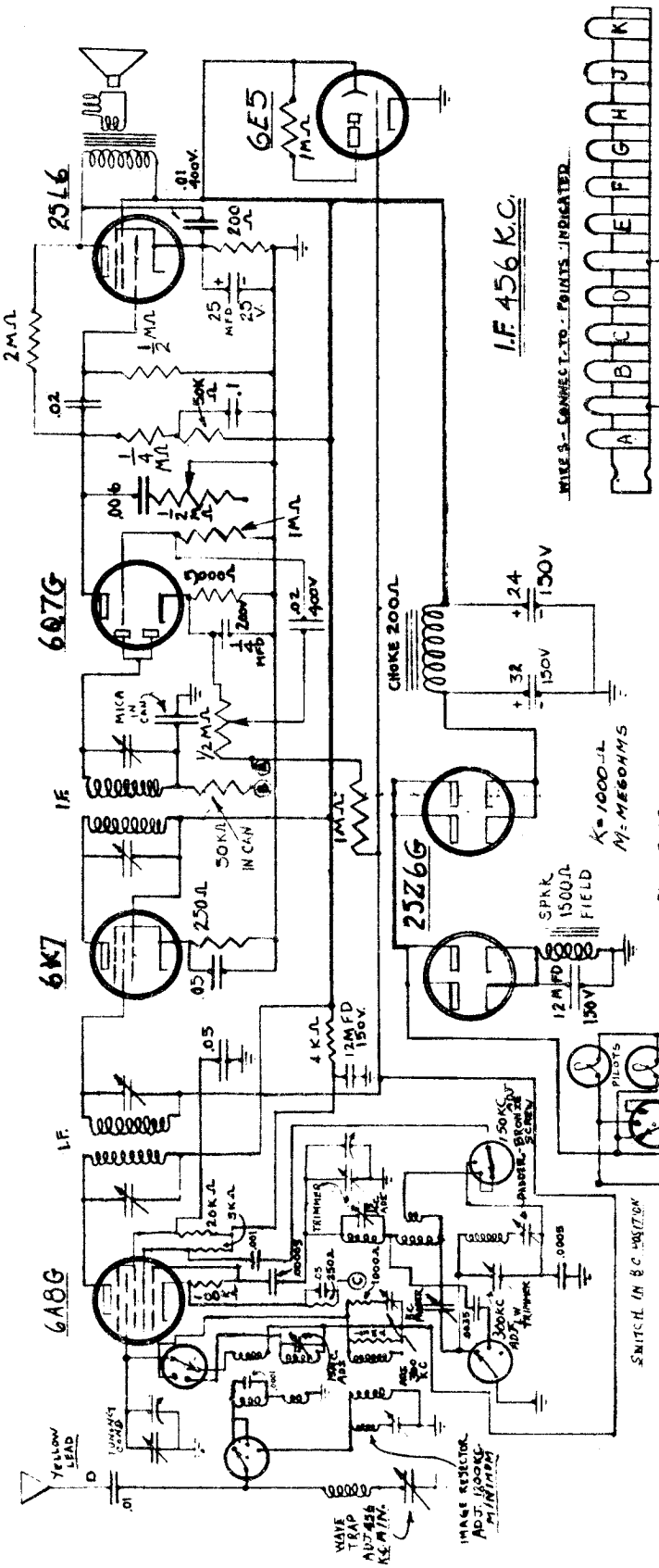
higher than ¾ to 1 amp. standard automobile cartridge fuses.

**EUROPEAN MODEL**—A special switch is provided on the motor-plate located underneath the pick-up arm, and is marked "110-220." With this switch in 220 Volt position, the PORT-O-MATIC will operate safely on voltages from 200 to 250. To avoid damage, if switch is accidentally placed in wrong position, this particular model is equipped with a fused plug at the end of the electric cord. Should these fuses blow, replace same with no

DPB 9-29-38.

MODELS 25A,25C,25R,
250F,250C,250R
Chassis P8LW
Schematic,Alignment

# PORT-O-MATIC CORP.




This portable radio will operate on any current or principal voltage throughout the world. By setting the knob, in the back of the radio, it can be used on AC or DC at 120, 160, or 240 volts.

The receiver is designed to operate over the following three tuning ranges:

Broadcast—550 to 1600 kilocycles

Short-Wave—6 to 18 megacycles (16 to 51 meters)

Long-Wave—800-2000 Meters

PORTOMATIC

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII.

**IMPORTANT:**—To avoid damage if switch is accidentally placed in wrong position, this particular model is equipped with a fused plug at the end of the electric cord. Should these fuses blow, replace with no higher than ¾ to 1 amp. standard automobile cartridge fuses.

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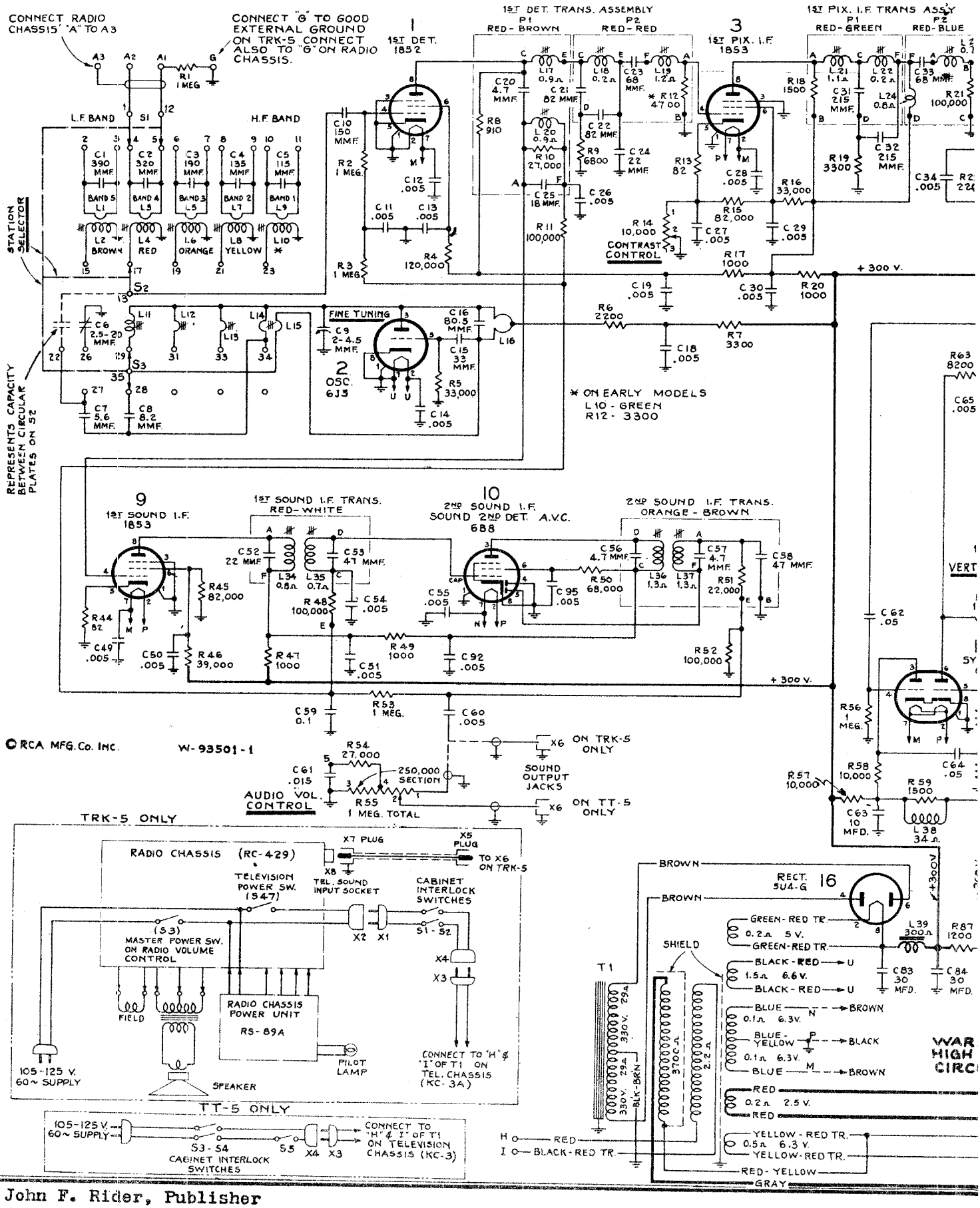


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INC.

MODELS TRK-5, Chassis Nos. KC-3A, RC-429, RS-89A
TT-5, Chassis KC-3

Schematic

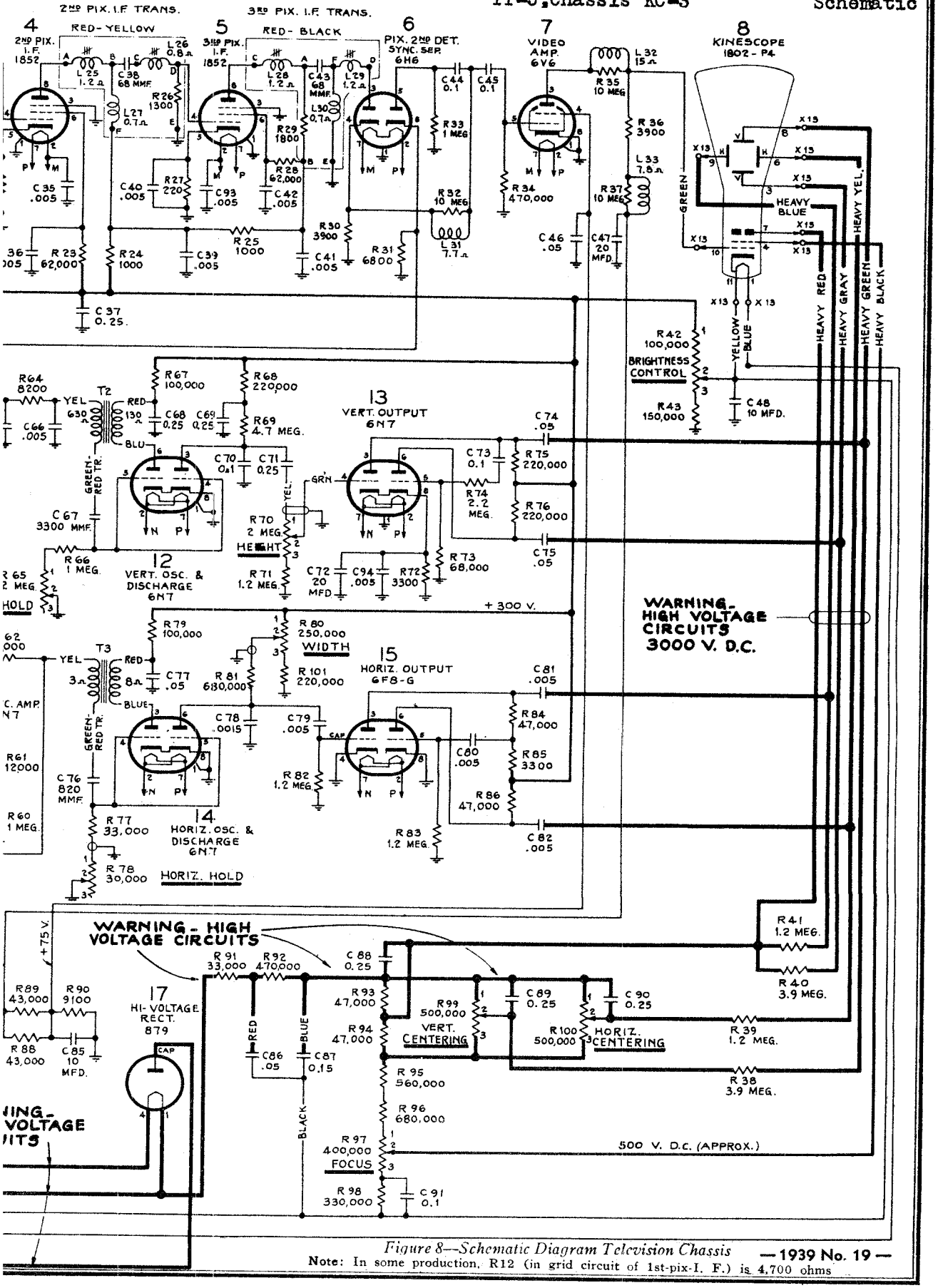


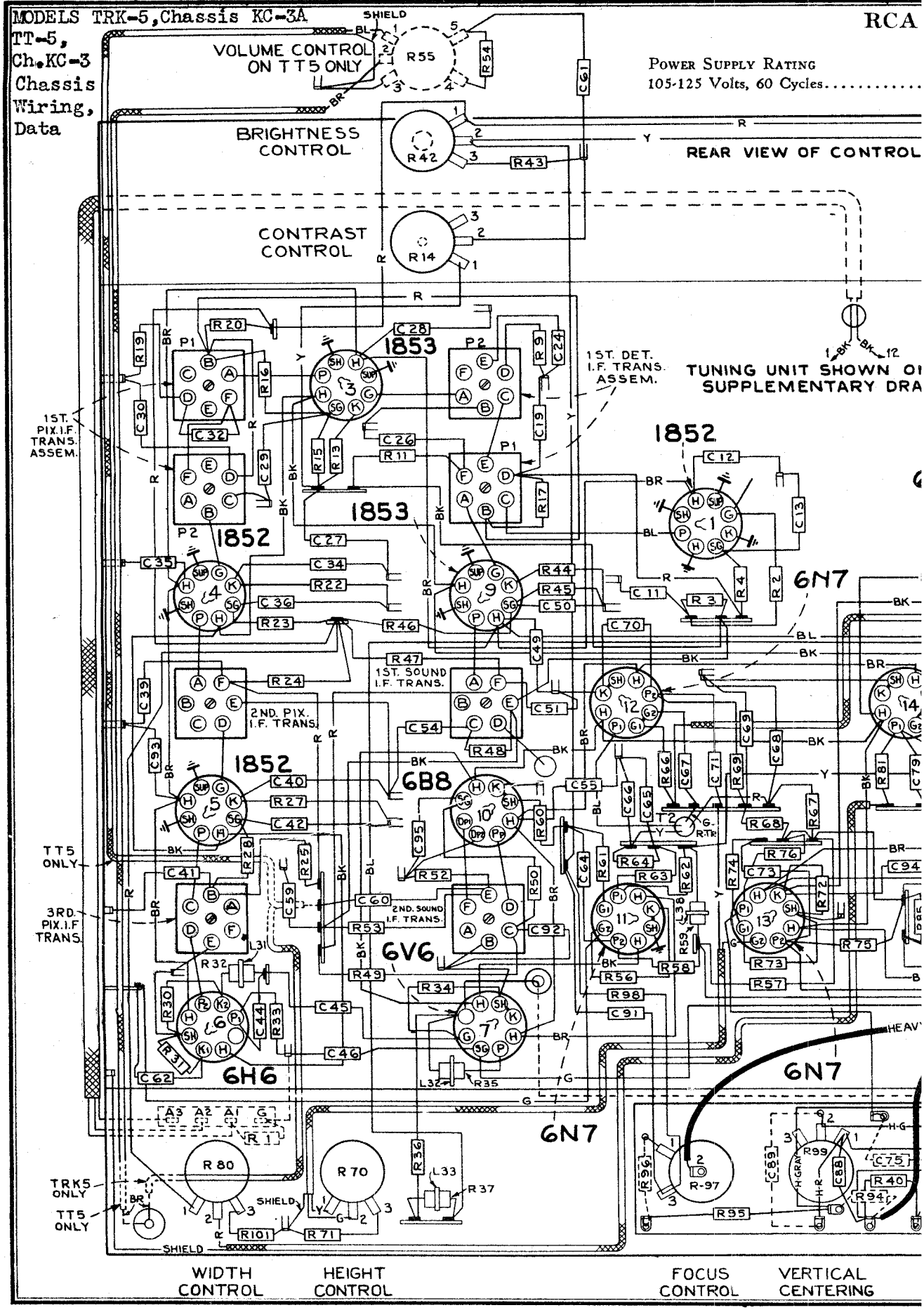

*Figure 8—Schematic Diagram Television Chassis*

— 1939 No. 19 —

Note: In some production, R12 (in grid circuit of 1st-pix-I. F.) is 4,700 ohms

MODELS TRK-5, Chassis KC-3A
TT-5,
Ch. KC-3
Chassis
Wiring,
Data

RCA

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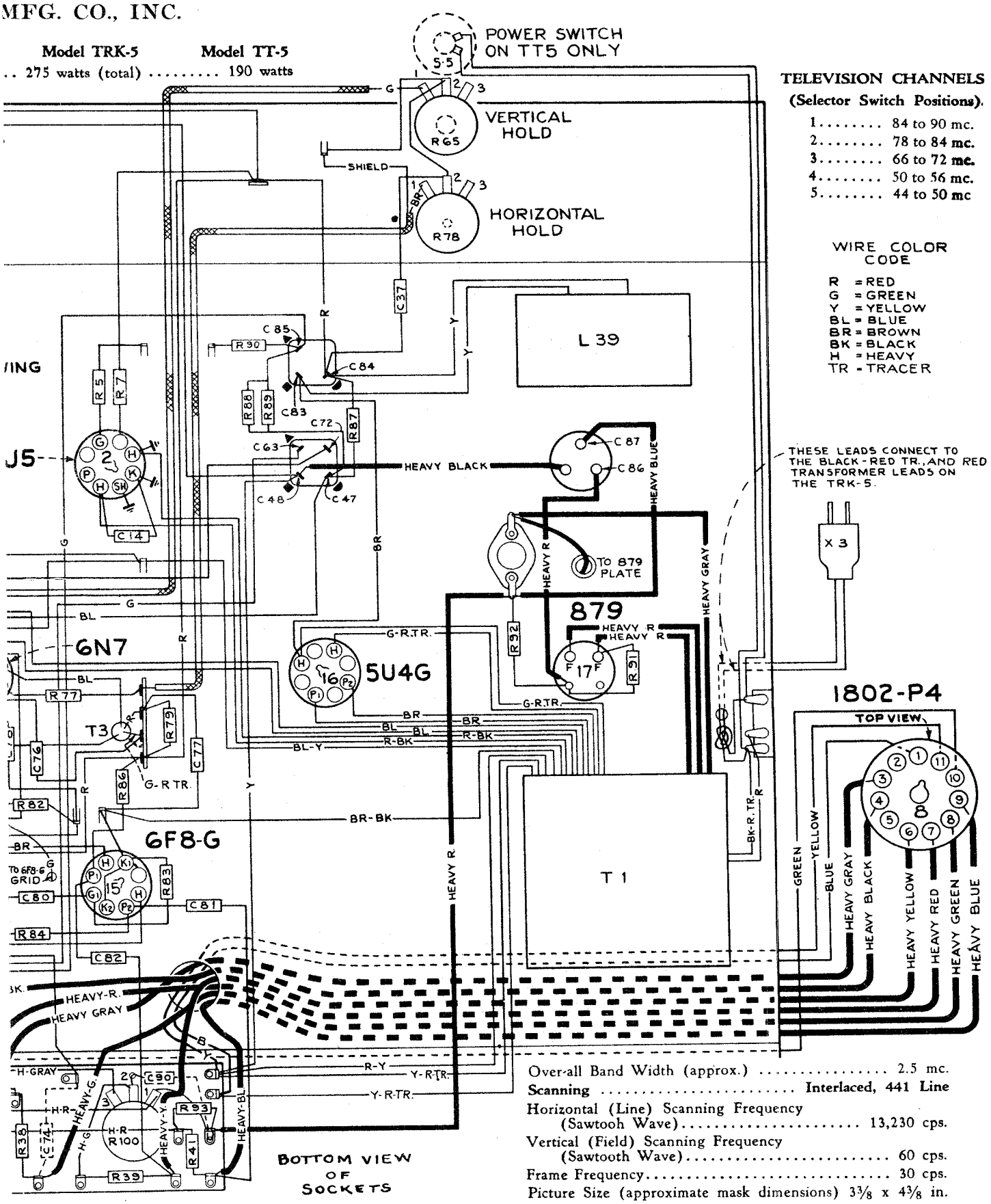
MFG. CO., INC.

**Model TRK-5** **Model TT-5**

.. 275 watts (total) ..... 190 watts




**TELEVISION CHANNELS**
**(Selector Switch Positions).**

1..... 84 to 90 mc.
2..... 78 to 84 mc.
3..... 66 to 72 mc.
4..... 50 to 56 mc.
5..... 44 to 50 mc

WIRE COLOR CODE

R = RED
G = GREEN
Y = YELLOW
BL = BLUE
BR = BROWN
BK = BLACK
H = HEAVY
TR = TRACER

Over-all Band Width (approx.) ..... 2.5 mc.
**Scanning** ..... **Interlaced, 441 Line**
Horizontal (Line) Scanning Frequency (Sawtooh Wave)..... 13,230 cps.
Vertical (Field) Scanning Frequency (Sawtooth Wave)..... 60 cps.
Frame Frequency..... 30 cps.
Picture Size (approximate mask dimensions) 3⅜ x 4⅜ in.
Chassis Base Dimensions.... 13 x 18 in. Max.; height 9 in.

*Figure 9—Wiring Diagram Television Chassis*

W-93503-0

# Operation Model TRK-5

The power-volume control on the broadcast radio receiver turns on the power for the complete receiver. Pushing the button marked "Television" on the push button panel turns on the Television receiver, if the above power control is "On." The volume control of the broadcast receiver also controls the Television sound volume level.

**Station Selector and Fine Tuning.**—The outer ring "O" section of the central dual control knob on the Television panel selects the station from which it is desired to receive television transmission.

Five television channels are covered as follows:

(1) 84 to 90 M.C.
(2) 78 to 84 M.C.
(3) 66 to 72 M.C.
(4) 50 to 56 M.C.
(5) 44 to 50 M.C.

Set the station selector to the number corresponding to the frequency of the station from which it is desired to receive Television Broadcasts.

The inner section "I" of this knob is used for fine tuning and may eliminate moving ripples or distortion if due to interfering radio signals. A slight inward pressure must be exerted on the knob while turning.

Before the Television portion of the receiver is turned "ON" it is advisable to turn the Brightness and Contrast controls completely counter-clockwise to reduce the illumination of the spot which appears on the Kinescope before the sweep circuits have started functioning.

**Contrast and Brightness Controls.**—The inner "I" section of the "Contrast"-"Brightness" controls is the "Contrast" control and varies the black and white tones of the picture being received. Too little contrast makes the picture all half-tones or grays. Turning clockwise increases contrast from grays, to black and white. See Test Patterns Figs. 2, 4, and 5, Page 10-21

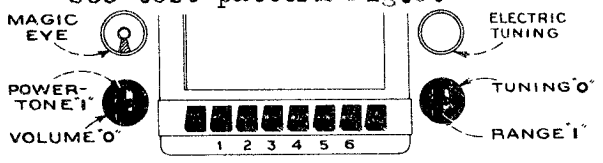
The outer ring "O" is the Brightness Control and affects the average illumination of the picture. Turning clockwise increases the brightness. See test pattern Figs. 2, 4, 5.

**Hold Controls.**—The dual knobs on the Television panel marked "Horizontal" and "Vertical" Hold, control the picture stability. The inner section designated by a "I" is the Horizontal Hold Control and when being set should be turned slowly to the point at which the picture "locks in" horizontally. See test pattern Fig. 6, Page 10-21

The outer ring section designated by "O" is the Vertical Hold Control and when being set should be turned to the point where the picture "locks in" vertically. Pattern Fig. 7.

These two controls on this dual knob should not ordinarily require readjustment after good picture reception has once been obtained. An accasional resetting may be necessary due to changing to a different station, and to the gradual ageing of the tubes.

**Focus Control.**—This control is located on the rear of the Video chassis, and controls the electron beam focus of the Kinescope. Ordinarily, after once being focused the Kinescope should not require re-focusing for a considerable length of time. See test pattern Fig. 3.



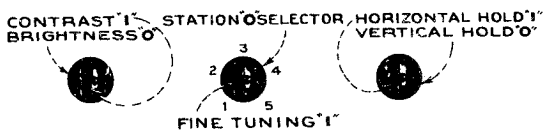




*Figure 1—Control Panel Model TRK-5*

# Operation Model TT-5

The operation of Model TT-5 is the same as that for the Model TRK-5 except that there is a separate "ON-OFF" switch, and a separate sound volume control because the broadcast radio receiver is not included in this model. When Model TT-5 is connected to a broadcast receiver for the Television sound reproduction, the broadcast receiver volume control should be turned to maximum and the Television sound volume controlled with the control on the Television Receiver.

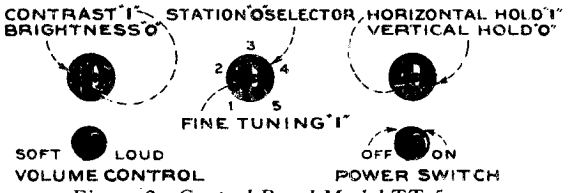



*Figure 2—Control Panel Model TT-5*

# SERVICE DATA

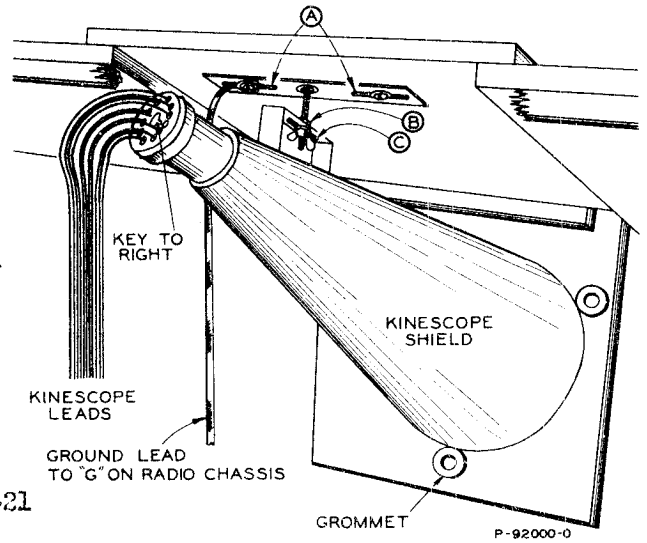



*Figure 3—Kinescope Installation*

Kinescope Installation Models TRK-5, TT-5: Refer to figure 3.

1. Remove back cover from cabinet.
2. Remove Kinescope mounting shield from shipping carton.
3. Using gloves and goggles remove Kinescope from shipping carton and place in the cone-shaped mounting shield.
4. Guide the Kinescope and mounting shield carefully into the cabinet, placing the Kinescope firmly up against the mask and viewing window. Fasten the mounting shield firmly in place with the thumb screw provided, so that it holds the Kinescope firmly against the mask. If the Kinescope does not line up properly with the mask, loosen the screws "A" and nut "B" and adjust in the direction desired.
5. After the receiver is operating, the Kinescope may be rotated to properly square up the picture with the mask.

**CAUTION:** When rotating tube the power should be turned "OFF."

**Adjustments.**—There are a series of screwdriver slot adjustments at the rear of the Video chassis used to obtain the proper picture size and centering. These adjustments are explained fully in the receiver operating instructions, and also in the booklet: **Practical Television by RCA.**

When the receiver is moved from one location to another, some readjustment of these controls may be necessary.

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MODELS TRK-5, TT-5
Antenna, Transmission Line Data, Voltage

RCA MFG. CO., INC.

# Antenna Installation:

In most cases, the antenna should not be installed permanently on the apartment or residence roof until the quality of the picture reception has been observed on a Television Receiver. A temporary transmission line can be run between receiver and the antenna allowing sufficient slack to permit moving the antenna. Then, with a telephone system connecting an observer at the receiver and an assistant on the roof to find an antenna location, the antenna can be positioned to give the most satisfactory results on the received signal. A shift of only a few feet in antenna position or direction may effect a tremendous difference in picture reception. Whenever possible, the antenna location should be chosen or erected so the antenna is not only broadside to the transmitter but removed as far as possible from highways, hospitals and doctors' offices, and similar sources of interference. Auto ignition and diathermy apparatus may cause noise interference which spoils the picture.

In mounting any antenna, care must be taken to keep the antenna rods or pickup wires proper at least 1/4 wave length (at least 6 feet) away from other antennas, metal roofs and gutters or metal objects.

Under certain extremely unusual conditions, it may be possible to rotate or position the antenna so it receives the cleanest picture over a reflected path. If such is the case, the antenna should be so positioned. However, such a position may give variable results as the nature of reflecting surfaces may vary with weather conditions, as a wet surface has been known to have different reflecting characteristics than a dry surface.

In short, a television receiving antenna and its installation must conform to much higher standards than an antenna for reception of International Short Wave and Standard Broadcast signals because:

(1) Intervening obstacles have a pronounced shielding effect on the ultra-high frequency waves producing low intensity signals. Severe trouble with multi-path transmissions may be experienced, especially in congested city areas.

(2) The picture signal is comprised of a very wide band or range of frequencies, all of which must be received with good efficiency.

(3) It must be continually remembered that the discernment of the eye is much more critical than that of the ear.

# The Transmission Line

RCA Victor has made available two types of exterior transmission lines. One is a special low loss weather-proofed line having the correct surge impedance to match the RCA Victor Television antennas and the RCA Victor Television receivers. It is carried as Stock No. 9882 in 1,000 foot rolls. The second type is a standard weather-proofed line also having the correct surge impedance for proper antenna and receiver matching. It is carried as Stock No. 12430 in 90 ft. rolls, Stock No. 12429 in 40 ft. rolls and is available in 1,000 ft. spools as Stock No. 9881. Use of improper lines may result in excessive loss or may lead to line reflections, resulting in multiple images or "ghosts," thus marring the reception.

For transmission line runs up to 200 feet, and where the signal strength on the antenna is relatively high, the Stock No. 12430, or Stock No. 12429 transmission line may be used. For all other applications the Stock No. 9882 transmission line is recommended.

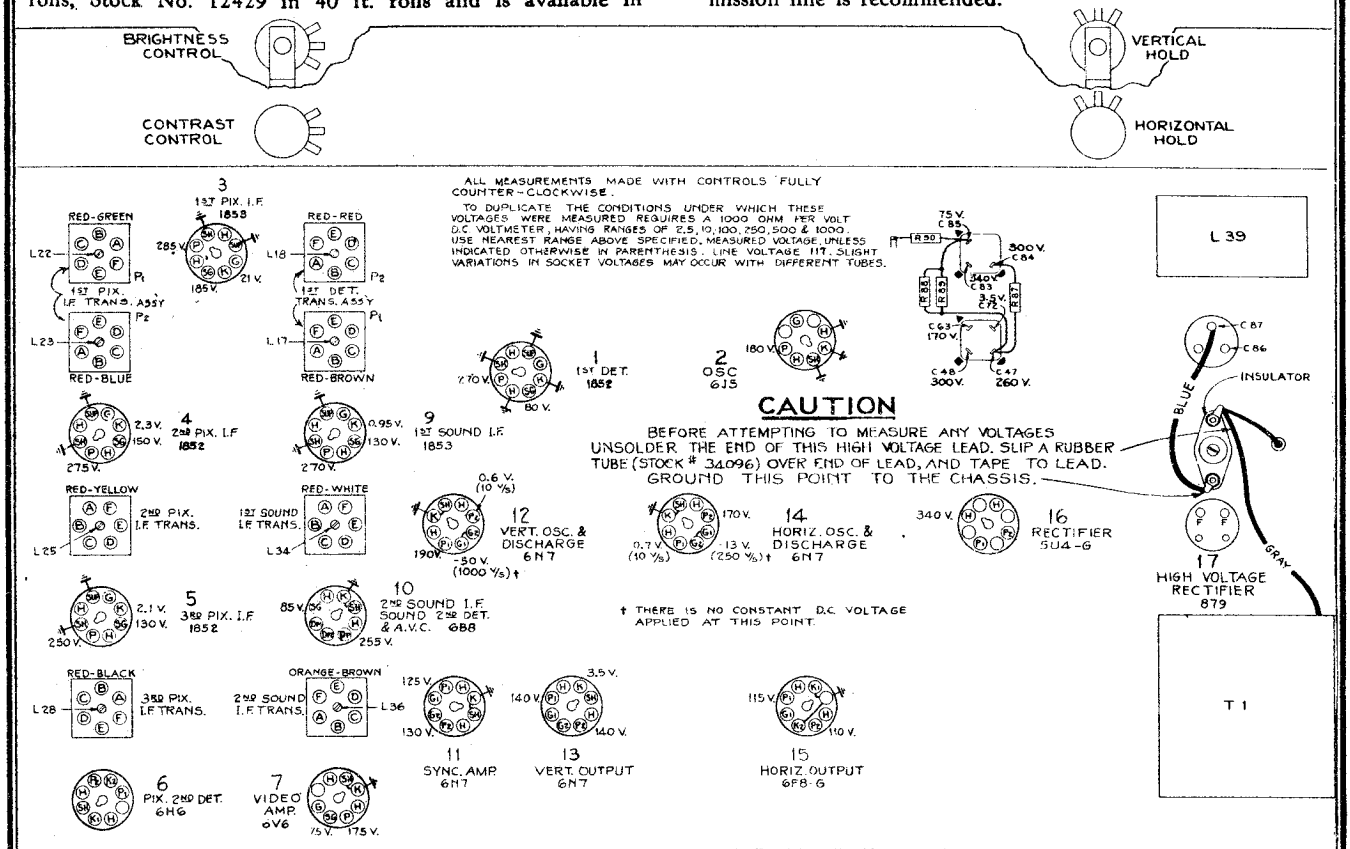
BRIGHTNESS CONTROL
CONTRAST CONTROL
VERTICAL HOLD
HORIZONTAL HOLD
ALL MEASUREMENTS MADE WITH CONTROLS FULLY COUNTER-CLOCKWISE.
CAUTION
BEFORE ATTEMPTING TO MEASURE ANY VOLTAGES UNSOLDER THE END OF THIS HIGH VOLTAGE LEAD. SLIP A RUBBER TUBE (STOCK # 34096) OVER END OF LEAD, AND TAPE TO LEAD. GROUND THIS POINT TO THE CHASSIS.
† THERE IS NO CONSTANT D.C. VOLTAGE APPLIED AT THIS POINT.
L 39
T 1
INSULATOR
BLUE
GRAY
HIGH VOLTAGE RECTIFIER 879
1 1ST DET. 1852
2 OSC 6J5
3 1ST PIX. I.F. 1853
4 2ND PIX. I.F. 1852
5 3RD PIX. I.F. 1852
6 PIX. 2ND DET. 6H6
7 VIDEO AMP. 6V6
9 1ST SOUND I.F. 1853
10 2ND SOUND I.F. SOUND 2ND DET. & A.V.C. 6B8
11 SYNC. AMP. 6N7
12 VERT. OSC. & DISCHARGE 6N7
13 VERT. OUTPUT 6N7
14 HORIZ. OSC. & DISCHARGE 6N7
15 HORIZ. OUTPUT 6F8-G
16 RECTIFIER 5U4-G
RED-GREEN
RED-RED
RED-BLUE
RED-BROWN
RED-YELLOW
RED-WHITE
RED-BLACK
ORANGE-BROWN
1ST PIX. I.F. TRANS. A55Y
1ST DET. TRANS. A55Y
2ND PIX. I.F. TRANS.
1ST SOUND I.F. TRANS.
3RD PIX. I.F. TRANS.
2ND SOUND I.F. TRANS.

*Figure 7—Voltage Diagram Television Chassis*

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Rear View, TRK-5

RCA MFG. CO., INC.

MODELS TRK-5, TT-5
Chassis KC-3A, KC-3
Socket, Voltage Data
Trimmers, Antenna

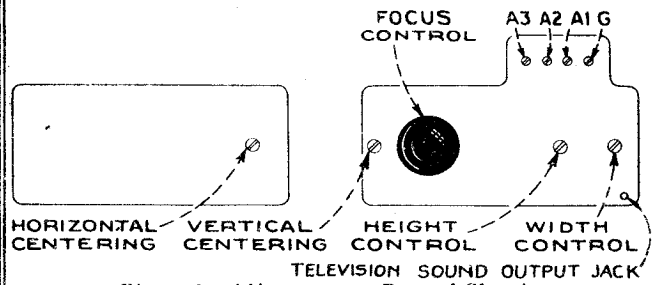


*Figure 4—Adjustments at Rear of Chassis*

# Video Chassis KC-3 (TT-5) KC-3A (TRK-5)

No attempt should ever be made to measure the high (2,000 volts) voltage, because of the dangers and difficulties involved. If at any time it becomes necessary to service the high voltage circuit, the suspected parts should be replaced by parts known to be in good operating condition.

Always replace the red can over the 879 high voltage rectifier.

The most dangerous portion of the receiver is the plate (top cap) lead for the 879 high voltage rectifier. Always be **very** careful when working near or with this lead.

When working on the high voltage supply portion of this chassis, the following precautions should be observed:

1. Remove power supply cord from the power supply socket.
2. Use only one hand at a time.
3. Connect a shorting lead between ground (firstly) and to the high voltage side.
4. Whenever working with the oil-filled high voltage filter capacitors, keep a constant short across the capacitor, as these capacitors do not completely lose their charge after being discharged a single or several subsequent times.
5. Only one person at a time should work on the unit to prevent any misunderstanding which may result in an accident.

When any changes are made on the Video portion of the chassis, the locations of leads and parts should be returned as closely as possible to their original positions.

**Service Hints:**

1. In some cases the horizontal sweep oscillator circuit will radiate energy to nearby broadcast receiving antennas and lead-ins, causing interference with standard broadcast receivers. It has been found that this trouble has been cleared up in some cases by use of an RCA "Magic Wave" antenna for the broadcast receiver receiving the interference.
2. If the picture "tears out" when the receiver is jarred it may be due to microphonic 1852, 1853, or 6J5 tubes.
3. The 6J5 oscillator tube should be removed without rocking it in its socket to loosen it, as the motion may cause the 80.5 mmf capacitor C16 to break off.
4. The coils or straps in the h.f. oscillator circuits **should not be touched or moved** or the alignment of the receiver will be disturbed.
5. The two Video coupling capacitors C44, 45, should be kept clear of chassis.
6. In some cases the metal Kinescope mounting shield may become magnetized by the earth's or some nearby magnetic field, and thus distort the picture on the screen towards the magnetized portion of the shield. The shield can be demagnetized by passing it slowly through a solenoid which is energized by an a-c current.

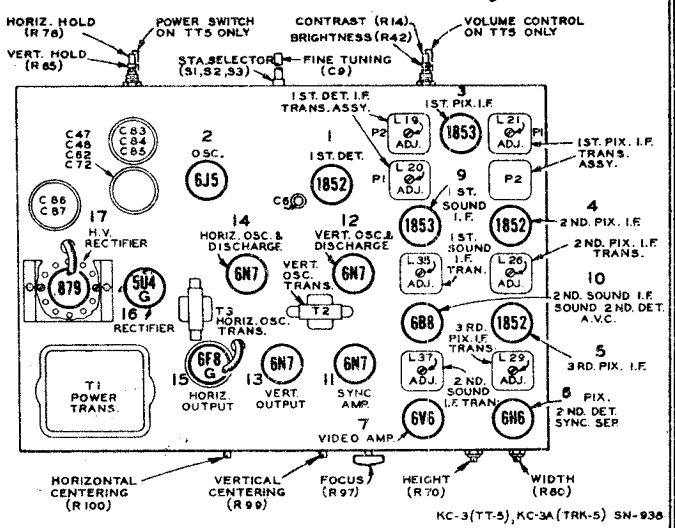


*Figure 5—Top View Television Chassis*

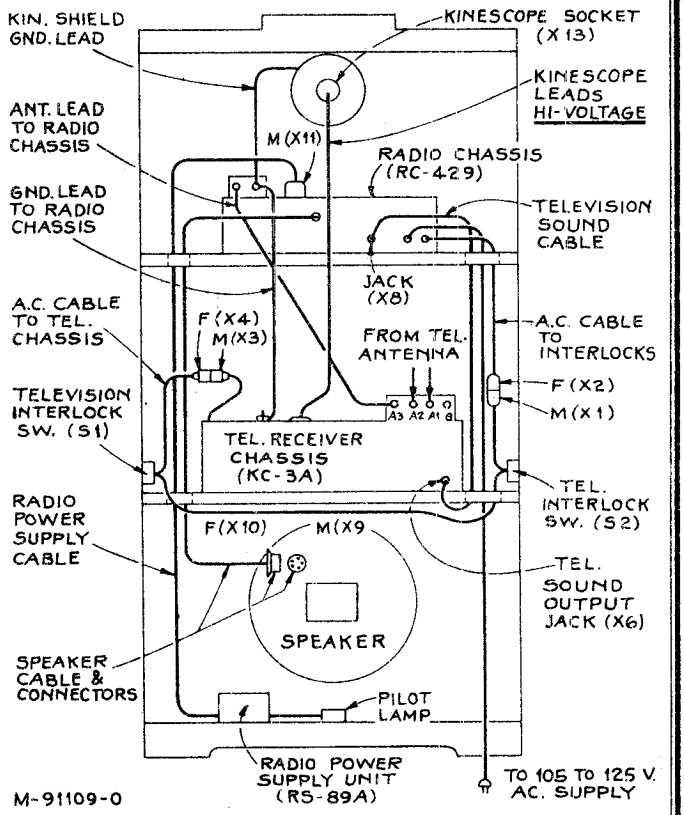


*Figure 6—Rear View Model TRK-5*

## Antenna

The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to use a correctly designed antenna, and use care in its installation.

The RCA Double Dipole Antenna, Stock No. 9871, is recommended for use with these receivers. Both this antenna and the "V" antenna described below are especially designed for a sufficient broad frequency response to cover the contemplated television spectrum with good efficiency and are therefore superior to a single Dipole type antenna.

When greater signal pickup, or where a shielding effect from noise pickup or image reflections are desired, a reflector assembly Stock No. 9872 may be added to the Stock No. 9871 Antenna to obtain an improved signal-to-noise ratio.

The RCA Double "V" Wire type Television Antenna is alternative type of antenna designed for television sight and sound reception. Two points of support are necessary. It serves adequately in suburban areas but may not be sufficiently flexible and efficient for congested city areas where bad reflections and interference are encountered.

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MODEL TRK-5
Receiver Chassis RC-429
Specifications, Dial Data

RCA MFG. CO., INC.

MODELS 98T, 98K2
Dial Calibration

## Electrical Specifications

FREQUENCY RANGES
Standard Broadcast ("A" band).....540-1720 kc
Medium Wave ("B" band).....2.3-7.0 mc
Short Wave ("C" band).....7.0-22 mc

Intermediate Frequency..... 455 kc

TUBE COMPLEMENT
(1) RCA-6A8-G..... 1st-Det., and Osc.
(2) RCA-6K7 .....I-F Amplifier
(3) RCA-6Q7..... 2nd-Det., A.V.C., 1st Audio
(4) RCA-6J5..... Phase Inverter
(5) RCA-6K6-G ..... Power Output
(6) RCA-6K6-G .....Power Output
(7) RCA-6U5 ....."Magic Eye"
(8) RCA-5Y3-G (in SPU RS-89A)...Full-Wave Rectifier

Dial Lamps ..... Mazda No. 44, 6.3 volts, .25 amp.

Power Supply Rating ..... 105-125 volts, 60 cycles, 75 watts

POWER OUTPUT
Undistorted ..... 5 watts
Maximum ..... 5.5 watts

LOUDSPEAKER (RL-70H-5)
Type ..... 12-inch electrodynamic
Voice-Coil impedance .....2.2 ohms at 400 cycles

ELECTRIC TUNING RANGES
Two stations between approximately..... 550-950 kc
Two stations between approximately..... 690-1,225 kc
Two stations between approximately..... 890-1,500 kc

## Mechanical Specifications

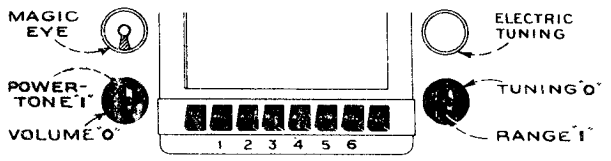
RC-429 CHASSIS BASE DIMENSIONS:
Height ..... 2-1/2 inches
Width ..... 13 inches
Depth ..... 6-1/2 inches
Over-all Chassis Height ..... 6-1/2 inches
Tuning Drive Ratio ..... 12 to 1

## General Description

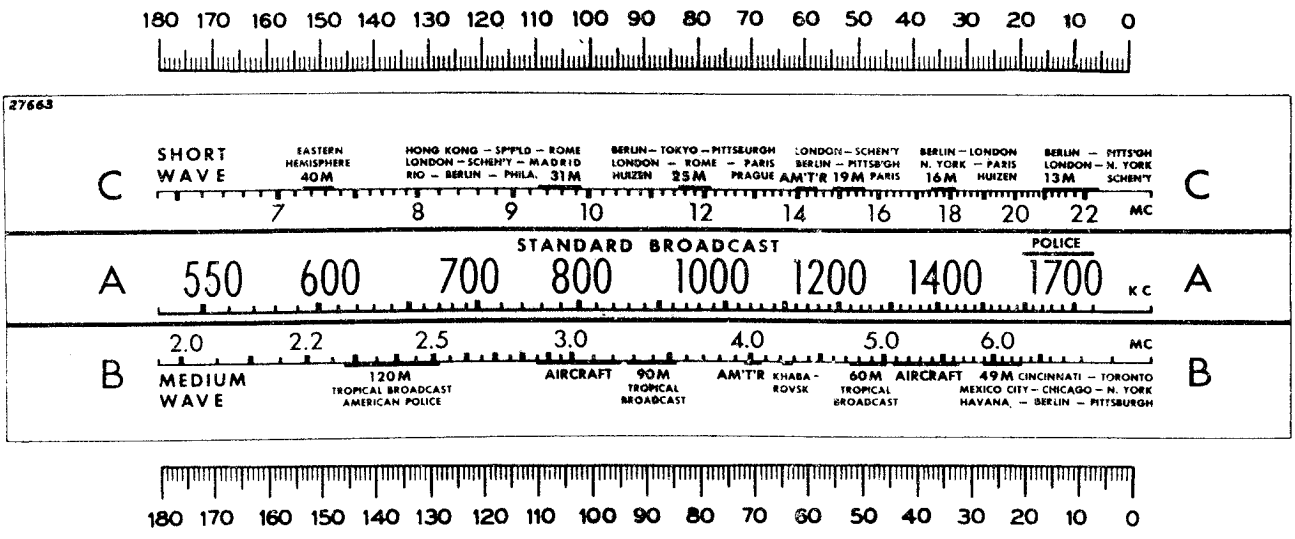
Radio receiver chassis No. RC-429 is used in RCA Victor Television console Model TRK-5.

The audio output of the television chassis is connected to the audio input of the RC-429 chassis by means of jack X-8 and the left-hand push-button switch (S44, S45, S46).

A separate plug-in power supply unit, RS-89A, is used to supply heater and plate voltage to the RC-427 chassis. Service data and diagrams for the power unit are contained in the following pages.




*Location of Controls (Radio)*


180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0
27663
C
SHORT WAVE
EASTERN HEMISPHERE 40M
HONG KONG – SPT'LD – ROME
LONDON – SCHEN'Y – MADRID
RIO – BERLIN – PHILA. 31M
BERLIN – TOKYO – PITTSBURGH
LONDON – ROME – PARIS
HUIZEN 25M PRAGUE
LONDON – SCHEN'Y
BERLIN – PITTSB'GH
AM'T'R 19M PARIS
BERLIN – LONDON
N. YORK – PARIS
16M HUIZEN
BERLIN – PITTS'GH
LONDON – N. YORK
13M SCHEN'Y
7 8 9 10 12 14 16 18 20 22 MC
STANDARD BROADCAST
POLICE
A
550 600 700 800 1000 1200 1400 1700 KC
2.0 2.2 2.5 3.0 4.0 5.0 6.0 MC
B
MEDIUM WAVE
120M TROPICAL BROADCAST AMERICAN POLICE
AIRCRAFT
90M TROPICAL BROADCAST
AM'T'R KHABAROVSK
60M TROPICAL BROADCAST
AIRCRAFT
49M CINCINNATI – TORONTO
MEXICO CITY – CHICAGO – N. YORK
HAVANA – BERLIN – PITTSBURGH
180 170 160 150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0

*Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales*

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example, 28° on the calibration scale corresponds to 1,500 kc on "A" band. Read instructions under "Alignment Procedure."

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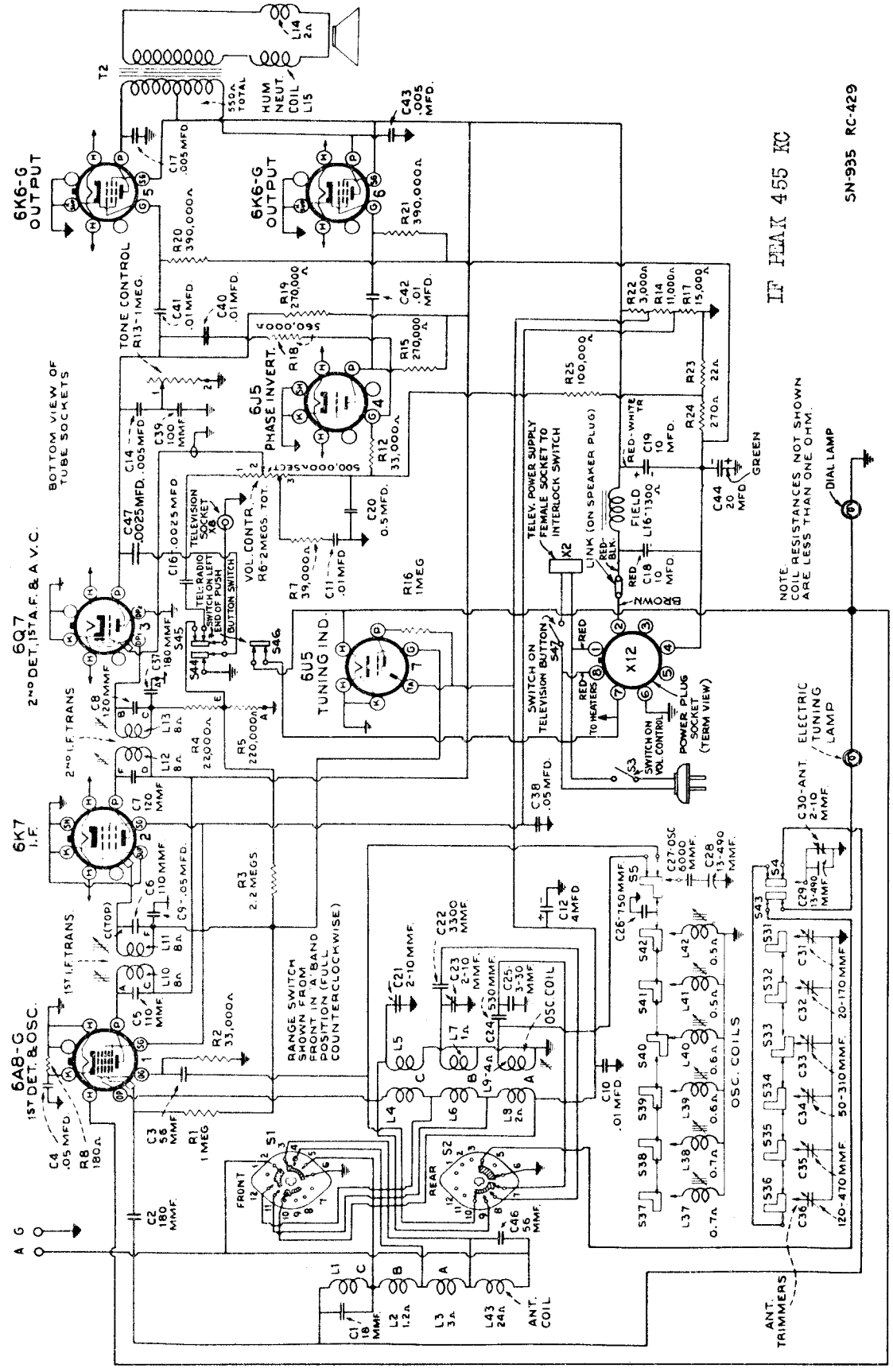
RCA MFG. CO., INC.

MODEL TRK-5, Chassis RC-429
Schematic, Lead Dress




*Schematic Circuit Diagram, Chassis No. RC-429*

**Precautionary Lead Dress:**

1. Electric tuning lamp leads to S43 must be dressed in front of the range switch.
2. Dress leads away from antenna coil.
3. Leads across back of chassis must be dressed away from television jack (X8).
4. C26 (750 mmfd.) on push-button switch assembly must be dressed carefully to prevent shorts.

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MODEL TRK-5,Chassis RC-429
Socket,Trimmers,Tuner
Alignment

RCA MFG. CO., INC.

# Alignment Procedure
## (RADIO CHASSIS)

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

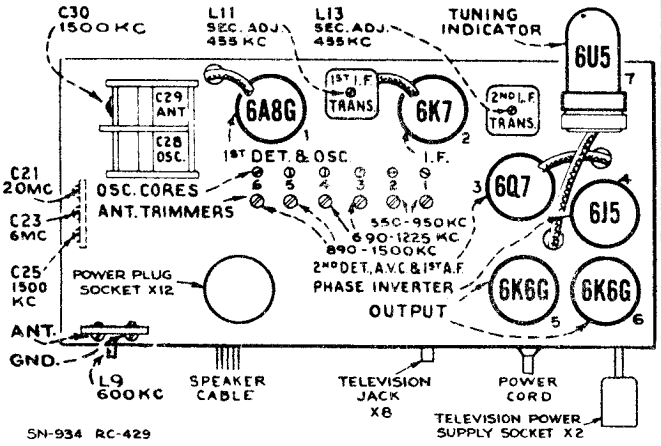
**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver ground terminal (G), and keep the output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial if fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-




condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

| Step | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | "A" band, Quiet Point between 550-750 kc | L12 and L13 (2nd I-F Trans.) |
| 2 | 6A8-G 1st-Det. grid cap, in series with .01 mfd. | | | L10 and L11 (1st I-F Trans.) |
| 3 | Antenna terminal, in series with 200 mmfd. | 600 kc | 600 kc 150.5° | L9 (osc.) |
| 4 | | 1,500 kc | 1,500 kc 28° | C25 (osc.) C30 (ant.) |
| 5 | Repeat steps 3 and 4. | | | |
| 6 | Antenna terminal, in series with 300 ohms | 6 mc | 6 mc 26.5° | C23 (osc.)* |
| 7 | | 20 mc | 20 mc 22° | C21 (osc.)* |
| 8 | Follow "Adjustments for Electric Tuning." | | | |

* Use **minimum** capacity peak if two peaks can be obtained, and check for image by tuning radio approximately 910 kc lower.
**Note:** The oscillator tracks above the signal on all bands.

# Adjustments for Electric Tuning

These models have eight push buttons. The left-hand button is a Television switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

**Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.**

5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers. Use the "Magic Eye" to ensure sharp peaking.

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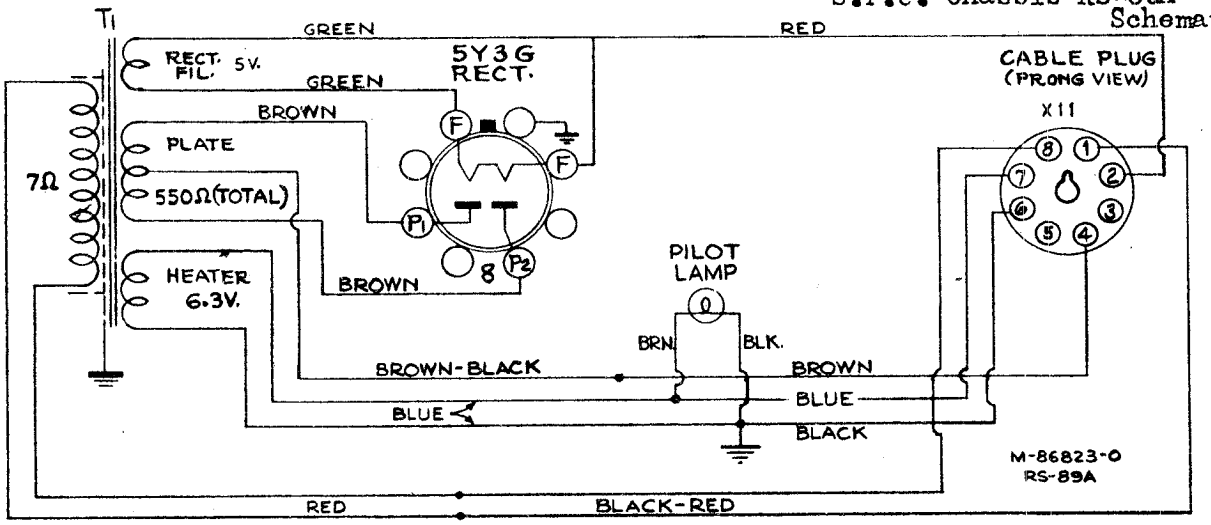
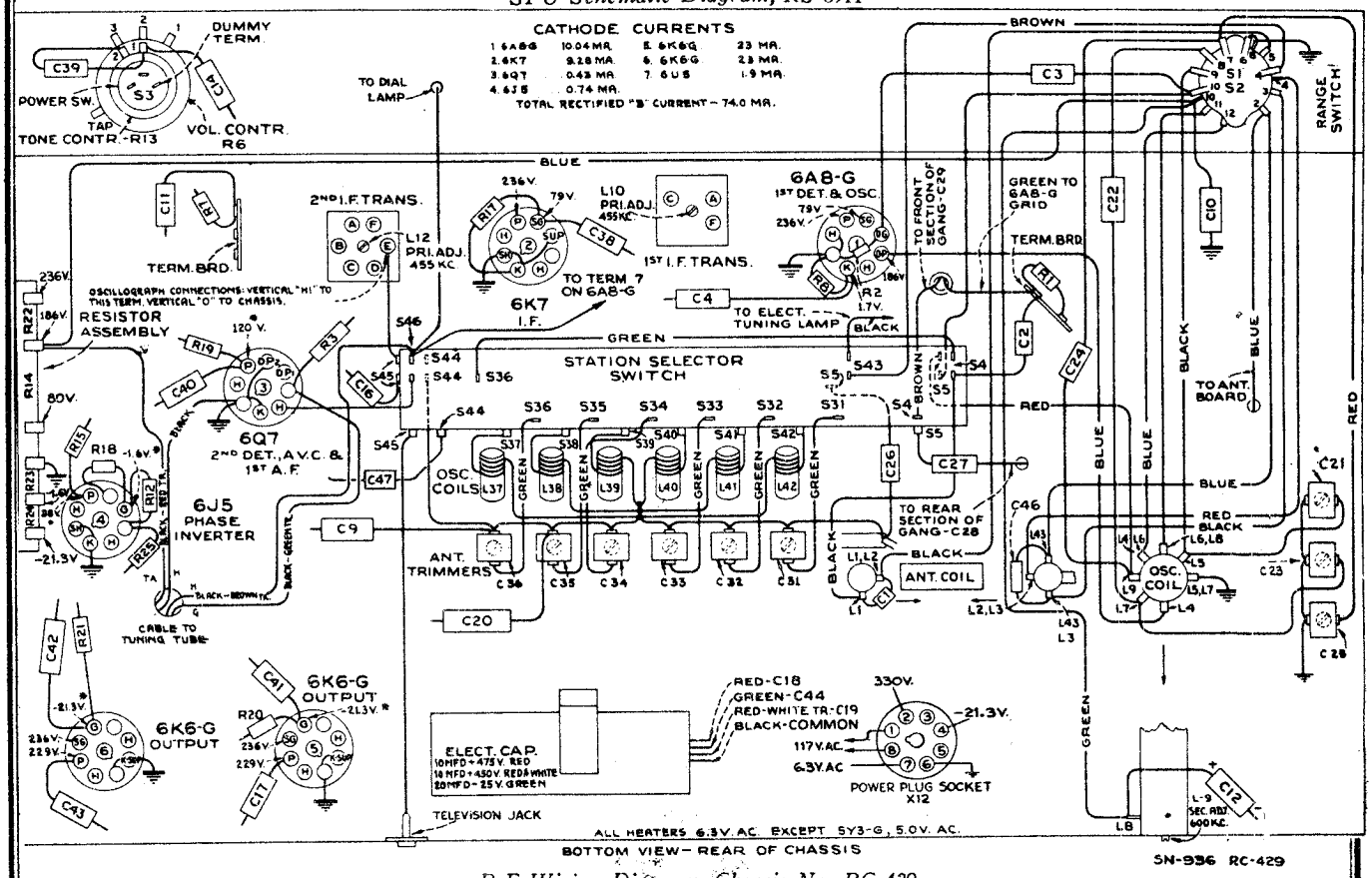
RCA MFG. CO., INC.

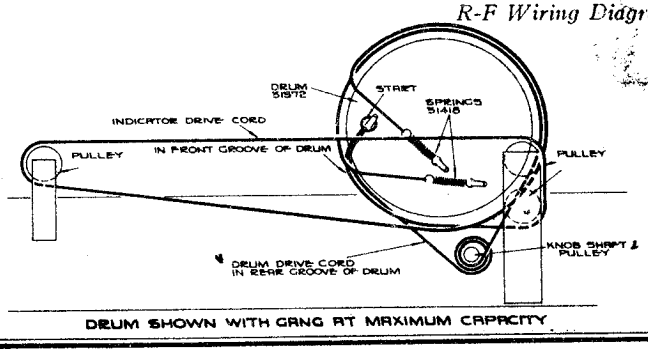
MODEL TRK-5, Chassis RC-429
R-F Chassis Wiring, Voltage
S.P.U. Chassis RS-89A
Schematic




*SPU Schematic Diagram, RS-89A*




*R-F Wiring Diagram, Chassis No. RC-429*




Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ±20% with 117-volt a-c supply.

***NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

*At Left—Dial Mechanism*

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# REPLACEMENT PARTS

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **TELEVISION CHASSIS ASSEMBLIES** | |
| | **TRK-5—KC-3A** | |
| | **TT-5—KC-3** | |
| 33387 | Adjuster—Magnetite core and stud in tube for high frequency oscillator circuit adjustment. (Used with L11, L12, L14, L15) | .55 |
| 33835 | Adjuster—Magnetite core and stud in tube for high frequency oscillator circuit adjustment. (Used with L13) | .55 |
| 31253 | Board—Antenna ground terminal board | .25 |
| 12884 | Capacitor—Plunger type air-trimmer—2½ to 20 mmfd. (Model TRK-5 only) (C6) | .60 |
| 12714 | Capacitor—Plunger type air-trimmer—2½ to 12 mmfd. (C6) (Model TT-5 only) | .50 |
| 33097 | Capacitor—4.7 mmfd. 500 volts (neg. temp. coeff.) (C20, C56, C57) | .35 |
| 33478 | Capacitor—5.6 mmfd., 500 volts (neg. temp. coeff.) (C7) | .40 |
| 33476 | Capacitor—8.2 mmfd., 500 volts (neg. temp. coeff.) (C8) | .40 |
| 33100 | Capacitor—18 mmfd., 500 volts (neg. temp. coeff.) (C25) | .40 |
| 33101 | Capacitor—22 mmfd., 500 volts (neg. temp. coeff.) (C24, C52) | .40 |
| 33111 | Capacitor—33 mmfd., 500 volts (neg. temp. coeff.) (C15) | .35 |
| 33102 | Capacitor—47 mmfd., 500 volts (neg. temp. coeff.) (C53, C58) | .45 |
| 33103 | Capacitor—68 mmfd., 500 volts (neg. temp. coeff.) (C23, C33, C38, C43) | .35 |
| 33477 | Capacitor—80.5 mmfd., 500 volts (neg. temp. coeff.) (C16) | .45 |
| 33104 | Capacitor—82 mmfd., 500 volts (neg. temp. coeff.) (C21, C22) | .45 |
| 33106 | Capacitor—115 mmfd. (C5) | .30 |
| 33107 | Capacitor—135 mmfd., (C4) | .30 |
| 12725 | Capacitor—150 mmfd., (C10) | .35 |
| 33108 | Capacitor—190 mmfd., (C3) | .30 |
| 33105 | Capacitor—215 mmfd., 500 volts (neg. temp. coeff.) (C31, C32) | .45 |
| 33109 | Capacitor—820 mmfd. (C2) | .30 |
| 33110 | Capacitor—390 mmfd. (C1) | .30 |
| 12536 | Capacitor—820 mmfd., 400 volts (C76) | .45 |
| 4881 | Capacitor—3,300 mmfd., 400 volts (C67) | .60 |
| 33806 | Capacitor—.0015 mfd., 1,500 volts (C78) | .25 |
| 33584 | Capacitor—.005 mfd., 1,200 volts (C11, C12, C13, C14, C18, C19, C26, C27, C28, C29, C30, C34, C35, C37, C39, C40, C41, C42, C49, C50, C51, C54, C55, C60, C65, C66, C79, C80, C92, C93, C94, C95) | .25 |
| 33340 | Capacitor—.005 mfd., 3,000 volts (C81, C82) | .50 |
| 11315 | Capacitor—.015 mfd., 400 volts (C61) (Model TT-5 only) | .20 |
| 32787 | Capacitor—.05 mfd., 400 volts (C46, C84) | .20 |
| 4686 | Capacitor—.05 mfd., 400 volts (C62, C77) | .20 |
| 33341 | Capacitor—.05 mfd., 3,000 volts (C74, C75) | .50 |
| 32786 | Capacitor—.1 mfd., 300 volts (C45, C44) | .25 |
| 4839 | Capacitor—.1 mfd., 400 volts (C59, C91, C70, C73) | .30 |
| 33020 | Capacitor—.15 mfd., 2,500 volts (C87) .05 mfd., 3,000 volts (C86) | 2.65 |
| 30965 | Capacitor—.25 mfd., 200 volts (C68, C71) | .30 |
| 12484 | Capacitor—.25 mfd., 350 volts (C37, C69, C88, C89, C90) | .30 |
| 33195 | Capacitor—10 mfd., 450 volts; 10 mfd., 450 volts; 20 mfd., 450 volts; 20 mfd., 25 volts (C63, C48, C47, C72) | 2.20 |
| 33190 | Capacitor—30 mfd., 450 volts; 30 mfd., 450 volts; 10 mfd., 150 volts (C83, C84, C85) | 2.50 |
| 33120 | Choke—Filter choke (L39) | |
| 33243 | Coil—High frequency oscillator coil with core and stud (L11) | .65 |
| 33234 | Coil—1¼-turn antenna coil, core, stud and capacitor assembly (C5, L9, L10) (green) | 1.10 |
| 33233 | Coil—2-turn antenna coil core, stud and capacitor assembly (C4, L7, L8) (yellow) | 1.10 |
| 33232 | Coil—3-turn antenna coil, core, stud and capacitor assembly (C3, L5, L6) (orange) | 1.15 |
| 33231 | Coil—5¼-turn antenna coil, core, stud and capacitor assembly (C2, L3, L4) (red) | 1.20 |
| 33230 | Coil—7¼-turn antenna coil, core, stud and capacitor assembly (C1, L1, L2) (brown) | 1.25 |
| 33538 | Coil—Peaking coil and 10 meg. ½ watt resistor assembly (L33, R37) | .55 |
| 33539 | Coil—Peaking coil and 10 meg. resistor assembly (L31, R32) | .55 |
| 33540 | Coil—Peaking coil and 10 meg. ½ watt resistor assembly (L32, R35) | .55 |
| 33541 | Coil—Peaking coil and 1,500 ohm, ½ watt resistor assembly (L38, R59) | .55 |
| 33228 | Condenser—Adjustable oscillator tuning condenser mounted on band switch (C9) | 2.10 |
| 33385 | Connector—Insulated plate connector and lead (Use with 879 Rectifier Tube) | .35 |
| 33280 | Control—Audio volume control—1 meg. (Model TT-5 only) (R55) | 1.50 |
| 33274 | Control—Dual contrast and brightness control 10,000 ohm and 100,000 ohm (R14, R42) | 2.00 |
| 33275 | Control—Dual horizontal and vertical holding control—30,000 ohm and 1.2 meg. (R78, R65) | 2.00 |
| 33278 | Control—250,000 ohm "Width" control (R80) | 1.00 |
| 33276 | Control—400,000 ohm "focus" control (R97) | 1.00 |
| 33277 | Control—500,000 ohm "Vert. cent."—"Hor. cent." control (R99, R100) | 1.00 |
| 33279 | Control—2 megohm "Height" control (R70) | 1.00 |
| 33015 | Insulator—Stand-off porcelain insulator—less hardware | .30 |
| 4449 | Knob—"Focus" control knob | .15 |
| 33225 | Nut—Speed nut for use with high frequency coil assemblies (Pkg. of 10) | .01 |
| 14278 | Receptacle—Television sound output receptacle (X6) | .25 |
| 14074 | Resistor—82 ohms, ½ watt (R13, R44) | .20 |
| 14561 | Resistor—220 ohms, ½ watt (R27, R22) | .20 |
| 11352 | Resistor—910 ohms, ½ watt (R8) | .20 |
| 14720 | Resistor—1,000 ohms, ½ watt (R17, R25, R49) | .20 |
| 30152 | Resistor—1,000 ohms, 1 watt (R20, R24, R47) | .22 |
| 33318 | Resistor—1,200 ohms, 2 watts (R87) | .25 |
| 11351 | Resistor—1,300 ohms, ½ watt (R26) | .20 |
| 14499 | Resistor—1,500 ohms, ½ watt (R18) | .20 |
| 12194 | Resistor—1,800 ohms, ½ watt (R29) | .20 |
| 13486 | Resistor—2,200 ohms, 1 watt (R6) | .22 |
| 13031 | Resistor—3,300 ohms, 1/10 watt (R12 in early production) | .15 |
| 12312 | Resistor—3,300 ohms, ½ watt (R19, R7) | .20 |
| 30150 | Resistor—3,600 ohms, 1 watt (R7) | .22 |
| 12955 | Resistor—3,900 ohms, ½ watt (R30) | .20 |
| 33566 | Resistor—3,900 ohms, 2 watts (R36) | .25 |
| 11650 | Resistor—4,700 ohms, 1/10 watt (R12 in later production) | .15 |
| 12265 | Resistor—6,800 ohms, ½ watt (R31, R9) | .20 |
| 14075 | Resistor—8,200 ohms, ½ watt (R63, R64) | .20 |
| 3155 | Resistor—9,100 ohms, 1 watt (R90) | .22 |
| 3078 | Resistor—10,000 ohms, ½ watt (R58, R62) | .20 |
| 8043 | Resistor—10,000 ohms, 2 watts (R57) | .25 |
| 30128 | Resistor—12,000 ohms, ½ watt (R61) | .20 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R51) | .15 |
| 14390 | Resistor—27,000 ohms, 1/10 watt (R10) | .15 |
| 12738 | Resistor—27,000 ohms, ½ watt (R54) (Model TT-5 only) | .20 |
| 12454 | Resistor—33,000 ohms, ½ watt (R5, R77) | .20 |
| 33639 | Resistor—33,000 ohms, 1 watt (R91) | .20 |
| 30683 | Resistor—33,000 ohms, 1 watt (R16) | .22 |
| 30434 | Resistor—39,000 ohms, 1 watt (R46) | .22 |
| 33182 | Resistor—43,000 ohms, 2 watts (R88, R89) | .25 |
| 12412 | Resistor—47,000 ohms, ½ watt (R93, R94) | .20 |
| 30495 | Resistor—47,000 ohms, 1 watt (R84, R86) | .22 |
| 33567 | Resistor—62,000 ohms, ½ watt (R28, R23) | .20 |
| 13715 | Resistor—68,000 ohms, ½ watt (R73) | .20 |
| 30679 | Resistor—68,000 ohms, 1 watt (R50) | .22 |
| 8064 | Resistor—82,000 ohms, ½ watt (R15, R45) | .20 |
| 11281 | Resistor—100,000 ohms, 1/10 watt (R21) | .15 |
| 14560 | Resistor—100,000 ohms, ½ watt (R11, R48, R52, R67, R79) | .20 |
| 30180 | Resistor—120,000 ohms, ½ watt (R4) | .20 |
| 30493 | Resistor—150,000 ohms, ½ watt (R43) | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt (R66, R75, R76, R101) | .20 |
| 33501 | Resistor—330,000 ohms, 1 watt (R98) | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt (R34) | .20 |
| 33502 | Resistor—470,000 ohms, 1 watt (R92) | .20 |
| 33593 | Resistor—560,000 ohms, 1 watt (R95) | .22 |
| 12413 | Resistor—680,000 ohms, ½ watt (R81) | .20 |
| 33598 | Resistor—680,000 ohms, 1 watt (R96) | .22 |
| 13730 | Resistor—1 meg. ½ watt (R1, R2, R3, R33, R53, R60, R56, R68) | .20 |
| 30208 | Resistor—1.2 meg., ½ watt (R39, R82, R83, R71, R41) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R74) | .20 |
| 13167 | Resistor—3.9 meg., ½ watt (R38, R40) | .20 |
| 30931 | Resistor—4.7 meg., ½ watt (R69) | .20 |
| 33229 | Roller—Rubber friction roller for use on band switch for adjustment of oscillator trimmer | .10 |
| 3682 | Shield—Tube shield for "Hor. out" tube | .22 |
| 33211 | Socket—4-prong rectifier tube socket | 1.00 |
| 31251 | Socket—Octal base wafer type tube socket | .25 |
| 33001 | Socket—11-prong magnal Kinescope socket (X13) | 1.20 |
| 18008 | Socket—6J5 oscillator tube socket | .25 |
| 33226 | Switch—Band switch complete—less tuning condenser and friction roller | 4.60 |
| 33281 | Switch—Rotary type power switch (S5) (Model TT-5 only) | .65 |
| 33519 | Transformer—"1st Det. P1" I-F transformer (R8, C20, L17, L20, R10, C25) (red and brown) | 2.70 |
| 33520 | Transformer—"1st Det. P2" I-F transformer (L18, C21, C22, C23, L19, R12) (red and red) | 2.70 |
| 33523 | Transformer—"1st pix P1" I-F transformer (L21, L22, R18, C31) (red and green) | 2.20 |
| 33524 | Transformer—"1st pix P2" I-F transformer (L23, L24, C33, R21) (red and blue) | 2.00 |
| 33526 | Transformer—"1st Sound" I-F transformer (L34, L35, C52, C53) (red and white) | 2.50 |
| 33522 | Transformer—"2nd Picture" I-F transformer (L25, L26, L27, C38, R26) (red and yellow) | 2.00 |
| 33527 | Transformer—"2nd Sound" I-F transformer (L36, L37, C56, C57, R51) (brown and orange) | 2.40 |
| 33525 | Transformer—"3rd Picture" I-F transformer (L28, L29, L30, C43, R29) (red and black) | 2.00 |
| 32899 | Transformer—Horizontal oscillation transformer (T3) | 1.75 |
| 33390 | Transformer—Plate and filament power transformer (T1) | 13.50 |
| 32898 | Transformer—Vertical oscillation transformer (T2) | 1.75 |
| | **3 BAND RADIO RECEIVER** | |
| | **No. RC-429 Used with Model TRK-5** | |
| 14517 | Board—Antenna—Ground terminal board | .25 |
| 30752 | Bracket—"Magic Eye" bracket | .25 |
| 30766 | Cap—Rubber cap for "Magic Eye" | .15 |
| 32486 | Capacitor—Antenna coil trimmer capacitor bank (C31, C32, C33, C34, C35, C36) | 1.40 |
| 31400 | Capacitor—Triple adjustable trimmer, two sections, 2-10 mmfd., one section 3-30 mmfd. (C21, C23, C25) | .50 |
| 12722 | Capacitor—18 mmfd. (C1) | .35 |
| 12723 | Capacitor—56 mmfd. (C3, C46) | .35 |
| 12720 | Capacitor—100 mmfd. (C39) | .35 |
| 14262 | Capacitor—109 mmfd. (C5, C6) | .30 |
| 12404 | Capacitor—120 mmfd. (C7, C8) | .30 |
| 14712 | Capacitor—180 mmfd. (C37) | .30 |
| 30232 | Capacitor—200 mmfd. (C2) | .35 |
| 32492 | Capacitor—530 mmfd. (C24) | .40 |
| 31435 | Capacitor—750 mmfd. (C26) | .40 |
| 4881 | Capacitor—3,300 mmfd. (C22) | .60 |
| 31405 | Capacitor—6,000 mmfd. (C27) | .75 |
| 5107 | Capacitor—.0025 mfd., 700 volt (C18, C47) | .20 |
| 4838 | Capacitor—.005 mfd., 1,000 volt (C14, C17, C43) | .25 |
| 14393 | Capacitor—.01 mfd., 300 volt (C11) | .50 |
| 30882 | Capacitor—.05 mfd., 200 volt (C4, C9, C38) | .20 |
| 4858 | Capacitor—.01 mfd., 500 volt (C10, C40, C41, C42) | .25 |
| 30867 | Capacitor—0.5 mfd., 200 volt (C20) | .30 |
| 32145 | Capacitor—1 mfd., 450 volt (C12) | .70 |
| 32142 | Capacitor—10-20 mfd. (C18, C19, C44) | 1.90 |
| 31382 | Clip—Push button coil and core mounting clip | .04 |
| 32493 | Coil—Antenna coil assembly A, B, and C band (L1, L2, L3, L43) | 1.35 |
| 31385 | Coil—Push button oscillator coil, "A" band (L37, L38) (550-950KC) | .30 |
| 32487 | Coil—Push button oscillator coil, "A" band (L39, L40) (690-1225KC) | .35 |
| 31383 | Coil—Push button oscillator coil, "A" band (L41, L42) (890-1,500KC) | .30 |
| 31951 | Coil—Oscillator coil assembly for A, B, and C bands (L4, L5, L6, L7, L8, L9) | 1.40 |
| 31369 | Condenser—2 gang variable tuning condenser (C28, C29, C30) | 2.65 |
| 33497 | Control—Dual volume and tone control and switch (R6, R13, S3) | 3.00 |
| 32634 | Cord—Drive cord with clamping clips | .10 |
| 12800 | Core—Adjustable core and stud for oscillator coil | .35 |
| 31372 | Drum—Variable condenser drive cord drum and calibration dial | .65 |
| 11891 | Lamp—6.3 volt dial lamp (Mazda No. 44) | .17 |
| 32670 | Plate—Dial plate assembly | .75 |
| 12493 | Plug—Female speaker cable plug (X10) | .30 |
| 32552 | Pointer—Dial pointer | .20 |
| 31373 | Pulley—Pointer drive cord pulley | .08 |
| 14278 | Receptacle—Television sound input socket (X8) | .25 |
| 32143 | Resistor—Voltage divider comprising one 11,000 ohm, one 3,000 ohm, one 22 ohm and one 270 ohm section (R14, R22, R23, R24) | .90 |
| 30545 | Resistor—180 ohms, ½ watt (R8) | .20 |
| 5114 | Resistor—15,000 ohms, 1 watt (R17) | .22 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R4) | .15 |
| 12454 | Resistor—33,000 ohms, ½ watt (R2, R12) | .20 |
| 12266 | Resistor—39,000 ohms, ½ watt (R7) | .20 |
| 14560 | Resistor—100,000 ohms, ½ watt (R25) | .20 |
| 11398 | Resistor—220,000 ohms, 1/10 watt (R5) | .15 |
| 12199 | Resistor—270,000 ohms, ½ watt (R15, R19) | .20 |
| 13479 | Resistor—390,000 ohms, ½ watt (R20, R21) | .20 |
| 12486 | Resistor—560,000 ohms, ½ watt (R18) | .20 |
| 12015 | Resistor—1 meg., 1/10 watt (R16) | .15 |
| 13730 | Resistor—1 meg., ½ watt (R1) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R3) | .29 |
| 14343 | Retainer—Retainer for stock No. 33500 tuning shaft | .03 |
| 14887 | Retainer—Retainer spring for stock No. 31373 pulley | .01 |
| 33500 | Shaft—Tuning shaft | .30 |
| 12581 | Shield—I-F transformer shield top | .25 |
| 31319 | Socket—8 prong socket for power supply plug (X12) | .25 |
| 31639 | Socket—Dial lamp socket, one wire non-insulated | .25 |
| 31364 | Socket—Dial lamp socket, two wire insulated | .20 |
| 13871 | Socket—Magic eye socket | .45 |
| 31251 | Socket—Octal type tube socket | .25 |
| 31418 | Spring—Indicator or drive cord tension spring | .05 |
| 33496 | Switch—Range switch (S1, S2) | 1.15 |
| 33498 | Switch—Station selector push button switch (S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S4, S5, S44, S45, S46) | 3.10 |
| 33499 | Switch—Television power switch and cover (S47) | .45 |
| 14376 | Transformer—1st I. F. transformer complete (L10, L11, C5, C6) | 2.45 |
| 14283 | Transformer—2nd I. F. transformer complete (L12, L13, C7, C8, C37, R4, R5) | 3.80 |
| | **POWER SUPPLY UNIT** | |
| | **RS—89—A** | |
| | **USED WITH RC—429** | |
| 33606 | Plug—8 prong plug for power supply cable (X11) | .45 |
| 31251 | Socket—Octal base tube socket | .25 |
| 33224 | Transformer—Power transformer (T1) | 5.25 |
| | **SPEAKER ASSEMBLIES** | |
| | **TRK-5** | |
| | **RL-70—H-5** | |
| 31825 | Cap—Speaker cone dust cap | .05 |
| 11469 | Coil—Hum bucking coil (L15) | .30 |
| 12012 | Coil—Speaker field coil (L16) | 2.90 |
| 31275 | Cone—Speaker cone and voice coil (L14) | 1.75 |
| 31539 | Plug—5 prong male speaker plug with link (X9) | .25 |
| 32146 | Speaker—Speaker complete | 12.10 |
| 14534 | Transformer—Output transformer (T2) | 2.10 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| | **MODEL TRK-5** | |
| | **MODEL TT-5** | |
| 31397 | Button—Station selector push button (Model TRK-5 only) | .15 |
| 33597 | Cap—Pilot lamp "bull's eye" (Model TRK-5 only) | .20 |
| 33480 | Cable—38-inch shielded cable with two male plugs. Used between Radio and television chassis (Model TRK-5 only) (X5, X7) | 1.30 |
| 33479 | Cable—61-inch audio connection cable with two male connectors (Model TT-5 only) (X5, X7) | 1.60 |
| 33363 | Connector—2 prong female plug for interlock cable (X2) | .45 |
| 4573 | Connector—2 prong female connector used on television power cable (X4) | .30 |
| 31456 | Cover—Package of eight protective push button covers | .08 |
| 32673 | Dial—3-band glass dial scale | .60 |
| 33481 | Escutcheon—Dial escutcheon and scale (Model TRK-5 only) | 3.60 |
| 33518 | Glass—Safety protective glass for kinescope | 2.90 |
| 33506 | Knob—Band switch knob (Model TRK-5 only) | .25 |
| 33471 | Knob—"Brightness", "Vert. hold" or "volume" knob | .25 |
| 33470 | Knob—"Contrast", "Hor. hold", "Fine tuning" or "Tone control" knob | .20 |
| 33469 | Knob—"Off-on" control knob (Model TT-5 only) | .20 |
| 33505 | Knob—Radio tuning knob (Model TRK-5 only) | .30 |
| 33472 | Knob—"Station selector" control knob (white dot) | .25 |
| 33468 | Knob—"Volume" control knob | .15 |
| 11891 | Lamp—6.3 volt, Pilot indicator lamp (Mazda No. 44) | .17 |
| 31458 | Marker—"Dial tuning" marker tab (Model TRK-5 only) | .01 |
| 33596 | Marker—"Television marker tab (Model TRK-5 only) | .01 |
| 31589 | Marker—Complete set of station call letter markers (TRK-5 only) | .35 |
| 33225 | Nut—"Speed nut" for high frequency coil assembly (Pkg. of 10) | .01 |
| 4577 | Plug—2 prong male connector used on television power cable (X3) | .45 |
| 33244 | Plug—2 prong male connector used on interlock cable (X1) | .45 |
| 12493 | Plug—5 prong female speaker connector plug (Model TRK-5 only) | .30 |
| 11210 | Screw—4x20x1 in. chassis mounting screw, washer and lock washer (5 req'd) | .05 |
| 4560 | Screw—4x20x1¼ chassis mounting screw, washer and lock washer (6 req'd) | .06 |
| 14270 | Spring—Knob spring for stock No. 33468, 33471, 33472 and 33469 knobs | .05 |
| 30330 | Spring—Knob spring for stock No. 33470 knob | .02 |
| 4982 | Spring—Knob spring for stock No. 33505 knob | .05 |
| 32384 | Switch—Interlock switch and cover (S1, S2, TRK-5, S3 S4, TT-5) | .55 |

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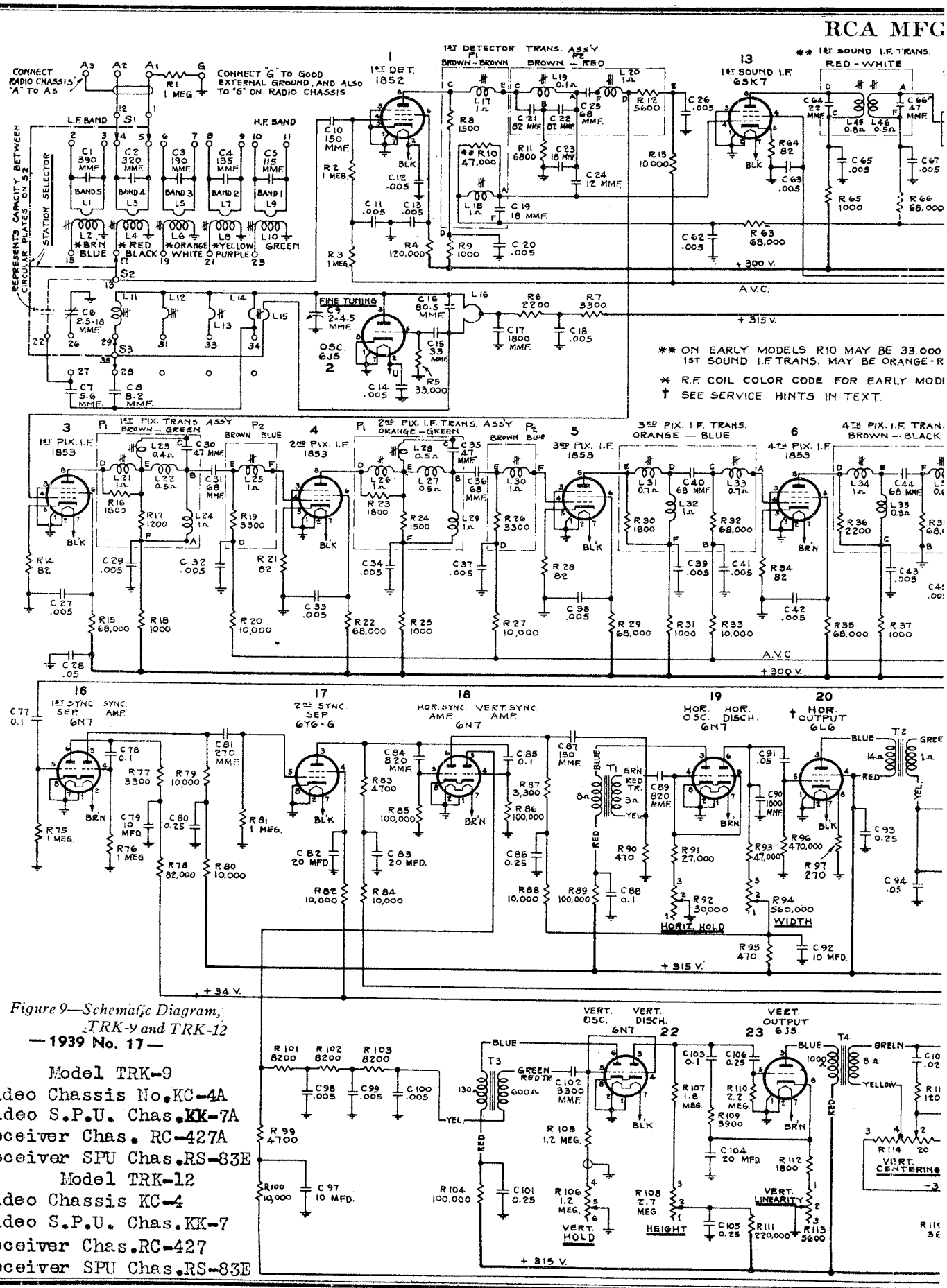


*Figure 9—Schematic Diagram, TRK-9 and TRK-12*

**— 1939 No. 17 —**

Model TRK-9
Video Chassis No.KC-4A
Video S.P.U. Chas.KK-7A
Receiver Chas. RC-427A
Receiver SPU Chas.RS-83E

Model TRK-12
Video Chassis KC-4
Video S.P.U. Chas.KK-7
Receiver Chas.RC-427
Receiver SPU Chas.RS-83E

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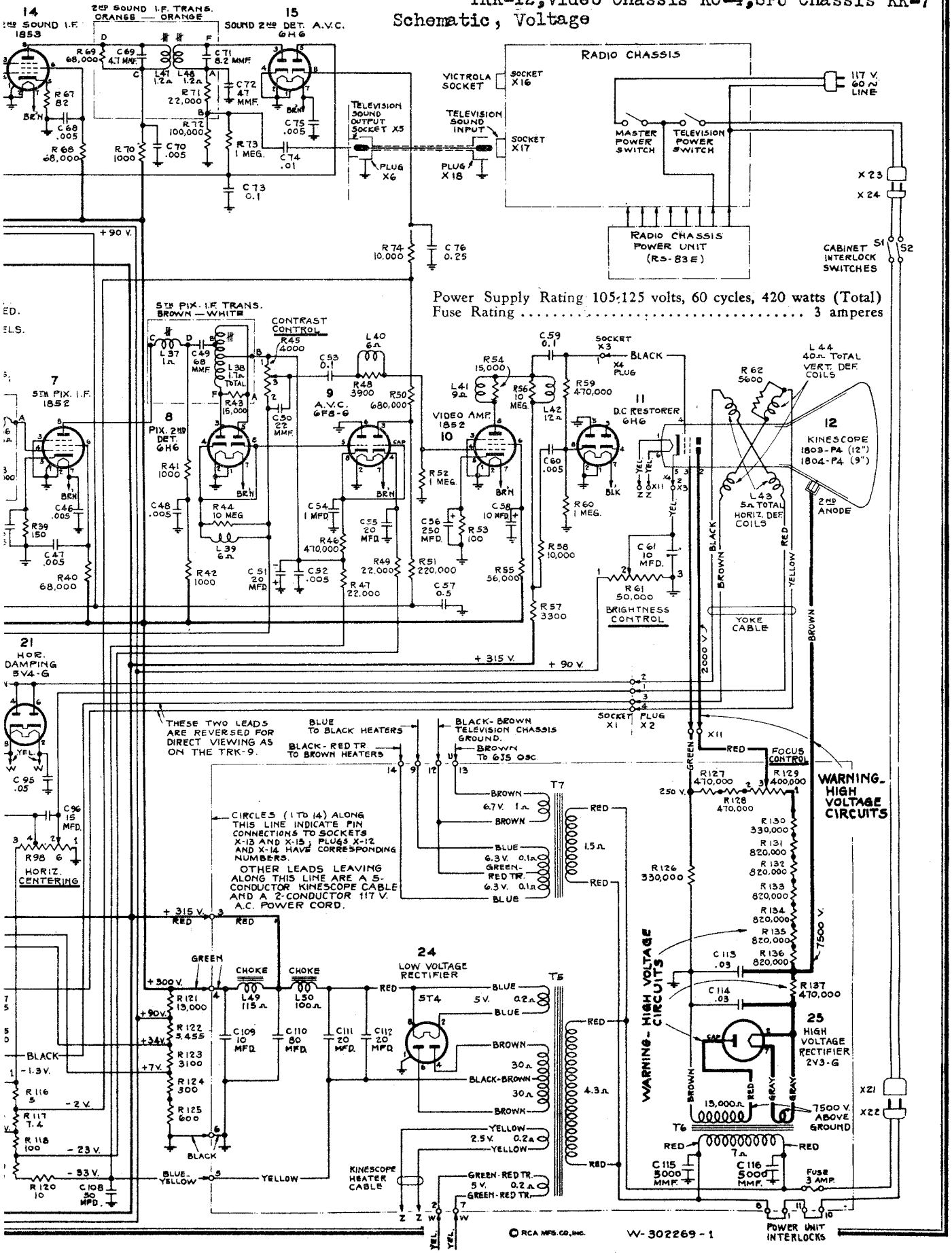
# MODELS TRK-9, Video Chassis KC-4A, SPU Chassis KK-7A
# TRK-12, Video Chassis KC-4, SPU Chassis KK-7
## Schematic, Voltage

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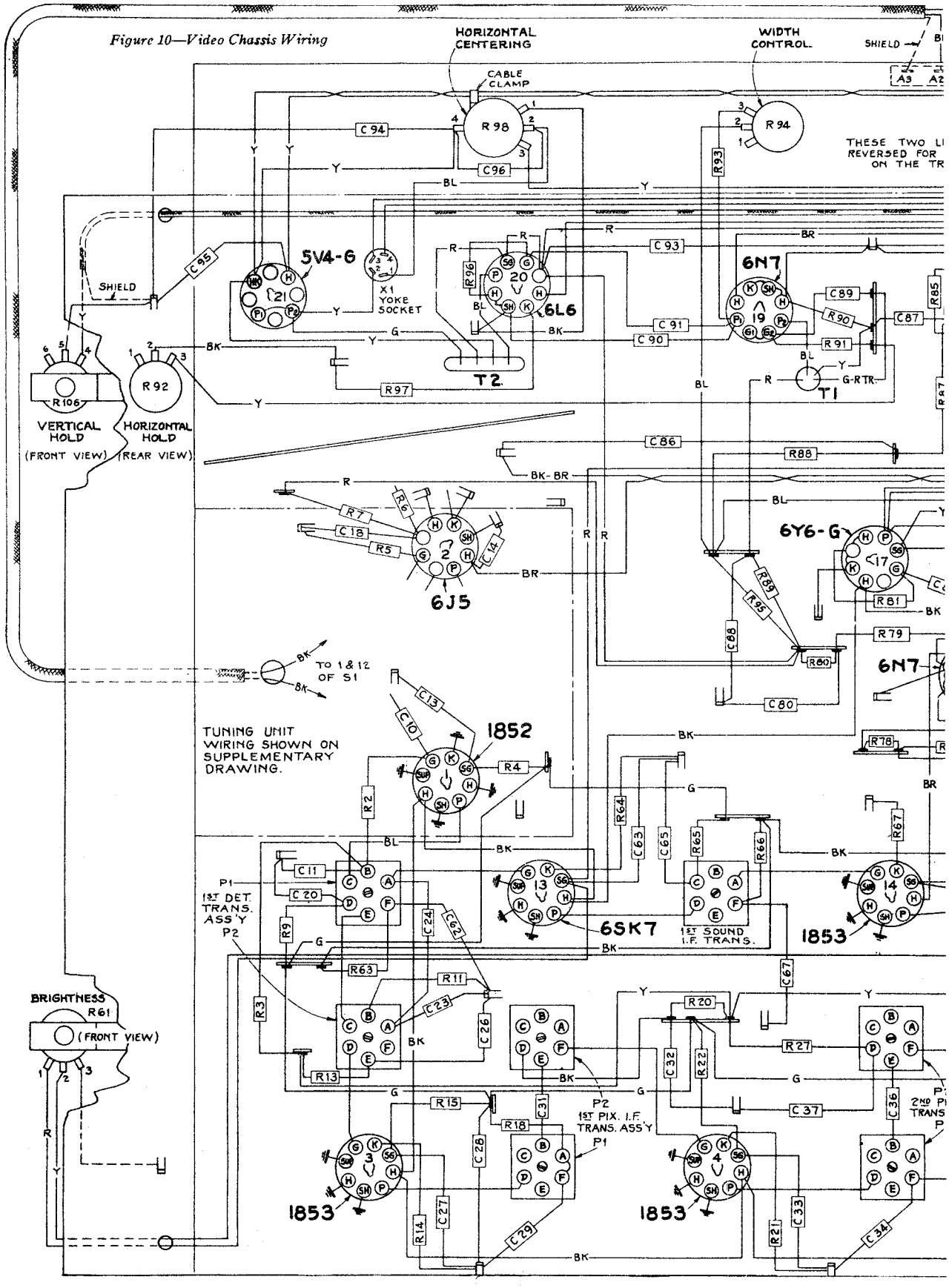
MODELS TRK-9,TRK-12
Video Chassis Wiring

RCA MFG.

*Figure 10—Video Chassis Wiring*

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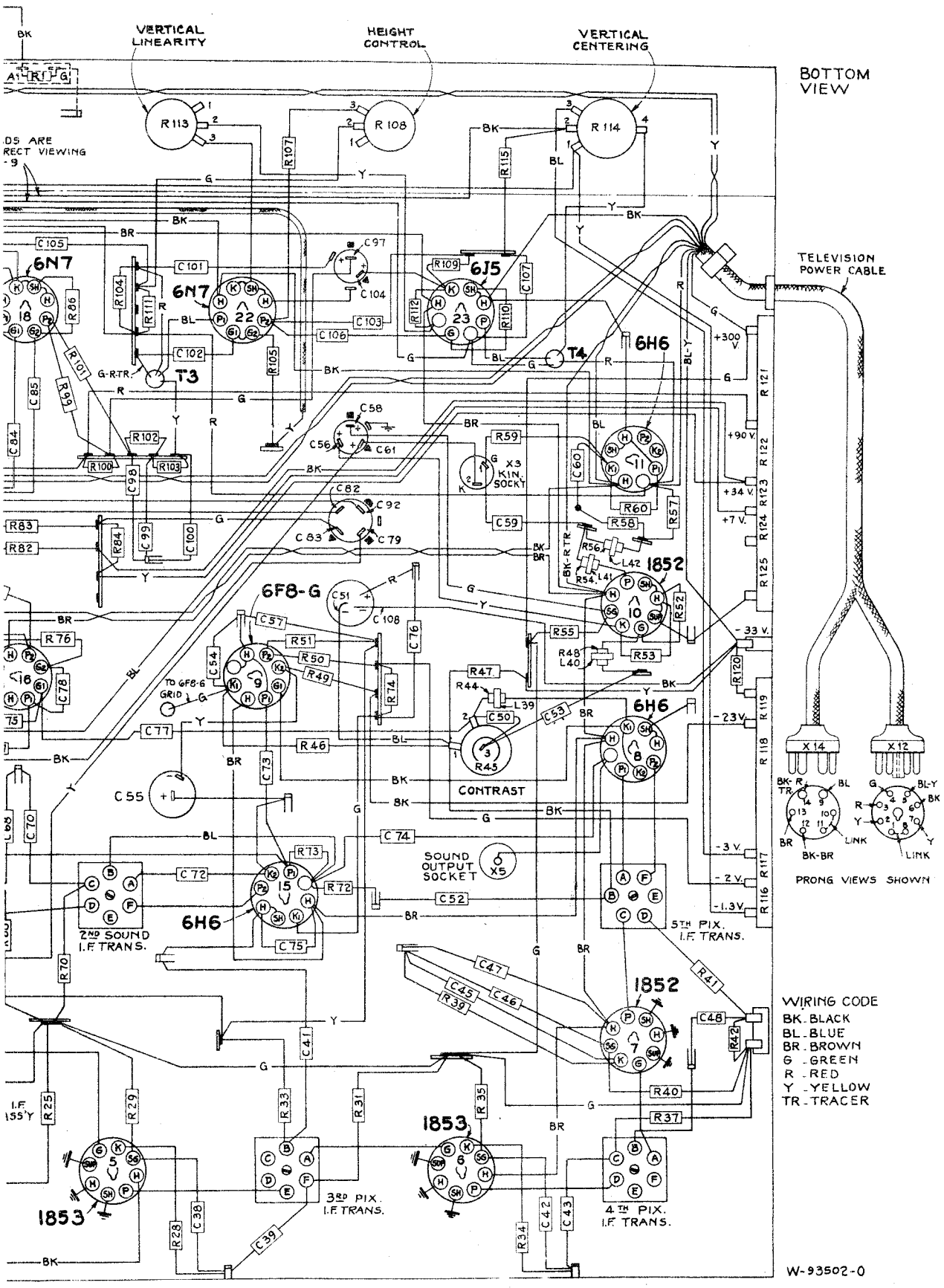
VERTICAL LINEARITY
HEIGHT CONTROL
VERTICAL CENTERING
BOTTOM VIEW
TELEVISION POWER CABLE
R113
R108
R114
6N7
6J5
6H6
T3
T4
1852
1853
6F8-G
X3 KIN. SOCKET
CONTRAST
SOUND OUTPUT SOCKET X5
2ND SOUND I.F. TRANS.
3RD PIX. I.F. TRANS.
4TH PIX. I.F. TRANS.
5TH PIX. I.F. TRANS.
+300 V.
+90 V.
+34 V.
+7 V.
-33 V.
-23V.
-3 V.
-2 V.
-1.3V
X14
X12
BK-R TR
BK-BR
LINK
PRONG VIEWS SHOWN
WIRING CODE
BK. BLACK
BL. BLUE
BR. BROWN
G. GREEN
R. RED
Y. YELLOW
TR. TRACER
W-93502-0

RCA MFG. CO., INC.

MODEL TRK-12
Assembly, Operating Controls
Specifications

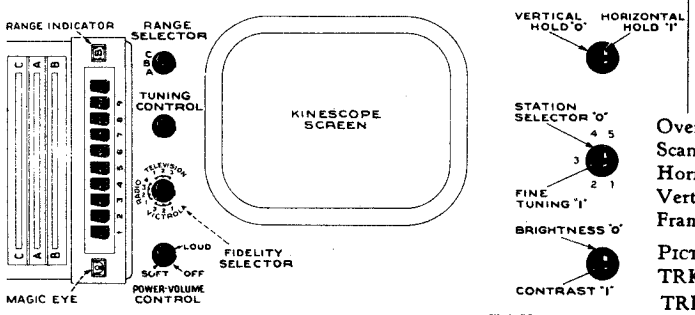


*Figure 2—Operating Controls, TRK-12*

TELEVISION CHANNELS (Selector Switch Positions)

| | |
|---|---|
| 1 | 84 to 90 mc. |
| 2 | 78 to 84 mc. |
| 3 | 66 to 72 mc. |
| 4 | 50 to 56 mc. |
| 5 | 44 to 50 mc. |

| | |
|---|---|
| Over-all Video Band Width | 4 mc. |
| Scanning | Interlaced, 441 Line |
| Horizontal (Line) Scanning Frequency (Sawtooth Wave) | 13,230 cps |
| Vertical (Field) Scanning Frequency (Sawtooth Wave) | 60 cps |
| Frame Frequency (Picture Repetition Rate) | 30 cps |

PICTURE SIZE (Approx. Mask Dimensions)

| | |
|---|---|
| TRK-9 | 5½ x 7¼ in. |
| TRK-12 | 7⅜ x 9¾ in. |

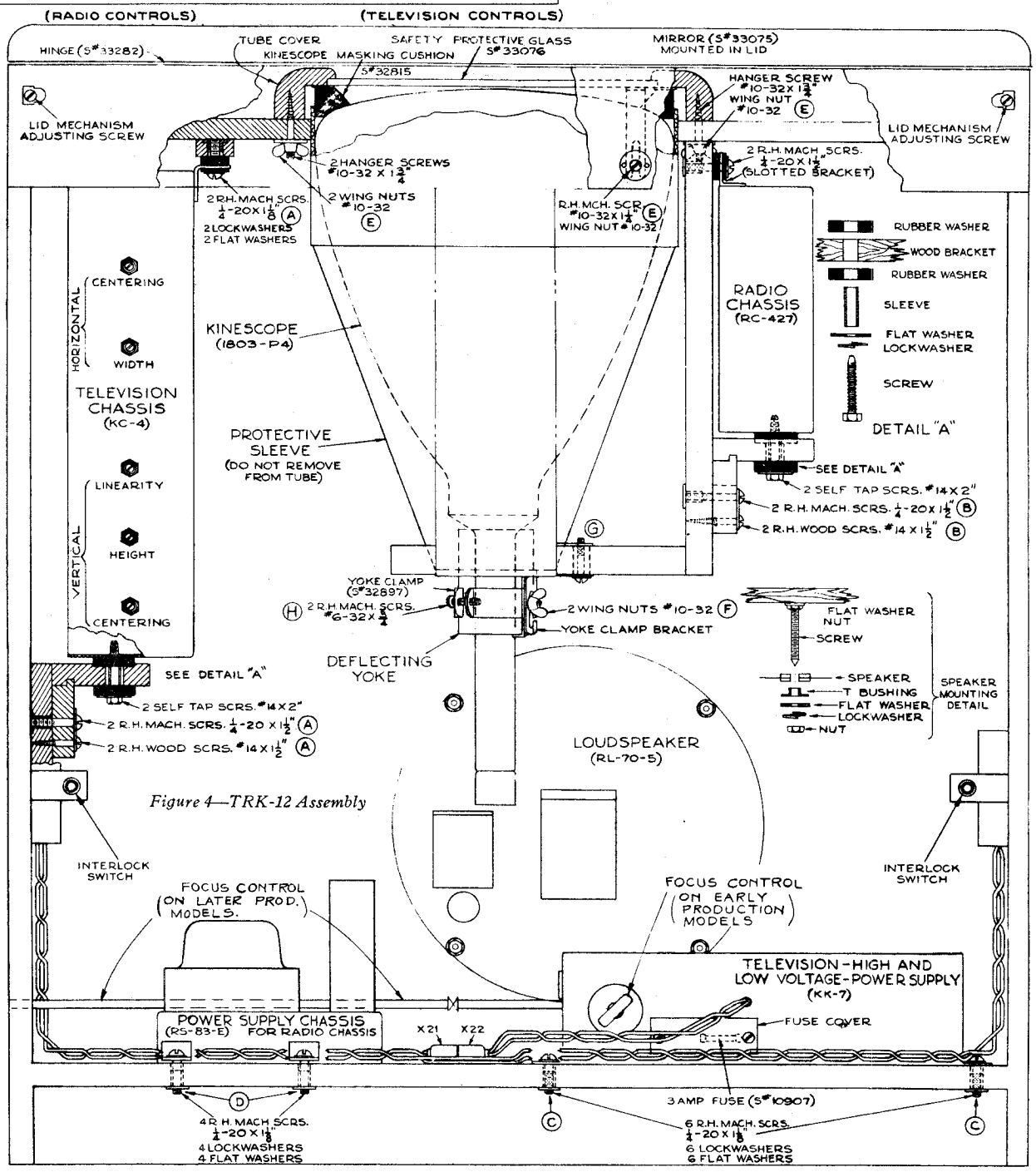


*Figure 4—TRK-12 Assembly*

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MODELS TRK-9, TRK-12
Cabinet Wiring
Socket

# RCA MFG. CO., INC.

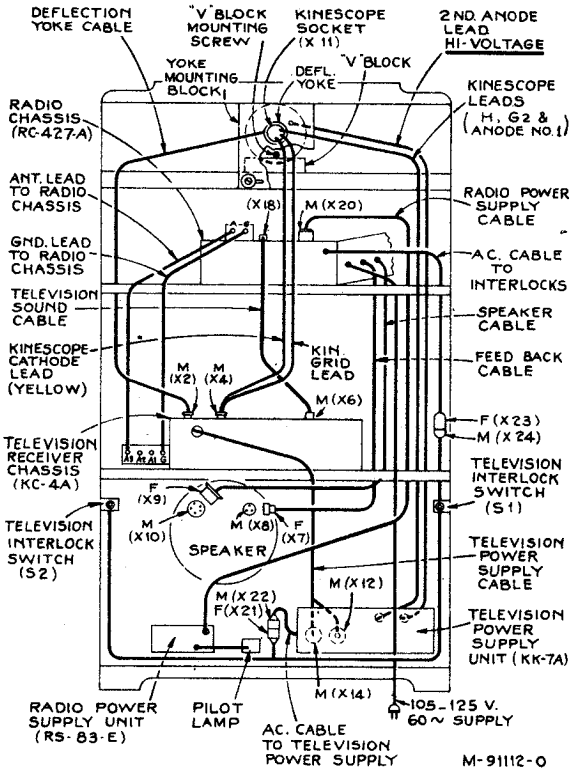



*Figure 3—Cabinet Wiring—Model TRK-9*

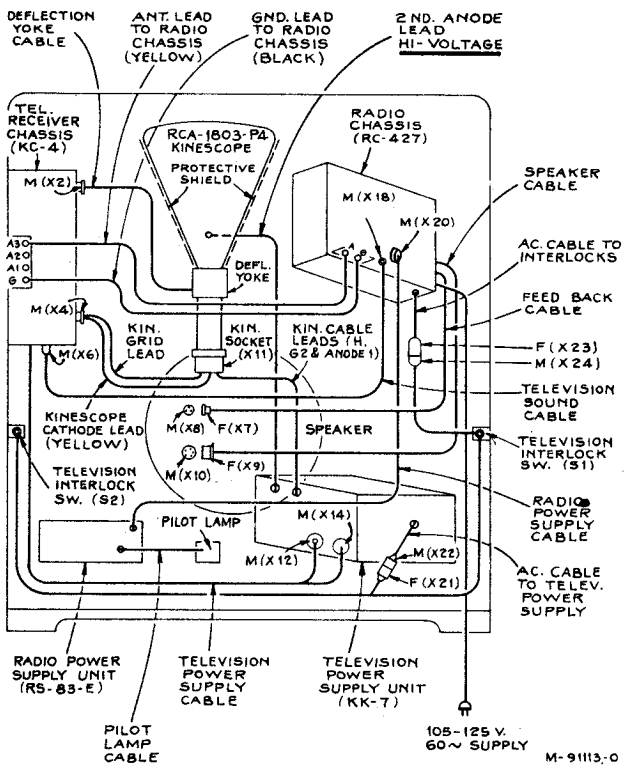
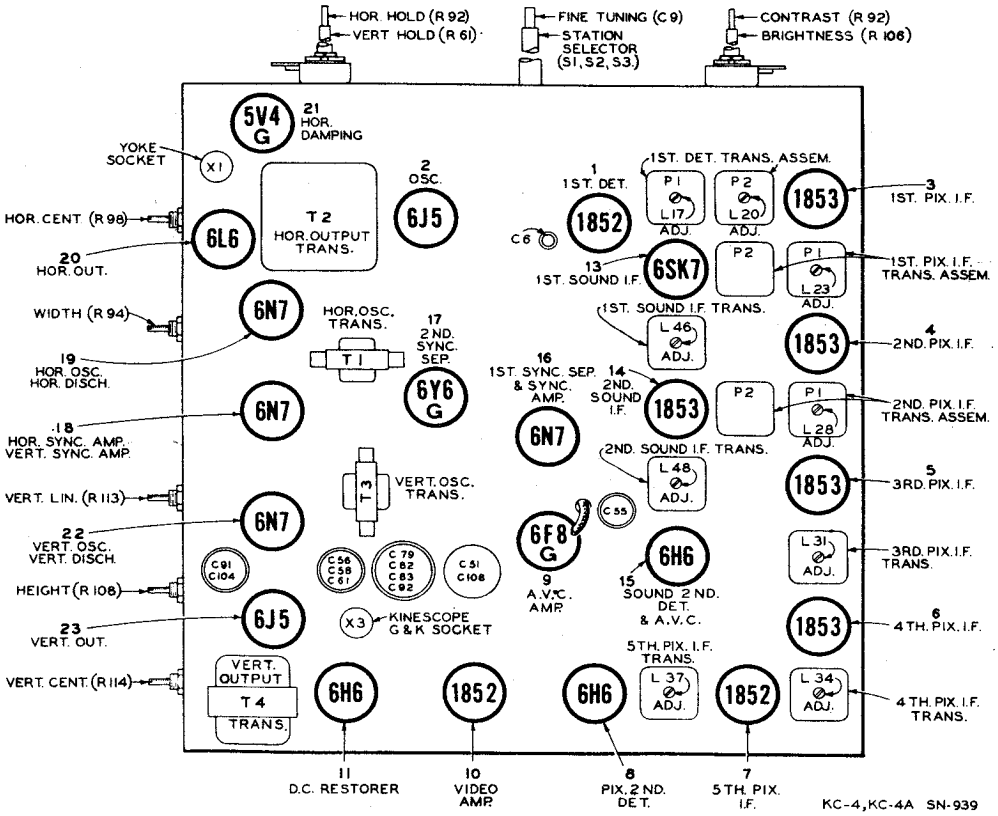
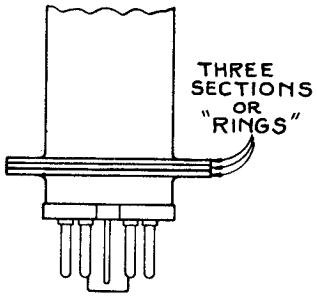



*Figure 3a—Cabinet Wiring—Model TRK-12*




*At Left—Figure 5*
*Top View Video Chassis*




*(Above) Figure 6*
*Recommended Type 6L6 Identification*

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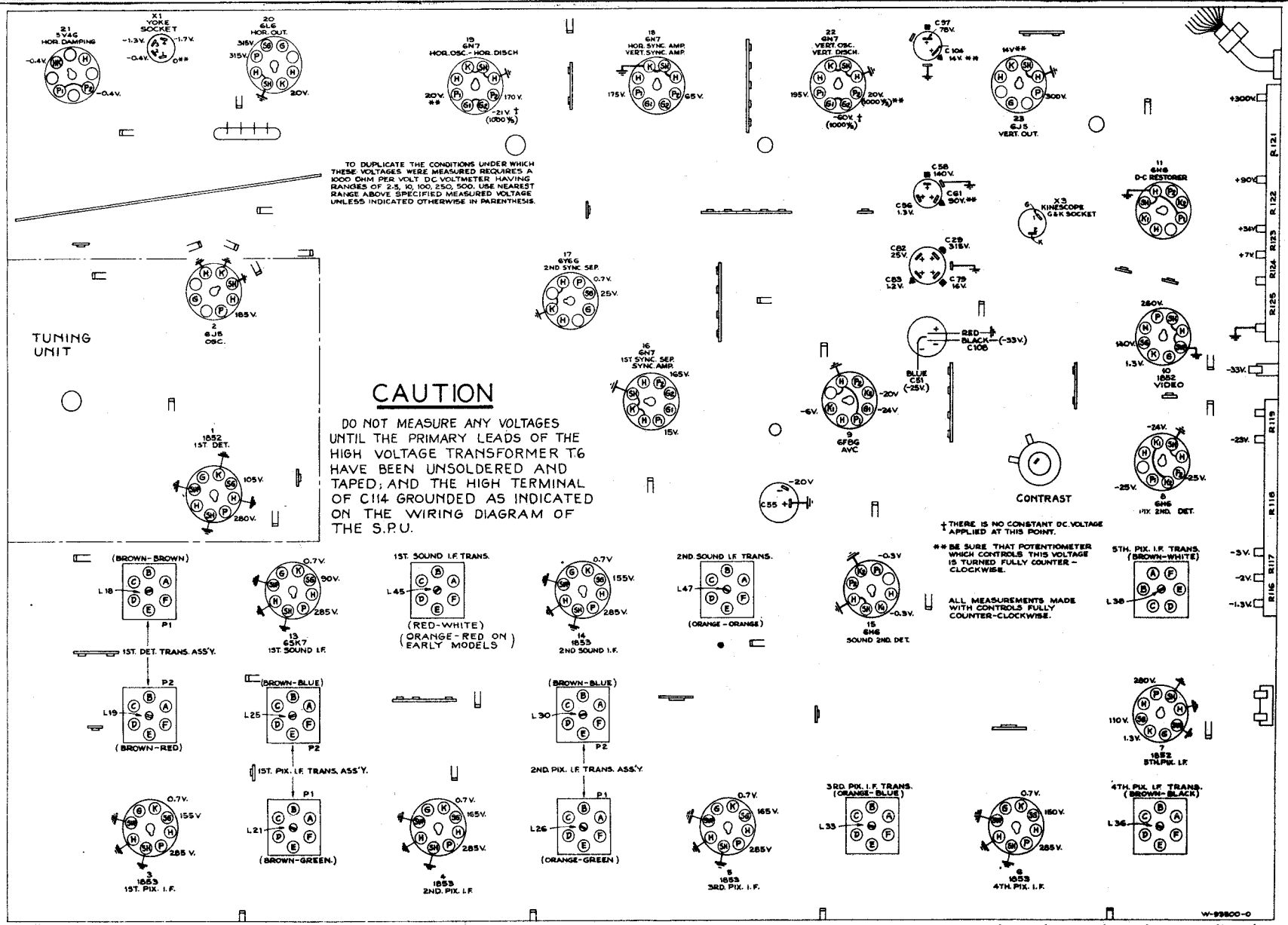
TUNING UNIT
CAUTION
DO NOT MEASURE ANY VOLTAGES UNTIL THE PRIMARY LEADS OF THE HIGH VOLTAGE TRANSFORMER T6 HAVE BEEN UNSOLDERED AND TAPED; AND THE HIGH TERMINAL OF C114 GROUNDED AS INDICATED ON THE WIRING DIAGRAM OF THE S.P.U.
TO DUPLICATE THE CONDITIONS UNDER WHICH THESE VOLTAGES WERE MEASURED REQUIRES A 1000 OHM PER VOLT D.C. VOLTMETER HAVING RANGES OF 2.5, 10, 100, 250, 500. USE NEAREST RANGE ABOVE SPECIFIED MEASURED VOLTAGE UNLESS INDICATED OTHERWISE IN PARENTHESIS.
CONTRAST
† THERE IS NO CONSTANT D.C. VOLTAGE APPLIED AT THIS POINT.
** BE SURE THAT POTENTIOMETER WHICH CONTROLS THIS VOLTAGE IS TURNED FULLY COUNTER-CLOCKWISE.
ALL MEASUREMENTS MADE WITH CONTROLS FULLY COUNTER-CLOCKWISE.
1ST. DET. TRANS. ASS'Y.
1ST. PIX. I.F. TRANS. ASS'Y.
2ND. PIX. I.F. TRANS. ASS'Y.
3RD. PIX. I.F. TRANS. (ORANGE-BLUE)
4TH. PIX. I.F. TRANS. (BROWN-BLACK)
5TH. PIX. I.F. TRANS. (BROWN-WHITE)
1ST. SOUND I.F. TRANS.
2ND. SOUND I.F. TRANS.
(RED-WHITE) (ORANGE-RED ON EARLY MODELS)
BOTTOM VIEW
W-99800-0

* **NOTE:** Values with star ( * ) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

*Figure 8—Voltage Diagram*

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and all controls and adjustments full counter-clockwise. Values should hold within ±20% with 117-volt a-c supply.

MODELS TRK-9,TRK-12
SPU Chassis KK-7,KK-7A
Chassis Wiring

RCA MFG. CO., INC.

## Socket Power Units KK7, KK7A

These precautions should be observed when any work on the SPU is being done:

1. Remove power supply cord from the power supply socket, S*33244.
2. Use only one hand at a time. It is advisable to keep the other hand in one's pocket.
3. Connect a shorting lead between ground (first) and the high voltage side of C-114.
4. Whenever working with the oil-filled capacitors, keep a constant short across the capacitor, as these capacitors do not completely lose their charge after being discharged a single or several subsequent times.
5. Only one person at a time should work on the unit to prevent any misunderstanding which may result in an accident.

No attempt should ever be made to measure the high (7,500 volts) voltage because of the difficulties and dangers involved. If, at any time it becomes necessary to service the SPU, the suspected parts should be replaced by parts known to be in good operating condition.

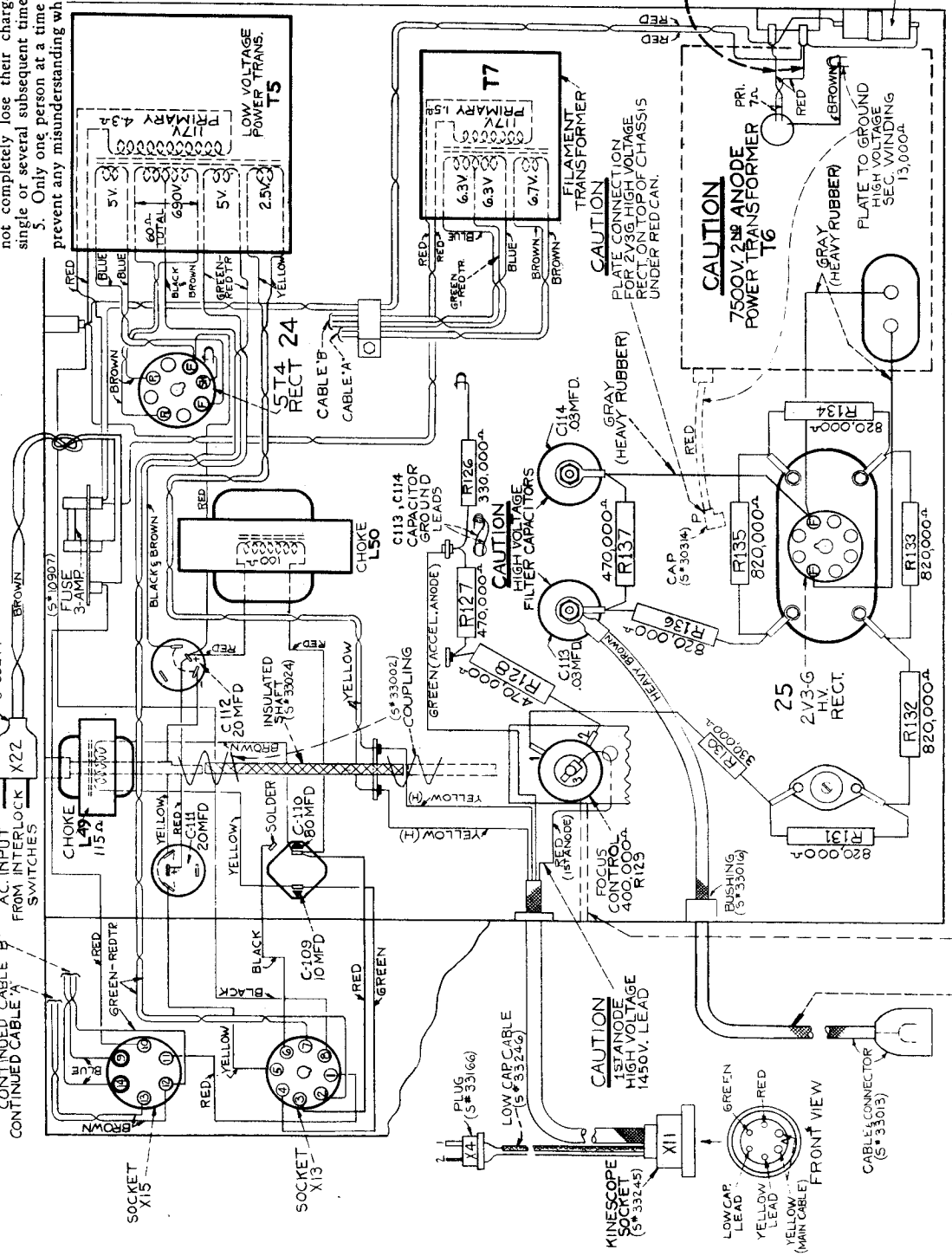


*Figure 11—SPU Wiring*

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# RCA MFG. CO., INC.

MODELS TRK-5,TT-5
MODELS TRK-9,TRK-12
Test Patterns




*Figure 2*—CORRECT PICTURE



*Figure 3*—INCORRECT FOCUS
***To correct**—Adjust Focusing Control for sharpest image*



*Figure 4*—TOO MUCH CONTRAST
***To correct**—Turn Contrast Control counterclockwise and Brightness Control clockwise*



*Figure 5*—TOO LITTLE CONTRAST
***To correct**—Turn Contrast Control clockwise and Brightness Control counterclockwise*



*Figure 6*—INCORRECT HORIZONTAL HOLD
***To correct**—Adjust Horizontal Hold Control until picture "locks in"*



*Figure 7*—INCORRECT VERTICAL HOLD
***To correct**—Adjust Vertical Hold Control until picture "locks in"*



*Figure 8*—INCORRECT HORIZONTAL CENTERING
***To correct**—Adjust Horizontal Centering Control (screwdriver adjustment) to center picture horizontally*



*Figure 9*—INCORRECT VERTICAL CENTERING
***To correct**—Adjust Vertical Centering Control (screwdriver adjustment) to center picture vertically*



*Figure 10*—INCORRECT WIDTH
***To correct**—Adjust Width Control (screwdriver adjustment) for correct width of picture*



*Figure 11*—INCORRECT HEIGHT
***To correct**—Adjust Height Control (screwdriver adjustment) for correct height of picture*



*Figure 12*—INCORRECT VERTICAL LINEARITY—(Circles flattened at bottom)
***To correct**—Turn Vertical Linearity Control counterclockwise and Height Control clockwise (screwdriver adjustments)*



*Figure 13*—INCORRECT VERTICAL LINEARITY—(Circles flattened at top)
***To correct**—Turn Vertical Linearity Control clockwise and Height Control counterclockwise (screwdriver adjustments)*

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MODELS TRK-9, TRK-12

The RCA Model TRK 12 Television and All Wave Sound Receiver is designed for operation on the present Television Broadcast Bands between 44 and 90 megacycles to reproduce both picture and sound transmissions, and to receive Radio Broadcasts on the three standard major radio bands between 550 and 22,000 kilocycles.

## Antenna

A television receiving antenna and its installation must conform to much higher standards than an antenna for reception of international Short Wave and Standard Broadcast signals because:

(1) At the short wave lengths employed, intervening obstacles have a pronounced shielding effect, causing low intensity signals, and often severe trouble with multi-path transmissions; these produce blurring and multi-images.

(2) The picture signal is comprised of a very wide band or range of frequencies, all of which must be received with good efficiency.

Only an RCA Television Antenna which has been designed for the particular instrument should be used with the TRK 12 to insure best results. Three types are available.

1. The Double "V" Type, Stock No. 9870.
2. The Double Dipole, Stock No. 9871.
3. The Double Dipole, Stock No. 9871, with Reflector, Stock No. 9872.

Under favorable conditions, good pictures may be obtained with the Double "V" Wire Type. In areas of weak signals or where interference or double images mar the picture a Double Dipole or Double Dipole and Reflector become necessary.

Full instructions accompany all RCA Television antennas and these instructions must be followed implicitly.

The two leads from the antenna transmission line are for connection to the terminals A1 and A2 showing at the back of the cabinet of the television receiver. *Terminal G must be connected to a good ground such as a cold water pipe.* Terminals A3 and G are connected to the Radio chassis and the circuit is designed so that the Television Antenna is also used for Standard Broadcast and Short-Wave Radio Reception.

An RCA Radio Antenna such as the RCA Magic Wave or RCA Spiderweb may be installed. The connection from "A" on the terminal board on the radio chassis to "A3" on the terminal board on the Television chassis must then be removed and the leads from the radio antenna connected to the radio chassis in accordance with the instructions accompanying the antenna. The connection from "G" on the Radio chassis to "G" on the Television chassis must not be removed.

***A good ground connection from the terminal "G" on the antenna terminal board to a cold water pipe or equivalent "good ground" is absolutely necessary to avoid possible danger from electric shock.***

# TELEVISION

The picture is formed on the Kinescope screen under the lid and is reflected in the mirror on the lid. The lid when opened must be set at the correct angle for best viewing of the picture. Once your TRK 12 is installed and giving good reception, the controls on the panel under the lid are all that are necessary for satisfactory pictures and sound. If the instrument is moved to another location in the home, the screwdriver-operated controls in the back, and also the Kinescope yoke, may have to be reset.

***The ground connection to the antenna terminal board must always be reconnected.***

## Controls

There are three dual control knobs for Television to the right of the screen, and four single control knobs in the Radio section to the left. Two of these single control knobs are all purpose controls and are used on Television, Radio and Phonograph reproductions. See Figure 1.

**Power-Volume Control.**—The knob nearest the front of the cabinet on the left hand side turns on the power to the receiver when rotated clockwise from its extreme "Off" position. Rotating it further increases sound volume for Television, Radio, or Phonograph (when an attachment is used).

**Fidelity-Selector.**—The second knob from the front in the Radio section selects the type of entertainment i.e. "Victrola," "Radio" or "Television."

Turned to the position marked "Victrola" it provides for operation of a Victrola Attachment such as the RCA R-100 or R-93-C. There are three variations of tone possible:

(1) Fully counterclockwise modifies tone, reducing surface noise on old recordings and emphasizing low tones.

(2) The middle Victrola point minimizes bass response, thus emphasizing higher tones.

(3) The next point in a clockwise direction sets the instrument for full tone phonograph reproduction.

The position, marked "Radio," sets the instrument for Radio reception and provides four variations of radio tone control. Turning clockwise these are:

(1) Reduction of static and circuit hiss, and emphasis on low tones.

(2) Speech point with a modification of low tones.

(3) Full tone reception for normal reproductions.

(4) High Fidelity reception for special musical programs giving all the tone values possible.

The position marked "Television" sets the instrument for Television reception. The first and second points, give modified tones as for the "Victrola" position, points (1) and (2), and the third point (3) gives full tone reception.

**Horizontal and Vertical Hold Controls.**—The dual knob at the back of the panel on the right controls the picture stability. The inner section designated by a "I" is the Horizontal Hold Control and when being set should be turned slowly to the point at which the picture "locks in" horizontally. Figure 6 shows the effect of incorrect setting of the control.

The outer ring section designated by "O" is the Vertical Hold Control and when being set should be turned to the point where the picture "locks in" vertically. See Figure 7.

These two controls on this dual knob should not ordinarily require readjustment after good picture reception has once been obtained. An occasional resetting will be necessary due to changing to a different station, and to the gradual ageing of the tubes.

**Station Selector and Fine Tuning.**—The outer ring "O" section of the central dual control knob on the right hand side of the panel selects the station from which it is desired to receive television transmissions. The range covers five television channels:

(1) 84 to 90 M.C.
(2) 78 to 84 M.C.
(3) 66 to 72 M.C.
(4) 50 to 56 M.C.
(5) 44 to 50 M.C.

The inner "I" section of this knob is used to obtain best picture reception by elimination of distortion resulting from interfering radio signals. These interfering signals show as a moving ripple in the picture. Adjustment of this knob will often eliminate the interference. A slight downward pressure must be exerted on the knob while turning.

**Contrast and Brightness Controls.**—The inner "I" Contrast section of the dual knob near the front of the cabinet on the right regulates the sensitivity of the receiver, varying the black and white tones of the picture being received. Too much contrast gives blurred details and a lack of half-tones, while too little contrast makes it all half-tones or grays. Turning clockwise increases contrast from grays, to black and white. See Figures 2, 4 and 5.

The outer ring "O" is the Brightness Control and affects the average illumination of the picture. Turning clockwise increases the brightness. See Figures 2, 4 and 5.

**Focusing Control.**—This control is a knob located on the back of the cabinet near the bottom and is used for adjustment of the picture focus. This adjustment affects the sharpness (detail observable) of the picture and must be carefully made when the receiver is first placed in operation. It may be checked occasionally to insure continuous best focusing. See Figure 3.

**Pilot Light.**—A little jewel pilot light at the bottom of the front of the cabinet tells when current is on.

**Other Controls.**—There are five other controls on the television chassis. All of these will be permanently adjusted at the time the TRK 12 is installed, but may require occasional resetting. These controls are accessible from the back of the cabinet. See Figure 15. They are adjustable by means of a screwdriver through a vertical row of holes in the left side of the back of the cabinet towards the top.

## Receiving the Picture

To obtain picture reception, open the lid of the cabinet and:

1. Turn the Fidelity-Selector Control on the radio panel to "Television," fully clockwise.

2. Turn Power-Volume Control on radio panel clockwise and advance about half way.

3. Set the Station Selector on the Television panel to the desired television station 1-2-3-4 or 5.

4. Turn the Contrast Control fully counterclockwise and then turn Brightness Control slowly until illumination of the screen almost disappears. Advance the Contrast Control until the picture appears at its best as viewed in the mirror on the lid. The Contrast Control turned too far clockwise causes blurring. Make final adjustment for best picture by adjusting both the Contrast and Brightness Controls.

The illustrations shown in Figures 2, 4 and 5 give an idea of the effect of the Brightness and Confrast Controls. Incorrect setting has effects somewhat similar to under and over exposure on photographic prints.

5. If the picture is not steady, the "Hold" controls will require slight readjustment. If the picture is moving sideways the Horizontal Hold (inner "I" section of the knob) requires readjustment. If the picture is moving up or down or is off position, then the outer ring "O" of the knob, Vertical Hold Control, requires readjustment. See Figures 6 and 7.

6. Adjust the Volume Control and the Tone Control (Fidelity-Selector knob) for best sound reception.

7. If an interfering ripple is observed in the picture, adjustment of the Fine Tuning knob may reduce or eliminate the distortion.

8. If the picture appears out of focus, carefully turning the Focusing Control knob on the back of the cabinet will remedy the condition.

As long as the Television Receiver is not moved in any way, only an occasional setting of the other controls will be required.

A spot in the center and also a slight discoloration of the television screen may gradually appear as the Kinescope ages. This is normal and in no way affects good picture reproduction.

## Television Fixed Controls

1. **Horizontal Centering.**—This is a screwdriver adjustment at the top of the row. It serves to center the picture horizontally on the Kinescope screen and is made at the time of installation of the receiver. It may require resetting, due primarily to the earth's magnetic field, if the receiver location is changed, the cabinet turned around, or the Kinescope replaced. Figure 8 shows the effect of incorrect setting of this control.

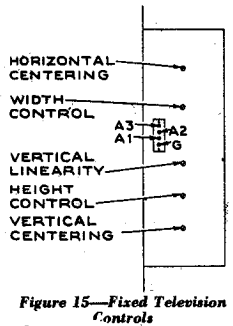



*Figure 15—Fixed Television Controls*

2. **Width.**—The next screwdriver control determines the width of the picture and is adjusted when the receiver is installed. Further adjustment may occasionally be necessary in order to compensate for the gradual reduction in horizontal deflection with tube life. See Figure 10.

3. **Vertical Linearity.**—The third control is operated in conjunction with the Height Control, No. 4, to give the correct vertical proportions to the picture. It may require readjustment due to changing of the Height Control and due to the gradual ageing of the tubes. See Figures 12 and 13. If the picture fills the frame but is crowded near the top, turn Vertical Linearity Control clockwise and Height Control counterclockwise. If crowded towards the bottom, turn these two controls in the reverse directions.

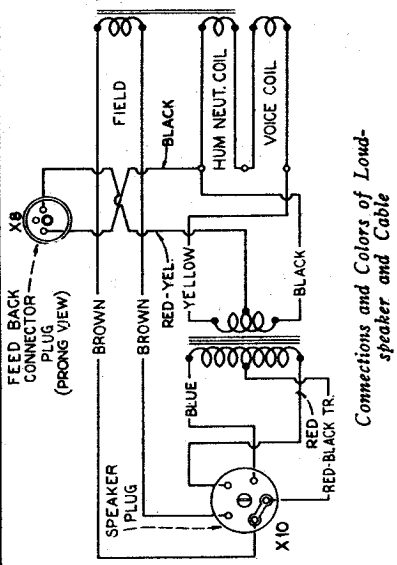
4. **Height.**—The fourth control determines the height of the picture and is adjusted in conjunction with Vertical Linearity when the receiver is installed. Further adjustment will occasionally be necessary in order to compensate for the gradual reduction in vertical deflection with tube life. See Figure 11.

5. **Vertical Centering.**—The screwdriver adjustment at the bottom of the row serves to center the picture vertically on the Kinescope screen and is made at the time of installation. It will require resetting whenever the receiver location is changed, the cabinet turned around, or the Kinescope replaced. See Figure 9.

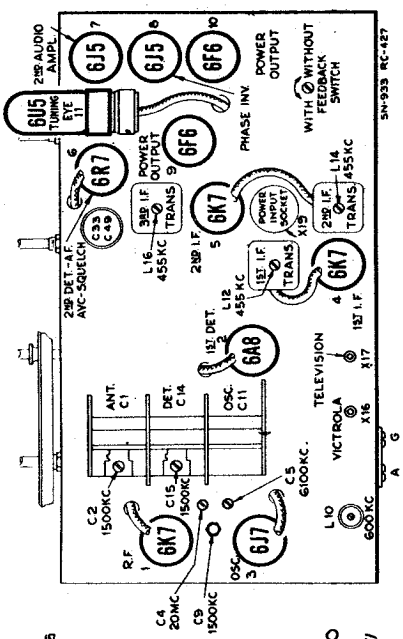
MODEL TRK-9
Operating Controls
Chassis RC-427A
Loud Speaker Connections
MODEL TRK-12
Chassis RC-427
Socket, Speaker Connections

RCA MFG. CO., INC.

MODELS TRK-5, TT-5
MODELS TRK-9, TRK-12
Video Band Switch Wiring
MODELS TRK-9, TRK-12
SPU Chassis RS-83E Schematic




*Connections and Colors of Loud-speaker and Cable*



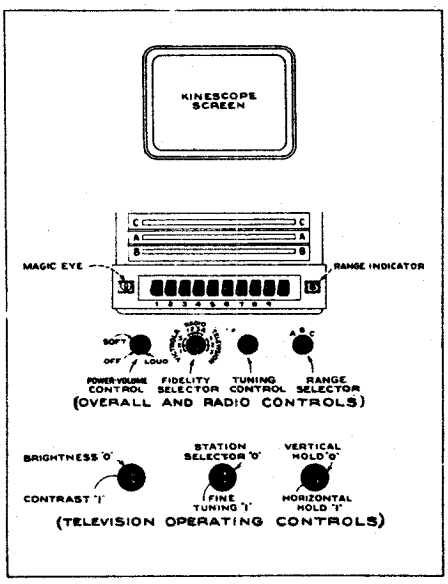
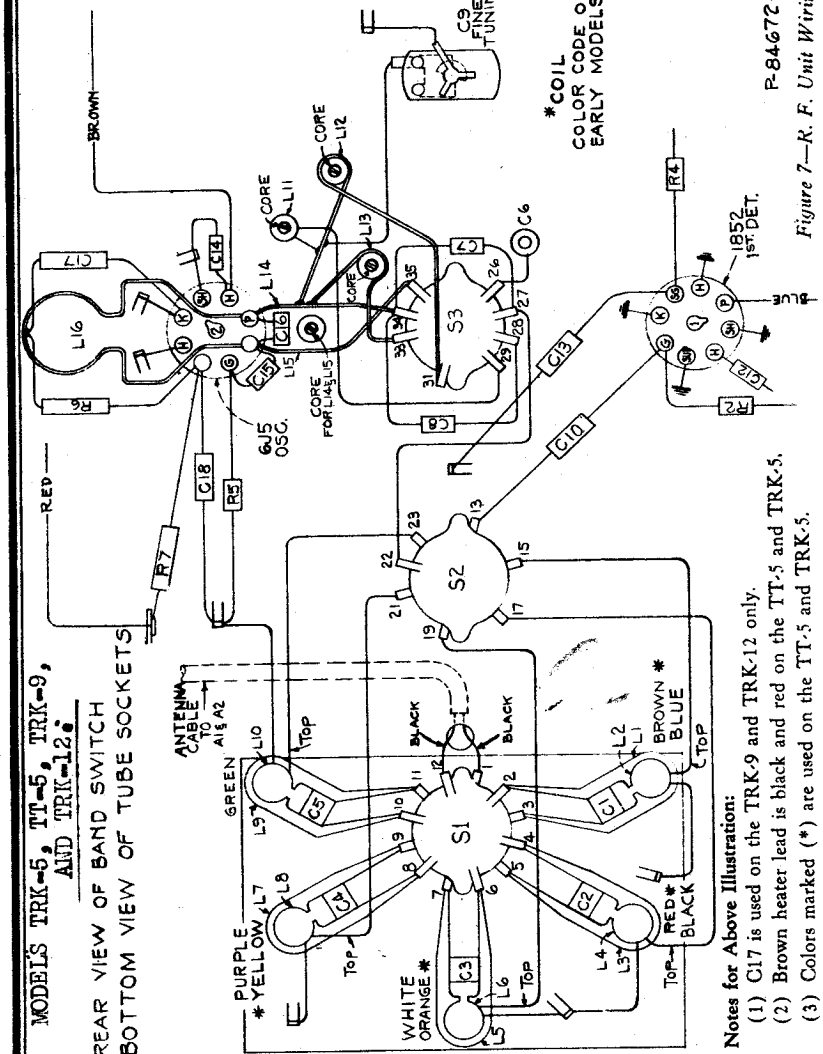
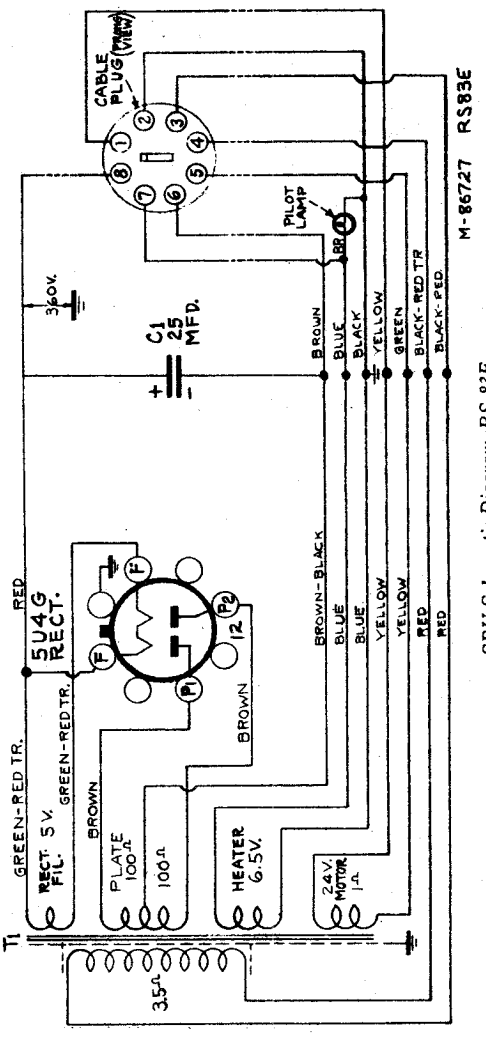




*Figure 1—Operating Controls, TRK-9*




P-84672-O

*Figure 7—R. F. Unit Wiring*




M-86727 RS83E

*SPU Schematic Diagram, RS-83E*

MODELS TRK-5, TT-5, TRK-9, AND TRK-12

REAR VIEW OF BAND SWITCH
BOTTOM VIEW OF TUBE SOCKETS

**Notes for Above Illustration:**
(1) C17 is used on the TRK-9 and TRK-12 only.
(2) Brown heater lead is black and red on the TT-5 and TRK-5.
(3) Colors marked (*) are used on the TT-5 and TRK-5.

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# REPLACEMENT PARTS

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **TELEVISION CHASSIS ASSEMBLIES** | |
| | **KC-4 in TRK-12** | |
| | **KC-4A in TRK-9** | |
| 33387 | Adjuster—Magnetite core and stud in tube for high frequency oscillator circuit adjustment (Used with L11, L12, L14, L15) | .55 |
| 33835 | Adjuster—Magnetite core and stud in tube, for high frequency oscillator circuit adjustment (Used with L13) | .60 |
| 31253 | Board—4 terminal antenna-ground terminal board | .25 |
| 12884 | Capacitor—Adjustable plunger type air trimmer (C6) | .60 |
| 33097 | Capacitor—4.7 mmfd., (neg. temp. coeff.) (C69) | .35 |
| 33478 | Capacitor—5.6 mmfd., 500 volts (C7) | .40 |
| 33476 | Capacitor—8.2 mmfd., 500 volts (C8) | .40 |
| 33381 | Capacitor—8.2 mmfd. (neg. temp. coeff.) (C71) | .40 |
| 33380 | Capacitor—12 mmfd., 500 volts (C24) | .40 |
| 33100 | Capacitor—18 mmfd., 500 volts (neg. temp. coeff.) (C19, C23) | .40 |
| 14021 | Capacitor—22 mmfd. (C50) | .35 |
| 33101 | Capacitor—22 mmfd. (neg. temp. coeff.) (C64) | .40 |
| 33111 | Capacitor—33 mmfd., 500 volts (C15) | .35 |
| 33102 | Capacitor—47 mmfd. (neg. temp. coeff.) (C30, C35, C66) | .45 |
| 33103 | Capacitor—68 mmfd., 500 volts (C31, C36, C25, C40, C44, C49) (neg. temp. coeff.) | .35 |
| 33477 | Capacitor—80.5 mmfd., 500 volts (C16) | .45 |
| 33104 | Capacitor—82 mmfd. (neg. temp. coeff.) (C21, C22) | .45 |
| 33106 | Capacitor—115 mmfd. (C5) | .30 |
| 33107 | Capacitor—135 mmfd. (C4) | .30 |
| 12725 | Capacitor—150 mmfd., 400 volts (C10, C87) | .35 |
| 33108 | Capacitor—190 mmfd. (C3) | .30 |
| 12488 | Capacitor—270 mmfd. (C81) | .35 |
| 33109 | Capacitor—320 mmfd. (C2) | .30 |
| 33110 | Capacitor—390 mmfd. (C1) | .30 |
| 32788 | Capacitor—820 mmfd., 400 volts (C84, C89) | .40 |
| 12635 | Capacitor—1000 mmfd., 400 volts (C90) | .50 |
| 13580 | Capacitor—1800 mmfd., 400 volts (C17) | .50 |
| 4881 | Capacitor—3300 mmfd., 400 volts (C102) | .50 |
| 33584 | Capacitor—.005 mfd., 1200 volts (C11, C12, C13, C14, C18, C20, C26, C27, C29, C32, C33, C34, C37, C38, C39, C41, C42, C43, C45, C46, C47, C48, C52, C80, C82, C83, C85, C87, C88, C70, C75, C98, C99, C100) | .25 |
| 4937 | Capacitor—.01 mfd., 1000 volts (C74) | .25 |
| 4870 | Capacitor—.025 mfd., 400 volts (C107) | .20 |
| 30882 | Capacitor—.05 mfd., 200 volts (C94, C95) | .20 |
| 32787 | Capacitor—.05 mfd., 400 volts (C28) | .20 |
| 4886 | Capacitor—.05 mfd., 400 volts (C91) | .20 |
| 4839 | Capacitor—0.1 mfd., 400 volts (C73, C53, C77, C78, C85, C59, C88, C103) | .30 |
| 12484 | Capacitor—0.25 mfd., 350 volts (C86, C93, C101, C106, C80, C76, C105) | .30 |
| 12741 | Capacitor—.5 mfd. (C57) | .30 |
| 32015 | Capacitor—1.0 mfd., 150 volts (C54) | .60 |
| 33158 | Capacitor—10 mfd., 150 volts, 20 mfd., 25 volts, (C97, C104) | 1.00 |
| 33159 | Capacitor—10 mfd., 350 volts, 10 mfd., 150 volts, 250 mfd., 15 volts (C58, C61, C62) | 1.60 |
| 33160 | Capacitor—10 mfd., 350 volts, 10 mfd., 150 volts, 20 mfd., 25 volts, 20 mfd., 25 volts (C92, C79, C82, C83) | 1.60 |
| 32045 | Capacitor—15 mfd. (C96) | .70 |
| 33475 | Capacitor—20 mfd., 25 volts (C55) | .75 |
| 33161 | Capacitor—20-50 mfd., 35 volts (C51, C108) | 1.45 |
| 33243 | Coil—Oscillator coil with core and stud (L11) | .65 |
| 33234 | Coil—1-¼ turn antenna coil, core, stud and capacitor assembly (C5, L9, L10) (green) | 1.10 |
| 33647 | Coil—2 turn antenna coil, core, stud and capacitor assembly (C4, L7, L8) (yellow or purple) | 1.10 |
| 33646 | Coil—3 turn antenna coil, core, stud and capacitor assembly (C3, L5, L6) (orange or white) | 1.10 |
| 33645 | Coil—5-¼ turn antenna coil, core, stud and capacitor assembly (C2, C3, L4) (red or black) | 1.10 |
| 33644 | Coil—7-¼ turn antenna coil, core, stud and capacitor assembly (C1, L1, L2) (brown or blue) | 1.10 |
| 33535 | Coil—Peaking coil and 10 megohm resistor assembly (L39, R44) | .55 |
| 33534 | Coil—Peaking coil and 3900 ohm resistor assembly (L40, R48) | .55 |
| 33536 | Coil—Peaking coil and 15,000 ohm resistor assembly (L41, R54) | .55 |
| 33537 | Coil—Peaking coil and 10 megohm resistor assembly (L42, R56) | .55 |
| 33228 | Condenser—Oscillator "Fine tuning" condenser, located on range switch (C9) | 2.10 |
| 33164 | Control—Dual 1.2 meg. and 30,000 ohms "Vertical hold" and "Horizontal hold" controls (R106, R92) | 2.00 |
| 33206 | Control—6 ohm tapped "Horizontal centering" control (R98) | 1.50 |
| 33210 | Control—20 ohm tapped "Vertical centering" control (R114) | 1.50 |
| 33162 | Control—4000 ohm, "Contrast" control (R45) | 1.00 |
| 33209 | Control—5600 ohm, "Vertical linearity" control (R113) | 1.00 |
| 33163 | Control—50,000 ohms "Brightness" control (R61) | 1.00 |
| 33207 | Control—560,000 ohm "Width" control (R94) | 1.00 |
| 33208 | Control—2.7 meg. "Height" control (R108) | 1.00 |
| 33002 | Coupling—Flexible Bronze coupling, located on control shaft end of "contrast" control | .10 |
| 33383 | Coupling—Flexible Bronze coupling located on panel shaft end of "contrast" control | .10 |
| 4574 | Plug—6-prong male plug for Television chassis power supply cable (X14) | .48 |
| 16838 | Plug—8-prong male plug for Television chassis power supply cable (X12) | .25 |
| 32723 | Resistor—10 ohms, ½ watt (R120) | .22 |
| 33325 | Resistor—Voltage divider comprising a 36-100-7.4 and 5 ohm section (R119, R118 R117, R116) | .80 |
| 14074 | Resistor—82 ohms, ½ watt (R64, R67, R14, R21, R28, R34) | .20 |
| 14439 | Resistor—100 ohms, ½ watt (R53) | .20 |
| 13428 | Resistor—150 ohms, ½ watt (R39) | .20 |
| 13219 | Resistor—270 ohms, 2 watts (R97) | .25 |
| 30499 | Resistor—470 ohms, ½ watt (R90, R95) | .20 |
| 33326 | Resistor—Voltage divider comprising a 600-300-3100-5455 and 13,000 ohm section (R125, R124, R122, R122, R121) | 1.20 |
| 14720 | Resistor—1000 ohms, ½ watt (R9, R65, R70, R18, R41, R25, R31, R37, R42) | .20 |
| 14993 | Resistor—1200 ohms, 1/10 watt (R17) | .15 |
| 12267 | Resistor—1200 ohms, ½ watt (R115) | .20 |
| 14499 | Resistor—1500 ohms, ½ watt (R8, R24) | .20 |
| 81920 | Resistor—1800 ohms, 1/10 watt (R16, R23, R30) | .15 |
| 12194 | Resistor—1800 ohms, ½ watt (R112) | .20 |
| 11863 | Resistor—2200 ohms, 1/10 watt (R36) | .15 |
| 13486 | Resistor—2200 ohms, 1 watt (R6) | .22 |
| 13031 | Resistor—3300 ohms, 1/10 watt (R19, R26) | .15 |
| 12312 | Resistor—3300 ohms, ½ watt (R77, R87) | .20 |
| 30150 | Resistor—3300 ohms, 1 watt (R7, R57) | .22 |
| 12955 | Resistor—3900 ohms, ½ watt (R109) | .20 |
| 30146 | Resistor—4700 ohms, ½ watt (R83, R99) | .20 |
| 31789 | Resistor—5600 ohms, 1/10 watt (R12) | .15 |
| 12265 | Resistor—6800 ohms, ½ watt (R11) | .20 |
| 14075 | Resistor—8200 ohms, ½ watt (R101, R102, R103) | .20 |
| 14559 | Resistor—10,000 ohms, ½ watt (R20, R27, R33, R13, R58, R82, R84, R88, R100, R74) | .20 |
| 13097 | Resistor—10,000 ohms, 1 watt (R79, R80) | .22 |
| 13594 | Resistor—15,000 ohms, 1/10 watt (R43) | .15 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R71) | .15 |
| 13998 | Resistor—22,000 ohms, ½ watt (R47, R49) | .20 |
| 12738 | Resistor—27,000 ohms, ½ watt (R91) | .20 |
| 11300 | Resistor—33,000 ohms, 1/10 watt (R10) (early production only) | .15 |
| 12454 | Resistor—33,000 ohms, ½ watt (R5) | .20 |
| 12412 | Resistor—47,000 ohms, ½ watt (R93) (R10—Late production only) | .20 |
| 30650 | Resistor—56,000 ohms, ½ watt (R55) | .20 |
| 12010 | Resistor—68,000 ohms, 1/10 watt (R32, R38, R69) | .15 |
| 13715 | Resistor—68,000 ohms, ½ watt (R85, R66) | .20 |
| 14138 | Resistor—68,000 ohms, ½ watt (R15, R22, R29, R35, R40, R68) | .20 |
| 14023 | Resistor—82,000 ohms, ½ watt (R78) | .20 |
| 14560 | Resistor—100,000 ohms, ½ watt (R72, R85, R86, R89, R104) | .20 |
| 30180 | Resistor—120,000 ohms, ½ watt (R4) | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt (R51, R111) | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt (R46, R59, R96) | .20 |
| 12413 | Resistor—680,000 ohms, ½ watt (R50) | .20 |
| 13730 | Resistor—1 meg., ½ watt (R1, R2, R76, R75, R73, R52, R60, R81) | .20 |
| 2546 | Resistor—1 meg., 1 watt (R3) | .22 |
| 30208 | Resistor—1.2 meg., ½ watt (R105) | .20 |
| 5028 | Resistor—1.8 meg., ½ watt (R107) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R110) | .20 |
| 33229 | Roller—Rubber friction roller for oscillator condenser drive. Part of range switch assembly | .10 |
| 33165 | Socket—2-prong female socket for Video output to Kinescope (X3) | .25 |
| 33011 | Socket—4-contact female socket for Kinescope deflecting yoke (X1) | .25 |
| 31251 | Socket—8-contact octal type socket | .25 |
| 18007 | Socket—Ceramic octal socket for 6L6 "Hor. out" and 6J5 "Osc." | .65 |
| 14278 | Socket—Television audio output pin socket (X5) | .25 |
| 33227 | Switch—Range switch with shield plate and mounting studs—less coils, condenser and friction roller (S1, S2, S3) | 4.65 |

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| 33330 | Transformer—"1st det. P1" I-F transformer (L17, L18) (br. and br.) | 2.60 |
| 33331 | Transformer—"1st det. P2" I-F transformer (L19, L20) (Brown and red) | 2.80 |
| 33334 | Transformer—"1st pix P1" I-F transformer (L21, L22, L23, L24) (Brown and green) | 2.50 |
| 33335 | Transformer—"1st pix P2" (L25) or "2nd pix P2" (L30) I-F transformer (brown and blue) | 1.65 |
| 33338 | Transformer—"1st sound" I-F transformer (L45, L48) (orange and red) (Used in early production) | 2.40 |
| 33526 | Transformer—"1st sound" I-F transformer (L45, L46) (red and white) (Used in late production) | 2.50 |
| 33516 | Transformer—"2nd pix P1" I-F transformer (L26, L27, L28, L29) (orange and orange) | 2.60 |
| 33339 | Transformer—"2nd sound" I-F transformer (L47, L48) (orange and orange) | 2.60 |
| 33333 | Transformer—"3rd pix" I-F transformer (L31, L32, L33) (orange and blue) | 2.40 |
| 33336 | Transformer—"4th pix" I-F transformer (L34, L35, L36) (brown and black) | 2.00 |
| 33337 | Transformer—"5th pix" I-F transformer (L37, L38) (brown and white) | 1.80 |
| 32899 | Transformer—Horizontal oscillation transformer (T1) | 1.75 |
| 9862 | Transformer—Horizontal output transformer (T2) | 17.50 |
| 32900 | Transformer—Vertical output transformer (T4) | 5.50 |
| 32898 | Transformer—Vertical oscillation transformer (T3) | 1.75 |
| | **3-BAND RADIO RECEIVER CHASSIS** | |
| | **RC-427 IN TRK-12** | |
| | **RC-427A IN TRK-9** | |
| 31863 | Board—Antenna-ground terminal board | .20 |
| 32232 | Body—Station setting contact body and spring | .15 |
| 32090 | Bracket—Motor mounting bracket | .40 |
| 31282 | Bracket—Magic Eye mounting bracket and clip | .22 |
| 32635 | Cable—Indicator pointer drive cable—60-in. length | .24 |
| 30766 | Cap—"Magic Eye" cap | .15 |
| 14392 | Capacitor—4.7 mmfd. (C46) | .35 |
| 31353 | Capacitor—15 mmfd. (C8) | .40 |
| 31270 | Capacitor—100 mmfd. (C41, C42) | .35 |
| 12720 | Capacitor—100 mmfd. (C38, C18) | .35 |
| 12724 | Capacitor—120 mmfd. (C12, C21) | .35 |
| 13003 | Capacitor—180 mmfd. (C3, C17) | .35 |
| 12952 | Capacitor—330 mmfd. (C39) | .35 |
| 31433 | Capacitor—560 mmfd. (C6) | .35 |
| 31552 | Capacitor—680 mmfd. (C19, C20, C23, C24) | .40 |
| 32197 | Capacitor—3900 mmfd., 500 volts (C7) | .55 |
| 31405 | Capacitor—6000 mmfd., 500 volts (C10) | .75 |
| 5107 | Capacitor—.0035 mfd., 700 volts (C35, C36, C55) | .20 |
| 30303 | Capacitor—.0035 mfd., 700 volts (C40, C54) | .40 |
| 33584 | Capacitor—.005 mfd., 1200 volts (C53) | .25 |
| 4937 | Capacitor—.01 mfd., 1000 volts (C37, C44, C43, C39) | .25 |
| 11315 | Capacitor—.015 mfd., 400 volts (C31) | .20 |
| 4870 | Capacitor—.025 mfd., 400 volts (C32, C50) | .20 |
| 32787 | Capacitor—.05 mfd., 400 volts (C27, C26) | .20 |
| 4839 | Capacitor—0.1 mfd., 400 volts (C22, C18, C26, C34, C52) | .30 |
| 12484 | Capacitor—.25 mfd., 350 volts (C13, C28, C48, C45, C51) | .30 |
| 12741 | Capacitor—0.5 mfd., 150 volts (C47) | .30 |
| 18530 | Capacitor—20-20 mfd., 350 volts (C33, C49) | 3.00 |
| 32088 | Capacitor—Motor capacitor 60 mfd., 40 volts (C30) | .90 |
| 31263 | Coil—"A" Band antenna coil (L1, L2) | .95 |
| 31265 | Coil—"A" Band detector coil (L8, L7) | 1.20 |
| 31296 | Coil—"A" Band oscillator coil (L10) | 1.05 |
| 31980 | Coil—"B" and "C" Band antenna coil (L3, L4, L5) | .80 |
| 31783 | Coil—"B" and "C" band oscillator coil (L8, L9) | 1.05 |
| 31234 | Condenser—3-gang variable condenser (C1, C11, C14, C2, C15) | 6.45 |
| 12714 | Condenser—Air trimmer condenser (C9) | .50 |
| 31292 | Condenser—Double section trimmer capacitor 3-30 mmfd., each section (C4, C5) | .40 |
| 31971 | Contact—Push button switch contacts comprising 11 contacts riveted on insulating strip | .65 |
| 31972 | Contact—Push button switch contacts—comprising 14 contacts riveted on insulating strip | 1.25 |
| 31231 | Contact—Station setting contact tip | .06 |
| 33448 | Control—"Power-volume control"—1-½ meg. (R12, S10, S11) | 2.00 |
| 32634 | Cord—Band indicator and variable condenser drive cord | .10 |
| 31269 | Core—Core and stud for 1st, 2nd, or 3rd I-F transformer | .15 |
| 32093 | Damper—Flywheel for rear end of motor shaft | .25 |
| 32098 | Disc—Friction disc and pinion gear | .35 |
| 32091 | Drive—Friction drive gear assembly | 1.50 |
| 31273 | Drum—Variable condenser drive drum | .70 |
| 31239 | Gear—Knob shafe drive gear and hub | .65 |
| 31532 | Indicator—Band indicating strip (Model TRK-12 only) | .15 |
| 31304 | Indicator—Band indicating strip (Model TRK-9 only) | .15 |
| 31480 | Lamp—6.3 volt electric tuning set-up lamp Mazda No. 47 | .20 |
| 11891 | Lamp—6.3 volt dial lamp Mazda No. 44 | .17 |
| 31969 | Lockplate—Push button switch lockplate comprising 10 contact locks in 1 strip | .75 |
| 32095 | Motor—Electric tuning drive motor complete (M1) | 5.25 |
| 31228 | Plate—Station selector contact plate—less plungers | .45 |
| 31227 | Plate—Station selector mounting plate—mounts on rear of variable condenser | .50 |
| 12493 | Plug—Female connector for speaker cable (X9) | .30 |
| 31271 | Pulley—Drive pulley fastens on station selector knob shaft | .25 |
| 31280 | Pulley—Indicator pointer drive cord pulley | .10 |
| 31272 | Pulley—Range switch pulley | .20 |
| 14720 | Resistor—1000 ohms, ½ watt (R7) | .20 |
| 12267 | Resistor—1200 ohms, ½ watt (R6) | .20 |
| 12312 | Resistor—3300 ohms, ½ watt (R5) | .20 |
| 14559 | Resistor—10,000 ohms, ½ watt (R10) | .20 |
| 12695 | Resistor—15,000 ohms, ½ watt (R14) | .20 |
| 12738 | Resistor—27,000 ohms, ½ watt (R13) | .20 |
| 13477 | Resistor—27,000 ohms, 1 watt (R22) | .22 |
| 12454 | Resistor—33,000 ohms, ½ watt (R3, R4) | .20 |
| 12266 | Resistor—39,000 ohms, ½ watt (R23) | .20 |
| 12412 | Resistor—47,000 ohms, ½ watt (R18) | .20 |
| 12286 | Resistor—56,000 ohms, ½ watt (R30) | .20 |
| 14560 | Resistor—100,000 ohms, ½ watt (R11, R16, R20, R32, R31) | .20 |
| 14020 | Resistor—150,000 ohms, ½ watt (R17) | .20 |
| 12199 | Resistor—270,000 ohms, ½ watt (R15, R33, R34) | .20 |
| 18020 | Resistor—470,000 ohms, 1 watt (R24) | .22 |
| 12486 | Resistor—560,000 ohms, ½ watt (R21) | .20 |
| 12013 | Resistor—1 meg., 1/10 watt (R8) | .15 |
| 13730 | Resistor—1 meg., ½ watt (R1, R2, R19) | .20 |
| 12879 | Resistor—2.2 meg., ½ watt (R9) | .20 |
| 31548 | Resistor—Voltage divider consisting of one 1500, one 2950, one 3400, one 30 and one 3165 ohm section (R25, R26, R27, R28, R29) | .90 |
| 14887 | Retainer—Drive cord pulley retainer | .01 |
| 32086 | Roller—Rubber friction roller for front end of motor shaft | .10 |
| 31233 | Rotor—Station selector rotor disc—mounts on rear of variable condenser shaft | 1.16 |
| 5042 | Screw—No. 8-32 set screw for drive pulley | .03 |
| 14350 | Screw—No. 8-32 square head set screw for rotor disc stock No. 31233 | .03 |
| 31681 | Shaft—Dial drive knob shaft | .20 |
| 31384 | Socket—Dial or electric tuning set-up lamp socket | .20 |
| 13871 | Socket—"Magic Eye" socket | .45 |
| 31251 | Socket—Octal type Radiotron or power supply socket | .25 |
| 14278 | Socket—Pin socket for phono or television input with mounting plates (X16) (X17) | .25 |
| 31279 | Spring—Band indicator tension spring | .03 |
| 13638 | Spring—Indicator drive cord tension spring | .08 |
| 31970 | Spring—Push button switch lock bar spring | .05 |
| 31232 | Spring—Station setting tip spring | .01 |
| 12007 | Spring—Stud retaining spring for I-F adjuster | .02 |
| 31418 | Spring—Variable condenser drive cord tension spring | .05 |
| 33448 | Switch—Feed-back switch (S8, S9) | 1.40 |
| 33447 | Switch—H. F. tone control phono-radio-Television and power switch (S4, S5, S6, S7, S12) | 2.65 |
| 31979 | Switch—Range switch (S1, S2, S3) | 1.55 |
| 31968 | Switch—Station selector push button switch complete | 3.95 |
| 31565 | Transformer—1st I-F transformer complete (L11, L12, C19, C20, L19) | 2.40 |
| 31551 | Transformer—2nd I-F transformer complete (L13 L14, C23, C24, L20) | 2.40 |
| 31549 | Transformer—3rd I-F transformer complete (L15, L16, C41, C42) | 2.10 |
| 32231 | Washers—Comprising one metal washer, two fibre washers and one solder lug or retainer for station setting body | .03 |
| 32094 | Washers—Assorted washers for mounting damper on motor shaft | .10 |
| | **POWER SUPPLY UNIT (TELEVISION AUDIO RECEIVER) (RS-83E)** | |
| 14631 | Capacitor—25 mfd. filter capacitor (C1) | 1.55 |
| 33606 | Plug—8-contact male plug for power supply cable (X20) | .45 |
| 31251 | Socket—5U4G Radiotron socket | .25 |
| 33445 | Transformer—110 V. 60 cycle power transformer (T1) | 10.30 |

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

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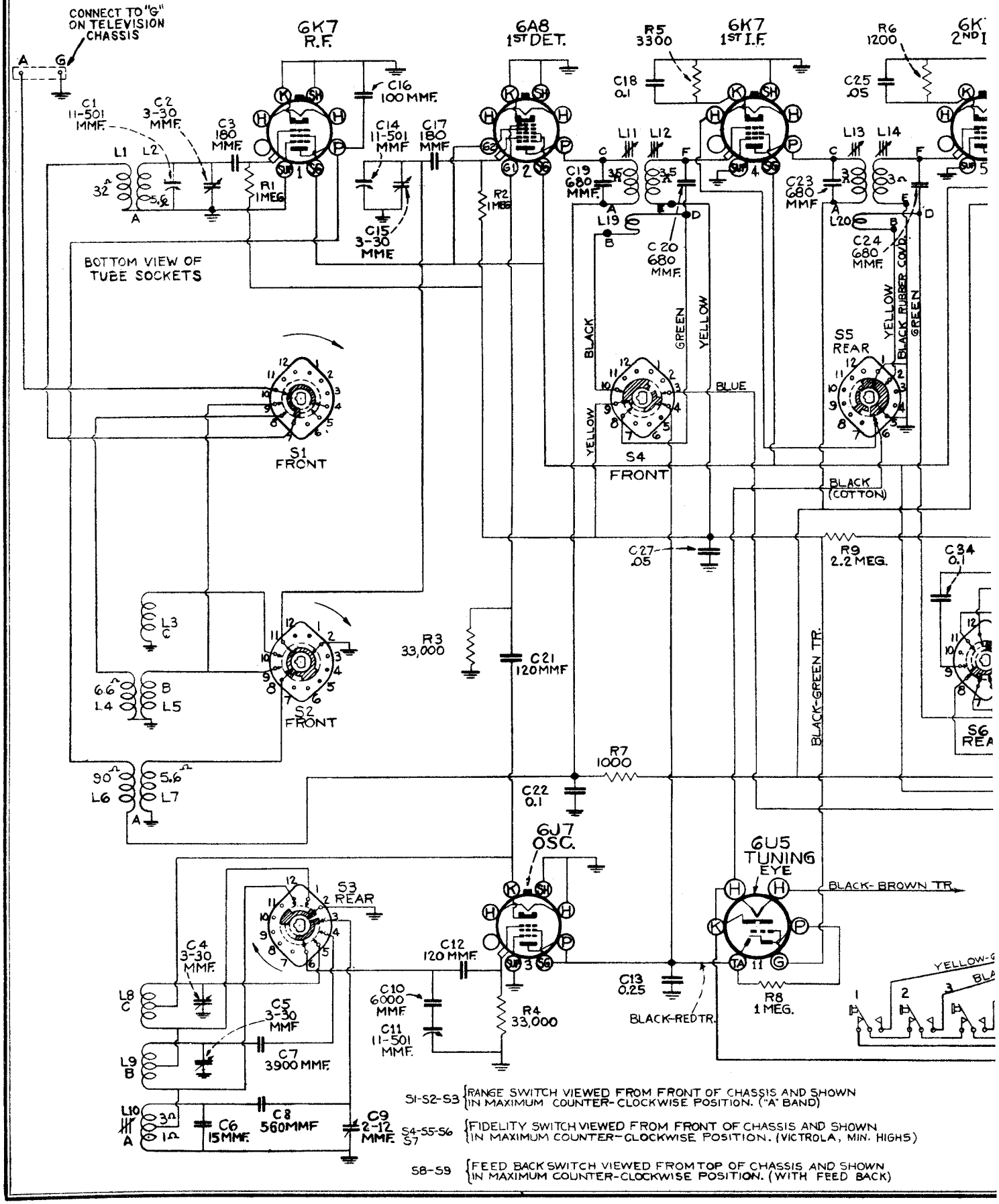


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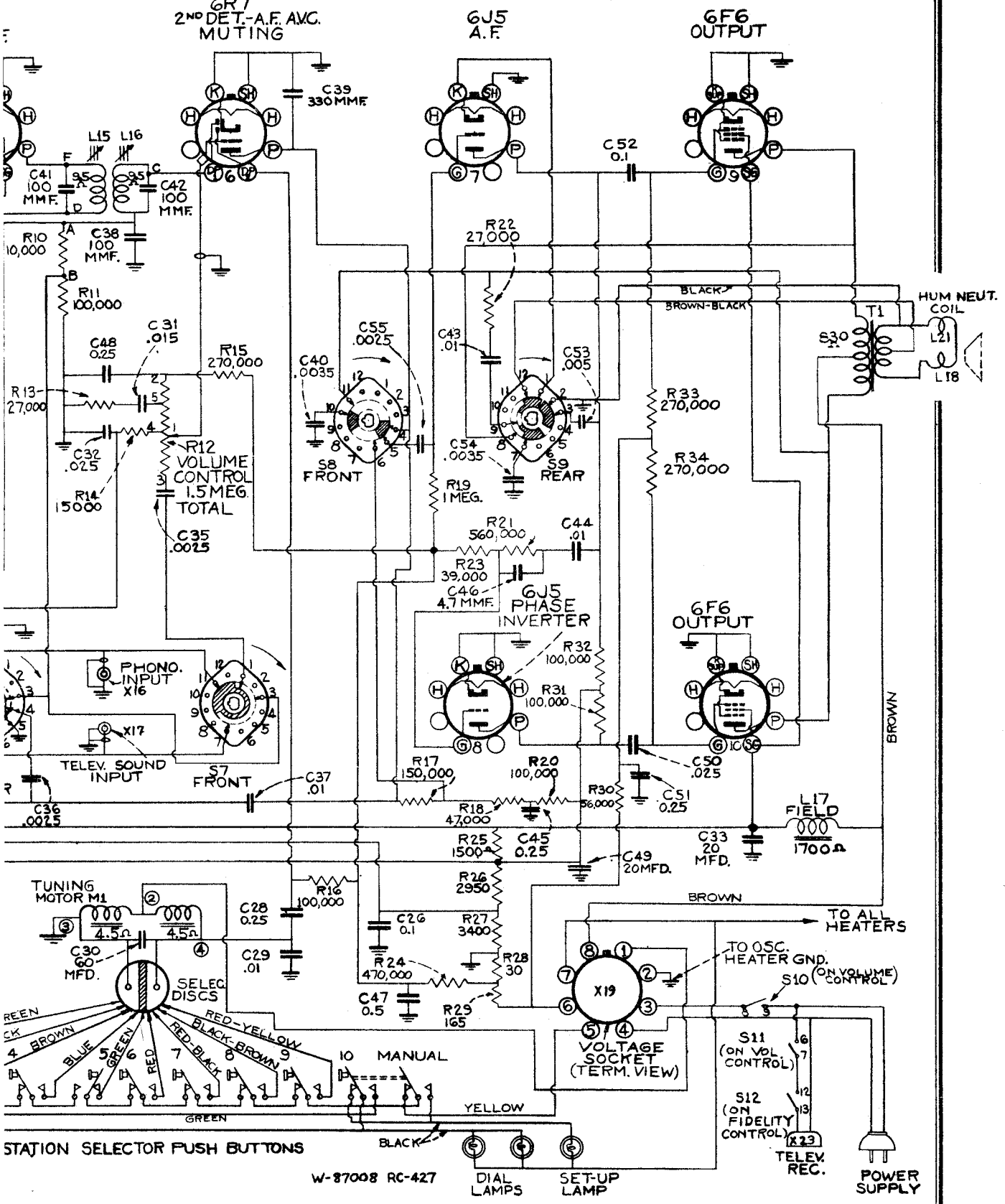
INC.

MODELS TRK-9, TRK-12
Receiver Chassis RC-427A, RC-427
Schematic




I.F. PEAK 455 KC

*Schematic Circuit Diagram, Radio Chassis*

# RCA MFG. CO., INC.

**MODELS TRK-9, TRK-12**
**Receiver Chassis Nos. RC-427A, RC-427**
**Chassis Wiring, R-F. Voltage**

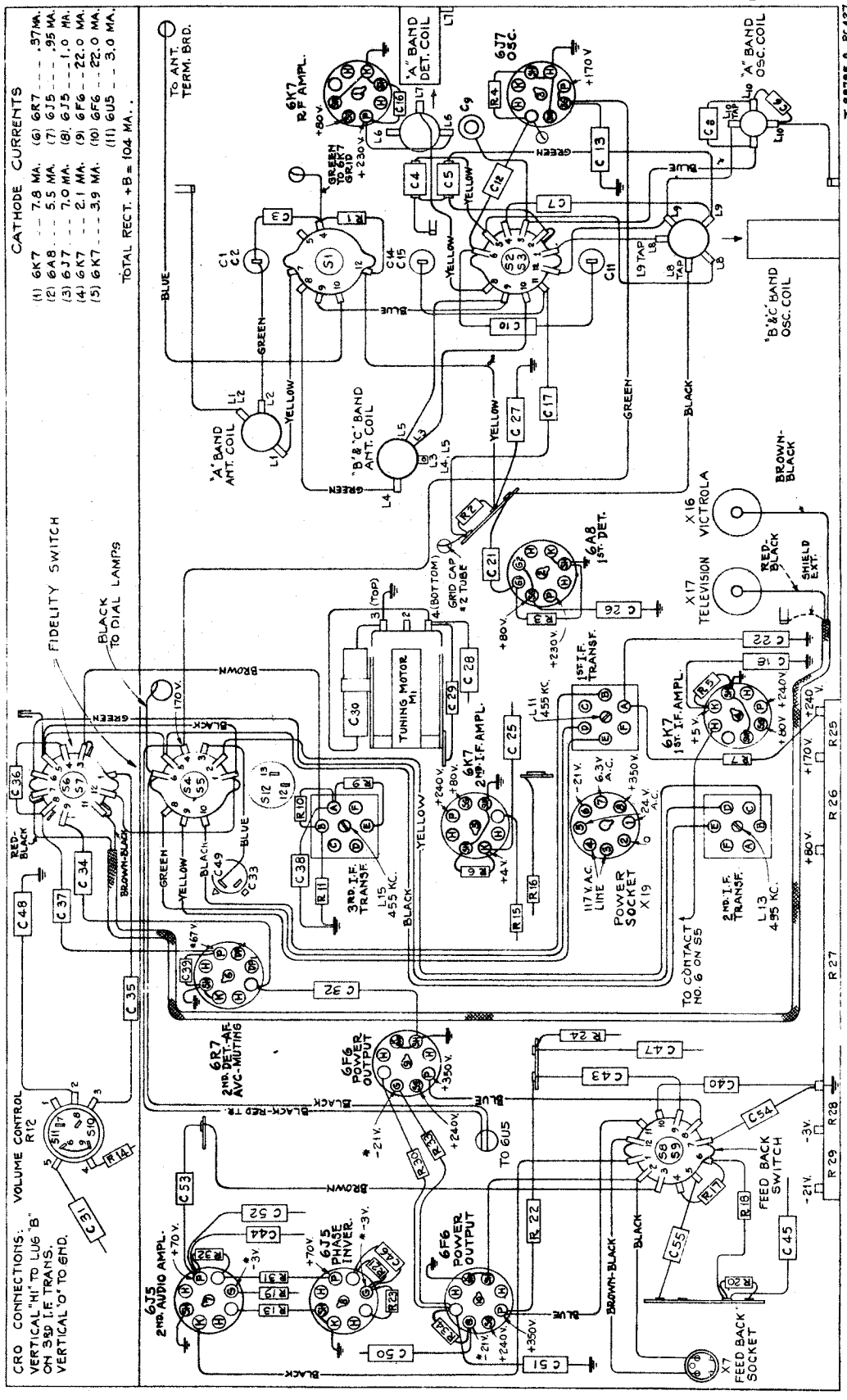
Dial Lamps ..... { Two Mazda No. 44, 6.3 volts, .25 amp. / One Mazda No. 47, 6.3 volts, .15 amp.
(The Mazda No. 47 is the electric tuning set-up lamp, located at center of dial.)

Power Supply Rating ..... 105-125 volts, 60 cycles, 120 watts

Power Output
Undistorted ..... 10 watts
Maximum ..... 12 watts

Loudspeaker (RL-70F-5)
Type ..... 12-inch electrodynamic
Voice-Coil Impedance ..... 2.2 ohms at 400 cycles

Frequency Ranges
Standard Broadcast ("A" band) ..... 540-1,720 kc
Medium Wave ("B" band) ..... 2.3-7.0 mc
Short Wave ("C" band) ..... 7.0-22 mc


CATHODE CURRENTS
(1) 6K7 - - 7.8 MA.
(2) 6A8 - - 5.5 MA.
(3) 6J7 - - 7.0 MA.
(4) 6K7 - - 2.1 MA.
(5) 6K7 - - 3.9 MA.
(6) 6R7 - - - .37MA.
(7) 6J5 - - - .95 MA.
(8) 6J5 - - - 1.0 MA.
(9) 6F6 - - 22.0 MA.
(10) 6F6 - - 22.0 MA.
(11) 6U5 - - 3.0 MA.
TOTAL RECT. +B = 104 MA.
CRO CONNECTIONS: VERTICAL "HI" TO LUG "B" ON 3rd I.F. TRANS. VERTICAL "O" TO GND.
VOLUME CONTROL R12
FIDELITY SWITCH
BLACK TO DIAL LAMPS
TO ANT. TERM. BRD.
"A" BAND ANT. COIL
"B" & "C" BAND ANT. COIL
"A" BAND DET. COIL
"A" BAND OSC. COIL
"B" & "C" BAND OSC. COIL
6K7 R.F. AMPL.
6J7 OSC.
6A8 1ST. DET.
6K7 2ND I.F. AMPL.
6K7 1ST. I.F. AMPL.
1ST I.F. TRANSF.
2ND I.F. TRANSF.
3RD I.F. TRANSF.
TUNING MOTOR M1
X16 VICTROLA
X17 TELEVISION
117 V. A.C. LINE
POWER SOCKET X19
6R7 2ND DET.-AF. AVC-MUTING
6F6 POWER OUTPUT
6J5 2ND AUDIO AMPL.
6J5 PHASE INVER.
6F6 POWER OUTPUT
FEED BACK SWITCH
X7 FEED BACK SOCKET
TO CONTACT NO. 6 ON S5
TO 6U5
GRID CAP 2 TUBE
SHIELD EXT.
ALL HEATER VOLTAGES 6.3 V. A.C.
BOTTOM VIEW - REAR OF CHASSIS
T-88795-0 RC427

***NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point, volume control at minimum. Values should hold within approximately ±20% with 117-volt a-c supply.

*R-F Wiring Diagram and Socket Voltages (Radio Chassis)*

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# Alignment Procedure

## (RADIO CHASSIS)

**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "O" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the accompanying drawing which shows the dial with O-180° calibration scales drawn at top and bottom.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang condenser frame, and bend the wire so that it points to the "O" mark on the calibration scale when the plates are fully meshed.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator approximately 1/16-inch above end dots at low-frequency ends of bands with gang condenser fully meshed. See that pointer does not rub background screen or dial face. The indicator has a spring clip for attachment to the cable.

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Set tuning gang to— | Adjust the following— | To obtain— |
|---|---|---|---|---|---|
| 1 | Turn fidelity switch to No. 3 radio (sharp). | | | | |
| 2 | 6K7 2nd I-F grid cap, in series with .01 mfd. | 455 kc | Quiet point on "B" band | L15, L16 (3rd I-F Trans.) | Coincidental images on cathode-ray oscillograph, or max. output on output meter. |
| 3 | 6K7 1st I-F grid cap, in series with .01 mfd. | | | L13, L14 (2nd I-F Trans.) | |
| 4 | 6A8 1st Det. grid cap, in series with .01 mfd. | | | L11, L12 (1st I-F Trans.) | |
| 5 | Turn fidelity switch to No. 4 radio (broad). The curve on CRO should broaden out to a double peak and reduce gain nearly 50%. | | | | |
| 6 | Turn fidelity switch to No. 3 radio for the following adjustments. Back out the "B" and "C" oscillator trimmers, C5 and C4. Preset "A" band oscillator trimmer, C9, approximately an inch out. | | | | |
| 7 | Antenna terminal, in series with 100 mmf. | 600 kc | 600 kc (31°) "A" band | L10 (osc.) | Max. Output |
| 8 | | 1,500 kc | 1,500 kc (151°) "A" band | C9 (osc.) C2 (ant.) C15 (det.) | Max. Output |
| 9 | | 600 kc | 600 kc "A" band | L10 (osc.) | Rock in for Max. Output |
| 10 | Repeat step No. 8. | | | | |
| 11 | Antenna terminal, in series with 300 ohms | 6,100 kc | 6,100 kc (140°) "B" band | C5 (osc.) | Max. Output * |
| 12 | | 20 mc | 20 mc (146°) "C" band | C4 (osc.) | Rock in for Max. Output * |
| | Follow "Adjustments for Electric Tuning." | | | | |

* Use minimum capacitance peak if two peaks can be obtained.
**Note:** The oscillator tracks 455 kc above the signal on all bands.

Radio receiver chassis No. RC-427 is used in RCA Victor Television Console Models TRK-9 and TRK-12.

The audio output of the television chassis is connected to the audio input of the radio chassis by means of jack X-17 and section S7 of the fidelity switch. The functions of this switch are tabulated on the following page.

A separate plug-in power unit, RS-83E, is used to supply heater and plate voltages to the radio chassis. Service data and diagram for this power unit are shown below.

## Victrola Attachment

A jack (X-16) is located near the antenna terminal board for convenience in plugging in a Victrola Attachment. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

## Feedback Switch (S8 and S9)

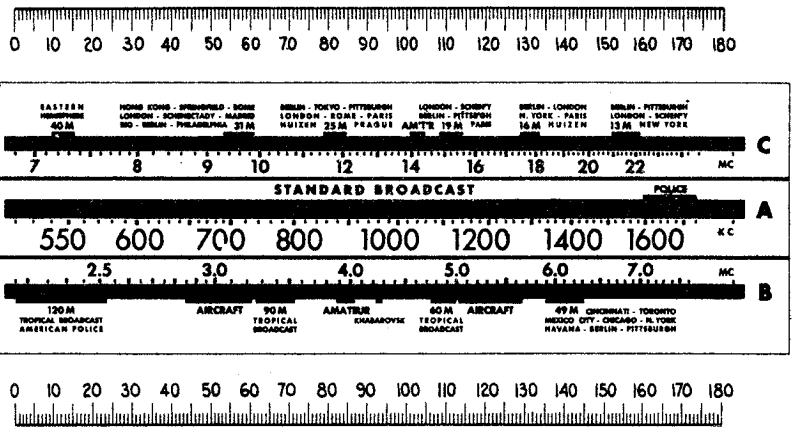
| Counter-clockwise position (with feedback) | Clockwise position (without feedback) |
|---|---|
| 1. Provides inversed feedback by connecting part of secondary of output transformer in cathode of 6J5 2nd-audio tube. | 1. Removes reversed feedback and grounds cathode of 2nd-audio tube. |
| 2. Disconnects compensating network (R22, C43, C54, C40) from plate circuit of output tubes. | 2. Connects compensating network (R22, C43, C54, C40) to plate circuit of output tubes. |
| 3. Connects grid of 2nd audio to high side of 1st A-F plate resistor R17, for maximum input. | 3. Connects grid of 2nd audio to low side of 1st A-F plate resistor R17, for reduced input. |
| 4. Connects capacitor C53 (.005) from plate of 2nd audio to chassis. | 4. Disconnects C53 from plate of 2nd audio. |

## Fidelity Switch (S4, S5, S6, S7)

| Switch Position | For | I-F Amp. | Audio Amp. | 110-V. Supply for Tele. Chassis * | Magic Eye | Osc. and Eye +B Supply | Dial Lamps ** |
|---|---|---|---|---|---|---|---|
| No. 1 (Counter-clockwise) | Victrola | — | Min. Highs | Off | — | Off | On |
| No. 2 | Victrola | — | Max. Highs Reduced Lows | Off | — | Off | On |
| No. 3 | Victrola | — | Full Range | Off | — | Off | On |
| No. 1 | Radio | Sharp | Min. Highs Max. Lows | Off | On | On | On |
| No. 2 | Radio | Sharp | Max. Highs Reduced Lows | Off | On | On | On |
| No. 3 | Radio | Sharp | Max. Highs Full Lows | Off | On | On | On |
| No. 4 | Radio | Broad | Full Range | Off | On | On | On |
| No. 1 | Television | — | Min. Highs | On | Off | Off | Off |
| No. 2 | Television | — | Med. Highs Reduced Lows | On | Off | Off | Off |
| No. 3 | Television | — | Full Range | On | Off | Off | Off |

* Controlled by switch (S12) on rear of fidelity switch.
** The 1st-I.F. heater is opened on positions 8, 9, and 10.

## Calibration Scale


0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180
87667
C
7 8 9 10 12 14 16 18 20 22 MC
STANDARD BROADCAST
POLICE
A
550 600 700 800 1000 1200 1400 1600 KC
2.5 3.0 4.0 5.0 6.0 7.0 MC
B
120 M TROPICAL BROADCAST AMERICAN POLICE
AIRCRAFT
90 M TROPICAL BROADCAST
AMATEUR KHABAROVSK
60 M TROPICAL BROADCAST
AIRCRAFT
49 M CINCINNATI - TORONTO MEXICO CITY - CHICAGO - N. YORK HAVANA - BERLIN - PITTSBURGH




*Tuning Dial, and Corresponding 0-180° Calibration Scale*

The corresponding dial setting for any reading of the calibration scale can be determined by drawing a line straight up from this point; for example, 151° on the calibration scale corresponds to a dial reading of 1,500 kc on "A" band. Read instructions under "Alignment Procedure."

## Precautionary Lead Dress

(1) All A-C leads should be twisted together and dressed away from parts in chassis to prevent hum pickup.

(2) Keep pilot light leads away from 6R7 grid.

(3) Yellow, green, and black leads from fidelity switch to 1st i-f transformer must be twisted together and dressed away from chassis.

(4) Yellow, green, and black leads from fidelity switch to 2nd i-f transformer must be twisted together and dressed away from chassis.

RCA MFG. CO., INC.

MODELS TRK-9, TRK-12
Electric Tuning Data

# Electric Tuning Mechanism

When a station button is pushed in, it completes the 24-volt circuit through the corresponding station-setting contact and one-half of the brass selector disc, which is connected to one side of the motor field coil. This energizes the motor, and the rotor is pulled forward, engaging with the gear train that drives the tuning condenser and selector disc. The condenser and disc rotate until the insulation line comes under the particular station-setting contact, and the motor circuit is broken.

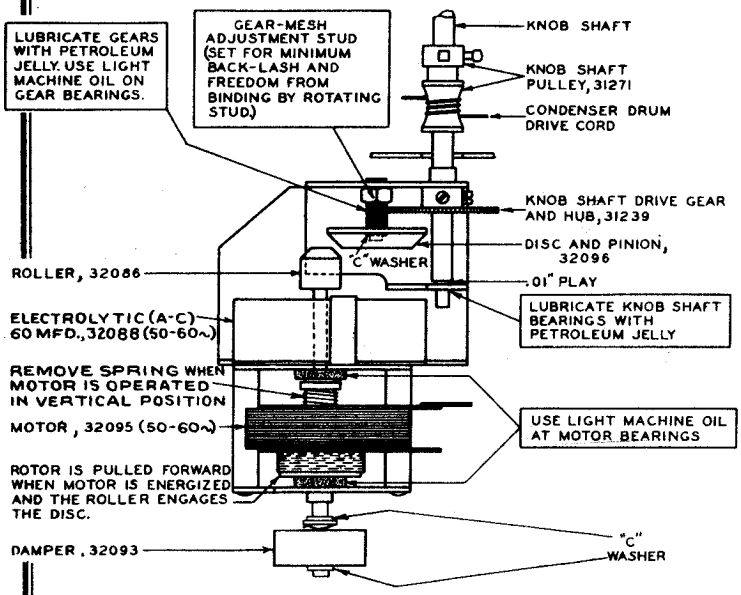
When the electric tuning mechanism is in action, the motor-supply voltage is fed into a diode rectifier circuit which applies a high bias to the first-audio amplifier. This prevents audio amplification and makes the set quiet or "mute" while the mechanism is operating.

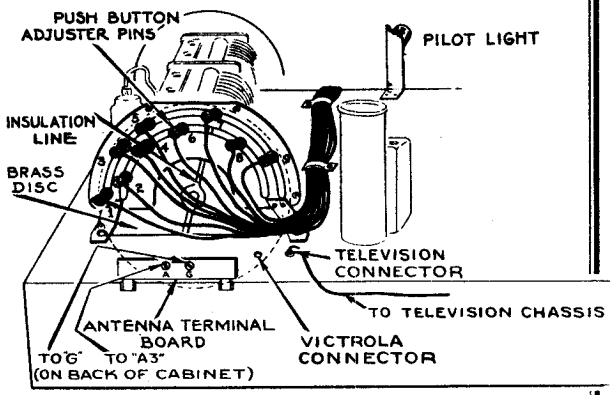
The brass selector disc is fastened to the rear shaft of the tuning condenser by means of two set-screws. When the condenser is at maximum (plates fully meshed) the insulation line should be horizontal, with the operating-end at the left (viewed from rear). The brass is beveled at this end.

The selector disc should be set so that the contact-tip plungers in the station-setting contacts project not more than 1/16-in. from the body of the contacts.

## LUBRICATION

**Motor bearings** and **gear bearings;** use light machine oil.
**Gear faces;** use "Pure Oil No. 611" or petroleum jelly.
**Dial-indicator pulleys** and **rails;** use "Castordag" or petroleum jelly.
**Selector disc;** apply ***thin*** film of petroleum jelly.


LUBRICATE GEARS WITH PETROLEUM JELLY. USE LIGHT MACHINE OIL ON GEAR BEARINGS.
GEAR-MESH ADJUSTMENT STUD (SET FOR MINIMUM BACK-LASH AND FREEDOM FROM BINDING BY ROTATING STUD)
KNOB SHAFT
KNOB SHAFT PULLEY, 31271
CONDENSER DRUM DRIVE CORD
KNOB SHAFT DRIVE GEAR AND HUB, 31239
DISC AND PINION, 32096
"C" WASHER
.01" PLAY
ROLLER, 32086
LUBRICATE KNOB SHAFT BEARINGS WITH PETROLEUM JELLY
ELECTROLYTIC (A-C) 60 MFD., 32088 (50-60~)
REMOVE SPRING WHEN MOTOR IS OPERATED IN VERTICAL POSITION
MOTOR, 32095 (50-60~)
USE LIGHT MACHINE OIL AT MOTOR BEARINGS
ROTOR IS PULLED FORWARD WHEN MOTOR IS ENERGIZED AND THE ROLLER ENGAGES THE DISC.
DAMPER, 32093
"C" WASHER

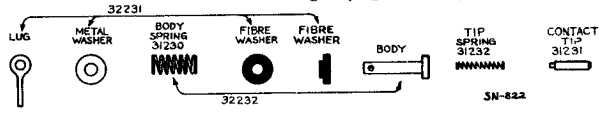



| Station Button | Color of Lead To Station-Setting Contact | Station Button | Color of Lead To Station-Setting Contact |
|---|---|---|---|
| No. 1 | Yellow-green | No. 6 | Red |
| No. 2 | Black | No. 7 | Red-black |
| No. 3 | Brown | No. 8 | Brown-black |
| No. 4 | Blue | No. 9 | Red-yellow |
| No. 5 | Green | | |

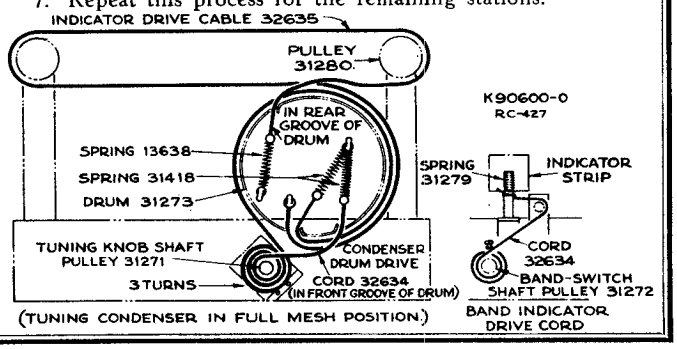
# Adjustments for Electric Tuning

With power turned off, disconnect the antenna transmission line and ground connection, turn fidelity control to radio (3rd radio position—6th position from full counter-clockwise). Remove the back from the cabinet and reconnect the antenna transmission line and ground connection. The two interlock switches on the side panels should not be touched and care should be taken not to press on them when making the push-button set-up. Then turn on power, set range selector to "A," allow a few moments warm-up period and proceed as follows:

1. Make a list of the desired nine stations, arranged in order from low to high frequencies.
2. Turn on power-volume control, turn range selector to "A" band, and allow a few minutes for warming up.
3. Press down the "dial-tuning" (right-hand) button.
4. Manually tune in the first station on the list, using the "Magic Eye" for accurate tuning.
5. Hold down the "dial-tuning" button and press down station button No. 1 (left-hand). Both buttons will stay down. Move station adjuster contact pin No. 1 to the insulating line on the disc at rear of gang. When the pin is correctly centered on the insulating line, the central dial lamp will go out completely.
6. Press down any other button in order to release the dial-tuning button and station button No. 1. Tune to some other section on the dial, and then press down station button No. 1 again; the electric tuning mechanism will function to tune in the first station, and the central dial lamp will stay on.
7. Repeat this process for the remaining stations.




*Components of Station Setting Contact*




*At Right—Dial Mechanism*

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MODELS TRK-9, TRK-12
Kinescope Data
Parts List

RCA MFG. CO., INC.

# Precautions in Handling Kinescopes

The Kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, Kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the Kinescope bulb — particularly that part at the rim of the viewing surface — must not be struck, scratched or subjected to more than moderate pressure at any time. If the tube sticks, or fails to slip into its socket or deflecting yoke smoothly, investigate and remove the cause of trouble. Do not force the tube.

All RCA Kinescopes are shipped in special cartons and should always be left in the cartons until ready for installation in the receiver. Keep the carton for future use.

The RCA-1803-P4 (12-inch) Kinescope is equipped with a protective lid and shield. Do not at any time remove the close-fitting cone-shaped section of the protective shield from the Kinescope. This section should be installed with the tube in the cabinet and is designed to protect the user while handling the glass bulb.

## REPLACEMENT PARTS (Continued)

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **7,500 VOLT TELEVISION POWER UNIT** | |
| | **TRK-12—KK-7** | |
| | **TRK-9—KK-7A** | |
| 33016 | Bushing—Porcelain bushing and spring | .25 |
| 33288 | Cable—Insulated connector complete with cable for Kinescope (2nd anode) | 2.10 |
| 33995 | Capacitor—.005-.005 mfd., 1,000 v. (C115, C116) | xx |
| 32901 | Capacitor—0.03 mfd., 7,500 volt (C113, C114) | 3.25 |
| 32400 | Capacitor—20 mfd., 450 volt (C111, C112) | 1.05 |
| 33023 | Capacitor—80-10-mfd., 400 volt (C110, C109) | 2.80 |
| 14854 | Choke—Filter choke (L49) | 1.80 |
| 32940 | Choke—Filter choke (L50) | 3.75 |
| 30314 | Clip—Plate connector for 2V3G Radiotron | .03 |
| 33037 | Control—Focus control, 400,000 ohms (R129) (Used in 1st production) | 1.00 |
| 33971 | Control—Focus control, 400,000 ohms (R129) (Used in 2nd production) | 1.00 |
| 33002 | Coupling—Flexible bronze coupling | .10 |
| 10907 | Fuse—3 ampere, 250 volt | .08 |
| 33015 | Insulator—Stand-off insulator only—less hardware | .30 |
| 32937 | Knob—Focus control knob | .20 |
| 33244 | Plug—2-prong male connector for A.C. power cord (X22) | .45 |
| 33166 | Plug—Two prong male plug for Kinescope grid-cathode cable (X4) | .20 |
| 33501 | Resistor—330,000 ohms, 1W (1,000V.) (R126, R130) | .20 |
| 33502 | Resistor—470,000 ohms, 1W (1,000V.) (R127, R128, R137) | .20 |
| 33554 | Resistor—820,000 ohms, 1W (1,000V.) (R131, R132, R133, R134, R135, R136) | .20 |
| 33024 | Shaft—Bakelite shaft for focus control | .50 |
| 18007 | Socket—Ceramic octal base socket and retaining ring for high voltage rectifier | .65 |
| 33245 | Socket—Kinescope socket, less cable (X11) | .35 |
| 31251 | Socket—Octal base 5T4 rectifier, or television power supply socket (X13) | .25 |
| 12143 | Socket—6-prong television power supply socket (X15) | .50 |
| 32909 | Support—Rectifier [illegible], plate, and stand-off insulator assembly | 2.00 |
| 32939 | Transformer—Filament power transformer (T7) | 5.65 |
| 9861 | Transformer—High voltage power transformer (T6) | 22.50 |
| 32938 | Transformer—Low voltage power transformer (T5) | 10.00 |
| | **SPEAKER ASSEMBLY** | |
| | **RL-70F-5** | |
| 31825 | Cap—Cone center dust cap | .05 |
| 11469 | Coil—Hum neutralizing coil (L21) | .30 |
| 11234 | Coil—Speaker field coil (L17) | 3.85 |
| 31275 | Cone—Speaker cone assembly (L18) | 1.75 |
| 31567 | Plug—3-prong male feed back cable plug (X8) | .15 |
| 31539 | Plug—5-prong speaker plug (X10) | .25 |
| 31556 | Speaker—Speaker complete (RL-70F-5) | 13.45 |
| 31557 | Transformer—Speaker output transformer (T1) | 3.20 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| | **TRK-12** | |
| | **TRK-9** | |
| 31358 | Button—Station selector push button | .15 |
| 33676 | Cable—17½-inch shielded audio lead with plugs (X6, X18) (Model TRK-9 only) | .85 |
| 33480 | Cable—38-inch shielded audio lead with plugs (Model TRK-12 only) (X6, X18) | 1.30 |
| 33246 | Cable—Low capacity Kinescope grid cable (Model TRK-12 only) | 1.25 |
| 33605 | Cable—Low capacity Kinescope grid cable (Model TRK-9 only) | 1.35 |
| 33597 | Cap—Blue pilot lamp "Bulls Eye" | .20 |
| 32897 | Clamp—Deflecting yoke clamp assembly | .65 |
| 4573 | Connector—2-prong female connector for power supply circuit (X23) | .30 |
| 33363 | Connector—2-prong female connector, used on interlock cable (X21) | .45 |
| 33002 | Coupling—Flexible bronze coupling (Used in 2nd production receivers) | .10 |
| 31456 | Cover—Eight protective covers for push button markers | .08 |
| 32815 | Cushion—Kinescope masking cushion (Model TRK-12 only) | 2.30 |
| 33019 | Cushion—Kinescope masking cushion (Model TRK-9 only) | 1.90 |
| 33643 | Cushion—Television chassis mounting cushion with screw, spacer and washer (sufficient for one chassis) | .40 |
| 33442 | Dial—Three-band glass dial scale | 1.25 |
| 33329 | Escutcheon—Dial escutcheon less buttons, button shaft and dial scale | 2.60 |
| 32083 | Frame—Dial frame with screen less pointer, carriage and rod | 1.20 |
| 10907 | Fuse—3 ampere line fuse | .08 |
| 33074 | Glass—6¾ by 8¾ inch safety protective glass (Model TRK-9 only) | 2.40 |
| 33076 | Glass—8¾ by 11¼ inch safety protective glass (Model TRK-12 only) | 3.90 |
| 33282 | Hinge—Piano type lid hinge and screws | 2.50 |
| 33468 | Knob—Radio tuning, volume or range selector knob | .15 |
| 33470 | Knob—Television "Contrast," "Hor. hold" or "Fine Tuning" knob | .20 |
| 33471 | Knob—Television "Brightness" or "Vert. hold" knob | .25 |
| 33472 | Knob—Television "Station selector" knob | .25 |
| 33469 | Knob—"Victrola—Radio—Television—Fidelity selection" knob | .20 |
| 11891 | Lamp—6.3 V. pilot lamp, Mazda No. 44 | .17 |
| 31589 | Marker—Complete set of call letter markers | .35 |
| 31458 | Marker—"Dial Tuning" push button marker | .01 |
| 31457 | Marker—"Victrola" push button marker | .01 |
| 33075 | Mirror—20¼ by 14¾ in. viewing mirror | 9.00 |
| 33225 | Nut—Speed nut for mounting high frequency coil assemblies | .01 |
| 4577 | Plug—2-prong male plug for power supply circuit (X24) | .45 |
| 33244 | Plug—2-prong male plug, used on interlock cable (X22) | .45 |
| 33166 | Plug—2-prong male plug for Kinescope grid-cathode cable (X4) | .20 |
| 32816 | Plug—4-prong male plug for deflecting yoke cable (X2) | .20 |
| 12493 | Plug—5-prong female speaker cable plug (X9) | .30 |
| 4574 | Plug—6-prong male plug for Television chassis power supply cable (X14) | .48 |
| 16836 | Plug—8-prong male plug for Television chassis power supply cable (X12) | .25 |
| 31542 | Pointer—Station selector pointer with carriage | .35 |
| 31287 | Rod—Dial frame pointer slide rod | .15 |
| 32083 | Screen—Dial frame difusing screen with rivets | 1.20 |
| 4560 | Screw—#20 by 1¼ in. long, machine screw, washer and lockwasher for chassis mounting (12 required) | .06 |
| 33517 | Sleeve—Bell mouth sleeve for screw-driver adjustments (Model TRK-9 only) | .05 |
| 14270 | Spring—Knob spring for stock Nos. 33468, 33471, 33472, 33469 knobs | .05 |
| 30330 | Spring—Knob spring for stock Nos. 33470, knob | .03 |
| 33362 | Switch—Interlock switch with leads | 1.80 |
| 31522 | Support—Left hand lid support | 2.25 |
| 31478 | Support—Right hand lid support | 2.20 |
| 9857 | Yoke—Deflecting yoke complete with cable and 4-prong plug (L43, L44, R62) | 17.50 |

XX—Price upon application to your RCA Parts Distributor

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Schematic, Transformer Data
Lead Dress, Specifications

# RCA MFG. CO., INC.

MODELS 5Q5A, 5Q5B, 5Q5C, 5Q5D, 5Q5E, 5Q55, 5Q56, Chassis RC-396
MODEL 6Q7, Chassis RC-414A

**FREQUENCY RANGES**

| | |
|---|---|
| "Standard Broadcast" (A) | 540-1,720 kc (555-174 m) |
| "Medium Wave" (B) | 2.3-7.0 mc (130-42.8 m) |
| "Short Wave" (C) | 7.0-22.0 mc (42.8-13.6 m) |
| Intermediate Frequency | 455 kc |

**RCA TUBE COMPLEMENT**

| | |
|---|---|
| (1) RCA-6SA7 | First Detector—Oscillator |
| (2) RCA-6K7 | Intermediate Amplifier |
| (3) RCA-6SQ7 | Second-Detector, A.V.C., and A-F Amplifier |
| (4) RCA-6F6-G | Power Output |
| (5) RCA-5Y3-G | Full-Wave Rectifier |
| (6) RCA-6U5 (Model 6Q7) | "Magic Eye" |
| Pilot Lamp (1) | Mazda 44, 6.3 volts, 0.25 amp. |

**POWER OUTPUT RATING**

| | |
|---|---|
| Undistorted | 1.5 watts |
| Maximum | 3.3 watts |

**LOUDSPEAKER**

| | |
|---|---|
| Type (5Q5, 5Q55, 5Q56) RL-78-2 | 5-inch Electrodynamic |
| (6Q7) RL-79-2 | 6-inch Electrodynamic |
| Voice-Coil Impedance | 3.4 ohms at 400 cycles |

**POWER SUPPLY RATINGS**

| | |
|---|---|
| Rating A | 105-125 volts, 50-60 cycles, 70 watts |
| Rating B | 105-125 volts, 25-60 cycles, 70 watts |
| Rating C | 105-125/200-250 volts, 50-60 cycles, 70 watts |

**CABINET DIMENSIONS**

| | Models 5Q5, 5Q55 5Q56 | Model 6Q7 |
|---|---|---|
| Height | 9⅝ inches | 12-5/16 inches |
| Width | 13⅜ inches | 14⅛ inches |
| Depth | 8¼ inches | 8½ inches |
| Weight (net) | 18½ pounds | 16½ pounds |

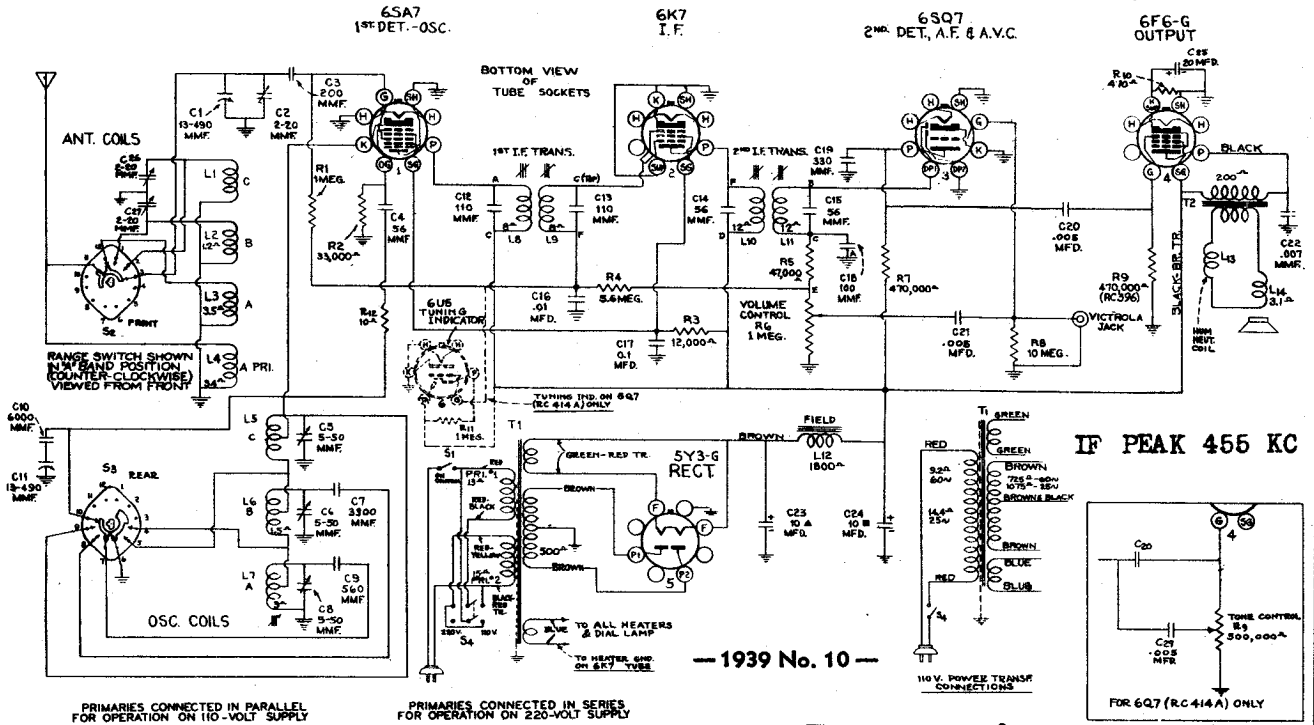
| | |
|---|---|
| Chassis Base Dimensions | 12 in. wide, 5¼ in. deep, 2¾ in. high |
| Overall Chassis Height | 7 inches |
| Tuning Drive Ratio | 18 to 1 |

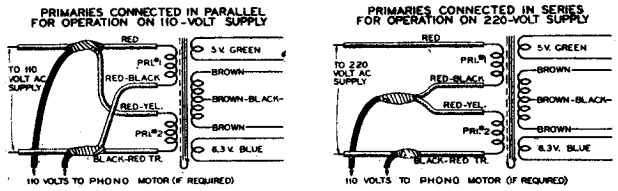
## General Description

Models 5Q5, 5Q55, 5Q56 and 6Q7 are three-band table type superheterodyne receivers. They are designed to cover the standard broadcast range of 540 to 1,720 kilocycles, and the short-wave range from 2.3 to 22 megacycles.

**Models 5Q5 and 6Q7 are Export Types.**

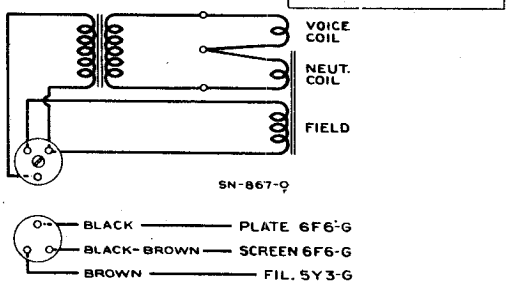
Features of design include: Magnetite-core I-F transformers; magnetite-core "A" band oscillator coil; automatic volume control; continuously-variable high-frequency tone control on Model 6Q7; edge-lighted straight-line dial; band indicator in dial; jack for Victrola Attachment; and dust-proof electrodynamic loudspeaker.





PRIMARIES CONNECTED IN PARALLEL FOR OPERATION ON 110-VOLT SUPPLY
PRIMARIES CONNECTED IN SERIES FOR OPERATION ON 220-VOLT SUPPLY
110 VOLTS TO PHONO MOTOR (IF REQUIRED)
110 VOLTS TO PHONO MOTOR (IF REQUIRED)

| D-C Resistance | | |
|---|---|---|
| | Primary No. 1 | 13 ohms |
| | Primary No. 2 | 15 ohms |
| | H. V. Secondary (Total) | 500 ohms |

*Connections of Universal Power Transformer Primary for 220 and 110 Volts*




*Connections and Colors of Speaker and Cable*

## Miscellaneous Service Data

### Precautionary Lead Dress

1. Lead from 2nd I.F. (E) to volume control should be kept close to chassis.
2. R.F. coil leads should be kept short and away from coil.
3. Leads to 6,000 mmf. (C10) should be as short as possible and condenser dressed away from chassis, bearing against 10 ohm (R12) resistor.

**Victrola Attachment.**—A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug to fit the jack.

**Loudspeaker.**—To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

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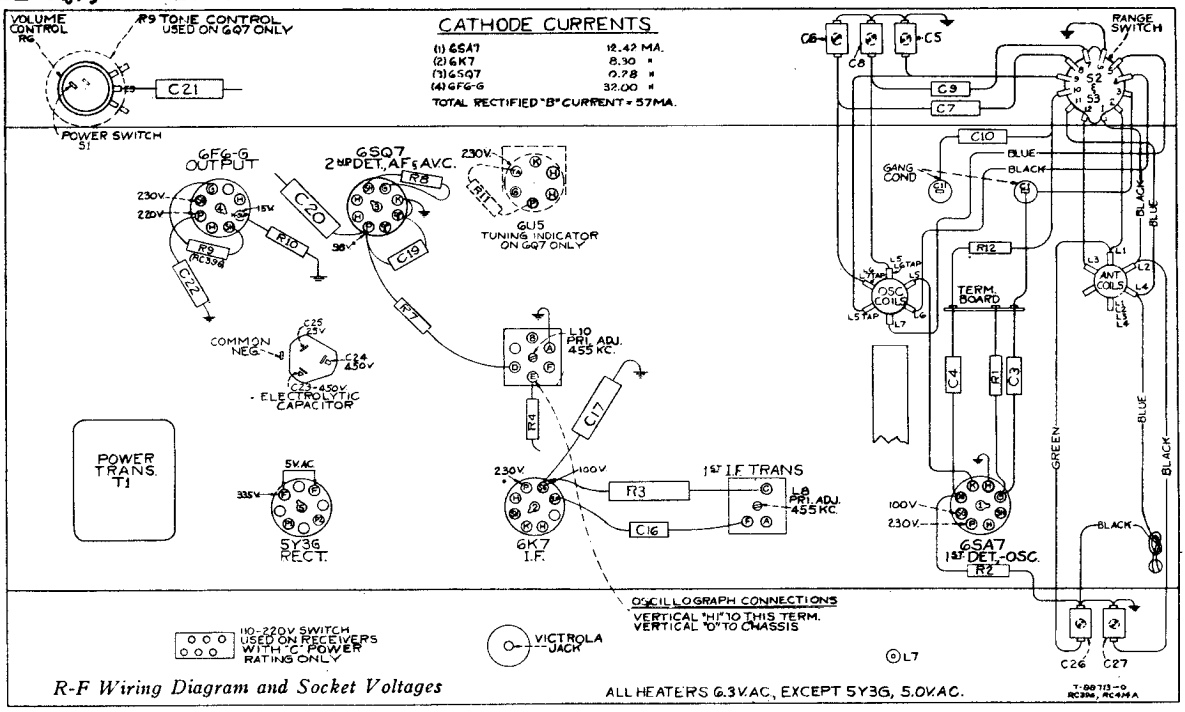
MODELS 5Q5A, 5Q5B, 5Q5C, 5Q5D, 5Q5E
5Q55, 5Q56, Chassis RC-396
MODEL 6Q7, Chassis RC-414A

# RCA MFG. CO., INC.

Socket, Trimmers, Voltage
Drive Cord Data, Scale




*R-F Wiring Diagram and Socket Voltages*

ALL HEATERS 6.3 V.AC., EXCEPT 5Y3G, 5.0 V.AC.

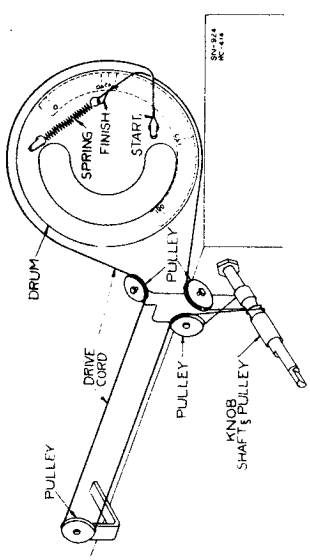
BOTTOM VIEW - REAR OF CHASSIS

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ± 20% with 117-volt a-c supply.

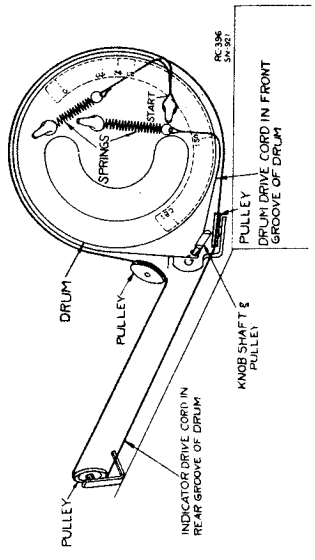
***NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

| Models | Description |
|---|---|
| *5Q5A* | *Brown Plastic Cabinet* |
| *5Q5B* | *Black Plastic Cabinet* |
| *5Q5C* | *Ivory Plastic Cabinet* |
| *5Q5D* | *Maroon Plastic Cabinet* |
| *5Q5E* | *Black Plastic Cabinet with Metal Grille* |
| *5Q55* | *Mottled Brown Plastic Cabinet* |
| *5Q56* | *Ivory Finish Plastic Cabinet* |

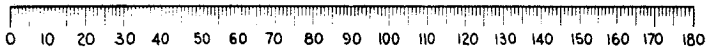
*Model 6Q7*
*Striped Walnut Wood Cabinet*

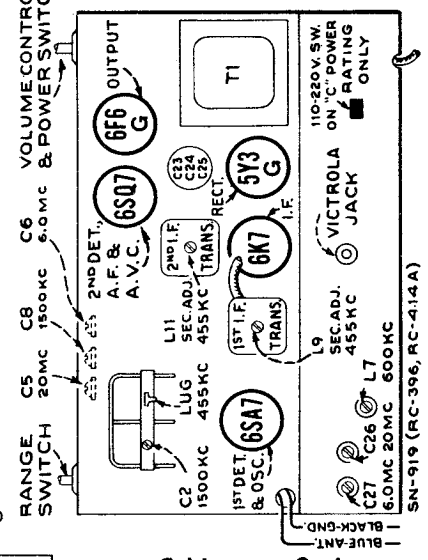



*Arrangement of Drive Cord for Tuning Condenser and Dial Indicator (Model 6Q7) Drum Shown with Gang at Maximum Capacity*

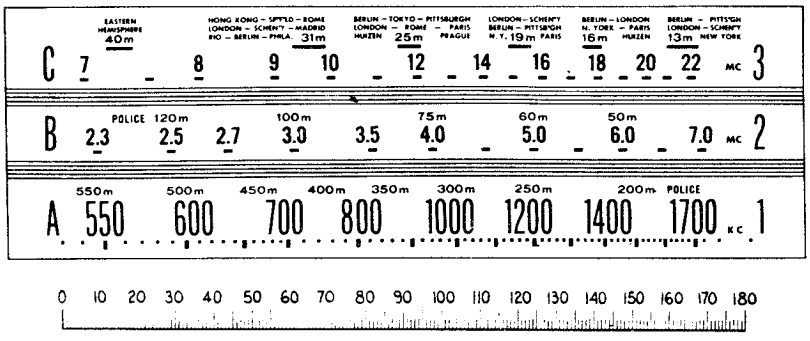



*Arrangement of Drive Cords for Tuning Condenser and Dial Indicator (Models 5Q5, 5Q55 and 5Q56) Drum Shown with Gang at Maximum Capacity*




*Tube and Trimmer Locations*


EASTERN HEMISPHERE 40m
HONG KONG – SYDNEY – ROME
LONDON – SCHENY – MADRID
RIO – BERLIN – PHILA. 31m
BERLIN – TOKYO – PITTSBURGH
LONDON – ROME – PARIS
HUIZEN 25m PRAGUE
LONDON – SCHENY
BERLIN – PITTSBURGH
N. Y. 19m PARIS
BERLIN – LONDON
N. YORK – PARIS
16m HUIZEN
BERLIN – PITTSBURGH
LONDON – SCHENY
13m NEW YORK
C 7 8 9 10 12 14 16 18 20 22 MC 3
POLICE 120m
100m
75m
60m
50m
B 2.3 2.5 2.7 3.0 3.5 4.0 5.0 6.0 7.0 MC 2
550m 500m 450m 400m 350m 300m 250m 200m POLICE
A 550 600 700 800 1000 1200 1400 1700 KC 1




## Calibration Scale

*Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales*

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 33° on the calibration scale corresponds to approximately 7.9 mc on "C" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

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| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES** | |
| 32832 | Bracket—Drive bracket, pulleys, and tuning knob shaft complete (Models 5Q5, 5Q55 and 5Q56) | 1.20 |
| 32635 | Cable—Pointer drive cable (Models 5Q5, 5Q55 and 5Q56) | .24 |
| 12581 | Cap—First I.F. transformer shield cap | .25 |
| 12723 | Capacitor—56 mmfd. (C4) | .35 |
| 30949 | Capacitor—56 mmfd. (C14, C15) | .25 |
| 14262 | Capacitor—109 mmfd. (C12, C13) | .30 |
| 32238 | Capacitor—110 mmfd. (C18) | .30 |
| 12694 | Capacitor—220 mmfd. (C3) | .35 |
| 12952 | Capacitor—330 mmfd. (C19) | .35 |
| 12537 | Capacitor—560 mmfd. (C9) | .35 |
| 31403 | Capacitor—3,300 mmfd. (C7) | .60 |
| 31405 | Capacitor—6,000 mmfd. (C10) | .75 |
| 32830 | Capacitor—Trimmer capacitor bank, 2 sections 2-20 mmfd. (C26, C27) | .40 |
| 32829 | Capacitor—Trimmer capacitor bank, 3 sections 5-50 mmfd. (C5, C6, C8) | .55 |
| 4838 | Capacitor—.005 mfd. (C20, C21, C29) | .25 |
| 5148 | Capacitor—.007 mfd. (C22) | .20 |
| 14393 | Capacitor—.01 mfd. (C16) | .30 |
| 4839 | Capacitor—0.1 mfd. (C17) | .30 |
| 32240 | Capacitor—Electrolytic, 2 sections 10 mfd., 1 section 20 mfd. (C23, C24, C25) | 1.45 |
| 32821 | Coil—Antenna coil A, B, C, bands (L1, L2, L3, L4) | 1.35 |
| 32824 | Coil—Oscillator coil—A, B, C bands (L5, L6, L7) | 1.00 |
| 32817 | Condenser—2-gang variable condenser (C1, C2, C11) | 2.60 |
| 32634 | Cord—Drive cord | .10 |
| 32713 | Core—Core and stud for oscillator coil adjustment | .35 |
| 32835 | Drum—Drive cord drum | .55 |
| 11891 | Lamp—Dial lamp | .17 |
| 32953 | Plate—Dial back plate and pointer—less dial scale (Model 6Q7) | 1.60 |
| 5119 | Plug—3-contact female for speaker cable | .25 |
| 32834 | Pulley—Drive cord pulley and mounting bracket (1 pulley) | .25 |
| 32951 | Pulley—Drive cord pulleys and mounting bracket (3 pulleys) (Model 6Q7) | .45 |
| 13988 | Resistor—10 ohms, ½ watt (R12) | .20 |
| 30681 | Resistor—470 ohms, 1 watt (R10) | .22 |
| 12013 | Resistor—1 meg., 1/10 watt (R11) (Model 6Q7) | .15 |
| 31389 | Resistor—12,000 ohms, 3½ watt (R3) | .50 |
| 12454 | Resistor—33,000 ohms, ½ watt (R2) | .20 |
| 5132 | Resistor—47,000 ohms, 1/10 watt (R5) | .15 |
| 12285 | Resistor—470,000 ohms, ½ watt (R7, R9) | .20 |
| 13730 | Resistor—1 meg., ½ watt (R1) | .20 |
| 11668 | Resistor—5.6 meg., ½ watt (R4) | .20 |
| 13601 | Resistor—10 meg., ½ watt (R8) | .20 |
| 14343 | Retainer—Retaining ring for holding tuning knob shaft (Model 6Q7) | .03 |
| 14887 | Retainer—Tuning knob shaft retainer (Models 5Q5, 5Q55 and 5Q56) | .01 |
| 32848 | Screw—No. 8-32 square head set screw for drum | .03 |
| 32833 | Shaft—Tuning knob shaft, eyelet and retainer (Models 5Q5, 5Q55 and 5Q56) | .30 |
| 32932 | Shaft—Tuning knob shaft (Model 6Q7) | .30 |
| 31365 | Socket—Dial lamp insulated socket | .30 |
| 31251 | Socket—Octal base tube socket | .25 |
| 32950 | Socket—Magic Eye socket and bracket (Model 6Q7) | .50 |
| 14278 | Socket—Phonograph socket | .25 |
| 31418 | Spring—Drive cord or pointer cable tension spring | .05 |
| 32819 | Switch—Range switch (Models 5Q5, 5Q55 and 5Q56) (S2, S3) | 1.00 |
| 32929 | Switch—Range switch (Model 6Q7) (S2, S3) | 1.10 |
| 32827 | Switch—Voltage change switch—110-220 volts (S4) | .35 |
| 14376 | Transformer—First i.f. transformer (L8, L9, C12, C13) | 2.45 |
| 32825 | Transformer—Second i.f. transformer (L10, L11, C14, C15, C18, R5) | 2.50 |
| 32910 | Transformer—Power transformer—105-120 volts, 25-60 cycles (T1) | 6.20 |
| 32911 | Transformer—Power transformer—105-120 volts, 50-60 cycles (T1) | 4.10 |
| 32852 | Transformer—Power transformer—105-120 and 200-240 volts, 50-60 cycles (T1) | 4.50 |
| 32818 | Volume control and switch (R6, S1) (Models 5Q5 and 5Q55) | 1.50 |
| 32928 | Volume control, tone control and power switch (R6, R9, S1) (Model 6Q7) | 2.50 |
| | **SPEAKER ASSEMBLIES** Models 5Q5, 5Q55 and 5Q56 (RL-78-2) | |
| 32907 | Cap—Cone center dust cap | .02 |
| 32903 | Coil—Speaker field coil (L12) | 1.25 |
| 32906 | Coil—Speaker hum neutralizing coil (L13) | .25 |
| 32904 | Cone—Speaker cone, voice coil, center suspension, and dust cap (L14) | 1.20 |
| 5118 | Plug—3-contact male for speaker | .25 |
| 32902 | Speaker—Complete | 4.00 |
| 32905 | Transformer—Output transformer (T2) | 1.35 |
| | **SPEAKER ASSEMBLIES** Model 6Q7 (RL-79-2) | |
| 32907 | Cap—Speaker cone center dust cap | .02 |
| 32903 | Coil—Speaker field coil (L12) | 1.25 |
| 32906 | Coil—Speaker hum neutralizing coil (L13) | .25 |
| 32934 | Cone—Speaker cone and voice coil (L14) (Model 6Q7) | 1.65 |
| 5118 | Plug—3-prong male for speaker | .25 |
| 32933 | Speaker—Complete | 5.50 |
| 32905 | Transformer—Output transformer (T2) | 1.35 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 32845 | Bracket—Dial mounting bracket and lamp bracket assembly—less pointer and pointer slide rods (Models 5Q5, 5Q55 and 5Q56) | .85 |
| 32837 | Dial—Dial scale | .65 |
| 32843 | Knob—Black range switch knob (Models 5Q5 and 5Q55) | .15 |
| 33085 | Knob—Black tuning knob (Models 5Q5 and 5Q55) | .25 |
| 32841 | Knob—Black volume control knob (Models 5Q5 and 5Q55) | .15 |
| 32839 | Knob—Brown tuning knob (Models 5Q5 and 5Q55) | .25 |
| 33087 | Knob—Ivory range switch knob (Models 5Q5 and 5Q55) | .15 |
| 33091 | Knob—Ivory tuning knob (Models 5Q5 and 5Q55) | .25 |
| 33086 | Knob—Ivory volume control knob (Models 5Q5 and 5Q55) | .15 |
| 33563 | Knob—Maroon range switch knob (Models 5Q5 and 5Q55) | .15 |
| 33093 | Knob—Maroon tuning knob (Models 5Q5 and 5Q55) | .25 |
| 33562 | Knob—Maroon volume control (Models 5Q5 and 5Q55 | .15 |
| 32847 | Pointer—Dial pointer, carriage and clip | .35 |
| 32846 | Rod—Pointer slide rod | .25 |
| 4393 | Screw—No. 8-32 x 5/16 headless set screw for knob, Stock Nos. 32840, 32842, 32844, 33088, 33089, 33090, 33092 and 33094 | .03 |
| 32937 | Knob—Range switch knob (small) (Model 6Q7) | .20 |
| 33029 | Knob—Tone control and switch knob (small) (Model 6Q7) | .15 |
| 32935 | Knob—Tuning knob (large) (Model 6Q7) | .25 |
| 32936 | Knob—Volume control knob (large) (Model 6Q7) | .25 |
| 4982 | Spring—Retaining spring for knob, Stock No. 32935 (Model 6Q7) | .05 |
| 30330 | Spring—Retaining spring for knob, Stock No. 33029 (Model 6Q7) | .03 |
| 14270 | Spring—Retaining spring for knob, Stock Nos. 32839, 32841, 32843, 33085, 33086, 33087, 33091 and 33093 | .05 |

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## Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

**Output Meter Alignment.** — If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the ground terminal, and keep the output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 45 degree mark on the drum scale (see "Drum Drive and Indicator Cord Assembly" drawings) must be in a horizontal position when the plates are fully meshed. The distance from the edge of the chassis to the drum must not exceed ⅛-inch. The drum is held to the shaft by means of a set screw, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | "A" Band quiet point between 550-750 kc | L10 and L11 (2nd I.F. trans.) |
| 2 | Tuning condenser stator (osc.) in series with .01 mfd. ** | 455 kc | | L8 and L9 (1st I.F. trans.) |
| 3 | Antenna lead (blue) in series with 200 mmfd. | 600 kc | 600 kc (33°) "A" Band | L7† |
| 4 | | 1,500 kc | 1,500 kc (152.4°) "A" Band | C2 (ant.) C8 (osc.) |
| 5 | Repeat steps 3 and 4 | | | |
| 6 | Antenna lead (blue) in series with 400 ohms | 20 mc | 20 mc (155.4°) "C" Band | C5 (osc.) * C26 (ant.) |
| 7 | | 6 mc | 6 mc (149°) "B" Band | C6 (osc.) * C27 (ant.) |
| 8 | Antenna lead (blue) in series with 200 mmf. | 1,500 kc | 1,500 kc (152.4°) "A" Band | C8 (osc.) |

* Use minimum capacity peak if two peaks can be obtained.
† Rock gang condenser slightly while adjusting L7.
** Make test-oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.
Note.—Oscillator tracks 455 kc above signal on all bands.

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MODELS 5X5I, 5X5W
Chassis RC-406
Alignment, Parts

RCA MFG. CO., INC.

# Model 5X5 Series (Chassis No. RC-406)

## Five-Tube, Single-Band, AC-DC Multiplex Superheterodyne Receiver

## Model PLF-10

## Power Line Filter Coupling Unit

### General Description

The following features are incorporated in the design of the Little Nipper Multiplex 5X5 Series Receiver:

First, it is a "standard broadcast" receiver. Second, it will operate any other radio in the home by "remote control" without the use of connecting wires. Third, records may be reproduced through the Little Nipper when used with Victrola Attachment. Fourth, the Model 5X5 (when used with Victrola Attachment) will reproduce records through any other radio in the home without the use of connecting wires.

When using the 5X5 as a remote control, the Model PLF-10 Power Line Filter Coupling Unit should be used in conjunction with the receiver to be controlled. The filter is connected between the power line receptacle and the receiver being controlled, as shown in accompanying drawing.

### Alignment Procedure

**Output Meter Alignment.**—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

**The Remote Control Oscillator** in the 5X5 is set at the factory to approximately 540 kc. The frequency may be varied between 540 and 800 kc to suit local conditions by adjusting the trimmer condenser C7.

**Power-Supply Polarity.**—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

If the electric supply circuit is a three-wire system, it may be necessary to connect a ½ mfd 700-volt capacitor between the two outside lines of the three-wire system.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | Tuning condenser stator (osc.) in series with .01 mfd. | 455 kc | Quiet point at 1,600 kc end of dial | C1, C2, C3, C4 (1st and 2nd I-F transformers) |
| 2 | Antenna term. of ant. trans. in series with 100 mmfd. | 1,720 kc | Full clockwise (out of mesh) | C5 (oscillator) |
| 3 | | 1,500 kc | Resonance on 1,500 kc signal | C6 (antenna) |

### Replacement Parts

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES** | |
| 13057 | Capacitor—60 mmfd. | .35 |
| 12488 | Capacitor—250 mmfd. | .35 |
| 12952 | Capacitor—300 mmfd. | .35 |
| 30433 | Capacitor—400 mmfd. | .35 |
| 4838 | Capacitor—.005 mfd. | .25 |
| 4937 | Capacitor—.01 mfd. | .25 |
| 4870 | Capacitor—.025 mfd. | .20 |
| 4839 | Capacitor—0.1 mfd. | .30 |
| 12484 | Capacitor—0.25 mfd. | .30 |
| 33321 | Capacitor—Electrolytic, 2 sections 30 mfd. each | 1.00 |
| 32572 | Coil—Antenna coil | .60 |
| 33320 | Coil—Duplex oscillator coil | .90 |
| 32962 | Coil—Oscillator coil | .60 |
| 33323 | Condenser—Trimmer 20-150 mmfd. | .35 |
| 32968 | Condenser—2-gang variable tuning | 2.25 |
| 32634 | Cord—Drive cord | .10 |
| 32946 | Drum—Condenser drive drum | .35 |
| 31480 | Lamp—Dial lamp—Mazda No. 47 | .20 |
| 12409 | Lead—Antenna lead | .45 |
| 33322 | Resistor—5 ohms, 5 watts | .20 |
| 14671 | Resistor—33 ohms, ½ watt | .20 |
| 13428 | Resistor—150 ohms, ½ watt | .20 |
| 13998 | Resistor—22,000 ohms, ½ watt | .20 |
| 12454 | Resistor—33,000 ohms, ½ watt | .20 |
| 12412 | Resistor—47,000 ohms, ½ watt | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt | .20 |
| 12679 | Resistor—2.2 meg., ½ watt | .20 |
| 13601 | Resistor—10 meg., ½ watt | .20 |
| 32945 | Shaft—Tuning knob shaft and bushing | .20 |
| 32969 | Socket—Dial lamp socket | .25 |
| 14278 | Socket—Phonograph socket | .25 |
| 32537 | Socket—Tube socket | .20 |
| 30585 | Spring—Drive cord spring | .06 |
| 33324 | Switch—Phonograph switch | .50 |
| 33319 | Transformer—First i-f transformer | 1.40 |
| 33057 | Transformer—Second i-f transformer | 1.25 |
| 32578 | Volume control and power switch | 1.50 |
| | **POWER LINE FILTER PLF-10** | |
| 13057 | Capacitor—60 mmfd. | .35 |
| 12484 | Capacitor—0.25 mfd. | .30 |
| 33492 | Coil—Choke coil | .50 |
| 33493 | Receptacle—Power receptacle | .40 |
| 33491 | Switch | .35 |
| | **SPEAKER ASSEMBLIES (39105—2)** | |
| 32963 | Speaker complete | 3.95 |
| 32964 | Transformer—Output transformer | 1.25 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| X-639 | Cabinet—Ivory finish—Model 5X5I (net) | 2.20 |
| X-638 | Cabinet—Walnut finish—Model 5X5W (net) | 1.35 |
| 32942 | Dial—Glass dial scale | .30 |
| 33317 | Fastener—Push fastener to hold cabinet back | .02 |
| 33306 | Knob—Black tuning knob—Model 5X5I | .15 |
| 32447 | Knob—Ivory knob—Model 5X5W | .15 |
| 32943 | Nut—Speed nut to hold dial | .01 |
| 31646 | Spring—Knob retaining spring | .02 |

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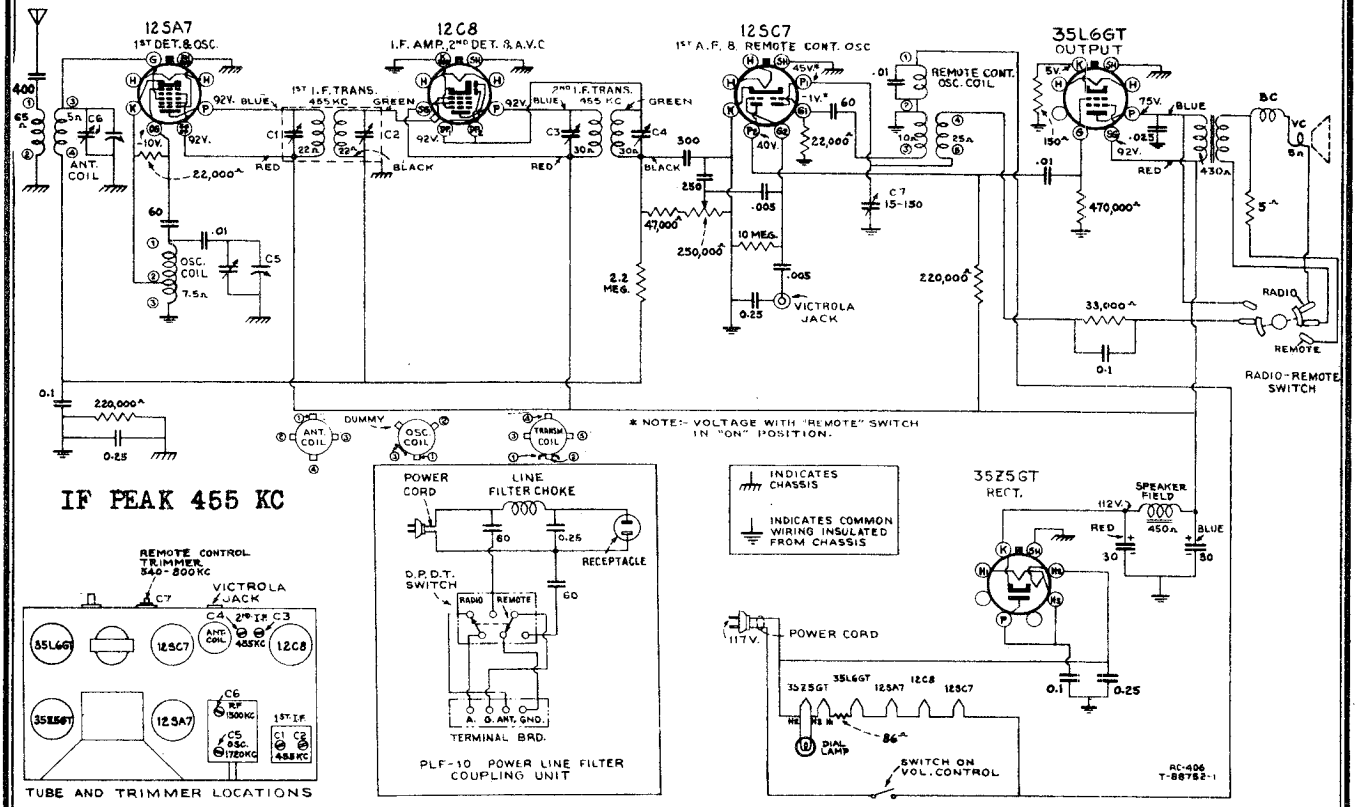
Socket, Trimmers

# RCA MFG. CO., INC.

MODELS 5X5I, 5X5W
Chassis RC-406
MODEL PLF-10 Coupling Unit
Schematics, Tuner, Voltage




—1939 No. 18—

## Electrical and Mechanical Specifications

**Frequency Range**
Receiver ..... 540-1,720 kc
Remote Control Oscillator ..... 540-800 kc

**Tube Complement**
(1) RCA-12SA7 ..... 1st-Detector-Oscillator
(2) RCA-12C8 ..... I-F Amp., 2nd-Det., and A.V.C.
(3) RCA-12SC7 ..... 1st A-F and Remote Control Osc.
(4) RCA-35L6GT ..... Power Output
(5) RCA-35Z5GT ..... Half-Wave Rectifier
Dial Lamp (1) ..... Mazda 47, 6.3 Volts, .15 amp.
Intermediate Frequency ..... 455 kc

**Power Supply Ratings**
A-C Rating ..... 100-125 volts, 50-60 cycles, 30 watts
D-C Rating ..... 100-125 volts, direct current, 30 watts

**Power Output (125 volt, 60 cycle supply)**
Undistorted ..... 1.5 watts
Maximum ..... 2.0 watts

**Loudspeaker**
Type ..... 4 inch Electrodynamic
Cabinet Dimensions (inches) Height 5¼, Width 8¼, Depth 4¼
Weight (net) ..... 5¼ pounds

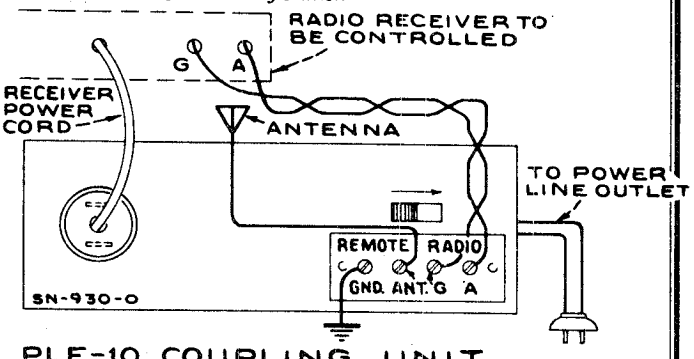
*Model 5X5W* *Walnut Finish*
*Model 5X5I* *Ivory Finish*

## Set-up Procedure for Remote Control

1. Install the 5X5 and tune in any desired station.
2. Turn the control switch on the back of the 5X5 to its clockwise position marked "Remote." The 5X5 becomes silent.
   The 5X5 now becomes a small relay station for signalling to the controlled receiver via the power line wiring.
3. Next tune the main receiver to the exact frequency of transmission of the 5X5, usually 540 kc. Tune carefully to this frequency, setting the volume control as high as permissible with regard to hum and noise conditions. The station to which the 5X5 was tuned will be heard. If the receiver is equipped with tuning indicator (Magic Eye) the correct point will most easily be obtained by observing the indicator.
4. Now any station tuned in on the 5X5 dial will be heard on the controlled receiver. The volume will also be controlled with the 5X5 volume control.
5. If it is desired to operate the controlled receiver on its own controls it is only necessary to set the switch on the Power Line Filter Coupling Unit to its position marked "Radio."
6. In the event that, with the 5X5 being used as a remote control, other receivers in the home are in use, trouble may be experienced due to noise and hum. To avoid this, connect a Power Line Filter Coupling Unit, RCA Victor PLF-10, to each of these other receivers, as shown in accompanying drawing.

### Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12C8 close to chassis.
2. Dress A.V.C. condenser (0.1) close to chassis and tight to 0.25 mmfd. condenser.




PLF-10 COUPLING UNIT

**Antenna.**—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

**Victrola Attachment.**—A jack is provided on the rear of chassis for connecting a Victrola Attachment into the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

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First Edition
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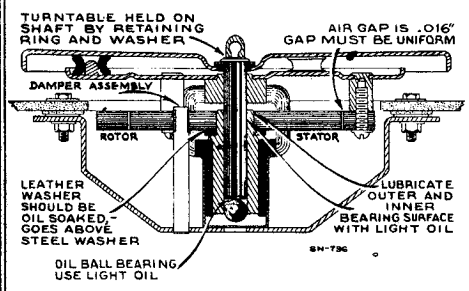
MODELS U8M,U8W
Chassis RC-404A
Motor Assembly,Parts

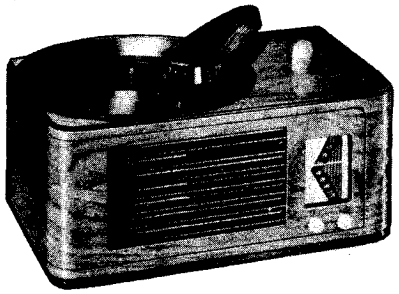
RCA MFG. CO., INC.

# RCA Victor MODEL U-8 (Chassis No. RC-404A)

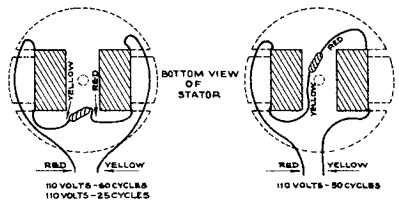
## Five-Tube, Single-Band, A-C, Superheterodyne Victrola


TURNTABLE HELD ON SHAFT BY RETAINING RING AND WASHER
AIR GAP IS .016" GAP MUST BE UNIFORM
DAMPER ASSEMBLY
ROTOR
STATOR
LEATHER WASHER SHOULD BE OIL SOAKED, GOES ABOVE STEEL WASHER
LUBRICATE OUTER AND INNER BEARING SURFACE WITH LIGHT OIL
OIL BALL BEARING USE LIGHT OIL
SM-796

*Cross Section of Motor Assembly*



*Model U-8W*
*Walnut Finish*
*Model U-8M*
*Blonde Mahogany Finish*




*Motor Coil Assembly and Connections*

## Replacement Parts

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES** | |
| 12488 | Capacitor—250 mmfd. | .35 |
| 12952 | Capacitor—300 mmfd. | .35 |
| 4838 | Capacitor—.005 mfd. | .25 |
| 4937 | Capacitor—.01 mfd. | .25 |
| 33736 | Coil—Antenna coil | .75 |
| 32962 | Coil—Oscillator coil | .60 |
| 13057 | Condenser—60 mmfd. | .35 |
| 30433 | Condenser—400 mmfd. | .35 |
| 30303 | Condenser—.0035 mfd. | .40 |
| 33584 | Condenser—.005 mfd. | .25 |
| 4870 | Condenser—.025 mfd. | .20 |
| 4839 | Condenser—0.1 mfd. | .30 |
| 12536 | Condenser—820 mfd. | .45 |
| 32576 | Condenser—Electrolytic, one section 20 mfd., one section 12 mfd. | .90 |
| 32968 | Condenser—2-gang variable tuning | 2.25 |
| 32634 | Cord—Drive cord | .10 |
| 33289 | Dial—Glass dial scale | .40 |
| 33297 | Drive—Dial drive mechanism—comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled | .85 |
| 33006 | Feet—Rubber feet | .03 |
| 33295 | Indicator—Dial pointer | .25 |
| 32571 | Knob—Tan knob (tuning or volume) | .15 |
| 11765 | Lamp—Dial lamp—Mazda 51 | .15 |
| 31193 | Lead—Antenna lead | .50 |
| 33292 | Plate—Dial color plate | .25 |
| 33294 | Pulley—Drive cord pulley | .02 |
| 33558 | Resistor—86 ohms | .15 |
| 13428 | Resistor—150 ohms, ½ watt | .20 |
| 30538 | Resistor—330 ohms, ½ watt | .20 |
| 13998 | Resistor—22,000 ohms, ½ watt | .20 |
| 12266 | Resistor—39,000 ohms, ½ watt | .20 |
| 12412 | Resistor—47,000 ohms, ½ watt | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt | .20 |
| 12679 | Resistor—2.2 meg., ½ watt | .20 |
| 13601 | Resistor—10 meg., ½ watt | .20 |
| 33464 | Shaft—Tuning knob shaft and bearing | .25 |
| 32969 | Socket—Dial lamp socket | .25 |
| 32537 | Socket—Tube socket | .20 |
| 32803 | Spring—Dial knob spring | .01 |
| 31615 | Spring—Drive cord tension spring | .02 |
| 33296 | Spring—Drive drum retaining spring | .06 |
| 32667 | Spring—Knob or drive drum retaining spring. | .02 |
| 32966 | Transformer—First i-f transformer | 1.25 |
| 32967 | Transformer—Second i-f transformer | 1.05 |
| 33465 | Transformer—Output transformer | 1.35 |
| 33504 | Volume control and power switch | 1.50 |
| | **PICKUP AND ARM ASSEMBLIES** | |
| 33121 | Arm—Pickup arm complete—less crystal cartridge | 1.75 |
| 33592 | Base—Pickup arm base and pivot arm | .70 |
| 33122 | Crystal—Pickup crystal cartridge and needle screw | 4.35 |
| 33123 | Damper—Viscoloid damper for pickup armature. | .15 |
| 33529 | Screw—Pickup needle screw | .15 |

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **MOTOR ASSEMBLIES** | |
| 31045 | Base—Motor support, damper, and bearing cup assembly | .60 |
| 31046 | Bearing—Rotor bearing | .70 |
| 33353 | Cap—Turntable spindle cap (rubber) | .10 |
| 33357 | Coil—Motor field coil—105-120 volts, 25 cycle. | .60 |
| 31918 | Coil—Motor field coil—105-120 volts, 50 cycle. | .70 |
| 31917 | Coil—Motor field coil—105-120 volts, 60 cycle | .70 |
| 31040 | Cushion—One set rubber cushion for turntable mounting | .25 |
| 31047 | Cushion—Rubber cushion for rotor bearing | .15 |
| 33941 | Frame—Motor frame and spindle—60 cycle | |
| 33641 | Lamination—Rotor lamination—60 cycle | 1.30 |
| 33358 | Lamination—Stator laminations—25 cycle | 1.30 |
| 33354 | Lamination—Stator laminations—less coil 50 cycle | 1.00 |
| 33355 | Motor—105-120 volts, 25 cycle | 11.75 |
| 33351 | Motor—105-120 volts, 50 cycle | 7.65 |
| 33940 | Motor—105-120 volt, 60 cycle | 7.30 |
| 32075 | Ring—Lead ring for turntable—25 cycle | 1.85 |
| 33041 | Ring—Retaining ring and washer for spindle cap | .06 |
| 33356 | Rotor—Rotor frame, laminations, and spindle shaft assembled—25 cycle | 2.55 |
| 33352 | Rotor—Rotor frame, laminations, and spindle shaft assembled—50 cycle | 2.45 |
| 31036 | Rotor—Turntable and rotor lamination for 60 cycle operation | 4.55 |
| 31042 | Stator—Stator assembly comprising coils and laminations for 60 cycle operation | 2.50 |
| 32076 | Turntable—Finished turntable plate only—25 cycle | 1.40 |
| 31039 | Turntable—Finished turntable plate only—50 cycle | .95 |
| 4083 | Washer—Leather Washer | .02 |
| 33348 | Washers—Leather and metal washers for stator bearing | .10 |
| 14231 | Washer—Metal spacing washer | .02 |
| 32074 | Weight—One upper and one lower weight for stator—25 cycle (2 each required) | .65 |
| | **SPEAKER ASSEMBLIES (RL—78—4)** | |
| 32907 | Cap—Cone dust cap | .02 |
| 33809 | Coil—Speaker field coil | 1.10 |
| 32904 | Cone—Speaker cone and voice coil | 1.20 |
| 33466 | Speaker complete (no output transformer) | 4.25 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 33467 | Control—Tone control and Radio-Record switch | 1.35 |
| 33289 | Dial—Glass dial scale | .40 |
| 30863 | Knob—Tone control knob | .15 |
| 32895 | Knob—Tuning or volume control knob | .15 |
| 33530 | Mounting—Pickup arm rubber cushion, washer and nut | .10 |
| 30870 | Plug—2-prong plug for motor leads | .35 |
| 32610 | Rest—Pickup arm rest | .10 |

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First Edition

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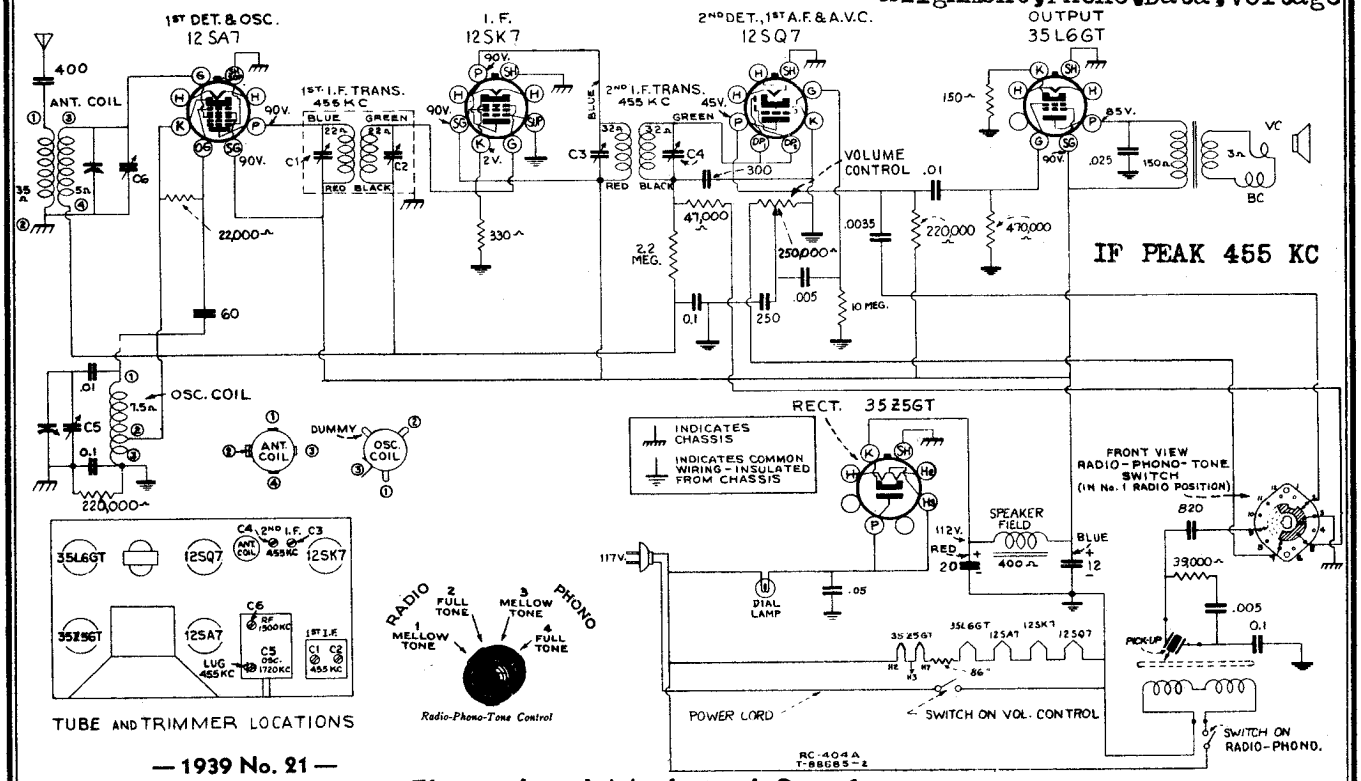
# RCA MFG. CO., INC.

MODELS U8M, U8W
Chassis RC-404A
Schematic, Socket, Trimmers
Alignment, Phono, Data, Voltage




TUBE AND TRIMMER LOCATIONS

— 1939 No. 21 —

## Electrical and Mechanical Specifications

| | |
|---|---|
| FREQUENCY RANGE | 540-1,720 kc |
| INTERMEDIATE FREQUENCY | 455 kc |
| **TUBE COMPLEMENT** | |
| (1) RCA-12SA7 | 1st-Detector-Oscillator |
| (2) RCA-12SK7 | I-F Amplifier |
| (3) RCA-12SQ7 | 2nd-Detector, 1st A-F, and A.V.C. |
| (4) RCA-35L6GT | Power Output |
| (5) RCA-35Z5GT | Half-Wave Rectifier |
| Dial Lamp (1) | Mazda 51, 7.5 volts, 0.2 amp. |
| **POWER SUPPLY RATINGS** | |
| A-5 | 105-125 volts, 50 cycles, 40 watts |
| A-6 | 105-125 volts, 60 cycles, 40 watts |

| | |
|---|---|
| **POWER OUTPUT** (125 volt, 60 cycle supply) | |
| Undistorted | .75 watts |
| Maximum | 1.3 watts |
| **LOUDSPEAKER** | |
| Type | 5-inch Electrodynamic |
| Voice-Coil Impedance | 3.4 ohms at 400 cycles |
| PHONOGRAPH | Synchronous (manual starting) |
| Records | 10-inch and 12-inch, 78 r.p.m. |
| Pickup | Crystal, 100,000 ohms at 1,000 c.p.s. |
| Average Output of Pickup | 1⅓ volts at 1,000 c.p.s. across ½ meg. load |
| Cabinet Dimensions (inches) | Height 6 9/16, Width 14⅞, Depth 8¾ |
| Weight (net) | 11½ pounds |

## Alignment Procedure

**Output Meter Alignment.**—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

**Antenna.**—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

### Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress electrolytic capacitor against chassis apron.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | Tuning condenser stator (osc.) in series with .01 mfd. | 455 kc | Quiet point at 1,600 kc end of dial | C1, C2, C3, C4 (1st and 2nd I-F transformers) |
| 2 | Antenna term. of ant. trans. in series with 100 mmfd. | 1,720 kc | Full clockwise (out of mesh) | C5 (oscillator) |
| 3 | | 1,500 kc | Resonance on 1,500 kc signal | C6 (antenna) |

**Power Supply.**—Although this model employs an ac-dc chassis, it is not suitable for use on dc, as this would damage the motor.

### Phonograph Service Data

The motor is started by turning the radio-phono tone control to either 3rd or 4th position clockwise and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

**Hum and Vibration.**—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.

**5. The damper spring must fit without binding or chattering in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. The damper spring must exert approximately equal force in restoring the stator to its mid-position when the stator is deflected manually in each direction.**

**Removing Rotor.**—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

**Rotor Adjustment.**—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

**Lubrication.**—Oiling points are indicated in the diagram.

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MODELS 9SX-1 to 9SX-8 incl.
Little Nipper
MODELS 9TX-1 to 9TX-5 incl.
Little Nipper-2nd
Parts Lists

RCA MFG. CO., INC.

# "Little Nipper" Models 9SX-1, -2, -3, -4, -5, -6, -7, and -8

## Five-Tube, Two-Band, AC-DC Superheterodyne Receivers

9SX-1, -2, -3, -4, -5, -6, -7, -8

### Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

| STOCK No. | DESCRIPTION | Unit List Price | STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|---|---|---|
| 31193 | Antenna—35 ft. antenna wire—wound on reel | .50 | 32444 | Knob—Station selector knob—Black | .25 |
| X-569 | Cabinet—Walnut and Ivory cabinet (9SX-2) | 3.50 net | 32445 | Knob—Station selector knob—Maroon | .25 |
| X-572 | Cabinet—Blue and Onyx cabinet (9SX-6) | 3.50 net | 32446 | Knob—Volume control or range switch knob—Walnut | .15 |
| X-575 | Cabinet—Onyx cabinet (9SX-7) | 3.50 net | | | |
| X-570 | Cabinet—Walnut cabinet (9SX-1) | 3.50 net | 32447 | Knob—Volume control or range switch knob—Ivory | .15 |
| X-573 | Cabinet—Ivory cabinet (9SX-3) | 3.50 net | | | |
| X-576 | Cabinet—Marble cabinet (9SX-8) | 3.50 net | 32448 | Knob—Volume control or range switch knob—Red | .15 |
| X-571 | Cabinet—Red and Ivory cabinet (9SX-4) | 3.50 net | | | |
| X-574 | Cabinet—Black and Marble cabinet (9SX-5) | 3.50 net | 32449 | Knob—Volume control or range switch knob—Blue | .15 |
| 32392 | Capacitor—.0005 mfd. | .20 | | | |
| 32396 | Capacitor—.0005 mfd. mica capacitor | .30 | 32450 | Knob—Volume control or range switch knob—Black | .15 |
| 32393 | Capacitor—.001 mfd. | .20 | | | |
| 4858 | Capacitor—.01 mfd. | .25 | 32451 | Knob—Volume control or range switch knob—Maroon | .15 |
| 31796 | Capacitor—.02 mfd. | .20 | | | |
| 4886 | Capacitor—.05 mfd. | .20 | 4340 | Lamp—Dial lamp—Mazda 40 | .17 |
| 4839 | Capacitor—0.1 mfd. | .30 | 30540 | Resistor—100 ohms, 1/3 watt | .20 |
| 32386 | Capacitor—10-20 mfd., Electrolytic | 1.35 | 32397 | Resistor—120 ohms, 1/2 watt, Flexohm | .20 |
| 32394 | Capacitor—Trimmer capacitor 1,500 K.C. adjustment (C4) | .20 | 30880 | Resistor—150 ohms, 1/3 watt | .20 |
| | | | 30492 | Resistor—20,000 ohms, 1/3 watt | .20 |
| 32395 | Capacitor—Trimmer capacitor 1,720 K.C. adjustment (C3) | .20 | 3594 | Resistor—50,000 ohms, 1/3 watt | .20 |
| | | | 30493 | Resistor—150,000 ohms, 1/3 watt | .20 |
| 32387 | Coil—Antenna coil (T1) | 1.05 | 3048 | Resistor—500,000 ohms, 1/3 watt | .20 |
| 32388 | Coil—Oscillator coil (T2) | 1.05 | 30652 | Resistor—1 megohm, 1/3 watt | .20 |
| 32389 | Coil—Short wave antenna coil (T3) | .85 | 32398 | Screw—No. 6-32 fibre screw—back cover mounting | .08 |
| 32379 | Condenser—2-gang variable tuning condenser | 2.35 | | | |
| 32384 | Cord—Resistance power cord | .95 | 32390 | Socket—8-prong moulded Octal tube socket | .25 |
| 32399 | Dial—Indicator dial scale | .35 | 32380 | Speaker—Dynamic loudspeaker | 2.90 |
| 32440 | Knob—Station selector knob—Walnut | .25 | 32381 | Transformer—Output transformer (T6) | 1.00 |
| 32441 | Knob—Station selector knob—Ivory | .25 | 32382 | Transformer—First i.f. transformer (T4) | 1.80 |
| 32442 | Knob—Station selector knob—Red | .25 | 32383 | Transformer—Second i.f. transformer (T5) | 1.80 |
| 32443 | Knob—Station selector knob—Blue | .25 | 32385 | Volume Control and Switch | 1.50 |

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# "Little Nipper—2nd" Models 9TX-1, -2, -3, -4, and -5

## Five-Tube, Single-Band, AC-DC Superheterodyne Receivers

9TX-1, -2, -3, -4, -5

### Replacement Parts

Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.

| STOCK No. | DESCRIPTION | Unit List Price | STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|---|---|---|
| X-587 | Cabinet for 9TX1 (Walnut finish) | 1.35 net | 32570 | Knob—Maroon volume control knob for 9TX4 | .15 |
| X-588 | Cabinet for 9TX2 (Ivory finish) | 2.20 net | | | |
| X-589 | Cabinet for 9TX3 (Wood, Mahogany finish) | 2.80 net | 32571 | Knob—Tan volume control knob for 9TX1 and 9TX3 | .15 |
| X-590 | Cabinet for 9TX4 (Arizona Cream Onyx finish) | 4.50 net | | | |
| | | | 31480 | Lamp—Dial lamp—Mazda 47 | .20 |
| X-591 | Cabinet for 9TX5 (Brazilian Green Onyx finish) | 4.50 net | 12409 | Lead—Antenna lead | .45 |
| | | | 14439 | Resistor—100 ohms, ½ watt | .20 |
| 32572 | Coil—Antenna coil | .60 | 32535 | Resistor—120 ohms, wire wound | .20 |
| 32573 | Coil—Oscillator coil | .50 | 12412 | Resistor—47,000 ohms, ½ watt | .20 |
| 13057 | Condenser—60 mmfd. | .35 | 12264 | Resistor—220,000 ohms, ½ watt | .20 |
| 12488 | Condenser—250 mmfd. | .35 | 12285 | Resistor—470,000 ohms, ½ watt | .20 |
| 12952 | Condenser—300 mmfd. | .35 | 12679 | Resistor—2.2 meg., ½ watt | .20 |
| 30433 | Condenser—400 mmfd. | .35 | 13601 | Resistor—10 meg., ½ watt | .20 |
| 4858 | Condenser—.01 mfd. | .25 | 31199 | Shield—Dial lamp shield — Models 9TX1, 9TX2, 9TX4, and 9TX5 | .04 |
| 4870 | Condenser—.025 mfd. | .20 | | | |
| 4886 | Condenser—.05 mfd. | .20 | 32537 | Socket—Tube socket | .20 |
| 4839 | Condenser—0.1 mfd. | .30 | 32575 | Speaker—Complete with transformer | 4.00 |
| 32576 | Condenser—Electrolytic, one section 20 mfd., one section 12 mfd. | .90 | 32574 | Transformer—First i.f. transformer | 1.20 |
| | | | 32581 | Transformer—Output transformer | 1.25 |
| 32579 | Condenser—Variable tuning condenser | 2.25 | 32534 | Transformer—Second i.f. transformer | .90 |
| 32577 | Cord—Resistance power cord | .95 | 32578 | Volume Control and Power Switch—Models 9TX1, 9TX2, and 9TX3 | 1.50 |
| 32566 | Dial—Ivory dial for 9TX2 and 9TX5 | .45 | | | |
| 32567 | Dial—Maroon dial for 9TX4 | .45 | 32580 | Volume Control and Power Switch—Models 9TX4 and 9TX5 | 1.50 |
| 32568 | Dial—Tan dial for 9TX1 and 9TX3 | .55 | | | |
| 32569 | Knob—Ivory volume control knob for 9TX2 and 9TX5 | .20 | | | |

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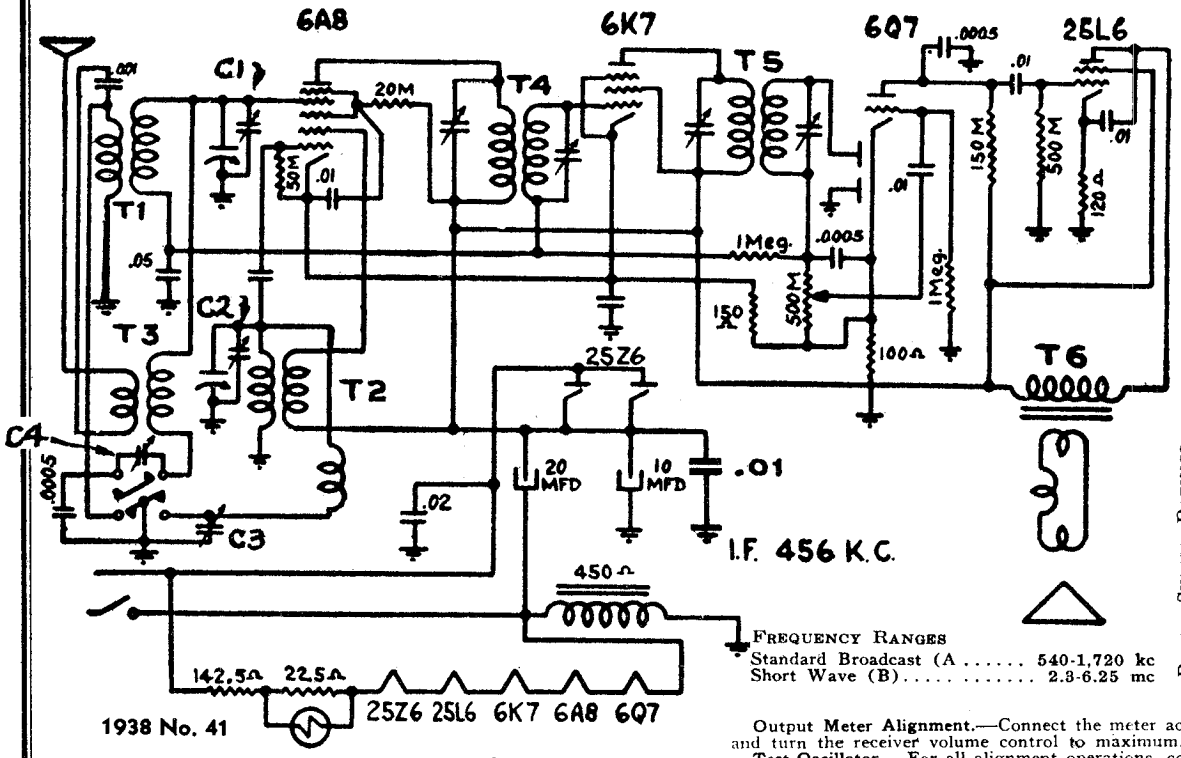
Schematic, Alignment, Socket Trimmers, Notes

# RCA MFG. CO., INC.

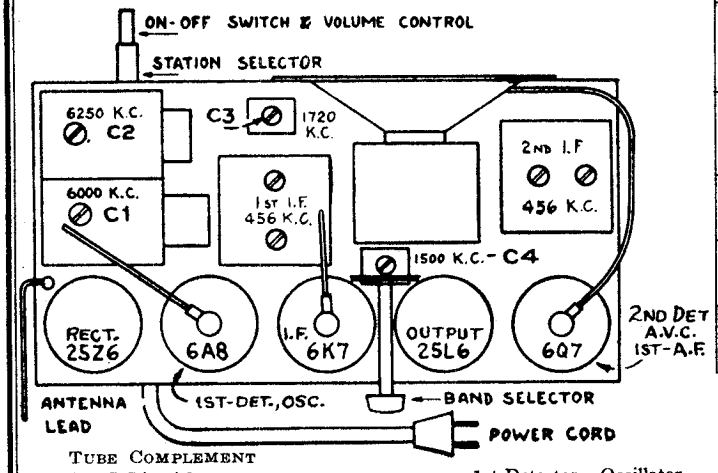
MODELS 9SX-1 to 9SX-8 incl.
Little Nipper



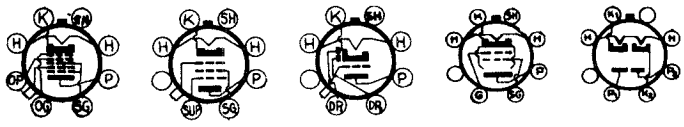

POWER SUPPLY RATINGS
A-C Rating ..... 105-125 volts, 50-60 cycles, 50 watts
D-C Rating ..... 105-125 volts, direct current, 50 watts
POWER OUTPUT (125 volt, 60 cycle supply)*
Undistorted ..... 1.5 watt
Maximum ..... 2.0 watts
LOUDSPEAKER
Type ..... 4-inch Electrodynamic

FREQUENCY RANGES
Standard Broadcast (A ..... 540-1,720 kc
Short Wave (B) ..... 2.3-6.25 mc

**Model 9SX-1**, Molded cabinet, walnut finish, ivory knobs.
**Model 9SX-2**, Molded cabinet, walnut body, ivory front, walnut knobs.
**Model 9SX-3**, Molded cabinet, ivory finish, red knobs.
**Model 9SX-4**, Molded cabinet, red body, ivory front, red knobs.
**Model 9SX-5**, Molded cabinet, black body, marble front, jet knobs.
**Model 9SX-6**, Molded cabinet, blue body, onyx front, blue knobs.
**Model 9SX-7**, Molded cabinet, onyx finish, maroon knobs.
**Model 9SX-8**, Molded cabinet, marble finish, jet knobs.




TUBE COMPLEMENT
(1) RCA-6A8 ..... 1st-Detector—Oscillator
(2) RCA-6K7 ..... I-F Amplifier
(3) RCA-6Q7 ..... 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6 ..... Power Output
(5) RCA-25Z6 ..... Half-Wave Rectifier
Dial Lamp (1) ..... Mazda 40, 6.3 volts, .15 amp.



6A8 6K7 6Q7 25L6 25Z6

*Bottom view of tube sockets*

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis through .01 mfd., and keep the output as low as possible to avoid a-v-c action.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 456 kc | Quiet point between 1,650-1,720 kc, with range switch at broadcast position (counter-clockwise from rear). | Two trimmers on 2nd I-F trans. |
| 2 | 6A8 1st-Det. grid cap, in series with .01 mfd. | 456 kc | | Two trimmers on 1st I-F trans. |
| 3 | Antenna Term. on antenna trans., in series with 400 ohms. | 6,250 kc | Max. clockwise (out of mesh) "B" band | C2 (osc. gang trimmer)* |
| 4 | | 6,000 kc | Resonance on 6,000 kc signal | C1 (ant. gang trimmer)** |
| 5 | Antenna Term. on antenna trans., in series with 90 mmf. | 1,720 kc | Max. clockwise (out of mesh) | C3 |
| 6 | | 1,500 kc | Resonance on 1,500 kc signal. | C4 |

* Use minimum capacity peak if two peaks can be obtained.
** After this adjustment, check for image by leaving test oscillator at 6,000 kc, and shifting receiver dial to 5,088 kc, where a weaker signal should be received.

| | Height | Width | Depth |
|---|---|---|---|
| Cabinet Dimensions | 4¾ inches | 8 inches | 4½ inches |
| Weight | 7 pounds (shipping) | | |

Power-Supply Polarity.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Resistor in Power Cord.—The power cord contains a resistor which becomes warm during operation.

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

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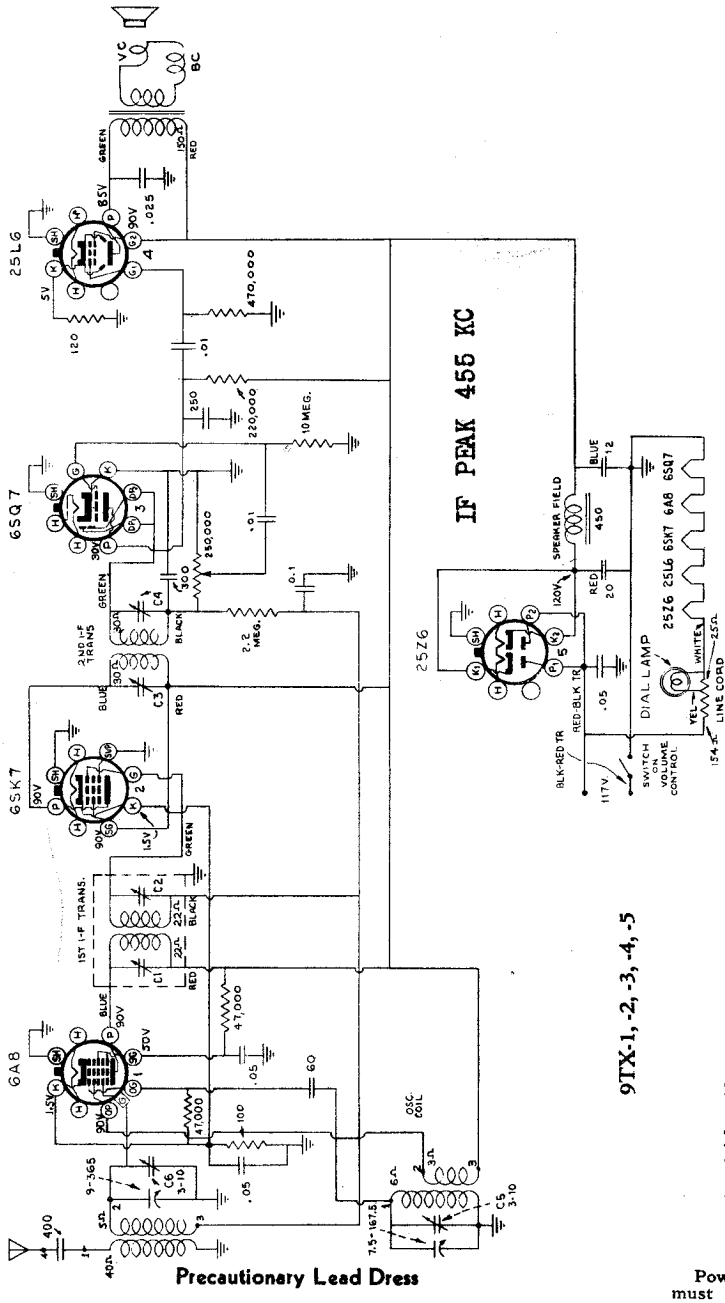
MODELS 9TX-1 to 9TX-5 incl.
Little Nipper-2nd

# RCA MFG. CO., INC.

Schematic, Voltage, Socket
Trimmers, Alignment




**Model 9TX-1,** Molded cabinet, walnut finish, mottled tan dial and knob.

**Model 9TX-2,** Molded cabinet, ivory finish, ivory dial and knob.

**Model 9TX-3,** Two-tone wood cabinet, piano finish, mottled tan dial and knob.

**Model 9TX-4,** Molded Arizona cream onyx cabinet, maroon dial and knob.

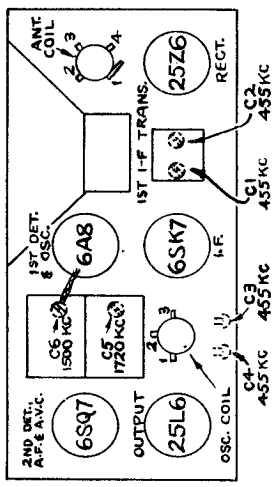
**Model 9TX-5,** Molded green onyx cabinet, ivory dial and knob.

## Alignment Procedure

**Test-Oscillator.**—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | 6A8 1st-Det. grid cap, in series with .01 mfd. | 455 kc | Quiet point at 1,600 kc end of dial | C1, C2, C3, C4 (1st and 2nd I-F transformers). |
| 2 | Antenna term. of ant. trans. in series with 100 mmfd. | 1,720 kc | Full clockwise (out of mesh) | C5 (oscillator) |
| 3 | | 1,500 kc | Resonance on 1,500 kc signal. | C6 (antenna) |

**Output Meter Alignment.**—Connect the meter across the voice coil, and turn the receiver volume control to maximum.




## Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 6SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.
3. Keep leads away from adjusting screws to allow easy access.
4. Dress output plate lead along front apron and away from 6A8.
5. Dress parts at ends of chassis to clear cabinet bosses.

**Power-Supply Polarity.**—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

**Resistor in Power Cord.**—The power cord contains a resistor which becomes warm during operation.

**Antenna.**—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

## Electrical and Mechanical Specifications

FREQUENCY RANGE ..... 530-1,720 kc

TUBE COMPLEMENT

(1) RCA-6A8 ..... 1st-Detector—Oscillator
(2) RCA-6SK7 ..... I-F Amplifier
(3) RCA-6SQ7 ..... 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6 ..... Power Output
(5) RCA-25Z6 ..... Half-Wave Rectifier
Dial Lamp (1) ..... Mazda 47, 6.3 volts, .15 amp.

POWER SUPPLY RATINGS

A-C Rating ..... 105-125 volts, 50-60 cycles, 50 watts
D-C Rating ..... 105-125 volts, direct current, 50 watts

INTERMEDIATE FREQUENCY ..... 455 kc

POWER OUTPUT (125 volt, 60 cycle supply)

Undistorted ..... 1.5 watts
Maximum ..... 2.0 watts

LOUDSPEAKER

Type ..... 4-inch Electrodynamic

| | | Height | Width | Depth |
|---|---|---|---|---|
| Cabinet Dimensions | 9TX-1, -2 | 5 inches | 8¾ inches | 4¾ inches |
| | 9TX-3 | 5¾ inches | 8¾ inches | 4¾ inches |
| | 9TX-4, -5 | 5¼ inches | 8½ inches | 4½ inches |

Weight ..... 7 pounds (shipping)

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Schematic, Voltage, Socket Trimmers, Alignment, Data

RCA MFG. CO., INC.

MODELS 9TX-21, 9TX-22
Chassis RC-403
MODEL 9TX-23
Chassis RC-403A

# Electrical and Mechanical Specifications

FREQUENCY RANGE ..... 530-1,720 kc

TUBE COMPLEMENT

(1) RCA-6A8 ..... 1st-Detector—Oscillator
(2) RCA-6SK7 ..... I-F Amplifier
(3) RCA-6SQ7 ..... 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6 ..... Power Output
(5) RCA-25Z6 ..... Half-Wave Rectifier
Dial Lamp (1) ..... Mazda 47, 6.3 volts, .15 amp.

POWER SUPPLY RATINGS

A-C Rating ..... 105-125 volts, 50-60 cycles, 50 watts
D-C Rating ..... 105-125 volts, direct current, 50 watts

**Power-Supply Polarity.**—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

**Resistor in Power Cord.**—The power cord contains a resistor which becomes warm during operation.

INTERMEDIATE FREQUENCY ..... 455 kc

POWER OUTPUT (125 volt, 60 cycle supply)

Undistorted ..... 1.5 watts
Maximum ..... 2.0 watts

LOUDSPEAKER

Type ..... 4-inch Electrodynamic

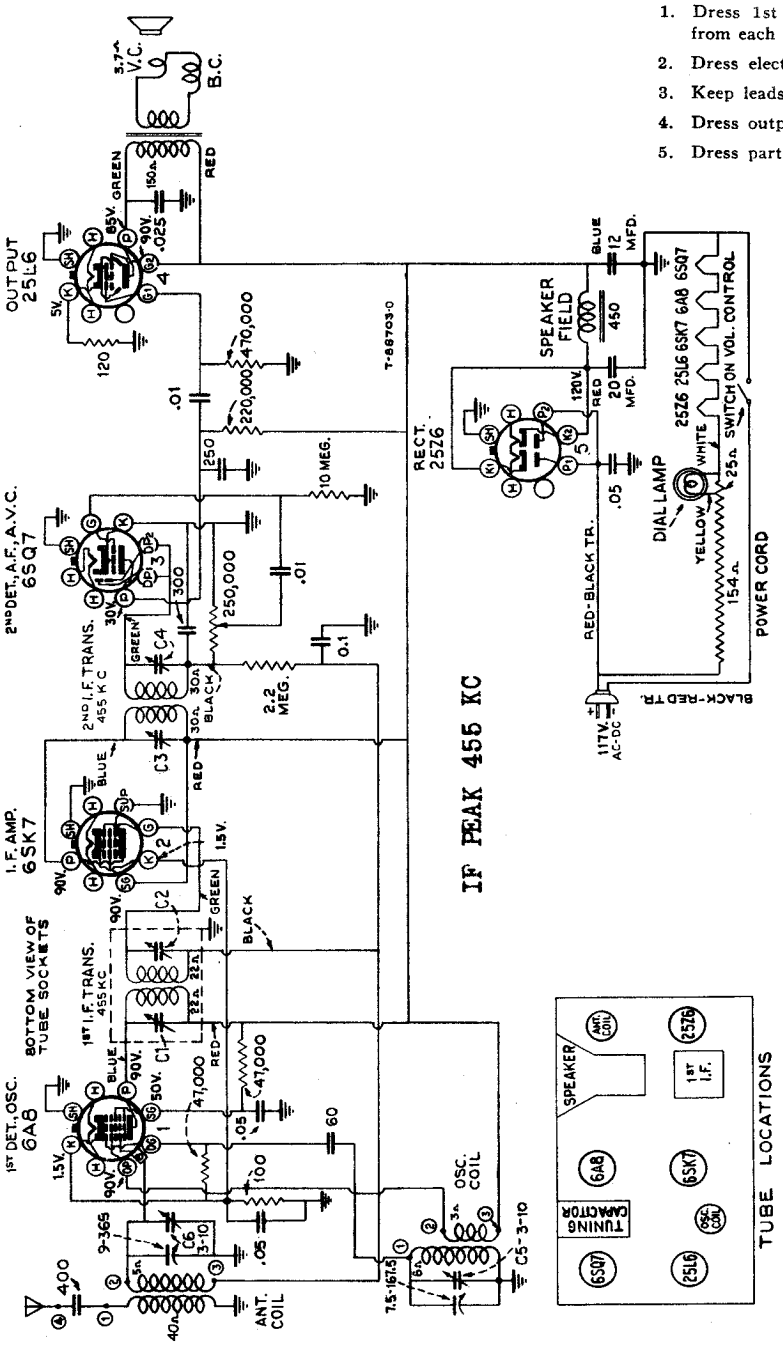
Cabinet Dimensions, 5⅛ in. high, 8½ in. wide, 4¼ in. deep.

Weight (approx.) ..... 7 pounds (shipping)

Antenna.—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

## Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 6SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.
3. Keep leads away from adjusting screws to allow easy access.
4. Dress output plate lead along front apron and away from 6A8.
5. Dress parts at ends of chassis to clear cabinet bosses.

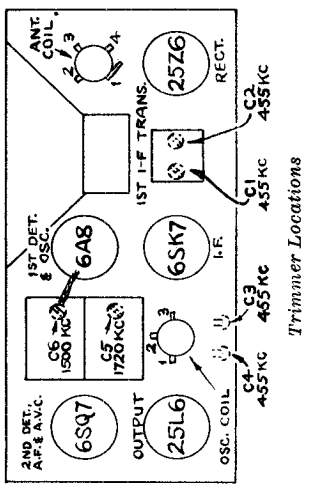



## Alignment Procedure

**Test-Oscillator.**—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible. The antenna should be rolled up and kept at least one foot from chassis during alignment.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | 6A8 1st-Det. grid cap, in series with .01 mfd. | 455 kc | Quiet point at 1,600 kc end of dial | C1, C2, C3, C4 (1st and 2nd I-F transformers) |
| 2 | Antenna term. of ant. trans. in series with 100 mmfd. | 1,720 kc | Full clockwise (out of mesh) | C5 (oscillator) |
| 3 | | 1,500 kc | Resonance on 1,500 kc signal. | C6 (antenna) |

**Output Meter Alignment.**—Connect the meter across the voice coil, and turn the receiver volume control to maximum.




*Trimmer Locations*

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MODELS 9TX-21, 9TX-22
Chassis RC-403
MODEL 9TX-23, Chas. RC-403A
MODEL 9TX-31, Chas. RC-405

RCA MFG. CO., INC.

MODEL 9TX-32, Chas. RC405A
MODEL 9TX-33, Chas. RC405B
Parts Lists

# Models 9TX-21, -22, and -23

## Chassis No. RC-403 RC-403 RC-403A

## Replacement Parts

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| X-638 | Cabinet for 9TX21 (Walnut Finish).....(net) | 1.35 |
| X-639 | Cabinet for 9TX22 (Ivory Finish).....(net) | 2.20 |
| X-640 | Cabinet for 9TX23 (Wood-Walnut Finish).(net) | 3.25 |
| 32572 | Coil—Antenna coil | .60 |
| 32573 | Coil—Oscillator coil | .50 |
| 13057 | Condenser—60 mmfd. | .35 |
| 12488 | Condenser—250 mmfd. | .35 |
| 12952 | Condenser—300 mmfd. | .35 |
| 30433 | Condenser—400 mmfd. | .35 |
| 4858 | Condenser—.01 mfd. | .25 |
| 4870 | Condenser—.025 mfd. | .20 |
| 4886 | Condenser—.05 mfd. | .20 |
| 4839 | Condenser—0.1 mfd. | .30 |
| 32576 | Condenser—Electrolytic, one section 20 mfd., one section 12 mfd. | .90 |
| 32944 | Condenser—2-gang variable tuning | 2.20 |
| 32634 | Cord—Drive cord | .10 |
| 32577 | Cord—Resistance power cord | .95 |
| 32942 | Dial—Glass dial scale—Models 9TX21, 9TX22. | .30 |
| 33289 | Dial—Glass dial scale—Model 9TX23 | .40 |
| 33297 | Drive—Dial drive mechanism comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled—Model 9TX23 | .85 |
| 32946 | Drum—Variable condenser drive drum and indicator disc—Models 9TX21 and 9TX22 | .35 |
| 33006 | Feet—Rubber feet for 9TX23 | .03 |
| 33295 | Indicator—Dial pointer—Model 9TX23 | .25 |
| 32447 | Knob—Ivory knob (tuning or volume) Model 9TX22 | .15 |
| 32571 | Knob—Tan knob (tuning or volume) Models 9TX21 and 9TX23 | .15 |
| 31480 | Lamp—Dial lamp—Mazda 47 | .20 |
| 12409 | Lead—Antenna lead | .45 |
| 32943 | Nut—Speed nut to fasten dial—Models 9TX21 and 9TX22 | .01 |
| 33292 | Plate—Dial color plate—Model 9TX23 | .25 |
| 33294 | Pulley—Drive cord pulley—Model 9TX23 | .02 |
| 14439 | Resistor—100 ohms, ½ watt | .20 |
| 32535 | Resistor—120 ohms, wire wound | .20 |
| 12412 | Resistor—47,000 ohms, ½ watt | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt | .20 |
| 12679 | Resistor—2.2 meg., ½ watt | .20 |
| 13601 | Resistor—10 meg., ½ watt | .20 |
| 32945 | Shaft—Tuning knob shaft—Models 9TX21 and 9TX22 | .20 |
| 33293 | Shaft—Tuning knob shaft and bushing—Model 9TX23 | .30 |
| 33290 | Socket—Dial lamp socket | .15 |
| 32537 | Socket—Tube socket | .20 |
| 32575 | Speaker—Complete with transformer | 4.00 |
| 32803 | Spring—Dial knob spring | .01 |
| 32947 | Spring—Drive cord tension spring—Models 9TX21 and 9TX22 | .05 |
| 31615 | Spring—Drive cord tension spring—Model 9TX23 | .02 |
| 33296 | Spring—Drive drum retaining spring—Model 9TX23 | .06 |
| 32667 | Spring—Knob or drive drum retaining spring | .02 |
| 32574 | Transformer—First i. f., transformer | 1.20 |
| 32581 | Transformer—Output transformer | 1.25 |
| 32534 | Transformer—Second i. f. transformer | .90 |
| 32578 | Volume Control and power switch—Models 9TX21 and 9TX22 | 1.50 |
| 33291 | Volume Control and switch—Model 9TX23 | 1.50 |

# MODELS 9TX-31, 9TX-32, 9TX-33

## Chassis No. RC-405, RC-405A, RC-405B

## Replacement Parts

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| X-638 | Cabinet for 9TX31 (Walnut Finish).....(net) | 1.35 |
| X-639 | Cabinet for 9TX32 (Ivory Finish).....(net) | 2.20 |
| X-640 | Cabinet for 9TX33 (Wood—Walnut Finish)...(net) | 3.25 |
| 12488 | Capacitor—250 mmfd. | .35 |
| 12952 | Capacitor—300 mmfd. | .35 |
| 4838 | Capacitor—.005 mfd. | .25 |
| 4937 | Capacitor—.01 mfd. | .25 |
| 12484 | Capacitor—0.25 mfd. | .30 |
| 32572 | Coil—Antenna coil | .60 |
| 32962 | Coil—Oscillator coil | .60 |
| 13057 | Condenser—60 mmfd. | .35 |
| 30433 | Condenser—400 mmfd. | .35 |
| 4870 | Condenser—.025 mfd. | .20 |
| 4839 | Condenser—0.1 mfd. | .30 |
| 32576 | Condenser—Electrolytic, one section 20 mfd., one section 12 mfd. | .90 |
| 32968 | Condenser—2-gang variable tuning | 2.25 |
| 32634 | Cord—Drive cord | .10 |
| 32942 | Dial—Glass dial scale (Models 9TX31, 9TX32) | .30 |
| 33289 | Dial—Glass dial scale (Model 9TX33) | .40 |
| 13998 | Resistor—22,000 ohms, ½ watt | .20 |
| 12412 | Resistor—47,000 ohms, ½ watt | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt | .20 |
| 12679 | Resistor—2.2 meg., ½ watt | .20 |
| 13601 | Resistor—10 meg., ½ watt | .20 |
| 32945 | Shaft—Tuning knob shaft (Models 9TX31 and 9TX32) | .20 |
| 33293 | Shaft—Tuning knob shaft and bushing (Model 9TX33) | .30 |
| 32969 | Socket—Dial lamp socket | .25 |
| 14278 | Socket—Phonograph socket | .25 |
| 32537 | Socket—Tube socket | .20 |
| 32963 | Speaker—Complete with transformer | 3.95 |
| 33297 | Drive—Dial drive mechanism—comprising drive drum, cord, shaft, dial color plate, back plate and pulleys assembled (Model 9TX33) | .85 |
| 32946 | Drum—Variable condenser drive drum and indicator disc (Models 9TX31 and 9TX32) | .35 |
| 33006 | Feet—Rubber feet for 9TX33 | .03 |
| 33295 | Indicator—Dial pointer (Model 9TX33) | .25 |
| 32447 | Knob—Ivory knob (tuning or volume) (Model 9TX32) | .15 |
| 32571 | Knob—Tan knob (tuning or volume) (Models 9TX31 and 9TX33) | .15 |
| 31480 | Lamp—Dial lamp—Mazda 47 | .20 |
| 12409 | Lead—Antenna lead | .45 |
| 32943 | Nut—Speed nut to fasten dial (Models 9TX31 and 9TX32) | .01 |
| 33292 | Plate—Dial color plate (Model 9TX33) | .25 |
| 33294 | Pulley—Drive cord pulley (Model 9TX33) | .02 |
| 32970 | Resistor—Dial lamp resistor—24 ohms | .15 |
| 32971 | Resistor—Series dropping resistor—42 ohms | .15 |
| 13428 | Resistor—150 ohms, ½ watt | .20 |
| 30538 | Resistor—330 ohms, ½ watt | .20 |
| 32803 | Spring—Dial knob spring | .01 |
| 32947 | Spring—Drive cord tension spring (Models 9TX31 and 9TX32) | .05 |
| 31615 | Spring—Drive cord tension spring (Model 9TX33) | .02 |
| 33296 | Spring—Drive drum retaining spring (Model 9TX33) | .06 |
| 32667 | Spring—Knob or drive drum retaining spring | .02 |
| 32966 | Transformer—First i-f transformer | 1.25 |
| 32967 | Transformer—Second i-f transformer | 1.05 |
| 32964 | Transformer—Output transformer | 1.25 |
| 32578 | Volume Control and power switch (Models 9TX31 and 9TX32) | 1.50 |
| 32545 | Volume Control and switch (Model 9TX33) | 1.50 |

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

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# RCA MFG. CO., INC.

MODELS 9TX-31, Chas. RC-405
9TX-32, Chas. RC-405A, 9TX-33
Chas. RC-405B
Schematic, Voltage, Socket
Trimmers, Alignment, Data

## Electrical and Mechanical Specifications

**Frequency Range** ..... 530-1,720 kc

**Tube Complement**
(1) RCA-12SA7 ..... 1st-Detector—Oscillator
(2) RCA-12SK7 ..... I-F Amplifier
(3) RCA-12SQ7 ..... 2nd-Detector, 1st A-F, and A.V.C.
(4) RCA-35L6GT ..... Power Output
(5) RCA-35Z4GT ..... Half-Wave Rectifier

Dial Lamp (1) ..... Mazda 47, 6.3 volts, .15 amp.

**Power Supply Ratings**
A-C Rating ..... 105-125 volts, 50-60 cycles, 30 watts
D-C Rating ..... 105-125 volts, direct current, 30 watts

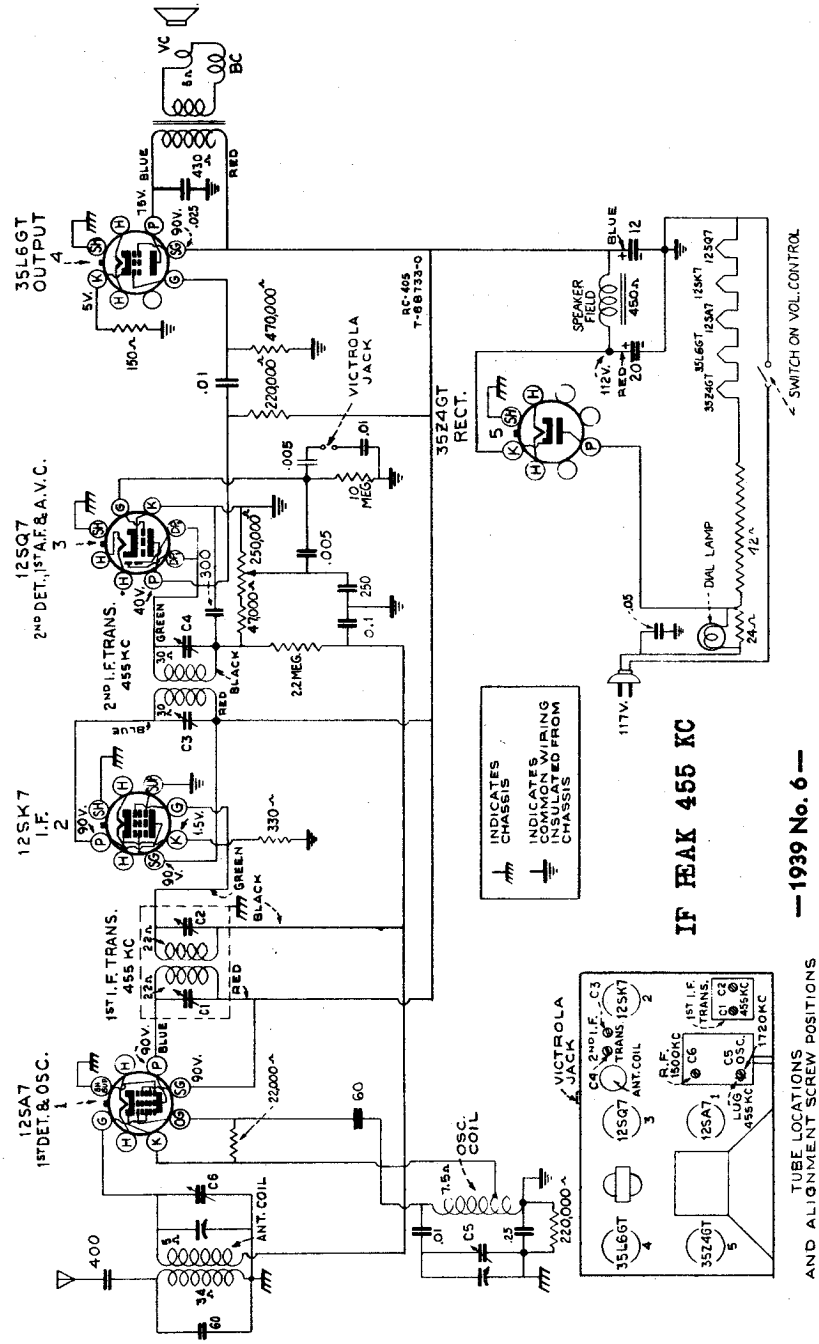
**Intermediate Frequency** ..... 455 kc

**Power Output** (125 volt, 60 cycle supply)
Undistorted ..... 1.5 watts
Maximum ..... 2.0 watts

**Loudspeaker**
Type ..... 4-inch Electrodynamic

| | | Height | Width | Depth |
|---|---|---|---|---|
| Cabinet Dimensions | 9TX-31 | 5¾ inches | 8⅝ inches | 4½ inches |
| | 9TX-32 | 5¾ inches | 8⅝ inches | 4½ inches |
| | 9TX-33 | 6¾ inches | 9¾ inches | 4¾ inches |

Weight (net) ..... 9TX-31, 32.. 4¾ pounds; 9TX-33.. 5½ pounds




### Precautionary Lead Dress

1. Dress 1st I-F plate and grid leads against chassis and away from each other. Dress plate lead from 12SK7 close to chassis.
2. Dress electrolytic capacitor against rear apron.

**Power-Supply Polarity.**—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

**Antenna.**—The set is equipped with length of antenna wire. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

**Victrola Attachment.**—A jack is provided on the rear of chassis for connecting a Victrola Attachment into the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

### Alignment Procedure

**Output Meter Alignment.**—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | Tuning condenser stator (osc.) in series with .01 mfd. | 455 kc | Quiet point at 1,600 kc end of dial | C1, C2, C3, C4 (1st and 2nd I-F transformers) |
| 2 | Antenna term. of ant. trans. in series with 100 mmfd. | 1,720 kc | Full clockwise (out of mesh) | C5 (oscillator) |
| 3 | | 1,500 kc | Resonance on 1,500 kc signal | C6 (antenna) |

*Model 9TX-31*
*Walnut Finish, Tan Knobs*

*Model 9TX-32*
*Ivory Finish, Ivory Knobs*

*Model 9TX-33*
*Heart Walnut, Ornamental Sides*
*Tan Knobs*

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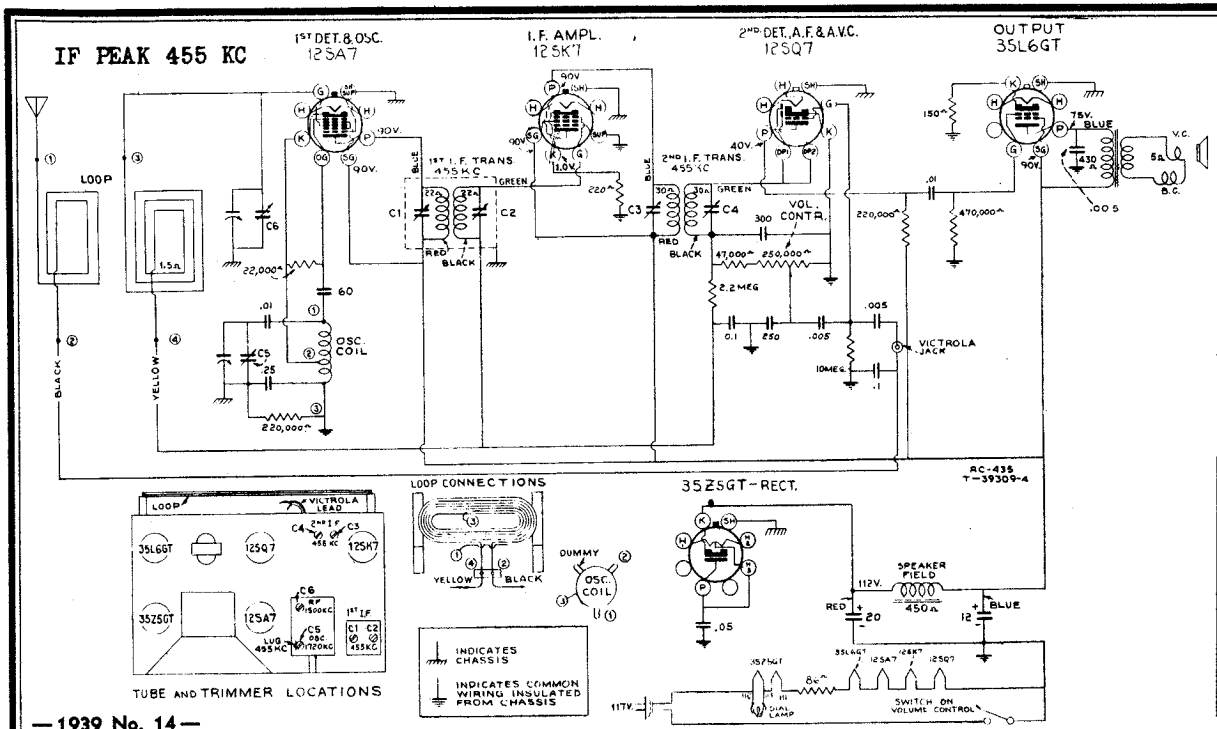


**—1939 No. 14—**

*Model 9TX-50* — *Light Mahogany Cabinet*

*Model 9TX-50M* — *Regular Mahogany Cabinet*

Features of design include: New Type, single-ended tubes (12SA7, 12SK7, and 12SQ7); edge-lighted dial; dust-proof electrodynamic loudspeaker; "Magic Voice"; "Magic Loop"; Television-Victrola Jack; and Beam Power Output.

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES (RC—435)** | |
| 32968 | Capacitor—2 gang variable tuning | 2.25 |
| 13057 | Capacitor—60 mmfd. | .35 |
| 12488 | Capacitor—250 mmfd. | .35 |
| 12952 | Capacitor—300 mmfd. | .35 |
| 4838 | Capacitor—.005 mfd. | .25 |
| 32787 | Capacitor—.05 mfd. | .20 |
| 4839 | Capacitor—.1 mfd. | .30 |
| 12484 | Capacitor—.25 mfd. | .30 |
| 32576 | Capacitor—Electrolytic 20-12 mfd. | .90 |
| 32962 | Coil—Oscillator coil | .60 |
| 32634 | Cord—Drive cord | .10 |
| 33662 | Drum—Drive cord and indicator drum | .25 |
| 33295 | Indicator—Dial pointer | .25 |
| 31480 | Lamp—Pilot Lamp | .20 |
| 33663 | Loop—Antenna loop | 1.20 |
| 33294 | Pulley—Drive cord pulley | .02 |
| 33558 | Resistor—86 ohms | .15 |
| 13428 | Resistor—150 ohms, ½ watt | .20 |
| 14561 | Resistor—220 ohms, ½ watt | .20 |
| 13998 | Resistor—22,000 ohms, ½ watt | .20 |
| 12738 | Resistor—27,000 ohms, ½ watt | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt | .20 |
| 12679 | Resistor—2.2 meg. ½ watt | .20 |
| 13601 | Resistor—10 meg. ½ watt | .20 |
| 33293 | Shaft—Tuning knob shaft and bushing | .30 |
| 33557 | Socket—Dial Light | .30 |
| 32537 | Socket—Tube Socket | .20 |
| 31615 | Spring—Drive cord tension spring | .02 |
| 33296 | Spring—Drum retaining spring | .06 |
| 32966 | Transformer—I. F. Input | 1.25 |
| 32967 | Transformer—I. F. Output | 1.25 |
| 33291 | Volume Control | 1.50 |
| | **SPEAKER ASSEMBLIES** | |
| 33740 | Speaker—Complete | 4.00 |
| 33741 | Transformer—Output | 1.15 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 33289 | Dial—Dial Scale | .40 |
| 33006 | Foot—Rubber foot for cabinet | .03 |
| 32571 | Knob—Tuning or volume control knob | .15 |
| 33742 | Socket—Phonograph input socket | .20 |

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

**Output Meter Alignment.**—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

**Pre-Setting Dial.**—With gang condenser in full mesh, the pointer should be adjusted so that top edge of pointer just touches rivet in dial plate.

**Antenna.**—The set is equipped with a built-in loop antenna. If an outdoor antenna is used, it may be connected to the "ANT" terminal on rear of cabinet. It should not be longer than 100 feet, including lead-in. If it is longer, connect a 100 to 200 mmf. capacitor in series with the lead-in.

**Power-Supply Polarity.**—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

**Victrola Attachment.**—A jack is provided on the rear of cabinet for connecting a Victrola Attachment into the audio-amplifying circuit. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | Tuning condenser stator (osc.) in series with .01 mfd. | 455 kc | Quiet point at 1,600 kc end of dial | C1, C2, C3, C4 (1st and 2nd I-F transformers) |
| 2 | Antenna term. of ant. loop in series with 100 mmfd. | 1,720 kc | Full clockwise (out of mesh) | C5 (oscillator) |
| 3 | | 1,500 kc | Resonance on 1,500 kc signal | C6 (antenna) |

### Precautionary Lead Dress

1. Dress 2nd I-F green lead close to chassis and under other parts.
2. Dress lead from gang condenser to grid of 12SA7 close to chassis and away from 12SQ7 socket.
3. Dress blue 1st I-F lead under volume control close to chassis.
4. Dress blue 2nd I-F lead close to chassis and behind 12SK7 socket.

## Electrical and Mechanical Specifications

FREQUENCY RANGE ..... 540-1,720 kc
Intermediate Frequency ..... 455 kc

TUBE COMPLEMENT
(1) RCA-12SA7 ..... 1st-Detector-Oscillator
(2) RCA-12SK7 ..... I-F Amplifier
(3) RCA-12SQ7 ..... 2nd-Detector, 1st A-F and A.V.C.
(4) RCA-35L6GT ..... Power Output
(5) RCA-35Z5GT ..... Half-Wave Rectifier

Dial Lamp (1) ..... Mazda 47, 6.3 volts, .15 amp.

POWER SUPPLY RATINGS
A-C Rating ..... 105-125 volts, 50-60 cycles, 30 watts
D-C Rating ..... 105-125 volts, direct current, 30 watts

POWER OUTPUT (125 volt, 60 cycle supply)
Undistorted ..... 1.5 watts
Maximum ..... 2.0 watts

LOUDSPEAKER
Type ..... 4-inch Electrodynamic
Cabinet Dimensions (inches) .. Height 7¼, Width 11½, Depth 6½
Weight (net) ..... 6½ pounds

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Schematic Changes
Parts

RCA MFG. CO., INC.

MODEL D22-1A

## Model D22-1A

Service Data for Model D22-1 are directly applicable to these instruments except as follows:

(1) The schematic circuit diagram for Model D22-1A is shown by figure 5.
(2) The metal rectifier socket wiring for tube No. 14 is shown by figure 2.
(3) Figure 3 shows the Pickup details.
(4) The phonograph motor is of the capacitor type. Light machine oil should be used to lubricate the motor bearings. The motor is wired in this instrument as follows: One power-supply lead connects to one terminal of switch S201. The other terminal of S201 connects to one terminal of the brake switch S202. The other terminal of S202 connects to the yellow motor lead. The green motor lead connects to one lead of the motor capacitor. The red motor lead connects to the other capacitor lead and also to the remaining power-supply lead.
(5) The Radiotron socket voltages (figure 4 herein) apply to all Models D22-1 or D22-1A and should be used in place of figure 4 of the D22-1 Service Data.
(6) The resistor assembly R44 and R45 is mounted on the front chassis apron instead of the rear chassis apron.
(7) Change price on Stock No. 11879 Transformer from $3.50 to $8.15.
(8) Change price on Stock No. 11541 Arm from $0.82 to $8.15.
(9) Change price on Stock No. 11480 Microphone from $7.05 to $7.50.
(10) Refer to Substitute and Additional Replacement Parts contained herein for other parts changes.

SEE RIDER'S VOL. VI FOR OTHER DATA

| Stock No. | Model D22-1A (use replacement parts from D22-1 except as listed below) | List Price |
|---|---|---|
| 13405 | Armature—Pickup armature | .95 |
| 4870 | Capacitor—.025 mfd. (C47) | .20 |
| 11195 | Socket—Five-contact Rectifier Radiotron socket for tube No. 14 | .15 |
| 11887 | Transformer—Power transformer—105-125 volts—25-50 cycles | 6.95 |
| 11880 | Transformer—Power transformer—105-125 volts—50-60 cycles—(T1) | 5.80 |
| 12051 | Capacitor—2-mfd. complete with 2-contact male connector for use with motor Stock Nos. 9650 or 9651—(C217) | 4.18 |
| 13101 | Capacitor—4-mfd. complete with 2-contact male connector for use with motor Stock No. 9735—(C217) | 5.05 |
| 4674 | Connector—2-contact male connector for capacitor Stock No. 12051 or 13101 | .25 |
| 9735 | Motor—105-125 volts—25 cycles—(M1) | 49.50 |
| 9651 | Motor—105-125 volts—50 cycles—(M1) | 35.35 |
| 9650 | Motor—105-125 volts—60 cycles—(M1) | 35.35 |
| 12050 | Suspension Spring—Motor mounting spring, washer, and stud assembly—comprising six springs, six cup washers, three spring washers and three studs | .60 |
| 11997 | Capacitor—75 mmfd.—(C216) | .14 |
| 12352 | Filter—Microphone and pickup input filter pack—(L307, C218, R223). Stock Nos. 4858 (C47), 11273, 4794 (tube 14), 8062, 8061, 9479, 9478, 9477, and 4562, are not used in Model D22-1A. | 1.85 |

**The prices quoted above are subject to change without notice.**

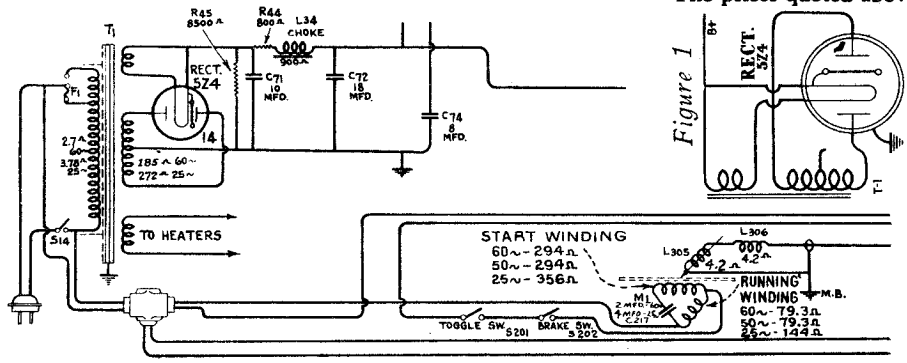


*Figure 5— Schematic Circuit Diagram (Model D22-1A)*




*Figure 1*

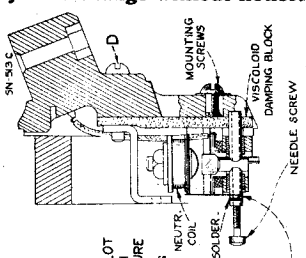


*Figure 3— Pickup Details (D-22-1A)*

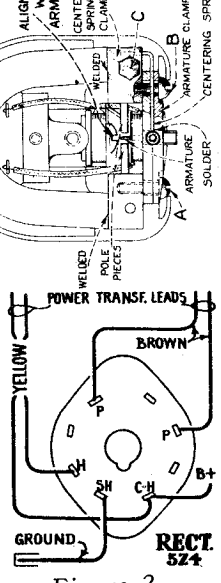


*Figure 2*

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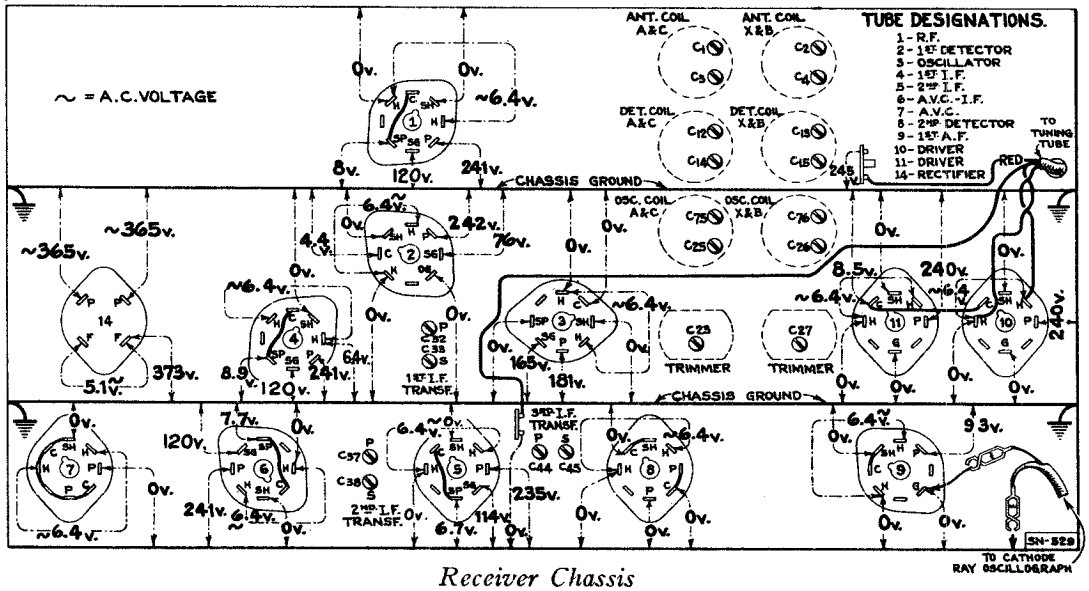
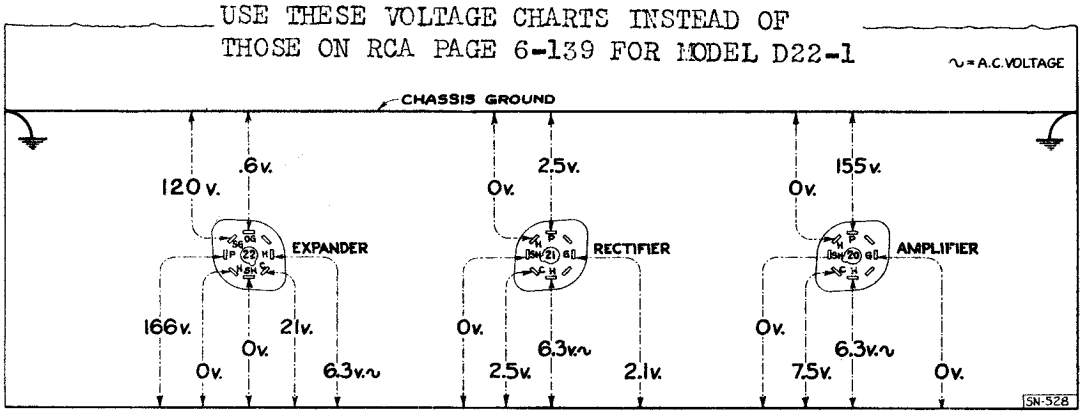
MODEL D22-1
Corrected Voltage
MODEL D22-1A
Voltage

RCA MFG. CO., INC.

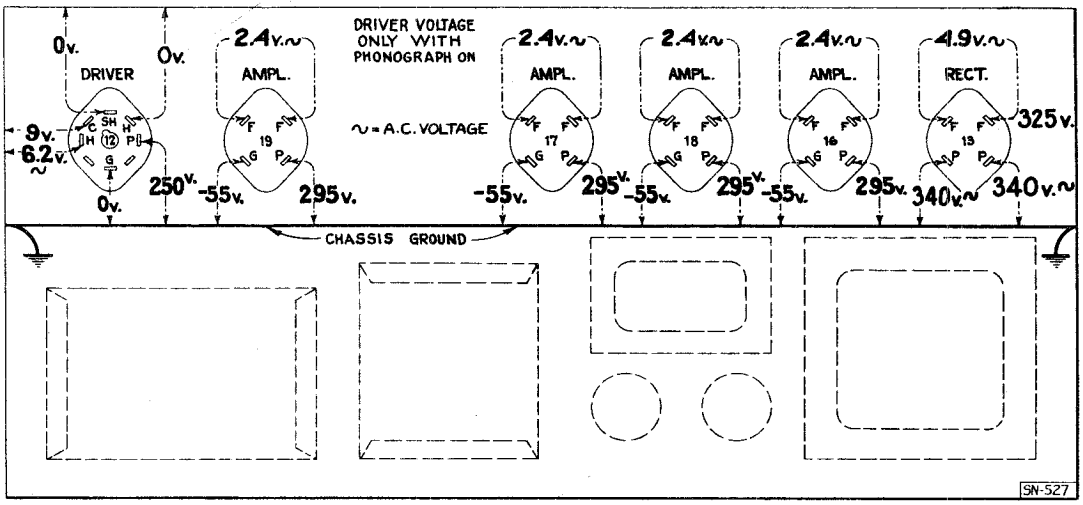



*Receiver Chassis*

USE THESE VOLTAGE CHARTS INSTEAD OF THOSE ON RCA PAGE 6-139 FOR MODEL D22-1




*Dynamic Amplifier*




*Power Amplifier*

*Figure 4—Radiotron Socket Voltages* (D22-1 and D22-1A)
Measured at 115 volts, 60-cycle supply—No signal being received

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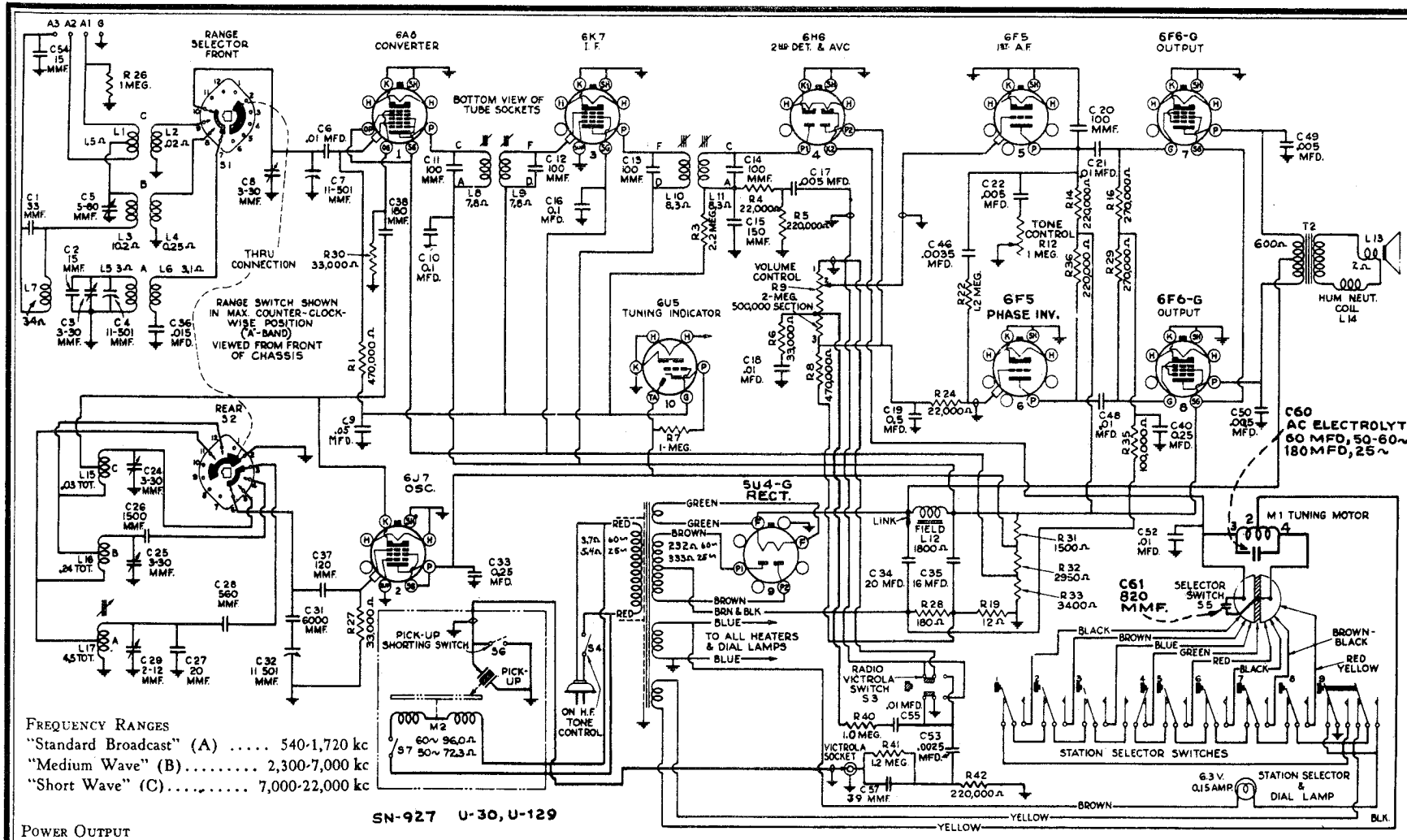
*Schematic Circuit Diagram*

In Model U-30, a 1.0 megohm resistor (R48) is connected from the Victrola socket to chassis.




FREQUENCY RANGES

| | |
|---|---|
| "Standard Broadcast" (A) | 540-1,720 kc |
| "Medium Wave" (B) | 2,300-7,000 kc |
| "Short Wave" (C) | 7,000-22,000 kc |

POWER OUTPUT

| | |
|---|---|
| Undistorted | 10 watts |
| Maximum | 12 watts |

PHONOGRAPH

| | |
|---|---|
| Record Capacity | Seven ten or twelve inch |
| Turntable Speed | 78 R.P.M. (Adjustable) |

LOUDSPEAKER

| | |
|---|---|
| Type | 12-inch Electrodynamic |
| Voice Coil Impedance | 2.2 ohms at 400 cycles |

| | |
|---|---|
| Type Pickup | Crystal |
| Pickup Impedance | 80,000 ohms at 1,000 cycles |

INTERMEDIATE FREQUENCY
455 kc

# MODELS U-30 and U-129

Chassis No. RC-335KR, RC-335K

—1939 No. 11—

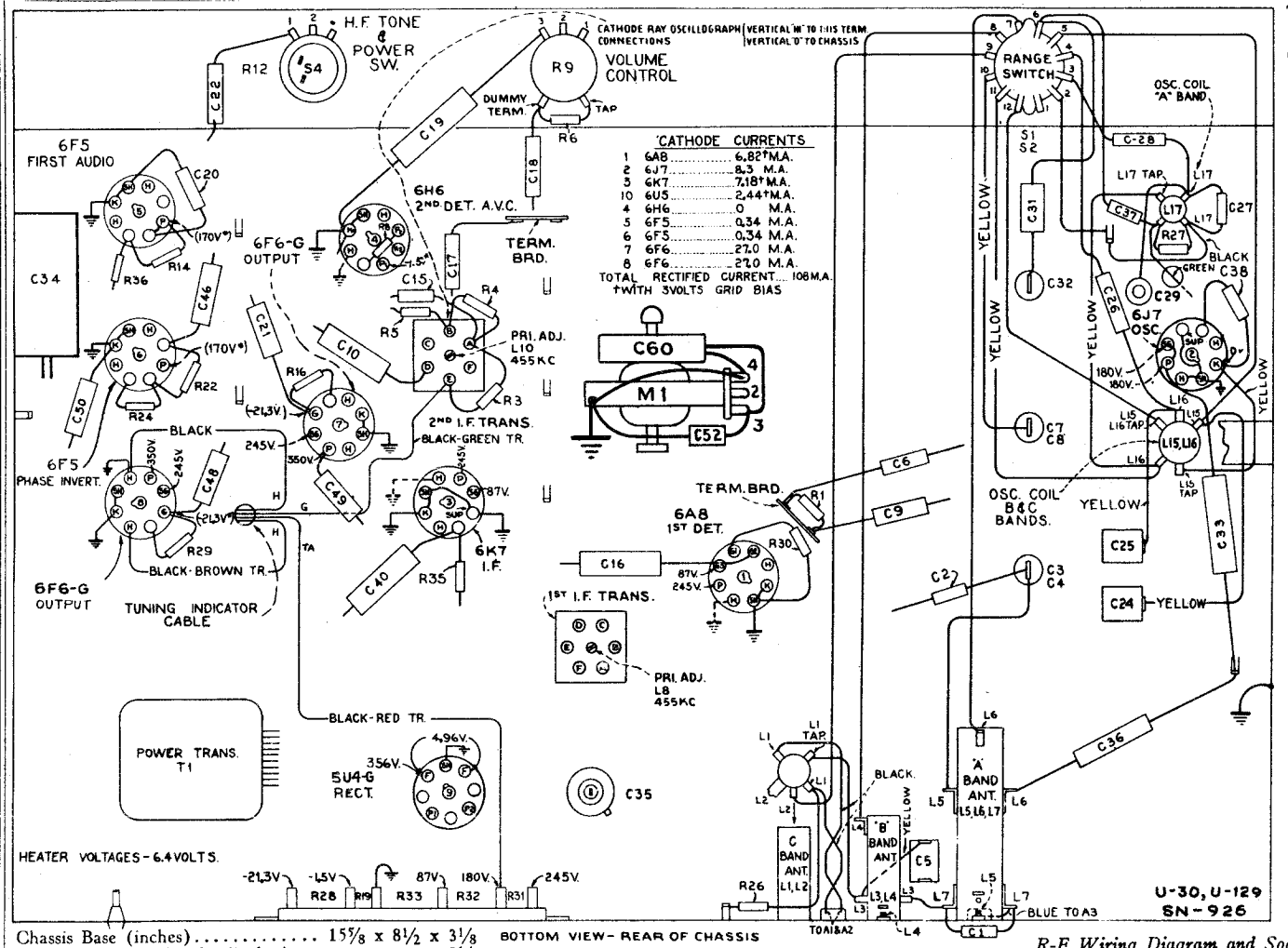
FOR DIAL CALIBRATION SEE INDEX

## Ten-Tube, Three-Band, Electric Tuning, A-C Victrolas

| POWER SUPPLY RATING | Radio Only | Total |
|---|---|---|
| A | 105-125 volts, 50-60 cycles, 120 watts | 145 watts |
| A-6 | 105-125 volts, 60 cycles, 120 watts | 145 watts |
| B-2 | 105-125 volts, 25 cycles, 120 watts | 145 watts |
| C | 105-130/140-160/200-250 volts, 50-60 cycles, 120 watts | 145 watts |
| C-6 | 105-130/140-160/200-250 volts, 60 cycles, 120 watts | 145 watts |

MODELS U-30, Chas. RC-335K
U-129, Chas. RC-335K
Voltage, Chassis Wiring
Transformer, Notes

# RCA MFG. CO., INC.




BOTTOM VIEW - REAR OF CHASSIS

Chassis Base (inches) ..... 15⅝ x 8½ x 3⅛
Maximum chassis height (inches) ..... 8¼

*R-F Wiring Diagram and Socket Voltages*

## General Description

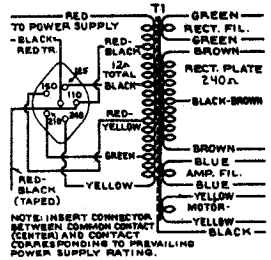
These receivers employ a ten-tube, three-band, "Magic Brain" superheterodyne circuit. Features of design include: "Electric Tuning" for eight broadcast stations; a link-coupled antenna circuit; magnetite-core i-f transformers and "A"-band oscillator coil; full automatic volume control; "Magic Eye" tuning tube; improved 12-inch dust-proof electro-dynamic loudspeaker; aurally compensated audio volume control; continuously variable high-frequency tone control; provision for armchair control attachment; illuminated band indicator; noise-reducing antenna adjustment on "A" band; temperature-stabilized capacitors; phase inverter audio amplifier; and push-pull power output stage.

The phonograph has a self-starting motor, crystal pickup, and may be set to play ten-inch and twelve-inch records singly, or automatically. In the automatic position, seven twelve-inch; eight ten-inch; or a mixed group of seven, ten- and twelve-inch records, may be played in succession. The output of the pickup is "shorted" out when the pickup is on the pickup rest.

TUBE COMPLEMENT

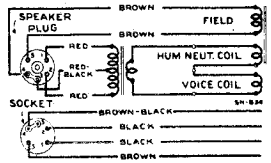
(1) RCA-6A8 ..... First Det.
(2) RCA-6J7 ..... Oscillator
(3) RCA-6K7 ..... I-F Amp.
(4) RCA-6H6.. 2nd Det. and A.V.C.
(5) RCA-6F5 ..... First Audio
(6) RCA-6F5 ..... Phase Inverter
(7) RCA-6F6-G ..... Power Output
(8) RCA-6F6-G ..... Power Output
(9) RCA-5U4-G ..... Rectifier
(10) RCA-6U5 ..... "Magic Eye"

| | U-30 | U-129 |
|---|---|---|
| Height (inches) ..... | 34 | 35 |
| Width (inches) ..... | 36¼ | 33¼ |
| Depth (inches) ..... | 17⅛ | 17 |




**Above — Universal Power Transformer Connections.**

| | U-30 | U-129 |
|---|---|---|
| Weight (Net lbs.) ..... | 101 | 104 |
| Weight (Shipping lbs.) .... | 141 | 134 |




**Above — Connections and Colors of Loudspeaker and Cable.**

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point, volume control at minimum. Values should hold within approximately ±20% with 117-volt a-c supply.

*** NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.



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# ALIGNMENT PROCEDURE

**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the rear of the indicator-drive-cord drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

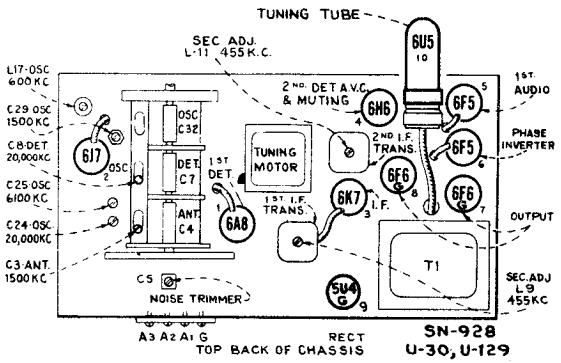
As the first step in r-f alignment, check the position of the drum. The "0" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "0" mark on the calibration scale when the plates are fully meshed.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

## Service Data

**Loudspeaker.**—Centering of the loudspeaker is made in the usual manner with three narrow celluloid or paper feelers after first removing the front dust cover. A dust cover should be cemented in place upon completion of adjustment.




**Precautionary Lead Dress.** — (1) The lead from the left pilot light should be kept behind the bulb and toward the "Magic Eye," to keep it away from the 6F5 grid cap, (2) leads from mica trimmers to coil should be kept away from the coil and other parts, (3) leads on oscillator coil which are an extended part of the coil winding should be as short as possible, (4) "C" band series capacitor C31 must have leads as short as possible, (5) all leads from antenna board to antenna coils should be dressed toward back apron, (6) the one lead of the line cord and the primary lead of the power transformer which run to the power switch should be twisted together, (7) shielding on leads to Victrola switch should be kept away from the switch terminals and jack.

| Steps | Connect the high side of test-oscillator to — | Tune test-oscillator to — | Range Selector | Set tuning gang to— | Adjust the following for max. peak output |
|---|---|---|---|---|---|
| No. 1 | 6K7 I-F grid cap in series with .01 mfd. | 455 kc | "A" | Quiet point between 550-750 kc | L10, L11 (2nd I-F Transformer) |
| No. 2 | 6A8 Det. grid cap in series with .01 mfd. | 455 kc | "A" | | L8, L9 (1st I-F Transformer) |
| No. 3 | A2. Connect A1 to chassis. | 20 mc | "C" | 20 mc (147.5°) | C24 (osc.)* C8 (det.)† |
| No. 4 | A2, in series with 100 mmfd. Connect A3 to chassis. | 6,100 kc | "B" | 6,100 kc (145.5°) | C25 (osc.)** |
| No. 5 | A2, in series with 100 mmfd. Connect A3 to chassis. | 1,500 kc | "A" | 1,500 kc (151.5°) | C29 (osc.) C3 (ant.) |
| No. 6 | A2, in series with 100 mmfd. Connect A3 to chassis. | 600 kc | "A" | 600 kc (29.5°) | L17 (osc.) |
| No. 7 | A2, in series with 100 mmfd. Connect A3 to chassis. | 1,500 kc | "A" | 1,500 kc (151.5°) | C29 (osc.) |

* Use **minimum** capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used by turning to 141.5° (19,090 kc), at which point a weaker signal should be received.

** Use **minimum** capacity peak if two peaks can be obtained. Check to determine that the correct peak has been used by turning to 124° (5,190 kc), at which point a weaker signal should be received.

† Rock gang condenser and use maximum capacity peak if two peaks can be obtained with C8.

# ADJUSTMENTS FOR ELECTRIC TUNING

1. Make a list of the desired eight stations, arranged in order from low to high frequencies.
2. Turn range selector to "A" band, turn power on, and allow a few minutes for warming up.
3. Press down the "dial-tuning" (right-hand) button.
4. Manually tune in the first station on the list, using the "Magic Eye" for accurate tuning.
5. Hold down the "dial-tuning" button, and press down station button No. 1 (second from left). Both buttons will stay down. Move adjusting pin No. 1 to the insulating line on the disc at rear of gang. When the pin is correctly centered on the insulating line, the central dial lamp will go out.
6. Press down any other button in order to release the dial-tuning button and station button No. 1. Then press down station button No. 1 again. The electric tuning mechanism will function to tune in the station, and the central dial lamp will stay on.
7. Repeat this process for the remaining stations.

## Antenna Connections

**RCA Victor Master Antenna Kit.**—Connect the twisted-pair transmission line to terminals A1 and A2 on the terminal board at rear of chassis. Connect the counter-poise to A3. Terminal G may be connected to ground, but this connection is not necessary for correct operation.

**Noise-Reducing Adjustment.**—After the RCA Victor Master Antenna Kit is connected to the receiver, tune the receiver to a point near 900 kc where no station is heard. Turn volume control clockwise until noise is heard. If no noise of a regular character is audible, start any brush-type motor-driven appliance, such as a vacuum cleaner, electric razor, refrigerator, etc., but do not bring it too near the receiver. This will generate noise as a continuous crackling, or buzz. Adjust C5, which is mounted behind the antenna terminal board, to a point where this noise is reduced to a minimum.

Adjustment of the noise reducing trimmer C5 should be made in the customer's home, with the RCA Victor Master Antenna connected to the receiver.

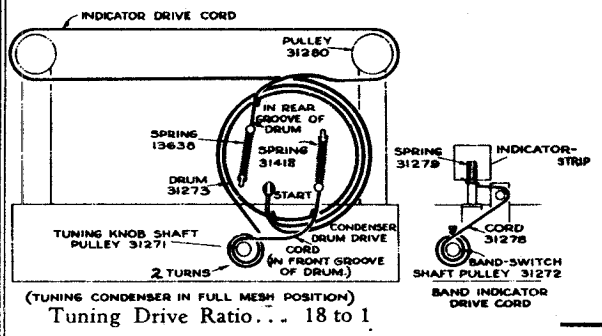
**This adjustment is effective only when the RCA Victor Master Antenna is used. For all other types of antenna, the noise-adjustment trimmer C5 should be screwed all the way down.**

**Other Antennas.**—Use terminals A1 and A3 on the receiver terminal board as antenna and ground connecting points respectively. Terminal A3 may be connected to terminal G, unless this causes interference, in which case this connection should be omitted.

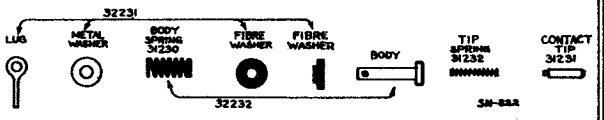
MODELS U-30,Chas.RC-335KR
U-129,Chas. RC-335K

RCA MFG. CO., INC.

Tuning Mechanism,Data
Armchair Cont.Unit Data



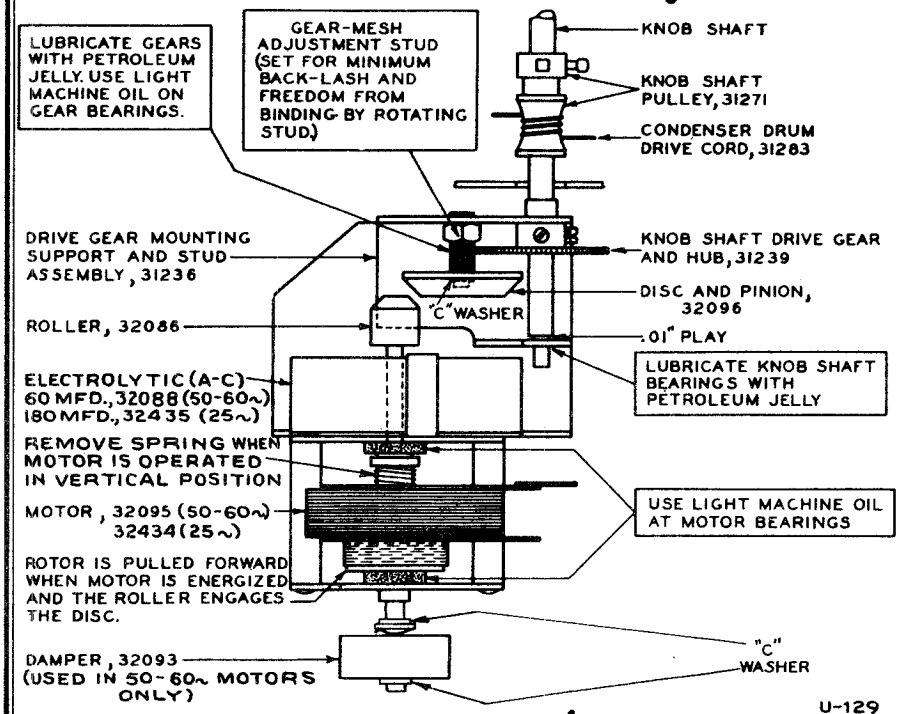

Tuning Drive Ratio. . . 18 to 1




*Component Parts of Station Setting Contact*

*At left—Dial Mechanism*

## Electric Tuning Mechanism


LUBRICATE GEARS WITH PETROLEUM JELLY. USE LIGHT MACHINE OIL ON GEAR BEARINGS.
GEAR-MESH ADJUSTMENT STUD (SET FOR MINIMUM BACK-LASH AND FREEDOM FROM BINDING BY ROTATING STUD.)
KNOB SHAFT
KNOB SHAFT PULLEY, 31271
CONDENSER DRUM DRIVE CORD, 31283
DRIVE GEAR MOUNTING SUPPORT AND STUD ASSEMBLY, 31236
KNOB SHAFT DRIVE GEAR AND HUB, 31239
"C" WASHER
DISC AND PINION, 32096
.01" PLAY
ROLLER, 32086
LUBRICATE KNOB SHAFT BEARINGS WITH PETROLEUM JELLY
ELECTROLYTIC (A-C) 60 MFD., 32088 (50-60~) 180 MFD., 32435 (25~)
REMOVE SPRING WHEN MOTOR IS OPERATED IN VERTICAL POSITION
MOTOR, 32095 (50-60~) 32434 (25~)
USE LIGHT MACHINE OIL AT MOTOR BEARINGS
ROTOR IS PULLED FORWARD WHEN MOTOR IS ENERGIZED AND THE ROLLER ENGAGES THE DISC.
DAMPER, 32093 (USED IN 50-60~ MOTORS ONLY)
"C" WASHER

U-129
SN-923

When a station button is pushed in, it completes the 24-volt circuit through the corresponding station-setting contact and one-half of the brass selector disc, which is connected to one side of the motor field coil. This energizes the motor, and the rotor is pulled forward, engaging with the gear train that drives the tuning condenser and selector disc. The condenser and disc rotate until the insulation line comes under the particular station-setting contact, and the motor circuit is broken.

When the electric tuning mechanism is in action, the motor-supply voltage is fed into a diode rectifier circuit which applies a high bias to the first-audio amplifier. This prevents audio amplification and makes the set quiet or "mute" while the mechanism is operating.

The brass selector disc is fastened to the rear shaft of the tuning condenser by means of two set-screws. When the condenser is at maximum (plates fully meshed) the insulation line should be horizontal, with the operating-end at the left (viewed from rear). The operating-end has dark insulating material and the brass is beveled at this end.

The selector disc should be set so that the contact-tip plungers in the station-setting contacts project not more than 1/16-in. from the body of the contacts.

### Lubrication

**Motor bearings** and **gear bearings**; use light machine oil.

**Gear faces**; use "Pure Oil No. 611" or petroleum jelly.

**Dial-indicator pulleys** and **rails**; use "Castordag" or petroleum jelly.

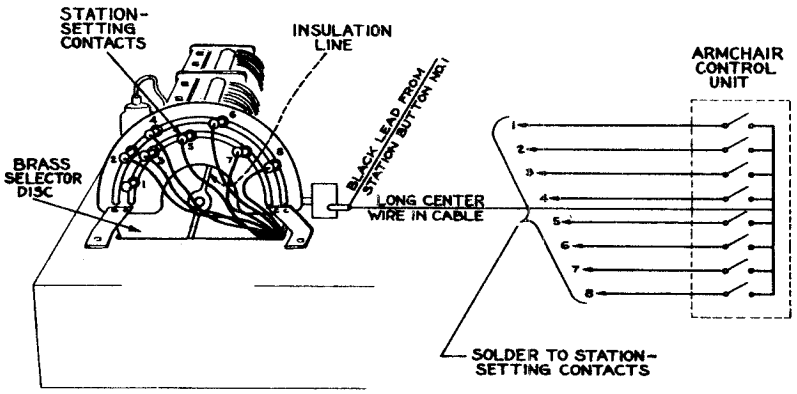
**Selector disc**; apply ***thin*** film of petroleum jelly.

## Armchair Control Unit

*Station-Setting Contacts and Selector Disc*

This illustration shows connections for a G8A Armchair Control Unit. This unit is not supplied with the receiver but may be added as an accessory.

| Station Button | Color of Lead To Station-Setting Contact |
|---|---|
| No. 1 | Black |
| No. 2 | Brown |
| No. 3 | Blue |
| No. 4 | Green |
| No. 5 | Red |
| No. 6 | Red-black |
| No. 7 | Brown-black |
| No. 8 | Red-yellow |




When a Model G8A Armchair Control is connected to the receiver it duplicates the action of the push-buttons on the front panel when No. 1 button is pressed down. The black lead from push-button No. 1 is unsoldered from No. 1 station-setting contact and soldered to a terminal board which is to be mounted on the frame of selector mechanism. If desired one of the other seven station buttons on the set may be used in place of No. 1 button.

This arrangement allows the use of only seven of the eight buttons when tuning in stations at the set, but allows the use of the entire eight buttons on the Armchair Control. In operating the G8A Armchair Control the push-button must be held down until the station has been tuned in. Care must be taken not to hold two of the station-buttons down at one time as both windings of the motor may be engaged instantaneously causing the motor to be inoperative and overheated.

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Automatic Record Changer
Data, Adjustments

RCA MFG. CO., INC.

MODELS U-30, Chas. RC-335KR
U-129, Chas. RC-335K
MODEL U-125, Chas. RC-386

## Automatic Record Changer
### GENERAL INFORMATION

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

### ADJUSTMENTS

**A. Main Lever.**—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

**B. Friction Clutch.**—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

**C. Pickup Lift Cable Screw.**—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

**D. & E. Needle Landing on Record.**—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

**F. & G. Record Separating Knife.**—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .058 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055—.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

**H. Record Support Shelf.**—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

*If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.*

**J. Tone Arm Rest Support (not shown).**—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

**K. Trip Pawl Stop Pin.**—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

**Lubrication.**—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

### MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E".
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C".
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H".
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "34".

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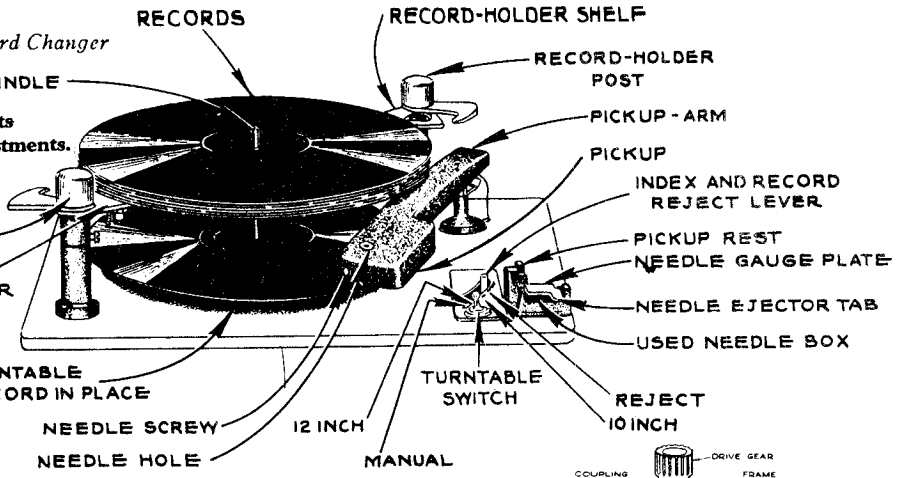
MODELS U-30,U-129
MODEL U-125

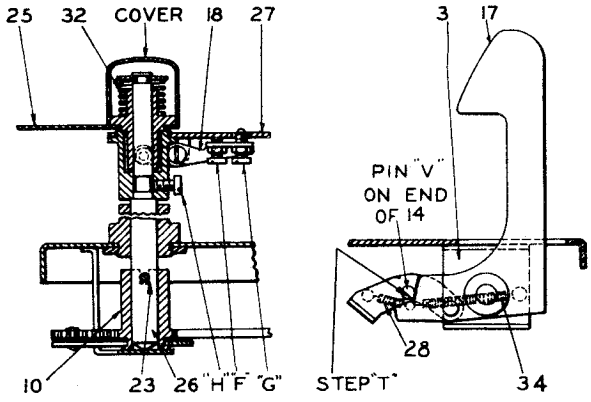
# RCA MFG. CO., INC.

Record Changer
Assembly,Details

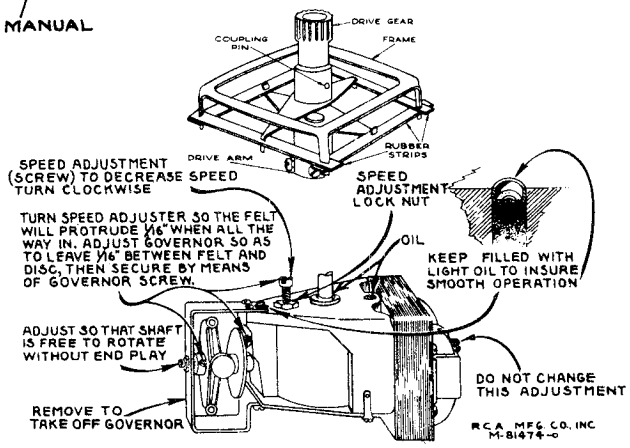
*Top View of Automatic Record Changer*

NOTE: Numbers refer to parts —letters refer to adjustments.

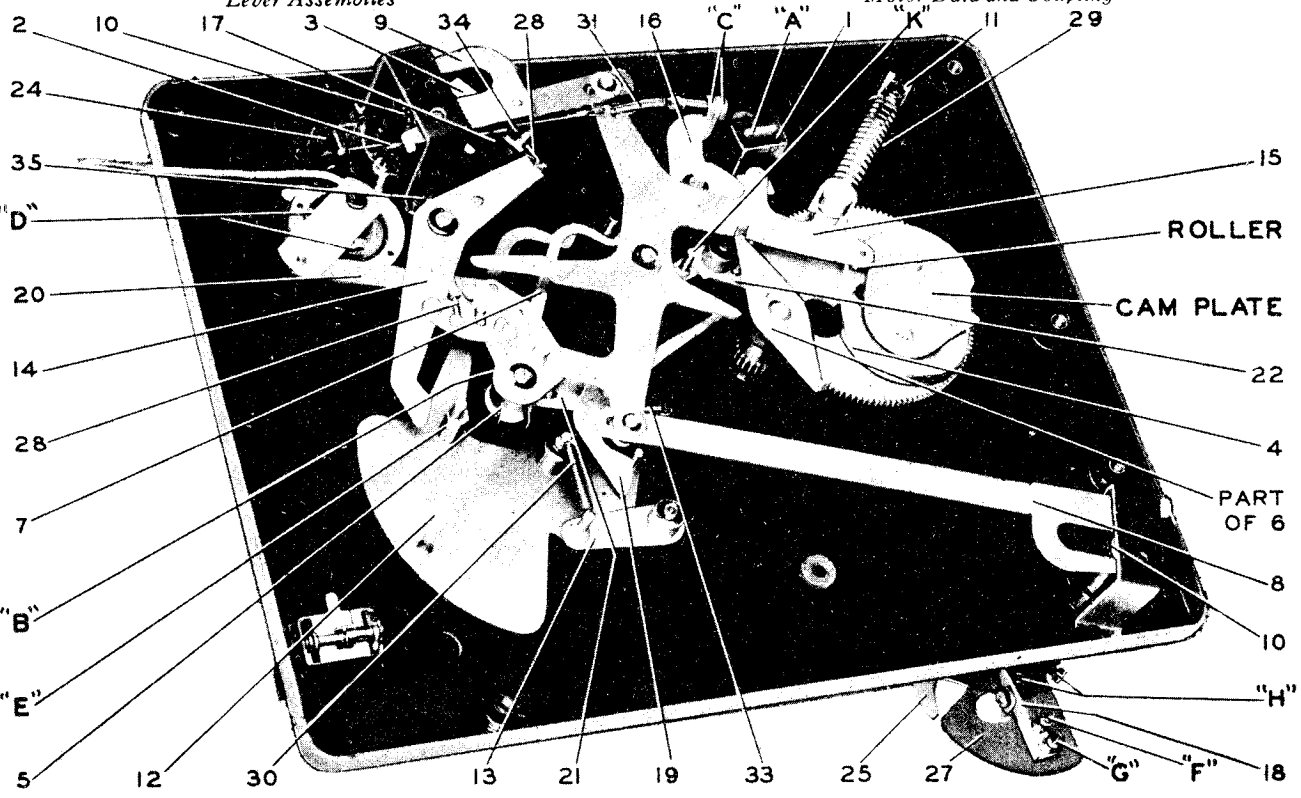



*Details of Record Shelf Posts, and Locating Lever Assemblies*


DRIVE GEAR
COUPLING PIN
FRAME
RUBBER STRIPS
DRIVE ARM
SPEED ADJUSTMENT (SCREW) TO DECREASE SPEED TURN CLOCKWISE
SPEED ADJUSTMENT LOCK NUT
TURN SPEED ADJUSTER SO THE FELT WILL PROTRUDE 1/16" WHEN ALL THE WAY IN. ADJUST GOVERNOR SO AS TO LEAVE 1/16" BETWEEN FELT AND DISC, THEN SECURE BY MEANS OF GOVERNOR SCREW.
OIL
KEEP FILLED WITH LIGHT OIL TO INSURE SMOOTH OPERATION
ADJUST SO THAT SHAFT IS FREE TO ROTATE WITHOUT END PLAY
DO NOT CHANGE THIS ADJUSTMENT
REMOVE TO TAKE OFF GOVERNOR
RCA MFG. CO. INC. M-81474-0

*Motor Data and Coupling*




*Bottom View of Automatic Record Changer*

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# REPLACEMENT PARTS

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES (RC-335K and RC-335KR)** | |
| 31531 | Board—Antenna and ground terminal board | .25 |
| 32232 | Body—Comprising one plunger body and one body spring | .15 |
| 31276 | Bracket—Band indicator mounting bracket complete—less indicator strip, cord, and tension spring | .40 |
| 31282 | Bracket—Magic Eye mounting bracket and holder | .22 |
| 32090 | Bracket—Motor mounting bracket and studs | .40 |
| 12714 | Capacitor—Adjustable trimmer, 2-12 mmfd. (C29) | 1.50 |
| 31292 | Capacitor—Dual adjustable trimmer, 3-30 mmfd. each section (C24, C25) | .40 |
| 31252 | Capacitor—Adjustable trimmer, 5-80 mmfd. (C5) | .25 |
| 12896 | Capacitor—15 mmfd. (C2, C54) | .35 |
| 12948 | Capacitor—33 mmfd. (C1) | .35 |
| 31432 | Capacitor—20 mmfd. (C27) | .40 |
| 13545 | Capacitor—39 mmfd. (C57) | .35 |
| 12720 | Capacitor—100 mmfd. (C20) | .35 |
| 31270 | Capacitor—100 mmfd. (C11, C12, C13, C14) | .35 |
| 12724 | Capacitor—120 mmfd. (C37, C38) | .35 |
| 12725 | Capacitor—150 mmfd. (C15) | .35 |
| 31433 | Capacitor—560 mmfd. (C28) | .35 |
| 31033 | Capacitor—1,500 mmfd. (C26) | .35 |
| 31405 | Capacitor—6,000 mmfd. (C31) | .75 |
| 5107 | Capacitor—.0025 mfd. (C53) | .20 |
| 30303 | Capacitor—.0035 mfd. (C46) | .40 |
| 4838 | Capacitor—.005 mfd. (C17, C22, C49, C50) | .25 |
| 4858 | Capacitor—.01 mfd. (C21, C48) | .25 |
| 14393 | Capacitor—.01 mfd. (C6, C18, C39, C52) | .30 |
| 11315 | Capacitor—.015 mfd. (C36) | .20 |
| 30882 | Capacitor—.05 mfd. (C9) | .20 |
| 4839 | Capacitor—0.1 mfd. (C10, C16) | .30 |
| 12484 | Capacitor—0.25 mfd. (C33) | .30 |
| 30985 | Capacitor—0.25 mfd. (C40) | .30 |
| 30867 | Capacitor—0.5 mfd. (C19) | .30 |
| 31496 | Capacitor—16 mfd. (C35) | 1.25 |
| 31495 | Capacitor—20 mfd. (C34) | 1.75 |
| 32088 | Capacitor—60 mfd., a-c electrolytic, 40 V. (50-60 cycle only) | .90 |
| 32435 | Capacitor—180 mfd., a-c electrolytic, 40 V. (25 cycle only) | .90 |
| 31293 | Coil—"A" band antenna coil (L5, L6, L7) | 1.30 |
| 31296 | Coil—"A" band oscillator coil (L17) | 1.05 |
| 31294 | Coil—"B" band antenna coil (L3, L4) | .80 |
| 31295 | Coil—"B" and "C" band oscillator coil (L15, L16) | .85 |
| 31287 | Coil—"C" band antenna coil (L1, L2) | .90 |
| 31290 | Condenser—3-gang variable condenser (C3, C4, C7, C8, C32) | 6.50 |
| 31231 | Contact—Contact tip for station-setting contact | .06 |
| 31345 | Contact—Push button switch contacts—comprising 10 contacts riveted on insulating strip | .70 |
| 31344 | Contact—Push button switch contacts—comprising 13 contacts riveted on insulating strip | 1.20 |
| 31278 | Cord—Band indicator drive cord | .12 |
| 32635 | Cord—Indicator pointer drive cord | .24 |
| 32634 | Cord—Variable condenser drum drive cord | .10 |
| 31269 | Core—Adjustable core and stud for i-f transformers | .15 |
| 31260 | Core—Adjustable core and stud for "A" band oscillator coil | .35 |
| 32093 | Damper — Flywheel damper — less mounting washers for rear end of tuning motor shaft (50-60 cycle motors only) | .25 |
| 32096 | Disc—Friction disc and pinion gear | .35 |
| 32091 | Drive—Drive gear assembly — comprising friction disc and pinion gear, drive gear, and knob shaft, assembled on gear-mounting bracket | 1.50 |
| 31273 | Drum—Indicator drive cord drum | .80 |
| 31239 | Gear—Knob shaft drive gear and hub | .85 |
| 31545 | Gear—Variable condenser intermediate drive gear and pinion gear—25 cycle models only | .40 |
| 31532 | Indicator—Band indicator strip | .15 |
| 11891 | Lamp—Dial, pilot, or compartment lamp, 6.3 V, 0.25 amp. | .17 |
| 31480 | Lamp—Electric tuning adjustment indicator lamp, 6.3 V, 0.15 amp. | .20 |
| 31346 | Lock—Push button switch lock plate—comprising 10 contact locks in one strip | .80 |
| 32095 | Motor—Electric tuning motor, 60 mfd. capacitor, friction roller, and damper, assembled (50-60 cycle only) | 5.25 |
| 32434 | Motor—Electric tuning motor, 150 mfd. capacitor, and friction roller (25 cycle only) | 6.50 |
| 31228 | Plate—Selector contact plate—less contacts | .45 |
| 31227 | Plate—Selector mounting plate—mounts on rear of variable condenser | .50 |
| 30868 | Plug—2-contact female plug for phono. motor cable | .35 |
| 12493 | Plug—5-contact female plug for speaker cable | .30 |
| 32232 | Plunger—Station setting contact tip | .15 |
| 31280 | Pulley—Indicator pointer drive cord pulley | .10 |
| 31271 | Pulley—Motor pulley | .25 |
| 31272 | Pulley—Range switch pulley | .20 |
| 31250 | Resistor—Voltage divider—comprising one 1,500 ohm, one 2,950 ohm, one 3,400 ohm, one 12 ohm, and one 100 ohm sections (R19, R28, R31, R32, R33) | .90 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R24) | .15 |
| 13998 | Resistor—22,000 ohms, ½ watt (R4) | .20 |
| 11300 | Resistor—33,000 ohms, 1/10 watt (R27, R30) | .15 |
| 12454 | Resistor—33,000 ohms, ½ watt (R6) | .20 |
| 14560 | Resistor—100,000 ohms, ½ watt (R35) | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt (R5, R36) | .20 |
| 11308 | Resistor—220,000 ohms, 1/10 watt (R14) | .15 |
| 11453 | Resistor—270,000 ohms, 1/10 watt (R16, R29) | .15 |
| 11452 | Resistor—470,000 ohms, 1/10 watt (R1) | .15 |
| 12285 | Resistor—470,000 ohms, ½ watt (R8) | .20 |
| 12013 | Resistor—1 meg., 1/10 watt (R7, R26, R40) | .15 |
| 13730 | Resistor—1 meg., ½ watt (R43) (U-30 only) | .20 |
| 30208 | Resistor—1.2 meg., ½ watt (R41) | .20 |
| 5131 | Resistor—2.2 meg., 1/10 watt (R3) | .15 |
| 14887 | Retainer—Indicator pointer drive cord pulley retainer | .01 |
| 32086 | Roller—Rubber friction roller for front end of motor (attach to motor shaft with shellac) | .10 |
| 31233 | Rotor—Selector rotor disc—mounts on rear of variable condenser shaft | 1.16 |
| 4119 | Screw—No. 8-32 headless set screw for gear, Stock No. 31239 | .02 |
| 14350 | Screw—No. 8-32 square head set screw for selector rotor disc | .03 |
| 4869 | Screw—No. 8-32 square head set screw for pulley, Stock Nos. 31271 and 31272, and drum, Stock No. 31273 | .03 |
| 31681 | Shaft—Dial drive knob shaft | .20 |
| 31364 | Socket—Dial lamp socket | .20 |
| 13871 | Socket—Magic Eye socket | .45 |
| 31347 | Socket—Pickup socket and bracket | .30 |
| 31251 | Socket—Tube socket | .25 |
| 31365 | Socket—Tuning indicator lamp insulated socket | .30 |
| 31279 | Spring—Band indicator tension spring | .03 |
| 31232 | Spring—Contact tip spring for station-setting contact | .01 |
| 13638 | Spring—Indicator pointer drive cord tension spring | .08 |
| 31418 | Spring—Variable condenser drive cord tension spring | .05 |
| 12007 | Spring—Retaining spring for core, Stock No. 31269 | .02 |
| 31230 | Spring—Station-setting contact body spring | .01 |
| 31262 | Spring—Tension spring for core, Stock No. 31260 | .01 |
| 31970 | Spring—Tension spring for push button switch latch bar | .05 |
| 31236 | Support—Variable condenser drive gear mounting support and studs assembly | .65 |
| 31360 | Switch—Pickup switch for mounting on push button switch assembly (S3) | .35 |
| 31291 | Switch—Range switch (S1, S2) | .95 |
| 31312 | Switch—Station selector push button switch and bracket complete | 4.25 |
| 31248 | Tone Control—H.f. tone control and power switch (R12, S4) | 1.50 |
| 31267 | Transformer—First i-f transformer (L8, L9, C11, C12) | 2.20 |
| 31268 | Transformer—Second i-f transformer (L10, L11, C13, C14) | 2.05 |
| 31308 | Transformer—Power transformer, 105/130-140/160-200/250 volts, 50-60 cycle (T1) | 13.85 |
| 31226 | Transformer—Power transformer, 110 volts, 25-60 cycle (T1) | 13.00 |
| 31225 | Transformer—Power transformer, 110 volts, 50-60 cycle (T1) | 8.50 |
| 31249 | Volume Control (R9) | 1.50 |
| 32231 | Washer—Comprising 1 metal washer, 2 fibre washers, and 1 solder lug or retainer for station selector plunger | .03 |
| 32094 | Washers—One set of washers for mounting damper on 50-60 cycle motors only—comprising 2 "C" washers, 1 spring washer, and 1 flat washer | .10 |
| | **OPERATING MECHANISM** | |
| 31134 | Bracket—Pickup locating lever mounting bracket (3) | .30 |
| 31144 | Cam—Cam and gear assembly (4) (U-129) | 2.80 |
| 32878 | Cam—Cam and gear assembly (4) (U-30) | 2.80 |
| 6808 | Clutch—Trip lever friction clutch assembly (5) | .35 |
| 31146 | Coupling—Motor coupling complete with turntable drive gear, rubber strips, motor coupling, and drive arm (6) | 1.80 |
| 31129 | Cover—Cap for top of record post | .45 |
| 31116 | Finger—Trip lever friction finger assembly (7) | .45 |
| 31119 | Gear—Long arm and rack gear for front left-hand record post (8) | .60 |
| 31120 | Gear—Short arm and rack gear for rear right-hand record post (9) | .55 |
| 31121 | Gear—Record post gear (10) | .90 |
| 31123 | Guide—Main lever spring guide (11) | .40 |

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| 31114 | Lever—Index lever assembly (12) | .75 |
| 31137 | Lever—Index lever tension spring lever (13) | .30 |
| 31139 | Lever—Locating lever and pawl assembly (14) | .70 |
| 31113 | Lever—Main lever assembly (15) | 1.35 |
| 31140 | Lever—Pickup lift cable lever and spring assembly (16) | .55 |
| 31135 | Lever—Pickup locating lever assembly (17) | .85 |
| 31130 | Lever—Record separator elevating lever complete with adjustment screws (18) | .80 |
| 31132 | Lever—Trip detaining lever (19) | .30 |
| 31115 | Lever—Trip lever assembly (20) | 1.85 |
| 31131 | Lever—Trip regulator lever (21) | .25 |
| 31133 | Pawl—Trip pawl assembly (22) | .80 |
| 31124 | Pin—Record post drive pin (23) | .04 |
| 14207 | Roller—Pickup lift cable roller and bracket assembly (24) | .55 |
| 31118 | Screw—Cone pointed set screw for trip lever hub or record post shelf | .06 |
| 4563 | Screw—Pickup lift cable screw and nuts | .04 |
| 14195 | Screw—Set screw for flexible coupling | .05 |
| 31117 | Screw—Special screw to adjust friction clutch tension | .03 |
| 31126 | Separator—Record separator knife (25) | .75 |
| 31122 | Shaft—Record separator post shaft (26) | .40 |
| 31125 | Shelf—Record post shelf assembly (27) | 1.25 |
| 31141 | Spindle—Turntable spindle shaft | 1.40 |
| 3676 | Spring—Cam pawl tension spring on main gear (12 turns, .190-in. O.D., 43/64-in. lg.) | .04 |
| 14190 | Spring—Pickup locating lever short spring or locating lever pawl tension spring (28) (16 turns, .180-in. O.D., 19/32-in. lg.) | .08 |
| 32882 | Spring—Main lever tension spring (29) (18 turns, .6-in. O.D., 3-in. lg.) | .05 |
| 31136 | Spring—Index lever tension spring (30) (25 turns, .190-in. O.D., 15/16-in. lg.) | .05 |
| 3666 | Spring—Pickup lift cable tension spring (31) (20 turns, .195-in. O.D., 1-in. lg.) | .04 |
| 31127 | Spring—Record separator pressure spring (32) (2 turns, ¼-in. O.D., ¼-in. lg.) | .02 |
| 14191 | Spring—Trip detaining lever tension spring (33) (15 turns, .190-in. O.D., ¾-in. lg.) | .04 |
| 31875 | Spring—Pickup locating lever tension spring (34) (14 turns, .220-in. O.D., 27/32-in. lg.) | .04 |
| 32436 | Spring—Locating lever tension spring (35) (16 turns, .182-in. O.D., 21/32-in. lg.) | .05 |
| 31147 | Strip—Complete set of rubber strips for flexible coupling | .40 |
| 31139 | Turntable Assembly—less spindle | 3.35 |
| 31128 | Washers—"C" washer for top of record post | .04 |
| 31143 | Washers—Turntable thrust washers (1 steel, 1 bronze, 1 felt) | .15 |
| | **PICKUP AND ARM ASSEMBLIES** | |
| 33096 | Arm—Pickup arm, less crystal and cable (viscoloid-damped type for U-30 and 2nd-production U-129) | 2.60 |
| 31162 | Cable—Pickup arm lift cable and clips | .15 |
| 33119 | Cable—Shielded cable and plug | .60 |
| 31156 | Crystal—Pickup crystal cartridge and needle screw | 4.25 |
| 33114 | Damper—Viscoloid damper for armature (U-30 and 2nd-production U-129) | .15 |
| 31159 | Pickup arm complete (without viscoloid damper—for 1st-production U-129) | 7.45 |
| 31160 | Screw—Pickup needle screw | .12 |
| 31161 | Shaft—Pickup pivot arm and shaft assembly | .45 |
| | **MOTORBOARD ASSEMBLIES** | |
| 31149 | Base—Tone arm mounting base | .35 |
| 32927 | Board—Record changer base complete with all welded and riveted posts and bearings (U-30 only) | 6.30 |
| 31152 | Board—Record changer base complete with all welded and riveted posts and bearings—less all operating parts (U-129 only) | 7.90 |
| 14209 | Bumper—Main lever rubber bumper (1) | .08 |
| 9848 | Cup—Used needle cup, rest, and lid complete | .75 |
| 31148 | Escutcheon—Index escutcheon (U-129 only) | .40 |
| 32877 | Escutcheon—Index escutcheon (U-30 only) | .40 |
| 31151 | Guide—Pickup lift cable guide (coil spring, SOT 2-in. large) (2) | .10 |
| 31150 | Mounting—Pickup arm base rubber mounting complete | .45 |
| 31155 | Spring—Needle cup lid tension spring | .04 |
| | **MOTOR ASSEMBLIES (U-129 only)** | |
| 31617 | Bracket—Governor end bearing bracket | .30 |
| 31626 | Coil—Field coil and laminations for 25 cycle motor | 9.30 |
| 31619 | Coil—Field coil and laminations for 50-60 cycle motor | 7.80 |
| 31618 | Coil—Field coil and laminations for 60 cycle motor | 5.50 |
| 31624 | Governor—Motor governor for 25-cycle motor | 3.05 |
| 11703 | Governor—Motor governor for 50-60 cycle motor | 3.05 |
| 31623 | Governor—Motor governor for 60-cycle motor | 2.80 |
| 31448 | Motor—105-125 volts, 25 cycle (M1) | 23.70 |
| 31163 | Motor—105-125 volts, 50-60 cycles (M1) | 20.50 |
| 31157 | Motor—105-125 volts, 60 cycles (M1) | 17.75 |
| 30870 | Plug—2-contact male plug for motor power cable | .35 |
| 31447 | Screw—Complete set of motor mounting screws, washers, and spacers—for 25 cycle models only | .40 |
| 31158 | Screw—Complete set of motor mounting screws, washers, and spacers—for 50-60 cycle models only | .25 |
| 31616 | Screw—Rotor bearing thrust screw | .25 |
| 31620 | Screw—Speed regulator screw with nut | .20 |
| 31636 | Spindle—Spindle and gear for 25 cycle motor | 1.90 |
| 31634 | Spindle—Spindle and gear for 50-60 cycle and 60 cycle motors | 1.70 |
| 32913 | Spring—Governor spring and ball for 25 cycle motor | .25 |
| 32914 | Spring—Governor spring and ball for 50-60 cycle motor | .30 |
| 32912 | Spring—Governor spring and ball for 60 cycle motor | .25 |
| 14206 | Switch—Motor toggle switch (S7) | .90 |
| 31622 | Washer—Metal and felt washers for lower spindle bearing | .10 |
| | **MOTOR ASSEMBLIES (U-30 only)** | |
| 31618 | Field—Coils and laminations, 105-125 volts, 60 cycle | 5.50 |
| 31619 | Field—Coils and laminations, 105-125 volts, 50-60 cycle | 7.80 |
| 31626 | Field—Coils and laminations, 105-125 volts, 25 cycle | 9.30 |
| 31623 | Governor—60 cycle | 2.80 |
| 11703 | Governor—50-60 cycle | 3.05 |
| 31624 | Governor—25 cycle | 3.05 |
| 31448 | Motor—105-125 volts, 25 cycle (M1) | 23.70 |
| 31163 | Motor—105-125 volts, 50-60 cycle (M1) | 20.50 |
| 31157 | Motor—105-125 volts, 60 cycle (M1) | 17.75 |
| 30870 | Plug—2-contact male plug for motor power cable | .35 |
| 31447 | Screw—Complete set of motor mounting screws, washers, and spacers—for 25-cycle models only | .40 |
| 31158 | Screw—Complete set of motor mounting screws, washers, and spacers—for 50-60 cycle models only | .25 |
| 31634 | Shaft—Turntable shaft and gear—60, and 50-60 cycle | 1.70 |
| 31636 | Shaft—Turntable shaft and gear—25 cycle | 1.90 |
| 32875 | Switch—Motor toggle switch | .30 |
| 32912 | Weight—Governor weight and spring—60 cycle | .25 |
| 32914 | Weight—Governor weight and spring — 50-60 cycle | .30 |
| 32913 | Weight—Governor weight and spring—25 cycle | .25 |
| | **SPEAKER ASSEMBLIES (RL-70H-4)** | |
| 13866 | Cap—Dust cap for cone center | .03 |
| 11234 | Coil—Field coil (L12) | 3.85 |
| 11469 | Coil—Neutralizing coil (L14) | .30 |
| 31275 | Cone—Speaker cone and voice coil (L13) | 1.75 |
| 31539 | Plug—5-contact male plug for speaker | .25 |
| 31538 | Speaker complete | 10.65 |
| 14534 | Transformer—Output transformer (T2) | 3.85 |
| 14357 | Washer—Spring washer to hold field coil securely | .06 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 31358 | Button—Station selector push button | .15 |
| 13103 | Cap—Pilot lamp cap | .15 |
| 31456 | Cover—5 protective covers for push button markers | .08 |
| 31540 | Cushion—Chassis mounting cushion and screw assemblies—sufficient for one chassis | .50 |
| 31541 | Cushion—Motor plate mounting cushion and clamp assembly—sufficient for one instrument | .50 |
| 31451 | Dial—Station selector dial scale and crystal | .95 |
| 31361 | Escutcheon—Tuning dial escutcheon, less dial and push buttons | 2.20 |
| 30698 | Hinge—Cabinet lid hinge | .95 |
| 31542 | Indicator—Station selector indicator pointer and carriage | .35 |
| 31355 | Knob—Station selector, volume control, tone control, or range switch knob | .12 |
| 31478 | Lid Support—Cabinet lid support | 2.20 |
| 31589 | Marker—Station call letter push button markers | .35 |
| 31457 | Marker—"Victrola" push button marker | .01 |
| 31458 | Marker—"Dial Tuning" push button marker | .01 |
| 32083 | Screen—Dial color screen | 1.20 |
| 14270 | Spring—Retaining spring for knob, Stock No. 31355 | .05 |
| 31470 | Suspension—Motorboard suspension spring, screw, and lockwasher, 4 required | .10 |

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## Alignment Procedure

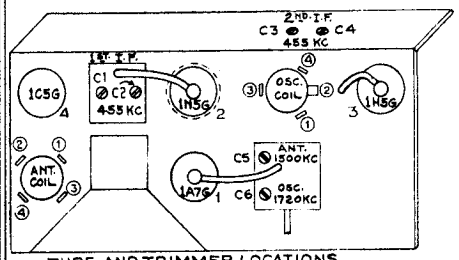
**Output Meter Alignment.**—If this method is used connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

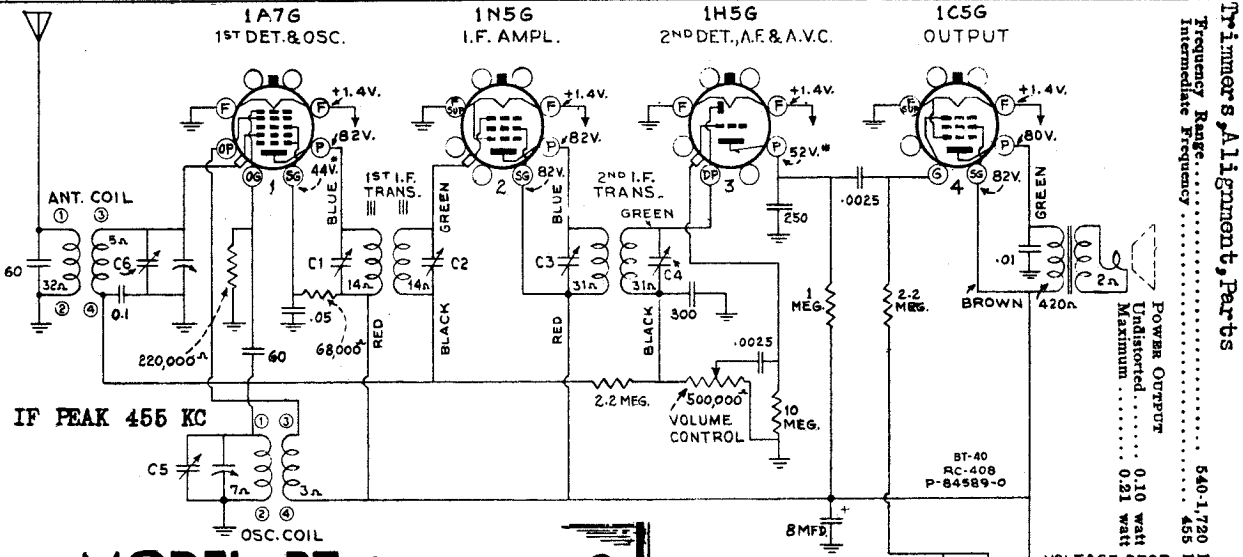
For additional details, refer to booklet "RCA Victor Receiver Alignment."

**Pre-setting Dial.**—With gang condenser in full mesh, the pointer should be horizontal.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | 1A7G 1st-Det. grid cap, in series with .01 mfd. | 455 kc | Quiet point at 1,600 kc end of dial | C1, C2, C3, C4 (1st and 2nd I-F transformers) |
| 2 | Antenna lead (blue) in series with 100 mmfd. | 1,720 kc | Full clockwise (out of mesh) | C5 (oscillator) |
| 3 | | 1,500 kc | Resonance on 1,500 kc signal | C6 (antenna) |



TUBE AND TRIMMER LOCATIONS




Frequency Range ..... 540-1,720 kc
Intermediate Frequency ..... 455 kc

Power Output
Undistorted ..... 0.10 watt
Maximum ..... 0.21 watt

# MODEL BT-40

## Chassis No. RC-408

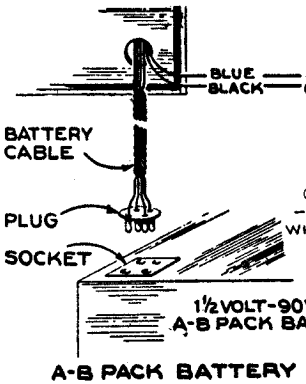
RCA Tube Complement

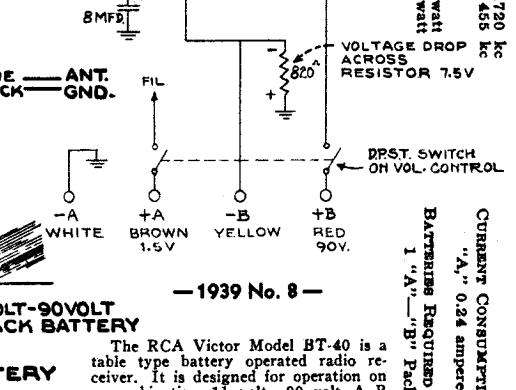
(1) RCA-1A7-G ..... 1st-Det.—Osc.
(2) RCA-1N5-G ..... I-F Amplifier
(3) RCA-1H5-G ..... 2nd-Det., A-F, and A.V.C.
(4) RCA-1C5-G ..... Output

Loudspeaker

Type ..... 4-inch permanent-magnet dynamic
Voice-coil Impedance ..... 2 ohms at 400 cycles

| | Height | Width | Depth |
|---|---|---|---|
| Cabinet Dimensions (inches) | 6½ | 9½ | 4-11/16 |
| Chassis Base Dimensions (inches) | 1½ | 8½ | 8¾ |
| Over-all Chassis Height | | | 5¼ inches |
| Weight—Shipping weight | | | 6½ pounds |
| Net weight | | | 4½ pounds |
| Tuning Drive Ratio | | | 11 to 1 |




— 1939 No. 8 —

The RCA Victor Model BT-40 is a table type battery operated radio receiver. It is designed for operation on a combination 1½-volt—90-volt A-B Pack Battery.

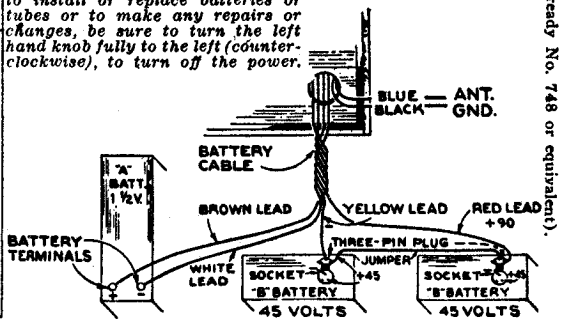
Current Consumption
"A," 0.24 ampere—"B," 9.0 milliamperes.

Batteries Required
1 "A"—"B" Pack (Eveready No. 748 or equivalent).

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price | STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|---|---|---|
| 11591 | Button—Plug button for chassis | .10 | 14076 | Resistor—820 ohms, ½ watt | .20 |
| 13057 | Capacitor—60 mmfd. | .35 | 13715 | Resistor—68,000 ohms, ½ watt | .20 |
| 12488 | Capacitor—250 mmfd. | .35 | 12264 | Resistor—220,000 ohms, ½ watt | .20 |
| 12952 | Capacitor—300 mmfd. | .35 | 13730 | Resistor—1 meg., ½ watt | .20 |
| 5107 | Capacitor—.0025 mfd. | .20 | 12679 | Resistor—2.2 meg., ½ watt | .20 |
| 4937 | Capacitor—.01 mfd. | .25 | 13601 | Resistor—10 meg., ½ watt | .20 |
| 32787 | Capacitor—.05 mfd. | .20 | 33061 | Shaft—Tuning knob drive shaft | .20 |
| 4839 | Capacitor—0.1 mfd. | .30 | 32595 | Shield—Tube shield—less cap | .15 |
| 32187 | Capacitor—Electrolytic, 8 mfd. | .65 | 32537 | Socket—Tube socket | .20 |
| 32572 | Coil—Antenna coil | .60 | 33058 | Speaker complete | 4.00 |
| 33055 | Coil—Oscillator coil | .70 | 30585 | Spring—Drive cord tension spring | .06 |
| 33060 | Condenser—2-gang tuning | 2.25 | 32667 | Spring—Retaining spring for knobs or drive drum | .02 |
| 32634 | Cord—Drive cord | .10 | 33056 | Transformer—First i-f transformer | 1.40 |
| 33310 | Dial—Glass dial scale | .30 | 33057 | Transformer—Second i-f transformer | 1.25 |
| 32946 | Drum—Variable condenser drive drum | .35 | 33062 | Transformer—Output transformer | 1.30 |
| 32571 | Knob—Tan volume or tuning knob | .15 | 33059 | Volume control and switch | 1.50 |
| 30550 | Plug—4-prong male plug for battery cable | .20 | | | |

*CAUTION. — Before attempting to install or replace batteries or tubes or to make any repairs or changes, be sure to turn the left hand knob fully to the left (counter-clockwise), to turn off the power.*



SEPARATE "A" AND "B" BATTERIES

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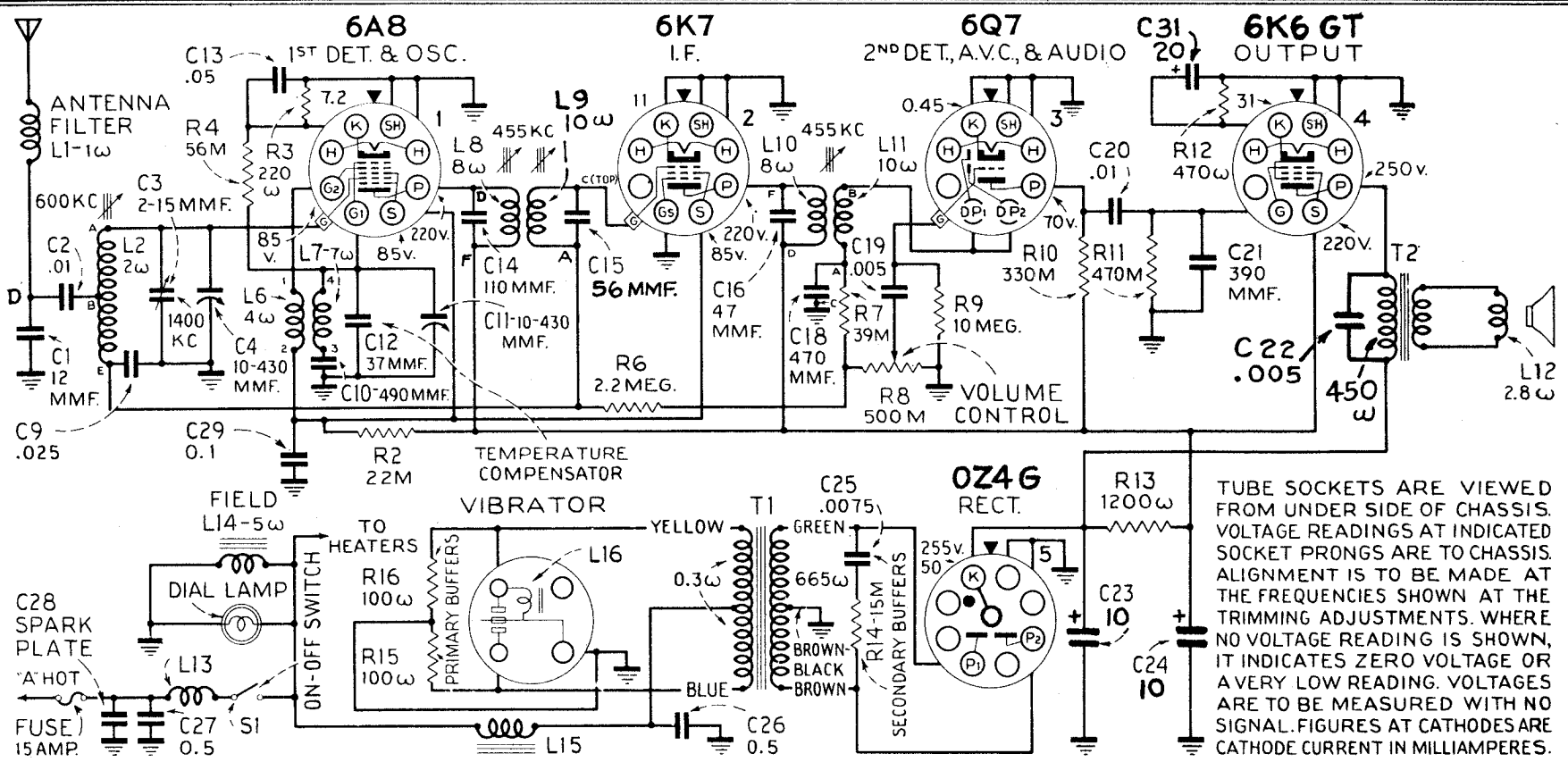



M = 1000 OHMS

IF PEAK 455 KC

*Schematic Circuit Diagram*

— 1939 No. 22 —

## General Description

Model M50 is a five-tube superheterodyne receiver with loudspeaker and radio chassis in the same case. It is equipped with five push buttons, for tuning your five favorite broadcast stations, as well as the standard method of dial tuning. Adjustments for push button tuning are explained under the heading "Push Button Tuning Mechanism." The receiver is designed to be mounted under the dash panel. The operating controls are integral with the radio and speaker case.

**Loudspeaker.**—The loudspeaker voice coil should be centered in the usual manner with three narrow paper feelers, after first removing the front dust cover. The dust cover should be cemented back in place with ambroid cement after adjustment has been completed.

## Electrical Specifications

FREQUENCY RANGE ..... 550-1,550 kc

POWER OUTPUT

Type ..... Pentode
Undistorted ..... 2 watts
Maximum ..... 3.5 watts
Dial Lamp ..... 6-8 volts, 0.2 amp., Mazda 51

ALIGNMENT FREQUENCIES

I-F ..... 455 kc
Ant. ..... 600 and 1,400 kc
Oscl. ..... No Adjustment

LOUDSPEAKER

Type ..... Electrodynamic
Size ..... 5 inches
V.C. Impedance ..... 3.2 ohms at 400 cycles
Field Coil Resistance ..... 5 ohms

POWER SUPPLY

"A" .... 6.3 volt Auto Storage Battery
"B" ..... Non-Synchronous Vibrator
Current Drain ..... 6.0 amps.

CHASSIS FEATURES

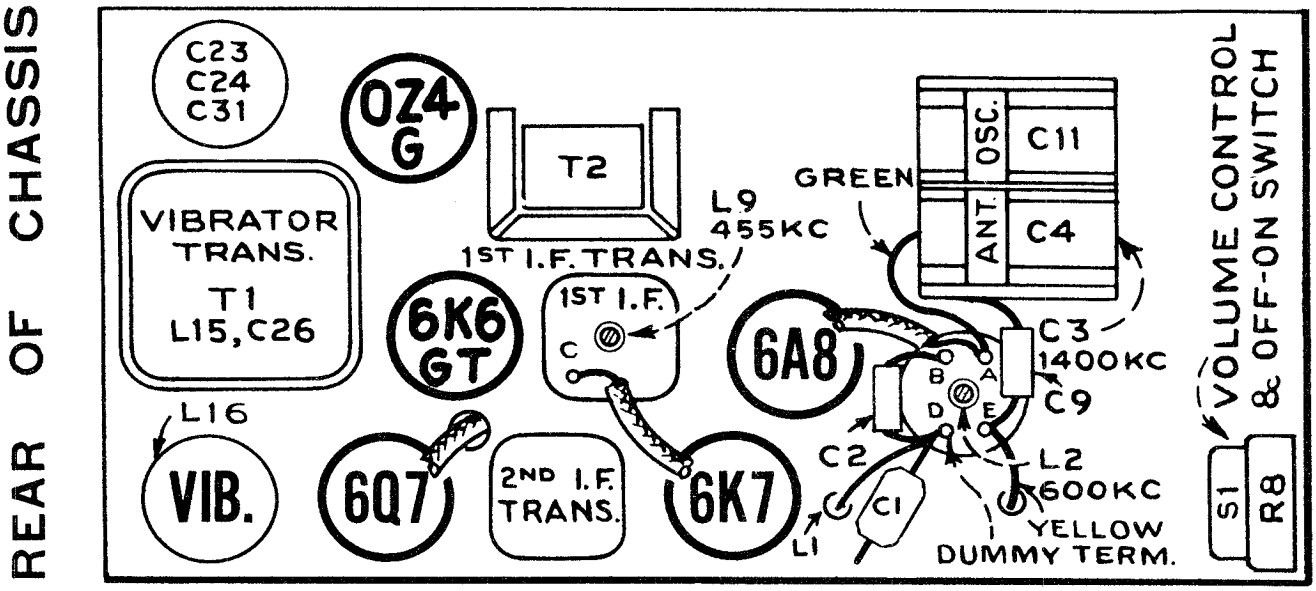
No. I-F Stages ..... One
Completely Shielded Ant. Filter
Magnetite-core Adjusted Antenna and I-F Transformers
Ignition-Noise-Suppression Filters
Antenna Compensator Trimmer
Illuminated Dial

MODEL M50,Chassis RC-357J
Chassis Wiring,Socket
Trimmers

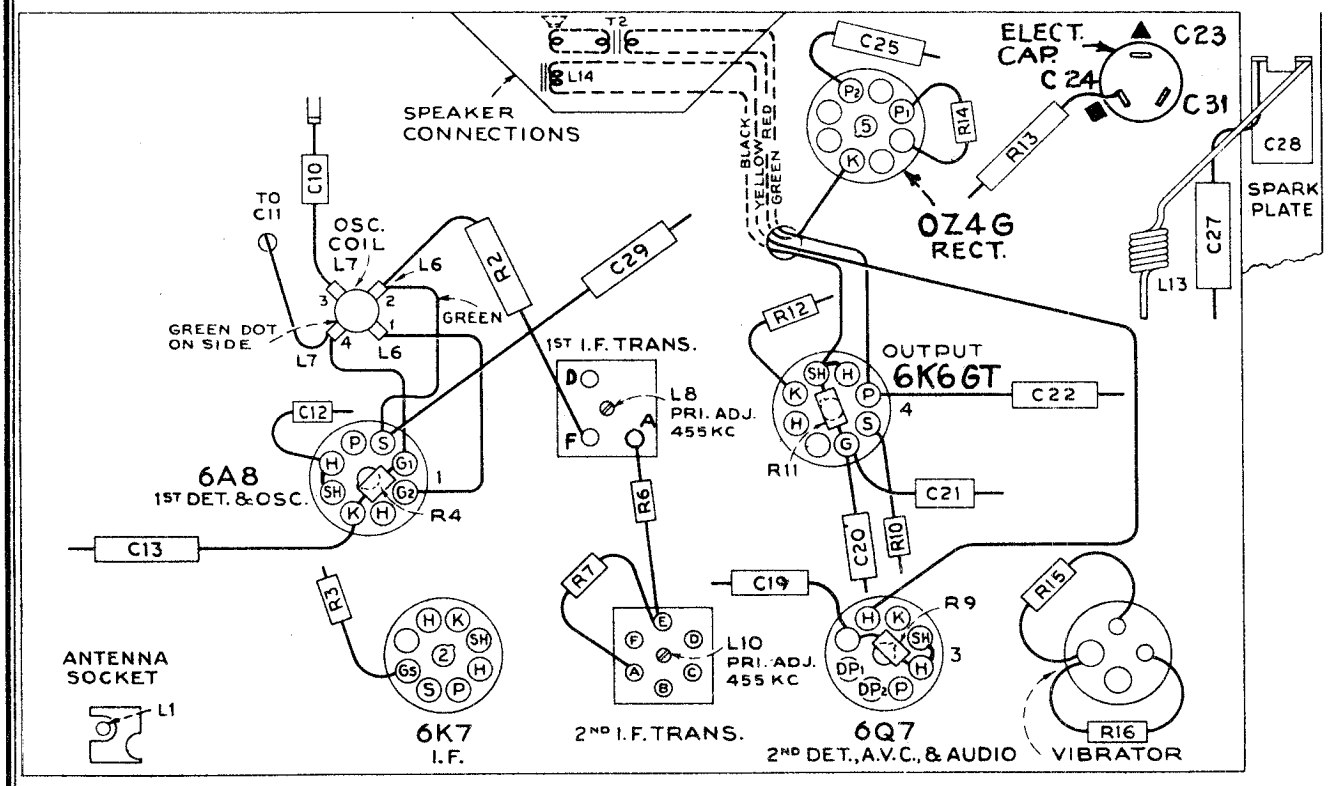
RCA MFG. CO., INC.

TUBES AND FUNCTIONS

(1) RCA-6A8 ..... First Detector—Oscillator
(2) RCA-6K7 ..... I-F Amplifier
(3) RCA-6Q7 ..... Second Det., A-F Amp. and A.V.C.
(4) RCA-6K6GT ..... Output
(5) RCA-OZ4G ..... Rectifier




*Location of Parts and Alignment Adjustments on Top of Chassis*




*Location of Parts and Alignment Adjustments on Bottom of Chassis*

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# RCA MFG. CO., INC.

MODEL M50, Chassis RC-357J
MODEL M60, Chassis RC-357K
Alignment

**PRELIMINARY:**

Output meter connections ..... Across speaker voice coil
Output meter readings to indicate 1 watt ..... 1.8 volts
Generator ground lead connections ..... To chassis
Generator modulation ..... 30%, 400 cycles
Position of Volume Control ..... Fully clockwise
Chassis must be in its case with front end removed, when aligning R-F circuit.

## MODEL M50 Chassis No. RC 357J

| Position of Dial Pointer | Generator Frequency | Dummy Antenna | Generator Connection | Adjustment Symbol | Circuit Adjusted |
|---|---|---|---|---|---|
| No Signal 550-750 kc | 455 kc | .001 mfd. | 6K7 Grid | L-10 | 2nd I.F. Trans. |
| No Signal 550-750 kc | 455 kc | .001 mfd. | 6A8 Grid | L-8, L-9 | 1st I.F. Trans. |
| 1,400 kc | 1,400 kc | .0001 mfd. † | Ant. Lead | C-3 | Ant. |
| 600 kc | 600 kc | .0001 mfd. † | Ant. Lead | L-2 | Ant. |
| 1,400 kc | 1,400 kc | .0001 mfd. † | Ant. Lead | C-3 * | Ant. |

**NOTE:** No oscillator alignment adjustments are required in this receiver.

† Make the generator connection to the receiver thru a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If C-2 has been changed, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.

* Re-adjust C-3 after installation as outlined under "Antenna Circuit"

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.

Alignment adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

Oscillator circuit alignment is not required in this receiver at either end of the band; the oscillator coil is preadjusted for inductance in the factory.

Since the oscillator coil is unshielded, the case has some effect on its inductance. Therefore alignment must be done either with the chassis in the case or with a steel plate (covering the bottom of chassis), substituting for the case.

## MODEL M60 Chassis No. RC 357K

| Position of Dial Pointer | Generator Frequency | Dummy Antenna | Generator Connection | Adjustment Symbol | Circuit Adjusted |
|---|---|---|---|---|---|
| No Signal 550-750 kc | 455 kc | .001 mfd. | 6K7 I.F. Grid | L-10, L-11 | 2nd I.F. Trans. |
| No Signal 550-750 kc | 455 kc | .001 mfd. | 6A8 Grid | L-8, L-9 | 1st I.F. Trans. |
| Rock Through 600 kc | 600 kc | .0001 mfd.† | Ant. Lead | L-7 | Osc. |
| 1,400 kc ** | 1,400 kc | .0001 mfd.† | Ant. Lead | C-5 | Det. |
| 1,400 kc ** | 1,400 kc | .0001 mfd.† | Ant. Lead | C-3 | Ant. |
| Rock Through 600 kc | 600 kc | .0001 mfd.† | Ant. Lead | L-7 | Osc. |
| 1,400 kc ** | 1,400 kc | .0001 mfd.† | Ant. Lead | C-5 | Det. |
| 1,400 kc ** | 1,400 kc | .0001 mfd.† | Ant. Lead | C-3* | Ant. |

† Make the generator connection to the receiver through a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If a capacitor has been added in series with the lead from antenna filter L-1 to the antenna coil, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.

* Re-adjust C-3 after installation as outlined under "Antenna Circuit".

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.

Alignment adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

** OSCILLATOR CIRCUIT

A magnetite core is used to provide temperature stability. The conventional high frequency trimmer has been replaced with a fixed temperature-compensating capacitor (C-12) which determines the high frequency range. Since the inductance of L-7 is adjustable, the conventional series trimmer has been replaced with a fixed capacitor (C-10). C-10 is a special capacitor having zero temperature coefficient to provide for oscillator stability in the low frequency range. Aligning the receiver for 600 kc is accomplished by adjusting L-7 to the antenna and det. circuits (gang condenser must be rocked while making this adjustment). The 1,400 kc alignment is accomplished by adjusting the antenna and the det. trimmers (C-3 and C-5) to the oscillator.

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MODEL M50, Chas. RC-357J
MODEL M60, Chas. RC-357K
Antenna Data,
Tuner Data

RCA MFG. CO., INC.

## Antenna Circuit

**M50**

The antenna circuit is designed to work with a low capacity antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If larger antennas, such as screened top or a double under the running-board having a total capacity of 200 to 550 mmf. is to be used, it will be necessary to reduce the value of the antenna coupling capacitor C-2 from .01 to approximately 200 mmf. (.0002). For even larger antennas such as insulated steel tops, a correspondingly smaller value of C-2 (approximately 125 to 150 mmf.) should be used keeping in mind to use the largest value possible with which the antenna circuit can be aligned.

**M60**

The antenna circuit is designed to work with an antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If an antenna having a larger capacity is to be used, it will be necessary to add a capacitor in series with the lead from antenna filter L-1 to the antenna coil terminal ("A"). Where a "Double Under the Running Board" type of antenna is to be used having a capacity of approximately 200 mmf. the capacitor added should be approximately 300 mmf. The insulated running board type having an approximate capacity of 550 mmf. will require a capacitor of approximately 200 mmf. Cars using an insulated steel top of approximately 3,500 mmf. will require a series capacitor of 150 mmf.

**M50 M60**

After installation, and with antenna connected, tune in a weak station near 1,400 kc and adjust compensator trimmer (C-3) for maximum signal output. This trimmer is accessible by prying off the nameplate between the control knobs.

## Antenna Filter

A filter is included in the antenna circuit. Being completely shielded, it prevents radiating ignition interference within the set. It also reduces the possibility of picking up vibrator interference. The filter unit is mounted inside a steel shell which in turn is welded to the chassis. The shielded antenna lead-in makes contact with the filter unit within the steel shell and is held in place by a bayonet type connector.

# Push Button Tuning Mechanism

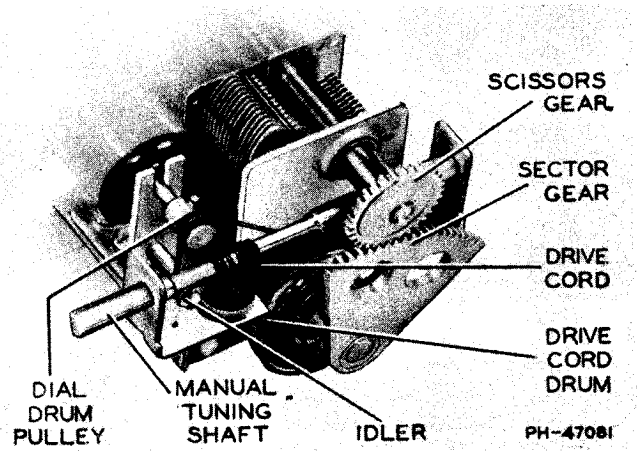
The push button tuning mechanism used in this receiver is of the mechanical type, wherein the movement of the button actually turns the tuning condenser to any pre-determined setting. The movement is actuated thru a Push-Arm, Cam, Rocker Plate and Sector Gear, which meshes with a Scissors Gear directly fastened to the tuning condenser shaft. The scissors gear prevents backlash between the sector gear and the tuning condenser. Since the sector gear is mounted directly on the rocker plate shaft, the position of the rocker plate will accurately determine the position of the tuning condenser.

## Setting Up Stations

The push buttons should be adjusted for five favorite stations after the receiver is installed and operating.

Any standard broadcast stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Loosen the push buttons one-half turn.
2. Using the tuning control, accurately tune in the first station.




*Tuning Mechanism*

3. With station accurately tuned in, press the first push button fully in and then gently release so as not to jar mechanism.
4. Tighten the push button securely with fingers. Do not force with pliers.
5. Proceed in same manner to adjust the other four push buttons.

## Adjustments

The mechanism should be adjusted so that when using either manual or push-button tuning, it operates positively and without backlash or bind. The following hints will be found helpful in adjusting the mechanism properly.

1. With the gang condenser in full mesh, the sector gear should have the two end teeth fully meshed in the scissor gear.
2. The position of the sector gear on the rocker-plate shaft should be adjusted so that there is clearance between the rocker-plates and the frame of the push-button mechanism at both extremities of gang rotation. Thus correct adjustment prevents the rotation of the gang being limited by the rocker plates touching the frame.
3. The drive cord should have 8½ turns around the tuning shaft as shown in the illustration. Three degrees of adjustment of the tension on the drive cord may be obtained by use of the three positions for connecting the drive-cord-tension spring to the drive-cord drum on the condenser shaft as shown.
4. The push-arms, rocker-plate shaft, and pulleys should be lubricated with light grease (sparingly). Care should be taken to keep the lubricant off the drive cord.

## Manual Tuning

A manual tuning knob is provided so that additional stations may be tuned in as desired. The manual tuning shaft is connected thru a cord drive to a drum on the rocker plate shaft. This same cord drives the dial drum by passing over a pulley on the drum shaft. A sketch shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and dial drum pulley. Stops are provided on the dial drum so that dial scale adjustment is made by tuning the set to the extreme ends of the band.

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Parts List, Drive Data — RCA MFG. CO., INC. — MODEL M50, Chas. RC-357J; MODEL M60, Chas. RC-357K

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES** | |
| | **MODEL M-50 (RC-357J)** | |
| 13002 | Capacitor—12 mmfd. (C1) | .35 |
| 31728 | Capacitor—37 mmfd. (C12) | .35 |
| 12405 | Capacitor—47 mmfd. (C16) | .30 |
| 12629 | Capacitor—56 mmfd. (C15) | .35 |
| 14262 | Capacitor—109 mmfd. (C14) | .30 |
| 13894 | Capacitor—390 mmfd. (C21) | .35 |
| 30673 | Capacitor—470 mmfd. (C18) | .25 |
| 34250 | Capacitor—490 mmfd. (C10) | .40 |
| 33584 | Capacitor—.005 mfd. (C19, C22) | .25 |
| 30626 | Capacitor—.0075 mfd. (C25) | .30 |
| 4937 | Capacitor—.01 mfd. (C2, C20) | .25 |
| 4870 | Capacitor—.025 mfd. (C9) | .20 |
| 30882 | Capacitor—.05 mfd. (C13) | .20 |
| 4839 | Capacitor—0.1 mfd. (C29) | .30 |
| 12741 | Capacitor—0.5 mfd. (C27) | .30 |
| 32240 | Capacitor—Electrolytic, 2 sections 10 mfd., and 1 section 20 mfd. (C23, C24, C31) | 1.45 |
| 31596 | Clip—Spring clip to hold oscillator coil | .02 |
| 31977 | Coil—Antenna filter (L1) | .45 |
| 31594 | Coil—Oscillator coil (L6, L7) | .75 |
| 31595 | Coil—Oscillator coil (L6, L7) | 1.35 |
| 11765 | Lamp—Dial lamp | .15 |
| 30641 | Lead—"A" lead | .30 |
| 30540 | Resistor—100 ohms, ½ watt (R15, R16) | .20 |
| 14561 | Resistor—220 ohms, ½ watt (R3) | .20 |
| 30499 | Resistor—470 ohms, ½ watt (R12) | .20 |
| 6134 | Resistor—1,200 ohms, 1 watt (R13) | .22 |
| 12695 | Resistor—15,000 ohms, ½ watt (R14) | .20 |
| 13669 | Resistor—22,000 ohms, 2 watts (R2) | .25 |
| 12266 | Resistor—39,000 ohms ½ watt (R7) | .20 |
| 12286 | Resistor—56,000 ohms, ½ watt (R4) | .20 |
| 14983 | Resistor—330,000 ohms, ½ watt (R10) | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt (R11) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R6) | .20 |
| 13601 | Resistor—10 meg., ½ watt (R9) | .20 |
| 3584 | Ring—R.F. coil retaining ring | .03 |
| 31639 | Socket—Dial lamp socket | .25 |
| 31319 | Socket—Tube socket | .25 |
| 13686 | Socket—Vibrator socket | .20 |
| 14261 | Transformer—First i-f transformer (L8, L9, C14, C15) | 2.05 |
| 30672 | Transformer—Second i-f transformer (L10, L11, C16, C18) | 2.10 |
| 31597 | Transformer—Vibrator power transformer (T1, L15, C26) | 4.85 |
| 13688 | Vibrator—Plug-in vibrator complete (L16) | 3.35 |
| 31637 | Volume control and power switch (R8, S1) | 1.50 |
| | **CHASSIS ASSEMBLIES** | |
| | **MODEL M-60 (RC-357K)** | |
| 13002 | Capacitor—12 mmfd. (C1) | .35 |
| 31729 | Capacitor—43.5 mmfd., temp. comp. (C12) | .35 |
| 30904 | Capacitor—100 mmfd. (C14, C15, C16, C17) | .25 |
| 13894 | Capacitor—390 mmfd. (C21) | .35 |
| 14497 | Capacitor—680 mmfd. (C30) | .40 |
| 33584 | Capacitor—.005 mfd. (C19, C22) | .25 |
| 30626 | Capacitor—.0075 mfd. (C25) | .30 |
| 14393 | Capacitor—.01 mfd. (C2) | .30 |
| 4937 | Capacitor—.01 mfd. (C20) | .25 |
| 32787 | Capacitor—.05 mfd. (C8, C9) | .20 |
| 30882 | Capacitor—.05 mfd. (C13) | .20 |
| 4839 | Capacitor—0.1 mfd. (C29) | .30 |
| 12741 | Capacitor—0.5 mfd. (C27) | .30 |
| 33803 | Capacitor—Electrolytic, 2 sections 10 mfd. each (C23, C24) | 1.05 |
| 32363 | Capacitor—470 mfd. (C10, C18) | .30 |
| 31596 | Clip—Spring clip to hold oscillator coil | .02 |
| 33664 | Coil—Antenna coil (L2, L3) | 1.35 |
| 31977 | Coil—Antenna filter (L1) | .45 |
| 31595 | Coil—Oscillator coil (L6, L7) | 1.35 |
| 31600 | Coil—R.F. coil—less shield (L4, L5) | 1.15 |
| 11765 | Lamp—Dial lamp | .15 |
| 30641 | Lead—"A" lead | .30 |
| 30540 | Resistor—100 ohms, ½ watt (R15, R16) | .20 |
| 13428 | Resistor—150 ohms, ½ watt (R3) | .20 |
| 30499 | Resistor—470 ohms, ½ watt (R12) | .20 |
| 6134 | Resistor—1,200 ohms, 1 watt (R13) | .22 |
| 12695 | Resistor—15,000 ohms, ½ watt (R14) | .20 |
| 13998 | Resistor—22,000 ohms, ½ watt (R2) | .20 |
| 13477 | Resistor—27,000 ohms, 1 watt (R5) | .22 |
| 12454 | Resistor—33,000 ohms, ½ watt (R7) | .20 |
| 12286 | Resistor—56,000 ohms, ½ watt (R4) | .20 |
| 14983 | Resistor—330,000 ohms, ½ watt (R10) | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt (R1, R11) | .20 |
| 12201 | Resistor—1.5 meg., ½ watt (R6) | .20 |
| 13601 | Resistor—10 meg., ½ watt (R9) | .20 |

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| 3584 | Ring—R.F. coil retaining ring | .03 |
| 31639 | Socket—Dial lamp socket | .25 |
| 31319 | Socket—Tube socket | .25 |
| 13686 | Socket—Vibrator socket | .20 |
| 30902 | Transformer—First i-f transformer (L8, L9, C14, C15) | 1.90 |
| 31593 | Transformer—Second i-f transformer (L10, L11, C16, C17) | 1.95 |
| 31597 | Transformer—Vibrator power transformer (T1, L15, C26) | 4.85 |
| 13688 | Vibrator—Plug-in vibrator complete (L16) | 3.35 |
| 31638 | Volume control and power switch (R8, S1) | 1.50 |
| | **MODELS M-50, M-60 SPEAKER ASSEMBLIES** | |
| | (Speaker 84391-1) | |
| 30782 | Cone—Speaker cone and voice coil (L12) | 1.20 |
| 30781 | Speaker—Complete | 4.40 |
| 30783 | Transformer—Output transformer (T2) | 1.45 |
| | (Speaker 84391-3) | |
| 31771 | Cone—Speaker cone and voice coil (L12) | 1.25 |
| 31770 | Speaker—Complete | 4.00 |
| 31772 | Transformer—Output transformer (T2) | 1.20 |
| | **MODEL M-60.** | |
| | **TUNING UNIT ASSEMBLIES** | |
| 33667 | Button—Push button | .20 |
| 31605 | Condenser—3-gang variable (C3, C4, C5, C6, C7, C11) | 3.60 |
| | **MODEL M-50** | |
| 33666 | Button—Push button | .15 |
| 31766 | Coil—Antenna coil—less shield (L2) | 1.05 |
| 31604 | Condenser—2-gang variable (C3, C4, C11) | 2.55 |
| | **MODELS M-50, M-60** | |
| 31614 | Cord—Variable condenser drive cord | .10 |
| 31725 | Drum—Indicator drum assembly | .40 |
| 31610 | Drum—Variable condenser drive cord drum | .40 |
| 31612 | Gear—Variable condenser drive gear sector—fastens on cam shaft | .60 |
| 33665 | Mechanism—Comprising 5 push arms, cams, cam plate, and mounting bracket assembled—less variable condenser | 7.00 |
| 31606 | Pulley—Indicator drum pulley | .20 |
| 31607 | Pulley—Pulley for indicator drum bracket | .10 |
| 13471 | Ring—Retaining ring for antenna coil | .03 |
| 4389 | Screw—No. 6-32 x 3/16-in. set screw for pulley, Stock No. 31606 | .03 |
| 31613 | Screw—No. 8-32 x ¼-in. set screw for gear, Stock No. 31612 | .02 |
| 31611 | Screw—No. 8-32 x ¼-in. set screw for drum, Stock No. 31610 | .02 |
| 31609 | Shaft—Station selector knob shaft | .20 |
| 31615 | Spring—Variable condenser drive cord tension spring | .02 |
| 30585 | Spring—Push button arm tension spring | .06 |
| 2917 | Washer—"C" washer to hold knob shaft | .03 |
| 31608 | Washer—"C" washer to hold pulley, Stock No. 31607 | .01 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 4289 | Body—Fuse holder body for ammeter lead | .03 |
| 5025 | Capacitor—Generator capacitor | .45 |
| 33668 | Case—Receiver case only | 5.30 |
| 4291 | Clip—Spring clip for amateur lead | .06 |
| 31456 | Covers—8-protective celluloid covers for call letter markers | .08 |
| 33670 | Dial—Dial scale and holder | .60 |
| 4286 | Ferrule—Bushing and ferrule for fuse holder | .03 |
| 5023 | Fuse—15 amp. | .08 |
| 4290 | Insulator—Insulating sleeve for fuse holder | .02 |
| 7786 | Lead—Ammeter lead complete with clip and fuse holder | .40 |
| 31589 | Markers—One set call letter markers for push buttons | .35 |
| 33669 | Mounting—Complete set mounting brackets, strap, washers, screws, bolts, and nuts | .85 |
| 31660 | Plate—Name plate | .40 |
| 31646 | Spring—Retaining spring for knobs | .02 |
| 4284 | Spring—Spring for fuse holder | .03 |
| 5024 | Suppressor—Distributor suppressor | .40 |
| 4285 | Washer—Insulating washer for fuse holder | .02 |

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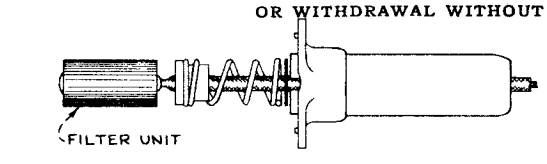
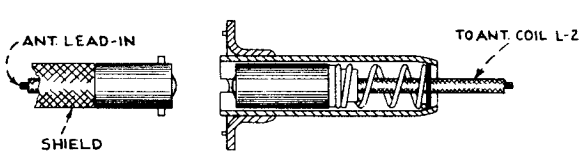
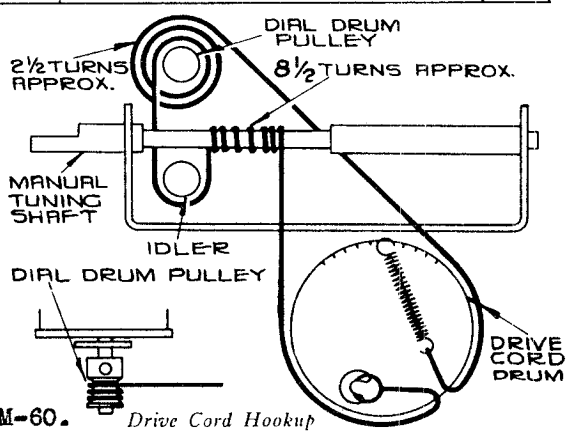



*Antenna Filter*




*Drive Cord Hookup*

**MODELS M-50, M-60.**

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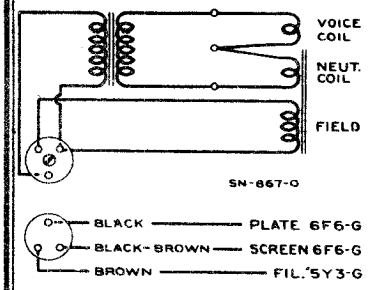
MODEL U50, Chas. RC-414C

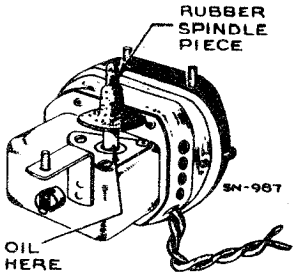
# RCA MFG. CO., INC.

Switch Mechanism, Parts

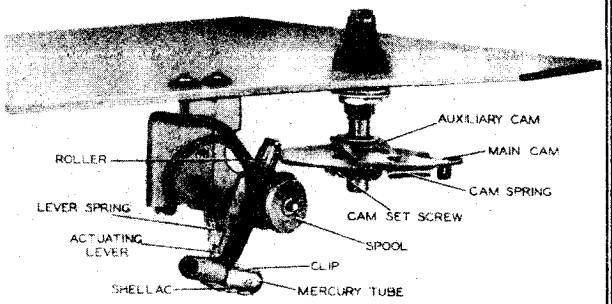
Speaker Connections




*Connections and Colors of Speaker and Cable*




*Phonograph Motor*




*Switch Mechanism*
(Shown with pickup in rest position)

## Replacement Parts

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES (RC—414—C)** | |
| 32834 | Bracket—Drive bracket and 1 pulley assembled | .25 |
| 33411 | Bracket—Drive bracket and 3 pulleys assembled | .65 |
| 12581 | Cap—Top shield cap for i-f transformer | .25 |
| 32830 | Capacitor—2-gang trimmer, 2-20 mmfd. each section (C26, C27) | .40 |
| 32829 | Capacitor—3-gang trimmer, 5-60 mmfd. each section (C5, C6, C8) | .55 |
| 12723 | Capacitor—56 mmfd. (C4) | .35 |
| 30949 | Capacitor—56 mmfd. (C14, C15) | .25 |
| 14262 | Capacitor—109 mmfd. (C12, C13) | .30 |
| 32238 | Capacitor—110 mmfd. (C18) | .30 |
| 30232 | Capacitor—220 mmfd. (C3) | .35 |
| 12952 | Capacitor—330 mmfd. (C19) | .35 |
| 13894 | Capacitor—390 mmfd. (C33) | .35 |
| 12537 | Capacitor—560 mmfd. (C9, C34) | .35 |
| 31403 | Capacitor—3300 mmfd. (C7) | .60 |
| 31405 | Capacitor—6000 mmfd. (C10) | .75 |
| 33584 | Capacitor—.005 mfd. (C30) | .25 |
| 4838 | Capacitor—.005 mfd. (C20, C21, C29) | .25 |
| 14393 | Capacitor—.01 mfd. (C16) | .30 |
| 11315 | Capacitor—.015 mfd. (C31, C32) | .20 |
| 4870 | Capacitor—.025 mfd. (C22) | .20 |
| 4839 | Capacitor—0.1 mfd. (C17) | .30 |
| 32240 | Capacitor—Electrolytic, 2 sections 10 mfd., 400 V., and one section 20 mfd., 25 V. (C23, C24, C25) | 1.45 |
| 32821 | Coil—Antenna coil (L1, L2, L3, L4) | 1.35 |
| 32824 | Coil—Oscillator coil (L5, L6, L7) | 1.00 |
| 32817 | Condenser—2-gang variable tuning (C1, C2, C11) | 2.60 |
| 33409 | Control—Volume control, tone control, and power switch (R6, R9, S1) | 3.00 |
| 32713 | Core—Adjustable core and stud for oscillator coil | .35 |
| 32835 | Drum—Drive cord drum with set screw | .55 |
| 11891 | Lamp—Dial lamp—Mazda No. 44 | .17 |
| 30868 | Plug—2-contact female motor cable plug | .35 |
| 5119 | Plug—3-contact female speaker cable plug | .25 |
| 13988 | Resistor—10 ohms, ½ watt (R12) | .20 |
| 30681 | Resistor—470 ohms, 1 watt (R10) | .22 |
| 3078 | Resistor—10,000 ohms, ½ watt (R13) | .20 |
| 31389 | Resistor—12,000 ohms, 3½ watts (R3) | .50 |
| 13998 | Resistor—22,000 ohms, ½ watt (R15) | .20 |
| 12454 | Resistor—33,000 ohms, ½ watt (R2) | .20 |
| 12266 | Resistor—39,000 ohms, ½ watt (R14) | .20 |
| 5132 | Resistor—47,000 ohms, 1/10 watt (R5) | .15 |
| 12285 | Resistor—470,000 ohms, ½ watt (R7) | .20 |
| 13730 | Resistor—1 meg., ½ watt (R1) | .20 |
| 11668 | Resistor—5.6 meg., ½ watt (R4) | .20 |
| 13601 | Resistor—10 meg., ½ watt (R8) | .20 |
| 14343 | Retainer—Retaining ring to hold tuning knob shaft | .03 |
| 32848 | Screw—No. 8-32 square head set screw for drum | .03 |
| 33412 | Shaft—Tuning knob shaft | .20 |
| 31365 | Socket—Dial lamp socket (insulated) | .30 |
| 31251 | Socket—Octal base tube socket | .25 |
| 31418 | Spring—Drive cord tension spring | .05 |
| 33413 | Switch—Radio-Record switch (S4) | .75 |
| 33410 | Switch—Range switch (S2, S3) | 1.00 |
| 14376 | Transformer—First i-f transformer (L8, L9, C12, C13) | 2.45 |
| 32825 | Transformer—Second i-f transformer (L10, L11, C14, C15, C18, R5) | 2.50 |
| 33112 | Transformer—Power transformer 105-125 volts, 50-60 cycle (T1) | 4.30 |
| | **PICKUP AND ARM ASSEMBLIES** | |
| 33216 | Arm—Pickup arm—less crystal, needle screw, and cable | 2.20 |
| 33218 | Base—Pickup arm mounting base and pivot shaft | 1.00 |
| 33217 | Crystal—Pickup crystal cartridge and needle screw | 3.75 |
| 33114 | Damper—Viscoloid damper for pickup armature | .15 |
| 31160 | Screw—Pickup needle screw | .12 |
| | **MOTOR ASSEMBLIES** | |
| 32650 | Field—Motor field coils and laminations, 110 volts, 50 cycle | 5.10 |
| 32336 | Field—Motor field coils and laminations, 110 volts, 60 cycle | 5.10 |
| 33220 | Motor—105-125 volts, 50 cycles—less mounting plate (M1) | 11.25 |
| 33219 | Motor—105-125 volts, 60 cycles—less mounting plate (M1) | 10.75 |
| 33361 | Shaft—Turntable spindle shaft and gear—50 cycle | 1.40 |
| 33360 | Shaft—Turntable spindle shaft and gear—60 cycle | 1.40 |
| | **AUTOMATIC SWITCH ASSEMBLIES** | |
| 33221 | Cam—Cam assembly comprising main and auxiliary cams, hub, and set screws | .65 |
| 32864 | Lever—Actuating lever with roller and mercury tube clip | .45 |
| 14195 | Screw—No. 10-32 x 5/16 cone pointed set screw for cam hub | .05 |
| 32869 | Screw—No. 10-32 x 5/16 set screw for cam hub | .01 |
| 32868 | Spring—Actuating lever tension spring | .05 |
| 32867 | Spring—Cam tension spring | .05 |
| 32865 | Support—Switch support and terminal board | .40 |
| 32866 | Switch—Mercury tube with leads (S5) | 1.75 |
| 31608 | Washer—"C" washer for actuating lever shaft | .01 |
| | **SPEAKER ASSEMBLIES (84604-1)** | |
| 33406 | Cone—Speaker cone and voice coil (L14) | 2.10 |
| 5118 | Plug—3-contact male for speaker | .25 |
| 33222 | Speaker complete | 6.65 |
| 33407 | Transformer—Output transformer (T2) | 2.00 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 10290 | Cap—Ventilating cap | .25 |
| 31464 | Damper—Damper plate and rubber sleeve for spindle | .30 |
| 32837 | Dial—Dial scale (glass) | .65 |
| 33415 | Escutcheon—Dial scale escutcheon | .80 |
| 11771 | Foot—Cabinet foot | .02 |
| 33416 | Frame—Dial frame, support, color plate, and mounting brackets—less pointer and carriage, and dial scale | 1.40 |
| 32633 | Handle—Carrying handle | .90 |
| 13085 | Hinge—Cabinet lid hinge | .22 |
| 11865 | Holder—Needle cord holder | .30 |
| 33417 | Indicator—Dial scale pointer and carriage | .35 |
| 33468 | Knob—Radio-Record switch knob | .15 |
| 33506 | Knob—Range switch knob (small) | .25 |
| 33470 | Knob—Tone control and switch knob (small dual) | .20 |
| 33505 | Knob—Tuning knob (large) | .30 |
| 33471 | Knob—Volume control knob (large dual) | .25 |
| 33223 | Mounting—Complete set motor mounting screws, washers, and spacers | .30 |
| 31054 | Mounting—Pickup arm mounting cushion, washers, and nut | .15 |
| 30870 | Plug—2-contact male for motor leads | .35 |
| 31048 | Plug—2-contact male plug for phono. cable | .15 |
| 32846 | Rod—Indicator slide rod | .25 |
| 33418 | Spring—Indicator tension spring | .02 |
| 30330 | Spring—Retaining spring for tone control knob | .03 |
| 4982 | Spring—Retaining spring for tuning knob | .05 |
| 14270 | Spring—Retaining spring for volume control, range switch, or radio-record switch knob | .05 |
| 33364 | Support—Cabinet lid support (LH) | .50 |
| 33673 | Support—Pickup arm support | .25 |
| 33414 | Turntable | 1.55 |

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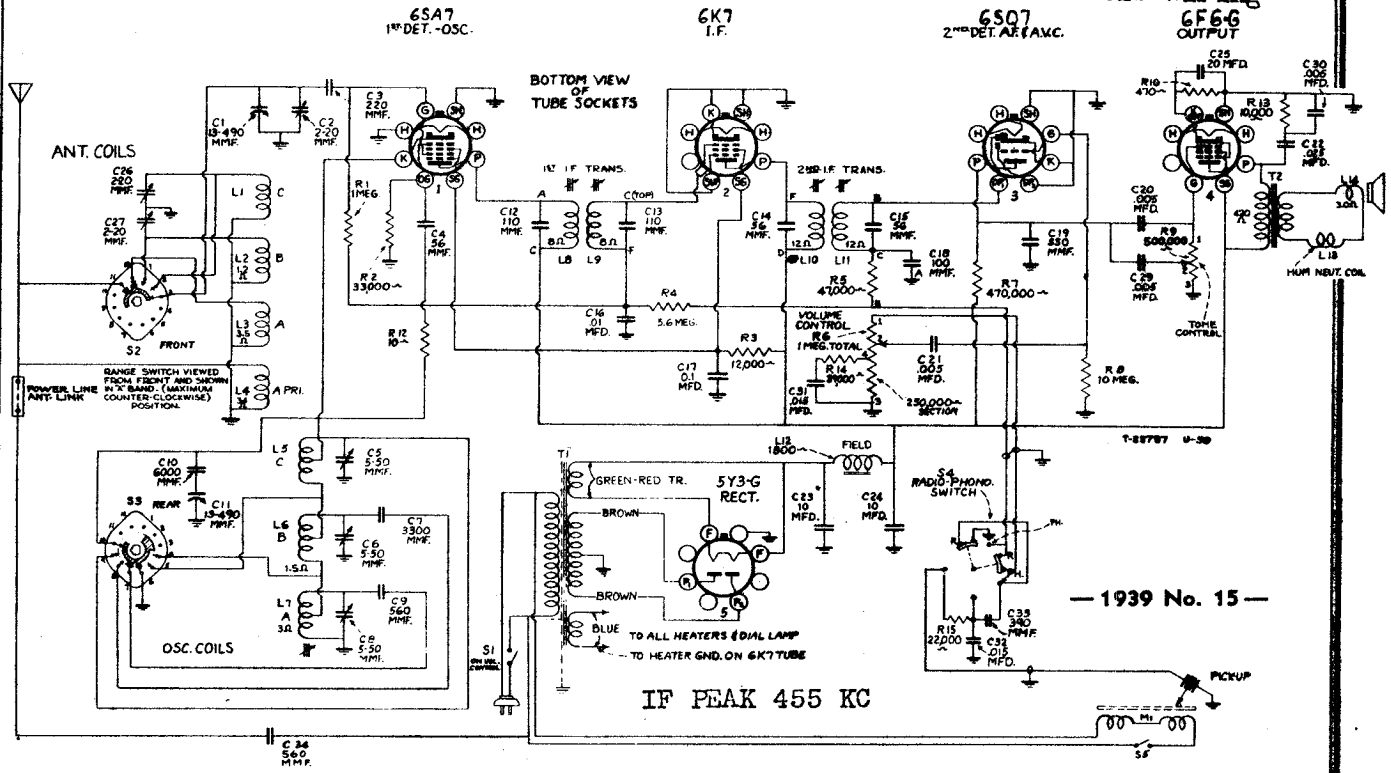
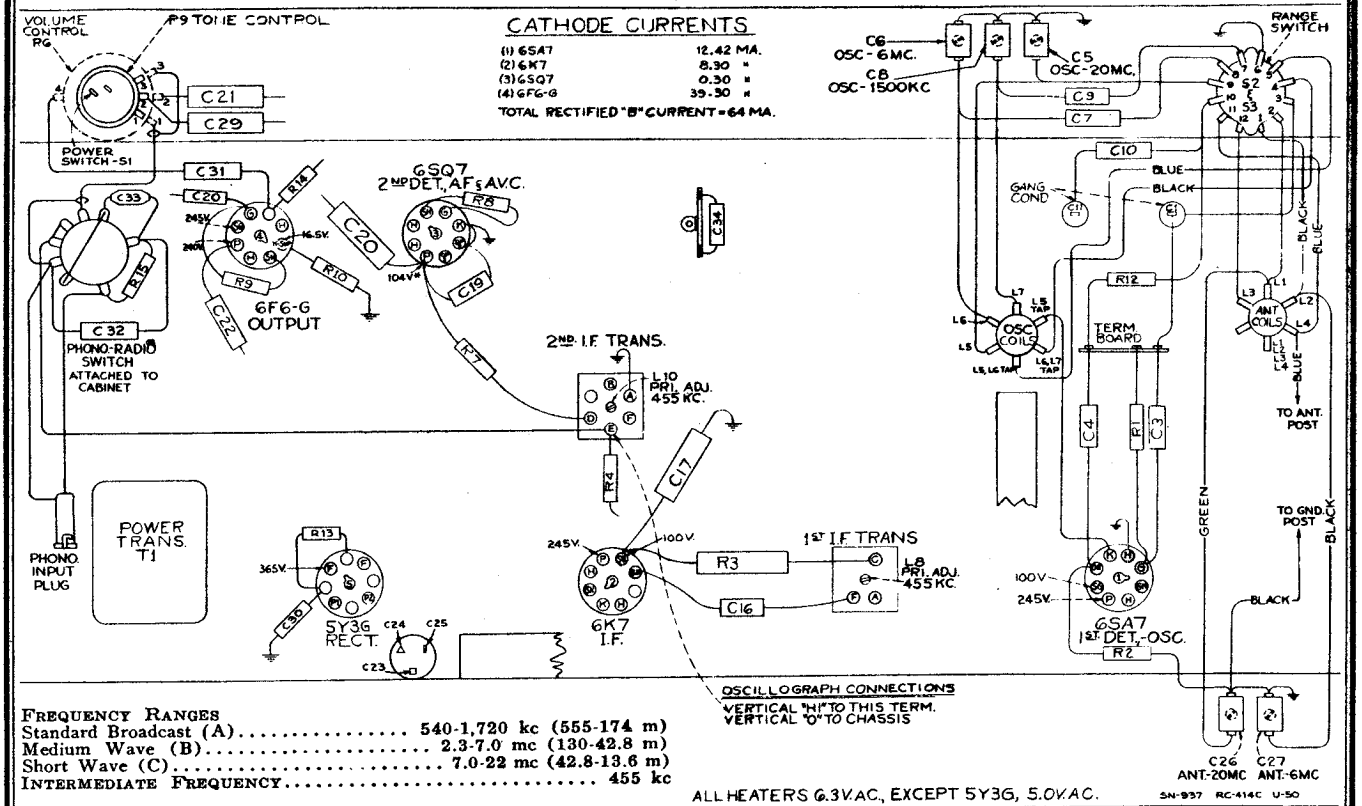
# RCA MFG. CO., INC.

## MODEL U50, Chas. RC-414C
## Schematic, Voltage
## R-F Chassis Wiring




**FREQUENCY RANGES**

| | |
|---|---|
| Standard Broadcast (A) | 540-1,720 kc (555-174 m) |
| Medium Wave (B) | 2.3-7.0 mc (130-42.8 m) |
| Short Wave (C) | 7.0-22 mc (42.8-13.6 m) |
| INTERMEDIATE FREQUENCY | 455 kc |

BOTTOM VIEW - REAR OF CHASSIS

First Edition

*R-F Wiring Diagram and Socket Voltages*

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ± 20% with 117-volt a-c supply.

***NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

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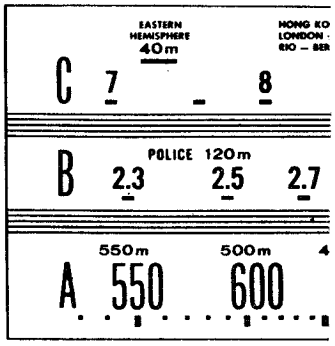
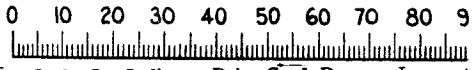
MODEL U50, Chas. RC-414C
Socket, Trimmers, Dial Data
Alignment, Phono, Data

# RCA MFG. CO., INC.

*Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales*

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 33° on the calibration scale corresponds to approximately 7.9 mc on "C" band, and 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."




**Calibration Scale On Indicator-Drive-Cord Drum.**—In most cases it will not be necessary to remove the chassis from the dial scale for alignment, allowing the dial scale to be used for calibration. However, if alignment is made with the receiver chassis removed, the calibration scale attached to the rear of the drum which is mounted on the front shaft of the gang condenser must be used. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 135° mark on the drum scale must be vertical, and directly under the center of the gang-condenser shaft when the plates are fully meshed. The drum is held in place by one set-screw, which must be securely tightened when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the 0° mark on the calibration scale when the plates are fully meshed.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

**Tube Complement**

(1) RCA-6SA7..... First Detector-Oscillator
(2) RCA-6K7..... I-F Amplifier
(3) RCA-6SQ7..... Second Det., A.V.C., and A-F Amplifier
(4) RCA-6F6-G..... Power Output
(5) RCA-5Y3-G..... Rectifier

**Pilot Lamp (1).....**
Mazda No. 44, 6.3 volts, 0.25 amp.

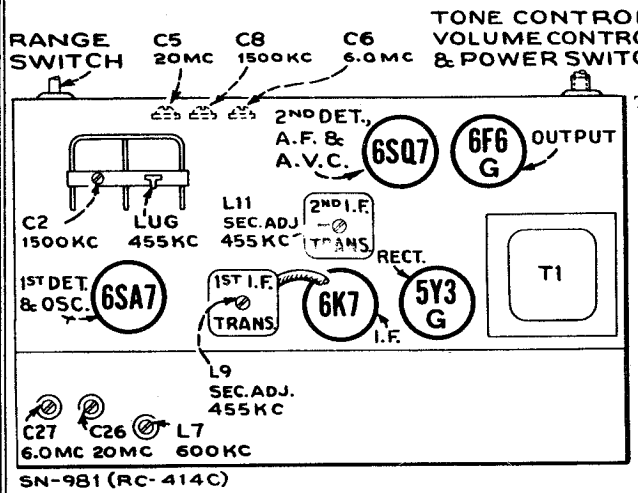
**Power Output Rating**
Undistorted..... 2.0 watts
Maximum..... 3.6 watts

**Power Supply Ratings**
Rating A.. 105-125 volts, 50-60 cycles, 105 watts

**Loudspeaker (84604-1)**
Type..... 8-inch electrodynamic
Voice Coil Impedance.. 3.3 ohms at 400 cycles

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | "A" Band quiet point between 550-750 kc | L10 and L11 (2nd I.F. trans.) |
| 2 | Tuning condenser stator (osc.) in series with .01 mfd. ** | 455 kc | | L8 and L9 (1st I.F. trans.) |
| 3 | Antenna lead in series with 200 mmfd. | 600 kc | 600 kc (33°) "A" Band | L7† |
| 4 | | 1,500 kc | 1,500 kc (152.4°) "A" Band | C2 (ant.) C8 (osc.) |
| 5 | Repeat steps 3 and 4 | | | |
| 6 | Antenna lead in series with 400 ohms | 20 mc | 20 mc (155.4°) "C" Band | C5 (osc.) * C26 (ant.) |
| 7 | | 6 mc | 6 mc (149°) "B" Band | C6 (osc.) * C27 (ant.) |
| 8 | Antenna lead in series with 200 mmf. | 1,500 kc | 1,500 kc (152.4°) "A" Band | C8 (osc.) |

* Use minimum capacity peak if two peaks can be obtained
† Rock gang condenser slightly while adjusting L7.
** Make test-oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.
**Note.**—Oscillator tracks 455 kc above signal on all bands.




SN-981 (RC-414C)

**Phonograph Mechanism:**

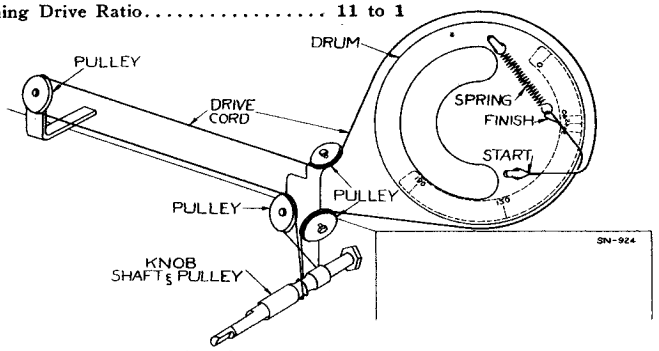
**The phonograph motor** is a self-starting, constant-speed induction type. It should be lubricated every six months by applying a few drops of light machine oil to the spindle bearing and oil hole.

**The motor spindle** is tapered, and a conical rubber piece fits snugly on the spindle. The hole in the turntable bushing is tapered to fit the rubber. This provides an excellent self-centering floating mounting.

**A metal washer** is placed on the spindle under the rubber piece. The washer has ears on the under side which fit over a pin that projects through the spindle.

**The motor switch** is automatic for both starting and stopping, and when properly adjusted, will turn the motor on as the pickup is moved from the pickup rest toward the turntable. The switch should be adjusted so that it will snap into the "off" position when the pickup needle is 1⅞ inches from the center line of the spindle

Tuning Drive Ratio..... 11 to 1




*Arrangement of Drive Cord for Tuning Condenser and Dial Indicator. Drum Shown with Gang at Maximum Capacity*

shaft. The motor may be shut off at any time by placing the pickup on the pickup rest.

**Power-Line Antenna:**

At the back of the motorboard is a terminal board for antenna and ground connections. When it is desired to use the power line antenna, a jumper should be placed across the two outside binding-posts, thus connecting the antenna input of the receiver through a capacitor to the power line. The center binding-post is for the ground connection. When an external antenna is used, it should be connected to the post marked "ANT"

**Precautionary Lead Dress:**

1. Lead from 2nd I-F transformer to volume control should be kept close to the chassis and dressed against front apron.
2. C-10 should be dressed away from the antenna section of the variable condenser (C-1).

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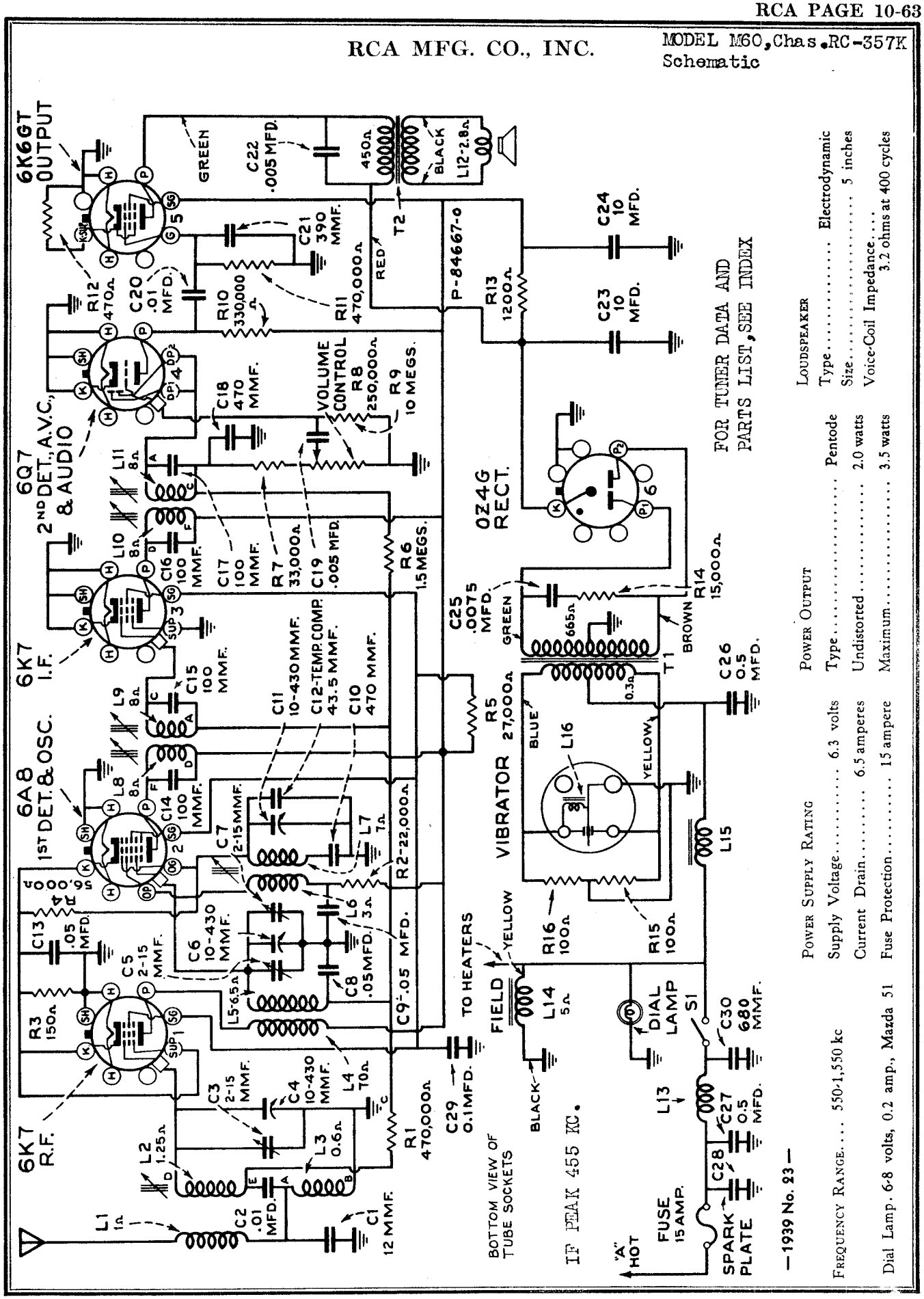
# RCA MFG. CO., INC.

MODEL M60, Chas. RC-357K
Schematic

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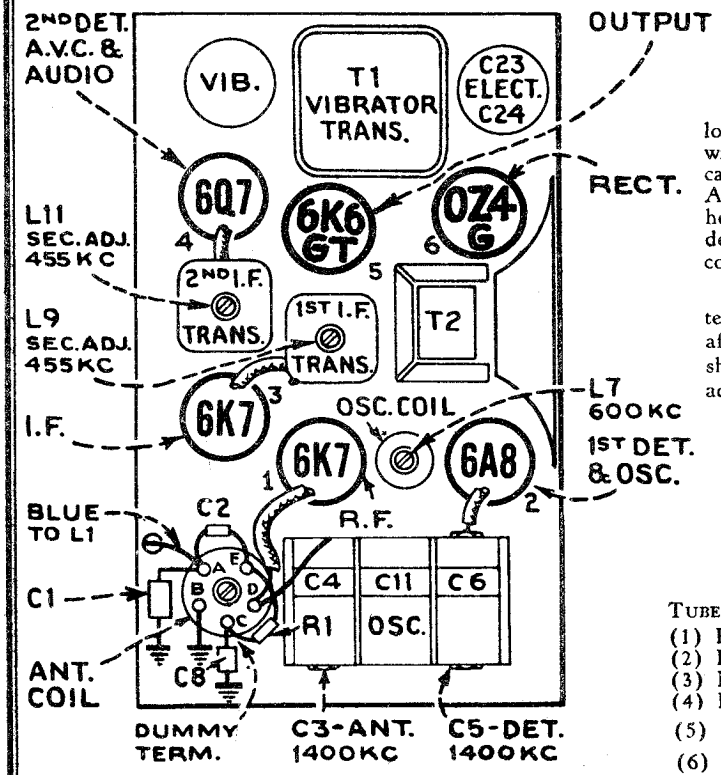
MODEL M60, Chas. RC-357K
Chassis Wiring, Socket
Trimmers
Voltage

# RCA MFG. CO., INC.




*Top View of Chassis*

## General Description

Model M60 is a six-tube superheterodyne receiver with loudspeaker and radio chassis in the same case. It is equipped with five push buttons, for tuning your five favorite broadcast stations, as well as the standard method of dial tuning. Adjustments for push button tuning are explained under the heading "Push Button Tuning Mechanism." The receiver is designed to be mounted under the dash panel. The operating controls are integral with the radio and speaker case.

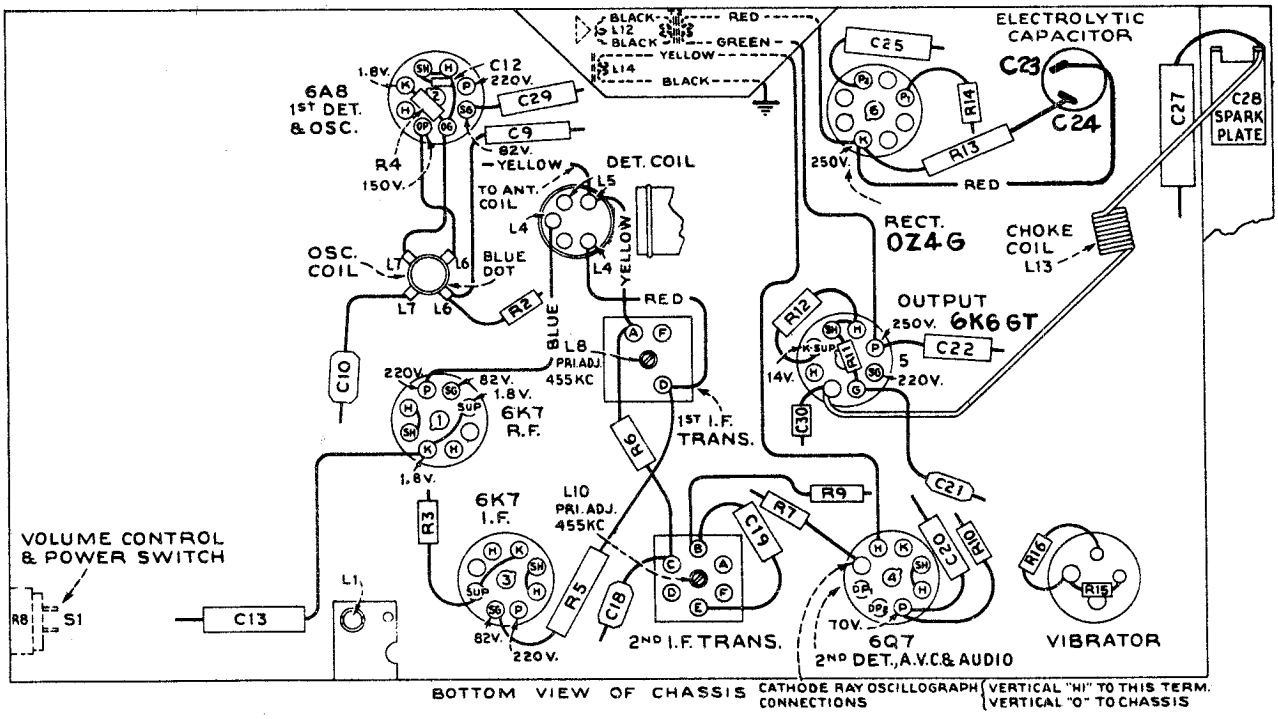
**Loudspeaker.**—The loudspeaker voice coil should be centered in the usual manner with three narrow paper feelers, after first removing the front dust cover. The dust cover should be cemented back in place with ambroid cement after adjustment has been completed.

ALIGNMENT FREQUENCIES

| | |
|---|---|
| I-F | 455 kc |
| Antenna | 1,400 kc |
| R-F | 1,400 kc |
| Oscillator | 600 kc |

TUBES AND FUNCTIONS

(1) RCA-6K7 ..... R-F Amplifier
(2) RCA-6A8 ..... First Detector—Oscillator
(3) RCA-6K7 ..... I-F Amplifier
(4) RCA-6Q7 .. Second Detector, A-F Amplifier and A.V.C.
(5) RCA-6K6GT ..... Output
(6) RCA-0Z4G ..... Rectifier




*Bottom View of Parts and Socket Voltages*

(Measured at 6.3 volts battery supply—Volume control minimum—No signal input—)

To duplicate the conditions under which the above voltages were measured requires a 1,000-ohm-per-volt d-c meter having ranges of 10, 50, 250, and 500 volts. Use the nearest range above the indicated voltage value. Each value should hold within ± 20% when the receiver is normally operative at its rated battery voltage.

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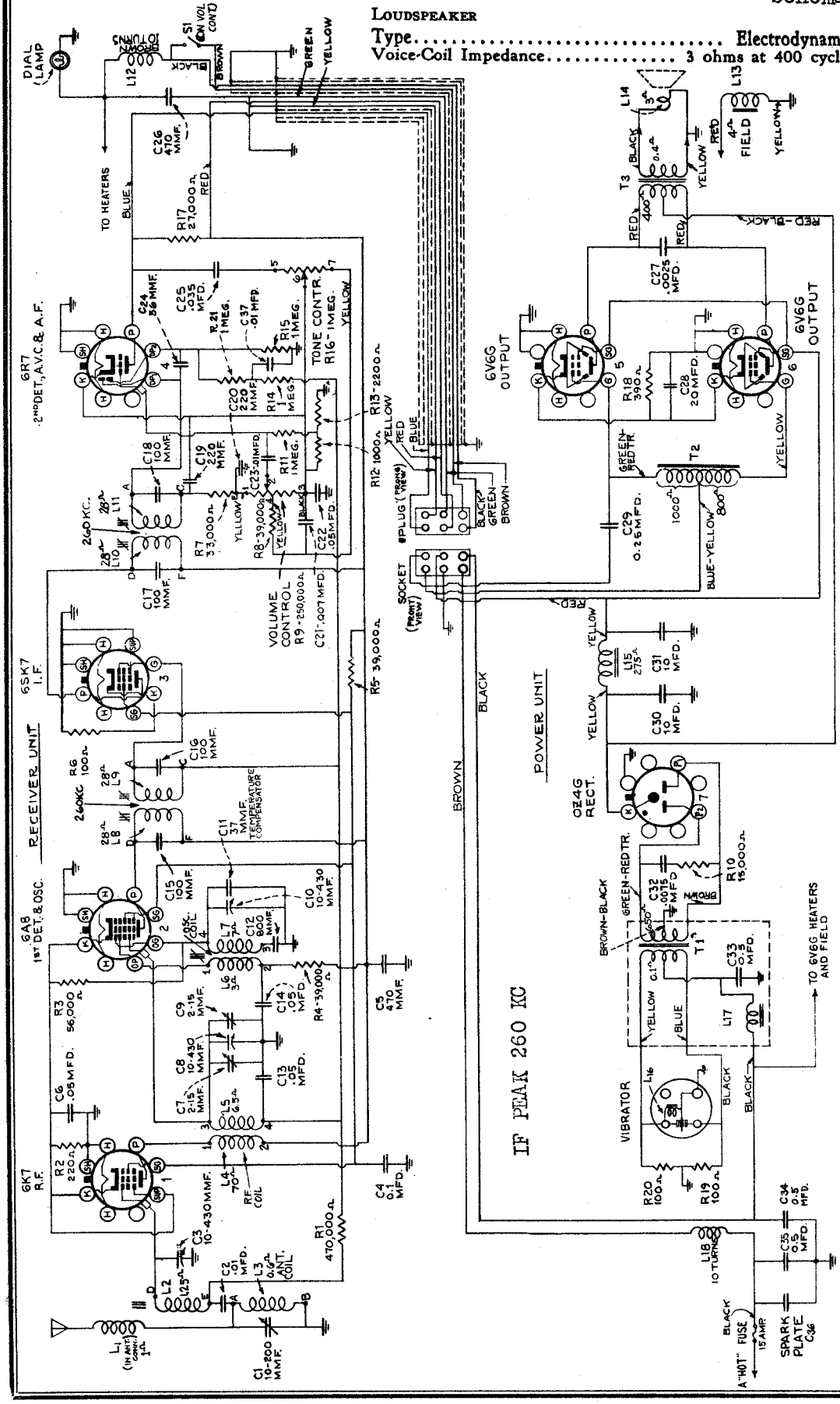
# RCA MFG. CO., INC.

MODEL M70, Chas. RC-394
Schematic

**LOUDSPEAKER**

Type..... Electrodynamic
Voice-Coil Impedance..... 3 ohms at 400 cycles




## Automobile Receiver
—1939 No. 12—

## MODEL M-70

Chassis No. RC-394

Model M-70 consists of a 7-tube, superheterodyne automobile receiver and an eight-inch electrodynamic loudspeaker built in two separately housed components. A small tuning unit for mounting under the instrument panel contains four tubes, while the cylindrical loudspeaker housing for firewall mounting contains three tubes. Design features include an R-F amplifier stage; antenna filter and antenna trimmers; magnetite core antenna, oscillator and I-F transformers; delayed automatic volume control; combined high- and low-frequency tone control; compensated volume control; true tone fidelity; five push button tuning; full-vision, edge-lighted glass dial; illuminated station call letters and a push-pull beam power output stage.

**POWER SUPPLY RATING**

Supply Voltage ..... 6.3 volts
Current Drain ..... 8.7 amperes
Fuse Protection ..... 15 ampere

**TUNING RANGE** .... 530 to 1,550 kc

**PILOT LAMP**... Mazda No. 51, 6-8 volts, 0.2 ampere

**INTERMEDIATE FREQUENCY**... 260 kc

**POWER OUTPUT RATINGS**

Maximum..... 8 watts
Undistorted..... 6 watts

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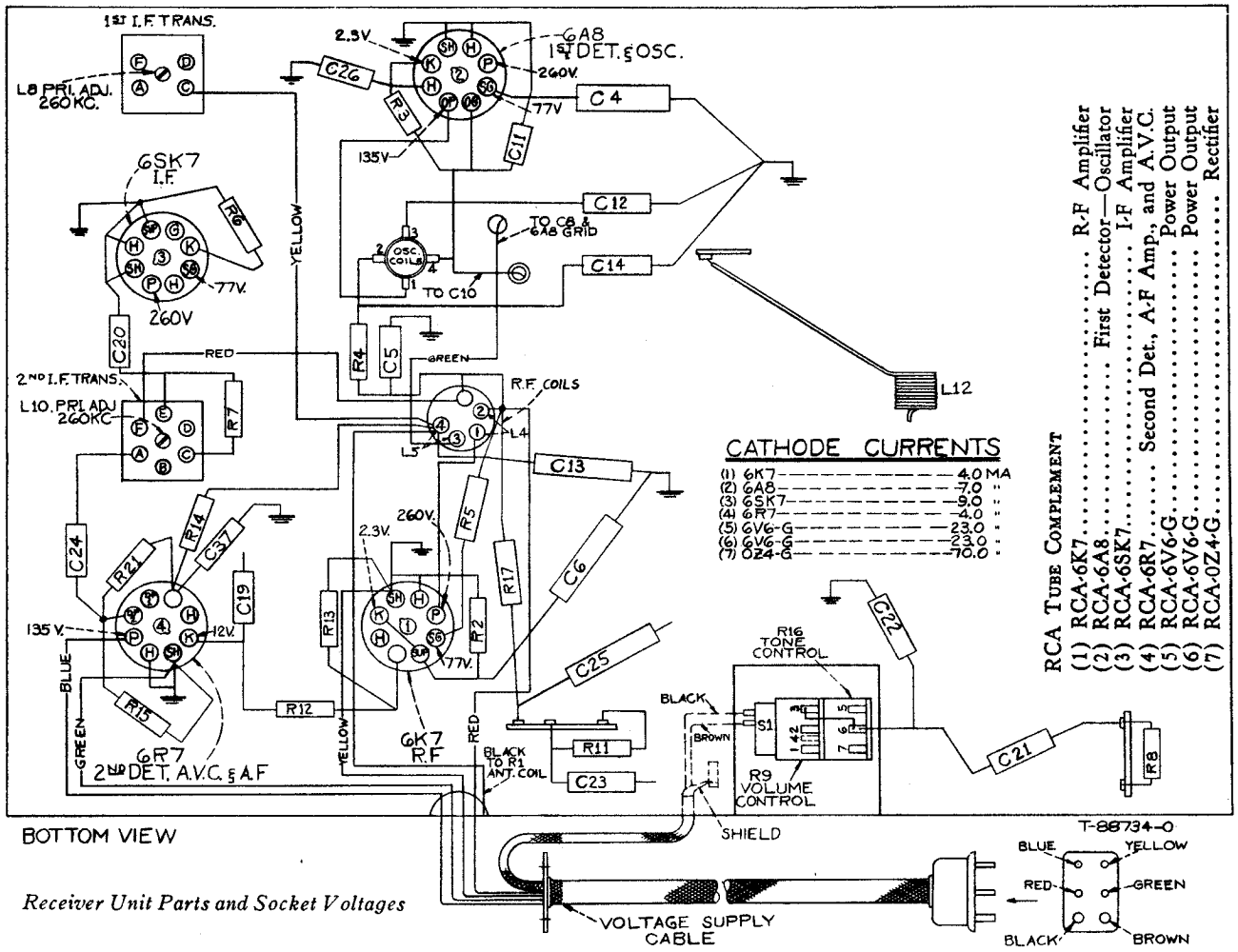
MODEL M70, Chas. RC-394
Voltage, Chassis Wiring
Tuner Data

RCA MFG. CO., INC.




*Receiver Unit Parts and Socket Voltages*

RECEIVER CASE DIMENSIONS ..... Height, 2½ inches; Width, 5⅞ inches; Depth, 9¼ inches

SPEAKER CASE DIMENSIONS ..... Diameter, 9½ inches; Depth, 5 inches

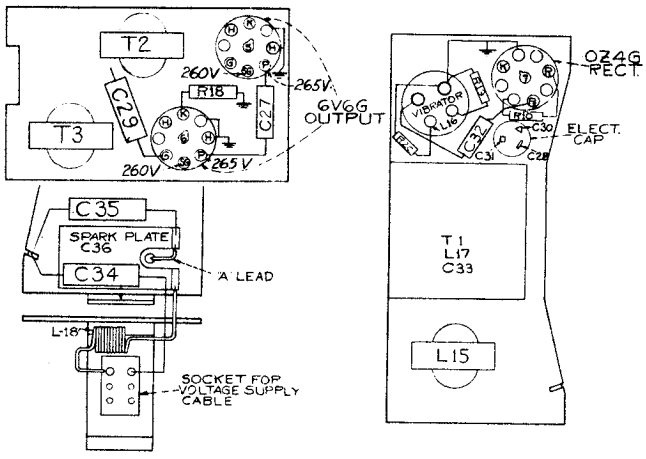
OPERATING CONTROLS ..... (Left)—(Plastic Knob) Power-Volume; (Wing Knob) Tone; (Center)—Five Station Push Buttons; (Right)—Manual Tuning; Ratio 7½ - 1.

WEIGHT ..... Net, 20 pounds; Shipping, 22 pounds

## Adjustment of Push-Button Mechanism

The mechanism should be adjusted so that when using either manual or push-button tuning, it operates positively and without backlash or bind. The following hints will be found helpful in adjusting the mechanism properly.

1. With the gang condenser in full mesh, the sector gear should have the two end teeth fully meshed in the scissor gear, as shown in the illustration.
2. The position of the sector gear on the rocker-plate shaft should be adjusted so that there is clearance between the rocker-plates and the frame of the push-button mechanism at both extremities of gang rotation. Thus correct adjustment prevents the rotation of the gang being limited by the rocker plates touching the frame.
3. The drive cord should have 6½ turns around the tuning shaft as shown in the illustration. Three degrees of adjustment of the tension on the drive cord may be obtained by use of the three positions for connecting the drive-cord-tension spring to the drive-cord drum on the condenser shaft as shown.
4. The push-arms, rocker-plate shaft, and pulleys should be lubricated with light grease (sparingly). Care should be taken to keep the lubricant off of the drive cord.




*Power Unit Parts and Socket Voltages*

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# Alignment Procedure

**Test Oscillator.**—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the output signal as low as possible to avoid a-v-c action.

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are as follows: Vertical "H1" to terminal "C" on 2nd I-F transformer; vertical "0" to chassis.

**Output Meter.** — Connect the output meter across the speaker voice-coil and turn the receiver volume control to maximum (fully clockwise) and tone control to middle of range.

**Dial Calibration.**—Rotate the gang condenser to its full-mesh (maximum-capacity) position and then adjust dial scale so that the pointer is aligned to the last calibration mark at the low-frequency end of the scale.

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6SK7 I-F grid (No. 4 pin) in series with .01 mfd. | 260 kc | No Signal 550-750 kc | L10 and L11 (2nd I-F Trans.) |
| 2 | 6A8 Det. grid cap in series with .01 mfd. | 260 kc | | L8 and L9 (1st I-F Trans.) |
| 3 † | * Ant. connector in series with 60 mmfd. | 600 kc | 600 kc | L7 (osc.) |
| 4 † | * Ant. connector in series with 60 mmfd. | 1,400 kc | 1,400 kc signal | C7 (det.) C1 (ant.) |
| 5 † | * Ant. connector in series with 60 mmfd. | 600 kc | 600 kc (rock) | L7 (osc.) |
| 6 † | * Ant. connector in series with 60 mmfd. | 1,400 kc | 1,400 kc signal | C7 (det.) C1 (ant.)** |

* **Note 1.**—This 60 mmfd. capacitor must be inserted at the antenna connector of the receiver. The lead from the test oscillator to the 60 mmfd capacitor may be shielded if desired, but no shielding should be used between capacitor and antenna connector.

† **Note 2.**—These adjustments should be made with unit enclosed in its shielded case, through holes provided for adjustment purposes.

** **Note 3.**—Final adjustment of C1 must be made after the receiver has been installed and the antenna connected. See "Antenna Circuit."

## Antenna Circuit

**It is very important that these instructions be followed when installing the M-70 receiver.**

The antenna circuit is designed to work with an antenna having a total capacity including the shielded lead-in not to exceed 150 mmf. If an antenna having a larger capacity is to be used, it will be necessary to add a capacitor in series with the lead from the antenna filter L-1 to the antenna coil terminal ("A"). Where a "Double Under the Running Board" type of antenna is to be used having a capacity of approximately 200 mmf., the capacitor added should be approximately 500 mmf. The insulated running board type having an approximate capacity of 550 mmf. will require a capacitor of approximately 150 mmf. Cars using an insulated steel top of approximately 3,500 mmf will require a series capacitor of 150 mmf.

After installation and with antenna connected, tune in a weak station near 1,400 kc and adjust compensator trimmer C-1 for maximum signal output. This trimmer is accessible by removing plug button near antenna jack on top of receiver. If a maximum (peak) signal output cannot be obtained in the range of the antenna trimmer, the effective capacity should be checked and compensated for by varying series capacity as described above.

## Loudspeaker

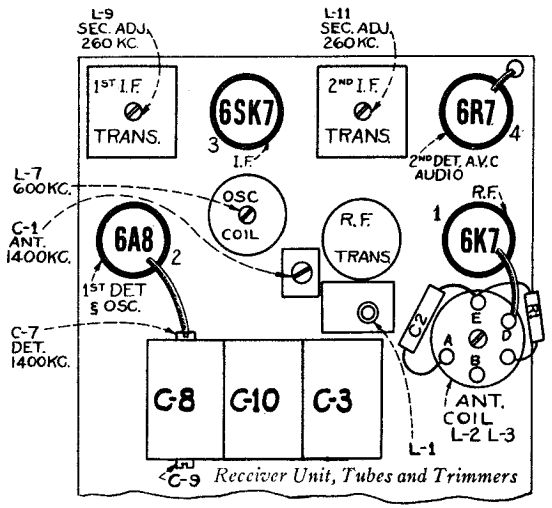
The loudspeaker cone may be centered in the usual manner with three celluloid or paper feelers after gently cutting away the front dust cover. A new cover should be cemented in place upon completion of the adjustment.

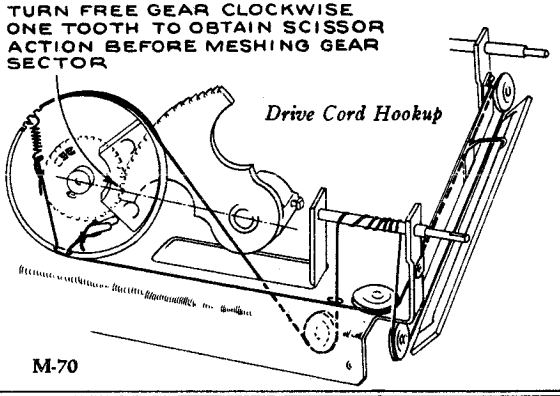
# Push Button Adjustment

The push buttons should be adjusted for five favorite stations after the receiver is installed and operating.

Any standard broadcast stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

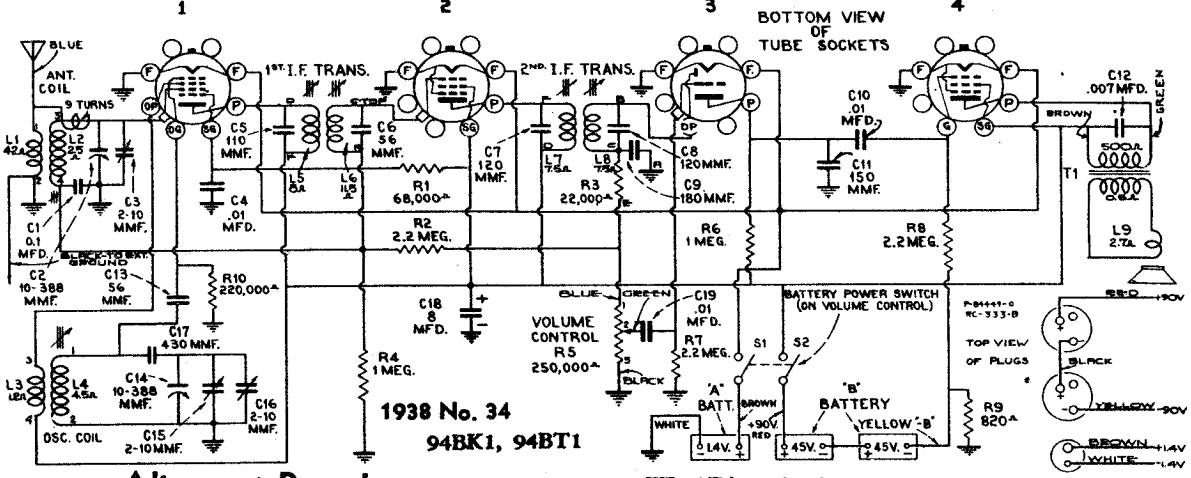
1. Loosen the push buttons one-half turn.
2. Using the tuning control, accurately tune in the first station.
3. With station accurately tuned in, press the first push button fully in and then gently release so as not to jar mechanism.
4. Tighten the push button securely with fingers. Do not force with pliers.
5. Proceed in same manner to adjust the other four push buttons.



MODELS 94BK1, 94BT1
Chassis RC-333B
Schematic, Voltage, Socket
Trimmers, Alignment

# RCA MFG. CO., INC.




## Alignment Procedure

**Cathode-ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

**Pre-setting Dial.**—With gang condenser in full mesh, the pointer should be horizontal.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| No. 1 | 1N5-G I-F grid cap, in series with 0.01 mfd. | 455 kc | Quiet point between 550-750 kc | L7 and L8 (2nd I-F transformer) |
| No. 2 | 1A7-G 1st-det. grid cap, in series with 0.01 mfd. | 455 kc | | L5 and L6 (1st I-F transformer) |
| No. 3 | Antenna lead, in series with 200 mmfd. | 600 kc | 600 kc | L4 (oscillator) L2 (antenna) |
| No. 4 | Antenna lead, in series with 200 mmfd. | 1,500 kc | 1,500 kc | C15† (oscillator) C3 (antenna) |

† Trimmer C16 on gang condenser should be unscrewed one complete turn from tight, before adjusting C15.

### Precautionary Lead Dress

1. Red lead from second i-f transformer to screen terminal of 1N5-G must be dressed close to and along edge of chassis.
2. Twisted green wire from antenna coil to gang must be 9 turns and kept clear of rotor.
3. Blue and green leads to volume control must be dressed close to chassis and between gang and front apron.

## Electrical and Mechanical Specifications

POWER OUTPUT

| | |
|---|---|
| Undistorted | 0.115 watt |
| Maximum | 0.280 watt |

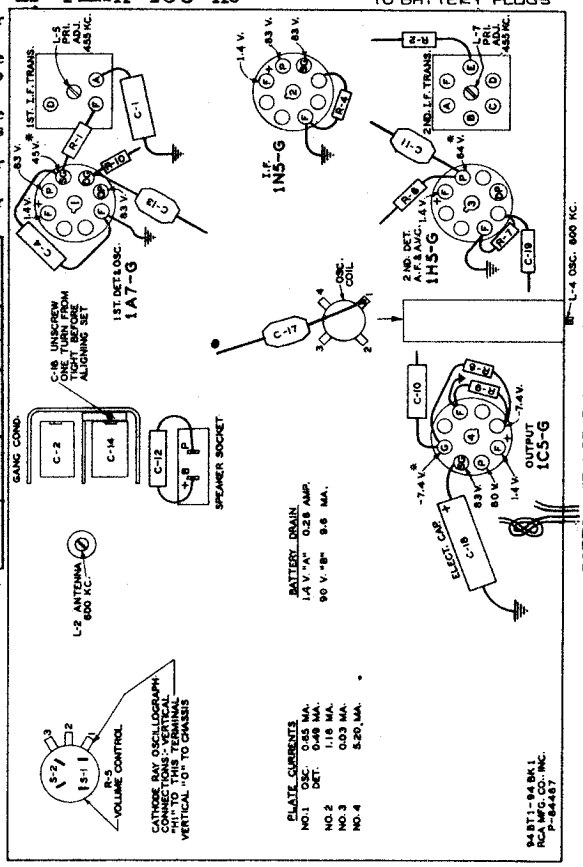
LOUDSPEAKER

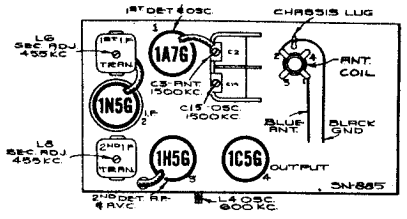
| | |
|---|---|
| Type | Permanent Magnet Dynamic |
| Diameter | 94BK1, 6 inches; 94BT1, 5 inches |
| Voice Coil Impedance | 3 ohms at 400 cycles |

| | Height | Width | Depth |
|---|---|---|---|
| Cabinet Dimensions (94BT1) | 12⅜ in. | 10⅝ in. | 6⅜ in. |
| Cabinet Dimensions (94BK1) | 37¼ in. | 22 in. | 10¼ in. |
| Chassis Base Dimensions | 2 in. | 9½ in. | 5⅝ in. |
| Over-all Chassis Height | | | 6 in. |

| | |
|---|---|
| Weight (94BT1) | 7⅝ lbs. net; 10½ lbs. shipping |
| Weight (94BK1) | 26½ lbs. net; 39½ lbs. shipping |
| Operating Controls | (1) Power Switch—Volume; (2) Tuning |
| Tuning Drive Ratio | 8 to 1 |
| Frequency Range | 540 to 1,720 kc |
| RF Alignment Frequencies | 600 kc (osc., ant.), 1,500 kc (osc., ant.) |
| Intermediate Frequency | 455 kc |

IF PEAK 455 KC




*Tube and Trimmer Locations*

* **NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured value will be lower, depending on the voltmeter loading.
Measurements made to chassis unless otherwise indicated, with set tuned to a quiet point and the volume control at minimum. Values should hold within approximately ± 20% with rated battery voltage.

*Socket Voltages, and Location of Parts*
FOR PARTS LIST, SEE INDEX

CURRENT CONSUMPTION
"A," at 1.4 volts, 0.26 amp.
"B," at 90 volts, 9.6 ma.

BATTERIES REQUIRED
"A," one 1.4-volt Air Cell or 1.5-volt Dry Cell.
"B," two 45-volt heavy duty "B" batteries.

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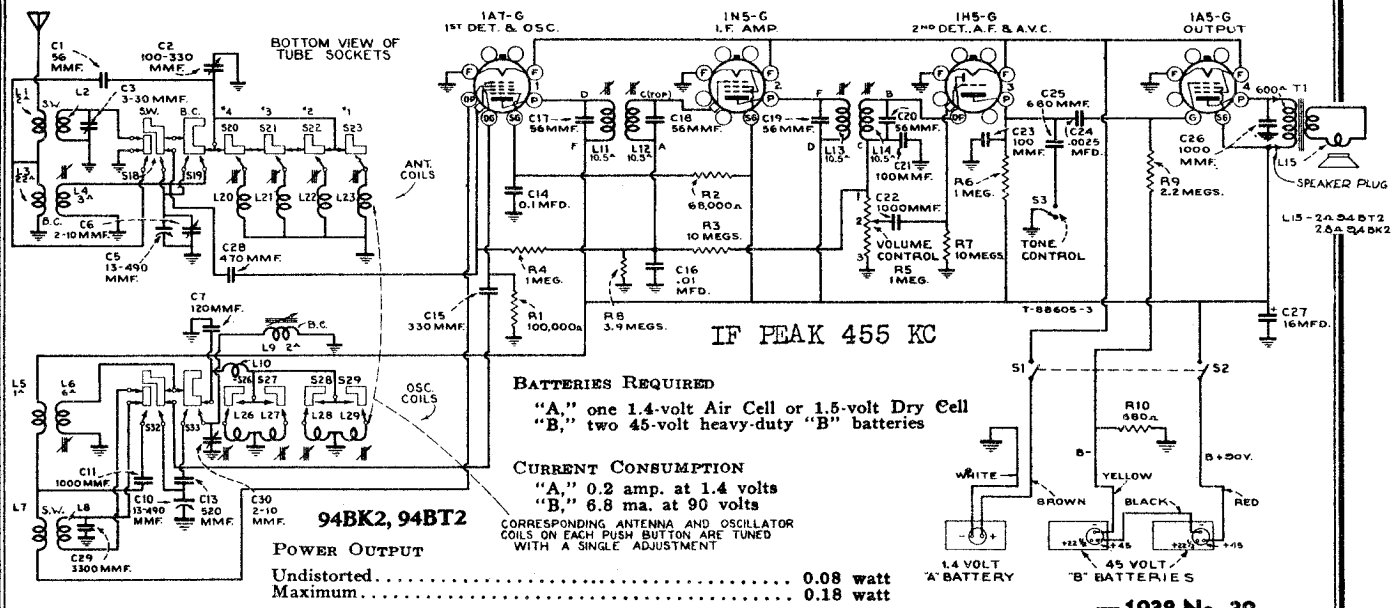
Schematic, Voltage
Chassis Wiring

# RCA MFG. CO., INC.

MODELS 94BK2, 94BT2
Chassis RC-390




## Batteries Required

"A," one 1.4-volt Air Cell or 1.5-volt Dry Cell
"B," two 45-volt heavy-duty "B" batteries

## Current Consumption

"A," 0.2 amp. at 1.4 volts
"B," 6.8 ma. at 90 volts

CORRESPONDING ANTENNA AND OSCILLATOR COILS ON EACH PUSH BUTTON ARE TUNED WITH A SINGLE ADJUSTMENT

## Power Output

| | |
|---|---|
| Undistorted | 0.08 watt |
| Maximum | 0.18 watt |

**—1938 No. 39—**

| | Model 94BK2 | Model 94BT2 |
|---|---|---|
| Height | 37¼ inches | 10⅝ inches |
| Width | 22 inches | 20-13/16 inches |
| Depth | 10 inches | 9⅝ inches |
| Net Weight | 40½ pounds | 15½ pounds |
| Shipping Weight | 53½ pounds | 19 pounds |
| Chassis Base Dimensions | 8 inches x 11⅛ inches x 5 inches | |
| Over-all Height of Chassis | 7⅝ inches | |
| Tuning Drive Ratio | 12 to 1 | |

The 94BK2 is a console model; the 94BT2 a table model. Each of these receivers is a low-drain, battery-operated superheterodyne. The design features include gang-tuned push button coils for single control electric tuning adjustments; magnetite-core i-f transformers and "A" band r-f coils; automatic volume control; and permanent magnet dynamic speaker. Push button electric tuning is provided for four favorite broadcast stations; two additional push-buttons provide dial tuning for "Standard-broadcast" and "Short-wave" bands.

## Loudspeaker

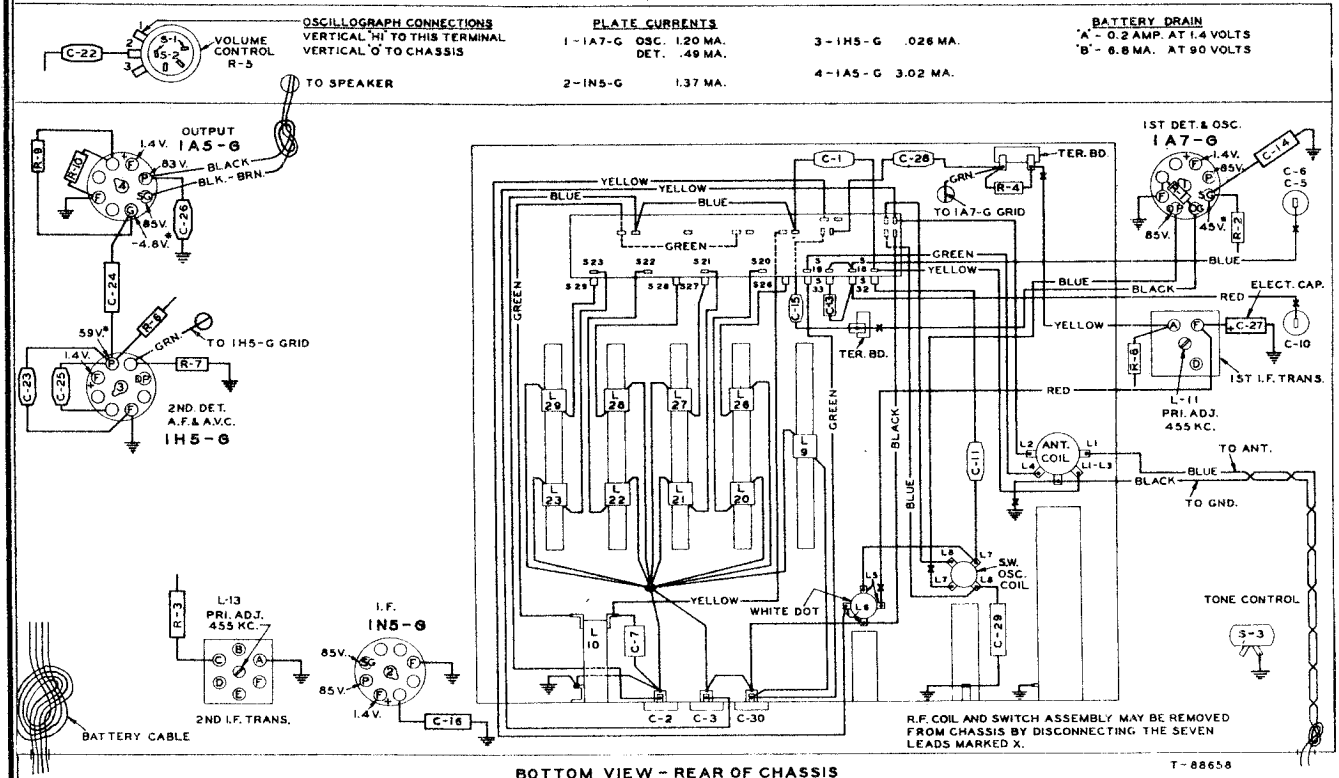
| | |
|---|---|
| Type | Permanent Magnet Dynamic |
| Diameter | 94BK2, 8 inches; 94BT2, 6 inches |
| Voice Coil Impedance (at 400 cycles) | 94BK2, 3 ohms; 94BT2, 2.2 ohms |

## Frequency Ranges

| | |
|---|---|
| Standard Broadcast ("A" Band) | 540—1,720 kc |
| Short Wave ("C" Band) | 5.8—15.4 mc |
| Four Electric Tuning Positions | 550—1,500 kc |

One station between approximately 550— 950 kc (Button No. 1)
One station between approximately 610—1,090 kc (Button No. 2)
One station between approximately 750—1,370 kc (Button No. 3)
One station between approximately 845—1,500 kc (Button No. 4)

Intermediate Frequency ..... 455 kc




BOTTOM VIEW - REAR OF CHASSIS

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured value will be lower, depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated, with set tuned to a quiet point and the volume control at minimum. Values should hold within approximately ± 20% with rated battery voltage.

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MODELS 94BK2,94BT2
Chassis RC-390
Socket,Trimmers,Alignment
Drive Cord Data,Lead Dress

RCA MFG. CO., INC.

## Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown on the chassis drawing.

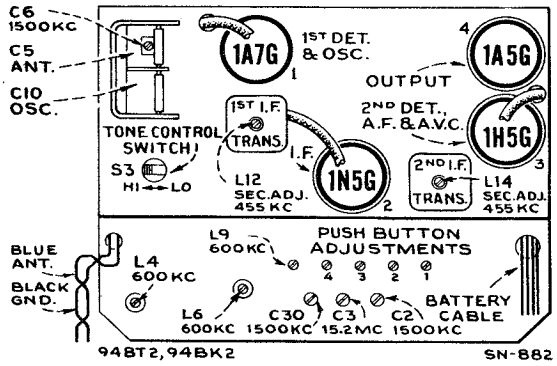
**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test Oscillator.**—For all alignment operations, connect the low side of the test oscillator to the chassis, and keep the output as low as possible to avoid a-v-c action.

**Calibration Marks.**—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, and 15.2 mc have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

**Dial Indicator Adjustment.**—With the gang condenser in full mesh, the indicator should point to the extreme left (low frequency) mark on the dial scale.

For additional details, refer to booklet "RCA Victor Receiver Alignment".



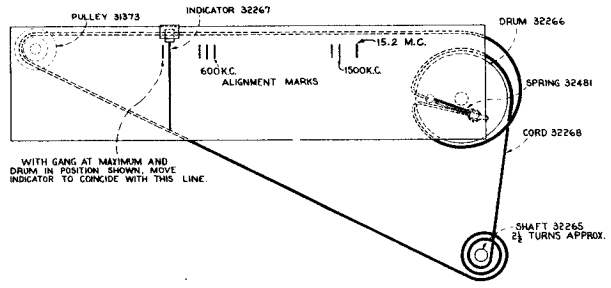

*Tube and Trimmer Locations*

| Steps | Connect the High Side of Test Oscillator to: | Tune Test Oscillator to: | Push Button | Turn Radio Dial to: | Adjust for Maximum Peak Output: |
|---|---|---|---|---|---|
| 1 | 1N5-G I-F grid cap in series with .01 mfd. | 455 kc | B.C. (5) | No Signal between 550—750 kc. | L13 and L14 (2nd I-F Trans.) |
| 2 | 1A7-G Det. grid cap in series with .01 mfd. | 455 kc | B.C. (5) | | L11 and L12 (1st I-F Trans.) |
| 3 | Antenna Lead (blue) in series with 200 mmfd. | 1,500 kc | No. 4 | | L20-L26 (No.4 Push Button Adj.) C2 (ant.) |
| 4 | Antenna Lead (blue) in series with 200 mmfd. | 600 kc | No. 1 | | L23-L29 *(No. 1 Push Button Adj.) L6 (osc.) |
| 5 | Antenna Lead (blue) in series with 200 mmfd. | 1,500 kc | No. 4 | | L20-L26 (No. 4 Push Button Adj.) C2 (ant.) |
| 6 | Antenna Lead (blue) in series with 200 mmfd. | 600 kc | No. 1 | | L23-L29 *(No. 1 Push Button Adj.) L6 (osc.) |
| 7 | Antenna Lead (blue) in series with 200 mmfd. | 1,500 kc | B.C. (5) | 1,500 kc Cal. Mark | C30 (osc.) C6 (ant.) |
| 8 | Antenna Lead (blue) in series with 200 mmfd. | 600 kc | B.C. (5) | 600 kc Cal. Mark | L9 (osc.) L4 (ant.) |
| 9 | Antenna Lead (blue) in series with 200 mmfd. | 1,500 kc | B.C. (5) | 1,500 kc Cal. Mark | C30 (osc.) C6 (ant.) |
| 10 | Antenna Lead (blue) in series with 300 ohms | 15.2 mc | S.W. (6) | Signal Near 15.2 mc Cal. Mark† | **C3 (ant.) |
| 11 | Follow the "Adjustments for Electric Tuning." | | | | |

* Adjust L23—L29 (No. 1 push button adjustment) and L6 at the same time, rocking in for maximum signal.

** Use maximum capacity peak if two peaks can be obtained, rock in for maximum signal. A weaker signal (image) should be received about one-quarter inch to the left on the dial plate.

† If two signals are received, set the dial to the higher frequency (right hand) position.




*Dial Drive Hookup and Alignment Marks*

Note: The oscillator tracks 455 kc above the signal on all bands. After the receiver has been installed and the antenna connected, it is sometimes advisable to make a slight change in the adjustment of the antenna trimmer, C2. In most cases it is desirable to make this adjustment while receiving a station on No. 4 push button. However, if a station received on one of the other buttons is especially weak, it may be advisable to make the adjustment while receiving the weak station on this button.

## Precautionary Lead Dress

1. Green lead to first detector grid cap should be pulled out of the chassis as far as possible, and dressed away from the tube envelope.

2. Blue lead from push button switch to gang condenser must be dressed over the top of the switch.

3. Leads to push button coils must be dressed close to the coils.

4. Red and blue leads to gang condenser must be dressed away from chassis.

5. Blue antenna lead must be dressed in the end of the chassis away from gang leads and coil windings.



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RCA MFG. CO., INC.

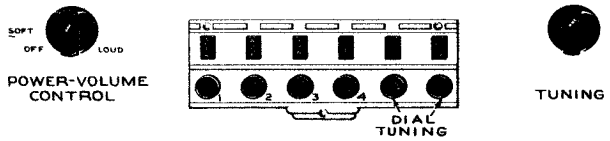
MODELS 94BK2, 94BT2
Chassis RC-390
Tuner Data, Parts

## Adjustments for Electric Tuning

These models have six push buttons. The right-hand button connects the receiver for dial tuning on the "Short-wave" band, the next button connects for dial tuning on the "Standard-broadcast" band, and the other four buttons are for electric tuning of four different stations in the standard-broadcast band. Each station button connects separate oscillator and antenna coils which are tandem-tuned by ganged magnetite cores, and may be adjusted for the desired stations. Use a small screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. Make a list of the four desired stations, arranged in order from low to high frequencies.
2. Push in the broadcast dial-tuning button (second from right), and manually tune in the first station on the list.
3. Push in station button No. 1 (left-hand) and adjust No. 1 push button adjustment to receive this station. Turn the adjusting screw all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust for each of the remaining three stations in the same manner. (Clockwise adjustment of the screw tunes the circuits to lower frequencies.)
5. After installation, and with antenna properly connected, readjust C2 as outlined in Note under "Alignment Procedure."




*Location of Controls*

## Miscellaneous Service Data

To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

The push button switch and coil assembly may be removed from the chassis by removing two screws from the front apron, one from the rear apron, removing the 1A7-G grid connector from the grid cap, and disconnecting the seven leads indicated on the Wiring Diagram.

# REPLACEMENT PARTS

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 32259 | Capacitor—3-section variable trimmer capacitor 2-10, 3-30, 100-330 mmfd. (C30, C3, C2) | .65 |
| 30949 | Capacitor—56 mmfd. (C17, C18, C19, C20) | .25 |
| 12723 | Capacitor—56 mmfd. (C1) | .35 |
| 30904 | Capacitor—100 mmfd. (C21) | .25 |
| 12720 | Capacitor—100 mmfd. (C23) | .35 |
| 12724 | Capacitor—120 mmfd. (C7) | .35 |
| 12952 | Capacitor—330 mmfd. (C15) | .35 |
| 30433 | Capacitor—470 mmfd. (C28) | .35 |
| 32269 | Capacitor—520 mmfd. (C13) | .40 |
| 14498 | Capacitor—680 mmfd. (C25) | .45 |
| 12635 | Capacitor—1,000 mmfd. (C11, C22, C26) | .50 |
| 4881 | Capacitor—3,300 mmfd. (C29) | .60 |
| 5107 | Capacitor—.0025 mfd. (C24) | .20 |
| 14393 | Capacitor—.01 mfd. (C16) | .30 |
| 4839 | Capacitor—0.1 mfd. (C14) | .30 |
| 31323 | Capacitor—16 mfd. (C7) | .65 |
| 32254 | Coil—Broadcast oscillator coil (L9) | .95 |
| 32258 | Coil—Antenna coil (L1, L2, L3, L4) | 1.20 |
| 32260 | Coil—Short wave oscillator coil (L7, L8) | .70 |
| 32256 | Coil—Push button osc. series coil (L10) | .60 |
| 32250 | Coil—Push button ant. and oscillator coil (L23, L29) | 1.15 |
| 32251 | Coil—Push button ant. and oscillator coil (L22, L28) | 1.10 |
| 32252 | Coil—Push button ant. and oscillator coil (L21, L27) | 1.10 |
| 32253 | Coil—Push button ant. and oscillator coil (L20, L26) | 1.10 |
| 32257 | Coil—Push button osc. shunt coil (L5, L6) | .65 |
| 32249 | Condenser—2-gang variable condenser (C5, C6, C10) | 2.70 |
| 32268 | Cord—Drive cord | .30 |
| 12800 | Core—Variable core and stud for antenna coil No. 32258 | .35 |
| 32266 | Drum—Variable condenser drive drum | .45 |
| 32267 | Indicator—Dial scale pointer | .25 |
| 32208 | Plug—2-prong male for battery cable | .20 |
| 5119 | Plug—3-contact female for speaker cable | .25 |
| 12827 | Plug—3-prong male for battery cable | .20 |
| 31373 | Pulley—Drive cord pullley | .08 |
| 14887 | Retainer—Tuning knob shaft retainer or drive cord pulley retaining washer | .01 |
| 12262 | Resistor—680 ohms, ½ watt (R10) | .20 |
| 13715 | Resistor—68,000 ohms, ½ watt (R2) | .20 |
| 14560 | Resistor—100,000 ohms, ½ watt (R1) | .20 |
| 13730 | Resistor—1 meg., ½ watt (R4, R6) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R9) | .20 |
| 13167 | Resistor—3.9 meg., ½ watt (R8) | .20 |
| 13601 | Resistor—10 meg., ½ watt (R3, R7) | .20 |
| 4669 | Screw—No. 8-32 square head set screw from drum | .03 |
| 32261 | Screw—Push button oscillator coil adjustment screw and mounting nut | .03 |
| 32265 | Shaft—Tuning knob shaft | .25 |
| 32149 | Shield—Tube shield | .20 |
| 31251 | Socket—Tube socket | .25 |
| 32481 | Spring—Drive cord tension spring | .05 |
| 12007 | Spring—Retaining spring for oscillator coil adjustment screw | .02 |
| 32255 | Switch—Push button switch (S18, S19, S20, S21, S22, S23, S26, S27, S28, S29, S32, S33) | 2.95 |
| 30953 | Switch—Tone control switch (S3) | .45 |
| 32263 | Transformer—First I-F transformer (L11, L12, C17, C18) | 2.30 |
| 32264 | Transformer—Second I-F transformer (L13, L14, C19, C20, C21) | 2.50 |
| 32262 | Volume control and power switch (R5, S1, S2) | 1.50 |
| | **SPEAKER ASSEMBLIES (84307-2) Model 94BT2** | |
| 32271 | Cone—Speaker cone and voice coil (L15) | 1.70 |
| 5118 | Plug—3-contact male for speaker | .25 |
| 32270 | Speaker complete | 6.00 |
| 32272 | Transformer—Output transformer (T1) | 1.65 |
| | **SPEAKER ASSEMBLIES (84477-1) Model 94BK2** | |
| 32274 | Cone—Speaker cone and voice coil (L15) | 1.80 |
| 5118 | Plug—3-contact male for speaker | .25 |
| 32273 | Speaker complete | 7.00 |
| 32272 | Transformer—Output transformer (T1) | 1.65 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 32279 | Button—Push button | .06 |
| 31935 | Clip—Spring clip to hold dial scale | .10 |
| 32276 | Dial—Dial scale (glass) | .60 |
| 32277 | Escutcheon—Dial scale escutcheon and crystal | 1.10 |
| 32278 | Escutcheon—Push button escutcheon | .70 |
| 31355 | Knob—Station selector or volume control knob | .12 |
| 32281 | Marker—"Broadcast" marker tab | .02 |
| 32067 | Marker—Push button call letter markers | .35 |
| 32280 | Marker—"Short Wave" marker tab | .02 |
| 14267 | Screw—Chassis mounting screw and washer (4 required), Model 94BT2 | .04 |
| 30467 | Screw—Chassis mounting screw and washer (4 required), Model 94BK2 | .05 |
| 14270 | Spring—Retaining spring for knob | .05 |

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.



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| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES (RC-407)** | |
| 13057 | Capacitor—60 mmfd. | .35 |
| 12488 | Capacitor—250 mmfd. | .35 |
| 12952 | Capacitor—300 mmfd. | .35 |
| 5107 | Capacitor—.0025 mfd. | .20 |
| 4838 | Capacitor—.005 mfd. | .25 |
| 32787 | Capacitor—.05 mfd. | .20 |
| 4839 | Capacitor—0.1 mfd. | .30 |
| 33303 | Capacitor—Electrolytic, 8 mfd. | .50 |
| 33055 | Coil—Oscillator coil | .70 |
| 33060 | Condenser—2-gang variable tuning | 2.25 |
| 32634 | Cord—Drive cord | .10 |
| 32946 | Drum—Drive cord drum | .35 |
| 33300 | Loop—Complete antenna loop | 1.80 |
| 32208 | Plug—2-contact plug for battery cable | .20 |
| 32641 | Plug—3-contact male plug for battery cable | .10 |
| 14076 | Resistor—820 ohms, ½ watt | .20 |
| 13715 | Resistor—68,000 ohms, ½ watt | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt | .20 |
| 13730 | Resistor—1 meg., ½ watt | .20 |
| 12679 | Resistor—2.2 meg., ½ watt | .20 |
| 13601 | Resistor—10 meg., ½ watt | .20 |
| 33305 | Shaft—Tuning knob shaft and bushing | .25 |
| 32595 | Shield—Tube shield—less cap | .15 |
| 32537 | Socket—Tube socket | .20 |
| 30585 | Spring—Drive cord spring | .06 |
| 33296 | Spring—Drive drum retaining spring | .06 |
| 33301 | Transformer—First i-f transformer | 1.20 |
| 33302 | Transformer—Second i-f transformer | 1.40 |
| 33304 | Volume control and switch | 1.50 |
| | **SPEAKER ASSEMBLIES (39128-1)** | |
| 33058 | Speaker complete | 4.00 |
| 33062 | Transformer—Output transformer | 1.30 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 33310 | Dial—Glass dial scale | .30 |
| 33311 | Escutcheon—Dial scale escutcheon | .45 |
| 33006 | Feet—Cabinet feet | .03 |
| 33376 | Handle—Carrying handle—Models 94BP61 94BP62, 94BP64 | .55 |
| 33377 | Handle—Carrying handle—Model 94BP66 | .55 |
| 33306 | Knob—Black tuning knob—Model 94BP66 | .15 |
| 33308 | Knob—Black volume control knob—Model 94BP66 | .25 |
| 32571 | Knob—Tan tuning knob—Models 94BP61, 94BP64, 94BP80 | .15 |
| 33309 | Knob—Tan volume control knob—Models 94BP81, 94BP64, 95BP80 | .25 |
| 32895 | Knob—Walnut tuning knob—Models 94BP62, 94BP81 | .15 |
| 33307 | Knob—Walnut volume control knob—Models 94BP62, 94BP81 | .25 |
| 33312 | Nut—Speed nut to mount dial | .02 |
| 31646 | Spring—Knob retaining spring | .02 |

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

Frequency Range ..... 550-1,720 kc
Intermediate Frequency ..... 455 kc

BATTERIES REQUIRED

"A," one 1.5 volt dry plug-type "A," 2½-in. x 2½-in. x 4-in. (Eveready No. 742 or equivalent)
"B," two 45 volt dry plug-type "B," 2½-in. x 4-in. x 5¼-in. (Eveready No. 762 or equivalent)

CURRENT CONSUMPTION

"A," 0.24 ampere—"B," 9.0 milliamperes

POWER OUTPUT

Undistorted ..... 0.10 watt
Maximum ..... 0.21 watt

LOUDSPEAKER

Type ..... 4-inch permanent-magnet dynamic
Voice-coil Impedance ..... 2 ohms at 400 cycles

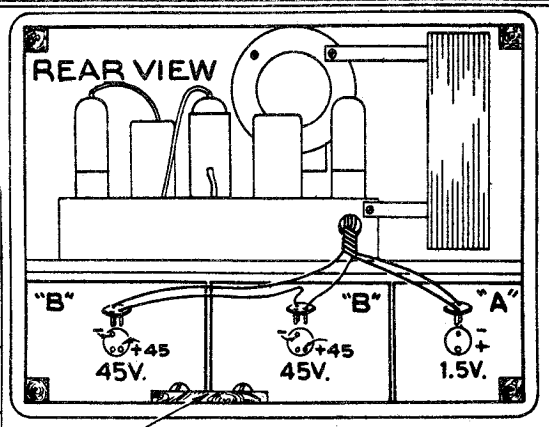
## Alignment Procedure

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-oscillator.**—For all alignment operations, keep the output as low as possible to avoid a-v-c action.

**Pre-setting Dial.**—With gang condenser in full mesh, the pointer should be horizontal.

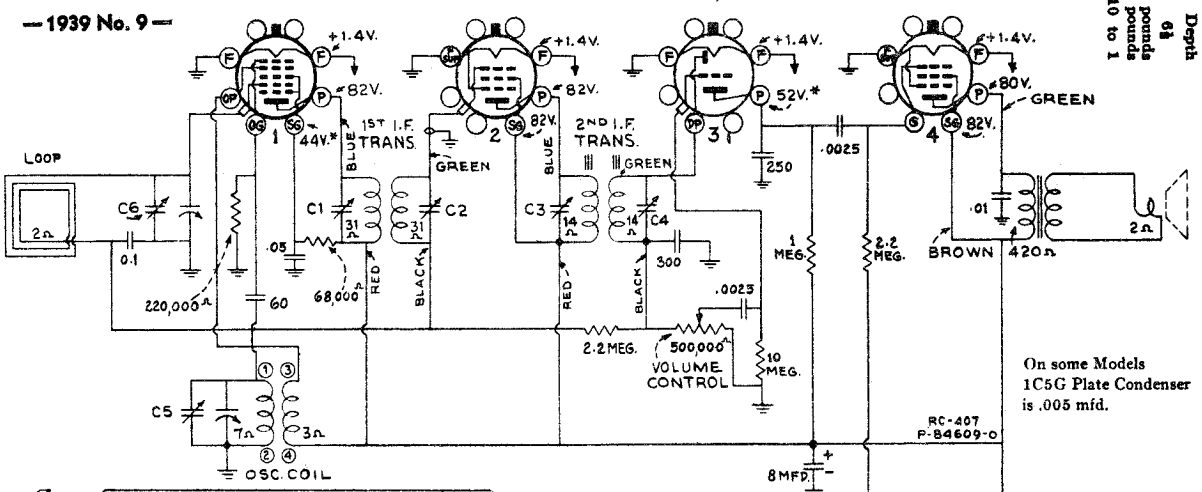
| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | 1A7G 1st-Det. grid cap, in series with .01 mfd. | 455 kc | Quiet point at 1,600 kc end of dial | C1, C2, C3, C4 (1st and 2nd I-F transformers) |
| 2 | Antenna coil loop by means of one turn of wire placed near loop | 1,720 kc | Full clockwise (out of mesh) | C5 (oscillator) |
| 3 | | 1,500 kc | Resonance on 1,500 kc signal | C6 (antenna) |



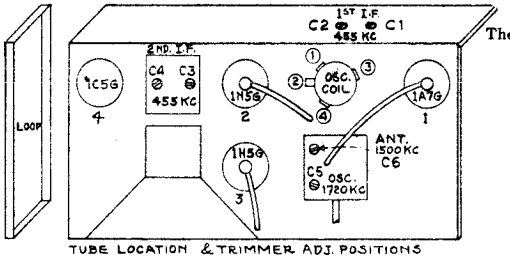

REMOVE THIS BLOCK-PLACE BATTERIES IN CABINET AS INDICATED

Cabinet Dimensions (inches) ..... Height 9¼ Width 13¼ Depth 6¼
Weight—(Net) less batteries ..... 6 pounds
With batteries ..... 12½ pounds
Tuning Drive Ratio ..... 10 to 1

**—1939 No. 9—**




On some Models 1C5G Plate Condenser is .005 mfd.




TUBE LOCATION & TRIMMER ADJ. POSITIONS

The following models comprise the 94BP1 Series—all contain the No. RC-407 chassis.

94BP61 Dark Brown
94BP62 Tan
94BP64 Light Brown
94BP66 Gray
94BP80 Brown Leather
94BP81 Black Leather

**Note:** Values with star (*) are operating voltages. Values not starred are actual measured voltages.

Measurements are made to chassis unless otherwise indicated, with set tuned to quiet point. Values should hold within approximately ± 20% with rated battery voltage.

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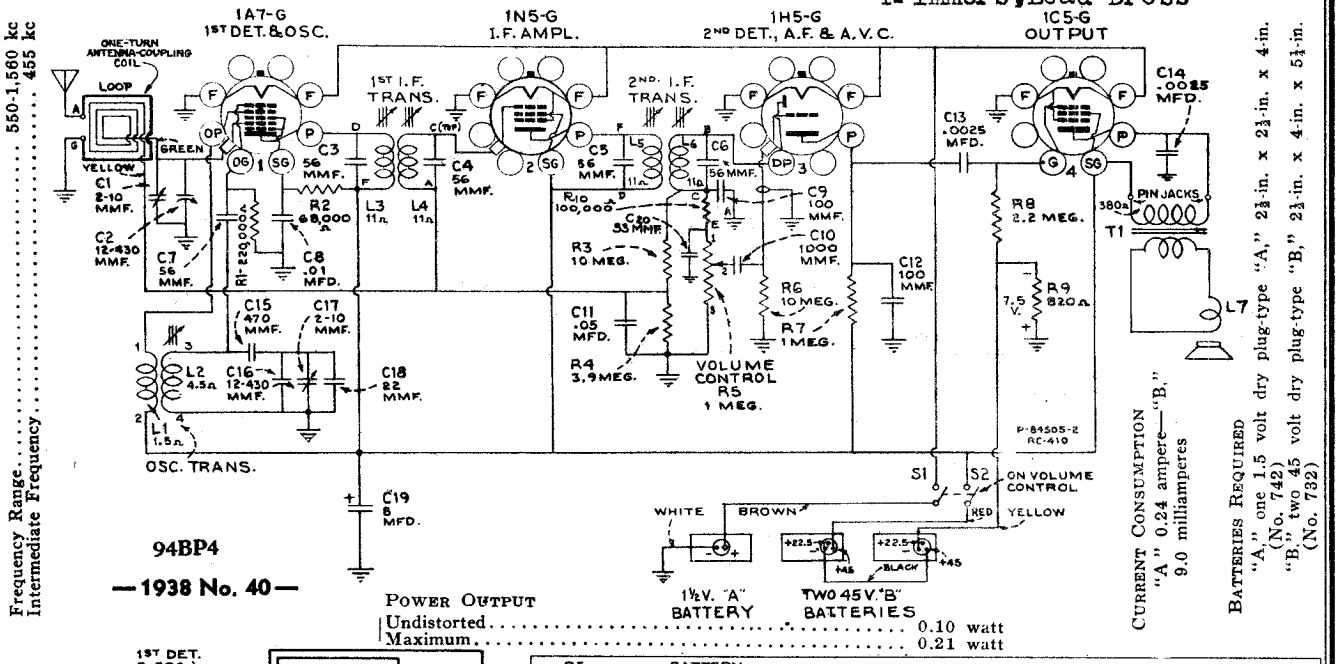
# RCA MFG. CO., INC.

## MODEL 94BP4, Chassis RC-410
## Schematic, Voltage, Alignment
## Chassis Wiring, Socket
## Trimmers, Lead Dress




Frequency Range..... 550-1,560 kc
Intermediate Frequency..... 455 kc

94BP4

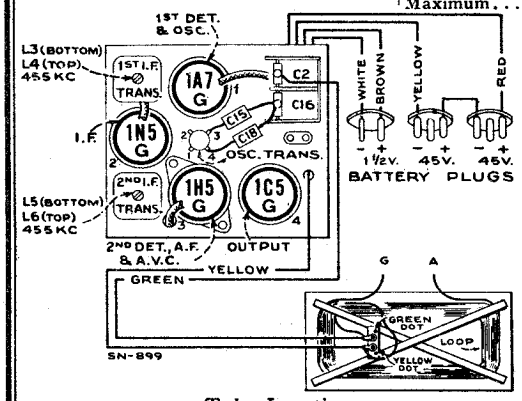
—1938 No. 40—

**Power Output**

Undistorted..... 0.10 watt
Maximum..... 0.21 watt

**Current Consumption**
"A" 0.24 ampere—"B," 9.0 milliamperes

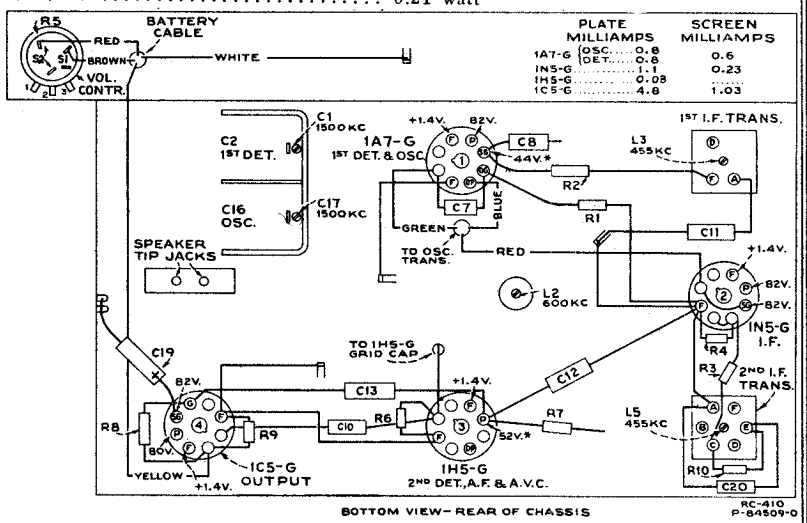
**Batteries Required**
"A," one 1.5 volt dry plug-type "A," 2½ in. x 2½ in. x 4 in. (No. 742)
"B," two 45 volt dry plug-type "B," 2½ in. x 4 in. x 5¼ in. (No. 732)




*Tube Location*

**Note:** Values with star (*) are operating voltages. Values not starred are actual measured voltages.

Measurements are made to chassis unless otherwise indicated, with set tuned to quiet point. Values should hold within approximately ± 20% with rated battery voltage.




*R-F Wiring Diagram and Socket Voltages*

## Alignment Procedure

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-oscillator.**—For all alignment operations, keep the output as low as possible to avoid a-v-c action.

**Pre-setting Dial.**—With gang condenser in full mesh, the pointer should be horizontal.

---

**Precautionary Lead Dress.—**

1. Dress speaker leads down to chassis.
2. The green lead from the loop to the antenna section of the gang should be dressed between the output and detector tube shields and pulled toward the far corner of the loop by means of the rubber band.
3. The spiral shield on the 1st-A.F. grid lead should be brought as close as possible to the grid cap.
4. Leads to the high side and tap of the volume control should be dressed down to the chassis and away from the output tube plate lead.

**Antenna.**—An antenna and ground may be connected to "A" and "G" at bottom of cabinet. If total length of antenna and lead-in is more than 150 feet, connect a 300 mmf capacitor in series with lead-in.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | 1N5-G grid cap, in series with .001 mfd. | 455 kc | Quiet point between 550-750 kc | L5 and L6 (2nd I-F transformer) |
| 2 | 1A7-G grid cap, in series with .001 mfd. | 455 kc | | L3 and L4 (1st I-F transformer) |
| 3 | Assemble chassis and batteries in correct position in cabinet, and fasten rear cover (loop) in place while making the following adjustments, which are accessible through holes in the bottom of the cabinet. | | | |
| 4 | Antenna terminal, in series with 200 mfd. Connect low side of test-osc. to "G" term. | 1500 kc | 1500 kc* | C17 (osc.) C1 (ant.) |
| 5 | | 600 kc | 600 kc* | L2 (osc.) Rock in |
| 6 | Repeat steps 4 and 5. | | | |

* Use bottom of "1" in "150" for 1500 kc calibration point, and use center of "0" in "60" for 600 kc calibration point.

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MODELS 94BK1, 94BT1
Chassis RC-333B

# RCA MFG. CO., INC.

MODEL 94BP4, Chassis RC-410
Parts List

**Model 94BP4**

## Specifications and Replacement Parts

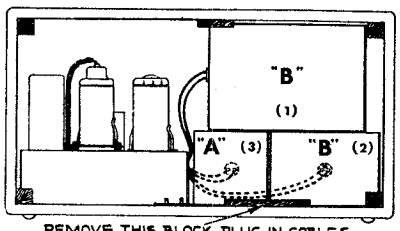
LOUDSPEAKER

Type ..... 5-inch permanent-magnet dynamic
Voice-coil Impedance ..... 2.2 ohms at 400 cycles

| | Height | Width | Depth |
|---|---|---|---|
| Cabinet Dimensions (inches) | 7¾ | 14 | 8⅛ |
| Chassis Base Dimensions (inches) | 2 | 7½ | 5½ |

Over-all Chassis Height ..... 6½ inches
Weight—Shipping weight, less batteries ..... 12½ pounds
Net weight, with batteries ..... 16 pounds
Tuning Drive Ratio ..... 8 to 1

*Battery Arrangement*




REMOVE THIS BLOCK. PLUG IN CABLES AND PLACE BATTERIES IN CABINET AS SHOWN, IN THE ORDER INDICATED. REPLACE CLAMPING BLOCK.

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES (RC-410)** | |
| 32592 | Bracket—Dial bracket | .15 |
| 12607 | Cap—Shield cap for first i.f. transformer | .20 |
| 12581 | Cap—Shield cap for second i.f. transformer | .25 |
| 32598 | Cap—Shield cap for 1H5G | .06 |
| 32596 | Cap—Tube shield cap | .06 |
| 14021 | Capacitor—22 mmfd. (C18) | .35 |
| 12948 | Capacitor—33 mmfd. (C20) | .35 |
| 30949 | Capacitor—56 mmfd. (C3, C4, C5, C6) | .25 |
| 12723 | Capacitor—56 mmfd. (C7) | .35 |
| 30904 | Capacitor—100 mmfd. (C9) | .25 |
| 12720 | Capacitor—100 mmfd. (C12) | .35 |
| 30433 | Capacitor—470 mmfd. (C15) | .35 |
| 12635 | Capacitor—1,000 mmfd. (C10) | .50 |
| 5107 | Capacitor—.0025 mfd. (C13, C14) | .20 |
| 14393 | Capacitor—.01 mfd. (C8) | .30 |
| 4886 | Capacitor—.05 mfd. (C11) | .20 |
| 32187 | Capacitor—8 mfd., 150 volts (C19) | .65 |
| 32148 | Coil—Oscillator coil (L1, L2) | .90 |
| 32591 | Condenser—2-gang variable (C1, C2, C16, C17) | 2.50 |
| 32634 | Cord—Condenser and pointer drive cord | .10 |
| 32593 | Dial—Dial scale | .55 |
| 30701 | Drum—Drive cord drum | .40 |
| 32605 | Indicator—Dial indicator pointer | .30 |
| 32208 | Plug—2-contact male for "A" leads | .20 |
| 32641 | Plug—3-contact male for "B" leads | .10 |
| 14076 | Resistor—820 ohms, ½ watt (R9) | .20 |
| 13715 | Resistor—68,000 ohms, ½ watt (R2) | .20 |
| 14560 | Resistor—100,000 ohms, ½ watt (R10) | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt (R1) | .20 |
| 13730 | Resistor—1 meg., ½ watt (R7) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R8) | .20 |
| 13167 | Resistor—3.9 meg., ½ watt (R4) | .20 |
| 13601 | Resistor—10 meg., ½ watt (R3, R6) | .20 |
| 14887 | Retainer—Tuning knob shaft retainer | .01 |
| 4669 | Screw No. 8-32 x ⅜ set screw for drum, Stock No. 30701 | .03 |
| 32609 | Shaft—Dial pointer shaft and pulley | .15 |
| 32597 | Shaft—Tuning knob shaft | .15 |
| 32595 | Shield—Tube shield—less cap | .15 |
| 31251 | Socket—Tube socket | 4.10 |
| 30956 | Socket—2-contact female | .30 |
| 14191 | Spring—Condenser drive cord spring | .04 |
| 30631 | Spring—Pointer drive cord spring | .03 |
| 32263 | Transformer—First i.f. transformer (L3, L4, C3, C4) | 2.30 |
| 32264 | Transformer—Second i.f. transformer (L5, L6, C5, C6, C9) | 2.50 |
| 32594 | Volume control and switch (R5, S1, S2) | 1.50 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 32602 | Bezel—Dial bezel and crystal | 1.20 |
| 32163 | Cone—Speaker cone and voice coil (L7) | 2.20 |
| 32600 | Escutcheon—Knob escutcheon | .35 |
| 32603 | Grille—Speaker grille and screen | .20 |
| 32633 | Handle—Carrying handle | .90 |
| 11610 | Knob—Volume control or tuning knob | .30 |
| 32604 | Loop—Antenna loop complete | 3.10 |
| 32601 | Retainer—Knob escutcheon retainer | .05 |
| 32162 | Speaker complete | 5.30 |
| 11349 | Spring—Knob retaining spring | .05 |
| 32164 | Transformer—Output transformer (T1) | 1.15 |

**94BK1, 94BT1** **Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 12629 | Capacitor—56 mmfd. (C6) | .35 |
| 12723 | Capacitor—56 mmfd. (C13) | .35 |
| 14262 | Capacitor—110 mmfd. (C5) | .30 |
| 12404 | Capacitor—120 mmfd. (C7, C8) | .30 |
| 12725 | Capacitor—150 mmfd. (C11) | .35 |
| 14712 | Capacitor—180 mmfd. (C9) | .30 |
| 30433 | Capacitor—430 mmfd. (C17) | .35 |
| 5148 | Capacitor—.007 mfd. (C12) | .20 |
| 14393 | Capacitor—.01 mfd. (C4, C10, C19) | .30 |
| 4839 | Capacitor—0.1 mfd. (C1) | .30 |
| 32187 | Capacitor—8 mfd. (C18) | .65 |
| 32150 | Coil—Antenna coil (L1, L2) | 1.15 |
| 32148 | Coil—Oscillator coil (L3, L4) | .90 |
| 32147 | Condenser—2-gang variable tuning condenser (C2, C3, C14, C15, C16) | 2.40 |
| 30877 | Cord—Drive cord | .20 |
| 30905 | Core—Adjustable core for I.F. transformers | .35 |
| 32186 | Dial—Dial scale, plate, and brackets assembled | .55 |
| 30701 | Drum—Tuning condenser drive cord drum with set screw | .40 |
| 14635 | Indicator—Station selector indicator pointer | .20 |
| 32208 | Plug—2-prong male plug for battery cable | .20 |
| 12827 | Plug—3-prong male plug for battery cable | .20 |
| 14076 | Resistor—820 ohms, ½ watt (R9) | .20 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R3) | .15 |
| 13715 | Resistor—68,000 ohms, ½ watt (R1) | .20 |
| 12264 | Resistor—220,000 ohms, ½ watt (R10) | .20 |
| 13730 | Resistor—1 meg., ½ watt (R4, R6) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R2, R7, R8) | .20 |
| 14887 | Retainer—Retainer for knob shaft | .01 |
| 30952 | Shaft—Station selector knob shaft | .25 |
| 32149 | Shield—Tube shield | .20 |
| 11196 | Socket—Tube socket | .25 |
| 30956 | Socket—Speaker socket | .30 |
| 14191 | Spring—Drive cord tension spring | .04 |
| 14261 | Transformer—First I.F. (L5, L6, C5, C6) | 2.05 |
| 14308 | Transformer—Second I.F. (L7, L8, C7, C8, C9, R3) | 2.90 |
| 30947 | Volume control and on-off switch (R5, S1, S2) | 1.50 |
| | **SPEAKER ASSEMBLIES** Model 94BT1 (Speaker 84226-3) | |
| 32163 | Cone—Speaker cone and voice coil (L9) | 2.20 |
| 32162 | Speaker—Complete | 5.30 |
| 32164 | Transformer—Output transformer (T1) | 1.15 |
| | **SPEAKER ASSEMBLIES** Model 94BK1 (Speaker 84145-2) | |
| 30973 | Cone—Speaker cone and voice coil (L9) | 2.25 |
| 30972 | Speaker—Complete | 6.30 |
| 30974 | Transformer—Output transformer (T1) | 1.90 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 30975 | Crystal—Station selector celluloid crystal | .45 |
| 31355 | Knob—Tuning or volume control knob | .12 |
| 30308 | Screw—Chassis mounting screw and washer—(94BT1 only) 4 required | .07 |
| 30467 | Screw—Chassis mounting screw and washer—(94BK1 only) 4 required | .05 |
| 14270 | Spring—Retaining spring for knob | .05 |

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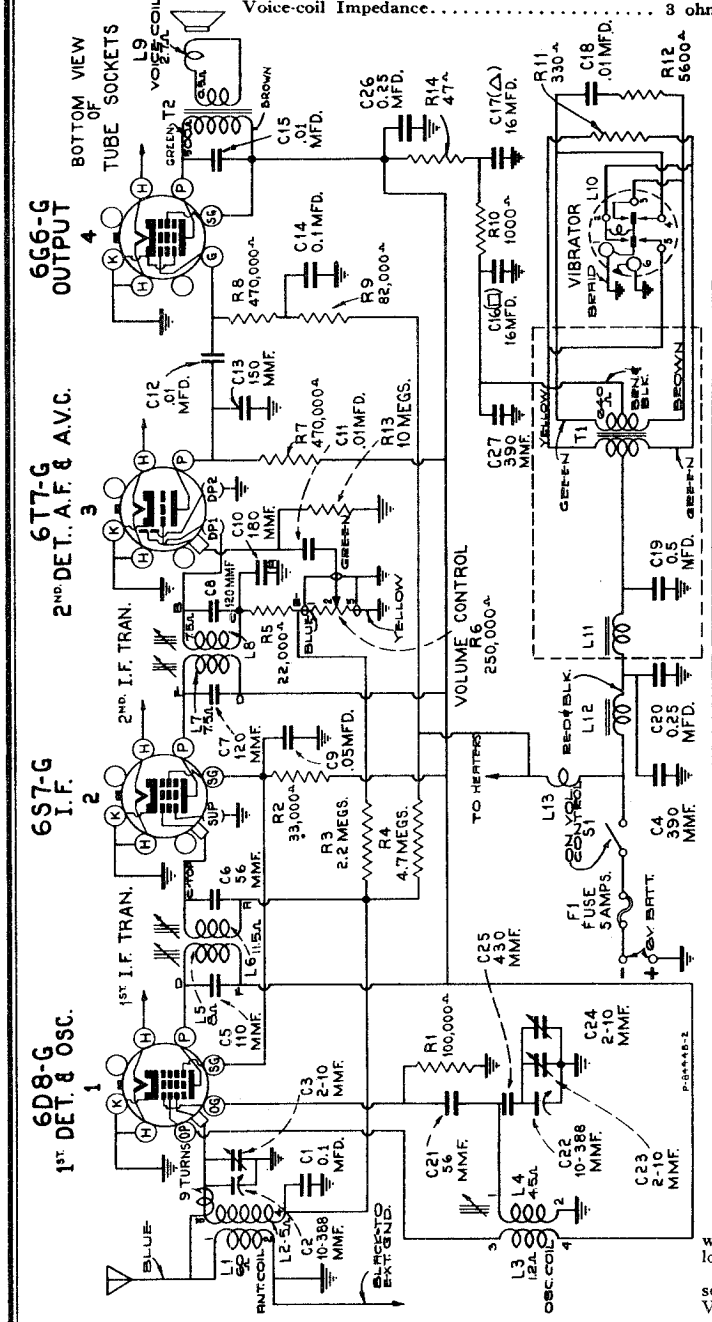
# RCA MFG. CO., INC.

## MODEL 94BT61, Chassis RC-333C
## Schematic, Voltage, Alignment Socket, Trimmers, Chassis Wiring

LOUDSPEAKER

Type ..... 5-inch Permanent Magnet Dynamic
Voice-coil Impedance ..... 3 ohms at 400 cycles

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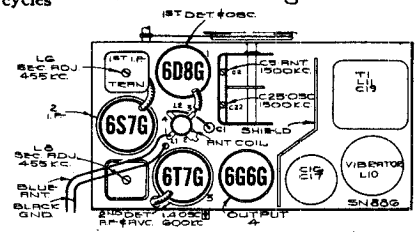
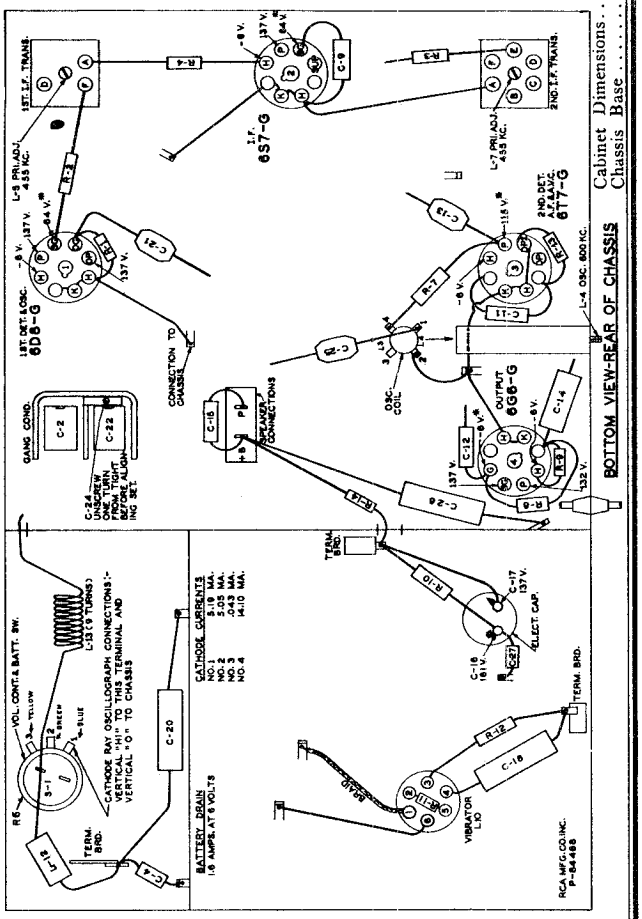



*Tube and Trimmer Locations*

| | Height | Width | Depth |
|---|---|---|---|
| Cabinet Dimensions | 12⅛ in. | 10⅝ in. | 6¾ in. |
| Chassis Base | 2 in. | 9¾ in. | 5⅝ in. |




*Socket Voltages and Location of Parts*

Frequency Range ..... 540 to 1,720 kc
R-F Alignment Frequencies .... 600 kc (osc.), 1,500 kc (osc., ant.)
Intermediate Frequency ..... 455 kc

**Cathode-ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

**Pre-setting Dial.**—With gang condenser in full mesh, the pointer should be horizontal.

| BATTERY REQUIRED | CURRENT CONSUMPTION |
|---|---|
| 6-volt Storage "A" Battery. | At 6 volts, 1.6 amperes. |

POWER OUTPUT (6 volts "A")

Undistorted ..... 0.45 watt
Maximum ..... 0.8 watt

* **NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated, with the set tuned to a quiet point and the volume control at minimum. Values should hold within approximately ± 20% with 6 volts "A."

## Alignment Procedure

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| No. 1 | 6S7-G I-F grid cap, in series with .01 mfd. | 455 kc | Quiet point between 550-750 kc | L7 and L8 (2nd I-F transformer) |
| No. 2 | 6D8-G 1st-det. grid cap, in series with .01 mfd. | 455 kc | | L5 and L6 (1st I-F transformer) |
| No. 3 | Antenna lead, in series with 200 mmfd. | 600 kc | 600 kc | L4 (oscillator) |
| No. 4 | Antenna lead, in series with 200 mmfd. | 1,500 kc | 1,500 kc | C23† (oscillator) C3 (antenna) |

† Adjust C24 on gang condenser to one complete turn from tight before adjusting C23.

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MODEL 94BT61, Chas. RC-333C
Lead Dress, Parts

RCA MFG. CO., INC.

MODELS 96BK6, 96BT6
Chassis RC-392
Socket, Trimmers
Alignment Procedure

# MODELS 96BK6 and 96BT6

## Chassis No. RC-392 Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown on the chassis drawing.

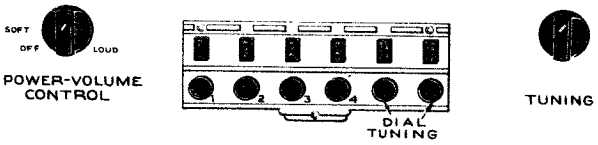
**Output Meter Alignment.**—If this method is used, connect the output meter across the voice coil, and turn the receiver volume control to maximum.

**Test Oscillator.**—For all alignment operations, connect the low side of the test oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

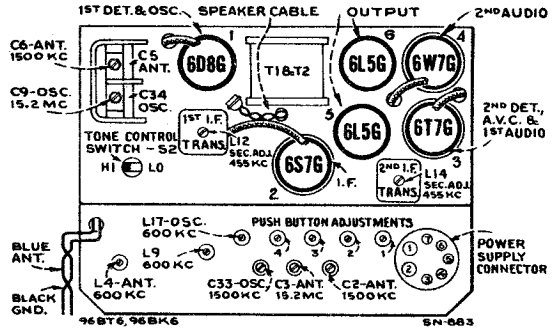
**Calibration Marks.**—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, and 15.2 mc have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

**Dial Indicator Adjustment.**—With the gang condenser in full mesh, the indicator should point to the extreme left (low frequency) mark on the dial scale.

For additional details, refer to booklet "RCA Victor Receiver Alignment."




*Location of Controls*




*Tube and Trimmer Locations*

## Miscellaneous Service Data

To center the loudspeaker voice coil, first remove the front dust cover, then loosen the screws holding the spider assembly. Insert three narrow feelers into the air gap, and tighten the spider screws. Remove the feelers and fasten a dust cover in place with loudspeaker cement.

The push button switch and coil assembly may be removed from the chassis by removing two screws from the front apron, one from the rear apron, removing the 6D8-G grid connector from the grid cap, and disconnecting the seven leads indicated on the Wiring Diagram.

# MODEL 94BT61 Chassis No. RC-333-C

### Precautionary Lead Dress

1. Capacitors C20 and C26 must be grounded with as short a lead as possible. C4 and C27 are soldered direct (no leads).

2. The "A" supply choke (L13) must be dressed clear of chassis. The H.V. secondary leads (brown and green), C18, and R12 must be dressed clear of the chassis and away from other leads.

3. The H.V. secondary mid-tap (brown-black) lead, and the brown lead from L13 to 6G6-G filament must be dressed close to the chassis and away from other parts.

4. The lead from the antenna coil (L1 and L2) to the gang must be 9 turns and kept clear of the rotor.

5. The I-F plate lead (blue) must be dressed close along edge of chassis.

6. R10 must be wired with body as close to terminal board as possible.

**Battery Charger Connections.**—The positive side of the 6-volt "A" circuit is connected to the receiver chassis, and the chassis is normally grounded. If the charger has a ground on the negative side, the ground should be removed, or changed to the positive. Do not change the length of the leads from the receiver to the battery.

**ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.**

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 30959 | Cable—Battery cable complete | 1.35 |
| 30967 | Cable—Shielded volume control cable | .45 |
| 12581 | Cap—Second I.F. transformer shield cap | .25 |
| 12629 | Capacitor—56 mmfd. (C6) | .35 |
| 12723 | Capacitor—56 mmfd. (C21) | .35 |
| 14262 | Capacitor—110 mmfd. (C5) | .30 |
| 12404 | Capacitor—120 mmfd. (C7, C8) | .30 |
| 12725 | Capacitor—150 mmfd. (C13) | .35 |
| 14712 | Capacitor—180 mmfd. (C10) | .30 |
| 13894 | Capacitor—390 mmfd. (C4, C27) | .35 |
| 30433 | Capacitor—430 mmfd. (C25) | .35 |
| 14393 | Capacitor—.01 mfd. (C11, C12, C15) | .30 |
| 4937 | Capacitor—.01 mfd. (C18) | .25 |
| 30882 | Capacitor—.05 mfd. (C9) | .20 |
| 30899 | Capacitor—0.1 mfd. (C1, C14) | .30 |
| 30965 | Capacitor—0.25 mfd. (C20, C26) | .30 |
| 32152 | Capacitor—Comprising 2 sections each 15 mfd. (C16, C17) | 1.05 |
| 30968 | Coil—"A" filter choke coil (L12) | .55 |
| 30950 | Coil—Antenna coil (L1, L2) | 1.10 |
| 32148 | Coil—Oscillator coil (L3, L4) | .90 |
| 32147 | Condenser—2-gang variable tuning condenser (C2, C3, C22, C23, C24) | 2.40 |
| 30877 | Cord—Drive cord | .20 |
| 30905 | Core—Adjustable core for I.F. transformers | .35 |
| 14289 | Clips—Battery clips—1 marked "+" and 1 unmarked | .30 |
| 32186 | Dial—Dial scale, plate, and brackets assembled | .55 |
| 30701 | Drum—Tuning condenser drive cord drum with set screw | .40 |
| 5140 | Fuse—Battery cable fuse (F1) | .10 |
| 14635 | Indicator—Station selector indicator pointer | .20 |
| 12848 | Resistor—47 ohms, ½ watt (R14) | .20 |
| 8063 | Resistor—330 ohms, ½ watt (R11) | .20 |
| 30152 | Resistor—1,000 ohms, 1 watt (R10) | .22 |
| 30734 | Resistor—5,600 ohms, ½ watt (R12) | .20 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R5) | .15 |
| 12454 | Resistor—33,000 ohms, ½ watt (R2) | .20 |
| 14023 | Resistor—82,000 ohms, ½ watt (R9) | .20 |
| 14560 | Resistor—100,000 ohms, ½ watt (R1) | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt (R7, R8) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R3) | .20 |
| 30271 | Resistor—4.7 meg., ½ watt (R4) | .20 |
| 13601 | Resistor—10 meg., ½ watt (R13) | .20 |
| 14887 | Retainer—Retainer for knob shaft | .01 |
| 30952 | Shaft—Station selector knob shaft | .25 |
| 3682 | Shield—Tube shield | .22 |
| 31251 | Socket—Tube socket | .25 |
| 30956 | Socket—Speaker socket | .30 |
| 14312 | Socket—Vibrator socket | .25 |
| 14191 | Spring—Drive cord tension spring | .04 |
| 14261 | Transformer—First I.F. transformer (L5, L6, C5, C6) | 2.05 |
| 14308 | Transformer—Second I.F. transformer (L7, L8, C7, C8, C10, R5) | 2.90 |
| 32151 | Transformer—Vibrator transformer (T1, L11 C19) | 4.10 |
| 14309 | Vibrator—Plug in vibrator (L10) | 4.25 |
| 30958 | Volume control and on-off switch (R6, S1) | 1.50 |
| | **SPEAKER ASSEMBLIES (Speaker 84226-3)** | |
| 32163 | Cone—Speaker cone and voice coil (L9) | 2.20 |
| 32162 | Speaker complete | 5.30 |
| 32164 | Transformer—Output transformer (T2) | 1.15 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 30975 | Crystal—Station selector celluloid crystal | .45 |
| 31355 | Knob—Tuning or volume control knob | .12 |
| 30308 | Screw—Chassis mounting screw and washer—4 required | .07 |
| 14270 | Spring—Retaining spring for knob, Stock No. 31355 | .05 |

Over-all Chassis Height ..... 6⅜ in.
Weight ..... 11½ lbs. net, 14 lbs. shipping

Operating Controls ..... (1) Power Switch—Volume; (2) Tuning
Tuning Drive Ratio ..... 8 to 1

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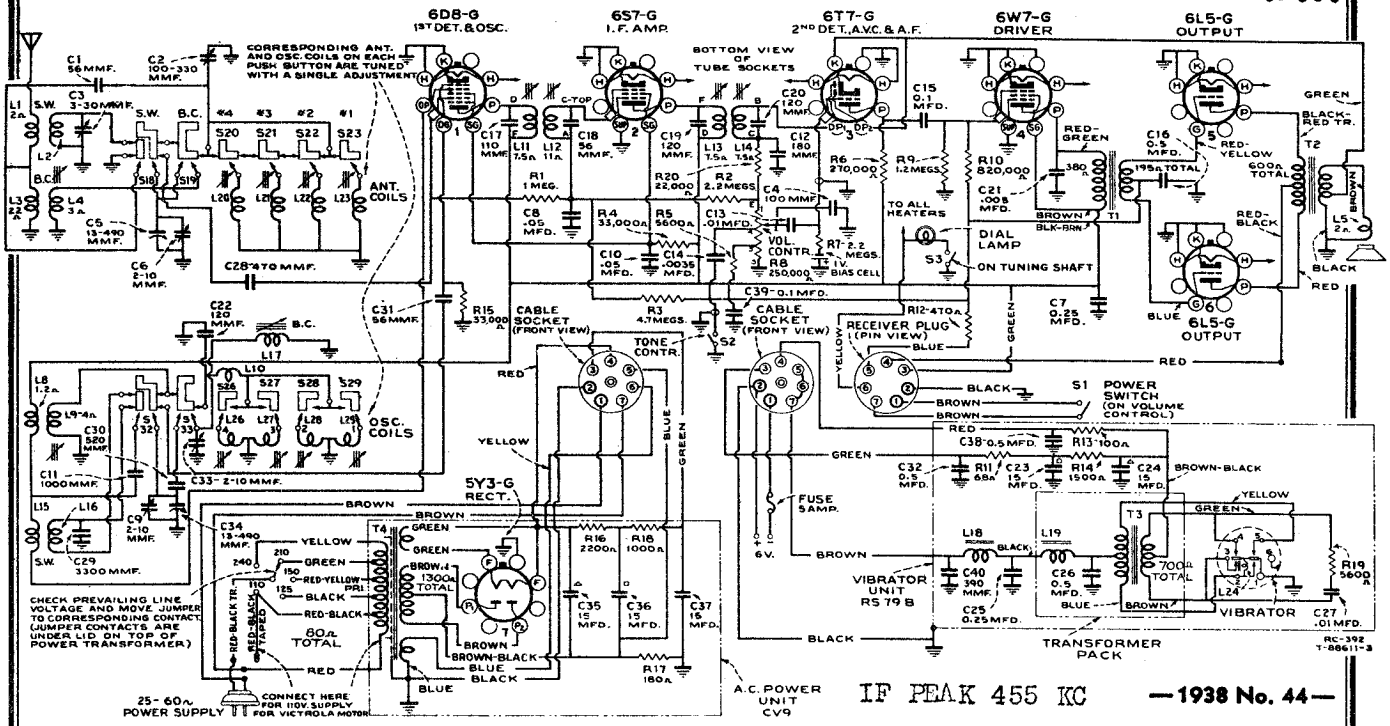
Schematic, Tuner Data

# RCA MFG. CO., INC.

MODELS 96BK6, 96BT6
Chassis RC-392
MODEL CV-9 A-C S.P.U.




*Schematic Circuit Diagram for Models 96BK6, 96BT6 and CV-9 A-C Power Unit*

**FREQUENCY RANGES**

| | |
|---|---|
| Standard Broadcast ("A" Band) | 540—1,720 kc |
| Short Wave ("C" Band) | 5.8—18 mc |
| Four Electric Tuning Positions | 550—1,500 kc |
| One station between approximately 550— | 950 kc (Button No. 1) |
| One station between approximately 610— | 1,090 kc (Button No. 2) |
| One station between approximately 750— | 1,370 kc (Button No. 3) |
| One station between approximately 845— | 1,500 kc (Button No. 4) |
| Intermediate Frequency | 455 kc |

**POWER SUPPLY RATINGS**

With CV-9 a-c power supply unit:
100-130/140-160/195-250 volts, 25-60 cycles, 45 watts

With RS-79B d-c power supply unit:
6.3 volts; total current drain 1.85 amps.

**POWER OUTPUT**

| | Undistorted | Maximum |
|---|---|---|
| With a-c power unit | 2.2 watts | 3.5 watts |
| With d-c power unit | 1.7 watts | 2.2 watts |

**LOUDSPEAKER**

| | |
|---|---|
| Type | Permanent Magnet Dynamic |
| Voice Coil Impedance | 2.2 ohms at 400 cycles |
| Diameter | 96BK6, 8 inches; 96BT6, 6 inches |

| | Model 96BT6 | Model 96BK6 |
|---|---|---|
| Height | 10⅝ inches | 39½ inches |
| Width | 20⅞ inches | 26 inches |
| Depth | 9¾ inches | 12⅝ inches |
| Net Weight | 17½ pounds | 21 pounds |
| Shipping Weight | 46 pounds | 61 pounds |
| Chassis Base Dimensions | 3 inches x 11⅛ inches | x 5 inches |
| Over-all Height of Chassis | 7¾ inches | |
| Tuning Drive Ratio | 12 to 1 | |

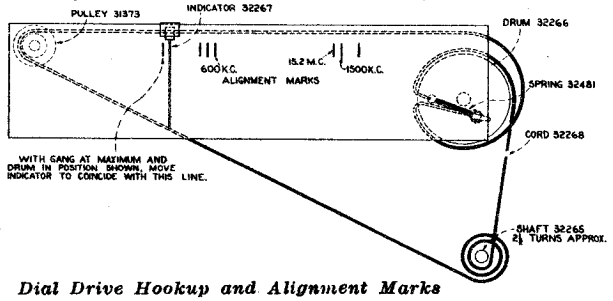
The 96BK6 is a console model, the 96BT6 a table model. Each of these receivers is a super-sensitive, six-tube superheterodyne.

## Adjustment for Electric Tuning

These models have six push buttons. The right-hand button connects the receiver for dial tuning on the "Short-wave" band, the next button connects for dial tuning on the "Standard-broadcast" band, and the other four buttons are for electric tuning of four different stations in the standard-broadcast band. Each station button connects separate oscillator and antenna coils which are tuned by ganged magnetite cores, and may be adjusted for the desired stations. Use a small screw-driver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use the regular antenna for all adjustments.

The procedure is as follows:

1. Make a list of the four desired stations, arranged in order from low to high frequencies.
2. Push in the broadcast dial-tuning button (second from right), and manually tune in the first station on the list.
3. Push in station button No. 1 (left-hand) and adjust No. 1 push button adjustment to receive this station. Turn the adjusting screw all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust for each of the remaining three stations in the same manner. (Clockwise adjustment of the screw tunes the circuits to lower frequencies.)
5. After installation, and with antenna properly connected, readjust C2 as outlined in note under "Alignment Procedure."




*Dial Drive Hookup and Alignment Marks*

## Power Supply Units

The receiver chassis has a seven-prong male plug for connection to the power-supply unit. Both a-c and d-c power supply units are available, as listed under "Power Supply Ratings." The receivers are shipped with a d-c power unit for use with a 6-volt supply. If an a-c unit is desired, it must be purchased separately as Model CV-9.

If no receiver chassis is available the a-c unit (CV-9) may be tested for proper operation by connecting a 6,500-ohm, 10-watt resistor between terminals 2 and 4 on the cable socket, and shorting terminals 1 and 7. With one voltmeter prod on terminal 2 (ground) the following readings should be obtained: terminal 3, + 200 volts d.c.; terminal 4, + 200 volts d.c.; terminal 5, —5.9 volts d.c.; terminal 6, 6.5 volts a.c. Values should be within ± 20% with rated supply voltage.

**Precautionary Lead Dress.—**

1. Blue lead from push button switch to gang condenser must be dressed over the top of the switch.
2. Leads to push button coils must be dressed close to the coils.
3. Red and blue leads to gang condenser must be dressed away from chassis.
4. Blue antenna lead must be dressed in the end of the chassis away from gang leads and coil windings.
5. Bias cell must be installed with carbon disc connected to chassis.
6. Leads from power switch to connector plug must be dressed away from other leads.
7. Parts under push button coils must be dressed down away from them.
8. Green lead to first detector grid cap should be pulled out of the chassis as far as possible, and dressed away from the tube envelope.

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MODELS 96BK6, 96BT6
Chassis RC-392

# RCA MFG. CO., INC.

Alignment, Voltage
Chassis Wiring

| Steps | Connect the High Side of Test Oscillator to: | Tune Test Oscillator To: | Press Push Button: | Turn Radio Dial to: | Adjust for Maximum Peak Output: |
|---|---|---|---|---|---|
| 1 | 6S7-G I-F grid cap in series with .01 mfd. | 455 kc | B.C. (No. 5) | No Station Point between 550—750 kc. | L13 and L14 (2nd I-F Trans.) |
| 2 | 6D8-G Det. grid cap in series with .01 mfd. | 455 kc | B.C. (No. 5) | | L11 and L12 (1st I-F Trans.) |
| 3 | Antenna Lead (blue) in series with 200 mmfd. | 1,500 kc | No. 4 | | L20-L26 (No. 4 Push Button Adj.) C2 (ant.) |
| 4 | Antenna Lead (blue) in series with 200 mmfd. | 600 kc | No. 1 | | L23-L29 * (No. 1 Push Button Adj.) L9 (osc.) |
| 5 | Repeat steps 3 and 4 until maximum signal is obtained. | | | | |
| 6 | Unscrew C9 (osc.) to minimum capacity. | | | | |
| 7 | Antenna Lead (blue) in series with 200 mmfd. | 600 kc | B.C. (No. 5) | 600 kc Calibration Mark | L17 (osc.) ** L4 (ant.) |
| 8 | Antenna Lead (blue) in series with 200 mmfd. | 1,500 kc | B.C. (No. 5) | 1,500 kc Calibration Mark | C33 (osc.) C6 (ant.) |
| 9 | Repeat steps 7 and 8 until maximum signal is obtained. | | | | |
| 10 | Antenna Lead (blue) in series with 300 ohms | 15.2 mc | S.W. (No. 6) | 15.2 mc Calibration Mark | C9 (osc.) † C3 (ant.) †† |
| 11 | Antenna Lead (blue) in series with 200 mmfd. | 1,500 kc | B.C. (No. 5) | 1,500 kc Calibration Mark | C33 (osc.) |
| 12 | Follow the "Adjustments for Electric Tuning." | | | | |

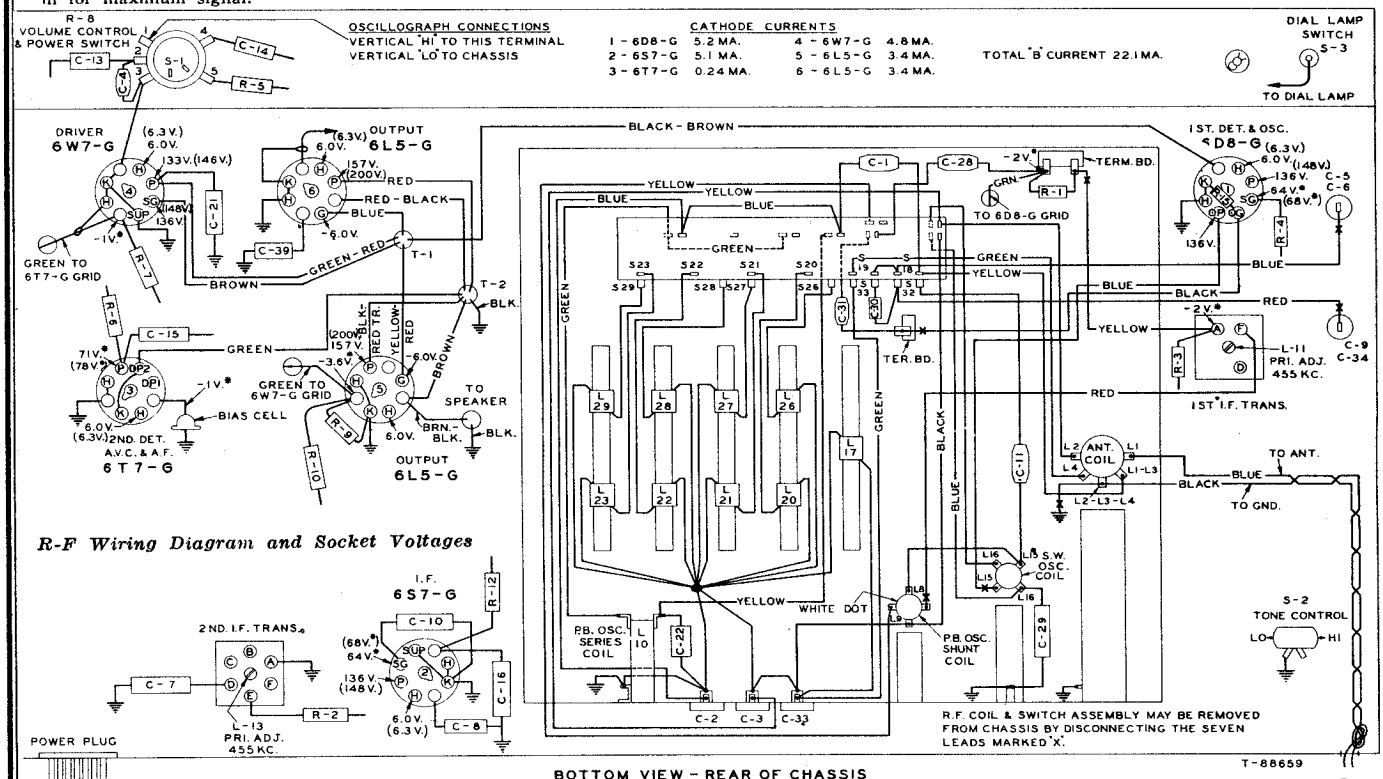
* Adjust L23-L29 (No. 1 push button adjustment) and L9 at the same time, rocking in for maximum signal.

** Turn L17 adjusting screw all the way out, then turn in slowly until a peak is reached. If two peaks can be obtained the lower inductance setting (screw out) should be used.

† Use minimum capacity peak if two peaks can be obtained. A weaker signal (image) should be received about one quarter inch to the left on the dial plate.

†† Use maximum capacity peak if two peaks can be obtained, rock in for maximum signal.

Note: The oscillator tracks 455 kc above the signal on all bands. After the receiver has been installed and the antenna connected, it is advisable to make a slight change in the adjustment of the antenna trimmer, C2. In most cases it is desirable to make this adjustment while receiving a station on No. 4 push button. However, if a station received on one of the other buttons is especially weak, it may be advisable to make the adjustment while receiving the weak station on that particular button.




*R-F Wiring Diagram and Socket Voltages*

BOTTOM VIEW - REAR OF CHASSIS

Measurements made to chassis unless otherwise indicated, with set tuned to a quiet point and the volume control at minimum. Values should hold within approximately ± 20% with rated supply voltage.

* Note: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured values will be lower, depending on the voltmeter loading.

Bracketed voltages ( ) refer to operation with CV-9 a-c power unit.

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# RCA MFG. CO., INC.

MODELS 96BK6, 96BT6
MODELS 96E2, 96K5, 96K6, 96T7, 97K2, 97T2
Parts Lists

**Models** 96E2 96K5 96K6 96T7 97K2 97T2

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES** | |
| 14517 | Board—Antenna ground terminal board | .25 |
| 30752 | Bracket—Magic Eye bracket and holder—Models 97T2 and 97K2 | .25 |
| 32670 | Bracket—Dial color plate and lamp brackets | .75 |
| 32684 | Cable—Indicator drive cable | .20 |
| 30766 | Cap—Magic Eye cap | .15 |
| 12110 | Cap—Tube shield cap | .14 |
| 31400 | Capacitor—Triple adjustable trimmer two sections 2-10 mmfd., one section 3-30 mmfd. (C21, C23, C25) | .50 |
| 12722 | Capacitor—18 mmfd. (C1) | .35 |
| 32486 | Capacitor—Antenna trimmer capacitor bank. (C31, C32, C33, C34, C35, C36) | 1.40 |
| 12948 | Capacitor—33 mmfd. (C3) | .35 |
| 12720 | Capacitor—100 mmfd. (C42) | .35 |
| 14262 | Capacitor—109 mmfd. (C5, C6) | .30 |
| 12724 | Capacitor—120 mmfd. (C12) | .35 |
| 12404 | Capacitor—120 mmfd. (C7, C8) | .30 |
| 14712 | Capacitor—180 mmfd. (C37) | .30 |
| 30433 | Capacitor—470 mmfd. (C2) | .35 |
| 32492 | Capacitor—530 mmfd. (C24) | .40 |
| 31435 | Capacitor—750 mmfd. (C28) | .40 |
| 31403 | Capacitor—3300 mmfd. (C22) | .60 |
| 31405 | Capacitor—6000 mmfd. (C27) | .75 |
| 5107 | Capacitor—.0025 mfd. (C13) | .20 |
| 4838 | Capacitor—.005 mfd. (C14, C17) | .25 |
| 14393 | Capacitor—.01 mfd. (C10) | .30 |
| 4839 | Capacitor—0.1 mfd. (C38, C39) | .30 |
| 11315 | Capacitor—.015 mfd. (C11) | .20 |
| 4886 | Capacitor—.05 mfd. (C9) | .20 |
| 32485 | Capacitor—Comprising two 10 mfd., one 20 mfd., and one 5 mfd. sections (C16, C18, C19, C41) | 1.75 |
| 31382 | Clip—Oscillator coil and core mounting clip | .04 |
| 32493 | Coil—Antenna coil—A, B, and C bands (L1, L2, L3, L43) | 1.35 |
| 31951 | Coil—Oscillator coil—A, B, and C bands (L4, L5, L6, L7, L8, L9) | 1.40 |
| 31383 | Coil—Oscillator coil—A band (L41, L42) | .30 |
| 32487 | Coil—Oscillator coil—A band (L39, L40) | .35 |
| 31385 | Coil—Oscillator coil—A band (L37, L38) | .30 |
| 31369 | Condenser—2-gang variable tuning condenser (C28, C29, C30) | 2.65 |
| 32868 | Control—Volume control, tone control, and on-off switch (R6, R13, S3) | 3.00 |
| 32634 | Cord—Indicator pointer and variable condenser drum drive cord | .10 |
| 30905 | Core—Adjustable core and stud for i-f transformer | .35 |
| 31386 | Core—Adjustable core and stud for oscillator coil Stock Nos. 31383 and 31385 | .15 |
| 12800 | Core—Adjustable core and stud for oscillator coil Stock No. 32487 | .35 |
| 31372 | Drum—Variable condenser drive cord drum and calibrator dial | .65 |
| 32552 | Indicator—Dial pointer and clip | .20 |
| 11891 | Lamp—Dial or Electric Tuning indicator lamp | .17 |
| 5040 | Plug—4-contact female plug for speaker cable | .30 |
| 31373 | Pulley—Indicator drive cord pulley | .08 |
| 14671 | Resistor—33 ohms, ½ watt (R11) | .20 |
| 31388 | Resistor—390 ohms, 1 watt (R12) | .22 |
| 31389 | Resistor—12,000 ohms, wire wound, 5 watts (R14) | .50 |
| 30151 | Resistor—18,000 ohms, 1 watt (R17) | .22 |
| 14264 | Resistor—22,000 ohms, 1/10 watt (R4) | .15 |
| 12738 | Resistor—27,000 ohms, ½ watt (R7) | .20 |
| 12454 | Resistor—33,000 ohms, ½ watt (R2) | .20 |
| 14560 | Resistor—100,000 ohms, ½ watt (R10) | .20 |
| 11398 | Resistor—220,000 ohms, 1/10 watt (R5) | .15 |
| 12199 | Resistor—270,000 ohms, ½ watt (R8) | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt (R9) | .20 |
| 12013 | Resistor—1 meg., 1/10 watt (R16) Models 97T2 and 97K2 | .15 |
| 13730 | Resistor—1 meg., ½ watt (R1) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R3) | .20 |
| 14343 | Retainer—Retaining spring for station selector knob shaft | .03 |
| 14887 | Retainer—Drive cord pulley retainer | .01 |
| 4669 | Screw—No. 8-32 square head set screw for drum Stock No. 31372 | .03 |
| 32671 | Shaft—Station selector knob shaft and pulley | .35 |
| 31189 | Shield—Electric tuning lamp shield | .04 |
| 31364 | Socket—Dial lamp socket | .20 |
| 31365 | Socket—"Electric Tuning" indicator lamp insulated socket Model 97T2 and 97K2 | .30 |
| 13871 | Socket—Magic Eye socket (Models 97T2 and 97K2) | .45 |
| 31251 | Socket—Octal base tube socket | .25 |
| 14278 | Socket—Pickup socket | .25 |
| 31418 | Spring—Indicator, or drum drive cord tension spring | .05 |
| 32669 | Switch—Range switch (S1, S2) | 1.10 |
| 31370 | Switch—Station selector push-button switch (S4, S6, S31, S32, S35, S34, S36, S37, S38, S39, S40, S41, S42, S43, S44, S45) | 3.85 |
| 30902 | Transformer—First i-f transformer (L10, L11, C5, C6) | 1.90 |
| 14283 | Transformer—Second i-f transformer (L12, L13, C7, C8, C37, R4, R5) | 3.80 |
| 31445 | Transformer—Power transformer 100-120 volts, 25-60 cycle (T1) | 7.80 |
| 31380 | Transformer—Power transformer 100-120 volts, 50-60 cycle (T1) | 4.75 |
| 31446 | Transformer—Power transformer 100-130, 140-160, 200-250 volts, 50-60 cycle (T1) | 8.05 |
| | **SPEAKER ASSEMBLIES (84308-4) Model 96T7** | |
| 32918 | Cone and Voice Coil assembly complete with metal housing | 2.40 |
| 32919 | Field Coil Complete | 1.80 |
| 32920 | Output Transformer | 1.45 |
| 31302 | Plug—4-contact male for speaker | .25 |
| | **SPEAKER ASSEMBLIES (84308-1) Models 96T7 and 97T2** | |
| 31443 | Cone—Speaker cone and voice coil (L14) | 1.40 |
| 31442 | Speaker—Complete | 4.00 |
| 31444 | Transformer—Output transformer (T2) | 1.95 |
| | **SPEAKER ASSEMBLIES (RL-79-1) Model 97T2** | |
| 32907 | Cap—Cone center dust cap | .02 |
| 32906 | Coil—Hum neutralizing coil | .25 |
| 33077 | Coil—Speaker field coil | 1.20 |
| 32934 | Cone—Cone and voice coil assembly | 1.85 |
| 31302 | Plug—4-prong male speaker plug | .25 |
| 33078 | Speaker—Speaker complete | 5.40 |
| 32905 | Transformer—Output transformer (T2) | 1.35 |
| | **SPEAKER ASSEMBLIES (RL-63H-3) Model 96E2** | |
| 31825 | Cap—Speaker cone center dust cap | .05 |
| 11469 | Coil—Hum neutralizing coil (L17) | .30 |
| 12012 | Coil—Speaker field coil (L16) | 2.90 |
| 31310 | Cone—Speaker cone and voice coil (L16) | 1.75 |
| 31302 | Plug—4-contact male plug for speaker | .25 |
| 31324 | Speaker complete | 10.45 |
| 14355 | Transformer—Output transformer (T2) | 2.00 |
| | **SPEAKER ASSEMBLIES (RL-70H-1) Models 96K5 and 97K2** | |
| 31825 | Cap—Dust cap for cone center | .05 |
| 12012 | Coil—Field coil (L16) | 2.90 |
| 11469 | Coil—Hum neutralizing coil (L15) | .30 |
| 31275 | Cone—Speaker cone and voice coil (L14) | 1.75 |
| 31302 | Plug—4-contact male plug | 25 |
| 31592 | Speaker—Speaker complete | 9.35 |
| 14358 | Screw—Screw, washer, and lockwasher to hold core in yoke | .04 |
| 14355 | Transformer—Output transformer (T2) | 2.00 |
| 14357 | Washer—Spring washer to hold field coil | .06 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 31397 | Button—Push button | .15 |
| 31456 | Cover—8-protective covers for push button markers | .08 |
| 32673 | Dial—Dial scale and crystal (glass) | .60 |
| 32672 | Escutcheon—Dial escutcheon and dial—less buttons—Models 96K5, 96E2, and 96T7 | 3.40 |
| 32674 | Escutcheon—Dial escutcheon and dial—less buttons—Models 97K2 and 97T2 | 3.85 |
| 31355 | Knob—Range switch knob | .12 |
| 14359 | Knob—Station selector knob | .20 |
| 31391 | Knob—Tone control knob | .15 |
| 30773 | Knob—Volume control knob | .15 |
| 31589 | Marker—1 set station call letter markers | .35 |
| 31458 | Marker—"Dial Tuning" push button marker | .01 |
| 31457 | Marker—"Victrola" push button marker | .01 |
| 11210 | Screw—Chassis mounting screws, washers and lockwashers. Models 96K5, 97K2 and 96E2 (3 required) | .05 |
| 31390 | Screw—Chassis mounting screws, washers and lockwashers Models 96T7 and 97T2. (Sufficient for one chassis) | .10 |
| 4982 | Spring—Retaining spring for knob Stock No. 14359 | .05 |
| 14270 | Spring—Retaining spring for knob Stock Nos. 30773 and 31355 | .05 |
| 30330 | Spring—Retaining spring for knob Stock No. 31391 | .03 |

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

**96BK6, 96BT6**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES** | |
| 32259 | Capacitor—3-section trimmer bank 2-10, 3-30, 100-330 mmfd. (C33, C3, C2) | .65 |
| 12629 | Capacitor—56 mmfd. (C18) | .35 |
| 12723 | Capacitor—56 mmfd. (C1, C31) | .35 |
| 30406 | Capacitor—100 mmfd. (C4) | .35 |
| 14262 | Capacitor—110 mmfd. (C17) | .30 |
| 12404 | Capacitor—120 mmfd. (C19, C20) | .30 |
| 32370 | Capacitor—120 mmfd. (C22) | .50 |
| 14712 | Capacitor—180 mmfd. (C12) | .30 |
| 30433 | Capacitor—470 mmfd. (C28) | .35 |
| 32269 | Capacitor—520 mmfd. (C30) | .40 |
| 12635 | Capacitor—1,000 mmfd. (C11) | .50 |
| 4881 | Capacitor—3,300 mmfd. (C29) | .60 |
| 30303 | Capacitor—.0035 mfd. (C14) | .40 |
| 4838 | Capacitor—.005 mfd. (C21) | .25 |
| 14393 | Capacitor—.01 mfd. (C13) | .30 |
| 4886 | Capacitor—.05 mfd. (C8, C10) | .20 |
| 4839 | Capacitor—.1 mfd. (C15, C39) | .30 |
| 30965 | Capacitor—.25 mfd. (C7) | .30 |
| 12741 | Capacitor—.5 mfd. (C16) | .30 |
| 31581 | Cell—1 volt bias cell | .25 |
| 32257 | Coil—Push button osc. shunt coil (L8, L9) | .65 |
| 32254 | Coil—Broadcast oscillator coil (L17) | .95 |
| 32258 | Coil—Antenna coil (L1, L2, L3, L4) | 1.20 |
| 32366 | Coil—"C" band oscillator coil (L15, L16) | .70 |
| 32256 | Coil—Push button osc. series coil | .60 |
| 32253 | Coil—Push button antenna and oscillator coil (L20, L26) | 1.10 |
| 32252 | Coil—Push button antenna and oscillator coil (L21, L27) | 1.10 |
| 32251 | Coil—Push button antenna and oscillator coil (L22, L28) | 1.10 |
| 32250 | Coil—Push button antenna and oscillator coil (L23, L29) | 1.15 |
| 32365 | Condenser—2-gang variable condenser (C5, C6, C9, C34) | 2.70 |
| 32369 | Contact—Dial lamp spring contact (S3) | .10 |
| 12006 | Core—Variable core and stud for I.F. transformers | .15 |
| 12800 | Core—Variable core and stud for antenna coil | .35 |
| 32268 | Cord—Drive cord | .30 |
| 32266 | Drum—Variable condenser drive drum | .45 |
| 31580 | Holder—Bias cell holder | .15 |
| 32267 | Indicator—Dial scale pointer | .25 |
| 31480 | Lamp—Dial lamp | .20 |
| 14404 | Plugs—7-prong plug—mates with socket on supply cable | .35 |
| 31373 | Pulley—Drive cord pulley | .08 |
| 30546 | Resistor—470 ohms, ½ watt (R12) | .20 |
| 13714 | Resistor—5,600 ohms, ½ watt (R5) | .20 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R20) | .15 |
| 12454 | Resistor—33,000 ohms, ½ watt (R4, R15) | .20 |
| 12199 | Resistor—270,000 ohms, ½ watt (R6) | .20 |
| 30983 | Resistor—820,000 ohms, ½ watt (R10) | .20 |
| 13730 | Resistor—1 meg., ½ watt (R1) | .20 |
| 30208 | Resistor—1.2 meg., ½ watt (R9) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R2, R7) | .20 |
| 30271 | Resistor—4.7 meg., ½ watt (R3) | .20 |
| 14887 | Retainer—Drive cord pulley retaining washer | .01 |
| 32261 | Screw—Push button oscillator coil adjustment screw and mounting nut | .03 |
| 3993 | Screw—No. 6-32 x ¼ square head set screw for switch collar | .05 |
| 4669 | Screw—No. 8-32 square head set screw from drive drum | .03 |
| 32265 | Shaft—Tuning knob shaft and retainer | .25 |
| 3882 | Shield—Detector tube shield | .22 |
| 3950 | Shield—Oscillator tube shield | .26 |
| 31365 | Socket—Dial lamp socket | .30 |
| 5119 | Socket—3-contact speaker cable socket | .25 |
| 31251 | Socket—8-contact tube socket | .25 |
| 32481 | Spring—Drive cord tension spring | .05 |
| 32255 | Switch—Push button switch (S18, S19, S20, S21, S22, S23, S26, S27, S28, S29, S32, S33) | 2.95 |
| 30953 | Switch—Tone control switch (S2) | .45 |
| 32368 | Transformer—Driver and output transformer pack (T1, T2) | 5.25 |
| 14261 | Transformer—First I.F. transformer (L11, L12, C17, C18) | 2.05 |
| 14308 | Transformer—Second I.F. transformer (L13, L14, C12, C19, C20, R20) | 2.80 |
| 32367 | Volume Control and Power Switch (R8, S1) | 2.00 |
| | **SPEAKER ASSEMBLIES Model 96BT6 (Speaker 84307-3)** | |
| 32326 | Cone—Speaker cone and voice coil | 1.75 |
| 5118 | Plug—3-prong male plug | .25 |
| 32325 | Speaker—Complete | 8.00 |
| | **SPEAKER ASSEMBLIES Model 96BK6 (Speaker 84477-2)** | |
| 32328 | Cone—Speaker cone and voice coil | 1.90 |
| 5118 | Plug—3-prong male plug | .25 |
| 32327 | Speaker—Complete | 6.95 |
| | **VIBRATOR POWER UNIT ASSEMBLIES (RS-79B)** | |
| 13894 | Capacitor—390 mmfd. (C40) | .35 |
| 4937 | Capacitor—.01 mfd. (C27) | .25 |
| 12484 | Capacitor—.25 mfd. (C25) | .30 |
| 30867 | Capacitor—0.5 mfd. (C32, C38) | .30 |
| 32152 | Capacitor—Capacitor-15-15 mfd. Electrolytic (C23, C24) | 1.05 |
| 14289 | Clip—Battery clip for cable | .30 |
| 31794 | Coil—Choke coil (L18) | .65 |
| 6516 | Connector—Fuse connector | .20 |
| 5140 | Fuse—5 ampere | .10 |
| 14281 | Resistor—68 ohms, ½ watt (R11) | .20 |
| 14439 | Resistor—100 ohms, ½ watt (R13) | .20 |
| 3153 | Resistor—1,500 ohms, 1 watt (R14) | .22 |
| 30734 | Resistor—5,600 ohms, ½ watt (R18) | .20 |
| 4786 | Socket—6-prong socket for plug-in vibrator unit | .25 |
| 14409 | Socket—7-contact female socket for vibrator cable | .45 |
| 32371 | Transformer—Vibrator transformer (T3, L19, C26) | 4.25 |
| 14309 | Vibrator—(L24) | 4.25 |
| | **A.C. POWER UNIT ASSEMBLIES Model CV-9** | |
| 32223 | Capacitor—15 mfd. (C37) | 1.00 |
| 32222 | Capacitor—2-sections 15 mfd. each (C35, C36) | 1.30 |
| 14409 | Plug—7-contact female plug for power out cable | .45 |
| 30545 | Resistor—180 ohms, ½ watt (R17) | .20 |
| 4687 | Resistor—1,000 ohms, ½ watt (R18) | .20 |
| 13486 | Resistor—2,200 ohms, 1 watt (R16) | .22 |
| 31251 | Socket—Tube socket | .25 |
| 32221 | Transformer—Power transformer 100-130, 140-160, 195-250 volts, 25-60 cycles (T4) | 7.95 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 32279 | Button—Station selector push button | .06 |
| 31935 | Clip—Spring clips to hold dial | .10 |
| 32372 | Dial—Station selector dial scale | .65 |
| 32277 | Escutcheon—Dial bezel and crystal | 1.10 |
| 32278 | Escutcheon—Push button bezel | .70 |
| 31713 | Knob—Tuning knob | .20 |
| 31355 | Knob—Volume control knob | .12 |
| 32281 | Marker—Push button marker for broadcast band | .02 |
| 32280 | Marker—Push button marker for short wave band | .02 |
| 32067 | Marker—One set station call letter markers | .35 |
| 12993 | Screw—Set screw for knob, Stock No. 31713 | .02 |
| 14267 | Screw—Chassis mounting screw assembly—Model 96BT6 only | .04 |
| 30467 | Screw—Chassis mounting screw assembly—Model 96BK6 only | .05 |
| 14270 | Spring—Spring for knob, Stock No. 31355 | .05 |

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE

MODELS 96E2, 96K5, 96K6, 96T7
Chas. RC-351L; 97K2, 97T2
Chassis RC-351K

RCA MFG. CO., INC.

Alignment, Socket, Trimmers
Tuner Adjustments

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

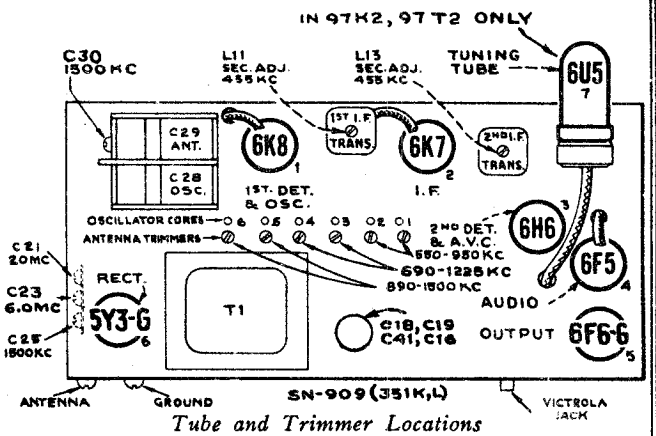
**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord Drum.** — The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.




*Tube and Trimmer Locations*

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the left-hand end mark, and gang condenser fully meshed.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

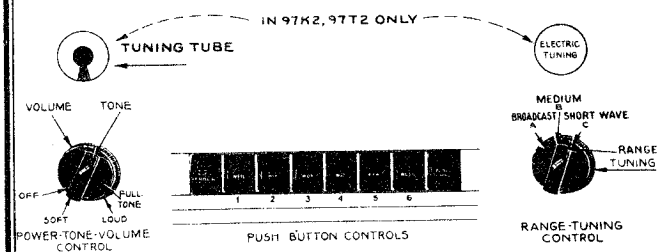
| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | "A" band, Quiet Point between 550-750 kc | L12 and L13 (2nd I-F Trans.) |
| 2 | 6K8 det. grid cap, in series with .01 mfd. | 455 kc | | L10 and L11 (1st I-F Trans.) |
| 3 | Antenna Terminal, in series with 200 mmf. | 600 kc | 600 kc (150.5°) "A" band | L9 |
| 4 | | 1,500 kc | 1,500 kc (28°) "A" band | C25 (osc.) C30 (ant.) |
| 5 | Repeat steps 3 and 4. | | | |
| 6 | Antenna Terminal, in series with 400 ohms | 6 mc | 6 mc (26.5°) "B" band | C23 (osc.)* |
| 7 | | 20 mc | 20 mc (22°) "C" band | C21 (osc.)* |
| 8 | Follow "Adjustments for Electric Tuning." | | | |

* Use **minimum** capacity peak if two peaks can be obtained, and rock gang condenser slightly while adjusting C23 and C21.

**Note.**—Oscillator tracks 455 kc above signal on all bands.

# ADJUSTMENTS FOR ELECTRIC TUNING

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.




*Location of Controls*

The left-hand push button is a Victrola-Attachment switch. The right-hand push button is for dial tuning.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

**Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.**

5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

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Schematic, Lead Dress

# RCA MFG. CO., INC.

MODELS 96E2, 96K5, 96K6, 96T7
Chas. RC-351L; 97K2, 97T2
Chassis RC351K

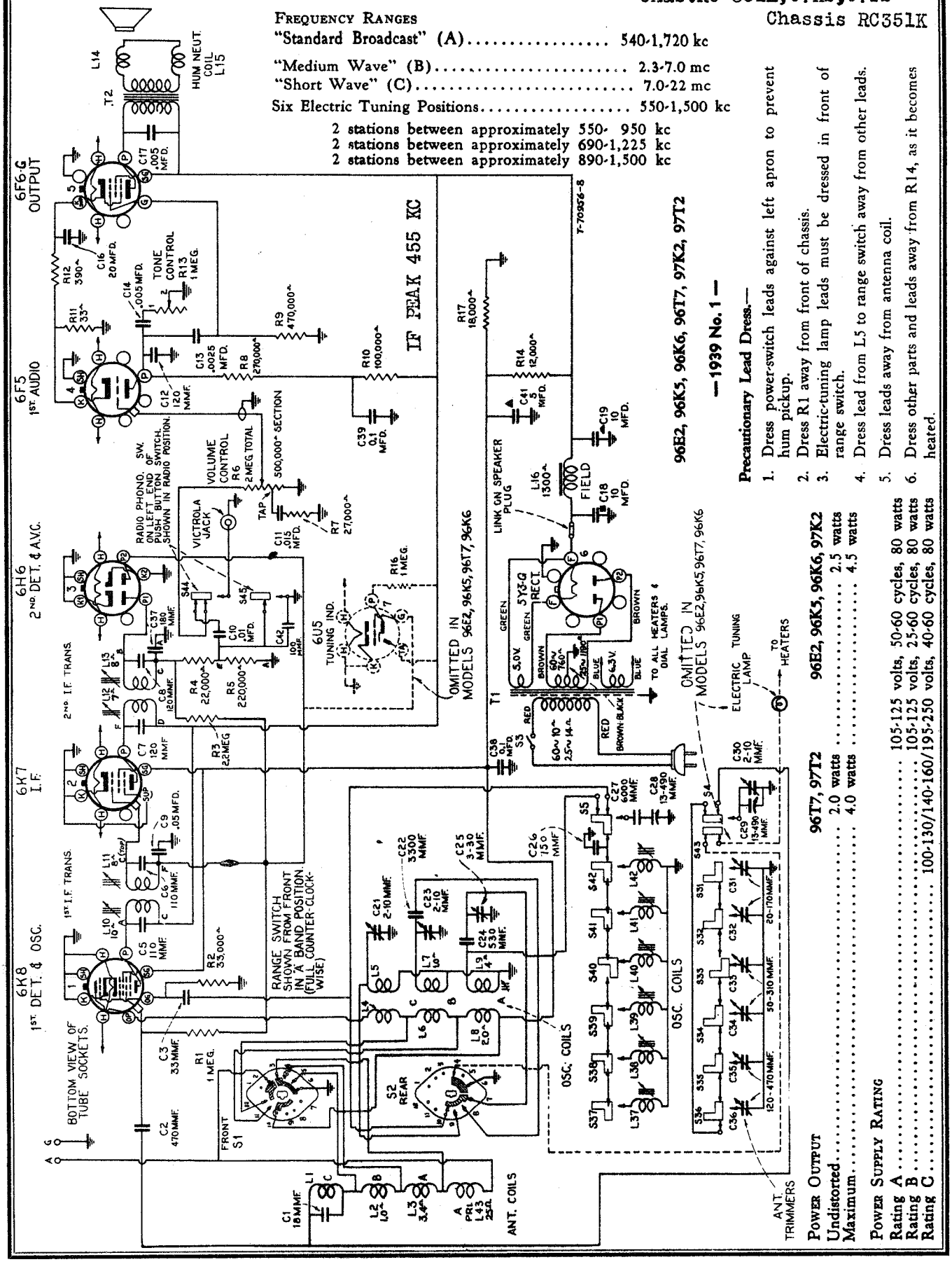
**Frequency Ranges**

"Standard Broadcast" (A)..... 540-1,720 kc

"Medium Wave" (B)..... 2.3-7.0 mc
"Short Wave" (C)..... 7.0-22 mc

Six Electric Tuning Positions..... 550-1,500 kc

2 stations between approximately 550- 950 kc
2 stations between approximately 690-1,225 kc
2 stations between approximately 890-1,500 kc




**Precautionary Lead Dress.—**

1. Dress power-switch leads against left apron to prevent hum pickup.
2. Dress R1 away from front of chassis.
3. Electric-tuning lamp leads must be dressed in front of range switch.
4. Dress lead from L5 to range switch away from other leads.
5. Dress leads away from antenna coil.
6. Dress other parts and leads away from R14, as it becomes heated.

| Power Output | 96T7, 97T2 | 96E2, 96K5, 96K6, 97K2 |
|---|---|---|
| Undistorted | 2.0 watts | 2.5 watts |
| Maximum | 4.0 watts | 4.5 watts |

**Power Supply Rating**

| | |
|---|---|
| Rating A | 105-125 volts, 50-60 cycles, 80 watts |
| Rating B | 105-125 volts, 25-60 cycles, 80 watts |
| Rating C | 100-130/140-160/195-250 volts, 40-60 cycles, 80 watts |

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MODELS 96E2, 96K5, 96K6, 96T7
Chassis RC-351L
LOUDSPEAKER

# RCA MFG. CO., INC.

97K2, 97T2, Chas. RC351K
R-F Chassis Wiring, Data

**Type** ..... Electrodynamic
Voice-coil impedance 84308-1, 84308-4, RL63H-3, RL70H-1.. 2.2 ohms, RL79-1..... 3.4 ohms..... at 400 cycles
Pilot Lamps (1 on Models 96K5, 96K6, 96E2, 96T7) (2 on Models 97K2, 97T2)..... Mazda No. 47, 6.3 volts, .15 amp.

**Loudspeaker.**—Centering of the loudspeaker voice coil is accomplished in the usual manner with three narrow celluloid or paper feelers after first removing the front dust cover. A dust cover should be cemented in place with ambroid upon completion of adjustment.

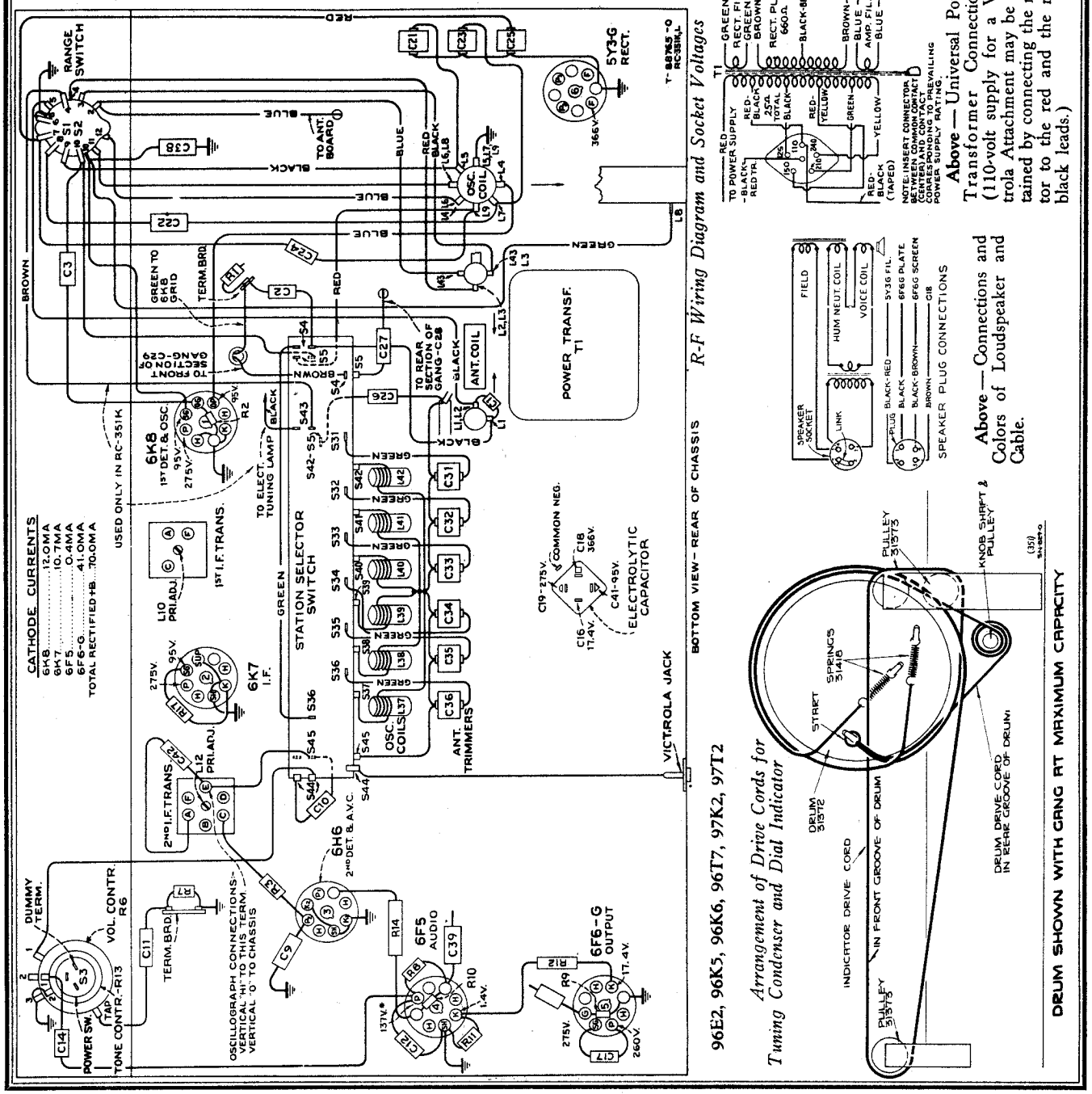
The seven-tube models have a "Magic Eye" tuning tube and illuminated indicator to show when the set is being operated on electric tuning. All models have electric tuning for six stations in the standard broadcast range.

Features of design include: Magnetite-core electric-tuning coils; magnetite-core "A" band oscillator coil; magnetite-core i-f transformers; temperature-compensated capacitor in the oscillator circuit; aural-compensated volume control; high-frequency tone control; jack and switch for Victrola attachment; straight-line dial; dust-proof electrodynamic loudspeaker.

**Victrola Attachment.**—A jack is provided on the rear of the chassis for connection to a Victrola Attachment. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.

***NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.


R-F Wiring Diagram and Socket Voltages
96E2, 96K5, 96K6, 96T7, 97K2, 97T2
BOTTOM VIEW—REAR OF CHASSIS
CATHODE CURRENTS
6K8 ..... 12.0MA
6H7 ..... 10.7MA
6F5 ..... 0.4MA
6F6-G ..... 41.0MA
TOTAL RECTIFIED-HB ..... 70.0MA
USED ONLY IN RC-351K
6K8 1ST DET. & OSC.
6K7 I.F.
6H6 2ND DET. & A.V.C.
6F5 AUDIO
6F6-G OUTPUT
5Y3-G RECT.
POWER TRANSF. T1
STATION SELECTOR SWITCH
RANGE SWITCH
VOL. CONTR. R6
TONE CONTR. R13
POWER SW. S3
DUMMY TERM.
1ST I.F. TRANS.
2ND I.F. TRANS.
ANT. TRIMMERS
OSC. COILS
ANT. COIL
VICTROLA JACK
ELECTROLYTIC CAPACITOR
COMMON NEG.
TO ANT. BOARD
TO ELECT. TUNING LAMP
TO REAR SECTION OF GANG-C28
TO FRONT SECTION OF GANG-C29
GREEN TO 6K8 GRID
TERM. BRD.
OSCILLOGRAPH CONNECTIONS—VERTICAL "HOT" TO THIS TERM.—VERTICAL "G" TO CHASSIS
Above—Universal Power Transformer Connections. (110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.)
Above—Connections and Colors of Loudspeaker and Cable.
SPEAKER PLUG CONNECTIONS
Arrangement of Drive Cords for Tuning Condenser and Dial Indicator
DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY
INDICATOR DRIVE CORD
IN FRONT GROOVE OF DRUM
DRUM DRIVE CORD IN REAR GROOVE OF DRUM
PULLEY 31573
DRUM 31572
SPRINGS 31416
START
KNOB SHAFT & PULLEY

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Schematic, Voltage
R-F Chassis Wiring

# RCA MFG. CO., INC.

MODELS 96T4, 96T5, Chas. RC-399
96T6, Chassis RC-399A

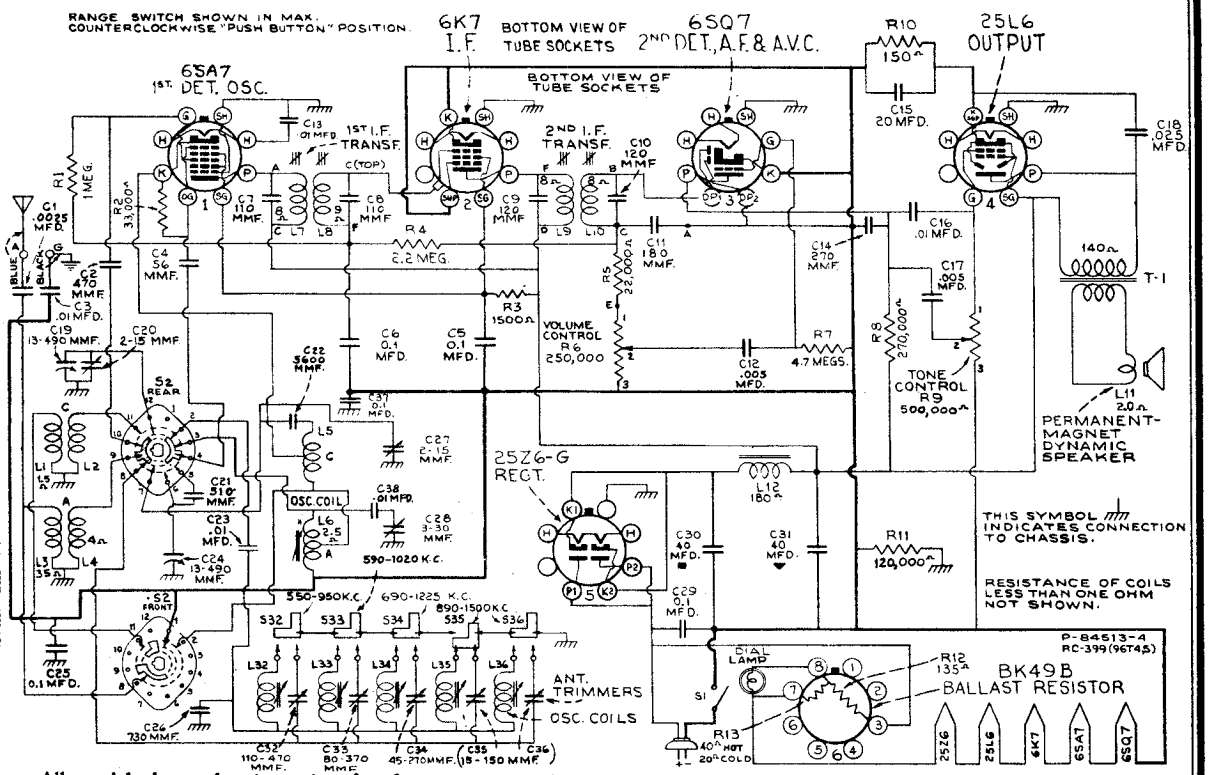
A-C Rating ..... 105-125 volts, 25-60 cycles, 60 watts
D-C Rating ..... 105-125 volts, direct current, 60 watts

Power Output Rating
Undistorted ..... 1.5 watts
Maximum ..... 2.5 watts

Frequency Ranges
"Standard Broadcast" (A) ..... 540-1,720 kc
"Short Wave" (C) ..... 5.8-18.0 mc
Intermediate Frequency ..... 455 kc

Pilot Lamp ..... Mazda 47, 6.3 volts, 0.15 amp.

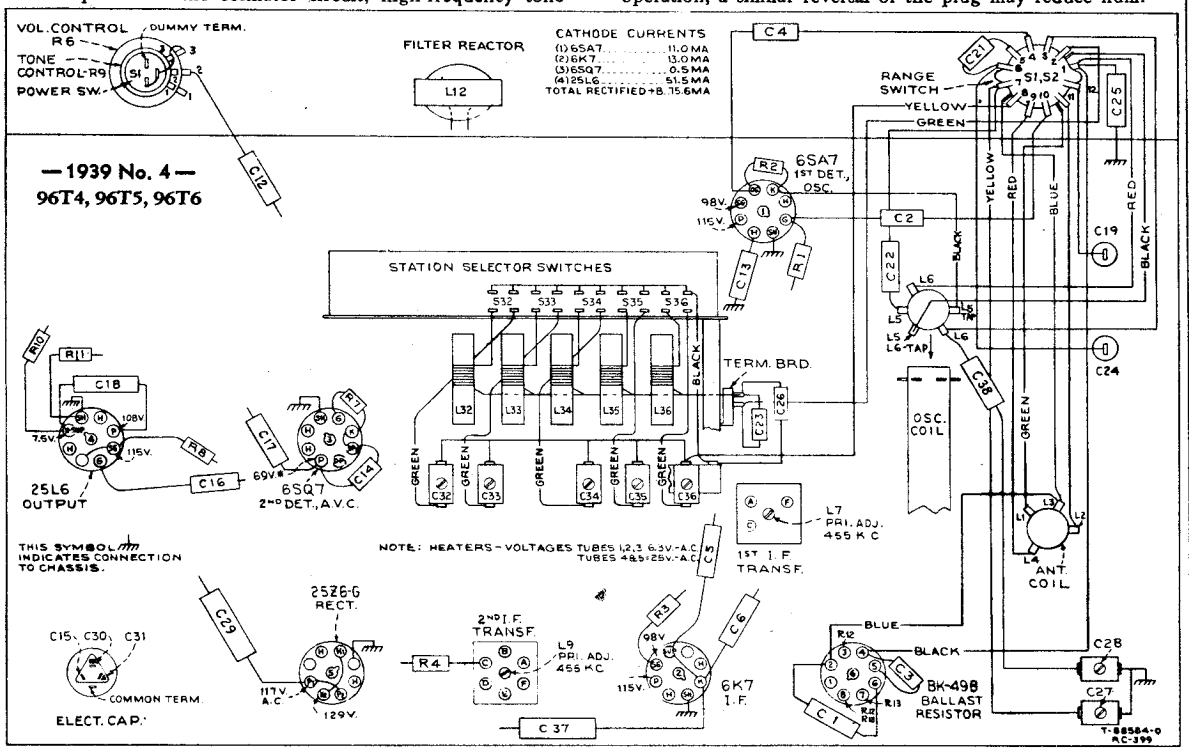
Loudspeaker
Type ..... Permanent Magnet Dynamic
Diameter ..... 96T4, 5: 5 inch—96T6: 6 inch
V.C. Impedance ..... 2 ohms at 400 cycles




All models have electric tuning for five stations in the standard broadcast range.

Features of design include: Magnetite-core electric-tuning coils; magnetite-core i-f transformers; temperature-compensated capacitor in the oscillator circuit; high-frequency tone control; straight-line dial; dust-proof permanent magnet dynamic loudspeaker.

**Power Supply Polarity.**—On d-c operation, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the position of the plug. On a-c operation, a similar reversal of the plug may reduce hum.




BOTTOM VIEW—REAR OF CHASSIS

*R-F Wiring Diagram and Socket Voltages*

Measurements made to low-side of volume control unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117 volt a-c supply.

* **Note:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

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MODELS 96T4, 96T5, Chassis RC-399
96T6, Chassis RC-399A
Alignment, Socket, Trimmers
Tuner, Lead Dress, Drive Data

RCA MFG. CO., INC.

## Mechanical Specifications

| Models | 96T4 | 96T5 | 96T6 |
|---|---|---|---|
| Height (inches) | 9½ | 9½ | 11¼ |
| Width (inches) | 12 | 12 | 15⅝ |
| Depth (inches) | 6⅛ | 6⅛ | 6 15/16 |
| Net Weight (pounds) | 11 | 11 | 14 |
| Shipping Weight (pounds) | 13 | 13 | 17 |

Chassis Base Dimensions ..... 11 9/16-in. wide, 5-in. deep, 2⅞-in. high
Over-all Chassis Height ..... 8 inches
Tuning Drive Ratio ..... 8 to 1

## Alignment Procedure

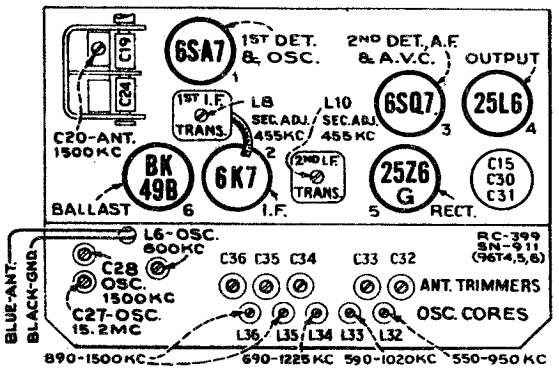
**Output Meter Alignment.**—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the black lead and keep the output as low as possible to avoid a-v-c action.

**Calibration Marks.**—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc, 1,500 kc, and 15.2 mc. have been stamped in the plate on the front of the chassis as shown in the accompanying drawing. These marks are used for reference during alignment.

**Dial Indicator Adjustment.**—With the gang condenser in full mesh, the indicator should point to the extreme left mark on the dial scale.

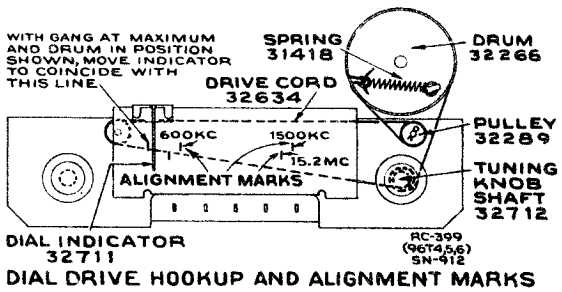
For additional details, refer to booklet "RCA Victor Receiver Alignment."




*Tube and Trimmer Locations*

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | "A" band, Quiet Point between 550-750 kc | L9 and L10 (2nd I-F Trans.) |
| 2 | Tuning condenser Stator (osc.) in series with .01 mfd. | 455 kc | | L7 and L8 (1st I-F Trans.) |
| 3 | Antenna Lead (Blue), in series with 200 mmf. | 1,500 kc | 1,500 kc (Cal. Mark) "A" Band | C28 (osc.) C20 (ant.) |
| 4 | Antenna Lead (Blue), in series with 200 mmf. | 600 kc | 600 kc (Cal. Mark) "A" Band | L6 (osc.) |
| 5 | Repeat steps 3 and 4. | | | |
| 6 | Antenna Lead (Blue), in series with 400 ohms | 15.2 mc | 15.2 mc (Cal. Mark) "C" Band | C27 (osc.)* |
| 7 | Follow "Adjustments for Electric Tuning." | | | |

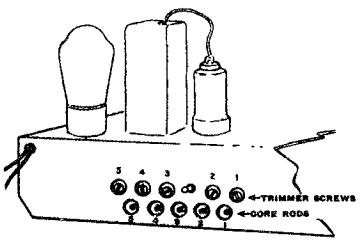
* Rock gang slightly while peaking C27, and use minimum capacity peak if two peaks can be obtained on C27.
Note.—Oscillator tracks 455 kc above signal on both bands.




DIAL DRIVE HOOKUP AND ALIGNMENT MARKS

*Dial-Indicator and Drive Mechanism*

Refer to "Alignment Procedure" for explanation of the "calibration marks" shown in this drawing.




*Push-Button Adjustments*

No. 1—Approximately 550-950 kc.
No. 2—Approximately 590-1,020 kc.
No. 3—Approximately 690-1,225 kc.
Nos. 4, 5—Approximately 890-1,500 kc.

**Removing Push-Button Assembly.**—The push-button assembly is held to the chassis by two nuts on the front apron and may be quickly and easily swung out for convenient access to the sockets and other parts. No unsoldering is required, as flexible leads are used for all connections from the chassis to the assembly.

## Miscellaneous Service Data

**Precautionary Lead Dress.—**

1. Volume control lead from 2nd I.F. transformer (E) should be dressed down on chassis.
2. A.C. leads to ballast tube should be dressed away from volume control lead on 2nd I.F. transformer.
3. Coupling condensers C2 and C4 should be dressed away from chassis.

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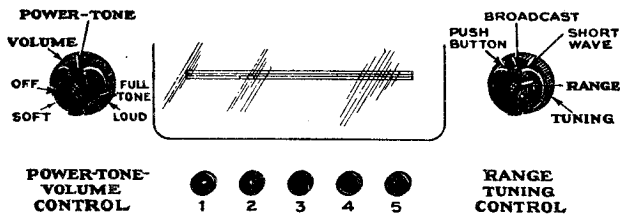
MODELS 96T4,96T5,Chas.RC-399
96T6,Chassis RC-399A
Tuner Adjustments,Parts

RCA MFG. CO., INC.

**96T4, 96T5, 96T6**




*Location of Controls*

## Adjustments for Electric Tuning

These models have five push buttons for electric tuning of five different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Turn Range Control Knob to "Broadcast" position and tune in station No. 1 (560 kc in example) by Manual Dial Tuning, for reference.
3. Push in station-button No. 1 and turn Range Selector to "PB" position. Adjust No. 1 oscillator core (L32) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust No. 1 antenna trimmer (C32) for maximum output on this station.
5. Adjust for each of the remaining four stations in the same manner.

(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)

6. Make a final careful adjustment of the oscillator cores and antenna trimmers, using one or two feet of wire as an antenna to ensure sharp peaking.

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES** (RC399—Models 96T4 and 96T5) (RC399A—Model 96T6) | |
| 32544 | Ballast—Ballast resistor tube — type BK49B (R12, R13) | .80 |
| 31379 | Capacitor—Dual trimmer, comprising one 3-30 mmfd. and one 2-10 mmfd. sections (C27, C28) | .40 |
| 12723 | Capacitor—56 mmfd. (C4) | .35 |
| 14262 | Capacitor—109 mmfd. (C7, C8) | .30 |
| 12404 | Capacitor—120 mmfd. (C9, C10) | .30 |
| 14712 | Capacitor—180 mmfd. (C11) | .30 |
| 12488 | Capacitor—270 mmfd. (C14) | .35 |
| 30433 | Capacitor—470 mmfd. (C2) | .35 |
| 12537 | Capacitor—560 mmfd. (C21) | .35 |
| 32714 | Capacitor—730 mmfd. (C26) | .45 |
| 13895 | Capacitor—5,600 mmfd. (C22) | .70 |
| 5107 | Capacitor—.0025 mfd., 700 volts (C1) | .20 |
| 4838 | Capacitor—.005 mfd., 1,000 volts (C12, C17) | .25 |
| 14393 | Capacitor—.01 mfd., 300 volts (C3, C13, C16, C23, C38) | .30 |
| 4870 | Capacitor—.025 mfd., 400 volts (C18) | .20 |
| 4839 | Capacitor—0.1 mfd., 400 volts (C5, C6, C25, C29, C67) | .30 |
| 32708 | Capacitor—Electrolytic, comprising two 40 mfd., and one 20 mfd. sections (C15, C30, C31) | 1.35 |
| 32705 | Capacitor—Push button trimmer capacitor bank (C32, C33, C34, C35, C36) | 1.20 |
| 31382 | Clip—Push button coil mounting clip | .04 |
| 32706 | Coil—Antenna coil (L1, L2, L3, L4) | 1.25 |
| 32707 | Coil—Oscillator coil (L5, L6) | .95 |
| 31385 | Coil—Push button oscillator coil — less core 550-950 KC. (L32) | .30 |
| 32704 | Coil—Push button oscillator coil — less core 590-1,020 KC. (L33) | .35 |
| 32340 | Coil—Push button oscillator coil — less core 690-1,225 KC. (L34) | .35 |
| 31383 | Coil—Push button oscillator coil — less core 890-1,500 KC. (L35, L36) | .30 |
| 32249 | Condenser—2-gang variable (C19, C20, C24) | 2.70 |
| 31413 | Control — Volume control, tone control, and power switch (R6, R9, S1) | 3.00 |
| 32634 | Cord—Drive cord | .10 |
| 31386 | Core—Core and stud for coil, Stock Nos. 31383, 31385, and 32704 | .15 |
| 30846 | Core—Core and stud for coil, Stock No. 32340 | .30 |
| 32713 | Core—Core and stud for oscillator coil, Stock No. 32707 | .35 |
| 32266 | Drum—Condenser drive cord drum | .45 |
| 32711 | Indicator—Dial indicator pointer | .20 |
| 31480 | Lamp—Dial lamp socket | .20 |
| 32710 | Plate—Dial color plate and pointer track | .30 |
| 5119 | Plug—3-contact female for speaker cable | .25 |
| 32289 | Pulley—Indicator drive cord pulley | .10 |
| 32709 | Reactor—Filter reactor (L12) | 1.40 |
| 30880 | Resistor—150 ohms, ½ watt (R10) | .20 |
| 14499 | Resistor—1,500 ohms, ½ watt (R3) | .20 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R5) | .15 |
| 12454 | Resistor—33,000 ohms, ½ watt (R2) | .20 |
| 13734 | Resistor—120,000 ohms, ½ watt (R11) | .20 |
| 12199 | Resistor—270,000 ohms, ½ watt (R8) | .20 |
| 13730 | Resistor—1 meg., ½ watt (R1) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R4) | .20 |
| 30271 | Resistor—4.7 meg., ½ watt (R7) | .20 |
| 32544 | Resistor—Ballast resistor tube—type BK49B (R12, R13) | .80 |
| 30340 | Retainer—Pulley retaining clip | .02 |
| 14343 | Retainer—Tuning knob shaft retaining ring | .03 |
| 4669 | Screw—No. 8-32 x ¾ square head set screw for drum | .03 |
| 32712 | Shaft—Tuning knob shaft and pulley | .20 |
| 31365 | Socket—Dial lamp socket | .30 |
| 31251 | Socket—Octal base tube socket | .25 |
| 31418 | Spring—Drive cord tension spring | .05 |
| 32703 | Switch—Push button switch (S32, S33, S34, S35, S36) | 2.25 |
| 32702 | Switch—Range switch (S2) | 1.15 |
| 14376 | Transformer—First i.f. transformer (L7, L8, C7, C8) | 2.45 |
| 14308 | Transformer—Second i.f. transformer (L9, L10, C9, C10, C11, R5) | 2.90 |
| 32544 | Tube—Ballast resistor tube — type BK49B (R12, R13) | .80 |
| | **SPEAKER ASSEMBLIES (84226-4)** Models 96T4 and 96T5 | |
| 32716 | Cone—Speaker cone and voice coil in housing (L11) | 1.80 |
| 32715 | Speaker—Complete | 6.70 |
| 32717 | Transformer—Output transformer (T1) | 1.40 |
| | **SPEAKER ASSEMBLIES (84307-4)** Model 96T6 | |
| 32719 | Cone—Speaker cone and voice coil in housing (L11) | 2.00 |
| 5118 | Plug—3-contact male plug for speaker | .25 |
| 32718 | Speaker—Speaker complete | 6.00 |
| 32720 | Transformer—Output transformer (T1) | 1.45 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 31428 | Button—Push button and spring | .06 |
| 31487 | Clip—Spring clip to hold dial scale | .12 |
| 31095 | Cover—One set protective covers for call letter markers | .10 |
| 32722 | Dial—Glass dial scale | .45 |
| 31667 | Escutcheon—Dial escutcheon (no crystal) | .55 |
| 31355 | Knob—Range switch knob | .12 |
| 31391 | Knob—Tone control knob | .15 |
| 14359 | Knob—Tuning knob | .20 |
| 30773 | Knob—Volume control knob | .15 |
| 30991 | Markers—One set station call letter markers | .40 |
| 32721 | Spring—Push button spring | .02 |
| 14270 | Spring—Retaining spring for range switch or volume control knob | .05 |
| 30330 | Spring—Retaining spring for tone control knob | .03 |
| 4982 | Spring—Retaining spring for tuning knob | .05 |

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

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MODELS 96X1 to 96X4, Chas. RC-400 RCA MFG. CO., INC.
96X11 to 96X14, Chas. RC-400A
MODEL U-104, Chassis RC-345H
Parts Lists

# MODELS 96X-1, -2, -3, -4 and -11, -12, -13, -14

## Chassis No. RC-400 and RC-400A

## Replacement Parts

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES** | |
| 32999 | Back—Cardboard back for cabinet | .10 |
| 32544 | Ballast—Ballast resistor type BK49B | .80 |
| 32530 | Button—Ivory push button for 96X11, 96X12 and 96X14 | .15 |
| 32528 | Button—Walnut push button for 96X13 | .15 |
| X-580 | Cabinet for 96X1 (net) | 3.10 |
| X-581 | Cabinet for 96X2 (net) | 3.10 |
| X-582 | Cabinet for 96X3 (net) | 3.35 |
| X-583 | Cabinet for 96X4 (net) | 5.60 |
| X-644 | Cabinet for 96X11 (net) | 2.90 |
| X-585 | Cabinet for 96X12 (net) | 2.90 |
| X-645 | Cabinet for 96X13 (net) | 3.00 |
| X-646 | Cabinet for 96X14 (net) | 5.20 |
| 32531 | Coil—Antenna coil | .75 |
| 32532 | Coil—Oscillator coil | 1.00 |
| 31379 | Condenser—Trimmer, one 3-30 mmfd. and one 2-10 mmfd. sections (C5, C7) | .40 |
| 14079 | Condenser—6.8 mmfd | .35 |
| 13057 | Condenser—60 mmfd | .35 |
| 12488 | Condenser—250 mmfd | .35 |
| 31399 | Condenser—4,700 mmfd | .65 |
| 31480 | Lamp—Dial lamp | .20 |
| 31589 | Marker—1 set push button call letter markers | .35 |
| 32810 | Mechanism—Push button tuning mechanism comprising push arms, cam plate, frame, and mounting bracket assembled—Models 96X11, 96X12, 96X13, 96X14 | 5.40 |
| 32538 | Pulley—Condenser drive pulley and gear—Models 96X11, 96X12, 96X13 and 96X14 | .65 |
| 32541 | Pulley—Condenser drive pulley—Models 96X1, 96X2, 96X3, 96X4 | .35 |
| 31606 | Pulley—Indicator drum pulley | .20 |
| 32544 | Resistor—Ballast resistor type BK49B | .80 |
| 14439 | Resistor—100 ohms, ½ watt | .20 |
| 32535 | Resistor—120 ohms, wire wound | .20 |
| 14499 | Resistor—1,500 ohms, ½ watt | .20 |
| 12454 | Resistor—33,000 ohms, ½ watt | .20 |
| 12412 | Resistor—47,000 ohms, ½ watt | .20 |
| 12284 | Resistor—220,000 ohms, ½ watt | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt | .20 |
| 12679 | Resistor—2.2 meg., ½ watt | .20 |
| 13601 | Resistor—10 meg., ½ watt | .20 |
| 4858 | Condenser—.01 mfd | .25 |
| 5196 | Condenser—.035 mfd | .20 |
| 4886 | Condenser—.05 mfd | .20 |
| 4839 | Condenser—0.1 mfd | .30 |
| 32548 | Condenser—Electrolytic, one 12 mfd. and one 20 mfd. sections | .65 |
| 32536 | Condenser—Variable tuning condenser | 2.40 |
| 31456 | Cover—1 set protective covers for push button markers | .08 |
| 32539 | Cord—Condenser drive cord | .10 |
| 32540 | Cord—Dial drive cord | .10 |
| 32526 | Dial—Black dial scale for 96X2 and 96X12 | .35 |
| 32527 | Dial—Ivory dial scale for 96X4 and 96X14 | .35 |
| 32525 | Dial—Walnut dial scale for 96X1, 96X3, 96X11 and 96X13 | .35 |
| 32290 | Gear—Sector gear fastens on cam shaft of tuning mechanism—Models 96X11, 96X12, 96X13, 96X14 | .50 |
| 32542 | Indicator—Dial indicator drum | .50 |
| 32522 | Knob—Ivory knob for 96X1, 96X2, 96X4, 96X11, 96X12, 96X14 | .15 |
| 32520 | Knob—Tan knob for 96X3 and 96X13 | .15 |
| 31482 | Screw—No. 8-32 set screw for condenser drive pulley or sector gear | .03 |
| 32510 | Screw—Push button cam locking screw—Models 96X11, 96X12, 96X13, 96X14 | .10 |
| 32547 | Shaft—Tuning knob shaft | .15 |
| 32543 | Socket—Dial lamp socket and bracket | .20 |
| 32537 | Socket—Tube socket | .20 |
| 31615 | Spring—Drive cord tension spring | .02 |
| 30585 | Spring—Push button lever spring—Models 96X11, 96X12, 96X13, 96X14 | .03 |
| 31646 | Spring—Retaining spring for knobs | .02 |
| 32546 | Switch—Band change switch | .65 |
| 32533 | Transformer—First i.f. transformer | 1.00 |
| 32534 | Transformer—Second i.f. transformer | .90 |
| 32545 | Volume control and power switch | 1.50 |
| | **SPEAKER ASSEMBLIES (84202-3)** | |
| 31202 | Cone—Speaker cone and voice coil | 1.30 |
| 31201 | Speaker complete | 3.95 |
| 31203 | Transformer—Output transformer | 1.00 |

# MODEL U-104

## Chassis No. RC-345H

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES (RC-345H)** | |
| 31198 | Ballast—Ballast resistor tube (R7, R8) | .80 |
| 4287 | Body—Connector body for dial lamp connector | .02 |
| 30883 | Capacitor—300 mmfd. (C9) | .35 |
| 12635 | Capacitor—1,100 mmfd. (C19) | .50 |
| 4838 | Capacitor—.005 mfd., 1,000 V. (C18) | .25 |
| 4858 | Capacitor—.01 mfd., 500 V. (C17) | .25 |
| 14393 | Capacitor—.01 mfd., 300 V. (C1, C8, C10) | .30 |
| 11315 | Capacitor—.015 mfd., 400 V. (C11) | .20 |
| 30938 | Capacitor—.025 mfd. (C15) | .20 |
| 30899 | Capacitor—0.1 mfd., 200 V. (C4) | .30 |
| 4839 | Capacitor—0.1 mfd., 400 V. (C12) | .30 |
| 12484 | Capacitor—0.25 mfd., 350 V. (C20, C16) | .30 |
| 31323 | Capacitor—16 mfd., 150 V. (C13, C14) | .65 |
| 30875 | Coil—Antenna coil (L1, L2) | 1.10 |
| 30876 | Coil—R.F. coil (L3, L4) | 1.10 |
| 31195 | Condenser—2-gang variable tuning condenser (C2, C3, C5, C6) | 2.50 |
| 14086 | Cord—Power cord | .65 |
| 32634 | Cord—Variable condenser drive cord | .10 |
| 31200 | Dial—Station selector dial scale and plate assembly | .40 |
| 4286 | Ferrule—Ferrule for dial lamp connector | .03 |
| 4340 | Lamp—Pilot lamp | .17 |
| 31193 | Lead—Antenna lead | .50 |
| 30868 | Plug—2-contact female motor cable plug | .35 |
| 31196 | Pointer—Station selector indicator pointer | .25 |
| 31198 | Resistor—Ballast resistor tube (R7, R8) | .80 |
| 30880 | Resistor—150 ohms, ½ watt (R6) | .20 |
| 13734 | Resistor—120,000 ohms, ½ watt (R10) | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt (R4) | .20 |
| 13730 | Resistor—1 megohm, ½ watt (R5) | .20 |
| 12679 | Resistor—2.2 megohms, ½ watt (R3) | .20 |
| 13601 | Resistor—10 megohms, ½ watt (R9) | .20 |
| 31197 | Shaft—Indicator pointer shaft and pulley | .10 |
| 31251 | Socket—8-contact tube socket | .25 |
| 14171 | Socket—Lamp socket assembly | .40 |
| 4284 | Spring—Spring for dial lamp connector | .03 |
| 31096 | Switch—Phono. switch (S2) | 1.20 |
| 31198 | Tube—Ballast resistor tube (R7, R8) | .80 |
| 32209 | Volume Control—(Phono.) (R11) | 1.00 |
| 31966 | Volume Control—Volume control power switch (R1, S1) | 1.50 |
| 4285 | Washer—Insulating washer for dial lamp connector | .02 |
| | **PICKUP AND ARM ASSEMBLIES** | |
| 32226 | Base—Pickup arm pivot shaft and base assembly | .65 |
| 4286 | Bushing—Bushing and ferrule insert for connector cap | .03 |
| 4288 | Cap—Pickup cable connector cap | .03 |
| 31050 | Crystal—Pickup crystal and needle screw | 3.75 |
| 32227 | Pickup arm and crystal complete—less mounting, Stock No. 31054 | 6.70 |
| 12529 | Screw—Pickup needle screw | .15 |
| | **MOTOR ASSEMBLIES** | |
| 9841 | Motor—110-volt, 60-cycle—complete with mounting (M1) | 6.50 |
| 31034 | Motor—110-volt, 50-cycle—less mounting (M1) | 8.90 |
| 31037 | Rotor—Turntable and rotor lamination assembly—complete for 50-cycle operation | 4.55 |
| 31036 | Rotor—Turntable and rotor lamination assembly—complete for 60-cycle operation | 4.55 |
| 31043 | Stator—Stator assembly—complete with coils and laminations for 50-cycle operation | 2.50 |
| 31042 | Stator—Stator assembly—comprising coils and laminations for 60-cycle operation | 2.50 |
| | **SPEAKER ASSEMBLIES (84202-3)** | |
| 31202 | Cone—Speaker cone (L5) | 1.30 |
| 31201 | Speaker—Speaker complete | 3.95 |
| 31203 | Transformer—Output transformer (T1) | 1.00 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 31205 | Crystal—Station selector dial crystal | .20 |
| 30863 | Knob—Station selector or power switch knob | .15 |
| 31054 | Mounting—Pickup arm rubber mounting, washer, and nut | .15 |
| 30870 | Plug—2-contact male plug for motor leads | .35 |
| 14267 | Screw—Chassis mounting screw | .04 |
| 31053 | Screw—Motor mounting screw assemply complete | .30 |

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Schematic, Voltage, Socket Trimmers, Alignment, Data

# RCA MFG. CO., INC.

MODELS 96X1 to 96X4 inc.
Chassis RC-400
96X11 to 96X14 inc.
Chassis RC-400A

*Without Push-Button Tuning*

| 96X-1 | 96X-2 | 96X-3 | 96X-4 |
|---|---|---|---|
| Walnut Finish | Black Finish | Walnut and Ivory Finish | Ivory Finish |

*With Push-Button Tuning*

| 96X-11 | 96X-12 | 96X-13 | 96X-14 |
|---|---|---|---|
| Walnut Finish | Black Finish | Walnut and Ivory Finish | Walnut Finish |

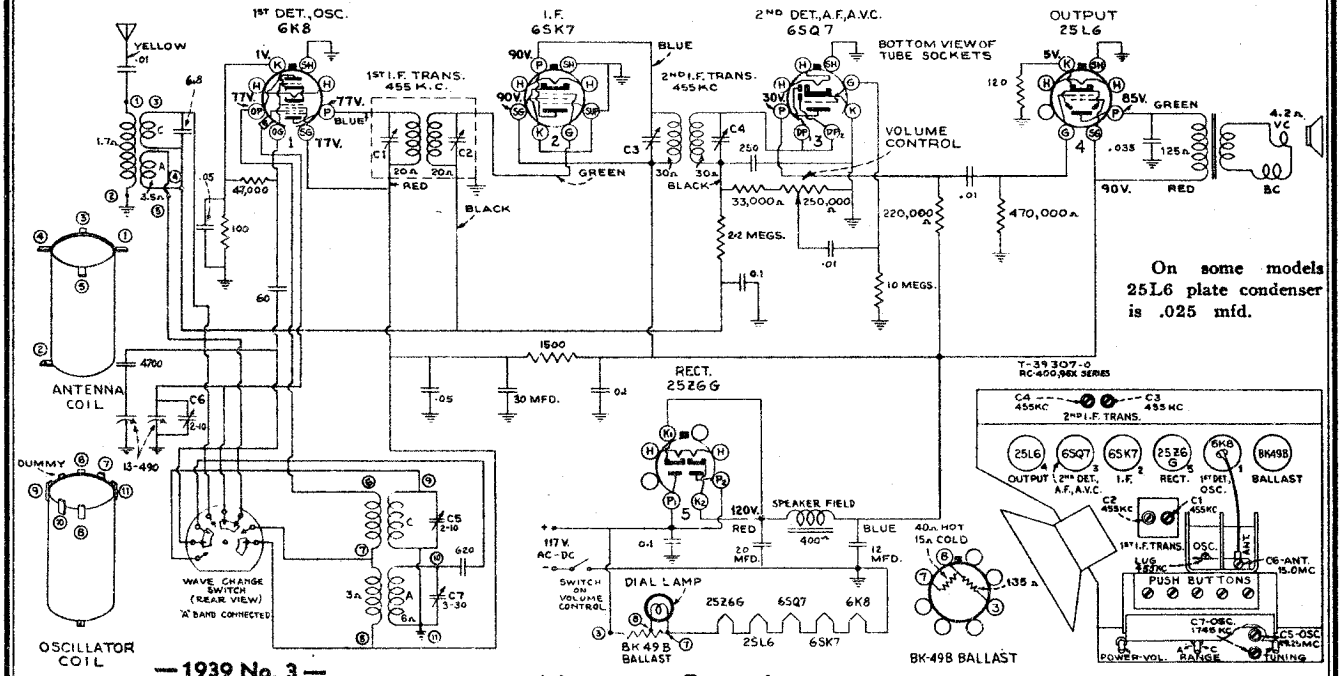
## Electrical and Mechanical Specifications

FREQUENCY RANGES
"Standard Broadcast" (A) (left) ..... 540-1,720 kc
"Short Wave" (C) (right) ..... 5,800-18,000 kc

TUBE COMPLEMENT
(1) RCA-6K8 ..... 1st.-Detector—Oscillator
(2) RCA-6SK7 ..... I-F Amplifier
(3) RCA-6SQ7 ..... 2nd-Det., 1st A-F, and A.V.C.
(4) RCA-25L6 ..... Power Output
(5) RCA-25Z6G ..... Half-Wave Rectifier
(6) RCA-BK-49B ..... Ballast
Pilot Lamp ..... Mazda No. 47, 6.3 volts, 0.15 amp.

POWER SUPPLY RATINGS
A-C Rating ..... 105-125 volts, 50-60 cycle, 50 watts
D-C Rating ..... 105-125 volts, direct current, 50 watts
INTERMEDIATE FREQUENCY ..... 455 kc
POWER OUTPUT (125 volts, 60 cycle supply)
Undistorted 1.5 watts—Maximum ..... 2.0 watts
LOUDSPEAKER Type 84202-3 ..... 5-inch Electrodynamic
Cabinet Dimensions ....H. 7¼ inches W. 11¼ inches D. 7⅞ inches
Weights (net) 96X1, 2, 3, 4—8½ lbs. .. 96X11, 12, 13, 14—9¼ lbs.
Tuning Drive Ratio ..... 8 to 1

**25 Cycle Operation.**—For 25 cycle operation change filter condensers to 40-40 mfd.




On some models 25L6 plate condenser is .025 mfd.

—1939 No. 3—

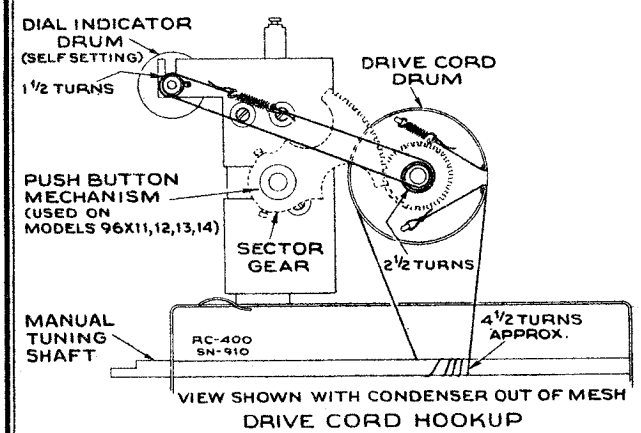
## Alignment Procedure

**Output Meter Alignment.**—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—Connect the low side of the test-oscillator to the receiver chassis, through a .01 mfd. capacitor, and keep the output as low as possible.

**Dial Setting.**—To set dial indicator drum, turn tuning condensers fully clockwise and then counter-clockwise.

**Push-button Adjustments.**—Remove bakelite button and loosen screw two turns with a screwdriver or coin. Tune in the desired station by means of the right-hand control knob. Press push lever down as far as it will go and tighten screw. Release lever and put on push-button.




DRIVE CORD HOOKUP

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output— |
|---|---|---|---|---|
| 1 | Tuning condenser stator (osc.) in series with .01 mfd.† | 455 kc | Quiet point between 550-750 kc | C1, C2, C3, C4 (1st and 2nd I-F transformer) |
| 2 | Antenna lead (yellow) in series with 400 ohms | 19.25 mc | Full clockwise (out of mesh) "C" band | C5* (osc.) |
| 3 | Same as step 2 | 15.0 mc | 15.0 mc Test oscillator signal | C6** (ant.) See Note No. 1 |
| 4 | Antenna lead in series with 200 mmf condenser | 1,745 kc | Full clockwise (out of mesh) "A" band | C7 (osc.) |

* Use minimum capacity peak if two peaks can be obtained.
** Rock gang slightly and check to determine that C5 has been adjusted to the correct peak by tuning to approximately 14.09 mc, where a weaker signal should be received.
† Make test oscillator connection to lug on tuning condenser stator (oscillator section) in series with .01 mfd. condenser.

**Note No. 1.**—Accurately tune receiver to the 15.0 mc test oscillator signal. This signal will appear twice (14.09 and 15.0 mc) as dial is turned. Use the higher frequency setting of the tuning condensers (gang furthest out of mesh).

**Note No. 2.**—Oscillator tracks 455 kc above signal on all bands.

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MODEL 97K, Chassis RC-351F
RC-351F "M", RC-351F "R"
Specifications, Calibration Scale

RCA MFG. CO., INC.

# MODEL 97K

## CHASSIS No. RC-351F, RC-351F "M", RC-351F "R"

## Electrical Specifications

FREQUENCY RANGES

"Standard Broadcast" (A) ..... 540-1,720 kc
"Short Wave" (C) ..... 5.8-18.0 mc
Six Electric Tuning Positions ..... 550 to 1,500 kc
Two stations between approximately 550- 950 kc
Two stations between approximately 680-1,180 kc (RC-351F)
Two stations between approximately 690-1,225 kc (RC-351F "M," RC-351F "R")
Two stations between approximately 890-1,500 kc

Intermediate Frequency ..... 455 kc

RCA TUBE COMPLEMENT

(1) RCA-6K8 ..... First Detector-Oscillator
(2) RCA-6K7 ..... Intermediate-Frequency Amplifier
(3) RCA-6H6 ..... Second Detector and A.V.C.
(4) RCA-6F5 ..... Audio Voltage Amplifier
(5) RCA-6F6-G ..... Audio Power Output
(6) RCA-5Y3-G ..... Full-Wave Rectifier
(7) RCA-6U5 ..... Tuning Indicator

Pilot Lamps (2) ..... Mazda No. 47, 6.3 volts, 0.15 amp.

POWER SUPPLY RATINGS

Rating A ..... 105-125 volts, 50-60 cycles, 80 watts
Rating B ..... 105-125 volts, 25-60 cycles, 80 watts
Rating C ..... 100-130/140-160/195-250 volts, 40-60 cycles, 80 watts

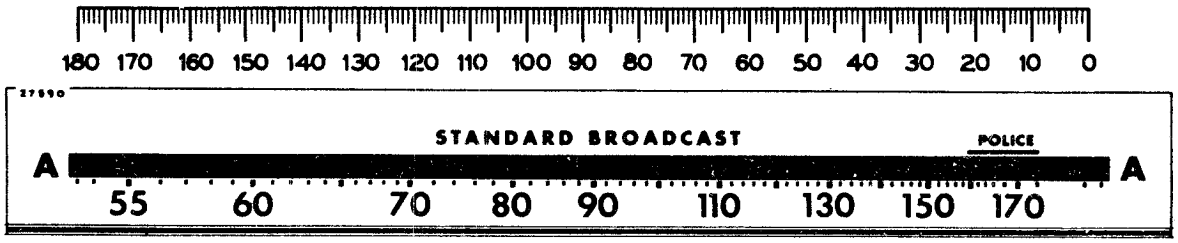
POWER OUTPUT

Undistorted ..... 2.5 watts
Maximum ..... 4.5 watts

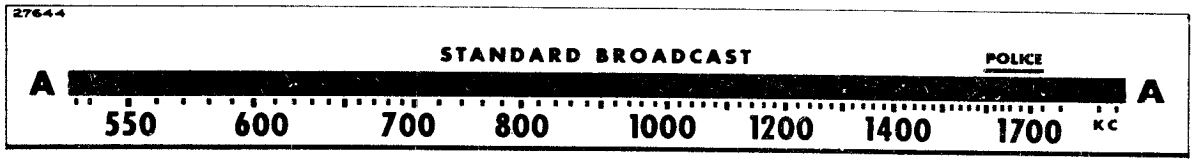
LOUDSPEAKER

Type ..... 12-inch, electrodynamic
Voice Coil Impedance at 400 cycles ..... 2.2 ohms

## Calibration Scale, RC-351F and RC-351F "M"




The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the lower calibration to the same point on the upper calibration scale. For example, 28° on the calibration scale corresponds to 1,500 kc on "A" band in RC-351F and RC-351F "M."

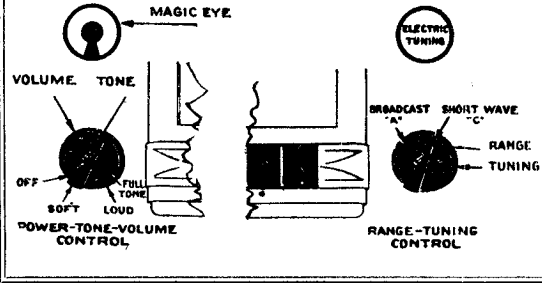



In RC-351F "R," 27.4° corresponds to 1,500 kc, and 15° corresponds to 18 mc.

## General Description

This receiver employs a two-band superheterodyne circuit which is operated either manually or by electric tuning on standard broadcast, and includes foreign short-wave, aircraft, police, and amateur stations on the short-wave band. **There are three different productions of Model 97K, conveniently identified by rear chassis stamping as RC-351F, RC-351F "M," and RC-351F "R."**

Features of design include magnetite-core adjusted i-f transformers and "Electric Tuning" oscillator coils; jack and switch for Victrola attachment; aural-compensated volume control; continuously variable tone-control; automatic volume control; dust-proof electrodynamic speaker; and straight-line dial.




**Precautionary Lead Dress.**—(1) Dress 110-volt leads away from audio wiring. (2) All leads in vicinity of antenna and oscillator coils must be dressed away from the coils. (3) Electric Tuning lamp leads from push-button switch must be dressed against front apron. (4) Keep speaker leads away from Victrola jack. (5) Lead from C19 in electrolytic (RC-351F "R") must be dressed around left-end of push-button switch, and against chassis base. (6) The leads across back of chassis in RC-351F must be dressed under the electrolytic capacitor to prevent approaching the Victrola jack.

**Victrola Attachment.**—A jack is provided on the rear of chassis for connection to a Victrola Attachment. The cable from the attachment should be terminated in a Stock No. 31048 plug to fit the jack.

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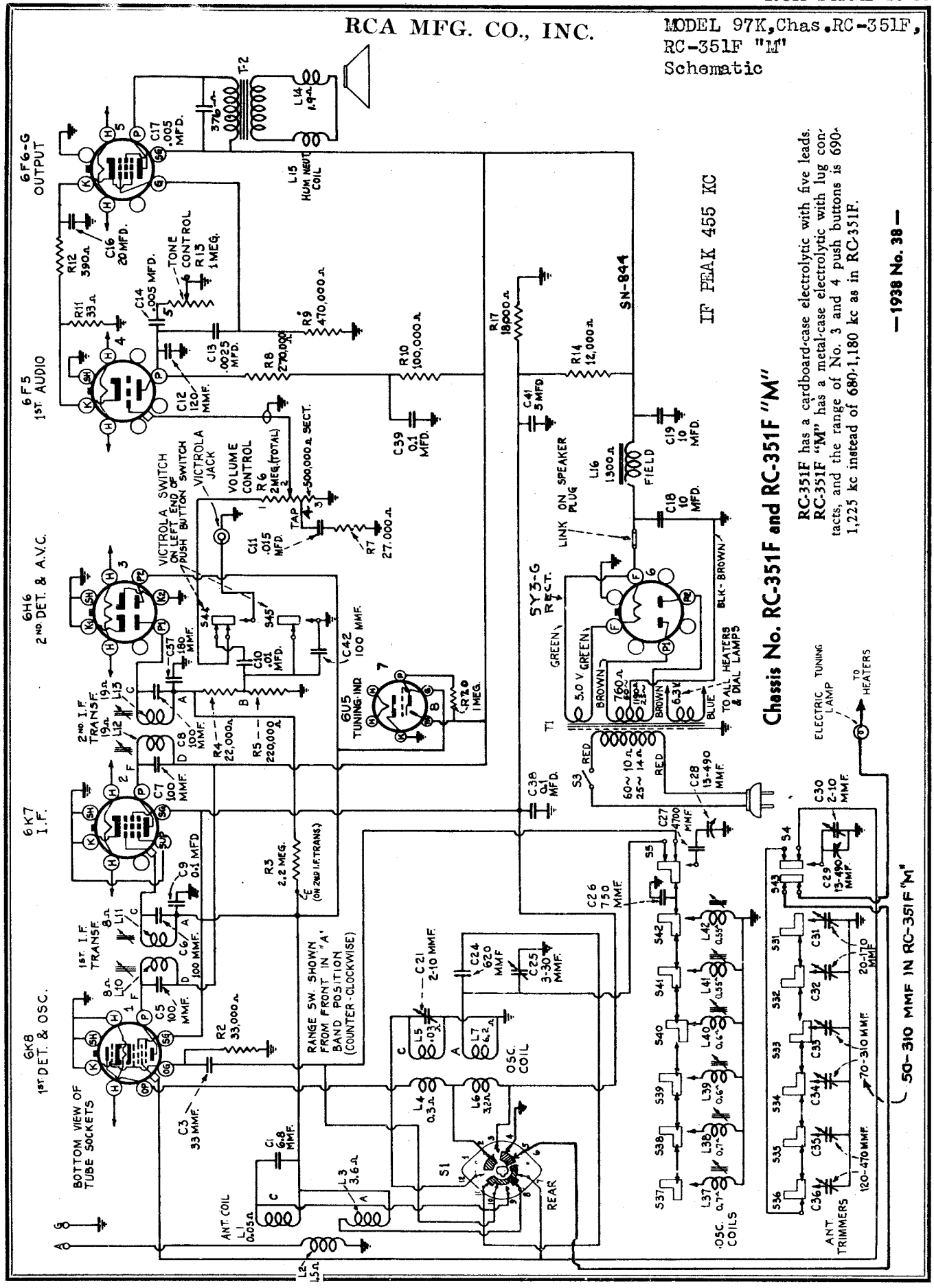


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MODEL 97K,Chas.RC-351F,
RC-351F "M"
Voltage,Chassis Wiring
Transformer,Speaker Data

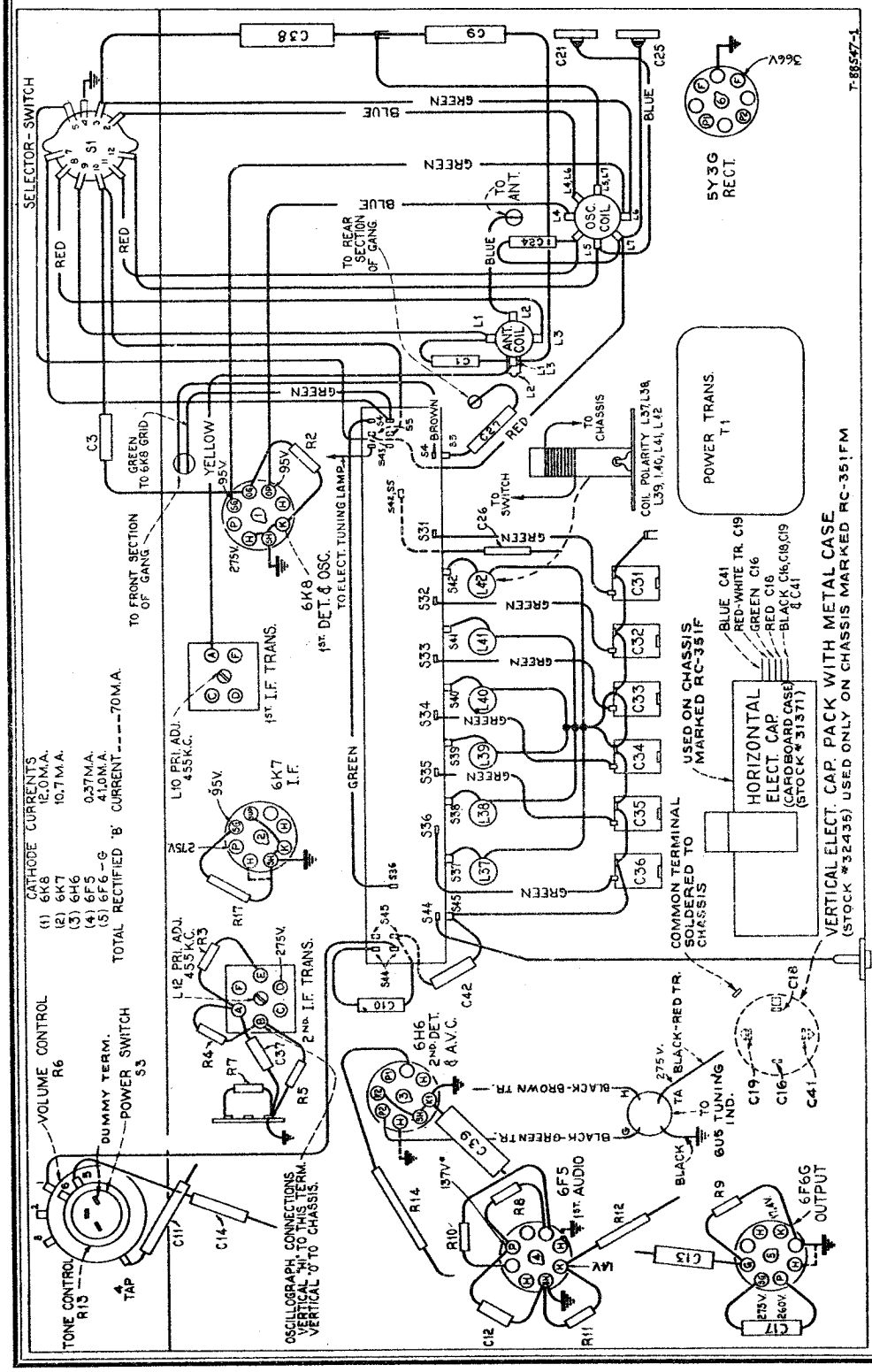
RCA MFG. CO., INC.

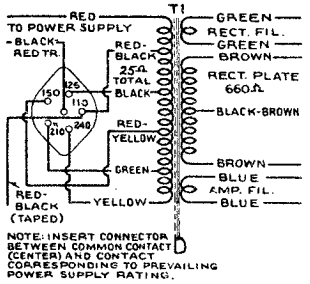
# Chassis No. RC-351F and RC-351F "M"

*R-F Wiring Diagram and Socket Voltages*

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.

***NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltage will be lower, depending on the voltmeter loading.

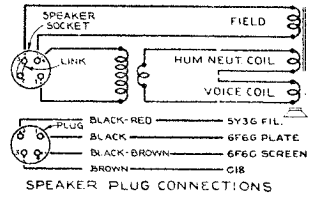



**Above.**—Universal Power Transformer Connections. 110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.

## Mechanical Specifications

| | |
|---|---|
| Height (inches) | 41 |
| Width (inches) | 27 3/8 |
| Depth (inches) | 14 1/2 |
| Net Weight (pounds) | 54 1/2 |
| Shipping Weight (pounds) | 69 |
| Chassis Base Dimensions | 13 inches x 6 1/2 inches x 2 1/2 inches |
| Overall Chassis Height | 6 inches |
| Tuning Drive Ratio | 12:1 |




**Above.**—Connections and Colors of Loudspeaker and Cable.

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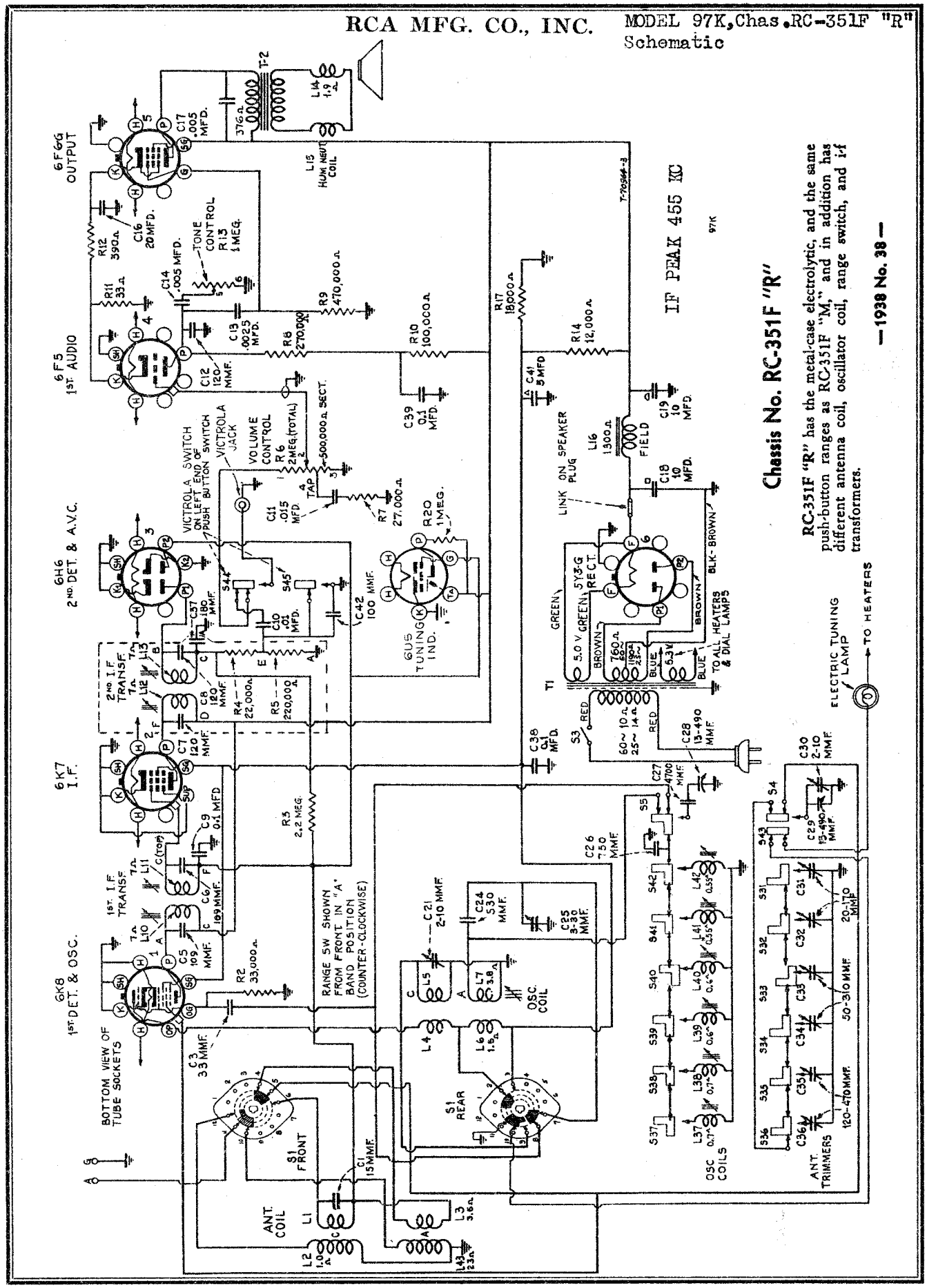


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MODEL 97K, Chas. RC-351F "R"
Voltage, Chassis Wiring
Transformer, Speaker Data

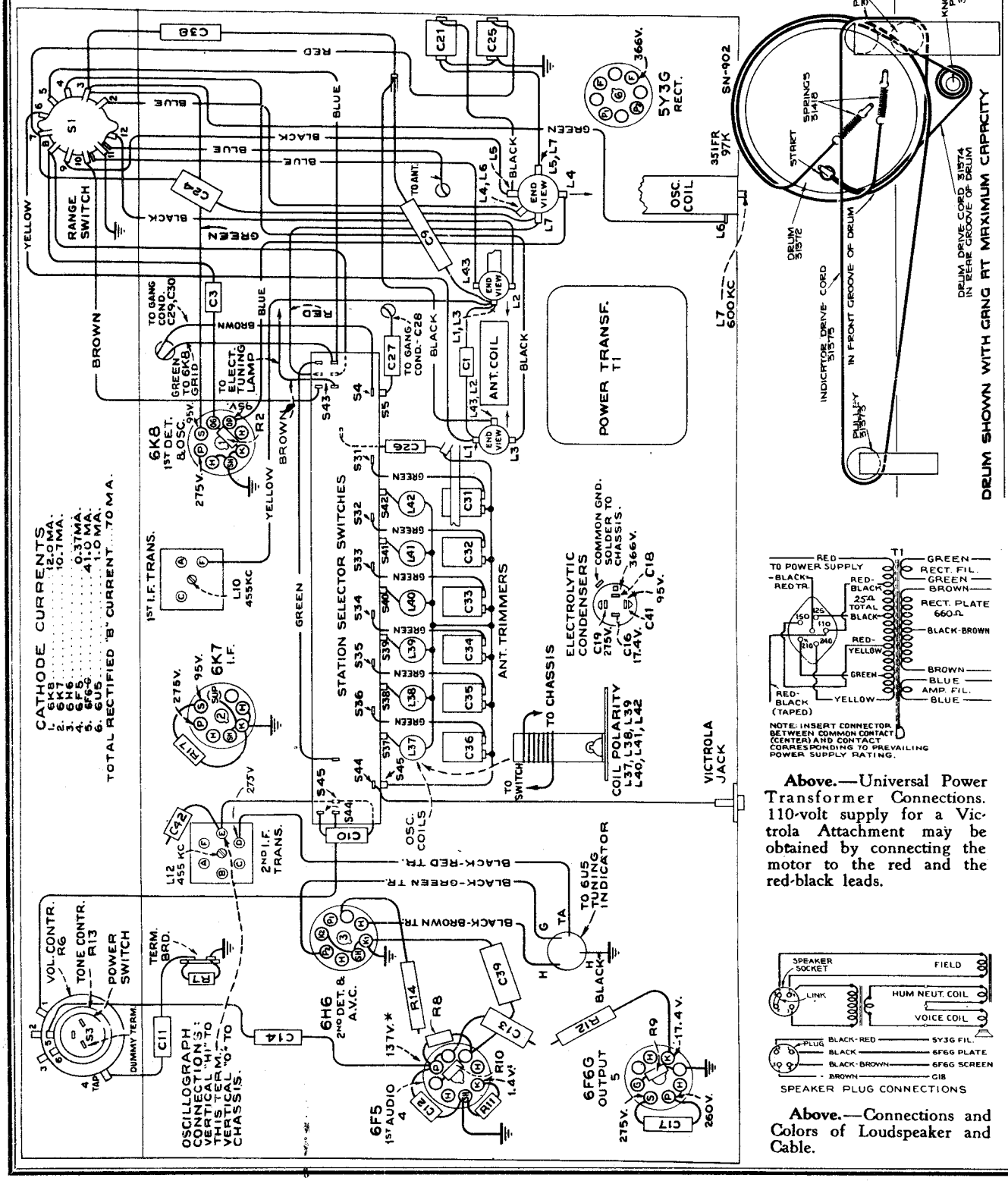
RCA MFG. CO., INC.

## Chassis No. RC-351F "R"

*R-F Wiring Diagram and Socket Voltages*

***NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltage will be lower, depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.







**Above.**—Universal Power Transformer Connections. 110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.




**Above.**—Connections and Colors of Loudspeaker and Cable.

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RCA MFG. CO., INC.

MODEL 97K, Chassis RC-351F, RC-351F "M", RC-351F "R"
Alignment, Socket, Trimmers

# ALIGNMENT PROCEDURE

Tuner Adjustments

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

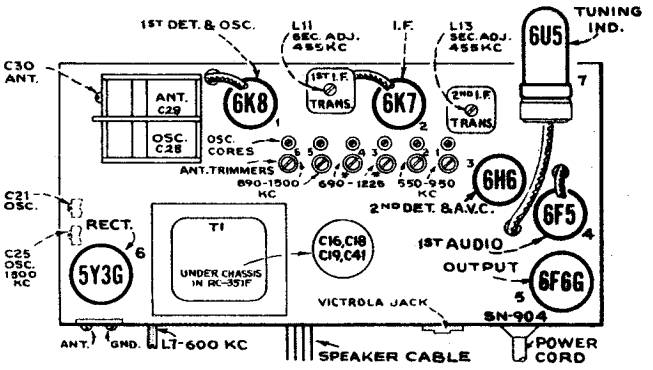
**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord Drum.** — The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed 3/8-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.




* In RC-351F, push buttons 3 and 4 cover 680-1,180 kc.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

## RC-351F and RC-351F "M"

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | "A" band, Quiet Point between 550-750 kc | L12 and L13 (2nd I-F Trans.) |
| 2 | 6K8 det. grid cap, in series with .01 mfd. | 455 kc | | L10 and L11 (1st I-F Trans.) |
| 3 | Antenna Terminal, in series with 400 ohms | 15.2 mc | 15.2 mc (33.5°) "C" band | C21* (osc.) C30** (ant.) |
| 4 | Antenna Terminal, in series with 200 mmf. | 1,500 kc | 1,500 kc (28°) "A" band | C25 (osc.) |
| 5 | Follow "Adjustments for Electric Tuning." | | | |

* Use minimum capacity peak if two peaks can be obtained.
** Rock gang slightly while adjusting C30. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 40.5° (14.29 mc), where a weaker signal should be received.
Note.—Oscillator tracks 455 kc above signal on both bands.

## RC-351F "R"

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | "A" band, Quiet Point between 550-750 kc | L12 and L13 (2nd I-F Trans.) |
| 2 | 6K8 det. grid cap, in series with .01 mfd. | 455 kc | | L10 and L11 (1st I-F Trans.) |
| 3 | Antenna Terminal in series with 200 mmf. | 1,500 kc | 1,500 kc (27.4°) "A" band | C25 (osc.) C30 (ant.) |
| 4 | Antenna Terminal, in series with 200 mmf. | 600 kc | 600 kc (148°) "A" band | L7 (osc.) |
| 5 | Repeat steps 3 and 4. | | | |
| 6 | Antenna Terminal, in series with 400 ohms | 18 mc | 18 mc (15°) "C" band | C21 (osc.)* |
| 7 | Follow "Adjustments for Electric Tuning." | | | |

* Rock gang slightly while peaking C21, and use minimum capacity peak if two peaks can be obtained on C21.
Note.—Oscillator tracks 455 kc above signal on both bands.

# ADJUSTMENTS FOR ELECTRIC TUNING

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Use one or two feet of wire as an antenna to ensure sharp peaking.
3. Push in the dial-tuning button, and manually tune in the first station on the list.
4. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
5. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

   **Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.**
6. Adjust for each of the remaining five stations in the same manner.
7. Make a final readjustment of the magnetite-cores.

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MODEL 97K, Chassis RC-351F,
RC-351F "M", RC-351F "R" RCA MFG. CO., INC.

Parts List

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES (RC-351F, RC-351F "M," and RC-351F "R")** | |
| 30752 | Bracket—Magic Eye mounting bracket | .25 |
| 14517 | Board—Antenna—ground terminal board | .25 |
| 12110 | Cap—Tube shield cap | .14 |
| 31379 | Capacitor—Dual trimmer 2-10 mmfd. and 3-30 mmfd. (C21, C25) | .40 |
| 14079 | Capacitor—6.8 mmfd. (C1) use in RC-351F and RC-351F "M" only | .35 |
| 12896 | Capacitor—15 mmfd. (C1) used in RC-351F "R" only | .35 |
| 31387 | Capacitor—Antenna coil trimmer capacitor bank, (C31, C32, C33, C34, C35, and C36) used in RC-351F only | 1.30 |
| 32486 | Capacitor—Antenna coil trimmer capacitor bank, (C31, C32, C33, C34, C35, and C36) used in RC-351F "M" and RC-351F "R" only | 1.40 |
| 12948 | Capacitor—33 mmfd. (C3) | .35 |
| 12720 | Capacitor—100 mmfd. (C42) | .35 |
| 30904 | Capacitor—100 mmfd. (C5, C6, C7, C8) used in RC-351F and RC-351F "M" only | .25 |
| 14262 | Capacitor—109 mmfd. (C5 and C6) used in RC-351F "R" only | .30 |
| 12404 | Capacitor—120 mmfd. (C7 and C8) used in RC-351F "R" only | .30 |
| 12724 | Capacitor—120 mmfd. (C12) | .35 |
| 13003 | Capacitor—180 mmfd. (C37) mounted under chassis in RC-351F and RC-351F "M" only | .35 |
| 14712 | Capacitor—180 mmfd. (C37) mounted in 2nd I-F transformer in RC-351F "R" only | .30 |
| 32492 | Capacitor—530 mmfd. (C24) in RC-351F "R" only | .40 |
| 31381 | Capacitor—620 mmfd. (C24) in RC-351F and RC-351F "M" only | .45 |
| 31435 | Capacitor—750 mmfd. (C26) | .40 |
| 31399 | Capacitor—4,700 mmfd. (C27) | .65 |
| 5107 | Capacitor—.0025 mfd. (C13) | .20 |
| 4838 | Capacitor—.005 mfd. (C14, C17) | .25 |
| 14393 | Capacitor—.01 mfd. (C10) | .30 |
| 11315 | Capacitor—.015 mfd. (C11) | .20 |
| 4839 | Capacitor—0.1 mfd. (C9, C38, C39) | .30 |
| 31371 | Capacitor—Comprising two 10 mfd., one 20 mfd., and one 5 mfd. sections (C16, C18, C19, C41) (cardboard case type, mounted horizontally and used in RC-351F only) | 2.25 |
| 32485 | Capacitor—Comprising two 10 mfd., one 20 mfd., and one 5 mfd. sections (C16, C18, C19, C41) (metal case type, mounted vertically and used in RC-351F "R" and RC-351F "M" only) | 1.75 |
| 31382 | Clip—Oscillator coil and core mounting clip | .04 |
| 31378 | Coil—Antenna coil, "A" and "C" bands (L1, L2, L3) mounted vertically and used in RC-351F and RC-351F "M" only | 1.10 |
| 32488 | Coil—Antenna coil, "A" and "C" bands (L1, L2, L3, L43) mounted horizontally and used in RC-351F "R" only | 1.40 |
| 31377 | Coil—Oscillator coil, "A" and "C" bands (L4, L5, L6, L7) mounted vertically (no magnetite core) and used in RC-351F and RC-351F "M" only | 1.70 |
| 32489 | Coil—Oscillator coil, "A" and "C" bands (L4, L5, L6, L7) mounted horizontally (with magnetite core) and used in RC-351F "R" only | .90 |
| 31383 | Coil—Push-button oscillator coil (L41, L42) | .30 |
| 31384 | Coil—Push-button oscillator coil (L39, L40) used in RC-351F only | .30 |
| 32487 | Coil—Push-button oscillator coil (L39, L40) used in RC-351F "M" and "R" | .35 |
| 31385 | Coil—Push-button oscillator coil (L37, L38) | .30 |
| 31369 | Condenser—2-gang variable tuning condenser (C28, C29, C30) | 2.65 |
| 31366 | Control—Volume control, tone control, and on-off switch (R6, R13, S3) | 3.00 |
| 31375 | Cord—Indicator pointer drive cord | .30 |
| 31374 | Cord—Variable condenser drum drive cord | .15 |
| 30905 | Core—Adjustable core and stud for i-f transformer | .35 |
| 31386 | Core—Adjustable core and stud for oscillator coils Stock Nos. 31383, 31384, 31385, 32487 | .15 |
| 12800 | Core—Adjustable core and stud for oscillator coil Stock No. 32489 | .35 |
| 31372 | Drum—Variable condenser drive cord drum and calibrator dial | .65 |
| 31480 | Lamp—Dial lamp | .20 |
| 5040 | Plug—4-contact female plug for speaker cable | .30 |
| 31373 | Pulley—Drive cord pulley | .08 |
| 14671 | Resistor—33 ohms, ½ watt (R11) | .20 |
| 31388 | Resistor—390 ohms, 1 watt (R12) | .22 |
| 31389 | Resistor—12,000 ohms, wire-wound, 5 watts (R14) | .50 |
| 30151 | Resistor—18,000 ohms, 1 watt (R17) | .22 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R4) | .15 |
| 12738 | Resistor—27,000 ohms, ½ watt (R7) | .20 |
| 12454 | Resistor—33,000 ohms, ½ watt (R2) | .20 |
| 14560 | Resistor—100,000 ohms, ½ watt (R10) | .20 |
| 11398 | Resistor—220,000 ohms, 1/10 watt (R5) used in RC-351F "R" | .15 |
| 12264 | Resistor—220,000 ohms, ½ watt (R5) used in RC-351F and RC-351F "M" | .20 |
| 12199 | Resistor—270,000 ohms, ½ watt (R8) | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt (R9) | .20 |
| 12013 | Resistor—1 meg., 1/10 watt (R20) | .15 |
| 12679 | Resistor—2.2 meg., ½ watt (R3) | .20 |
| 14343 | Retainer—Retaining spring for station selector knob shaft | .03 |
| 14887 | Retainer—Drive cord pulley retainer | .01 |
| 4669 | Screw—No. 8-32 square head set screw for drum Stock No. 31372 | .03 |
| 31368 | Shaft—Station selector knob shaft and pulley | .30 |
| 31418 | Spring—Indicator, or drum drive cord tension spring | .05 |
| 31364 | Socket—Dial lamp socket | .20 |
| 31365 | Socket—Electric tuning indicator lamp socket (insulated) | .30 |
| 13871 | Socket—Magic Eye socket | .45 |
| 14278 | Socket—Pickup socket | .25 |
| 31251 | Socket—Tube socket | .25 |
| 31367 | Switch—Range switch (S1) used in RC-351F and RC-351F "M" only | 1.05 |
| 32490 | Switch—Range switch (S1) used in RC-351F "R" only | 1.10 |
| 32498 | Switch—Station selector push-button switch (S4, S5, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44, S45) | 3.85 |
| 30902 | Transformer—1st I-F transformer (L10, L11, C5, C6) used in RC-351F and RC-351F "M" only | 1.90 |
| 14376 | Transformer—1st I-F transformer (L10, L11, C5, C6) used in RC-351F "R" only | 2.45 |
| 30903 | Transformer—2nd I-F transformer (L12, L13, C7, C8) used in RC-351F and RC-351F "M" only | 1.80 |
| 14283 | Transformer—2nd I-F transformer (L12, L13, C7, C8, C37, R4, R5) used in RC-351F "R" only | 3.80 |
| 31445 | Transformer—Power transformer 100-120 volts, 25-60 cycle (T1) | 7.80 |
| 31380 | Transformer—Power transformer 100-120 volts, 50-60 cycle (T1) | 6.35 |
| 31446 | Transformer—Power transformer 100-130/140-160/195-250 volts, 50-60 cycle (T1) | 8.05 |
| | **SPEAKER ASSEMBLIES (RL-70-F3)** | |
| 13866 | Cap—Dust cap for cone center | .03 |
| 12012 | Coil—Field coil (L12) | 2.90 |
| 11469 | Coil—Hum neutralizing coil (L14) | .30 |
| 31275 | Cone—Speaker cone and voice coil (L13) | 1.75 |
| 31302 | Plug—4-contact male plug | .25 |
| 31300 | Speaker—Speaker complete | 10.95 |
| 14358 | Screw—Screw, washer, and lockwasher to hold core in yoke | .04 |
| 31301 | Transformer—Output transformer (T2) | 1.70 |
| 14357 | Washer—Spring washer to hold field coil | .06 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 12038 | Band—Rubber band for "Magic Eye" | .02 |
| 31397 | Button—Station selector push button | .15 |
| 31456 | Cover—8 protective covers for push button markers | .08 |
| 31396 | Dial—Dial scale (glass) used in RC-351F and RC-351F "M" only | .95 |
| 32356 | Dial—Dial scale (glass) used in RC-351F "R" only | .70 |
| 31395 | Escutcheon—Station selector escutcheon—less dial scale and push buttons | 1.15 |
| 31407 | Escutcheon—"Magic Eye" or "Electric Tuning" indicator escutcheon | .25 |
| 31392 | Indicator—Station selector indicator pointer | .30 |
| 31355 | Knob—Range switch knob | .12 |
| 14359 | Knob—Station selector knob | .20 |
| 31391 | Knob—Tone control knob | .15 |
| 30778 | Knob—Volume control knob | .15 |
| 31589 | Marker—Station call letter markers for push buttons | .35 |
| 31458 | Marker—"Dial Tuning" marker for push button | .01 |
| 31457 | Marker—"Victrola" marker for push button | .01 |
| 31393 | Screen—Station selector dial color screen and light diffuser | .40 |
| 4982 | Spring—Retaining spring for knob Stock No. 14359 | .05 |
| 14270 | Spring—Retaining spring for knob Stock Nos. 31355 and 30773 | .05 |
| 30330 | Spring—Retaining spring for knob Stock No. 31391 | .03 |
| 31394 | Stop—Indicator pointer slide stop | .08 |

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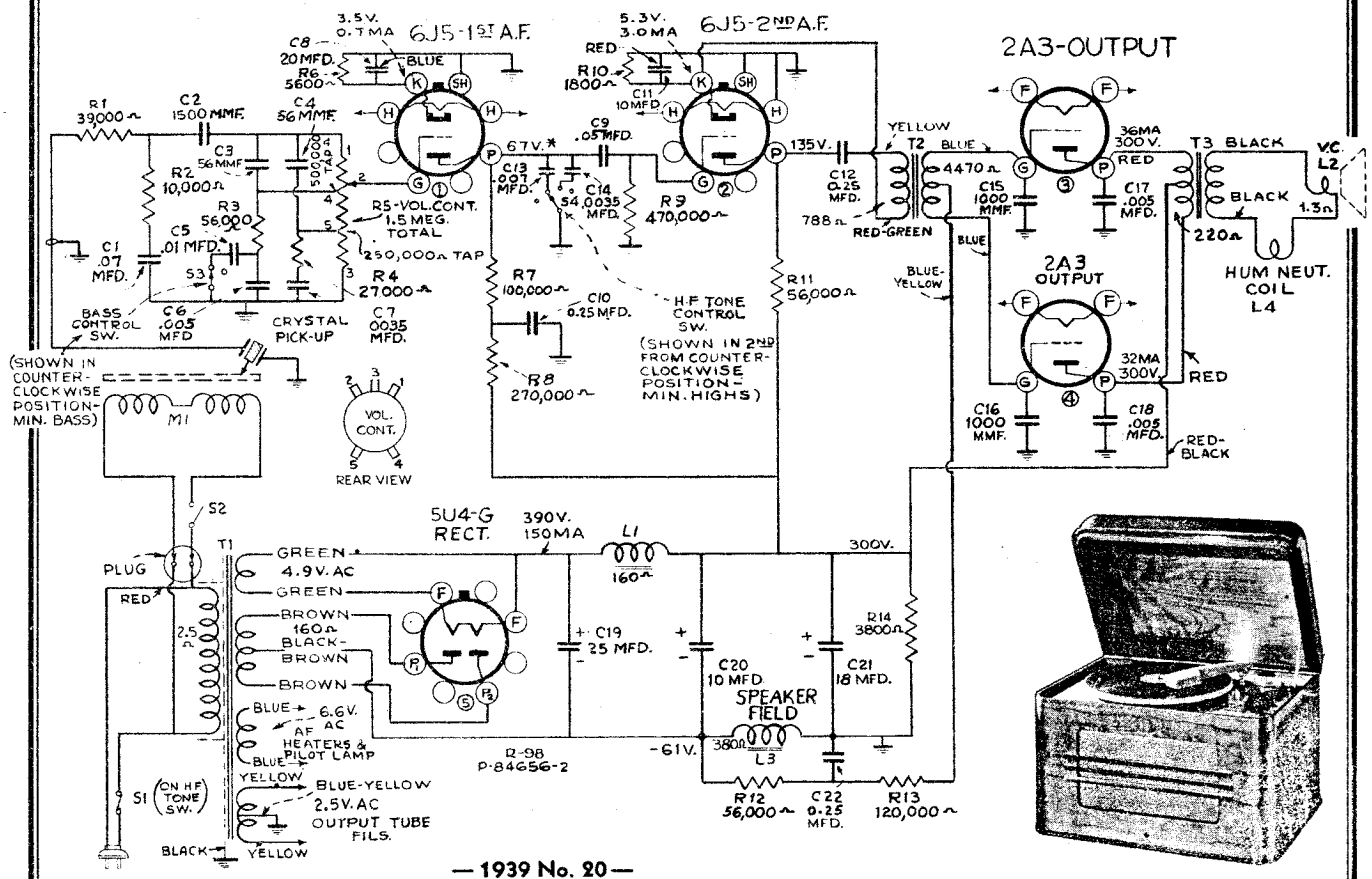
# RCA MFG. CO., INC.

MODEL R-98, Chassis RS-77
Schematic, Voltage, Socket
Speaker Connections






— 1939 No. 20 —

* NOTE: Values with star are operating voltages in circuits with high series-resistance, and when measured will read lower depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated, volume control at minimum. Values should hold within approximately ± 20% with 117-volt a-c supply.

### RCA Tube Complement

| | |
|---|---|
| (1) RCA-6J5 | 1st Audio Amplifier |
| (2) RCA-6J5 | 2nd Audio Amplifier |
| (3) RCA-2A3 | Power Output |
| (4) RCA-2A3 | Power Output |
| (5) RCA-5U4-G | Rectifier |

### Power Supply Rating

| | |
|---|---|
| A | 105-125 volts, 50-60 cycles, 175 watts |
| A-6 | 105-125 volts, 60 cycles, 175 watts |

### Power Output

| | |
|---|---|
| Undistorted | 12 watts |
| Maximum | 13.5 watts |

### Loudspeaker

| | |
|---|---|
| Type | Eight-Inch Electrodynamic |
| Voice Coil Impedance | 1.3 ohms at 400 cycles |

### Motor Board

| | |
|---|---|
| Motor | Self-starting Induction |
| Turntable Speed | 78 r.p.m. (adjustable) |

### Pickup

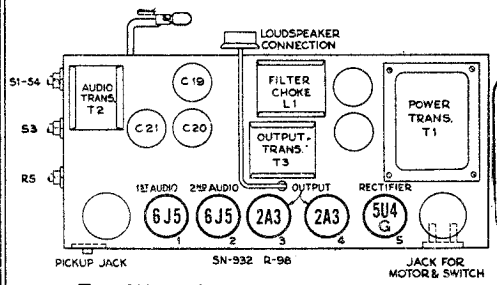
| | |
|---|---|
| Type | Crystal |
| Impedance | 100,000 ohms at 1,000 cycles |

| | | | | | |
|---|---|---|---|---|---|
| Cabinet Dimension | Height 14½ inches | Width | 19¾ inches | Depth | 14 inches |
| Chassis Base Dimensions | Height 2¾ inches | Width | 16¼ inches | Depth | 7¾ inches |
| Weight (Shipping) | 54 pounds | | Weight (Net) | | 47½ pounds |

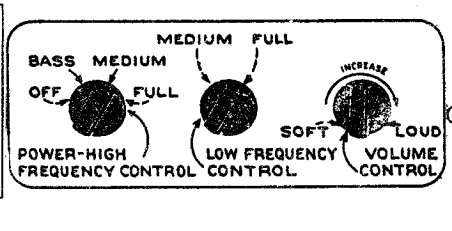
## General Description and Service Data

The model R-98 Victrola consists of a crystal pickup, a five tube audio amplifier, a eight inch dust-proof electrodynamic speaker, and a motor turntable mechanism all combined in a hinged-top, table type walnut veneer cabinet. This instrument will reproduce records up to 12-inches in size.

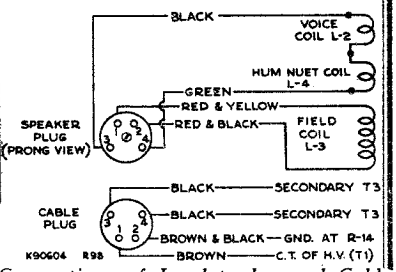
The crystal pickup unit is securely sealed in a metal casing, for protection against extreme changes in atmospheric conditions. If failure occurs, a new replacement crystal unit should be installed.




*Top View, Showing Location of Parts*




*Location of Controls*




*Connections of Loudspeaker and Cable*

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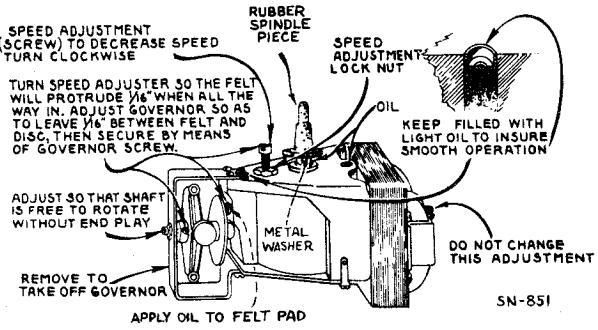
MODEL R-98, Chassis RS-77
Motor Data, Switch Assembly
Parts List

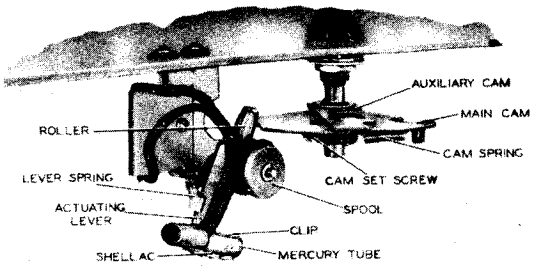
RCA MFG. CO., INC.

# RCA Victor MODEL R-98 (Chassis No. RS-77)

## Five-Tube, A-C, Electric Victrola (Phono. only)


SPEED ADJUSTMENT (SCREW) TO DECREASE SPEED TURN CLOCKWISE
RUBBER SPINDLE PIECE
SPEED ADJUSTMENT LOCK NUT
TURN SPEED ADJUSTER SO THE FELT WILL PROTRUDE 1/16" WHEN ALL THE WAY IN. ADJUST GOVERNOR SO AS TO LEAVE 1/16" BETWEEN FELT AND DISC. THEN SECURE BY MEANS OF GOVERNOR SCREW.
OIL
KEEP FILLED WITH LIGHT OIL TO INSURE SMOOTH OPERATION
ADJUST SO THAT SHAFT IS FREE TO ROTATE WITHOUT END PLAY
METAL WASHER
DO NOT CHANGE THIS ADJUSTMENT
REMOVE TO TAKE OFF GOVERNOR
APPLY OIL TO FELT PAD
SN-851

*Motor Lubrication and Adjustments*




*Mercury Switch Assembly*
(Shown with pickup in rest position)

Adjust main cam so that switch trips into the "off" position when needle is 1¼ inches from the center line of motor spindle.

## Replacement Parts

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **AMPLIFIER ASSEMBLIES** | |
| 12723 | Capacitor—56 mmfd. (C3, C4) | .35 |
| 12635 | Capacitor—1,000 mmfd. (C15, C16) | .50 |
| 31033 | Capacitor—1,500 mmfd. (C2) | .35 |
| 30303 | Capacitor—.0035 mfd. (C7, C14) | .40 |
| 4838 | Capacitor—.005 mfd. (C6, C17, C18) | .25 |
| 5148 | Capacitor—.007 mfd. (C13) | .20 |
| 4937 | Capacitor—.01 mfd. (C5) | .25 |
| 32787 | Capacitor—.05 mfd. (C9) | .20 |
| 14626 | Capacitor—.07 mfd. (C1) | .25 |
| 12484 | Capacitor—0.25 mfd. (C10, C12, C22) | .30 |
| 11203 | Capacitor—Electrolytic, 10 mfd (C20) | 1.15 |
| 14273 | Capacitor—Electrolytic, one 10 mfd., and one 20 mfd. sections (C8, C11) | 1.10 |
| 11496 | Capacitor—Electrolytic, 18 mfd. (C21) | 1.35 |
| 14531 | Capacitor—Electrolytic, 25 mfd. (C19) | 1.55 |
| 33396 | Control—H.F. tone control and switch (S1, S4) | 1.00 |
| 33397 | Control—L.F. tone control (S3) | .45 |
| 5040 | Plug—Speaker cable plug | .30 |
| 12466 | Reactor—Filter reactor (L1) | 4.20 |
| 12194 | Resistor—1,800 ohms, ½ watt (R10) | .20 |
| 33482 | Resistor—voltage divider, 3,800 ohms (R14) | .75 |
| 13714 | Resistor—5,600 ohms, ½ watt (R6) | .20 |
| 14559 | Resistor—10,000 ohms, ½ watt (R2) | .20 |
| 12738 | Resistor—27,000 ohms, ½ watt (R4) | .20 |
| 12266 | Resistor—39,000 ohms, ½ watt (R1) | .20 |
| 12286 | Resistor—56,000 ohms, ½ watt (R12) (R3) | .20 |
| 17440 | Resistor—56,000 ohms, 1 watt (R11) | .22 |
| 14560 | Resistor—100,000 ohms, ½ watt (R7) | .20 |
| 13734 | Resistor—120,000 ohms, ½ watt (R13) | .20 |
| 12199 | Resistor—270,000 ohms, ½ watt (R8) | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt (R9) | .20 |
| 4794 | Socket—Tube socket—4-prong | .25 |
| 32537 | Socket—Tube socket—8-prong | .20 |
| 14275 | Socket—2 contact female for motor power | .25 |
| 14274 | Socket—2 contact female for pickup input | .25 |
| 13964 | Transformer—Driver transformer (T2) | 3.70 |
| 33405 | Transformer—Output transformer (T3) | 3.85 |
| 14271 | Transformer—Power transformer, 105-120 volts, 50-60 cycles | 7.95 |
| 33398 | Volume Control (R5) | 1.50 |
| | **PICKUP AND ARM ASSEMBLIES** | |
| 33399 | Arm—Pickup arm less crystal cartridge, cable, and base and pivot arm | 1.60 |
| 33400 | Base—Pickup arm base and pivot shaft | 1.00 |
| 32885 | Cable—Pickup arm cable and plug | .25 |
| 31156 | Crystal—Pickup crystal cartridge and screw | 4.25 |
| 31160 | Screw—Pickup needle screw | .12 |
| | **MOTOR ASSEMBLIES** | |
| 31617 | Bracket—Governor end bearing bracket less bearing screw for 50 and 50-60 cycle motors | .30 |
| 31619 | Coil—Field coils and laminations for 50-60 cycle motor | 7.80 |
| 31618 | Coil—Field coils and laminations for 60 cycle motor | 5.50 |
| 11703 | Governor—Governor complete for 50-60 cycle motor | 3.05 |
| 31623 | Governor—Governor complete for 60 cycle motor | 2.80 |
| 31462 | Motor—105-125 volts, 50-60 cycle | 20.20 |
| 31461 | Motor—105-125 volts, 60 cycle | 17.35 |
| 31616 | Screw—Rotor bearing screw and nut for 60 and 50-60 cycle motor | .25 |
| 31620 | Screw—Speed regulator screw and nut for 60 and 50-60 cycle motor | .20 |
| 31621 | Shaft—Turntable spindle and gear for 60 and 50-60 cycle motor | 1.90 |
| 31622 | Washer—one felt and one metal thrust washer for turntable spindle | .10 |
| 32914 | Weight—Governor weight and spring for 50-60 cycle motor | .30 |
| 32912 | Weight—Governor weight and spring for 60 cycle motor | .25 |
| | **AUTOMATIC SWITCH ASSEMBLIES** | |
| 32863 | Cam—Cam assembly comprising main and auxiliary cams, hub, and set screws | .65 |
| 32864 | Lever—Actuating lever with roller and mercury tube clip | .45 |
| 14195 | Screw—No. 10-32 x 5/16 cone pointer set screw for cam hub | .05 |
| 32869 | Screw—No. 10-32 x 5/16 set screw for cam hub | .01 |
| 32868 | Spring—Actuating lever tension spring | .05 |
| 32867 | Spring—Cam tension spring | .05 |
| 32865 | Support—Switch support and terminal board | .40 |
| 32866 | Switch—Mercury tube with leads (S2) | 1.75 |
| 31608 | Washer—"C" washer for actuating lever shaft. | .01 |
| | **SPEAKER ASSEMBLIES (84613-1)** | |
| 33648 | Cone—Cone assembled with voice coil, center suspension and rim gasket | 1.75 |
| 5039 | Plug—4-prong male connector for reproducer | .30 |
| 33490 | Speaker complete (No Output Transformer) | 5.50 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 13103 | Cap—Pilot lamp bullseye | .15 |
| 33403 | Cup—New needle cup | .30 |
| 9848 | Cup—Used needle cup and pickup arm support | .75 |
| 31464 | Damper—Turntable damper sleeve and plate | .30 |
| 11771 | Foot—Cabinet foot | .02 |
| 13085 | Hinge—Cabinet lid hinge | .22 |
| 31355 | Knob—Volume control, or tone control knob | .12 |
| 33402 | Mounting—Motor mounting screws, washers, and spacers | .40 |
| 14805 | Plug—Plug for motor leads | .20 |
| 31155 | Spring—Coil spring for used needle cup lid | .04 |
| 14270 | Spring—Retaining spring for knobs | .05 |
| 31164 | Support—Cabinet lid support | .45 |
| 33401 | Turntable | 2.30 |

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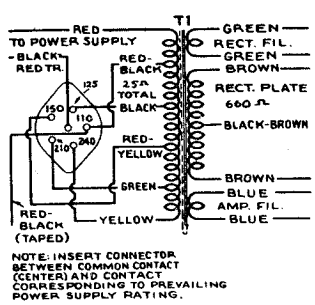
# RCA MFG. CO., INC.

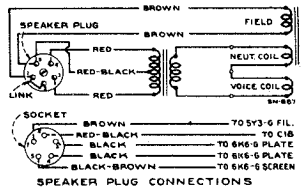
MODELS 98T, 98K2, Chas. RC-386A
Schematic, Socket, Trimmers
Transformer, Speaker, Data




NOTE: INSERT CONNECTOR BETWEEN COMMON CONTACT (CENTER) AND CONTACT CORRESPONDING TO PREVAILING POWER SUPPLY RATING.

## UNIVERSAL TRANS. CONNECTIONS

Above—Universal Power Transformer Connections. (110-volt supply for a Victrola Attachment may be obtained by connecting the motor to the red and the red-black leads.)

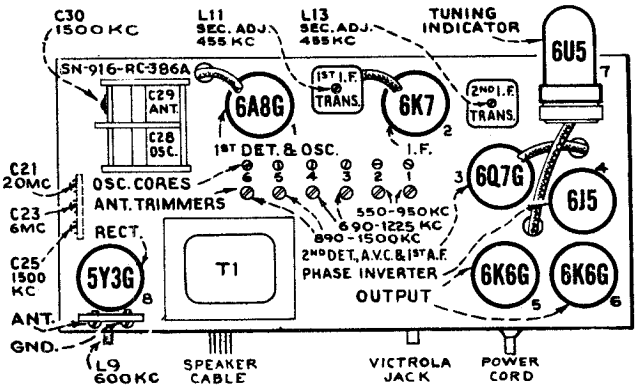



SPEAKER PLUG CONNECTIONS

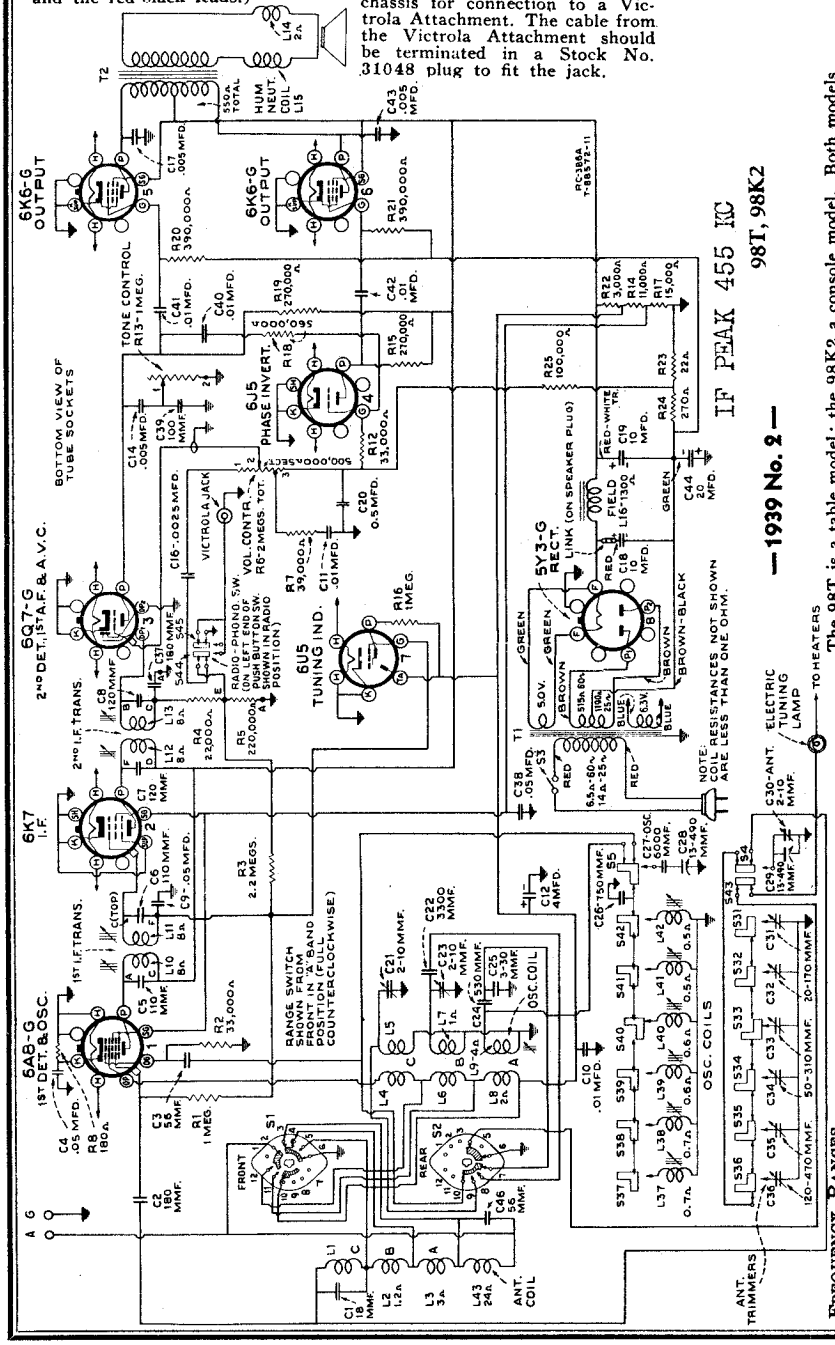
### *Connections and Colors of Loudspeaker and Cable*

**Loudspeaker.**—The loudspeaker cone may be centered in the usual manner with three celluloid or paper feelers after gently cutting away the front dust cover. A new cover should be cemented in place upon completion of the adjustment.

**Victrola Attachment.**—A jack is provided on the rear of the chassis for connection to a Victrola Attachment. The cable from the Victrola Attachment should be terminated in a Stock No. 31048 plug to fit the jack.




*Tube and Trimmer Locations*




The 98T is a table model; the 98K2 a console model. Both models have a "Magic Eye" tuning tube and illuminated indicator to show when the set is being operated on electric tuning. All models have electric tuning for six stations in the standard broadcast range.

Features of design include: Magnetite-core electric-tuning coils; magnetite-core i-f transformers; temperature-compensated capacitor in the oscillator circuit; aural-compensated volume control; high-frequency tone control; jack and switch for Victrola attachment; straight-line dial; dust-proof electrodynamic loudspeaker.

### *Location of Controls*

The left-hand push button is a Victrola-Attachment switch. The right-hand push button is for dial tuning.

**FREQUENCY RANGES**

| | |
|---|---|
| "Standard Broadcast" (A) | 540-1,720 kc |
| "Medium Wave" (B) | 2.3-7 mc |
| "Short Wave" (C) | 7-22 mc |
| Six Electric Tuning Positions | 550-1,500 kc |
| 2 stations between approximately 550- 950 kc (Buttons 1 and 2) | |
| 2 stations between approximately 690-1,225 kc (Buttons 3 and 4) | |
| 2 stations between approximately 890-1,500 kc (Buttons 5 and 6) | |
| Intermediate Frequency | 455 kc |
| **POWER SUPPLY RATINGS** | |
| A | 105-125 volts, 50-60 cycles, 115 watts |
| B | 105-125 volts, 25-60 cycles, 115 watts |
| C | 100-130/140-160/200-250 volts, 40-60 cycles, 115 watts |
| POWER OUTPUT | |
| Undistorted | 5 watts |
| Maximum | 5.5 watts |
| **LOUDSPEAKER** | |
| Type | Electrodynamic |
| Diameter | 98T, 6 inches; 98K2, 12 inches |
| Voice Coil Impedance | 2.2 ohms at 400 cycles |

| | Model 98T | Model 98K2 |
|---|---|---|
| Height | 12⅞ inches | 42 inches |
| Width | 18½ inches | 27½ inches |
| Depth | 9⅜ inches | 15½ inches |
| Net Weight | 21 pounds | 55 pounds |
| Shipping Weight | 28 pounds | 73 pounds |
| Chassis Base Dimensions | 13 in. x 6½ in. | 25 in. x 12 in. |
| Over-all Chassis Height | 6½ inches | 12 inches |
| Tuning Drive Ratio | 12 to 1 | |

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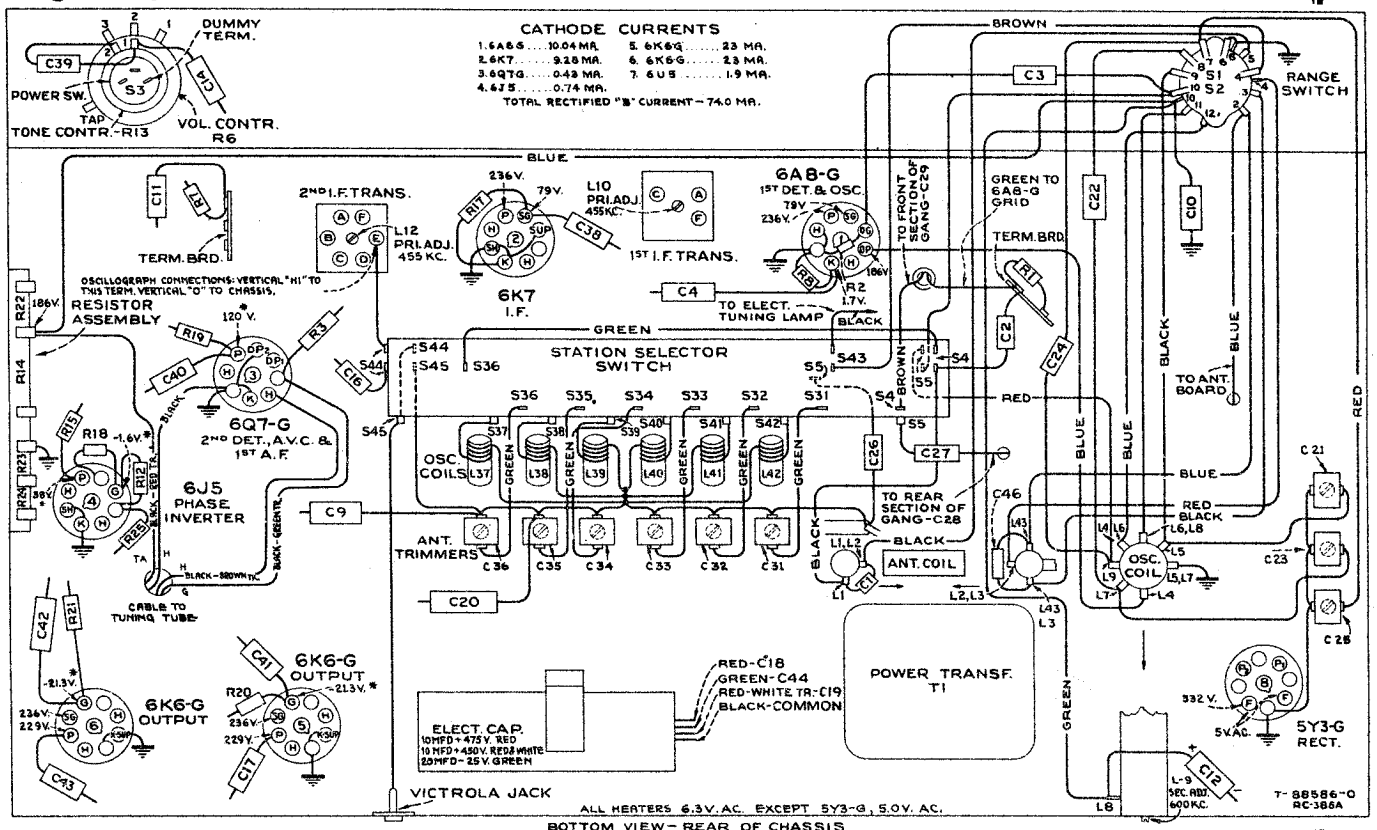
MODELS 98T, 98K2, Chas. RC-386A
Voltage, Chassis Wiring
Alignment, Drive Data

# RCA MFG. CO., INC.




*R-F Wiring Diagram and Socket Voltages*

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ± 20% with 117-volt a-c supply.

*NOTE: Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

## Alignment Procedure

**Calibration Scale on Indicator-Drive-Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed ⅛-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

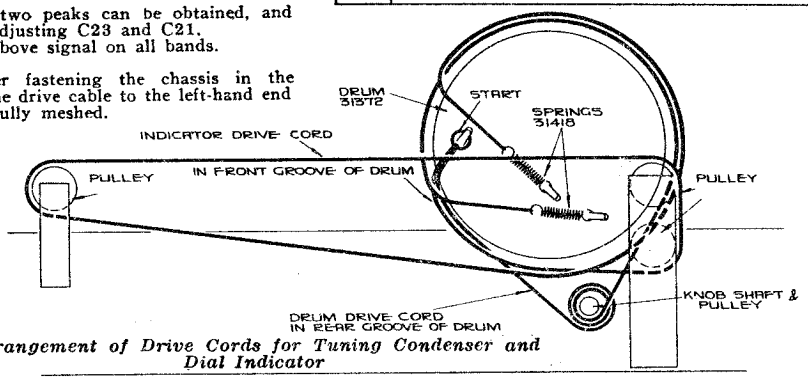
*Use minimum capacity peak if two peaks can be obtained, and rock gang condenser slightly while adjusting C23 and C21.

**Note.**—Oscillator tracks 455 kc above signal on all bands.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, move the dial indicator on the drive cable to the left-hand end mark on dial, with gang condenser fully meshed.

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio-dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | "A" band, Quiet Point between 550-750 kc | L12 and L13 (2nd I-F Transformer) |
| 2 | 6A8G det. grid cap, in series with .01 mfd. | 455 kc | | L10 and L11 (1st I-F Transformer) |
| 3 | Antenna Terminal, in series with 200 mmf. | 600 kc | 600 kc (150.5°) "A" band | L9 |
| 4 | | 1,500 kc | 1,500 kc (28°) "A" band | C25 (osc.) C30 (ant.) |
| 5 | Repeat steps 3 and 4. | | | |
| 6 | Antenna Terminal, in series with 400 ohms. | 6 mc | 6 mc (26.5°) "B" band | C23 (osc.)* |
| 7 | | 20 mc | 20 mc (22°) "C" band | C21 (osc.)* |
| 8 | Follow "Adjustments for Electric Tuning." | | | |

FOR DIAL CALIBRATION SEE INDEX




*Arrangement of Drive Cords for Tuning Condenser and Dial Indicator*

DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY

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## Adjustments for Electric Tuning

These models have eight push buttons. The left-hand button is a Victrola switch. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

**Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.**

5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

**Precautionary Lead Dress.—**

1. Dress red leads from power transformer to power switch (S3), in corner of chassis and away from volume control terminals.
2. Dress brown lead from push-button switch to gang over end of switch, and away from C27 and bus between S5 and range switch.
3. Leads to C27 must be as short as possible.
4. Blue lead from range switch to oscillator coil must be as short as possible and dressed away from other leads. All leads should be dressed away from antenna coil.
5. Leads across back of chassis must be dressed under electrolytic away from Victrola jack.
6. Parts and leads should be dressed away from R22-R14 as it becomes heated.
7. Leads from oscillator coil to trimmers must be dressed away from coil.
8. Green lead from S4 to range switch must be clear of other leads and away from front edge of chassis.

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES (RC-386-A)** | |
| 30752 | Bracket—Magic eye bracket and clip | .25 |
| 14517 | Board—"Antenna"—"Gnd" terminal board | .25 |
| 30766 | Cap—Rubber cap for magic eye | .15 |
| 32142 | Capacitor—Dry electrolytic capacitor comprising two 10 and one 20 mfd. sections (C18, C19, C44) | 1.90 |
| 31400 | Capacitor—Mica trimmer capacitor comprising two sections of 2-10 mmfd. and one section of 3-30 mmfd. (C21, C23, C25) | .50 |
| 32486 | Capacitor—Trimmer capacitor bank for push button switch (C31, C32, C33, C34, C35, C36) | 1.40 |
| 12722 | Capacitor—18 mmfd. (C1) | .35 |
| 12723 | Capacitor—56 mmfd. (C3, C46) | .35 |
| 30406 | Capacitor—100 mmfd. (C39) | .35 |
| 14262 | Capacitor—109 mmfd. (C5, C6) | .30 |
| 12404 | Capacitor—120 mmfd. (C7, C8) | .30 |
| 14712 | Capacitor—180 mmfd. (C37) | .30 |
| 30232 | Capacitor—180 mmfd. (C2) | .35 |
| 32492 | Capacitor—530 mmfd. (C24) | .40 |
| 31435 | Capacitor—750 mmfd. (C26) | .40 |
| 4881 | Capacitor—3300 mmfd. (C22) | .60 |
| 31405 | Capacitor—6000 mmfd. (C27) | .75 |
| 5107 | Capacitor—.0025 mfd., 700 volts (C16) | .20 |
| 4838 | Capacitor—.005 mfd., 1000 volts (C14, C17, C43) | .25 |
| 4858 | Capacitor—.01 mfd., 500 volts (C10, C40 C41, C42) | .25 |
| 14393 | Capacitor—.01 mfd., 300 volts (C11) | .30 |
| 30882 | Capacitor—.05 mfd., 200 volts (C4, C9, C38) | .20 |
| 30867 | Capacitor—.5 mfd., 200 volts (C20) | .30 |
| 32145 | Capacitor—4 mfd. (C12) | .70 |
| 31382 | Clip—Coil and core mounting clip for push button switch | .04 |
| 32493 | Coil—Antenna coil (L1, L2, L3, L43) | 1.35 |
| 31951 | Coil—Oscillator coil (L4, L5, L7, L9) | 1.40 |
| 31385 | Coil—Push button oscillator coil 550 to 950 kc. (L37, L38) | .30 |
| 32487 | Coil—Push button oscillator coil 690 to 1225 kc. (L39, L40) | .35 |
| 31383 | Coil—Push button oscillator coil 890 to 1500 kc. (L41, L42) | .30 |
| 31369 | Condenser—2-gang variable tuning condenser (C28, C29, C30) | 2.65 |
| 32668 | Control—Volume control, tone control and power switch (R6, R13, S3) | 3.00 |
| 32634 | Cord—Variable condenser drive or pointer indicator cord | .10 |
| 12800 | Core and Stud for oscillator coil Stock No. 31951 | .35 |
| 31372 | Drum—Variable condenser drive cord drum | .65 |
| 32552 | Indicator—Indicator pointer assembly | .20 |
| 11891 | Lamp—Dial or electric tuning indicator lamp | .17 |
| 32670 | Plate—Dial color plate (Metal) | .75 |
| 31373 | Pulley—Pointer drive cord pulley (⅜ in. dia.) | .08 |
| 30545 | Resistor—180 ohms, ½ watt (R8) | .20 |
| 5114 | Resistor—15,000 ohms, 1 watt (R17) | .22 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R4) | .15 |
| 12454 | Resistor—33,000 ohms, ½ watt (R2, R12) | .20 |
| 12266 | Resistor—39,000 ohms, ½ watt (R7) | .20 |
| 14560 | Resistor—100,000 ohms, ½ watt (R25) | .20 |
| 11398 | Resistor—220,000 ohms, 1/10 watt (R5) | .15 |
| 12199 | Resistor—270,000 ohms, ½ watt (R15, R19) | .20 |
| 13479 | Resistor—390,000 ohms, ½ watt (R20, R21) | .20 |
| 12486 | Resistor—560,000 ohms, ½ watt (R18) | .20 |
| 13730 | Resistor—1 meg., ½ watt (R1) | .20 |
| 12013 | Resistor—1 meg., 1/10 watt (R16) | .15 |
| 12679 | Resistor—2.2 meg., ½ watt (R3) | .20 |
| 32143 | Resistor—Voltage divider tapped at 22 ohm, 270 ohm, 3000 ohm, 11,000 ohm. (R14, R22, R23, R24) | .90 |
| 14887 | Retainer—Retainer for pointer indicator drive cord pulley | .01 |
| 14343 | Retainer—Retaining ring for tuning knob shaft | .03 |
| 4669 | Screw—No. 8-32 set screw for variable condenser drive cord drum | .03 |
| 32671 | Shaft—Tuning drive shaft and pulley | .35 |
| 31199 | Shield—Dial lamp shield | .04 |
| 3682 | Shield—Tube shield | .22 |
| 31364 | Socket—Dial lamp socket | .20 |
| 31365 | Socket—Insulated socket for electric tuning indicator lamp | .30 |
| 13871 | Socket—Magic eye socket | .45 |
| 31251 | Socket—Octal base tube socket | .25 |
| 14278 | Socket—Phonograph input socket | .25 |
| 12493 | Socket—Speaker cable socket | .30 |
| 31418 | Spring—Coil tension spring for variable condenser or pointer drive cord | .05 |
| 32498 | Switch—Push button selector switch (S4, S5, S37, S38, S39, S40, S41, S42, S43, S36, S35, S34, S33, S32, S31, S44, S45) | 3.85 |
| 32669 | Switch—Range switch (S1, S2) | 1.10 |
| 14376 | Transformer—First i.f. transformer (L10, L11, C5, C6) | 2.45 |
| 14283 | Transformer—Second i.f. transformer (L12, L13, C7, C8, C37, R4, R5) | 3.80 |
| 31445 | Transformer—Power transformer, 110 volt, 25/60 cycle (T1) | 7.80 |
| 32144 | Transformer—Power transformer, 110 volt, 50/60 cycle (T1) | 4.75 |
| 31446 | Transformer—Power transformer, 110-125-150-210-240 volts 40/60 cycle (T1) | 8.05 |
| | **SPEAKER ASSEMBLIES (RL-70H-5) MODEL 98K2** | |
| 13866 | Cap—Dust cap for cone center | .03 |
| 12012 | Coil—Field coil (L16) | 2.90 |
| 11469 | Coil—Neutralizing coil (L15) | .30 |
| 31275 | Cone—Speaker cone and voice coil (114) | 1.75 |
| 31539 | Plug—5-contact male plug for speaker | .25 |
| 32146 | Speaker complete | 12.10 |
| 14534 | Transformer—Output transformer (T2) | 3.85 |
| 14357 | Washer—Spring washer to hold field coil securely | .06 |
| | **SPEAKER ASSEMBLIES (84308-3) MODEL 98T** | |
| 32689 | Coil—Speaker field coil (L16) | 3.35 |
| 32688 | Cone—Cone and voice coil mounted and centered on housing (L14) | 1.85 |
| 31539 | Plug—5-contact plug or speaker | .25 |
| 32687 | Speaker—Speaker complete | 5.80 |
| 32690 | Transformer—Output transformer (T2) | 1.45 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 31397 | Button—Station selector push button | .15 |
| 31456 | Covers—8 Protective covers for push button markers | .08 |
| 32673 | Dial—Station selector glass dial | .60 |
| 32674 | Escutcheon—Station selector escutcheon—less push buttons | 3.85 |
| 31355 | Knob—Range switch knob | .12 |
| 31391 | Knob—Tone control knob | .15 |
| 14359 | Knob—Tuning knob | .20 |
| 30773 | Knob—Volume control knob | .15 |
| 31458 | Marker—"Dial Tuning" push button marker | .01 |
| 31457 | Marker—"Record Player" push button marker | .01 |
| 31589 | Marker—Station markers | .35 |
| 30330 | Spring for tone control knob | .03 |
| 4982 | Spring for tuning knob | .05 |
| 14270 | Spring for volume control or range switch knob | .05 |

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MODEL R-100
Victrola Attachment
Motor Data, Tone Compensation
Parts List

RCA MFG. CO., INC.

# RCA Victor Model R-100 Victrola Attachment

## Motor Data

Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

**Hum and Vibration**—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs, it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make sure that the leather and steel washers are arranged in proper sequence, as shown in the drawings.)
3. Motor not properly fastened in cabinet.
4. Burrs on poles of motor or stator.
5. Slight eccentricity of rotor or spindle.
6. Loose laminations of the stator.
7. Improper horizontal alignment of the rotor and stator (pertaining only to the type motor shown in Figure 1). Correct horizontal alignment is as shown in the motor assembly drawing. The position of the stator is raised or lowered by adding or removing washers below the leather washer. In the type motor shown in Figure 2, no adjustment is necessary because correct horizontal alignment is provided by the design of the motor.

**The damper spring must fit without binding or chattering, in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. Any binding in the washers or stator bearing which prevents the movement of the stator may cause speed variations in the motor.** The damper spring must exert equal force in restoring the stator to its mid-position when the stator is deflected manually in either direction.

## Tone Compensation

Because of the widely varying frequency characteristics of various types of audio amplifiers with which the R-100 may be used, it may be desirable in some cases to make refinements in the pickup circuit of the R-100 to compensate for the characteristics of the amplifier. The following circuits show means of making such refinements.

In Figure 3, R1 controls the low-frequency response; larger values of R1 give increased lows. For maximum low-frequency response, remove R1. R2 controls pickup output, smaller values of R2 giving increased output. C1 controls high-frequency response; to increase highs, increase C1.

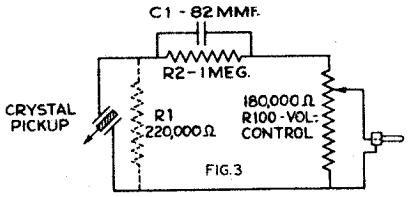

FIG. 3

Where a decrease in high-frequency response may be desired (for example, as an aid in reducing "needle scratch" on worn records), the circuit in Figure 4 is applicable. In this circuit, C2 acts as loading on the pickup and is also a controlling factor on the high-frequency response. Smaller values of C2 give more pickup output and also more highs. R3 gives a sharper high-frequency reduction; increasing R3 decreases highs.

The suggested values shown in Figures 3 and 4 should serve as a basis from which slight alterations may be made to suit individual cases.

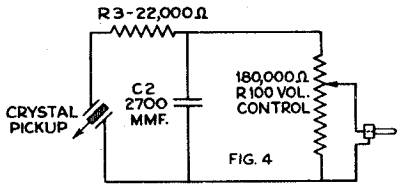

FIG. 4

## Replacement Parts

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **PICKUP AND ARM ASSEMBLIES** | |
| 33121 | Arm—Pickup arm complete—less crystal cartridge | 1.75 |
| 33124 | Base—Pickup arm base and pivot shaft | .80 |
| 33122 | Crystal—Pickup crystal cartridge and needle screw | 4.35 |
| 33123 | Damper—Viscoloid damper for pickup armature | .15 |
| 33529 | Screw—Pickup needle screw | .15 |
| | **MOTOR ASSEMBLIES (see figure 1)** | |
| 31045 | Base—Motor support, damper, and bearing cup assembly | .60 |
| 31046 | Bearing—Rotor bearing—50 and 25 cycle | .70 |
| 33353 | Cap—Turntable spindle cap (rubber) | .10 |
| 33357 | Coil—Motor field coil—105-120 volts, 25 cycle | .60 |
| 31918 | Coil—Motor field coil—105-120 volts, 50 cycle | .70 |
| 31917 | Coil—Motor field coil, 105-120 V., 60 cycle | .70 |
| 31040 | Cushion—One seat rubber cushion for turntable mounting | .25 |
| 31047 | Cushion—Rubber cushion for rotor bearing | .15 |
| 33941 | Frame—Rotor frame and spindle—60 cycle | 1.30 |
| 33641 | Lamination—Rotor lamination—60 cycle | 1.30 |
| 33358 | Lamination—Stator laminations—25 cycle | 1.00 |
| 33354 | Lamination—Stator laminations—less coil 50 cycle | 11.75 |
| 33355 | Motor—105-120 volts, 25 cycle | 7.65 |
| 33351 | Motor—105-120 volts, 50 cycle | 1.85 |
| 33940 | Motor—105-120 V., 60 cycle | .06 |
| 32075 | Ring—Lead ring for turntable—25 cycle | 2.55 |
| 33041 | Ring—Retaining ring and washer for spindle cap | 2.45 |
| 33356 | Rotor—Rotor frame, laminations, and spindle shaft assembled—25 cycle | 4.55 |
| 33352 | Rotor—Rotor frame, laminations, and spindle shaft assembled—50 cycle | |
| 31036 | Rotor—Turntable and rotor lamination for 60 cycle operation | |
| 31042 | Stator—Stator assembly comprising coils and laminations for 60 cycle operation | 2.50 |
| 32076 | Turntable—Finished turntable plate only—25 cycle | 1.40 |
| 31039 | Turntable—Finished turntable plate only—50 cycle | .95 |
| 4083 | Washer—Leather washer | .02 |
| 33348 | Washers—Leather and metal washers for stator bearing | .10 |
| 14231 | Washer—Metal spacing washer | .02 |
| 32074 | Weight—One upper and one lower weight for stator—25 cycle (2 each required) | .65 |
| | **MOTOR ASSEMBLIES (see figure 2)** | |
| 33345 | Cap—Turntable spindle cap (rubber) 60 cycle | .15 |
| 33346 | Coil—Motor field coil—105-120 volts, 60 cycle | .65 |
| 31040 | Cushion—One set rubber cushion for turntable mounting | .25 |
| 33350 | Frame—Motor support frame and bearing cup | .45 |
| 33349 | Hanger—Rubber hanger for mounting motor | .10 |
| 33347 | Lamination—Stator laminations and bearing—less field coils—60 cycle | 1.05 |
| 33343 | Motor—105-120 volts, 60 cycle | 6.95 |
| 33041 | Ring—Retaining ring and washer for spindle cap | .06 |
| 33344 | Rotor—Rotor frame, laminations, and spindle shaft assembled—60 cycle | 2.45 |
| 31039 | Turntable—Finished turntable plate only—60 cycle | .95 |
| 33348 | Washers—Leather and metal washers for stator bearing | .10 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 31051 | Foot—Cabinet foot | .04 |
| 3961 | Knob—Volume control and switch knob | .10 |
| 32500 | Mounting—Pickup arm mounting comprising one rubber cushion, 1 washer, and 1 snap ring | .15 |
| 31048 | Plug—2-contact male plugs for output cable | .15 |
| 33359 | Volume control and switch R1, S1 | 1.50 |

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First Edition

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Motor, Pick-up Details
Receiver Connections

# RCA MFG. CO., INC.

MODEL R-100
Victrola Attachment

## Electrical and Mechanical Specifications

MOTOR
78 r.p.m. ..... Synchronous (Manual Starting)
POWER SUPPLY RATINGS
A-6 ..... 105-125 volts, 60 cycles, 10 watts
A-5 ..... 105-125 volts, 50 cycles, 10 watts
B-2 ..... 105-125 volts, 25 cycles, 10 watts

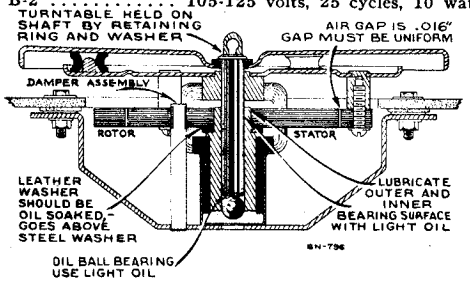
*At Left—Fig. 1*

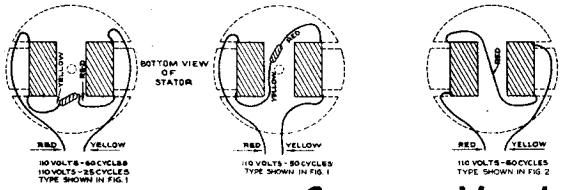
*At Right—Fig. 2*

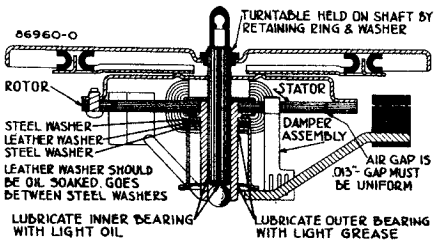
*Lower Left—Motor Coil Connections*

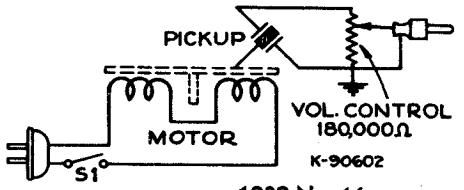
*Lower Right—R-100 Schematic Diagram*

CRYSTAL PICKUP
Impedance..... 100,000 ohms at 1,000 cycles
Average Output Voltage .... 1½ Volts at 1000 cycles across 250,000 ohms load
Cabinet Dimensions ..... 5¼ x 8¼ x 12 inches
Weight ..... 5½ lbs. (net), 7 lbs (shipping)


TURNTABLE HELD ON SHAFT BY RETAINING RING AND WASHER
AIR GAP IS .016" GAP MUST BE UNIFORM
DAMPER ASSEMBLY
ROTOR
STATOR
LEATHER WASHER SHOULD BE OIL SOAKED, GOES ABOVE STEEL WASHER
LUBRICATE OUTER AND INNER BEARING SURFACE WITH LIGHT OIL
OIL BALL BEARING USE LIGHT OIL
BN-796





86960-0
TURNTABLE HELD ON SHAFT BY RETAINING RING & WASHER
ROTOR
STATOR
STEEL WASHER
LEATHER WASHER
STEEL WASHER
DAMPER ASSEMBLY
AIR GAP IS .013" GAP MUST BE UNIFORM
LEATHER WASHER SHOULD BE OIL SOAKED. GOES BETWEEN STEEL WASHERS
LUBRICATE INNER BEARING WITH LIGHT OIL
LUBRICATE OUTER BEARING WITH LIGHT GREASE




—1939 No. 16—

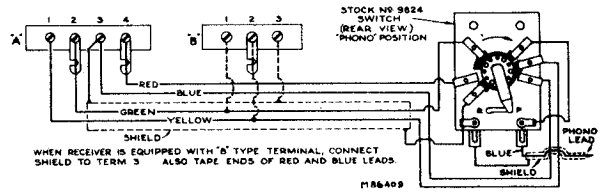
## Connecting Victrola Attachment to Radio Receivers

Methods of connecting the Victrola Attachment to various types of audio systems are given in the accompanying text and illustrations. Also included are the model numbers of the various RCA receivers to which the particular method applies. The data given requires that an RCA Stock No. 9824 Radio-Phono switch be used for switching from radio to phonograph, as desired. For ease in connecting the "phono" lead to the Stock No. 9824 switch, the male plug on the end of the lead should be removed by unsoldering or by cutting it off.

1939 RCA RADIOS OF THE "90" SERIES:

Plug male connector on the end of the "phono" lead into the female connector on the receiver chassis. Push or turn the "Phono" switch to "Phono" position, and operate the Victrola Attachment according to instructions.

RADIO RECEIVERS HAVING "PHONO" TERMINAL BOARDS.



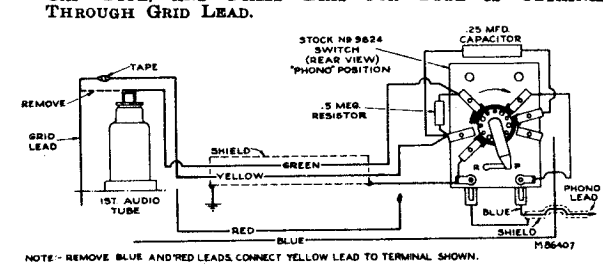

**RCA Radio Receivers to which the above illustration applies: 5T1, 5T4, 5T5, 5T6, 5T7, 5T8, 6T5, 8T2, 8T11, 8K11, 85T5, 86E, 86K, 86T, 86T1, 86T4, 86K7, 86T44, 87K, 87T, 87K1, 87K2, 87T2, 88K, 810K, 810K1, 810T, 810T4, 811K, 812K, 813K, 816K, 811T.**

**For following Receivers, Yellow lead should go on Terminal No. 1, Green lead on Terminal No. 2: 6K2, 6T2, 6K8, 6T10, 7T1, 7K1, 85T8, 86T3, 87T1, 86T2, 86T6, 6K10.**

**Insulate shield of switch wires from chassis, on following RCA Receivers: 5T, 6T, 6K, 6K1, 7T, 7K, 7X, 8T, 8K, 86X4, 87EY, 87X, 87Y, 8T10, 7X1, 8K1.**

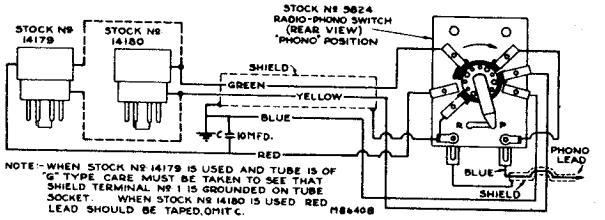
Receivers having a Four Terminal Board: 9K, 9T, 9K1, 9K2, 9K3, 9K10, 10T, 10K, 10K1, 13K, 15K. Reverse Red and Blue leads to Terminal Board of C9-6, T9-9, T8-16, C8-17.

RADIO RECEIVERS WHOSE FIRST AUDIO TUBE IS OF THE GRID CAP TYPE, AND FIXED BIAS FOR TUBE IS OBTAINED THROUGH GRID LEAD.




In general, the Victrola Attachment must be used with radio receivers having at least two stages of high-gain audio amplification. The output of the Victrola Attachment should be connected to the input of the first audio tube, and at the same time the output of radio receiver portion of the chassis should be shorted or opened, to prevent radio signals being heard while the Victrola Attachment is in operation.

RADIO RECEIVERS USING 6C5 OR 6J5, 6C5G OR 6J5G, TUBE FOR FIRST AUDIO AMPLIFIER.


STOCK NO 14179
STOCK NO 14180
STOCK NO 9824 RADIO-PHONO SWITCH (REAR VIEW) "PHONO" POSITION
SHIELD
GREEN
YELLOW
BLUE
C=10MFD.
RED
PHONO LEAD
NOTE:- WHEN STOCK NO 14179 IS USED AND TUBE IS OF "G" TYPE CARE MUST BE TAKEN TO SEE THAT SHIELD TERMINAL NO 1 IS GROUNDED ON TUBE SOCKET. WHEN STOCK NO 14180 IS USED RED LEAD SHOULD BE TAPED, OMIT C.
M86408

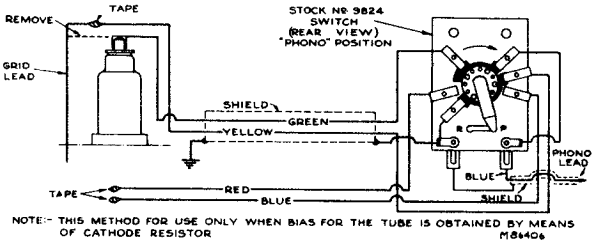
Stock No. 14179 Adaptor opens grid circuit, and inserts 2,700 ohm resistor in cathode of 6C5 or 6J5 tubes, for bias on Phono reproduction.

Stock No. 14180 Adaptor opens grid circuit of 6C5 or 6J5 tube.

Stock No. 14180 Adaptor necessary for RCA: C11-1, C13-2, T10-1, C11-3, C13-3.

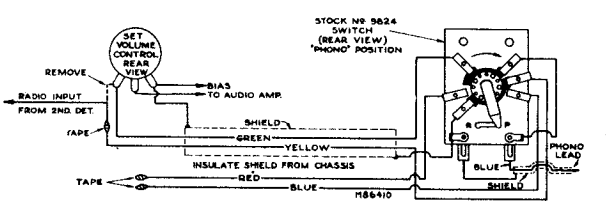
Stock No. 14179 Adaptor necessary for RCA: C15-3, C15-4.

RADIO RECEIVERS WHOSE FIRST AUDIO AMPLIFIER TUBE IS OF THE GRID CAP TYPE.




RCA Receivers for which above method applies: 125, 128, 128E, 224E, 225, 226, T6-1, C6-2, T6-9, T7-5, C7-6, T7-12, C7-14, T8-14, C8-15, T8-18, C8-19, C8-20, C9-4, T9-10.

RADIO RECEIVERS WHERE THE VOLUME CONTROL IS IN THE AUDIO INPUT CIRCUIT.

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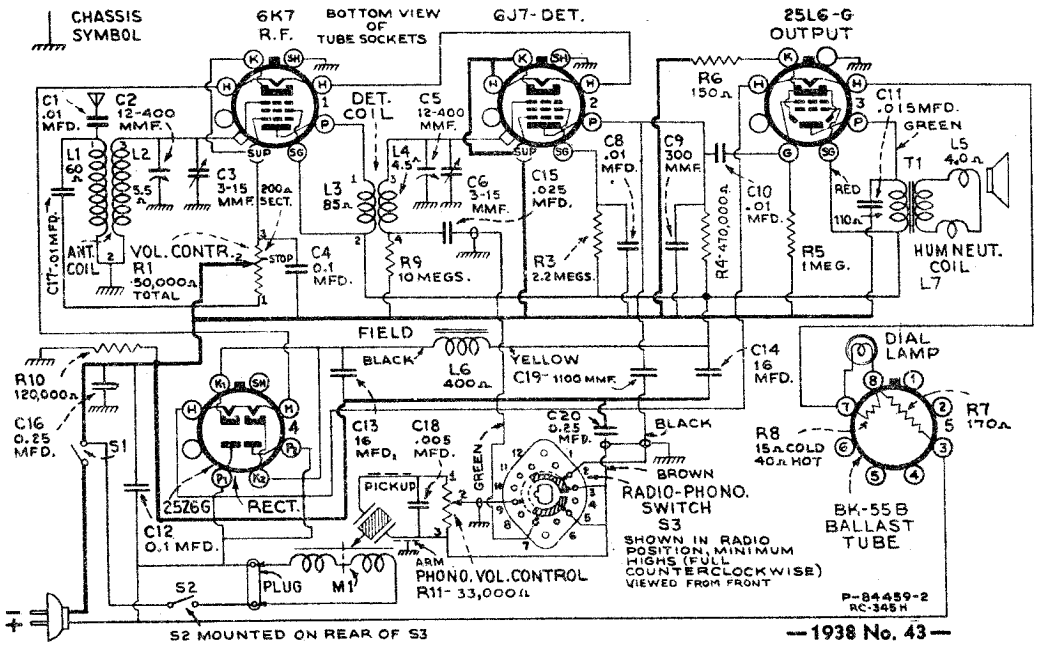
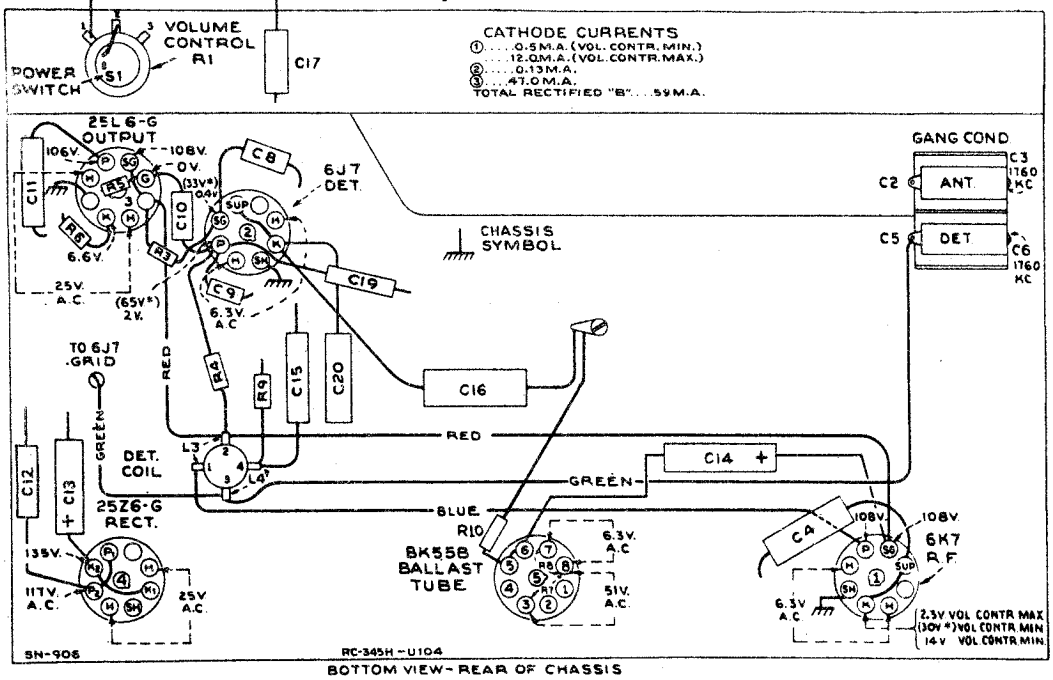
MODEL U-104
Chassis RC-345H
Schematic, Voltage
Chassis Wiring
Alignment Procedure

RCA MFG. CO., INC.




—1938 No. 43—

## Five-Tube, Single-Band, AC, Victrola U-104




BOTTOM VIEW-REAR OF CHASSIS

### Alignment Procedure

Adjust the two trimmers (C3 and C6) on side of gang condenser for maximum output, using lowest possible output from test-oscillator.

Turn pointer, while holding tuning knob, so that the pointer is horizontal and pointing to low-frequency end when the gang condenser is at maximum. Check pointer adjustment on a station.

Reel up the antenna wire, and connect the high side of test-oscillator through an 80-mmfd. capacitor to the antenna terminal on the antenna transformer. Connect low side of oscillator to receiver chassis through a 0.1-mfd. capacitor. Turn gang condenser to minimum (full out), tune oscillator to 1,760 kc, connect an output meter across the voice coil, and turn volume control to maximum.

Keep antenna roll and lead clear of chassis during alignment.

*R-F Wiring Diagram and Socket Voltages*
Measurements made to common negative line, unless otherwise specified

* Note: Values with star (*) are **operating** voltages.
Values not starred are actual **measured** voltages.

Measurements made with set tuned to quiet point, volume control at minimum, using 1,000-ohm-per-volt meter, having ranges of 10, 50, 250, and 500 volts. (Use nearest range above the specified measured voltage.)

Values should hold within approximately ± 20% for 117 volt 60 cycle supply.

Frequency Range ..... 540-1,720 kc
Alignment Frequency ..... 1,760 kc (ant., det.)

POWER OUTPUT (125-volt, 60-cycle supply)
Undistorted ..... 1.0 watt
Maximum ..... 1.5 watts

LOUDSPEAKER
Type ..... 5-inch Electrodynamic
Voice-Coil Impedance ..... 5 ohms at 400 cycles

PHONOGRAPH ..... Synchronous (manual starting)

Records ..... 10-inch and 12-inch, 78 r.p.m.
Pickup ..... Crystal, 100,000 ohms at 1,000 c.p.s.
Average Output of Pickup ..... 1½ volts at 1,000 c.p.s. across ¼-meg. load

Dial Lamp ..... Mazda No. 40, 6.3 volts, .15 amp.

POWER SUPPLY RATINGS
A-5 ..... 105-125 volts, 50 cycles, 60 watts
A-6 ..... 105-125 volts, 60 cycles, 60 watts

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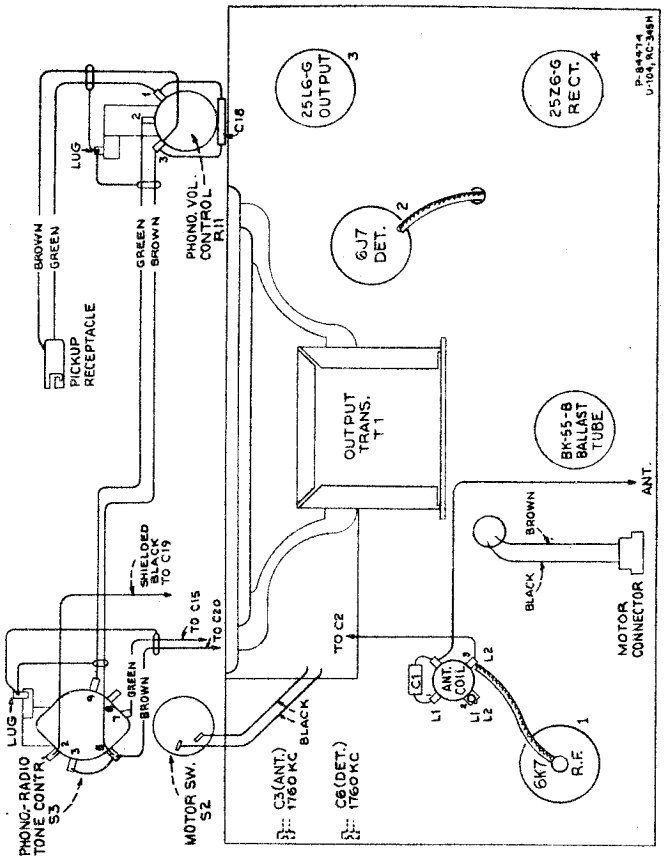
RCA MFG. CO., INC.

MODEL U-104
Chassis RC-345H
Chassis Wiring, Lead Dress
Pick-up, Phono. Data

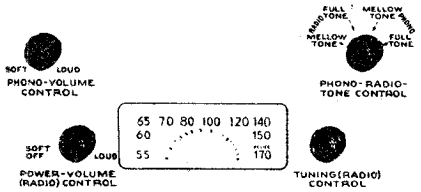



**Precautionary Lead Dress**

1. Dress power cord and line bypass C12 away from detector coil.
2. Plate lead from 6K7 to detector coil must be dressed close to chassis and run through center of chassis.
3. Green lead from detector coil to gang must be dressed clear of other leads.
4. Green lead from antenna coil to C17 must be dressed against front apron.
5. Dress all heater leads close to base.
6. Yellow lead from cathode 6K7 to volume control must be dressed against chassis, under gang condenser and against front apron.

**Power Supply.**—Although this model employs an ac-dc chassis, it is not suitable for use on dc, as this would damage the motor.

**Antenna.**—The set is equipped with a 25-foot antenna. Do not connect the antenna to ground. If an outdoor antenna is used, it should not be longer than 100 feet, including lead-in. If it is longer, connect a 100- to 200-mmfd. capacitor in series with the lead-in.

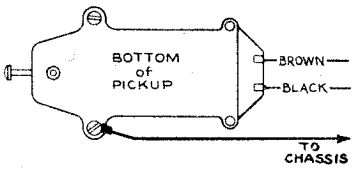



| | |
|---|---|
| Overall Chassis Height (inches) | 6 |
| Weight | 16 lbs. (shipping) |
| Tuning Drive Ratio | 1 to 1 |

| | Height | Width | Depth |
|---|---|---|---|
| Cabinet Dimensions (inches) | 9 | 12¼ | 9⅝ |
| Chassis Base (inches) | 2½ | 9 | 5¼ |

# PHONOGRAPH SERVICE DATA

U-104




*Pickup Connections*

The motor is started by turning the phono-radio tone control to either 3rd or 4th position clockwise and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.

**Hum and Vibration.**—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.

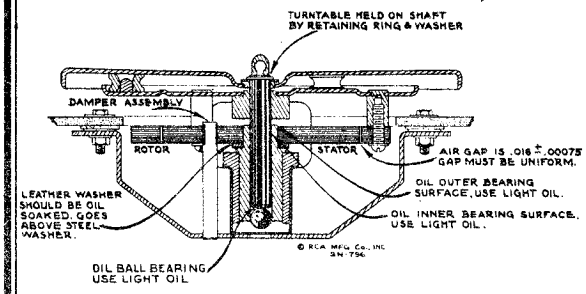
**5. The damper spring must fit without binding or chattering in the slot in the stator. The stator must be free to deflect in either direction between the limits of the damper spring. The damper spring must exert approximately equal force in restoring the stator to its mid-position when the stator is deflected manually in each direction.**

**Removing Rotor.** — The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

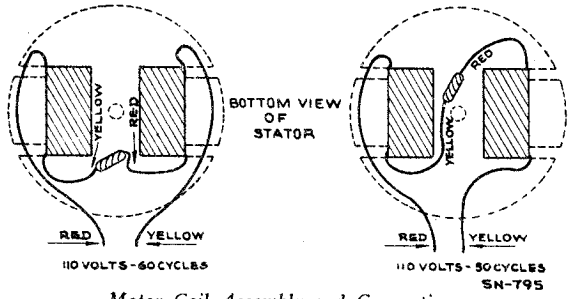
**Rotor Adjustment.**—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

**Lubrication.**—Oiling points are indicated in the diagram.

**On Phonograph Operation,** turn the radio volume control to minimum, and tune to a quiet point on the dial.


TURNTABLE HELD ON SHAFT BY RETAINING RING & WASHER
DAMPER ASSEMBLY
ROTOR
STATOR
AIR GAP IS .016 ± .0007 5 GAP MUST BE UNIFORM.
OIL OUTER BEARING SURFACE, USE LIGHT OIL.
OIL INNER BEARING SURFACE, USE LIGHT OIL.
LEATHER WASHER SHOULD BE OIL SOAKED, GOES ABOVE STEEL WASHER.
OIL BALL BEARING USE LIGHT OIL
© RCA MFG. Co., INC.
SN-796

*Cross Section of Motor Assembly*
This drawing shows the lubrication points




*Motor Coil Assembly and Connections*
D-C resistance of each coil (for 110 volts, 50 and 60 cycles) is approximately 82 ohms

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MODEL U-115
Chassis RC-348E

# RCA MFG. CO., INC.

Parts List

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES (RC-348E)** | |
| 32136 | Cable—Shielded cable and female plug for phonograph input | $0.35 |
| 12723 | Capacitor—56 mmfd. (C4) | .35 |
| 30904 | Capacitor—100 mmfd. (C7, C8, C9, C10) | .25 |
| 12725 | Capacitor—150 mmfd. (C35) | .35 |
| 13003 | Capacitor—180 mmfd. (C12) | .35 |
| 12488 | Capacitor—270 mmfd. (C32) | .35 |
| 31435 | Capacitor—750 mmfd. (C25) | .40 |
| 4838 | Capacitor—.005 mfd. (C15, C26, C30) | .25 |
| 14393 | Capacitor—.01 mfd. (C13, C14) | .30 |
| 4870 | Capacitor—.025 mfd. (C34) | .20 |
| 4886 | Capacitor—.05 mfd. (C11) | .20 |
| 30899 | Capacitor—0.1 mfd. (C1, C31) | .30 |
| 31424 | Capacitor—Comprising 2 sections 8 mfd. each (C16, C17) (This type has leads) | 1.65 |
| 32342 | Capacitor—Comprising 2 sections 10 mfd. each (C16, C17) (This type has terminals) | 1.20 |
| 31382 | Clip—Oscillator coil and core mounting clip | .04 |
| 32338 | Coil—Antenna coil (L1, L2) | .85 |
| 31098 | Coil—Oscillator coil (L3, L4) | .85 |
| 31422 | Condenser — 2-gang variable tuning condenser (C2, C3, C5, C6, C33) | 2.70 |
| 32355 | Control — Volume control, tone control and power switch | 3.00 |
| 30877 | Cord—Indicator drive cord | .20 |
| 30905 | Core—Adjustable core and stud for i-f transformers | .35 |
| 31386 | Core—Adjustable core and stud for oscillator coils | .15 |
| 31421 | Drum—Variable condenser drive cord drum | .45 |
| 31420 | Indicator—Station selector indicator pointer | .10 |
| 11891 | Lamp—Dial lamp | .17 |
| 31419 | Plate—Dial color plate | .12 |
| 30868 | Plug—2-contact female plug for motor power leads | .35 |
| 31373 | Pulley—Indicator drive cord pulley | .08 |
| 31425 | Resistor—Voltage divider—comprising one 22-ohm, one 18,000-ohm, one 8,200-ohm and one 3,900-ohm sections (R3, R11, R12, R15) | .90 |
| 31388 | Resistor—390 ohms, 1 watt (R9) | .22 |
| 14559 | Resistor—10,000 ohms, ½ watt (R17) | .20 |
| 12738 | Resistor—27,000 ohms, ½ watt (R10) | .20 |
| 12286 | Resistor—56,000 ohms, ½ watt (R2) | .20 |
| 3252 | Resistor—100,000 ohms, ½ watt (R19) | .20 |
| 13734 | Resistor—120,000 ohms, ½ watt (R16) | .20 |
| 12199 | Resistor—270,000 ohms, ½ watt (R7) | .20 |
| 30963 | Resistor—820,000 ohms, ½ watt (R18) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R4) | .20 |
| 13601 | Resistor—10 meg., ½ watt (R6) | .20 |
| 14887 | Retainer—Pulley retainer | .01 |
| 14350 | Screw—No. 8-32 square-head set screw for drum, Stock No. 31421 | .03 |
| 31364 | Socket—Dial lamp socket | .20 |
| 31251 | Socket—Tube socket | .25 |
| 31418 | Spring—Indicator drive cord tension spring | .05 |
| 31414 | Switch—Push button station selector switch (S12, S13, S14, S15, S16, S17, S20, S21, S22, S23, S24, S25) | 3.05 |
| 30902 | Transformer—First i-f transformer (L5, L6, C7, C8) | 1.90 |
| 30903 | Transformer—Second i-f transformer (L7, L8, C9, C10) | 1.80 |
| 31574 | Transformer—Power transformer, 100-120 volts, 25-60 cycle (T1) | 9.20 |
| 31380 | Transformer—Power transformer, 100-120 volts, 50-60 cycle (T1) | 6.35 |
| 31575 | Transformer—Power transformer, 100-120 and 200-240 volts, 50-60 cycle (T1) | 8.35 |
| | **MOTOR ASSEMBLIES *** (Motor No. 84430) | |
| 32176 | Bearing—Rotor thrust bearing screw and nut | .25 |
| 32175 | Field—Motor field coils and laminations | 4.95 |
| 32135 | Motor—105-125 volts, 60 cycle | 12.60 |
| 32177 | Shaft—Turntable spindle shaft and fibre gear (Motor No. 84484-2, 3, or 4) | 1.55 |
| 32336 | Field—Motor field coils and laminations, 110 volts, 60 cycle (For Motor 84484-2) | 5.10 |
| 32650 | Field—Motor field coils and laminations, 110 volts, 50 cycle (For Motor 84484-3) | 5.10 |
| 32652 | Field—Motor field coils and laminations, 110 volts, 25 cycle (For Motor 84484-4) | 6.90 |
| 32558 | Motor—105-125 volts, 60 cycle (84484-2) | 10.50 |
| 32637 | Motor—105-125 volts, 50 cycle (84484-3) | 11.20 |
| 32638 | Motor—105-125 volts, 25 cycle (84484-4) | 12.80 |
| 32337 | Shaft—Turntable spindle shaft and fibre gear—60 cycle (For Motor 84484-2) | 1.40 |
| 32651 | Shaft—Turntable spindle shaft and fibre gear—50 cycle | 1.30 |
| 32653 | Shaft—Turntable spindle shaft and fibre gear—25 cycle | 1.30 |
| | **PICKUP AND ARM ASSEMBLIES** | |
| 31212 | Base—Pickup arm pivot shaft, trip lever, and mounting base assembly | .95 |
| 32138 | Cable—Shielded cable and male plug for pick-up arm | .20 |
| 31050 | Crystal—Pickup crystal and needle screw | 3.75 |
| 32137 | Pickup and arm complete | 7.00 |
| 12539 | Screw—Pickup needle screw | .15 |
| | **SPEAKER ASSEMBLIES** | |
| 31443 | Cone—Speaker cone and voice coil (L9)—for Speaker No. 84327-1 | 1.40 |
| 31663 | Speaker complete (No. 84327-1) | 4.95 |
| 31477 | Transformer—Output transformer (T2) (For Speaker No. 84327-1) | 1.00 |
| 32586 | Cone—Speaker cone and voice coil for Speaker No. 84327-3 | 2.40 |
| 32587 | Coil—Speaker field coil for Speaker No. 84327-3 | 2.45 |
| 32588 | Transformer—Output transformer for Speaker No. 84327-3 | 1.45 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 14803 | Brake—Automatic brake complete | 2.95 |
| 31428 | Button—Station selector switch push button | .06 |
| 31487 | Clip—Spring clip to hold dial | .12 |
| 31464 | Damper—One rubber cap for motor spindle, and one metal damper plate | .30 |
| 31429 | Dial—Station selector glass dial | .40 |
| 31095 | Disc—10 protective discs for call letter markers | .10 |
| 31667 | Escutcheon—Tuning dial escutcheon | .55 |
| 32140 | Hinge—Cabinet lid hinge | .25 |
| 31355 | Knob—Station selector or radio-record switch knob (small) | .12 |
| 31391 | Knob—Tone control and power switch knob (small) | .15 |
| 30773 | Knob—Volume control or station selector knob (large) | .15 |
| 30991 | Markers—Push button call letter markers | .40 |
| 31054 | Mounting—Pickup arm rubber mounting, washers, and nut | .15 |
| 32139 | Mounting—Motor mounting spacers, washers, and screw—sufficient for one motor | .25 |
| 30870 | Plug—2-contact male plug for motor leads | .35 |
| 14270 | Spring—Retaining spring for knob, Stock Nos. 30773 and 31355 | .05 |
| 30330 | Spring—Retaining spring for knob, Stock No. 31391 | .03 |
| 30100 | Springs—Tension springs for automatic brake—one long and one short | .08 |
| 32141 | Support—Cabinet lid support | .40 |
| 14804 | Switch—Automatic brake switch (S26) | .60 |
| 12647 | Switch—Radio-Record switch (S27) | .75 |
| 31463 | Turntable | 1.50 |

* Motor No. 84430 is type that mounts from below motorboard. Motor No. 84484 is type that mounts from top of motorboard through a cutout.

## TRIMMER CAPACITOR BANK AND ELECTRIC-TUNING OSCILLATOR COILS

(Refer to Electrical Specifications for frequency ranges)

| DESCRIPTION | Chassis Stamped RC-348E | | Chassis Stamped RC-348E "MOD" | | Chassis Stamped RC-348E "M" | |
|---|---|---|---|---|---|---|
| | Stock No. | Unit List Price | Stock No. | Unit List Price | Stock No. | Unit List Price |
| Capacitor—Trimmer capacitor bank (C20, 21, 22, 23, and 24) | 31416 | $1.20 | 32066 | $1.30 | 32339 | $1.20 |
| Coil—Oscillator coil (L12) | 31415 | .30 | 31415 | .30 | 31415 | .30 |
| Coil—Oscillator coil (L13) | 31384 | .30 | 31415 | .30 | 31415 | .30 |
| Coil—Oscillator coil (L14) | 31384 | .30 | 31384 | .30 | 32340 | .35 |
| Coil—Oscillator coil (L15) | 31383 | .30 | 31383 | .30 | 31383 | .30 |
| Coil—Oscillator coil (L16) | 31383 | .30 | 31383 | .30 | 31383 | .30 |

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Schematic, Chassis Wiring, Trimmers, Voltage Socket Transformer Data

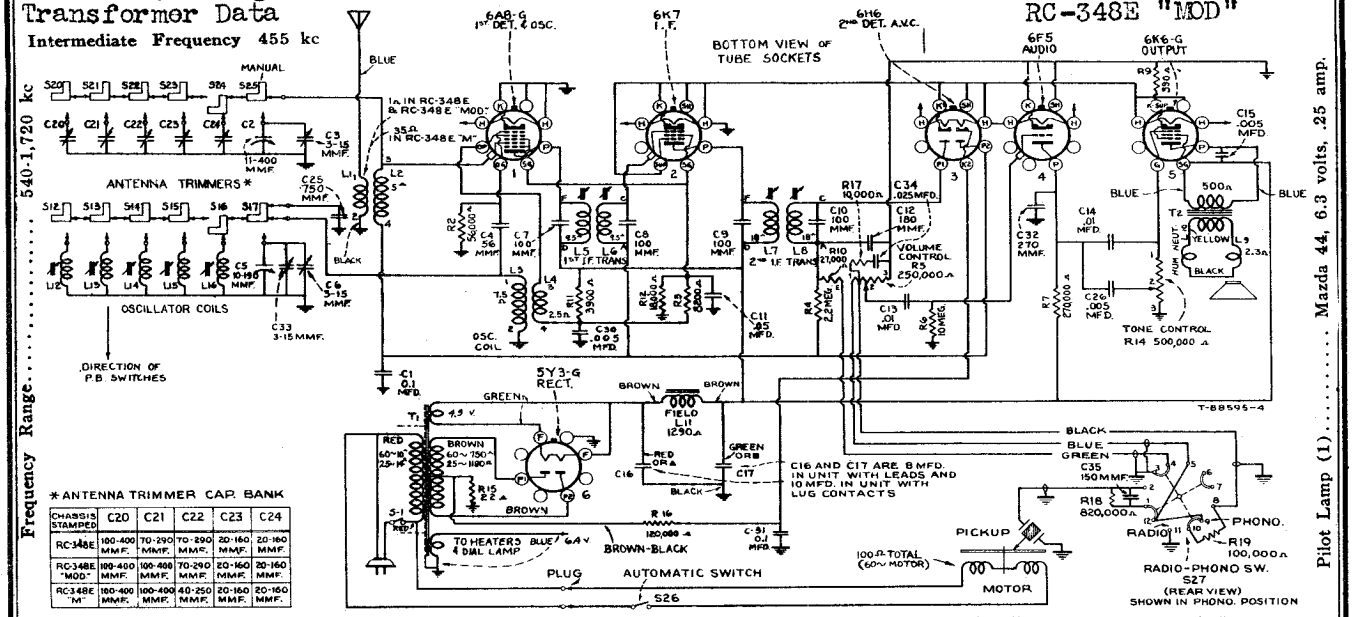
# RCA MFG. CO., INC.

MODEL U-115
Chassis RC-348E, RC-348E "M"
RC-348E "MOD"

**Intermediate Frequency 455 kc**

Frequency Range..... 540-1,720 kc

Pilot Lamp (1)..... Mazda 44, 6.3 volts, .25 amp.



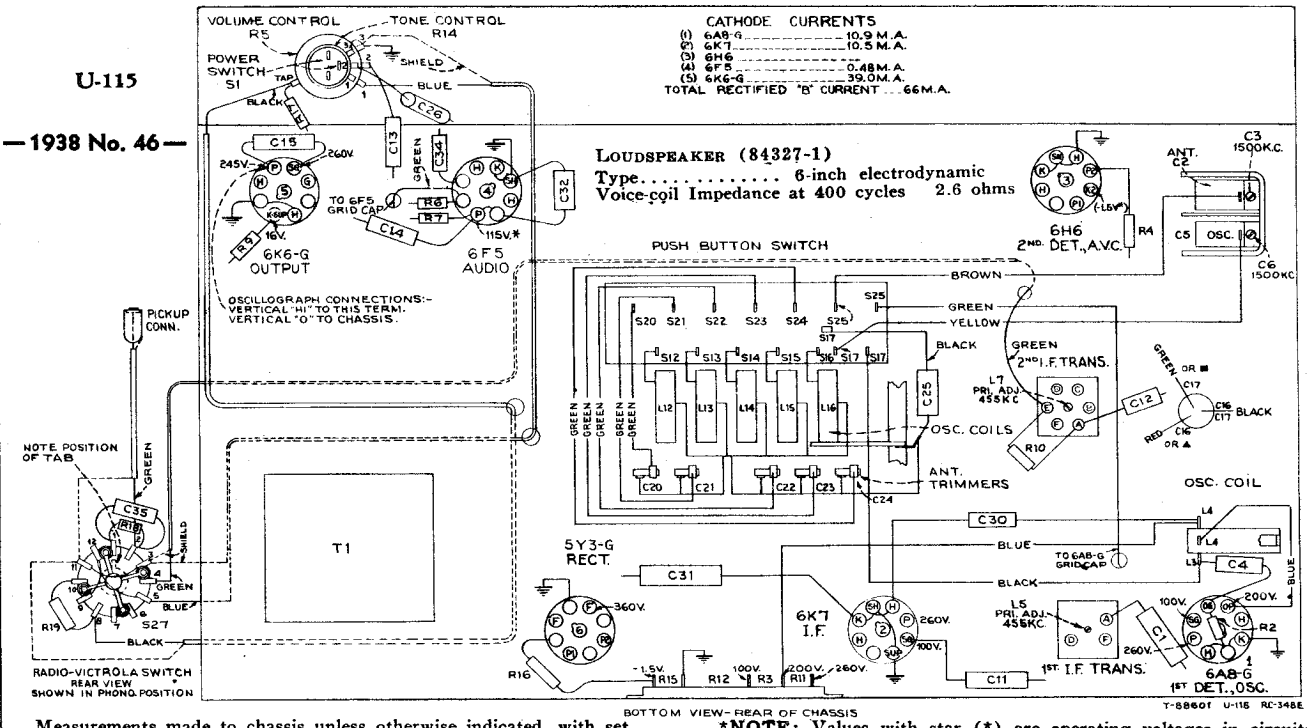

* ANTENNA TRIMMER CAP. BANK

| CHASSIS STAMPED | C20 | C21 | C22 | C23 | C24 |
|---|---|---|---|---|---|
| RC-348E | 100-400 MMF. | 70-290 MMF. | 70-290 MMF. | 20-160 MMF. | 20-160 MMF. |
| RC-348E "MOD." | 100-400 MMF. | 100-400 MMF. | 70-290 MMF. | 20-160 MMF. | 20-160 MMF. |
| RC-348E "M" | 100-400 MMF. | 100-400 MMF. | 40-250 MMF. | 20-160 MMF. | 20-160 MMF. |

**Precautionary Lead Dress.**—(1) Dress green lead from antenna coil to switch away from the chassis and gang. (2) Dress lead from 2nd I.F. transformer to volume control away from other leads. (3) Ground bus from 6H6 socket must be close to chassis. (4) Dress leads away from oscillator coil adjustment screws. (5) Dress power transformer primary leads toward left-hand end of chassis. (6) Dress plate lead to output transformer close to chassis.

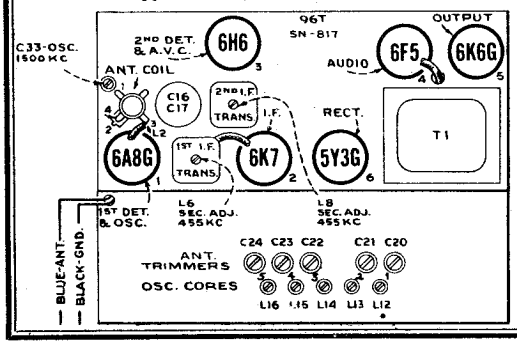
**U-115**

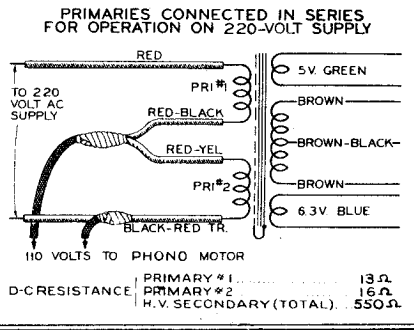
**—1938 No. 46—**

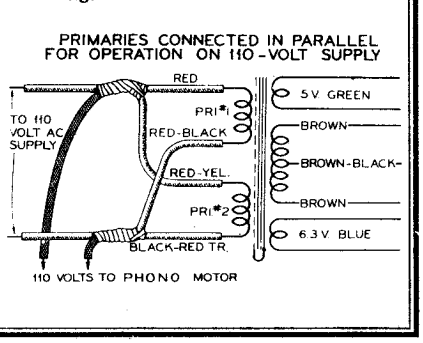



Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ± 20% with 117-volt a-c supply.

***NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

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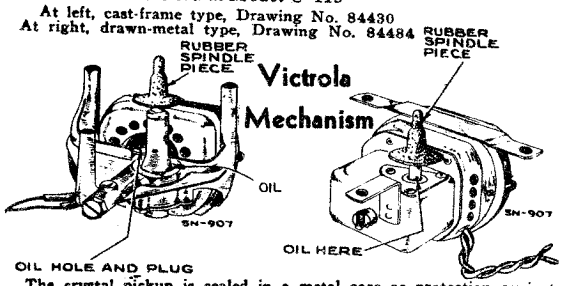
MODEL U-115
Chassis RC-348E, RC-348E "M", RC-348E "MOD"

# RCA MFG. CO., INC.

Alignment, Phono. Data
Tuner Adjustments

*Motors Used in Model U-115*

At left, cast-frame type, Drawing No. 84430
At right, drawn-metal type, Drawing No. 84484




**The crystal pickup** is sealed in a metal case as protection against extreme changes of climate. If failure occurs, do not attempt to repair the unit, but install a new crystal unit.

**The phonograph motor** is a self-starting constant-speed induction type. Two styles of motor are employed: One style (drawing No. 84430) has a cast frame and mounts from below the motorboard. The other style (drawing No. 84484) has a drawn metal case, and mounts from top of motorboard through a cutout. The two types are shown in the accompanying illustrations.

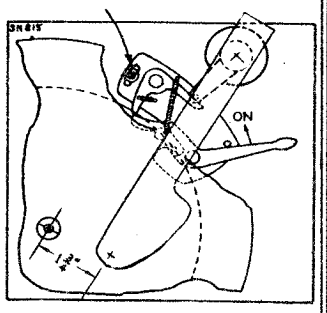
**Motor Lubrication.**—Apply a few drops of light machine oil to the spindle bearing and oil hole every six months.

**The motor spindle is tapered,** and a conical rubber piece fits snugly on the spindle. The hole in the turntable bushing is tapered to fit the rubber. This provides an excellent self-centering floating mounting.

**A metal washer** is placed on the spindle under the rubber piece. The washer has ears on the under side which fit over a pin that projects through the spindle.

**The automatic stop** should be adjusted so that the lever will snap to the "off" position when the pickup needle is 1⅞ inches from the center line of the spindle.

ADJUST SWITCH TO TRIP WHEN NEEDLE IS ON 1-3/4" RADIUS FROM ℄ OF MOTOR SPINDLE




**Power Supply Ratings**

| | |
|---|---|
| A-6 | 105-125 volts, 60 cycles, 100 watts |
| A-5 | 105-125 volts, 50 cycles, 100 watts |
| B-2 | 105-125 volts, 25 cycles, 100 watts |
| C-6 | 105-125, 200-250 volts, 60 cycles, 100 watts |
| C-5 | 105-125, 200-250 volts, 50 cycles, 100 watts |

POWER-TONE-VOLUME CONTROL ● 1 ● 2 ● 3 ● 4 ● 5 ● TUNING CONTROL

**Push Button Ranges:**

| | RC-348E | RC-348E "MOD" | RC-348E "M" |
|---|---|---|---|
| Button No. 1 (left) | 550-980 kc | 550-980 kc | 550-980 kc |
| Button No. 2 | 650-1,080 kc | 550-980 kc | 550-980 kc |
| Button No. 3 | 650-1,080 kc | 650-1,080 kc | 690-1,225 kc |
| Button No. 4 | 850-1,500 kc | 850-1,500 kc | 850-1,500 kc |
| Button No. 5 | 850-1,500 kc | 850-1,500 kc | 850-1,500 kc |

**Calibration Marks.** — The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc and 1,500 kc have been stamped in the plate on the front of the chassis, as shown in the accompanying drawing. These marks are used for reference during alignment.

**Drum and Dial Indicator Adjustment.**—As the first step in r-f alignment, check the position of the drum on the front shaft of the gang condenser. With the gang at maximum (full mesh) the drum set-screw should be pointing directly down as shown in the drawing. With the drum in this position, and the gang at maximum, move the dial indicator along the drive cord to coincide with the left-hand line as shown. The indicator is held to the drive cord by means of spring clips.

**After completion of alignment, and after the chassis has been fastened in the cabinet, turn the gang to maximum and note whether the dial indicator is at the left-hand end mark on the dial; if it is not, loosen the drum set-screw (which is accessible through a slot in the bottom of the cabinet), turn the drum slightly so that the indicator is at this mark, and then tighten the set-screw.**

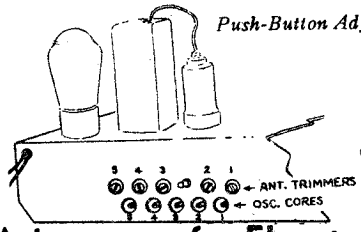
After completion of alignment, seal the i-f core-adjustment screws with household cement.

For additional details, refer to booklet, "RCA Victor Receiver Alignment."

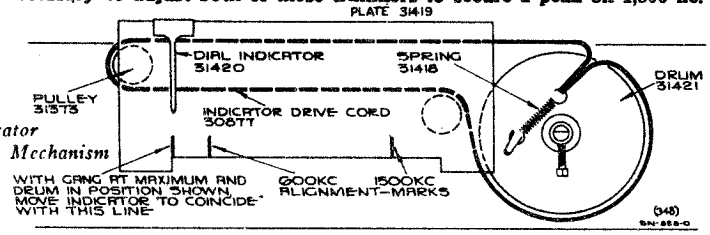
| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | Quiet point between 550-750 kc | L7 and L8 (2nd I-F Trans.) |
| 2 | 6A8-G grid cap, in series with .01 mfd. | 455 kc | | L5 and L6 (1st I-F Trans.) |
| 3 | Antenna lead (blue) in series with 200 mmf. | 1,500 kc | 1,500 kc calibration mark. | C6 (osc.)* C3 (ant.) |
| 4 | Follow "Adjustments for Electric Tuning." | | | |

*** The oscillator section of the gang condenser has two trimmers, one on top, accessible through a hole in the chassis, and the other on bottom. It may be necessary to adjust both of these trimmers to secure a peak on 1,500 kc.**

*Push-Button Adjustments*




*Dial-Indicator and Drive Mechanism*




## Adjustments for Electric Tuning

DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY

These models have six push buttons. The right-hand button connects the gang condenser for dial tuning. The other five buttons are for electric tuning of five different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning (right-hand) button, and manually tune in the first station on the list.
3. Push in station-button No. 1 (left-hand) and adjust No. 1 oscillator core (L12) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust No. 1 antenna trimmer (C20) for maximum output on this station.
5. Adjust for each of the remaining four stations in the same manner.

**(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)**

6. Make a final careful adjustment of the oscillator cores using one or two feet of wire as an antenna.

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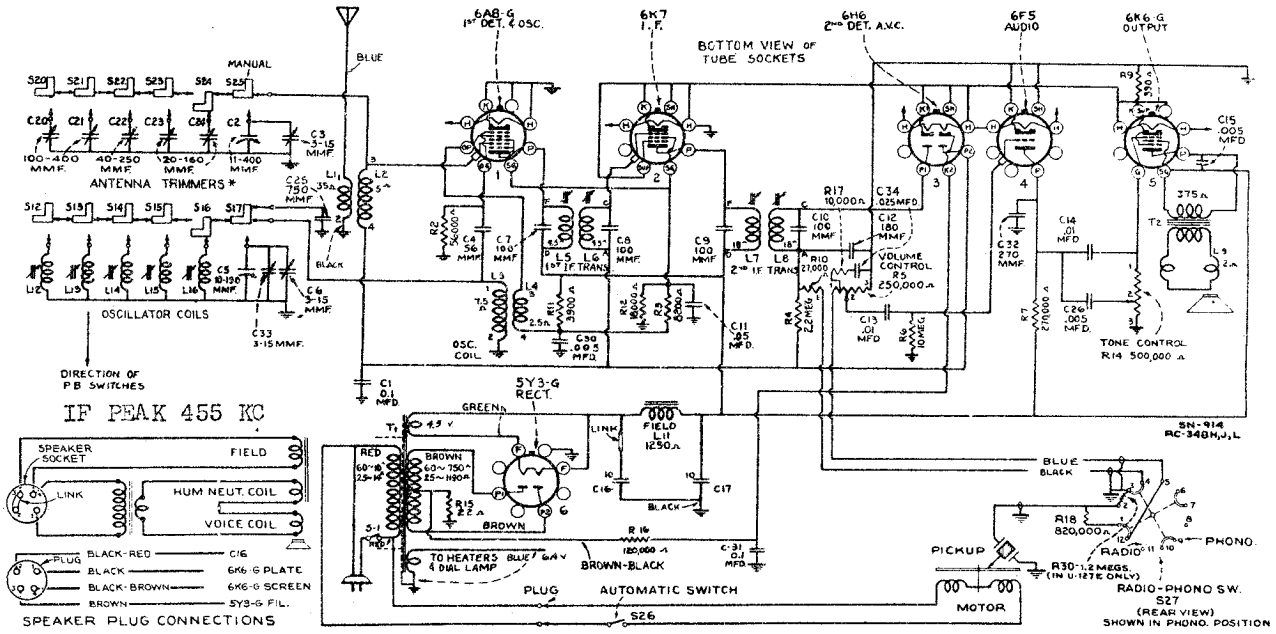
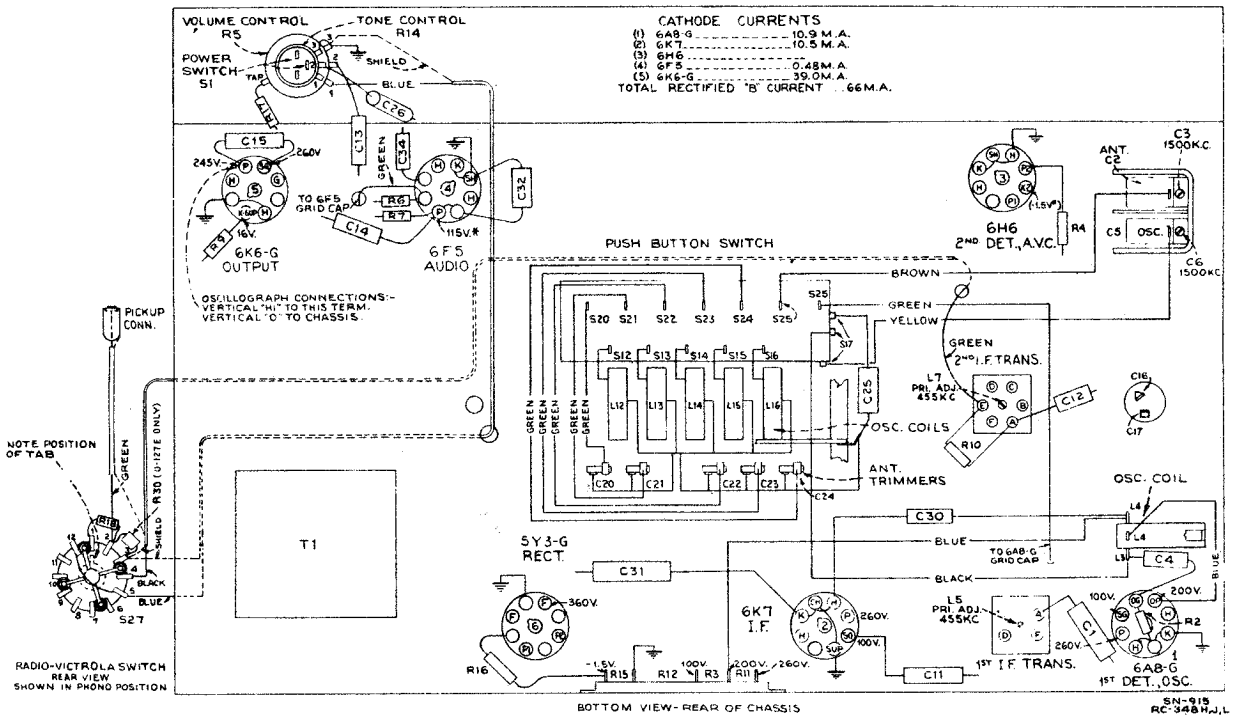
RCA MFG. CO., INC.

MODELS U-121, Ch. RC-348J
U-123 (Single Band) Ch. RC-348H
U-127E, Chassis RC-348L
Schematic, Chassis Wiring
Voltage




## U-121, U-123 (Single-Band), and U-127E

**Precautionary Lead Dress.**—(1) Dress green lead from antenna coil to switch away from the chassis and gang. (2) Ground bus from 6H6 socket must be close to chassis. (3) Dress leads away from oscillator coil adjustment screws. (4) Dress power transformer primary leads toward left-hand end of chassis. (5) Dress plate lead from output tube close to chassis.




Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ± 20% with 117-volt a-c supply.

***NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

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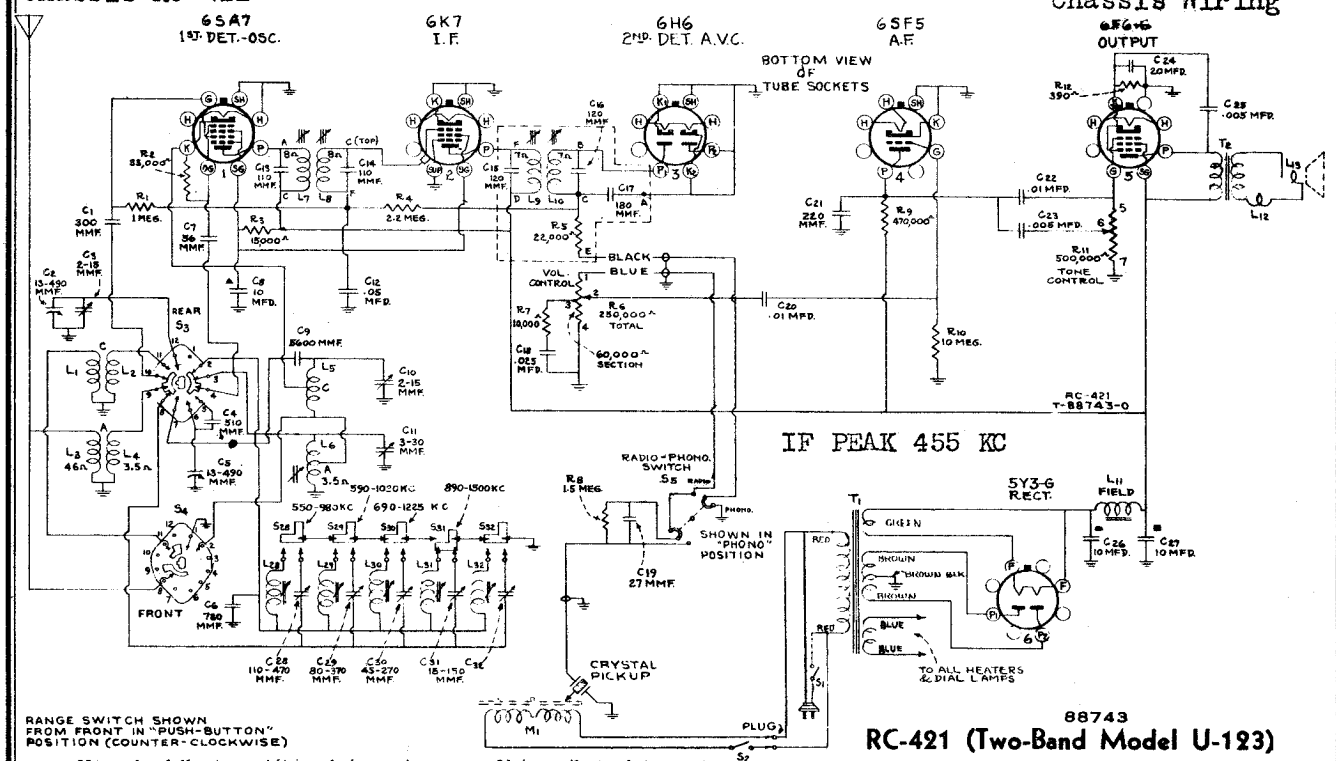
MODEL U-123(2 Bands)
Chassis RC-421

# RCA MFG. CO., INC.

Schematic, Voltage
Chassis Wiring



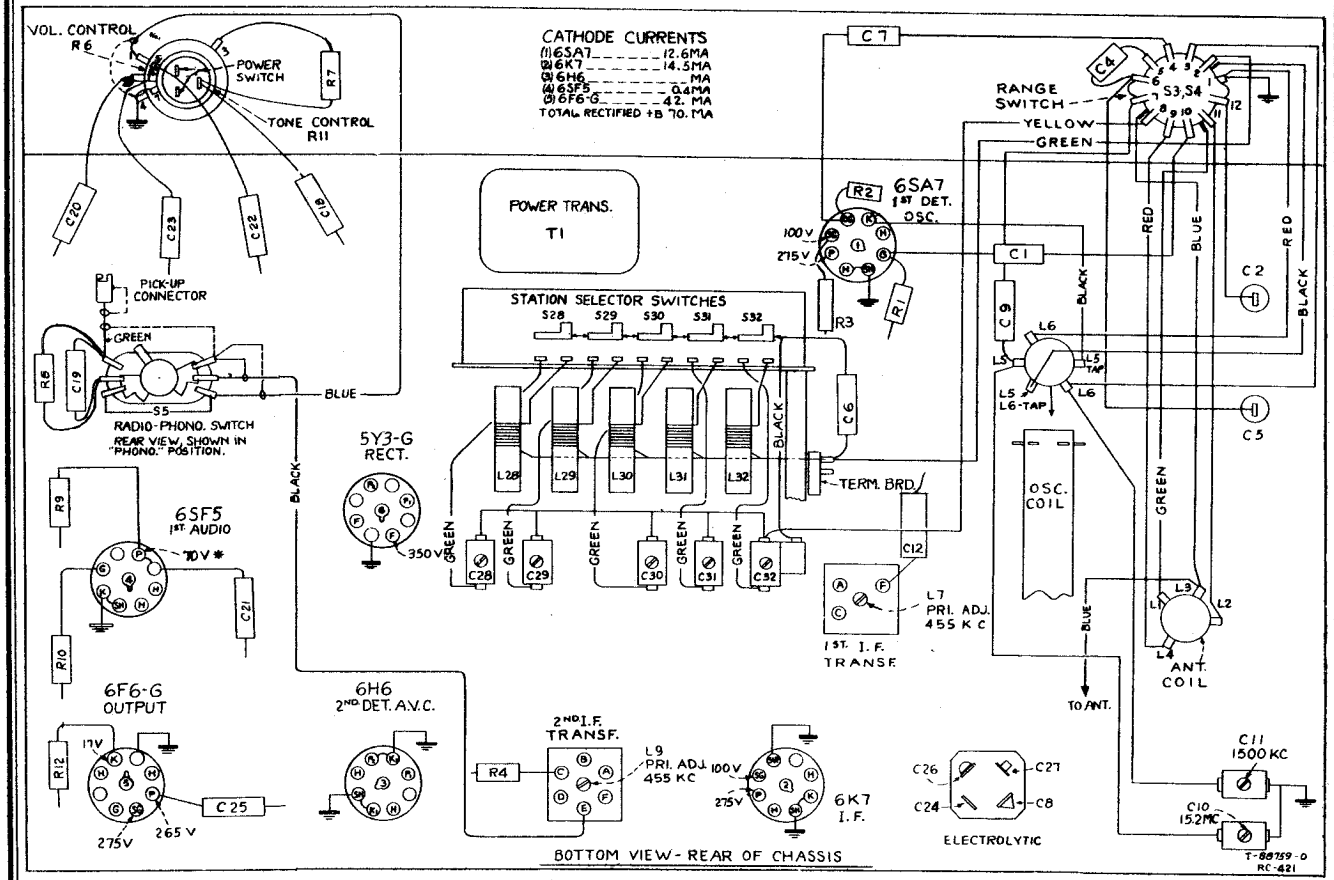

RANGE SWITCH SHOWN FROM FRONT IN "PUSH-BUTTON" POSITION (COUNTER-CLOCKWISE)

88743

## RC-421 (Two-Band Model U-123)

Note the following additional d-c resistances: Voice-coil, 2 ohms; primary of output transformer, 375 ohms; 60-cycle power transformer, primary 9 ohms, secondary 735 ohms.

**Precautionary Lead Dress.**—Dress the oscillator grid condenser (C7) away from chassis. Leads along back of chassis must be dressed in corner of chassis and away from contact "E" of 2nd i-f transformer. Keep a-c leads against end of chassis. Dial drum must be 5/32-inch from front apron.




Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within approximately ± 20% with 117-volt a-c supply.

* **NOTE:** Values with star (*) are operating voltages in circuits with high series-resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

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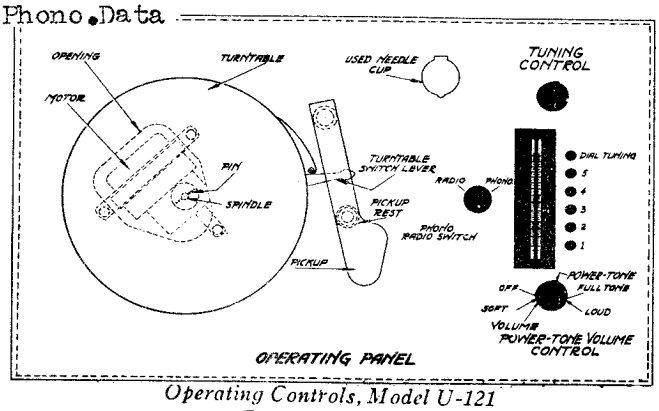
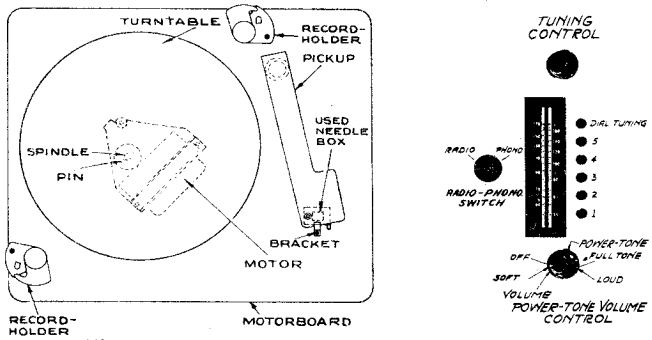
U-127E, Chassis RC-348L
Alignment, Socket, Trimmers
Phono. Data

# RCA MFG. CO., INC.

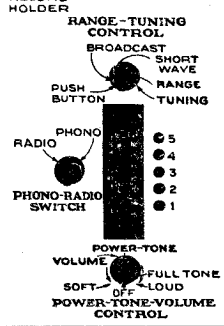
MODELS U-121, Ch. RC-348J
U-123, Ch. RC-348H, RC-421




*Operating Controls, Model U-121*

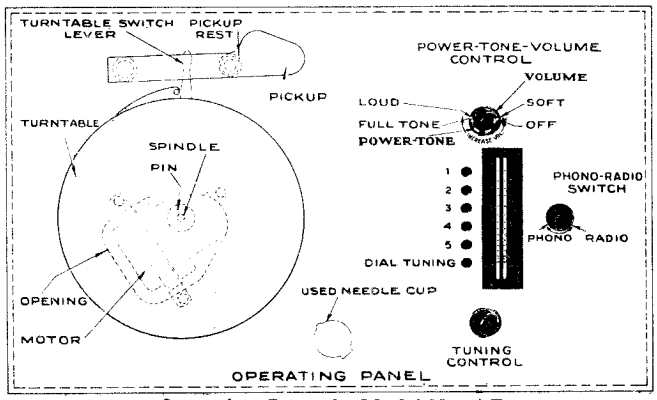



*Operating Controls, Model U-123*

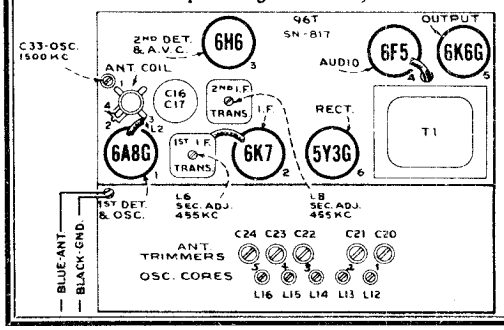



*Above—Radio controls for single-band U-123 (RC-348H).*

*At left—Radio controls for double-band U-123 (RC-421).*

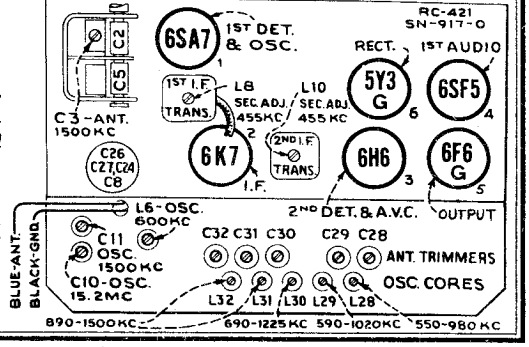



*Operating Controls, Model U-127E*




*At left—Tube and trimmer location for single-band chassis, RC-348J, RC-348H, and RC-348L.*

*At right—Tube and trimmer location for double-band chassis RC-421.*




## Alignment Procedure

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing. Turn the receiver volume control to maximum.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

**Calibration Marks.**—The tuning dial is fastened in the cabinet and can not be used for reference during alignment. Therefore calibration marks corresponding to dial readings of 600 kc and 1,500 kc have been stamped in the plate on the front of the chassis, as shown in the accompanying drawing. These marks are used for reference during alignment.

**Drum and Dial Indicator Adjustment.**—As the first step in r-f alignment, check the position of the drum on the front shaft of the gang condenser. With the gang at maximum (full mesh) the drum set-screw should be pointing directly down (RC-348 series) and up for RC-421. With the drum in this position, and the gang at maximum, move the dial indicator along the drive cord to coincide with the left-hand line as shown. The indicator is held to the drive cord by means of spring clips.

**After completion of alignment, and after the chassis has been fastened in the cabinet, turn the gang to maximum and note whether the dial indicator is at the left-hand end mark on the dial; if it is not, move the pointer the required distance along the cord.**

### RC-348J, RC-348H, and RC-348L

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | Quiet point between 550-750 kc | L7 and L8 (2nd I-F Trans.) |
| 2 | 6A8-G grid cap, in series with .01 mfd. | 455 kc- | | L5 and L6 (1st I-F Trans.) |
| 3 | Antenna lead (blue) in series with 200 mmf. | 1,500 kc | 1,500 kc calibration mark | C6 (osc.)* C3 (ant.) |
| 4 | Follow "Adjustments for Electric Tuning." | | | |

* The oscillator section of the gang condenser has two trimmers, one on top, accessible through a hole in the chassis, and the other on bottom. It may be necessary to adjust both of these trimmers to secure a peak on 1,500 kc.

### RC-421 (Two-band Model U-123)

| Steps | Connect the high side of test.-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | Quiet point between 550-750 kc | L9 and L10 (2nd I-F trans.) |
| 2 | Stator of ant. section of gang | 455 kc | | L7 and L8 (1st I-F trans.) |
| 3 | Antenna lead, in series with 200 mmf. | 600 kc | 600 kc calibration mark | L6 (osc.) |
| 4 | | 1,500 kc | 1,500 kc calibration mark | C11 (osc.) C3 (ant.) |
| 5 | Repeat steps 3 and 4. | | | |
| 6 | Antenna lead, in series with 400 ohms | 15.2 mc | 15.2 mc calibration mark | C10 (osc.)* |
| 7 | Follow "Adjustments for Electric Tuning." | | | |

* Rock gang for maximum output while adjusting C10.
Note.—The oscillator tracks above the signal on both bands.

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MODELS U-121,Ch.RC-348J
U-123,Ch.RC-348H,RC-421
U-127E,Chassis RC-348L

# RCA MFG. CO., INC.
## Automatic Record Changer

Automatic Record Changer Adjustments,Notes

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

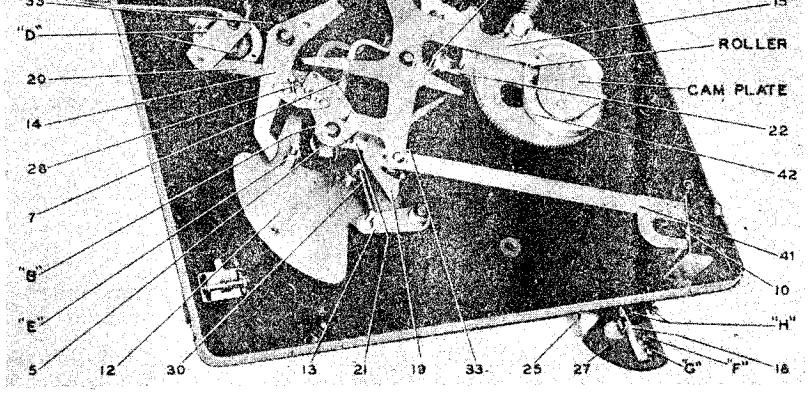
The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

## ADJUSTMENTS

**A. Main Lever.**—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

**B. Friction Clutch.**—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.




**NOTE: Numbers refer to parts—letters refer to adjustments**

**C. Pickup Lift Cable Screw.**—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

**D. & E. Needle Landing on Record.**—The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17." Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D."

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

**F. & G. Record Separating Knife.**—The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .058 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .055—.061 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F" adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

**H. Record Support Shelf.**—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustment be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H."

***If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.***

**J. Tone Arm Rest Support (not shown).**—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

**K. Trip Pawl Stop Pin.**—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

**Lubrication.**—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

Apply a few drops of light machine oil to the motor spindle bearing and oil hole adjacent to the spindle bearing. The oil hole has a screw plug.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or rubber spindle cap.

## MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual misadjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A."
2. Needle does not land properly on both 10 and 12 inch records —Make complete adjustments "D" and "E."
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E."
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B." Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C."
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H."
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "34."

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Specifications, Tuner Data
Record Changer Details

# RCA MFG. CO., INC.

MODELS U-121, Ch. RC-348J
U-123, Ch. 348H, RC-421
U-127E, Ch. RC-348L

## Electrical and Mechanical Specifications

**Frequency Range**..... 540-1,720 kc
**RC-421 also has a short-wave band of**..... 5.8-18.0 mc

**Push Button Ranges (RC-348J, 348H, and 348L)**
Two stations between approximately 550- 980 kc
One station between approximately 690-1,225 kc
Two stations between approximately 850-1,500 kc

**Push Button Ranges (RC-421)**
One station between approximately 550- 980 kc
One station between approximately 590-1,020 kc
One station between approximately 690-1,225 kc
Two stations between approximately 890-1,500 kc

**Tube Complement**
(1) RCA-6A8-G (6SA7 in RC-421)..... First-Detector, Oscillator
(2) RCA-6K7..... Intermediate-Frequency Amp.
(3) RCA-6H6..... Second-Detector, A.V.C.
(4) RCA-6F5 (6SF5 in RC-421)..... Audio Voltage Amplifier
(5) RCA-6K6-G (6F6-G in RC-421)..... Power Output
(6) RCA-5Y3-G..... Full-Wave Rectifier

**Power Output (RC-348J, 348H, and 348L)**
Undistorted..... 2 watts, Maximum..... 4 watts

**Power Output (RC-421)**
Undistorted..... 2.5 watts, Maximum..... 4.5 watts

**Power Supply Ratings**
A-6..... 105-125 volts, 60 cycles, 100 watts total
A-5..... 105-125 volts, 50 cycles, 100 watts total
B-2..... 105-125 volts, 25 cycles, 100 watts total
C-6..... 105-125/210-250 volts, 60 cycles, 100 watts total
C-5..... 105-125/210-250 volts, 50 cycles, 100 watts total

| | U-121 | U-123 (RC-348H) | U-123 (RC-421) | U-127E |
|---|---|---|---|---|
| Loudspeaker (electrodynamic) | RL-70F-3 | RL-70F-3 | RL-70H-6 | RL-63H-5 |
| Diameter | 12-inch | 12-inch | 12-inch | 8-inch |
| Voice-Coil Impedance at 400 cycles | 2.2 ohms | 2.2 ohms | 2.2 ohms | 2.2 ohms |

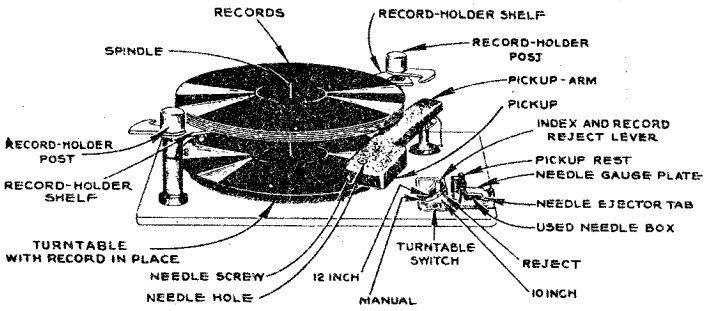
**Cabinet Dimensions:**

| | U-121 | U-123 | U-127E |
|---|---|---|---|
| Height (inches) | 34 | 34 | 25⅝ |
| Width (inches) | 25⅝ | 30⅛ | 29 |
| Depth (inches) | 16⅝ | 17 | 16⅝ |
| Weight (net) pounds | 56 | 74 | 52 |
| Weight (shipping) pounds | 73 | 94 | 71 |

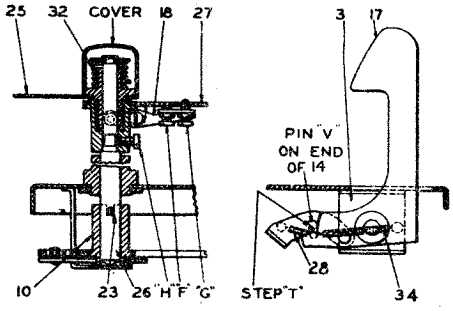
Chassis Base Dimensions..... 3 inches x 11⅛ inches x 5 inches
Over-all Chassis Height..... 6½ inches
Tuning Drive Ratio..... 6 to 1

Radio features include: Magnetite-core electric-tuning oscillator coils and magnetite-core i-f transformers; automatic volume control; automatic bass compensation; continuously-variable high-frequency tone control; temperature-stabilized capacitors in oscillator circuit; electro-dynamic loudspeaker; straight-line dial and electric tuning for five stations in the broadcast range.

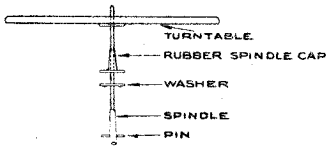
Models U-121 and U-127E have a non-automatic Victrola mechanism, with crystal pickup, automatic stop, and self-starting constant-speed motor.
Model U-123 has an automatic Victrola mechanism which permits playing seven 12-inch or eight 10-inch records in succession. It has a crystal pickup and constant-speed self-starting motor.




*Top View of Automatic Record Changer*




*Details of Record Shelf Posts, and Locating Lever Assemblies*




*Turntable Assembly (All Models)*

**The crystal pickup** is sealed in a metal case as protection against extreme changes of climate. If failure occurs, do not attempt to repair the unit, but install a new crystal unit.

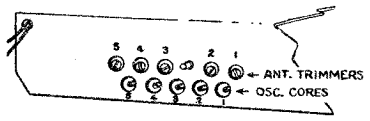
**The phonograph motor** is a self-starting constant-speed induction type.

**Motor Lubrication (Models U-121 and U-127E).**—Apply a few drops of light machine oil to the spindle bearing and oil hole every six months. The oil hole is located in the motor casting, adjacent to the spindle bearing, and has a screw plug.

**The automatic stop (Models U-121 and U-127E)** should be adjusted so that the lever will snap to the "off" position when the pickup needle is 1⅝ inches from the center line of the spindle.

## Adjustments for Electric Tuning

**Push-Button Ranges in RC-348J, 348H, and 348L (Single-Band Receivers)**
No. 1 and 2...Approximately 550- 980 kc
No. 3.....Approximately 690-1,225 kc
No. 4 and 5...Approximately 850-1,500 kc




**Push-Button Ranges in RC-421 (Two-Band Model U-123)**
No. 1.....Approximately 550- 980 kc
No. 2.....Approximately 590-1,020 kc
No. 3.....Approximately 690-1,225 kc
Nos. 4, 5.....Approximately 890-1,500 kc

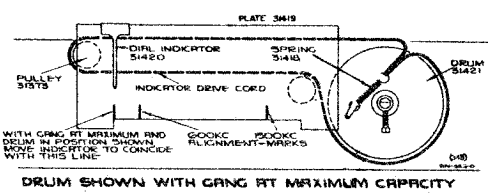
These models have six push buttons. The right-hand button connects the gang condenser for dial tuning. The other five buttons are for electric tuning of five different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments. Use a regular antenna for the preliminary adjustments.

The procedure is as follows:

1. Make a list of the five desired stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station-button No. 1 and adjust No. 1 oscillator core to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until the station is received.
4. Adjust No. 1 antenna trimmer for maximum output on this station.
5. Adjust for each of the remaining four stations in the same manner.

**(Clockwise adjustment of oscillator cores and antenna trimmers tunes the circuits to lower frequencies.)**

6. Make a final careful adjustment of the oscillator cores using one or two feet of wire as an antenna.

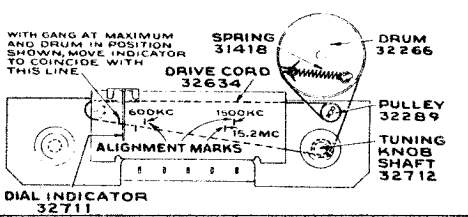



DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY

*Dial Mechanism*

RC-348J, 348H, and 348L

RC-421

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MODELS U-121, Ch. RC-348J
U-123, Ch. RC-348H

RCA MFG. CO., INC.

U-127E, Ch. RC-348L
Parts List

# Replacement Parts Models U-121, U-123 (Single-Band), and U-127E

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **CHASSIS ASSEMBLIES** (U121-RC348J) (U123-RC348H, Single-Band) (U127E-RC348L) | |
| 32339 | Capacitor—Capacitor bank for push button switch assembly (C20, C21, C22, C23, C24) | 1.20 |
| 12723 | Capacitor—56 mmfd. (C4) | .35 |
| 30904 | Capacitor—100 mmfd. (C7, C8, C9, C10) | .25 |
| 13003 | Capacitor—180 mmfd. (C12) | .35 |
| 12488 | Capacitor—270 mmfd. (C32) | .35 |
| 31435 | Capacitor—750 mmfd. (C25) | .40 |
| 4838 | Capacitor—.005 mfd., 1,000 volts (C15, C26, C30) | .25 |
| 14393 | Capacitor—.01 mfd. (C13, C14) | .30 |
| 4870 | Capacitor—.025 mfd., 400 volts (C34) | .20 |
| 30882 | Capacitor—.05 mfd., 200 volts (C11) | .20 |
| 30899 | Capacitor—0.1 mfd., 200 volts (C1, C31) | .30 |
| 32342 | Capacitor—10-10 mfd. electrolytic capacitor (C16, C17) | 1.20 |
| 31382 | Clip—Coil and core clip for push button oscillator coils | .04 |
| 32338 | Coil—Antenna coil (L1, L2) | .85 |
| 31098 | Coil—Oscillator coil (L3, L4) | .85 |
| 31415 | Coil—Push button oscillator coil, 550 to 980 KC. (L12, L13) | .30 |
| 32340 | Coil—Push button oscillator coil, 690 to 1,225 KC. (L14) | .35 |
| 31383 | Coil—Push button oscillator coil, 850 to 1,500 KC. (L15, L16) | .30 |
| 31422 | Condenser—2-gang variable tuning condenser (C2, C3, C5, C6, C33) | 2.70 |
| 32355 | Control—Volume and tone control and power switch (R5, R14, S1) | 3.00 |
| 32634 | Cord—Drive cord | .10 |
| 31386 | Core—Core and stud assembly for push button oscillator coils | .15 |
| 31421 | Drum—Tuning drive drum and hub | .45 |
| 11891 | Lamp—Dial lamp | .17 |
| 32136 | Lead—Phonograph input shielded lead and connector (U-121 and U-123) | .35 |
| 32908 | Lead—Phonograph input shielded lead and socket (U-127E only) | .40 |
| 31419 | Plate—Dial color plate | .12 |
| 30868 | Plug—2-contact female for motor leads | .35 |
| 31420 | Pointer—Dial indicator pointer | .10 |
| 31373 | Pulley—Tuning indicator drive pulley | .08 |
| 31388 | Resistor—390 ohms, 1 watt (R9) | .22 |
| 14559 | Resistor—10,000 ohms, ½ watt (R17) | .20 |
| 12738 | Resistor—27,000 ohms, ½ watt (R10) | .20 |
| 12286 | Resistor—56,000 ohms, ½ watt (R2) | .20 |
| 13734 | Resistor—120,000 ohms, ½ watt (R16) | .20 |
| 12199 | Resistor—270,000 ohms, ½ watt (R7) | .20 |
| 30963 | Resistor—820,000 ohms, ½ watt (R18) | .20 |
| 30208 | Resistor—1.2 meg., ½ watt (R30) (U127E only) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R4) | .20 |
| 13601 | Resistor—10 meg., ½ watt (R6) | .20 |
| 31425 | Resistor—Voltage divider resistor tapped at 22 ohms, 18,000 ohms, 8,200 ohms, and 3,900 ohms (R15, R12, R3, R11) | .90 |
| 14887 | Retainer—Indicator drive pulley retainer | .01 |
| 31482 | Screw—No. 8 square head set screw for drive drum | .03 |
| 5040 | Socket—4-contact socket for speaker cable | .30 |
| 31364 | Socket—Dial lamp socket | .20 |
| 31251 | Socket—Octal base tube socket | .25 |
| 31418 | Spring—Drive cord tension spring | .05 |
| 31414 | Switch—Selector switch for push button switch assembly (S20, S21, S22, S23, S24, S25, S12, S13, S14, S15, S16, S17) | 3.05 |
| 30902 | Transformer—First i.f. transformer (L5, L6, C7, C8) | 1.90 |
| 30903 | Transformer—Second i.f. transformer (L7, L8, C9, C10) | 1.80 |
| 31445 | Transformer—Power transformer, 110 volts, 25-60 cycle (T1) | 7.80 |
| 31380 | Transformer—Power transformer, 110 volts, 50-60 cycle (T1) | 4.75 |
| 31575 | Transformer—Power transformer, 110-220 volts, 50-60 cycle (T1) | 8.35 |
| | **PICKUP AND ARM ASSEMBLIES** Model U-121 and U-127E | |
| 31212 | Base—Pickup arm pivot shaft, trip lever, and mounting base assembly | .95 |
| 32138 | Cable—Shielded cable and male plug for pickup arm | .20 |
| 31050 | Crystal—Pickup crystal and needle screw | 3.75 |
| 32137 | Pickup and arm complete | 7.00 |
| 12539 | Screw—Pickup needle screw | .15 |
| | **PICKUP AND ARM ASSEMBLIES** Model U-123 (Single-Band) | |
| 31162 | Cable—Pickup arm lift cable and clips | .15 |
| 32885 | Cable—Pickup arm output cable | .25 |
| 31156 | Crystal—Pickup crystal cartridge and needle screw | 4.25 |
| 32884 | Pickup and arm complete | 7.45 |
| 31160 | Screw—Pickup needle screw | .12 |
| 31161 | Shaft—Pickup pivot arm and shaft assembly | .45 |
| | **MOTOR ASSEMBLIES** Model U-121 and U-127E | |
| 31464 | Damper—Comprising 1 rubber spindle sleeve and 1 metal damper plate | .30 |
| 32652 | Field—Motor coils and laminations, 105-120 volts, 25-cycle | 6.90 |
| 32650 | Field—Motor coils and laminations, 105-120 volts, 50-cycle | 5.10 |
| 32336 | Field—Motor coils and laminations, 105-120 volts, 60-cycle | 5.10 |
| 32638 | Motor—105-120 volts, 25-cycle | 12.80 |
| 32637 | Motor—105-120 volts, 50-cycle | 11.20 |
| 32558 | Motor—105-120 volts, 60-cycle | 10.50 |
| 30870 | Plug—2-contact male for motor leads | .35 |
| 32653 | Shaft—Turntable shaft and gear for 25-cycle motor | 1.30 |
| 32651 | Shaft—Turntable shaft and gear for 50-cycle motor | 1.30 |
| 32337 | Shaft—Turntable shaft and gear for 60-cycle motor | 1.40 |
| | **MOTOR ASSEMBLIES** Model U-123 | |
| 32956 | Coil—Field coil and laminations for 25-cycle motor | 7.15 |
| 32955 | Coil—Field coil and laminations for 50-cycle motor | 5.90 |
| 32954 | Coil—Field coil and laminations for 60-cycle motor | 5.35 |
| 32960 | Gear—Motor spindle gear and pin | .75 |
| 32873 | Motor—Motor complete, 25-cycle, 110 volts AC. | 15.95 |
| 32872 | Motor—Motor complete, 50-cycle, 110 volts AC. | 13.75 |
| 32871 | Motor—Motor complete, 60-cycle, 110 volts, AC. | 13.25 |
| 30870 | Plug—2-prong male plug—used on motor leads. | .35 |
| 32959 | Spindle—Turntable spindle complete with metal pinion and fibre gear for 25-cycle motor | 2.90 |
| 32958 | Spindle—Turntable spindle complete with metal pinion and fibre gear for 50-cycle motor | 2.90 |
| 32957 | Spindle—Turntable spindle complete with metal pinion and fibre gear for 60-cycle motor | 2.90 |
| 32875 | Switch—Motor control switch | .30 |
| | **MOTORBOARD ASSEMBLIES** Model U-121 and U-127E | |
| 14803 | Brake—Automatic brake and switch | 2.95 |
| 31464 | Damper—Comprising one rubber spindle sleeve, and one metal damper plate | .30 |
| 30870 | Plug—2-contact male for motor leads | .35 |
| 32610 | Rest—Rubber rest for pickup arm | .10 |
| 30100 | Springs—One set of springs for automatic brake | .08 |
| 32743 | Switch—Radio-Record switch (S27) | .95 |
| 14804 | Switch—Switch only for automatic brake (S26) | .60 |
| 31463 | Turntable—Record turntable | 1.50 |
| | **MOTORBOARD ASSEMBLIES** Model U-123 | |
| 31149 | Base—Tone arm mounting base | .35 |
| 32876 | Board—Motorboard complete with all riveted and welded posts and brackets — less operating mechanisms | 6.50 |
| 14209 | Bumper—Main lever rubber bumper (1) | .08 |
| 9848 | Cup—Used needle cup, rest, and lid complete | .75 |
| 32877 | Escutcheon—Index escutcheon | .40 |
| 31151 | Guide—Pickup lift cable guide (coil spring, 80T 2-in. large) (2) | .10 |
| 31150 | Mounting—Pickup arm base rubber mounting complete | .45 |
| 31155 | Spring—Needle cup lid tension spring | .04 |
| | **OPERATING MECHANISM** Model U-123 | |
| 31134 | Bracket — Pickup locating lever mounting bracket (3) | .30 |
| 32878 | Cam—Cam and drive gear (42) | 2.80 |
| 6808 | Clutch—Trip lever friction clutch assembly (5) | .35 |
| 31129 | Cover—Cap for top of record post | .45 |
| 32883 | Damper—Motor spindle rubber drive sleeve and metal damper plate | .30 |
| 31116 | Finger—Trip lever friction finger assembly (7) | .45 |
| 32879 | Gear—Rack gear for front left-hand record post (41) | .60 |
| 32880 | Gear—Rack gear for rear right-hand record post (40) | .55 |
| 31121 | Gear—Record post gear (10) | .90 |
| 31123 | Guide—Main lever spring guide (11) | .40 |
| 31114 | Lever—Index lever assembly (12) | .75 |
| 31137 | Lever—Index lever tension spring lever (13) | .30 |
| 31138 | Lever—Locating lever and pawl assembly (14) | .70 |
| 31113 | Lever—Main lever assembly (15) | 1.35 |

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# RCA MFG. CO., INC.

MODELS U-121, Ch. RC-348J
U-123, Ch. RC-348H, RC-421
U-127E, Ch. RC-348L

Parts List

ALL PRICES ARE SUBJECT TO CHANGE OR WITHDRAWAL WITHOUT NOTICE.

## Replacement Parts (cont'd) Models U-121, U-123 (Single-Band), and U-127E

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| 31140 | Lever—Pickup lift cable lever and spring assembly (16) | .55 |
| 31135 | Lever—Pickup locating lever assembly (17) | .85 |
| 31130 | Lever—Record separator elevating lever complete with adjustment screws (18) | .80 |
| 31132 | Lever—Trip detaining lever (19) | .30 |
| 31115 | Lever—Trip lever assembly (20) | 1.85 |
| 31131 | Lever—Trip regulator lever (21) | .25 |
| 31133 | Pawl—Trip pawl assembly (22) | .80 |
| 31124 | Pin—Record post drive pin (23) | .04 |
| 14207 | Roller—Pickup lift cable roller and bracket assembly (24) | .55 |
| 31118 | Screw—Cone pointed set screw for trip lever hub or record post shelf | .06 |
| 4563 | Screw—Pickup lift cable screw and nuts | .04 |
| 31117 | Screw—Special screw to adjust friction clutch tension (3) | .03 |
| 31126 | Separator—Record separator knife (25) | .75 |
| 31122 | Shaft—Record separator post shaft (26) | .40 |
| 31125 | Shelf—Record post shelf assembly (27) | 1.25 |
| 3676 | Spring—Cam pawl tension spring on main gear (12 turns, .190-in. O.D., 4-3/64-in. lg.) | .04 |
| 32882 | Spring—Main lever tension spring (43) (18 turns, .6-in. O.D., 3-in. lg.) | .05 |
| 14190 | Spring—Pickup locating lever short spring or locating lever pawl tension spring (28) (16 turns, .180-in. O.D., 19/32-in. lg.) | .08 |
| 31136 | Spring—Index lever tension spring (30) (25 turns, .190-in. O.D., 15/16-in. lg.) | .05 |
| 3666 | Spring—Pickup lift cable tension spring (31) (20 turns, .195-in. O.D., 1-in. lg.) | .04 |
| 31127 | Spring—Record separator pressure spring (32) (8 turns, 5/8-in. O.D., 3/4-in. lg.) | .02 |
| 14191 | Spring—Trip detaining lever tension spring (33) (15 turns, .190-in. O.D., 3/4-in. lg.) | .04 |
| 31875 | Spring—Pickup locating lever tension spring (34) (14 turns, .220-in. O.D., 27/32-in. lg.) | .04 |
| 32436 | Spring—Locating lever tension spring (35) (16 turns, .182-in. O.D., 21/32-in. lg.) | .05 |
| 32881 | Turntable complete | 2.00 |
| 31128 | Washer—"C" washer for top of record post | .04 |
| | **SPEAKER ASSEMBLIES (RL-70F3) Models U-121 and U-123 (Single-Band)** | |
| 13866 | Cap—Dust cap for cone center | .03 |
| 12012 | Coil—Field coil (L16) | 2.90 |
| 11469 | Coil—Hum neutralizing coil (L15) | .30 |
| 31275 | Cone—Speaker cone and voice coil (L14) | 1.75 |
| 31302 | Plug—4-contact male plug | .25 |
| 31300 | Speaker—Speaker complete | 10.95 |
| 14358 | Screw—Screw, washer, and lockwasher to hold core in yoke | .04 |
| 31301 | Transformer—Output transformer (T2) | 1.70 |
| 14357 | Washer—Spring washer to hold field coil | .06 |
| | **SPEAKER ASSEMBLIES (RL-63H5) Model U-127E** | |
| 14356 | Board—3-contact speaker terminal board | .15 |
| 13866 | Cap—Cone center dust cap | .25 |
| 12012 | Coil—Field coil | 2.90 |
| 11469 | Coil—Hum neutralizing coil | .30 |
| 31310 | Cone—Speaker cone and voice coil | 1.75 |
| 31302 | Plug—4-contact male plug for speaker | .25 |
| 14358 | Screw—Screw, washer, and lockwasher to hold core in yoke | .04 |
| 31453 | Speaker complete | 10.25 |
| 14355 | Transformer—Output transformer | 2.00 |
| 14357 | Washer—Spring washer to hold field coil | .06 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 32798 | Button—Push button | .10 |
| 13103 | Cap—Pilot lamp cap (bullseye) (For Model U-123 only) | .15 |
| 31487 | Clip—Spring clip to mount dial scale | .12 |
| 31095 | Cover—One set protective discs for call letter markers | .10 |
| 32742 | Dial—Glass dial scale (For Models U-121 and U-123) | .45 |
| 31429 | Dial—Glass dial scale (For Model U-127E only) | .40 |
| 31103 | Hinge—Cabinet lid hinge (For Model U-127E only) | .50 |
| 32562 | Holder—Needle card holder (For Model U-121 only) | .35 |
| 31391 | Knob—Tone control knob | .15 |
| 31355 | Knob—Dummy or radio-record switch knob | .12 |
| 30773 | Knob—Volume control or tuning knob | .15 |
| 30991 | Marker—One set station call letter markers | .40 |
| 31054 | Mounting—Pickup arm rubber mounting, washers, and nuts (For Model U-121 and U-127E only) | .15 |
| 32870 | Screen—Phonograph compartment lamp screen (For Model U-123 only) | 1.00 |
| 31470 | Spring—Motorboard mounting springs, bolts, and washers (For Model U-123 only) (4 required) | .10 |
| 32721 | Spring—Retaining spring for push button | .02 |
| 30330 | Spring—Retaining spring for tone control knob | .03 |
| 14270 | Spring—Retaining spring for tuning, volume control, or switch knob | .05 |
| 11831 | Support—Cabinet lid support (For Model U-121 only) | 1.85 |
| 31478 | Support—Cabinet lid support (For Model U-123 only) | 2.20 |
| 30946 | Support—Cabinet lid support (For Model U-127E only) | .60 |
| 32743 | Switch—Radio-Record switch (For Model U-123 only) | .95 |
| 31667 | Escutcheon—Dial scale escutcheon | .55 |
| 32799 | Escutcheon—Push button escutcheon | .50 |
| 30698 | Hinge—Cabinet lid hinge (For Models U-121 and U-123) | .95 |

## Replacement Parts Model U-123 (Two-Band)

| | | |
|---|---|---|
| | **CHASSIS ASSEMBLIES (RC-421) Model U-123 (Two Band)** | |
| 32136 | Cable—Phono. input cable and socket | .35 |
| 31379 | Capacitor—Dual trimmer—comprising one 3-30 mmfd. and one 2-10 mmfd. sections (C10, C11) | .40 |
| 13605 | Capacitor—27 mmfd. (C19) | .35 |
| 12723 | Capacitor—56 mmfd. (C7) | .35 |
| 14262 | Capacitor—109 mmfd. (C13, C14) | .30 |
| 12404 | Capacitor—120 mmfd. (C15, C16) | .30 |
| 14712 | Capacitor—180 mmfd. (C17) | .30 |
| 30232 | Capacitor—220 mmfd. (C21) | .35 |
| 12952 | Capacitor—300 mmfd. (C1) | .35 |
| 30608 | Capacitor—510 mmfd. (C4) | .35 |
| 32714 | Capacitor—730 mmfd. (C6) | .45 |
| 13895 | Capacitor—5,600 mmfd. (C9) | .70 |
| 4838 | Capacitor—.005 mfd. (C23, C25) | .25 |
| 4937 | Capacitor—.01 mfd. (C20, C22) | .25 |
| 4870 | Capacitor—.025 mfd. (C18) | .20 |
| 32787 | Capacitor—.05 mfd. (C12) | .20 |
| 33014 | Capacitor—Electrolytic — comprising three 10 mfd. and one 20 mfd. sections (C8, C24, C26, C27) | 1.90 |
| 32705 | Capacitor—Push button trimmer capacitor bank (C28, C29, C30, C31, C32) | 1.20 |
| 31382 | Clip—Push button coil mounting clip | .04 |
| 32706 | Coil—Antenna coil (L1, L2, L3, L4) | 1.25 |
| 32707 | Coil—Oscillator coil (L5, L6) | .95 |
| 31385 | Coil—Push button oscillator coil — less core, 550-950 kc (L28) | .30 |
| 32704 | Coil—Push button oscillator coil — less core, 590-1,020 kc (L29) | .35 |
| 32340 | Coil—Push button oscillator coil — less core, 690-1,225 kc (L30) | .35 |
| 31383 | Coil—Push button oscillator coil — less core, 890-1,500 kc (L31, L32) | .30 |
| 32249 | Condenser—2-gang variable (C2, C3, C5) | 2.70 |
| 32355 | Control—Volume control, tone control, and power switch (R6, R11, S1) | 3.00 |
| 32634 | Cord—Drive cord | .10 |
| 31386 | Core—Core and stud for coil, Stock Nos. 31383, 31385, and 32704 | .15 |
| 30846 | Core—Core and stud for coil, Stock No. 32340 | .30 |
| 32713 | Core—Core and stud for oscillator coil, Stock No. 32707 | .35 |
| 32266 | Drum—Condenser drive cord drum | .45 |
| 32711 | Indicator—Dial indicator pointer | .20 |
| 31480 | Lamp—Dial lamp socket | .20 |
| 32710 | Plate—Dial color plate and pointer track | .30 |
| 5119 | Plug—3-contact female for speaker cable | .25 |
| 30868 | Plug—Motor cable plug | .35 |
| 32289 | Pulley—Indicator drive cord pulley | .10 |
| 12261 | Resistor—390 ohms, 1 watt (R12) | .20 |
| 14559 | Resistor—10,000 ohms, ½ watt (R7) | .20 |
| 33489 | Resistor—15,000 ohms, 2.5 watt (R3) | .55 |
| 14284 | Resistor—22,000 ohms, 1/10 watt (R5) | .15 |
| 12454 | Resistor—33,000 ohms, ½ watt (R2) | .20 |
| 12285 | Resistor—470,000 ohms, ½ watt (R9) | .20 |
| 13730 | Resistor—1 meg., ½ watt (R1) | .20 |
| 12201 | Resistor—1.5 meg., ½ watt (R8) | .20 |
| 12679 | Resistor—2.2 meg., ½ watt (R4) | .20 |
| 13601 | Resistor—10 meg., ½ watt (R10) | .20 |
| 30340 | Retainer—Pulley retaining clip | .02 |
| 14343 | Retainer—Tuning knob shaft retaining ring | .03 |
| 4669 | Screw—No. 8-32 x ¼ square head set screw for drum | .03 |
| 32712 | Shaft—Tuning knob shaft and pulley | .20 |
| 31319 | Socket—Octal base tube socket | .25 |
| 31418 | Spring—Drive cord tension spring | .05 |
| 32703 | Switch—Push button switch (S28, S29, S30, S31, S32) | 2.25 |
| 33113 | Switch—Radio record switch (S5) | .65 |
| 32702 | Switch—Range switch (S3, S4) | 1.15 |
| 14376 | Transformer—First i.f. transformer (L7, L8, C13, C14) | 2.45 |
| 14308 | Transformer—Second i.f. transformer (L9, L10, C15, C16, C17, R5) | 2.90 |
| 33112 | Transformer—Power transformer—105-125 volts, 50-60 cycle (T1) | 4.30 |
| | **PICKUP AND ARM ASSEMBLIES** | |
| 33096 | Arm—Pickup arm complete — less crystal cartridge, needle screw, and cable | 2.60 |
| 31162 | Cable—Pickup arm lift cable and clips | .15 |
| 32885 | Cable—Output cable and plug | .25 |
| 31156 | Crystal—Pickup crystal cartridge and needle screw | 4.25 |
| 33114 | Damper—Viscoloid damper for crystal armature | .15 |
| 31160 | Screw—Pickup needle screw | .12 |
| 31161 | Shaft—Pickup pivot arm and shaft assembly | .45 |
| | **SPEAKER ASSEMBLIES (RL-70H6) Model U-123 (Two Band)** | |
| 31825 | Cap—Dust cap for cone center | .05 |
| 11469 | Coil—Hum neutralizing coil (L12) | .30 |
| 33116 | Coil—Speaker field coil (L11) | 2.10 |
| 31275 | Cone—Speaker cone and voice coil (L13) | 1.75 |
| 5118 | Plug—3-prong male for speaker | .25 |
| 33115 | Speaker—Speaker complete | 10.55 |
| 14358 | Screw—Screw, washer, and lockwasher to hold core in yoke | .04 |
| 31301 | Transformer—Output transformer (T2) | 1.70 |
| 14357 | Washer—Spring washer to hold field coil | .06 |
| | **MOTOR ASSEMBLIES, MOTORBOARD ASSEMBLIES, and OPERATING MECHANISM Model U-123 (Two Band)** Same as in Single-Band U-123 | |
| 32798 | Button—Push button | .10 |
| 13103 | Cap—Pilot lamp cap (bullseye) | .15 |
| 31487 | Clip—Spring clip to mount dial scale | .12 |
| 31095 | Cover—One set protective discs for call letter markers | .10 |
| 33117 | Dial—Glass dial scale | .50 |
| 31667 | Escutcheon—Dial scale escutcheon | .55 |
| 33118 | Escutcheon—Push button escutcheon | .50 |
| 30698 | Hinge—Cabinet lid hinge | .95 |
| 31391 | Knob—Tone control knob | .15 |
| 31355 | Knob—Tuning or radio-record switch knob | .12 |
| 14359 | Knob—Radio-record switch knob | .20 |
| 30773 | Knob—Volume control knob | .15 |
| 30991 | Marker—One set station call letter markers | .40 |
| 32870 | Screen—Phonograph compartment lamp screen | 1.00 |
| 31470 | Spring—Motorboard mounting springs, bolts, and washers (4 required) | .10 |
| 32721 | Spring—Retaining spring for push button | .02 |
| 30330 | Spring—Retaining spring for tone control knob | .03 |
| 14270 | Spring—Retaining spring for tuning, volume control, or switch knob | .05 |
| 4982 | Spring—Retaining spring for radio-record switch knob | .05 |
| 31478 | Support—Cabinet lid support | 2.20 |

MISCELLANEOUS ASSEMBLIES

MODEL U-125,Ch.RC-386
Alignment,Tuner Data

RCA MFG. CO., INC.

# ALIGNMENT PROCEDURE

**Cathode-Ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

**Output Meter Alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-Oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

**Calibration Scale on Indicator-Drive-Cord Drum.** — The tuning dial is fastened in the cabinet and cannot be used for reference during alignment; therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed ⅜-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

For additional details, refer to booklet "RCA Victor Receiver Alignment."

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | "A" band, Quiet Point between 550-750 kc | L12 and L13 (2nd I-F Trans.) |
| 2 | 6A8-G det. grid cap, in series with .01 mfd. | 455 kc | | L10 and L11 (1st I-F Trans.) |
| 3 | Antenna Terminal, in series with 300 ohms | 20 mc | 20 mc (23°) "C" band | C21* (osc.) C30** (ant.) |
| 4 | Antenna Terminal, in series with 300 ohms | 6 mc | 6 mc (33°) "B" band | C23 (osc.)† |
| 5 | Antenna Terminal, in series with 200 mmf. | 1,500 kc | 1,500 kc (28½°) "A" band | C25 (osc.) |
| 6 | Follow "Adjustments for Electric Tuning" | | | |

* Use **minimum** capacity peak if two peaks can be obtained.

** Rock gang slightly and use **maximum** capacity peak if two peaks can be obtained with C30. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 28° (19.09 mc), where a weaker signal (image) should be received.

† Use **minimum** capacity peak if two peaks can be obtained. Check to determine that C23 has been adjusted to the correct peak by tuning to approximately 51° (5.09 mc), at which point a weaker signal (image) should be received.

**Note.**—Oscillator tracks 455 kc above signal on all bands.

# ADJUSTMENTS FOR ELECTRIC TUNING

This model has eight push-buttons. The front button is the Victrola switch. The rear button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 31031. Allow at least five minutes warm-up period before making adjustments.

Use one or two feet of wire as an antenna to ensure sharp peaking.

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (second from front) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

**Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.**

5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers.

**Precautionary Lead Dress.—**

1. Dress red leads from power transformer to power switch (S3), in corner of chassis and away from volume control terminals.
2. Dress brown lead from push-button switch to gang over end of switch, and away from C27 and bus between S5 and range switch.
3. Leads to C27 must be as short as possible.
4. Blue lead from range switch to oscillator coil must be as short as possible and dressed away from other leads. All leads should be dressed away from antenna coil.
5. Leads across back of chassis must be dressed under electrolytic away from Victrola jack.
6. Parts and leads should be dressed away from R22-R14 as it becomes heated.
7. Leads from oscillator coil to trimmers must be dressed away from coil.
8. Green lead from S4 to range switch must be clear of other leads and away from front edge of chassis.

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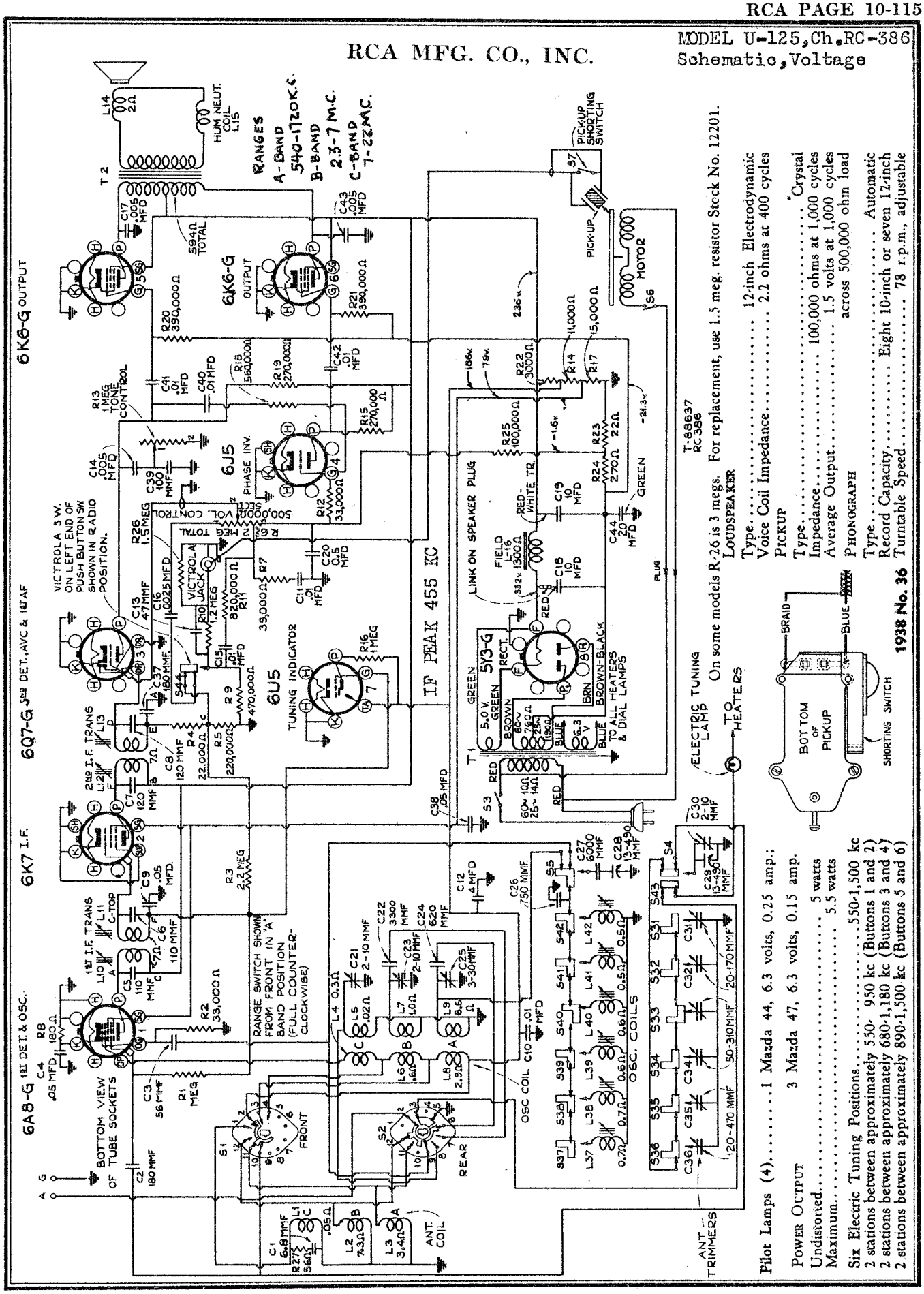
RCA MFG. CO., INC.
MODEL U-125, Ch. RC-386
Schematic, Voltage
6A8-G 1ST DET. & OSC.
6K7 I.F.
6Q7-G 2ND DET., AVC & 1ST AF
6K6-G OUTPUT
6U5 TUNING INDICATOR
6J5 PHASE INV.
5Y3-G RECT.
IF PEAK 455 KC
RANGES
A-BAND 540-1720 K.C.
B-BAND 2.3-7 M.C.
C-BAND 7-22 M.C.
VICTROLA SW. ON LEFT END OF PUSH BUTTON SW SHOWN IN RADIO POSITION.
RANGE SWITCH SHOWN FROM FRONT IN 'A' BAND POSITION (FULL COUNTER-CLOCKWISE)
LINK ON SPEAKER PLUG
ELECTRIC TUNING LAMP
On some models R-26 is 3 megs.
T-88637
RC-386
For replacement, use 1.5 meg. resistor Stock No. 12201.
LOUDSPEAKER
Type..... 12-inch Electrodynamic
Voice Coil Impedance..... 2.2 ohms at 400 cycles
PICKUP
Type..... *Crystal
Impedance..... 100,000 ohms at 1,000 cycles
Average Output..... 1.5 volts at 1,000 cycles across 500,000 ohm load
PHONOGRAPH
Type..... Automatic
Record Capacity..... Eight 10-inch or seven 12-inch
Turntable Speed..... 78 r.p.m., adjustable
1938 No. 36
Pilot Lamps (4)..... 1 Mazda 44, 6.3 volts, 0.25 amp.; 3 Mazda 47, 6.3 volts, 0.15 amp.
POWER OUTPUT
Undistorted..... 5 watts
Maximum..... 5.5 watts
Six Electric Tuning Positions..... 550-1,500 kc
2 stations between approximately 530- 950 kc (Buttons 1 and 2)
2 stations between approximately 680-1,180 kc (Buttons 3 and 4)
2 stations between approximately 890-1,500 kc (Buttons 5 and 6)

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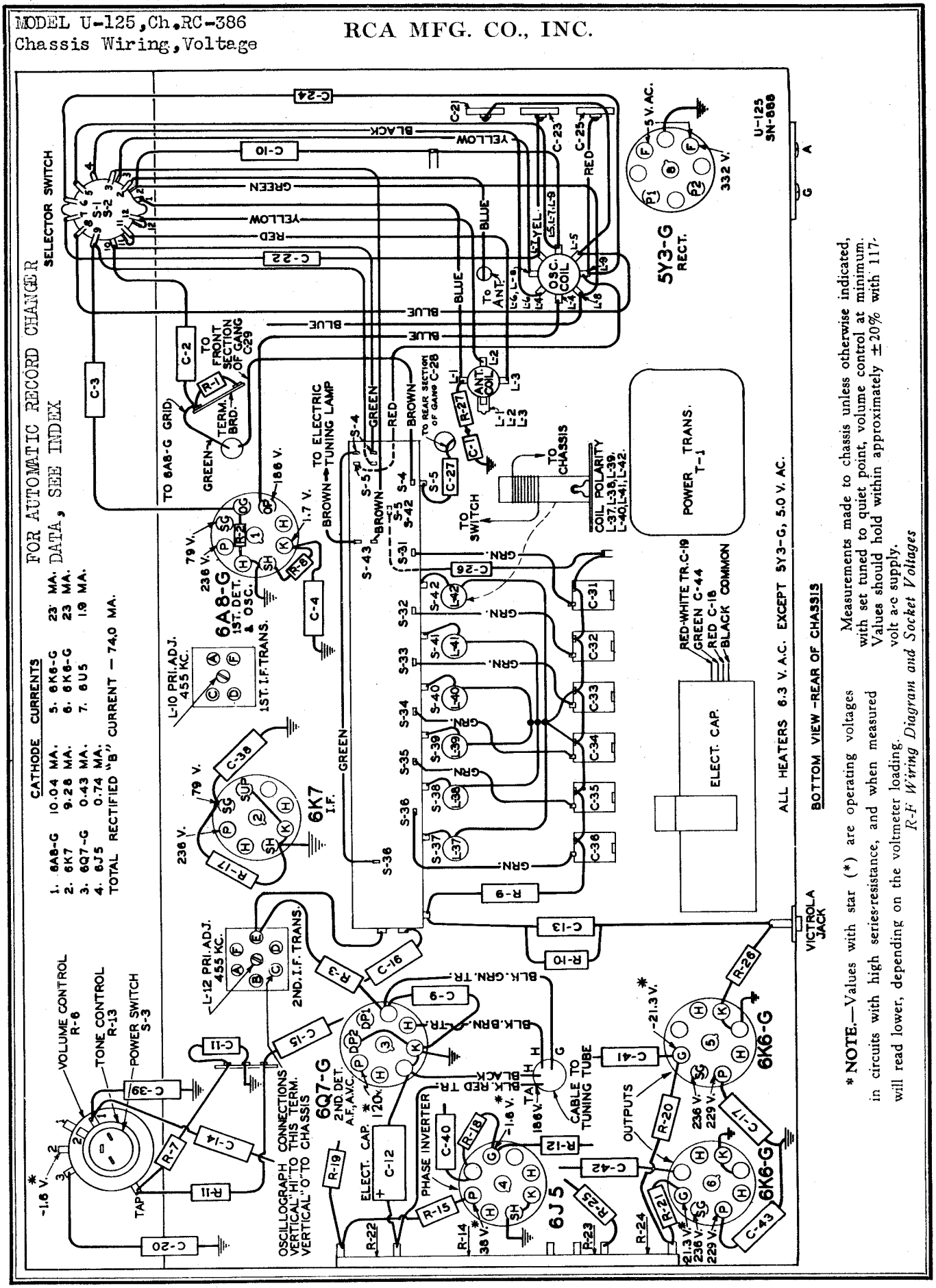
MODEL U-125, Ch. RC-386
Chassis Wiring, Voltage

# RCA MFG. CO., INC.




* NOTE.—Values with star (*) are operating voltages in circuits with high series-resistance, and when measured will read lower, depending on the voltmeter loading.

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point, volume control at minimum. Values should hold within approximately ±20% with 117-volt a-c supply.

*R-F Wiring Diagram and Socket Voltages*

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RCA MFG. CO., INC.

MODEL U-125, Ch. RC-386
Parts List

# REPLACEMENT PARTS

**Insist on genuine factory-tested parts, which are readily identified and may be purchased from authorized dealers.**

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| | **RECEIVER ASSEMBLIES** | |
| 14517 | Board—Antenna ground terminal board | .25 |
| 30752 | Bracket—Magic Eye mounting bracket | .25 |
| 31400 | Capacitor—Triple adjustable trimmer two sections 2-10 mmfd., one section 3-30 mmfd. (C21, C23, C25) | .50 |
| 14079 | Capacitor—6.8 mmfd. (C1) | .35 |
| 31387 | Capacitor—Antenna coil trimmer capacitor bank 20-470 mmfd. (C31, C32, C33, C34, C35, C36) | 1.30 |
| 13141 | Capacitor—47 mmfd. (C13) | .35 |
| 12723 | Capacitor—56 mmfd. (C3) | .35 |
| 12720 | Capacitor—100 mmfd. (C39) | .35 |
| 14262 | Capacitor—110 mmfd. (C5, C6) | .30 |
| 12404 | Capacitor—120 mmfd. (C7, C8) | .30 |
| 13003 | Capacitor—180 mmfd. (C2) | .35 |
| 14712 | Capacitor—180 mmfd. (C37) | .30 |
| 31381 | Capacitor—620 mmfd. (C24) | .45 |
| 31435 | Capacitor—750 mmfd. (C26) | .40 |
| 4881 | Capacitor—3,300 mmfd. (C22) | .60 |
| 31405 | Capacitor—6,000 mmfd. (C27) | .75 |
| 5107 | Capacitor—.0025 mfd. (C16) | .20 |
| 4838 | Capacitor—.005 mfd. (C14, C17, C43) | .25 |
| 4858 | Capacitor—.01 mfd. (C10, C40, C41, C42) | .25 |
| 14393 | Capacitor—.01 mfd. (C11, C15) | .30 |
| 30882 | Capacitor—.05 mfd. (C4, C9, C38) | .20 |
| 30867 | Capacitor—0.5 mfd. (C20) | .30 |
| 32145 | Capacitor—4 mfd. (C12) | .70 |
| 32142 | Capacitor—Comprising two 10 mfd., one 20 mfd. sections (C18, C19, C44) | 1.90 |
| 31382 | Clip—Oscillator coil and core mounting clip | .04 |
| 31402 | Coil—Antenna coil—A, B, and C bands (L1, L2, L3) | 1.15 |
| 31401 | Coil—Oscillator coil—A, B, and C bands (L4, L5, L6, L7, L8, L9) | 2.00 |
| 31383 | Coil—Oscillator coil—A band (L41, L42) | .30 |
| 31384 | Coil—Oscillator coil—A band (L39, L40) | .30 |
| 31385 | Coil—Oscillator coil—A band (L37, L38) | .30 |
| 31369 | Condenser—2-gang variable tuning condenser (C28, C29, C30) | 2.65 |
| 31366 | Control—Volume control, tone control, and on-off switch (R6, R13, S3) | 3.00 |
| 31375 | Cord—Indicator pointer drive cord | .30 |
| 31374 | Cord—Variable condenser drum drive cord | .15 |
| 30905 | Core—Adjustable core and stud for i-f transformer | .35 |
| 31386 | Core—Adjustable core and stud for oscillator coil, Stock Nos. 31383, 31384, and 31385 | .15 |
| 31372 | Drum—Variable condenser drive cord drum and calibration dial | .65 |
| 11891 | Lamp—Phono. compartment lamp | .17 |
| 31480 | Lamp—Dial and "Electric Tuning" lamp | .20 |
| 30868 | Plug—2-contact female plug for motor cable | .35 |
| 5040 | Plug—4-contact female plug for speaker cable | .30 |
| 31373 | Pulley—Drive cord pulley | .08 |
| 32143 | Resistor—Voltage divider comprising one 11,000-ohm, one 3,000-ohm, one 22-ohm, and one 270-ohm sections (R14, R22, R23, R24) | .90 |
| 13220 | Resistor—56 ohms, ½-watt (R27) | .20 |
| 30545 | Resistor—180 ohms, ½-watt (R8) | .20 |
| 5114 | Resistor—15,000 ohms, 1-watt (R17) | .22 |
| 14284 | Resistor—22,000 ohms, 1/10-watt (R4) | .15 |
| 12454 | Resistor—33,000 ohms, ½-watt (R2, R12) | .20 |
| 12266 | Resistor—39,000 ohms, ½-watt (R7) | .20 |
| 14560 | Resistor—100,000 ohms, ½-watt (R25) | .20 |
| 11398 | Resistor—220,000 ohms, 1/10-watt (R5) | .15 |
| 12199 | Resistor—270,000 ohms, ½-watt (R15, R19) | .20 |
| 13479 | Resistor—390,000 ohms, ½-watt (R20, R21) | .20 |
| 12285 | Resistor—470,000 ohms, ½-watt (R9) | .20 |
| 12486 | Resistor—560,000 ohms, ½-watt (R18) | .20 |
| 30963 | Resistor—820,000 ohms, ½-watt (R11) | .20 |
| 12013 | Resistor—1 meg., 1/10-watt (R16) | .15 |
| 13730 | Resistor—1 meg., ½-watt (R1) | .20 |
| 30208 | Resistor—1.2 meg., ½-watt (R10) | .20 |
| 12201 | Resistor—1.5 meg., ½-watt (R26) | .20 |
| 12679 | Resistor—2.2 meg., ½-watt (R3) | .20 |
| 14343 | Retainer—Retaining spring for station selector knob shaft | .03 |
| 14887 | Retainer—Drive cord pulley retainer | .01 |
| 4669 | Screw—No. 8-32 square head set screw for drum, Stock No. 31372 | .03 |
| 31368 | Shaft—Station selector knob shaft and pulley | .30 |
| 3682 | Shield—Tube shield | .22 |
| 30868 | Socket—2-contact female socket for motor power cable | .35 |
| 12493 | Socket—5-contact female socket for speaker cable | .30 |
| 13871 | Socket—Magic Eye socket | .45 |
| 14278 | Socket—Pickup input socket | .25 |
| 31251 | Socket—Tube socket | .25 |
| 31418 | Spring—Indicator or drum drive cord tension spring | .05 |
| 31398 | Switch—Range switch (S1, S2) | 1.25 |
| 31370 | Switch—Station selector push-button switch (S4, S5, S31, S32, S33, S34, S35, S36, S37, S38, S39, S40, S41, S42, S43, S44) | 3.85 |
| 14376 | Transformer—First i-f transformer (L10, L11, C5, C6) | 2.45 |
| 14283 | Transformer—Second i-f transformer (L12, L13, C7, C8, C37, R4, R5) | 3.80 |
| 31445 | Transformer—Power transformer 105-125 volts, 25-60 cycles (T1) | 7.80 |
| 31446 | Transformer—Power transformer 100-130/140-160/200-250 volts, 50-60 cycles (T1) | 8.05 |
| 32144 | Transformer—Power transformer 105-125 volts, 50-60 cycles (T1) | 4.75 |
| | **SPEAKER ASSEMBLIES (RL-70H-5)** | |
| 13866 | Cap—Dust cap for cone center | .03 |
| 12012 | Coil—Field coil (L16) | 2.90 |
| 11469 | Coil—Neutralizing coil (L15) | .30 |
| 31275 | Cone—Speaker cone and voice coil (L14) | 1.75 |
| 31539 | Plug—5-contact male plug for speaker | .25 |
| 32146 | Speaker complete | 12.10 |
| 14534 | Transformer—Output transformer (T2) | 3.85 |
| 14357 | Washer—Spring washer to hold field coil securely | .06 |
| | **MOTORBOARD ASSEMBLIES** | |
| 31149 | Base—Tone arm mounting base | .35 |
| 31152 | Board—Record changer base complete with all welded and riveted posts and bearings—less all operating parts | 7.90 |
| 14209 | Bumper—Main lever rubber bumper (1) | .08 |
| 9848 | Cup—Used needle cup, rest, and lid complete | .75 |
| 31148 | Escutcheon—Index escutcheon | .40 |
| 31151 | Guide—Pickup lift cable guide (Coil spring, 80T 2-in. large) (2) | .10 |
| 31150 | Mounting—Pickup arm base rubber mounting complete | .45 |
| 31155 | Spring—Needle cup lid tension spring | .04 |
| | **OPERATING MECHANISM** | |
| 31134 | Bracket—Pickup locating lever mounting bracket (3) | .30 |
| 31144 | Cam—Cam and gear assembly (4) | 2.80 |
| 6808 | Clutch—Trip lever friction clutch assembly (5) | .35 |
| 31146 | Coupling—Motor coupling complete with turntable drive gear, rubber strips, motor coupling, and drive arm (6) | 1.80 |
| 31129 | Cover—Cap for top of record post | .45 |
| 31116 | Finger—Trip lever fricton on finger assembly (7) | .45 |
| 31119 | Gear—Long arm and rack gear for front left-hand record post (8) | .60 |
| 31120 | Gear—Short arm and rack gear for rear right-hand record post (9) | .55 |
| 31121 | Gear—Record post gear (10) | .90 |
| 31123 | Guide—Main lever spring guide (11) | .40 |
| 31114 | Lever—Index lever assembly (12) | .75 |
| 31137 | Lever—Index lever tension spring lever (13) | .30 |
| 31138 | Lever—Locating lever and pawl assembly (14) | .70 |
| 31113 | Lever—Main lever assembly (15) | 1.35 |
| 31140 | Lever—Pickup lift cable lever and spring assembly (16) | .55 |
| 31135 | Lever—Pickup locating lever assembly (17) | .85 |
| 31130 | Lever—Record separator elevating lever complete with adjustment screws (18) | .80 |
| 31132 | Lever—Trip detaining lever (19) | .30 |
| 31115 | Lever—Trip lever assembly (20) | 1.85 |
| 31131 | Lever—Trip regulator lever (21) | .25 |
| 31133 | Pawl—Trip pawl assembly (22) | .80 |
| 31124 | Pin—Record post drive pin (23) | .04 |
| 14207 | Roller—Pickup lift cable roller and bracket assembly (24) | .55 |
| 31118 | Screw—Cone pointed set screw for trip lever hub or record post shelf | .06 |
| 4563 | Screw—Pickup lift cable screw and nuts | .04 |
| 14195 | Screw—Set screw for flexible coupling | .05 |
| 31117 | Screw—Special screw to adjust friction clutch tension | .03 |
| 31126 | Separator—Record separator knife (25) | .75 |
| 31122 | Shaft—Record separator post shaft (26) | .40 |
| 31125 | Shelf—Record post shelf assembly (27) | 1.25 |
| 31141 | Spindle—Turntable spindle shaft and spring | 1.40 |
| 3676 | Spring—Cam pawl tension spring on main gear (12 turns, .190-in. O.D., 43/64-in. lg.) | .04 |
| 14190 | Spring—Pickup locating lever short spring or locating lever pawl tension spring (28) (16 turns, .180-in. O.D., 19/32-in. lg.) | .08 |
| 31145 | Spring—Main lever tension spring (29) (18 turns, 9/16-in. O.D., 3-in. lg.) | .05 |
| 31136 | Spring—Index lever tension spring (30) (25 turns, .190-in. O.D., 15/16-in. lg.) | .05 |
| 3666 | Spring—Pickup lift cable tension spring (31) (20 turns, .195-in. O.D., 1-in. lg.) | .04 |
| 31127 | Spring—Record separator pressure spring (32) (8 turns, ⅜-in. O.D., ¾-in. lg.) | .02 |
| 14191 | Spring—Trip detaining lever tension spring (33) (15 turns, .190-in. O.D., ¾-in. lg.) | .04 |
| 31875 | Spring—Pickup locating lever tension spring (34) (14 turns, .220-in. O.D., 27/32-in. lg.) | .04 |

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## REPLACEMENT PARTS (Continued)

| STOCK No. | DESCRIPTION | Unit List Price |
|---|---|---|
| 32436 | Spring—Locating lever tension spring (35) (16 turns, .182-in. O.D., 21/32-in. lg.) | .05 |
| 31142 | Spring—Turntable spindle spring | .03 |
| 31147 | Strip—Complete set of rubber strips for flexible coupling | .40 |
| 31139 | Turntable Assembly—less spindle | 3.35 |
| 31128 | Washers—"C" washer for top of record post | .04 |
| 31143 | Washers—Turntable thrust washers (1 steel, 1 bronze, 1 felt) | .15 |
| | **MOTOR ASSEMBLIES** | |
| 11703 | Governor—Motor speed governor (M1) | 3.05 |
| 31448 | Motor—105-125 volts, 25 cycles (M1) | 23.70 |
| 31163 | Motor—105-125 volts, 50-60 cycles (M1) | 20.50 |
| 31157 | Motor—105-125 volts, 60 cycles (M1) | 17.75 |
| 30870 | Plug—2-contact male plug for motor power cable | .35 |
| 31447 | Screw—Complete set of motor mounting screws, washers, and spacers—for 25 cycle models only | .40 |
| 31158 | Screw—Complete set of motor mounting screws, washers, and spacers—for 50-60 cycle models only | .25 |
| 14206 | Switch—Motor toggle switch (S6) | .90 |
| | **PICKUP AND ARM ASSEMBLIES** | |
| 31162 | Cable—Pickup arm lift cable and clips | .15 |
| 31156 | Crystal—Pickup crystal cartridge and needle screw | 4.25 |
| 31159 | Pickup and arm complete | 7.45 |
| 31160 | Screw—Pickup needle screw | .12 |
| 31161 | Shaft—Pickup pivot arm and shaft assembly | .45 |
| | **MISCELLANEOUS ASSEMBLIES** | |
| 12038 | Band—Rubber band for Magic Eye | .02 |
| 31397 | Button—Station selector push-button | .15 |
| 13103 | Cap—Pilot light jewel | .15 |
| 31456 | Cover—8-protective covers for push-button markers | .08 |
| 31541 | Cushion—Motor plate mounting cushions and clamps sufficient for one instrument | .50 |
| 31591 | Dial—Station selector dial scale | .75 |
| 31407 | Escutcheon—Magic Eye or Electric Tuning indicator escutcheon | .60 |
| 31395 | Escutcheon—Tuning dial escutcheon only, less push-buttons and dial scale | 1.15 |
| 30698 | Hinge—Cabinet lid hinge | .95 |
| 31543 | Indicator—Electric Tuning indicator disc | .25 |
| 31392 | Indicator—Indicator pointer, carriage, and clip | .30 |
| 31355 | Knob—Range switch knob | .12 |
| 14359 | Knob—Station selector knob | .20 |
| 31391 | Knob—Tone control knob | .15 |
| 30773 | Knob—Volume control knob | .15 |
| 31460 | Marker—"Dial Tuning" marker for push-button | .04 |
| 31459 | Marker—"Victrola" marker for push-button | .04 |
| 31590 | Markers—Station call letter markers | .40 |
| 31393 | Screen—Dial color screen | .40 |
| 31760 | Screen—Phono. compartment lamp screen | .20 |
| 11210 | Screw—Chassis mounting screws, washers, and lockwashers | .05 |
| 31470 | Springs—Motorboard suspension top spring, bottom spring, screw, and lockwasher (4 reqd.) | .10 |
| 4982 | Spring—Retaining spring for knob Stock No. 14359 | .05 |
| 14270 | Spring—Retaining spring for knob Stock Nos. 30773 and 31355 | .05 |
| 30330 | Spring—Retaining spring for knob Stock No. 31391 | .03 |
| 31478 | Support—Cabinet lid support | 2.20 |

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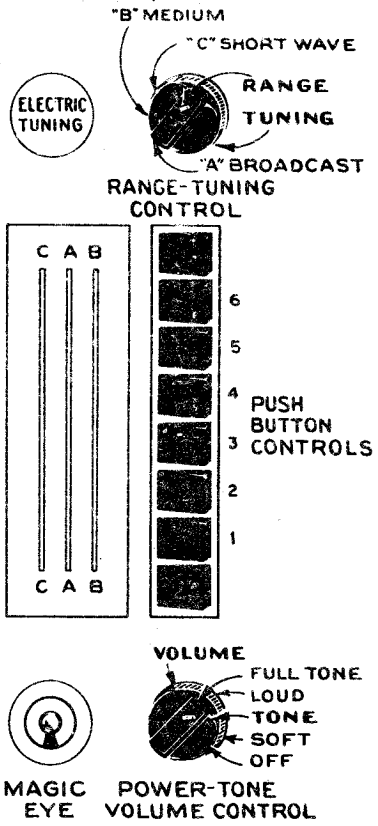
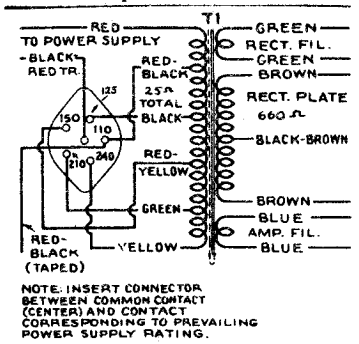
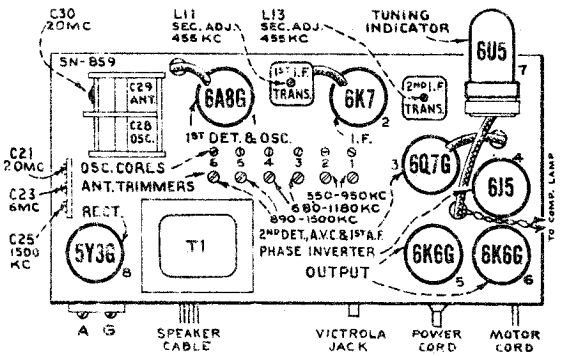



The rear push-button is for dial tuning
The front push-button is the Victrola switch



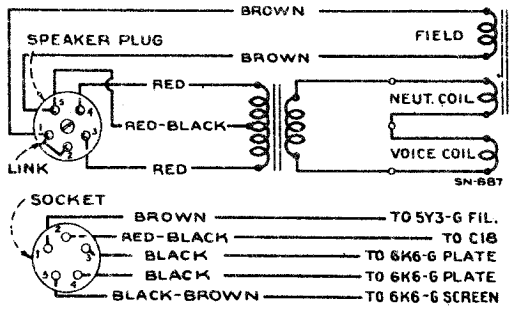

UNIVERSAL TRANS. CONNECTIONS

(110-volt supply for the Victrola motor is obtained by connecting the motor to the red and the red-black leads.)

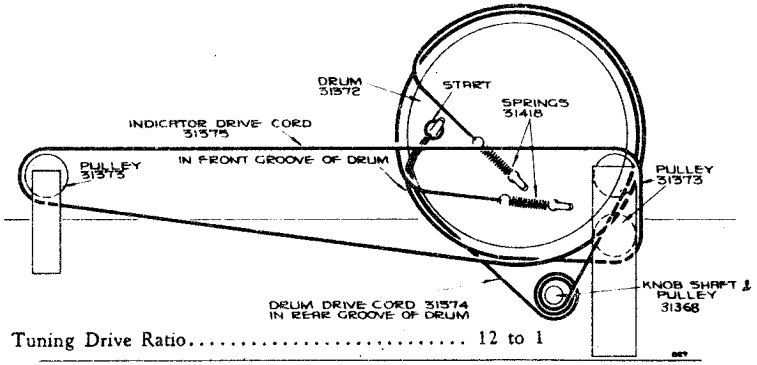



### POWER SUPPLY RATINGS

| | | | |
|---|---|---|---|
| A-6 | 105-125 volts, | 60 cycles, | 115 watts |
| A | 105-125 volts, | 50-60 cycles, | 115 watts |
| B-2 | 105-125 volts, | 25 cycles, | 115 watts |
| C-6 | 100-130/140-160/200-250 volts, | 60 cycles, | 115 watts |
| C | 100-130/140-160/200-250 volts, | 50-60 cycles, | 115 watts |




SPEAKER PLUG CONNECTIONS
*Connections and Colors of Loudspeaker and Cable*



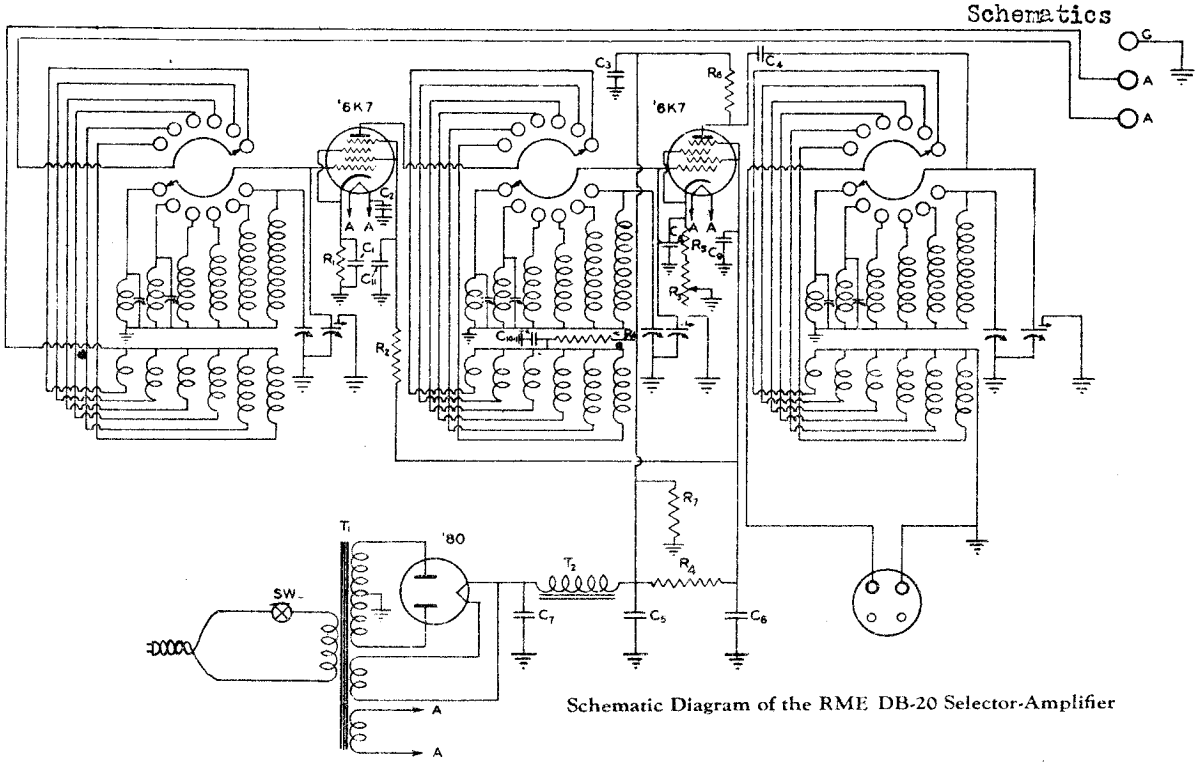

Tuning Drive Ratio..... 12 to 1

DRUM SHOWN WITH GANG AT MAXIMUM CAPACITY
*Arrangement of Drive Cords for Tuning Condenser and Dial Indicator*

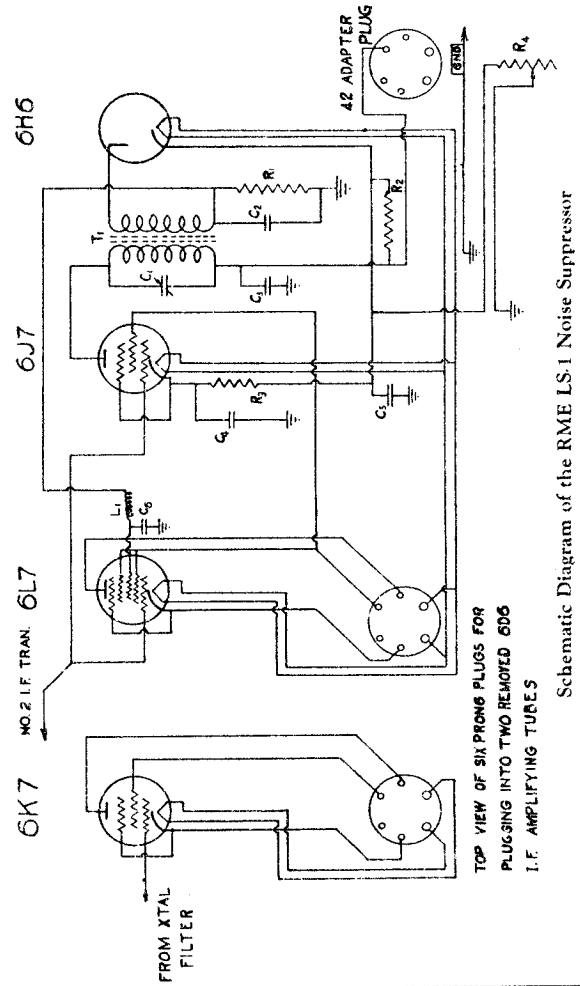
MODEL RME DB-20
Amplifier Schematic

# RADIO MFG. ENGINEERS, INC.

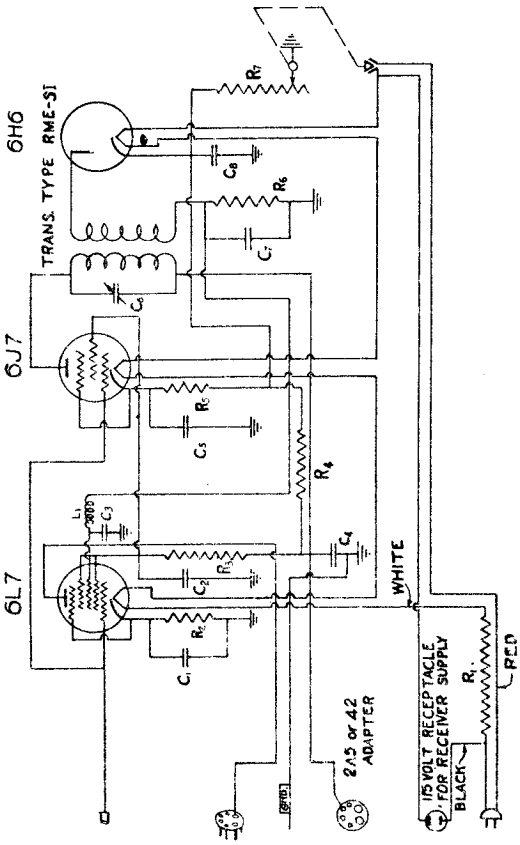
MODEL RME LS-1
MODEL RME LS-2
Noise Suppressors
Schematics




Schematic Diagram of the RME DB-20 Selector-Amplifier




Schematic Diagram of the RME LS-1 Noise Suppressor




Schematic Diagram of the RME LS-2 Noise Suppressor

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MODEL RME 69
Socket, Trimmers
Controls

## RADIO MFG. ENGINEERS, INC.

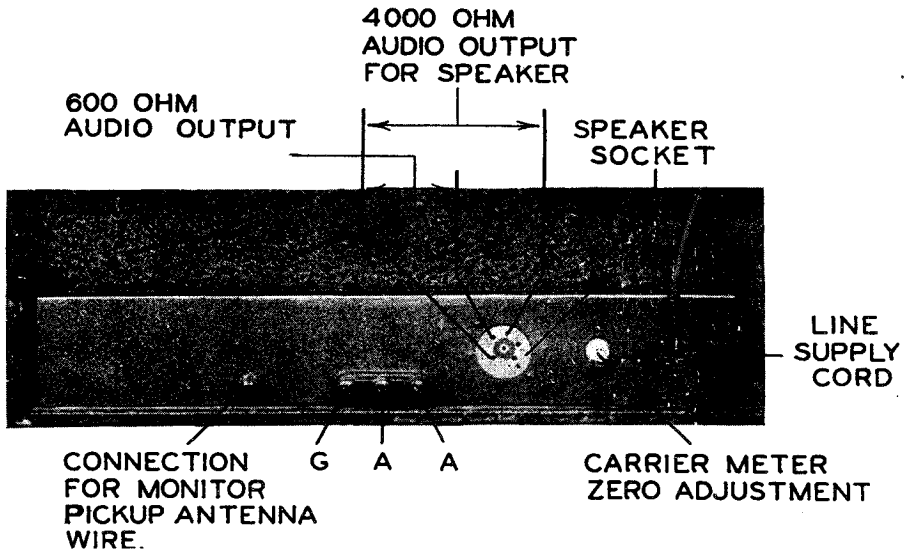


FIG. 3

FOR SCHEMATIC SEE VOLUME VII.

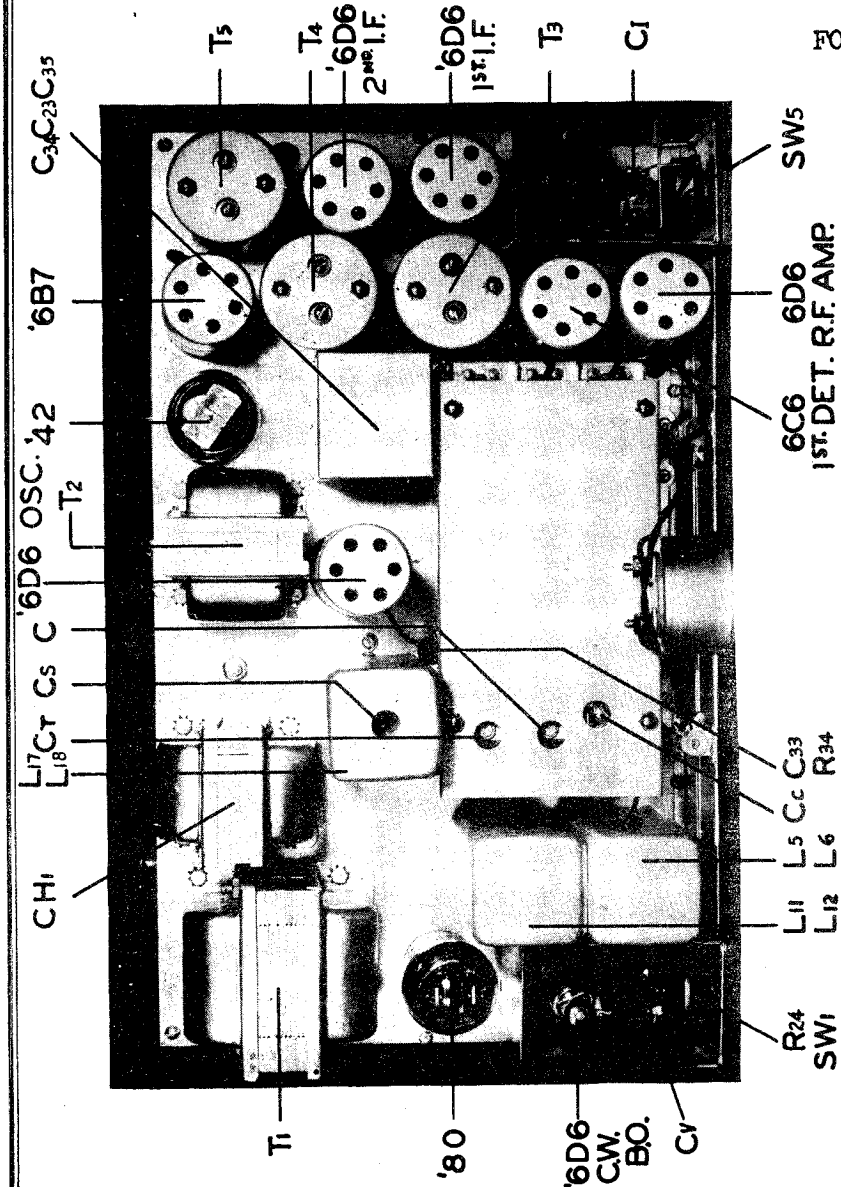


FIG. 4

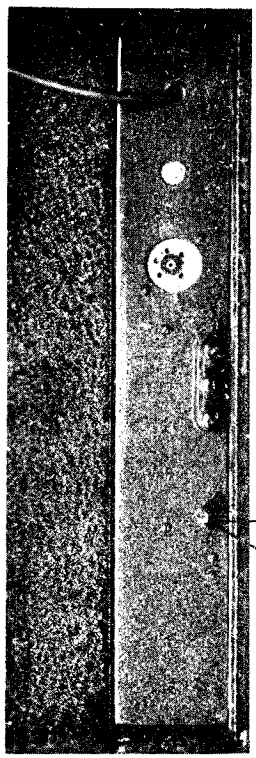

FIG. 6

SHORT ANT. WIRE FOR
PICKUP OF NEARBY TRANSMITTER

SMALL MONITOR TYPE OSCILLATOR
COVERING FREQ. RANGE OF TRANSMITTER

OSC. OUPUT

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RADIO MFG. ENGINEERS, INC.

MODEL RME 69
Chassis, Trimmers
Panel View

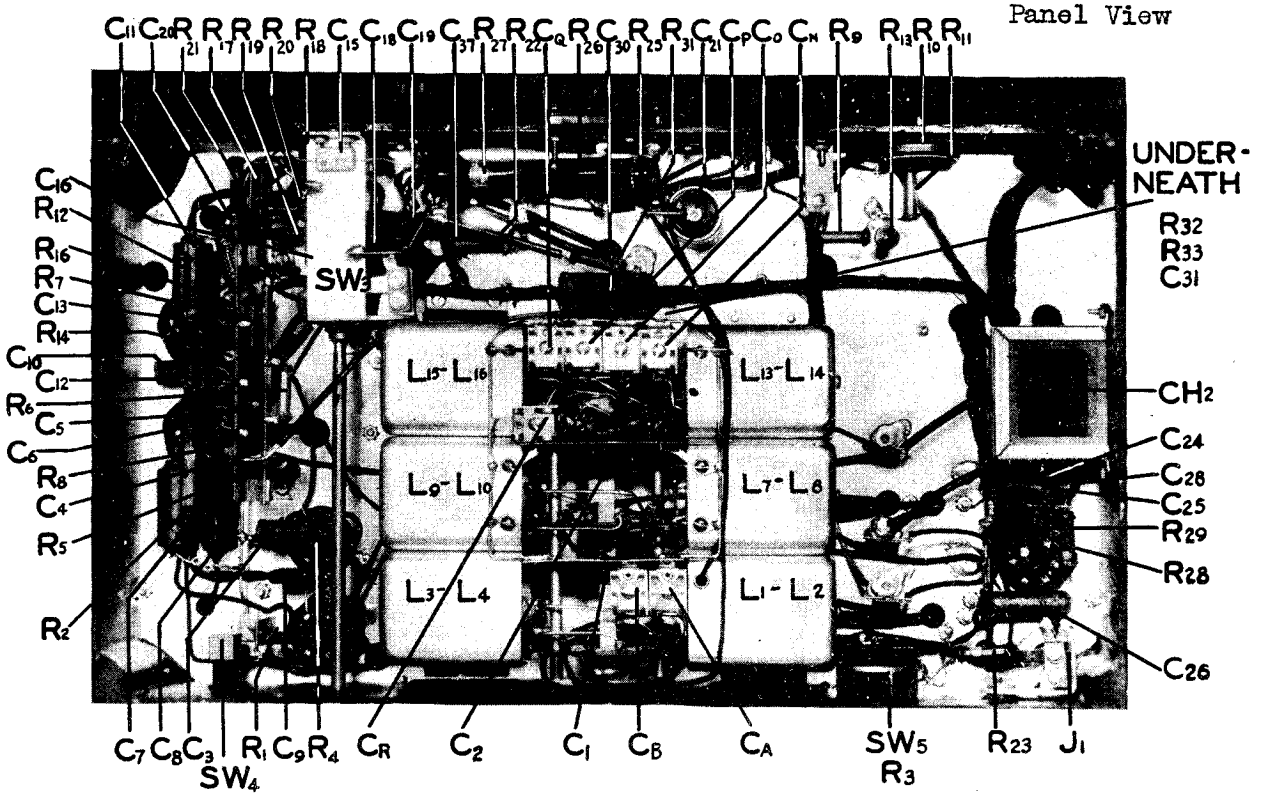


Fig. 11A

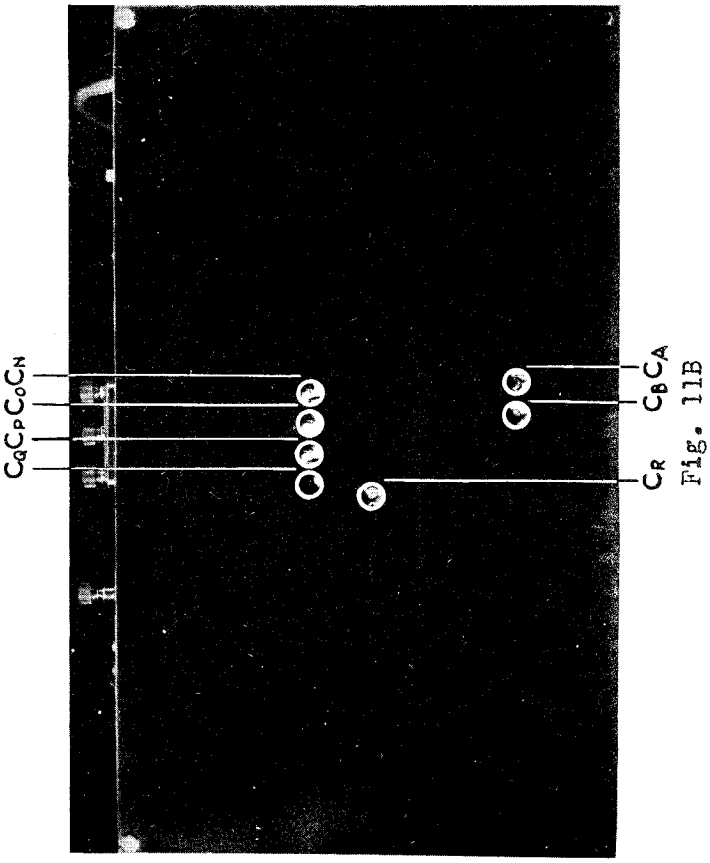


Fig. 11B

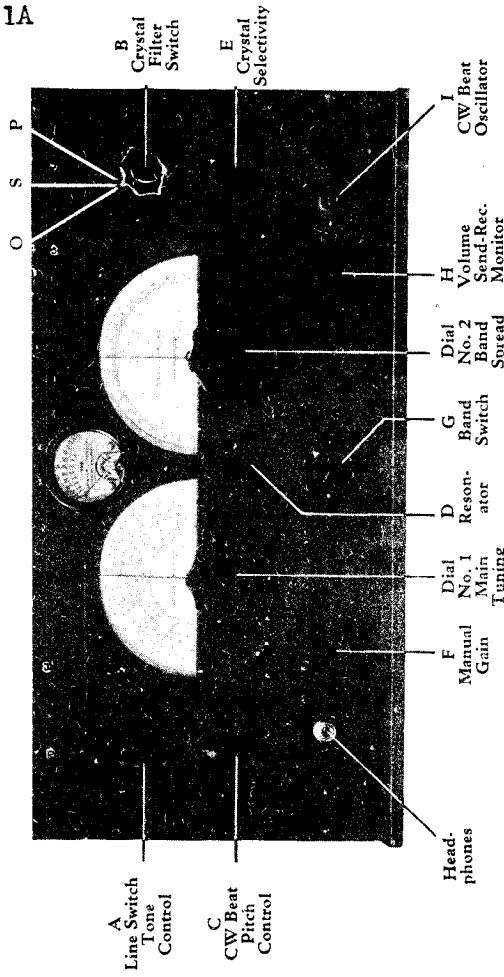


Fig. 2A. Front Panel Layout of the Standard RME-69, AC Model.

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SERVICE NOTES FOR THE
RME-69 RECEIVER

ALIGNMENT

One of the first evidences of misalignment in a receiver is low over-all gain of the receiver. In the RME-69 Receiver this is evidenced by low meter readings on signals which were formerly capable of producing higher meter readings. Due to the tremendous gain available in the audio system of the RME-69 Receiver, a misalignment due to loss of gain may not be noticed if the condition of the receiver is judged by audio output, since it may be possible to turn the volume control to the maximum output position and still obtain high values of audio output. Misalignment, however, does not affect the circuits of the audio amplifier and has solely to do with the intermediate frequency amplifier and, to some extent, the radio frequency amplifiers. Principal among the contributions to low gain is the part which the intermediate frequency amplifier plays in providing over-all sensitivity and selectivity of a satisfactory order.

Misalignment of the radio frequency section (principally that part of the section which is made up of the high frequency oscillator) is the control of the receiver calibration. This also is susceptible to certain outside influences which can cause variations to such a degree that the stated calibration of the receiver is changed to other values. However, this effect is not a common effect and usually the calibration of the receiver, unless tampered with by inexperienced hands, will remain very close to its stated value indefinitely.

This loss of gain when occurring in the radio frequency section of the receiver is usually due to the fact that the oscillator has been grossly misaligned so that it is apparent in the frequency calibration of the receiver. In other words, it might well be said that a loss of sensitivity in the receiver occurring simultaneously with a wide-spread condition of off calibration might indicate the fact that the loss of gain is caused by misalignment of the radio frequency section of the receiver.

On the other hand, if the gain of the receiver is low, but the calibration is correct, it might be said without hesitation that the most probable cause for the low gain is the misalignment of the intermediate frequency amplifiers relative to the trimming condensers of the intermediate frequency amplifier transformers.

It is for the purpose of realignment of these intermediate frequency transformers that the following test procedure is outlined. IMPORTANT NOTE. It is essential that the 465 KC intermediate signal which is used for realignment of the intermediate frequency amplifier is not set according to any arbitrary calibration on the test oscillator itself since it has been found that commercial test oscillators for service work vary considerably, at least to an extent which will not permit proper alignment of a communication type receiver in which is installed a quartz filter. It is therefore better if no test oscillator is had, since a broadcast station of constant signal strength will furnish adequate test signal for alignment of the intermediate frequency amplifier, using the quartz filter for establishing the proper IF frequency as indicated in the following procedure.

The meter on the RME-69 receiver affords an excellent method of indicating the peak alignment of each of the transformers. The location of the three intermediate frequency amplifier transformers, T-3, T-4, and T-5 is given on Figure 4 of the illustrated sheet attached. The two padding condensers located in each of these transformers and accessible through apertures in the top of the shields can also be seen.

OUTLINE OF PROCEDURE FOR CORRECT ALIGNMENT OF THE INTERMEDIATE FREQUENCY AMPLIFIER TRANSFORMERS OF THE RME-69 RECEIVER.

The intermediate frequency amplifiers in the RME-69 Receiver are designed for a frequency of 465 KC. Since these receivers are always supplied with a quartz crystal filter, it is essential that the intermediate frequency amplifier transformers be accurately aligned with the crystal frequency. Crystals are supplied in frequencies slightly at variance from the above stated value of intermediate frequency by an amount not greater than one kilocycle plus or minus 465 KC. Rather therefore than align the intermediate frequency amplifier stages of the RME-69 to a set frequency of 465, it is essential that the alignment be done in conjunction with the quartz filter so that alignment of the intermediate frequency amplifier is achieved at the frequency of the filter. This is done as follows and when the process as herein outlined is followed accurately, maximum results will be obtained. The use of any other process of a general type will produce inferior results.

The first step in the alignment procedure is to tune in a broadcast station, preferrably in the low frequency portion of the broadcast band. The signal should be one of medium signal strength so that the R meter indicates a signal level of R9 or slightly less. If no station of this amplitude is available but a stronger station is available, a reduction in the efficiency of the antenna by the connection of a short wire to the antenna post may help to bring the signal strength as indicated down to R9. Usually between 550 and 800 KC in most any territory a station can be received at most any time for this test and adjustment.

When the station has been chosen, let us assume that its frequency is 700 KC, the next step is to slightly detune the main tuning control so that the frequency reads approximately 715 or 720 KC. This of course will tune the station out. It does not necessarily have to be the frequency mentioned or the exact frequency of detune, but the general procedure is to tune the main tuning control slightly higher than the chosen station so that it may be brought back to resonance by decreasing the scale reading of the band-spread control. This is done merely to provide vernier tuning.

With the station chosen and resonated on the band-spread scale, the crystal filter is switched to the series position which is the middle position of the three available. The band-spread scale is then adjusted with respect to the signal so

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that a maximum meter reading is obtained. This procedure is one which requires patience and accuracy of adjustment since the receiver is ultra sharp with the crystal filter in and there will be one definitely sharp peak indicating crystal resonance. The receiver should be tuned to this peak and left on it during all adjustments to be made regarding the intermediate frequency amplifier.

When this peak has been tuned to and the meter is at maximum reading, a small standard intermediate frequency trimmer tool of the insulated screw-driver type should be used. Then the control "E", Figure 2A, should be set so that the condenser it adjusts is set at 50% mesh. Then, without particular attention to a course of procedure in tuning, any transformer may be adjusted at any particular time, the important factor being that they all be adjusted so that the R meter is brought to and left at a maximum meter reading. Usually this adjustment will not require very much turning of the adjustment screws. A good procedure to follow is to start with the No. 1 transformer and align in sequence No. 2 and No. 3. All adjustments should be made as before mentioned so that the meter reading is maximum.

It is advisable from time to time to make sure that the signal is still adjusted to peak resonance of the crystal by slightly varying the adjustment of the band-spread control. When this procedure has been completed as outlined and all transformers have been adjusted and left at maximum meter reading, the intermediate frequency amplifier of the receiver is in peak adjustment and the crystal aligned with it for maximum effectiveness in filter action.

### RME-69 RECEIVER INTERMEDIATE FREQUENCY AMPLIFIER ALIGNMENT WITH SILENCER INSTALLED

The general procedure for alignment of the intermediate frequency amplifier as described above also applies to receivers in which the LS-1 silencer has been installed. Preliminary adjustment as above described should be made with the silencer threshold control set at maximum clockwise position, of rotation. When the intermediate frequency transformers have been aligned as outlined, the silencer transformer may be peaked by turning the band switch to No. 6 band on the receiver and tuning in and resonating the frequency band around 30 megacycles so that the receiver is sensitive at that point. Then under conditions of automobile ignition interference the silencer control should be set to maximum counter-clockwise rotation position and the small screw accessible through the hole in the noise rectifier transformer located on the silencer auxiliary chassis should be adjusted for a minimum response, of the interference noise. This insures accurate alignment of the noise amplifying system with that of the intermediate frequency, a condition which must necessarily exist for efficient silencer action.

---

After the intermediate frequency amplifier has been aligned as per the instructions under the article concerning intermediate frequency transformer alignment, a check of the phasing of the crystal filter should be made. Tune in a broadcast station, preferrably on the low frequency end of Band 1. Then tune the main tuning control slightly to the high frequency side of it, say 10 KC or more higher in frequency than the selected station.

Then resonate the station again by means of the band-spread control. Next set the crystal switch to the series position as indicated on Figure 2A by the position "S" on control "B". Now vary the band-spread control as may be required to produce peak reading of the signal on the R meter by resonating with the crystal resonance peak.

With this setting achieved, vary the dial Number 1 slightly higher and slightly lower by five kilocycles as can be approximated by the calibration of the dial (one half division each way since one division is representative of 10 kilocycles) and notice the drop in the R meter reading. The drop so achieved by varying the setting of Dial 1 five kilocycles above and below the selected signal should be productive of an R meter drop of 40 db. or greater. In other words, if the signal when resonated produces an R meter reading of 60 db. on the R meter scale, setting the dial Number 1 five kilocycles higher in frequency than the frequency of the signal being used should make the R meter fall to 20 db. or less. Similarly, setting the dial Number 1 five kilocycles lower in frequency than the station being used, the R meter should again fall from 60 db. on the scale to 20 db. or less. Should it fail to do this, the phasing condenser (C-1, figure 4) should be adjusted and a test made as just described by five kilocycle above and below adjustment of Dial 1 until the proper variation in the R meter is achieved.

It will be found that the condenser C-1 will usually run at a very low value of capacity, very close to its minimum capacity adjustment. Therefore only slight turning of this condenser will be productive of changes which materially affect the attenuation of the crystal filter. It is usually found that this condenser is not required to be adjusted since it holds its setting very well over long periods of time. The procedure just outlined gives the proper method for checking the phasing and adjusting when necessary.

### ALIGNMENT OF RADIO FREQUENCY SECTION OF THE RME-69 RECEIVER

Alignment of the radio frequency section of the receiver will affect principally the calibration of the receiver. Within certain limits this of course will also affect the sensitivity. A small variation in frequency (up to 2%) will not materially reduce the sensitivity of the receiver although they of course will show up as variations in the calibration as indicated by the required setting of the main tuning dial indicator. Correction for any variation in calibration can be made by following the suggestions outlined below.

Band 1 includes the frequencies between 550 and 1500 KC. For band one there are two frequency adjustments for adjusting the indicator to proper calibration. One of these, $C_s$, is adjusted as indicated on Figure 4 through the top of the shield can just in the rear of the main tuning condenser assembly. Just in front of this aperture and on the main tuning condenser assembly is $C_t$ which is used to adjust the

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frequency for the high frequency end of Band 1. The procedure is this: Put the main tuning indicator to a position so that the main tuning condensers are fully meshed. The pointer of the main tuning control should then be set at maximum left end of scale so that the pointer falls just below the line above the numbers indicating the various channels. In this respect it will partially cover the top half of the numerals indicating the different tuning bands on this scale. In other words, the line which borders the semi-circular scale at the extreme counter-clockwise position should rest on the top edge of the pointer as it is turned to maximum counter-clockwise rotation and the condenser plates are at full mesh.

The next step is to choose a station or a signal of accurately known frequency, around 700 KC, and set the main indicator to the frequency of the signal which is going to be used for the test. For example: There is a station available with fairly good signal strength or a test oscillator is available which can ACCURATELY be set at 700 KC. If the receiver indicator on the main tuning dial is set at 700, and the receiver is considerably out of calibration of course the signal will not be received. However, leave the indicator at the correct frequency of the signal being used for the test and set the band-spread control to a reading of 180 on the dial at which position it has no material effect on the tuning circuits of the receiver and permits the calibration of the main tuning dial to indicate accurately the frequency of setting.

Then by means of condenser $C_s$ (Figure 4) accessible through the trimming hole in the oscillator shield can for Band 1, adjust until the signal is brought in with the pointer set at the proper frequency. Then choose a signal at about 1200 or 1300 kilocycles, and set the main tuning dial indicator to the correct frequency for that signal and bring the signal in on that setting with trimmer $C_t$. It will then be necessary to return to the former frequency setting of 700 KC to make sure that the variation of $C_t$ has not made some slight change in the setting for the lower frequency calibration point and it may be necessary to readjust $C_s$ slightly again. Then in order to make certain of the accuracy of both settings return to the frequency chosen between 1200 and 1300 KC and if necessary, slightly readjust $C_t$ again. After several checks on each frequency, it will be found that the calibration can be made satisfactorily.

Calibrations on the higher frequency bands are controlled for Bands 2, 3, 4, 5, and 6 by the trimmers $C_r$, $C_q$, $C_p$, $C_o$, $C_n$, (Figure 11-B) respectively. High side beat is used on all frequencies in the RME-69 Receiver which means that all of the condensers $C_r$, $C_q$, $C_p$, $C_o$, $C_n$, must be set to the lowest capacity setting which will provide a beat and the proper calibration for the frequencies in the respective bands. Calibration frequencies used are as follows:

Band 2: 2 megacycles and 3 megacycles.
Band 3: 4 megacycles, 5 megacycles, 6 megacycles.
Band 4: 7 megacycles, 9 megacycles, 11 megacycles, 13 megacycles.
Band 5: 14 megacycles, 15 megacycles, 17 megacycles.
Band 6: 30 megacycles.

After the calibration has been made accurately on all of the frequencies, or if the receiver has been found to be accurately set insofar as its calibration is concerned on all frequencies, the trimmers $C_b$ and $C_a$ have a distinct effect upon the RF grid circuits for bands 5 and 6 respectively. They are adjusted as follows: With a steady incoming signal on between 14 and 15 megacycles and the most effective setting of the control "D" for signal in that region, and with the antenna connected, the condenser $C_b$ is adjusted for maximum meter reading. With these same conditions existing on 30 megacycles, with the band switch set on band 6 and the antenna connected, $C_a$ is adjusted for maximum response on a given steady signal. All other trimming and adjusting is done manually by means of control "D", Figure 2-A, and is a variable RF amplifier and detector grid padder which can be critically adjusted for peak resonance at any frequency it is desired to tune to.

It is of importance to note the setting of the condenser $C_c$ (Figure 4). This is the antenna coupling condenser used when the receiver is set to Band 1. It as well as condenser "C" (Figure 4) should be set to practically its minimum capacity in order to provide constant alignment and proper coupling to the antenna when using Band 1. Excessive capacity in the condenser $C_c$ will cause misalignment of the RF amplifier and hence promiscuous beating of harmonically related broadcast frequencies to the effect that a number of whistling tones will be received on the high frequency end of the broadcast band. Excessive capacity on C will somewhat contribute to the same result but will, more than that, reduce the sensitivity on the broadcast band. When the receiver leaves the factory, they are set at a very small capacity and should not be set at any other capacity or material reduction in the efficiency of operation will be produced.

Whenever the receiver is gone over for alignment, it is well to remove the dust cover from the condenser assembly and inspect the permanence of position of the rotor plates of the ganged condenser controlled by the knob "D". This is located between the two main variable condensers and is located underneath the dust cover which is removable by unscrewing the four acorn nuts holding it down on the condenser assembly. Some times the rotors become loosened-and misplaced angularly with respect to each other. They should always be adjusted so that the rotors are at full mesh at the same time. Any slight angular displacement of one rotor with respect to the other will materially reduce the sensitivity of the receiver and destroy the preselection, thereby reducing the image frequency rejection and also the sensitivity, especially on the high frequency bands.

The padders $C_b$ and $C_a$ (Figure 11-B) materially contribute to the image signal rejection on the bands 5 and 6. Special care should therefore be taken in the adjustment of these condensers when the receiver is aligned.

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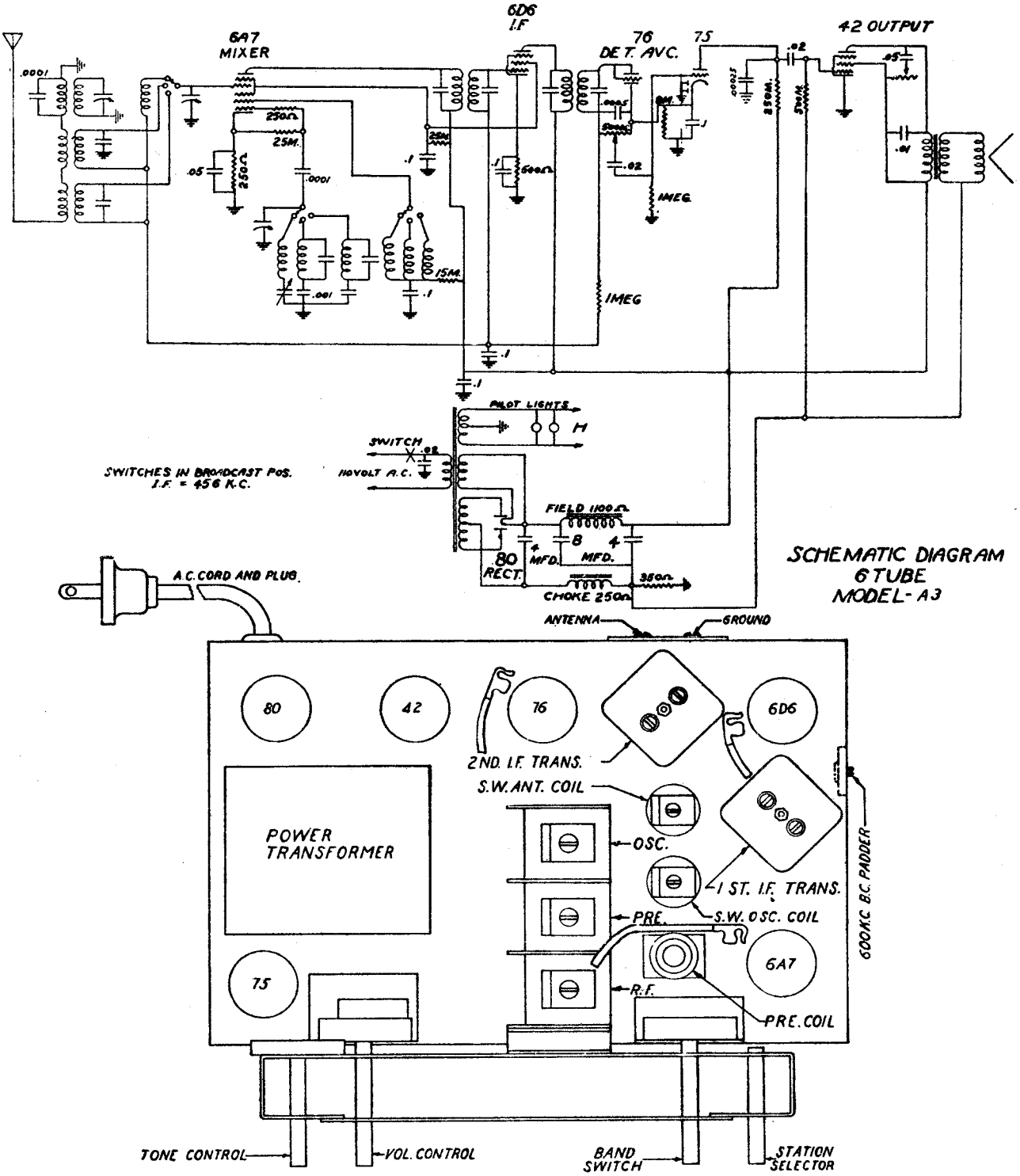
# RADIO PRODUCTS CORP.

MODEL A3
Schematic, Socket
Trimmers, Alignment




CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOLUME VIII.

FREQUENCY RANGES AND ALIGNMENT FREQUENCIES;-

BROADCAST - 540 to 1700 KC - Adjust the OSC, RF and ANT. to maximum peak of 1400 KC, then pad the oscillator circuit at 600 KC while rocking gang condenser.
SHORT WAVE - 5800 to 15200 KC - Adjust the OSC and ANT. trimmers to maximum peak of 14000 KC. No padding required.
POLICE - 1700 to 5000 KC - Adjust the ANT. coil trimmer to a maximum peak of 4000 KC. No other adjustments are required.

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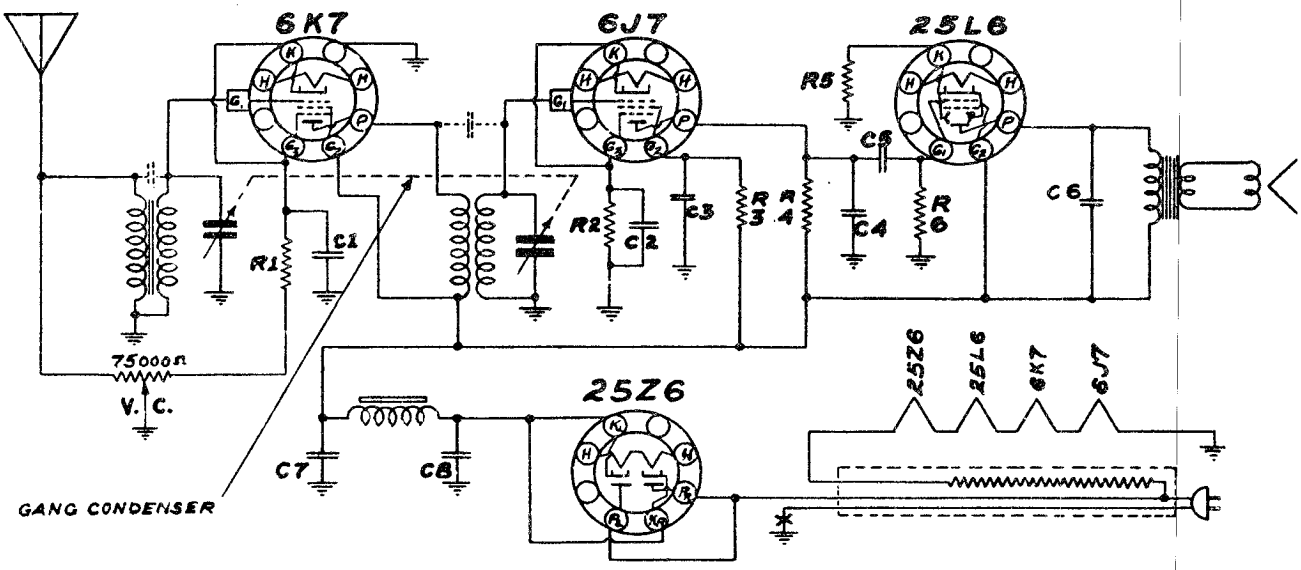
MODEL 4H
Schematic, Socket
Trimmers, Alignment

# RADIO PRODUCTS CORP.




## CAPACITORS

| Nº | MFD. | TYPE | Nº | MFD. | TYPE |
|---|---|---|---|---|---|
| C1 | .1 | 200V. | C5 | .01 | 400V. |
| C2 | .25 | 200V. | C6 | .02 | 400V. |
| C3 | .1 | 200V. | C7 | 10.0 } | ELECT. |
| C4 | .00025 | MICA | C8 | 30.0 } | |

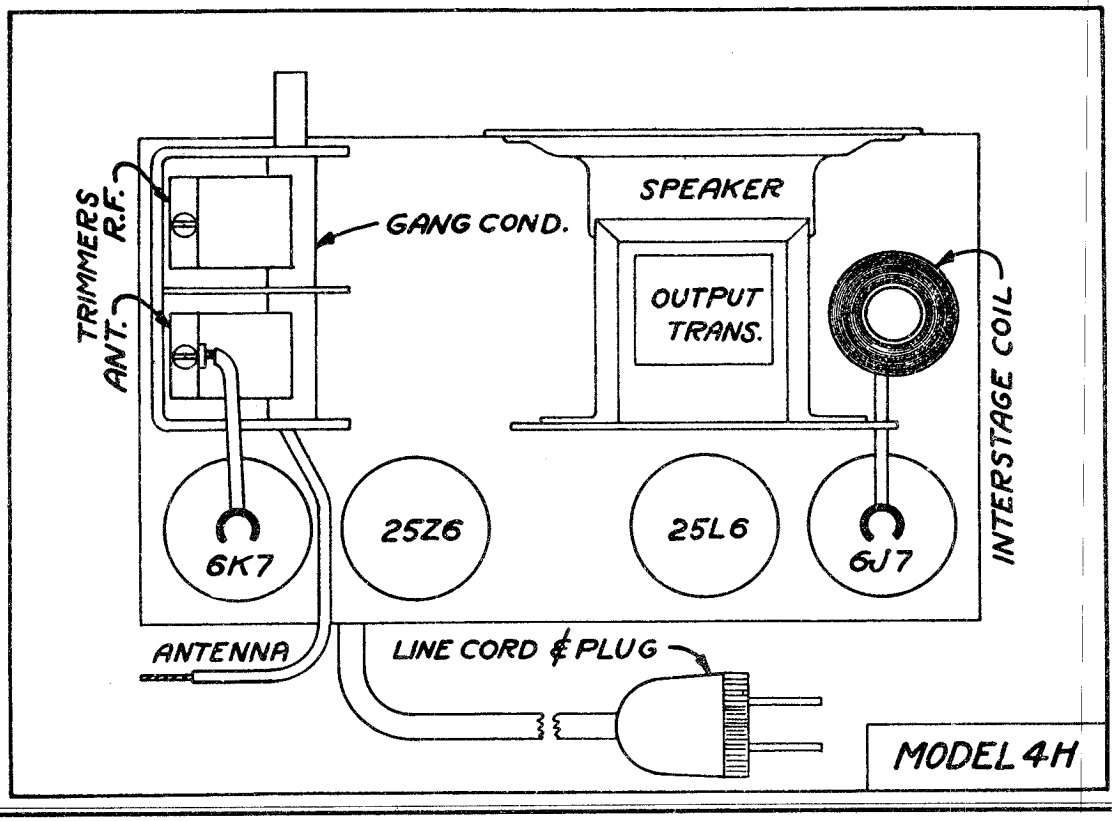
## RESISTORS

| Nº | OHMS | WATTS | Nº | OHMS | WATTS |
|---|---|---|---|---|---|
| R1 | 250 | 1/4 | R4 | 500,000 | 1/4 |
| R2 | 25,000 | 1/4 | R5 | 110 | 1/2 |
| R3 | 2,000,000 | 1/4 | R6 | 500,000 | 1/4 |

RESISTANCE OF LINE CORD 173 OHMS

SCHEMATIC DIAGRAM
MODEL 4H

4 TUBE T.R.F. RECEIVER, RANGE 535-1730 KILOCYCLES.
POWER SUPPLY: AC(60 CYCLE) OR DC, 105-125 VOLTS.
CAUTION: DO NOT USE A GROUND ON THIS RECEIVER.
ALIGN AT 1400 KC THROUGH 100 MMF. CONDENSER.

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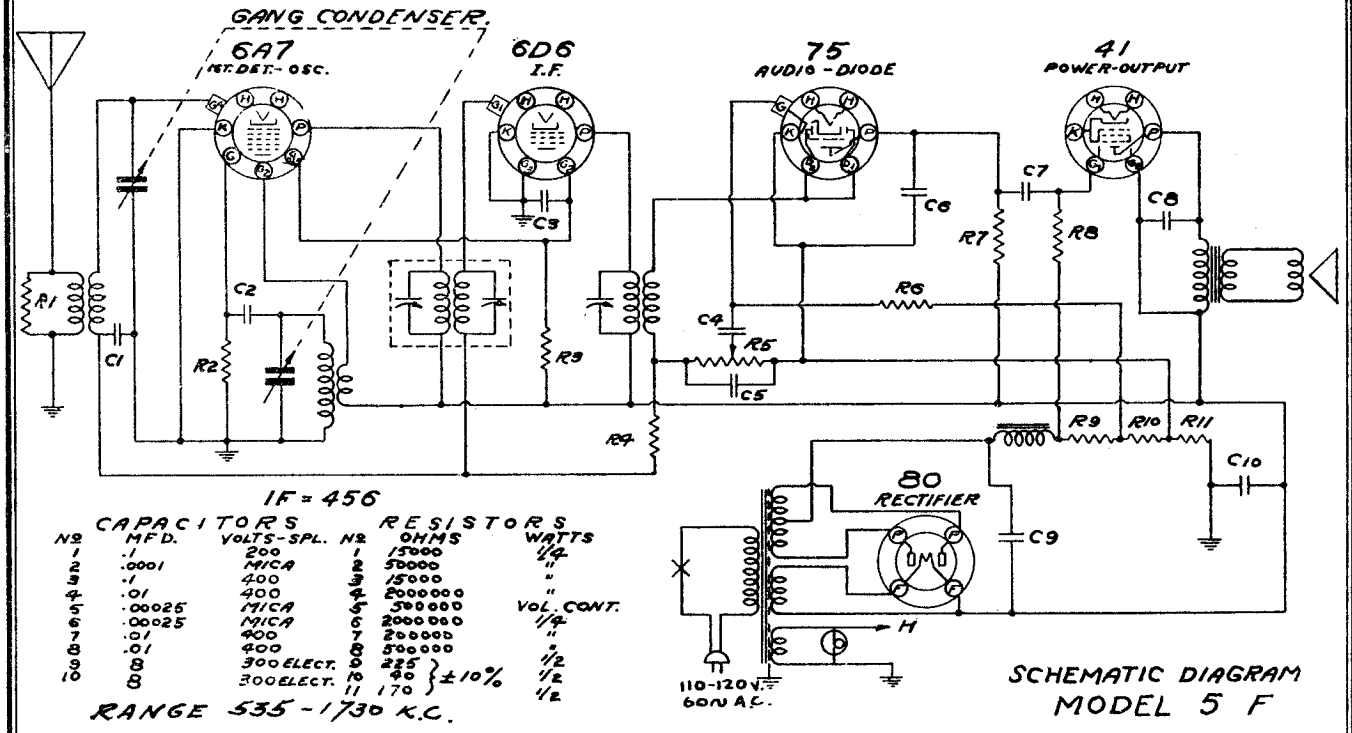
# RADIO PRODUCTS CORP.

MODEL 5F
Schematic
Alignment
MODEL 5G
Schematic




IF = 456

CAPACITORS

| No. | MFD. | VOLTS-SPL. |
|---|---|---|
| 1 | .1 | 200 |
| 2 | .0001 | MICA |
| 3 | .1 | 400 |
| 4 | .01 | 400 |
| 5 | .00025 | MICA |
| 6 | .00025 | MICA |
| 7 | .01 | 400 |
| 8 | .01 | 400 |
| 9 | 8 | 300 ELECT. |
| 10 | 8 | 300 ELECT. |

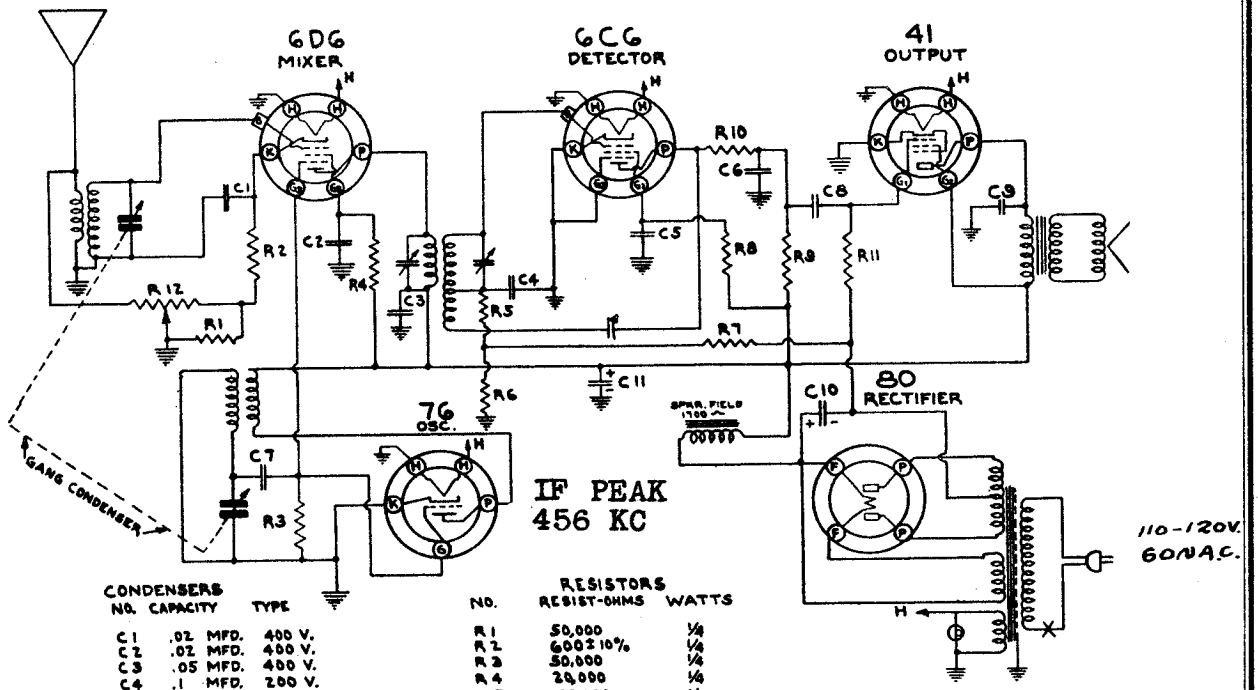
RESISTORS

| No. | OHMS | WATTS |
|---|---|---|
| 1 | 15000 | 1/4 |
| 2 | 50000 | " |
| 3 | 15000 | " |
| 4 | 2000000 | " |
| 5 | 500000 | VOL. CONT. |
| 6 | 2000000 | 1/4 |
| 7 | 200000 | " |
| 8 | 500000 | " |
| 9 | 225 ±10% | 1/2 |
| 10 | 90 ±10% | 1/2 |
| 11 | 170 ±10% | 1/2 |

RANGE 535 - 1730 K.C.

SCHEMATIC DIAGRAM
MODEL 5 F

FOR ALIGNMENT OF MODEL 5F, SEE THAT FOR MODEL 4A, PAGE 9-1




CONDENSERS

| No. | Capacity | Type | |
|---|---|---|---|
| C1 | .02 | MFD. | 400 V. |
| C2 | .02 | MFD. | 400 V. |
| C3 | .05 | MFD. | 400 V. |
| C4 | .1 | MFD. | 200 V. |
| C5 | .01 | MFD. | 400 V. |
| C6 | .0005 | MFD. | MICA |
| C7 | .0001 | MFD. | MICA |
| C8 | .01 | MFD. | 400 V. |
| C9 | .002 | MFD. | 400 V. |
| C10 | 8.0 | MFD. | 300 V. ELECTROLYTIC |
| C11 | 8.0 | MFD. | 300 V. ELECTROLYTIC |

RESISTORS

| No. | Resist-Ohms | Watts | |
|---|---|---|---|
| R1 | 50,000 | 1/4 | |
| R2 | 600 ± 10% | 1/4 | |
| R3 | 50,000 | 1/4 | |
| R4 | 20,000 | 1/4 | |
| R5 | 1,000,000 | 1/4 | |
| R6 | 50 ± 10% | 1/4 | |
| R7 | 300 ± 10% | 1/4 | |
| R8 | 2,000,000 | 1/4 | |
| R9 | 500,000 | 1/4 | |
| R10 | 5,000 | 1/4 | |
| R11 | 500,000 | 1/4 | |
| R12 | 50,000 | VOL. CONTROL | |

SCHEMATIC DIAGRAM
MODEL 5 G

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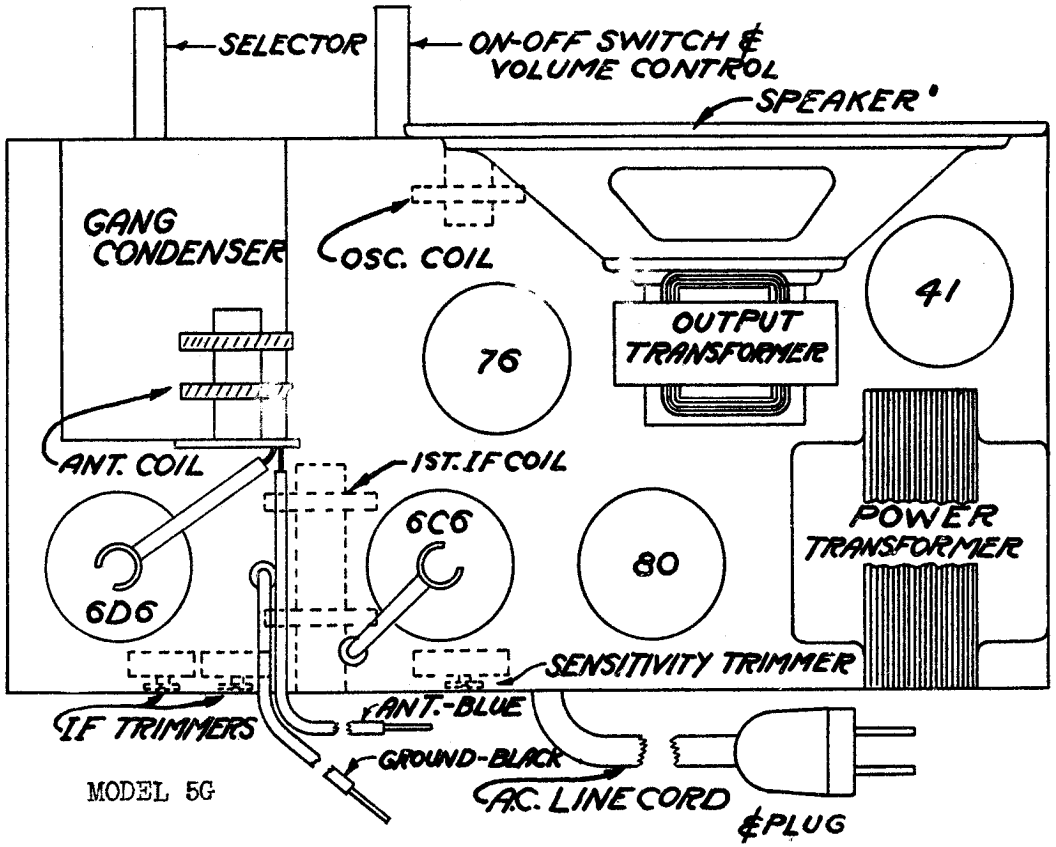


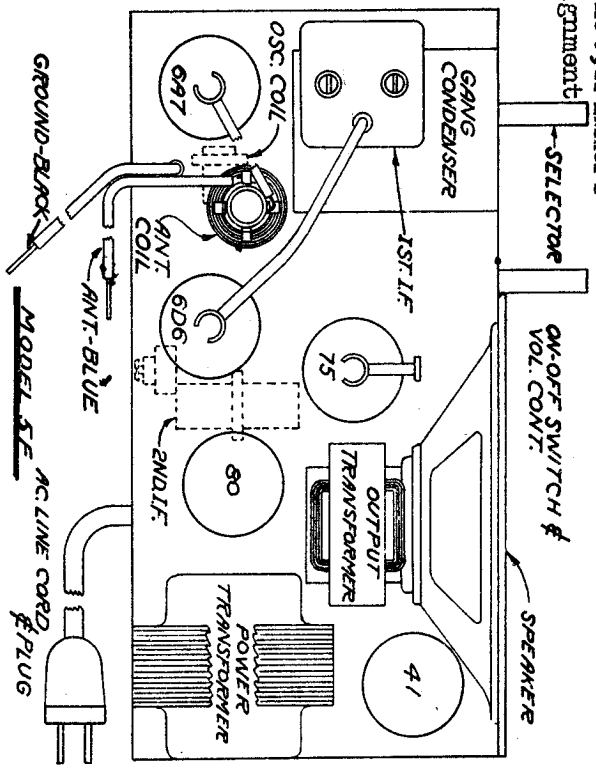


## ALIGNMENT DATA AND SERVICING

Connect the signal generator through a .1 mfd. condenser to the grid of the 6D6 tube. Connect an output meter across the voice coil of the speaker. Set the generator to 456 K.C. and align the I.F. transformer for maximum reading on the output meter. Set the sensitivity control about ¼ turn counter-clockwise from the point where the whistles start and re-align the I.F.

Feed the generator through a 100 mmf. condenser to the antenna lead of the receiver. Set the generator to 1400 K.C. Turn the dial of the radio to 1400 K.C. Align the oscillator and antenna trimmers on the gang condenser for maximum output on the meter.

## ADJUSTMENT OF SENSITIVITY CONTROL

The sensitivity control is accessible from the rear of the cabinet, (see layout) and takes the form of a trimmer condenser, which may be adjusted with a small screw driver or knife blade. This control is adjusted at the factory to give normal sensitivity for a set of this type; and in most locations there will be no need for re-adjustment. However, in rural areas where signal strength is low, the gain of the receiver can be increased by three or four times by turning the trimmer in the following manner:

1. Tune in a station.
2. Increase sensitivity by turning trimmer in a clockwise direction until the station signal is distorted by a whistle.
3. Turn trimmer slowly counter-clockwise until whistle ceases. This is the point of maximum sensitivity.
4. Tune in several stations. If some of these signals still whistle, the sensitivity must be again retarded slightly.

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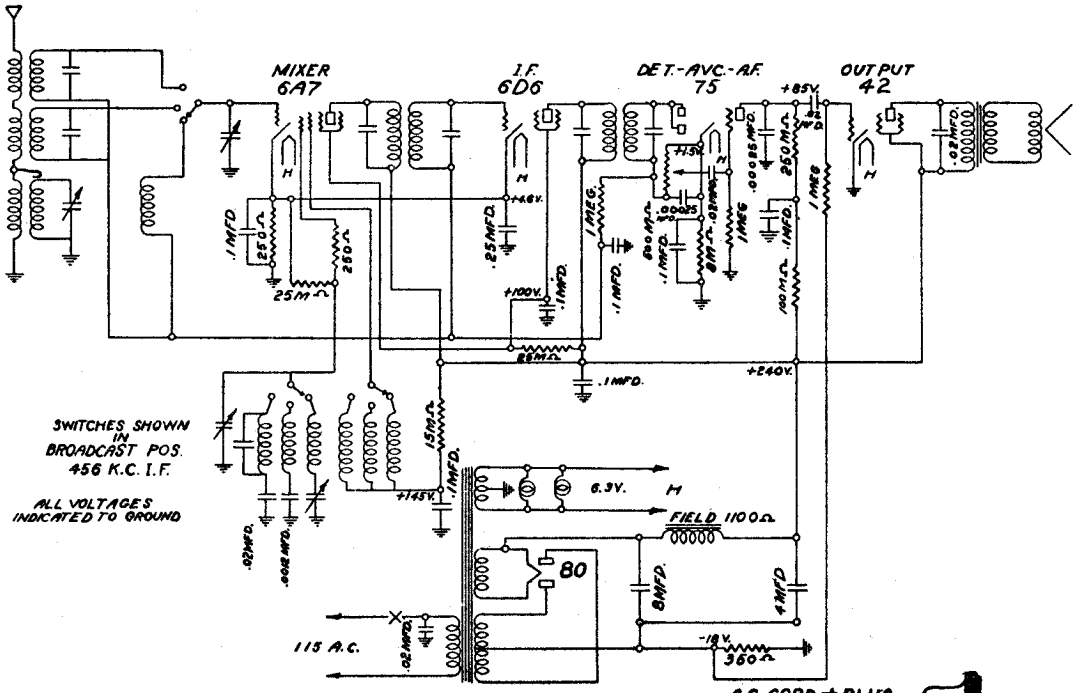
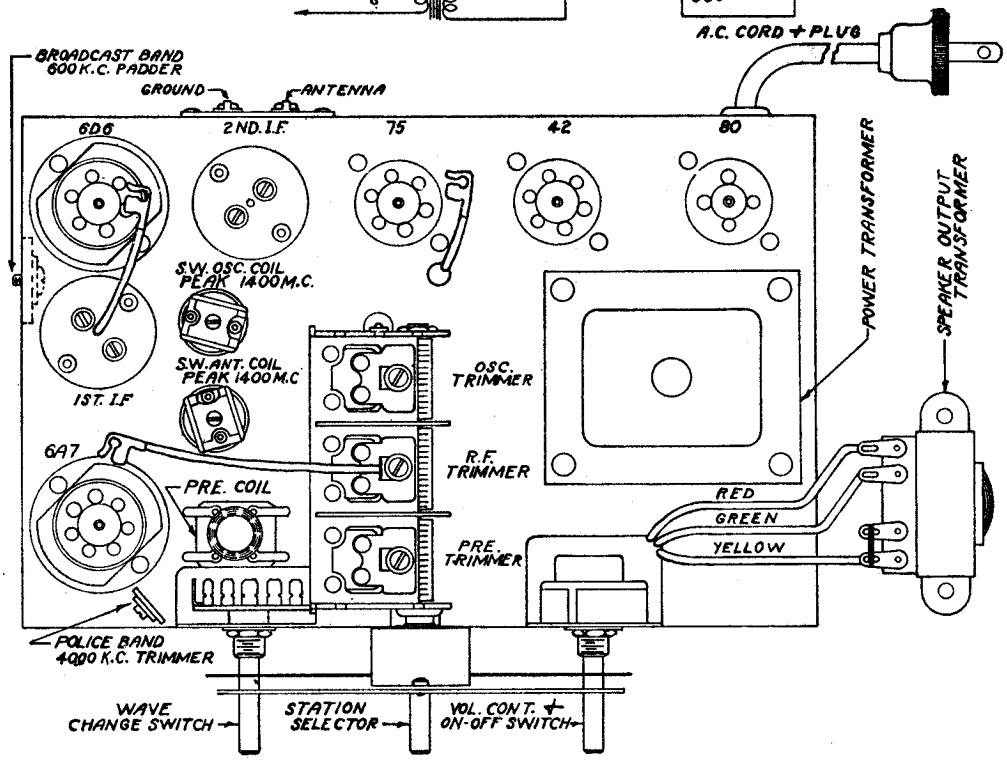
# RADIO PRODUCTS CORP.

MODEL X8
Schematic, Voltage, Socket
Trimmers, Alignment




CONVENTIONAL ALIGNMENT - SEE THE SPECIAL SECTION VOL. VIII

FREQUENCY RANGES - BROADCAST - 540 to 1700 KC - Adjust the OSC, RF and ANT trimmers to a maximum peak of 1400 KC, then pad the Oscillator circuit at 600 KC while rocking gang condenser.

SHORTWAVE - 5800 to 15200 KC - Adjust the OSC and ANT trimmers to a maximum peak of 14000 KC. No padding required.

POLICE - 1700 to 5000 KC - Adjust the ANT coil trimmer to a maximum peak of 4000 KC. No other adjustments required.

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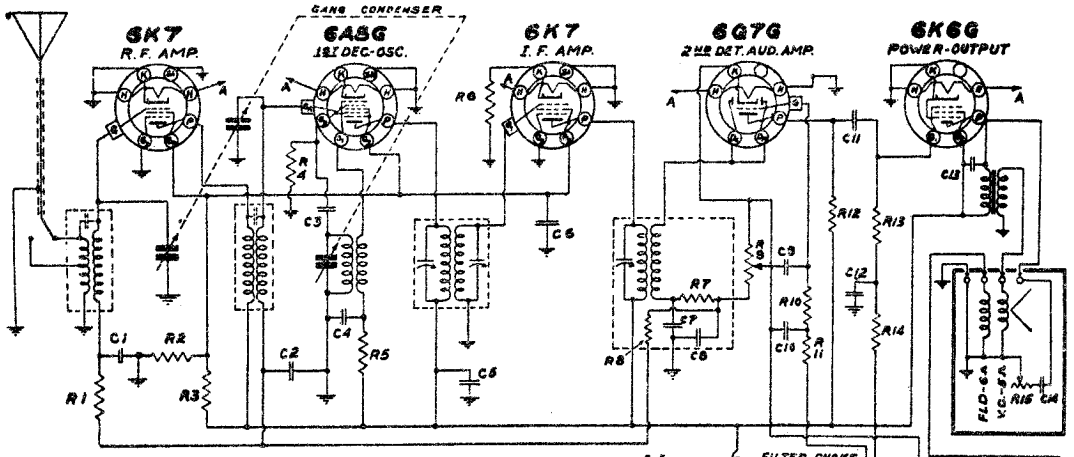
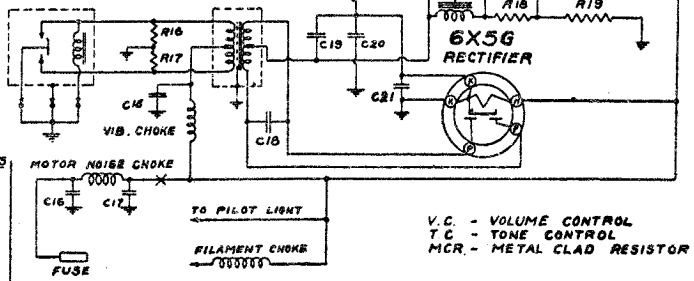
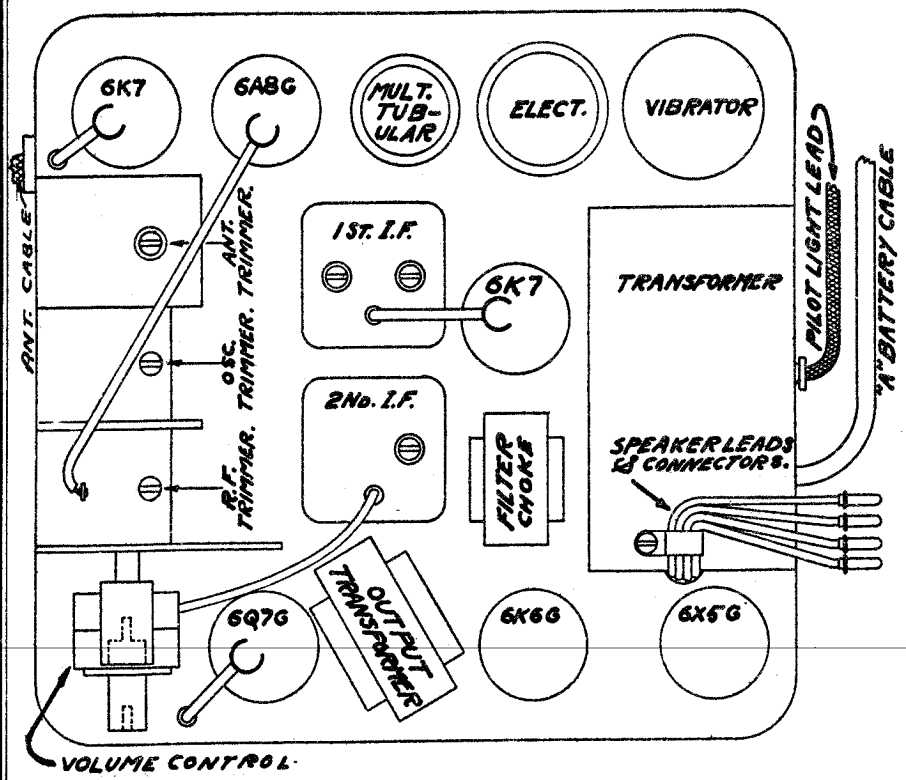
R.F. ALIGNMENT. Adjust the test oscillator to 1550 K.C. and connect the output to the antenna through a .00005 mfd. mica condenser to give the equivalent of a low capacity average auto antenna. When this adjustment is made, the signal must be introduced into the receiver through the shielded lead supplied with the receiver. The plug should be inserted to conform with the "Low Capacity" position. (See Figure 1 ). Set the gang condenser to minimum and adjust the ascillator trimmer to peak. (Center section of gang condenser). The next step is to set the test oscillator and receiver to 1400 K.C. and adjust the front and rear trimmers of the gang condenser to peak. The rear section of the gang condenser tunes the antenna amplifier stage (6K7 tube), and the front condenser section tunes the detector grid coil of the 6A8G tube.




IF PEAK 175 KC

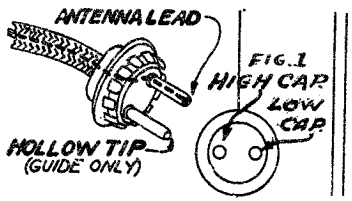


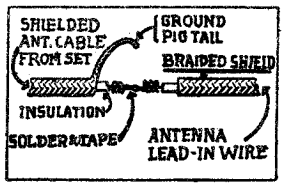

SCHEMATIC DIAGRAM
MODEL 69




| RESISTORS | | |
|---|---|---|
| NO | OHMS | WATTS |
| 1 | 200,000 | ¼ |
| 2 | 25,000 | ½ |
| 3 | 25,000 | 1 |
| 4 | 50,000 | ¼ |
| 5 | 15,000 | ½ |
| 6 | 1,000 | ¼ |
| 7 | 50,000 | ¼ |
| 8 | 1,000,000 | ¼ |
| 9 | 500,000 | V.C. |
| 10 | 2,000,000 | ¼ |
| 11 | 500,000 | ¼ |
| 12 | 200,000 | ½ |
| 13 | 500,000 | ¼ |
| 14 | 100,000 | ¼ |
| 15 | 100,000 | T.C |
| 16 | 50 | 1 |
| 17 | 50 | 1 |
| 18 | 30 | MCR |
| 19 | 50 | |

| CONDENSERS | | |
|---|---|---|
| NO | CAP-MFD | WKG V |
| 1 | .05 | 200 |
| 2 | .05 | 200 |
| 3 | .0001 | MICA |
| 4 | .1 | 400 |
| 5 | .1 | 400 |
| 6 | .1 | 200 |
| 7 | .00025 | MICA |
| 8 | .00025 | MICA |
| 9 | .61 | 400 |
| 10 | .1 | 200 |
| 11 | .01 | 400 |
| 12 | .25 | 200 |
| 13 | .005 | 600 |
| 14 | .05 | 400 |
| 15 | .5 | 50 |
| 16 | .002 | MICA |
| 17 | 002 | MICA |
| 18 | .0075 | 1600 |
| 19 | 6.0 (ELECT) | 350 |
| 20 | 8.0 (ELECT) | 350 |
| 21 | .01 | 400 |

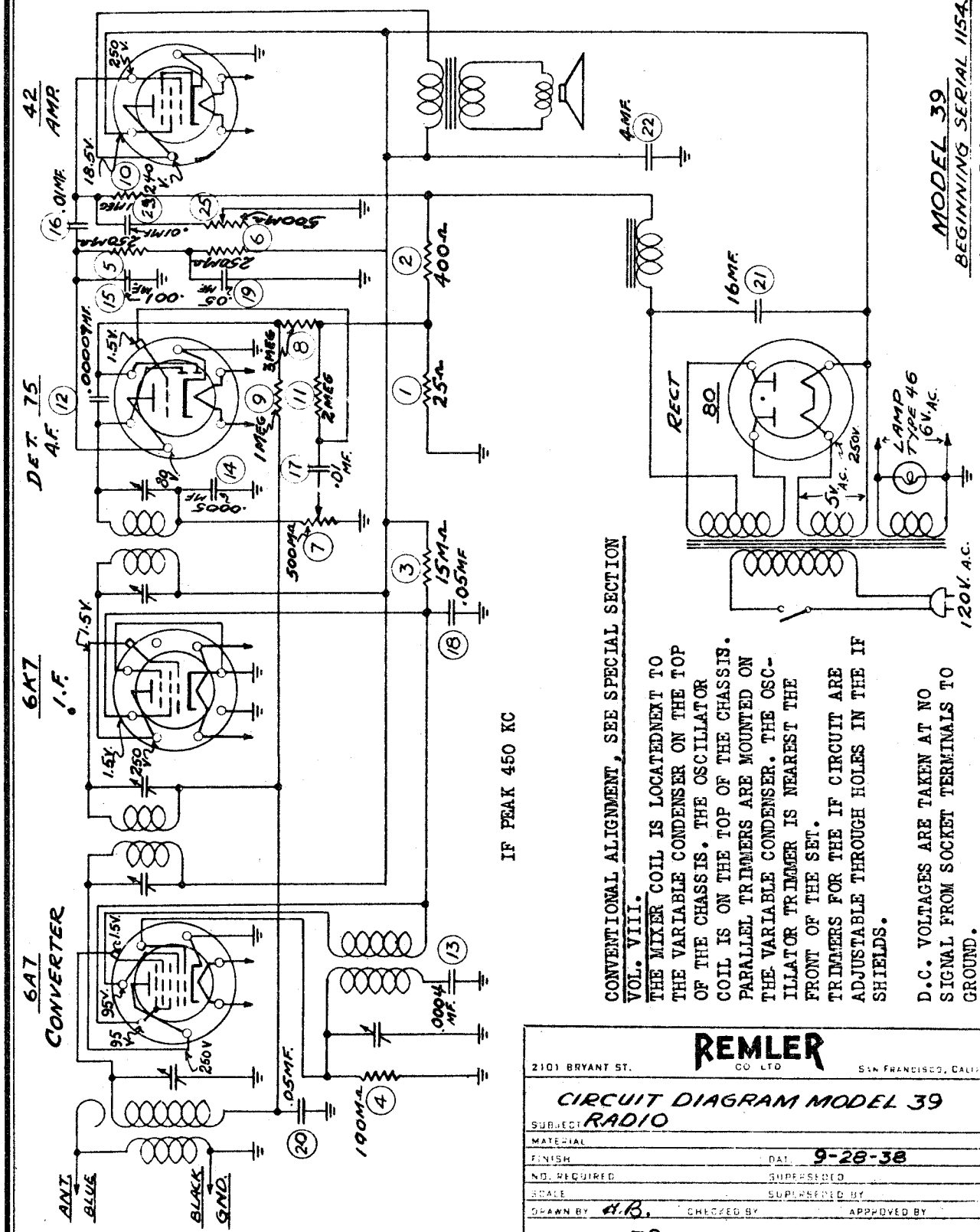



I.F. ALIGNMENT. Adjust the test oscillator to 175 K.C. and connect the output to the grid of the first detector tube, 6A8G, through a .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

REMLER COMPANY, LTD.

MODEL 39, Above Ser. 115439
Schematic, Voltage
Alignment




CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.

THE MIXER COIL IS LOCATEDNEXT TO THE VARIABLE CONDENSER ON THE TOP OF THE CHASSIS. THE OSCILLATOR COIL IS ON THE TOP OF THE CHASSIS. PARALLEL TRIMMERS ARE MOUNTED ON THE VARIABLE CONDENSER. THE OSCILLATOR TRIMMER IS NEAREST THE FRONT OF THE SET. TRIMMERS FOR THE IF CIRCUIT ARE ADJUSTABLE THROUGH HOLES IN THE IF SHIELDS.

D.C. VOLTAGES ARE TAKEN AT NO SIGNAL FROM SOCKET TERMINALS TO GROUND.

REMLER CO. LTD.
2101 BRYANT ST. SAN FRANCISCO, CALIF.

CIRCUIT DIAGRAM MODEL 39

SUBJECT RADIO
MATERIAL
FINISH DAT. 9-28-38
NO. REQUIRED SUPERSEDED
SCALE SUPERSEDED BY
DRAWN BY A.B. CHECKED BY APPROVED BY

MOD. 39 DWG. NO.

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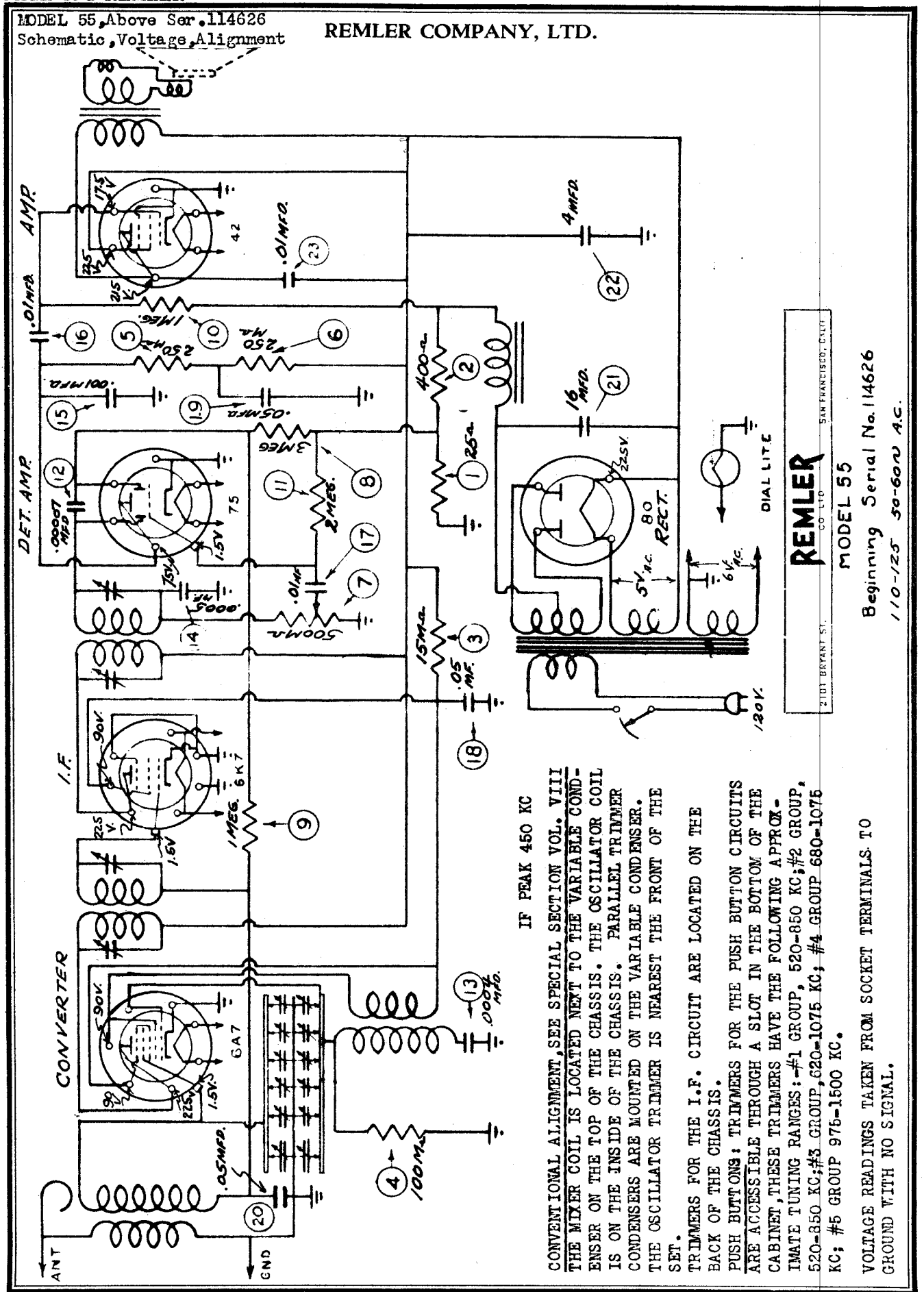
MODEL 55, Above Ser. 114626
Schematic, Voltage, Alignment

REMLER COMPANY, LTD.




IF PEAK 450 KC

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII
THE MIXER COIL IS LOCATED NEXT TO THE VARIABLE CONDENSER ON THE TOP OF THE CHASSIS. THE OSCILLATOR COIL IS ON THE INSIDE OF THE CHASSIS. PARALLEL TRIMMER CONDENSERS ARE MOUNTED ON THE VARIABLE CONDENSER. THE OSCILLATOR TRIMMER IS NEAREST THE FRONT OF THE SET.
TRIMMERS FOR THE I.F. CIRCUIT ARE LOCATED ON THE BACK OF THE CHASSIS.
PUSH BUTTONS: TRIMMERS FOR THE PUSH BUTTON CIRCUITS ARE ACCESSIBLE THROUGH A SLOT IN THE BOTTOM OF THE CABINET, THESE TRIMMERS HAVE THE FOLLOWING APPROXIMATE TUNING RANGES:-#1 GROUP, 520-850 KC; #2 GROUP, 520-850 KC; #3 GROUP, 620-1075 KC; #4 GROUP 680-1075 KC; #5 GROUP 975-1500 KC.

VOLTAGE READINGS TAKEN FROM SOCKET TERMINALS TO GROUND WITH NO SIGNAL.

MODEL 55
Beginning Serial No. 114626
110-125 50-60 A.C.

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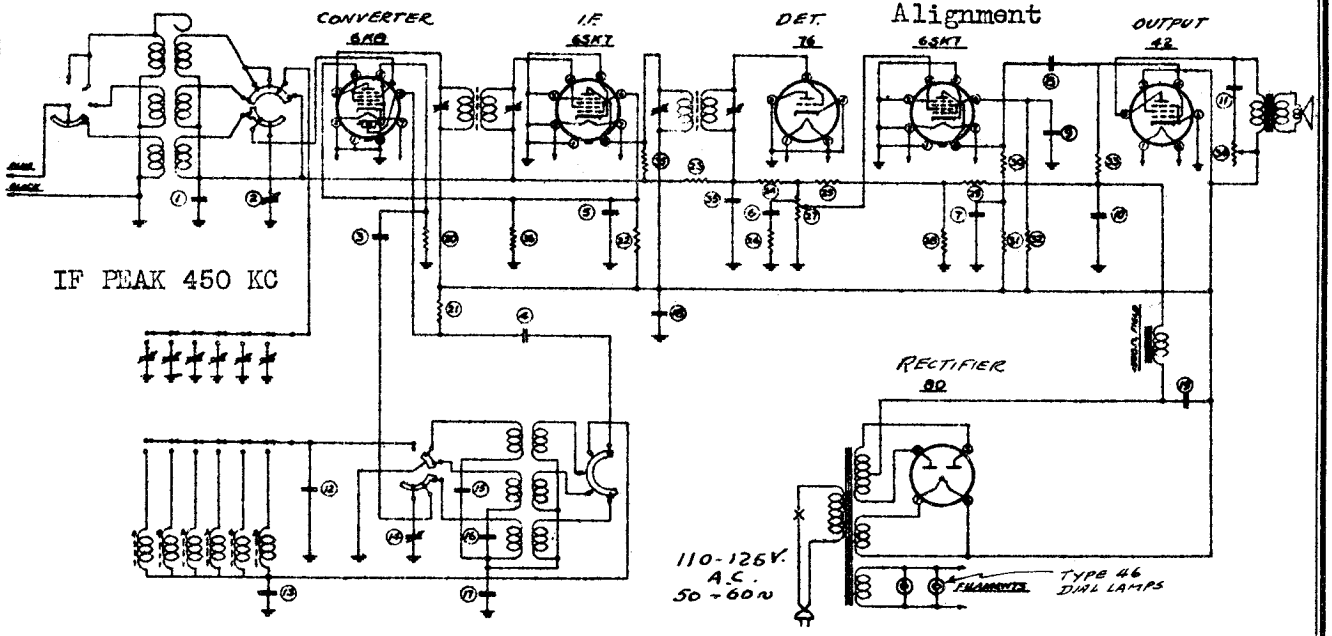
# REMLER COMPANY, LTD.

MODEL 73
Schematic, Voltage, Tuner Alignment




| NO. | DESCRIPTION | NO. | DESCRIPTION | NO. | DESCRIPTION | NO. | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| 1 | .05 MFD. COND. 600 V. | 11 | .05 MFD. COND. 600 V. | 20 | 25,000 Ω 75 W. RESISTOR | 30 | 250M Ω 75 W. RESISTOR |
| 2 | 400 MMFD. MIC. COND. | 12 | 680 MMFD. COND. | 21 | 30,000 Ω 75 W. RESISTOR | 31 | 250M Ω 75 W. RESISTOR |
| 3 | 3.5 MMFD. COND. | 13 | 1400 MMFD. COND. | 22 | 15,000 Ω 7 W. RESISTOR | 32 | 3 MEG. 75 W. RESISTOR |
| 4 | 1400 MMFD. COND. | 14 | 400 MMFD. MIC. COND. | 23 | 1 MEG. 75 W. RESISTOR | 33 | 1 MEG. 75 W. RESISTOR |
| 5 | .05 MFD. COND. 600 V. | 15 | 600 MMFD. COND. | 24 | 50,000 Ω 75 W. RESISTOR | 34 | 25M Ω POTENTIOMETER |
| 6 | .01 MFD. COND. 600 V. | 16 | 1500 MMFD. COND. | 25 | 1 MEG. 75 W. RESISTOR | 35 | 500M Ω 75 W. RESISTOR |
| 7 | .05 MFD. COND. 600 V. | 17 | 2500 MMFD. COND. | 26 | 500 Ω 75 W. RESISTOR | 36 | 50,000 Ω 1W. RESISTOR |
| 8 | .02 MFD. COND. 600 V. | 18 | .1 MFD. COND. | 27 | 500M Ω POTENTIOMETER | | |
| 9 | .1 MFD. COND. 600 V. | 19 | 16 MFD. COND. | 28 | 20 Ω 75 W. RESISTOR | | |
| 10 | 16 MFD. COND. 25 V. | 20 | .0005 MFD. COND. | 29 | 400Ω 7W RESISTOR | | |

REMLER
CIRCUIT DIAGRAM MODEL 73
Mod. 73 Dwg. No.

SETTING UP PUSH BUTTONS:-

The push button set up may be changed as follows:

The selection of stations should be arranged with the location of the lowest frequency station on the extreme left button. A resonance indicator or output meter will aid in making the adjustments. With the band switch on "BC", tune in the desired station with the selector, depress the button and turn the band switch to "A". Now with a screwdriver adjust the trimmer on the top of the chassis nearest the back and adjacent to the speaker. When the desired station is tuned in adjust the trimmer nearest the front panel for maximum volume. Now turn the band switch to "BC" to check the adjustment. Proceed with the next lower frequency station for the next set of trimmers with the band switch on "A".

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL.VIII.

The mixer coil is located on the right side of the variable condenser and the oscillator coil on the left side. Trimmers for oscillator and mixer coils are adjustable through holes in the coil supports.

The broadcast trimmers are at the top, the medium wave in the middle and the short wave nearest the bottom of the support.

Trimmers for the I.F. transformers are accessible through openings in the top of the I.F. transformer shields.

VOLTAGE READINGS A.C. voltages:- Line 120 volts; Heaters-6volts; Rectifier filament-5 volts.

D.C. voltages (Taken with no signal from ground to points indicated) 80 Rectifier filament--250 volts; 42 plate--235 volts; 42 Screen--250 volts; 42 bias--20 volts; 6SK7----audio plate 60,---audio screen 10, I.F. plate 250,---I.F. screen 100,---and I.F. bias 2.5 volts; 6K8-----plate 250,---oscillator plate 90,---screen 100, and bias supply 2.5 volts.

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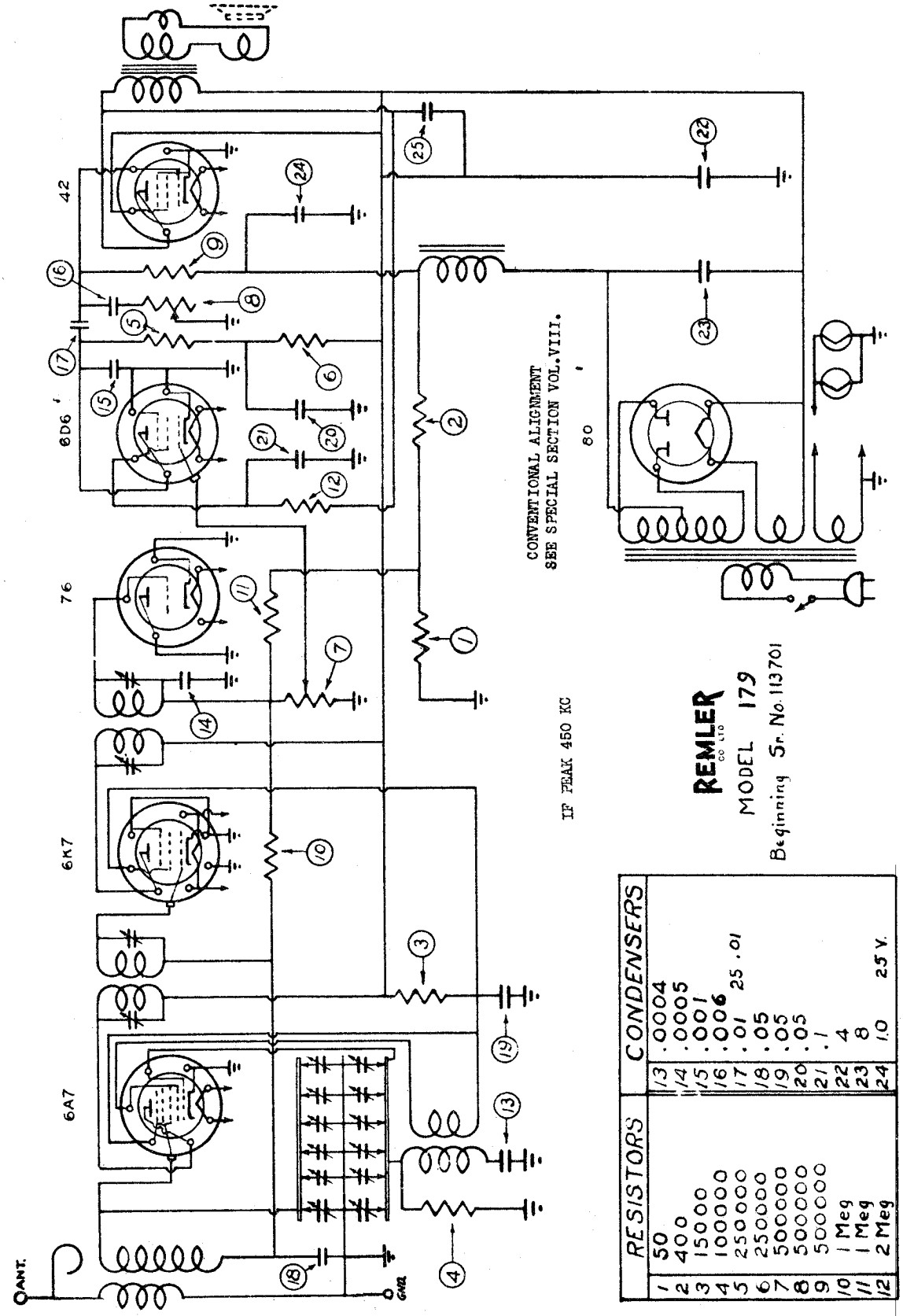
MODEL 179
Above Ser.113701
Schematic, Alignment

# REMLER COMPANY, LTD.




| RESISTORS | |
|---|---|
| 1 | 50 |
| 2 | 400 |
| 3 | 150000 |
| 4 | 1000000 |
| 5 | 250000 |
| 6 | 250000 |
| 7 | 500000 |
| 8 | 500000 |
| 9 | 500000 |
| 10 | 1 Meg |
| 11 | 1 Meg |
| 12 | 2 Meg |

| CONDENSERS | | |
|---|---|---|
| 13 | .0004 | |
| 14 | .0005 | |
| 15 | .001 | |
| 16 | .006 | 25 .01 |
| 17 | .01 | |
| 18 | .05 | |
| 19 | .05 | |
| 20 | .05 | |
| 21 | .1 | |
| 22 | 4 | |
| 23 | 8 | |
| 24 | 10 | 25 V. |

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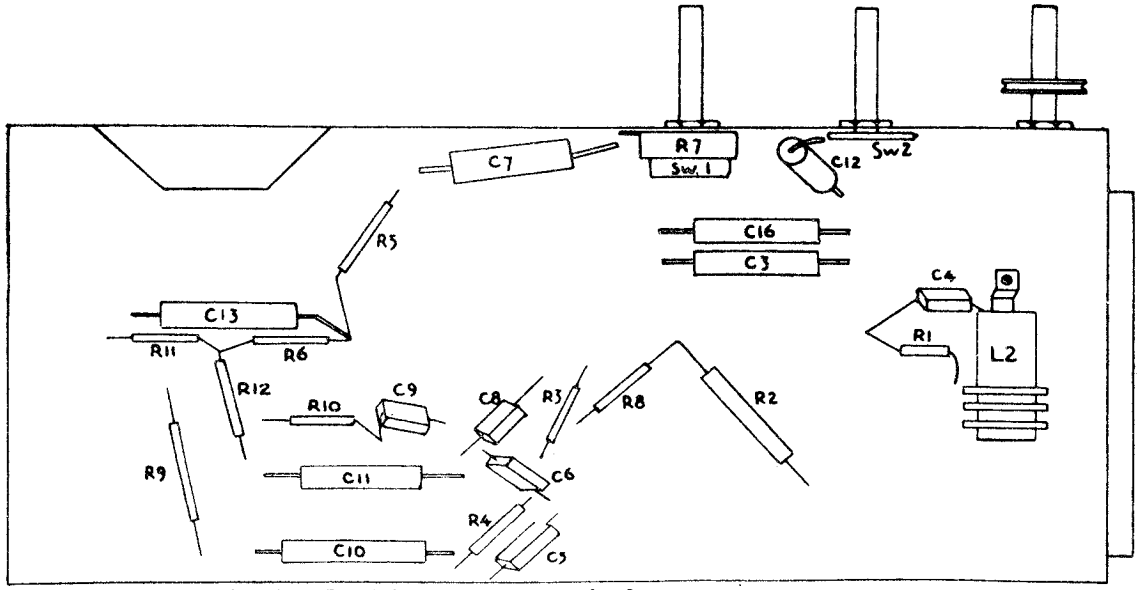
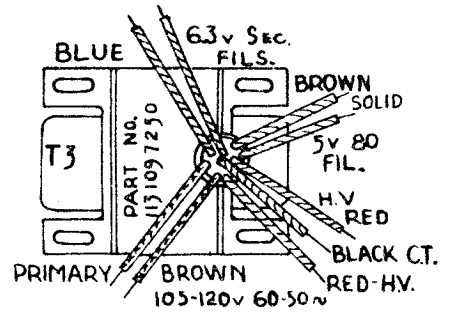
Schematic, Voltage
Chassis, Color Code

# SEARS-ROEBUCK & CO.

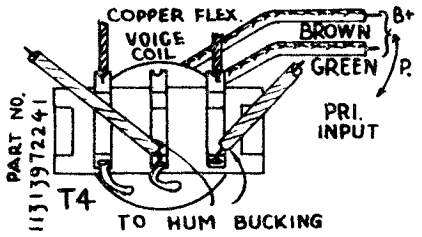
MODEL 3972
Chassis 113.972



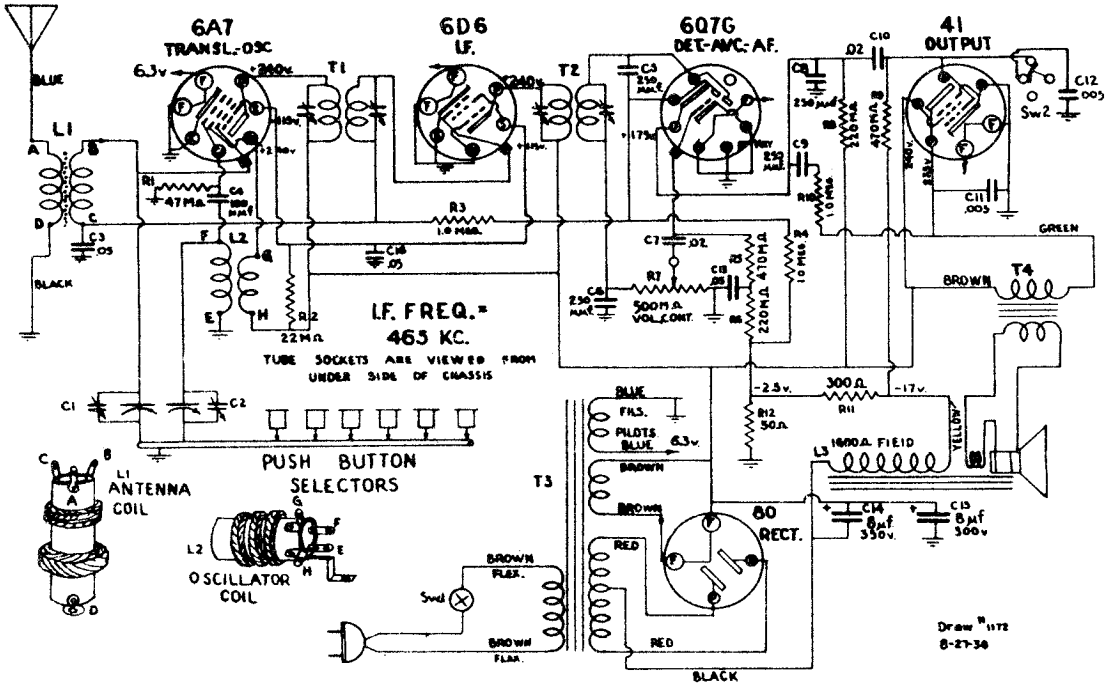

LOCATION OF PARTS UNDER CHASSIS




**COLOR CODE-POWER TRANS LEADS**




COLOR CODE OUTPUT TRANS. LEADS

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MODEL 3972
Ch.113.972
Alignment, Socket
Trimmers

SEARS-ROEBUCK & CO.

# GENERAL INFORMATION & SERVICE HINTS

57 RL 132
SEPT. 8, 1938

SILVERTONE
5 TUBE BROADCAST BAND SUPERHETERODYNE
MODEL 3972
FACTORY IDENTIFICATION NUMBER - 113.972

Should it be necessary to remove the chassis from the cabinet it is important when reassembling the receiver that the selector knob not be pushed on the shaft so far that it will exert pressure on the front of the cabinet, as any friction at this point will cause difficulty in operating the push buttons.

Should there be instances where it is difficult to set the push buttons accurately on a station it is very possible that the trouble is caused by a slight burr on the end of the screw insert in the push button knob; remove the push button in question and remove the burr that might be on the end of the screw.

## ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
6A7 . . . . . Translator-Oscillator
6D6 . . . . . IF
6Q7G . . . . . AVC, detector, 1st audio
41 . . . . . Output
80 . . . . . Rectifier

POWER SUPPLY:
105 - 120 Volts, 50-60 Cycle A.C. . . . . 47 Watts

FREQUENCY RANGE:
Broadcast . . . . . 540-1750 KC

ALIGNMENT FREQUENCIES:

| | Oscil. Trimmer | Ant.-Transl. Trimmer |
|---|---|---|
| Broadcast. . . . . | 1400 KC | 1400 KC |

INTERMEDIATE FREQUENCY . . . . . 465 KC

POWER OUTPUT:
Type . . . . . Single Pentode
Undistorted . . . . . 2.25 Watts
Maximum . . . . . 3.2 Watts

LOUD SPEAKER:
Type. . . . . Dynamic
Size. . . . . 5 inch
Field resistance. . . . . 1600 ohms

## MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left knob. . "On-Off" switch and Volume
2. Center knob. . . . . Tone Control
3. Right knob . . . . . Station Selector

CONTROL OPERATION:
Turning right: Power on: Volume increase
Turning right: . . . . . Bass, Treble
Tuning ratio: . . . . . 1:1

### AUTOMATIC TUNING CONTROL ADJUSTMENT

Tune the receiver dial to any desired station, choose the push button which you wish to control this station. Unscrew the push button one full turn, then depress the button as far as it will go, with the button in this position turn it until tight. The chosen station may always be received by depressing this button.

Remove call letter disc of station from list supplied and insert in button.

Insert celluloid disc.

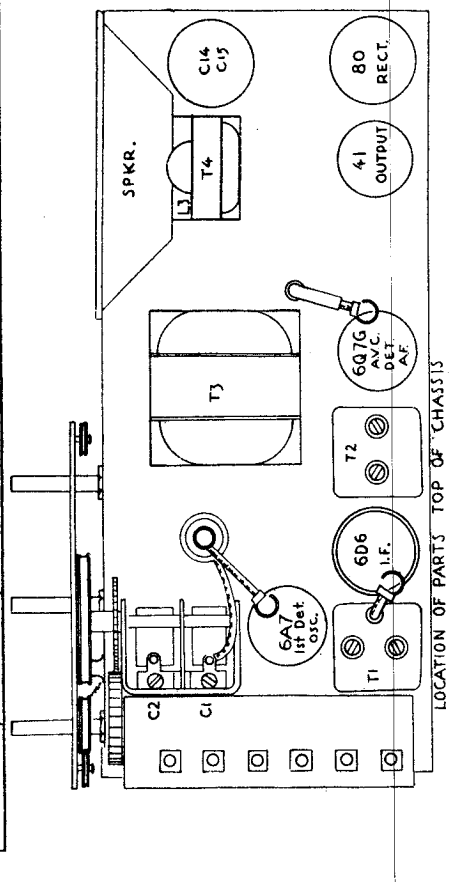
In a like manner select a station for each of the other buttons and make necessary adjustments for each station.

### ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . . 1.1 volts
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation. . . . . 30%, 400 cycles
Position of volume control. . . . . Fully clockwise
Position of tone control. . . . . Clockwise
Position of Dial Pointer with variable fully closed . . . . . Over first heavy line below 550 kc

| POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROX. MICROVOLTS |
|---|---|---|---|---|---|---|
| Open | 465 kc. | .1 mfd. | 6A7 Grid | T2, T1 | IF Output IF Input | 100 |
| 1400 kc. | 1400 Kc. | .0082 mfd. | Ant. Lead | C2, C1 | Oscillator Translator | 50 |



LOCATION OF PARTS TOP OF CHASSIS

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SEARS-ROEBUCK & CO.

**JULY 5, 1938**

MODELS 4608A, 4609A, 4628A
4629A, 4638A, 4639A, 4648A
4649A, 4728A, 4748A
Chassis 101.472X
Schematic, Voltage, Socket
Trimmers, Chassis

**POWER SUPPLY:**

"A" Battery (4½ volt dry) . . 1 - #5032P
"A" Battery (4 volt storage). 1 - #5049
"B" Batteries . . . . . 2 - #5131P

"A" Drain . . . . . .0.3 amperes
"B" Drain . . . . . 14 ma

**FREQUENCY RANGES:**

Band "A" . . . . . 540-1780 kc
Band "P" . . . . . 1760-6200 kc
Band "F" . . . . . 5975-18500 kc

**ALIGNMENT FREQUENCIES:**

| | Oscil. Trimmer | Ant.-Transl. Trimmer | Padder |
|---|---|---|---|
| Band "A" | 1400 kc | 1400 kc | 600 kc |
| Band "P" | 5 mc | 5 mc | Fixed |
| Band "F" | -- | 15 mc | Fixed |

**INTERMEDIATE FREQUENCY** . . . . . 465 kc

**POWER OUTPUT:**

Type . . . . . Class "B"
Undistorted . . . . . 0.45 watts
Maximum . . . . . 0.9 watts

**LOUD SPEAKER:**

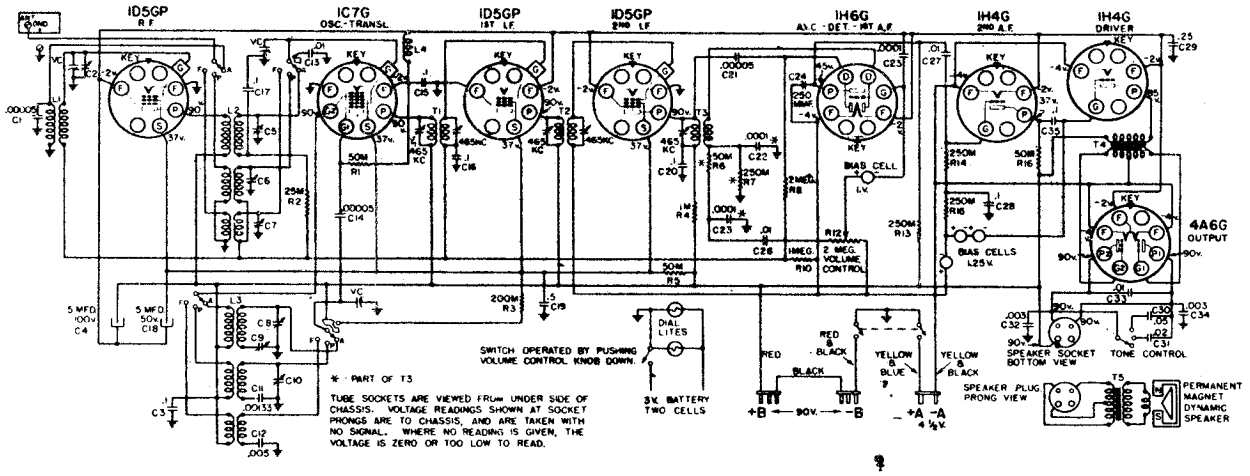
Type . . . . Permanent Magnet Dynamic
Size . . . . . 6 and 8 inch

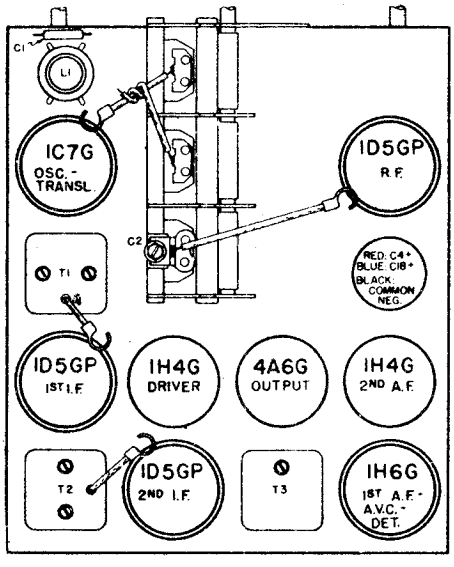
**OPERATING FEATURES:**

Three position Tone Control
Automatic Volume Control
"On-Off" Indicator
Flash-O-Light Dial Illumination
Short Wave Stations marked on dial
Wave Band Indicator

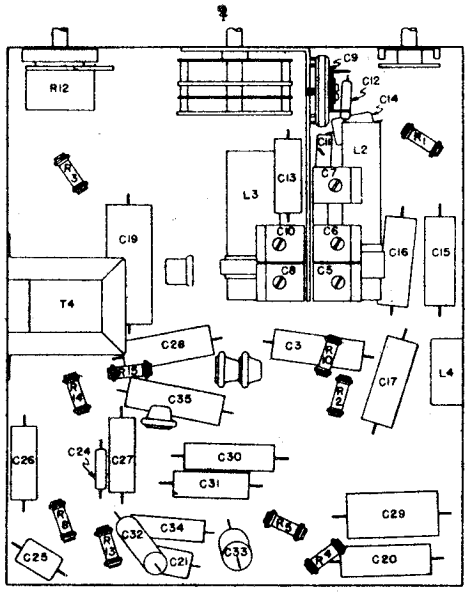
**CHASSIS FEATURES:**

Number RF stages . . .One on Broadcast Band
Number IF stages . . . . . Two
Number condensers in gang . . . Three
Antenna . . . . . Conventional
Plugs attached to battery cable


1D5GP R.F.
1C7G OSC.-TRANSL.
1D5GP 1ST I.F.
1D5GP 2ND I.F.
1H6G 1ST A.F.-A.V.C.-DET.-1ST A.F.
1H4G 2ND A.F.
1H4G DRIVER
4A6G OUTPUT
* PART OF T3
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
SWITCH OPERATED BY PUSHING VOLUME CONTROL KNOB DOWN.
DIAL LITES
3V. BATTERY TWO CELLS
2 MEG. VOLUME CONTROL
BIAS CELL
BIAS CELLS
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
TONE CONTROL
PERMANENT MAGNET DYNAMIC SPEAKER




LOCATIONS OF PARTS ON TOP OF CHASSIS



LOCATIONS OF PARTS UNDER CHASSIS

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MODELS 4608A,4609A,4628A
4629A,4638A,4639A,4648A
4649A,4728A,4748A
Chassis 101.472X

# SEARS-ROEBUCK & CO.

MODEL 4700
Chassis 104.235
Alignment,Notes

MODEL 4700. CHASSIS 104.235. **ALIGNMENT PROCEDURE**

PRELIMINARY:
Output meter connections . . . . . Across loud speaker voice coil
Output meter readings to indicate 1 watt . . . . . 1.9 volts
Average sensitivity microvolts for 1 watt output . . . . . See chart below
Generator ground lead connection . . . . . Receiver Chassis
Dummy antenna value to be put in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of volume control . . . . . Fully clockwise
Cover must be on case when making R. F. adjustments.

| Position of Dial Pointer | Generator Frequency | Dummy Antenna | Generator Connections | Adjustment Symbol | Circuit Adjusted | Approx. Microvolts |
|---|---|---|---|---|---|---|
| No Signal 550-750 KC | 456 KC | .001 Mfd. | 6K7 grid | C-10<br>C-9 | 2nd IF Trans. | 3500 |
| No Signal 550-750 KC | 456 KC | .001 Mfd. | 6A6 grid | C-8<br>C-7 | 1st IF Trans. | 35 |
| 1520 KC | 1520 KC | .0001 Mfd.* | Ant. Lead | C-5 | Osc. | 20 |
| 600 KC | 600 KC | .0001 Mfd.* | Ant. Lead | C-2 | Ant. | 15 |
| 1400 KC | 1400 KC | .0001 Mfd.* | Ant. Lead | C-6 | Ant. | 15 |
| 600 KC | 600 KC | .0001 Mfd.* | Ant. Lead | C-2 ** | Ant. | 15 |

IMPORTANT ALIGNMENT NOTES

*Make the generator connection to the receiver through a shielded lead having not more than 50 MMF. (.00005) capacity. If a series condenser has been employed as outlined in the first paragraph under "General Information and Service Hints" the dummy antenna should be the same as the antenna itself.

**Readjust C-2 after installation as outlined under "Antenna Matching in "Service Hints". Each step of the Alignment Procedure should be repeated in order to afford greater accuracy. Always keep the output from the signal generator at its lowest possible value to prevent any possible AVC action.

Alignment Adjustment screws are shown in Figures 3 and 4.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

Oscillator circuit alignment can be made only at high frequencies. A fixed padder is used in series with the return of the oscillator coil secondary. Oscillator coil inductance is preadjusted at factory.

Values shown under "Microvolts" are only approximate.

Dial Adjustments:

Rotate dial completely to the right. Then rotate dial completely to the left. Now dial will be set to properly.

If controls operate with too much difficulty it indicates that the control cables are bent too sharply. This should be avoided.

CAUSES AND REMEDIES FOR UNUSUAL NOISE CONDITIONS

If after making proper installation of receiver, you encounter noises you cannot eliminate refer to HI's Nos. 2, 6, 40, 41, 72, 73, 117, for suggestions and remedies.

ELIMINATING WHISTLE AT 900 TO 920 KC:

In localities where a strong 910 KC station is in operation, a whistle may be experienced at 900 to 920 KC. This whistle is due to a beat between the second harmonic (910 KC) of the 455 KC I. F. and the 910 KC station. Such a condition can be corrected by changing the I. F. frequency to a higher or lower value until the whistle disappears. However, the I. F. amplifier should not be shifted to a frequency higher than 465 KC nor lower than 445 KC but should be as close to 456 KC as possible.

If the I. F. frequency is changed, it will be necessary to realign the rest of the receiver as described under "Alignment Procedure".

Antenna Matching:

An antenna padder condenser is used to match antenna capacities up to 500 MMF. If, in the installation this padder is not effective, it is because the capacity of the antenna is over 500 MMF. In that case a fixed capacity of .0005 MFD. or less should be connected in series with the antenna. The location of the antenna adjustment is found on Fig.3.

MODELS 4608A,4609A,4628A,4629A,4638A,4639A,4648A,4649A,4728A,4748A. CHASSIS 101.472X

**ALIGNMENT PROCEDURE**

PRELIMINARY:
Output meter connection . . . . . Across speaker voice coil
Output meter reading to indicate 50 milliwatts . . . . . 0.4 volts
Average sensitivity in microvolts for 50 milliwatts output . . . . . See chart below
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Connection of generator ground lead . . . . . Receiver chassis
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully on
Position of Tone Control . . . . . Fully clockwise
Position of Dial Pointer . . . . . To fall on end line of scale (low frequency end). Loosen dial drum set screws and rotate drum if necessary. Tighten set screws after pointer is properly set.

| WAVE BAND SWITCH POSITION | POSITION OF DIAL POINTER | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "P" | 8 mc | 465 kc | .1 mfd. | 1G7G Grid | T7,T2,T1 | IF | 20 |
| "A" | 1400 kc | 1400 kc | .0003 mfd. | Ant. Term. | C8,C5,C2 | Osc.,Transl., Antenna | 7 |
| "A" | 600 kc (rock) | 600 kc | .0003 mfd. | Ant. Term. | C9 | Padder | 7 |
| "P" | 5 mc | 5 mc | 400 ohms | Ant. Term. | C10,C6 | Oscillator Translator | 10 |
| "P" | 15 mc | 15 mc | 400 ohms | Ant. Term. | C7 | Translator | 15 |

IMPORTANT ALIGNMENT NOTES

Note that the IF must be adjusted with the Wave Band Switch in the "P" position.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Always keep the output from the signal generator at its lowest possible value to prevent the AVC action of the receiver from interfering with accurate alignment. As the receiver sensitivity is increased through alignment, the output from the generator should be decreased to compensate.

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left Knob . . . . . "On-Off" Switch; Volume; Flash-O-Light.
2. Center lower knob . . . . . Wave Band Switch
3. Center upper knob . . . . . Station Selector
4. Right knob . . . . . Tone Control

CONTROL OPERATION:
Turning right: Power on; Volume increase; Flash-O-Light Pushing down: Flash-O-Light
Turning right: "A", "P", "P"

Tuning Ratio: 30:1

Turning right: "LO", "MED", "HI"

**SUBJECT: CIRCUIT REVISIONS TO REDUCE BATTERY DRAIN**

Later production of chassis number 101.472 (described in RL 48) is identified as 101.472X. As will be seen from the Wiring Diagram in this supplement, the circuit has been revised and tube changes made. The two 1J6G output tubes have been replaced by a 1F4G driver tube and a 4A6G output tube. These changes reduce the "A" battery drain from .5 amperes to .3 amperes, and reduce the "B" drain from 23 ma. to 15 ma.

The Parts List, Locations of Parts Diagrams, and Wiring Diagram follow. Be sure to mention chassis identification number 101.472X when ordering parts for this chassis.

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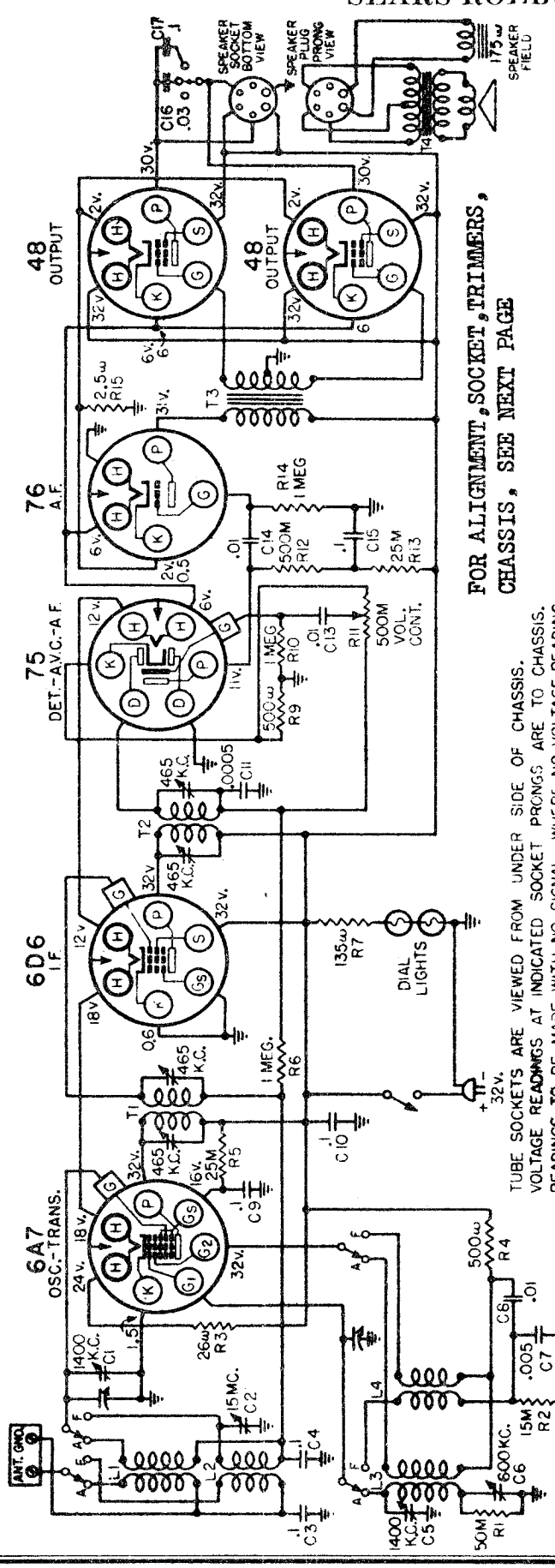
# SEARS-ROEBUCK & CO.

MODELS 4612A, 6162
Chassis 101.533
Schematic, Voltage




FOR ALIGNMENT, SOCKET, TRIMMERS, CHASSIS, SEE NEXT PAGE

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
READINGS TO BE MADE WITH NO SIGNAL. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
FIGURES AT CATHODE ARE CATHODE CURRENT IN MILLIAMPERES.

**CONTROL OPERATIONS:**
Turning right: . . . . . .Volume Increase
Turning right: . . . . . "AM", "FOR"

Tuning ratio: . . . . . 17:1

Turning right: ON, HI, MED, LO

**OPERATING CONTROLS:**
1. Left knob . . . . . Volume
3. Next to left knob . . . . Wave Band Switch
3. Next to right knob . . . . Station Selector
4. Right knob . . . . . Tone Control

CABINET SOURCES: . . . . . D,J

57 RL 135

SEPT. 14, 1938

**POWER SUPPLY:**
All models available . . . . . 32 volts, DC; 45 Watts

**FREQUENCY RANGES:**

| | |
|---|---|
| Band "AM" | 540-1750 kc |
| Band "FOR" | 5.5-18.5 mc |

**ALIGNMENT FREQUENCIES:**

| | Ant-Transf. | Oscil. | Oscil. Padder |
|---|---|---|---|
| | Trimmer | Trimmer | |
| Band "AM" | 1750 kc | 1400 kc | 600 kc |
| Band "FOR" | 15 mc | -- | Fixed |

**INTERMEDIATE FREQUENCY** . . . . . 465 kc

**POWER OUTPUT:**
Type . . . . . Push-Pull
Undistorted . . . . . 0.15 watts
Maximum . . . . . 0.33 watts

**LOUD SPEAKER:**
Type . . . . . Dynamic
Size . . . . . 8" and 8"
Field coil resistance . . . . 175 ohms
Field coil voltage drop . . . 32 volts

**OPERATING FEATURES:**
Tone Control . . . . . 3 Position
Automatic Volume Control

**CHASSIS FEATURES:**
Number IF stages . . . . . One
Antenna . . . . . Conventional
Push-Pull Output

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CHASSIS 101.505,101.505X
101.506,101.507,101.509
101.512,101.513,101.527

# SEARS-ROEBUCK & CO.

101.528,101.533
Alignment,Notes

USE OF ALIGNMENT TABLE BELOW:- FOR TRIMMER LOCATIONS FOR ALL MODELS, SEE INDEX.

MODELS INDICATED AS 4612A INCLUDES MODELS 6162, CHASSIS 101.533.
" " .4632A " 4632A, 6014, 6016, 6044, 6045, 6064, 6144, 6164,, CHASSIS 101.505 OR 101.505X.
" " " 6005 " 6071, 6076, 6171, 6176,, CHASSIS 101.507.
" " " 6016 " 6017, 6046, 6047, 6146,, CHASSIS 101.512.
" " " 6022 " 6122, 6132,, CHASSIS 101.509.
" " " 6023 " 6123,, CHASSIS 101.506.
" " " 6072 " 6077, 6172,, CHASSIS 101.513.
" " " 6073 " 6173,, CHASSIS 101.528.
" " " 6125 " CHASSIS 101.527.

FOR ALL MODELS, ALIGN EACH SUCCESSIVE TRIMMER AS INDICATED. IN SOME MODELS, ALIGNMENT FREQUENCIES DIFFER; IN THESE CASES THE MODELS ARE SHOWN IN THE "WAVE BAND SWITCH POSITION" COLUMN. WHERE NO TRIMMER IS SHOWN FOR ADJUSTMENT, THE SET IS NOT ALIGNED AT THAT FREQUENCY.

Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 50 milliwatts, Models 4612A, 6073 - .32 volt; 6005 - .29 volt; 4632A - .38 volt; 6016, 6072 - .37 volt.
Output meter reading to indicate 500 milliwatts, Models 6125 - 1.17 volts; 6022 - 1.22 volts; 6023 - 1.23 volts.
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Average sensitivity in microvolts for 500 milliwatts output, Models 6022, 6072, 6125, 6023; for 50 milliwatts output, Models 4612, 6016, 6073, 6005; for 15 milliwatts output, Model 4632A . . . . . See chart below
Position of Volume Control . . . . . Fully clockwise
Position of Tone Control . . . . . Hi
Position of Dial Pointer with variable fully closed . . . . . Horizontal (To fall along second ornamental horizontal line) Model 4632A; (To fall along first heavy black line below 550 kc.) Models 4612A, 6005, 6016, 6022, 6023, 6072, 6073, 6125.




LOCATIONS OF PARTS ON TOP OF CHASSIS
4612A,6162 CHASSIS 101.533.



LOCATION OF PARTS UNDER CHASSIS
4612A, 6162 CHASSIS 101.533.

ELIMINATING WHISTLE AT 930 KC: MODELS 4632A, 6005, 6016, 6022, 6023, 6072, 6125.

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 980 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near to 465 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GEN. FREQ. | DUMMY ANT. | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) MODELS 4612A | 4632A | 6005 | 6016 | 6022 | 6023 | 6072 | 6073 | 6125 | TRIMMER FUNCTION | MODELS 4612A | 4632A | APPROXIMATE MICROVOLTS 6005 | 6016 | 6022 | 6023 | 6072 | 6073 | 6125 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| "A" | CLOSED | 465KC | .1MFD. | 6072 6023 6016 1G7G GRID 4632A 6022 6125 6J8G GRID 6023 6073 6D8G GRID | T2,T1 | T2,T1 | T2T1 | T2T1 | T2T1 | T2T1 | T2T1 | T2T1 | T2T1 | IF OUTPUT IF INPUT | 40 - | 100 | 68 | 115 | 150 | 125 | 90 | -- | 115 |
| "A" (4612A) | 550KC | 465KC | .1MFD | 6A7 GRID T2,T1 | | | | | | | | | | I F | 40 | | | | | | | | |
| "A" | 600Kc | 465KC | .0002MFD. | ANT. TERM. | C1* | C1* | C1* | C1* | C2* | C1* | C1* | C1* | C1* | WAVE TRAP | - | - | - | - | - | - | - | - | - |
| "A" (4612A) | OPEN | 1750KC | .0002MFD. | ANT.TERM. | C5 | | | | | | | | | OSC. | 50 | | | | | | | | |
| "A" 6072 6022 | FULLY OPEN | 1730KC | .0002MFD. | ANT.TERM. | | | | | C7 | | C8 | | | OSC. | | | | | 95 | | 80 | | |
| "A" | 1400KC | 1400KC | .0002MFD. | ANT.TERM. | C1 | C5,C8 | C6C2 | C3 | C2 | C9C5 | C2 | C8C2 | | OSC.-TRANS. | 25 | 60 | 40 | 30 | 70 | 30 | 55 | | 45 |
| "A" (6016) | 1730KC | 1730KC | .0002MFD. | ANT.TERM. | | | | C5 | | | | | | OSC. | | | | 40 | | | • | | |
| "A" (6073) | 1500KC | 1500KC | .0002MFD. | ANT.TERM. | | | | | | | | C5C2 | | OSC.-TRANS. | | | | | | | | 40 | |
| "A" | 600KCROCK | 600KC | .0002MFD. | ANT.TERM. | C6 | C7 | C7 | C7 | C8 | C10 | C7 | C6 | C9 | PADDER | 15 | 40 | 30 | 35 | 60 | 30 | 40 | 30 | 30 |
| "F" 4612A 6023 6073 6125 6022 | 1.5MC ROCK | 1.5MC | 400 OHMS | ANT. TERM. | C2 | | C3 | | C3 | C5 | | C3 | C4 | TRANS. | 35 | | | | 60 | 45 | | 45 | 100 |
| "F" | 1.6MC ROCK | 1.6MC | 400 OHMS | ANT.TERM. | | C4 | C4 | C4 | | | C3 | | | TRANS. | | 70 | 50 | 40 | | | 50 | | |
| "F" (4612A) | 6 MC | 6 MC | 400 OHMS | ANT.TERM. | | | | | | | | | | --- | 70 | | | | | | | | |

IMPORTANT ALIGNMENT NOTES

* The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 465 kc is known, the generator should be adjusted to the frequency of that station instead of to 465 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

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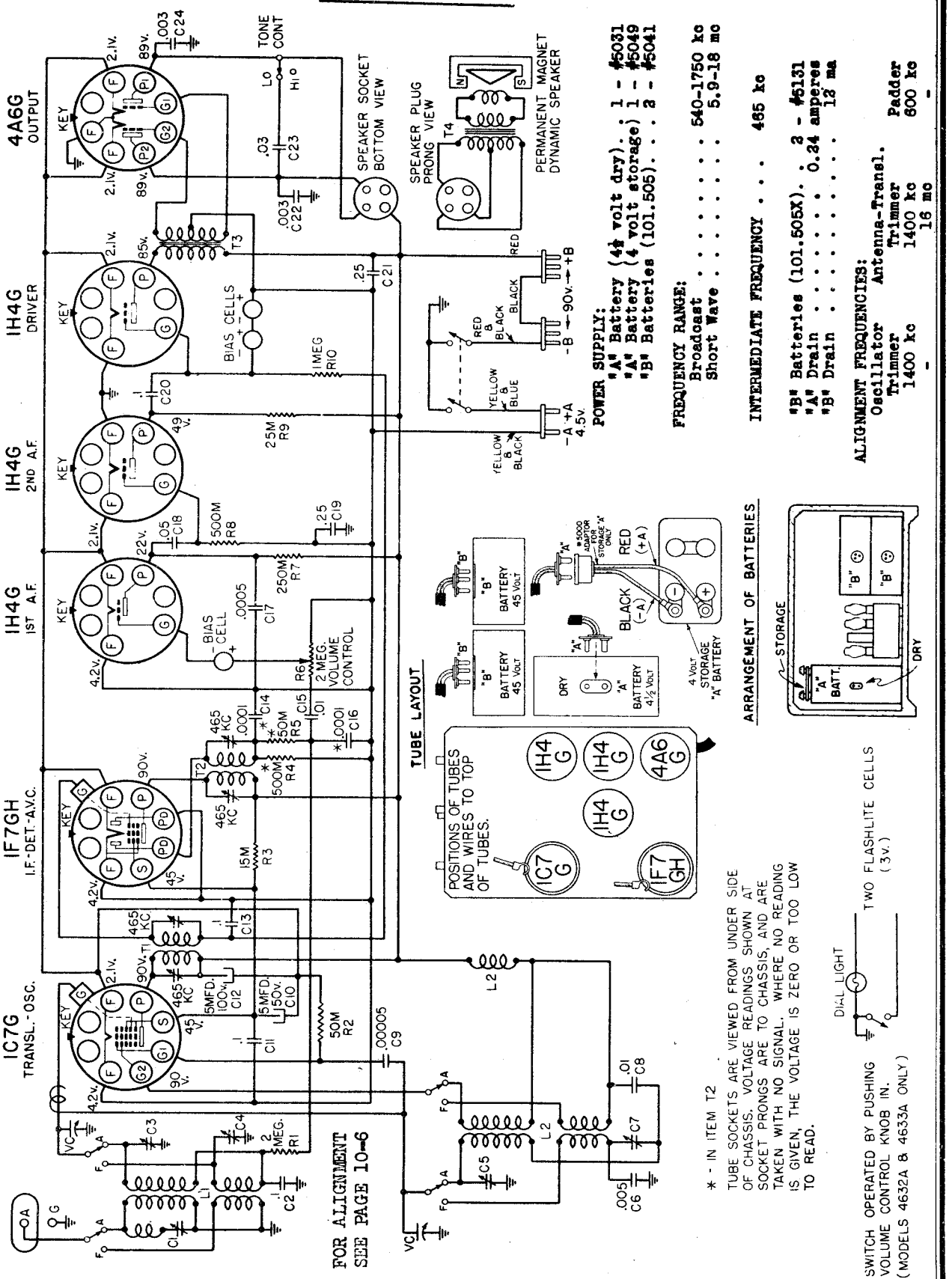
SEARS-ROEBUCK & CO.

MODELS 4632A,4633A,6014,6015
6044,6045,6064,6144,6164
Chassis 101.505,101.505X
Schematic,Voltage,Socket

APRIL 15, 1938




**POWER SUPPLY:**
"A" Battery (4½ volt dry). . 1 - #6031
"A" Battery (4 volt storage) 1 - #6049
"B" Batteries (101.505). . . 2 - #6041

**FREQUENCY RANGE:**
Broadcast . . . . . 540-1750 kc
Short Wave . . . . . 5.9-18 mc

**INTERMEDIATE FREQUENCY . . . 465 kc**

"B" Batteries (101.505X). . 2 - #6131
"A" Drain . . . . . 0.34 amperes
"B" Drain . . . . . 12 ma

**ALIGNMENT FREQUENCIES:**

| Oscillator | Antenna-Transl. | |
|---|---|---|
| Trimmer | Trimmer | Padder |
| 1400 kc | 1400 kc | 600 kc |
| - | 16 mc | - |

* - IN ITEM T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

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MODELS 4632A,4633A,6014
6015,6044,6045,6144,6164
6064 Ch.101.505,101.505X
Socket,Chassis,Notes

# SEARS-ROEBUCK & CO.

MODELS 4667,4767,4777,
4798.Chassis 101.498
Tuner Condensers,Drive

MODELS 4667,4767,4777,4798, CHASSIS 101.498.

OPERATING CONTROLS:
1. Left knob . . "On-Off" switch and Volume
2. Lower center knob . . . . Wave Band Switch
3. Upper center knob . . . . Station Selector
4. Right knob . . . . . Tone Control

CONTROL OPERATION:
Turning right: Power on; volume increases
Turning right: Push Button Tuning, "A", "P", "F"
Tuning ratio: 32:1
Turning right: "LO", "MEDIUM", "HI"

DIAL & KNOB FUNCTIONS

STATION SELECTOR

VOLUME ON-OFF SWITCH

TONE SWITCH

BAND SWITCH

10131|7416 TRAP FOR ELIMINATING BROADCAST STATION INTERFERENCE.

CHASSIS

ANT. GND.

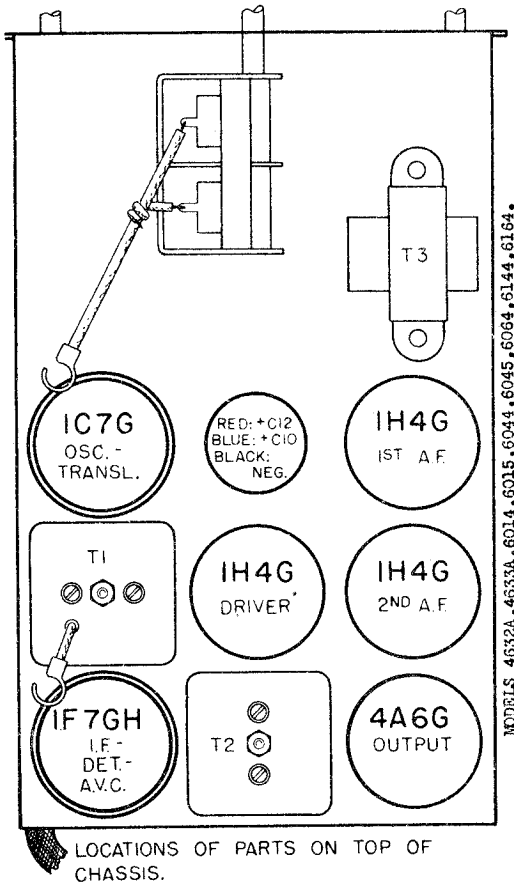
ANT. SET

POINTER DRIVE HOOKUP

CONDENSER DRIVE HOOKUP

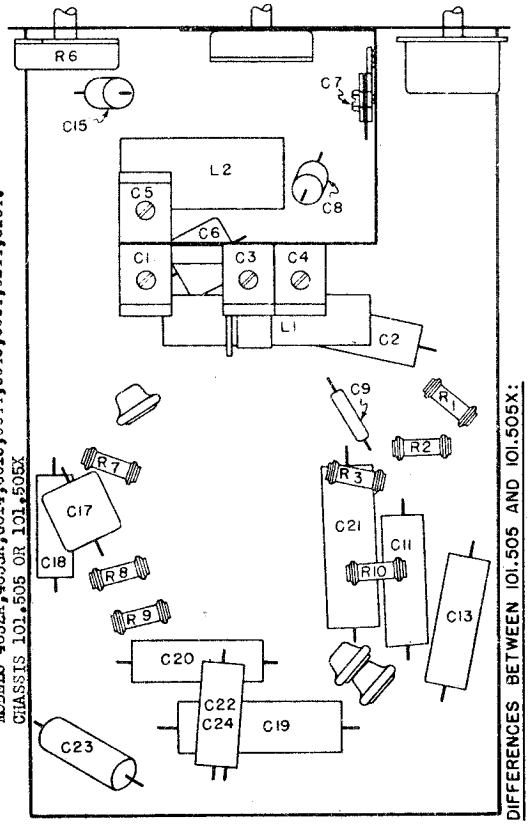
PUSH BUTTON CONDENSER POSITIONS

#1 C4 C5 C12 C13
#2 C6 C7 C14 C15
#3 C8 C9 C16 C17
#4 C10 C11 C18 C19
#5
#6
#7
#8




LOCATIONS OF PARTS ON TOP OF CHASSIS.

MODELS 4632A,4633A,6014,6015,6044,6045,6064,6144,6164.
CHASSIS 101.505 OR 101.505X




LOCATIONS OF PARTS UNDER CHASSIS.

DIFFERENCES BETWEEN 101.505 AND 101.505X:

The Model 101.505X incorporates the Dial FLASH-O-LITE feature. Pushing the Volume Control knob in will cause the dial to become illuminated. Two flash-light cells provide the battery for the dial lamp.

POWER OUTPUT:
Type . . . . . Class "B"
Undistorted . . . . . 0.4 watts
Maximum . . . . . 0.8 watts

LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6 and 8 inch

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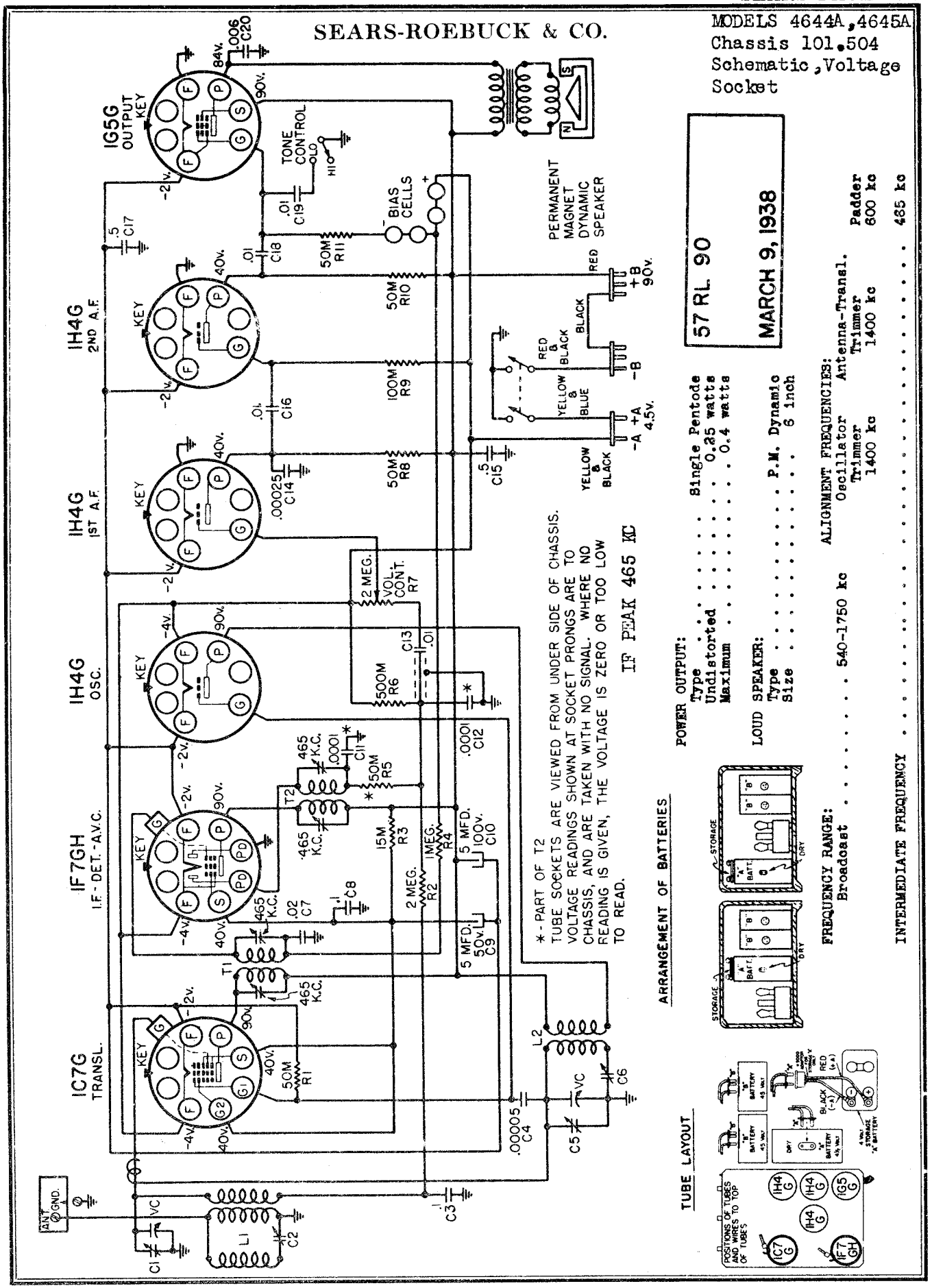
SEARS-ROEBUCK & CO.
MODELS 4644A, 4645A
Chassis 101.504
Schematic, Voltage
Socket
57 RL 90
MARCH 9, 1938
1G5G OUTPUT
1H4G 2ND A.F.
1H4G 1ST A.F.
1H4G OSC.
1F7GH I.F.-DET.-A.V.C.
1C7G TRANSL.
TONE CONTROL
BIAS CELLS
PERMANENT MAGNET DYNAMIC SPEAKER
IF PEAK 465 KC
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
ARRANGEMENT OF BATTERIES
TUBE LAYOUT
POWER OUTPUT:
Type . . . . . Single Pentode
Undistorted . . . . . 0.25 watts
Maximum . . . . . 0.4 watts
LOUD SPEAKER:
Type . . . . . P.M. Dynamic
Size . . . . . 6 inch
FREQUENCY RANGE:
Broadcast . . . . . 540-1750 kc
ALIGNMENT FREQUENCIES:
Oscillator Antenna-Transl.
Trimmer Trimmer Padder
1400 kc 1400 kc 600 kc
INTERMEDIATE FREQUENCY . . . . . 465 kc

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MODELS 4644A,4645A
Socket,Chassis
Alignment

# SEARS ROEBUCK & CO.

MODELS 6010,6040
MODELS 6052,6053
MODELS 6054,6055
Alignment

MODELS 4644A,4645A CHASSIS 101.504; 6010,6040 CHASSIS 101.519; 6052,6053 CHASSIS 101.525; 6054-5 CHASSIS 101.532.
USE OF TABLE: ONLY ONE MODEL FOR EACH CHASSIS IS SHOWN IN TABLE BELOW, FOR EXAMPLE 4644A INDICATES CHASSIS 101.504 AND MODEL 4645A.

Output meter connections, Models 4644A,6010,6052 ---------- Across loud speaker voice coil.
Model 6054-5 ---------- 4000 ohm Weston meter, across speaker terminals.
Output reading to indicate 50 milliwatts, Models 4644A,6010,6052----------0.37 volts.
Model 6054-5 ----------9.40 volts.
Generator Ground lead connection----------Receiver chassis.
Dummy antenna value to be in series with generator output ---------- See chart below.
Connection of generator output lead---------- See chart below.
Generator modulation----------30%, 400 cycles.
Approximate average sensitivity in microvolts for 50 milliwatts output---------- See chart below.
Position of volume control----------Fully On.
Position of Tone control, Models 4644A,6010,6052----------"HI".

| POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMER ADJUSTMENTS (IN ORDER SHOWN) MODELS 4644A | 6010 | 6052 | 6054-5 | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS MODELS 4644A | 6010 | 6052 | 6054-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Closed | 465 kc | .1 mfd. | 1G7G Tranal. Grid | T2,T1 | T2,T1 | T2,T1 | T2,T1 | IF | 160 | 185 | 225 | --- |
| 600 kc | 465 kc * | .0002 mfd. | Antenna Term. | C2* | C16* | C2* | C16* | IF Wave Trap | --- | --- | --- | --- |
| Fully open | 1730 kc | .0002 mfd. | Ant. Clip | | C4 | | | Oscillator | | 90 | | |
| 1400 kc ** | 1400 Kb | .0002 mfd. | Antenna Term | C5,C1 | C1 | C5,C1 | C1,C4 | Oscillator Translator | 66 | 70 | 115 | 110 |
| 600 kc (rock) | 600 kc | .0002 mfd. | Antenna Term | C6 | C5 | C6 | C5 | Padder | 33 | 70 | 80 | 80 |

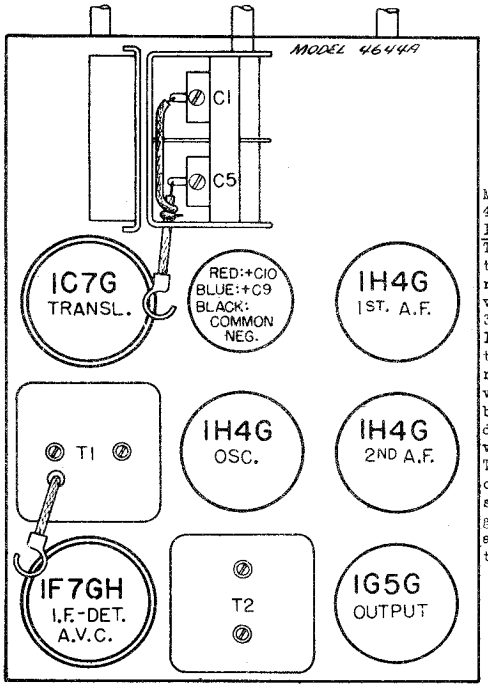
*The generator should be adjusted to give high output. The trimmer should be adjusted for minimum output meter reading instead of usual maximum output meter reading. If the frequency of an interfering code station near 465 kc is known, the generator should be adjusted to that frequency instead of 465 kc.

**Using the dial as a template make a dummy dial of cardboard with only the 1400 kc calibration on it. Slip this dummy dial over the shaft, hold it horizontal so the 1400 mark will come at the same position as the 1400 mark of the actual dial and turn the dial pointer to the 1400 kc mark.(The dial pointer should be horizontal when the condenser is fully open or fully meshed.)

The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.
The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.
Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.
Values shown under "Microvolts" are only approximate.

ELIMINATING WHISTLE AT 930 KC: MODELS 4644A, 6052, 6054-5, 6010.

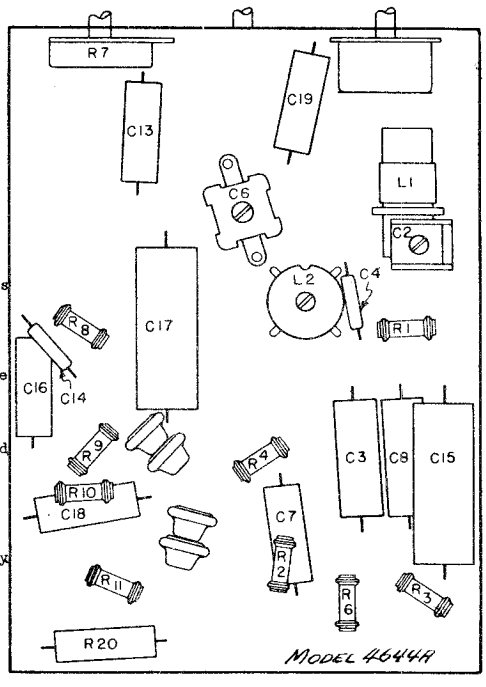
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.
Determine at what point between 900 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near to 465 kc as possible.
Align the IF at the new frequency and then realign the rest of the receiver as described.




LOCATIONS OF PARTS ON TOP OF CHASSIS.

MODELS 4644A, 4645A; Chassis 101.504

The dry "A" battery should be replaced when its voltage drops to 3.4 volts, under load. "B" batteries should be replaced when the voltage of each battery has dropped to 34 volts, under load. The life rating of the various size batteries, given are for an average use of three hours a day.




LOCATIONS OF PARTS UNDER CHASSIS

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Schematic, Voltage Changes for Jacks

# SEARS-ROEBUCK & CO.

MODELS 4667, 4677, 4767, 4777
4798 Chassis 101.498

**POWER SUPPLY:**
All models available . . . . . 105-125 volts, 50-60 cycle, 75 watts
All models available . . . . . 125-125 volts, 25 cycle, 75 watts

**FREQUENCY RANGES:**
Band "A" . . . . . 540-1750 kc
Band "B" . . . . . 3150-6300 kc
Band "F" . . . . . 6-18.2 mc

**LOUD SPEAKER:**
Type . . . . . Dynamic
Size . . . . . 6", 8", 12"
App. field coil resistance .. 1000 ohms
App. field coil voltage drop . . . 110 volts

**POWER OUTPUT:**
Type . . . . . Beam tube
Undistorted . . . . . 3 watts
Maximum . . . . . 6 watts

IF PEAK 465 KC

JAN. 15, 1938

CHASSIS 101.498

INTERMEDIATE FREQUENCY
465 kc

ADDITION OF PHONE AND PHONO JACKS

* - MOUNTED IN T2
★ - PUSH BUTTON POSITION

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGE READINGS MUST BE TAKEN WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPS.

MUTING SWITCH CLOSES WHILE PUSH BUTTON SWITCHES ARE BEING OPERATED.

OSC. & TRANSL. CONTACTS OF EACH SWITCH OPERATE SIMULTANEOUSLY.

CONNECT 500M RESISTOR TO THIS LUG

LOCATIONS OF PARTS UNDER CHASSIS

X X INDICATES LEAD TO BE BROKEN. DOTTED LINES INDICATE NEW CONNECTIONS.

H BUTTON POSITION

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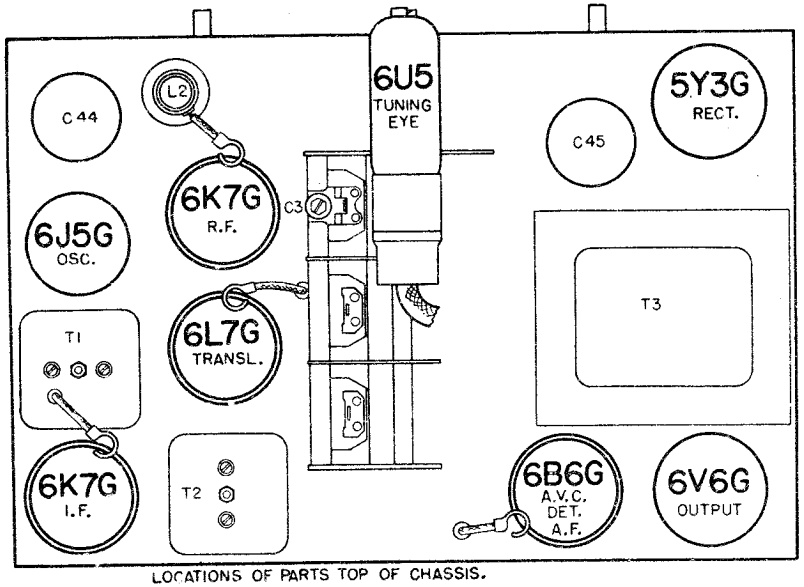
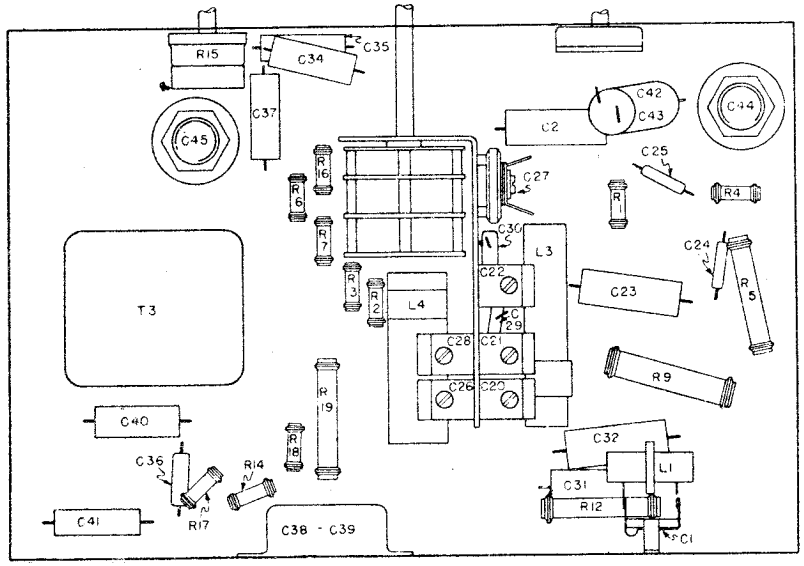
MODELS 4667,4677,4767
4777,4798.Ch.101.498
Socket,Trimmers,Chassis
Alignment,Transformer

SEARS-ROEBUCK & CO.




LOCATIONS OF PARTS TOP OF CHASSIS.




LOCATIONS OF PARTS UNDER CHASSIS

## ALIGNMENT PROCEDURE

PRELIMINARY:

| | |
|---|---|
| Output meter connection | Across voice coil leads |
| Output meter reading to indicate .5 watts output | 1.04 volts |
| Approximate microvolts input for .5 watts output | See chart below |
| Dummy antenna value to be in series with generator output | See chart below |
| Connection of generator output lead | See chart below |
| Connection of generator ground lead | To chassis |
| Generator modulation | 30%, 400 cycles |
| Position of Volume Control | Fully clockwise |
| Position of Tone Control | Fully clockwise |
| Position of Dial Pointer when variable is fully meshed | To fall on center of large square block at 550 kc end of dial. |

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "P" | Closed | 465 kc | .1 mfd. | 6L7G Grid | T2, T1 | IF Output<br>IF Input | 105 |
| "A" | Closed | 465 kc * | .0002 mfd. | Ant. Term. | C1 * | IF Trap | - |
| "A" | 1500 kc | 1500 kc | .0002 mfd. | Ant. Term. | C26,C20,<br>C3 | Oscillator<br>Transl.,RF | 11 |
| "A" | 600 kc (rock) | 600 kc | .0002 mfd. | Ant. Term. | C27 | Padder | 18 |
| "P" | 6 mc | 6 mc | 400 ohms | Ant. Term. | C28 | Oscillator | 70 |
| "P" | 5 mc (rock) | 5 mc | 400 ohms | Ant. Term. | C21 | Translator | 70 |
| "P" | 16 mc (rock) | 16 mc | 400 ohms | Ant. Term. | C22 | Translator | 60 |

## IMPORTANT ALIGNMENT NOTES

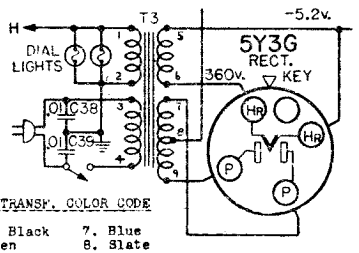
* If the frequency of an interfering code station is known, the generator should be adjusted to that frequency instead of to 465 kc. The trap should be adjusted to give minimum output meter deflection instead of the usual maximum reading.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is necessary to repeat the entire alignment procedure step by step in the original order to secure proper alignment. Perfect alignment is not possible with one adjustment of the trimmers.

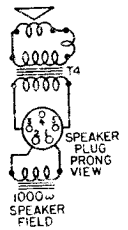
Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under, "Microvolts", are only approximate.




POWER TRANSF. COLOR CODE

1-3-3. Black
4. Green
5-6. Red
7. Blue
8. Slate
9. Red




SPEAKER PLUG COLOR CODE

1. Black
2. Yellow
3. Brown
4. Blank
5. Green

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# GENERAL INFORMATION & SERVICE HINTS

## INSTRUCTIONS FOR SETTING UP PUSH BUTTON STATIONS:

1. Remove the two escutcheons that enclose the push buttons. Remove the celluloid call letter holders. A label will be seen telling what frequency (kilocycle) stations can be set up on each button. Each button can be used for only ONE station in its frequency range.

2. Turn the Wave Switch knob to the "American" position and use the tuning knob to tune in the station chosen for #1 button. Then turn the Wave Band switch to the Push Button position, and push button #1 all the way in.

3. It will be seen that there are two adjusting screws for each button, an upper one and a lower one. Using a screw driver, turn the lower adjusting screw for #1 button until #1 station is tuned in as accurately as possible, as indicated by the Tuning Eye. If, during the adjustment, you obtain a strong Tuning Eye indication, but do not hear your station, turn the upper adjusting screw one or two turns to the right and then proceed with the lower screw adjustment. To check whether you are adjusting to the correct station, turn the Wave Switch knob back to the "American" position momentarily.

4. After the best possible setting of the lower screw has been made, adjust the #1 upper screw right or left to make the slit of the Tuning Eye still narrower.

5. Proceed in the same manner for each button. Be sure the Wave Switch knob is in the "Push Button" position and that you have pushed in the proper button before starting the screw adjustments for that button. The lower screw for each button MUST be adjusted before the upper screw for that button. The Wave Switch knob can be turned back to the "American" position momentarily at any time, to check whether you are adjusting to the correct station.

6. Place the call letters for the chosen stations in the celluloid call letter holders. Be sure to insert the call letters in the proper order so that they will be over the push button for their respective stations. Then replace the celluloid call letter holders and the escutcheons.

## THE A.V.C. CIRCUIT:

The diode current of the 6B6G tube, flowing through the 250M ohm resistor, R11, creates a voltage drop across it. This voltage is applied to the control grids of the RF, Translator, and IF tubes to provide AVC.

## OSCILLATION:

Be sure the tube shields are making good contact to their base clips. Poor contact may cause oscillation.

## ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to choose the new IF frequency as near to 465 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE". It will also be necessary to readjust any stations set up on the Push Button Tuning Mechanism.

## WAVE TRAPS:

A wave-trap, designed to eliminate code interference from ship transmitters, airports or air beacon stations in locations where the receiver is near such transmitters, is built into the receiver. As explained in the alignment procedure, this trap should be tuned to the interfering station in the vicinity of 465 kc.

A wave-trap, designed to eliminate whistles and cross modulation troubles on the broadcast band when the receiver is located comparatively near some powerful broadcast station, is available.

This trap can be ordered under part #1013117418 directly from Sears, Roebuck and Co. Retail Store or Mail Order branch. using Purchase Order Blank form F5384. The retail selling price is $1.30.

Mount the trap to the chassis mounting shelf or to the inside of the cabinet by means of wood screws through the bracket on the trap. It is important to connect a wire from under the head of one of the wood screws to the chassis so that the wave-trap shield becomes grounded to the chassis.

The trap has two terminals marked, "ANT" and "SET". Disconnect the antenna leadin from the receiver and connect it to the "ANT" terminal of the trap. Connect a wire from the "SET" terminal of the trap to the "ANT" terminal of the chassis. The ground connection to the chassis remains as it was. The trap then is in series between the antenna and the receiver. The trap should be tuned to eliminate the interfering station. The sensitivity of the receiver will be reduced in the region of the frequency to which the trap is tuned.

## INSTALLATION OF A PHONOGRAPH PICKUP JACK OR AN EARPHONE JACK: FOR CHASSIS 101.498 ONLY

A kit, part #1013117189, can be ordered from Colonial Radio Corporation, 354 Rano Street, Buffalo, N. Y. The retail selling price is $1.11. This kit contains the necessary parts for installing either a phonograph pick-up jack or an earphone jack. If the customer desires both a phonograph pick-up jack and an earphone jack, it will be necessary to use two kits and to drill an additional hole in the back of the chassis for the additional jack.

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack. In addition, changes must be made in the wiring to the speaker socket and the electrolytic condenser. As the Schematic Section shows, these wiring changes and the connections to the jack are as follows:

Disconnect the jumper between prongs 1 and 5 of the speaker socket.

Disconnect the lead from prong 3 of the speaker socket and connect it to prong 5.

Disconnect the leads from prong 1 of the speaker socket and connect them to prong 5.

There is a hole in the front apron of the chassis, between the Tone Control and the right side of the chassis. Mount one of the terminal boards, supplied in the kit, in this hole.

There is an electrolytic condenser just above the terminal board mentioned in the preceding paragraph. Remove the three leads that are soldered to the mounting nut of this condenser and connect them to the terminal board mentioned in the preceding paragraph.

Solder a lead from the mounting nut of the electrolytic, mentioned in the preceding paragraph, to prong #1 of the speaker socket.

The slate colored lead of the power transformer is connected to the mounting nut of the electrolytic condenser mounted next to the volume control. Remove this lead from the condenser mounting nut, lengthen the lead by splicing, and run it to prong #1 of the speaker socket.

Solder a lead from the mounting nut of the electrolytic, mentioned in the preceding paragraph, to prong #3 of the speaker socket.

There is a terminal board mounted under one of the nuts that mount the IF output transformer. Mount the terminal board supplied in the kit under this same nut. Connect the .05 condenser, supplied in the kit, between this new terminal board and terminal #1 of the jack.

Run a lead from the new terminal board to the cathode prong of the 6B6G tube.

There is a two-terminal board mounted on the front of the Wave Switch assembly bracket. Run a lead from the terminal of this board that is nearest the Volume Control to lug #3 of the jack.

Run a lead from lug #3 of the jack to prong #1 of the speaker socket.

Connect the 500M ohm resistor between lug #4 of the jack and the coil terminal shown in the illustration.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

Connect the .05 condenser from terminal #2 of the jack to the grid prong of the 6V6G output tube.

Connect terminal #3 of the jack to terminal #3 of the speaker socket.

Connect terminal #4 of the jack to terminal #5 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

With the connections as described, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to terminals 3 and 4 of the jack should be omitted.

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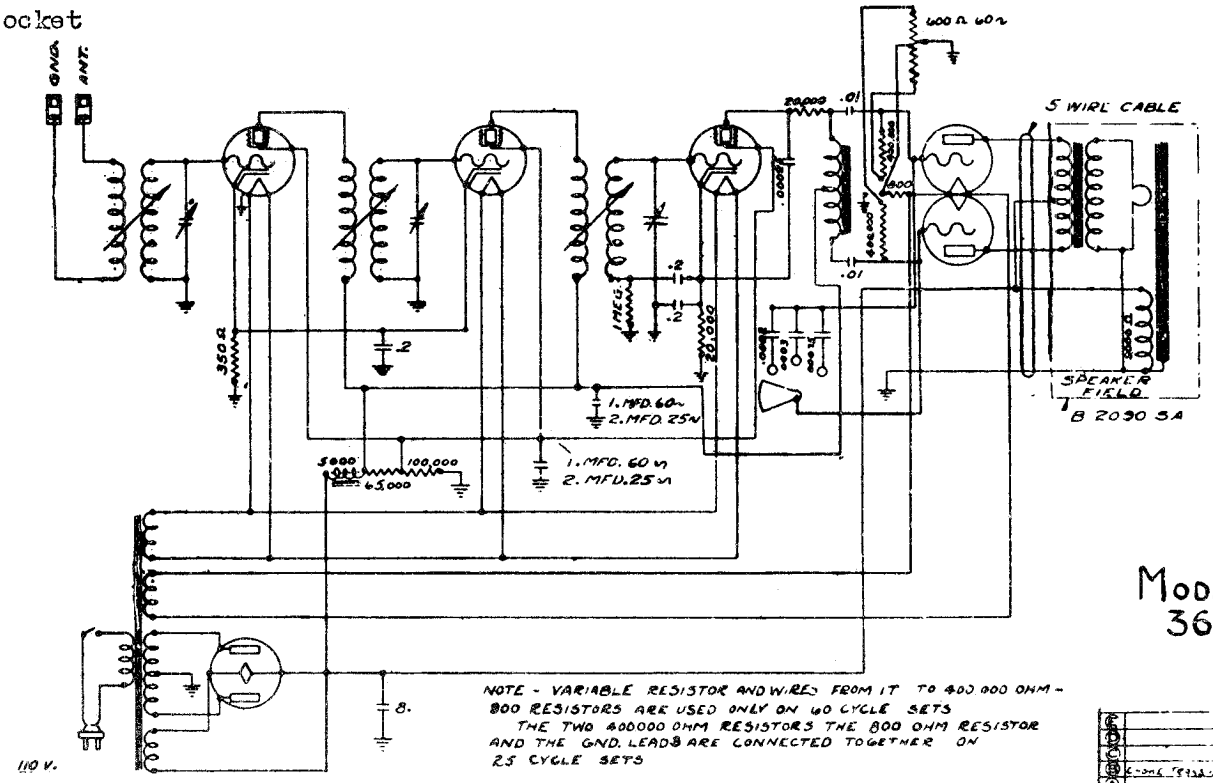
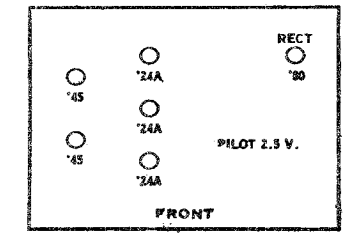
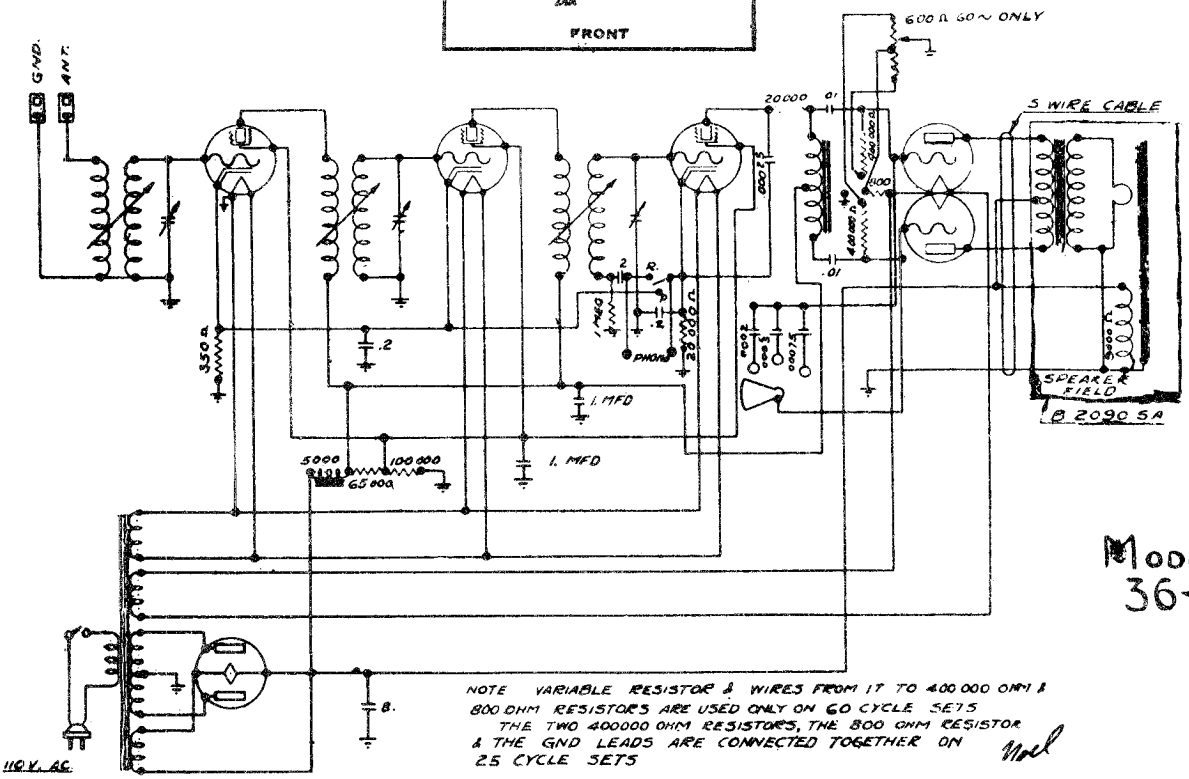
MODEL 36
MODEL 36-P
Schematics
Socket

# SEARS-ROEBUCK & CO.


GND.
ANT.
600 Ω 60~
5 WIRE CABLE
SPEAKER FIELD
B 2090 SA
1. MFD. 60~
2. MFD. 25~
NOTE - VARIABLE RESISTOR AND WIRES FROM IT TO 400 000 OHM - 800 RESISTORS ARE USED ONLY ON 60 CYCLE SETS
THE TWO 400000 OHM RESISTORS THE 800 OHM RESISTOR AND THE GND. LEADS ARE CONNECTED TOGETHER ON 25 CYCLE SETS
110 V.

MODEL 36





GND.
ANT.
600 Ω 60~ ONLY
5 WIRE CABLE
SPEAKER FIELD
B 2090 SA
1 MFD
1 MFD
NOTE VARIABLE RESISTOR & WIRES FROM IT TO 400 000 OHM & 800 OHM RESISTORS ARE USED ONLY ON 60 CYCLE SETS
THE TWO 400000 OHM RESISTORS, THE 800 OHM RESISTOR & THE GND LEADS ARE CONNECTED TOGETHER ON 25 CYCLE SETS
110 V. AC

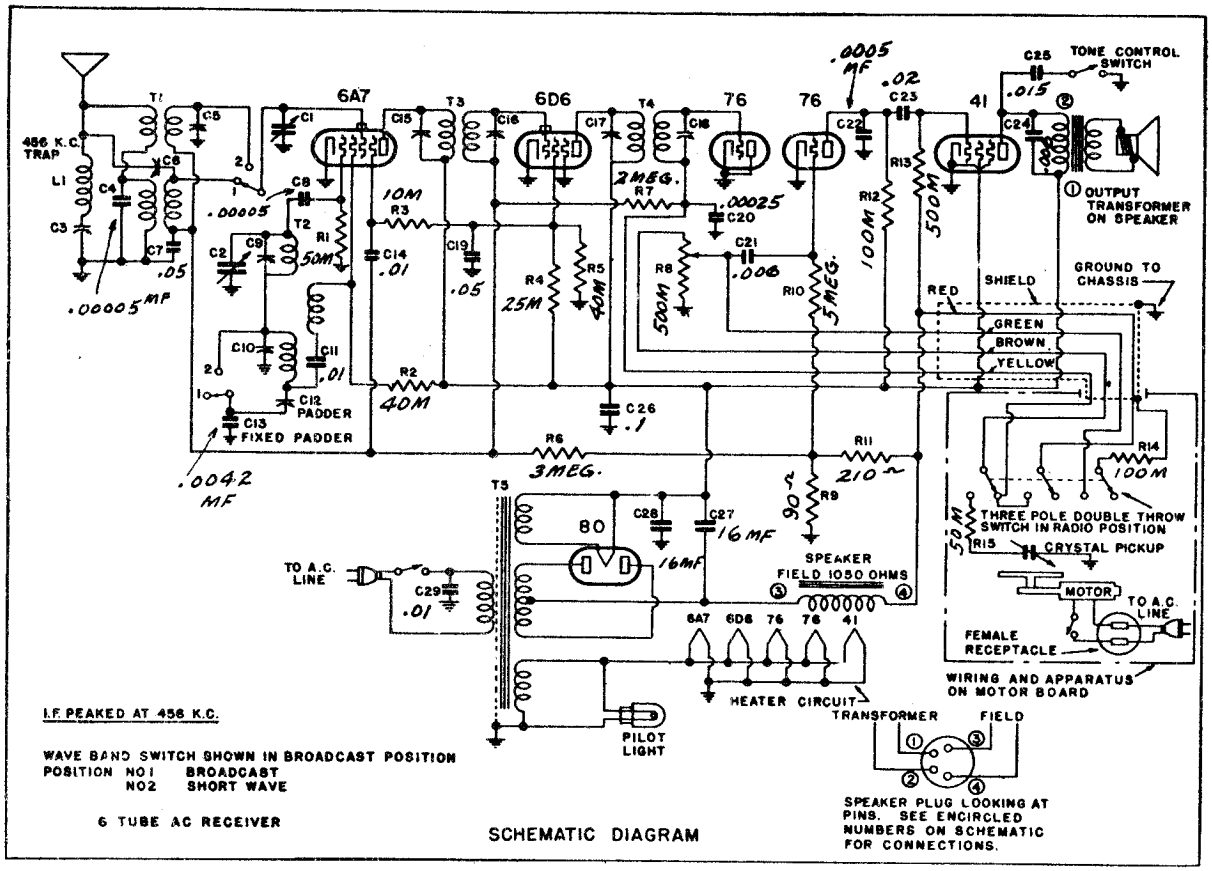
MODEL 36-P

©John F. Rider, Publisher

MODEL 4668,Ch.103,AR166

# SEARS-ROEBUCK & CO.

Schematic, Voltage




TUBES AND FUNCTIONS:

| | | | |
|---|---|---|---|
| 6A7 | Translator-Oscillator | 76 | A. F. Amplifier |
| 6D6 | IF | 41 | Output |
| 76 | AVC - Detector | 80 | Rectifier |

POWER SUPPLY:

All models available . . . . . 105-125 volts, 60 cycle, 53 watts

FREQUENCY RANGES:

American Band . . . . . 540-1730 KC
Foreign Band . . . . . 5.7-18.3 MC

ALIGNMENT FREQUENCIES:

| | Oscil. Trimmer | Oscil. Padder |
|---|---|---|
| Band "AM" | 1600 kc | 600 kc |
| Band "FOR" | 16 mc | Fixed |

INTERMEDIATE FREQUENCY . . . . . 456 kc

POWER OUTPUT:

Type . . . . . Pentode
Undistorted . . . . . 2.6 watts
Maximum . . . . . 3.9 watts

LOUD SPEAKER:

Type . . . . . Dynamic
Size . . . . . 6"
Field Coil Resistance . . . . 1050 Ohms

OPERATING FEATURES:

Tone Control . . . . . Two Point
Automatic Volume Control
Crystal Phonograph Pickup

Voltage Table

| | | | | | |
|---|---|---|---|---|---|
| 6A7 | 244 | 62 | 0 | 118 | 6.3 a.c. |
| 6D6 | 244 | 85 | 0 | — | 6.3 a.c. |
| 76 | 0 | — | 0 | — | 6.3 a.c. |
| 76 a-f | 86 | — | 0 | — | 6.3 a.c. |
| 41 | 226 | 244 | 0 | — | 6.3 a.c. |

Voltage across speaker field—65.

Voltage at 80 filament to B minus (center-tap of high-voltage winding on power transformer)—325.

The grid bias for all the tubes is developed across the resistors R9 and R11 (see schematic No. 1). The total voltage measured across R9 and R11 should be 15 volts, and is the bias for the 41 tube. The voltage measured across R9 should be 5 volts. To check the bias on the 6A7 and 6D6 tubes, measure the values of resistors R6, R7 and R8 (see schematic).

## MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:

1. Left Knob . . . . . Wave Change
2. Next to Left Knob . . Tone Control
3. Next to Right Knob. . . . Tuning
4. Right Knob . . . . . Power Switch

CONTROL OPERATION:

Clockwise "AM" . . Anti-Clockwise "FOR"

Ratio . . . . . 12:1
Turn Right: Power On; Volume Increase

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MODEL 4668, Ch. 103, AR166
Socket, Trimmers
Alignment

# SEARS-ROEBUCK & CO.




LOCATION OF PARTS TOP OF CHASSIS

57RL 75
FEB. 16, 1938

## ALIGNMENT PROCEDURE

**PRELIMINARY:**

Output meter connections . . . . . Across speaker voice coil

Output meter reading to indicate .050 watt.
(Meter on 50 V. scale or higher) . . . . . 18.7 volts

Average sensitivity in microvolts for .050 watts output . . . . . See chart below

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Connection of generator ground lead . . . . . To chassis

Generator modulation . . . . . App. 30% - 400 cycles

Position of volume control . . . . . Fully clockwise

Position of tone control . . . . . Fully clockwise

Position of dial pointer with variable fully meshed . . . . . Horizontal

| WAVE BAND SWITCH POSITION | POSITION OF DIAL POINTER | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED IN ORDER SHOWN | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| B.C. | 160 | 456 | .02 mfd. | 6A7 Grid | C15, C16 C17, C18 | I. F. | 50 |
| B.C. | 160 | 456 | .0002 mfd. | Ant. Lead | C3 | Wave trap Trim. for minimum response | |
| S.W. | 16 | 16 mc. | 400 ohm | Ant. Lead | C9, C5 | Osc., R. F. | 17 |
| B.C. | 60 (rock) | 600 kc. | .0002 mfd. | Ant. Lead | C12 | Osc. | 10 |
| B.C. | 160 | 1600 | .0002 mfd. | Ant. Lead | C10, C6 | Osc., R.F. | 12 |

**IMPORTANT ALIGNMENT NOTES**

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.

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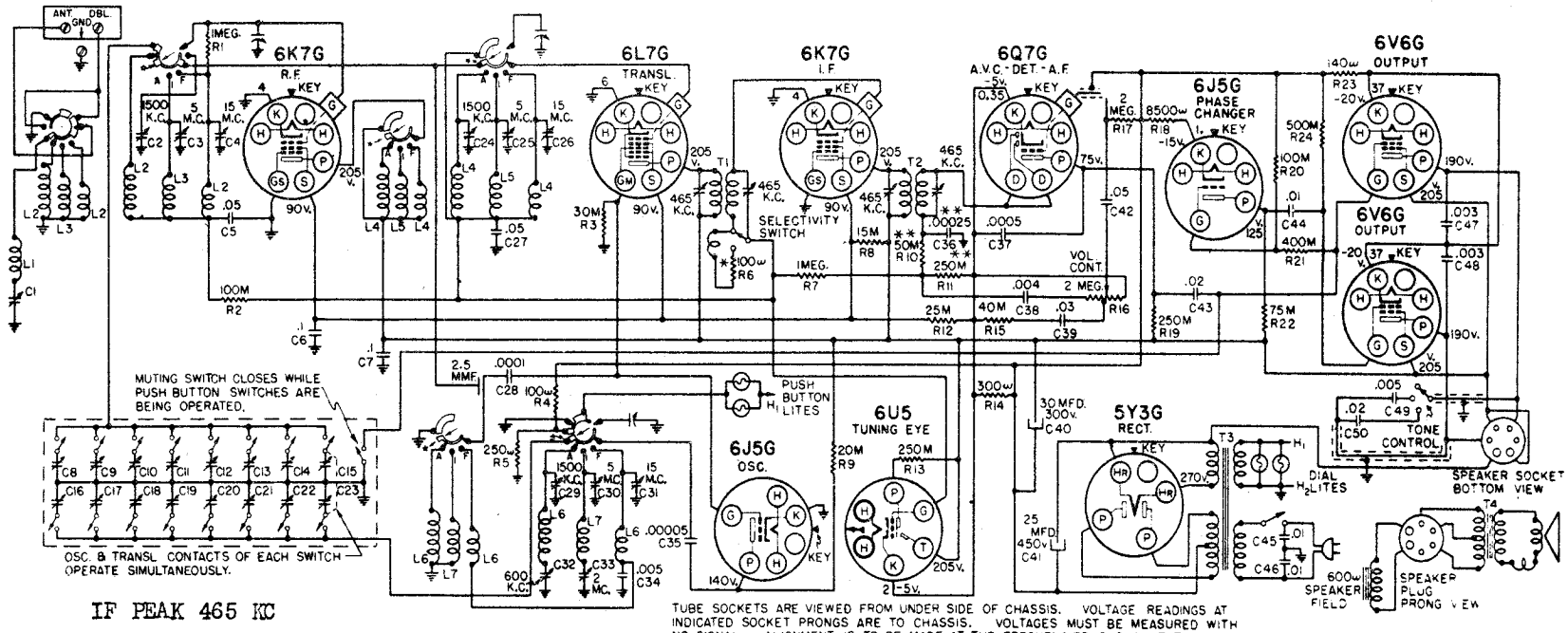
MODELS 4681, 4781
Chassis 101.499
Schematic, Voltage
Color Code




IF PEAK 465 KC

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

* - PART OF T1 ★ PUSH BUTTON TUNING POSITION

** - PART OF T2

**JAN. 19, 1938**

FOR TUNER DATA SEE PAGE 10-13

**FREQUENCY RANGES:**

| | |
|---|---|
| American Band | 540-1800 kc |
| Intermediate Band | 1760-6050 kc |
| Foreign Band | 5.9-18.1 mc |

**INTERMEDIATE FREQUENCY** . . . . . 465 kc

**POWER OUTPUT:**

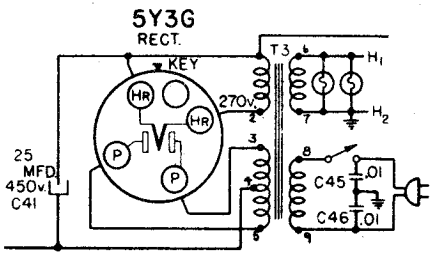
| | |
|---|---|
| Type | Push-Pull (Beam Tubes) |
| Undistorted | 6 watts |
| Maximum | 10 watts |

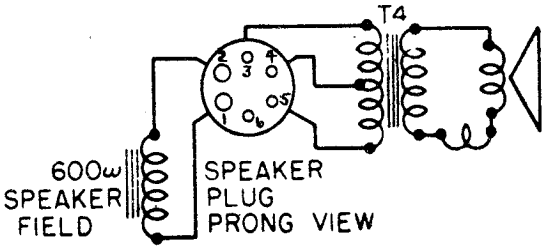
**LOUD SPEAKER:**

| | |
|---|---|
| Type | Dynamic |
| Size | 10" and 12" |
| App. field coil resistance | 600 ohms |
| App. field coil voltage drop | 65 volts |

**ALIGNMENT FREQUENCIES:**

| | Oscil. Trimmer | Ant-Transl. Trimmer | Oscil. Padder |
|---|---|---|---|
| Band "AM" | 1500 kc | 1500 kc | 600 kc |
| Band "INT" | 5 mc | 5 mc | 2 mc |
| Band "FOR" | 15 mc | 15 mc | Fixed |




**POWER TRANSF. COLOR CODE**

| | |
|---|---|
| 1,2,3-Red | 5-Blue |
| 4-Slate | 6,7,8-Black |
| 9-Green | |

**SPEAKER PLUG COLOR CODE**

| | |
|---|---|
| 1. Black | 4. Red |
| 2. Yellow | 5. Green |
| 3. Brown | 6. Blank |

**POWER SUPPLY:**

All models available . . . . . 105-125 volts, 50-60 cycle, 95 watts
All models available . . . . . 105-125 volts, 25 cycle, 100 watts

MODELS 4681,4781
Chassis 101.499

SEARS-ROEBUCK & CO.

Phone,Phono.Jacks
Installation,Schematic

## INSTALLATION OF A PHONOGRAPH PICKUP JACK OR AN EARPHONE JACK:

A kit, part #1016117189, can be ordered from Colonial Radio Corporation, 354 Rano Street, Buffalo, N. Y. The retail selling price is $1.11. This kit contains the necessary parts for installing either a phonograph pick-up jack or an earphone jack. If the customer desires both a phonograph pick-up jack and an earphone jack, it will be necessary to use two kits and to drill an additional hole in the back of the chassis for the additional jack.

PHONOGRAPH PICK-UP JACK: A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack.

Disconnect the jumper that is between prongs #1 and #4 of the speaker socket and move the lead on prong #1 to prong #4.

Locate the electrolytic condenser mounted alongside of the power transformer. A green lead runs from the anode (center terminal) of this electrolytic to prong #3 of the speaker socket. Transfer the connections of this lead from the anode to the cathode (mounting nut) of the electrolytic and from prong #3 to prong #1 of the speaker socket.

There is a jumper between the cathodes of the two electrolytics. Disconnect this jumper. Run a jumper between the anodes of the two electrolytics.

There is a four-terminal board mounted under the nut that holds the IF output transformer. Run a lead from the terminal nearest the speaker socket on this board to prong #3 of the speaker socket.

Run a lead from lug #1 of the jack to the cathode of the 6Q7G tube.

Connect the .05 mfd. condenser from lug #2 of the jack to the blank prong (3rd one clockwise from the locating pin when viewed from the underside) of the 6K7G tube socket.

Run a lead from lug #3 of the jack to the coil terminal shown in the illustration.

Connect the 500M ohm resistor, supplied in the kit, between lug #4 of the jack and prong #1 of the speaker socket.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

EARPHONE JACK: Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

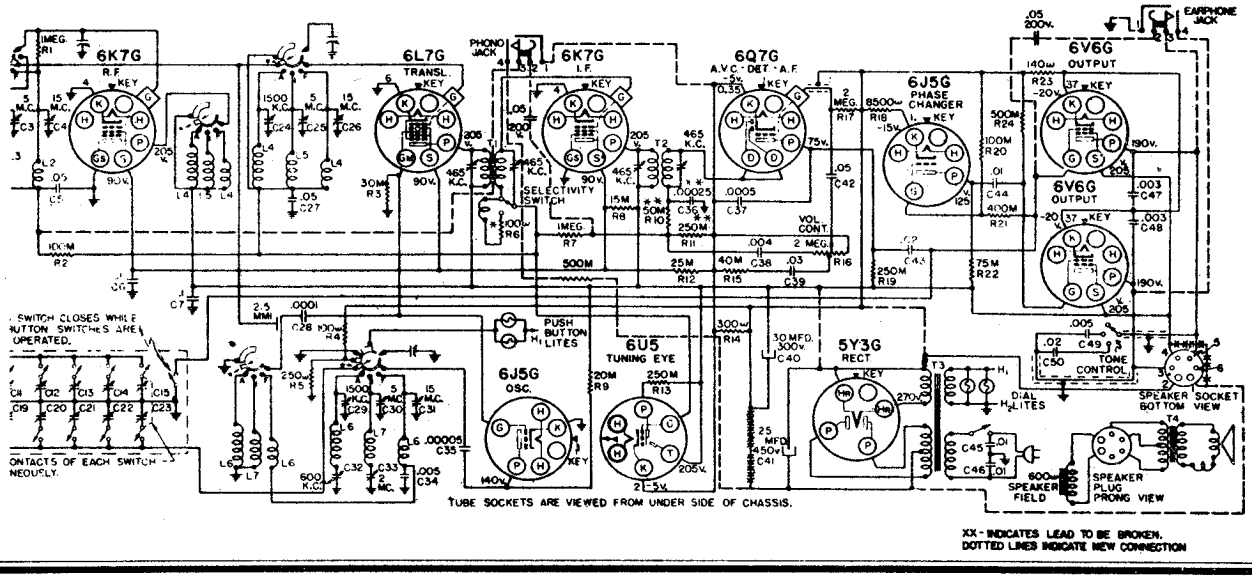
Connect the .05 condenser from terminal #3 of the jack to the grid prong of the 6V6G output tube.

Connect terminal #3 of the jack to terminal #5 of the speaker socket.

Connect terminal #4 of the jack to terminal #3 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

With the connections as described, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to terminals 3 and 4 of the jack should be omitted.

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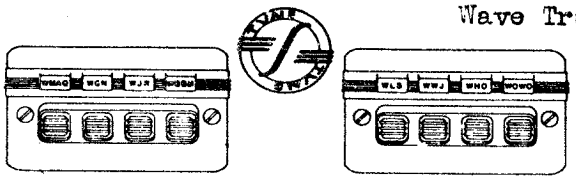
# SEARS-ROEBUCK & CO.

MODELS 4681,4781
Chassis 101.499
Chassis, Antenna
Wave Trap Data

1. Left knob . . "On-Off" switch and Volume
2. Next to left knob . . . Wave Band switch and Push Button Tuning
3. Center knob . . . . . Tuning
4. Next to right knob . . Selectivity
5. Right knob . . . . Tone Control

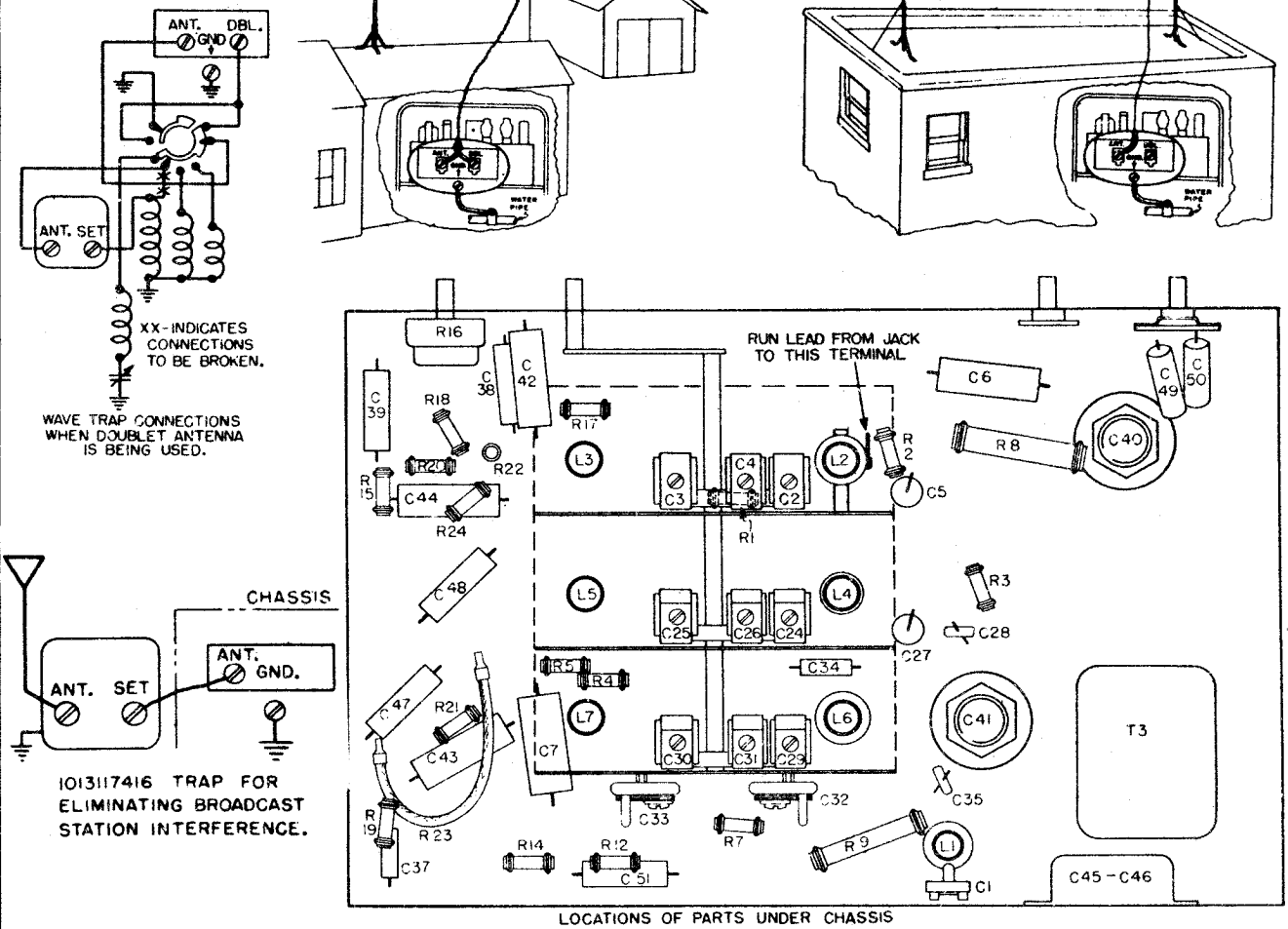


DIAL & KNOB FUNCTIONS

The trap has two terminals marked, "ANT" and "SET". If a conventional antenna is being used (not a doublet), the trap will be connected as follows. Disconnect the antenna leadin from the receiver and connect it to the "ANT" terminal of the trap. Connect a wire from the "SET" terminal of the trap to the "ANT" terminal of the chassis. The ground connection to the chassis remains as it was. The trap then is in series between the antenna and the receiver. The trap should be tuned to eliminate the interfering station. The sensitivity of the receiver will be reduced in the region of the frequency to which the trap is tuned.

If a doublet antenna is installed with the receiver, the trap must be connected between the antenna lug of the broadcast antenna coil primary and the Wave Switch. Remove the lead between the antenna lug of the primary and the wave switch. Connect the "ANT" terminal of the trap to the wave switch lug. Connect the "SET" terminal of the trap to the antenna coil lug. See Illustration below.

ANTENNA CONNECTIONS #5567 Doublet Antenna
#5510 Conventional Antenna
#5575 " "
#5513 " "




LOCATIONS OF PARTS UNDER CHASSIS

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## ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . . Across speaker voice coil
Output meter reading to indicate .5 watts output . . . . . 1.31 volts
Approximate average sensitivity in microvolts for .5 watts output . . . . . See chart below
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Connection of generator ground lead . . . . . To chassis
Generator modulation . . . . . 30%, 400 cycles
Position of volume control . . . . . Fully clockwise
Position of tone control . . . . . Fully clockwise
Position of selectivity control . . . . . Sharp
Position of dial pointer with variable fully closed . . . . . To fall on last calibration mark at 550 kc end of AMERICAN band.

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "INT" | 1.8 mc | 465 kc | .1 mfd. | 6L7G Grid | T2, T1 | IF | 70 |
| "AM" | Closed | 465 kc * | .0002 mfd. | Ant. Term. | C1 * | IF trap | - |
| "AM" | 1500 kc | 1500 kc | .0002 mfd. | Ant. Term. | C29,C24, C3 | Oscillator, Transl., RF | 30 |
| "AM" | 600 kc (rock) | 600 kc | .0002 mfd. | Ant. Term. | C32 | Padder | 18 |
| "INT" | 5 mc | 5 mc | 400 ohms | Ant. Term. | C30 | Oscillator | - |
| "INT" | 5 mc (rock) | 5 mc | 400 ohms | Ant. Term. | C25,C3 | Translator, RF | 5 |
| "INT" | 2 mc (rock) | 2 mc | 400 ohms | Ant. Term. | C33 | Padder | 15 |
| "FOR" | 15 mc | 15 mc | 400 ohms | Ant. Term. | C31 | Oscillator | - |
| "FOR" | 15 mc (rock) | 15 mc | 400 ohms | Ant. Term. | C26,C4 | Transl.,RF | 5 |

## IMPORTANT ALIGNMENT NOTES

* If the frequency of an interfering code station is known, the generator should be adjusted to that frequency instead of to 465 kc. The trap should be adjusted to give minimum output meter deflection instead of the usual maximum reading.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

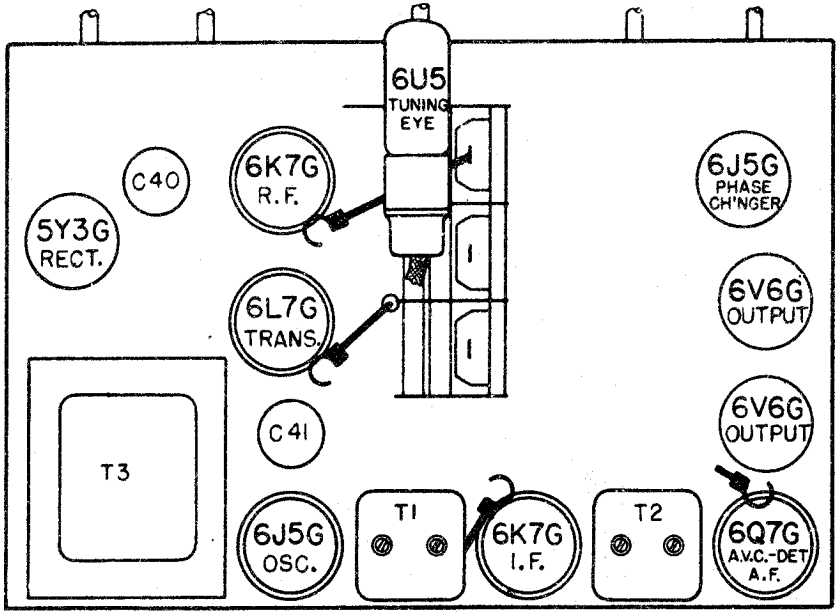
It is necessary to repeat the entire alignment procedure step by step in the original order to secure proper alignment. Perfect alignment is not possible with one adjustment of the trimmers.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

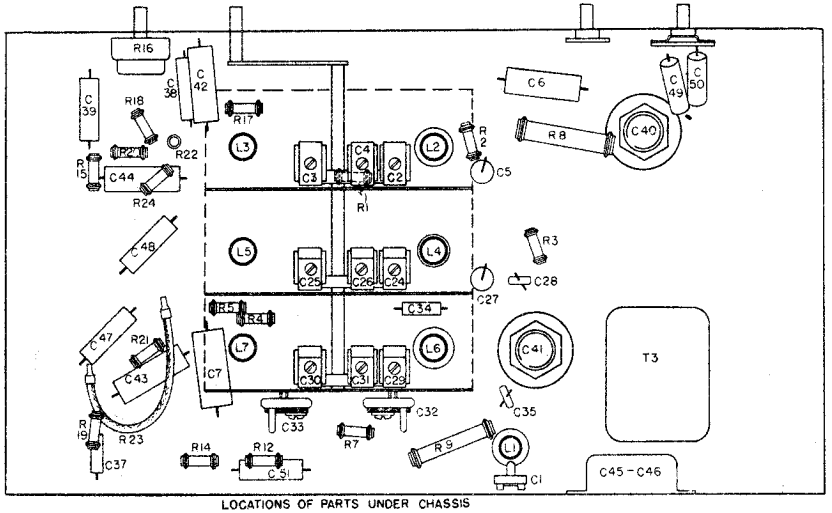
The shield plate that covers the coil assembly should be left in place while making the alignment adjustments. The trimmer screws are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment of any other band.

No connection should be made to the doublet terminal on the antenna connection block.




LOCATION OF PARTS ON TOP OF CHASSIS.




LOCATIONS OF PARTS UNDER CHASSIS

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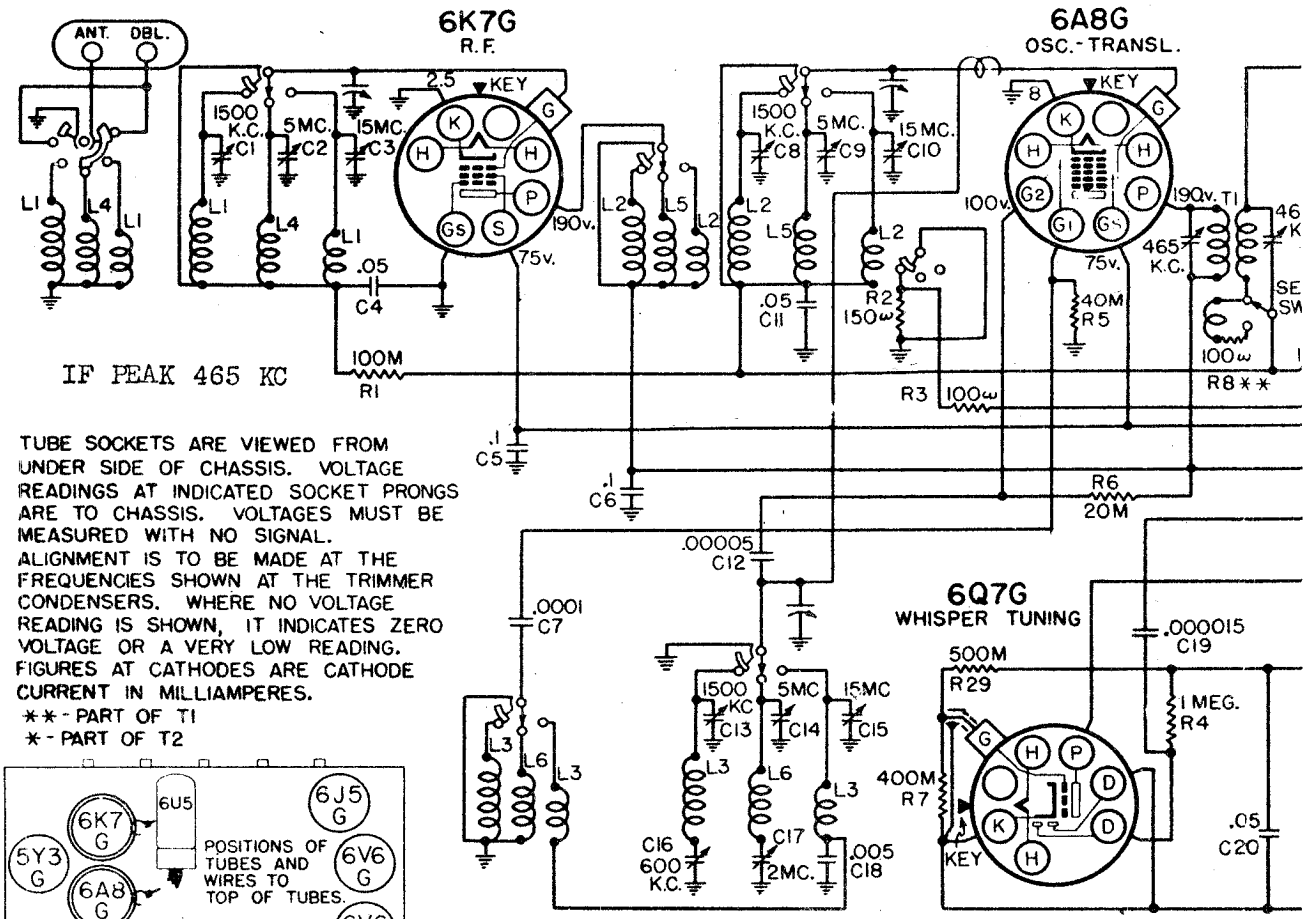
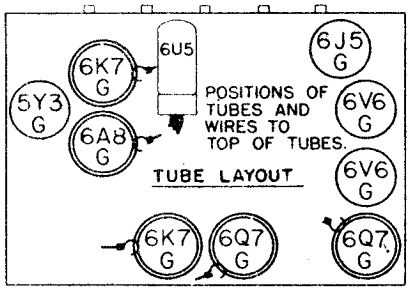



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. VOLTAGES MUST BE MEASURED WITH NO SIGNAL. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

** - PART OF T1

* - PART OF T2




POWER SUPPLY:
All models available 105-135 volts, 50-60 cycle, 85 watts
All models available 105-135 volts, 25 cycle, 90 watts

FREQUENCY RANGES:

| | |
|---|---|
| American Band | 540-1800 kc |
| Intermediate Band | 1760-6100 kc |
| Foreign Band | 5.9-18.3 mc |

ALIGNMENT FREQUENCIES:

| | Oscil. Trimmer | Ant-Transl. Trimmer | Oscil. Padder |
|---|---|---|---|
| Band "AM" | 1500 kc | 1500 kc | 600 kc |
| Band "INT" | 5 mc | 5 mc | 2 mc |
| Band "FOR" | 15 mc | 15 mc | Fixed |

INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:

| | |
|---|---|
| Type | Push-Pull (Beam Tubes) |
| Undistorted | 6 watts |
| Maximum | 10 watts |

LOUD SPEAKER:

| | |
|---|---|
| Type | Dynamic |
| Size | 6", 8", 10", 12" |
| Field coil resistance | 600 ohms |
| App. field coil voltage drop | 60 volts |

OPERATING FEATURES:
Tone Control . . . . . Three point
Selectivity Control . . . . Two point
Lo-Noise Control
Automatic Volume Control
Roll Over dial with only one scale visible at a time.
Automatic Tuning Dial

CHASSIS FEATURES:
Number RF stages . . . . . One
Number IF stages . . . . . One
Antenna . . . Doublet or Conventional
Line Noise Filter Condensers
Tuning Eye
Dual Tuning Ratio
Provision for Phonograph Pick-Up Connections

## MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left knob . . "On-Off" switch and Volume
2. Next to left knob . . . Wave Band Switch
3. Center knob . . . . . Tuning
4. Next to right knob. Inner: Selectivity. Outer: Lo-Noise.
5. Right knob . . . . . Tone Control

CONTROL OPERATION:
Turning right: Power on; volume increase
Turning right: American, Intermediate, Foreign
Tuning ratio: 6:1; 30:1
Turning right, inner: Sharp, Broad.
Turning right, outer: Normal, Lo-Noise.
Turning right: "LO", "MEDIUM", "HI"

FOR

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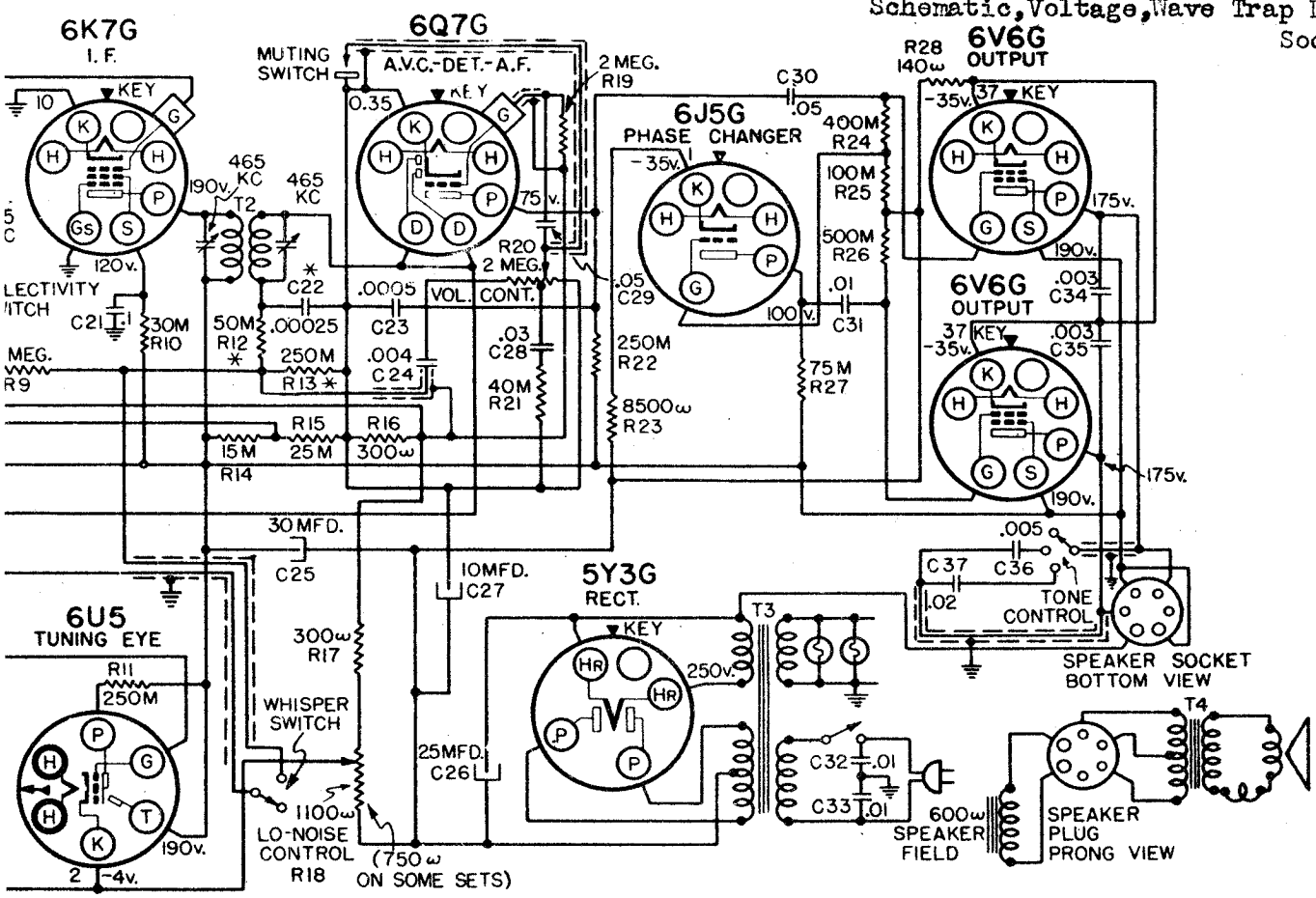
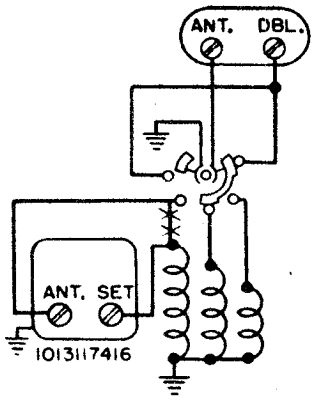
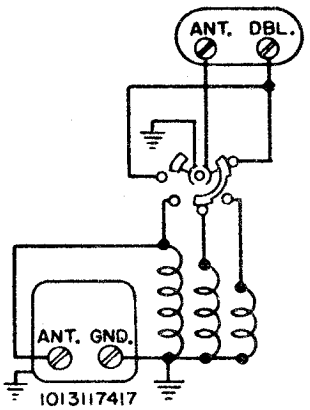
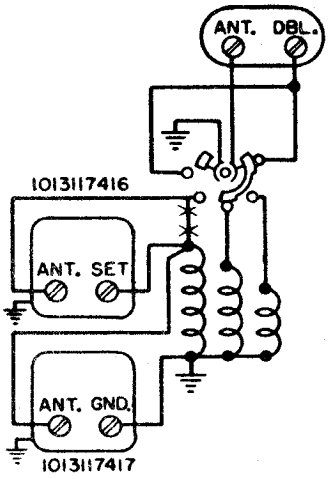
:BUCK & CO.

MODEL 4786, Chassis 100.196
Schematic, Voltage, Wave Trap Data
Socket

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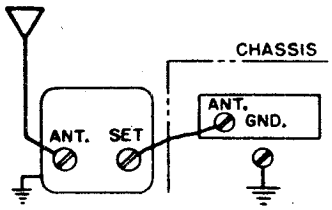
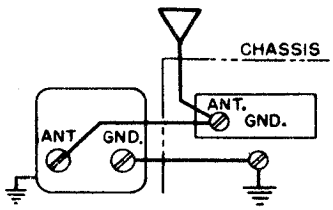
DEC. 10, 1937

X X - INDICATES CONNECTION TO BE BROKEN.

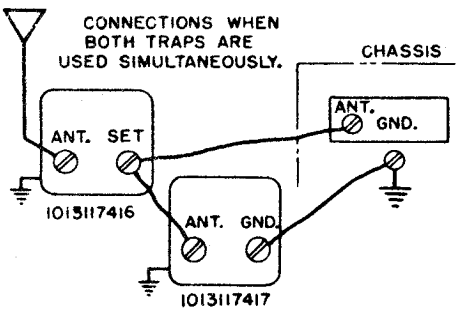
WAVE TRAP CONNECTIONS WHEN DOUBLET ANTENNA IS BEING USED




1013117416 TRAP FOR ELIMINATING BROADCAST STATION INTERFERENCE.



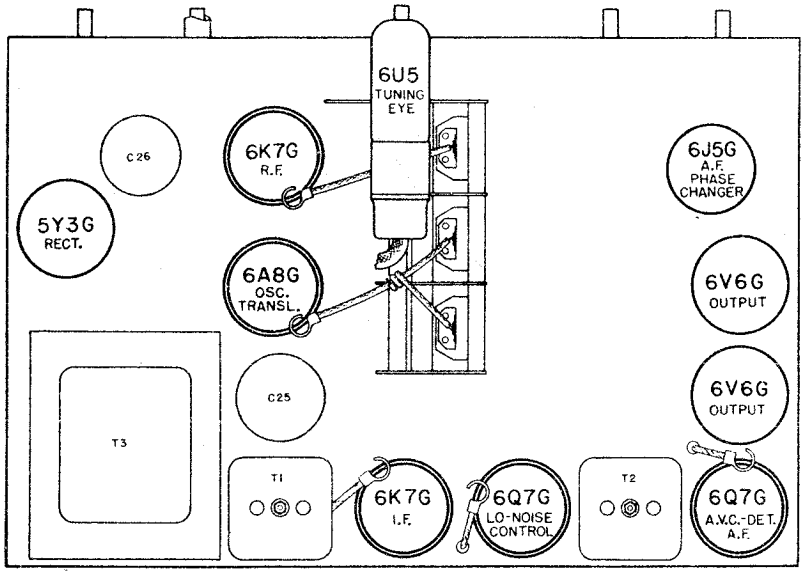

1013117417 TRAP FOR ELIMINATING CODE INTERFERENCE.



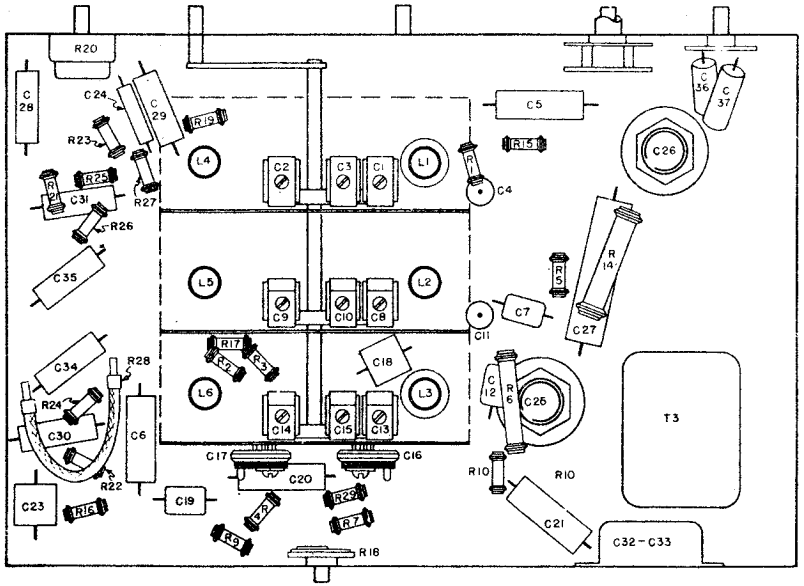

AUTOMATIC TUNING DIAL, SEE INDEX

# SEARS-ROEBUCK & CO.

MODEL 4786
Chassis 100.196
Socket, Trimmers
Alignment, Chassis




LOCATIONS OF PARTS ON TOP OF CHASSIS




LOCATIONS OF PARTS UNDER CHASSIS

## ALIGNMENT PROCEDURE

PRELIMINARY:

Output meter connections . . . . . Across speaker voice coil

Output meter reading to indicate .5 watts output . . . . . 1.31 volts

Approximate average sensitivity in microvolts for .5 watts output . . . . . See chart below

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Connection of generator ground lead . . . . . To chassis

Generator modulation . . . . . 30%, 400 cycles

Position of volume control . . . . . Fully clockwise

Position of tone control . . . . . Fully clockwise

Position of selectivity control . . . . . Sharp

Position of Lo-Noise control . . . . . Normal

Position of dial pointer with variable fully closed . . . . . To fall on last calibration mark at 550 kc end of AMERICAN band.

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "INT" | 1.8 mc | 465 kc | .1 mfd. | 6A8G Grid | T2,T1 | IF | 5200 |
| "AM" | 1500 kc | 1500 kc | .0003 mfd. | Ant. Term. | C13,C8, C1 | Oscillator, Transl., RF | 35 |
| "AM" | 600 kc (rock) | 600 kc | .0003 mfd. | Ant. Term. | C16 | Padder | 20 |
| "INT" | 5 mc | 5 mc | 400 ohms | Ant. Term. | C14 | Oscillator | - |
| "INT" | 5 mc (rock) | 5 mc | 400 ohms | Ant. Term. | C9,C3 | Translator, RF | 3 |
| "INT" | 2 mc (rock) | 2 mc | 400 ohms | Ant. Term. | C17 | Padder | 6 |
| "FOR" | 15 mc | 15 mc | 400 ohms | Ant. Term. | C15 | Oscillator | - |
| "FOR" | 15 mc (rock) | 15 mc | 400 ohms | Ant. Term. | C10,C3 | Translator, RF | 10 |

## IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the AVC action of the set from interfering with accurate alignment.

The shield plate that covers the coil assembly should be left in place while making the alignment adjustments. The trimmer screws are accessible through the holes in the shield.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment of any other band.

No connection should be made to the doublet terminal on the antenna connection block.

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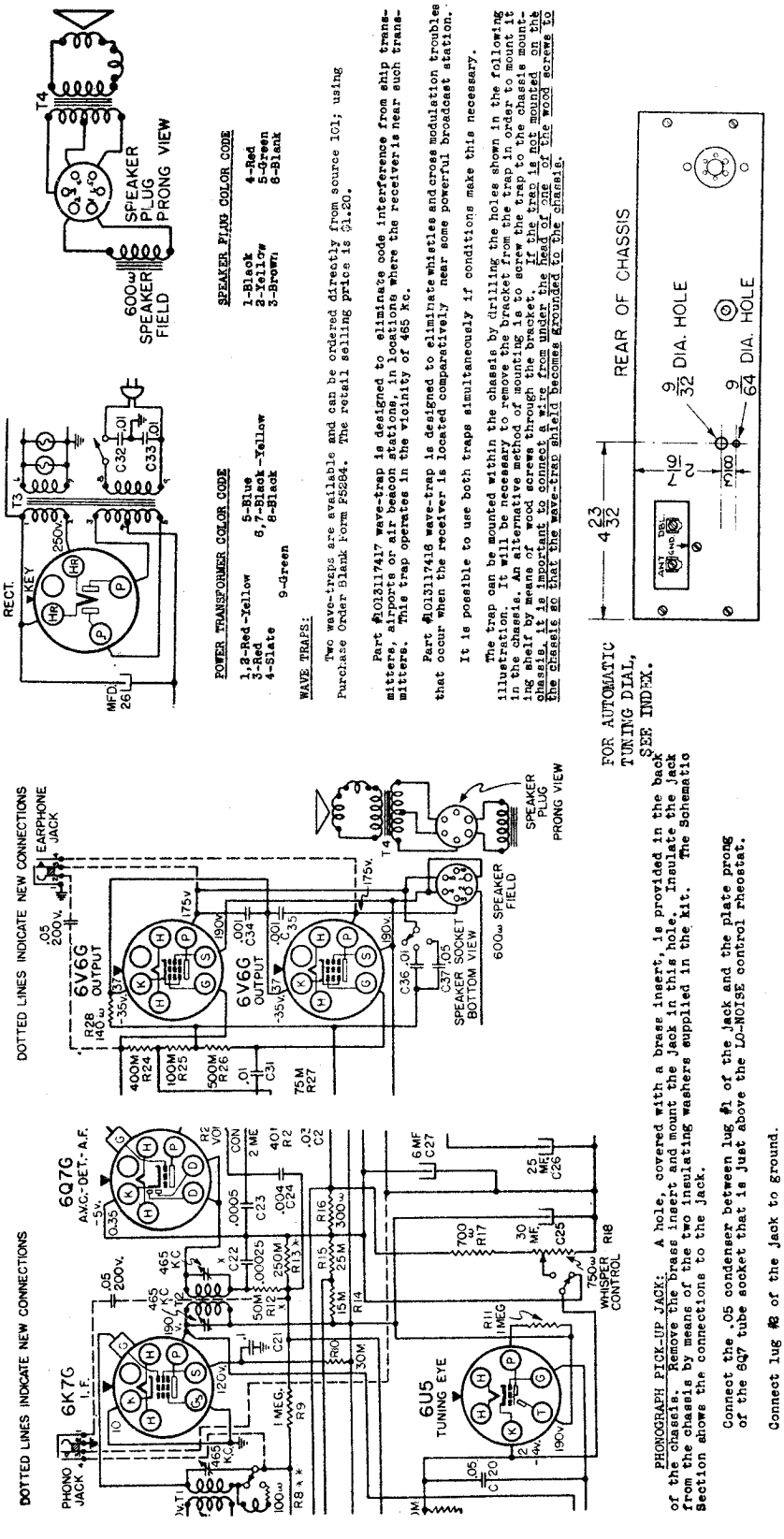
MODEL 4786
Chassis 100.196
Jacks Installation
Wave Trap, Color Code

# SEARS-ROEBUCK & CO.




FOR AUTOMATIC TUNING DIAL, SEE INDEX.

**SPEAKER PLUG COLOR CODE**

| | |
|---|---|
| 1-Black | 4-Red |
| 2-Yellow | 5-Green |
| 3-Brown | 6-Blank |

**POWER TRANSFORMER COLOR CODE**

| | |
|---|---|
| 1,2-Red-Yellow | 5-Blue |
| 3-Red | 6,7-Black-Yellow |
| 4-Slate | 8-Black |
| | 9-Green |

**WAVE TRAPS:**

Two wave-traps are available and can be ordered directly from source 101; using Purchase Order Blank Form P5884. The retail selling price is $1.20.

Part #1013117417 wave-trap is designed to eliminate code interference from ship transmitters, airports or air beacon stations, in locations where the receiver is near such transmitters. This trap operates in the vicinity of 465 Kc.

Part #1013117418 wave-trap is designed to eliminate whistles and cross modulation troubles that occur when the receiver is located comparatively near some powerful broadcast station.

It is possible to use both traps simultaneously if conditions make this necessary.

The trap can be mounted within the chassis by drilling the holes shown in the following illustration. It will be necessary to remove the bracket from the trap in order to mount it in the chassis. An alternative method of mounting is to screw the trap to the chassis mounting shelf by means of wood screws through the bracket. If the trap is mounted on the chassis, it is important to connect a wire from under the head of one of the wood screws to the chassis so that the wave-trap shield becomes grounded to the chassis.

If a conventional antenna is being used with the receiver, the traps are to be connected as described in the next two paragraphs and the illustration that follows them.

The part #1013117417 trap, for code interference elimination, has two terminals marked, "ANT" and "GND". Connect a wire between the "ANT" terminal of the trap and the "ANT" terminal of the chassis. Connect a wire between the "GND" terminal of the trap and the "GND" terminal of the chassis. The antenna and ground connections to the receiver remain as they were, the trap being connected across them. The trap should be adjusted to minimum response from the interfering station.

Part #1013117418 trap, for broadcast station interference elimination, has two terminals marked, "ANT" and "SET". Disconnect the antenna leadin from the receiver and connect it to the "ANT" terminal of the trap. Connect a wire from the "SET" terminal of the trap to the "ANT" terminal of the chassis. The ground connection to the chassis remains as it was. The trap then is in series between the antenna and the receiver. The trap should be tuned to eliminate the interfering station. The sensitivity of the receiver will be reduced in the region of the frequency to which the trap is tuned.

If a doublet antenna is installed with the receiver, the antenna terminal of the 1013117417 trap must be connected to the antenna lug of the broadcast band antenna coil primary in the chassis. The 1013117418 trap must be connected between the antenna lug of the broadcast antenna coil primary and the wave switch. Remove the lead between the antenna lug of the primary and the wave switch. Connect the antenna terminal of the trap to the wave switch lug. Connect the set terminal of the trap to the antenna coil lug. See next illustration.

**PHONOGRAPH PICK-UP JACK:** A hole, covered with a brass insert, is provided in the back of the chassis. Remove the brass insert and mount the jack in this hole. Insulate the jack from the chassis by means of the two insulating washers supplied in the kit. The Schematic Section shows the connections to the jack.

Connect the .05 condenser between lug #1 of the jack and the plate prong of the 6Q7 tube socket that is just above the LO-NOISE control rheostat.

Connect lug #2 of the jack to ground.

There is a terminal board mounted under the IF Input transformer. Connect the terminal on this board nearest the back of the chassis to lug #3 of the jack.

Connect lug #4 of the jack to the LO-NOISE control rheostat.

The radio Volume Control and Tone Control will operate for the phonograph pick-up.

**EARPHONE JACK:** Mount the jack in the hole in the back of the chassis. The jack frame must be grounded to the chassis. Therefore, do not use the insulating washers.

Connect the .05 condenser from terminal #2 of the jack to the grid prong of the 6V6G output tube.

Connect terminal #3 of the jack to terminal #5 of the speaker socket.

Connect terminal #4 of the jack to terminal #5 of the speaker socket.

This is the only wiring necessary. The wiring changes mentioned above for connection of the phonograph pick-up jack are not to be done if only an earphone jack is used.

With the connections as described, the loud speaker will not operate when the earphones are plugged in. If it is desired to have the loud speaker operate at the same time the earphones are plugged in, the connections to terminals 3 and 4 of the jack should be omitted.

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## THE AUTOMATIC TUNING DIAL:

The method of setting up the Automatic Tuning Dial follows in detail. In some cases frequency drift due to ageing of the parts with time will make it necessary to reset the Automatic Tuning dial buttons, particularly the ones for the high frequency end of the broadcast scale. After they have been reset once it is seldom necessary to reset them again although in some cases further ageing and drifting does occur, making a second resetting necessary.

**THE FIXED BUTTON, IDENTIFIED BY A RED CAP, CANNOT BE ADJUSTED TO ANY STATION. DO NOT TAMPER WITH THE ADJUSTMENT OF THIS BUTTON.**

| Approx. Kilocycle Range Or Button #1 | Approx. Kilocycle Range Or Button #2 | Approx. Kilocycle Range Or Button #3 | Approx. Kilocycle Range Or Button #4 | Approx. Kilocycle Range Or Button #5 | Approx. Kilocycle Range Or Button #6 | Approx. Kilocycle Range Or Button #7 | Approx. Kilocycle Range Or Button #8 | Approx. Kilocycle Range Or Button #9 | Approx. Kilocycle Range Or Button #10 | Approx. Kilocycle Range Or Button #11 |
|---|---|---|---|---|---|---|---|---|---|---|
| (CKLW) (BOSTON) (SAN FRANCISCO) (ALWAKN) (CHICAGO) (DENVER) (DESMOINES) (TYLOUS) (SAN ANTONIO) (MINNAN) (SACRAMENTO) (TACOMA) (KALAMAZOO) (NEW YORK) (CINCINNATI) (DALLAS) (CHICAGO) (PHILADELPHIA) (ROCHESTER) (NASHVILLE) (DAVIDSON) (SYRACUSE) (OMAHA) (LOS ANGELES) (CHICAGO) (DETROIT) (LOUISVILLE) (PITTSBURGH) (PHILADELPHIA) (ST PAUL) (BUFFALO) (DENVER) (SPOKANE) (NASHVILLE) (CHICAGO) (ATLANTA) (MINNEAPOLIS) (BOSTON) (CLEVELAND) (FT. WAYNE) (OKLAHOMA CITY) (POLICE) | | | | | | | | | | |
| 550 | 600 | 650 | 700 | 800 | 900 | 1000 | 1200 | 1400 | 1600 | 1800 |
| KILOCYCLES | ° ° ° AMERICAN ° ° ° | | | | | | | | | KILOCYCLES |

Make a list of the stations you want to set up on the AUTOMATIC TUNING dial. Mark down the frequency of the stations as well as their call letters. Arrange the stations in the order of their frequency. That is, the one of lowest frequency first; next higher frequency second, etc.

IF TWO OR MORE OF YOUR SELECTED STATIONS FALL WITHIN ONE BUTTON ADJUSTMENT, YOU MUST REVISE YOUR LIST OF STATIONS SO THAT ONLY ONE STATION WILL BE ASSIGNED TO A BUTTON.

To proceed with the setting up, turn the Selectivity Control knob to the SHARP position. See Fig. 7. (This knob must be turned to the SHARP position only for setting up the stations on the AUTOMATIC TUNING dial. After stations have been set up they may be tuned in with the knob in either the BROAD or SHARP positions.

If you select fewer than eleven stations so that there is no station in one or more of the frequency sections the button for that section will be left unadjusted. (54)

Pull the large knob, marked "TUNE", off of its shaft. See Fig. 7A.

Unscrew the four screws and remove the round AUTOMATIC TUNING plate. See Fig. 8. The mechanism will then appear as in Fig. 9. Note the numbering of the buttons.

Unlock the AUTOMATIC TUNING mechanism by pushing the stud to the left as shown by the forefinger and the arrow in Fig. 10. There will be a definite click and the studs will move about 5/16" to the edge of the slot. (You will find that the stud can also be pushed in. This is normal.) It takes quite a bit of pressure to move the stud so that it is necessary to hold the mechanism firmly with one hand, as shown.

Tune in the first station on your selected list. (The first station is the one of lowest frequency.) This can be done by rotating the center tuning shaft as shown in Fig. 11. (Be sure the Wave Band Switch is turned to the AMERICAN position.)

In the Illustration a 550 kc station has been chosen as an example. Note that the dial pointer is at approximately 580 kc on the Roll Over dial, the Tuning Eye shows the station as being tuned and that button #1 is in position to be adjusted. Your station for button #1 may be any station between 540 kc and approximately 550 kc since this is the frequency range of this button.

The key (see Fig. 12), has a hole at one end. This end is the handle. Insert the other end of the key into button #1. Push the button all the way in by means of the key and turn the button. You will find that the button can be turned in either direction but that it cannot be turned for more than one-half a circle. See Fig. 13.

If button #1 cannot be pushed in far enough to allow it to turn, it will be necessary to remove the hairpin clip from the red button. Then proceed to adjust button #1 as described in the following paragraph, being very careful not to turn the red button. The red button will go in slightly when adjusting button #1 but will return to its original position when #1 button is released after completing its adjustment. Replace the hairpin clip on the red button. This removal of the hairpin clip from the red button may be necessary only when adjusting button #1 or button #11. It will not be necessary when adjusting any of the other buttons.

There is a notch in the outer edge of the button that will tell you in what direction to turn the button. The button should be turned so that the notch would fall on an imaginary line drawn straight down from the center of the AUTOMATIC TUNING dial. When the notch reaches this point you will find that further rotation of the button will cause the entire AUTOMATIC TUNING mechanism to turn and will also cause the pointer to move on the Roll Over dial. Carefully turn the key so that your #1 station will be tuned in exactly. The station cannot be heard while the button is pushed in by means of the key, so that the Tuning Eye must be used for precise tuning as described in paragraph 18. When the dark portion at the bottom of the Tuning Eye is narrowest, the station is tuned in exactly even though the Roll Over dial pointer may not be exactly at 550 kc. See Fig. 14.

If the "Log" lists two buttons (#1 or #2) for the station you have selected, you may find that even when button #1 is turned as far as possible its notch does not quite come to the imaginary center line of the dial and that the station cannot be tuned in with button #1. You must then choose a different station for button #1 and the station you chose originally will be set up on button #2. If you have no other station for button #1, turn the button so that its notch is about midway in its range as shown by button #6 in Fig. 13. This will keep it from interfering with the adjustment of adjacent buttons. This procedure must be followed for all those stations that have two button numbers listed in the "Log".

Carefully pull out the key allowing the button to snap back into position. If the button sticks when you try to pull the key out, shake it slightly and it should snap out. See Fig. 15. The button must be out before proceeding to the next step. When the button is out, it must not be pushed in again until the mechanism has been locked as described in the following paragraph.

Lock the mechanism by moving the stud to the right as indicated by the forefinger and arrow in Fig. 16. Note that one hand is holding the mechanism at the outer edge of the buttons so that they are not pushed in accidentally.

You can check the accuracy of your setting of the button by turning the round AUTOMATIC TUNING mechanism about an inch or so, so that your station is no longer tuned in. Then push the button that you have just adjusted all the way in with your finger and turn the mechanism so that the button is carried toward the bottom point of the AUTOMATIC TUNING dial until it reaches its stop. Then remove your finger from the button and your station will be tuned in. Now see if it can be tuned any more exactly by rotating the center shaft as illustrated in Fig. 11. Use the Tuning Eye to determine exactness of tuning. If you find that you can tune the station in more exactly by means of the center shaft than by means of the AUTOMATIC TUNING dial button, it indicates that you have not adjusted the button carefully enough and the procedure should be repeated more accurately.

LO-NOISE AND SELECTIVITY CONTROL

FIG. 7A

PULLING KNOB STRAIGHT OFF OF TUNING SHAFT.

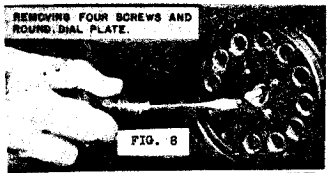
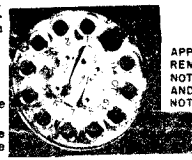



FIG. 8

FIG. 7



APPEARANCE OF MECHANISM AFTER REMOVAL OF ROUND DIAL PLATE. NOTE ELEVEN NUMBERED BUTTONS AND ONE FIXED BUTTON THAT IS NOT NUMBERED.

FIG. 9

FIG. 10

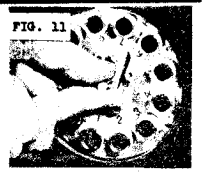
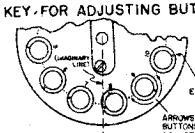


FIG. 11

TUNING IN #1 STATION WITH CENTER SHAFT.

FIG. 12

KEY FOR ADJUSTING BUTTONS




TURN BUTTON BY MEANS OF KEY SO THAT NOTCH WOULD FALL ON AN IMAGINARY LINE DRAWN STRAIGHT DOWN FROM CENTER OF DIAL.

ARROWS SHOW EXTENT TO WHICH BUTTONS MAY BE TURNED. DO NOT TRY TO TURN BUTTONS SO THAT NOTCH WOULD PASS DOTTED LINE.

FIG. 13

NOTE NARROWED SLOT OF TUNING EYE INDICATING STATION TUNED CORRECTLY.

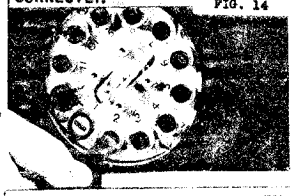


FIG. 14

TUNING IN #1 STATION WITH KEY.

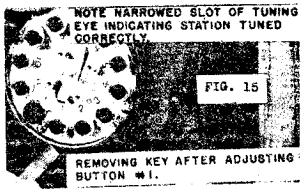



FIG. 15

Leave the receiver turned on for about half an hour to heat up before adjusting the AUTOMATIC TUNING mechanism. This will insure accurate and permanent settings.

FIG. 16

MECHANISM HELD FROM TURNING. BE CAREFUL NOT TO PUSH IN BUTTONS WHILE HOLDING.

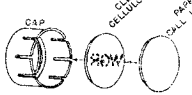
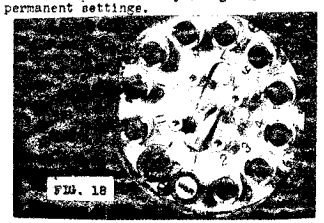



FIG. 17




CAP WITH CALL LETTERS IN PLACE ON BUTTON #1.

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After the AUTOMATIC TUNING dial button has been adjusted properly and the mechanism locked as described, you are ready to insert the cap with the station's call letters. If you purchased your radio from a Sears' Retail Store proceed as follows:

**RETAIL STORE MODELS:**

Push out the disc containing the call letters of your selected #1 station. Place one of the clear celluloid discs into one of the metal caps and then place the disc with your station call letters in the cap. Be sure to put the disc in so that the call letters are readable from the front of the cap. See Fig. 17.

Push the cap into place on the button for your station. See Fig. 18. Be sure the cap is put on so that the letters are upright and can be read easily.

Again unlock the dial mechanism by moving the stud to the left as shown by the forefinger and arrow in Fig. 20. As before, the mechanism must be held firmly with one hand, being careful not to push in any of the buttons, while unlocking the mechanism.

**MAIL ORDER MODELS.**

Tune in the second station on your selected list. This can be done by rotating the center tuning shaft as shown in Fig. 21. In the Illustration a 590 kc station has been chosen as an example. Note that the dial pointer is at approximately 590 kc on the Roll Over dial, the Tuning Eye shows the station as being tuned and that button #2 is in position to be adjusted. Your station for button #2 may be any station between approximately 580 kc and 590 kc since this is the frequency range for button #2. See Fig. 19.

Insert the key (Fig. 12) into button #2. Push the button all the way in by means of the key and turn the button. As before, you will find that the button can be turned in either direction but that it cannot be turned for more than one-half a circle. See Fig. 13.

There is a notch in the outer edge of the button that will tell you in what direction to turn the button. The button should be turned so that the notch would fall on an imaginary line drawn straight down from the center of the AUTOMATIC TUNING dial. When the notch reaches this point you will find that further rotation of the button will cause the entire AUTOMATIC TUNING mechanism to turn and will also cause the pointer to move on the Roll Over dial. Carefully turn the key so that your #2 station will be tuned in exactly. The station cannot be heard while the button is pushed in by means of the key, so that the Tuning Eye must be used for precise tuning as described. When the dark portion at the bottom of the Tuning Eye is narrowest, the station is tuned in exactly even though the Roll Over dial pointer may not be exactly at 590 kc. See Fig. 32.

Carefully pull out the key allowing the button to snap back into position. If the button sticks when you try to pull the key out, shake it slightly and it should snap out. See Fig. 33. The button must be out before proceeding to the next step. When the button is out, it must not be pushed in again until the mechanism has been locked as described in the following paragraph.

Lock the mechanism by moving the stud to the right as indicated by the forefinger and arrow in Fig. 24. Note that one hand is holding the mechanism at the outer edge of the buttons so that they are not pushed in accidentally.

You can check the accuracy of your setting of the button by turning the round AUTOMATIC TUNING mechanism about an inch or so, so that your station is no longer tuned in. Then push #2 button that you have just adjusted all the way in with your finger and turn the mechanism so that the button is carried toward the bottom point of the AUTOMATIC TUNING dial until it reaches its stop. Then remove your finger from the button and your station will be tuned in. Now see if it can be tuned any more exactly by rotating the center shaft as illustrated in Fig. 21. Use the Tuning Eye to determine exactness of tuning. If you find that you can tune the station in more exactly by means of the center shaft than by means of the AUTOMATIC TUNING dial button, it indicates that you have not adjusted the button carefully enough and the procedure should be repeated more accurately.

After the AUTOMATIC TUNING dial button has been adjusted properly and the mechanism locked as described, you are ready to insert the cap with the station's call letters. If you purchased your radio from a Sears' Retail Store proceed as follows:

**RETAIL STORE MODELS:**

Push out the disc containing the call letters of your selected #3 station. Place one of the clear celluloid discs into one of the metal caps and then place the disc with your station call letters in the cap. Be sure to put the disc in so that the call letters are readable from the front of the cap. See Fig. 35.

Push the cap into place on the button for your station. See Fig. 26. Be sure the cap is put on so that the letters are upright and can be read easily.

**MAIL ORDER MODELS:**

The same perforated paper sheet with station call letters and the clear celluloid discs are provided as for Retail Store Models. Because the call letter sheets are perforated, this is the easiest method. However, if you wish the station call letters to be illuminated, the perforated paper sheet and the clear celluloid discs will not be used. Instead, the cellophane sheet with station call letters and the colored celluloid discs will be used. It will be necessary to cut out the call letters of your selected station, using a scissors and cutting around the outline of the printed circle. Place one of the unprinted colored celluloid discs in one of the metal caps, then the cut-out cellophane disc with your station call letters, and then another colored celluloid disc in the cap. See Fig. 27. Then place the cap into position on the button.

**Proceed in the same manner with each of the other stations on your selected list. Always unlock the mechanism before attempting to adjust any of the buttons. Be careful not to push in and turn any of the adjusted buttons while the mechanism is in the unlocked position. Always be sure to lock the mechanism before putting on the cap with the station call letters. Otherwise, the button might be turned while the cap is being pushed on, upsetting the adjustment.**

**If there is no broadcast station on your selected list for button #11, this button can be used for "POLICE" stations. If the button is adjusted when the Roll Over dial pointer is set to about 1650 kc, various POLICE stations will be heard at this setting. However, if there is a particular POLICE transmitter to which you wish to adjust the button, tune in the station and adjust button #11 in the same manner as was done for broadcast stations.**

When all of the buttons have been adjusted and the caps put on them, the mechanism will appear as in Fig. 38. If you have selected fewer than 11 stations, not all of the buttons will be adjusted. A cap with the discs should be put on the unadjusted button but instead of using a disc with printed station call letters use one of the discs that has a printed star.

Replace the round AUTOMATIC TUNING dial plate, using the four screws. If there was a paper washer behind the plate, put it back in place before screwing on the plate. Then push the knob back onto its shaft. Notice that the shaft has a flat side and that the hole in the knob is correspondingly shaped, so that the two have to be fitted together properly before the knob can be pushed onto the shaft. See Fig. 29.

**OPERATION:**

To tune in any of the stations that have been set up on the AUTOMATIC TUNING dial, merely push in the button with the station's call letters and turn the dial until the button clicks into place at the bottom of the dial. The dial must always be turned in such direction that the button with your finger on it will reach the bottom point of the dial before the red button does. In other words, when you place your finger on a button for a desired station, turn the dial so that the red index button follows your finger rather than having your finger follow the red index button. The radio will be reduced in volume when the button is pushed in, eliminating noise between stations while tuning with the AUTOMATIC TUNING dial.

UNLOCKING MECHANISM BEFORE TUNING IN #2 STATION. NOTE LEFT HAND HOLDING MECHANISM FROM TURNING.

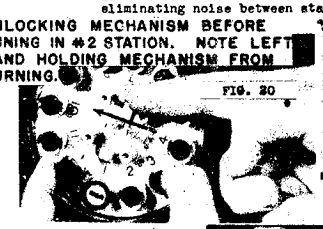


FIG. 20

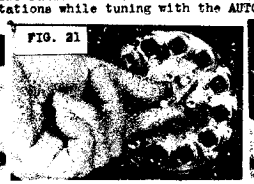


FIG. 21

TUNING IN #2 STATION WITH CENTER SHAFT.

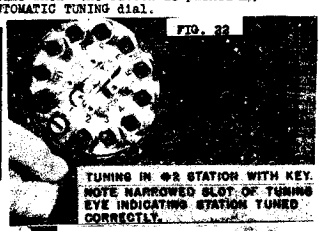


FIG. 32

TUNING IN #2 STATION WITH KEY. NOTE NARROWED SLOT OF TUNING EYE INDICATING STATION TUNED CORRECTLY.

FIG. 19
FIG. 27

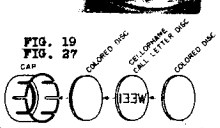
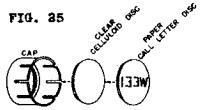



FIG. 35



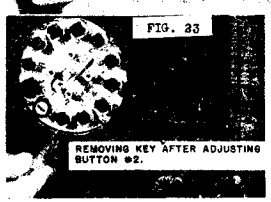



FIG. 33

REMOVING KEY AFTER ADJUSTING BUTTON #2.

LOCKING MECHANISM AFTER ADJUSTING BUTTON #2.

FIG. 34

MECHANISM HELD FROM TURNING. BE CAREFUL NOT TO PUSH IN BUTTONS WHILE HOLDING.

CAPS WITH CALL LETTERS IN PLACE ON ALL BUTTONS.

FIG. 38

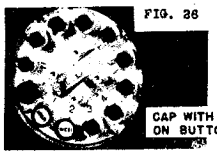


FIG. 26

CAP WITH CALL LETTERS IN PLACE ON BUTTON #2.

CAPS WITH CALL LETTERS IN PLACE ON ALL BUTTONS. DIAL PLATE AND KNOB REPLACED.

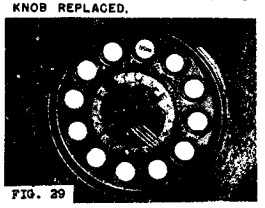
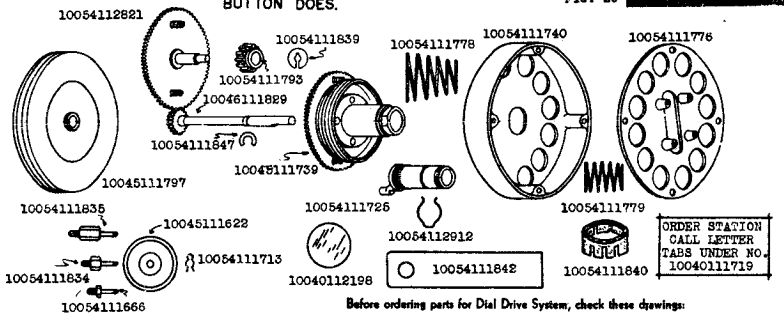


FIG. 29

PUSH IN BUTTON FOR DESIRED STATION AND TURN DIAL SO THAT FINGER REACHES BOTTOM POINT OF DIAL BEFORE RED BUTTON DOES.




Before ordering parts for Dial Drive System, check these drawings:

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Automatic Tuner Data
Part 3

SEARS-ROEBUCK & CO.

MODEL 4786,Ch.100.196
MODELS 4610,4669,4769
4789,Ch. 101.482

JULY 15, 1937

**SUBJECT: READJUSTING THE AUTOMATIC TUNING DIAL STOP BUTTON TO MAKE IT POSSIBLE TO SET UP DESIRED STATIONS, THAT ARE CLOSE IN FREQUENCY, ON ADJACENT BUTTONS.**

By referring to ranges it will be seen that WMAQ, 670 kc, would be set up on button #4. WGN, 720 kc, would be set up on button #4 or #5. WBBM, 770 kc, would be set up on button #5. Since these three stations come within the frequency range of only two of the buttons, the customer would ordinarily have to give up one of the three stations for AUTOMATIC TUNING.

It is possible, however, to change the setting of the "fixed" button and make it possible to set up three such stations, close together in frequency, on three separate buttons.

The method of doing this is as follows:

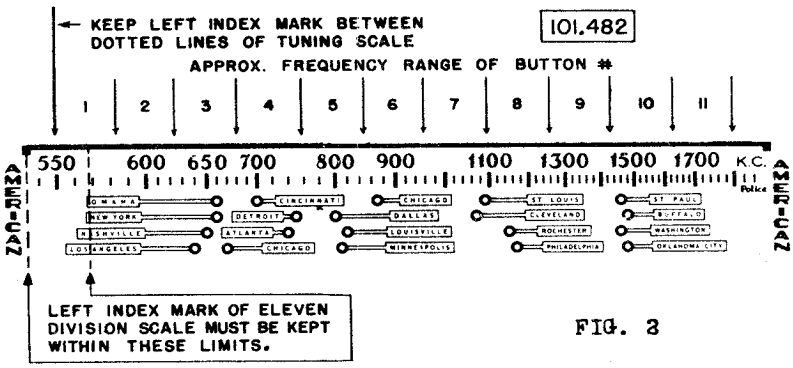


FIG. 2

**FIRST:-**
**Make a full size reproduction of button frequency ranges on a suitable paper or cardboard,- an eleven division scale, one division for each button range as illustrated.**
**SECOND:-**
**Likewise make a full size reproduction of the AMERICAN band on suitable paper or cardboard.**

Make a light pencil mark on the reproduction of the tuning scale at the frequency of each of the eleven desired stations. Then lay the eleven division scale against the reproduction of the tuning scale and move the eleven division scale to such a position that each of the pencil marked positions for the eleven desired stations will fall within the range of a different button. However, the eleven division scale can only be moved so that its left index mark comes between the dotted lines of the reproduction of the tuning scale, as shown in Fig. 2. In Fig. 2 it will be seen that by moving the eleven division scale to the point shown, WMAQ will be within the range of button #3; WGN will be within the range of button #4; and WBBM will be within the range of button #5.

When a position of the eleven division scale is found that will allow the eleven desired stations to fall within the range of separate buttons, carefully note at what point on the reproduction of the dial scale the left index mark of the eleven division scale comes. In the illustration for stations WMAQ, WGN, and WBBM, the index mark is just about opposite 550 kc on the dial scale. (Fig. 2).

Remove the chassis from its cabinet. Leave the AUTOMATIC TUNING dial escutcheon off.

Turn the AUTOMATIC TUNING dial to its stop so that the variable is fully meshed. Now move the pointer along its drive cable to the point on the dial that corresponds exactly to the position of the left index mark of the eleven division scale, as described in the preceding paragraph. As can be seen by inspection, the pointer is pinched onto the drive cable and it will be necessary to pry this pinching open slightly so that the pointer can be moved along the cable. The AUTOMATIC TUNING dial must be kept turned all the way to the left to its stop during the operation of moving the pointer. After the pointer has been moved to its new position it should be pinched onto the cable again so that it cannot slip.

Loosen the set screw that holds the variable condenser drive drum to the variable condenser shaft.

Unlock the AUTOMATIC TUNING dial mechanism by moving the studs counter-clockwise. Pull out the "hair pin" clip that will be found on the unnumbered stop button. This button can then be pushed in and turned the same as the other eleven numbered buttons. Push in the unnumbered button and turn it to such position that when the AUTOMATIC TUNING dial mechanism is turned to its limit the pointer will be at its original stop at the left end of the dial. Then lock the mechanism by rotating the studs clockwise. (Be careful not to push in button #1 while the unnumbered button is pushed in as this may jam the mechanism. If this should happen the mechanism can be freed by pushing in the stop latch, as will be seen by inspection.) Replace the "hair pin" clip on the unnumbered button.

With the mechanism turned all the way to the left to its stop and with the dial pointer at its left limit on the dial, fully mesh the variable condenser by turning the movable plates with the fingers. Then re-tighten the set screw that holds the condenser drive drum to the variable condenser shaft.

The eleven desired stations can then be set up on the eleven adjustable buttons in accordance with the instructions.(*SEE PRECEEDING PAGES*). The new frequency ranges for the buttons will be determined by holding the eleven division scale against the reproduction of the tuning scale, with the left index mark of the eleven division scale at the proper point between the dotted lines on the reproduction of the Tuning dial scale.

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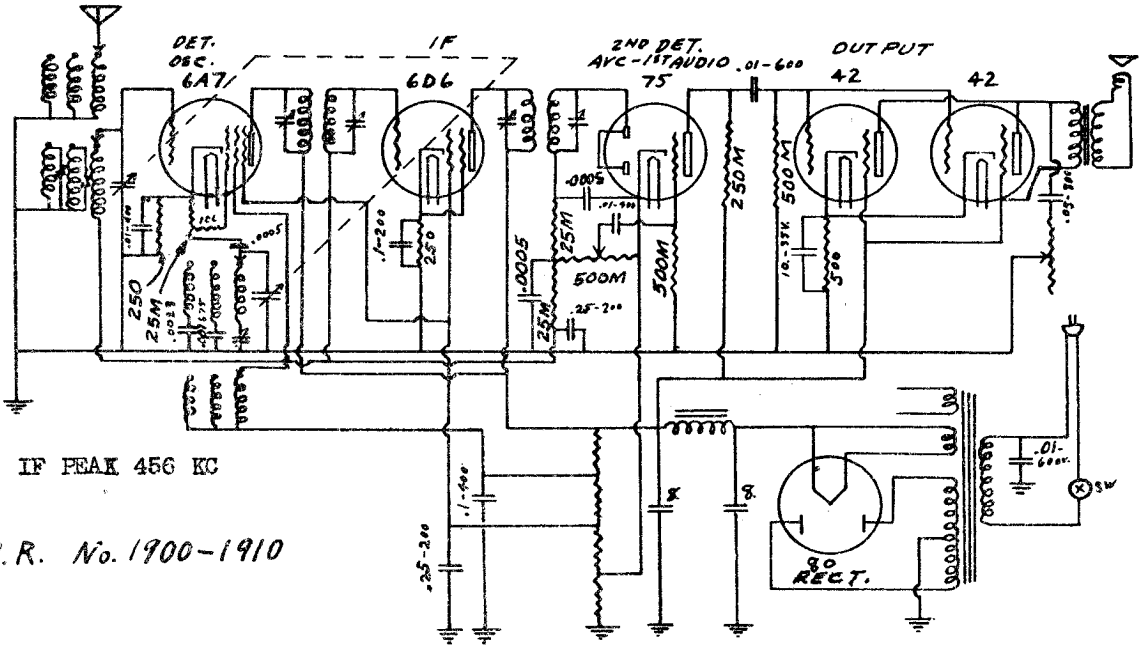
MODELS 1900,1910
Schematic,Socket

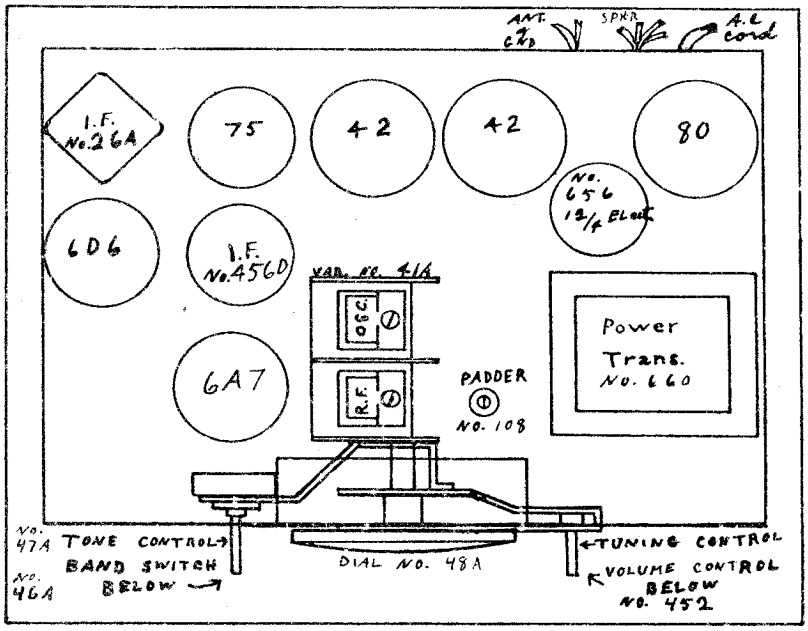
SEARS-ROEBUCK & CO.

Trimmers,Alignment




IF PEAK 456 KC

S.R. No. 1900-1910




ALIGNMENT

1- Apply 456 KC note to control grid of 6A7 and peak IF trans. for max. gain.
2- Apply 4000 KC note to antenna wire; set band switch to 2nd band and align trimmer on oscillator section of variable condenser to track with 4000 KC on dial.
3- Turn Band switch to Brcadcast band; apply 1500 KC note to antenna wire, adjust trimmer on RF section of variable condenser for maximum gain.
4- Apply 600 KC note to antenna, adjust padder condenser for maximum gain, swinging condenser back and forth across 600 KC signal.
5- Check 1400 KC signal for alignment.
6-Turn band switch to 2nd band; check 4000 KC signal for alignment and adjust trimmer on antenna coil for greatest gain at 4000 KC.
7-Turn band switch to last band and adjust trimmer on antenna coil for greatest noise on 12 megacycles.

RECEIVER RANGE - THREE WAVE BANDS

540 - 1720 kilocycles; 1720 - 5000 kilocycles; 5.5 - 16 megacycles

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| | Radio Only | Total |
|---|---|---|
| POWER SUPPLY RATING . . . . . 105-125 volts, 60 cycles . . | 75 watts . . | 105 watts |

FREQUENCY RANGES:
- American Band . . . . . 540-1720 kc
- Foreign Band . . . . . 5.8-18 mc

ALIGNMENT FREQUENCIES:
- Band "F" . . . . . 15 mc(osc.,det.)
- Band "A" . 600 kc(osc.), 1500 kc(osc.)

INTERMEDIATE FREQUENCY . . . . . 460 kc

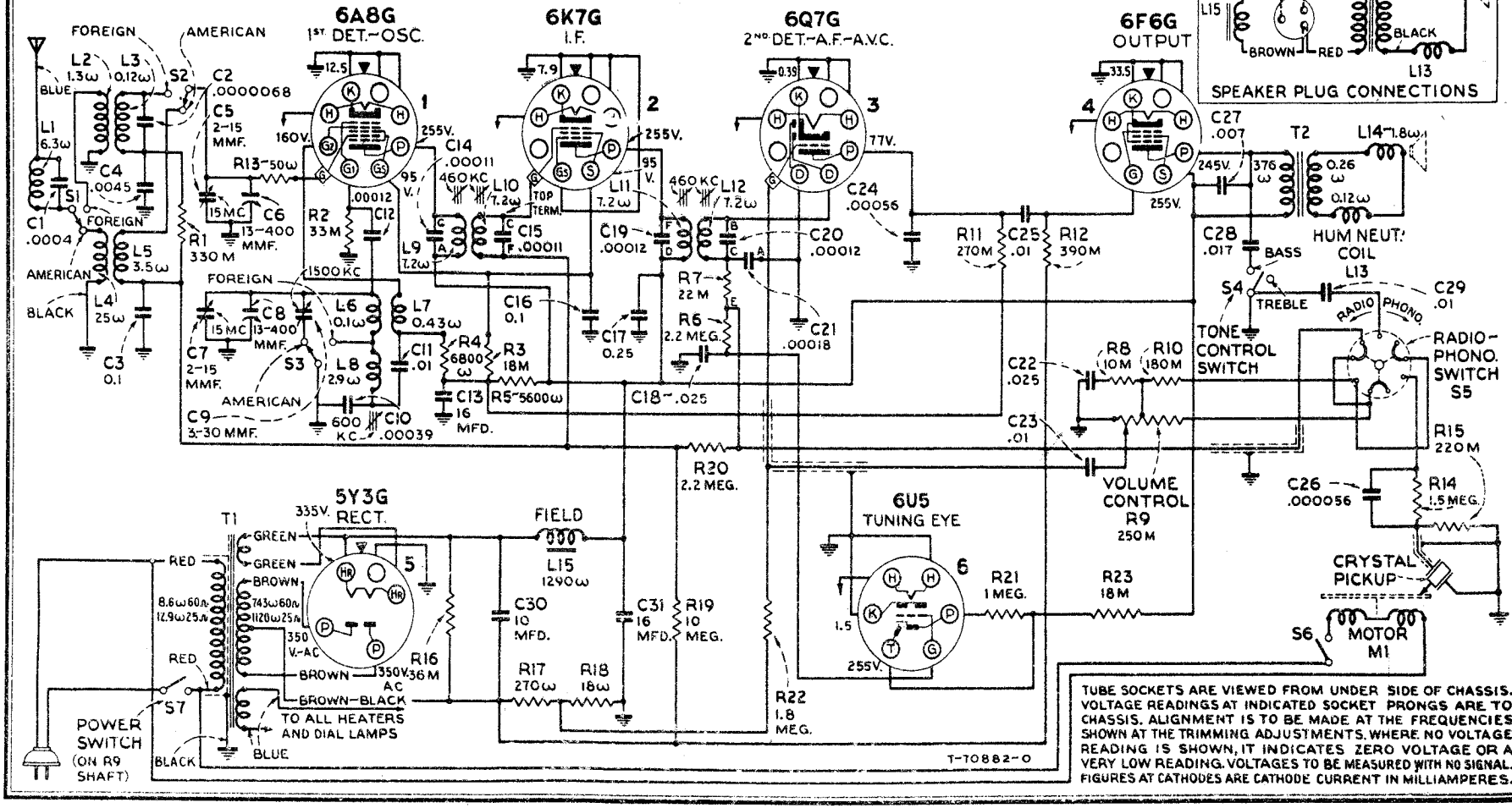
POWER OUTPUT:
- Type . . . . . Pentode
- Undistorted . . . . . 2.5 watts
- Maximum . . . . . 4.5 watts

LOUDSPEAKER:
- Type . . . . . Electrodynamic
- Size . . . . . 12 inches
- V.C. Impedance 2.25 ohms at 400 cycles
- Field Coil Resistance . . . . 1290 ohms
- App. Field Coil Voltage Drop . 80 volts

OPERATING FEATURES:
- Phonograph-Radio operation
- Automatic Phonograph Mechanism with self-starting, governor-type motor
- Two-point Tone Control
- Automatic Volume Control

PHONOGRAPH:
- Type . . . . . Automatic-Manual
- Record Capacity . . . . . Eight 10-inch
- Turntable Speed . . . . . 78 R.P.M.
- Type of Pickup . . . . . Crystal
- Pickup Impedance . . . 75,000 ohms at 1000 cycles

**DEC. 10, 1937**




TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. VOLTAGES TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

SEARS-ROEBUCK & CO.

MODEL 4796, Ch. 126-201 Schematic, Voltage

SEARS PAGE 10-29

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## ALIGNMENT PROCEDURE

**PRELIMINARY:**

Output meter connections . . . . . Across speaker voice coil

Output meter reading to indicate 1.0 watt output . . . . . 1.5 volts

Approximate average sensitivity in microvolts for 1.0 watt output . . . . . See chart below

Dummy antenna value to be inserted in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Connection of generator ground lead . . . . . To chassis

Generator modulation . . . . . 30%, 400 cycles

Position of Radio-Phono. switch . . . . . Counter-clockwise

Position of Volume Control . . . . . Fully clockwise

Position of Tone Control . . . . . Fully clockwise

Position of Dial Pointer with variable tuning condenser fully closed . . . . To fall on last calibration mark at 540 kc end of "American" band.

| WAVE-BAND SWITCH POSITION | POSITION OF DIAL POINTER | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "AM" | No signal 550-750 kc | 460 kc | .001 mfd. | 6K7-G Grid | L11,L12 | 2nd I-F Trans. | 15,000 |
| "AM" | No signal 550-750 kc | 460 kc | .001 mfd. | 6A8-G Grid | L9,L10 | 1st I-F Trans. | 200 |
| "FOR" | 15 mc | 15 mc | 300 ohms | Ant. Lead (blue) | C7** | "FOR" Osc. | - |
| "FOR" | 15 mc (rock) | 15 mc | 300 ohms | Ant. Lead (blue) | C5* | "FOR" Det. | 60 |
| "AM" | 1500 kc (rock) | 1500 kc | .0002 mfd. | Ant. Lead (blue) | C9 | "AM" Osc. | - |
| "AM" | 600 kc (rock) | 600 kc | .0002 mfd. | Ant. Lead (blue) | L8 | "AM" Osc. | 29 |
| "AM" | 1500 kc (rock) | 1500 kc | .0002 mfd. | Ant. Lead (blue) | C9 | "AM" Osc. | 97 |

**IMPORTANT ALIGNMENT NOTES**

**Use maximum capacity peak if two peaks can be obtained.

*Use minimum capacity peak if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the a-v-c action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment in any other band. Grid cap leads should remain in place during alignment.

Values shown under, "Microvolts," are only approximate.

CHASSIS FEATURES:
No. I-F stages . . . . . One
Antenna . . . . Doublet or Conventional
Tuning Eye
Line Noise Electrostatic Transformer Shield
Aural-Compensated Radio and Phonograph Volume Control
Fixed Wave-Trap
Magnetite-Core Adjusted IF Transformers and "American" Band Low-Frequency Oscillator Tracking

## GENERAL INFORMATION AND SERVICE HINTS

**ELIMINATING WHISTLE AT 920 KC:**

A whistle due to a beat between the second harmonic (920 kc) of the 460 kc I.F., and a 920 kc signal may be experienced. In localities where the 920 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the I-F frequency of the receiver.

Determine at what point between 890 kc and 950 kc the whistle will be least objectionable. Dividing this frequency by two will give the new I-F frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 905 kc would not be objectionable, the I.F. should be re-aligned at 905/2 or 452.5 kc. Try to select the new I-F frequency as close as possible to 460 kc.

An interfering whistle may also be caused by two stations having a frequency difference equal to the I-F frequency (460 kc) of the receiver and will be evidenced by a whistle appearing when the receiver is tuned to either of the stations. It may be further localized by tuning the receiver to each of these stations and then stopping the oscillator in each case, by grounding the oscillator stator section of the variable tuning condenser CB to chassis. If the whistle, in each case, still persists, it is being caused by the beat between these two stations and may be corrected by shifting the I-F frequency, of the receiver, to a frequency other than the difference frequence of the two local or strong signals (stations).

The I-F amplifier should not be shifted to a frequency higher than 475 kc, nor lower than 445 kc, but should be as close to 460 kc as possible.

Align the I.F. at the new frequency and then re-align the rest of the receiver as described under "ALIGNMENT PROCEDURE."

**AUTOMATIC RECORD MECHANISM:**

The record changing mechanism is designed to be simple and fool-proof. Certain adjustments may be required occasionally. The adjustments are illustrated in this booklet.

It is important, when servicing the automatic mechanism, to have it placed on a level support. It is also important to refrain from forcing the mechanism if there is a tendency to bind or jam, since bent levers and broken parts may result. Application of oil to the felt pad which rubs against the motor governor disc will insure smooth operation.

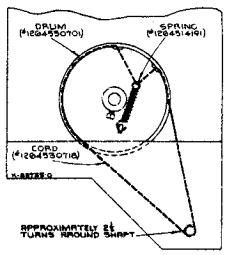
CAUTION.--Do not leave records stacked on record-holder posts, when not in use, as they are liable to warp, particularly so in warm climates.

**LOUDSPEAKER:**

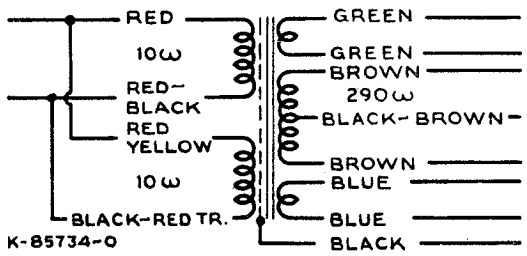
Centering of the loudspeaker is made in the usual manner with three, narrow-paper feelers, after first removing the front dust cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

**DIAL POINTER AND CONDENSER DRIVE HOOK-UP:**

The drive hook-up for the dial pointer and the variable condenser is illustrated.




DIAL DRIVE HOOKUP




CONNECTIONS FOR 110 VOLT, 60 CYCLE REPLACEMENT POWER TRANSFORMER (126030607)

MODEL 4796,Ch. 126.201
Socket,Trimmers
Chassis

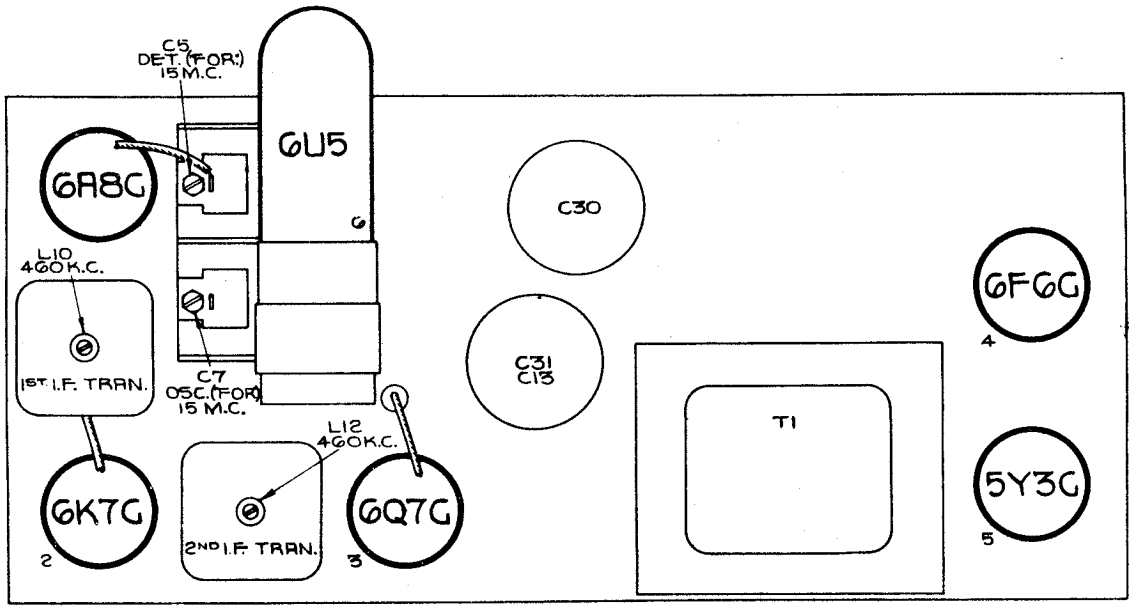
# SEARS-ROEBUCK & CO.

OPERATING CONTROLS:
RADIO PANEL:
1. Left knob . . "Radio-Phono." Switch
2. Next to left knob . "On-Off" Switch and Volume
3. Center knob . . . Wave-Band Switch
4. Next to right knob . . . . Tuning
5. Right knob . . . . . Tone Control
PHONO. COMPARTMENT:
6. Turntable Switch
7. Index Lever
8. Record Ejector

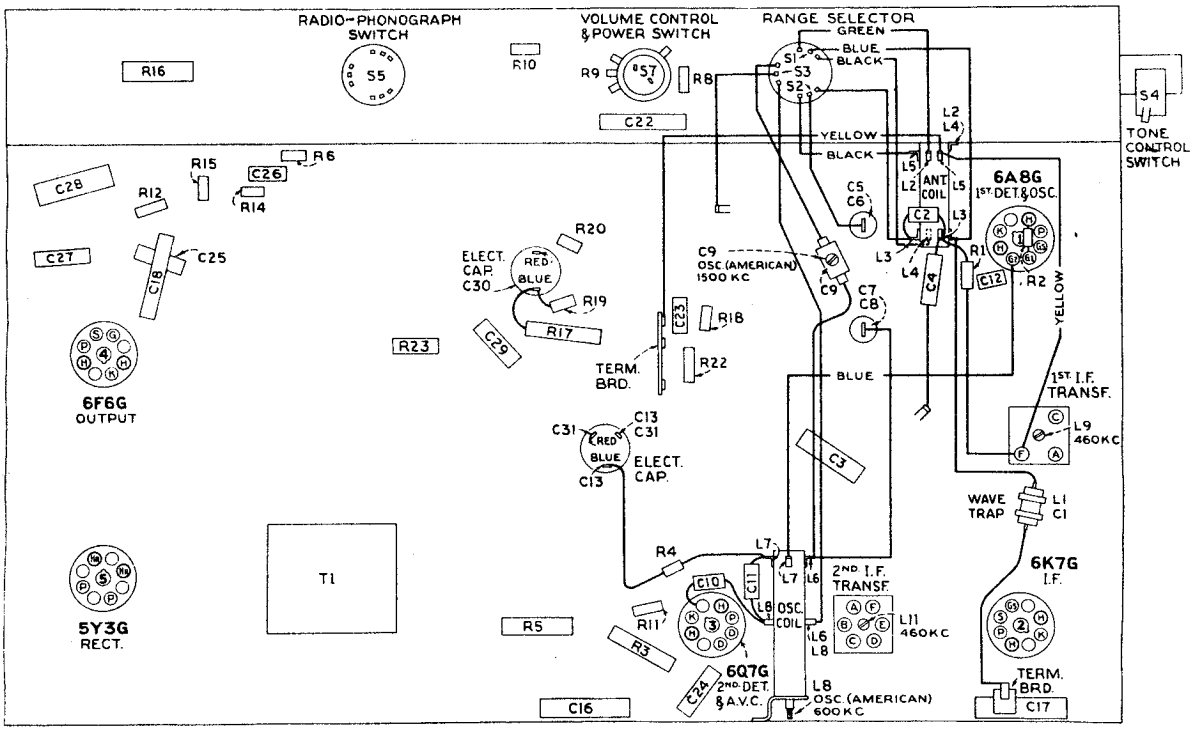
CONTROL OPERATION:

Turning right: Radio; Phonograph
Turning right: Power on; Volume Increase
Turning right: "American," "Foreign"
Tuning ratio: 10 to 1
Turning right: Bass, Treble

Toggle: Phono. Motor "On-Off"
Front 10" Automatic or Manual Operation
Rear . . . . . 12" Manual Operation
Pushing to Left Rejects When "Index Lever" is in 10" Position




LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS TOP OF CHASSIS




LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS BOTTOM OF CHASSIS

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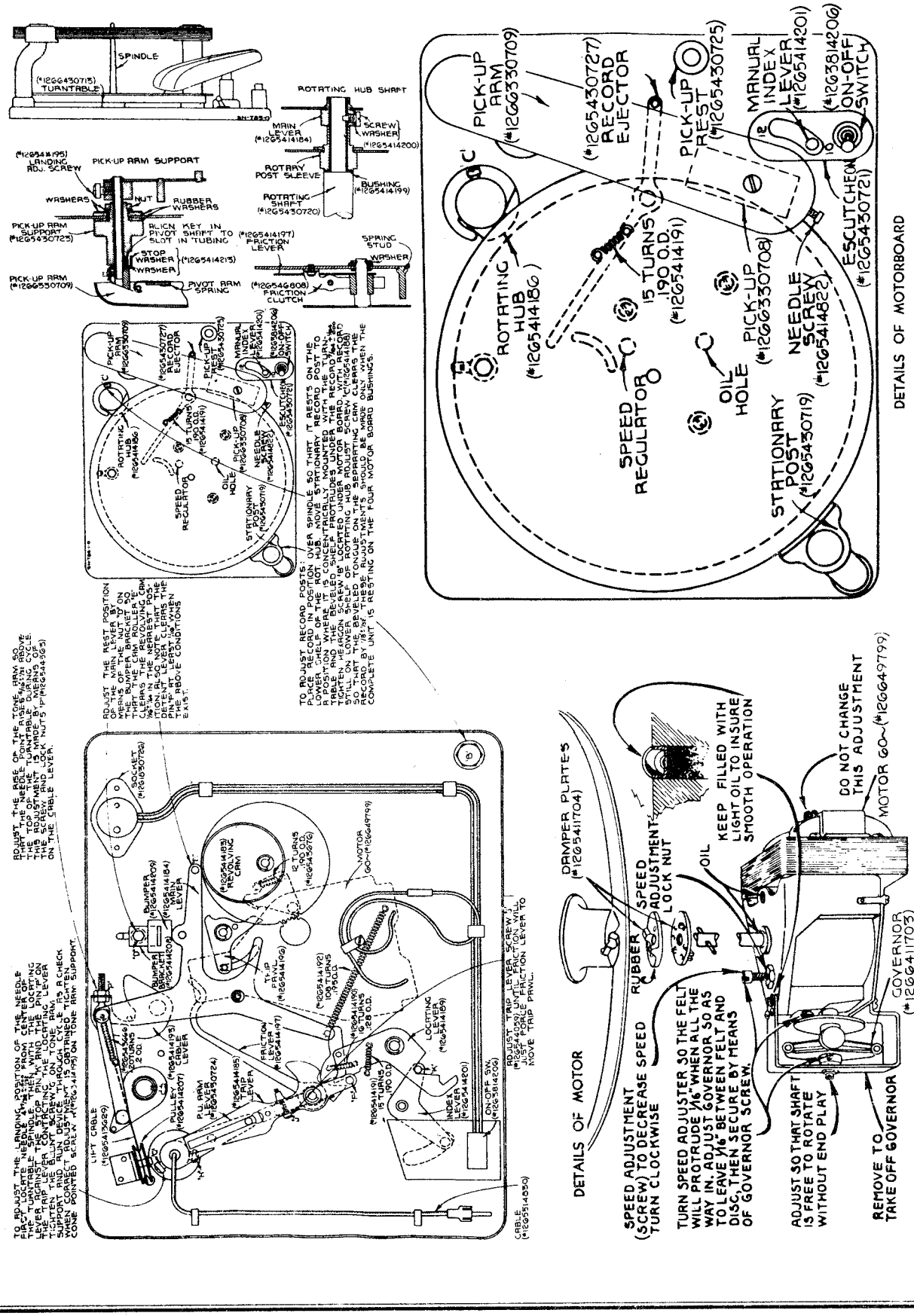
MODEL 4796, Ch. 126.201
Phono. Wiring, Details

SEARS-ROEBUCK & CO.


SPINDLE
(*12664307I3) TURNTABLE
ROTATING HUB SHAFT
MAIN LEVER (*12654141B4)
SCREW WASHER (*12654142O0)
BUSHING (*12654141B9)
ROTARY POST SLEEVE
ROTATING SHAFT (*12654307I0)
(*12654141B5) LANDING ADJ. SCREW
PICK-UP ARM SUPPORT
WASHERS
NUT
RUBBER WASHERS
PICK-UP ARM SUPPORT (*12654307I5)
PLAIN KEY IN PIVOT SHAFT TO SLOT IN TUBING
STOP WASHER
WASHER
(*12654142I3)
PICK-UP ARM (*12663507O9)
PIVOT ARM SPRING
(*12654141B7) FRICTION LEVER
SPRING STUD
WASHER
(*12654G8O8) FRICTION CLUTCH
PICK-UP ARM (*12663307O9)
(*12654307I7) RECORD EJECTOR
PICK-UP REST (*12654307I5)
MANUAL INDEX LEVER (*12654142O1)
(*12638142O6) ON-OFF SWITCH
ESCUTCHEON (*12654307I2I)
ROTATING HUB (*12654141B6)
15 TURNS 190 O.D. (*12654141B1)
SPEED REGULATOR
OIL HOLE
PICK-UP (*12663307O8)
NEEDLE SCREW (*12654142I2)
STATIONARY POST (*12654307I9)
DETAILS OF MOTORBOARD
TO ADJUST RECORD POSTS: PLACE RECORD IN POSITION OVER SPINDLE SO THAT IT RESTS ON THE LOWER SHELF OF THE RECORD POSTS. ROTATE THE TURNTABLE SO THAT THE BEVELED SHELF PROTRUDES UNDER MOTOR BOARD. TIGHTEN HEXAGON SCREW "B" LOCATED UNDER MOTOR BOARD WITH A 5/16" SOCKET WRENCH. ADJUST POSTS SO THAT THE BEVELED TONGUE ON THE SEPARATING CAM CLEARS THE RECORD BY 1/8". IF THESE ADJUSTMENTS SHOULD BE MADE ONLY WHEN THE COMPLETE UNIT IS RESTING ON THE FOUR MOTOR BOARD BUSHINGS.
ADJUST THE REST POSITION OF THE MAIN LEVER BY MEANS OF THE NUT "D" ON THE PLUNGER ON THE TURNTABLE SO THAT THE SEPARATING CAM CLEARS THE REVOLVING CAM (*12654141B2) BY 1/16" IN THE NEAREST POSITION. THE CORRECT REST POSITION OF THE DETENT LEVER CLEARS THE PIN AT LEAST 1/16" WHEN THE ABOVE CONDITIONS EXIST.
TO ADJUST THE LANDING POSITION OF THE NEEDLE FIRST TURN THE TURNTABLE SO THAT THE TONE ARM IS AWAY FROM CENTER OF THE TURNTABLE. THEN TURN THE LOCATING LEVER AGAINST THE STOP PIN "K" AND PIN "P" ON THE TRIP LEVER (OR CONTACTING THE LOCATING LEVER WITH THE TRIP LEVER). THIS PLACES THE TONE ARM SUPPORT AND RUN DEVICE THROUGH CYCLE TIGHTEN SCREW "L" (*12654141B9) ON TONE ARM SUPPORT WHEN CORRECT ADJUSTMENT IS OBTAINED. TIGHTEN CONE POINTED SCREW "M" (*12654141B5).
LIFT CABLE (*12654139G9)
SOCKET (*12610307O2)
BUMPER (*12654141O9)
MAIN LEVER (*12654141B4)
BUMPER BRACKET (*12654140O3)
REVOLVING CAM (*12654141B2)
15 TURNS 190 O.D. (*12654361I6)
MOTOR GO-(*12664947I9)
TRIP PAWL (*12654141O2)
(*12654141B2) 10 TURNS 190 O.D.
(*12654141B1) 15 TURNS 228 O.D.
LOCATING LEVER (*12654141B3)
FRICTION LEVER (*12654141B7)
PULLEY (*12654142O7)
P.U. ARM LEVER (*12654307I4)
P.U. ARM (*12654307I3)
INDEX LEVER (*12654142O1)
ON-OFF SW. (*12638142O6)
ADJUST TRIP LEVER SCREW W.L. (*12654141B9) SO THAT FRICTION LEVER TO JUST FORCE FRICTION LEVER TO MOVE TRIP PAWL.
CABLE (*12695140I0)
DETAILS OF MOTOR
DAMPER PLATES (*12654111704)
RUBBER
SPEED ADJUSTMENT LOCK NUT
SPEED ADJUSTMENT (SCREW) TO DECREASE SPEED TURN CLOCKWISE
TURN SPEED ADJUSTER SO THE FELT WILL PROTRUDE 1/16" WHEN ALL THE WAY IN. ADJUST GOVERNOR SO AS TO LEAVE 1/16" BETWEEN FELT AND DISC, THEN SECURE BY MEANS OF GOVERNOR SCREW.
OIL
KEEP FILLED WITH LIGHT OIL TO INSURE SMOOTH OPERATION
DO NOT CHANGE THIS ADJUSTMENT
MOTOR GO-(*12664947I9)
GOVERNOR (*12664111703)
ADJUST SO THAT SHAFT IS FREE TO ROTATE WITHOUT END PLAY
REMOVE TO TAKE OFF GOVERNOR

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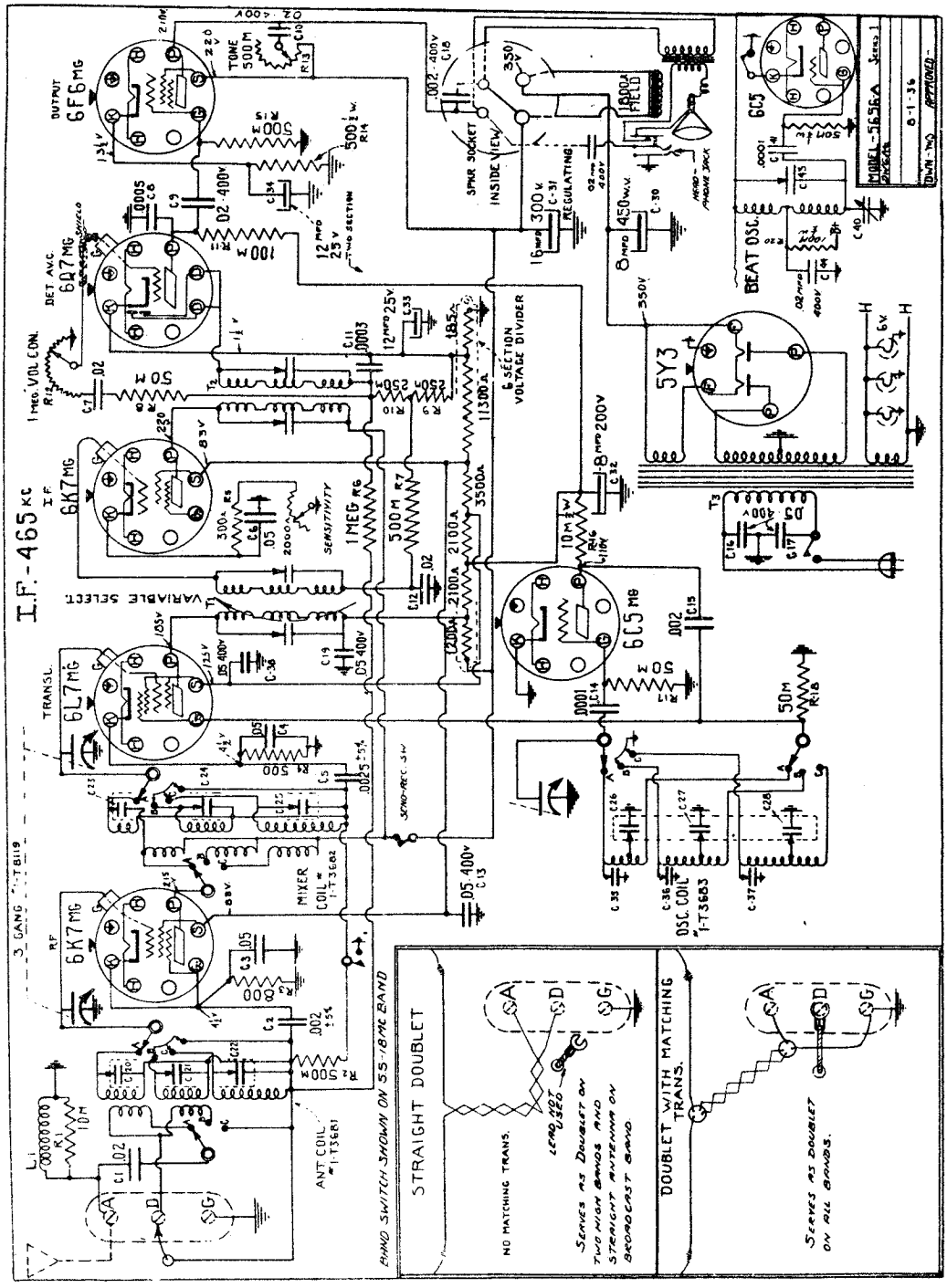
SEARS-ROEBUCK & CO.

MODEL 5656A
Schematic, Voltage




USE ONLY WITH ALTERNATING CURRENT

UNLESS OTHERWISE SPECIFIED ON BACK OF CHASSIS, THIS RECEIVER IS FOR USE WITH 105 TO 120 VOLT ALTERNATING CURRENT, ONLY.

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MODEL 5731 SEARS-ROEBUCK & CO.

Moto-Matic Tuner Part 128.15600

For MODELS 6000,6001 Ch.101.495X,101.496X MODELS 6100,6101 Ch.101.495,101.496 Details,Schematics,Data

## ELECTRICAL SPECIFICATIONS

Power Supply . . . . . 5 to 8 volts D.C. Starting current . . 6 amps. for 1 second
No current used while at rest Returning current. . 5 amps.for [redacted] seconds

2

## GENERAL INFORMATION AND SERVICE HINTS

### MOUNTING MOTO-MATIC TUNER:

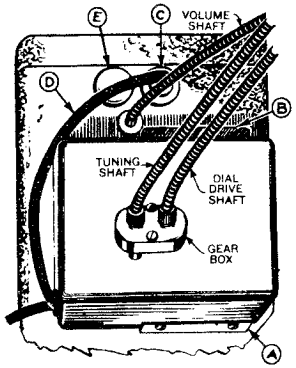



FIG. 1

Fasten mounting brackets A and B to receiver with four #8-32 machine screws and lockwashers.

Determine the angular position of key in variable condenser drive fitting that is located directly under the tuning cable opening in the radio case. Lower Moto-matic tuner into place between mounting brackets and rotate shaft on Moto-matic tuner so that slot has the same angular position as the key on variable condenser drive fitting. When lowered all the way into place no play should exist between key on variable condenser drive fitting and the slot on Moto-matic shaft. This is very important, and if there is play it should be corrected by lightly pinching together the slot on Moto-matic shaft.

Fasten tuner with four #8-32 machine screws and lockwashers. Remove plug button C as shown in Fig. 1 and plug in power lead.

NOTE: Check worm gear on the gang condenser for slippage of the clutch which is provided, as this will cause the tuner to tune inaccurately. This gear should not slip except when the condenser plates are all the way open or all the way closed when the worm is rotated in the direction to open or close the plates.

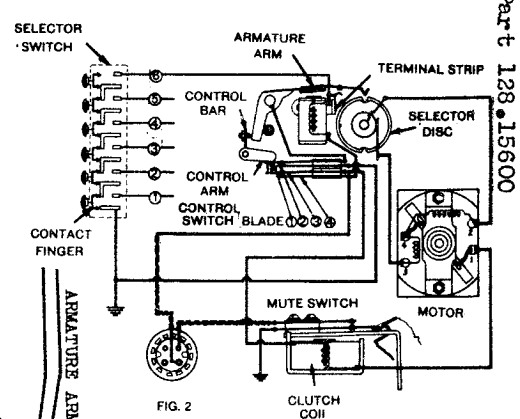



FIG. 2

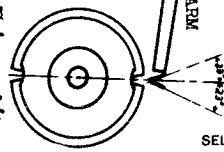



FIG. 6

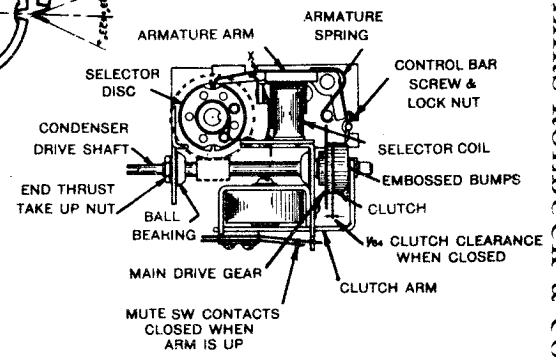


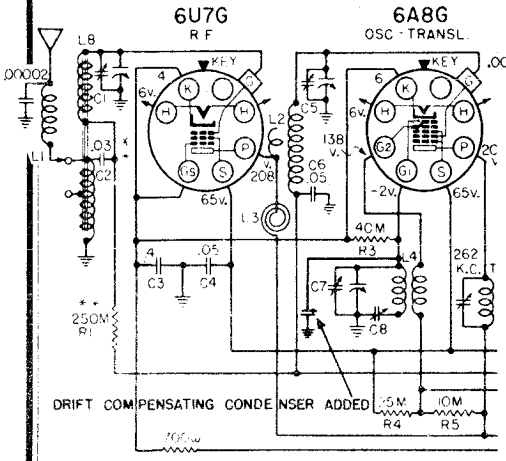

FIG. 4

**SUBJECT: ADDITION OF A DRIFT COMPENSATING CONDENSER TO MAINTAIN ACCURACY OF STATION TUNING.**

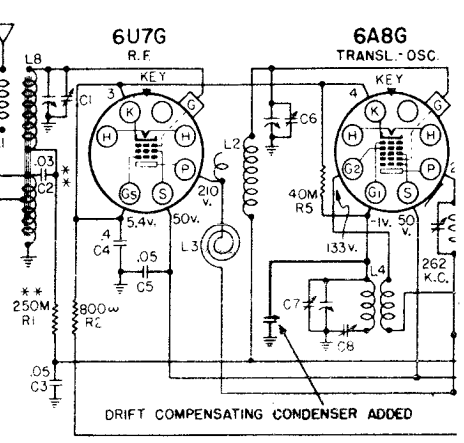
A drift compensating condenser, to eliminate frequency drift of the receiver as it warms up, is available from source 101. This condenser is connected across the oscillator trimmer as shown by the Schematic sections in this Supplement.

**AUGUST 25, 1938**

**CHASSIS 101.496 & 101.496X**




**CHASSIS 101.495 & 101.495X**



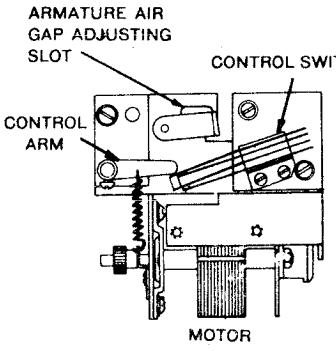




FIG. 5

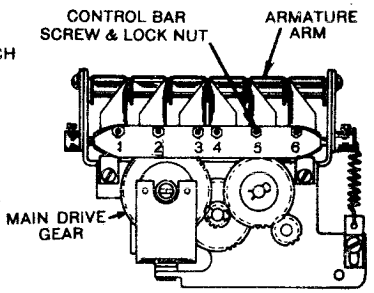



FIG. 3

SEARS-ROEBUCK & CO.

MODEL 5731
Moto-Matic Tuner
Part 128.15600
Adjustments, Part 1

ALIGNING MOTO-MATIC WITH RECEIVER:

Gear box and flexible drive shaft and dial drive shaft can be placed into the tuner temporarily so that the receiver and tuner can be aligned on the bench. Turn the free end of the flexible drive shaft clockwise until a stop is felt. Rotate in opposite direction until a stop is felt. Turn clockwise again so that the stop is again felt. This will cause the worm gear on the gang condenser to slip at the end which is short on travel and automatically correct itself after rotating as specified above. It is best to have the top cover off the receiver while doing this to ascertain that the condenser goes through 180 degrees when the shaft is rotated eight complete turns.

HOW TO SET UP STATIONS:

To set button for a certain station, have the receiver in operation and hold down button until tuner stops running. Now tune in the desired station manually, continuing to hold button down until station comes in accurately. Release button and this station is set to this particular button. After station is once set up it is not necessary to hold button down to tune automatically; only a momentary push is required. Mechanism will go through the complete operating cycle when once started. To set the other five buttons repeat for each button as outlined above.

HOW THE TUNER OPERATES:

The Moto-Matic tuner is a mechanical electro device actuated by an electric motor to speedily and accurately tune an automobile radio receiver. This device functions in the following manner:

ADJUSTMENT OF CONTROL SWITCH:

CAUTION: Do not adjust control switch unless accuracy adjustment of control bar (see instructions above) has failed to produce correct operation of the unit.

The purpose of the control switch is to open the circuit to the motor magnetic clutch and selector coils when the armature arm falls down into the slot of the selector disc. Opening of this circuit is used when setting up a selector disc to a station by the fact that the armature arm is down in the "V" slot. This holds the selector disc stationary while the shaft slips when tuning manually for a station setting.

The timing of the control switch is adjusted individually for each armature arm by screwing in or out the control bar adjustment screw as outlined under "Accuracy Adjustment of Control Bar".With the unit connected to 6 volts depress the selector switch button and hold down until motor stops running. With selector switch button held down, the armature arm should be at rest at the bottom of the "V" of selector disc. (See Figs. 4 & 5). The control arm (Fig. 2) should lift just high enough (.020") to open control switch contacts. If contacts do not open when the armature arm falls in slot it will be necessary to screw in the control bar adjustment screw. When adjusted properly the control switch will open when armature arm falls in slot and will not open when armature arm comes down on the edge of selector disc. If this adjustment is made improperly so that the armature arm just drops slightly into the selector disc slot, the unit will not tune accurately, due to the fact that armature arm will not hold down long enough. It is important that the armature arm falls practically all the way into the "V" slot of the selector disc before the control switch opens in order to obtain maximum accuracy.

To check switch operation disconnect power source. By hand press down the armature arm against the edge of the selector disc. (Be sure you have rotated each selector disc to a position away from the slot). Check each armature arm. The switch should not open nor should the fibre control arm move, as this would decrease contact pressure. If the control arm moves or the switch opens, readjust that particular control bar adjustment screw until there is no motion when the armature arm is riding on the edge of the selector disc. Now rotate selector disc until armature arm drops into the slot without play in the selector disc slot when rotated slightly. Now both switch contacts should open with about .020" clearance between points.

If you are troubled with rocking or bucking when making the initial accuracy adjustment, check for the parallel movement or opening of the control switch. By moving the fibre control arm (see Fig. 5) by hand so the control switch contacts open, make certain that they open and close simultaneously

By referring to Fig. 2 it may be seen that the #2 blade controls the selector coil, the #4 blade the motor and magnetic clutch. It is desirable to give the #2 blade a very slight lead in opening over the #4 blade. Adjustment can be made with a pair of long nose pliers, being sure to bend only the #2 or #4 blade. Never adjust the #1 or #3 blade, as these must always move parallel to each other.

When a selector switch button is depressed the contact finger opens the common circuit to the other buttons and closes the circuit to the selector coil, which pulls down the armature arm and closes the contact to the terminal strip. (See Fig. 2). The contact holds the selector coil circuit closed so that when pressure on the button of the selector switch is released the cycle will complete itself, the armature being held down on the selector disc which completes the circuit to one of the fields of the motor and through the clutch coil. The half of selector disc that is common to the shaft causes the motor to rotate in a clockwise direction, viewing the motor from the pinion end. The other half of the selector disc will give counter clockwise rotation. Through the reduction gearing the selector disc shaft is driven in the direction of whichever half of the selector disc the armature arm makes contact with. The selector shaft rotates until the formed end of armature arm falls into the "V" groove on the selector disc. This moves the control bar and control arm which opens the control switch. The control switch opens the motor and clutch coil circuits, and immediately resets for the next selection. The Motomatic drive shaft has revolved to the proper point which rotated the gang condenser to the angular position of the station setting. When setting a selector disc to a station the formed end of the armature arm is held down into the "V" groove of the selector disc by holding a selector switch button down, which holds the armature down in the "V" slot of the selector disc, although the control switch is open. This keeps the motor from running and the clutch from closing while manually tuning to set up a station on any button.

ACCURACY ADJUSTMENT OF CONTROL BAR ADJUSTING SCREWS FULLY MOUNTED IN CAR OR ON BENCH

Improvement of accuracy is sometimes necessary after installation due to additional springy torque load added by the control head cables, which are sometimes laid in an "S" bend to make a satisfactory mounting in the car. These complicated cable bends must be avoided as much as possible for good accuracy. A complete kit of adjusting tools is provided for this work and consists of the following:

1 - Double end socket wrench in combination with screw driver.
1 - Dummy cover with opening for access to accuracy adjusting screws and bushing for holding cable in place.
1 - .004 x 3/8 x 6 shim for adjusting armature and selector coil clearance gap. See parts list for ordering this material.

It is suggested that a complete assembly and accuracy check be made on the bench approximating the cable bends as they would be in the car. The check should not be made until the set has warmed up for about 20 to 30 minutes.

(1) Remove cover of Moto-matic unit, the side which is away from the radio. Two small screws at each end are to be removed and the cover will pry off easily.

(2) Replace with dummy cover and connect control head to bushing and lay cables as they would be in the car installation.

Before making any accuracy adjustments determine by trial whether or not the inaccuracy is being caused by the tuning control cables. If there are severe bends in the cables there will be a certain amount of spring that will tend to detune the station after an automatic selection has been made. Make sure that the complete installation is made with as few bends in the control cables as possible. If necessary shorten the tuning cables rather than having them kinked or pushed into small clearances.

After you have eliminated the possibility of inaccuracy due to the above, the following procedure should be followed closely:

(3) Set up a station at 1000 KC or higher, using one distantly located, or use your oscillator with low input. Hold down the station button which is set up and use the double-ended adjusting wrench with screw driver insert. Place over adjusting screw and locknut on the control bar. (The proper screw can be found by pressing the selector switch button several times and noting which armature moves. (See Fig. 3 for location with respect to switch.) DO NOT APPLY ANY PRESSURE TO CONTROL BAR ADJUSTING SCREW WHILE MAKING THE FOLLOWING ADJUSTMENT. Back off the adjusting screw very slowly 1/4 turn or more, while holding down the button, (a rubber band around the selector switch will serve to hold down the button to which the adjustment is being made) until the clutch pulls up with a click. (See Fig. 1). Now turn back or to the right until clutch drops back or open. Turn further to the right about 1/8 turn.

Lock up locknut; holding screw steady to prevent further turning. Remove rubber band. Make tuning check by rotating manually the condenser a short distance from resonance on both sides of the signal. In each case push the button setup for adjustment and check for accuracy by listening to quality of signal received, or use an output meter if signal generator is used.

Repeat for the rest of the buttons, using the same frequency setting.

If unit rocks back and forth while making the above adjustments it is due to one or two reasons. First - it is necessary that the control switch operates as outlined in the paragraphs under "Adjustment of Control Switch". Second - the armature arm must not strike the pole piece of the control magnet before it falls entirely into the "V" of the selector disc. The correction for this difficulty is also outlined in the paragraphs under "Adjustment of Control Switch".

Inaccuracy in station selection or inability to make accuracy adjustments due to rocking while making these adjustments will exist if the armature arm will not allow the "V" end to seat properly in the selector disc slot. This is caused by the armature pad striking against the coil core. For the correction of this use the following method:

You will find a small rectangular slot directly in line with the selector coil pole tops at the end of the frame. (See Fig. 5). This opening is used for checking air gap clearance to the armature pad and pole face. The minimum distance is .0035", maximum .0075", and must be checked by using a shim .004" thick which can be cut from a sheet of brass or bronze 3/8" wide x 6" long, furnished in the kit. Any greater gap than .0075" will cause setting up troubles at a low voltage of 5 volts at the battery.

If the armature does not fall entirely into the "V" slot of the selector disc when the .004 shim is inserted between armature pads and pole pieces, bend the armature at the point marked "X" (Fig. 4) until armature "V" seats properly all the way into "V" slot of selector disc.

The 5 volt check for setting up stations checks the ability of the armature arm to hold into the slot. To make this check connect a 6 volt battery charger with an output of 10 amperes or more that is adjustable up to 10 amperes. Connect two cells (4 volts) and allow charger to raise the voltage to 5 volts. Connect a volt meter across battery terminals and make this test when voltage is at 5 volts while the selector button is held down. The armature arm should not slip out during this test while setting up a station. This also checks that you have the proper gap between armature pad and core face of selector coil.

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TENSION ADJUSTMENT OF SELECTOR DISCS:

On one end of the selector disc cam shaft will be found two 3/8" nuts that determine the tension of the selector discs. These are permanently adjusted at the factory and should not require any attention. If readjustment is necessary, loosen the locknut. Tighten or loosen, whichever is necessary, the adjustment nut until the armature arm will hold and turn the selector disc when the selector coil is energized by 5 volts. Tighten the lock nut. The purpose of this adjustment is to keep the selector disc as tight as possible and still loose enough so that the armature arm will not be forced out of the "V" slot when setting up a station.

Angular Adjustment of the Armature Arm "V":-

The angular position of the sides of the "V" of the armature arm is correct when the angle of each side is the same with respect to the radius of the selector disc. (See Fig. 6). Too much angle will cause a slipping out of the armature arm when setting up a station. Under certain conditions not enough angle will cause the armature arm to stick. Any adjustments to the angles of the armature arm "V" should be made carefully with a pair of long nose pliers. Sticking armature arms may be caused by a burr on the face of the armature arm "V" that is cut into the metal by the edge of the groove of the selector disc slot. This burr may be removed by carefully filing this surface with a fine file.

IMPROPER ALIGNMENT OF CONDENSER DRIVE SHAFT WITH WORM DRIVE FITTING ON VARIABLE CONDENSER:

On earlier production the mounting bracket holes were too small to allow for production variations. If trouble is experienced with the mounting of the unit to the receiver case or it is found necessary to center the condenser drive shaft with respect to the worm drive fitting, redrill the mounting holes of the brackets with a 3/16" drill.

Remove the cover of the receiver and mount the motomatic tuner making sure the condenser drive shaft is centered in the worm drive fitting on the variable condenser.

MAGNETIC CLUTCH ARM ADJUSTMENT:

There may be an occasional complaint or observation of a chattering or skipping of the Motomatic tuner clutch when under full load. This is caused by the engaging pins not being engaged deep enough into the main driving gear. Press the clutch down by hand over the top of the coil and note if the clearance of 1/64" exists from clutch flange to clutch face proper. (See Fig. 1). If gap is greater remove clutch arm and bend angle closer to clutch outside face. This arm is made of soft annealed steel and bends easily. Replace and check; several trials may be necessary.

After making magnetic clutch adjustments it may be necessary to readjust the stop located above clutch so that clutch motion from the engaged position to the disengaged position can be held at a minimum. NOTE: When clutch is disengaged it is important that the clutch pins do not drag when tuning manually.

Sticking open of clutch when a button is depressed may be caused by many misadjustments. First - the clutch arm may be warped during the process of bending so that the embossed bumps do not ride on the outside edge of the clutch face. Correct this by rebending clutch arm. Second - it is imperative that both embossed bumps on the underside of the clutch arm apply an equal pressure to the clutch face while engaging clutch. Check this by depressing clutch arm and measuring a predetermined clearance with the .004" shim supplied with kit. In other words compare the spacing of the embossed bumps from the clutch face. Correct any differences by bending slightly the forked section of the clutch arm.

SELECTOR SWITCH:

Failure of tuner to operate may lie in the selector switch. Remove back plate and place jumper wire from the first terminal on the end where lead enters switch case to the red wire terminal. This should cause tuner to operate on #1 button. Now repeat, going to the red to blue, blue to brown, etc. wire terminals. Each one of these should operate an armature arm. Doing this will give a check as to whether the contact finger from the preceding button is making contact when button is out. See schematic wiring diagram. If tuner operates in this manner the individual contact fingers are not making contact when button is depressed. Remedies for the above are as follows:

First - it may be necessary to bend contact fingers so that good connection is made. Second - The selector switch case may be bulged in the center. This can be corrected by placing a strap across both sides.

The selector switch plunger back up plate may become loosened, in which case it will be necessary to push back in place and put a wood wedge between this plate and switch case.

CONDENSER DRIVE SHAFT END PLAY:

The condenser drive shaft (Fig. 4) should not have any lateral or axial play. If some does exist, it can be taken out by bending back the end play adjusting nut lockwasher tabs and taking up on the nut until no play is felt and no additional torque required to turn shaft.

HOW TO ORDER PARTS FOR THIS MOTO-MATIC TUNER - IDENTIFICATION NUMBER 128.15600

1. Use Purchase Order Form 5284.
2. On the Purchase Order always give the following information:
   (1) PART NUMBER and DESCRIPTION for each part ordered, as given in this parts list, regardless of number printed on part itself. When no part number is assigned, order by description and rating. Also give PRICE of part (indicate if no selling).
   (2) The IDENTIFICATION NUMBER, which is 128.15600. This number is found inside the top cover of the unit.

Authorized Replacement Parts for this model may be obtained from any Sears, Roebuck and Co. Retail Store or Mail Order branch. Always give part numbers and the chassis identification number.

## PARTS LIST-SOURCE NO. 128

| SCHEMATIC LOCATION | PART NUMBER | DESCRIPTION | SELLING PRICE EACH |
|---|---|---|---|
| A | 12815252 | Armature Shaft | .10 |
| | 12815427 | Armature Shaft Bearing | .05 |
| A1 | 12815543 | Armature Stop Shaft | .05 |
| A2 | 12815549 | Armature Arm R.H. | .25 |
| A2 | 12815695 | Armature Arm L.H. | .25 |
| | 12815560 | Armature Spring | 5 for .05 |
| | 12815428 | Case Mounting Bracket (Large) | .20 |
| | 12815429 | Case Mounting Bracket (Small) | .18 |
| | 12815236 | Clutch Coil | .65 |
| C2 | 12815612 | Clutch Pivot Bracket | .11 |
| | 12815412 | Clutch Sleeve and Pin Assembly | .43 |
| | 12815250 | Clutch Throwout Spring | .02 |
| | 12815333 | Control Switch | .81 |
| C3 | 12815940 | Control Bar Screw | 3 for .05 |
| | 12815799 | Control Bar Nut | 3 for .05 |
| C1 | 12815370 | Control Bar | .07 |
| | 12815420 | Control Bar Collar | .11 |
| | 12815497 | Control Arm Tension Spring Adjusting Bracket | .08 |
| C | 12815580 | Control Arm and Bushing Assembly | .20 |
| | 12815544 | Control Arm Tension Spring | .05 |
| | 12815283 | Cover (Set Side) | .21 |
| | 12815582 | Cover and Bushing Assembly (Tuning Side) | .47 |
| | 12815555 | Intermediate Gear Assembly | .50 |
| | 12815648 | Intermediate Idler Gear Retainer Spring (2 required) | .06 |
| | 12815552 | Motor and Pinion Assembly | 6.25 |
| | 12815426 | Motor Pinion | .23 |
| | 12815576 | Muting Switch | .40 |
| | 12815577 | Mounting Bracket, Worm Shaft, Worm and Idler Assembly | 4.20 |
| | 12815471 | Power Lead and Plug Assembly | .87 |
| | 12815592 | Selector Switch and Lead Assembly | 4.00 |
| | 12815602 | Selector Switch Back Cover | .06 |
| | 12815839 | Selector Switch Steering Column Strap (2 required) | .10 |
| | 12815606 | Selector Switch Mounting Bracket (2 Required) | .09 |
| | 12815609 | Selector Switch Oval Head Mounting Screw (2 Required) | .15 |
| | 12815608 | Selector Switch Plunger and Contact Finger Assembly | .17 |
| | 12815256 | Selector Switch Push Button | .07 |
| | 12815833 | Selector Switch Lead | .94 |
| | 12815260 | Selector Switch Plunger Spring | 3for .05 |
| | 12815264 | Selector Switch Case | .75 |
| | 12815495 | Selector Coil Assembly Mounting Clip | .05 |
| | 12815503 | Selector Coil Assembly (6) | 2.50 |
| | 12815547 | Selector Disc and Shaft Assembly | 3.50 |
| | 12815559 | Shaft Bearing and Stop Pin Assembly | .18 |
| | 12815615 | Station Call Letter Tab Retaining Plate | .20 |
| | 12815585 | Station Call Letter Tab Retaining Plate Screw (3 required) | .04 |
| | 12815616 | Station Call Letter Tabs | .23 |
| | 12815796 | Selector Coil Terminal Strip Assembly | .36 |
| | 12815797 | Selector Coil Terminal Strip Clamping Lug | 3 for .05 |
| | 12815367 | Terminal Strip Stud | .07 |
| | 12815486 | Terminal Strip Assembly | .38 |
| | 12815597 | Terminal Strip Torque Spring | .10 |
| | 12816522 | Moto-Matic Tuner Adjusting Kit (Order into stock at No Selling) - 85¢ each Cost. | |

RETAIL SELLING PRICES PREPAID
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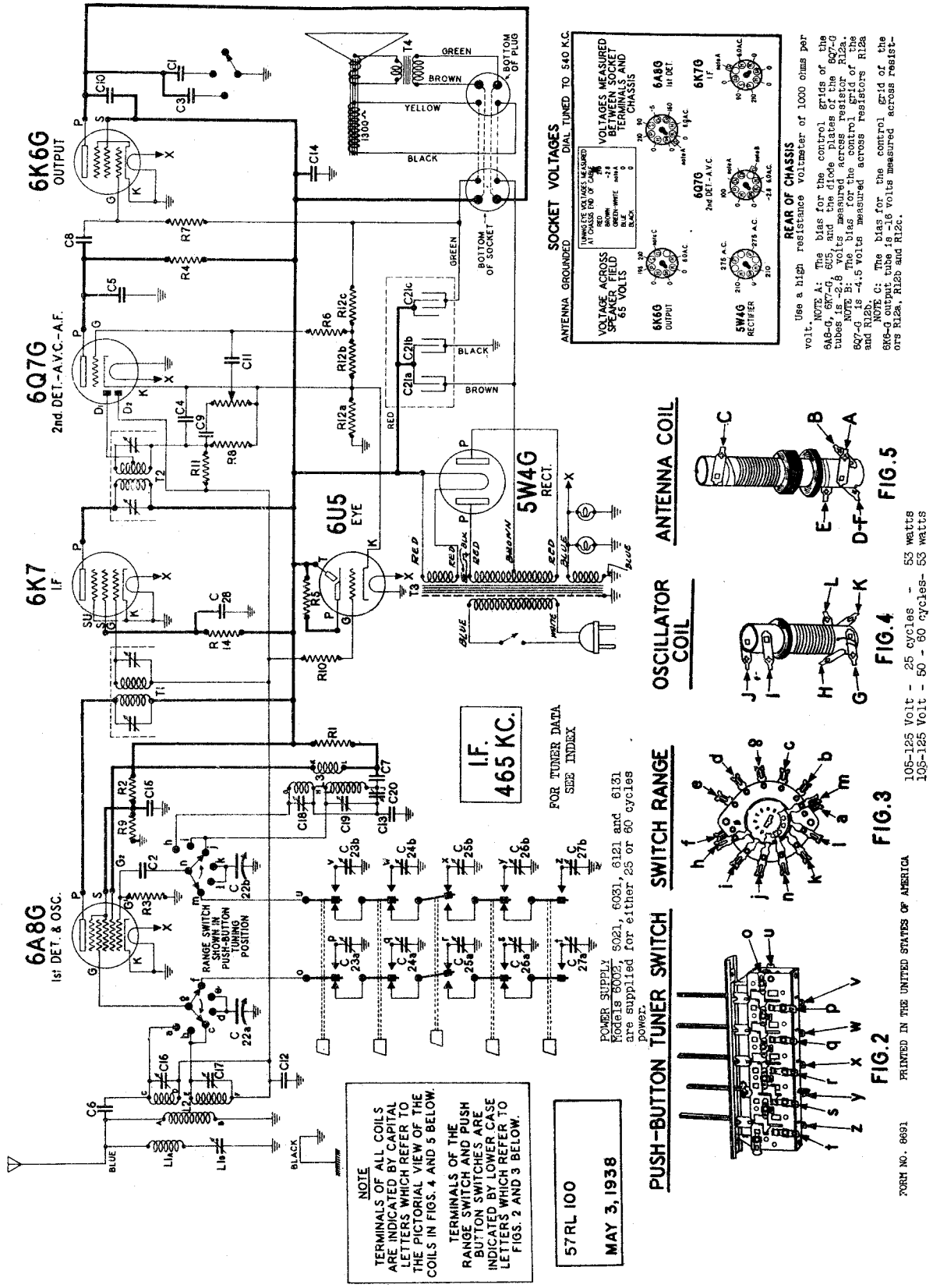
# SEARS-ROEBUCK & CO.

## MODELS 6002,6021,6031 6121,6131.Ch.100.195 Schematic,Voltage




SOCKET VOLTAGES
ANTENNA GROUNDED
DIAL TUNED TO 540 K.C.

| VOLTAGE ACROSS SPEAKER FIELD 65 VOLTS | VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS |
|---|---|
| 6K6G OUTPUT | 6A8G 1st DET. |
| 5W4G RECTIFIER | 6Q7G 2nd DET.-A.V.C. |
| | 6K7G I.F. |

REAR OF CHASSIS

Use a high resistance voltmeter of 1000 ohms per volt. NOTE A: The bias for the control grids of the 6A8-G, 6K7-G, 6U5 tube places of the 6Q7-G tubes is -2.8 volts measured across resistor R12a. NOTE B: The bias for the control grid of the 6Q7-G is -4.5 volts measured across resistors R12a and R12b. NOTE C: The bias for the control grid of the 6K6-G output tube is -16 volts measured across resistors R12a, R12b and R12c.

FIG.2 PUSH-BUTTON TUNER SWITCH

FIG.3 SWITCH RANGE

FIG.4 OSCILLATOR COIL

FIG.5 ANTENNA COIL

105-125 Volt - 25 cycles - 53 watts
105-125 Volt - 50 - 60 cycles- 53 watts

FORM NO. 8691 PRINTED IN THE UNITED STATES OF AMERICA

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MODELS 6002,6021,6031
6121,6131.Ch.100.195

SEARS-ROEBUCK & CO.

Socket,Trimmers,Chassis
Alignment

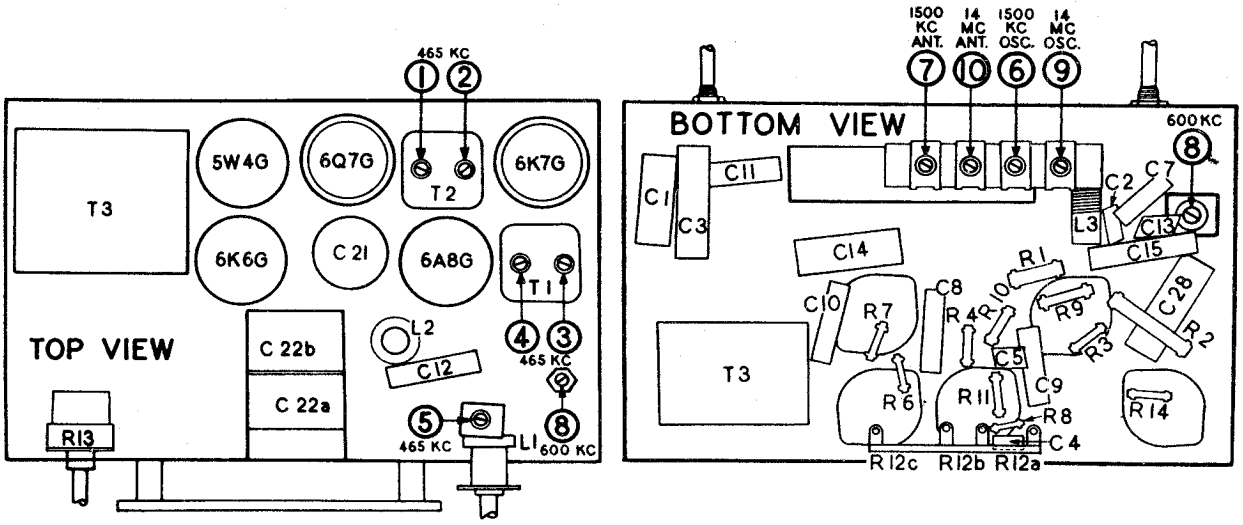
POWER OUTPUT
Type.....Pentode
Undistorted.....1.8 watts
Maximum.....3.5 watts

# ALIGNMENT PROCEDURE

Before attempting to align the receiver check to see that the dial pointer is in a horizontal position when the gang condenser is in full mesh. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang condenser in the full mesh position.

Output meter connections---Across voice coil leads
Output meter reading to indicate 0.2 watt output---0.835 volts
Average sensitivity in microvolts for 0.2 watt output---See chart below
Connection of Generator Ground---Receiver chassis
Dummy Antenna in series with Generator Output Lead---See chart below
Connection of Generator Output Lead---See chart below
Generator modulation---30%, 400 cycles
Position of volume control---Maximum clockwise

| DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RANGE SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | SENSITIVITY MICROVOLTS | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | AMERICAN "AM" (Center) | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 2nd I.F. | 85 | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | | 3-4 | 1st I.F. | | |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 465 KC | AMERICAN "AM" (Center) | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | - | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 1500 KC | AMERICAN "AM" (Center) | 1500 KC | 6 | "AMERICAN" OSCILLATOR (Shunt) | - | ADJUST TRIMMER TO BRING IN SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 1500 KC | AMERICAN "AM" (Center) | TUNE TO 1500 KC GENERATOR SIGNAL | 7 | "AMERICAN" ANTENNA | 40 | ADJUST FOR MAXIMUM OUTPUT. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 600 KC | AMERICAN "AM" (Center) | TUNE TO 600 KC GENERATOR SIGNAL | 8 | "AMERICAN" OSCILLATOR (Series Pad) | 30 | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 14 MC | FOREIGN "FOR" (Counter-clockwise) | 14 MC | 9 | "FOREIGN" OSCILLATOR (Shunt) | - | ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 14 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 14 MC | FOREIGN "FOR" (Counter-clockwise) | 14 MC | 10 | "FOREIGN" ANTENNA | 30 | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |

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# SEARS-ROEBUCK & CO.

**MODELS 6002,6021,6031 6121,6131.Ch.100.195**
**MODEL 6157 Ch.100.198**
**Parts Lists**

Model 6157 Chassis 100.198

## PARTS LIST-SOURCE NO. 100

**RETAIL SELLING PRICES PREPAID**
**PRICES SUBJECT TO CHANGE WITHOUT NOTICE**

## ELECTRICAL PARTS

| Part Number | Schematic Location | Description | Selling Price Each |
|---|---|---|---|
| 10031112796 | L1 | Coil - Wave trap (with trimmer) | $ .50 |
| 10028113295 | L2 | Coil - Antenna (broadcast) | 1.20 |
| 10028113296 | L3 | Coil - R.F. (broadcast) | 1.30 |
| 10028113297 | L4 | Coil - Oscillator (broadcast) | .48 |
| 10028113298 | L5 | Coil - Antenna (police) | .50 |
| 10028113301 | L6 | Coil - Antenna (short wave) | .52 |
| 10028113412 | L7 | Coil - Oscillator (police) | 1.20 |
| 10028113607 | L8 | Coil - Oscillator (short wave) | .52 |
| 1001983539 | C1-C2 | Condenser - mica 260 mmfd. | .20 |
| 1001983783 | C3-C4-C5 | Condenser - mica, 110 mmf. (10%) | .20 |
| 1001985061 | C6 | Condenser - mica 51 mmfd. | .15 |
| | C7 | Condenser - paper .02 mfd. 400 volt | .25 |
| | C8 | Condenser - paper .004 mfd.400 volt | .25 |
| | C9-C10 | Condenser - paper .01 mfd. 400 volt | .25 |
| | C11-C12 C13 | Condenser - paper .05 mfd. 200 volt | .25 |
| | C14 | Condenser - paper .1 mfd. 300 volt- | .25 |
| | C15-C16 | Condenser - paper .1 mfd. 400 volt- | .25 |
| | C17 | Condenser - paper .004 mfd.750 volt | .24 |
| 1002089937 | C18 | Condenser - elect. 30 mfd. 450 volt | 1.60 |
| 10020110377 | C19 | Condenser - elect. 10 mfd. 35 volt- | .80 |
| | C20-C21 C22 | Condenser - paper .05 mfd. 400 volt | .13 |
| 10019112426 | C23 | Condenser - mica 1650 mmfd. (3%) | .30 |
| 10019112427 | C24 | Condenser - mica 4050 mmfd. (3%) | .40 |
| 10020113261 | C25 | Condenser - elect. 30 mfd. 450 volt | 1.40 |
| 10017113319- | C26-C27 C28 | Condenser - trimmer - 3 section | .54 |
| 10017113320- | C29-C30 C31 | Condenser - trimmer - 3 section | .54 |
| 10017113346 | C32 | Condenser - padding | .38 |
| 10016114650- | C33-C34 C35 | Condenser - variable gang | 5.95 |
| 10017114697 | C36 to C47 | Trimmer condenser strip - for push buttons | 2.98 |
| 1005485321 | | Connector - Ground | .01 |
| 10049110629 | | Lamp - 6.3 volt - .25 amps. | .15 |
| | R1-R2 R3-R4 | Resistor - carb. 47,000 ohms ½ W. | .12 |
| | R5-R6-R7 R8-R9-R10 | Resistor - carb. 220,000 ohms ½ W. | .12 |
| | R11-R12 | Resistor - carb. 1 meg. 1/4 watt | .12 |
| | R13 | Resistor - carb. 4700 ohm 1/4 watt- | .12 |
| | R14 | Resistor - carb. 470,000 ohms ½ W. | .12 |
| | R15 | Resistor - carb. 100,000 ohms ½ W. | .12 |
| | R16 | Resistor - carb. 15,000 ohms 1 watt | .15 |
| | R17 | Resistor - carb. 4700 ohms ½ W.(10%) | .12 |
| | R18 | Resistor - carb. 2200 ohms 1/4 watt | .12 |
| 10023110596 | R19 | Resistor - carb. 15000 ohms 3 watts | .25 |
| | R20 | Resistor - carb. 10,000 ohms 1 watt | .25 |
| 10023112956 | R21 | Resistor - carb. 220000 ohm ½W.(10%) | .12 |
| 10023112992 | R22 | Resistor - carb. 39000 ohm ½W.(10%) | .12 |
| 10021114662 | R23-R24 | Resistor - Bias Strip Section R23 - 240 ohms Section R24 - 35 ohms | .46 |
| 10024114651 | R25 | Volume control & off-on switch (1 megohm) | 1.10 |
| R-10058115037 | | Speaker - dynamic 10 inch | 9.95 |
| R-10057114733 | | Cone and voice coil for R-10058115 037 speaker) | 2.76 |
| 10038114652 | | Switch - for push buttons | 3.70 |
| 10038114141 | | Switch - radio phono (D.P.D.T.) | .44 |
| 10037114649 | | Range switch | 2.10 |
| 10054111581 | | Terminal strip - phono | .13 |
| 10033114665 | T1 | Transformer - 1st I.F. | 1.44 |
| 10034114667 | T2 | Transformer - 2nd I.F. | 1.44 |
| 10013114663 | T3 | Transformer - output | 1.98 |
| 10010114668 | T4 | Transformer - power 117 V. 60 C. | 6.72 |
| 10011114758 | T4 | Transformer - power 117 V. 25 C. | 9.98 |

## DIAL & MISCELLANEOUS PARTS

| Part Number | Description | Selling Price Each |
|---|---|---|
| 10054114728 | Band Indicator Slide and strip | $ .30 |
| 10045114032 | Bracket & Pulley Assembly - right hand | .34 |
| 10045114034 | Bracket & Pulley Assembly - left hand | .34 |
| 10054113442 | Bracket - for tuning eye | .16 |
| 10054113149 | Button - for push button tuner | .08 |
| 10055114088 | Cable & Plug - for tuning eye | .60 |
| 10053114360 | Cap - for tube shield | .06 |
| 10045114042 | Clamp - for dial scale | .10 |
| 10054112745 | Clip - coil mounting (osc. & ant.) | .01 |
| 10054112798 | Clip - for mtg. wave trap coil | .01 |
| 10054114031 | Collar - for band switch shaft | .10 |
| 1005485321 | Connector - ground | .01 |
| 10045113178 | Cord - band indicator (28" required)(supplied in 4 ft. lengths) | .30 |
| 10054111302 | Cord - dial drive 6 or 50 ft. lgths. Per Ft. | .05 |
| 10054111973 | Cushion rubber rest for back of chassis | .06 |
| 10045114036 | Dial mtg. plate | .45 |
| 10045114048 | Dial pointer & slide | .20 |
| 10042114600 | Dial Scale - glass | .84 |
| 10045113338 | Drum - dial drive | .54 |
| 10044114623 | Escutcheon - for dial | 2.40 |
| 10044113135 | Escutcheon - for eye | .25 |
| 10044114624 | Escutcheon - around push buttons | 1.28 |
| 10054113207 | Gear - pinion on auxiliary range sw. shaft | .25 |
| 10054113347 | Gear - on range switch shaft | .20 |
| 10039114727 | Knob - for range switch | .19 |
| 10040114726 | Knob - for tuning | .19 |
| 10040114725 | Knob - for volume control | .19 |

Models 6002, 6021, 6031, 6121, 6131, Chassis 100.195

## PARTS LIST-SOURCE NO. 100

**RETAIL SELLING PRICES PREPAID**
**PRICES SUBJECT TO CHANGE WITHOUT NOTICE**

## ELECTRICAL PARTS

| Part Number | Schematic Location | Description | Selling Price Each |
|---|---|---|---|
| 10031112796 | L1a-L1b | Coil - Wave Trap (with trimmer) | $ .50 |
| 10028113011 | L2 | Coil - Ant.-broadcast & short-wave- | 1.20 |
| 10013113015 | L3 | Coil Assembly - oscillator | 1.00 |
| | C1 | Condenser - paper .02 mfd. 600 volt | .35 |
| 1001985061 | C2 | Condenser - mica 51 mmfd. | .15 |
| | C3 | Condenser - paper .04 mfd. 600 volt | .35 |
| 1001983539 | C4-C5 | Condenser - mica 250 mmfd. | .20 |
| 1001985454 | C6 | Condenser - mica 11 mmf. | .15 |
| | C7-C8-C9 | Condenser - paper .01 mfd. 400 volt | .25 |
| | C10 | Condenser - Ceramic tube .006 mfd. 600 volt | .25 |
| | C11-C12 | Condenser - paper .05 mfd. 200 volt | .25 |
| 1001988587 | C13 | Condenser - mica .0042 mfd. | .35 |
| | C14 | Condenser - paper .1 mfd. 400 volt- | .25 |
| | C15 | Condenser - paper .1 mfd. 200 volt- | .25 |
| 10017112893- | C16-C17 C18-C19 | Condenser - trimmer (4 section) | .60 |
| 10017112799 | C20 | Condenser - padder (530 to 630 mmfd) | .36 |
| 10020112883 | C21a-C21b C21c | Condenser - electrolytic (dry) (Section A - 8 mfd. - 400 volt) (Section B - 4 mfd. - 400 volt) (Section C - 4 mfd. - 400 volt) | 1.80 |
| 10016112888 | C22a-C22b | Condenser - variable gang | 2.90 |
| 10017112890 | C23a-C23b C24a-C24b | Condenser - dual push button trimmer (1100 KC to 1700 KC) | .36 |
| 10017112891 | C25a-C25b | Condenser - dual push button trimmer (770 KC to 1350 KC) | .45 |
| 10017112892 | C26a-C26b C27a-C27b | Condenser - dual push button trimmer (550 KC to 1000 KC) | .50 |
| | C28 | Condenser - paper .1 mfd. 400 volt- | .25 |
| 10057113409-U | | Cone - voice coil assem. (10057-115019-U Speaker) | 1.60 |
| 10057113410-U | | Cone - voice coil assem. (10057-115020-U Speaker) | 1.85 |
| 10049110629 | | Lamp - 6.3 volt - .25 amps | .15 |
| | R1 | Resistor - carb. 10,000 ohms ½ watt | .15 |
| | R2 | Resistor - carb. 15,000 ohms 1 watt | .15 |
| | R3 | Resistor - carb. 47,000 ohms ½ watt | .12 |
| | R4 | Resistor - carb.220,000 ohms ½ watt | .12 |
| | R5-R6 | Resistor - carb. 1 megohm 1/4 watt- | .12 |
| | R7 | Resistor - carb.470,000 ohms ½ watt | .12 |
| | R8 | Resistor - carb.220,000 ohms ½ watt | .12 |
| | R9 | Resistor - carb. 22,000 ohms ½ watt | .12 |
| | R10 | Resistor - carb. 2.2 meg. 1/4 watt- | .15 |
| | R11 | Resistor - carb. 3.3 meg. 1/4 watt- | .12 |
| 10021112789- | R12a-R12b R12c | Resistor - (Section A - 55 ohms) (Section B - 30 ohms) (Section C - 240 ohms) | .40 |
| | R14 | Resistor - carb. 68,000 ohms ½ watt | .12 |
| 10058115019-U | | Speaker - dynamic 6" | 5.30 |
| 10058115020-U | | Speaker - dynamic 8" | 7.70 |
| 10037112868 | | Switch - range | .96 |
| 10038112869 | | Switch Assembly - for push buttons- | 2.90 |
| 10038112870 | | Switch - Tone Control | .40 |
| 10033112884 | T1 | Transformer - 1st I.F. | 1.20 |
| 10035113496 | T2 | Transformer - 2nd I.F. | 1.25 |
| 10010112887 | T3 | Transformer - power 117 V.-60 cycle | 3.50 |
| 10010113473 | T3 | Transformer - power 117 V.-25 cycle | 5.00 |
| 10013113408-U | T4 | Transformer - output for 100131150-20-U or 10013115019-U speaker | 1.20 |
| 10024112889 | R13 | Volume Control - 500,000 ohms with off-on switch | .90 |

## DIAL DRIVE & MISCELLANEOUS PARTS

| Part Number | Description | Selling Price Each |
|---|---|---|
| 10054113149 | Button - for push button tuner | $ .08 |
| 10018113130 | Cable & Plug - for tuning eye | .55 |
| 10054112745 | Clip - coil mounting (osc. & ant.) | .01 |
| 10054112798 | Clip - wave trap coil mtg. | .01 |
| 10054113019 | Clip - dial scale retaining | .01 |
| 10054111302 | Cord - dial drive 6 or 50 ft. lgths. Per Ft. | .05 |
| 10054112233 | Drum & Bushing - for dial drive | .35 |
| 10044113146 | Escutcheon - for dial | .84 |
| 10044113147 | Escutcheon - for push buttons | .48 |
| 10044113148 | Escutcheon - for tuning eye | .20 |
| 10059113378 | Instruction Book - Model 100.195 | .10 |
| 10039113131 | Knob - Tone Control | .12 |
| 10039113132 | Knob - Range switch | .12 |
| 10039113133 | Knob - Volume control | .14 |
| 10039113134 | Knob - Tuning | .14 |
| 10054113138 | Mtg. Plate & Bracket - for dial | .42 |
| 10054110496 | Plug - Speaker (4 prong) | .12 |
| 10041113183 | Pointer - dial | .12 |
| 1005481145 | Retaining Ring - for drive shaft Per C | .50 |

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MODELS 6003,6004,6024
6034,6124,6134
Chassis 101,510

# SEARS-ROEBUCK & CO.

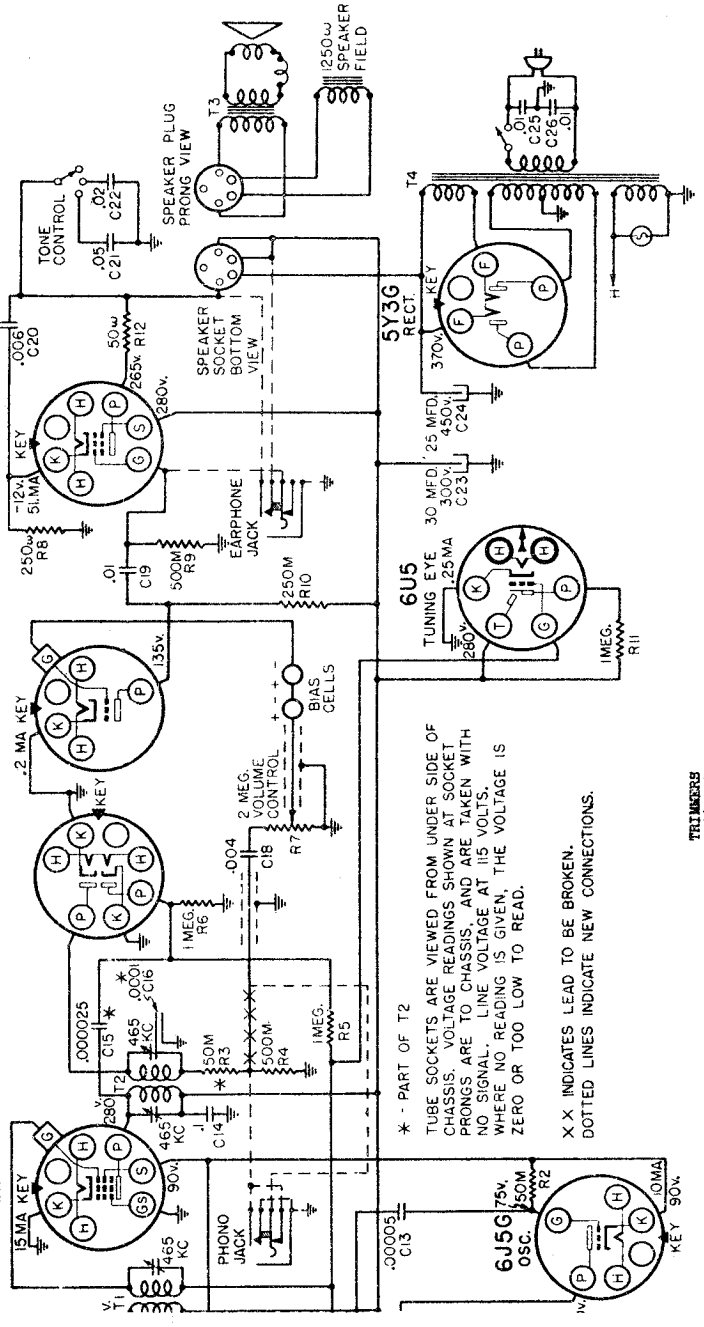
Jacks Installation
Schematic
Alignment

**SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPH PICKUP JACKS:**

Part number 1018119531 Jack, for connection of earphones or phonograph pick-up, can be ordered directly from source 101. Retail selling price is 79¢.

The schematic section on the back of this sheet shows the connections.

If a crystal pick-up is used, a filter composed of a .01 mfd. condenser and a 100M ohm resistor connected in series, should be connected across the pick-up to prevent excessive bass response. This filter will also act as a partial scratch filter.




* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

XX INDICATES LEAD TO BE BROKEN.
DOTTED LINES INDICATE NEW CONNECTIONS.

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "AM" | Closed | 455 kc | .1 mfd. | 6A8G Grid | T2,T1 | IF Output<br>IF Input | 90 |
| "SW" | 15 mc (rock) | 15 mc | 400 ohms | Ant. Term. | C5 | Translator | 50 |
| "SW" | 9.55 mc | 9.55 mc | 400 ohms | Ant. Term. | C7*<br>C8 | Oscillator<br>Translator | 80 |
| "AM" | Fully open | 1720 kc | .0003 mfd. | Ant. Term. | C8 | Oscillator | 90 |
| "AM" | 1400 kc | 1400 kc | .0003 mfd. | Ant. Term. | C3,C2 | Transl.,Ant. | 75 |
| "AM" | 600 kc(rock) | 600 kc | .0003 mfd. | Ant. Term. | C9 | Padder | 80 |

**IMPORTANT ALIGNMENT NOTES**

The alignment must be done in the order given.

*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

**ALIGNMENT PROCEDURE**

PRELIMINARY:

Output meter connection . . . . . Across loud speaker voice coil
Output meter reading to indicate 500 milliwatts . . . . . 0.85 volts
Output meter reading in microvolts for 500 milliwatts output . . . . . See chart below
Average sensitivity in microvolts for 500 milliwatts output . . . . . See chart below
Generator ground lead connection . . . . . Receiver chassis
Dummy antenna value to be in series with generator output . . . . . See chart below
Connection of generator output lead . . . . . See chart below
Generator modulation . . . . . 30%, 400 cycles
Position of Volume Control . . . . . Fully clockwise
Position of Tone Control . . . . . HI
Position of Dial Pointer with variable fully closed . . . . . Center of block to left of 550 kc calibration mark.

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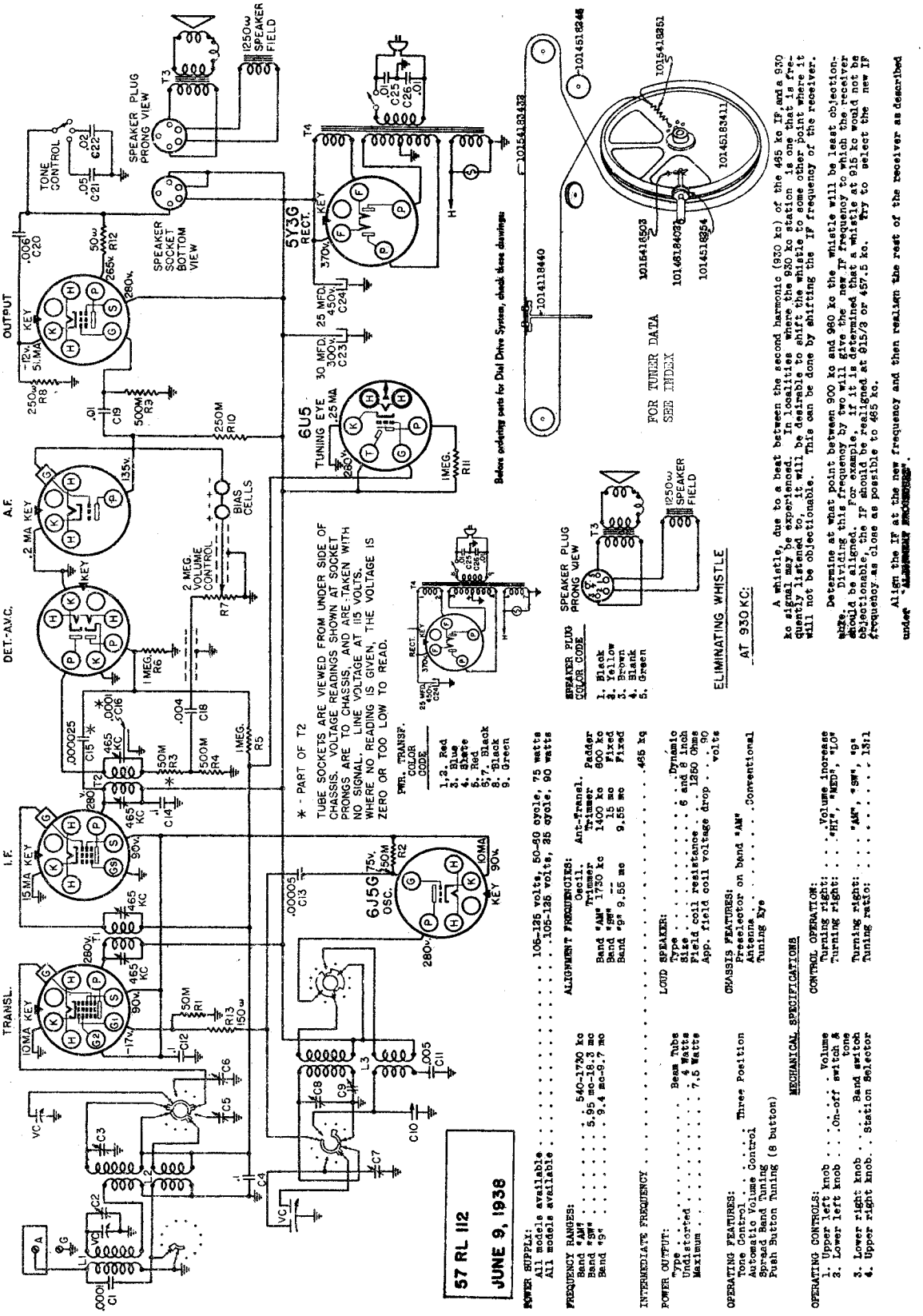
Schematic, Voltage
Drive Data

# SEARS-ROEBUCK & CO.

MODELS 6003, 6004, 6024
6034, 6124, 6134
Chassis 101.510




A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable, by tuning this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as close as possible to 465 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under "ALIGNMENT PROCEDURE".

POWER SUPPLY:
All models available . . . . . 105-125 volts, 50-60 cycle, 75 watts
All models available . . . . . 105-125 volts, 25 cycle, 90 watts

FREQUENCY RANGES:
Band "AM" . . . . . 540-1730 kc
Band "SW" . . . . . 5.95 mc-18.3 mc
Band "S" . . . . . 9.4 mc-9.7 mc

ALIGNMENT FREQUENCIES:

| | Osc. | Ant.-Transl. | |
|---|---|---|---|
| | | Trimmer | Padder |
| Band "AM" | 1730 kc | 1400 kc | 600 kc |
| Band "SW" | -- | 15 mc | Fixed |
| Band "S" | 9.55 mc | 9.85 mc | Fixed |

INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:
Type . . . . . Beam Tubes
Undistorted . . . . . 4 Watts
Maximum . . . . . 7.5 Watts

LOUD SPEAKER:
Type . . . . . Dynamic
Size . . . . . 6 and 8 inch
Field coil resistance . . . 1250 Ohms
App. field coil voltage drop . . 90 volts

OPERATING FEATURES:
Tone Control . . . . . Three Position
Automatic Volume Control
Spread Band Tuning
Push Button Tuning (8 button)

CHASSIS FEATURES:
Preselector on Band "AM"
Antenna . . . . . Conventional
Tuning Eye

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Upper left knob . . . . . Volume
2. Lower left knob . . . . . On-off switch & tone
3. Lower right knob . . . . Band switch
4. Upper right knob . . . . Station Selector

CONTROL OPERATION:
Turning right: . . . . . Volume increase
Turning right: . . . "HI", "MED", "LO"
Turning right: . . . "AM", "SW", "S"
Tuning ratio: . . . . . 13:1

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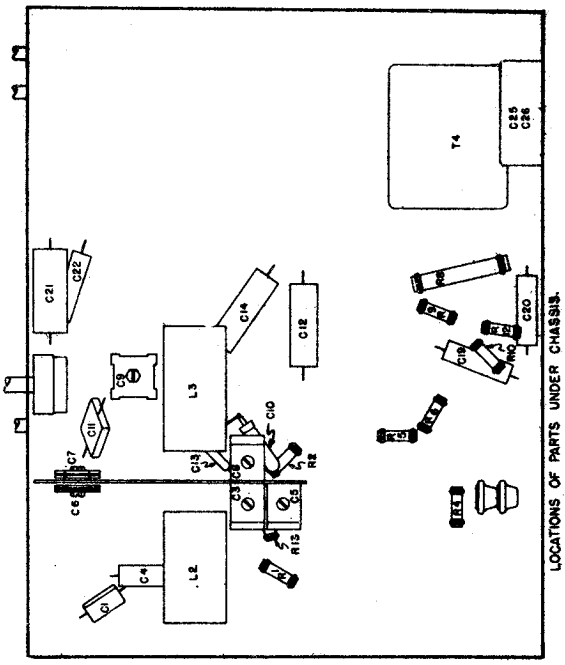
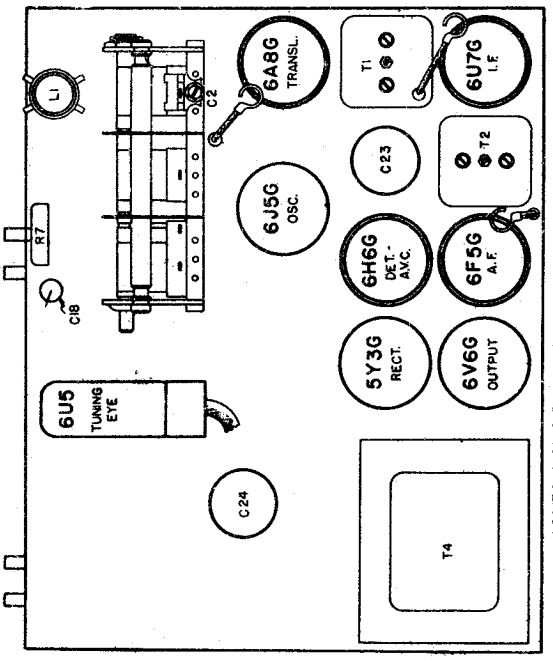
MODELS 6003,6004,6024
6034,6124,6134
Chassis 101.510

# SEARS-ROEBUCK & CO.

MODELS 6005,6071,6076
6171,6176.Ch.101.507
Socket,Trimmers,Chassis




LOCATIONS OF PARTS UNDER CHASSIS.
MODELS 6003,6004,6024,6034,6124,6134
CHASSIS 101,510




LOCATIONS OF PARTS ON TOP OF CHASSIS.

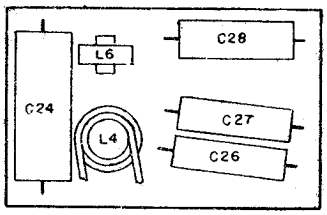
## SILVERTONE BATTERY CHARGERS AVAILABLE:

The customer should be told about the SILVERTONE GAS-O-POWER and the SILVERTONE SUPER AIR-CHARGER. Either of these units provides an economical means of keeping the storage battery charged. The customer should be informed of the advisability of frequent hydrometer testing of the storage battery to prevent it from becoming too low in charge. A battery that is allowed to run too low before re-charging will not have as long a life as one that is re-charged more frequently.

LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6"

POWER OUTPUT:
Type . . . . . Pentode
Undistorted . . . . . .35 watts
Maximum . . . . . .5 watts

CHASSIS FEATURES:
Number of IF stages . . . . . One
Number condenser in gang . . . . . Two
Antenna . . . . . Conventional
Tuning Eye
Built-in IF Wave Trap
Synchronous Vibrator-Rectifier




LOCATIONS OF PARTS UNDER POWER SUPPLY

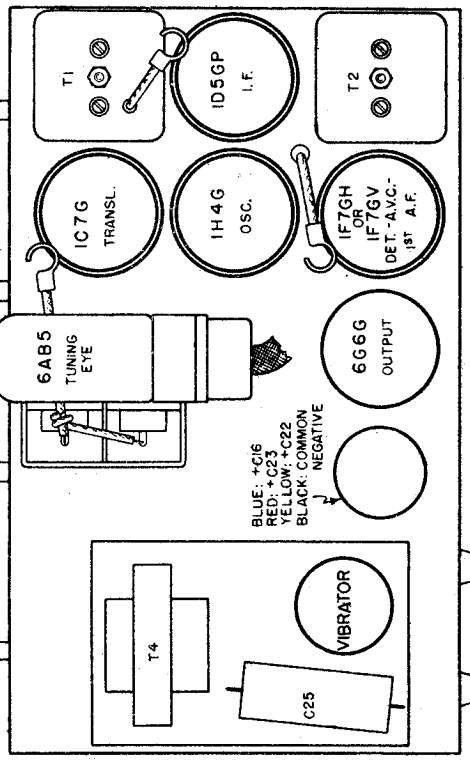
MODELS 6005, 6071, 6076
6171, 6176 CHASSIS 101.507

OPERATING FEATURES:
Tone Control . . . . . Two position
Automatic Volume Control

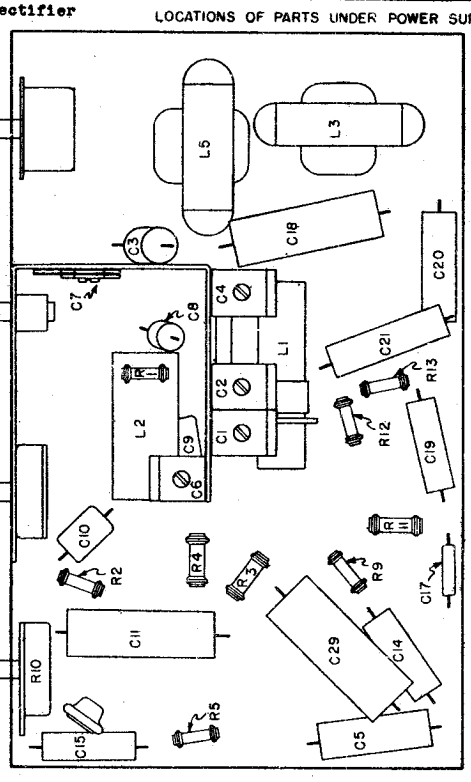
OPERATING CONTROLS:
1. Left knob . . . . . Volume Control
2. Next to left knob . . . . . Wave Switch
3. Next to right knob . . . . . Station Selector
4. Right knob . . . . . On-Off Switch and Tone Control

CONTROL OPERATION:

| | | |
|---|---|---|
| Turning right: | Volume increase | |
| Turning right: | "A", "F" | |
| Tuning ratio: | 13:1 | |
| Turning right: | On, | "HI"; "LO" |




LOCATIONS OF PARTS ON TOP OF CHASSIS.




LOCATIONS OF PARTS UNDER CHASSIS.

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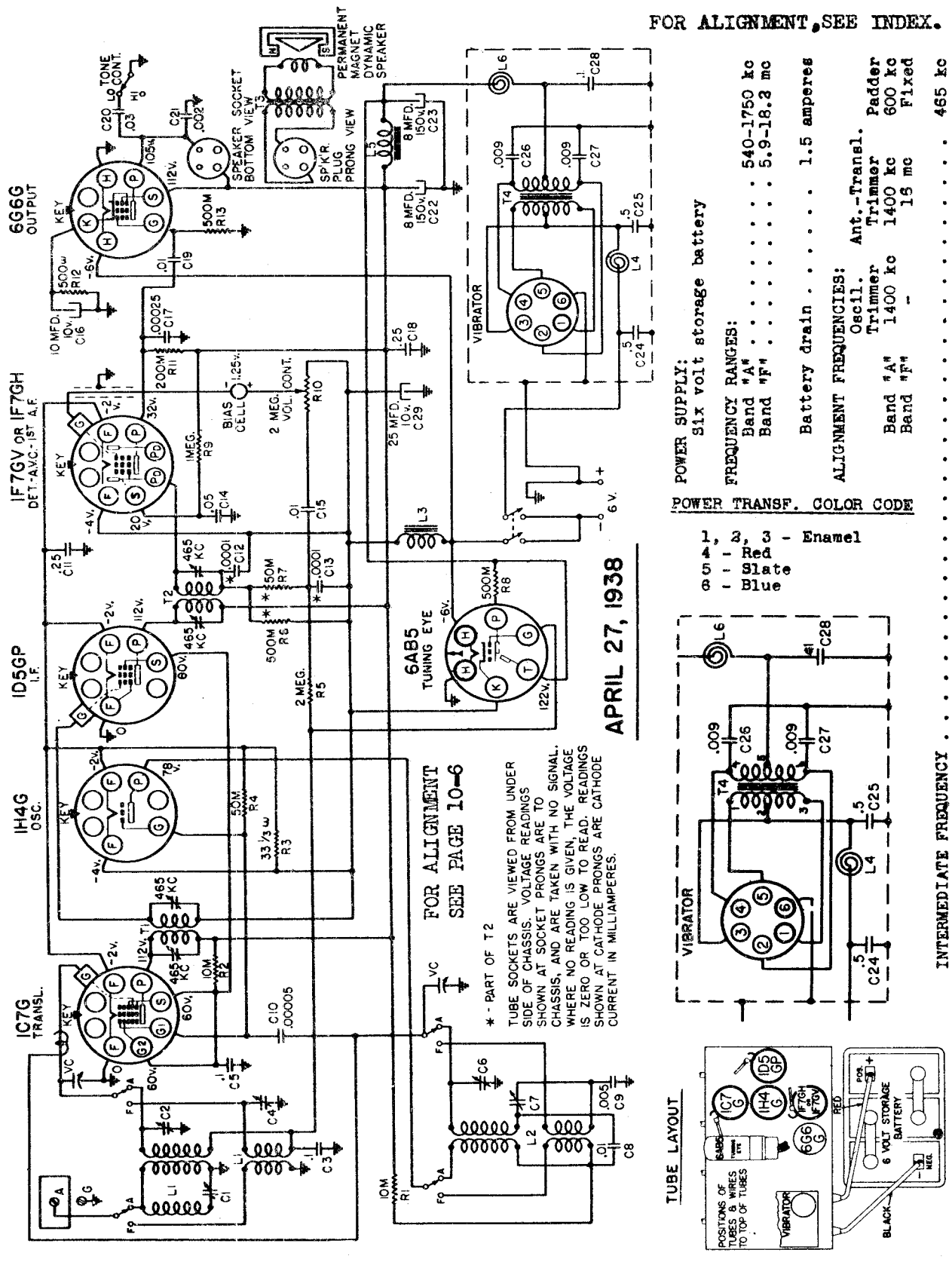
SEARS-ROEBUCK & CO.

MODELS 6005,6071,6076
6171,6176.Ch.101.507
Schematic,Voltage
Socket

FOR ALIGNMENT,SEE INDEX.


6G6G OUTPUT
1F7GV OR 1F7GH DET-A.V.C.-1ST A.F.
1D5GP I.F.
1H4G OSC.
1C7G TRANSL.
6AB5 TUNING EYE
VIBRATOR
PERMANENT MAGNET DYNAMIC SPEAKER
SPEAKER SOCKET BOTTOM VIEW
SP'K'R PLUG PRONG VIEW
TONE CONT.
BIAS CELL
2 MEG. VOL. CONT.
APRIL 27, 1938
FOR ALIGNMENT SEE PAGE 10-6
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. READINGS SHOWN AT CATHODE PRONGS ARE CATHODE CURRENT IN MILLIAMPERES.
POWER SUPPLY:
Six volt storage battery
FREQUENCY RANGES:
Band "A" . . . . . 540-1750 kc
Band "F" . . . . . 5.9-18.2 mc
Battery drain . . . . . 1.5 amperes
ALIGNMENT FREQUENCIES:
Band "A" Oscil. 1400 kc Ant.-Transl. Trimmer 1400 kc Padder 600 kc
Band "F" 16 mc Fixed
INTERMEDIATE FREQUENCY . . . . . 465 kc
POWER TRANSF. COLOR CODE
1, 2, 3 - Enamel
4 - Red
5 - Slate
6 - Blue
TUBE LAYOUT
POSITIONS OF TUBES & WIRES TO TOP OF TUBES
6 VOLT STORAGE BATTERY
RED
BLACK

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MODELS INDICATED AS 6008 INCLUDES MODELS, 6009,6018,6019,6048,6048,6068,6069, 6148,6168, CHASSIS 101.524.
.. .. .. 6074 .. .. , 6079. CHASSIS 101.515.
.. .. .. 6036 .. .. , 6136. CHASSIS 101.511.
.. .. .. 6038 .. .. , 6138. CHASSIS 101.517.
.. .. .. 6140 .. .. , CHASSIS 101.534.

FOR LOCATION OF TRIMMERS SEE INDEX.

Output meter connection .....Across loud speaker voice coil.
Output meter reading to indicate 50 milliwatts, MODEL 6008,6074, 0.37 volts, to indicate 500 milliwatts, MODELS 6036,6140, 0;96 volts; for MODEL 5038, 1.06 volts.
Approximate microvolts input for 50 milliwatts output:-
For Models , 6008,6074 see chart below.
For 500 milliwatts output, for Models 6036,6038,6140,--see chart below.
Generator ground lead connection.....receiver chassis.
Dummy antenna value to be in series with generator output .....see chart below.
Connection of generator output lead .....see chart below.
Generator modulation ..... 30% ,400 cycles.
Position of volume control..... Fully clockwise.
Position of tone control .....HI.
Position of dial pointer with variable fully closed ....Center of block to left of 550 kc calibration mark.

**MODEL 6008.**

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "AM" | Closed | 465 kc | .1 mfd. | 1G6G Grid | T3,T2,T1 | IF Output IF Interstage IF Input | 16 |
| "AM" | 600 kc | 465 kc* | .0002 mfd. | Ant. Term. | C2* | Wave Trap | -- |
| "SW" | 15 mc(rock) | 15 mc | 400 ohms | Ant. Term. | C4 | Translator | 15 |
| "9FOR" | 9.55 mc | 9.55 mc | 400 ohms | Ant. Term. | C6,C5 | Osc.,Transl. | 30 |
| "AM" | 1400 kc | 1400 kc | .0002 mfd. | Ant. Term. | C7,C1 | Osc.,Transl. | 15 |
| "AM" | 600 kc(rock) | 600 kc | .0002 mfd. | Ant. Term. | C8 | Padder | 15 |

**MODEL 6074**

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "AM" | Closed | 465 kc | .1 mfd. | 6D6G Grid | T2,T1 | IF Output IF Input | 75 |
| "AM" | 600 kc | 465 kc* | .0002 mfd. | Ant. Term. | C1* | Wave Trap | -- |
| "SW" | 15 mc(rock) | 15 mc | 400 ohms | Ant. Term. | C4 | Translator | 50 |
| "9FOR" | 9.55 mc | 9.55 mc | 400 ohms | Ant. Term. | C7** C5 | Oscillator Translator | 65 |
| "AM" | Fully open | 1720 kc | .0002 mfd. | Ant. Term. | C10 | Oscillator | 75 |
| "AM" | 1400 kc | 1400 kc | .0002 mfd. | Ant. Term. | C2 | Translator | 45 |
| "AM" | 600 kc(rock) | 600 kc | .0002 mfd. | Ant. Term. | C11 | Padder | 35 |

MODELS 6008, 6074. IMPORTANT ALIGNMENT NOTES

The alignment must be done in the sequence given.

*The generator should be adjusted for high output. The trimmer should be adjusted for minimum output meter reading instead of the usual maximum reading. If the frequency of an interfering station around 465 kc is known, the generator should be adjusted to the frequency of that station instead of to 465 kc.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

**MODEL 6036**

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "AM" | Closed | 465 kc | .1 mfd. | 6A8G Grid | T3,T1 | IF Output IF Input | -- |
| "SW" | 15 mc (rock) | 15 mc | 400 ohms | Ant. Term. | C5 | Translator | 35 |
| "9" | 9.55 mc | 9.55 mc | 400 ohms | Ant. Term. | C11* C8 | Oscillator Translator | 40 |
| "11" | 11.8 mc | 11.8 mc | 400 ohms | Ant. Term. | C10* C7 | Oscillator Translator | 35 |
| "15" | 15 mc | 15 mc | 400 ohms | Ant. Term. | C9* C6 | Oscillator Translator | 35 |
| "AM" | 1400 kc | 1400 kc | .0002 mfd. | Ant. Term. | C15,C4,C1 | Osc,Transl,RF | 35 |
| "AM" | 600 kc (rock) | 600 kc | .0002 mfd. | Ant. Term. | C16 | Padder | 40 |

MODEL 6038.

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "AM" | Closed | 465 kc | .1 mfd. | 6A8G Grid | T3,T2,T1 | IF Output, IF Interstage, IF Input | -- |
| "SW" | 18 mc | 18 mc | 400 ohms | Ant. Term. | C38* | Oscillator | -- |
| "SW" | 15 mc(rock) | 15 mc | 400 ohms | Ant. Term. | C11,C4 | Translator,RF | 10 |
| "9" | 9.55 mc | 9.55 mc | 400 ohms | Ant. Term. | C38* C12 C3 | Oscillator Translator RF | 30 |
| "11" | 11.7 mc | 11.7 mc | 400 ohms | Ant. Term. | C37* C13 C2 | Oscillator Translator RF | 13 |
| "15" | 14.9 mc | 14.9 mc | 400 ohms | Ant. Term. | C36* C14 C1 | Oscillator Translator RF | 10 |
| "AM" | 1400 kc | 1400 kc | .0002 mfd. | Ant. Term. | C20 C10 C5 | Oscillator Translator RF | 15 |
| "AM" | 600 kc(rock) | 600 kc | .0002 mfd. | Ant. Term. | C31 | Padder | 40 |

**MODEL 6140.**

| WAVE BAND SWITCH POSITION | POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMERS ADJUSTED (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|---|
| "AM" | Closed | 465 kc | .1 mfd. | 6A8G Grid | T2, T1 | IF Output IF Input | 90 |
| "SW" | 15 mc (rock) | 15 mc | 400 ohms | Ant. Term. | C5 | Translator | 50 |
| "9FOR" | 9.55 mc | 9.55 mc | 400 ohms | Ant. Term. | C7* C8 | Oscillator Translator | 80 |
| "AM" | 1400 kc | 1400 kc | .0003 mfd. | Ant. Term. | C8,C3,C2 | Osc.,Trans.Ant. | 75 |
| "AM" | 600 kc (rock) | 600 kc | .0002 mfd. | Ant. Term. | C9 | Padder | 80 |

MODELS 6036, 6038, 6140. IMPORTANT ALIGNMENT NOTES

The alignment must be done in the order given.

*Two peaks can be had, one with the trimmer screwed further out than the other. The correct adjustment is with the trimmer screwed further out. The other peak is the image.

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

The alignment procedure should be repeated stage by stage, in the original order, for greatest accuracy. Always keep the output from the test oscillator at its lowest possible value to make the AVC action of the receiver ineffective.

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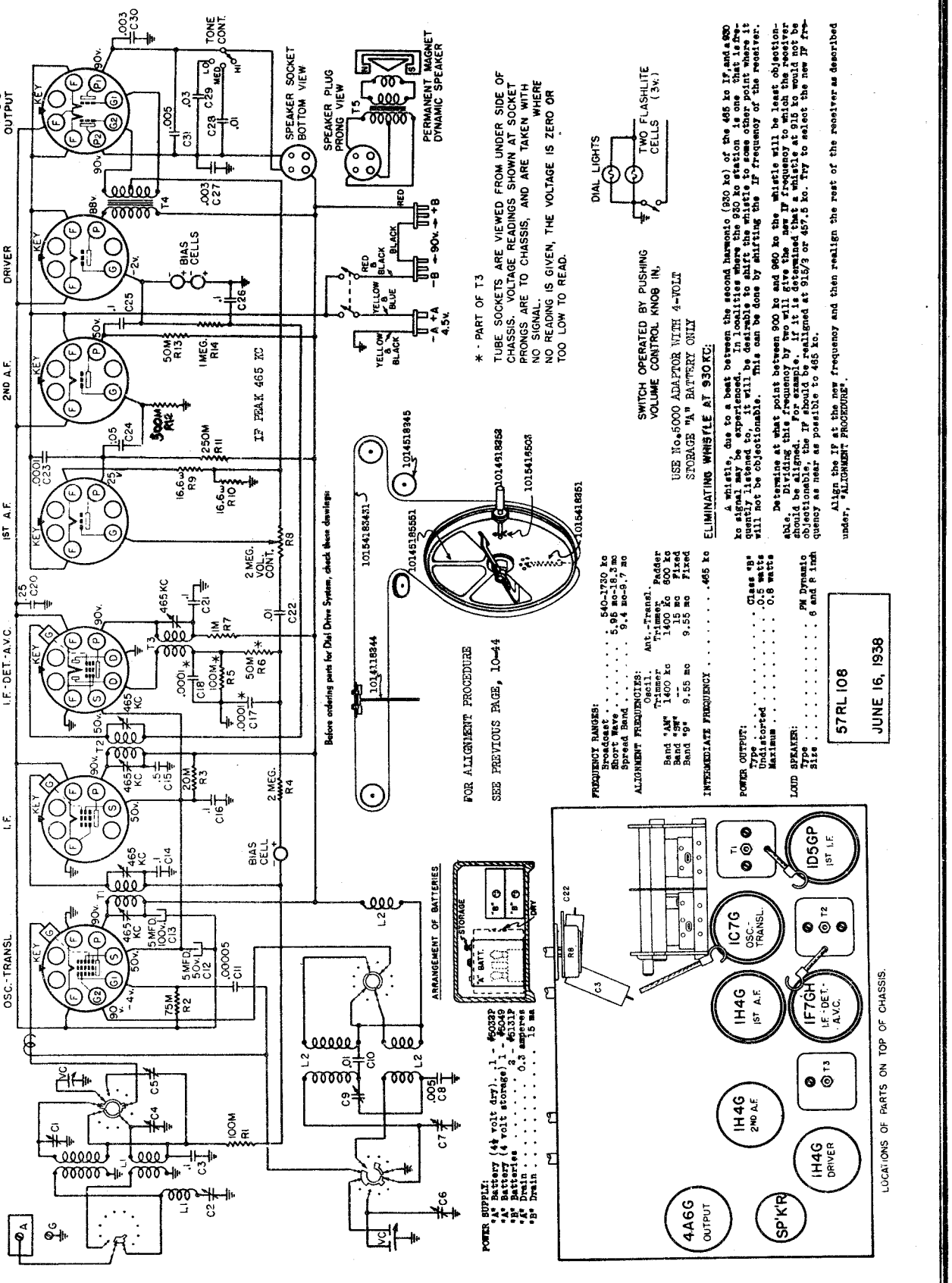
Schematic, Socket, Trimmers
Drive Data, Notes

# SEARS ROEBUCK & CO.

MODELS 6008, 6009, 6018
6019, 6048, 6049, 6068, 6069
6148, 6168 Chassis 101.524


4A6G OUTPUT
1H4G DRIVER
1H4G 2ND A.F.
1H4G 1ST A.F.
1F7GH I.F.-DET.-A.V.C.
1D5GP I.F.
1C7G OSC.-TRANSL.
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
PERMANENT MAGNET DYNAMIC SPEAKER
TONE CONT.
BIAS CELLS
IF PEAK 465 KC
2 MEG. VOL. CONT.
DIAL LIGHTS
TWO FLASHLITE CELLS (3v.)
SWITCH OPERATED BY PUSHING VOLUME CONTROL KNOB IN.
USE No.6000 ADAPTOR WITH 4-VOLT STORAGE "A" BATTERY ONLY
ELIMINATING WHISTLE AT 930 KC:
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.
Determine at what point between 900 kc and 980 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as near as possible to 465 kc.
Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".
FREQUENCY RANGES:
Broadcast . . . . . 540-1750 kc
Short Wave . . . . . 5.95 mc-18.3 mc
Spread Band . . . . . 9.4 mc-8.7 mc
ALIGNMENT FREQUENCIES:
Band "AW" 1400 kc
Band "BW" 9.55 mc
INTERMEDIATE FREQUENCY . . . . . 465 kc
POWER OUTPUT:
Type . . . . . Class 'B'
Undistorted . . . . . .5 watts
Maximum . . . . . 0.8 watts
LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6 and 8 inch
POWER SUPPLY:
"A" Battery (4½ volt dry) . 1 - #6032P
"A" Battery (4 volt storage) 1 - #6049
"B" Batteries . . . . . 2 - #6131P
"C" Drain . . . . . 0.3 amperes
"G" Drain . . . . . 15 ma
FOR ALIGNMENT PROCEDURE
SEE PREVIOUS PAGE, 10-44
* - PART OF T3
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
Before ordering parts for Dial Drive System, check these drawings:
101541834?1
1014518345
1014518344
1014518358
1014518503
1014518351
1014518565?
ARRANGEMENT OF BATTERIES
STORAGE
DRY
LOCATIONS OF PARTS ON TOP OF CHASSIS.
57RL108
JUNE 16, 1938

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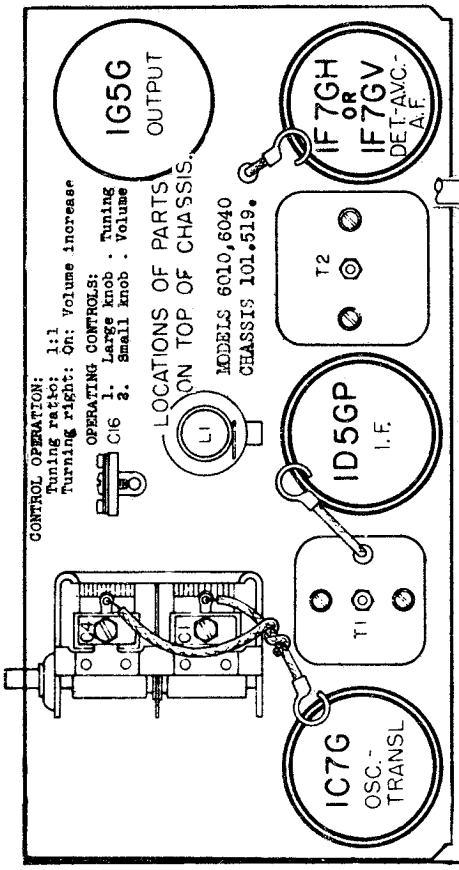
MODELS 6008,6009,6018
6019,6048,6049,6068,6069
6148,6168.Ch. 101.524
Chassis Layout,Data

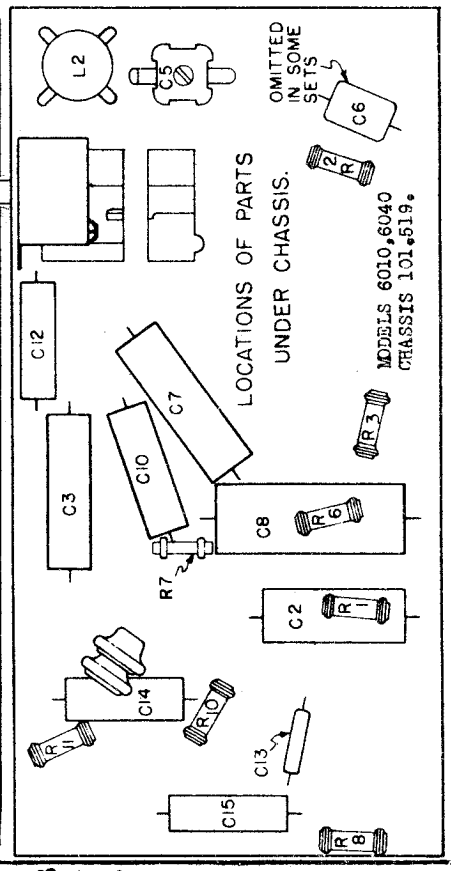
# SEARS-ROEBUCK & CO.

MODELS 6010,6040,Ch.101.519
Socket,Trimmers,Chassis
Notes

**BATTERY REPLACEMENT:**

The dry 4½ volt "A" battery should be replaced when its voltage drops to 3.4 volts,under load. The 67½ volt "B" battery should be replaced when the voltage of the battery has dropped to 45 volts, under load. The life rating of the various size batteries, given on the next page, are for an average use of three hours a day.




**THE "A" SUPPLY:**

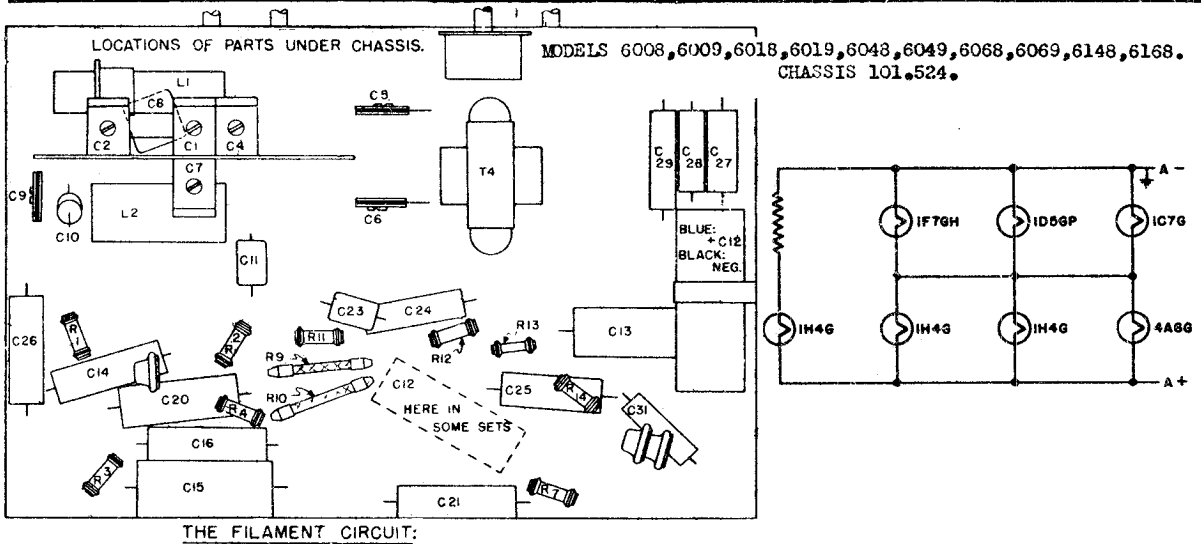
These models may be used with either a 4½ volt dry "A" battery or a 4 volt storage "A" battery. Catalog #5000 adaptor is necessary to make the connection between the "A" plug and the terminals of the storage battery.

**THE FILAMENT CIRCUIT:**

Since the tubes have two volt filaments and the "A" supply is four volts,a series parallel arrangement is used for the filament circuit. Accordingly, if any tube burns out, its companion tube will not light either. The full "A" voltage will appear across the filament terminals of the burnt out tube.

**THE AVC CIRCUIT:**

Diode current of the 1F7GH tube, flowing through the 500M ohm resistor, R8, creates a voltage drop across it. This voltage is applied to the control grid of the 1C7G tube to provide AVC.




THE FILAMENT CIRCUIT:

Since the "A" supply is four volts and the tube filaments are rated at two volts, a series parallel arrangement is used for the filament circuit. A simplified diagram is shown below. If any one tube burns out (except the 1H4G first AF), the filament voltage and current of the other tubes will be affected.

A Catalog #5000 adaptor must be used on the "A" cable plug when a storage "A" battery is used. The owner should be warned not to attempt the use of a six volt automobile storage battery. Only a four volt storage "A" battery should be used.

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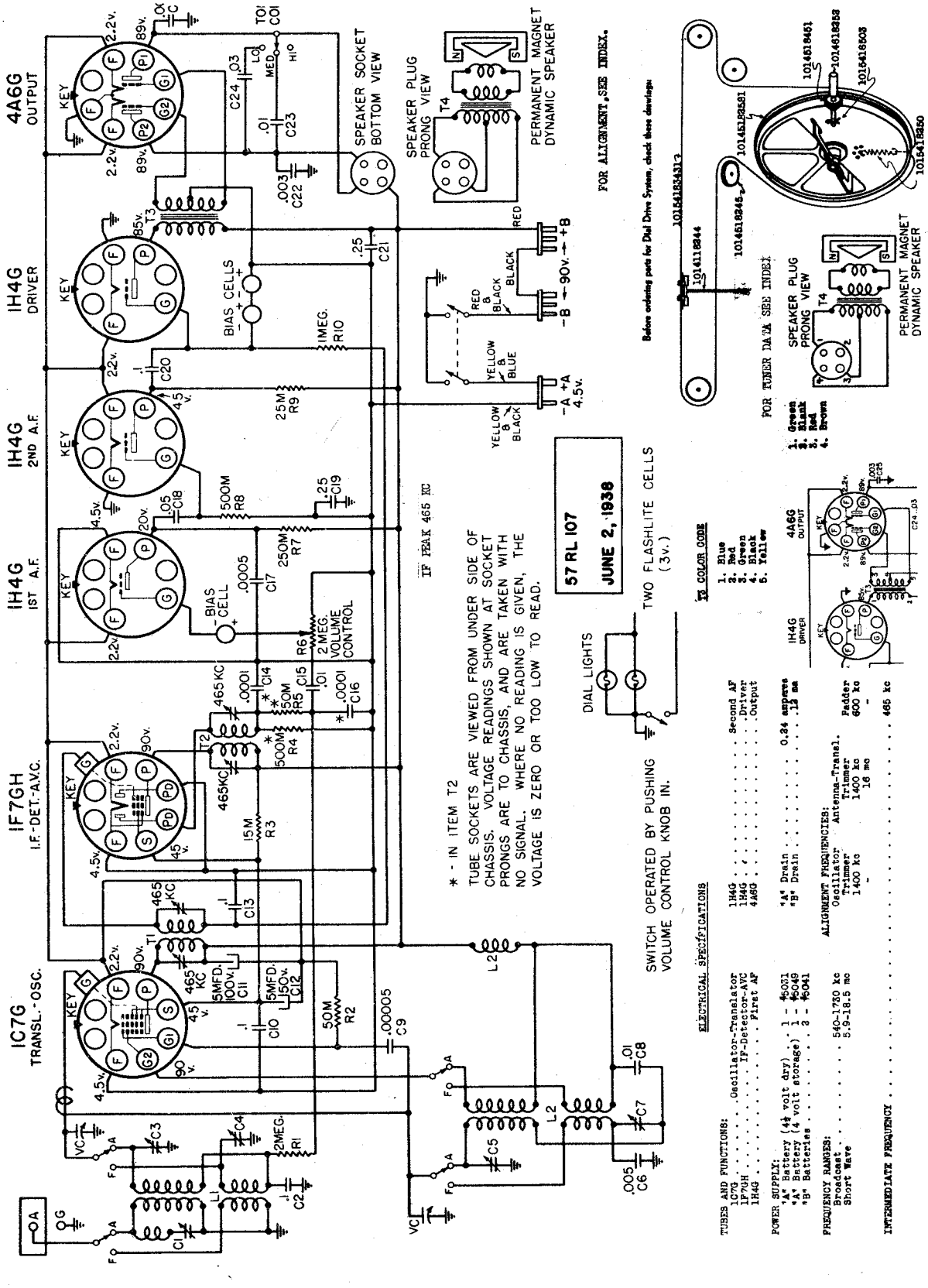
# SEARS-ROEBUCK & CO.

## MODELS 6016,6017,6046 6047,6146.Ch. 101.512 Schematic,Voltage Drive Data


1C7G TRANSL.-OSC.
1F7GH I.F.-DET.-A.V.C.
1H4G 1ST A.F.
1H4G 2ND A.F.
1H4G DRIVER
4A6G OUTPUT
KEY
BIAS CELL
BIAS CELLS
VOLUME CONTROL
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
PERMANENT MAGNET DYNAMIC SPEAKER
TO VOICE COIL
FOR ALIGNMENT, SEE INDEX.
IF PEAK 465 KC
* - IN ITEM T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
57 RL 107
JUNE 2, 1938
DIAL LIGHTS
TWO FLASHLITE CELLS (3v.)
SWITCH OPERATED BY PUSHING VOLUME CONTROL KNOB IN.
-B - 90v. - +B
-A +A 4.5v.
RED
BLACK
YELLOW
BLUE
Before ordering parts for Dial Drive System, check these drawings
FOR TUNER DATA SEE INDEX
1. Green
2. Blank
3. Red
4. Brown
1. Blue
2. Red
3. Green
4. Black
5. Yellow
ELECTRICAL SPECIFICATIONS
TUBES AND FUNCTIONS:
1C7G . . . . . Oscillator-Translator
1F7GH . . . . . IF-Detector-AVC
1H4G . . . . . First AF
1H4G . . . . . Second AF
1H4G . . . . . Driver
4A6G . . . . . Output
POWER SUPPLY:
"A" Battery (4½ volt dry) . . 1 - #6031
"A" Battery (4 volt storage) 1 - #6049
"B" Batteries . . . . . 3 - #6041
"A" Drain . . . . . 0.84 amperes
"B" Drain . . . . . 13 ma
FREQUENCY RANGES:
Broadcast . . . . . 540-1730 kc
Short Wave . . . . . 5.9-18.5 mc
ALIGNMENT FREQUENCIES:
Oscillator . . . . . Antenna-Transl.
Trimmer . . . . . Padder
1400 kc . . . . . 600 kc
- . . . . . 16 mc
INTERMEDIATE FREQUENCY . . . . . 465 kc

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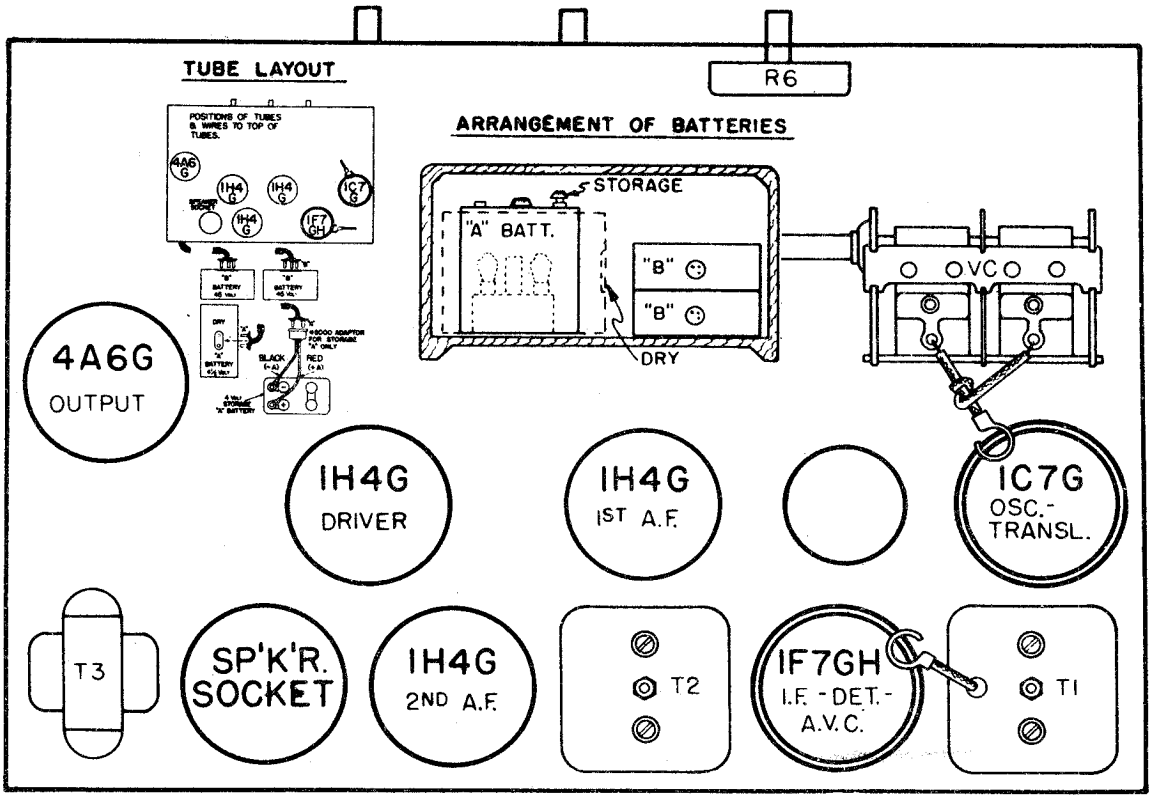
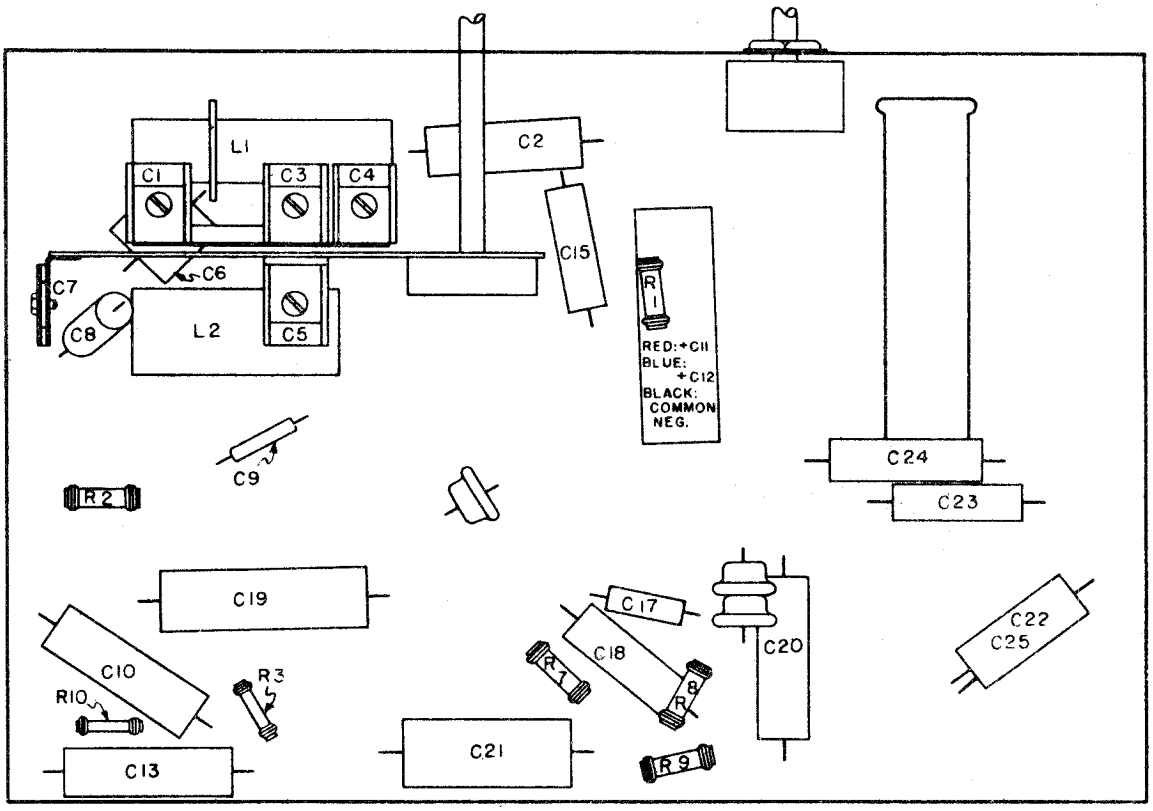
MODELS 6016,6017,6046
6047,6146 Ch. 101.512
Socket,Trimmers,Chassis

# SEARS-ROEBUCK & CO.




LOCATIONS OF PARTS ON TOP OF CHASSIS




LOCATIONS OF PARTS UNDER CHASSIS.

OPERATING FEATURES:
Tone control . . . . . Three position
Automatic Volume Control
"On-Off" indicator
Dial FLASH-O-LITE
Push Button Tuning

LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6"

POWER OUTPUT:
Type . . . . . Class "B"
Undistorted . . . . . 0.4 watts
Maximum . . . . . 0.8 watts

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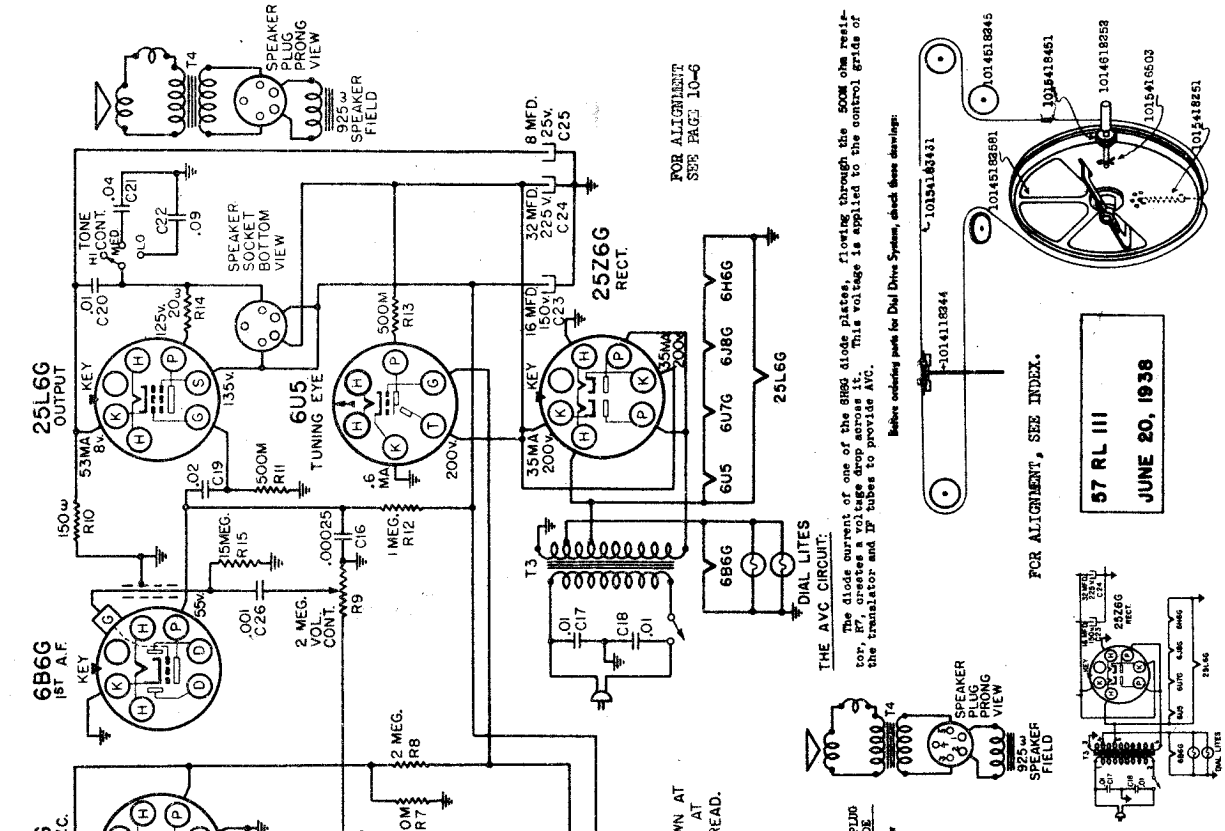
# SEARS-ROEBUCK & CO.

## MODELS 6022,6122,6132
## Chassis 101.509
## Schematic, Voltage
## Drive Data




* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

### ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
6J8G . . . . . Oscillator-Translator
6U7G . . . . . IF
6H6G . . . . . Detector-AVC
6B6G . . . . . First AF
25L6G . . . . . Output
6U5 . . . . . Tuning Eye
25Z5G . . . . . Rectifier

POWER SUPPLY:
All models available . . . . . 105-125 volts, 50-60 cycle, 55 watts
All models available . . . . . 105-125 volts, 25 cycle, 80 watts

FREQUENCY RANGES:
Band "AM" . . . . . 540 kc-1730 kc
Band "FOR" . . . . . 5.9 mc-18.5 mc

ALIGNMENT FREQUENCIES:
Oscil. Ant-Transl.
Band "AM" 1400 kc Trimmer 600 kc Padder
Band "FOR" -- 15 mc Fixed

INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:
Type . . . . . Beam Tube
Undistorted . . . . . 1.75 watts
Maximum . . . . . 3.00 watts

OPERATING FEATURES:
Tone Control . . . . . Three position
Automatic Volume Control
Push Button Tuning (6 button)

OPERATING CONTROLS:
1. Upper left knob . . . . . Volume
2. Lower left knob . . . . . Band Switch
3. Lower right knob . . . . . On-Off Switch and Tone
4. Upper right knob . . . . . Station Selector

LOUD SPEAKER:
Type . . . . . Dynamic
Size . . . . . 8 and 8 inch
Field coil resistance . . . . . 925 ohms

CHASSIS FEATURES:
Built-in IF Wave Trap
Number of IF Stages . . . . . One
Antenna . . . . . Conventional
Tuning Eye

CONTROL OPERATION:
Turning right: . . . . . Volume increases
Turning right: . . . . . "AM" "FOR"
Turning right: . . . . . "HI", "MED" "LO"

MECHANICAL SPECIFICATIONS

Tuning Ratio: . . . . . 10:1

SPEAKER PLUG COLOR CODE
1. Yellow
2. Black
3. Brown
4. Blank
5. Green

PWR. TRANSF COLOR CODE
1. Black
2. Green
3. Slate
4. Blue
5. Yellow
6. Red

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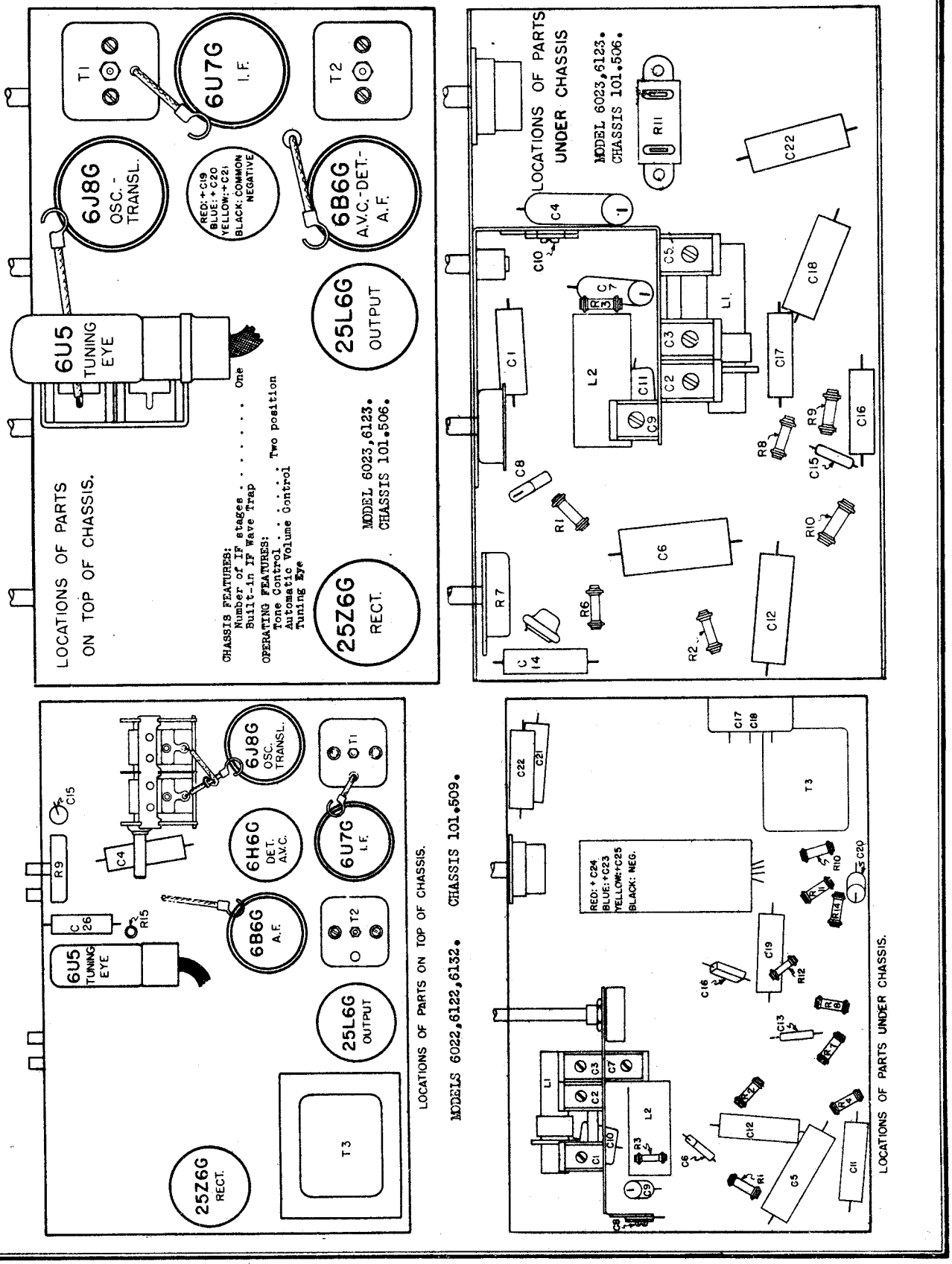
MODELS 6022,6122,6132
Chassis 101.509
MODELS 6023,6123
Chassis 101.506
Socket,Trimmers,Chassis

# SEARS-ROEBUCK & CO.

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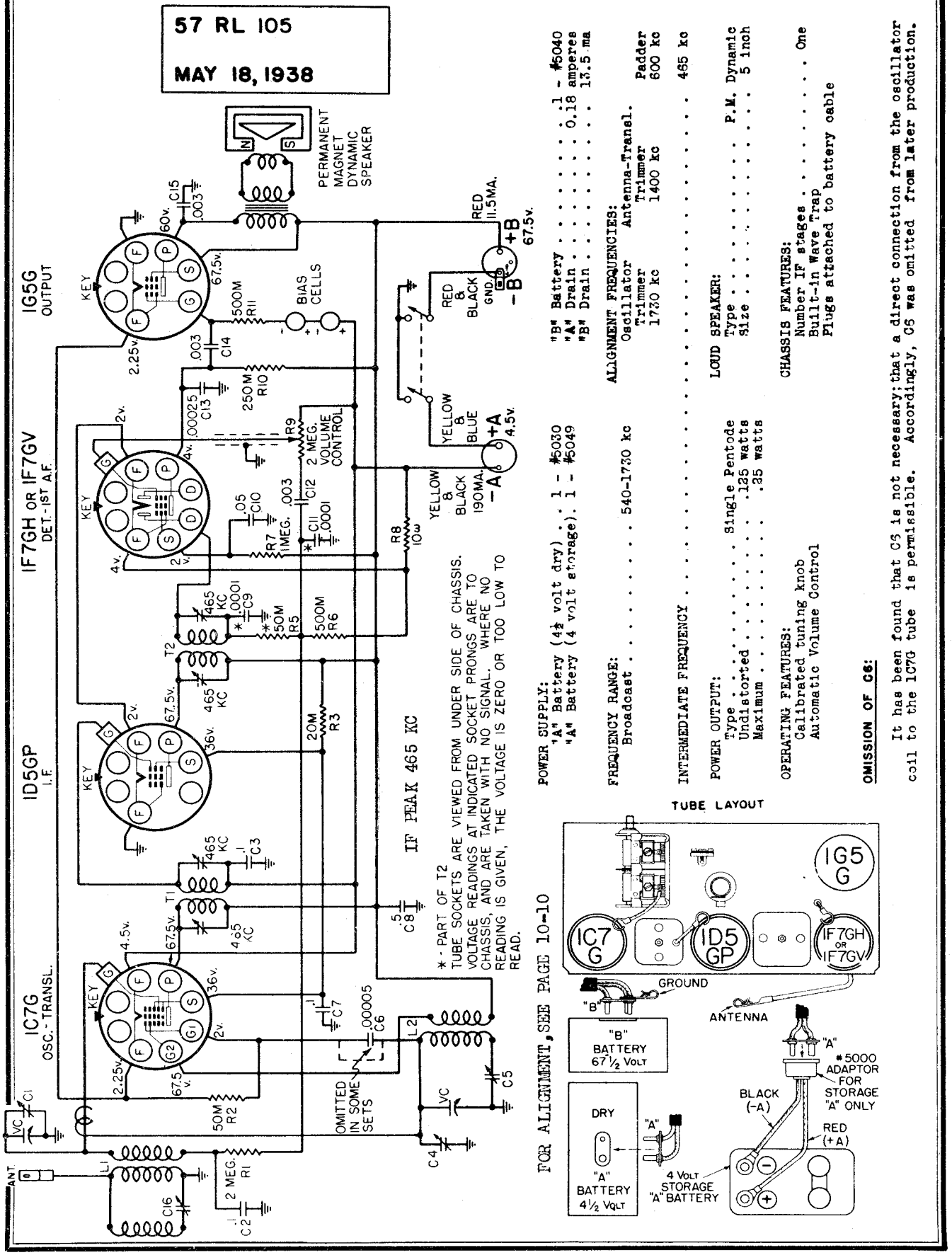
SEARS-ROEBUCK & CO.

MODELS 6010,6040,Ch.101.519
Schematic,Voltage,Socket
Trimmers,Change

**57 RL 105**

**MAY 18, 1938**


IG5G OUTPUT
IF7GH OR IF7GV DET.-1ST A.F.
ID5GP I.F.
IC7G OSC.-TRANSL.
PERMANENT MAGNET DYNAMIC SPEAKER
BIAS CELLS
2 MEG. VOLUME CONTROL
IF PEAK 465 KC
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
OMITTED IN SOME SETS
RED 11.5MA.
+B 67.5v.
-B
RED & BLACK
YELLOW & BLUE
+A 4.5v.
YELLOW & BLACK
190MA.
-A
ANT
KEY

FOR ALIGNMENT, SEE PAGE 10-10

POWER SUPPLY:
"A" Battery (4½ volt dry) . . . 1 - #5030
"A" Battery (4 volt storage). 1 - #5049

"B" Battery . . . . . 1 - #5040
"A" Drain . . . . . 0.18 amperes
"B" Drain . . . . . 13.5 ma

FREQUENCY RANGE:
Broadcast . . . . . 540-1730 kc

ALIGNMENT FREQUENCIES:

| Oscillator | Antenna-Transl. | |
|---|---|---|
| Trimmer | Trimmer | Padder |
| 1730 kc | 1400 kc | 600 kc |

INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:
Type . . . . . Single Pentode
Undistorted . . . . . .125 watts
Maximum . . . . . .35 watts

LOUD SPEAKER:
Type . . . . . P.M. Dynamic
Size . . . . . 5 inch

OPERATING FEATURES:
Calibrated tuning knob
Automatic Volume Control

CHASSIS FEATURES:
Number IF stages . . . . . One
Built-in Wave Trap
Plugs attached to battery cable

**OMISSION OF C6:**

It has been found that C6 is not necessary; that a direct connection from the oscillator coil to the 1C7G tube is permissible. Accordingly, C6 was omitted from later production.

TUBE LAYOUT

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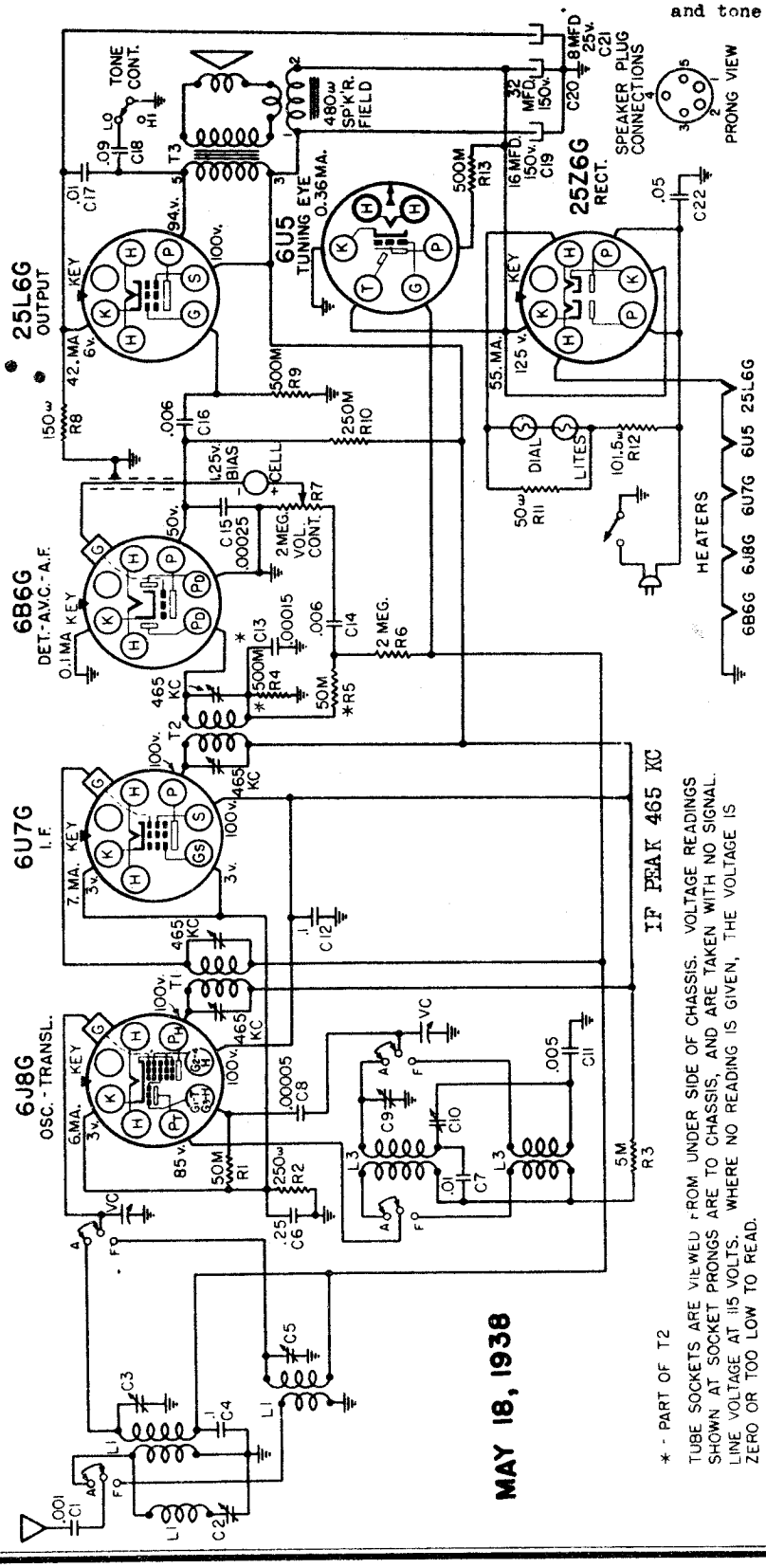
MODELS 6023,6123,Ch.101.506
Schematic,Voltage,Notes

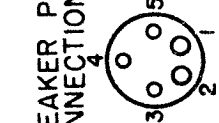
# SEARS ROEBUCK & CO.

**OPERATING CONTROLS:**

1. Left knob . . . . . .Volume
2. Next to left knob . . . Wave Band Switch
3. Next to right knob . . . .Station Selector
4. Right knob . . . ."On-off" switch and tone




SPEAKER PLUG CONNECTIONS




**SPEAKER PLUG CONNECTIONS**

1. Yellow
2. Black
3. Brown
4. Blank
5. Green

**FOR ALIGNMENT, SEE INDEX.**

* - PART OF T2

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

**POWER SUPPLY:**
All models available . . . . . 105-125 volts, 50-60 cycle, or DC, 50 watt

**FREQUENCY RANGES:**

| | |
|---|---|
| Band "A" | 540-1750 kc |
| Band "F" | 5.9-18.3 mc |

**ALIGNMENT FREQUENCIES:**

| | Oscil. Trimmer | Ant.-Transl. Trimmer | Padder |
|---|---|---|---|
| Band "A" | 1400 kc | 1400 kc | 500 kc |
| Band "F" | -- | 15 mc | Fixed |

INTERMEDIATE FREQUENCY . . . . . 455 kc

**POWER OUTPUT:**

| | |
|---|---|
| Type | Beam |
| Undistorted | 1.4 watt |
| Maximum | 3 watt |

**LOUD SPEAKER:**

| | |
|---|---|
| Type | Dynamic |
| Size | 8" |
| Field coil resistance | 480 ohms |
| App. field coil voltage drop | 35 volts |

**CONTROL OPERATION:**

| | |
|---|---|
| Turning right: | Volume increase |
| Tuning right: | "A", "F" |
| Tuning ratio: | 13:1 |
| Turning right: | "ON", "HI", "LO". |

**POWER SUPPLY AND HEATER CIRCUIT:**

All of the tube heaters are connected in series. Accordingly, if any one tube burns out the others will not light. The full line voltage will appear across the heater terminals of the burnt out tube.

Under certain conditions, the chassis may be above ground potential by an amount equal to the line voltage. Accordingly, appropriate precaution should be taken when working on the chassis.

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Motor, Pick-up Wiring
Alignment

# SEARS-ROEBUCK & CO.

## JULY 20, 1938

MODEL 6028
Chassis 126.204
Schematic, Voltage
Speaker Wiring







### LOUDSPEAKER WIRING

### PICKUP CONNECTIONS

Dial lamp..... 6.3 volts, 0.25 ampere
.....105-125 volts, 60 cycles, 80 watts
.....105-125 volts, 50 cycles, 80 watts

### MOTOR COIL WIRING

POWER SUPPLY RATINGS AVAILABLE.....

FREQUENCY RANGE:
Broadcast..... 540-1,720 kc

ALIGNMENT FREQUENCY:
Broadcast..... 1,500 kc (osc., ant.)

INTERMEDIATE FREQUENCY.....

POWER OUTPUT:
Type..... Pentode
Undistorted..... 2.0 watts
Maximum..... 3.5 watts

LOUDSPEAKER:
Type..... 5-inch electrodynamic
V.C. Impedance..... 5 ohms at 400 cycles
Field Coil Resistance..... 1,300 ohms
App. Field Coil Voltage Drop..... 100 volts

PHONOGRAPH:
Type..... Manual
Turntable Speed..... 78 R.P.M.
Type of Pickup..... Crystal
Pickup Impedance..... 80,000 ohms at 1,000 cycles

**Loudspeaker:**

Centering of the loudspeaker voice-coil is made in the usual manner with three, narrow-paper feelers, after first removing the front dust-cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid after adjustment has been completed.

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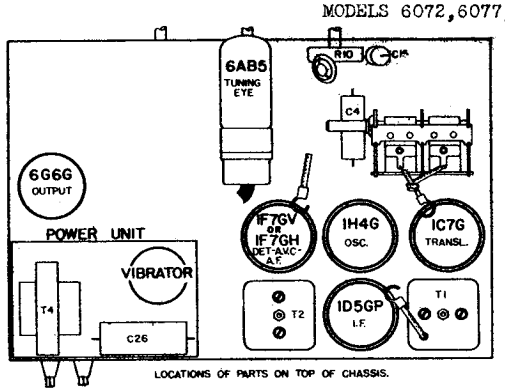
MODEL 6028,Ch.126.204
Motor Details,Trimmers
Chassis Wiring,Socket

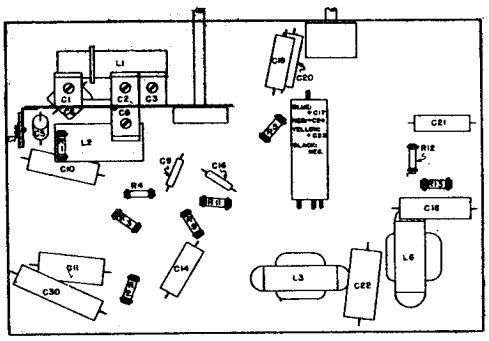
# SEARS-ROEBUCK & CO.

MODELS 6072,6077,6172
Chassis 101.513
Socket,Trimmers,Chassis

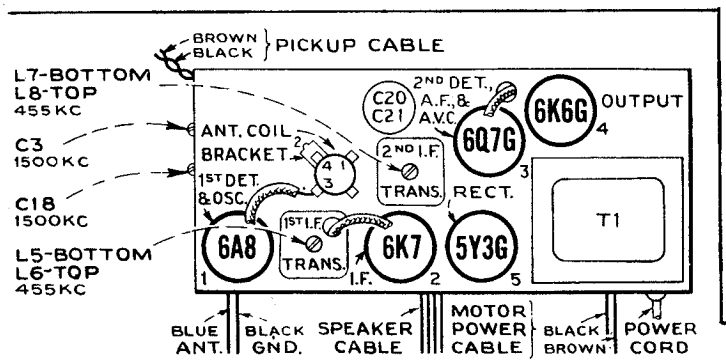
MODELS 6072,6077,6172. CHASSIS 101.513.

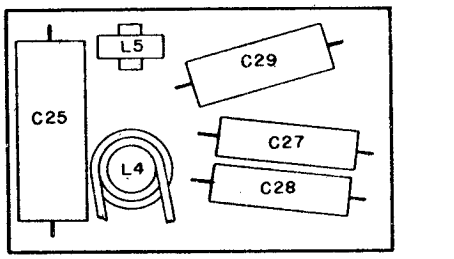



LOCATIONS OF PARTS ON TOP OF CHASSIS.



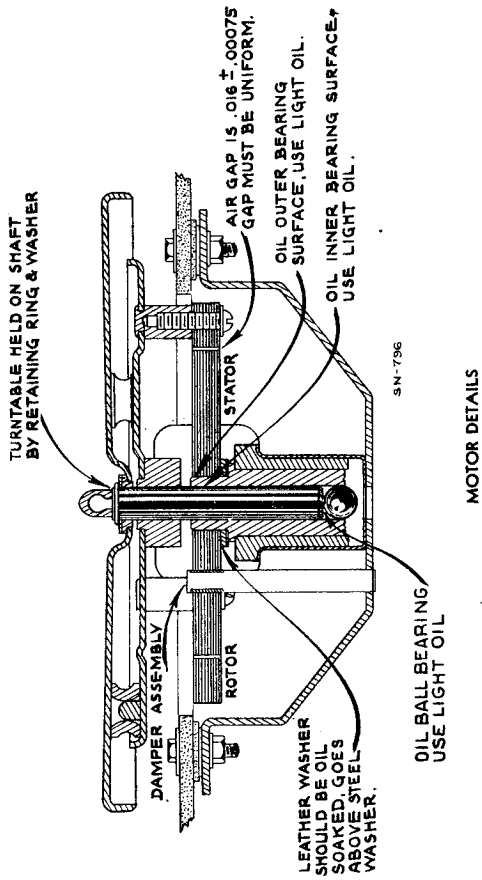
LOCATIONS OF PARTS UNDER CHASSIS.



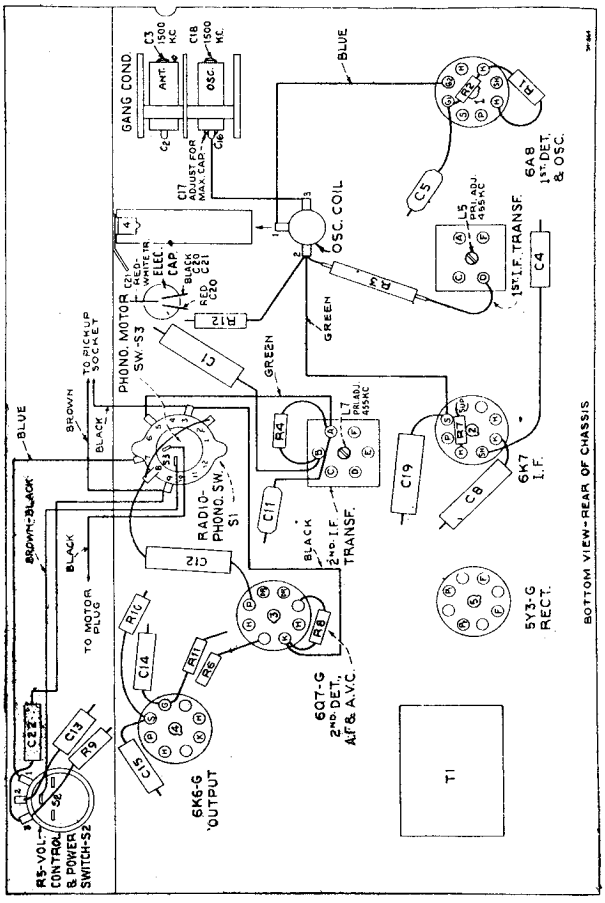




LOCATIONS OF PARTS UNDER POWER PACK.

MODEL 6028. CHASSIS 126.204.


TURNTABLE HELD ON SHAFT BY RETAINING RING & WASHER
AIR GAP IS .016 ± .0005" GAP MUST BE UNIFORM.
OIL OUTER BEARING SURFACE, USE LIGHT OIL.
OIL INNER BEARING SURFACE, USE LIGHT OIL.
STATOR
ROTOR
DAMPER ASSEMBLY
LEATHER WASHER SHOULD BE OIL SOAKED. GOES ABOVE STEEL WASHER.
OIL BALL BEARING USE LIGHT OIL
SN-796

MOTOR DETAILS

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## ALIGNMENT PROCEDURE

**PRELIMINARY:** MODEL 6038,6138 CHASSIS 101.517.

| | |
|---|---|
| Output meter connections | Across speaker voice coil |
| Output meter reading to indicate 1.0 watt output | 2.25 volts |
| Approximate average sensitivity in microvolts for 1.0 watt output | See chart below |
| Dummy antenna value to be inserted in series with generator output | See chart below |
| Connection of generator output lead | See chart below |
| Connection of generator ground lead | To chassis |
| Generator modulation | 30%, 400 cycles |
| Position of Volume Control | Fully clockwise |
| Position of Radio-Phono Switch | Second position from left |
| Position of Dial Pointer with variable tuning condenser fully closed | To coincide with horizontal lines on dial |

| Position of Dial Pointer | Generator Frequency | Dummy Antenna | Generator Connection | Trimmers Adjusted (In order shown) | Trimmer Function | Approximate Microvolts |
|---|---|---|---|---|---|---|
| Low End | 455 kc | .001 mfd. | 6K7 Grid | L7, L8 | 2nd I-F Trans. | 15,000 |
| Low End | 455 kc | .001 mfd. | 6A8 Grid | L5, L6 | 1st I-F Trans. | 270 |
| 1,500 kc | 1,500 kc | .0002 mfd. | Ant. Lead (Blue) | C18*, C3 | Osc., Ant. | 25 |

### IMPORTANT ALIGNMENT NOTES

* Trimmer C17, on opposite side of gang condenser from C18, should be screwed clockwise for maximum capacity before adjusting C18.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value to prevent the a-v-c action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Remove the dummy antenna used for alignment at any other frequency. Grid cap leads should remain in place during alignment.

Values shown under "Microvolts" are only approximate.

### Eliminating Whistle at 910 KC:

A whistle, due to a beat between the second harmonic (910 kc) of the 455 kc I.F., and a 910 kc signal may be experienced. In localities where the 910 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the i-f frequency of the receiver.

Determine at what point between 880 kc and 940 kc the whistle will be least objectionable. Dividing this frequency by two will give the new i-f frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the I.F. should be realigned at 915/2 or 457.5 kc. Try to select the new i-f frequency as near to 455 kc as possible.

Align the I.F. at the new frequency and then realign the rest of the receiver as described under "ALIGNMENT PROCEDURE"

### Phonograph Motor:

**Starting.**—The phonograph motor switch (S3) is turned "on" in the two phonograph positions of the Radio-Phono switch; and it is turned "off" in the two radio positions. To start the phonograph motor, turn the Radio-Phono switch to one of the two phonograph positions, which applies power to the motor, and then give the motor a clockwise twirl with the hand.

**Hum and Vibration.**—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.

**Removing Rotor.**—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

**Rotor Adjustment.**—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of the rotor must be flush with the top of the stator; add additional steel washers beneath the stator if necessary.

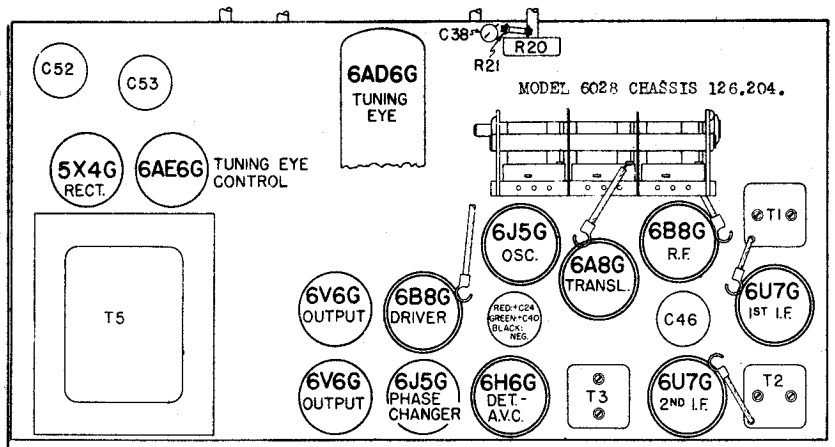
**Lubrication.**—Oiling points are indicated on "Details of Motor".

OPERATING FEATURES:

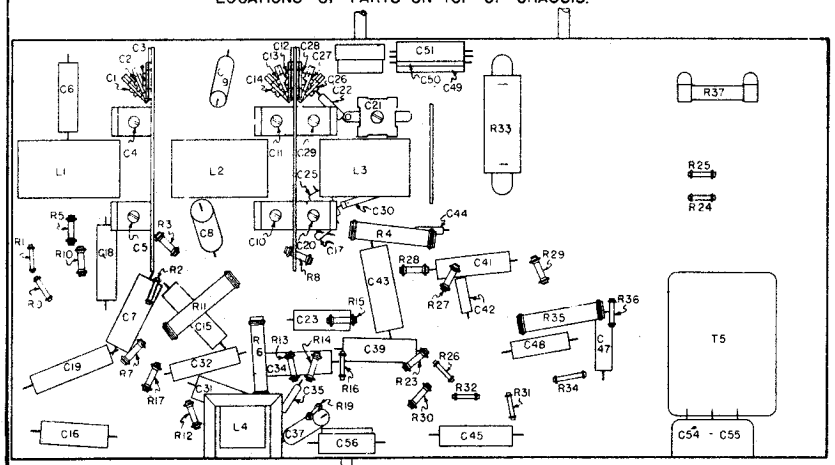
Phonograph-Radio operation
Manual-starting, synchronous-type motor
Two-point Tone Control
Automatic Volume Control

CHASSIS FEATURES:

No. I-F Stages..... One
Antenna..... Doublet or Conventional
Line Noise Electrostatic Transformer Shield
Magnet c-Core Adjusted I-F Transformers




LOCATIONS OF PARTS ON TOP OF CHASSIS.




LOCATIONS OF PARTS UNDER CHASSIS.

### ELIMINATING WHISTLE AT 930 KC:

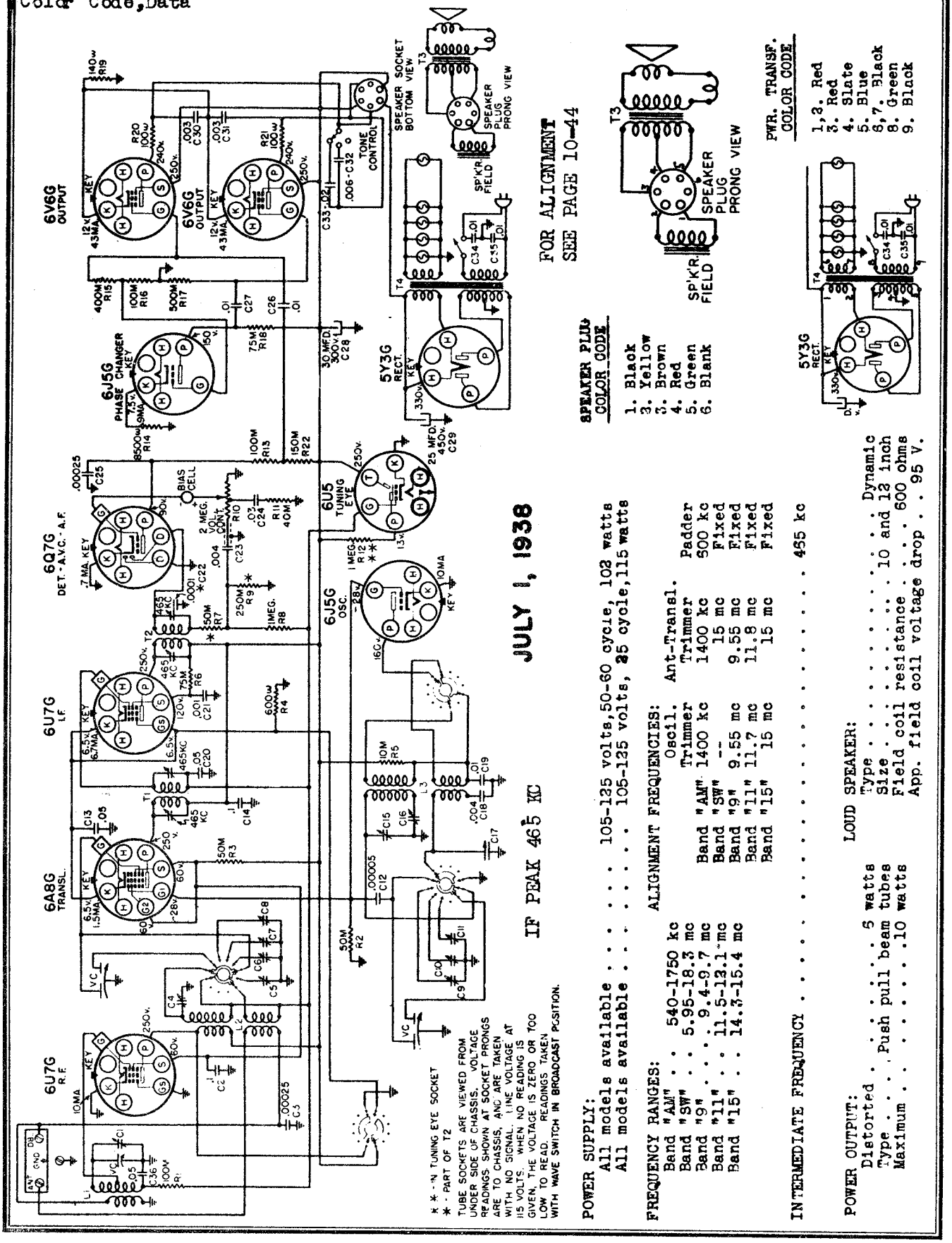
A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 930 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/2 or 457.5 kc. Try to select the new IF frequency as close to 455 kc as possible.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

MODELS 6036,6136
Chassis 101.511
Schematic,Voltage
Color Code,Data

# SEARS-ROEBUCK & CO.




POWER SUPPLY:
All models available . . . . . 105-135 volts,50-60 cycle, 102 watts
All models available . . . . . 105-135 volts, 25 cycle,115 watts

FREQUENCY RANGES:

| | | Oscil. Trimmer | Ant-Transl. Trimmer | Padder |
|---|---|---|---|---|
| Band "AM" . . | 540-1750 kc | | | |
| Band "SW" . . | 5.95-18.3 mc | Band "AM" 1400 kc | 1400 kc | 600 kc |
| Band "9" . . . | 9.4-9.7 mc | Band "SW" -- | 15 mc | Fixed |
| Band "11" . . | 11.5-13.1 mc | Band "9" 9.55 mc | 9.55 mc | Fixed |
| Band "15" . . | 14.3-15.4 mc | Band "11" 11.7 mc | 11.8 mc | Fixed |
| | | Band "15" 15 mc | 15 mc | Fixed |

INTERMEDIATE FREQUENCY . . . . . 455 kc

POWER OUTPUT:
Distorted . . . . . 6 watts
Type . . . . . Push pull beam tubes
Maximum . . . . . .10 watts

LOUD SPEAKER:
Type . . . . . Dynamic
Size . . . . . 10 and 12 inch
Field coil resistance . . . . 600 ohms
App. field coil voltage drop . . 95 V.

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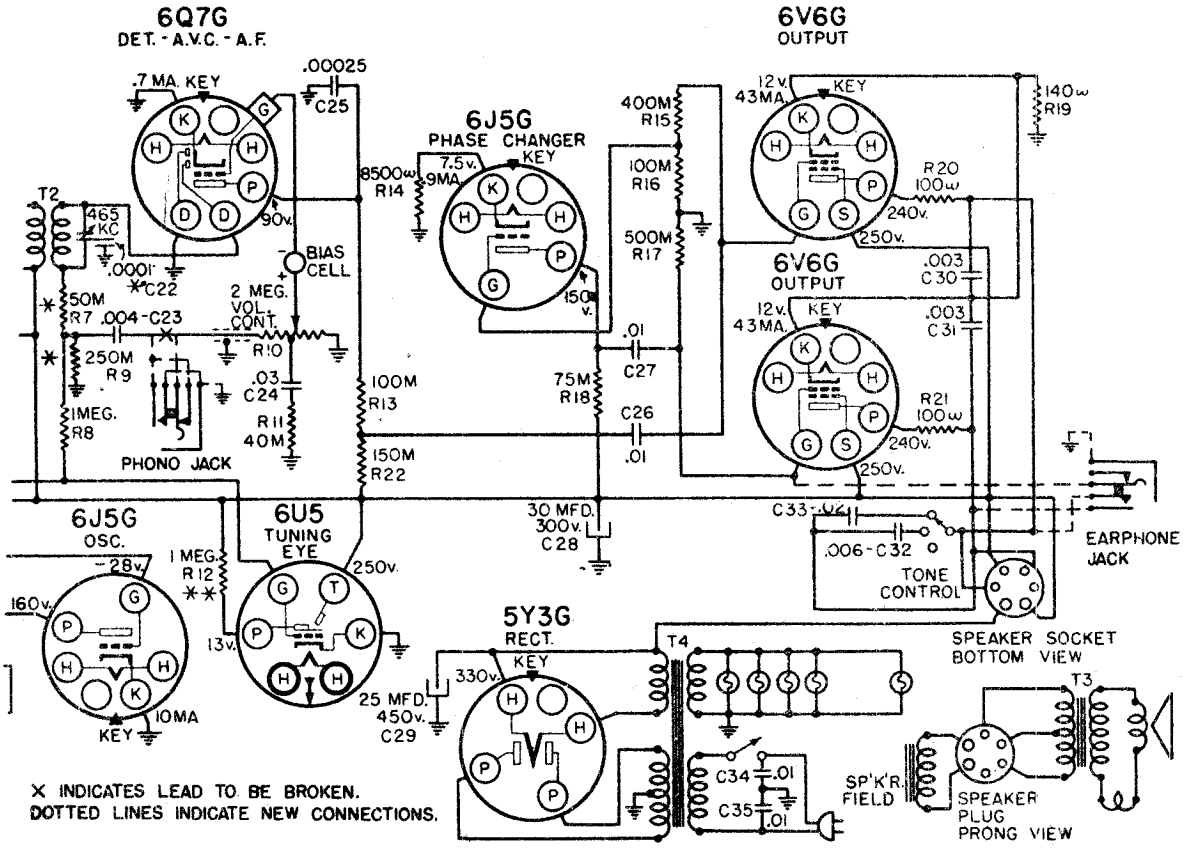
# SEARS-ROEBUCK & CO.

MODELS 6036,6136
Chassis 101.511
Phone,Phono.Jacks
Drive Data,Notes

SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPH PICKUP JACKS:

Part number 1015119531 Jack, for connection of earphones or phonograph pick-up, can be ordered directly from source 101.

If a crystal pick-up is used, a filter composed of a .01 mfd. condenser and a 100M ohm resistor connected in series, should be connected across the pick-up to prevent excessive bass response. This filter will also act as a partial scratch filter.




× INDICATES LEAD TO BE BROKEN.
DOTTED LINES INDICATE NEW CONNECTIONS.

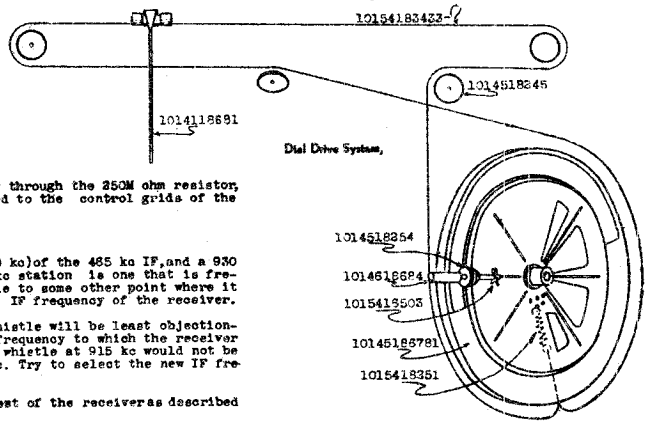
OPERATING FEATURES:
Tone Control . . . . . Three position
Automatic Volume Control
Three Spread Bands
Push Button Tuning (8 button)
Band Indicator

OPERATING CONTROLS:
1. Upper left knob . . . . . Volume
2. Lower left knob . . ."On-Off" Switch and Tone
3. Lower right knob. . Wave Band Switch
4. Upper right knob. . Station Selector

CHASSIS FEATURES:
Number RF stages . . One (on Band "AM")
Number IF stages . . . . . One
Tuning Eye
Number condensers in gang . . . .Three
Antenna . . . . . .Doublet

CONTROL OPERATION:
Turning right: . . . . Volume increase
Turning right:. ."ON","HI","MED", "LO"

Turning right: "AM","SW","9","11","15"
Tuning ratio: . . . . . 13:1




## THE AVC CIRCUIT:

The diode current of one of the 6Q7G diode plates, flowing through the 250M ohm resistor, R9, creates a voltage drop across it. This voltage is applied to the control grids of the RF, translator, and IF tubes, to provide AVC.

## ELIMINATING WHISTLE AT 930 KC:

A whistle, due to a beat between the second harmonic (930 kc) of the 465 kc IF, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the IF frequency of the receiver.

Determine at what point between 900 kc and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new IF frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 915 kc would not be objectionable, the IF should be realigned at 915/3 or 457.5 kc. Try to select the new IF frequency as near as possible to 465 kc.

Align the IF at the new frequency and then realign the rest of the receiver as described under, "ALIGNMENT PROCEDURE".

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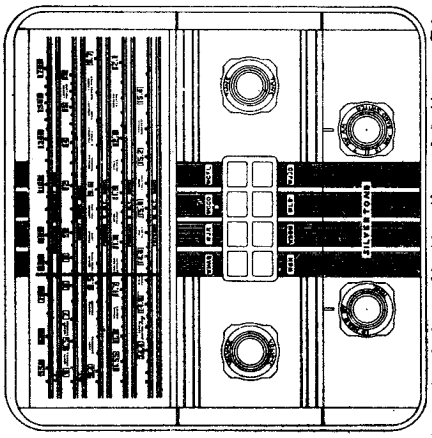
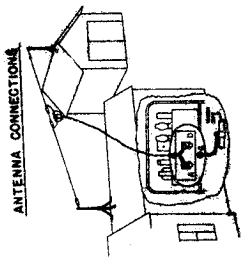
MODELS 6036,6136
Chassis 101.511
Socket,Trimmers
Chassis,Tuner Data

# SEARS-ROEBUCK & CO.

CHASSIS 101.509, 101.510, 101.512, 101.513, 101.515, 101.517, 101.524, 101.534
Tuner Data



TUNER DATA FOR CHASSIS:- 101.509,101.510,101.512, 101.513,101.515,101.517, 101.524,and 101.534.




## PUSH BUTTON TUNING

SETTING UP:

Leave the radio turned on for about 15 minutes before adjusting the push buttons. This "warming up" period will insure permanent and accurate settings.

1. Make a list of the stations that you want to set up for push button tuning. It is advisable, but not necessary, to arrange the stations in the order of their frequency (kilocycles); that is, the station of lowest frequency will be #1, the station of next higher frequency #2, etc. The top left push button can be used for station #1, the lower left one for station #2, the next upper one for station #3, etc. If you wish, Short Wave stations that can be tuned in on the "SW", "1", or "2" wo bands can be set up for push button tuning. The stations selected must give strong and reliable reception. The Band Switch knob must be turned to the proper position for the stations selected.

2. Pull the volume control and tuning knobs off of their shafts. Remove the snap-in buttons that were covered by the knobs. The escutcheon (the plate through which the push buttons protrude) can then be removed. Be careful not to lose the snap-in buttons.

3. Replace the tuning knob on its shaft. Push the knob in and turn it so that the dial pointer comes to the left end of the dial. A key will be found in the Instruction Leaflet envelope. Engage this key with the slotted shaft that is between the tuning knob and the push buttons. Unlock the mechanism by pushing the shaft in and unscrewing it(turn counterclockwise as far as it will go. Do not force it. About 8 turns is sufficient to loosen it completely. (A screw driver can be used for unlocking the mechanism instead of the key supplied.) Then remove the key.

4. Push the button that you wish to use for your #1 station, all the way in and hold it in firmly. Push the tuning knob in and turn it until your #1 station is tuned in exactly, as indicated by the tuning eye. Be as exact as possible in tuning your station since this will determine how accurately your station will be tuned whenever you use the push button. Then let go of the push button, making sure not to turn the tuning knob until you have let go of the button. (Turning the knob while the button is pushed in would spoil the accuracy of the adjustment.)

5. Push in your #2 button. Hold it in firmly and tune in your #2 station accurately. Then let go of the push button and then the tuning knob. Proceed in the same manner for the other stations on your list.

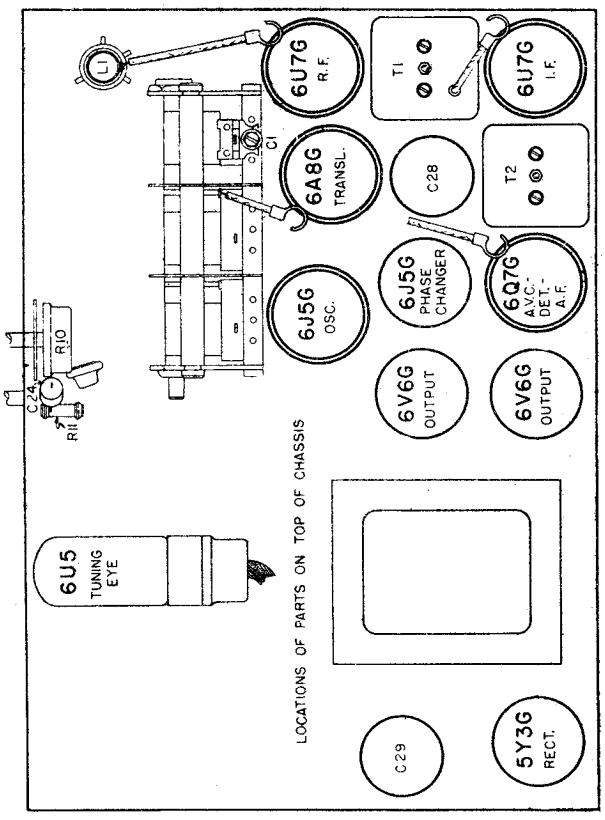
6. When all of the stations have been set up, push the tuning knob in and turn it so that the dial pointer comes to the right end of the dial. Then look the mechanism by securely tightening (turning clockwise) the slotted shaft, using the key supplied or a screw driver.

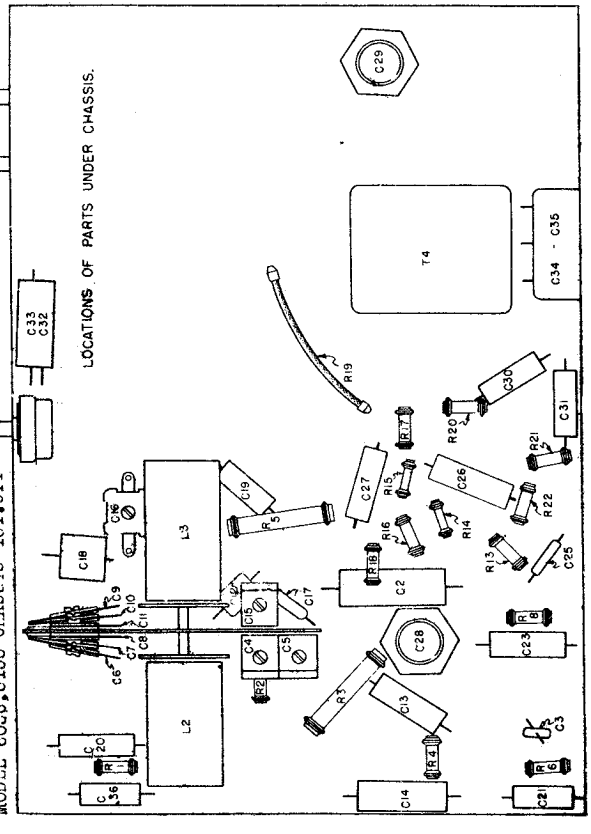
7. Punch out the call letters of your desired stations from the call letter sheets supplied. Insert the call letters in the celluloid holders at the back of the escutcheon. Be sure to insert the call letters so that they are opposite their respective push buttons. Then replace the escutcheon.

8. You may change your choice of stations at any time by unlocking the mechanism as described in Step 3 and adjusting the button to the new station, as described in Step 4. Then relock the mechanism as described in Step 6. The call letters of the new station should be inserted in the call letter holder in their proper position.

OPERATION:

Push the button, indicated for your desired station, all the way in. Your station then will be tuned in. If you have selected short wave stations for push button tuning, be sure the band switch is turned to the proper band. The button will remain part way in, indicating that station is tuned in, until you push another button or the tuning knob.

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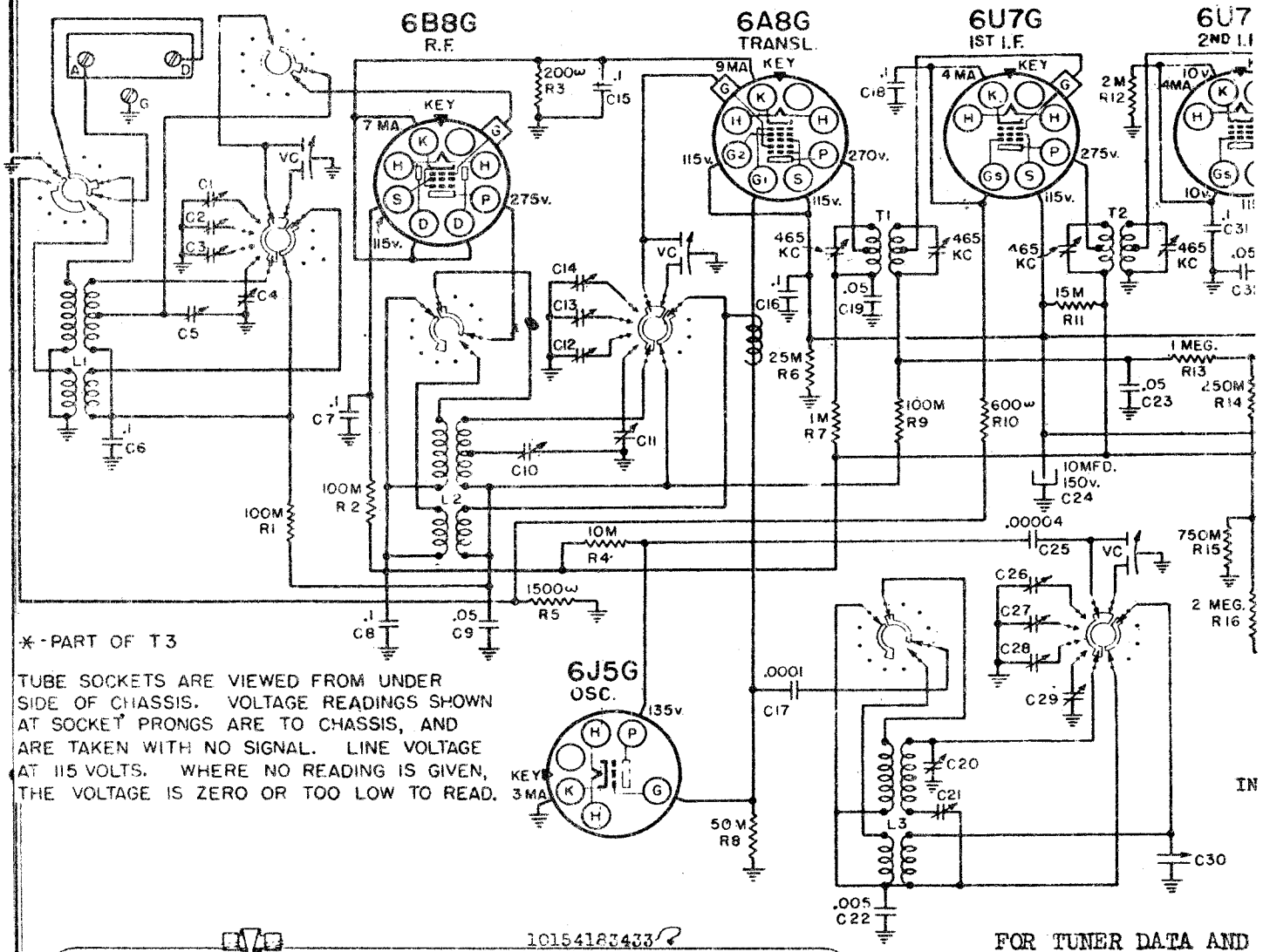
SEARS-ROEBU

# WIRING DIAGRAM FOR SILVERTONE CHASS

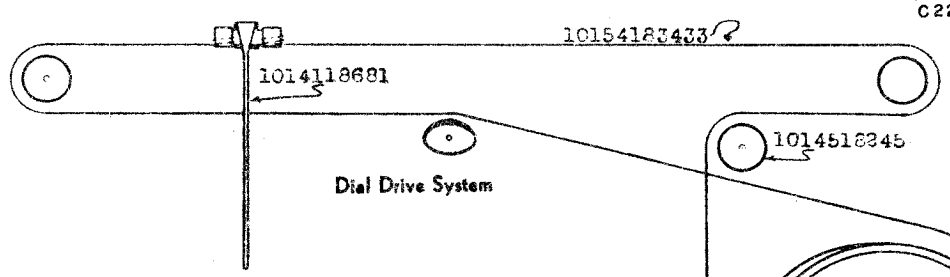



*-PART OF T3

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.

IN

FOR TUNER DATA AND ALIGNMENT, SEE INDEX

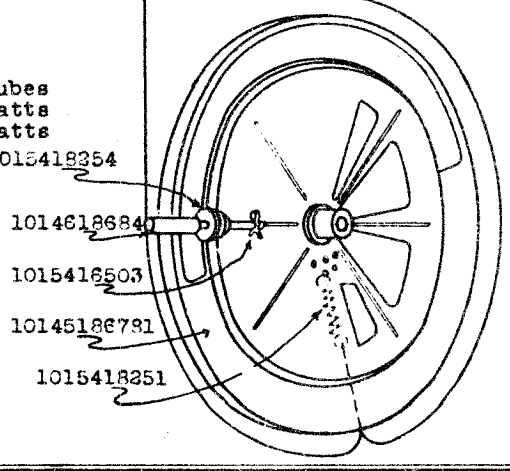



FREQUENCY RANGE
Band "AM"
Band "SW"
Band "9"
Band "11"
Band "15"

LOUD SPEAKER:
Type . . .
Size . . .
Field coil
App. field

POWER OUTPUT:
Type . . . . . Push pull beam tubes
Undistorted . . . . . 8.5 watts
Maximum . . . . . 13 watts

POWER SUPPLY:
All models available
105-125 volts, 50-60 cycle, 145 watts
105-125 volts, 35 cycle, 150 watts




SPEAKER PLUG COLOR CODE

1. Black
2. Yellow
3. Brown
4. Red
5. Green
6. Blank

**57 RL 119**

**JUNE 27, 1938**

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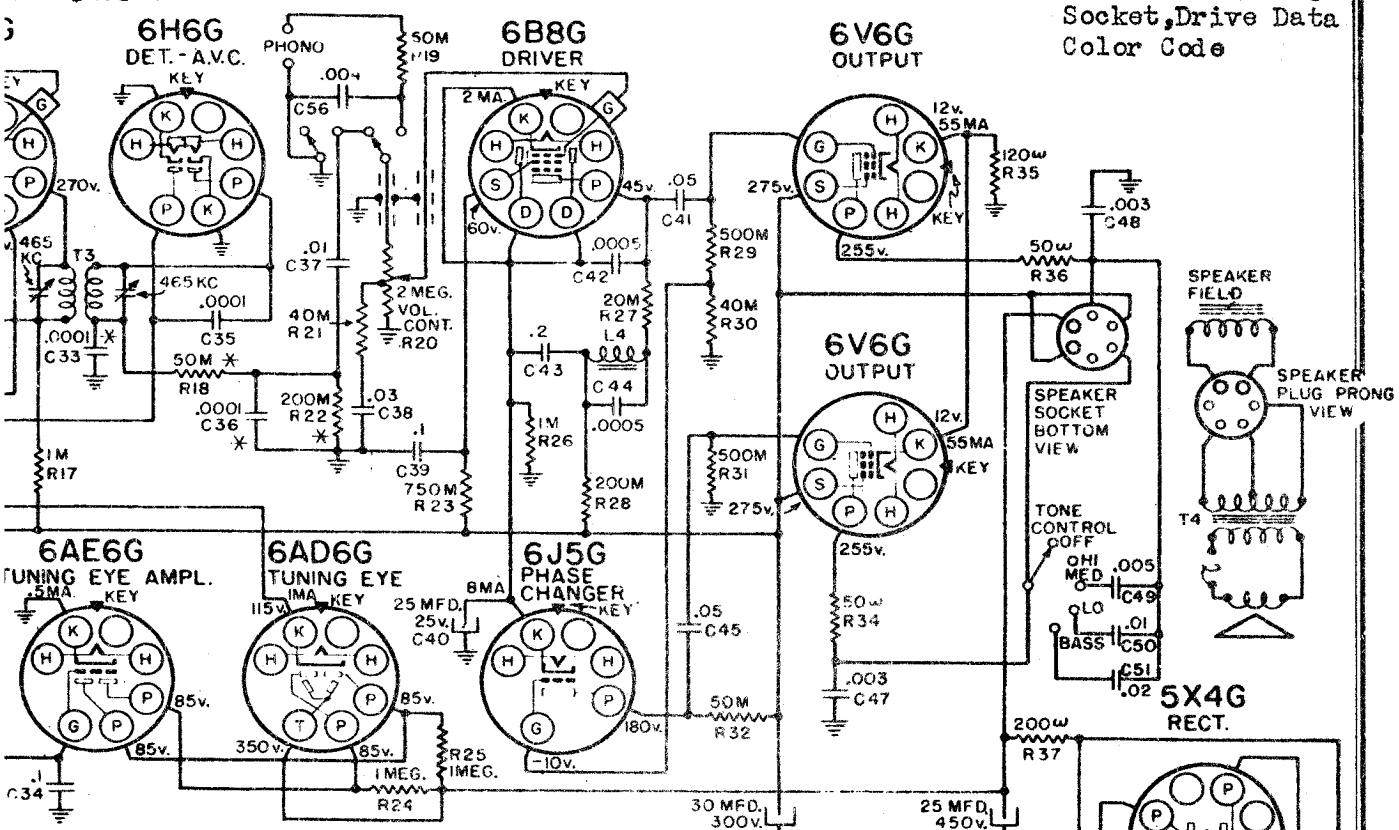
CK & CO.

S 101.517

MODELS 6038,6138
Chassis 101.517
Schematic,Voltage
Socket,Drive Data
Color Code




ERMEDIATE FREQUENCY

455 kc

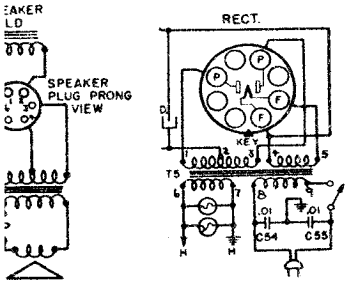
3:

| | |
|---|---|
| . . . . . | 543-1750 kc |
| . . . . . | 5.9 mc-18.1 mc |
| . . . . . | 9.4 mc-9.7 mc |
| . . . . . | 11.5 mc-12.1 mc |
| . . . . . | 14.6 mc-15.8 mc |

| | |
|---|---|
| . . . . . | Dynamic |
| . . . . . | 12 inch |
| resistance . . . . | 480 ohms |
| coil voltage drop . . | 65 V. |

ALIGNMENT FREQUENCIES:

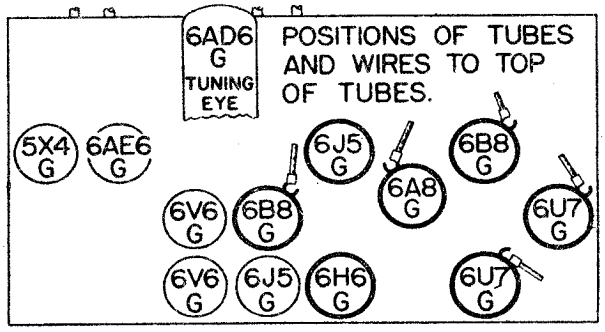
| | Oscil. Trimmer | Ant-Transl. Trimmer | Padder |
|---|---|---|---|
| Band "AM" | 1400 kc | 1400 kc | 600 kc |
| Band "SW" | 18 mc | 15 mc | Fixed |
| Band "9" | 9.55 mc | 9.55 mc | Fixed |
| Band "11" | 11.7 mc | 11.7 mc | Fixed |
| Band "15" | 14.9 mc | 14.9 mc | Fixed |




PWR. TRANSF COLOR CODE

1. Red
2. Slate
3. Blue
4,5. Red
6,7. Black
8. Black
9. Green

TUBE LAYOUT



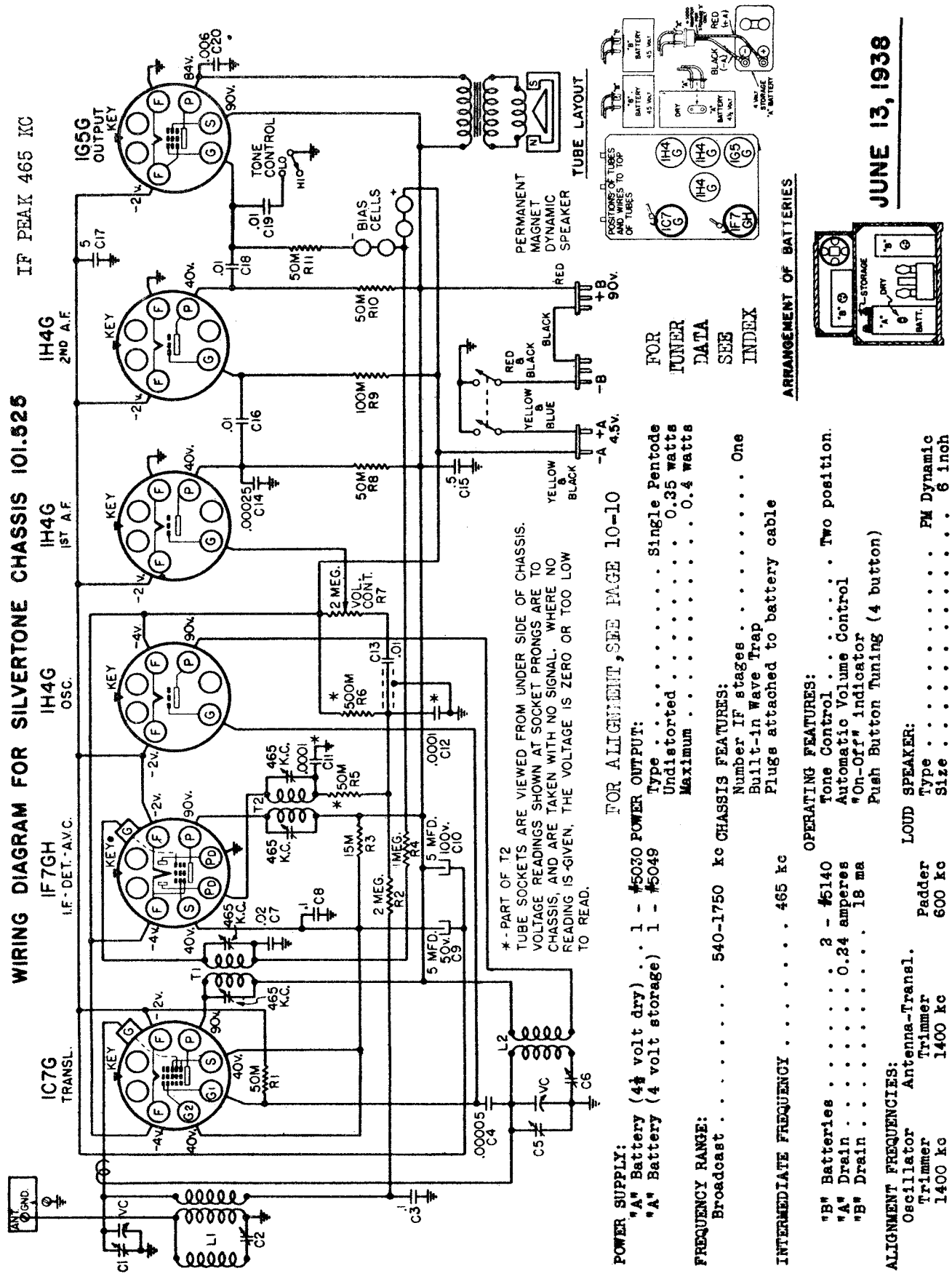
Schematic, Voltage
Socket, Data

SEARS-ROEBUCK & CO.

MODELS 6052, 6053
Chassis 101.525

# WIRING DIAGRAM FOR SILVERTONE CHASSIS 101.525

IF PEAK 465 KC


1G5G OUTPUT
1H4G 2ND A.F.
1H4G 1ST A.F.
1H4G OSC.
1F7GH I.F.-DET.-A.V.C.
1C7G TRANSL.
TONE CONTROL
BIAS CELLS
PERMANENT MAGNET DYNAMIC SPEAKER
2 MEG. VOL. CONT. R7
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
FOR ALIGNMENT, SEE PAGE 10-10
TUBE LAYOUT
POSITIONS OF TUBES AND WIRES TO TOP OF TUBES
ARRANGEMENT OF BATTERIES
FOR TUNER DATA SEE INDEX

**POWER SUPPLY:**
"A" Battery (4½ volt dry) . . 1 - #5030 POWER OUTPUT:
"A" Battery (4 volt storage) 1 - #5049
Type . . . . . Single Pentode
Undistorted . . . . . 0.35 watts
Maximum . . . . . 0.4 watts

**FREQUENCY RANGE:**
Broadcast . . . . . 540-1750 kc CHASSIS FEATURES:
Number IF stages . . . . . One
Built-in Wave Trap
Plugs attached to battery cable

**INTERMEDIATE FREQUENCY . . . . . 465 kc**

OPERATING FEATURES:
Tone Control . . . . . Two position.
Automatic Volume Control
"On-Off" indicator
Push Button Tuning (4 button)

"B" Batteries . . . . . 2 - #6140
"A" Drain . . . . . 0.24 amperes
"B" Drain . . . . . 18 ma

LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6 inch

**ALIGNMENT FREQUENCIES:**

| Oscillator | Antenna-Transl. | | |
|---|---|---|---|
| Trimmer | Trimmer | Padder | |
| 1400 kc | 1400 kc | 600 kc | |

JUNE 13, 1938

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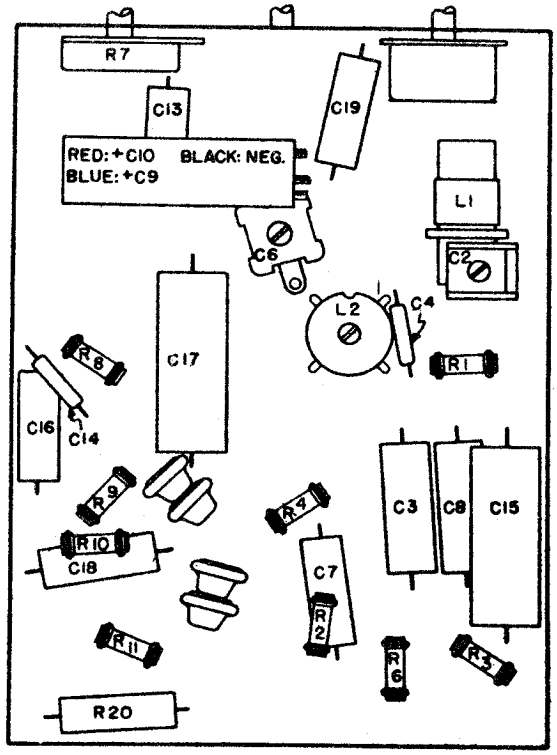
MODELS 6052,6053
Chassis 101.525
Socket,Trimmers
Chassis

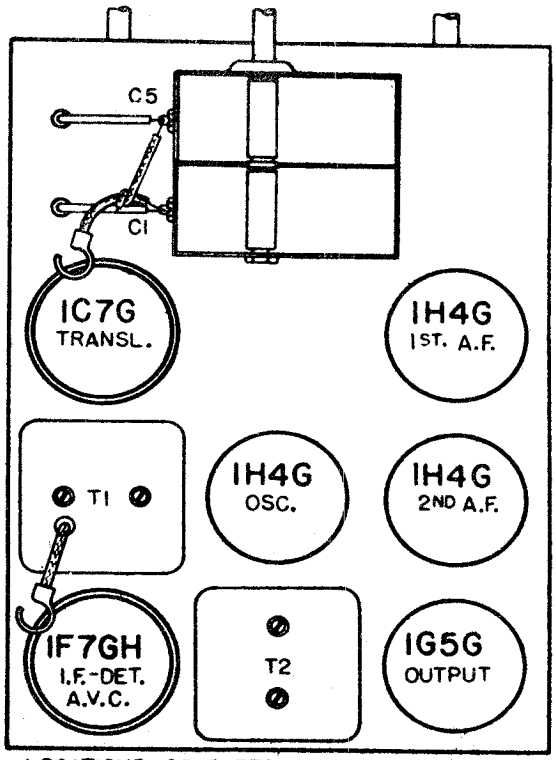
# SEARS-ROEBUCK & CO.

## MODELS 6052,6053.
## CHASSIS 101.525,

MODELS 6110,6111
Chassis 101.508
Socket,Trimmers
Chassis,Alignment




LOCATIONS OF PARTS UNDER CHASSIS

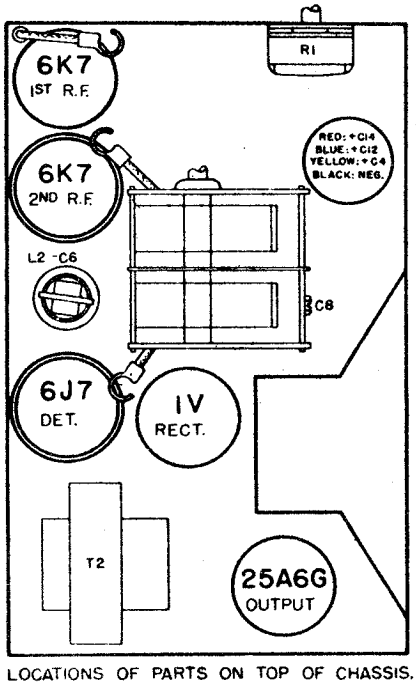



LOCATIONS OF PARTS ON TOP OF CHASSIS.

## ALIGNMENT PROCEDURE:

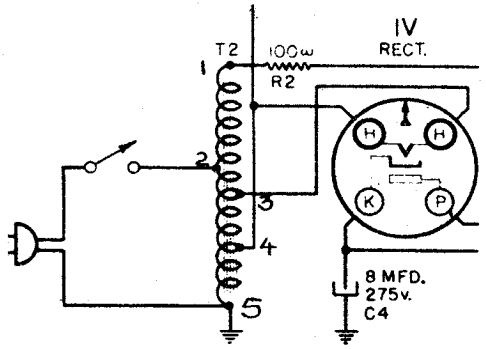
FOR CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOL. VIII INDEX

Either a broadcast station of about 1400 kc or a signal generator can be used for alignment. The chassis must be taken out of the cabinet for alignment of the trimmer, C8. The volume control setting should be reduced so that the signal is just audible in order to facilitate accuracy of adjustment. This set has no AVC so that a strong input signal may be used.



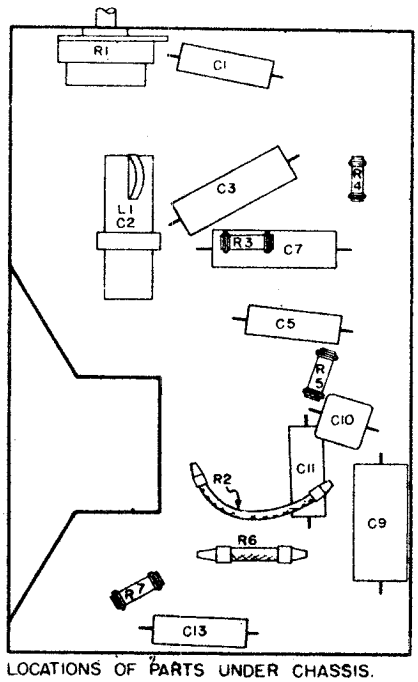

LOCATIONS OF PARTS ON TOP OF CHASSIS.

MODELS 6110, 6111
Chassis 101.508




PWR. TRANSF. COLOR CODE

1. Red
2. Green
3. Yellow
4. Blue
5. Black




LOCATIONS OF PARTS UNDER CHASSIS.

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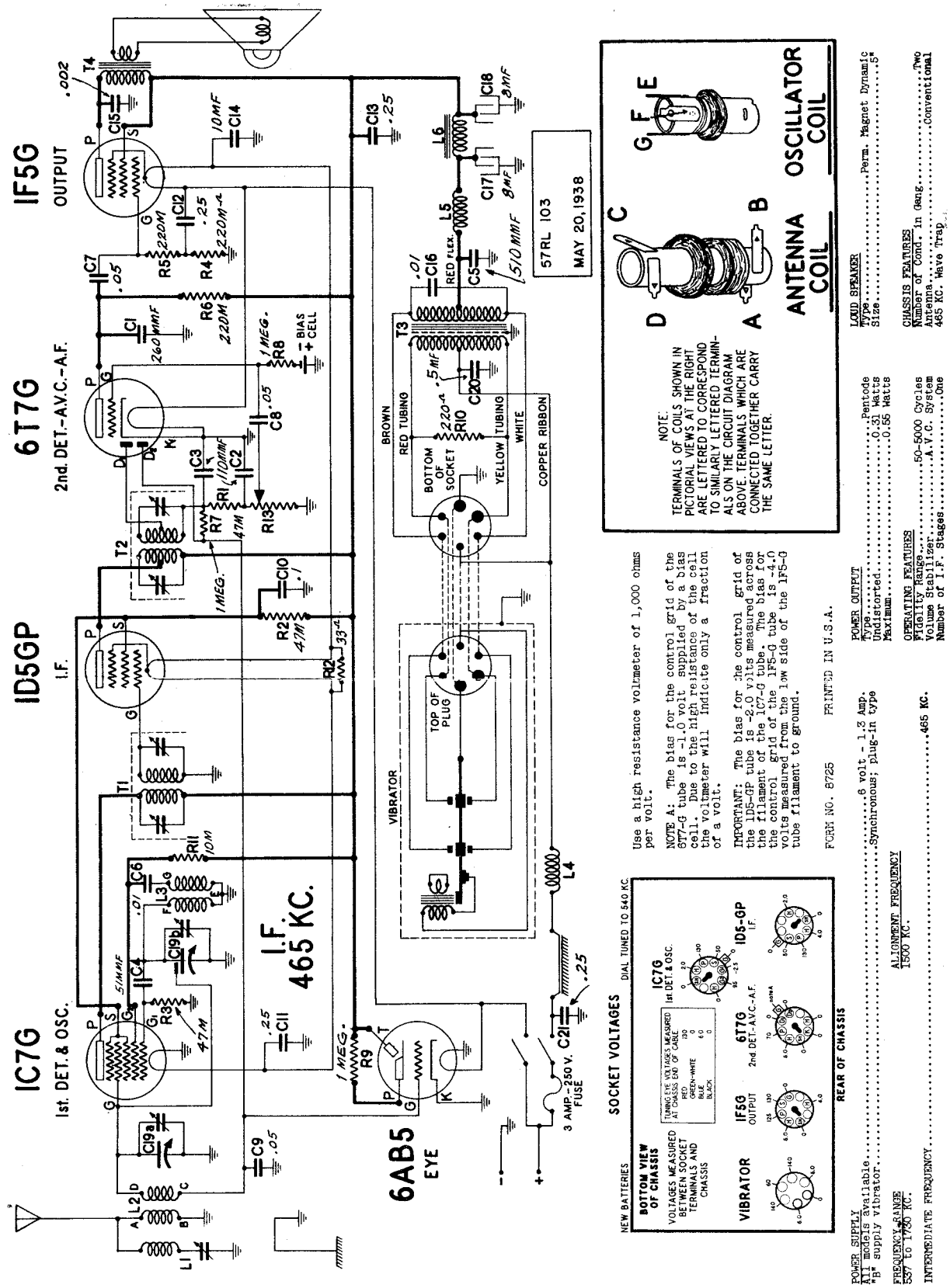
SEARS-ROEBUCK & CO.

MODELS 6070,6170
Chassis 100.189
Schematic, Voltage
Coils




Use a high resistance volmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grid of the 6T7-G tube is -1.0 volt supplied by a bias cell. Due to the high resistance of the cell the voltmeter will indicate only a fraction of a volt.

IMPORTANT: The bias for the control grid of the ID5-GP tube is -2.0 volts measured across the filament of the IC7-G tube. The bias for the control grid of the 1F5-G tube is -4.0 volts measured from the low side of the 1F5-G tube filament to ground.

FORM NO. 8725 PRINTED IN U.S.A.

POWER SUPPLY
All models available.....6 volt - 1.5 Amp.
"B" supply vibrator.....Synchronous; plug-in type

FREQUENCY RANGE
535 to 1720 KC.

ALIGNMENT FREQUENCY
1500 KC.

INTERMEDIATE FREQUENCY.....465 KC.

POWER OUTPUT
Type.....Pentode
Undistorted.....0.31 Watts
Maximum.....0.55 Watts

OPERATING FEATURES
Fidelity Range.....50-5000 Cycles
Volume Stabilizer.....A.V.C. System
Number of I.F. Stages.....One

LOUD SPEAKER
Type.....Perm. Magnet Dynamic
Size.....5"

CHASSIS FEATURES
Number of Cond. in Gang.....Two
Antenna.....Conventional
465 KC. Wave Trap

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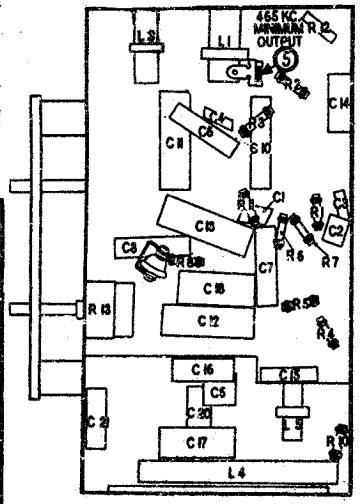
Model 6070, 6170 Chassis 100.189

# ALIGNMENT PROCEDURE

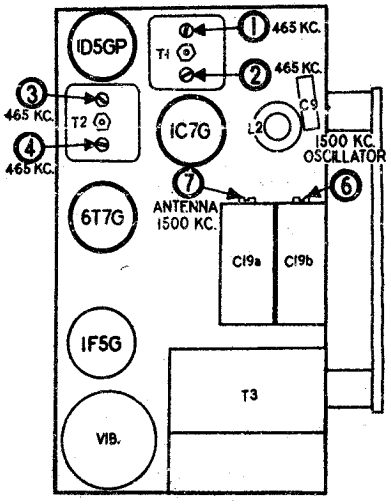
Before attempting to align the receiver check to see that the dial pointer is opposite the last scale division on the low frequency end of the dial scale when the gang condenser is in full mesh. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang condenser in the full-mesh position.

Output meter connections----Across voice coil leads
Output meter reading to indicate 0.05 watt output----0.5 volts
Average sensitivity in microvolts for 0.05 watt output----See chart below
Connection of Generator Ground----Receiver chassis
Dummy Antenna in series with Generator Output Lead----See chart below
Connection of Generator Output Lead----See chart below
Generator modulation----30%, 400 cycles
Position of volume control----Maximum clockwise

| DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | SENSITIVITY MICROVOLTS | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 1C7-G TUBE | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 1st I.F. | 200 | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | 3-4 | 2nd I.F. | | |
| 200 MMFD. MICA CONDENSER | ANTENNA TERMINAL | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | - | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |
| 200 MMFD. MICA CONDENSER | ANTENNA TERMINAL | 1500 KC | 1500 KC | 6 | OSCILLATOR | - | ADJUST TRIMMER TO BRING IN SIGNAL |
| 200 MMFD. MICA CONDENSER | ANTENNA TERMINAL | 1500 KC | TUNE TO 1500 KC GENERATOR SIGNAL | 7 | ANTENNA | 50 | ADJUST FOR MAXIMUM OUTPUT. |



BOTTOM VIEW



TOP VIEW

Model 7225 Chassis 110.255

## ALIGNMENT PROCEDURE

Output Meter Connections . . . . . Across Primary Output Transformer
Output Meter reading to indicate 0.050 watt
For Weston Type 571 Output Meter on 15 volt scale . . . . . 9 volts
Average sensitivity in MV for .05 watts output . . . . . see chart below
Dummy antenna value in series with generator output . . . . . 100 MMFDS
Connection of generator ground lead . . . . . To Chassis
Generator modulation . . . . . App. 30% at 400 cycles
Position of volume control . . . . . Fully clockwise

| POSITION OF DIAL POINTER | GENERATOR FREQUENCY | GENERATOR CONNECTION | TRIMMERS ADJUSTED | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|
| ** | 456 KC | Grid 6D6 | T7*,T6,T8 T7,T6,T8 | I.F. | 4500 |
| ** | 456 KC | Grid 6A7 | T4,T5 | I.F. | 60 |
| 600 KC (Rock) | 600 KC | Ant. | P | Osc. | 16 |
| 1500 KC | 1500 KC | Ant. | T3,T2 | Osc.,R.F. | 20 |
| 600 KC | 456 KC | Ant. | T1 | wave trap | *** |

## IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.

**Short oscillator section of variable condenser.
Second I.F. alignment must be done twice to secure flat top tuning.
***Adjust trimmer for minimum signal response with maximum signal input.
*First time T7 is misaligned about one turn by loosening center screw.

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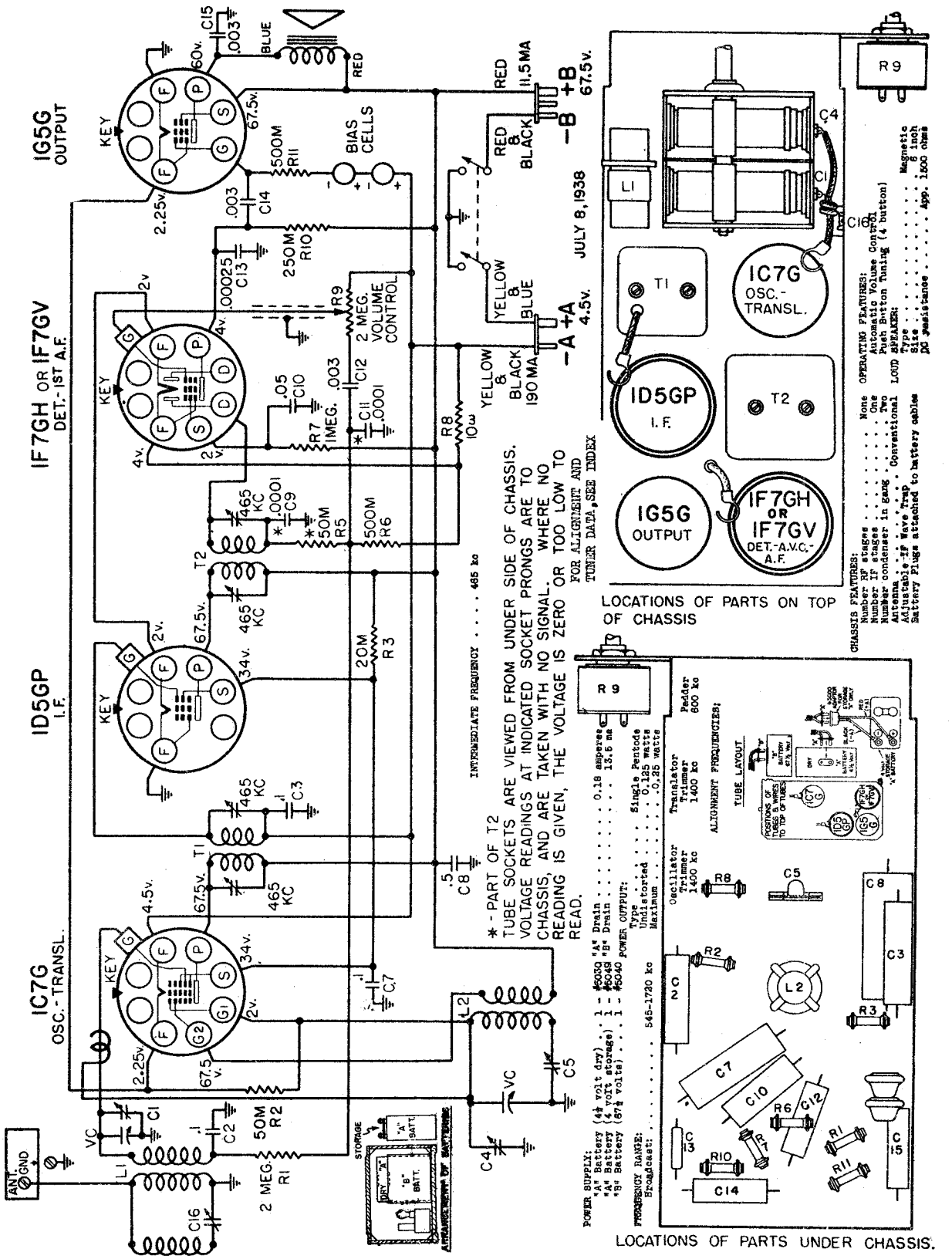
Socket, Trimmers
Chassis

# SEARS-ROEBUCK & CO.

MODELS 6054, 6055
Chassis 101, 532
Schematic, Voltage


IG5G OUTPUT
IF7GH OR IF7GV DET.-1ST A.F.
ID5GP I.F.
IC7G OSC.-TRANSL.
-B +B 67.5v.
-A +A 4.5v.
JULY 8, 1938
BIAS CELLS
2 MEG. VOLUME CONTROL
INTERMEDIATE FREQUENCY ..... 465 kc
* - PART OF T2
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
FOR ALIGNMENT AND TUNER DATA, SEE INDEX
LOCATIONS OF PARTS ON TOP OF CHASSIS
LOCATIONS OF PARTS UNDER CHASSIS.
CHASSIS FEATURES:
OPERATING FEATURES:
POWER SUPPLIX:
FREQUENCY RANGE:
TUBE LAYOUT
ALIGNMENT FREQUENCIES:
ANT.
GND
STORAGE
ARRANGEMENT OF BATTERIES

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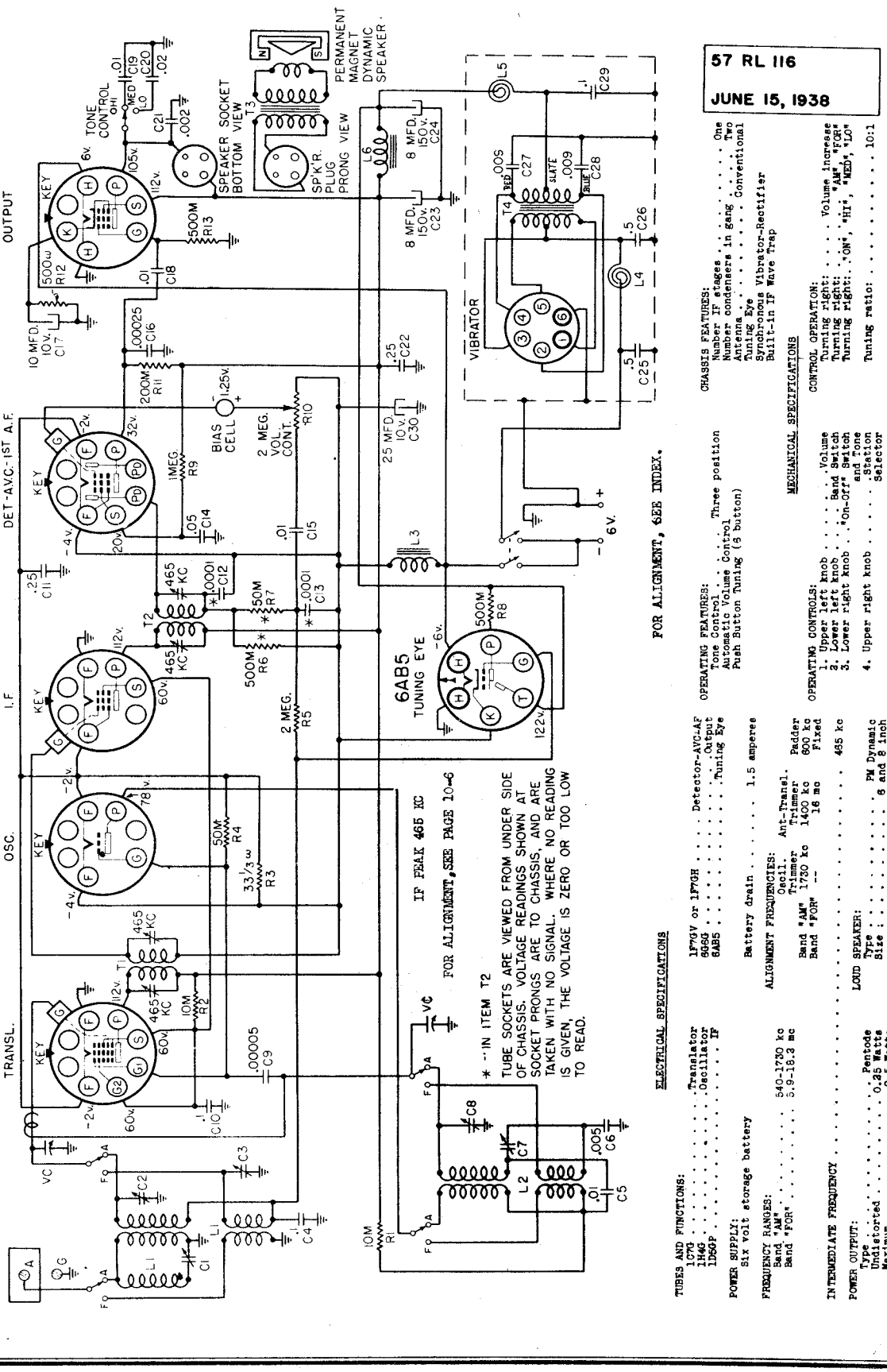
MODELS 6072,6077,6172
Chassis 101.513
Schematic,Voltage

# SEARS-ROEBUCK & CO.




ELECTRICAL SPECIFICATIONS

TUBES AND FUNCTIONS:
1C7G . . . . . Translator
1H4G . . . . . Oscillator
1D5GP . . . . . IF
1F7GV or 1F7GH . . . . Detector-AVC-AF
6G6G . . . . . Output
6AB5 . . . . . Tuning Eye

POWER SUPPLY:
Six volt storage battery
Battery drain . . . . . 1.5 amperes

FREQUENCY RANGES:
Band "AM" . . . . . 540-1730 kc
Band "FOR" . . . . . 5.9-18.3 mc

ALIGNMENT FREQUENCIES:
Band "AM" 1730 kc Ant-Transl. Trimmer 1400 kc 18 mc
Band "FOR" -- Padder 600 kc Fixed

INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:
Type . . . . . Pentode
Undistorted . . . . . 0.25 Watts
Maximum . . . . . 0.5 Watts

LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6 and 8 inch

OPERATING FEATURES:
Tone Control . . . . . Three position
Automatic Volume Control
Push Button Tuning (5 button)

OPERATING CONTROLS:
1. Upper left knob . . . . . Volume
2. Lower left knob . . . . . Band Switch
3. Lower right knob . . . "On-Off" Switch and Tone
4. Upper right knob . . . . . Station Selector

CHASSIS FEATURES:
Number IF stages . . . . . One
Number condensers in gang . . . . . Two
Antenna . . . . . Conventional
Tuning Eye
Synchronous Vibrator-Rectifier
Built-in IF Wave Trap

MECHANICAL SPECIFICATIONS

CONTROL OPERATION:
Turning right: . . . . . Volume increase
Turning right: . . . . . "AM" "FOR"
Turning right: . . . . . "ON", "HI", "MED", "LO"

Tuning ratio: . . . . . 10:1

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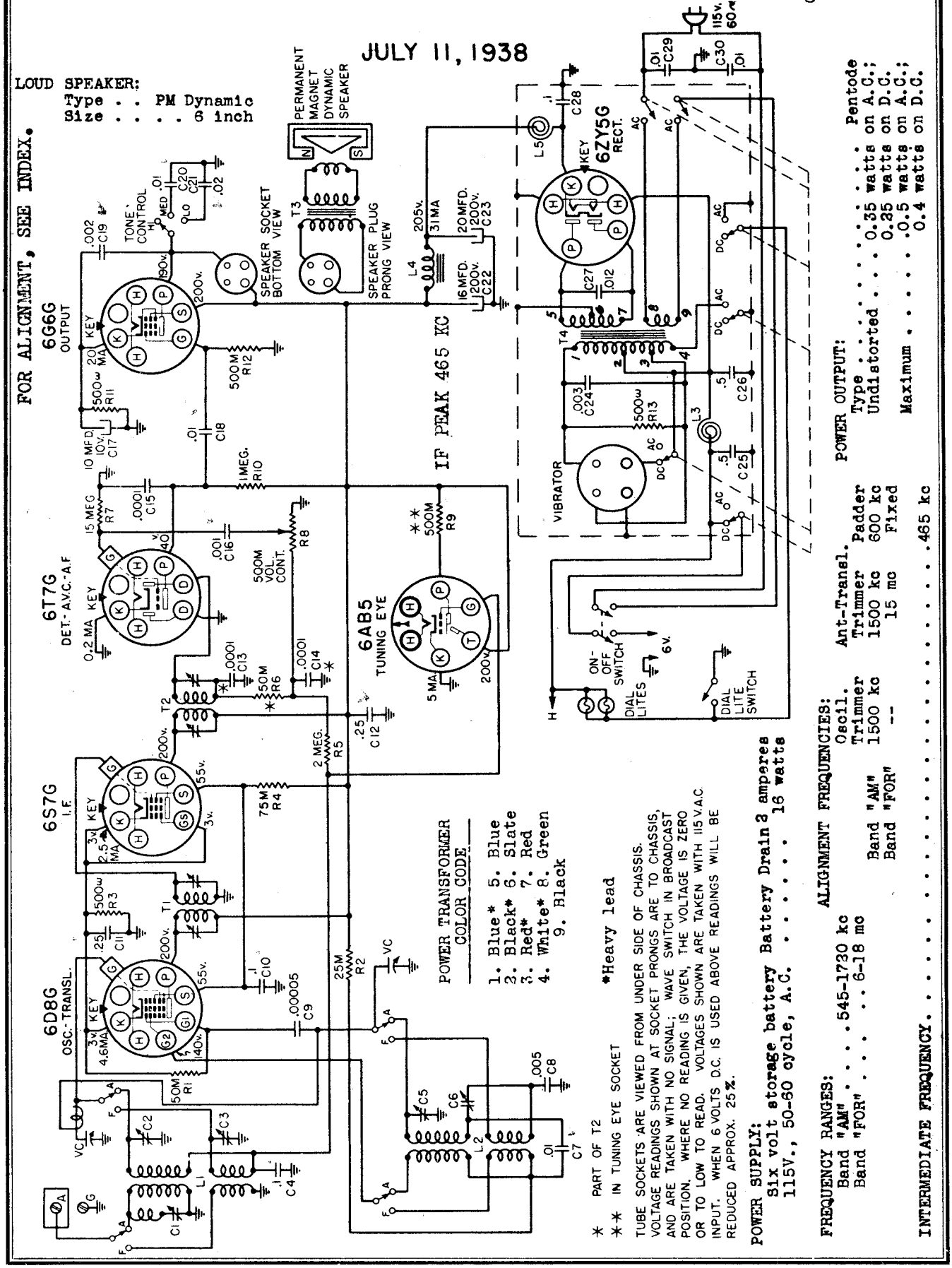
SEARS-ROEBUCK & CO. MODELS 6073,6173,Ch.101.528

Schematic, Voltage

JULY 11, 1938


LOUD SPEAKER:
Type . . PM Dynamic
Size . . . . 6 inch
FOR ALIGNMENT, SEE INDEX.
6G6G OUTPUT
6T7G DET.-A.V.C.-A.F.
6S7G I.F.
6D8G OSC.-TRANSL.
6AB5 TUNING EYE
6Z5G RECT.
IF PEAK 465 KC
PERMANENT MAGNET DYNAMIC SPEAKER
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
TONE CONTROL
500M VOL. CONT.
VIBRATOR
ON-OFF SWITCH
DIAL LITES
DIAL LITE SWITCH
POWER TRANSFORMER COLOR CODE
1. Blue* 5. Blue
2. Black* 6. Slate
3. Red* 7. Red
4. White* 8. Green
9. Black
* PART OF T2
** IN TUNING EYE SOCKET
*Heavy lead
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TO LOW TO READ. VOLTAGES SHOWN ARE TAKEN WITH 115 V.A.C. INPUT. WHEN 6 VOLTS D.C. IS USED ABOVE READINGS WILL BE REDUCED APPROX. 25%.

**POWER SUPPLY:**
Six volt storage battery Battery Drain 3 amperes
115V., 50-60 cycle, A.C. . . . . 18 watts

**FREQUENCY RANGES:**

| | |
|---|---|
| Band "AM" | .545-1730 kc |
| Band "FOR" | 6-18 mc |

**ALIGNMENT FREQUENCIES:**

| | Oscil. | Ant-Transl. | | |
|---|---|---|---|---|
| | Trimmer | Trimmer | Padder | |
| Band "AM" | 1500 kc | 1500 kc | 600 kc | |
| Band "FOR" | -- | | 15 mc | Fixed |

**POWER OUTPUT:**

| | |
|---|---|
| Type | Pentode |
| Undistorted | 0.35 watts on A.C.; 0.25 watts on D.C. |
| Maximum | .0.5 watts on A.C.; 0.4 watts on D.C. |

**INTERMEDIATE FREQUENCY** . . . . . .465 kc

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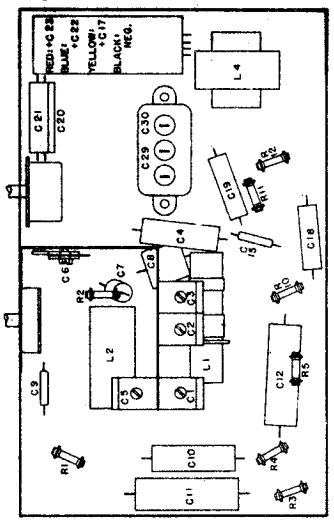
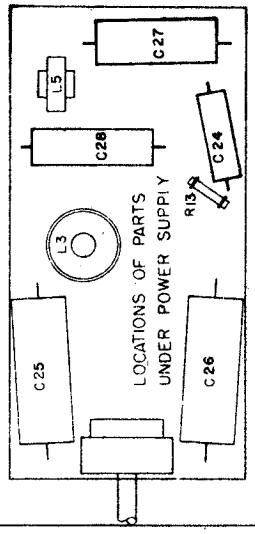
MODELS 6073,6173
Chassis 101.528
Socket,Trimmers,Chassis

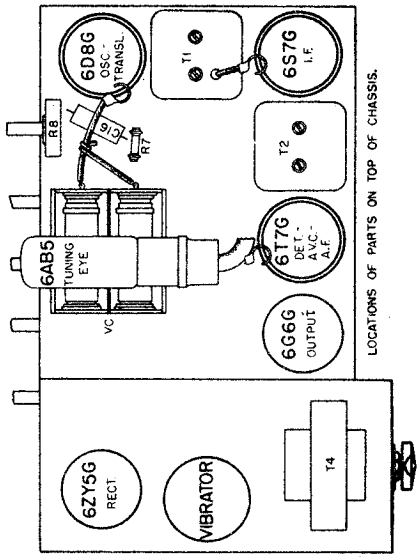
# SEARS-ROEBUCK & CO.

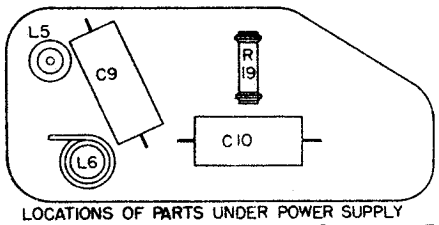
MODEL 6101,Ch.101.496
Socket,Trimmers,Chassis
Antenna Coil,Trimmers

MODELS 6073,6173. CHASSIS 101.528.




LOCATIONS OF PARTS UNDER POWER SUPPLY
USE INSULATED TYPE RESISTORS FOR REPLACEMENT WHERE USED ORIGINALLY

MODEL 6101. CHASSIS 101.496.

**ANTENNA MATCHING:**

Two separate adjustments are provided for matching the receiver to the particular car antenna. One adjustment consists of two taps on the antenna coil. The second adjustment is a trimmer, C1, on the variable condenser. It is accessible through a hole in the bottom cover of the receiver case. These adjustments are to be made as follows:

THE TAPPED ANTENNA COIL:

The adjustment of the tapped antenna coil should be made before installing the receiver on the car. Removal of the bottom cover of the receiver will reveal a terminal board mounted in the antenna coil shield can. The variable condenser plates must be closed for it to be seen. This terminal board has four jack holes, only two of which are used. These two are marked with the numerals "1", "3". The sets are shipped with the plug in hole #3.

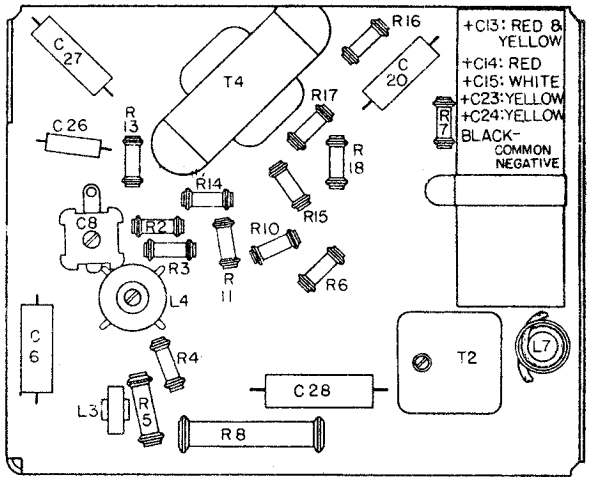
THE ANTENNA TRIMMER ADJUSTMENT.

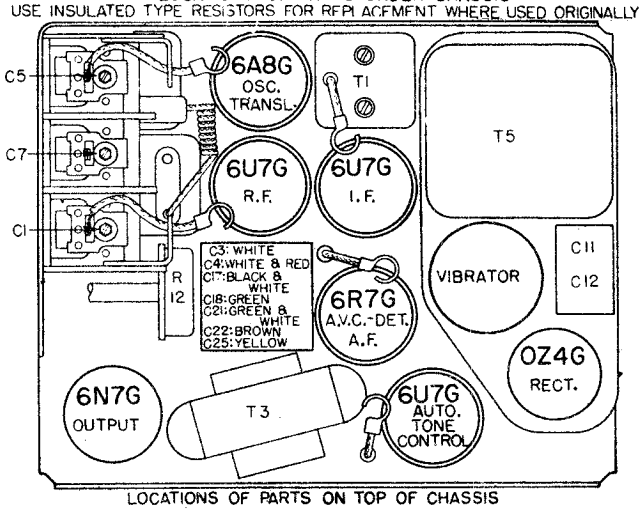
With the set tuned to a weak station at about 1500 kilocycles, turn the adjusting screw (accessible through the hole in the bottom cover) to the point affording maximum volume. A weak station must be used to prevent the AVC action of the receiver from interfering with accurate peaking. If a peak cannot be reached with the trimmer, the capacity of the car's antenna may be such that the other antenna tap adjustment should be used.

The plug position should be changed to hole #1 if a WHIP type aerial, such as Catalog #6583, or any other aerial of less than 135 mmf. capacity is used.

CHASSIS FEATURES:

| | |
|---|---|
| Automatic Tone Control | Variable antenna trimmer |
| Number RF stages . . . . . One | Non-synchronous vibrator |
| Number IF stages . . . . . One | Provision for combined Tone and Sensi- |
| Number condensers in gang . . . Three | tivity control unit accessory. |
| Antenna filter | Provision for Push Button Automatic |
| Tapped antenna coil for matching | Motor Tuner Accessory. |
| antenna capacity. | Provision for Auxiliary Speaker. |




LOCATIONS OF PARTS UNDER CHASSIS
USE INSULATED TYPE RESISTORS FOR REPLACEMENT WHERE USED ORIGINALLY

LOCATIONS OF PARTS ON TOP OF CHASSIS

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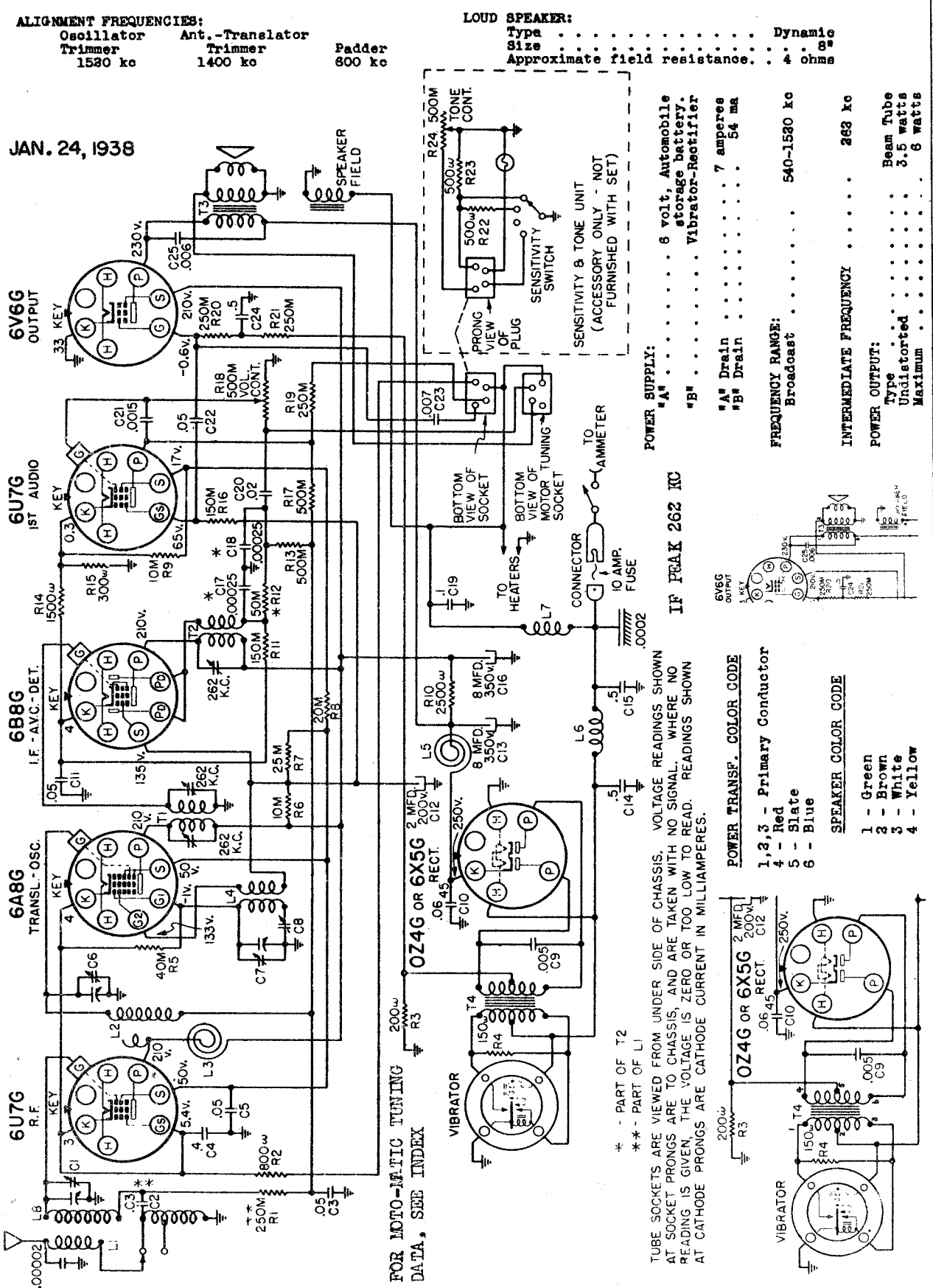
# SEARS-ROEBUCK & CO.

MODEL 6100, Ch. 101.495
Schematic, Voltage
Color Codes


ALIGNMENT FREQUENCIES:
Oscillator Trimmer 1530 kc
Ant.-Translator Trimmer 1400 kc
Padder 600 kc
LOUD SPEAKER:
Type . . . . . Dynamic
Size . . . . . 8"
Approximate field resistance. . 4 ohms
JAN. 24, 1938
6V6G OUTPUT
6U7G 1ST AUDIO
6B8G I.F.-A.V.C.-DET.
6A8G TRANSL.-OSC.
6U7G R.F.
0Z4G OR 6X5G RECT.
VIBRATOR
SPEAKER FIELD
TONE CONT.
SENSITIVITY SWITCH
PRONG VIEW OF PLUG
SENSITIVITY & TONE UNIT (ACCESSORY ONLY - NOT FURNISHED WITH SET)
BOTTOM VIEW OF SOCKET
BOTTOM VIEW OF MOTOR TUNING SOCKET
TO AMMETER
TO HEATERS
CONNECTOR
10 AMP. FUSE
IF PEAK 262 KC
POWER SUPPLY:
"A" . . . . . 6 volt, Automobile storage battery.
"B" . . . . . Vibrator-Rectifier
"A" Drain . . . . . 7 amperes
"B" Drain . . . . . 54 ma
FREQUENCY RANGE:
Broadcast . . . . . 540-1530 kc
INTERMEDIATE FREQUENCY . . . . . 262 kc
POWER OUTPUT:
Type . . . . . Beam Tube
Undistorted . . . . . 3.5 watts
Maximum . . . . . 8 watts
POWER TRANSF. COLOR CODE
1,2,3 - Primary Conductor
4 - Red
5 - Slate
6 - Blue
SPEAKER COLOR CODE
1 - Green
2 - Brown
3 - White
4 - Yellow
* - PART OF T2
** - PART OF L1
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. READINGS SHOWN AT CATHODE PRONGS ARE CATHODE CURRENT IN MILLIAMPERES.
FOR MOTO-MATIC TUNING DATA, SEE INDEX

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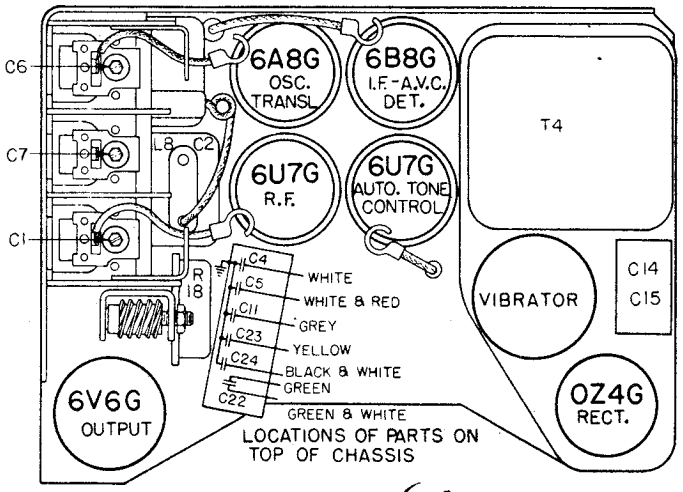
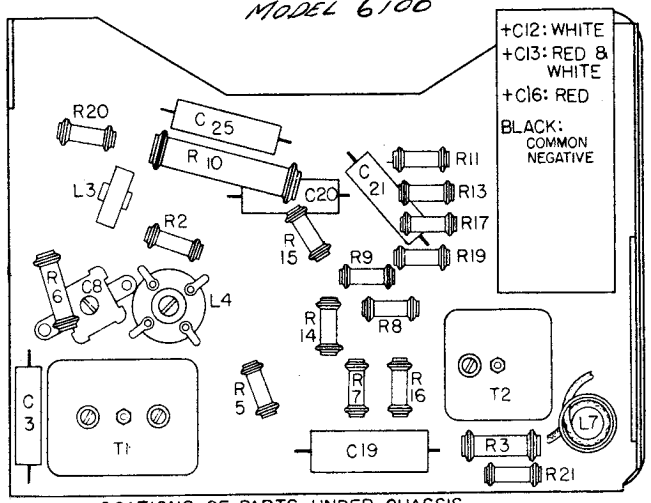



LOCATIONS OF PARTS ON TOP OF CHASSIS

MODEL 6100




LOCATIONS OF PARTS UNDER CHASSIS

USE INSULATED TYPE RESISTORS FOR REPLACEMENT WHERE USED ORIGINALLY

## ALIGNMENT PROCEDURE

**PRELIMINARY:**

Output meter connections . . . . . Across loud speaker voice coil

Output meter reading to indicate 1 watt . . . Model 6101 - 1.05 volts; Model 6100 - {6101 - .65 volts / 6100 - .89 volts}

Average sensitivity microvolts for 1 watt output . . . . . See chart below

Generator ground lead connection . . . . . Receiver chassis

Dummy antenna value to be in series with generator output . . . . . See chart below

Connection of generator output lead . . . . . See chart below

Generator modulation . . . . . 30%, 400 cycles

Position of Volume Control . . . . . Fully on

Position of Antenna Tap . . . . . #3 hole

The chassis must be in its case although the covers may be removed during the alignment procedure.

| POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTION | TRIMMER ADJUSTMENTS (IN ORDER SHOWN) | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS Model 6100 | Model 6101 |
|---|---|---|---|---|---|---|---|
| Closed | 262 kc | .1 mfd. | 6A8G Grid | T3, T1 | IF | 600 | 600 |
| Fully Open | 1520 kc | .0002 mfd. | Antenna Conn. | C7 | Oscillator, Trimmer | 1.5 | 1.0 |
| 1400 kc | 1400 kc | .0002 mfd. | Antenna Conn. | *C1, C6 | Antenna, Translator | 1.5 | 1.0 |
| 600 kc (rock) | 600 kc | .0002 mfd. | Antenna Conn. | C8 | Padder | 2.8 | 2.0 |

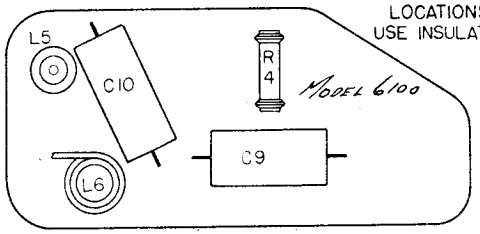
*Model 6101 - C1, C5

**IMPORTANT ALIGNMENT NOTES**

The variable should be rocked back and forth a degree or two while making the 600 kc adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

Always keep the output power from the generator at its lowest possible value to prevent the AVC of the receiver from interfering with accurate alignment.




LOCATIONS OF PARTS UNDER POWER SUPPLY
USE INSULATED TYPE RESISTORS FOR REPLACEMENT WHERE USED ORIGINALLY

**THE ANTENNA TRIMMER ADJUSTMENT:**

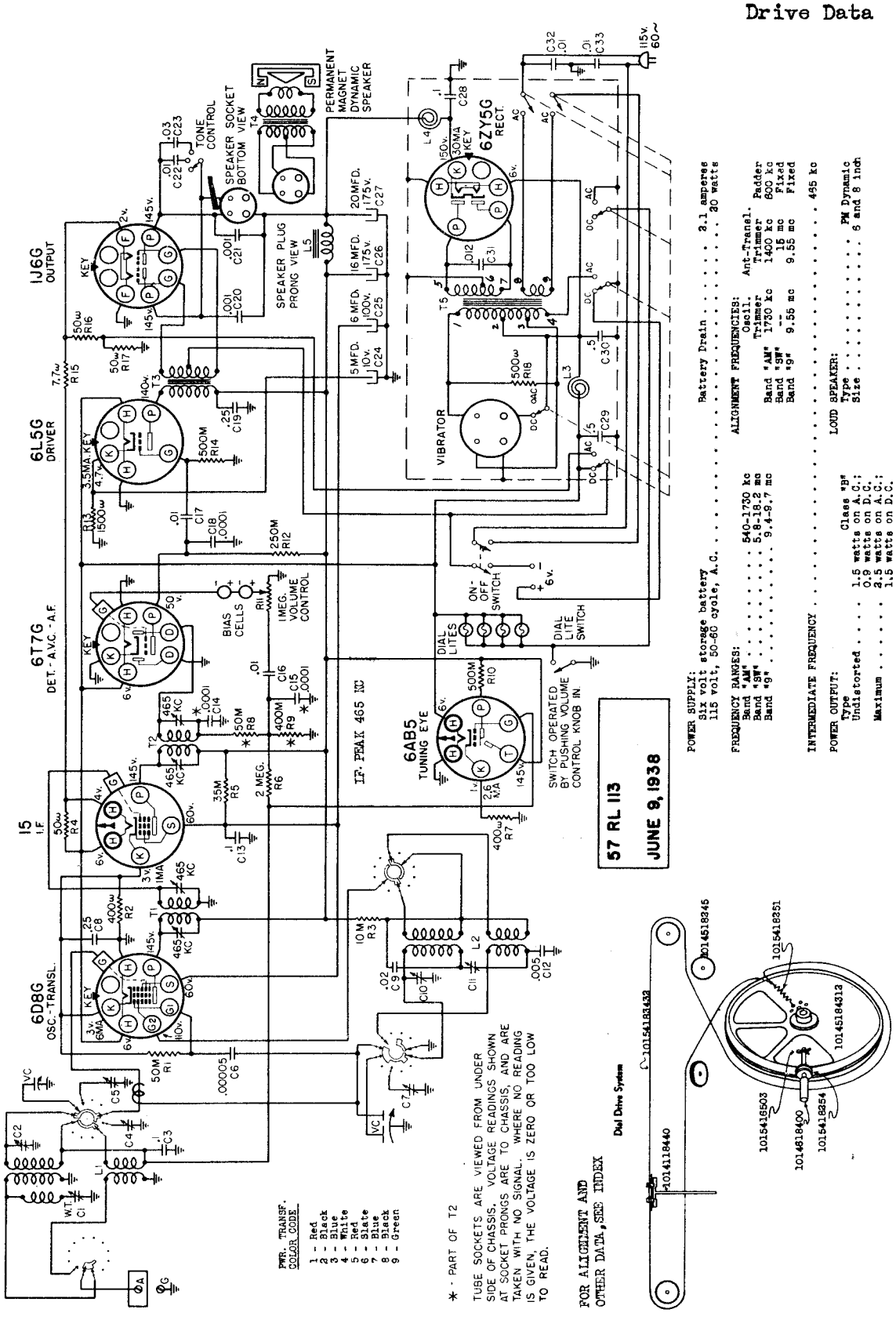
With the set tuned to a weak station at about 1500 kilocycles, turn the adjusting screw (accessible through the hole in the bottom cover) to the point affording maximum volume. A weak station must be used to prevent the AVC action of the receiver from interfering with accurate peaking. If a peak cannot be reached with the trimmer, the capacity of the car's antenna may be such that the other antenna tap adjustment should be used.

**OPERATING FEATURES:**
Automatic Volume Control

**CHASSIS FEATURES:**
Automatic Tone Control
Number RF stages . . . . . One
Number IF stages . . . . . One
Number condensers in gang . . . Three
Antenna filter
Tapped antenna coil for matching antenna capacity.
Variable antenna trimmer
Non-synchronous vibrator
Provision for combined Tone and Sensitivity control unit accessory.
Provision for Push Button Automatic Motor Tuner Accessory.
Provision for Auxiliary Speaker.

# SEARS-ROEBUCK & CO.

MODELS 6074,6079
Chassis 101.515
Schematic, Voltage
Drive Data




POWER SUPPLY:
Six volt storage battery
115 volt, 50-60 cycle, A.C. . . . . Battery Drain . . . . . 2.1 amperes
. . . . . 20 watts

FREQUENCY RANGES:

| | |
|---|---|
| Band "AM" | 540-1730 kc |
| Band "SW" | 5.8-18.2 mc |
| Band "9" | 9.4-9.7 mc |

ALIGNMENT FREQUENCIES:

| | Oscil. | Ant-Transl. Trimmer | Padder |
|---|---|---|---|
| Band "AM" | 1730 kc | 1400 kc | 600 kc |
| Band "SW" | -- | 15 mc | Fixed |
| Band "9" | 9.55 mc | 9.55 mc | Fixed |

INTERMEDIATE FREQUENCY . . . . . 465 kc

POWER OUTPUT:
Type . . . . . Class "B"
Undistorted . . . . . 1.5 watts on A.C.;
0.9 watts on D.C.
Maximum . . . . . 2.5 watts on A.C.;
1.5 watts on D.C.

LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 6 and 8 inch

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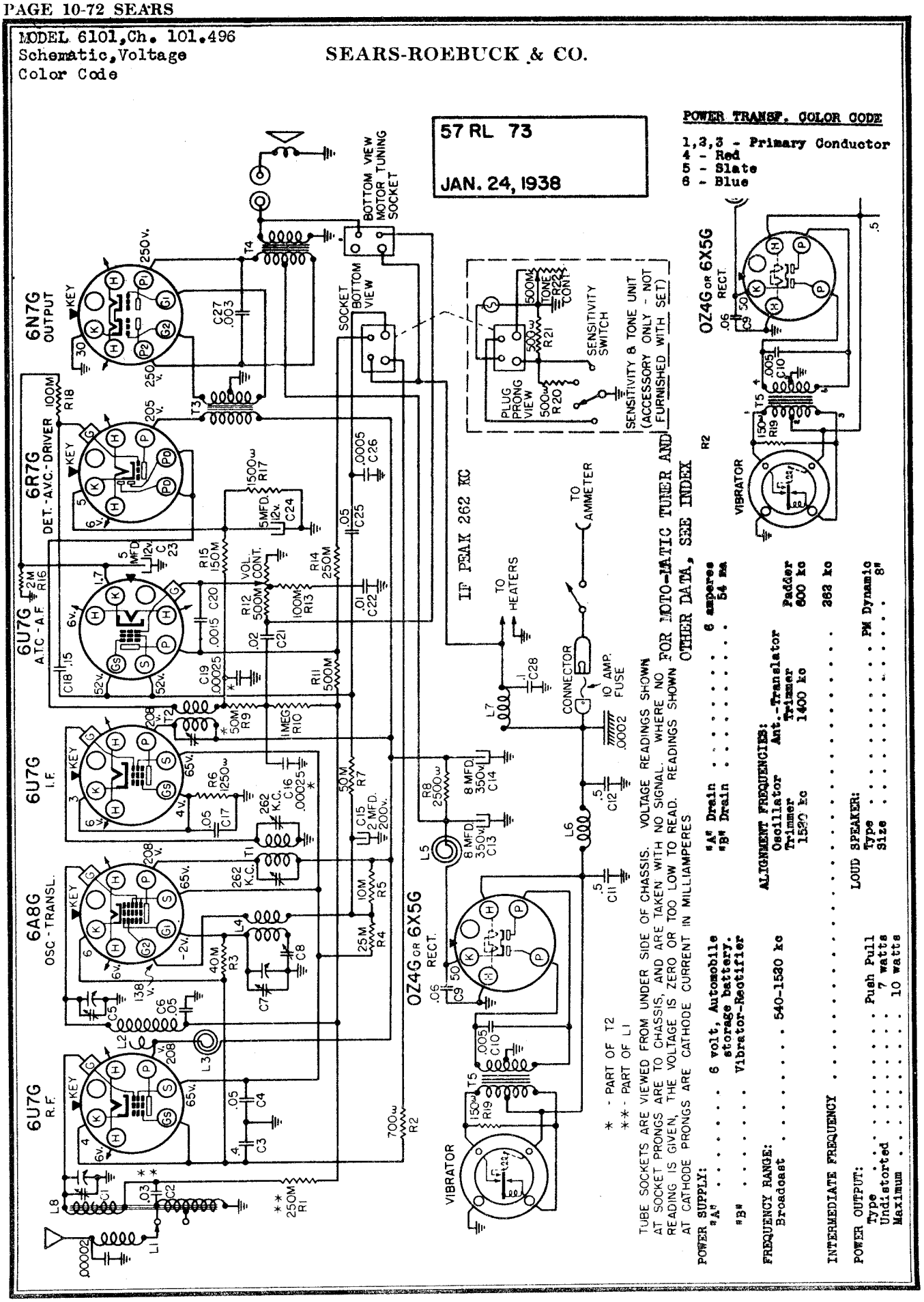
MODEL 6101,Ch. 101.496
Schematic,Voltage
Color Code

# SEARS-ROEBUCK & CO.

57 RL 73

JAN. 24, 1938




TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. READINGS SHOWN FOR MOTO-MATIC TUNER AND AT CATHODE PRONGS ARE CATHODE CURRENT IN MILLIAMPERES

OTHER DATA, SEE INDEX

POWER SUPPLY:
"A" . . . . . 6 volt, Automobile storage battery.
"B" . . . . . Vibrator-Rectifier
"A" Drain . . . . . 6 amperes
"B" Drain . . . . . 54 ma

FREQUENCY RANGE:
Broadcast . . . . . 540-1530 kc

ALIGNMENT FREQUENCIES:

| | Ant.-Translator | |
|---|---|---|
| Oscillator | Trimmer | Padder |
| 1530 kc | 1400 kc | 600 kc |
| | | 262 kc |

INTERMEDIATE FREQUENCY . . . . . 262 kc

LOUD SPEAKER:
Type . . . . . PM Dynamic
Size . . . . . 8"

POWER OUTPUT:
Type . . . . . Push Pull
Undistorted . . . . . 7 watts
Maximum . . . . . 10 watts

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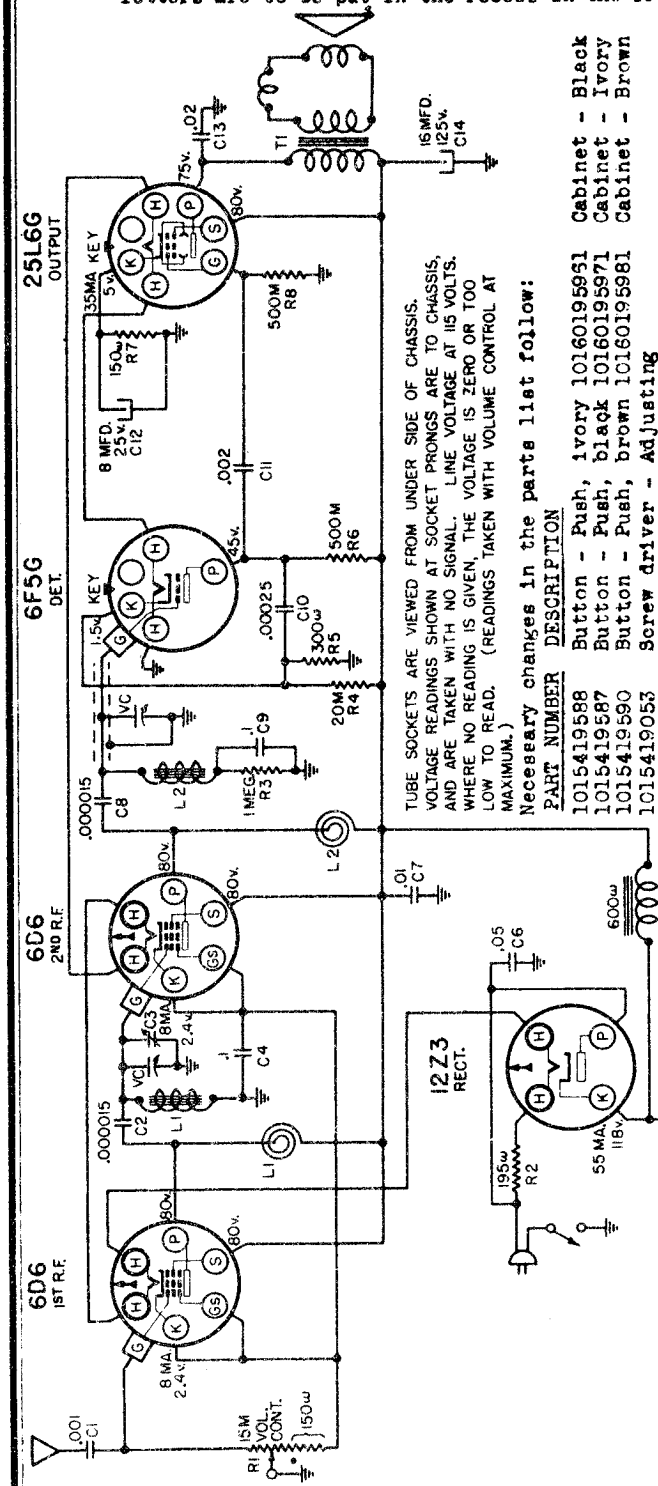
Schematic, Voltage, Alignment Tuner Changes

SEARS-ROEBUCK & CO.

MODELS 6102, 6102A, 6103, 6103A 6105, 6105A. Chassis 101.526, 101.526-1

## PUSH BUTTON TUNING:

Push buttons are set up in the following manner: Unlock the button by turning it counter-clockwise. Push the button all the way in. While holding it in, tune in the desired station. Then, with the button still pushed in, lock it by turning it clockwise. The station's call letters are to be put in the recess in the front of the button.




TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. (READINGS TAKEN WITH VOLUME CONTROL AT MAXIMUM.)

Necessary changes in the parts list follow:

| PART NUMBER | DESCRIPTION |
|---|---|
| 1015419588 | Button - Push, ivory 10160195951 Cabinet - Black |
| 1015419587 | Button - Push, black 10160195971 Cabinet - Ivory |
| 1015419590 | Button - Push, brown 10160195981 Cabinet - Brown |
| 1015419053 | Screw driver - Adjusting |
| 1014019827 | Sheets - Call letter, brown cabinet |
| 1014018953 | Sheets - Call letter, ivory cabinet |
| 1014019633 | Sheets - Call letter, black cabinet |
| 1011619599 | Unit - Push button, with var. cond. |
| 1013919608 | Knob - Volume, brown |
| 1013919609 | Knob - Tuning, brown |

**JUNE 15, 1938**

The receiver need not be taken out of the cabinet for alignment.

ALIGNMENT PROCEDURE

Either a broadcast signal of about 1500 kc should be tuned in or else a signal generator, connected through a .0003 mfd. condenser to the set's antenna, should be used.

Tune in the signal and adjust the trimmer (accessible through the hole in the bottom of the cabinet) for maximum loud speaker response. This can be done most accurately, if the volume control setting is reduced to give low volume level. (This set has no AVC.) The variable should be rocked a degree or two during the adjustment. An insulated screw driver should be used, since the chassis may be above ground potential as explained previously.

ALIGNMENT FREQUENCY:
1500 kc

LOUD SPEAKER:
Type . . . . . Dynamic
Size . . . . . 5 inch
Field coil resistance . . . . 600 ohms
App. field coil voltage drop . . . 40 volts

FREQUENCY RANGE:
Broadcast . . . . . 540-1730 kc

POWER OUTPUT:
Type . . . . . Beam Tube
Undistorted . . . . . 0.85 watts
Maximum . . . . . 1.5 watts

OPERATING CONTROLS:
1. Small knob: . . . . . "On-Off" Switch and Volume
2. Large knob: . . . . Station Selector

CONTROL OPERATION:
Turning right: . . . . Volume increase

Tuning ratio: . . . . . Direct

CHASSIS FEATURES:
Attached antenna

OPERATING FEATURES:
Push Button Tuning (4 button)

SUBJECT: CHANGES IN PUSH BUTTON MECHANISM.

Chassis embodying these changes have the identification number 101.526-1. The suffix letter "A" also has been added to the catalog number.

The design of the push button tuning mechanism has been changed somewhat. Stations are set up as follows:

Pull the push buttons off of their levers. Using the small screw driver supplied, unscrew the push button screw two or three turns. With screw and lever pushed in firmly, tune in the desired station. Then securely tighten the screw. Check the accuracy of the setting by pushing the lever to get the station and then seeing if the station can be still more accurately tuned with the tuning knob. If necessary, repeat the adjustment to obtain a more accurate setting. Punch out the station's call letters from the sheet, insert them in the recess in the front of the button, cover them with the clear celluloid disc, and replace the button. Proceed in the same manner for the remaining buttons.

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MODELS 6102,6102A,6103
6103A,6105,6105A
Chassis 101.526,101.526-1
Socket,Chassis

# SEARS-ROEBUCK & CO.

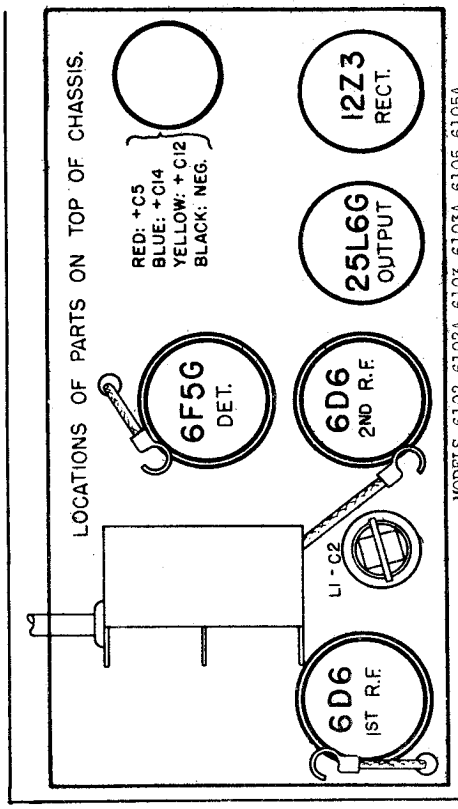
MODEL 6125,Ch.101.527
Socket,Trimmers,Chassis
Notes

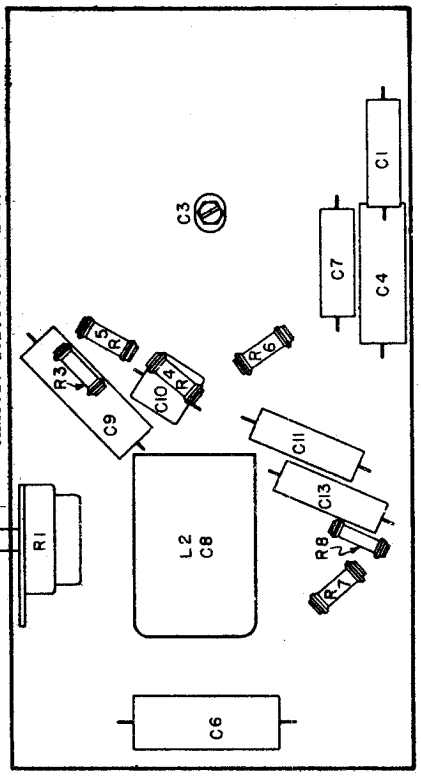
**THE ANTENNA:** MODEL 6125. CHASSIS 101.527.

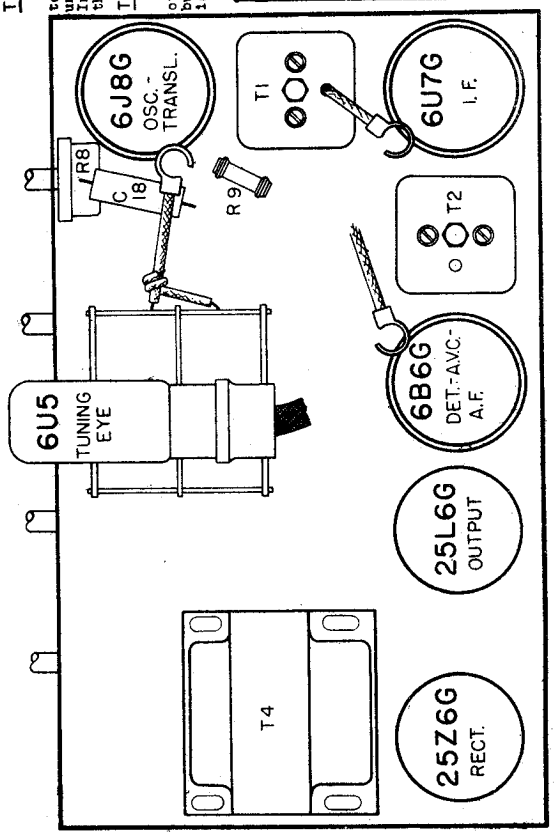
An attached antenna wire is supplied with the receiver. It should be uncoiled and extended as far from the radio as possible. If interference between stations is encountered, uncoil the antenna only far enough to obtain satisfactory reception, free of interference. In locations remote from broadcasting stations additional pick-up can be had by connecting the end of the antenna to a conventional outdoor antenna leadin.

THE FILAMENT CIRCUIT:

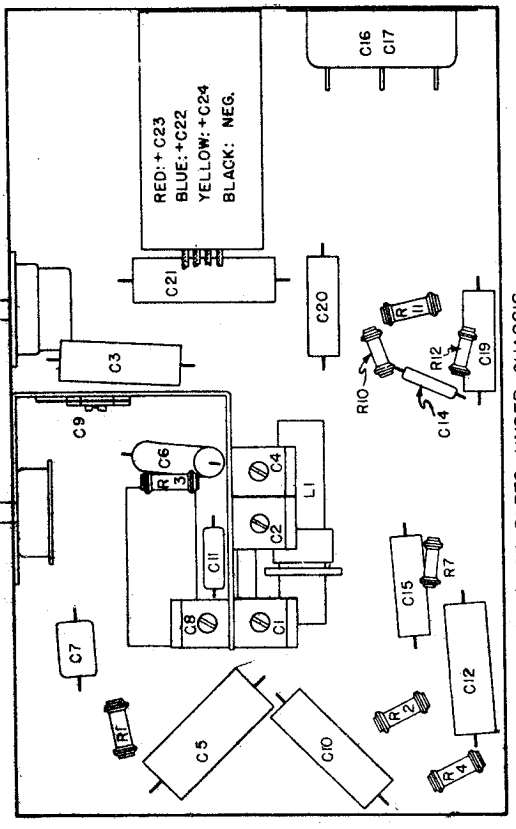
All of the tubes are connected in series. Accordingly, if any one tube burns out, the others will not light. The full line voltage will appear across the heater prongs of the burnt out tube. The power cord contains a resistor, in series with the tube heaters, and it is normal for the cord to become warm during operation.




LOCATIONS OF PARTS ON TOP OF CHASSIS.
MODEL 6125. CHASSIS 101.527.




LOCATIONS OF PARTS UNDER CHASSIS.

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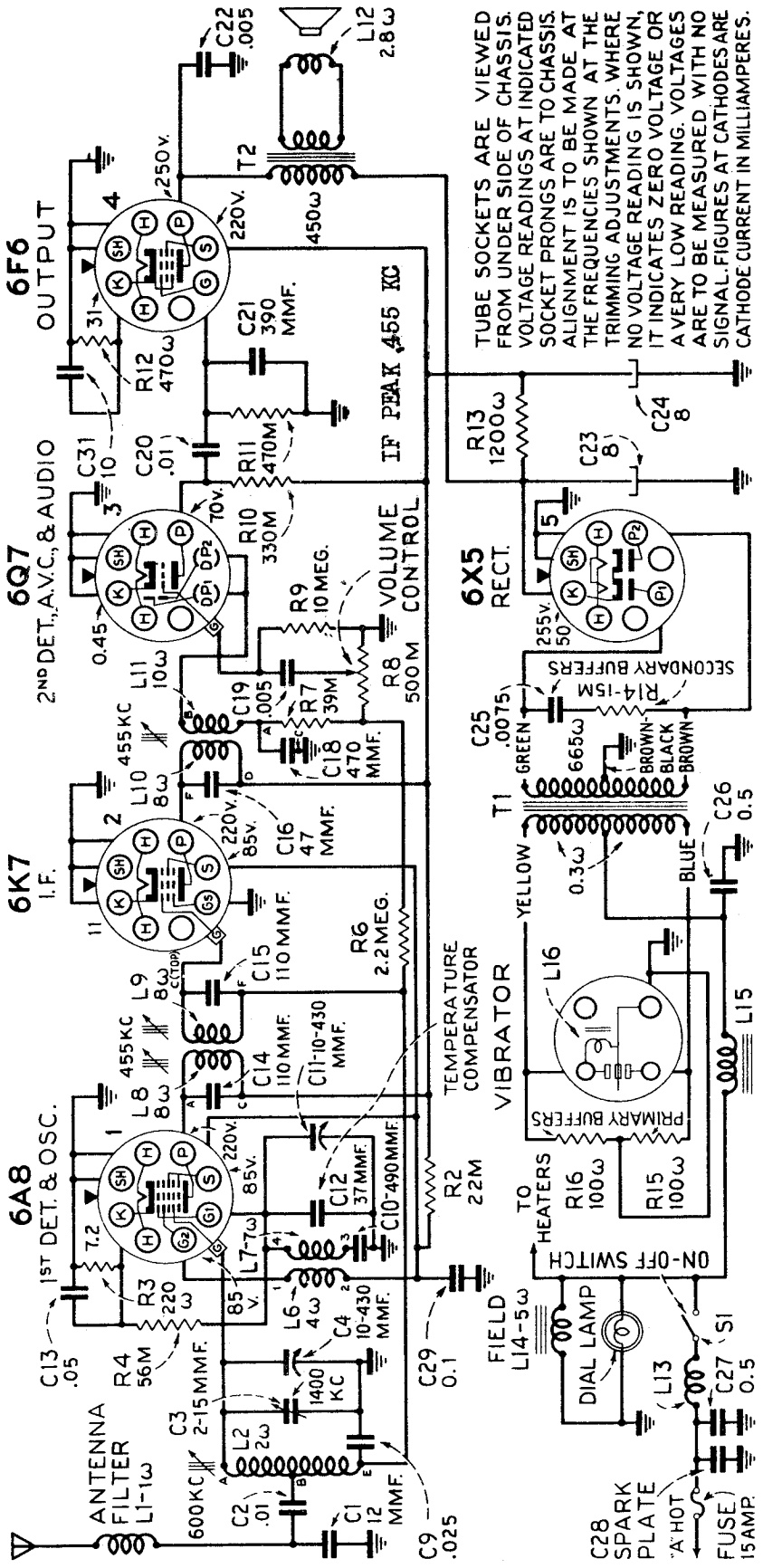
SEARS-ROEBUCK & CO.

MODEL 6104, Ch. 126, 203
Schematic, Voltage
Data




**JUNE 30, 1938**

FREQUENCY RANGE..... 550-1,550 kc

POWER OUTPUT:
- Type..... Pentode
- Undistorted..... 2.1 watts
- Maximum..... 4.1 watts

POWER SUPPLY:
- "A"..... 6.3 volt Auto Storage Battery
- "B"..... Non-Synchronous Vibrator
- Current Drain..... 6.75 amps.

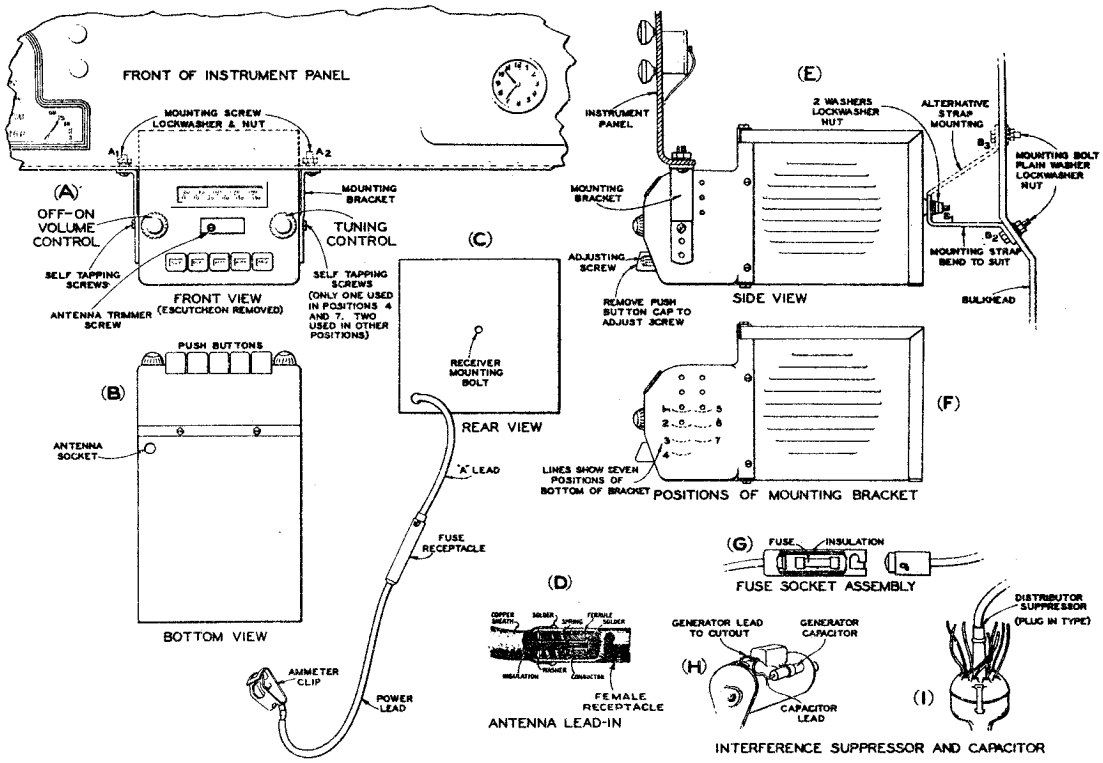
ALIGNMENT FREQUENCIES:
- I-F..... 455 kc
- Ant..... 600 and 1,400 kc
- Oscl..... No Adjustment

LOUDSPEAKER:
- Type..... Electrodynamic
- Size..... 5 inches
- V.C. Impedance..... 3.2 ohms at 400 cycles
- Field Coil Resistance..... 5 ohms
- App. Field Coil Voltage Drop..... 6 volts

©John F. Rider, Publisher

MODEL 6104,Ch. 126,203
Tuner Assembly, Data

SEARS-ROEBUCK & CO.



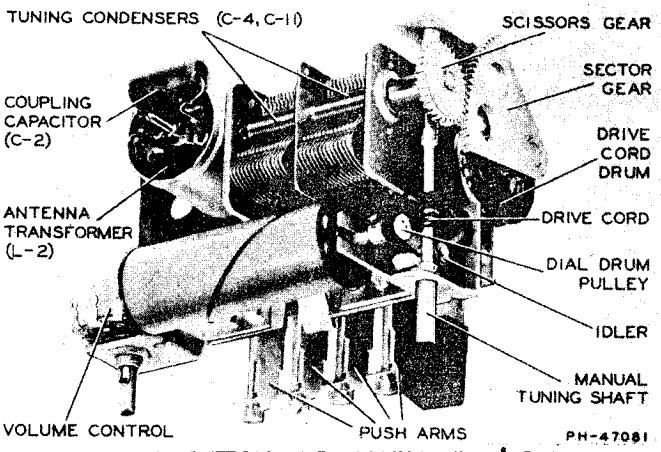




FIGURE 1—PUSH BUTTON AND MANUAL TUNING ASSEMBLY

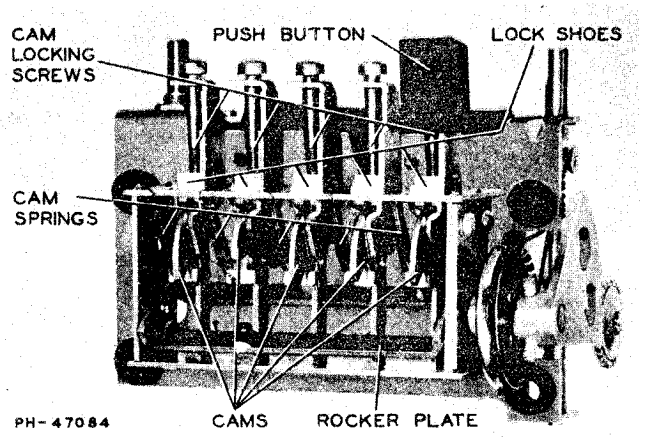



FIGURE 2—BOTTOM VIEW OF PUSH BUTTON MECHANISM

## Push Button Tuning Mechanism:

The push button tuning mechanism used in this receiver is of the mechanical type, wherein the movement of the button actually turns the tuning condenser to any pre-determined setting. The movement is actuated thru a Push-Arm, Cam, Rocker Plate and Sector Gear, which meshes with a Scissors Gear directly fastened to the tuning condenser shaft —(See Figures 1 and 2.) The scissors gear prevents backlash between the sector gear and the tuning condenser. Since the sector gear is mounted directly on the rocker plate shaft, the position of the rocker plate will accurately determine the position of the tuning condenser.

The cams (Figure 2) which determine the stop points for each button are mounted on the push arms and are locked in place by the locking screws and lock-shoes, which press firmly against the cams when the locking screws are tightened. *Care should be used when locking screws are tightened not to use excessive force as the threads may become damaged or stripped.*

Adjustments for Push Button Tuning are very easily made. To adjust a push button for any station proceed as follows:

(1) Pull the push button off the push arm.
(2) Loosen the cam locking screw one-half turn.
(3) Using the Dial Tuning Control tune in the station.
(4) Press the push arm in as far as it will go and accurately retune station.
(5) With the push button still held down, tighten cam locking screw.
(6) Replace the push button.

With the locking screw tight, the cam is locked in position and when the button is pushed in, the cam pressure causes the rocker plate to assume the position that tunes in the desired station (See Figure 2.)

## Manual Tuning Dial:

A manual tuning knob is provided so that additional stations may be tuned in as desired. The manual tuning shaft is connected thru a cord drive to a drum on the rocker plate shaft. This same cord drives the dial drum by passing over a pulley on the drum shaft. Figure 6 shows the complete cord drive assembly and the correct number of turns which the cord should be wrapped around the drive shaft and dial drum pulley. Stops are provided on the dial drum so that dial scale adjustment is made by tuning the set to the extreme ends of the band.

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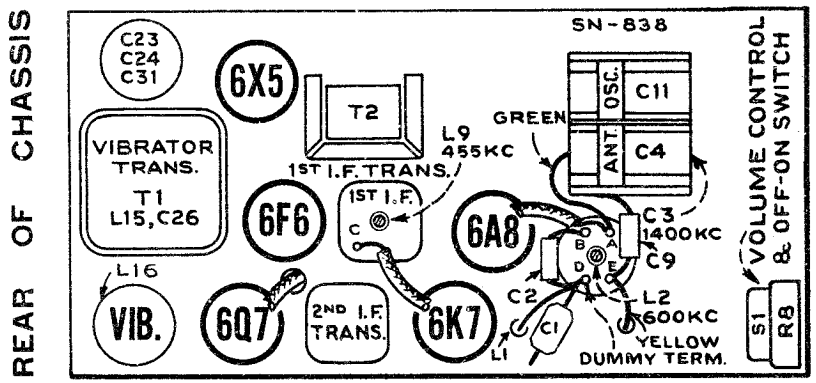



FIGURE 3—LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS ON TOP OF CHASSIS

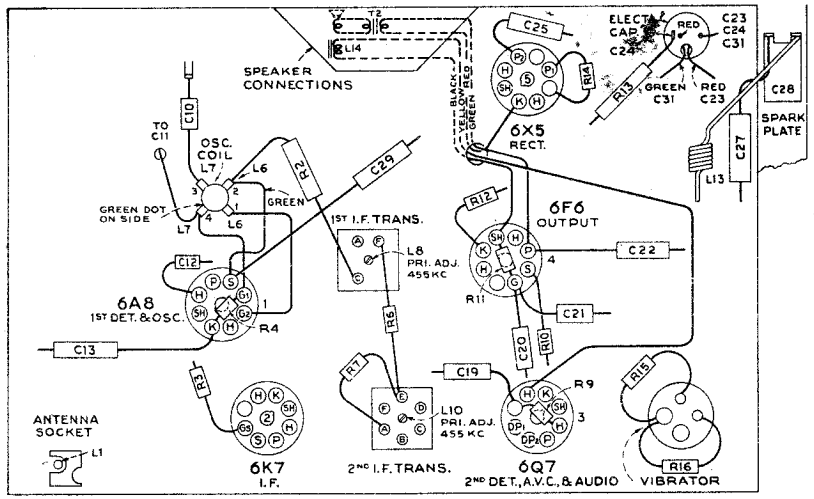



FIGURE 4—LOCATION OF PARTS AND ALIGNMENT ADJUSTMENTS ON BOTTOM OF CHASSIS

## ALIGNMENT PROCEDURE

**PRELIMINARY:**

Output meter connections..... Across speaker voice coil
Output meter readings to indicate 1 watt..... 1.8 volts
Generator ground lead connections..... To chassis
Dummy antenna value to be in series with generator output..... See chart below
Connection of generator output lead..... See chart below
Generator modulation..... 30%, 400 cycles
Position of Volume Control..... Fully clockwise
Chassis must be in its case with front end removed, when aligning R-F circuit.

| Position of Dial Pointer | Generator Frequency | Dummy Antenna | Generator Connections | Adjustment Symbol | Circuit Adjusted | Approx. Microvolts |
|---|---|---|---|---|---|---|
| No Signal 550-750 kc | 455 kc. | .001 mfd. | 6K7 Grid | L-10 | 2nd I.F. Trans. | 3,500 |
| No Signal 550-750 kc | 455 kc | .001 mfd. | 6A8 Grid | L-8, L-9 | 1st I.F. Trans. | 35 |
| 1,400 kc | 1,400 kc | .0001 mfd. † | Ant. Lead | C-3 | Ant. | 3 |
| 600 kc | 600 kc | .0001 mfd. † | Ant. Lead | L-2 | Ant. | 9 |
| 1,400 kc | 1,400 kc | .0001 mfd. † | Ant. Lead | C-3* | Ant. | 3 |

**NOTE:** No oscillator alignment adjustments are required in this receiver.

### IMPORTANT ALIGNMENT NOTES

† Make the generator connection to the receiver thru a shielded lead-in having not more than 50 mmf. (.00005) capacity with a male connector attached for connection to antenna socket. If C-2 has been changed, as outlined under "Antenna Circuit," for reason of a high capacity antenna, the Dummy Antenna should be the same value as the antenna itself.

* Re-adjust C-3 after installation as outlined under "Antenna Circuit" in "Service Hints."

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the A.V.C. action of the receiver from interfering with accurate alignment.

Alignment adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular frequency should be used. Grid cap leads should remain in place during alignment.

Oscillator circuit alignment is not required in this receiver at either end of the band; the oscillator coil is pre-adjusted for inductance in the factory.

Since the oscillator coil is unshielded, the case has some effect on its inductance. Therefore alignment must be done either with the chassis in the case or with a steel plate (covering the bottom of chassis), substituting for the case.

Values shown under "Microvolts" are only approximate.

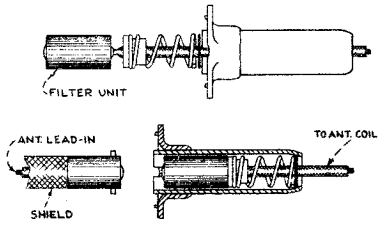



FIGURE 5—ANTENNA FILTER

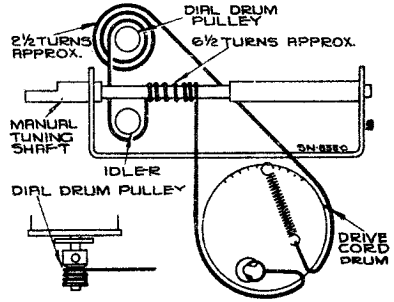


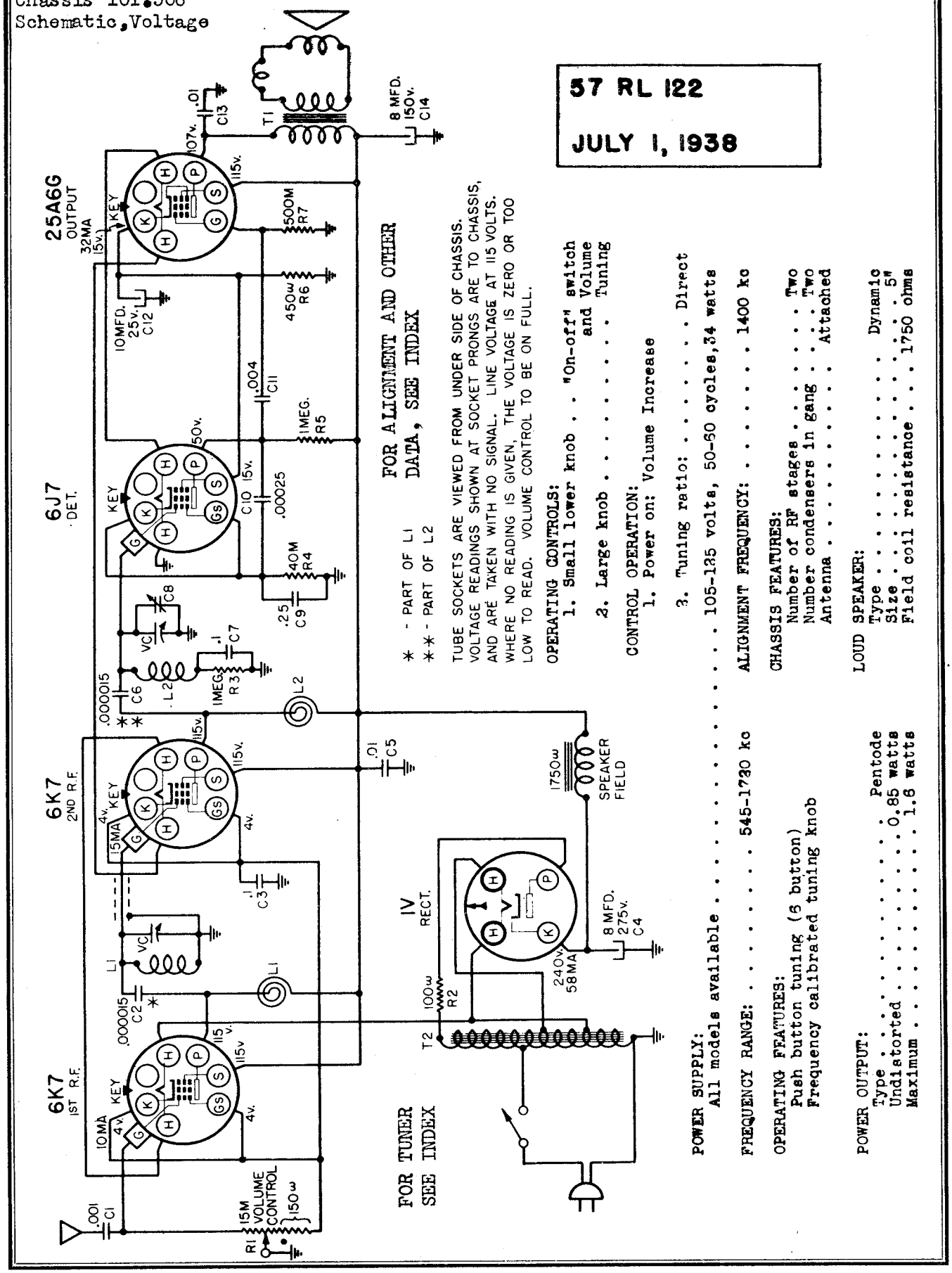

FIGURE 6—DRIVE CORD HOOKUP

MODELS 6110,6111
Chassis 101.508
Schematic,Voltage

# SEARS-ROEBUCK & CO.

**57 RL 122**

**JULY 1, 1938**




TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLUME CONTROL TO BE ON FULL.

**OPERATING CONTROLS:**
1. Small lower knob . . "On-off" switch and Volume
2. Large knob . . . . . Tuning

**CONTROL OPERATION:**
1. Power on: Volume Increase
2. Tuning ratio: . . . . . Direct

**POWER SUPPLY:**
All models available . . . . . 105-125 volts, 50-60 cycles,34 watts

**FREQUENCY RANGE:** . . . . . 545-1730 kc

**OPERATING FEATURES:**
Push button tuning (5 button)
Frequency calibrated tuning knob

**POWER OUTPUT:**
Type . . . . . Pentode
Undistorted . . . . . 0.85 watts
Maximum . . . . . 1.8 watts

**ALIGNMENT FREQUENCY:** . . . . . 1400 kc

**CHASSIS FEATURES:**
Number of RF stages . . . . . Two
Number condensers in gang . . . . Two
Antenna . . . . . Attached

**LOUD SPEAKER:**
Type . . . . . Dynamic
Size . . . . . 5"
Field coil resistance . . . 1750 ohms

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SEARS ROEBUCK & CO.

MODELS 6112,6113,6118
Chassis 101.521
Schematic,Voltage,Tuner
Socket,Chassis

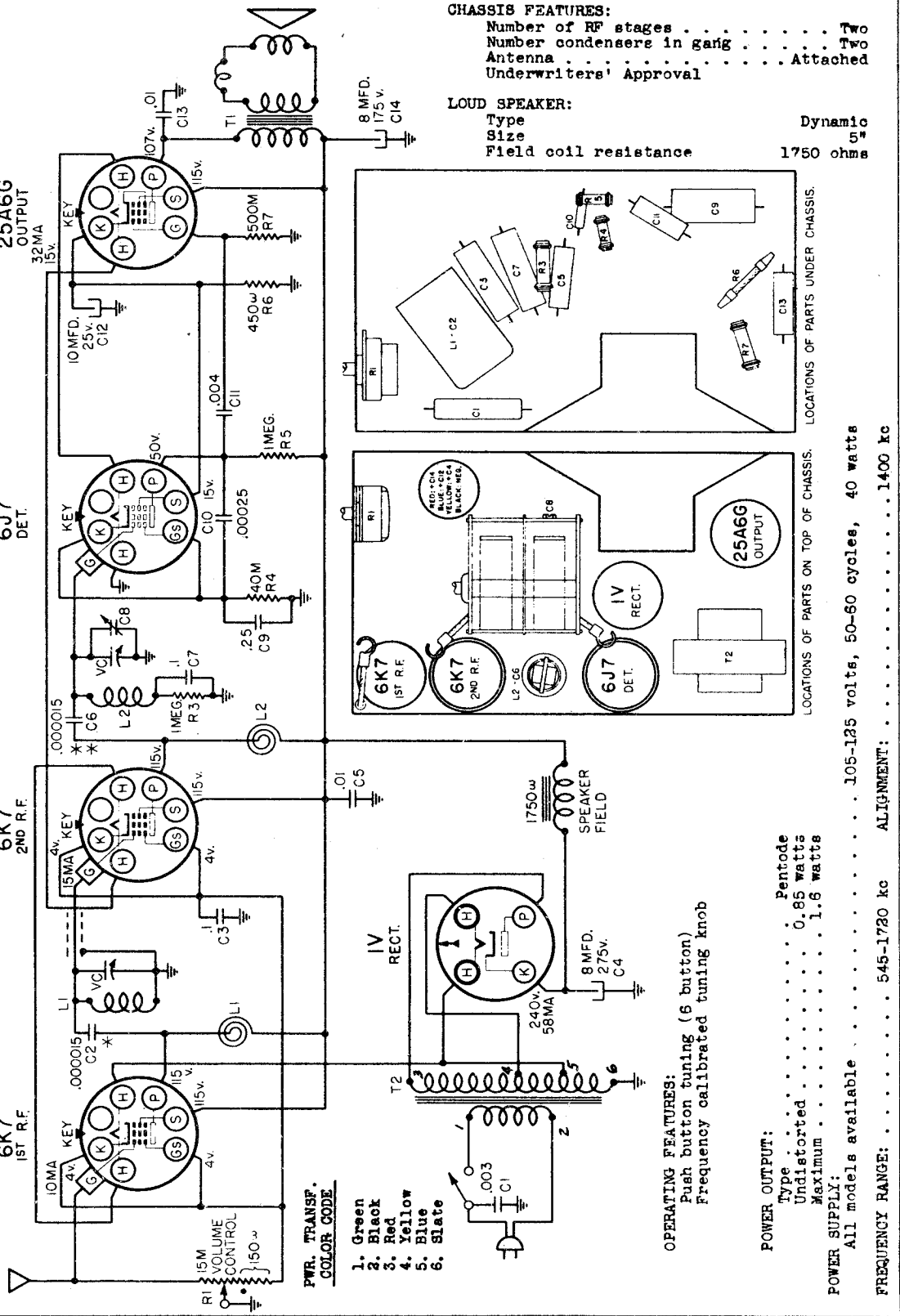
## ALIGNMENT PROCEDURE:

Either a broadcast station of about 1400 kc or a signal generator can be used for alignment. The chassis must be taken out of the cabinet for alignment of the trimmer, C8. The volume control setting should be reduced so that the signal is just audible in order to facilitate accuracy of adjustment. This set has no AVC so that a strong input signal may be used.

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLUME CONTROL TO BE ON FULL.

* - PART OF L1
** - PART OF L2

**OCT. 6, 1938**




LOCATIONS OF PARTS UNDER CHASSIS.




LOCATIONS OF PARTS ON TOP OF CHASSIS.




### CHASSIS FEATURES:

| | |
|---|---|
| Number of RF stages | Two |
| Number condensers in gang | Two |
| Antenna | Attached |
| Underwriters' Approval | |

### LOUD SPEAKER:

| | |
|---|---|
| Type | Dynamic |
| Size | 5" |
| Field coil resistance | 1750 ohms |

### ADJUSTING THE PUSH BUTTONS:

Unlock the mechanism by loosening the screw at the center of the tuning knob, for a few turns. Push the button all the way in and tune in the desired station while the button is held in firmly. Then release the button before tuning in the next station. Proceed in the same manner for the remaining buttons. Lock the mechanism by tightening the screw in the tuning knob. Punch out the station call letters from the sheet supplied and insert them in the recess in each button. Cover the call letters with the clear celluloid discs, supplied. Be careful not to drop the call letter tabs inside the receiver when inserting them in the push buttons.

OPERATING FEATURES:
Push button tuning (6 button)
Frequency calibrated tuning knob

POWER OUTPUT:
Type . . . . . Pentode
Undistorted . . . . . 0.85 watts
Maximum . . . . . 1.8 watts

POWER SUPPLY:
All models available . . . . . 105-125 volts, 50-60 cycles, 40 watts

FREQUENCY RANGE: . . . . . 545-1720 kc ALIGNMENT: . . . . . 1400 kc

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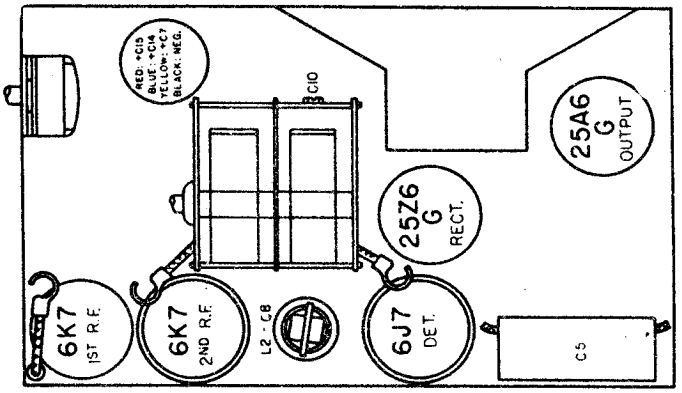
MODELS 6114,6115,Ch.101,522
Schematic,Voltage,Chassis
Socket,Alignment,Tuner

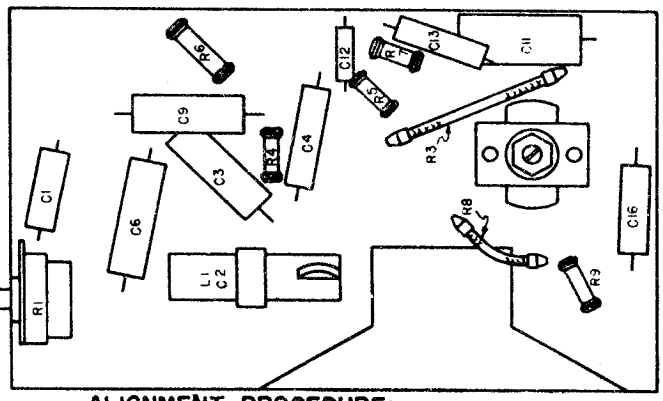
# SEARS-ROEBUCK & CO.

## ADJUSTING THE PUSH BUTTONS:

Unlock the mechanism by loosening the screw at the center of the tuning knob, for a few turns. Push the button all the way in and tune in the desired station while the button is held in firmly. Then release the button before tuning in the next station. Proceed in the same manner for the remaining buttons. Lock the mechanism by tightening the screw in the tuning knob. Punch out the station call letters from the sheet supplied and insert them in the recess in each button. Cover the call letters with the clear celluloid discs, supplied. Be careful not to drop the call letter tabs inside the receiver when inserting them in the push buttons.




LOCATIONS OF PARTS ON TOP OF CHASSIS.




LOCATIONS OF PARTS UNDER CHASSIS.

## ALIGNMENT PROCEDURE:

Either a BC Station of about 1400KC or a sig. gen. can be used for align.-Chassis to be removed for C8 trimmer align.-Volume Cont. setting be reduced so signal is just audible to facilitate accurate adj.

This set has no AVC so that a strong input signal may be used.

**LOUD SPEAKER:**
Type . . . . . Dynamic
Size . . . . . 5"
Field coil resistance . . . . . 1750 ohms

POWER SUPPLY:
All models available . . . . . 50 watts.
105-125 volts, DC or 25-60 cycle AC,

ALIGNMENT: . . . . . .1400 kc

FREQUENCY RANGE: . . . . . 545-1720 kc

OPERATING FEATURES:
Push button tuning (3 button)
Frequency calibrated tuning knob

POWER OUTPUT:
Type . . . . . Pentode
Undistorted . . . . . 0.85 watts on AC
0.45 watts on DC
Maximum . . . . . 1.8 watts on AC
1.1 watts on DC

TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS AND ARE TAKEN WITH NO SIGNAL. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ. VOLUME CONTROL TO BE ON FULL.

* - PART OF L1
** - PART OF L2

OCT. 6, 1938

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MODELS 6054,6055
MODEL 7225
Tuner Data

# SEARS-ROEBUCK & CO.

MODEL 6125,Chassis 101.527
Schematic,Voltage,Tuner

**POWER SUPPLY:** 105-125 volts, 50-60 cycle, 50 watts

**OPERATING CONTROLS:**

1. Upper left knob . . . . . .Volume
3. Lower left knob . . .Wave Band Switch
3. Lower right knob . . ."On-Off" Switch and Tone
4. Upper right knob . . Station Selector

**CONTROL OPERATION:**

Turning right: . . . . Volume increase
Turning right: . . . . . "AM", "SW"
Turning right: . . ."ON", "HI", "LO"

Tuning ratio: . . . . . 4:1

FOR ALIGNMENT, SEE INDEX.

**ALIGNMENT FREQUENCIES:**

| | Oscil. Trimmer | Ant-Transl. Trimmer | Padder |
|---|---|---|---|
| Band "AM" | 1400 kc | 1400 kc | 600 kc |
| Band "SW" | -- | 15 mc | Fixed |

**FREQUENCY RANGES:**

Band "AM" . . . . . 540-1730 kc
Band "SW" . . . . . 5.9 mc-18.3 mc

**POWER OUTPUT:**

Type . . . . . Beam Tube
Undistorted . . . . . 1.75 watts
Maximum . . . . . 3 watts

**LOUD SPEAKER:**

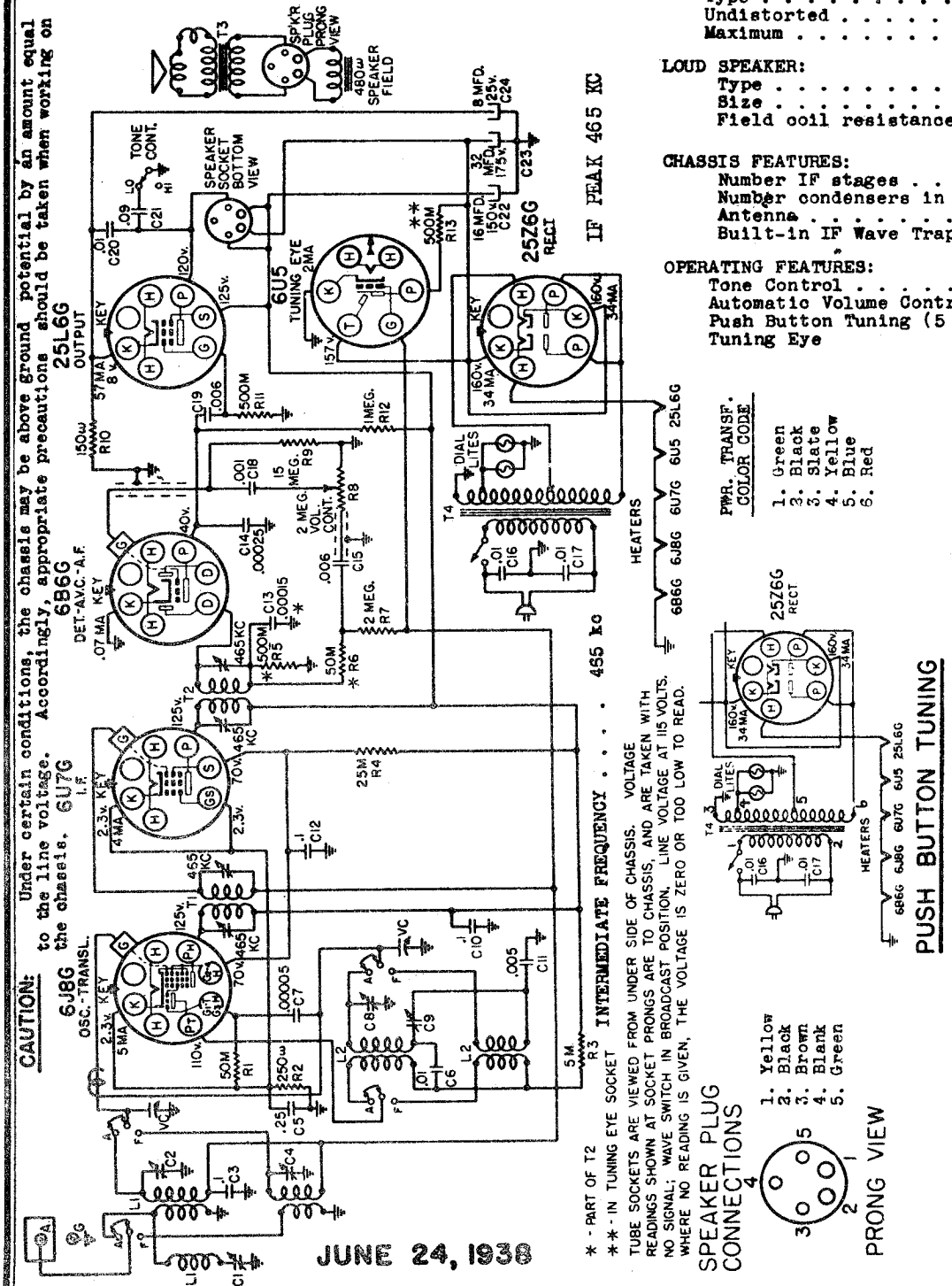
Type . . . . . Dynamic
Size . . . . . 6 and 8 inch
Field coil resistance . . . . 480 ohms

**CHASSIS FEATURES:**

Number IF stages . . . . . One
Number condensers in gang . . . . Two
Antenna . . . . . Conventional
Built-in IF Wave Trap

**OPERATING FEATURES:**

Tone Control . . . . . Two position
Automatic Volume Control
Push Button Tuning (5 button)
Tuning Eye


CAUTION: Under certain conditions, the chassis may be above ground potential by an amount equal to the line voltage. Accordingly, appropriate precautions should be taken when working on the chassis.
6J8G OSC.-TRANSL.
6B6G DET.-A.V.C.-A.F.
6U7G I.F.
25L6G OUTPUT
6U5 TUNING EYE 2MA
25Z6G RECT
IF PEAK 465 KC
INTERMEDIATE FREQUENCY . . . . 465 kc
HEATERS
6B6G 6J8G 6U7G 6U5 25L6G
PWR. TRANSF. COLOR CODE
1. Green
2. Black
3. Slate
4. Yellow
5. Blue
6. Red
SPEAKER SOCKET BOTTOM VIEW
SPKR PLUG PRONG VIEW
SPEAKER FIELD
TONE CONT.
DIAL LITES
2 MEG. VOL. CONT.
* - PART OF T2
** - IN TUNING EYE SOCKET
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
SPEAKER PLUG CONNECTIONS
1. Yellow
2. Black
3. Brown
4. Blank
5. Green
PRONG VIEW
PUSH BUTTON TUNING
JUNE 24, 1938

**SETTING UP:**

Unscrew (turn counter-clockwise) the push button two or three turns. (Use a penny in the button slot to unscrew it, if necessary.) Push the button all the way in. Hold it in firmly and at the same time tune in your desired station. With your station tuned in, lock the adjustment by tightening the push button knob (turn clockwise). Hold the button in while tightening it. Punch out the station's call letters from the sheet supplied and insert the call letters in the recess in the button. Then cover the call letters with one of the clear celluloid discs supplied.

Proceed in the same manner for the remaining buttons. If a change in selection of stations is desired, the old call letters can be removed with a pin inserted in the slot under the call letters.

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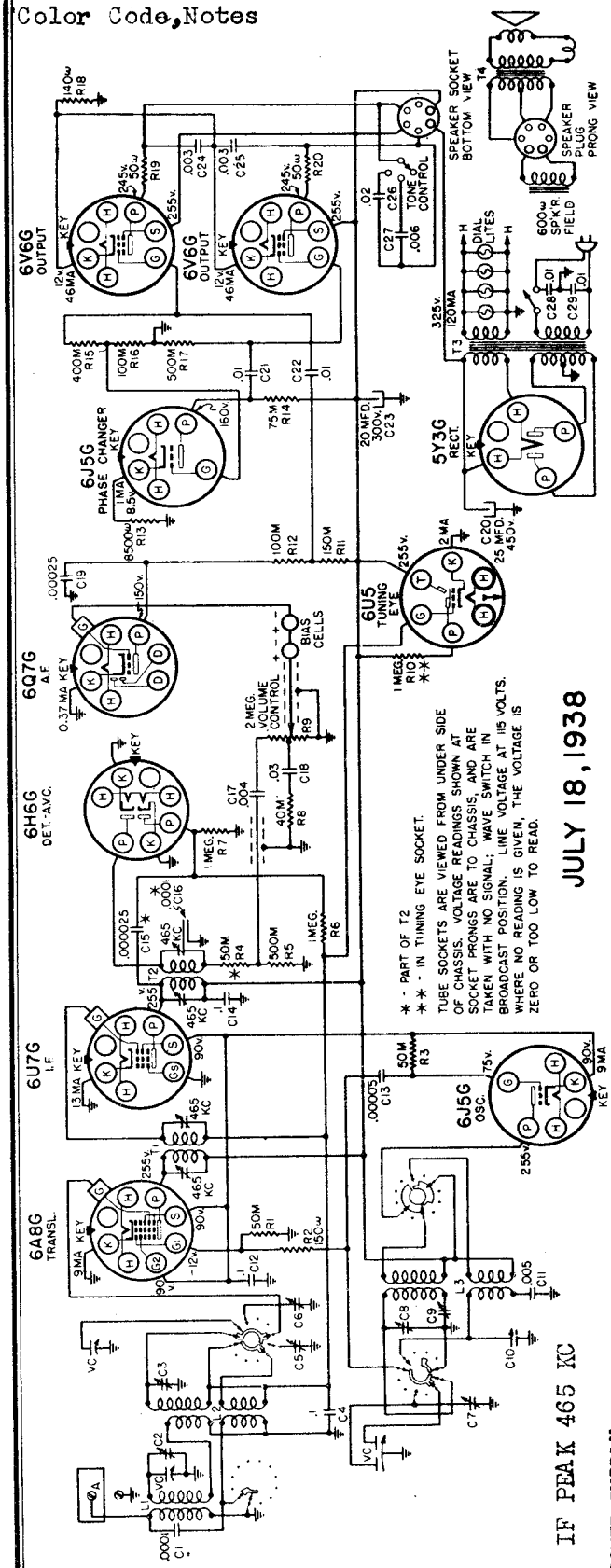
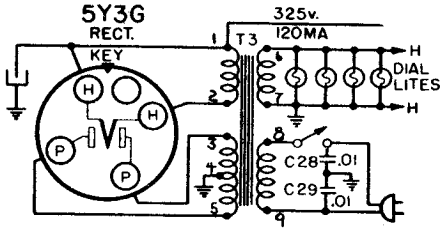
MODEL 6140,Ch. 101.534
MODELS 6152,6153
Chassis 101.537
Schematic,Voltage
Color Code,Notes

# SEARS-ROEBUCK & CO.


6A8G TRANSL.
6U7G I.F
6Q7G A.F
6H6G DET.-AVC.
6J5G PHASE CHANGER
6V6G OUTPUT
6V6G OUTPUT
5Y3G RECT.
6J5G OSC.
6U5 TUNING EYE
5Y3G RECT.
T4
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
TONE CONTROL
DIAL LITES
600Ω SP'K'R FIELD
2 MEG. VOLUME CONTROL
BIAS CELLS
* - PART OF T2
** - IN TUNING EYE SOCKET.
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 115 VOLTS. WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
JULY 18, 1938
IF PEAK 465 KC

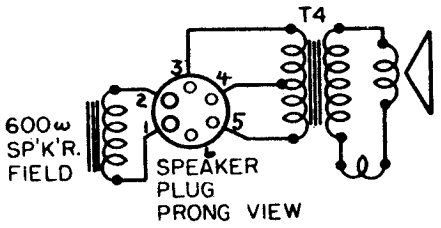



PWR. TRANSF. COLOR CODE

1,3. Red
3. Blue
4. Slate
5. Red
6,7. Black
8. Black
9. Green

SPEAKER PLUG COLOR CODE

1. Black
2. Yellow
3. Brown
4. Red
5. Green
6. Blank




POWER SUPPLY:
All models available . . . . . .105-135 volts, 50-60 cycle, 105 watts
All models available . . . . . 105-135 volts, 35 cycle, 120 watts

FREQUENCY RANGES:

| | Oscil. Trimmer | Ant.-Transl. Trimmer | Padder |
|---|---|---|---|
| Band "AM" . . . . . 540-1730 kc | Band "AM" 1400 kc | 1400 kc | 600 kc |
| Band "SW" . . . . . 5.95 mc-18.3 mc | Band "SW" -- | 15 mc | Fixed |
| Band "9" . . . . . 9.4 mc-9.7 mc | Band "9" 9.55 mc | 9.55 mc | Fixed |

INTERMEDIATE FREQUENCY . . . . . 455 kc

POWER OUTPUT:
Type . . . . . Push pull beam tubes
Undistorted . . . . . 6 watts
Maximum . . . . . 10 watts

OPERATING FEATURES:
Tone Control . . . . . Three position
Automatic Volume Control
Spread Band Tuning
Push Button Tuning (8 button)

OPERATING CONTROLS:
1. Upper left knob . . . . . Volume
2. Lower left knob . . "On-off" switch & Tone
3. Lower right knob . . . . Band switch
4. Upper right knob . . Station Selector

LOUD SPEAKER:
Type . . . . . Dynamic
Size Models 6140 . . . . . 12 inch
Size Models 6152, 6153 . . . . . 10 inch
Field coil resistance . . . . . 600 ohms
App. field coil voltage drop . . . .70 volts
CHASSIS FEATURES:
Preselector on band "AM"
Antenna . . . . . .Conventional
Tuning Eye

CONTROL OPERATION:
Turning right: . . . . .Volume increase
Turning right: . . ."HI", "MED", "LO"

Turning right: . . . . ."AM", "SW", "9"
Tuning ratio: . . . . . 13:1

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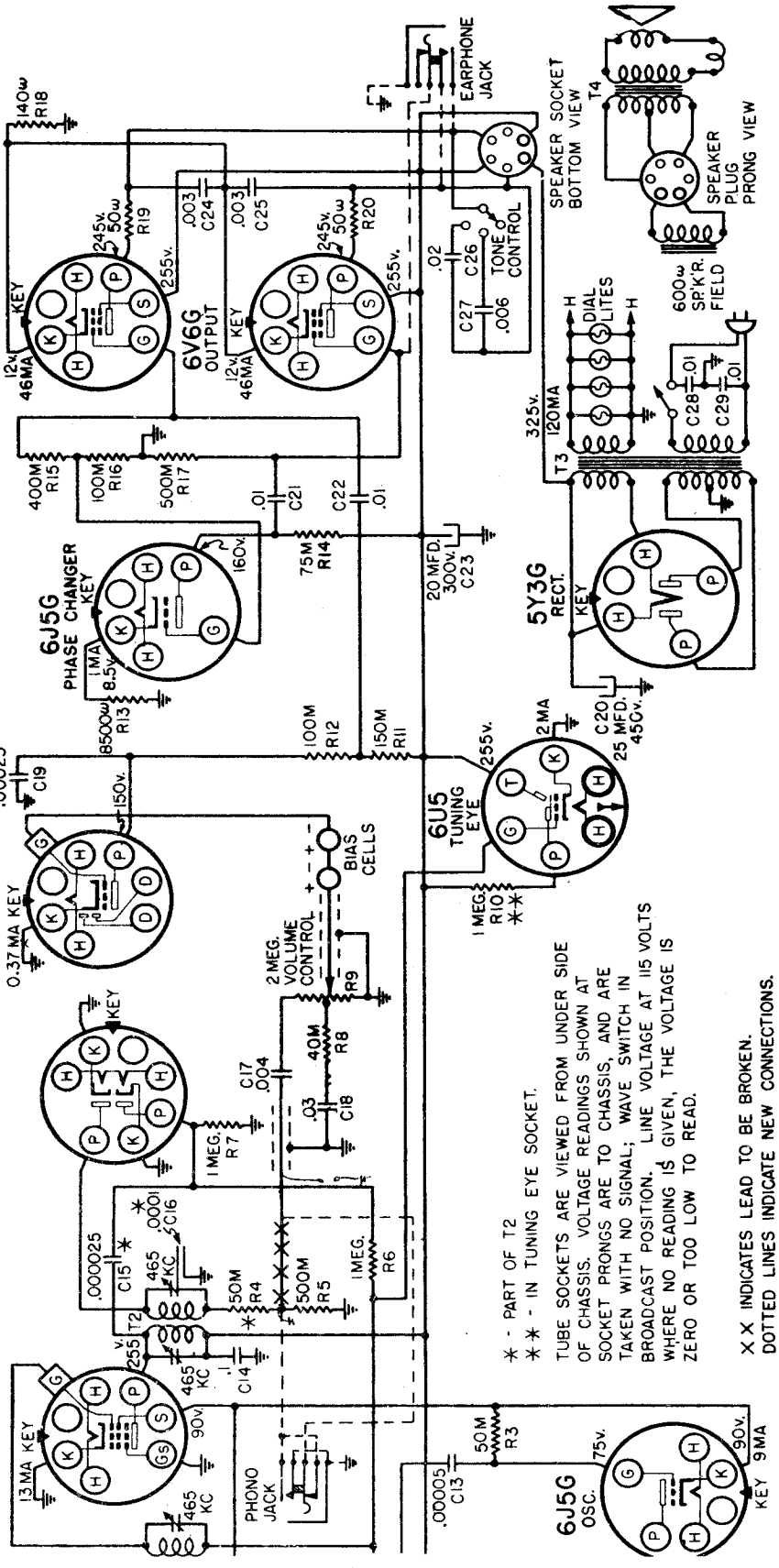
SEARS-ROEBUCK & CO.

MODEL 6140,Ch. 101.534
MODELS 6152,6153
Chassis 101.537
Phone,Phono Jacks Data


6U7G I.F.
6H6G DET.-A.V.C.
6Q7G A.F.
6J5G PHASE CHANGER
6V6G OUTPUT
6V6G OUTPUT
6U5 TUNING EYE
5Y3G RECT.
6J5G OSC.
EARPHONE JACK
SPEAKER SOCKET BOTTOM VIEW
SPEAKER PLUG PRONG VIEW
PHONO JACK
BIAS CELLS
2 MEG. VOLUME CONTROL
TONE CONTROL
DIAL LITES
600ω SP'K'R. FIELD
20 MFD. 300v. L C23
25 MFD. 450v. C20
T3
T4
T2
* - PART OF T2
** - IN TUNING EYE SOCKET.
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS SHOWN AT SOCKET PRONGS ARE TO CHASSIS, AND ARE TAKEN WITH NO SIGNAL; WAVE SWITCH IN BROADCAST POSITION. LINE VOLTAGE AT 115 VOLTS WHERE NO READING IS GIVEN, THE VOLTAGE IS ZERO OR TOO LOW TO READ.
XX INDICATES LEAD TO BE BROKEN. DOTTED LINES INDICATE NEW CONNECTIONS.

SUBJECT: CONNECTION OF EARPHONE AND PHONOGRAPH PICKUP JACKS:

Part number 1016119531 jack, for connection of earphones or phonograph pick-up, can be ordered directly from source 101.

If a crystal pick-up is used, a filter composed of a .01 mfd. condenser and a 100M ohm resistor connected in series, should be connected across the pick-up to prevent excessive bass response. This filter will also act as a partial scratch filter.

DIAL LIGHT REPLACEMENT:

The lamps that illuminate the push button call letters are made accesible for replacement by removing the push button escutcheon.

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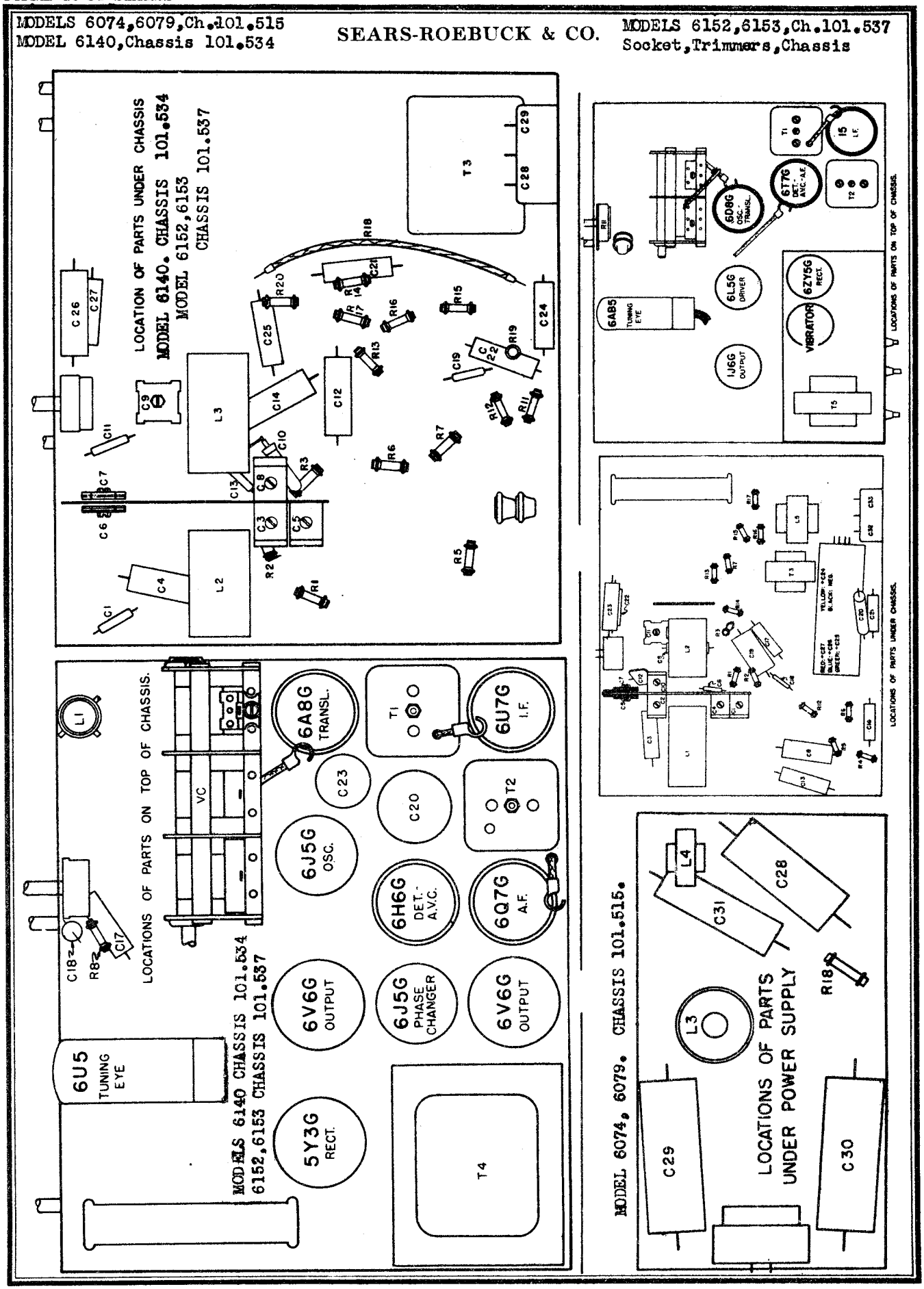
MODELS 6074,6079,Ch.101.515
MODEL 6140,Chassis 101.534

# SEARS-ROEBUCK & CO.

MODELS 6152,6153,Ch.101.537
Socket,Trimmers,Chassis

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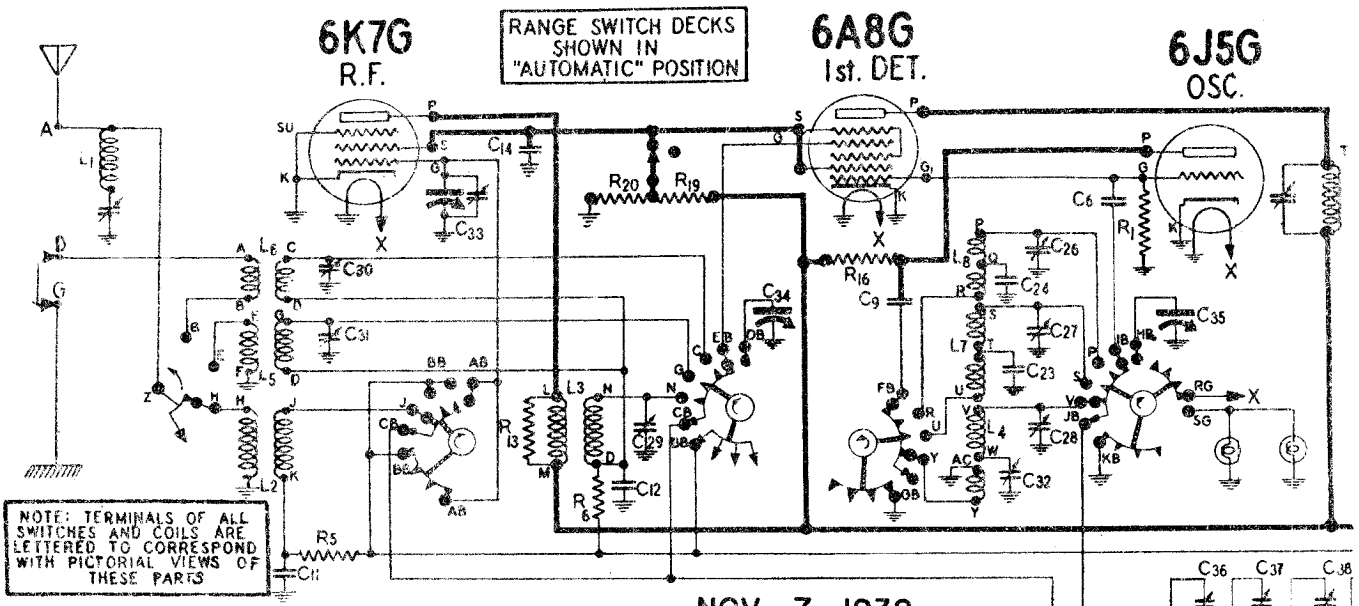
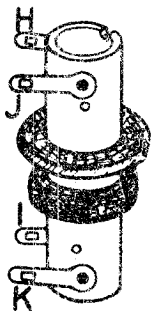
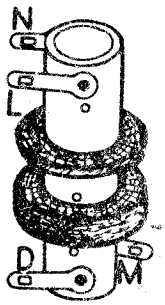


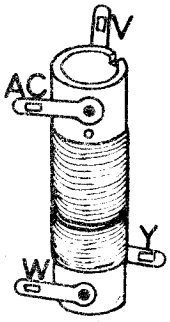

NOV. 7, 1938



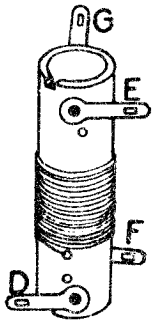
113295
BROADCAST
ANTENNA COIL



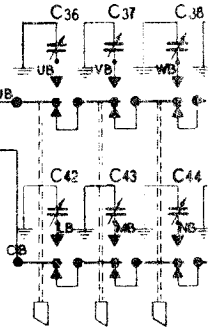
113296
BROADCAST
R.F. COIL



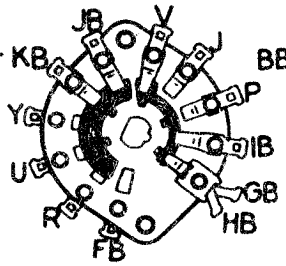
113297
BROADCAST
OSCILLATOR
COIL



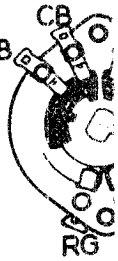
113298
INTERMEDIATE
ANTENNA COIL



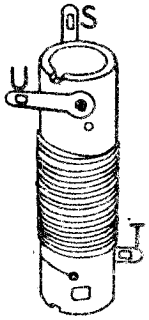
FRONT VIEW OF F



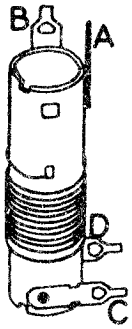
FRONT DECK



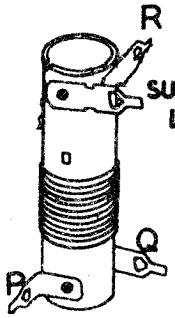
MIDDLE



113412
INTERMEDIATE
OSCILLATOR
COIL

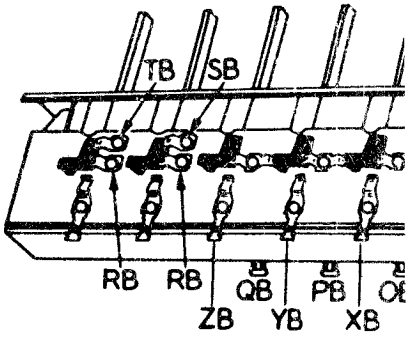


113301
FOREIGN
ANTENNA COIL




113607
FOREIGN
OSCILLATOR
COIL

PUSH-BUTTON




INTERMEDIATE FREQUENCY.....465 KC.

POWER OUTPUT
Type.....Push-Pull Pentodes
Undistorted..... 6 watts
Maximum..... 10 watts

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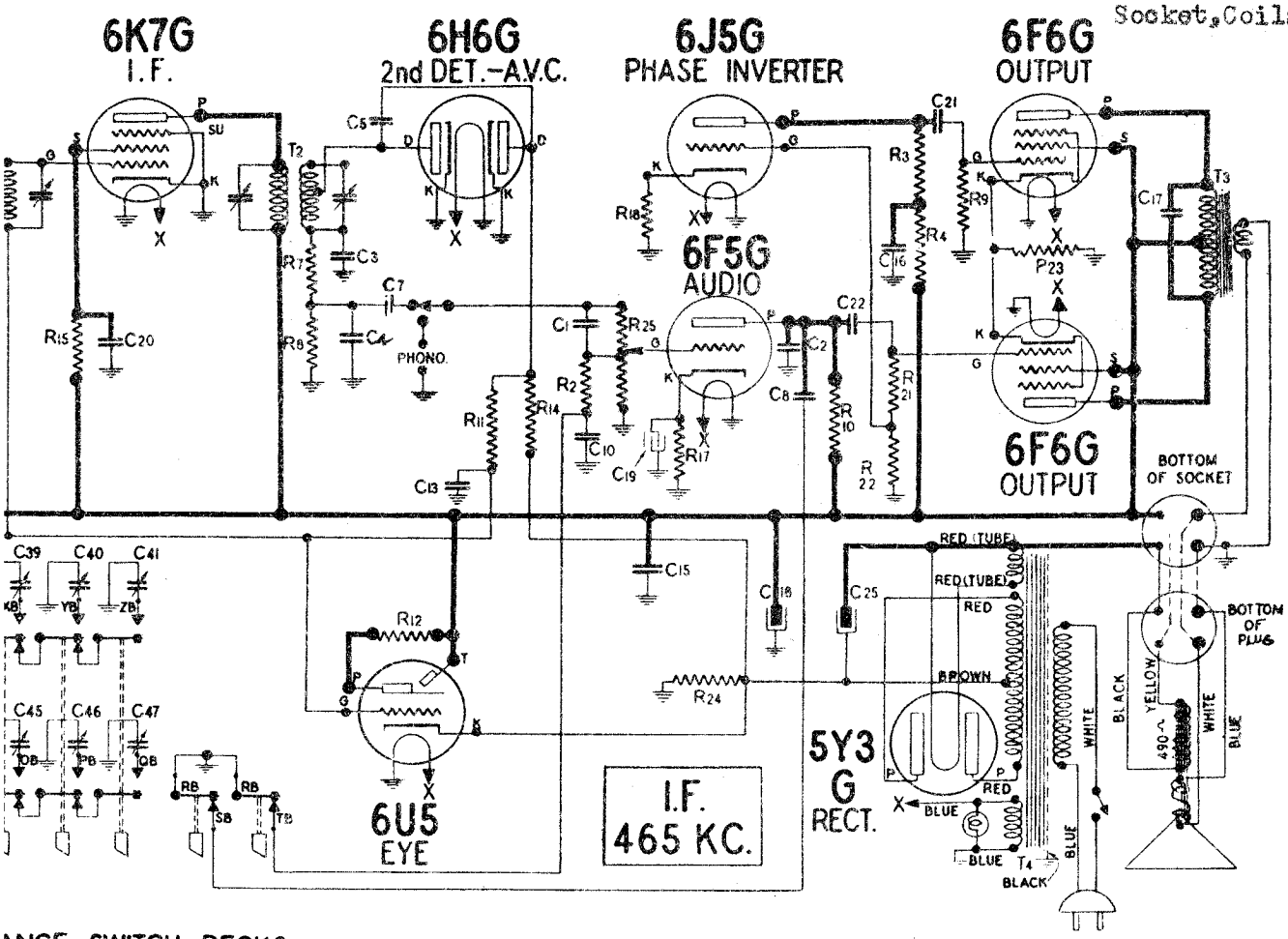
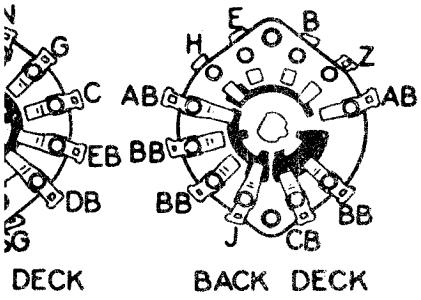
'CK & CO.

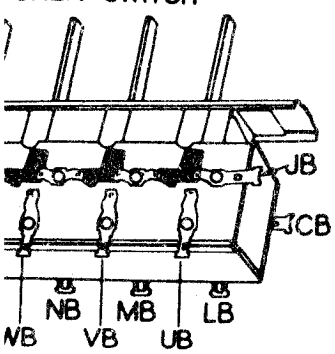
MODEL 6157, Chassis 100.198
Schematic, Voltage, Switches
Socket, Coils



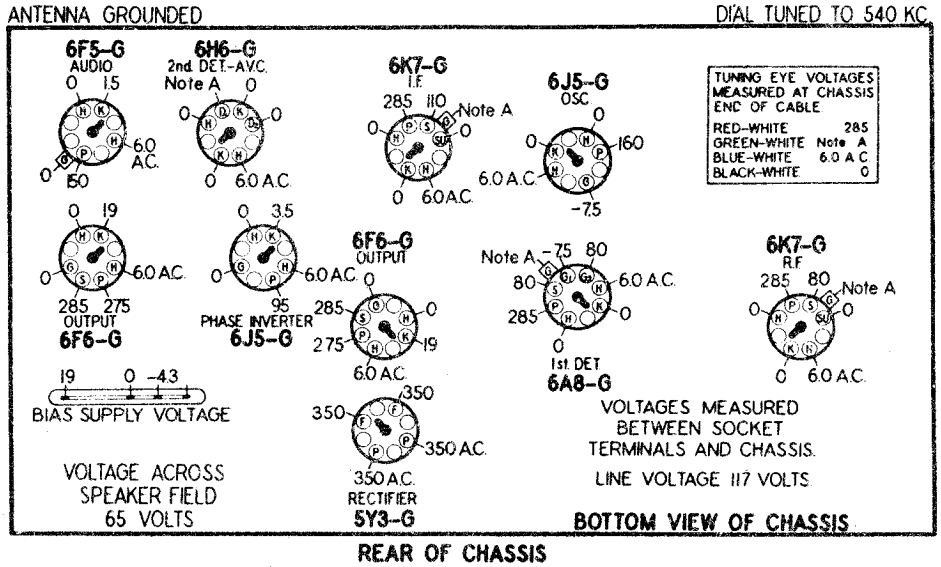

ANGE SWITCH DECKS.




TUNER SWITCH




## SOCKET VOLTAGES




Use high resistance voltmeter of at least 1000 ohms per volt.

The bias on the control grids of the 6A8-G, 6U5 and 6K7-G and the delay voltage on the diode plate (D1) of the 6H6-G is -4.3 volts, measured across resistor R24

SEARS-ROEBUCK & CO.

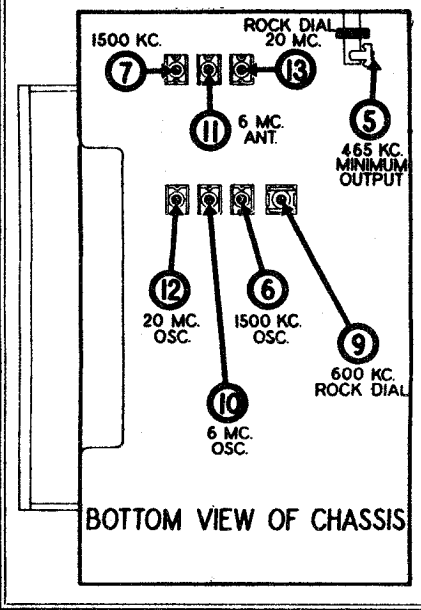
MODEL 6157,Ch. 100.198
Alignment,Trimmers

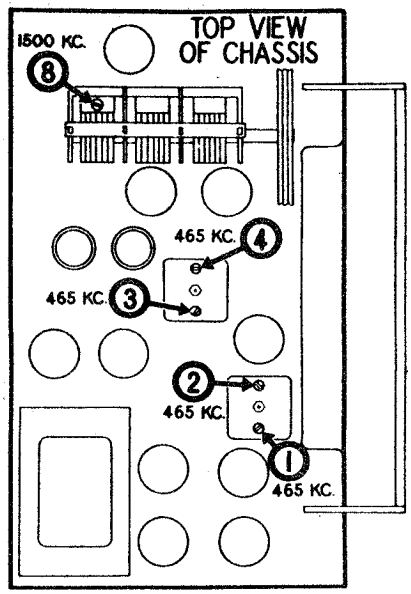
# ALIGNMENT PROCEDURE

Before attempting to align the receiver, see that the dial pointer is correctly set. With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser in full mesh with the pointer properly set, then retighten the set screw.

Output meter connections----Across voice coil leads
Output meter reading to indicate 0.5 watt output----1.325 volts
Average sensitivity in micorvolts for 0.5 watt output----See chart below
Connection of Generator Ground----Receiver chassis
Dummy antenna in series with Generator Output Lead----See chart below
Connection of Generator Output Lead----See chart below
Generator modulation----30%, 400 cycles
Position of volume control----Maximum clockwise

| DUMMY ANT IN SERIES WITH SIGNAL GENERATOR | CONNECTION OF SIGNAL GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | SENSITIVITY MICROVOLTS | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 6A8G TUBE | 465 KC | BROADCAST | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 2ND I.F. | 7000 | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | | 3-4 | 1ST I.F. | 150 | |
| 200 MMFD. CONDENSER | ANTENNA TERMINAL | 465 KC | BROADCAST | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | | ADJUST FOR MINIMUM OUTPUT. USING A STRONG GENERATOR SIGNAL. |
| 200 MMFD. CONDENSER | ANTENNA TERMINAL | 1500 KC | BROADCAST | 1500 KC | 6 | BROADCAST OSCILLATOR (SHUNT) | | ADJUST FOR MAXIMUM OUTPUT. |
| 200 MMFD. CONDENSER | ANTENNA TERMINAL | 1500 KC | BROADCAST | TUNE TO 1500 KC GENERATOR SIGNAL | 7 | BROADCAST DETECTOR | 30 | ADJUST FOR MAXIMUM OUTPUT. |
| | | | | | 8 | BROADCAST ANTENNA | 6 | |
| 200 MMFD. CONDENSER | ANTENNA TERMINAL | 600 KC | BROADCAST | TUNE TO 600 KC GENERATOR SIGNAL | 9 | BROADCAST OSCILLATOR (SERIES) | 5 | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 6 MC | INTERMEDIATE | 6 MC | 10 | INTERMEDIATE OSCILLATOR | | ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 6 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 6 MC | INTERMEDIATE | TUNE TO 6 MC GENERATOR SIGNAL | 11 | INTERMEDIATE ANTENNA | 30 | ADJUST FOR MAXIMUM OUTPUT. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 20 MC | FOREIGN | 20 MC | 12 | FOREIGN OSCILLATOR | | ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 19.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 20 MC WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 20 MC | FOREIGN | TUNE TO 20 MC GENERATOR SIGNAL | 13 | FOREIGN ANTENNA | 65 | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED |




POWER SUPPLY
Model 6157 can be supplied for operation from either 25 or 60 cycle power supplies.

105-125 volt - 25 cycles - 110 watts
105-125 volt - 50 - 60 cycles - 110 watts

ALIGNMENT FREQUENCIES
20 MC.; 6 MC.;
1500 KC.; 600 KC.

FREQUENCY RANGES
Broadcast Band.....540 to 1730 KC.
Intermediate Band.....2.2 to 7.0 MC.
Foreign Band.....6.8 to 22.5 MC.

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# HOW TO SET UP AND USE YOUR PUSH BUTTON TUNER.

SET-UP PRELIMINARY

A. Be sure that your set is connected to a good antenna system.

B. Turn on the set and allow it to operate at least one quarter hour before setting-up the push buttons.

C. Make a list of station call letters for six nearby powerful broadcast stations for which you wish to set up the buttons. Arrange the stations in your list in the order of their frequency. That is, the station of lowest frequency will be first; the next higher second, and etc. Refer to the radio log furnished with this receiver and you will be able to determine the correct frequency of the desired stations. After you have marked down the frequencies on your chart alongside of the station call letters and arranged them in their proper order, number them 3, 4, 5, 6, 7 and 8 respectively. Check each frequency using Figs. 1 & 2. If each frequency falls within the range of its button, proceed as outlined in the following paragraphs.

A typical list of stations and the buttons that would be used to set them up is shown below:-

| Station Call Letters | Frequency | Button No. |
|---|---|---|
| WMAQ | 670 KC. | 3 |
| WLW | 700 KC. | 4 |
| WGN | 720 KC. | 5 |
| WENR-WLS | 870 KC. | 6 |
| WHO | 1000 KC. | 7 |
| Police(State) | 1640 KC. | 8 |

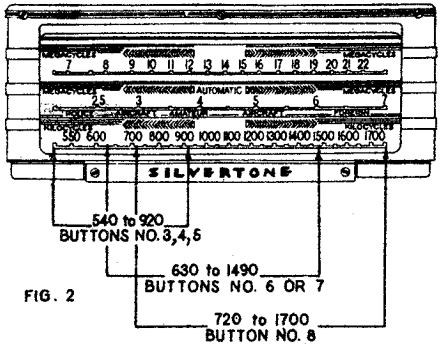

FIG. 2

D. Notice in Fig. 1 that buttons 1 and 2 are for use as tone control buttons. Buttons 3 to 8 inclusive are to be set-up for automatic station selection. Also notice that stations with a frequency between 540 KC and 920 can be set-up on buttons 3, 4 and 5. Stations with a frequency assignment between 630 and 1490 KC may be up on button 6 and 7. Button No. 8 may be used for setting up a station between 720 KC and 1700 KC. There can be only one station on your list that has a frequency rating between 1490 KC and 1700 KC and it must be set-up on button No. 8. However, on the same button it is possible to set-up a station whose frequency is as low as 720 KC.

E. Remove the escutcheon around the push buttons by taking out the six screws holding it to the cabinet. This will bring into view the six pairs of adjustment screws, each pair of which is used to tune in a station that you wish to set-up on a particular button.

F. SET-UP PROCEDURE

1. Turn the band switch (right hand knob) to the right (clockwise) until the word "BROADCAST" appears in the lower opening in the dial scale. Then using the tuning knob (center) tune in the station.

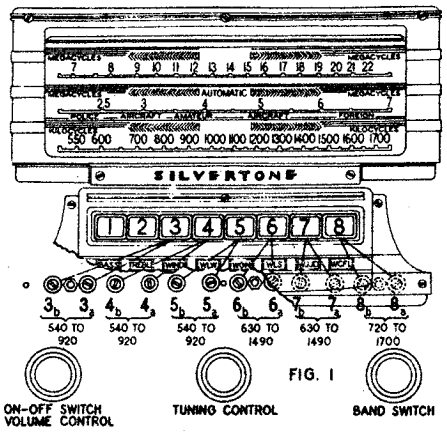

FIG. 1

2. Now turn the band switch to the extreme clockwise position until the word "AUTOMATIC" appears in the dial opening.

3. Push in the button to which you wish to set up the station (See Fig. 1).

4. Use a small screw driver and insert it in the "a" screw for that button (see Fig. 1).

5. Rotate the screw back and forth slowly until the program previously heard is heard again. If trouble is experienced in getting the station, turn the volume control to the right. NOTE: Be sure that you adjust this particular screw until the sides of the tuning eye "shadow" are closest together.

If you are not successful in tuning in the station by turning the "a" screw back and forth, carefully re-read paragraphs "C" and "D", and repeat procedure 1, 2, 3, 4 and 5.

Check to see if you have the proper station by changing the band switch from "Automatic" to "Broadcast" and vise versa.

6. Now insert the screw driver in the "b" screw for that button (see Fig. 1) and turn it to the left or right until the program is received with maximum volume. The correct setting for this screw is when the sides of the tuning eye "shadow" are closest together.

7. Re-adjust the "a" and "b" screws slightly while the band switch is in the "Automatic" position until the sides of the tuning eye "shadow" are closest together.

8. Set-up buttons 4, 5, 6, 7 and 8 following steps 1 to 7 inclusive.

G. Call letter tabs and celluloid windows are supplied with your receiver. The tabs are used to label the six push buttons set-up for stations. The celluloid tabs are supplied as a perforated sheet which is to be broken into eight sections. Select the proper call letter tabs from station call letter sheets supplied.

H. Place the call letter tabs in back of the celluloid window and insert them in their respective slots in the push button estucheon.

I. Replace the escutcheon with its six retaining screws.

# REPLACING THE POINTER DRIVE CORD

1. Tie one end of 51" of special dial cord ( part number 111302) to the spring, which is attached to Lug H.

2. Thread the free end of the cord through hole A in drum C. (threading from the inside of the drum out) See Fig. 3.

3. After pulling the cord through hole A, make one half turn around the drum C in a clockwise direction (viewed from the front) using the front groove in the drum.

4. Continuing, draw the cord up around the back of pulley F to pulley G. From this point continue across to pulley D and around to pulley E.

5. Go over pulley E and down to the bottom of the front groove on drum C. Continue up around the drum to hole B.

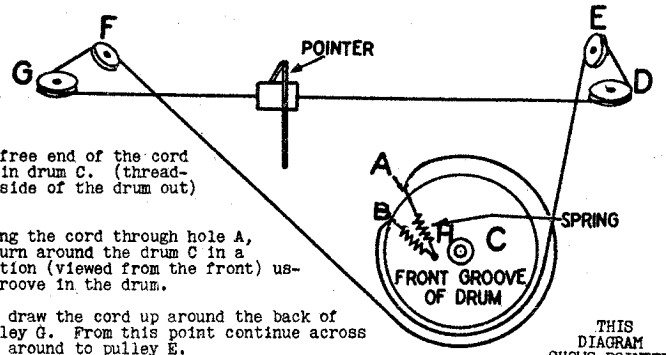

FIG. 3

6. Draw the cord through hole B and tie it to the end of the tension spring in such a manner that when the spring is clipped on to lug H it will be extended to about 1 1/8" long.

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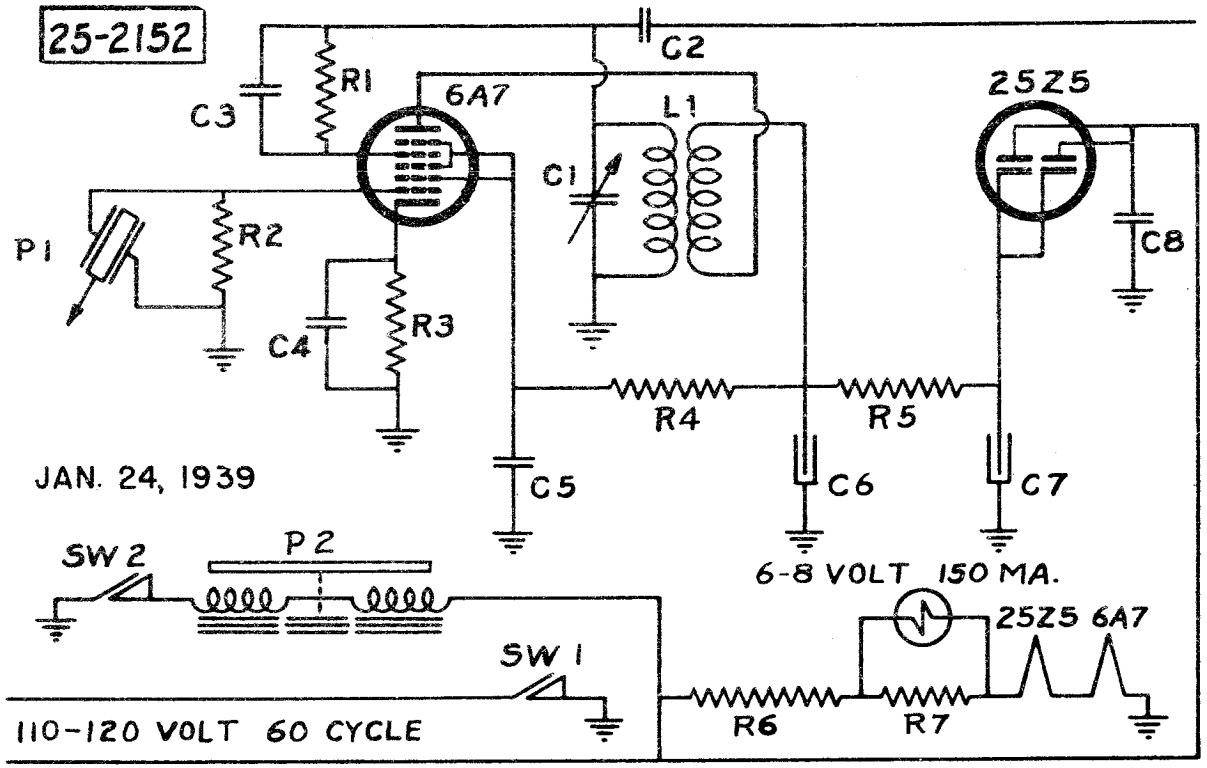
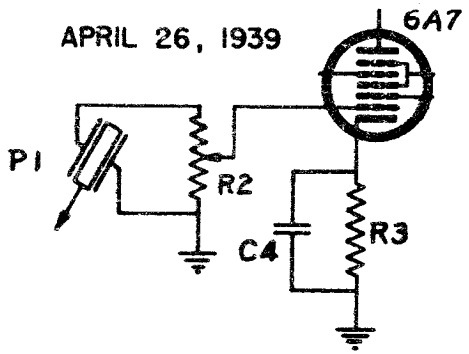
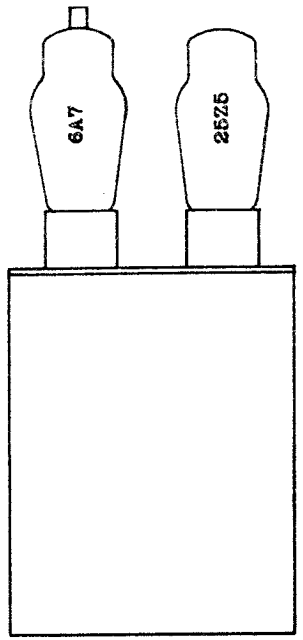
SCHEMATIC DIAGRAM FOR CHASSIS NO. 134.802




APRIL 26, 1939




CHASSIS 134.802-1




BOTTOM VIEW OF CHASSIS
Schematic Changes, Notes
Chassis 134.802-1
Schematic, Notes
Wireless Record Player
MODEL 6226, Chassis 134.802

SEARS-ROEBUCK & CO.

SUBJECT: ADDITION OF VOLUME CONTROL WITH A "MASTER" SWITCH.

There has been effected a change to further promote the satisfaction to be derived from this equipment by the incorporation of a volume control with the "Master" switch control.

To place the volume control in a position for easier operation, the "Master" switch has been placed on the right hand side of the equipment, the "Motor" switch taking up its position on the left hand side of the equipment.

To place the equipment in operation, the right hand switch marked "Master" should be turned on and advanced to the limit of its clockwise turn, which will place the volume control "Full-on". Slightly to the left of the right hand control will be noticed a small metal cap. This should be pried up with the screw driver furnished to gain entrance to the tuning control, instead of making this adjustment from the bottom as directed -- then the usual procedure should be gone through as indicated under "Set Up Procedure".

The volume control can now be set at a level indicated by the satisfaction of the user. Turning the control to the right increases volume, turning it to the left decreases volume.

MODEL 6226,Ch.134.802
Operating,Set-up Data
Parts Lists

# SEARS-ROEBUCK & CO.

## ELECTRICAL SPECIFICATIONS

TUBE COMPLEMENT:
6A7 . . . . . Modulator-Oscillator
2525 . . . . . Rectifier

POWER SUPPLY:
Model 6226 is supplied for operation from 105 to 125 volts, 60 Cycles AC only.

25 Cycle and 50 Cycle units are available by special order.

Power Consumption . . . . . 50 Watts

FREQUENCY RANGE:
The frequency range is 750 to 540 Kilocycles

POWER OUTPUT:
The power output of this unit is arranged so that it can be operated at distances of 20 to 30 feet from the receiver.

OPERATING FEATURES:
Fidelity ranges . . . 50 to 6,000 cycles.

## MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
1. Left hand knob . . . . "Master" switch
2. Right hand knob . . . . "Motor" switch

CONTROL OPERATION:
Turning #1 control to right connects power supply to transmitting unit and makes available power supply to the motor. Turning #2 switch to right connects power supply to motor. #1 switch should not be turned off during operation or changing records, and the table should be stopped when changing records by turning switch #2 to the left.

The Model No. 6226, carrying identification No. 134.802, is so designed that it has a tuning range of 750 to 540 kilocycles. This range is selected on the lower part of the broadcast band and is ample in latitude because in any geographical location there will be found a space somewhere in this latitude of frequency where a powerful carrier does not exist and satisfactory operation may be had by tuning the equipment to this frequency. This section of the broadcast band is chosen because there are more cleared channels in this part of the frequency band than in the higher part of the band.

This wireless remote record player is designed to not be connected to any additional antenna and during times when there is high atmospheric interference or where entire freedom from heterodyne whistle cannot be effected by operating the player with its normal antenna array, it may be used closely connected with the receiver with which it is being operated by connecting a wire to the antenna lead to the receiver. This will not in any way interfere with the operation of the radio receiver.

The circuit network used in the wireless remote record player is of conventional design in so far as the oscillator circuit is concerned, however the modulator circuit is unique in that modulation occurs on the electron stream before it is affected by any of the tube elements associated with the oscillator circuit. This prevents, among other things, frequency modulation which gives rise to distortion if its extent be great. The percentage modulation is chosen so that, using a moderate tone needle, it will vary from approximately 20% on low amplitude records to as high as 80% on very high amplitude recordings. In the general sense it is impossible for the oscillator to become more than 100% modulated. Distortion arising from high amplitude passages is associated with the arm and should be remedied by using a soft, long needle.

There are two switch controls on the equipment so that the "Master" switch may be turned on and left in this position, and the "Motor" switch operated to turn on and off the motor. In this position, the power supply will continue to be connected to the oscillator unit. The oscillator always maintaining quiet operation in the receiver due to the fact that the AVC of the receiver is operating to maintain a low sensitivity. This results in the carrier wave of the transmitter not be heard. If the carrier were interrupted during record changing, the automatic volume control would cease to operate in the receiver that device and hence the sensitivity would increase to a maximum, thereby bringing up very high background noise which would not promote the satisfaction of the user.

When distortion is apparent in the output of this device, it will probably be caused by a defective tone needle. First of all, the quality of the needle should be investigated, then a tube, known to give distortionless operation in the wireless remote record player, should be inserted and last of all, the crystal cartridge in the arm should be replaced.

### SET UP PROCEDURE

A. Set up the equipment not more than 20 feet from some point of the antenna system of the radio set with which it is going to be operated.

B. Turn on the radio receiver and allow time for the tubes to come to operating temperature. Tune through the frequency spectrum between 750 and 540 kilocycles and locate a channel which is quiet and on which you do not hear broadcasting.

C. Turn the "Master" switch of your wireless remote record player to the right hand position, select a record and place it on the table, and place the tone arm in normal position. Pull the record player forward on the table, exposing the large hole in the bottom of the player. After turning "Motor" switch on and starting table, insert the screw driver provided through this hole and adjust the trimming condenser located directly above until the record player should be tuned back and forth across the channel to which the radio receiver is tuned until it is absolutely centered and the music issuing from the radio receiver of good quality. Many times a final tuning of the receiver a small amount will result in more nearly correct tuning.

D. After the above adjustment has been made, all subsequent operation is taken care of at the radio receiver, such as adjusting tone control, volume control, and when it is again desired to operate the record player, it will be heard in the same place on the scale of the receiver to which it has now become adjusted.

E. In changing records, operate only the right hand control. The pilot light will illuminate the record sufficiently so that no other light is required for replacing records or changing needles, and the motor can be stopped or started by the use of this one control.

Good results will not be obtained unless needles are changed regularly.

The quality of the tone response will be in proportion to the goodness of the radio receiver, and for full tone response a good console set should be used.

It is essential that the wave channel selected for operation of the record player should be practically free from radio signal.

If difficulty is experienced in finding a cleared channel, or if severe atmospheric static is present these faults can be overcome by moving the record player closer to the radio set or its antenna, even to the extent of attaching a wire to the end of the antenna which protrudes from the attachment cord and placing the other end of this wire one turn around your antenna lead to the set. Do not make any direct connection, however.

A few types of phonograph records, including some symphonic reproductions, give a very heavy signal when used with medium or loud needles, and better results can be secured with these records by the use of soft tone needles.

In the case of old phonograph records made prior to the use of electrical recording, a low signal volume is sometimes available and this can be corrected by the use of loud or extra loud needles.

Authorized Replacement Parts for this model may be obtained from any Sears Roebuck and Co. Retail Store or Mail Order branch. Always give part numbers and the chassis identification number.

| PART NO. | SCHEMATIC LOCATION | DESCRIPTION | SELLING PRICE EACH |
|---|---|---|---|
| **The following parts have been added to this model IDENTIFICATION NO. 134.802-1** | | | |
| 134192013 | R2 & S1 | Volume Control & Off-and-On Switch | .75 |
| 134662023 | S2 | Motor Off-On Switch (Interchangeable with 134662021) | .45 |
| **The following parts are not used in the 134.802-1:** | | | |
| 134662021 | S1 | Line Off-On Switch | |
| 134662021 | S2 | Motor Off-On Switch | |
| | R2 | Resistor, 250,000 Ohm 1/4 Watt | |
| 13472031 | | Bumper, Rubber | .04 |
| 13471471 | | Button, Cabinet Snap | .01 |
| 134152003 | | Clamp, Cord | .04 |
| 134152002 | | Clip, Cord | .01 |
| 134162002 | | Clip, Pilot Socket Mounting | .57 |
| 134172223 | L1 | Coil Assembly, Oscillator | .20 |
| 134782034 | C1 | Condenser, Trimmer 40-240 Mmfd. | .14 |
| | C2 | Condenser, .00001 Mfd. Mica | .11 |
| | C3 | Condenser, .00005 Mfd. Mica | .11 |
| | C4 & C5 | Condenser, .1 Mfd. 200 Volt | .45 |
| | C6 | Condenser, 8 Mfd. 150 W. V. | .50 |
| | C7 | Condenser, 16 Mfd. 150 W. V. | .11 |
| | C8 | Condenser, .1 Mfd. 200 Volt | 1.82 |
| 134202005 | | Cord, 110 Volt & Antenna | 3.70 |
| 13462140 | | Case Assembly, Cabinet | .90 |
| 13462141 | | Case Bottom, Cabinet | .06 |
| 134232017 | | Cup, Needle | 6.00 |
| 134232019 | | Cartridge, Crystal | .02 |
| 13434903 | | Feet, Rubber | .09 |
| 134402038 | | Knob, Walnut "Master" | .09 |
| 134402039 | | Knob, Walnut "Motor" | .12 |
| 13445349 | | Lamp, Pilot, Mazda #T-46 | .02 |
| 134492009 | | Nut, Pickup Arm Mtg. | .20 |
| 134512053 | | Plate, Bottom, for Pickup Head | .10 |
| 134512052 | | Plate, Turn Table Clutch | 6.50 |
| 134322080 | P1 | Phono Pickup Arm Assembly | |
| 134322081 | P2 | Phono Motor Assembly, 60 Cycle AC 110-120 V. with 9" Turn Table | 8.32 |
| 134522086 | | Phono Motor Assembly, 50 Cycle AC 110-120 V. with 9" Turn Table | 8.32 |
| | | Turn Table, 9" | 1.12 |
| 134522099 | | Phono Motor, 60 Cycle AC 110-120 Volt | 7.60 |
| 134522081 | | Resistor, 10,000 Ohm 1/4 Watt | .15 |
| | R1 | Resistor, 250,000 Ohm 1/4 Watt | .15 |
| | R2 | Resistor, 1,000 Ohm 1/4 Watt | .15 |
| | R3 | Resistor, 5,000 Ohm 1/4 Watt | |
| 134532021 | R4 & R5 | Resistor, 278 Ohm 25 Watt tapped at 26 Ohm 2.34 Watt. | .58 |
| | R6 & R7 | Rest, Arm | .20 |
| 134552004 | | Ring, Rubber Locking | .05 |
| 134552003 | | Socket, 6 prong | .12 |
| 13462819 | | Socket, 7 prong | .12 |
| 13462824 | | Socket Assembly, Pilot Light | .25 |
| 134622049 | SW1 | Switch, Line "Off-On" | .43 |
| 134662021 | SW2 | Switch, Motor "Off-On" | .43 |
| 134732035 | | Washer, Pickup Arm Mtg. | .01 |
| 134732037 | | Washer, Motor Mtg. | .05 |
| 134732038 | | Washer, Shouldered Rubber Motor Mtg. | .05 |
| 134732039 | | Washer, Plain Rubber Motor Mtg. | .05 |
| 134732040 | | Washer, Turn Table Rubber Clutch | .05 |

RETAIL SELLING PRICES PREPAID
PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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# SEARS ROEBUCK & CO.

MODELS 6195,6196,6197
Chassis 109.216
Schematic,Voltage
Socket,Trimmers
Alignment

## ALIGNMENT PROCEDURE

Either a broadcast signal between 1400 and 1500 KC may be used.

The antenna of the receiver should be extended as in normal use. Tune in a station between 1400 and 1500 KC. and adjust the trimmers on top of the variable condenser for maximum signal.

If a signal generator is used, extend the antenna as described above, run a wire from the generator parallel to, but insulated from the antenna. Set the generator at 1720 KC. Turn the variable condenser all the way to the right (minimum capacity). Tune in the signal from the generator with the trimmer on the front section of the variable condenser. Set the generator at about 1400 KC. Tune in the signal and adjust the trimmer on the rear section of the variable condenser for maximum signal.

The signal generator method is most satisfactory and should always be used when available.

CAUTION:
Under no condition should a ground be attached to this receiver, also no grounded object should be allowed to come in contact with the chassis.

POWER SUPPLY:
105-125 volts, 50-60 cycle or D. C. 43 Watts on 117 volt line.

FREQUENCY RANGE:
Broadcast and other services 540 to 1720 KC.

ALIGNMENT FREQUENCIES:
1720 and 1500 KC.

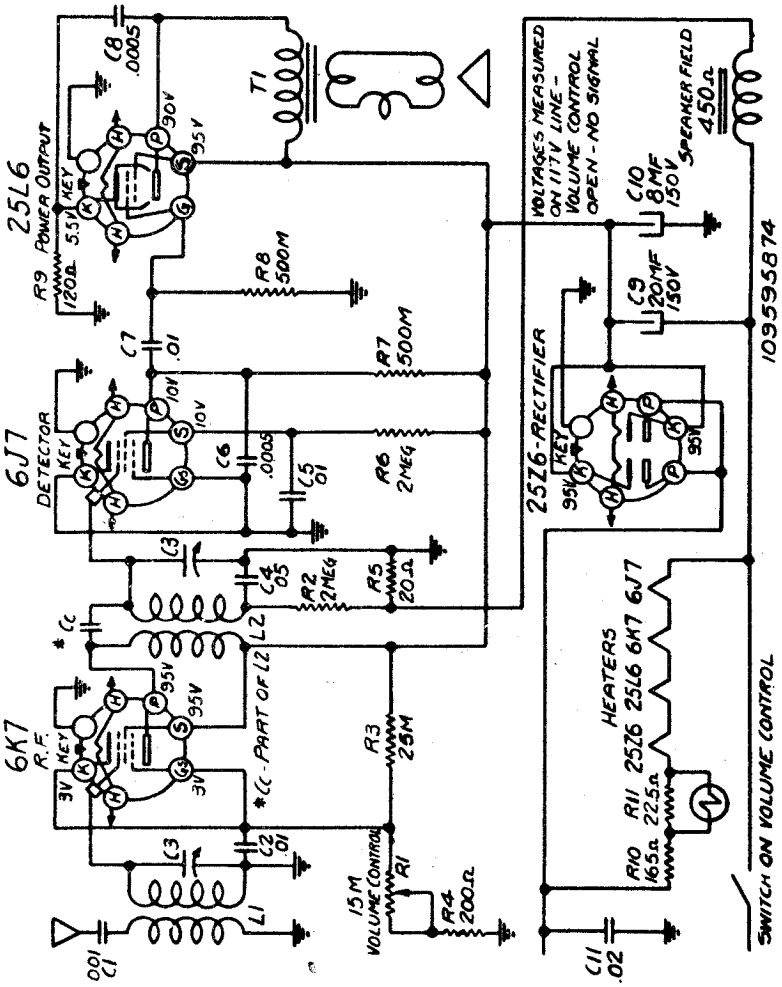
POWER OUTPUT:
Type.....Beam Power
Undistorted.....1 Watt
Maximum.....2.0 Watts

LOUD SPEAKER:
Type.....Dynamic
Size.....3½"
Field Resistance.....450 Ohms

## MECHANICAL SPECIFICATIONS

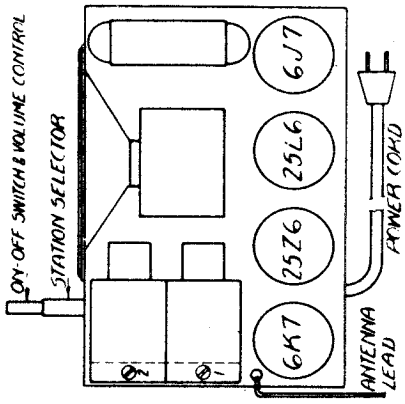
CONTROLS:
Upper Knob.....Tuning
Lower Knob.....Volume control,On-Off Switch

CONTROL OPERATION:
Direct Drive
Turn right to turn power on and to increase volume.




WIRING DIAGRAM FOR SILVERTONE CHASSIS 109.216

57 RL 138
OCT. 7, 1938

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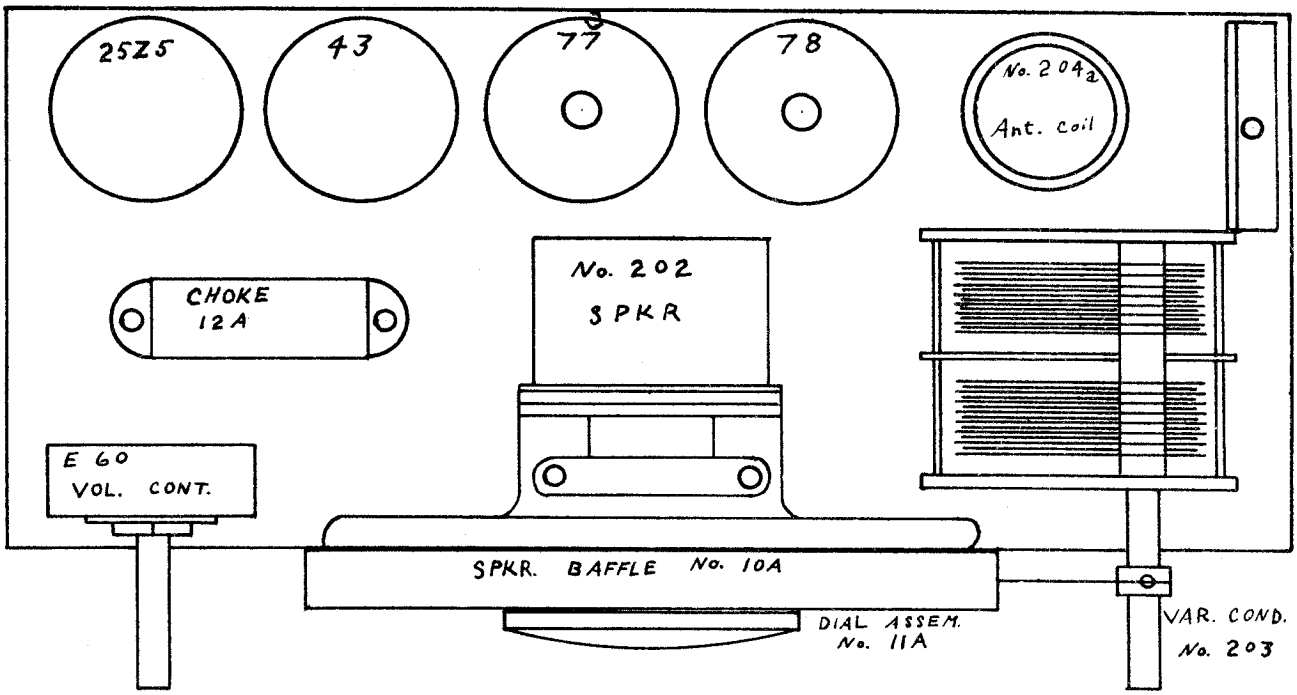
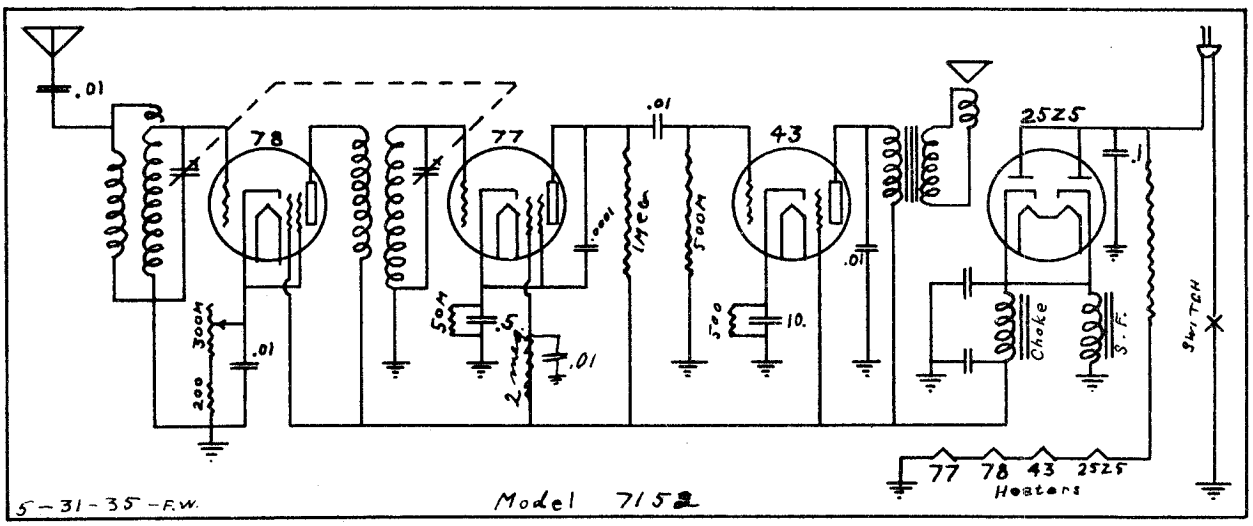
MODEL 7152
Schematic, Socket Voltage

# SEARS-ROEBUCK & CO.

FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION
VOLUME VIII




SOCKET VOLTAGES

| TUBE | POSITION | EF | EK | EG2 | EG3 | EP |
|---|---|---|---|---|---|---|
| 78 | RF | 6.3 | 2.1 | 110 | 2.1 | 108 |
| 77 | Det. | 6.3 | 1.4 | 14 | 1.4 | 18 |
| 43 | PR. OUTPUT | 25 | 16 | 110 | - | 100 |

Line voltage 115 Volts - Voltage control all the way up
All voltages taken with 1000 ohms per volt D.C. meter except heaters. From points indicated to ground.
F - Filament K - Cathode G2 - Screen Grid
G3 - Suppressor grid P - Plate

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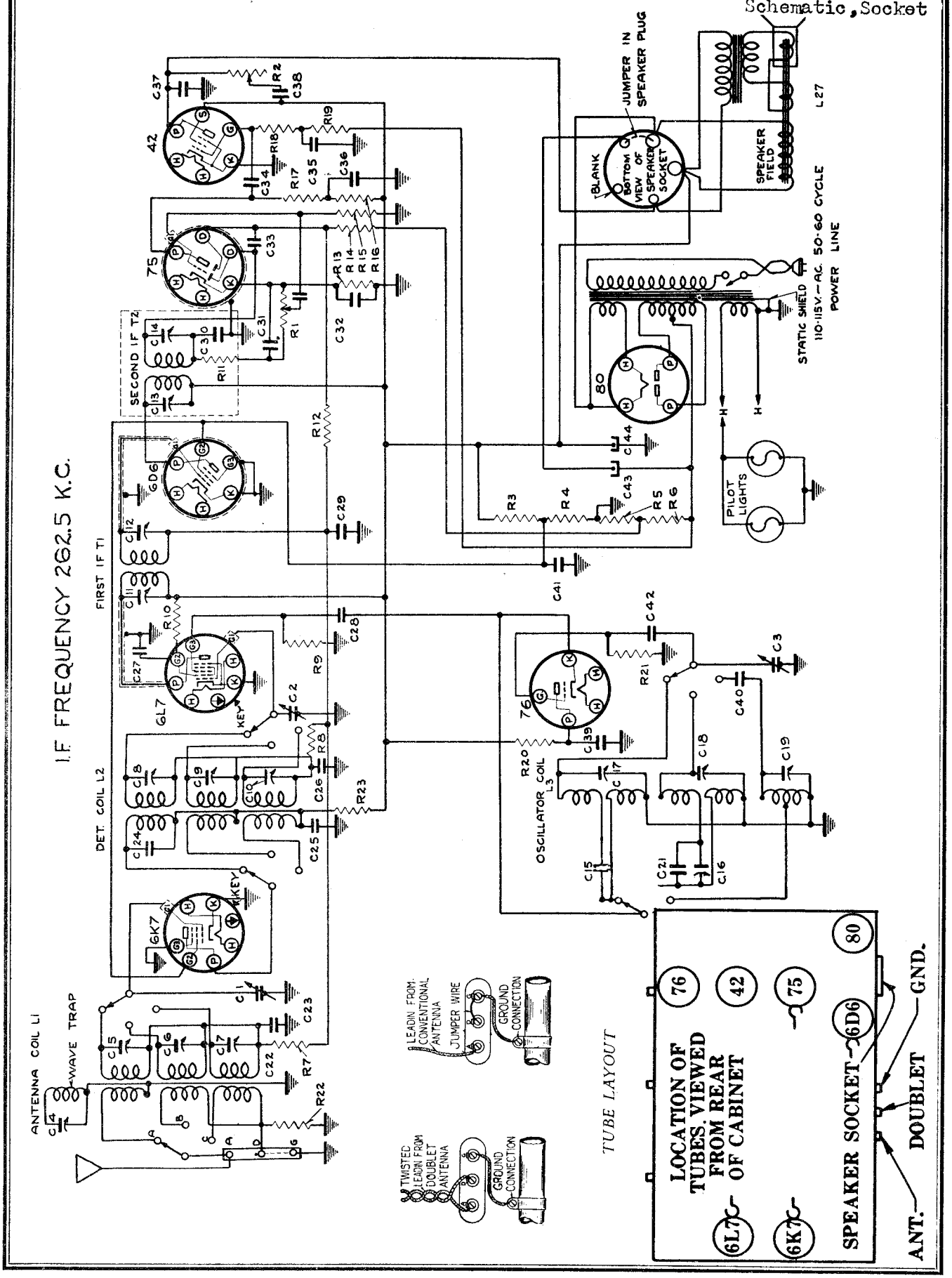
# SEARS ROEBUCK & CO.

MODELS 7170, 7170A
Schematic, Socket

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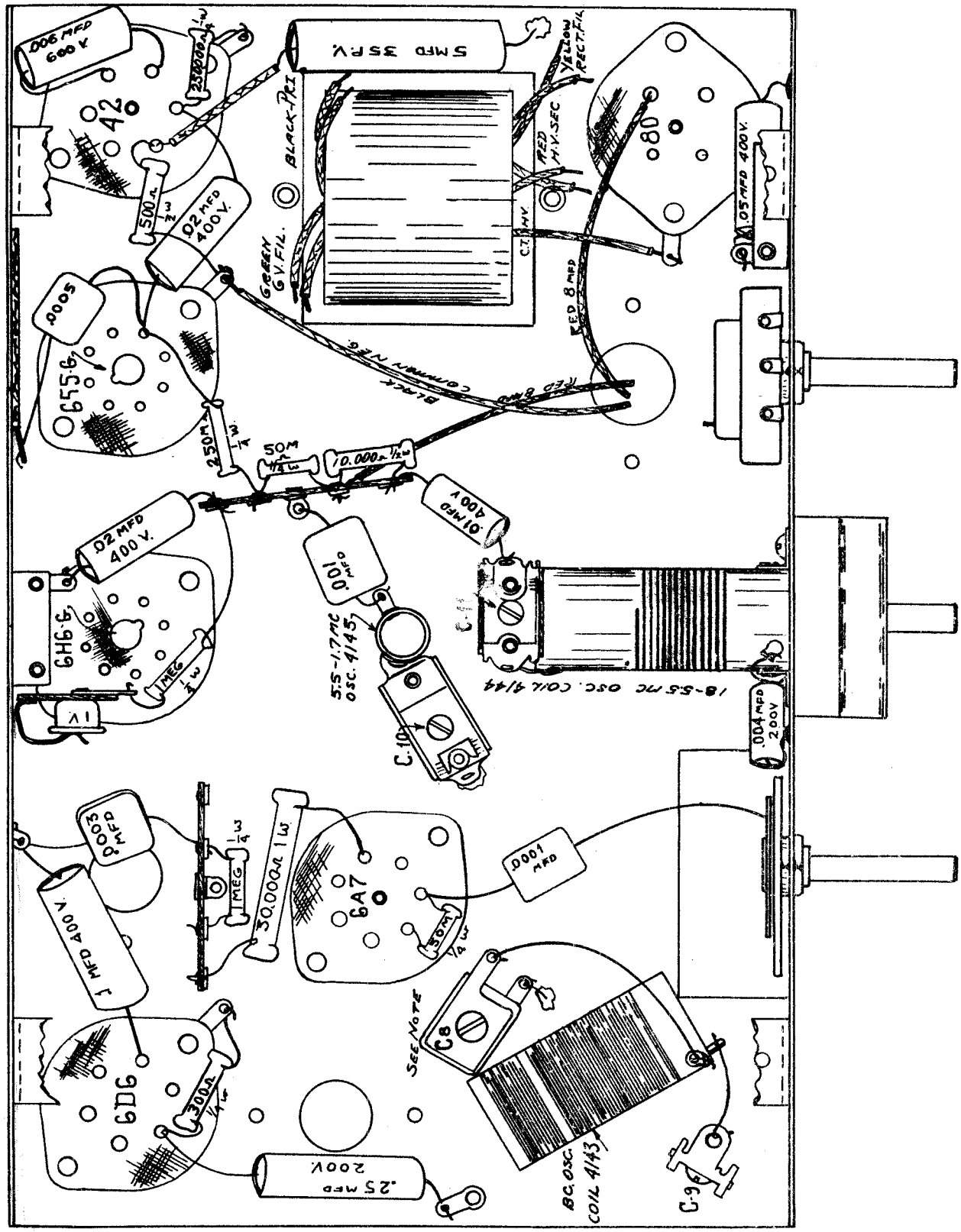
MODEL 7171
Chassis Wiring

## SEARS-ROEBUCK & CO.

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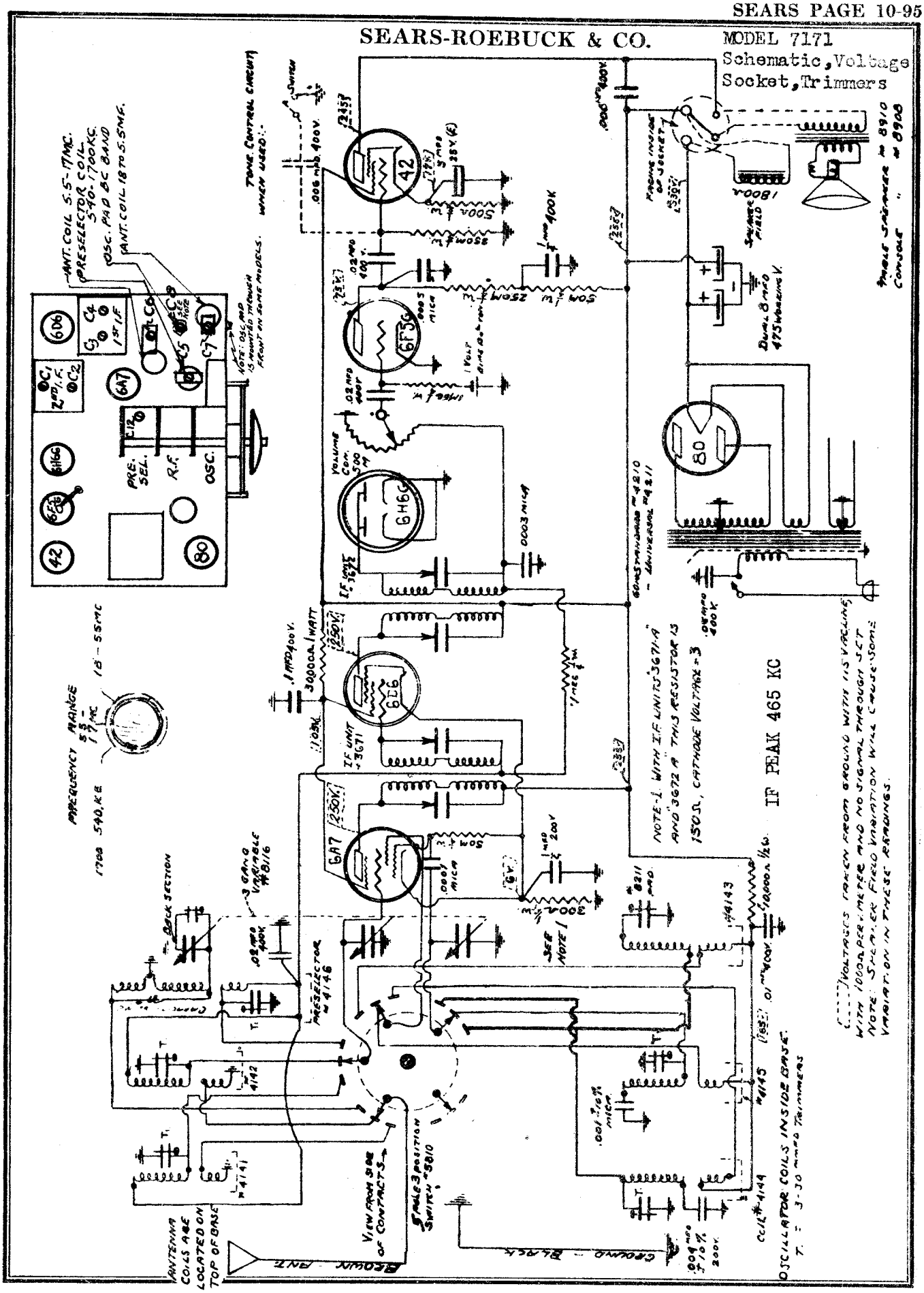


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## THE ALIGNMENT PROCEEDURE

The following alignment instructions are given with the assumption that the service station has an oscillator capable of accurately covering the range of the receiver.

The only other apparatus necessary is a meter connected in the output stage to indicate resonance. This can be 0 to 3 volt AC meter connected across the voice coil of the speaker or preferably an output meter connected in the plate circuit of the 42 power tube in series with an 8 MFD paper condenser.

### I THE I.F. STAGES

The I.F's are aligned by the usual system of feeding the intermediate frequency of 465KC into the grid of the 6A7 tube.

The two trimmers in each of the I.F. cans should be very carefully peaked to resonance as they are very critical and will greatly affect the performance of the set. These are trimmers number C1, C2, C3, C4. (See pictorial diagram).

The sensitivity of the I.F. stages will be 40 microvolts or better.

Always use as low an output as possible from the test oscillator in making the various adjustments.

### II ALIGNMENT OF SHORTWAVE BAND 5.5 TO 18 M.C.

First check the position of the dial hand by rotating the condenser shaft to the left to full capacity. At this point the dial hand should be straight across in line with the lines dividing the scale in half. If the hand is off position it can be easily lined up by loosening the set screw behind the dial card in the drive hub.

1. Set the test oscillator to 17 megacycles.

2. Turn wave band switch all the way to right for highest S.W. band, and set dial hand to 17 M.C.

3. Peak trimmer condenser C-11 of the oscillator coil (See pictorial 6-2) to resonance with 17 M.C. fed into antenna.

4. Peak Ant. coil trimmer C-7 at same setting to 17 M.C.

### III SHORT WAVE BAND 1.7 TO 5.5 M.C.

1. Turn wave switch to middle position.

2. Set dial hand to 5 megacycles on the 1.7 to 5.5 M.C. inner scale.

Peak oscillator trimmer C-10 to 5 M.C. from test oscillator. And Ant. coil trimmer C-6 to same frequency.

NOTE: After adjusting the two high bands at 17 megacycles and 5 megacycles the test oscillator input to antenna should be increased and receiver dial advanced to .9 megacycle lower and note if test oscillator signal is heard.

In case there is no response the oscillator trimmers have been pulled down too tightly. The trimmers should be released until this condition exists then go back to original point of alignment - reduce antenna input voltage and correct the trimmer adjustment.

EXAMPLE: The receiver has been adjusted to 17 megacycles. Tune receiver to approximately 16.9 M.C.

Increase oscillator signal by "opening up" the alternator. Move the dial back and forth at 16.9 M.C.

If no signal is heard, let oscillator trimmer off until it is heard at 16.9 M.C.

Reduce signal voltage from generator, go back to 17 M.C. and slightly correct this last trimmer adjustment.

The same thing applies to the 5 M.C. adjustment.

### IV THE BROADCAST BAND

1. Turn wave band switch all the way to left and dial hand set to 1400 KC (the top scale).

2. Peak oscillator trimmer C-9 to 1400 KC., the Antenna preselector C-12 (variable condenser trimmer) to 1400 KC, and trimmer C-5 to 1400 KC.

3. Set dial hand to 550 KC and adjust oscillator padding condenser C-8 to 550 KC.

4. Recheck dial at 1400 KC as in number (1) and (2).

5. Points in the middle of the dial may be checked and if necessary the plates of the front section of variable condenser may be bent for alignment.

### V NOTES.

1. Seal all trimmers after their final adjustment.

2. Be sure that the settings are being made to the true fundamental signal from the oscillator and not on a harmonic or image frequency.

3. Refer to the schematic for the voltages at the tube sockets.

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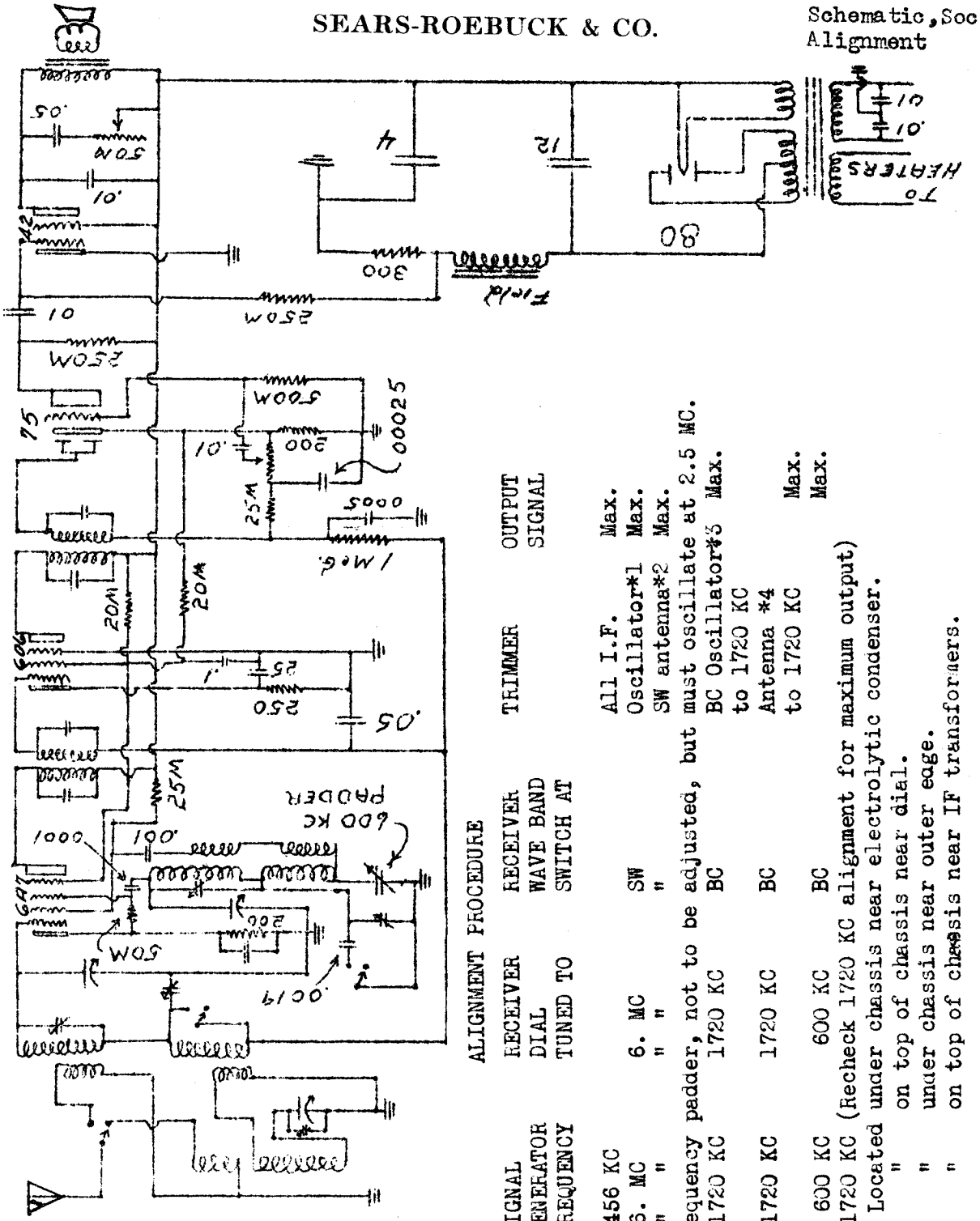
# SEARS-ROEBUCK & CO.

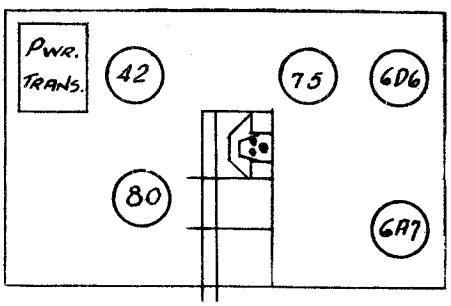
MODEL 7172
Schematic, Socket
Alignment




ALIGNMENT PROCEDURE

| CONNECT SIGNAL GENERATOR | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL TUNED TO | RECEIVER WAVE BAND SWITCH AT | TRIMMER | OUTPUT SIGNAL |
|---|---|---|---|---|---|
| 6A7 Grid | 456 KC | | | All I.F. | Max. |
| Antenna | 6. MC | 6. MC | SW | Oscillator*1 | Max. |
| Antenna | " " | " " | " | SW antenna*2 | Max. |
| Note: SW low frequency padder, not to be adjusted, but must oscillate at 2.5 MC. | | | | | |
| Antenna | 1720 KC | 1720 KC | BC | BC Oscillator*3 to 1720 KC | Max. |
| Antenna | 1720 KC | 1720 KC | BC | Antenna *4 to 1720 KC | Max. |
| Antenna | 600 KC | 600 KC | BC | | Max. |
| Antenna | 1720 KC (Recheck 1720 KC alignment for maximum output) | | | | |

*1- Located under chassis near electrolytic condenser.
*2- " on top of chassis near dial.
*3- " under chassis near outer edge.
*4- " on top of chassis near IF transformers.

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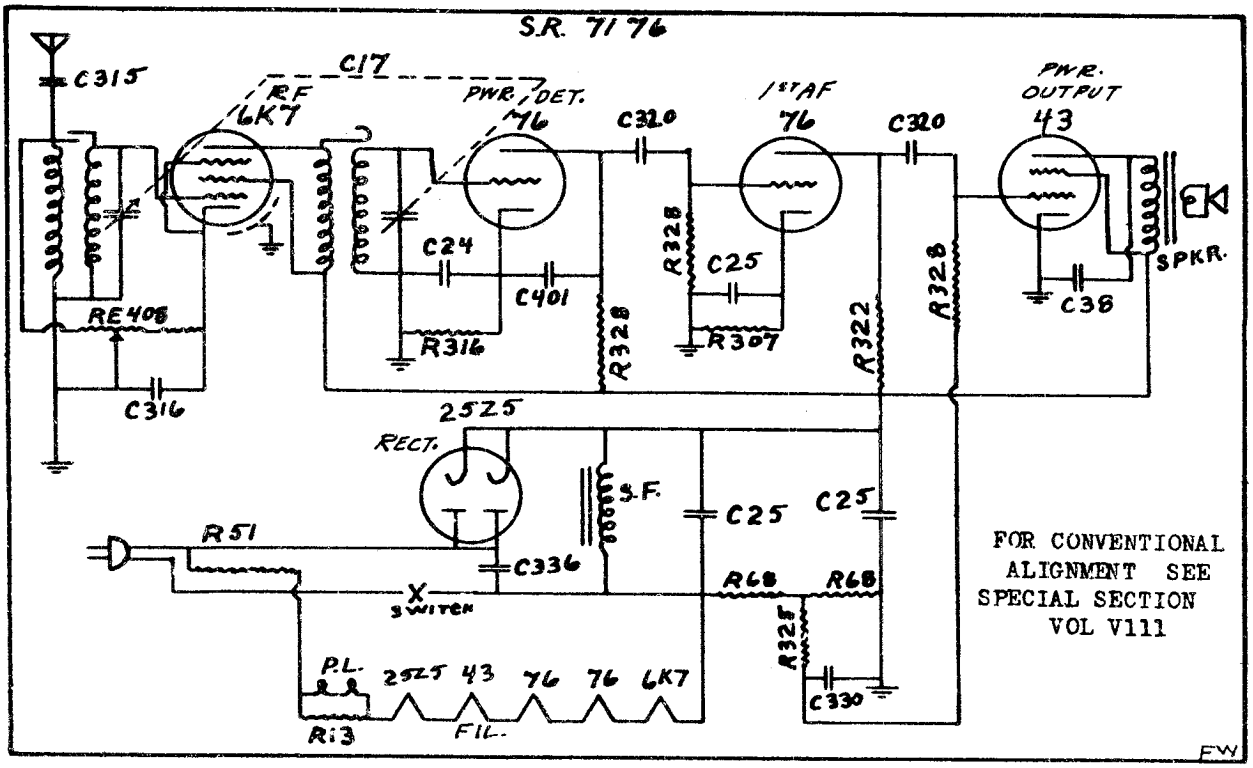
MODEL 7176
Schematic, Socket, Trimmers
Alignment

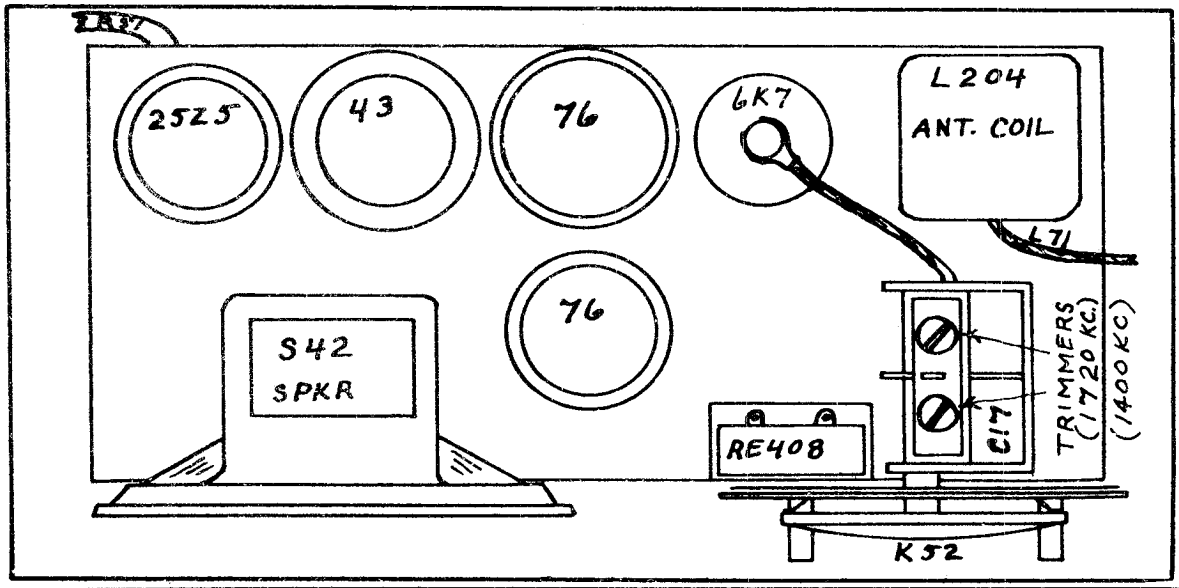
SEARS-ROEBUCK & CO




## LEGEND

C17 - 360 MMF. Var. Cond.
C24 - 5 MFD. 35V. Elect.
C25 - 16-8-5 MFD
C38 - .003 MFD. 800V.
C315 - .01 MFD. 200V
C316 - .01 MFD. 400V
C320 - .02 MFD. 200V
C330 - .05 MFD. 200V
C336 - .1 MFD. 400V
C401 - .0001 Mica

R13 - 50 OHMS.
R51 - 135 OHM. Cordohm
R68 - 400 OHMS
R307 - 2,500 OHMS
R316 - 15,000 OHMS
R322 - 50,000 OHMS
R328 - 1 MEG.
RE408 - 300,000 OHM Vol. Cont.
P.L. - Pilot Lights
S.L. - Speaker Field

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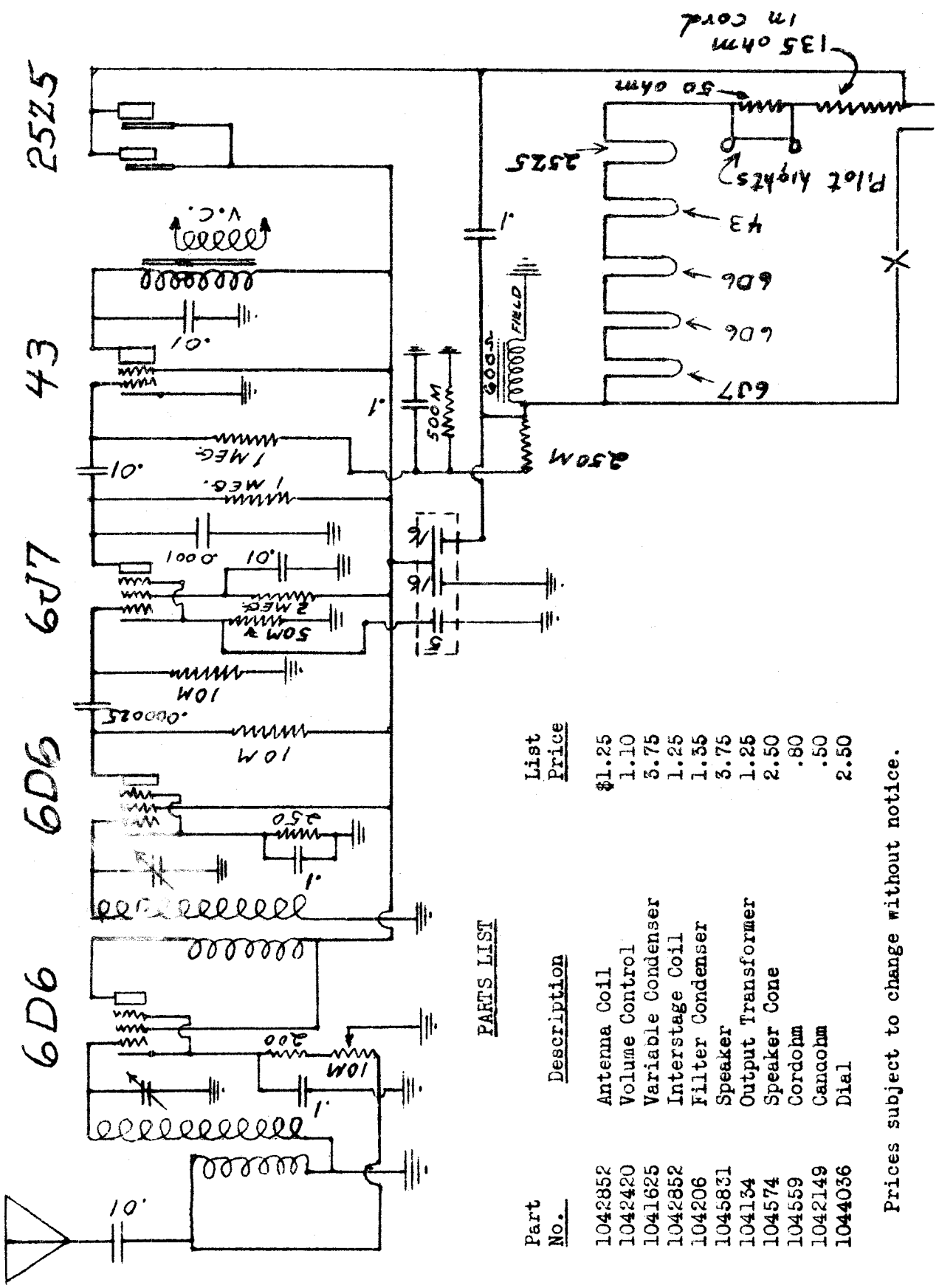
MODEL 7177
Schematic




PARTS LIST

| Part No. | Description | List Price |
|---|---|---|
| 1042852 | Antenna Coil | $1.25 |
| 1042420 | Volume Control | 1.10 |
| 1041625 | Variable Condenser | 3.75 |
| 1042852 | Interstage Coil | 1.25 |
| 104206 | Filter Condenser | 1.35 |
| 1045831 | Speaker | 3.75 |
| 104134 | Output Transformer | 1.25 |
| 104574 | Speaker Cone | 2.50 |
| 104559 | Cordohm | .80 |
| 1042149 | Cancohm | .50 |
| 1044036 | Dial | 2.50 |

Prices subject to change without notice.

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MODEL 7211, Ch. 110, 7211
MODELS 7212, 7212A
Chassis 110, 7212
Schematics, Socket, Trimmers
Alignment

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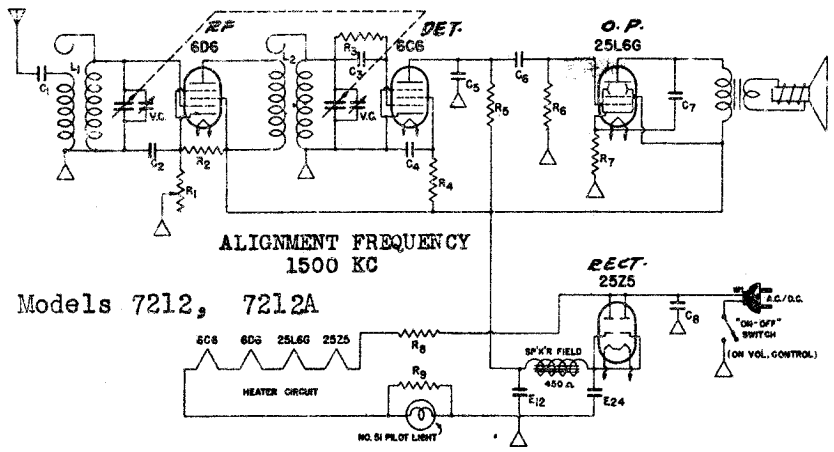
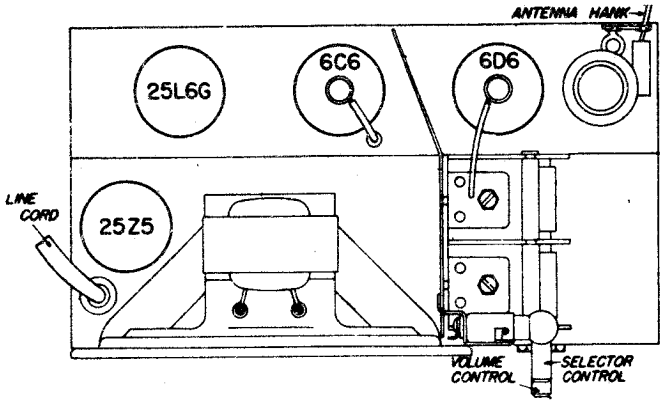



ALIGNMENT FREQUENCY
1500 KC

## Models 7212, 7212A

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $R_1$ | 25,000 | OHM | VOL. CONTROL | $L_1$ | ANTENNA COIL | $C_1$ | .005 | 400 V. |
| $R_2$ | 35,000 | " | 1/4 WATT | $L_2$ | R.F. COIL | $C_2$ | .02 | 200 V. |
| $R_3$ | 6,000,000 | " | " " | | | $C_3$ | .005 | 400 V. |
| $R_4$ | 6,000,000 | " | " " | | | $C_4$ | .02 | 200 V |
| $R_5$ | 1,000,000 | " | " " | $E_{12}$ | 12 MFD 150 V.W. | $C_5$ | .00025 | MICA |
| $R_6$ | 500,000 | " | " " | $E_{24}$ | 24 " " " | $C_6$ | .02 | 200 V. |
| $R_7$ | 150 | " | 1 " | | | $C_7$ | .01 | 400 V. |
| $R_8$ | 165 | " | IN LINE CORD | | | $C_8$ | .1 | " |
| $R_9$ | 31 | OHM | 3 WATT | V.C. - 410 MMF. MAX. VARIABLE COND. | | | | |



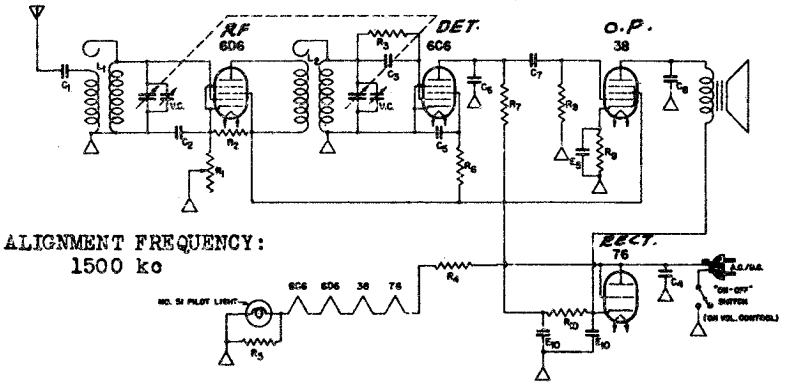

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII

POWER SUPPLY:
All models 105-125 volts, 50-60 cycle or DC, 40 watts

FREQUENCY RANGE:
Broadcast . . . . . 540-1470 KC

POWER OUTPUT:
Type . . . . . Beam Power
Undistorted . . . . . 1 watt
Maximum . . . . . 1.5 watts

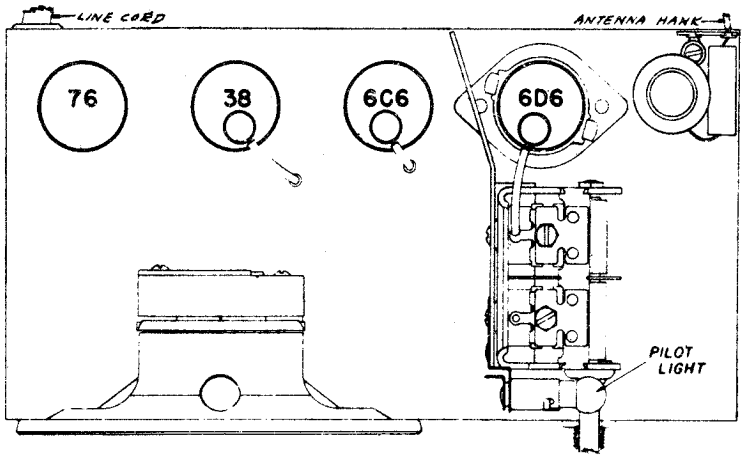
APRIL 7, 1938




ALIGNMENT FREQUENCY:
1500 kc

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| $R_1$ | 25,000 | OHM | VOL. CONTROL | $L_1$ | ANTENNA COIL | $C_1$ | .005 | 400 V. |
| $R_2$ | 35,000 | " | 1/4 WATT | $L_2$ | R.F. COIL | $C_2$ | .02 | 200 V. |
| $R_3$ | 3,000,000 | " | " " | | | $C_3$ | .005 | 400 V. |
| $R_4$ | 290 | " | IN LINE CORD | $E_8$ | 8 MFD. 25 W.V. | $C_4$ | .05 | " |
| $R_5$ | 31 | " | 3 WATT | $E_{10}$ | 10 " 150 " | $C_5$ | .02 | 200 V. |
| $R_6$ | 6,000,000 | " | 1/4 " | | | $C_6$ | .00025 | MICA |
| $R_7$ | 1,000,000 | " | " " | | | $C_7$ | .02 | 200 V. |
| $R_8$ | 750,000 | " | " " | | | $C_8$ | .006 | 400 V. |
| $R_9$ | 1,000 | " | " " | | | | | |
| $R_{10}$ | 2,700 | " | " " | | | | | |

## Model 7211




POWER SUPPLY:
All models 105-125 volts, 25-60 cycle or DC, 35 watts

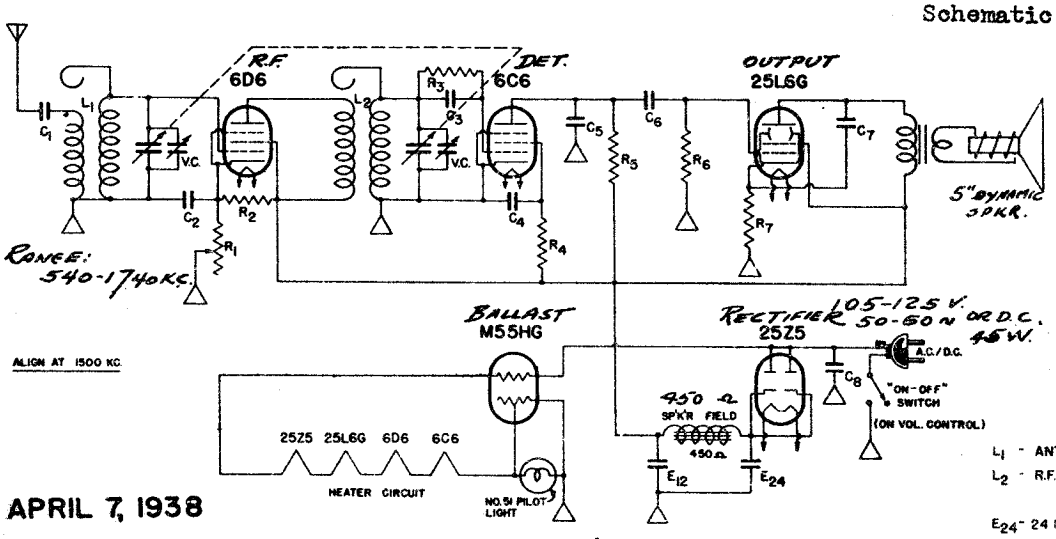
FREQUENCY RANGE:
Broadcast . . . . . 540-1700 kc

POWER OUTPUT:
Type . . . . . Single Pentode
Undistorted . . . . . .3 watts
Maximum . . . . . .6 watts

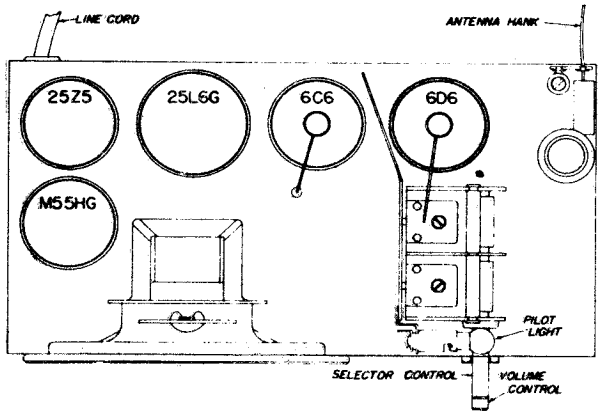
APRIL 7, 1938

SEARS ROEBUCK & CO.

MODEL 7213, Ch. 110.7213
Schematic, Socket, Trimmers
MODEL 7214, Ch. 110.7214
Schematic




APRIL 7, 1938




MODEL 7213
CHASSIS 110.7213

| | | | |
|---|---|---|---|
| $C_1$ | .005 | 400 V. | |
| $C_2$ | .02 | 200 V. | |
| $C_3$ | .005 | 400 V. | |
| $C_4$ | .02 | 200 V. | |
| $C_5$ | .0001 | MICA | |
| $C_6$ | .02 | 200 V. | |
| $C_7$ | .01 | 400 V. | |
| $C_8$ | .1 | 400 V. | |

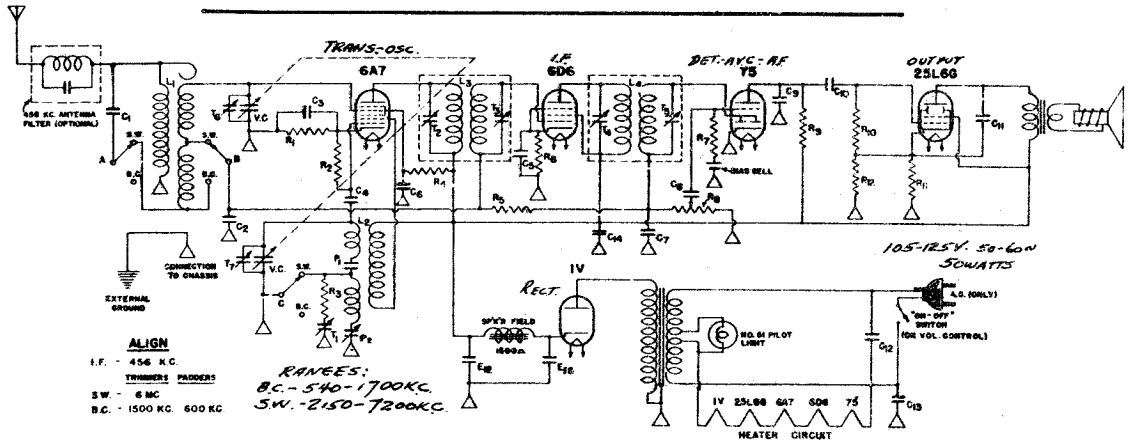
$L_1$ - ANTENNA COIL
$L_2$ - R.F. COIL

$E_{24}$ - 24 MFD. 150 V.W.
$E_{12}$ - 12 " " "

V.C. - 410 MMF. MAX. VARIABLE COND.

| | | | |
|---|---|---|---|
| $R_1$ | 25,000 | OHM | VOLUME CONTROL |
| $R_2$ | 35,000 | " | 1/4 WATT |
| $R_3$ | 6,000,000 | " | " " |
| $R_4$ | 6,000,000 | " | " " |
| $R_5$ | 1,000,000 | " | " " |
| $R_6$ | 500,000 | " | " " |
| $R_7$ | 150 | " | 1/2 " |

POWER OUTPUT:
Type . . . . . Beam Power
Undistorted . . . . . 1.2 watts
Maximum . . . . . 1.6 watts




| | | | |
|---|---|---|---|
| $R_1$ | 400 | OHM | 1/4 WATT |
| $R_2$ | 50,000 | " | " " |
| $R_3$ | 85 | " | " " |
| $R_4$ | 35,000 | " | " " |
| $R_5$ | 3,000,000 | " | " " |
| $R_6$ | 400 | " | " " |
| $R_7$ | 750,000 | " | " " |
| $R_8$ | 500,000 | " | VOL. CONTROL |
| $R_9$ | 500,000 | " | 1/4 WATT |
| $R_{10}$ | 500,000 | " | " " |
| $R_{11}$ | 300 | " | 1/2 " |
| $R_{12}$ | 600 TO 800 | " | 1/4 " |

SWITCHES A,B,C, 3 POLE DOUBLE THROW WAVE BAND SWITCH

$L_1$ - COMBINATION ANTENNA COIL
$L_2$ - COMBINATION OSCILLATOR COIL
$L_3$ - 456 K.C. INPUT I.F.
$L_4$ - 456 K.C. OUTPUT I.F.

$P_1$ - 1380 MMF. MICA PADDER
$P_2$ - 700 MMF. MAX. PADDER

$E_{12}$ - 12 MFD. 150 V.W.
$E_{18}$ - 18 " " "

V.C. - 410 MMF. MAX. VARIABLE COND.

$T_1$ - 3-35 MMF. TRIMMER

| | | | |
|---|---|---|---|
| $C_1$ | .005 | - | 400 V. |
| $C_2$ | .05 | - | 200 V. |
| $C_3$ | .05 | - | " |
| $C_4$ | .0001 | - | MICA |
| $C_5$ | .05 | - | 200 V. |
| $C_6$ | .02 | - | 200 V. |
| $C_7$ | .00025 | - | MICA |
| $C_8$ | .02 | - | 400 V. |
| $C_9$ | .00025 | - | MICA |
| $C_{10}$ | .02 | - | 200 V. |
| $C_{11}$ | .01 | - | 600 V. |
| $C_{12}$ | .1 | - | 400 V. |
| $C_{13}$ | .05 | - | " |
| $C_{14}$ | .02 | - | 200 V. |

MODEL 7214
CHASSIS 110.7214

APRIL 7, 1938

POWER OUTPUT:
Type . . . . . Beam Power
Undistorted . . . . . 1.75 watts
Maximum . . . . . 2.5 watts

LOUD SPEAKER:
Type . . . . . Dynamic
Size . . . . . 5"
Field Resistance . . . . . 1500 ohms

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MODEL 7214

FACTORY IDENTIFICATION NO. 110.7214

## ALIGNMENT PROCEDURE

PRELIMINARY:

Output Meter connections . . . . . Across output transformer
Output meter reading to indicate 0.050 watt
For Weston type 571 output meter on 15 volt scale . . . . . 9 volts
Average sensitivity in MV for .05 watts output . . . . . See chart below
Dummy antenna value in series with generator output . . . . . 100 Mmfds.
Connection of generator ground lead . . . . . To chassis
Generator modulation . . . . . App. 30% at 400 cycles
Position of volume control . . . . . Fully clockwise

| WAVE BAND SWITCH POSITION | POSITION OF DIAL POINTER | GENERATOR FREQUENCY | GENERATOR CONNECTION | TRIMMERS ADJUSTED | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|
| "SW" | 6 MC | 456 KC | 6A7 Grid | T2, T3, T4, T5 | IF | 140 |
| "SW" | 6 MC | 6 MC | Ant. lead | T7, T8 | Osc., R.F. | 30 |
| "BC" | 600 (Rock) | 600 KC | Ant. lead | P2 | Osc. | 30 |
| "BC" | 1500 | 1500 KC | Ant. lead | T1 | Osc. | 45 |

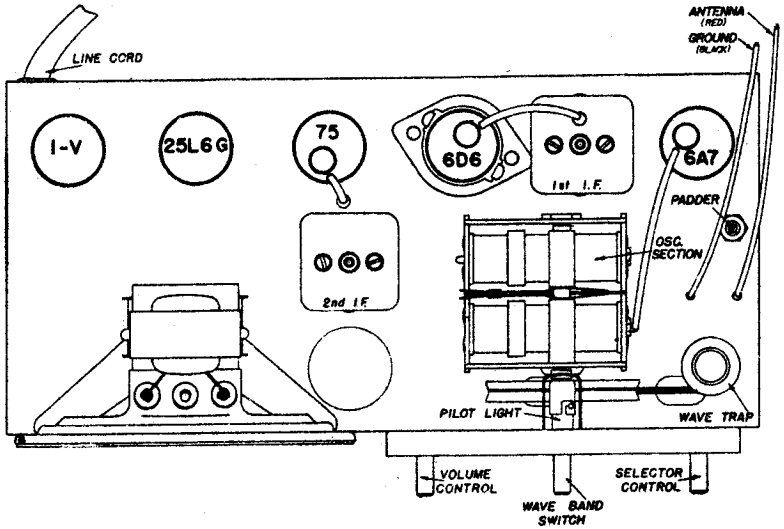
### IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.




TUBE SOCKET LOCATIONS

MODEL 7215

FACTORY IDENTIFICATION NO. 110.7215

## AUTOMATIC TUNING CONTROL ADJUSTMENT

This radio leaves the factory with the push button unset, and the user will have to make the necessary adjustments for setting the buttons.

The following is the procedure to be followed in making the adjustments for each station.

Note: Before attempting to set buttons read through the ENTIRE PROCEDURE VERY CAREFULLY.

1. Decide on station you wish to receive.
2. From the radio section of your daily newspaper find the transmitting frequency in kilocycles of the stations.
3. Refer to the diagram underneath cabinet and see which set of adjustment screws will have a tuning range that includes the frequency of the station desired. This is the pair of screws to be adjusted for this particular station. The ranges are listed under each pair of adjustment screws.
4. From the same diagram, after finding where the proper pair of adjustment screws are located, trace dotted line connecting these screws to one of the push buttons. This is the button which, after the adjustments are completed, will tune in the station.
5. Push button located by paragraph 4 "IN".
6. Turn volume control knob on full (to the extreme right) and adjust screw marked "O" until desired station is heard. If when making this adjustment, a number of stations can be brought in as the screw is turned and it is doubtful which station is the correct one, press button No. 6 (Manual Tuning) "IN" and move dial pointer by turning station selector knob to the number on the dial that corresponds to the frequency of the station. (The number on the dial must be multiplied by ten to give the frequency in kilocycles). Listening to the program being broadcast will identify the station when adjusting screw "O".
7. Adjust screw marked "A" for maximum volume, retarding the volume control and readjusting if necessary. This completes the adjustments for this particular station.
8. Cut out name of station from list supplied and insert in button.
9. Insert celluloid disc.
10. In a like manner select a station for each of the other buttons and make necessary adjustments for each station.

## ALIGNMENT PROCEDURE

Output Meter Connections . . . . . Across Primary Output Transformer
Output Meter reading to indicate 0.050 watt
For Weston Type 571 Output Meter on 15 volt scale . . . . . 9 volts
Average sensitivity in MV for .05 watts output . . . . . See chart below
Dummy antenna value in series with generator output . . . . . 100 MMFDS
Connection of generator ground lead . . . . . To chassis
Generator modulation . . . . . App. 30% at 400 cycles
Position of volume control . . . . . Fully clockwise

| PUSHBUTTON SWITCH POSITION | POSITION OF DIAL POINTER | GENERATOR FREQUENCY | GENERATOR CONNECTION | TRIMMERS ADJUSTED | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|
| Manual | ** | 456 KC | Grid 6D6 | T9*, T8, T10 T9, T8, T10 | I.F. | 5000 |
| | ** | 456 KC | Grid 6A7 | T6, T7 | I.F. | 120 |
| | 600 (Rock) | 600 KC | Ant. | P | Osc. | 25 |
| | 1500 | 1500 | Ant. | T12, T11 | Osc. R.F. | 22 |

### IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.

**Short oscillator section of variable condenser.
Second I.F. alignment must be done twice to secure flat top tuning.
*First time T9 is about one turn misaligned by loosening center screw.

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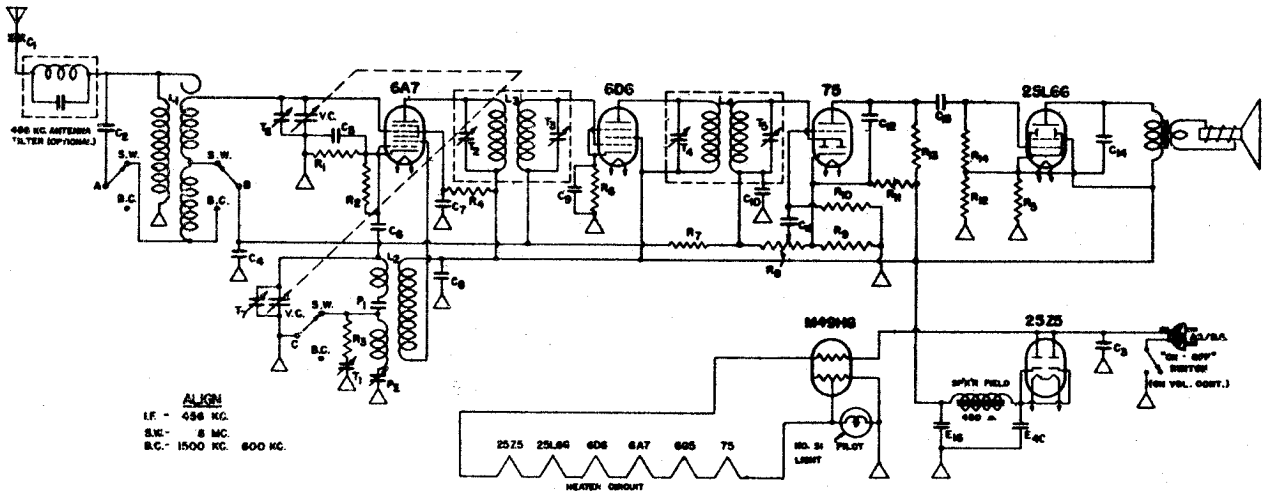
# SEARS-ROEBUCK & CO.

MODEL 7220, Ch. 110.7220
Schematic, Notes




| | | | |
|---|---|---|---|
| $R_1$ - 400 OHM 1/4 WATT | $L_1$ - COMBINATION ANTENNA COIL | $C_1$ - .005 - 400 V. |
| $R_2$ - 50,000 " " " | $L_2$ - COMBINATION OSCILLATOR COIL | $C_2$ - .005 - " |
| $R_3$ - 35 " " " | $L_3$ - 456 K.C. INPUT I.F. | $C_3$ - .1 - 400 V. |
| $R_4$ - 35,000 " " " | $L_4$ - 456 K.C. OUTPUT I.F. | $C_4$ - .05 - 200 V. |
| $R_5$ - 150 " 1/2 " | | $C_5$ - .05 - " |
| $R_6$ - 400 " 1/4 " | $P_1$ - 1380 MMF. MICA PADDER | $C_6$ - .0001 - MICA |
| $R_7$ - 3,000,000 " " " | $P_2$ - 700 MMF. MAX. PADDER | $C_7$ - .02 - 200 V. |
| $R_8$ - 500,000 " VOL. CONTROL | | $C_8$ - .02 - 200 V. |
| $R_9$ - 200 " 1/2 WATT | $E_{15}$ - 15 MFD. 150 V.W. | $C_9$ - .05 - " |
| $R_{10}$ - 750,000 " " " | $E_{40}$ - 40 " " " | $C_{10}$ - .00025 - MICA |
| $R_{11}$ - 25,000 " " " | | $C_{11}$ - .02 - 200 V. |
| $R_{12}$ - 600 to 800 " " " | V.C. - 410 MMF. MAX. VARIABLE COND. | $C_{12}$ - .00025 - MICA |
| $R_{13}$ - 500,000 " " " | | $C_{13}$ - .02 - 200 V. |
| $R_{14}$ - 500,000 | $T_1$ - 3-35 MMF. TRIMMER | $C_{14}$ - .01 - 400 V. |

SWITCHES A,B,C - 3 POLE DOUBLE THROW WAVE BAND SWITCH

## ELECTRICAL SPECIFICATIONS

APRIL 7, 1938

TUBES AND FUNCTIONS:

| | |
|---|---|
| 6A7 | Translator-Oscillator |
| 6D6 | IF |
| 75 | AVC, detector, 1st audio |
| 25L6G | Output |
| 25Z5 | Rectifier |
| M49HG | Ballast tube |

POWER SUPPLY:
All models available . . . . . 105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGES:

| | |
|---|---|
| Broadcast | 540-1700 KC |
| Short Wave | 2150-7200 KC |

ALIGNMENT FREQUENCIES:

| | Oscil. Trimmer | Oscil. Padder |
|---|---|---|
| Broadcast | 1500 KC | 600 KC |
| Short Wave | 6 MC | Fixed |

POWER OUTPUT:

| | |
|---|---|
| Type | Beam Power |
| Undistorted | .8 watts |
| Maximum | 1.5 watts |

LOUD SPEAKER:

| | |
|---|---|
| Type | Dynamic |
| Size | 5" |
| Field resistance | 450 ohms |

## MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
Left Knob . ."On-Off" switch, volume control
Center Knob . . . . . Wave change switch
Right Knob . . . . . Tuning

CONTROL OPERATION:
Turning right; power on; volume increase
Left Foreign; right Broadcast.

Under certain conditions, the chassis may be above ground potential. Do not allow any grounded object to come into contact with the chassis while the line cord is plugged in. Also, be careful when working on the chassis out of its cabinet, to avoid shocks.

If the power supply is DC, the power cord plug must be in its receptacle in the proper way. If the receiver does not operate after being turned on for a minute, reverse the polarity by removing the power cord plug from its receptacle and turning it half way around before re-inserting it in the receptacle.

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MODEL 7220 CHASSIS 110.7220 **ALIGNMENT PROCEDURE**

Output Meter Connections . . . . . Across primary of output transformer
Output meter reading to indicate 0.050 watt
For Weston type 571 output meter on 15 volt scale . . . . . .9 volts
Average sensitivity in MV for .05 watts output . . . . . See chart below
Dummy antenna value in series with generator output . . . . . 100 MMFDS.
Connection of generator ground lead . . . . . To chassis
Generator modulation . . . . . App. 30% at 400 cycles
Position of volume control . . . . . Fully clockwise

| WAVE BAND SWITCH POSITION | POSITION OF DIAL POINTER | GENERATOR FREQUENCY | GENERATOR CONNECTION | TRIMMERS ADJUSTED | TRIMMER FUNCTION | APPROXIMATE MICROVOLTS |
|---|---|---|---|---|---|---|
| SW | 6 MC | 456 KC | 6A7 Grid | T2,T3,T4,T5 | I.F. | 70 |
| SW | 6 MC | 6 MC | Ant. lead | T7,T6 | Osc. R.F. | 45 |
| BC | 600 (Rock) | 600 KC | Ant. lead | P2 | Osc. | 12 |
| BC | 1500 | 1500 KC | Ant. lead | T1 | Osc. | 18 |

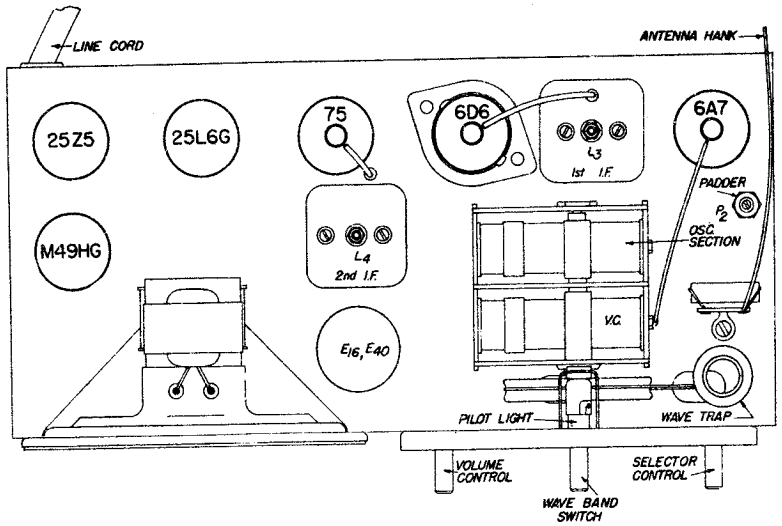
IMPORTANT ALIGNMENT NOTES

Where indicated by the word, "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

It is advisable to repeat the entire alignment procedure band by band and in the original order to insure greater accuracy.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

Values shown under "Microvolts" are only approximate.




TUBE SOCKET LOCATIONS

MODEL 7226 CHASSIS 110.880 **ALIGNMENT PROCEDURE**

Output Meter Connections . . . . . Across Primary Output Transformer
Output meter reading to indicate 0.05 watt . . . . . .
For Weston Type 571 Output meter on 15 volt scale. . . . . 9 volts
Average sensitivity in MV. for .05 watt output . . . . . See chart
Dummy antenna value in series with generator output . . . . . 100 mmfds.
Connection of generator ground lead . . . . . To chassis
Generator modulation . . . . . App. 30% @ 400 cycles
Position of volume control . . . . . Fully clockwise
Position of tone control . . . . . Fully clockwise

| Position of Dial Pointer | Generator Frequency | Generator Connection | Trimmers Adjusted | Trimmer Function | Approximate Microvolts |
|---|---|---|---|---|---|
| ** | 456 KC | Grid 6D6 | T7*, T6, T8 T7, T6, T8 | I.F. | 2500 |
| ** | 456 KC | Grid 6A7 | T4, T5 | I.F. | 37 |
| 600 KC (Rock) | 600 KC | Ant. | P | Osc. | 80 |
| 1500 KC | 1500 KC | Ant. | T2, T3 | Osc., R. F. | 16 |
| 600 KC | 456 KC | Ant. | T1 | Wave Trap | *** |

IMPORTANT ALIGNMENT NOTES

Where indicated by the word "Rock", the variable should be rocked back and forth a degree or two while making the adjustment.

Always keep the output from the test oscillator at its lowest possible value. As the sensitivity is increased by alignment, the generator output should be reduced correspondingly.

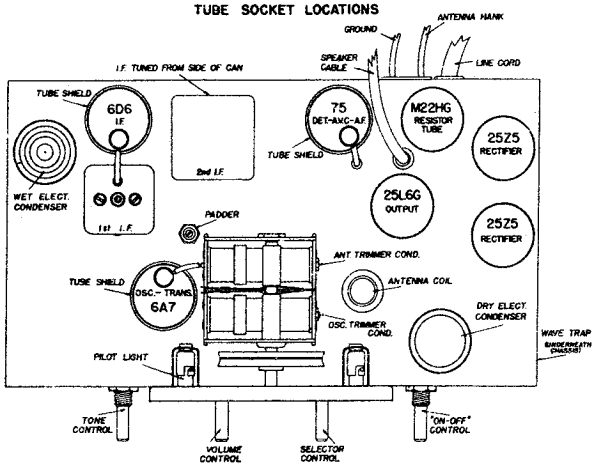
Values shown under "Microvolts" are only approximate.

*First time T7 is misaligned about one turn by loosening center screw.

**Short oscillator section of variable condenser.

***Wave trap is aligned to secure minimum output with maximum signal input.

TUBE SOCKET LOCATIONS




TUBE SOCKET LOCATIONS

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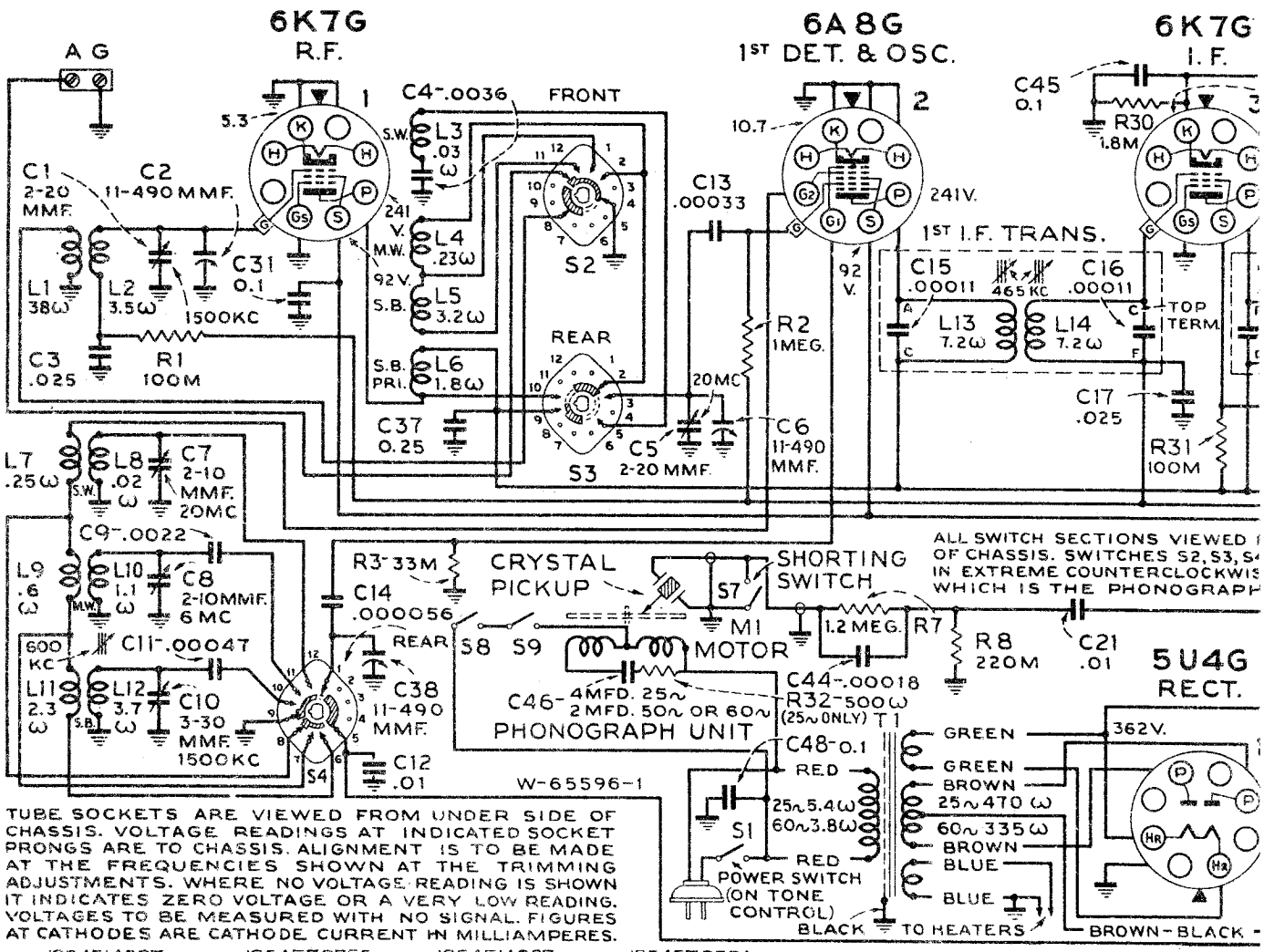
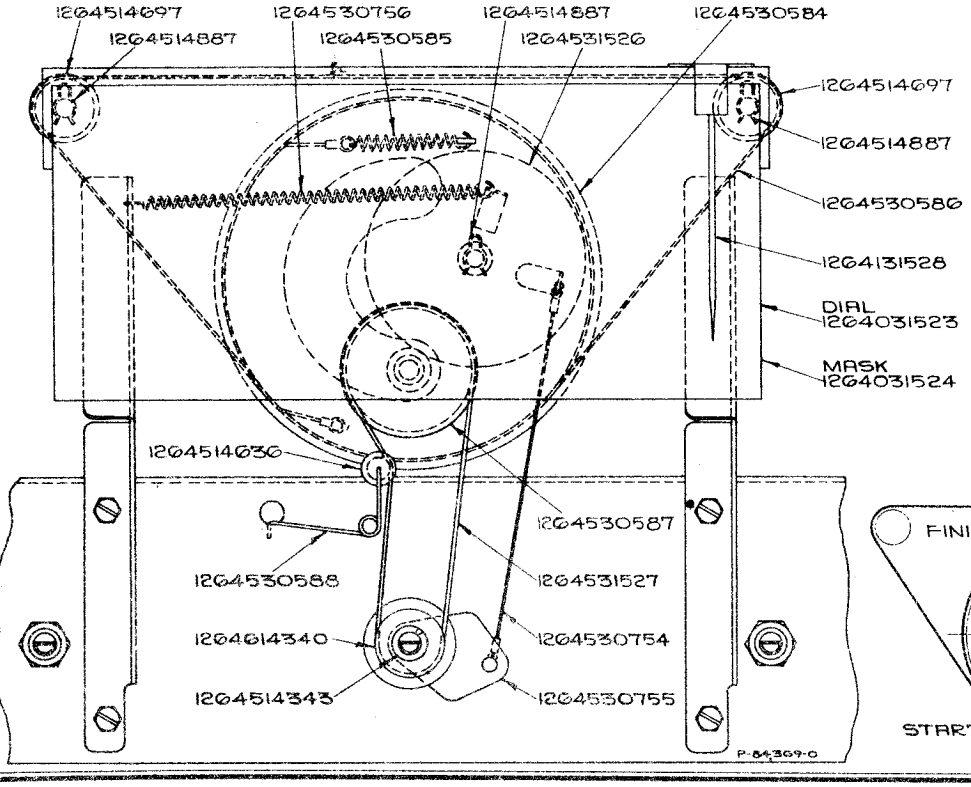



TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS. VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS. ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMING ADJUSTMENTS. WHERE NO VOLTAGE READING IS SHOWN IT INDICATES ZERO VOLTAGE OR A VERY LOW READING. VOLTAGES TO BE MEASURED WITH NO SIGNAL. FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.

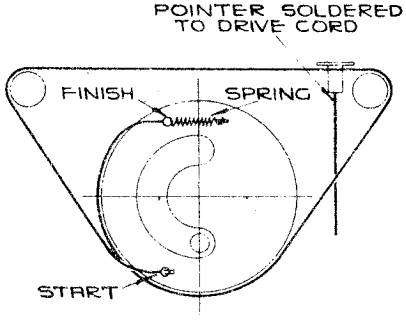



## DIAL DRIVE SYSTEM

## AND POINTER DRIVE HOOKUP

**57 RL 106**

**MAY 27, 1938**

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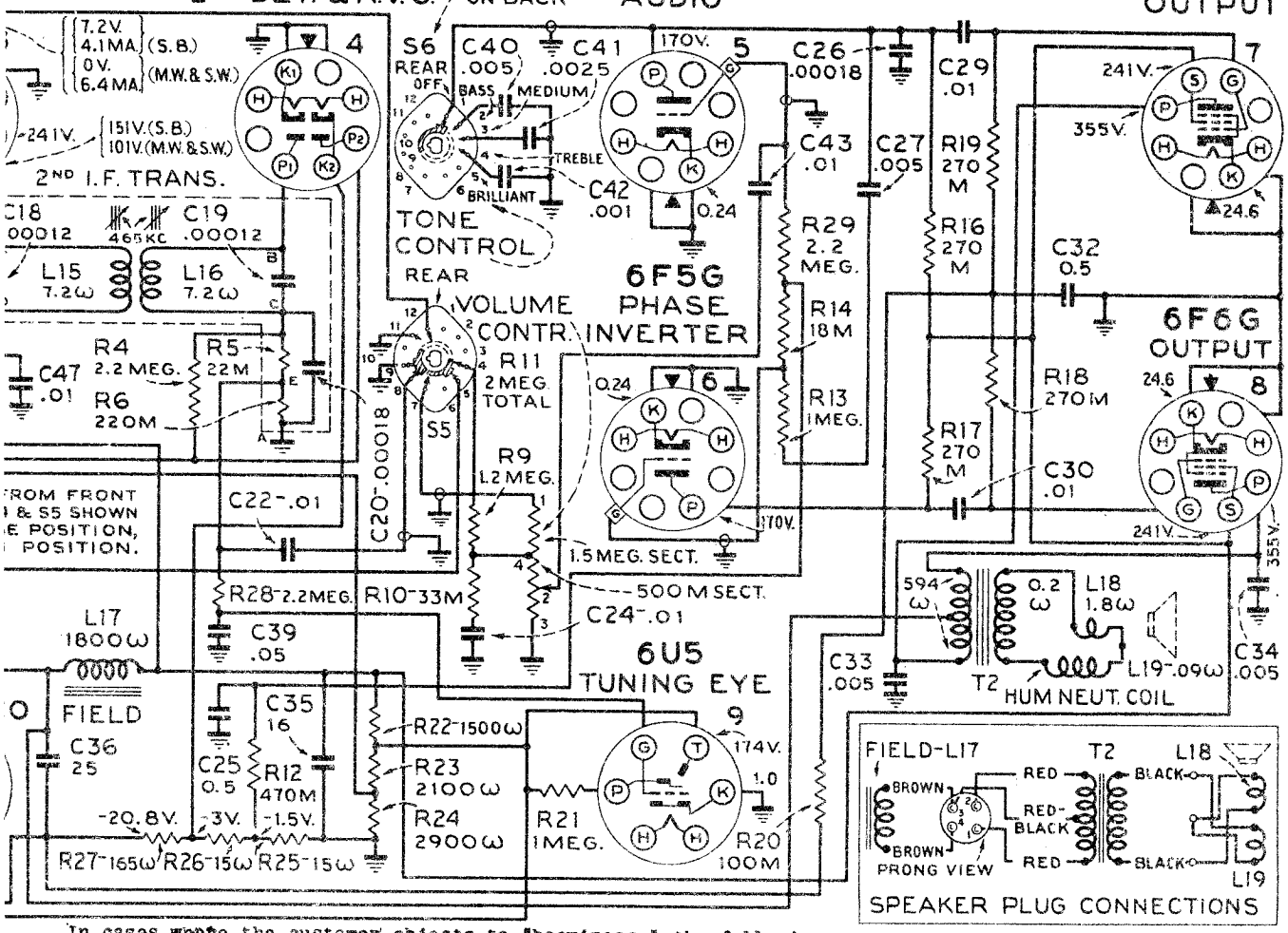
'CK & CO.

MODEL 7221, Chassis 126.202
Schematic, Voltage,
Drive Data, Specifications




In cases where the customer objects to "boominess," the following circuit change may be made to minimize low-frequency response.

Change condenser C43 to .001 mfd., or in the most stubborn cases to .0001 mfd. Add a 2 megohm resistor across the crystal pickup circuit connecting it from junction of pickup cable, C44, and R7 to chassis. This will reduce low-frequency response.

Mount the speaker away from the baffle by about 1/4" to 3/8".

| POWER SUPPLY RATINGS AVAILABLE | | Radio Only | Total |
|---|---|---|---|
| | 105-125 volts, 60 cycles | 120 watts | 150 watts |
| | 105-125 volts, 50 cycles | 120 watts | 155 watts |
| | 105-125 volts, 25 cycles | 120 watts | 150 watts |

FREQUENCY RANGES:

| | |
|---|---|
| Standard Broadcast (S.B.) | 540—1,720 kc |
| Medium Wave (M.W.) | 2.3—7.5 mc |
| Short Wave (S.W.) | 7.5—22 mc |

ALIGNMENT FREQUENCIES:

| | |
|---|---|
| Band "S.W." | 20 mc (osc., ant.) |
| Band "M.W." | 6 mc (osc.) |
| Band "S.B." | 1,500 kc (osc., ant.), 600 kc (osc.) |

INTERMEDIATE FREQUENCY ..... 465 kc

POWER OUTPUT:

| | |
|---|---|
| Type | Push-Pull Pentode |
| Undistorted | 10 watts |
| Maximum | 12 watts |

OPERATING FEATURES:

Phonograph-Radio operation
Automatic Phonograph Mechanism with self-starting, synchronous-type motor
Four-point Tone Control
Automatic Volume Control

PHONOGRAPH:

| | |
|---|---|
| Type | Automatic—Manual |
| Record Capacity | Eight 10-inch or Seven 12-inch |
| Turntable Speed | 78 R.P.M. |
| Type of Pickup | Crystal |
| Pickup Impedance | 80,000 ohms at 400 cycles |

LOUDSPEAKER:

| | |
|---|---|
| Type | Electrodynamic |
| Size | 12 inches |
| V.C. Impedance | 2.25 ohms at 400 cycles |
| Field Coil Resistance | 1,800 ohms |
| App. Field Coil Voltage Drop | 115 volts |

CHASSIS FEATURES:

| | |
|---|---|
| No. R-F stages (Band "S.B.") | One |
| No. I-F stages | One |
| Antenna | Doublet or Conventional |

Tuning Eye
Line Noise Electrostatic Transformer Shield
Aural-Compensated Volume Control
Magnetite-Core Adjusted I-F Transformers and Band "S.B." Low-Frequency Oscillator Tracking

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## ALIGNMENT PROCEDURE

**PRELIMINARY:**

Output meter connections ..... Across speaker voice coil
Output meter reading to indicate 1.0 watt output ..... 1.5 volts
Approximate average sensitivity in microvolts for 1.0 watt output ..... See chart below
Dummy antenna value to be inserted in series with generator output ..... See chart below
Connection of generator output lead ..... See chart below
Connection of generator ground lead ..... To chassis
Generator modulation ..... 30%, 400 cycles
Position of Volume Control ..... Fully clockwise
Position of Tone Control ..... Fully clockwise
Position of Dial Pointer with variable tuning condenser fully closed ..... To fall on last calibration mark at 540 kc end of "Standard Broadcast" band

| Wave-Band Switch Position | Position of Dial Pointer | Generator Frequency | Dummy Antenna | Generator Connection | Trimmers Adjusted (In order shown) | Trimmer Function | Approximate Microvolts |
|---|---|---|---|---|---|---|---|
| "M.W." | Low End | 465 kc | .001 mfd. | 6K7-G I-F Grid | L15, L16 | 2nd I-F Trans. | 7,600 |
| "M.W." | Low End | 465 kc | .001 mfd. | 6A8-G Grid | L13, L14 | 1st I-F Trans. | 130 |
| "S.W." | 20 mc | 20 mc | 400 ohms | Ant. | C7 | Osc. ** | —— |
| "S.W." | 20 mc (rock) | 20 mc | 400 ohms | Ant. | C5 | Ant. | 45 |
| "M.W." | 6 mc | 6 mc | 400 ohms | Ant. | C8 | Osc. * | 45 |
| "S.B." | 1,500 kc | 1,500 kc | .0002 mfd. | Ant. | C10, C1 | Osc. Ant. | —— |
| "S.B." | 600 kc (rock) | 600 kc | .0002 mfd. | Ant. | L12 | Osc. | 6 |
| "S.B." | 1,500 kc | 1,500 kc | .0002 mfd. | Ant. | C10, C1 | Osc. Ant. | 3 |

### IMPORTANT ALIGNMENT NOTES

** Use maximum capacity peak if two peaks can be obtained.

* Use minimum capacity peak if two peaks can be obtained.

Where indicated by the word "Rock," the variable tuning condenser should be rocked back and forth a degree or two while making this adjustment.

Each step of the alignment should be repeated in its original order for greater accuracy. Always keep the output from the generator at its lowest possible value, to prevent the a-v-c action of the set from interfering with accurate alignment.

Adjustment locations are shown on the top and bottom parts location views of chassis.

Only the dummy antenna indicated in the chart for any particular band should be used. Remove the dummy antenna used for alignment in any other band. Grid cap leads should remain in place during alignment.

Values shown under, "Microvolts," are only approximate.

### Eliminating Whistle at 930 KC:

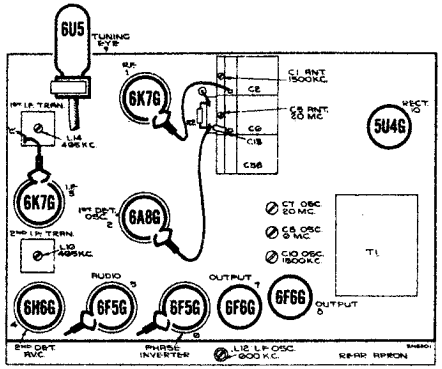
A whistle due to a beat between the second harmonic (930 kc) of the 465 kc I-F, and a 930 kc signal may be experienced. In localities where the 930 kc station is one that is frequently listened to, it will be desirable to shift the whistle to some other point where it will not be objectionable. This can be done by shifting the I-F frequency of the receiver.

Determine at what point between 900 and 960 kc the whistle will be least objectionable. Dividing this frequency by two will give the new I-F frequency to which the receiver should be aligned. For example, if it is determined that a whistle at 910 kc would not be objectionable, the I-F should be re-aligned at 910/2 or 455 kc. Try to select the new I-F frequency as close as possible to 465 kc.

An interfering whistle may also be caused by two stations having a frequency difference equal to the I-F frequency (465 kc) of the receiver and will be evidenced by a whistle appearing when the receiver is tuned to either of the stations. It may be further localized by tuning the receiver to each of these stations and then stopping the oscillator, in each case, by grounding the oscillator stator section of the variable tuning condenser C38 (rear section) to chassis. If the whistle, in each case, still persists, it is being caused by the beat between these two stations and may be corrected by shifting the I-F frequency of the receiver to a frequency other than the difference frequency of the two local or strong signals (stations).

The I-F amplifier should not be shifted to a frequency higher than 480 kc, nor lower than 450 kc, but should be as close to 465 kc as possible.

Align the I-F at the new frequency and then re-align the rest of the receiver as described under "ALIGNMENT PROCEDURE."




## Automatic Record Changer Mechanism

Under normal operating conditions, service requirements on this mechanism should be negligible. Occasionally, however, certain adjustments may be necessary. It is important to refrain from forcing the mechanism if there is a tendency to bind or jam, when operating or adjusting, since bent levers and possibly broken parts may result.

**Record Changer Adjustments.**—Mount motor-board on a level support. Remove turntable and cover at right of turntable. Adjustment locations are designated on motor-board illustrations as A, B, etc. The adjustments are explained under corresponding symbols below. Perform adjustments in the following order:

**A.**—Trip rod "A" should be engaged in "Switch Lever" slot. Adjust trip rod "A" to obtain about 1/8 of an inch clearance from motor-board.

**B.**—Adjust "B" to the position shown.

**C.**—With "Index Lever" in "Manual" position, "Pickup Arm" rotated to extreme left, and switch tripped to open contacts "C," adjust contact points "C" by bending the stiff contact arm until points are opened 10 to 30 thousandths of an inch.

**D.**—With "Index Lever" in "Manual" position, release set screw "D" and force "Manual Index Finger" as far as it will go towards "Trip Pawl Stop Pin." Tighten set screw.

**E.**—Adjust at "E" to provide approximately 1/32 of an inch between outer end of "Link Slot" and screw when rubber "Bumper" is in contact with stop bracket.

**F. and G.**—Remove rubber silencer at "F" and adjust "F" and "G" so ejector tip "F" is in line with "Spindle." Longitudinal movement, with respect to "Ejector Arm," may be effected by loosening hex. head at "F." Lateral movement of "Ejector Arm" may be effected by adjustment "G."

**H.**—Adjust "H" so under side of pickup head can be raised 2½ inches above motor-board.

**J.**—Adjust screw "J" until friction will just force "Trip Finger" to move "Trip Pawl" when "Index Lever" is in "12" inch position.

**N.**—Adjust needle pressure by turning screw under center of "Pickup Arm" so that a force of 72 grams (2.5 ounces) is required to lift needle from record. Hook scale under needle screw to measure force.

**K.**—Adjustment "N" must be performed prior to this adjustment. With a 12-inch record on turntable, turn on "Motor Switch," place "Index Lever" to "12" position and adjust "K" so that "Cable" tension will allow needle to lower slowly on start of record at completion of eject cycle. Turn "Motor Switch" off after eject cycle is completed and check to see that "Cable" is slightly loose when "Pickup Arm" is moved against "Spindle." Replace turntable and put a needle in "Pickup."

**L.**—Adjust "L" so needle will drop into center of smooth portion at the start of a 12-inch record when "Index Lever" is in "12" inch position and "Pickup Arm" is to extreme right.

**M.**—Loosen three screws "M" and rotate "Spacer" until pointer on "Spacer" is in line with screw to right of "Pickup Arm."

**P.**—Adjust turntable height by insertion or removal of thrust washers at "P" so ejector tip "F" will not eject bottom 12-inch record but will eject second from bottom record.

**Q.**—Adjust position of shorting switch at "Q" so switch closes when needle is just outside a 12-inch record.

**R.**—Adjust screw "R" upward just enough so that with one record on turntable and ejector tip "F" resting on record surface, there is 1/32 of an inch clearance between screw "R" and "Ejector Arm."

**Record Changer Service Hints.**—A general perusal of the following possible troubles which may be experienced with this mechanism, together with the adjustment or adjustments to be applied for same, will enable one to ascertain that which pertains to the instrument at hand:

1.—"Ejector Arm" goes through normal cycle but does not eject records. Adjust "F" and "G." See that "Spindle" slides freely.

2.—Ejects bottom record. Lower turntable by removing thrust washers at "P."

3.—Ejects records properly down to second from bottom of pile. Raise turntable by placing thrust washers at "P."

4.—Eject cycle does not start after needle reaches eccentric groove. Adjust "J" (turn screw clockwise).

5.—Eject cycle starts before eccentric record groove is reached. Adjust "J" (turn screw counter-clockwise). Set "Index Lever" to "12" inch or "10" inch position after starting to play record. Do not jar motor-board during automatic operation.

6.—Lateral movement of "Pickup Arm" has no control over starting and stopping. Adjust clearance of rod "A." See that rod "A" engages in slot of "Switch Lever."

7.—Fails to eject top record of a pile because "Ejector Arm" strikes record in returning to center at end of eject cycle. Adjust screw "R" upward to provide greater incline so that roller in "Ejector Arm" will roll back during cycle.

8.—Pickup strikes record during eject cycle. Adjust "K" and "H."

9.—Starts playing record several grooves in from beginning or needle misses record entirely. Adjust "L."

10.—Needle falls on smooth portion at start of record but does not move into playing groove. Adjust "M." Check to see that motor-board is level.

11.—Automatic stop does not operate after needle reaches eccentric groove. Adjust "B" and "C."

12.—Motor does not re-start when "Pickup" is returned to rest position. Adjust "C." See that switch mechanism parts move freely and springs are functioning.

13.—Starts eject cycle although set for "Manual" operation. Adjust "D."

14.—Noise in loudspeaker while changing needles. Clean "Shorting Contact" and adjust "Q."

15.—"Wow" in record reproduction.—Instrument should be warmed to about 65° F. Ejector tip should be centered and free to rotate (adjustments "F" and "G"). There should be no solid particles on gear teeth or in grease; no tendency to bind. Turntable plate should be in dynamic balance and "Spindle" should be straight. Proper lubrication is important.

**Lubrication.**—The motor gear-box should be re-greased periodically from one to two years depending on usage of the automatic mechanism. Clean the motor gear-box thoroughly before re-greasing. Apply about a level tablespoonful of good, clean, gear grease having uniform viscosity over wide temperature ranges and good clinging quality. This should be placed on the worm and fibre gears only. Approximately every six months, put medium motor oil (S.A.E. No. 30) in the rotor and spindle bearing oil holes. Do not allow grease or heavy oil to accumulate in these bearings. Cover the main gear and cam of the automatic mechanism with a light grease. Any good household oil, such as Cross Country General Purpose oil, is suitable for the ejector-tip "F" bearing.

### Loudspeaker:

Centering of the loudspeaker voice-coil is made in the usual manner with three, narrow-paper feelers, after first removing the front dust-cover. This may be removed by softening its cement with a light application of acetone, using care not to allow the acetone to flow into the air gap. The dust cover should be cemented back in place with ambroid upon completion of adjustment.

MODEL 7221, Ch. 126.202
Chassis Wiring

# SEARS-ROEBUCK & CO.

## MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:

RADIO PANEL:

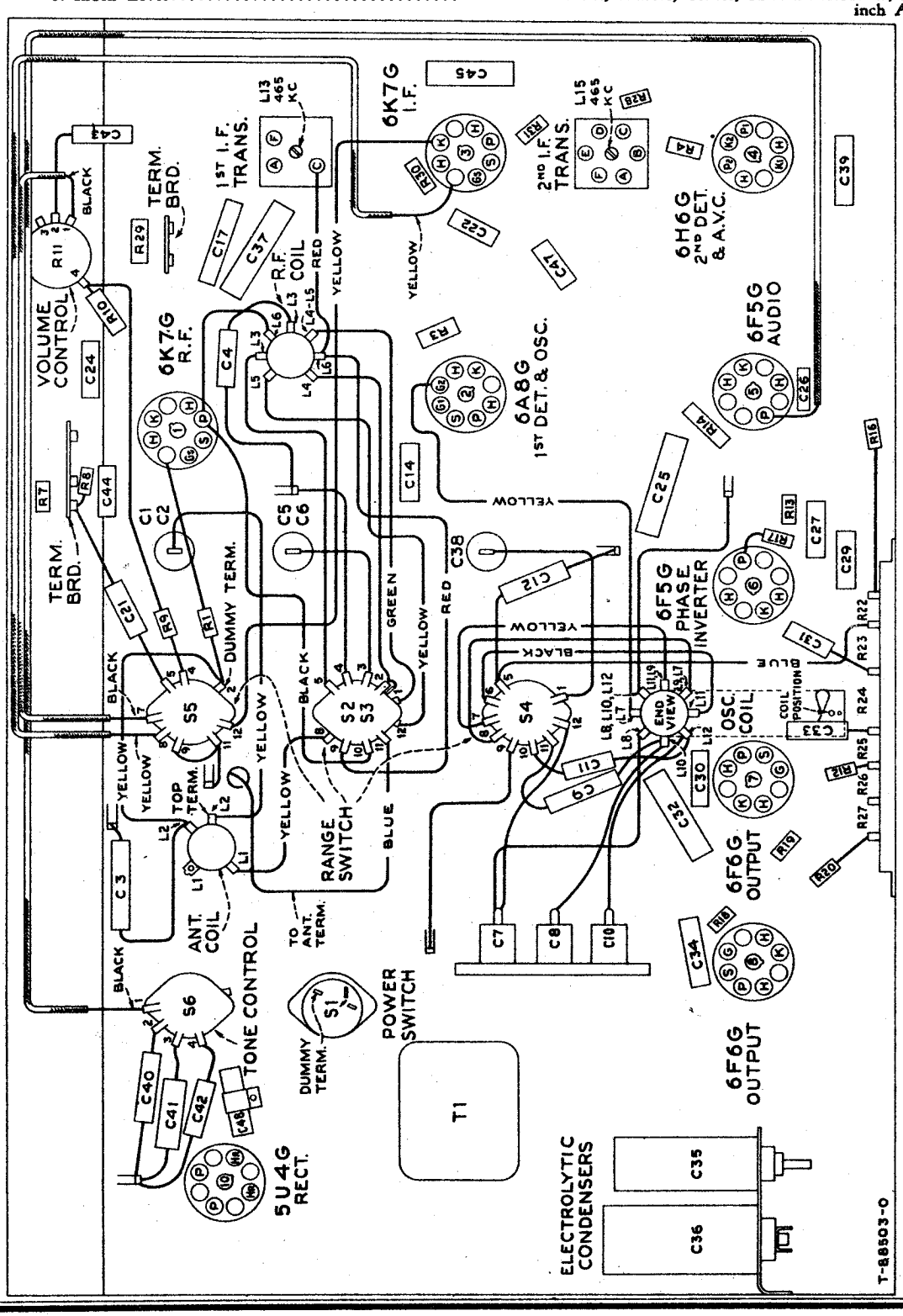
1. Rear Knob..... Radio or Phonograph Volume
2. Center Knob (large)..... Tuning
   Center Knob (small) Phonograph and Wave-Band Switch
3. Front Knob..... "On-Off" Switch and Tone

PHONOGRAPH COMPARTMENT:

4. Turntable Switch.....
5. Index Lever.....

CONTROL OPERATION:

Turning right..... Volume Increase
Tuning ratio..... 20 to 1
Turning right..... "Phonograph"; "Standard Broadcast"; "Medium Wave"; "Short Wave"
Turning right..... Power on—Bass; Medium; Treble; Brilliant
Toggle..... Phonograph Motor "On-Off"
Front, Manual; Center, 12-inch Automatic; Rear, 10-inch Automatic

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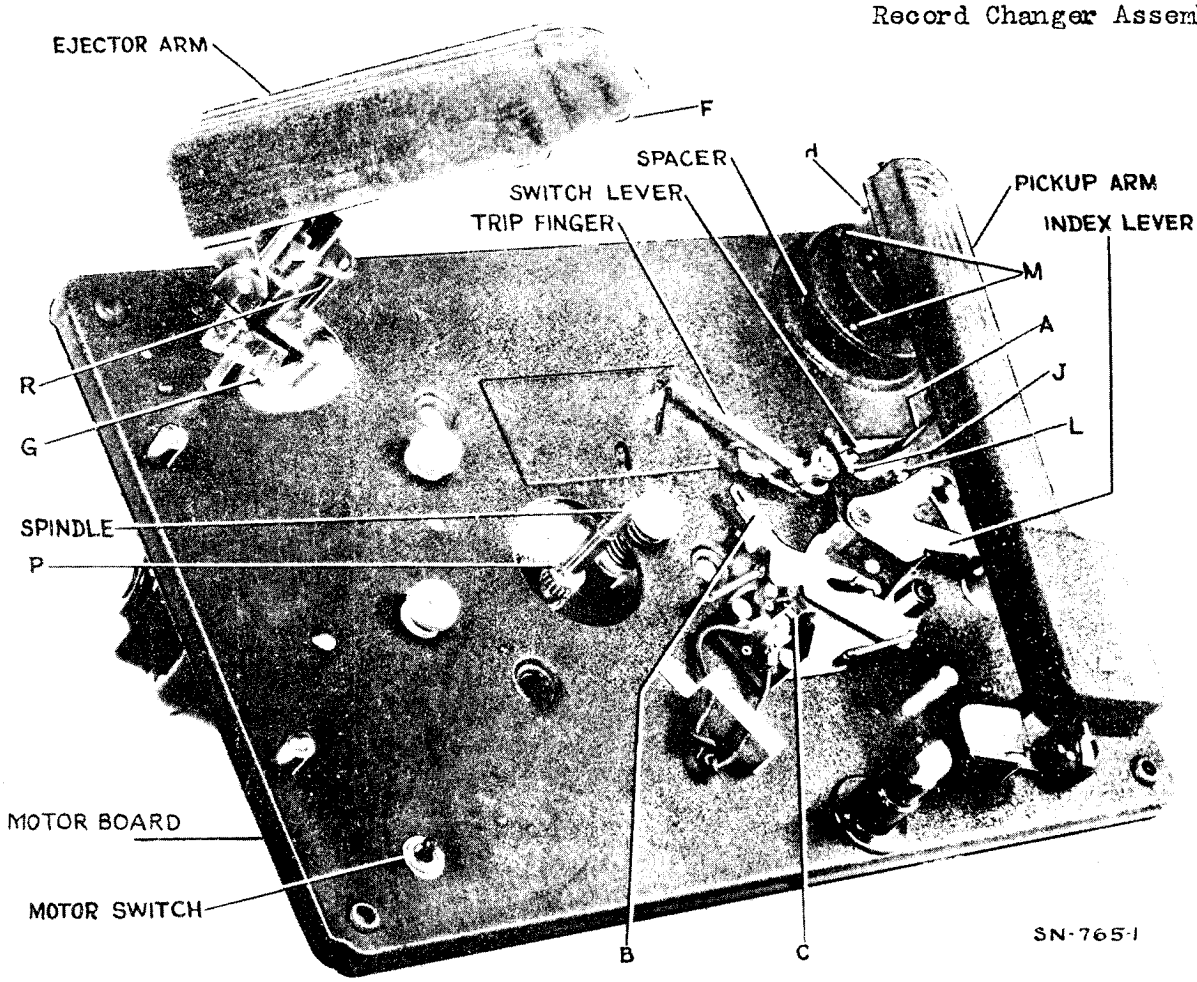
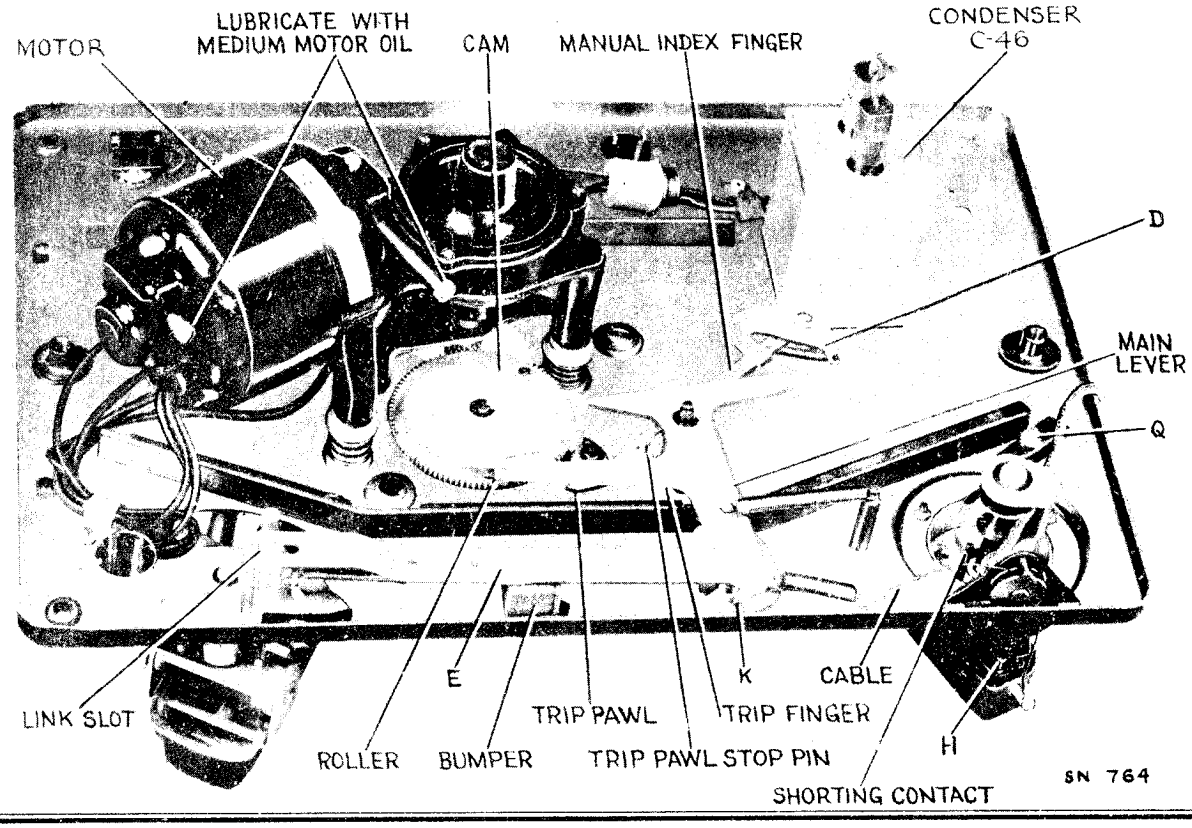
SEARS-ROEBUCK & CO. MODEL 7221,Ch. 126.202
Record Changer Assembly

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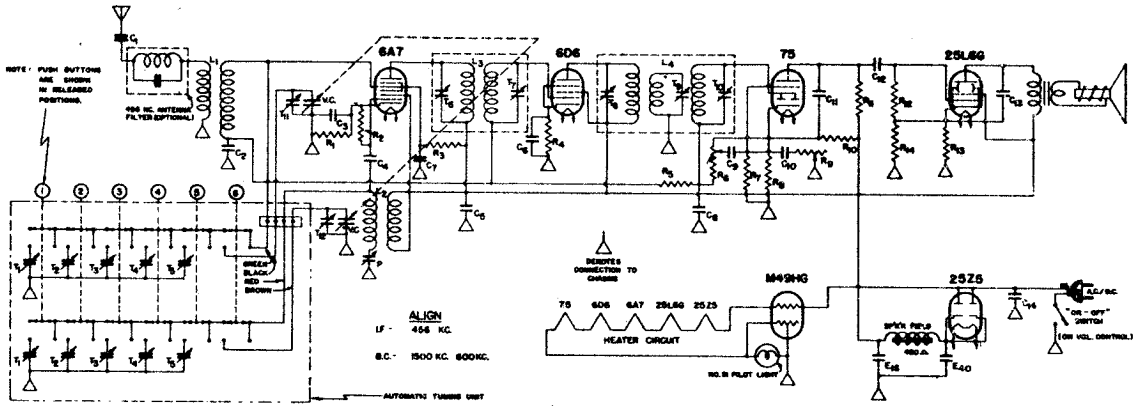
MODEL 7215, Ch. 110.7215
Schematic, Socket, Tuner Trimmers

# SEARS-ROEBUCK & CO.




| | | | | | |
|---|---|---|---|---|---|
| $R_1$ | 400 | OHM | 1/4 | WATT |
| $R_2$ | 50,000 | " | " | " |
| $R_3$ | 35,000 | " | " | " |
| $R_4$ | 400 | " | " | " |
| $R_5$ | 3,000,000 | " | " | " |
| $R_6$ | 500,000 | " | VOL. CONTROL | |
| $R_7$ | 750,000 | " | 1/4 | WATT |
| $R_8$ | 200 | " | 1/2 | " |
| $R_9$ | 500,000 | " | TONE CONTROL | |
| $R_{10}$ | 25,000 | " | 1/4 | WATT |
| $R_{11}$ | 500,000 | " | " | " |
| $R_{12}$ | 500,000 | " | " | " |
| $R_{13}$ | 150 | " | " | " |
| $R_{14}$ | 600 to 800 | " | " | " |

$L_1$ - ANTENNA COIL
$L_2$ - OSCILLATOR COIL
$L_3$ - 456 K.C. INPUT I.F.
$L_4$ - 456 K.C. TRIPLE TUNED OUTPUT I.F.

P - 700 MMF. MAX. PADDER

$E_{16}$ - 16 MFD. 150 V.W.
$E_{40}$ 40 " " "

VC - 410 MMF. MAX. VARIABLE COND.

$T_1$ - 180 - 420 MMF.
$T_2, T_3$ - 100 - 300 MMF.
$T_4$ - 60 - 200 MMF.
$T_5$ - 20 - 140 MMF.

| | | | |
|---|---|---|---|
| $C_1$ | .006 | - | 400 V. |
| $C_2$ | .05 | - | 200 V. |
| $C_3$ | .05 | - | 200 V. |
| $C_4$ | .0001 | - | MICA |
| $C_5$ | .02 | - | 200 V. |
| $C_6$ | .05 | - | " |
| $C_7$ | .02 | - | " |
| $C_8$ | .00025 | - | MICA |
| $C_9$ | .02 | - | 200 V. |
| $C_{10}$ | .006 | - | 400 V. |
| $C_{11}$ | .00025 | - | MICA |
| $C_{12}$ | .02 | - | 200 V. |
| $C_{13}$ | .01 | - | 400 V. |
| $C_{14}$ | .1 | - | " |

**POWER SUPPLY:**
All models available . . . . . 105-125 volts, 25-60 cycle or DC, 45 watts

**FREQUENCY RANGE:**
Broadcast . . . . . 540-1700 KC

**ALIGNMENT FREQUENCIES:**

| | Oscil. Trimmer | Oscil. Padder |
|---|---|---|
| Broadcast . . . . . | 1500 KC | 600 KC |

**POWER OUTPUT:**

| | |
|---|---|
| Type . . . . . | Beam Power |
| Undistorted . . . . . | 1.2 |
| Maximum . . . . . | 1.6 |

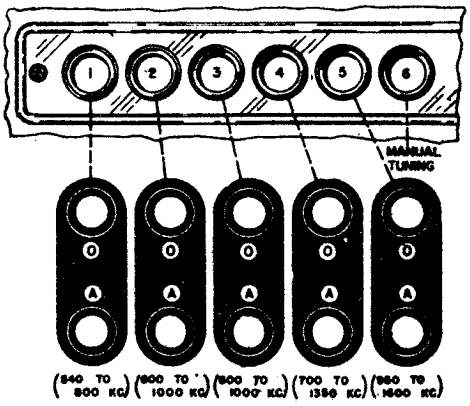
**LOUD SPEAKER.**

| | |
|---|---|
| Type . . . . . | Dynamic |
| Size . . . . . | 5" |
| Field resistance . . . . . | 450 ohms |

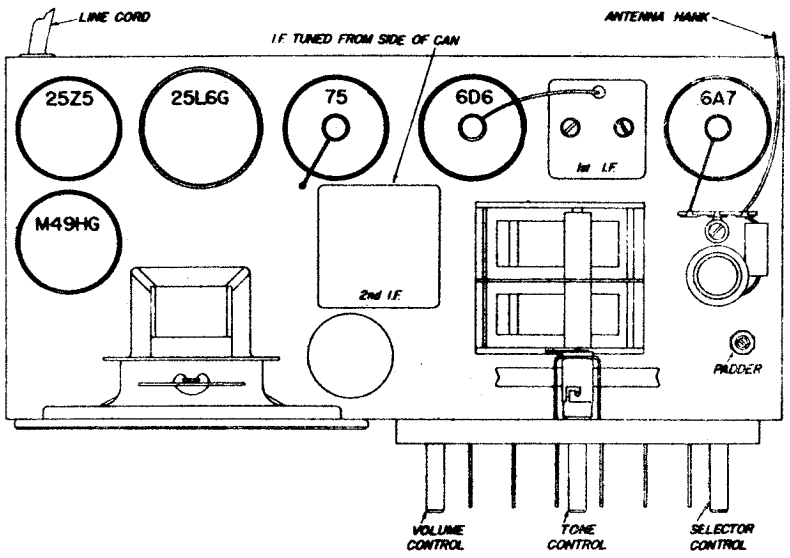
**AUTOMATIC TUNING CONTROL:**

There are six buttons on the front panel. Five of them can be set so that by simply pushing the button marked with the station's call letters, any of five different broadcast stations can be received.

The sixth button is used to cut out the automatic tuning and convert the set for use with the regular dial and manual tuning.




AUTOMATIC TUNING ADJUSTMENTS




APRIL 7, 1938

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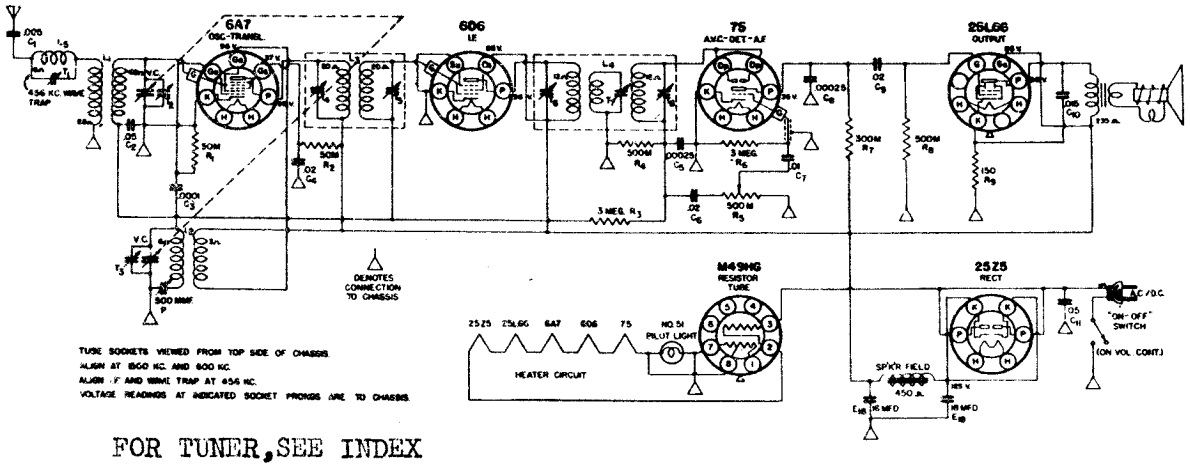
# SEARS-ROEBUCK & CO.

MODEL 7225, Ch. 110.255
Schematic, Socket
Trimmers, Voltage, Alignment




FOR TUNER, SEE INDEX

**POWER SUPPLY:**
All models available . . . . . 105-125 volts, 25-60 cycle or DC, 45 watts

**FREQUENCY RANGE:**
Broadcast . . . . . 540-1740 KC

**ALIGNMENT FREQUENCIES:**

| | Oscil. Trimmer | Oscil. Padder |
|---|---|---|
| Broadcast | 1500 KC | 600 KC |

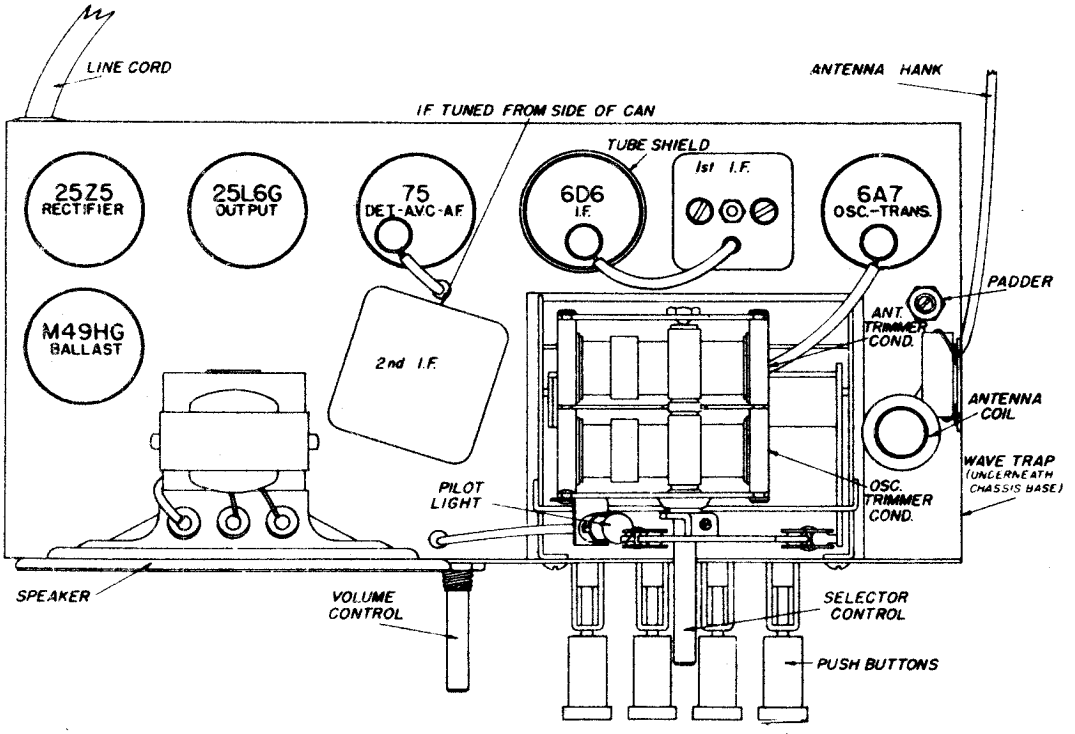
**POWER OUTPUT:**
Type . . . . . Beam Power
Undistorted . . . . . 1.
Maximum . . . . . 1.6

**LOUD SPEAKER:**
Type . . . . . Dynamic
Size . . . . . 5"
Field resistance . . . . . 450 ohms

## MECHANICAL SPECIFICATIONS

**OPERATING CONTROLS:**
Left knob, "On-Off" switch, volume control
Upper Right Knob . . . . . tuning

**CONTROL OPERATION:**
Turning right; power on; vol. increase




57RL109 JUNE 16, 1938

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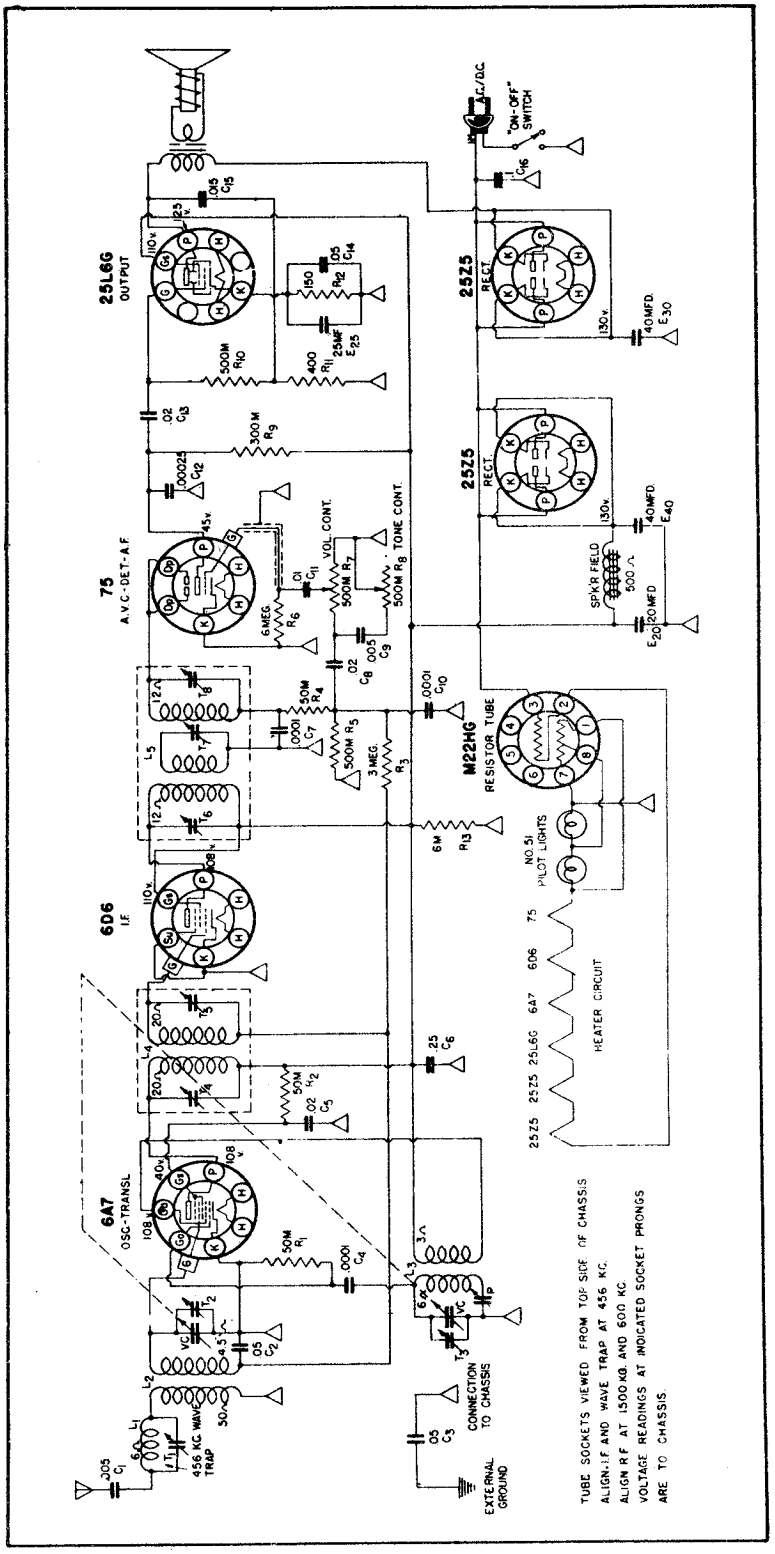
MODEL 7226, Ch. 110.880
Schematic, Voltage
Alignment

# SEARS-ROEBUCK & CO.

57RL 121

JULY 11, 1938




POWER SUPPLY:
All models available . . . . . 105-125 volts, 25-60 cycle or DC, 45 watts

FREQUENCY RANGE:
Broadcast . . . . . 540-1740 KC

ALIGNMENT FREQUENCIES:

| | Oscil. | Oscil. |
|---|---|---|
| | Trimmer | Padder |
| Broadcast | 1500 KC | 600 KC |

POWER OUTPUT:
Type . . . . . Beam Power
Undistorted . . . . . 1.7 Watts
Maximum. . . . . 2.7 Watts

LOUD SPEAKER:
Type . . . . . Dynamic
Size . . . . . 8"
Field Resistance . . . . . 500 ohms

MECHANICAL SPECIFICATIONS

OPERATING CONTROLS:
Left Knob . . . . . Tone control — Turning right; mellow to brilliant
Left Center . . . . . Volume control — Turning right; volume increase
Right Center . . . . . Selector control — Turning right; power on
Right Knob. . . . . "On-Off" switch

THE GROUND:

In noisy locations, it may be desirable to connect the black lead in rear of chassis to a water pipe or radiator. This may eliminate much of the interference.

CAUTION: Do not connect a ground wire directly to the chassis; otherwise harm will result.

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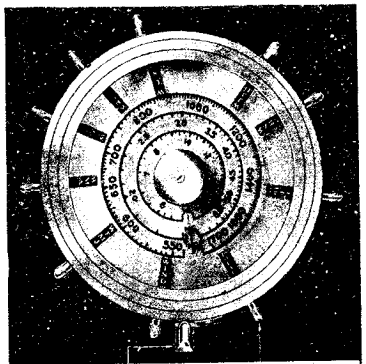
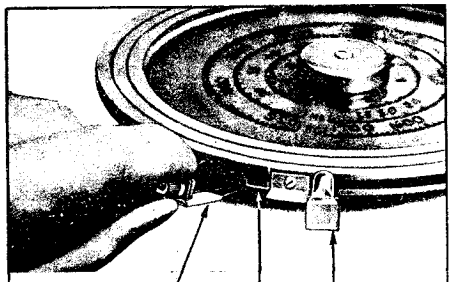
# SERVICE NOTES for "AUTOMATIC-TUNE" WHEEL DIAL

USED WITH MODELS 78B, 78BE, 82A, 82AE, 86AE, 91B AND 95B


INDICATOR STOP: TO TUNE... GRASP KNURLED METAL TAB BELOW THE STATION CALL LETTER OF THE DESIRED STATION BETWEEN THUMB AND FOREFINGER AND SWING DIAL UNTIL KNURLED TAB IS UNDERNEATH INDICATOR STOP.
KNURLED METAL TAB: AFTER PROPERLY SETTING TAB HOLDERS, FIRMLY TIGHTEN SO THAT THEY CANNOT MOVE ON DIAL RAIL.
FROM 1 TO 10 STATIONS OPERATING ON FREQUENCIES SEPARATED BY 40 KILOCYCLES OR MORE MAY BE AUTOMATIC TUNE ..... BY PROPERLY SETTING TAB HOLDERS
FIG. 1


INSERT CELLULOID ENVELOPE BETWEEN EDGE OF DIAL AND METAL FACE PLATE THEN LIGHTLY PRESS NUT INTO SQUARE NOTCH
INDICATOR STOP
SLOTTED DIAL TAB RAIL
FIG. 3

While an "AUTOMATIC-TUNE" tab may be set for distant weak stations, better results will be obtained if the stations selected for "AUTOMATIC-TUNE" are strong nearby or local stations.

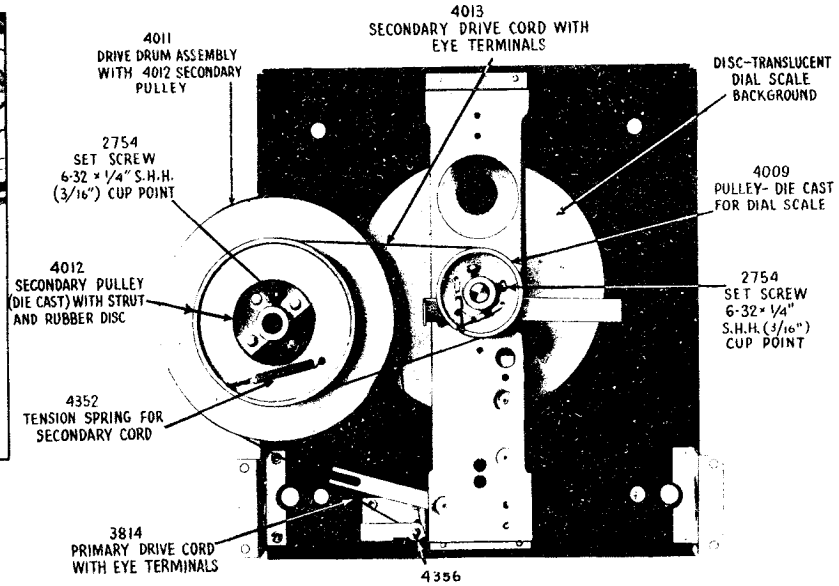
**AFTER IT IS DETERMINED WHAT STATIONS YOU WISH TO "AUTOMATIC-TUNE", OBTAIN THE FREQUENCIES USED AND CALL LETTERS OF THESE STATIONS AND SET STATION TABS BY:**

1. Lay station call letter tab sheet on flat surface and with a razor or sharp knife cut out desired station tab by cutting around black edges of each desired tab.
2. To illustrate the proper setting of station paper strip and metal tab holder the receiver is shipped from the factory with a station tab properly set for Station WGN 720 kilocycles.
   Carefully note that the station call letter tab appears directly below the 720 kilocycle calibration on the face of the dial and that the knurled tab is firmly screwed down on slotted tab rail. If Station WGN is not one of the selected stations or if a tab is to be set for a station which operates on a frequency less than 720 kilocycles, remove WGN celluloid envelope and station call letter paper strip by:
   (a) Loosen tab holder by grasping knurled end of metal tab with finger tips and turn one or two turns to the left.
   (b) Slide the metal holder tab to square notch in dial tab rail—adjacent to permanently attached tab stop—and pull outward on tab until it is pulled free from tab holder rail.
   (c) Slide the celluloid envelope out of the metal tab frame.
3. **PLACE EACH SELECTED STATION CALL LETTER PAPER STRIP INSIDE OF CELLULOID ENVELOPE BY:**
   (a) Hold celluloid envelope with curved end upward.
   (b) Place station call letter paper strip inside of celluloid envelope with printed call letters upward.
4. **INSERT CELLULOID ENVELOPE INTO A METAL TAB FRAME BY:**
   (a) Hold curved end of celluloid envelope towards metal knurled tab holder and insert celluloid into metal frame.
   (b) Gently push celluloid inward until curved end of envelope touches edge of celluloid envelope tab frame.
   (c) Arrange tabs in numerical order according to station frequency.
5. **SET THE METAL TAB HOLDERS ON DIAL BY: (See Fig. 3)**
   (a) Set the first metal tab holder for the station that broadcasts on the lowest frequency—least number of kilocycles—and then set the next station tab for the selected station operating on the next lowest frequency, continuing on in this way until a tab has been set for all of the selected stations.
   (b) Carefully tune in the station which broadcasts on the lowest frequency—least number of kilocycles.
   (c) Insert celluloid envelope between edge of dial and metal face plate—Lightly press nut on end of knurled tab into square notch in slotted dial rail—then slide tab holder along rail until the knurled tab is underneath the indicator stop on the dial at which point station call letter strip will appear directly below the indicator line on the face of the dial.
   (d) Tighten tab holders as much as possible without moving dial by turning knurled tab to the right—then swing dial so knurled tab is away from indicator stop on the dial and firmly tighten so that it cannot move on the dial rail. **DO NOT USE PLIERS TO TIGHTEN.**

## REPLACING No. 4000 DIAL GLASS SCALE ASSEMBLY

As it requires special tools to properly set part No. 4005 shaft assembly on part No. 4000 glass scale—we will ship all orders for No. 4000 glass scales with the No. 4005 shaft assembled on the glass scale.

## DIAL MECHANISM




WHEN INSTALLING PART No. 4000 GLASS ASSEMBLY WITH No. 4005 SHAFT ATTACHED carefully follow procedure in order given:

(a) Insert No. 4005 shaft into main bushing attached to the cadmium plated bracket on back of dial face.

b) Place steel spacer washer and brass tension spring in order named over end of No. 4005 shaft.

(c) Place the small die cast primary pulley No. 4009 on shaft—do not tighten No. 2754 set screws.

(d) Loosen the two set screws in brass spacer collar on the No. 4005 shaft.

(e) Adjust brass spacer collar—by sliding collar on shaft—so that there will be approximately 1/8" clearance between the bottom of metal tab holder and the face plate. Firmly retighten brass collar and No. 2754 die cast pulley set screws. Failure to provide proper clearance will result in scratches on dial face and the dial mechanism will not operate freely.

**TO INSTALL No. 3814 PRIMARY DRIVE CORD:**

(a) Looking at back of dial, wrap dial cord twice around No. 4355 drive shaft in CLOCKWISE direction.

(b) Hook No. 3462 tension spring into loops at end of dial cord.

NEVER LOOSEN THE FOUR SCREWS THAT HOLD THE CADMIUM PLATED BRACKET TO DIAL FACE—OTHERWISE THE MAIN BUSHING WILL BE THROWN OUT OF CENTER.

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**TO INSTALL No. 4013 SECONDARY DRIVE CORD:**

The dial mechanism picture shows and refers to eye terminals on drive cord—these were used in early production. Loops made by knots in the cords are now used to attach cord to lugs in the No. 4009 die cast pulley and to the No. 4352 & 3462 tension springs.

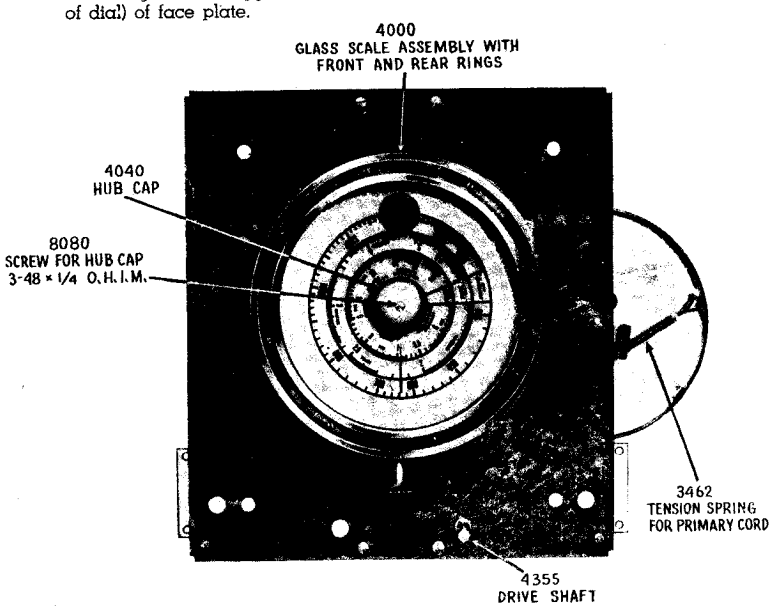
(a) Looking at the front of the dial rotate dial scale COUNTER-CLOCKWISE until dial stop is reached.

(b) Loosen the two No. 2754 set screws in small die cast pulley No. 4009.

(c) Looking at front of dial turn the small die cast pulley so that the cut out in pulley will be towards the left and approximately in line with the upper edge of the dial light bracket. This bracket which is only used in six volt battery and 110 volt AC models is shown mounted on the cadmium plated dial face plate bracket in dial mechanism picture.

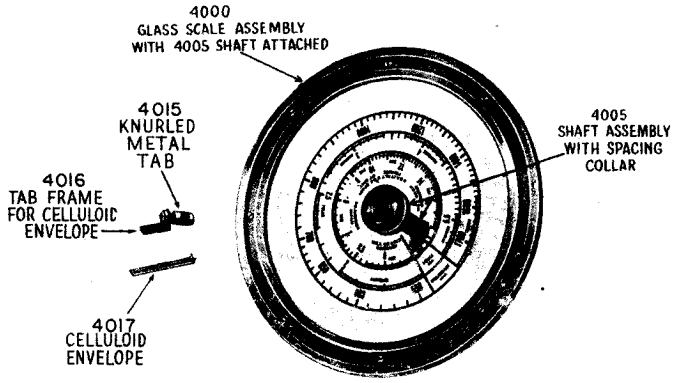
(d) Hook No. 4352 tension spring in dial cord loop.

(e) Turn No. 4011 drum so that the hole in the No. 4012 large die cast pulley—through which the secondary drive cord is pulled—is towards the top of face plate. This will bring the hole approximately in line with the left hand edge (looking at back of dial) of face plate.




(f) Take long end of No. 4013 secondary drive cord—measured from knot at spring to end of cord—then looking at the front of dial, wrap cord one complete turn CLOCK WISE around the No. 4009 small die cast pulley. The other end of the cord (short end) is placed on bottom half of secondary and primary die cast pulleys.

(g) Firmly tighten No. 2754 set screws in small die cast pulley.




**COMPLETE WHEEL DIAL ASSEMBLY LESS ESCUTCHEON**

| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| •205 | Dial Assembly | Used With Model 78B Complete Assembly Less Escutcheon | $12.75 |
| 206 | Dial Assembly | Used With Model 78BE Complete Assembly Less Escutcheon | 12.75 |
| 207 | Dial Assembly | Used With Model 82A Complete Assembly Less Escutcheon | 12.75 |
| 201 | Dial Assembly | Used With Model 82AE & 86AE Complete Assembly Less Escutcheon | 12.75 |
| 204 | Dial Assembly | Used With Model 91B & 95B Complete Assembly Less Escutcheon | 12.25 |

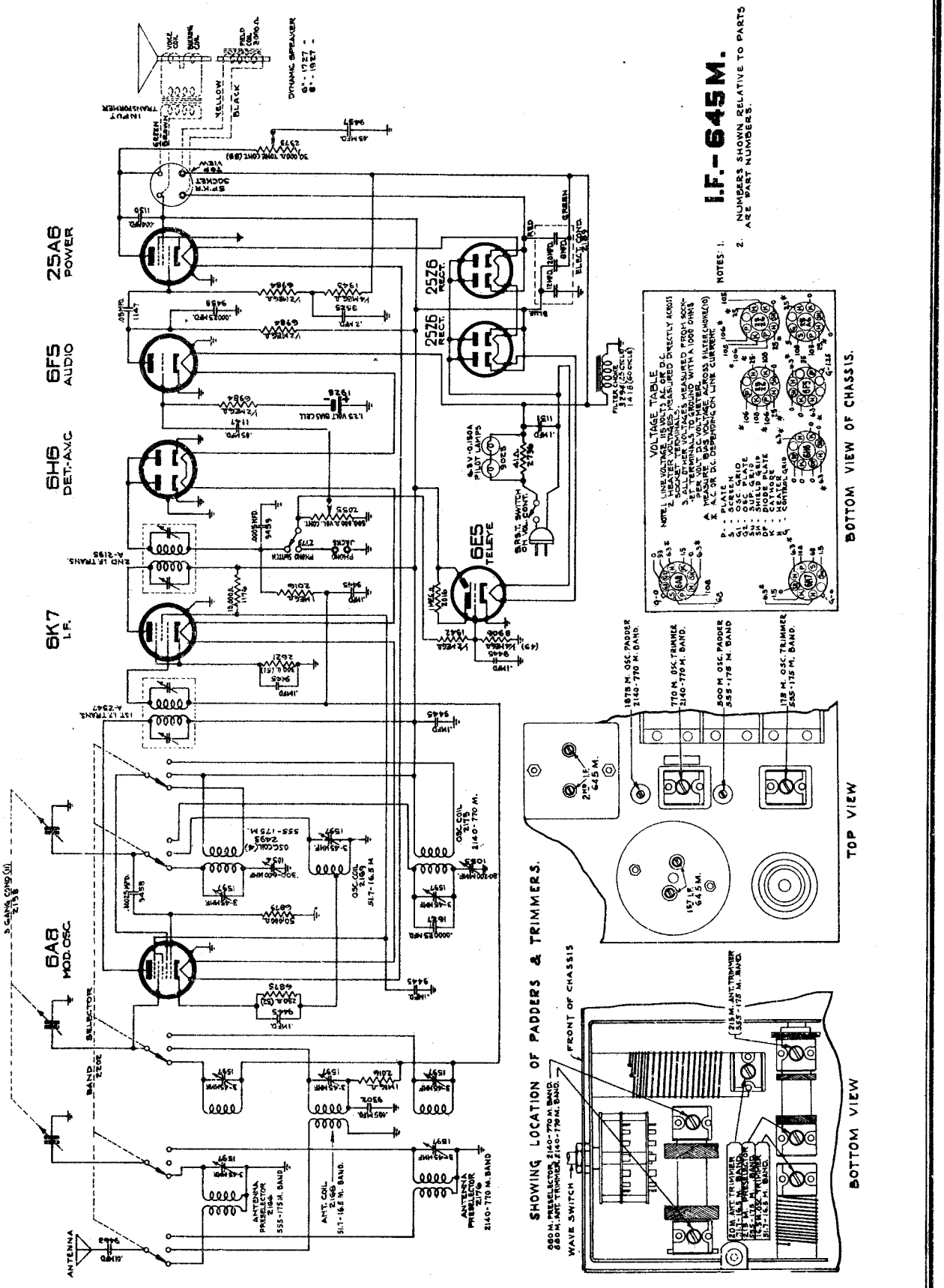
**MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES**

| | | | |
|---|---|---|---|
| 4016 | Celluloid Envelope | Station Call Letter Cover | .05 |
| 3814 | Cord | Primary Drive Cord | .15 |
| 4013 | Cord | Secondary Drive Cord | .15 |
| 3995 | Band Indicator Assem. | For Model 78BE-78B-91B-95B | .75 |
| 3992 | Band Indicator Assem. | For Model 82AE-82A-86AE | .75 |
| 4011 | Drive Drum Assem. with | 4012 Secondary Pulley and Rubber Disc Coupler | 1.25 |
| 4355 | Drive Shaft | | .12 |
| 4027 | Disc | Translucent Dial Scale Background for Model 78BE | .50 |
| 3984 | Disc | Translucent Dial Scale Background for Model 82AE & 86AE | .55 |
| 4024 | Disc | Translucent Dial Scale Background for Model 82A | .55 |
| 4029 | Disc | Translucent Dial Scale Background for Model 91B, 95B & 78B | .50 |
| 3771 | Escutcheon | For Cabinet—All Models | 1.00 |
| 4017 | Frame | Metal Holder for Celluloid Envelope | .05 |
| 4040 | Hub Cap | | .15 |
| 4015 | Knurled Tab | | .05 |
| 4009 | Pulley | Dial Scale Drive (Die Cast) | .45 |
| 4000 | Scale | Calibrated Glass Scale With 4005 Shaft Assem. | 2.75 |
| 8071 | Screw | For Hub Cap 3-48 x ¼" O.H.I.M. | .005 |
| 2754 | Screw | For Pulley 6-32 x ¼" S.H.H. Cup Point | .01 |
| 4356 | Spring Lock | For Drive Shaft | .01 net |
| 4352 | Spring Tension | For Secondary Cord | .07 |
| 3462 | Spring Tension | For Primary Cord | .07 |

**Prices are subject to change without notice.**

# SENTINEL RADIO CORP.

MODEL 56U
Schematic, Voltage
Socket, Trimmers

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MODEL 56U
MODEL 67L
MODELS 68B,68BE
Alignment

# SENTINEL RADIO CORP.

## Model 56U Eight Tube AC-DC Superheterodyne Receiver

**ALIGNING I. F. STAGE AT 645 METERS:**

(a) Connect the high side of the test oscillator output to the control grid of the 6A8 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver base through a .2 Mfd. condenser.
(b) Set test oscillator frequency to 645 meters (this must be accurate).
(c) Peak each of the second I. F. transformer trimmers.
(d) Peak each of the first I. F. transformer trimmers.
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

**ALIGNING 16.5-51.7 METER BAND:**

(a) Connect the high output side of the test oscillator through a 400 ohm resistor to receiver antenna lead and the low side to the set ground through a .02 Mfd. condenser.
(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop, (complete in mesh), at which point the dial needle must be exactly even with the last line at the high wave length end of the dial calibration. If the dial needle does not point exactly to the last line, move needle to correct position.
(c) Place the band selector switch for operation on the 16.5-51.7 meter band, tune receiver dial ond set test oscillator frequency to EXACTLY 16.5 meters. Then tune in the 16.5 METER SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 16.5 METER OSCILLATOR TRIMMER.

**NOTE:** When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE RIGHT PEAK IS USED FOR ALIGNING THE RECEIVER AT 16.5 METERS. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the SECOND PEAK which is the proper one to use is tuned in. If the trimmer is screwed down only to the point where the first peak is received, the incorrect peak will be tuned in.

(d) Tune the receiver dial and set test oscillator frequency to EXACTLY 20 METERS. Adjust 20 meter antenna trimmer for maximum 20 meter test signal sensitivity.

**ALIGNING 175-555 METER BAND:**

(a) Replace the 400 ohm resistor in series with test oscillator lead with a 200 Mfd. condenser, place the band selector switch for operation on the 175-555 meter band, tune receiver dial and set test oscillator frequency to EXACTLY 175 METERS. BRING IN THE 175 METER TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 175 METER OSCILLATOR TRIMMER.
(b) Set test oscillator frequency and receiver dial to EXACTLY 215 METERS. Adjust 215 meter preselector and antenna trimmers for maximum 215 test oscillator signal sensitivity.
(c) Tune receiver dial and set test oscillator frequency to approximately 500 meters. While rocking gang condenser slightly to right and left adjust 500 meter oscillator padder for maximum sensitivity.

**ALIGNING 770-2140 METER BAND:**

(a) Place band selector switch for operation on the 770 to 2140 meter band, and set test oscillator frequency and receiver dial to EXACTLY 770 METERS. BRING IN 770 METER TEST SIGNAL TO MAXIMUM OUTPUT WITH 770 METER OSCILLATOR TRIMMER.
(b) Tune receiver dial and set test oscillator frequency to EXACTLY 880 METERS. Adjust 880 meter antenna and preselector trimmers for maximum 880 meter test signal response.
(c) Set receiver dial and test oscillator frequency to approximately 1875 meters. Then while rocking gang condenser slightly to right and left adjust 1875 meter padding condenser for maximum sensitivity.

**ALIGNING 1.8-5.8 MEGACYCLE BAND:**

(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.
(b) Adjust band selector switch to 1.8-5.8 megacycles, tune receiver dial and set test oscillator frequency to EXACTLY 5.8 megacycles. Bring in 5.8 megacycle test signal to maximum output by adjusting 5.8 M.C. oscillator trimmer.
(c) Tune receiver dial and test oscillator frequency to EXACTLY 5 megacycles, and adjust 5 M.C. antenna trimmer for maximum sensitivity.

**ALIGNING 5.8-18.3 MEGACYCLE BAND:**

(a) Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 5.8-18.3 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 18 megacycles.
(b) Adjust 18 M.C. oscillator trimmer to bring in 18 megacycle test signal to maximum output.

**NOTE:** When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the FIRST PEAK which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 18 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 17 megacycles. Then vary the receiver dial slightly to the right and left of 17 megacycles, and if the fundamental peak was used in aligning at 18 megacycles the test oscillator signal will be heard at approximately 17 megacycles on the receiver dial.

(c) Tune receiver dial and set test oscillator frequency to EXACTLY 15 megacycles.
(d) Rock gang condenser slightly to right and left and adjust 15 M.C. antenna trimmer for maximum 15 megacycle test signal response.

## Model 67L
## Six Tube Superheterodyne Receiver

**ALIGNING I.F. STAGE AT 465 KILOCYCLES:**

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead to the grid cap of the 6A7 tube through a .02 Mfd. condenser DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.

**ADJUSTING 465 KILOCYCLE WAVE TRAP:**

(a) Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna lead and the low side to the set ground.
(b) Set test oscillator frequency to EXACTLY 465 kilocycles and adjust the 465 K.C. wave trap trimmer condenser mounted on and accessible through hole in rear of chassis for MINIMUM 465 kilocycle signal response.

**ALIGNING 1720-540 KILOCYCLE BAND:**

(a) Adjust band selector switch for operation on 1720-540 kilocycle band and leave test oscillator lead connected to receiver antenna lead through the .00025 Mfd. series condenser.
(b) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles.
(c) Adjust 1720 K. C. oscillator trimmer to bring in 1720 kilocycle test oscillator signal to maximum output.
(d) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
(e) Adjust 1400 K.C. antenna trimmer for maximum sensitivity.
(f) Set receiver dial and test oscillator frequency to approximately 600 kilocycles.
(g) While rocking gang condenser slightly to right and left adjust 600 K.C. padder for maximum sensitivity.

**ALIGNING 2.3-6.3 MEGACYCLE BAND:**

(a) Replace .00025 Mfd. test oscillator lead series condenser with a 400 ohm resistor. Adjust band selector switch for operation on 6.3 to 2.3 megacycle band, and tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.
(b) Adjust 6.3 M.C. oscillator trimmer to bring in 6.3 megacycle test oscillator signal to maximum output.
(c) Tune receiver dial and set test oscillator frequency to 5.8 megacycles, and while rocking gang condenser slightly to right and left adjust 5.8 M.C. antenna trimmer for maximum sensitivity.
(d) No adjustment is required at low frequency end of this band as a fixed oscillator pad is used.
To assure more accurate trimmer setting repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

## Model 68B-68BE—Three Band Superheterodyne Receiver

**ALIGNING I.F. STAGE AT 465 KILOCYCLES:**

(a) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.

**ALIGNING 1720-535 KILOCYCLE BAND:**

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(b) Remove test oscillator lead from grid of 6A7 tube and connect to receiver antenna lead through a .00025 Mfd. series condenser.
(c) Adjust band selector switch for operation on the 1720-535 kilocycle band.
(d) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles, and BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. preselector and antenna trimmers for maximum sensitivity.
(f) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum signal response.

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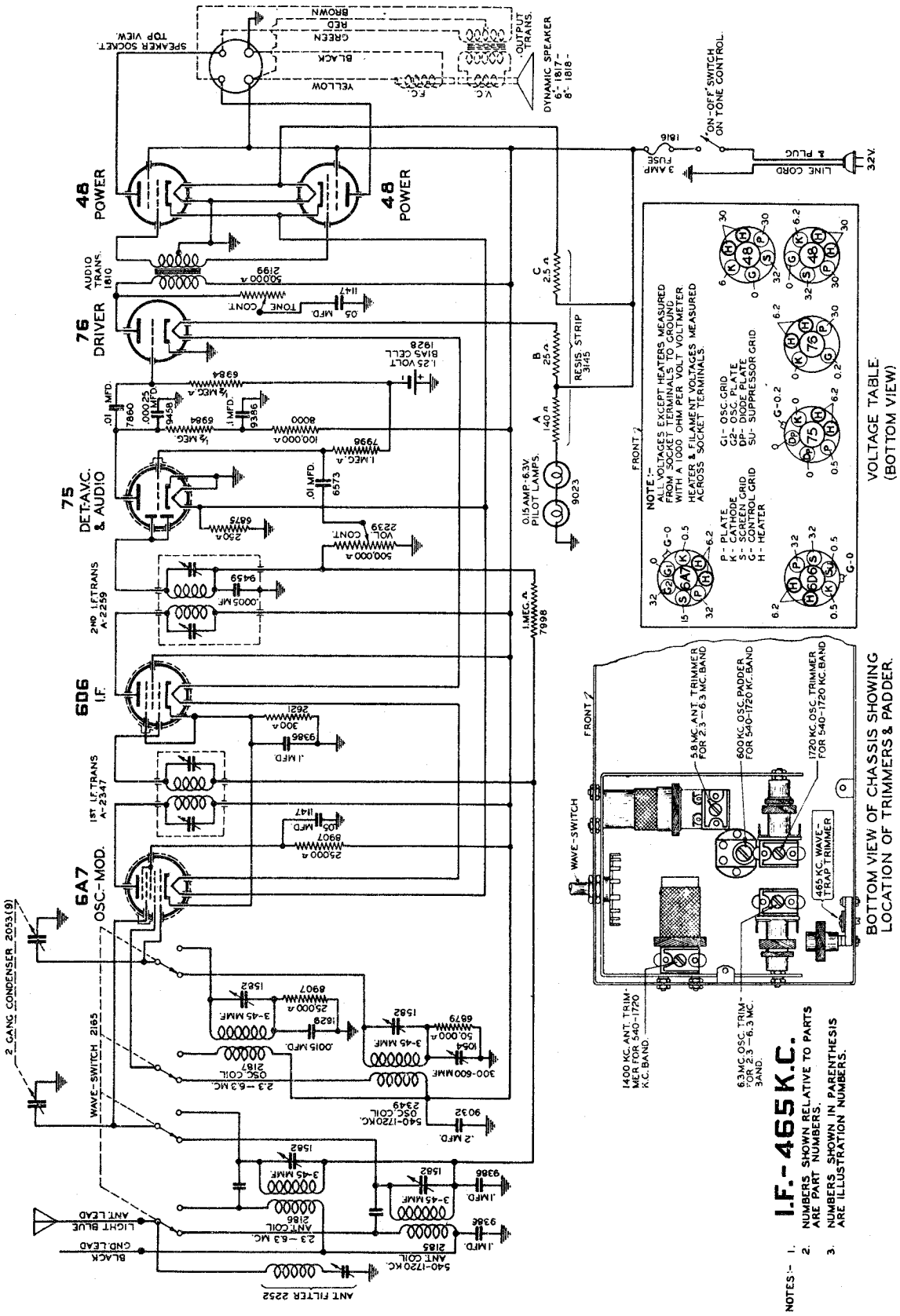
# SENTINEL RADIO CORP.

MODEL 67L
Schematic, Voltage
Socket, Trimmers


48 POWER
48 POWER
76 DRIVER
75 DET. A.V.C. & AUDIO
606 I.F.
6A7 OSC.-MOD.
2 GANG CONDENSER 2053(9)
WAVE-SWITCH 2185
ANT FILTER 2252
DYNAMIC SPEAKER 6"- 1817- 8"- 1818-
OUTPUT TRANS.
SPEAKER SOCKET TOP VIEW
ON-OFF SWITCH ON TONE CONTROL
3 AMP FUSE
LINE CORD & PLUG
32V.
RESIS. STRIP 3145
0.15 AMP. 6.3V. PILOT LAMPS.
FRONT
NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER & FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS.
P - PLATE
K - CATHODE
S - SCREEN GRID
G - CONTROL GRID
H - HEATER
G1 - OSC. GRID
G2 - OSC. PLATE
DP - DIODE PLATE
SU - SUPPRESSOR GRID
VOLTAGE TABLE (BOTTOM VIEW)
BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDER.
WAVE-SWITCH
5.8 MC. ANT. TRIMMER FOR 2.3 - 6.3 MC. BAND
600 KC. OSC. PADDER FOR 540-1720 KC. BAND
1720 KC. OSC. TRIMMER FOR 540-1720 KC. BAND
465 KC. WAVE TRAP TRIMMER
1400 KC. ANT. TRIMMER FOR 540-1720 K.C. BAND
6.3 MC. OSC. TRIMMER FOR 2.3 - 6.3 MC. BAND.
I.F. - 465 K.C.
NOTES:- 1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.

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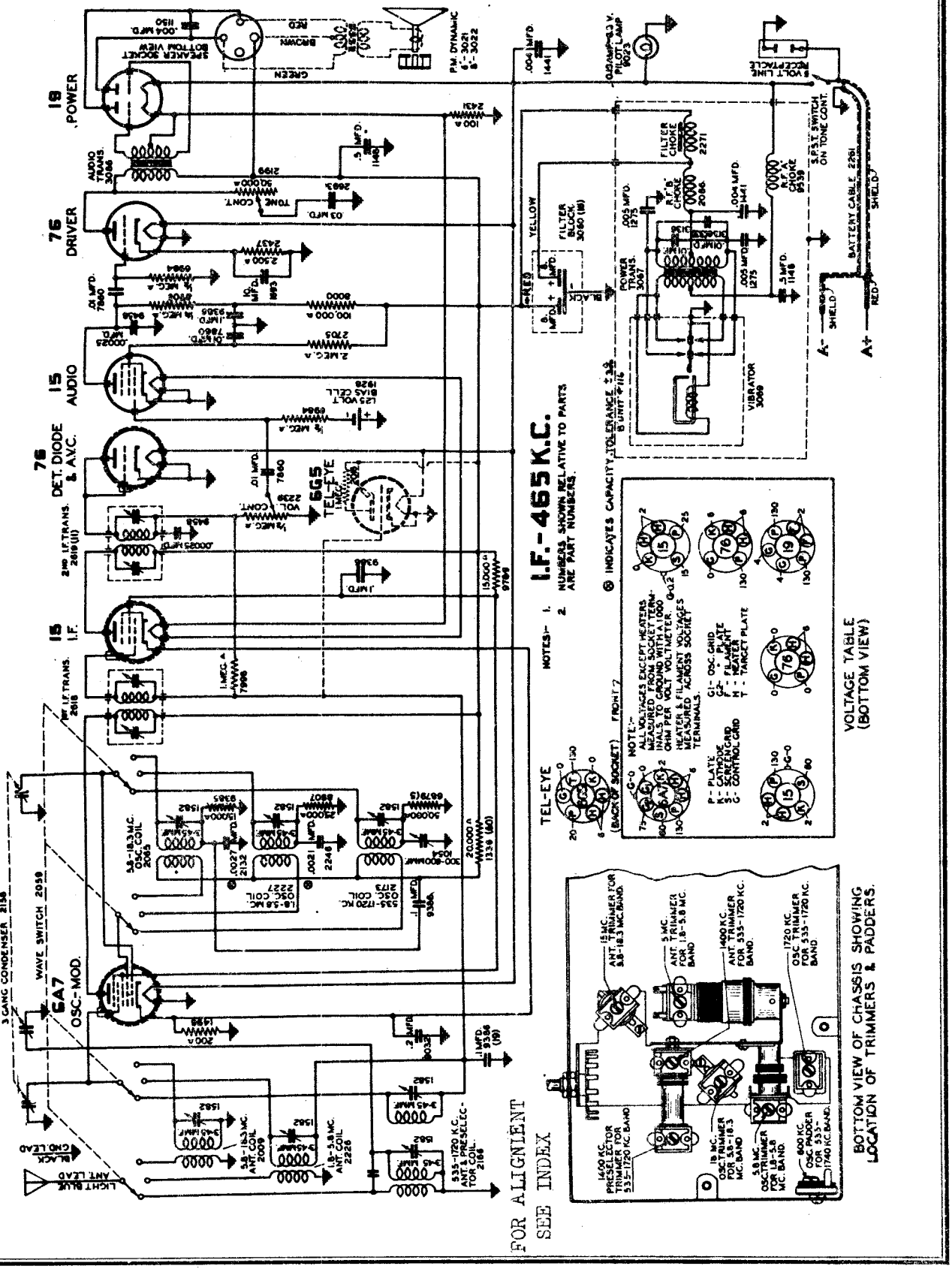
MODELS 68B,68BE
Schematic,Voltage
Socket,Trimmers

# SENTINEL RADIO CORP.


I.F.-465 K.C.
NOTES- 1. ⊛ INDICATES CAPACITY TOLERANCE ± 10%
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
TEL-EYE
(BACK OF SOCKET)
FRONT
NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER & FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS.
P - PLATE
K - CATHODE
S - SCREEN GRID
C - CONTROL GRID
G1 - OSC. GRID
F - FILAMENT
H - HEATER
T - TARGET PLATE
VOLTAGE TABLE
(BOTTOM VIEW)
BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS.
1400 KC. PRESELECTOR TRIMMER FOR 535-1720 KC. BAND
18 MC. OSC. TRIMMER FOR 5.8-18.3 MC. BAND
5.8 MC. OSC. TRIMMER FOR 1.8-5.8 MC. BAND
600 KC. OSC. PADDER FOR 535-1740 KC. BAND
1.8 MC. ANT. TRIMMER FOR 5.8-18.3 MC. BAND
5 MC. ANT. TRIMMER FOR 1.8-5.8 MC. BAND
1400 KC. ANT. TRIMMER FOR 535-1720 KC. BAND
1720 KC. OSC. TRIMMER FOR 535-1720 KC. BAND
FOR ALIGNMENT SEE INDEX

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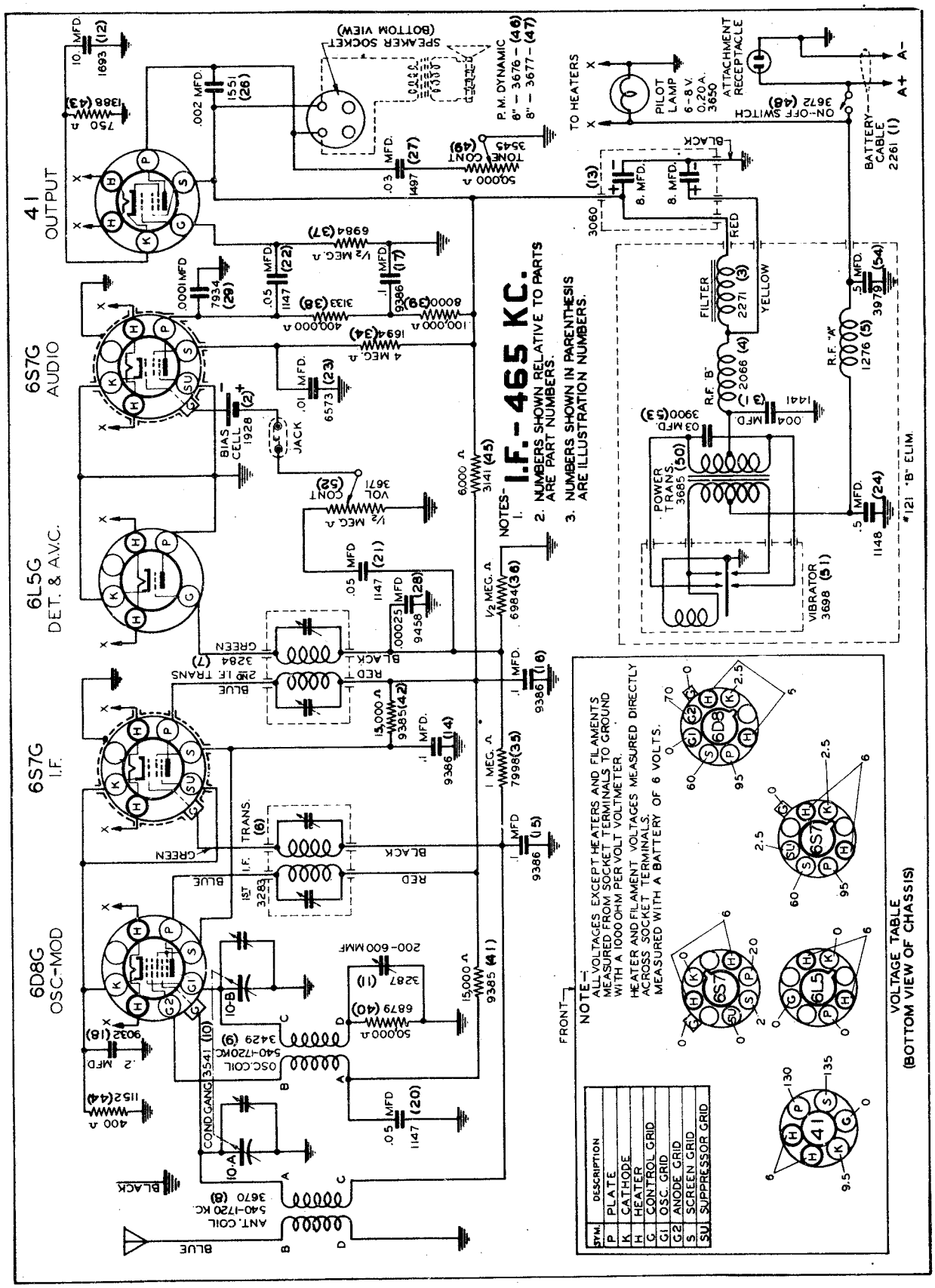
# SENTINEL RADIO CORP.

MODEL 73B
Schematic, Voltage
Socket


I.F.-465 KC.
NOTES-
1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
41 OUTPUT
6S7G AUDIO
6L5G DET. & A.V.C.
6S7G I.F.
6D8G OSC-MOD
SPEAKER SOCKET (BOTTOM VIEW)
P.M. DYNAMIC 8" — 3676 — (46) 8" — 3677 — (47)
TONE CONT (49) 50000 Ω
TO HEATERS
PILOT LAMP 6-8 V. 0.20 A. 3650
ATTACHMENT RECEPTACLE
ON-OFF SWITCH 3672 (48)
BATTERY CABLE 2261 (1)
A+ A-
FILTER 2271 (3)
R.F. "A" 1276 (5)
R.F. "B" 2066 (4)
POWER TRANS. 3685 (50)
VIBRATOR 3698 (51)
VOL CONT 3671 (52)
BIAS CELL 1928 (2)
JACK
2ND I.F. TRANS (7)
1ST I.F. TRANS. (6)
OSC. COIL 540-1720 KC. 3429 (9)
ANT. COIL 540-1720 KC. 3670 (8)
COND GANG 3541 (10)
200-600 MMF 3287 (11)
NOTE- ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. MEASURED WITH A BATTERY OF 6 VOLTS.
FRONT
SYM. DESCRIPTION
P PLATE
K CATHODE
H HEATER
G CONTROL GRID
G1 OSC. GRID
G2 ANODE GRID
S SCREEN GRID
SU SUPPRESSOR GRID
VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)
*121 "B" ELIM.

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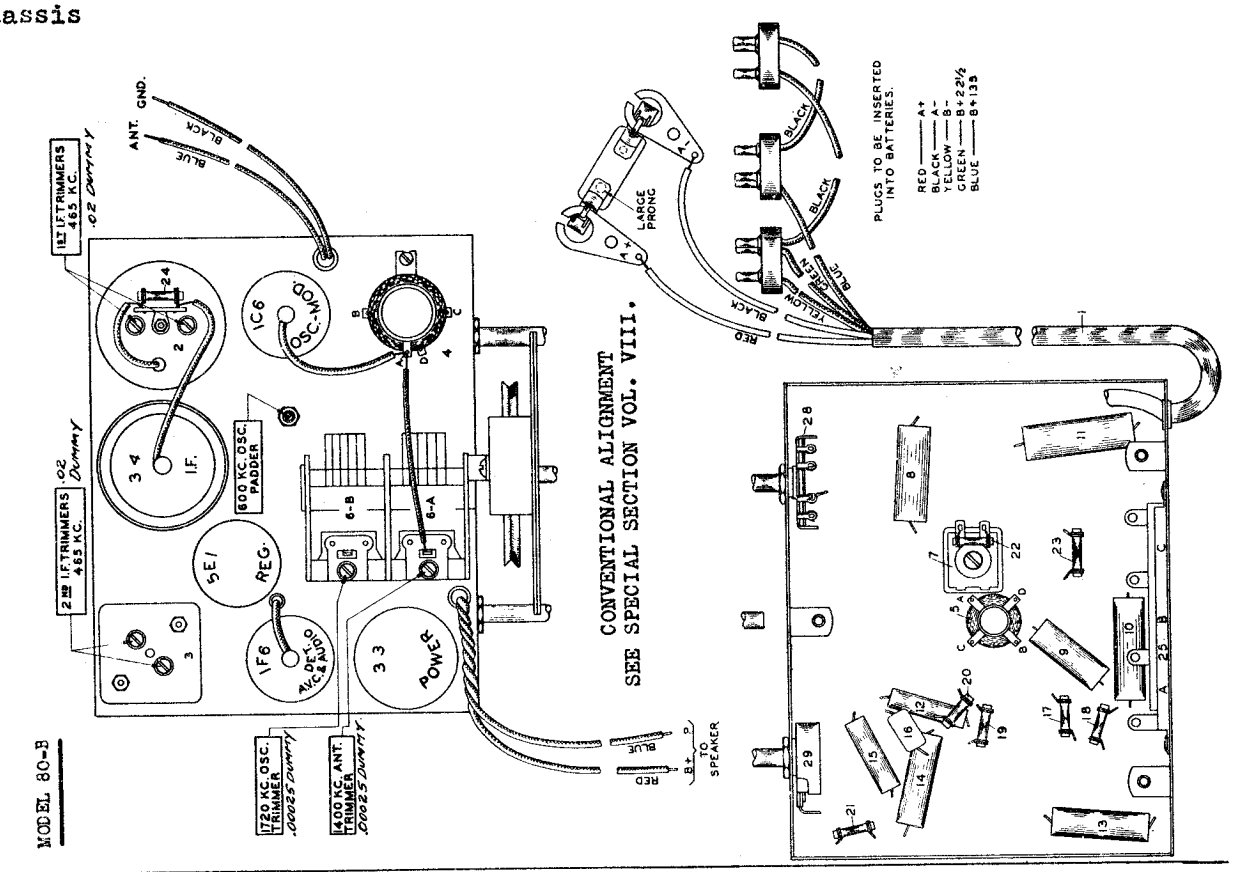
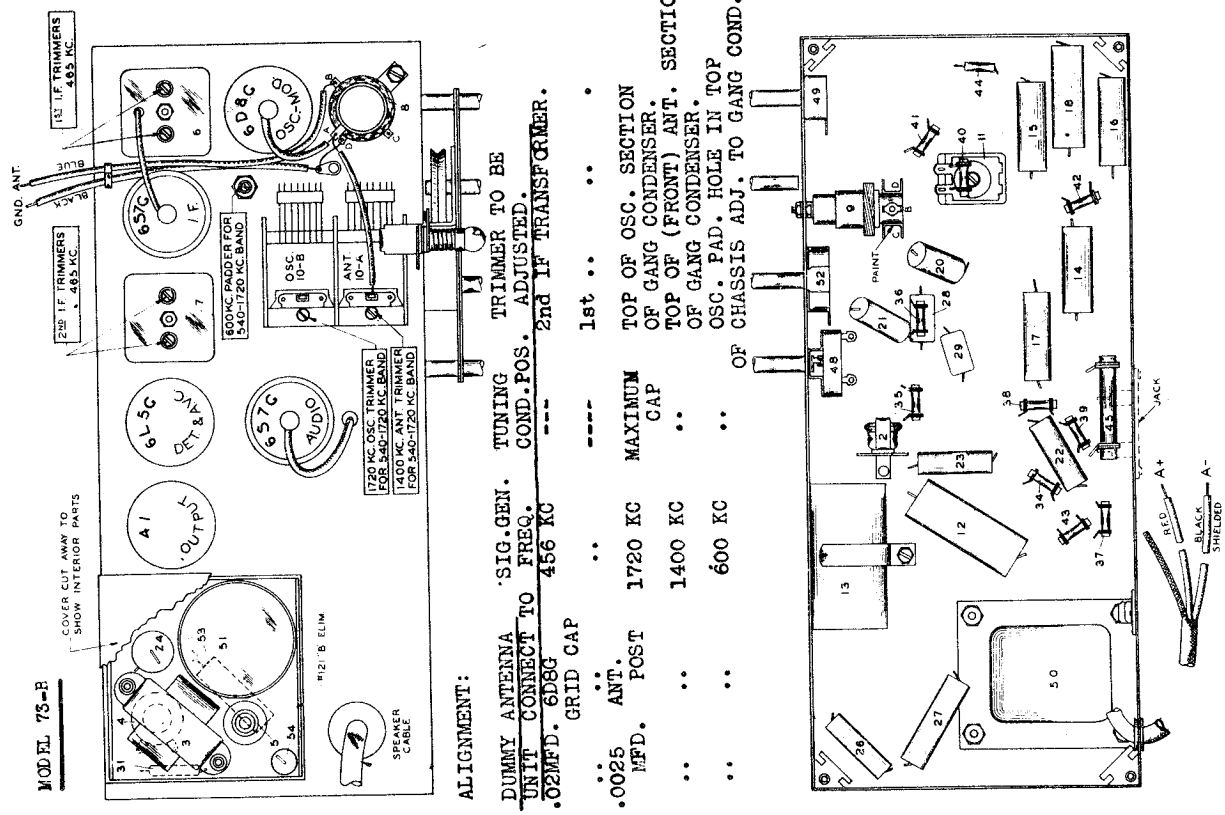
MODEL 73B
MODEL 80B
Alignment, Trimmers
Chassis

# SENTINEL RADIO CORP.




ALIGNMENT:

| DUMMY ANTENNA | SIG.GEN. | TUNING | TRIMMER TO BE |
|---|---|---|---|
| UNIT CONNECT TO | FREQ. | COND.POS. | ADJUSTED. |
| .02MFD. 6D8G GRID CAP | 456 KC | --- | 2nd IF TRANSFORMER. |
| .. .. .. | .. | ---- | 1st .. .. .. |
| .0025 ANT. MFD. POST | 1720 KC | MAXIMUM CAP | TOP OF OSC. SECTION OF GANG CONDENSER. |
| .. .. .. | 1400 KC | .. | TOP OF (FRONT) ANT. SECTION OF GANG CONDENSER. |
| .. .. .. | 600 KC | .. | OSC. PAD. HOLE IN TOP OF CHASSIS ADJ. TO GANG COND. |

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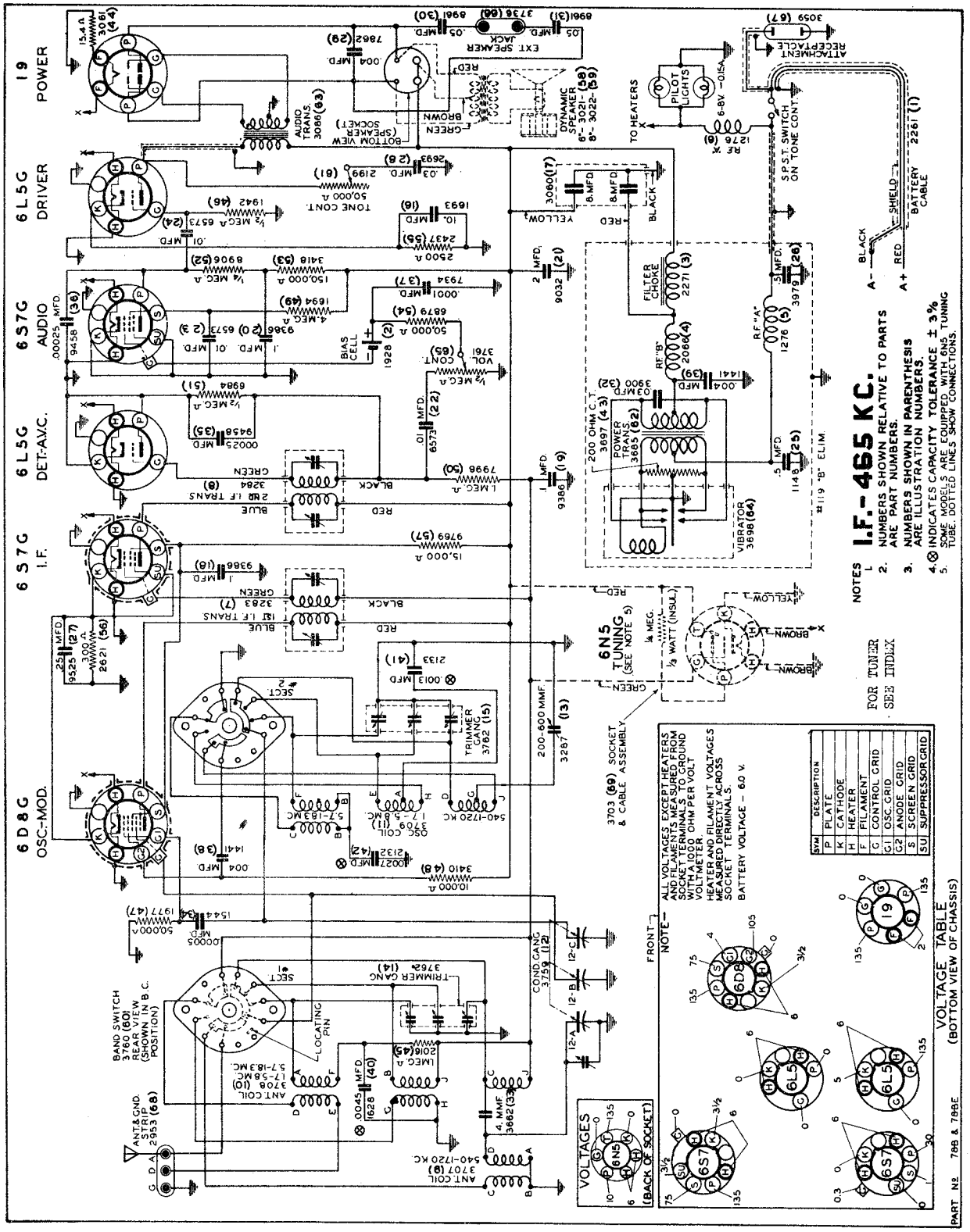
# SENTINEL RADIO CORP.

MODELS 78B, 78BE
Schematic, Voltage
Socket


I.F.-465 KC.
NOTES
1. ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER
2. HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
3. BATTERY VOLTAGE – 6.0 V.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
VOLTAGES
(BACK OF SOCKET)
FRONT
6D8 OSC.-MOD.
6S7G I.F.
6L5G DET.-A.V.C.
6S7G AUDIO
6L5G DRIVER
19 POWER
6N5 TUNING
3703 (69) SOCKET & CABLE ASSEMBLY
FOR TUNER SEE INDEX
PART NO. 78B & 78BE

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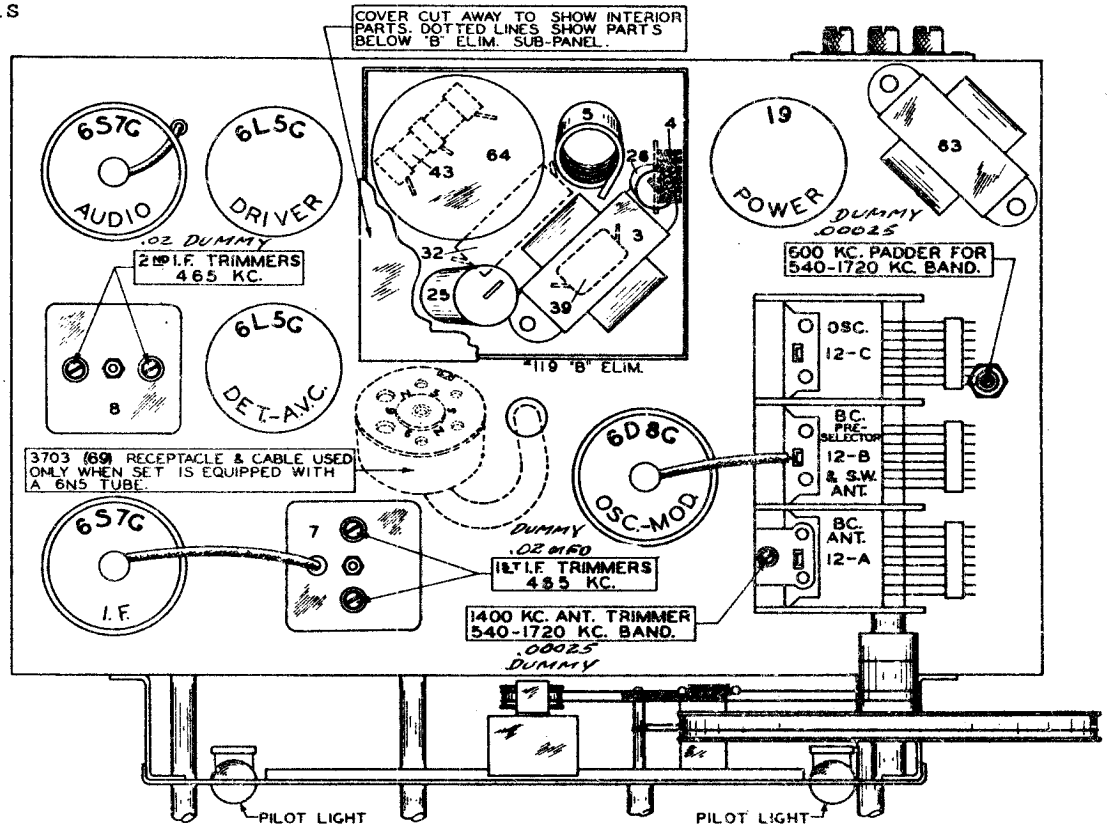
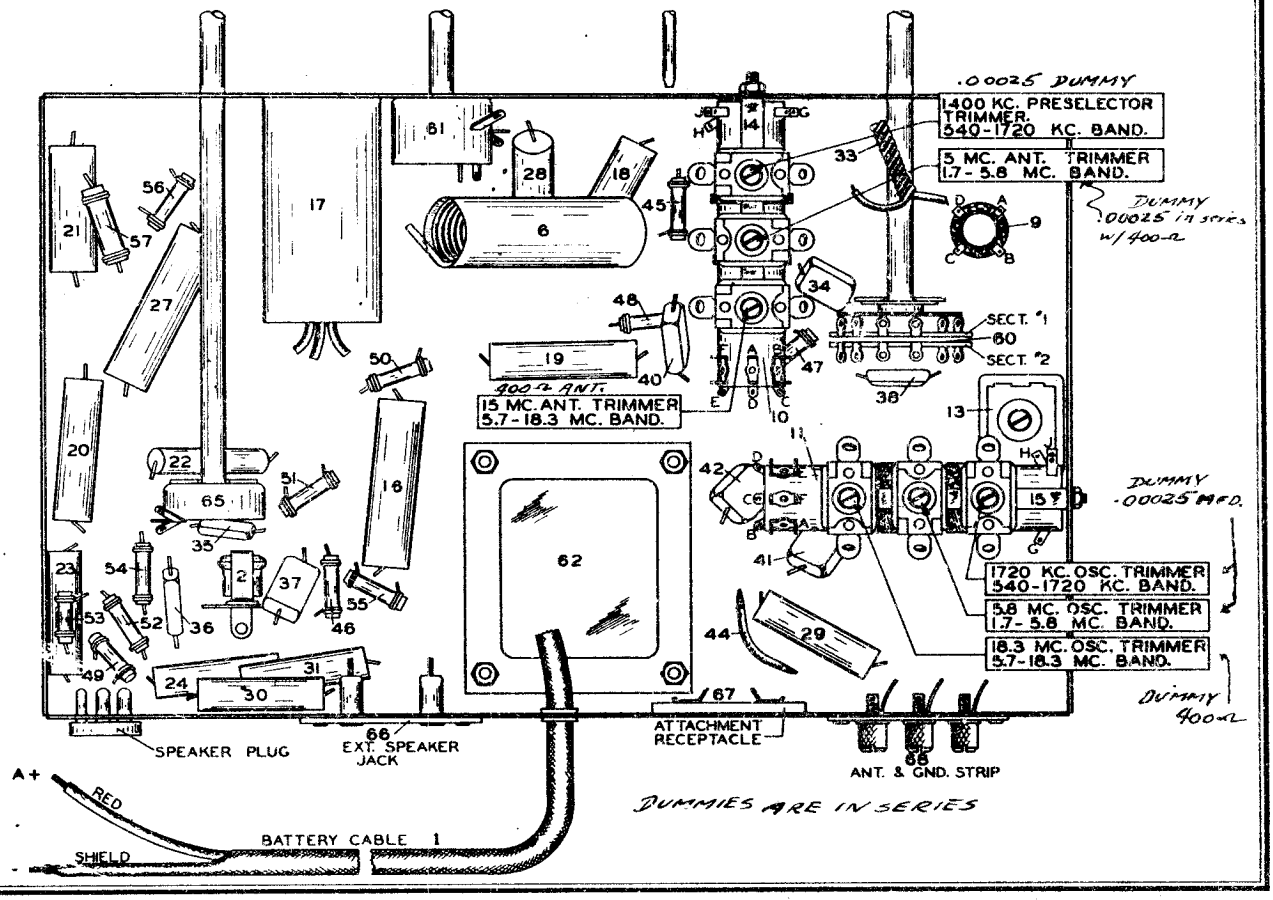
MODELS 78B, 78BE
Alignment, Trimmers
Chassis

# SENTINEL RADIO CORP.


COVER CUT AWAY TO SHOW INTERIOR PARTS. DOTTED LINES SHOW PARTS BELOW "B" ELIM. SUB-PANEL.
6S7G AUDIO
6L5G DRIVER
.02 DUMMY
2ND I.F. TRIMMERS 465 KC.
6L5G DET.-A.V.C.
3703 (69) RECEPTACLE & CABLE USED ONLY WHEN SET IS EQUIPPED WITH A 6N5 TUBE
6S7G I.F.
6D8G OSC.-MOD.
DUMMY .02 MFD
1ST I.F. TRIMMERS 465 KC.
1400 KC. ANT. TRIMMER 540-1720 KC. BAND.
.00025 DUMMY
"119 "B" ELIM.
19 POWER
DUMMY .00025
600 KC. PADDER FOR 540-1720 KC. BAND.
OSC. 12-C
B.C. PRE-SELECTOR 12-B & S.W. ANT.
B.C. ANT. 12-A
PILOT LIGHT
PILOT LIGHT

## CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

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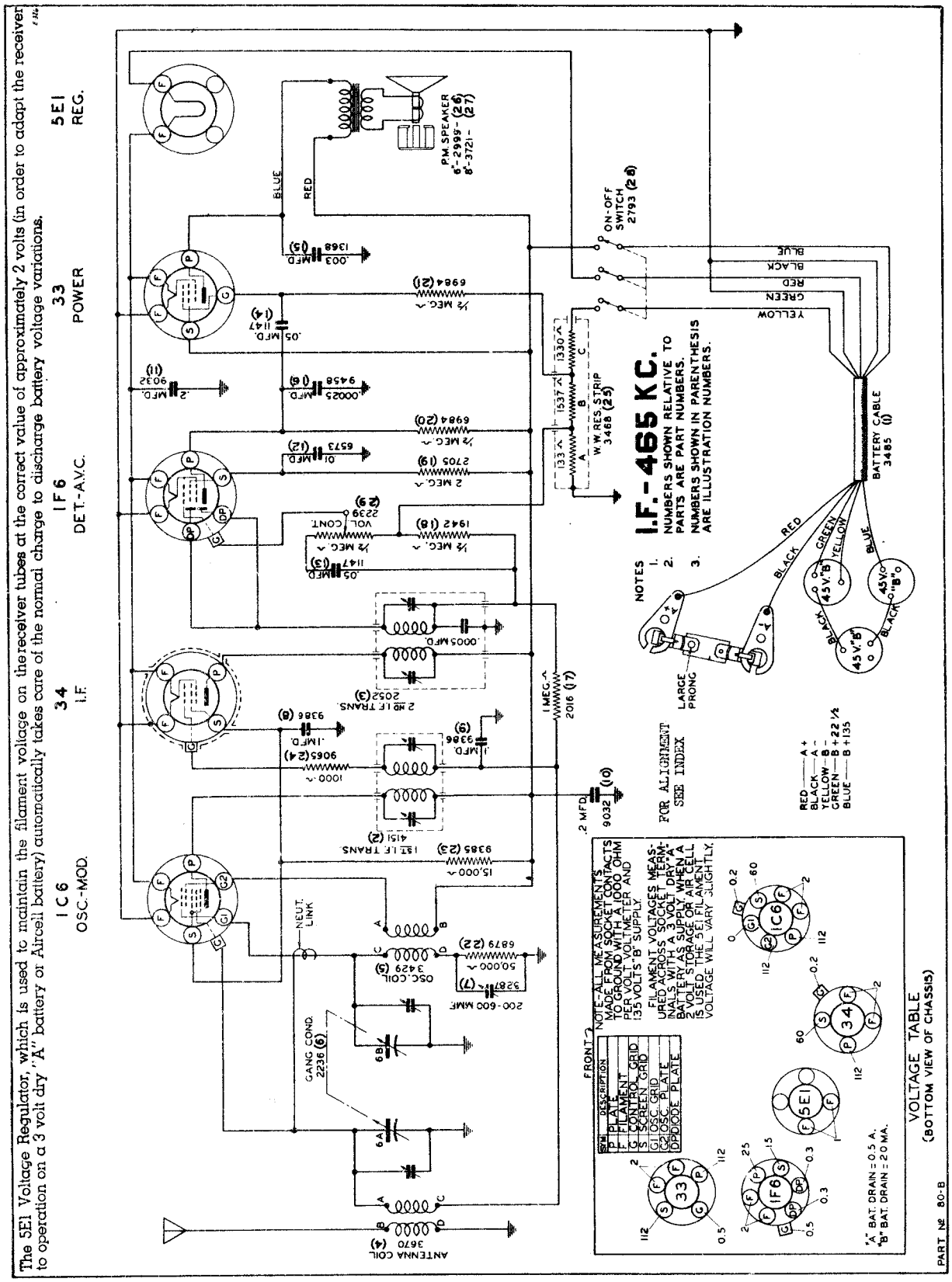
# SENTINEL RADIO CORP.

MODEL 80B
Schematic, Voltage
Socket


The 5E1 Voltage Regulator, which is used to maintain the filament voltage on the receiver tubes at the correct value of approximately 2 volts (in order to adapt the receiver to operation on a 3 volt dry "A" battery or Aircell battery) automatically takes care of the normal change to discharge battery voltage variations.
1C6 OSC.-MOD.
34 I.F.
1F6 DET.-A.V.C.
33 POWER
5E1 REG.
I.F. 465 KC.
NOTES
1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. FOR ALIGNMENT SEE INDEX
ON-OFF SWITCH 2793 (26)
P.M. SPEAKER 8"-2999- (26) 8"-3721- (27)
W.W. RES. STRIP 3468 (25)
BATTERY CABLE 3485 (1)
LARGE PRONG
45 V. "B"
RED — A+
BLACK — A-
YELLOW — B+22½
GREEN — B+135
BLUE — B+135
ANTENNA COIL 3670 (4)
1ST I.F. TRANS. 4151 (2)
2ND I.F. TRANS. 2052 (3)
OSC. COIL 3429 (5)
GANG COND. 2236 (6)
NEUT. LINK
NOTE-ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 135 VOLTS "B" SUPPLY
FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 3 VOLT DRY "A" BATTERY AS SUPPLY WHEN A 2 VOLT STORAGE OR AIR CELL IS USED, THE 5E1 FILAMENT VOLTAGE WILL VARY SLIGHTLY.
SYM DESCRIPTION
P PLATE
F FILAMENT
G CONTROL GRID
S SCREEN GRID
G1 OSC. GRID
G2 OSC. PLATE
DP DIODE PLATE
FRONT
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
"A" BAT. DRAIN = 0.5 A.
"B" BAT. DRAIN = 20 MA.
PART № 80-B

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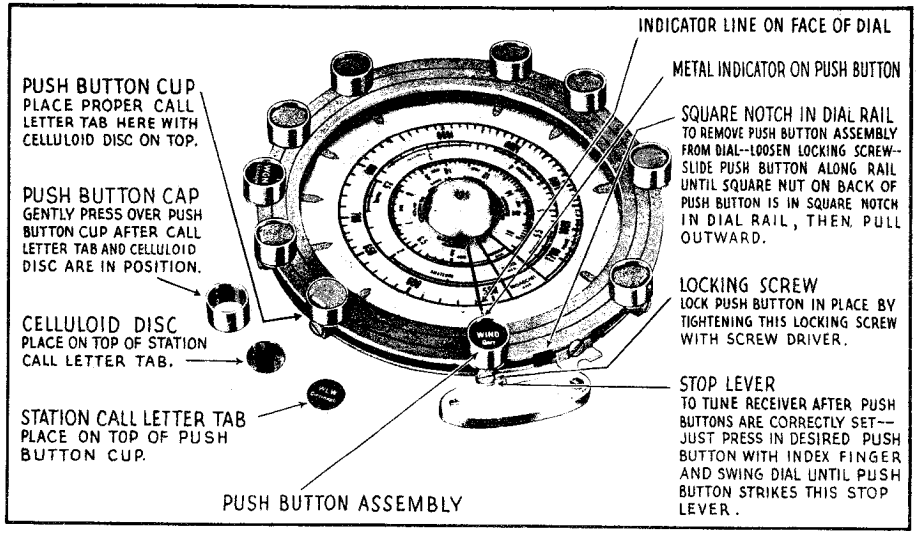
# SERVICE NOTES for PUSH BUTTON DIAL

FOR OTHER ASSEMBLIES SEE "AUTOMATIC TUNE" WHEEL DIAL ASSEMBLIES.


INDICATOR LINE ON FACE OF DIAL
METAL INDICATOR ON PUSH BUTTON
PUSH BUTTON CUP
PLACE PROPER CALL LETTER TAB HERE WITH CELLULOID DISC ON TOP.
SQUARE NOTCH IN DIAL RAIL
TO REMOVE PUSH BUTTON ASSEMBLY FROM DIAL--LOOSEN LOCKING SCREW--SLIDE PUSH BUTTON ALONG RAIL UNTIL SQUARE NUT ON BACK OF PUSH BUTTON IS IN SQUARE NOTCH IN DIAL RAIL, THEN PULL OUTWARD.
PUSH BUTTON CAP
GENTLY PRESS OVER PUSH BUTTON CUP AFTER CALL LETTER TAB AND CELLULOID DISC ARE IN POSITION.
LOCKING SCREW
LOCK PUSH BUTTON IN PLACE BY TIGHTENING THIS LOCKING SCREW WITH SCREW DRIVER.
CELLULOID DISC
PLACE ON TOP OF STATION CALL LETTER TAB.
STOP LEVER
TO TUNE RECEIVER AFTER PUSH BUTTONS ARE CORRECTLY SET--JUST PRESS IN DESIRED PUSH BUTTON WITH INDEX FINGER AND SWING DIAL UNTIL PUSH BUTTON STRIKES THIS STOP LEVER.
STATION CALL LETTER TAB
PLACE ON TOP OF PUSH BUTTON CUP.
PUSH BUTTON ASSEMBLY

**FROM ONE TO TEN STATIONS OPERATING ON FREQUENCIES SEPARATED BY FORTY KILOCYCLES OR MORE MAY BE AUTOMATICALLY TUNED BY PROPERLY SETTING PUSH BUTTONS.**

IT IS A SIMPLE MATTER TO "AUTOMATIC TUNE" AFTER THE STATION PUSH BUTTONS HAVE BEEN PROPERLY SET—JUST PLACE INDEX FINGER INTO THE PUSH BUTTON HAVING CALL LETTERS OF THE DESIRED STATION PUSHING INWARD—THEN SWING DIAL UNTIL DIAL STOPS, AT WHICH POINT THE DESIRED STATION SHOULD BE PROPERLY TUNED IN AND THE METAL INDICATOR ATTACHED TO THE PUSH BUTTON SHOULD POINT TO THE INDICATOR LINE ON FACE OF DIAL. If reception is slightly distorted—which may be particularly noticeable when tuning weak stations—retune for maximum clarity by using conventional tuning knobs.

WHILE A PUSH BUTTON MAY BE SET FOR DISTANT WEAK STATIONS, BETTER RESULTS WILL BE OBTAINED IF THE STATIONS SELECTED FOR AUTOMATIC PUSH BUTTON TUNING ARE STRONG NEARBY OR LOCAL STATIONS.

AFTER IT IS DETERMINED WHAT STATIONS YOU WISH TO "AUTOMATIC PUSH BUTTON TUNE" OBTAIN THE FREQUENCY USED AND CALL LETTERS OF THESE STATIONS AND SET PUSH BUTTONS BY:

To illustrate the proper installation and setting of the Push Buttons, the receiver is shipped from the factory with a Push Button properly set for station WGN, Chicago, 720 kilocycles. If station WGN is not one of the selected stations, remove call letters by:

a. Grasp cap section of Push Button between fingers and gently pull outward until it is clear of dial.

b. Carefully remove the station call letter tab and celluloid disc.

**SET STATION PUSH BUTTON BY:**

a. Gently press desired round paper station call letter tabs out of station tab sets.

b. Always set the first push button for the desired station that broadcasts on the lowest frequency—the least number of kilocycles—and then set the next push button for the selected station operating on the next lowest frequency, continuing on in this manner until a Push Button has been set for all of the desired stations.

c. Loosen Push Button locking screw and remove cups on all Push Buttons by grasping cap between fingers and gently pulling outward—then remove celluloid discs.

d. Carefully tune in the station which broadcasts on the lowest frequency—least number of kilocycles.

e. Slide the Push Button nearest to the low frequency end of dial scale—without moving dial—until metal indicator attached to Push Button is exactly even with the indicator line on the face of the dial,—then with a small screw driver firmly lock Push Button in place by tightening Push Button locking screw.

f. Place printed paper station call letter tab, having call letters of station tuned in—on top of Push Button cup, then—place celluloid protective disc on top of this and gently press Push Button cap firmly down over Push Button cup.

g. Next set a Push Button for the desired station operating on the next lowest frequency in the same manner as above and continue on in this way until all the Push Buttons have been properly set.

**AFTER THE TEN PUSH BUTTONS HAVE BEEN PROPERLY SET THEY WILL NOT REQUIRE FURTHER ATTENTION — EXCEPT WHEN MOVED FROM THEIR POSITION OR WHEN AN ADDITIONAL TAB IS INCLUDED WHICH WOULD DISTURB THE POSITION OF THE OTHER TABS.**

# PARTS LIST

## COMPLETE PUSH BUTTON DIAL ASSEMBLY LESS ESCUTCHEON

| Part No. | Part Name | Description | List Price |
|---|---|---|---|
| 211 | Dial Assembly | Used With Model 78B Complete Assembly Less Escutcheon | $12.75 |
| 212 | Dial Assembly | Used With Model 78BE Complete Assembly Less Escutcheon | 12.75 |
| 208 | Dial Assembly | Used With Model 82A Complete Assembly Less Escutcheon | 12.75 |
| 209 | Dial Assembly | Used With Model 82AE & 86AE Complete Assembly Less Escutcheon | 12.75 |
| 210 | Dial Assembly | Used With Model 91B & 95B Complete Assembly Less Escutcheon | 12.25 |

## MISCELLANEOUS PARTS USED IN ABOVE ASSEMBLIES

| | | | |
|---|---|---|---|
| 4047 | Cap | Push Button | .15 |
| 4046 | Celluloid Disc | Station Call Letter Cover | .05 |
| 3814 | Cord | Primary Drive Cord | .15 |
| 4013 | Cord | Secondary Drive Cord | .15 |
| 4041 | Cup Assembly | Push Button—With Clip and Compression Spring | .15 |
| 3995 | Band Indicator Assem. | For Model 78BE-78B-91B-95B | .75 |
| 3992 | Band Indicator Assem. | For Model 82AE-82A-86AE | .75 |
| 4011 | Drive Drum Assem. with | 4012 Secondary Pulley and Rubber Disc Coupler | 1.25 |
| 4355 | Drive Shaft | | .12 |
| 4027 | Disc | Translucent Dial Scale Background for Model 78BE | .50 |
| 3984 | Disc | Translucent Dial Scale Background for Model 82AE & 86AE | .55 |
| 4024 | Disc | Translucent Dial Scale Background for Model 82A | .55 |
| 4029 | Disc | Translucent Dial Scale Background for Model 91B, 95B & 78B | .50 |
| 3771 | Escutcheon | For Cabinet—All Models | 1.00 |
| 4040 | Hub Cap | | .15 |
| 4009 | Pulley | Dial Scale Drive (Die Cast) | .45 |
| 4039 | Plate | Slide Stop | .10 |
| 4000 | Scale | Calibrated Glass Scale With 4005 Shaft Assem. | 2.75 |
| 8071 | Screw | For Hub Cap 3-48 x 1/4" O.H.I.M. | .005 |
| 2754 | Screw | For Pulley 6-32 x 1/4" S.H.H. Cup Point | .01 |
| 4037 | Slide Stop | Push Button Stop | .10 |
| 4356 | Spring Lock | For Drive Shaft | .01 net |
| 4352 | Spring Tension | For Secondary Cord | .07 |
| 3462 | Spring Tension | For Primary Cord | .07 |

**Prices are subject to change without notice.**

**When ordering parts be sure to mention part number and order all parts from:**

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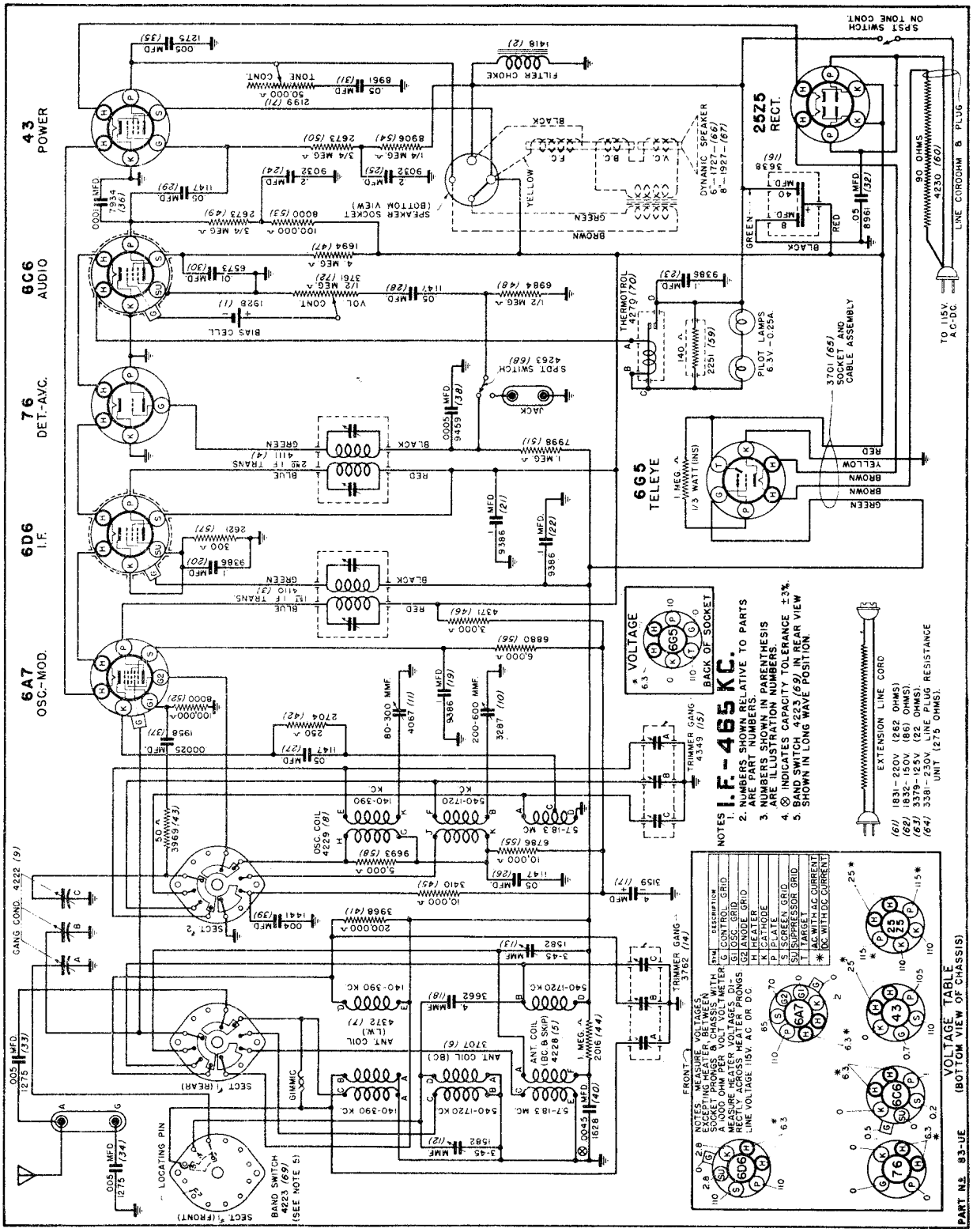
# SENTINEL RADIO CORP.

MODEL 83UE
Schematic, Voltage
Socket


43 POWER
6C6 AUDIO
76 DET.-AVC.
6D6 I.F.
6A7 OSC.-MOD.
6G5 TELEYE
2525 RECT.
I.F.-465 KC.
NOTES
1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. ⊗ INDICATES CAPACITY TOLERANCE ±3%.
4. BAND SWITCH 4223 (69) IN REAR VIEW SHOWN IN LONG WAVE POSITION.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
EXTENSION LINE CORD
(61) 1831-220V (262 OHMS)
(62) 1832-150V (86 OHMS)
(63) 3379-125V (22 OHMS).
(64) 3381-230V LINE PLUG RESISTANCE UNIT (275 OHMS).
PART No. 83-UE

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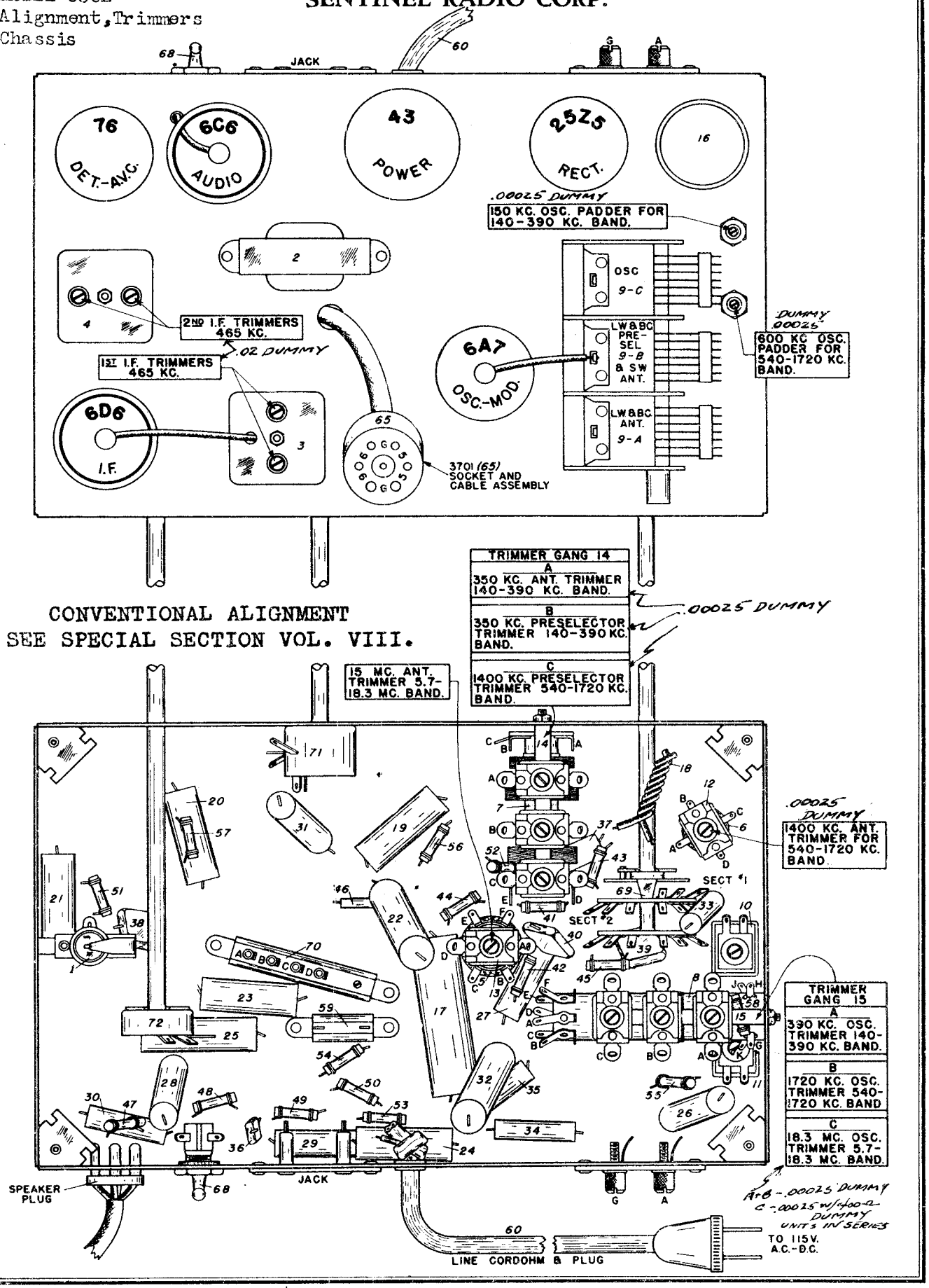
MODEL 83UE
Alignment, Trimmers
Chassis

# SENTINEL RADIO CORP.


JACK
76 DET.-A.V.C.
6C6 AUDIO
43 POWER
25Z5 RECT.
16
.00025 DUMMY
150 KC. OSC. PADDER FOR 140-390 KC. BAND.
OSC 9-C
LW & BC PRE-SEL 9-B & SW ANT.
LW & BC ANT. 9-A
DUMMY .00025
600 KC OSC. PADDER FOR 540-1720 KC. BAND.
2ND I.F. TRIMMERS 465 KC.
.02 DUMMY
1ST I.F. TRIMMERS 465 KC.
6A7 OSC.-MOD.
6D6 I.F.
3701 (65) SOCKET AND CABLE ASSEMBLY
TRIMMER GANG 14
A 350 KC. ANT. TRIMMER 140-390 KC. BAND.
B 350 KC. PRESELECTOR TRIMMER 140-390 KC. BAND.
C 1400 KC. PRESELECTOR TRIMMER 540-1720 KC. BAND.
.00025 DUMMY
15 MC. ANT. TRIMMER 5.7-18.3 MC. BAND.
.00025 DUMMY
1400 KC. ANT. TRIMMER FOR 540-1720 KC. BAND
SECT #1
SECT #2
TRIMMER GANG 15
A 390 KC. OSC. TRIMMER 140-390 KC. BAND.
B 1720 KC. OSC. TRIMMER 540-1720 KC. BAND
C 18.3 MC. OSC. TRIMMER 5.7-18.3 MC. BAND.
A & B - .00025 DUMMY
C - .0025 W/400Ω DUMMY UNITS IN SERIES
SPEAKER PLUG
JACK
LINE CORDOHM & PLUG
TO 115V. A.C.-D.C.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

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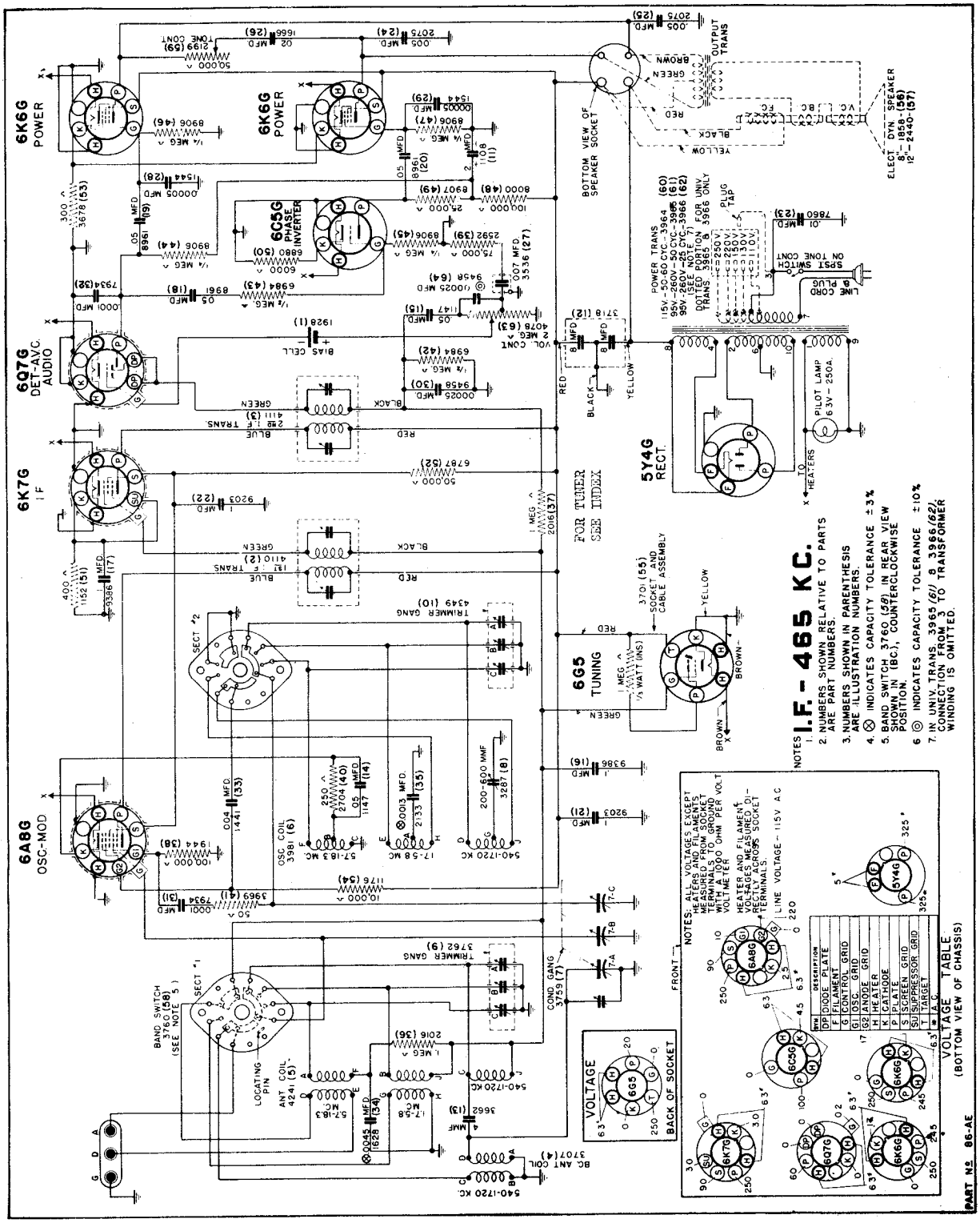
# SENTINEL RADIO CORP.

MODEL 86AE
Schematic, Voltage
Socket


I.F. - 465 KC.
NOTES
1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. ⊗ INDICATES CAPACITY TOLERANCE ±3%
4. ◎ INDICATES CAPACITY TOLERANCE ±10%
5. BAND SWITCH 3760 (58) IN REAR VIEW SHOWN IN (BC), COUNTERCLOCKWISE POSITION.
6. IN UNIV. TRANS. 3965 (61) & 3966 (62) CONNECTION FROM 3 TO TRANSFORMER WINDING IS OMITTED.
6K6G POWER
6K6G POWER
6C5G PHASE INVERTER
6Q7G DET-AVC AUDIO
6K7G I F
6A8G OSC-MOD
6G5 TUNING
5Y4G RECT.
FOR TUNER SEE INDEX
OUTPUT TRANS
ELECT DYN SPEAKER
SPST SWITCH ON TONE CONT
LINE CORD & PLUG
PILOT LAMP 6.3V - 250A
TO HEATERS
BOTTOM VIEW OF SPEAKER SOCKET
BAND SWITCH 3760 (58) (SEE NOTE 5)
TRIMMER GANG
COND GANG 3759 (7)
OSC. COIL 3981 (6)
ANT. COIL 4241 (5)
LOCATING PIN
BC ANT COIL 3707 (4)
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
BACK OF SOCKET
PART No. 86-AE

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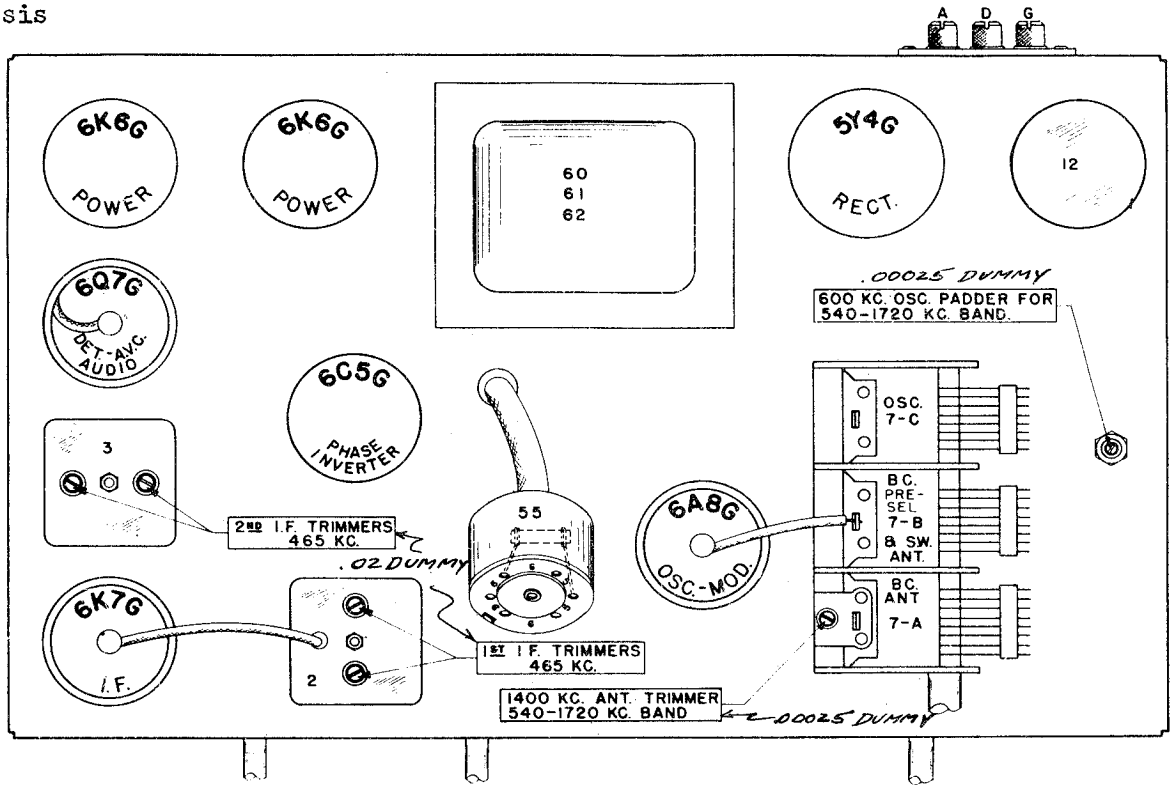
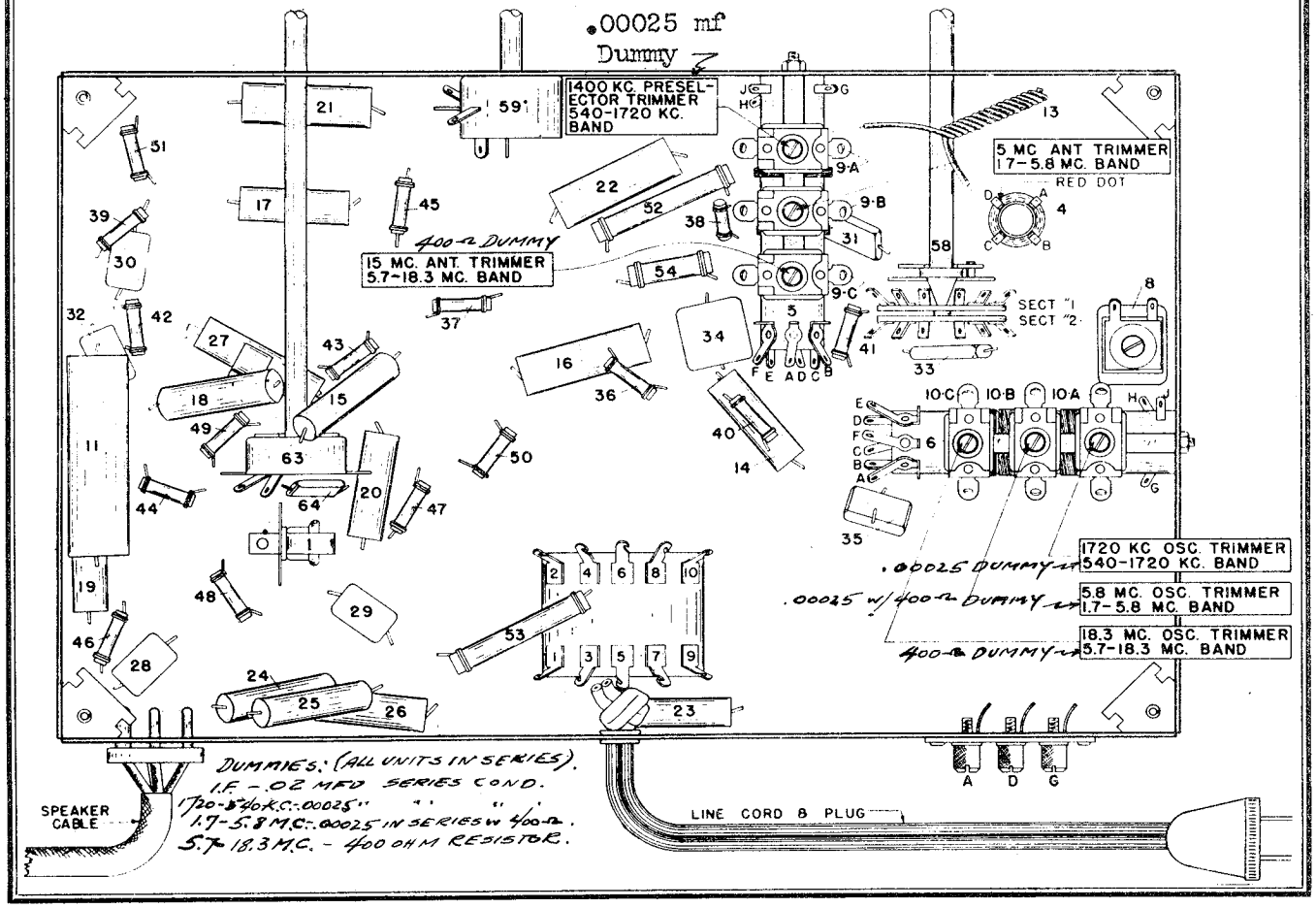
MODEL 86AE
Alignment, Trimmers
Chassis

# SENTINEL RADIO CORP.




## CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.


.00025 mf Dummy
1400 KC. PRESELECTOR TRIMMER 540-1720 KC. BAND
5 MC. ANT TRIMMER 1.7-5.8 MC. BAND
RED DOT
400Ω DUMMY
15 MC. ANT. TRIMMER 5.7-18.3 MC. BAND
SECT "1"
SECT "2"
1720 KC OSC. TRIMMER 540-1720 KC. BAND
.00025 DUMMY
.00025 w/ 400Ω DUMMY
5.8 MC. OSC. TRIMMER 1.7-5.8 MC. BAND
18.3 MC. OSC. TRIMMER 5.7-18.3 MC. BAND
400Ω DUMMY
DUMMIES: (ALL UNITS IN SERIES).
I.F. - .02 MFD SERIES COND.
1720-540 K.C. - .00025 " " "
1.7-5.8 M.C. - .00025 IN SERIES w 400Ω.
5.7-18.3 M.C. - 400 OHM RESISTOR.
SPEAKER CABLE
LINE CORD & PLUG
A D G

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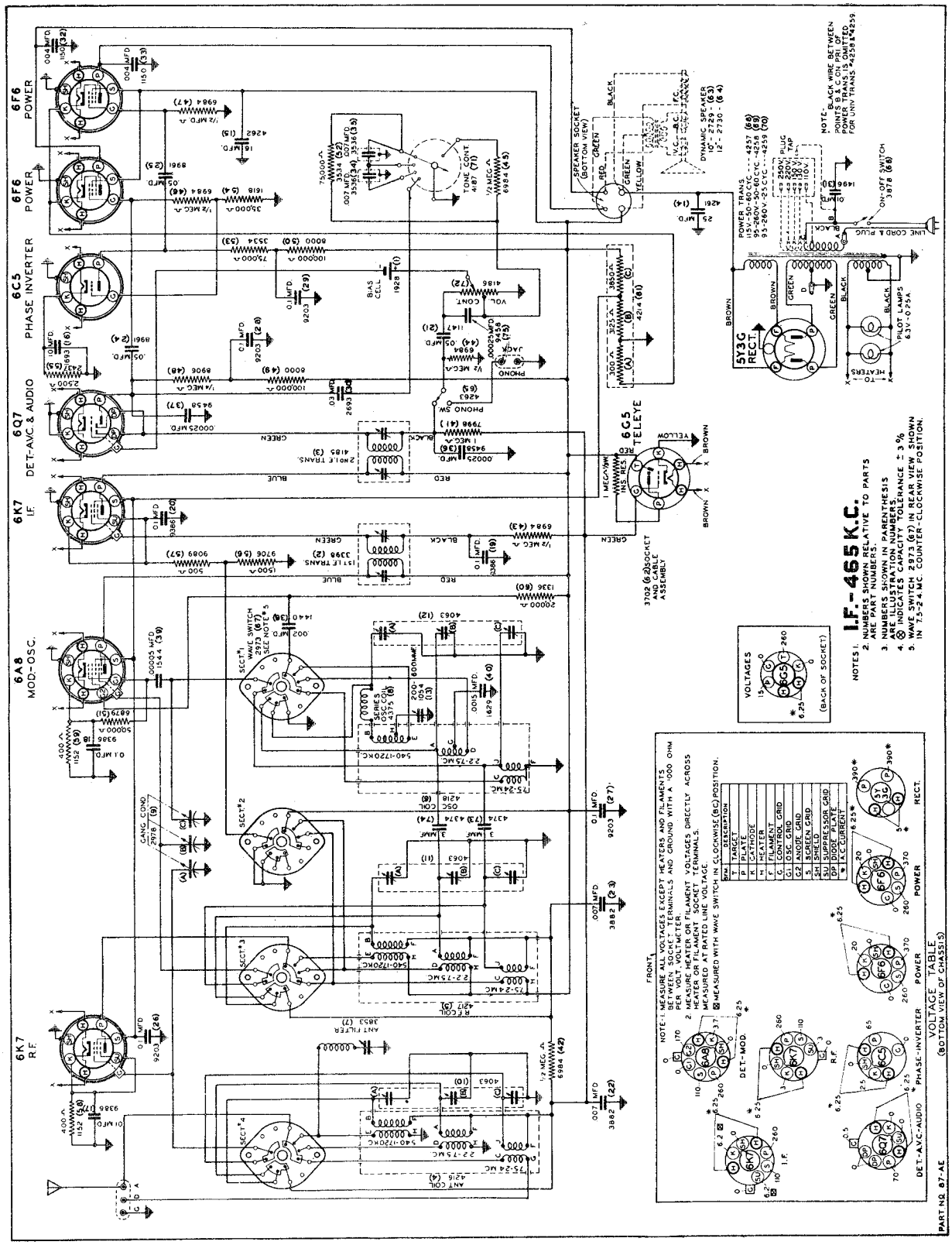
# SENTINEL RADIO CORP.

MODEL 87AE
Schematic, Voltage
Socket

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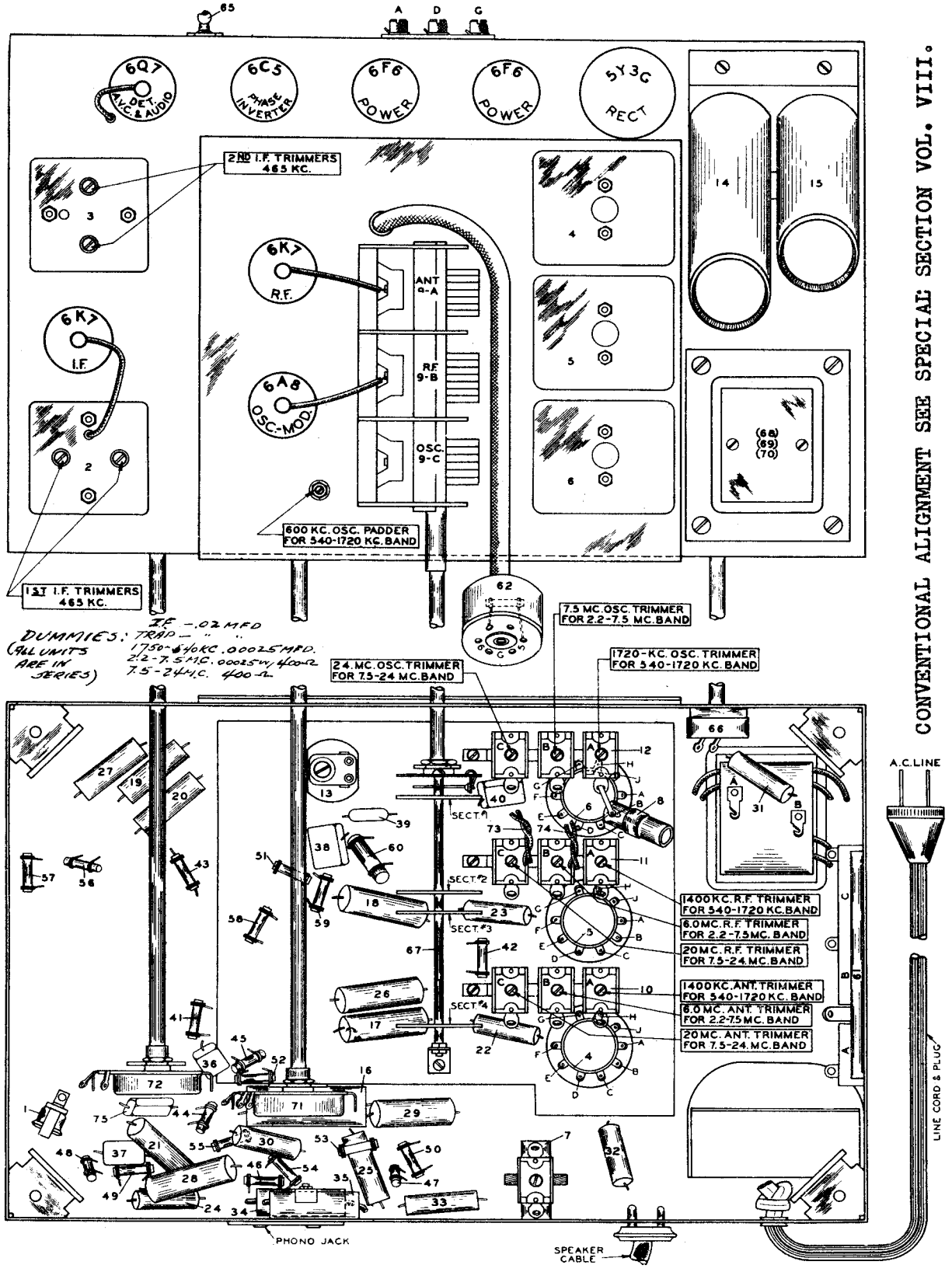
MODEL 87AE
Alignment, Trimmers
Chassis

# SENTINEL RADIO CORP.


6Q7 DET. A.V.C. & AUDIO
6C5 PHASE INVERTER
6F6 POWER
6F6 POWER
5Y3G RECT
2ND I.F. TRIMMERS 465 KC.
6K7 R.F.
6K7 I.F.
6A8 OSC-MOD
ANT a-A
RF 9-B
OSC. 9-C
600 KC. OSC. PADDER FOR 540-1720 KC. BAND
1ST I.F. TRIMMERS 465 KC.
DUMMIES: (ALL UNITS ARE IN SERIES)
IF .02 MFD
TRAP " "
1750-540 KC. .00025 MFD.
2.2-7.5 M.C. .00025 MFD. 400Ω
7.5-24 M.C. 400Ω
7.5 MC. OSC. TRIMMER FOR 2.2-7.5 MC. BAND
24 MC. OSC. TRIMMER FOR 7.5-24 MC. BAND
1720-KC. OSC. TRIMMER FOR 540-1720 KC. BAND
1400 KC. R.F. TRIMMER FOR 540-1720 KC. BAND
6.0 MC. R.F. TRIMMER FOR 2.2-7.5 MC. BAND
20 MC. R.F. TRIMMER FOR 7.5-24 MC. BAND
1400 KC. ANT. TRIMMER FOR 540-1720 KC. BAND
6.0 MC. ANT. TRIMMER FOR 2.2-7.5 MC. BAND
20 MC. ANT. TRIMMER FOR 7.5-24 MC. BAND
A.C. LINE
LINE CORD & PLUG
PHONO JACK
SPEAKER CABLE
SECT. #1
SECT. #2
SECT. #3
SECT. #4

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

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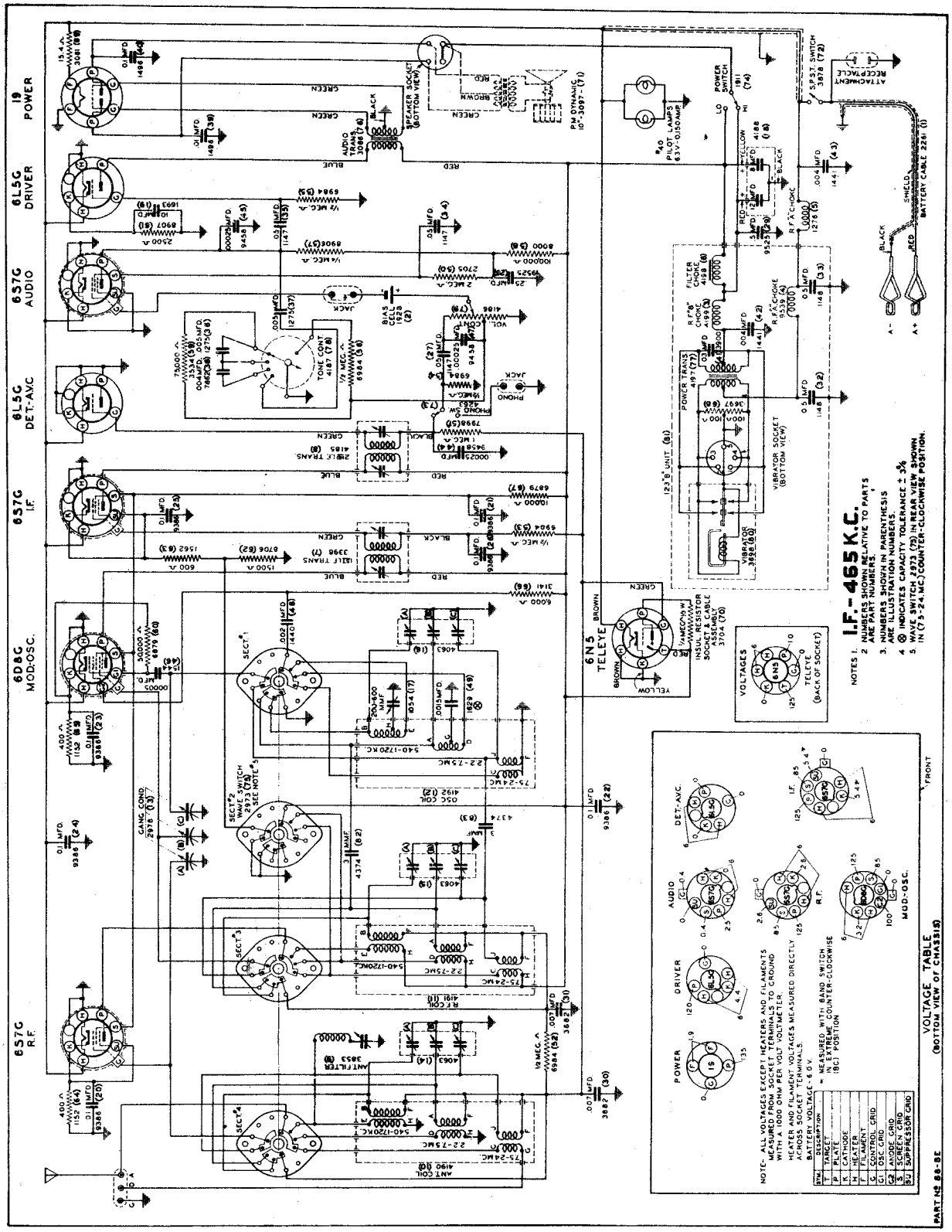
# SENTINEL RADIO CORP.

MODEL 88BE
Schematic, Voltage
Socket

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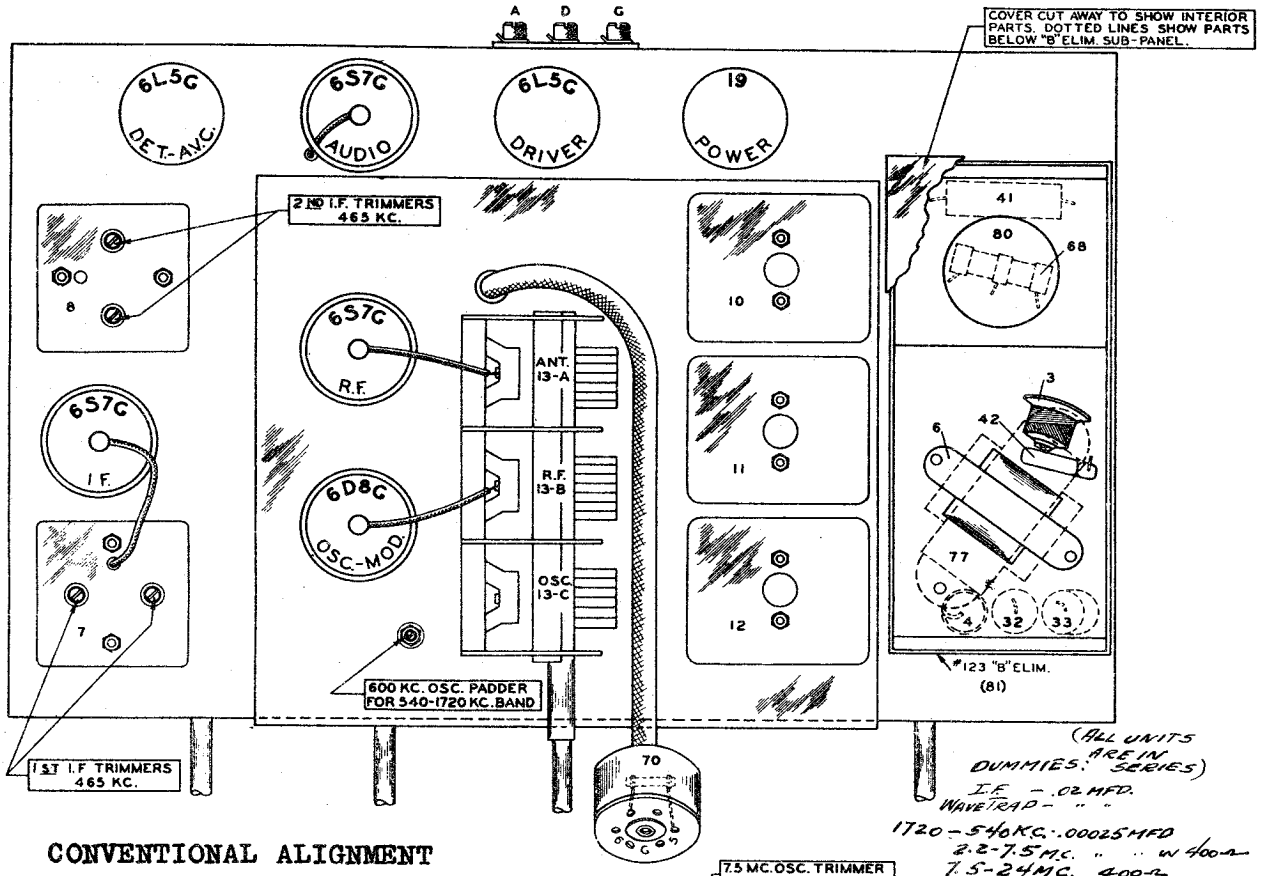
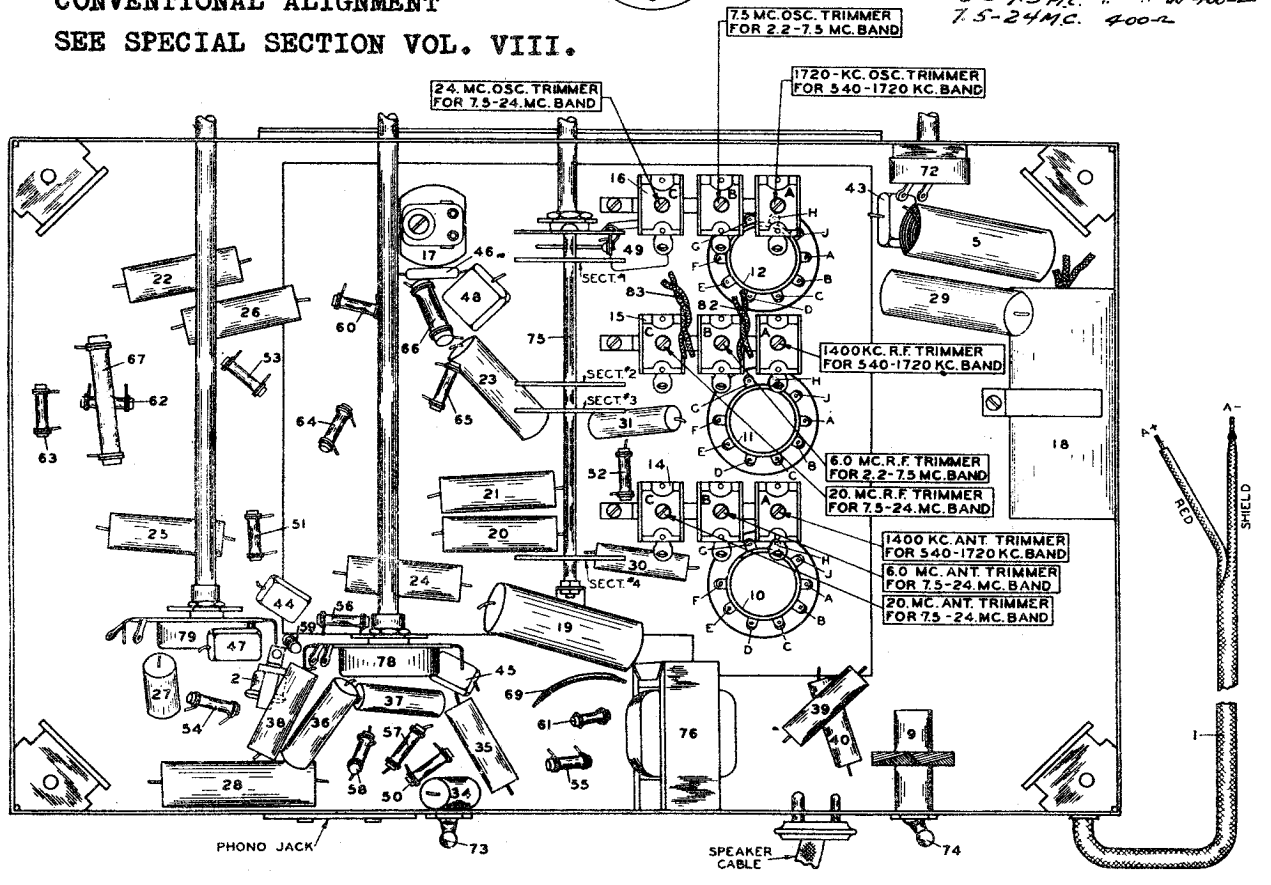
MODEL 88BE
Alignment, Trimmers
Chassis

# SENTINEL RADIO CORP.




**CONVENTIONAL ALIGNMENT**

**SEE SPECIAL SECTION VOL. VIII.**


7.5 MC. OSC. TRIMMER FOR 2.2-7.5 MC. BAND
24 MC. OSC. TRIMMER FOR 7.5-24 MC. BAND
1720-KC. OSC. TRIMMER FOR 540-1720 KC. BAND
1400 KC. R.F. TRIMMER FOR 540-1720 KC. BAND
6.0 MC. R.F. TRIMMER FOR 2.2-7.5 MC. BAND
20. MC. R.F. TRIMMER FOR 7.5-24. MC. BAND
1400 KC. ANT. TRIMMER FOR 540-1720 KC. BAND
6.0 MC. ANT. TRIMMER FOR 7.5-24. MC. BAND
20. MC. ANT. TRIMMER FOR 7.5-24. MC. BAND
SECT. #1
SECT. #2
SECT. #3
SECT. #4
RED
SHIELD
PHONO JACK
SPEAKER CABLE

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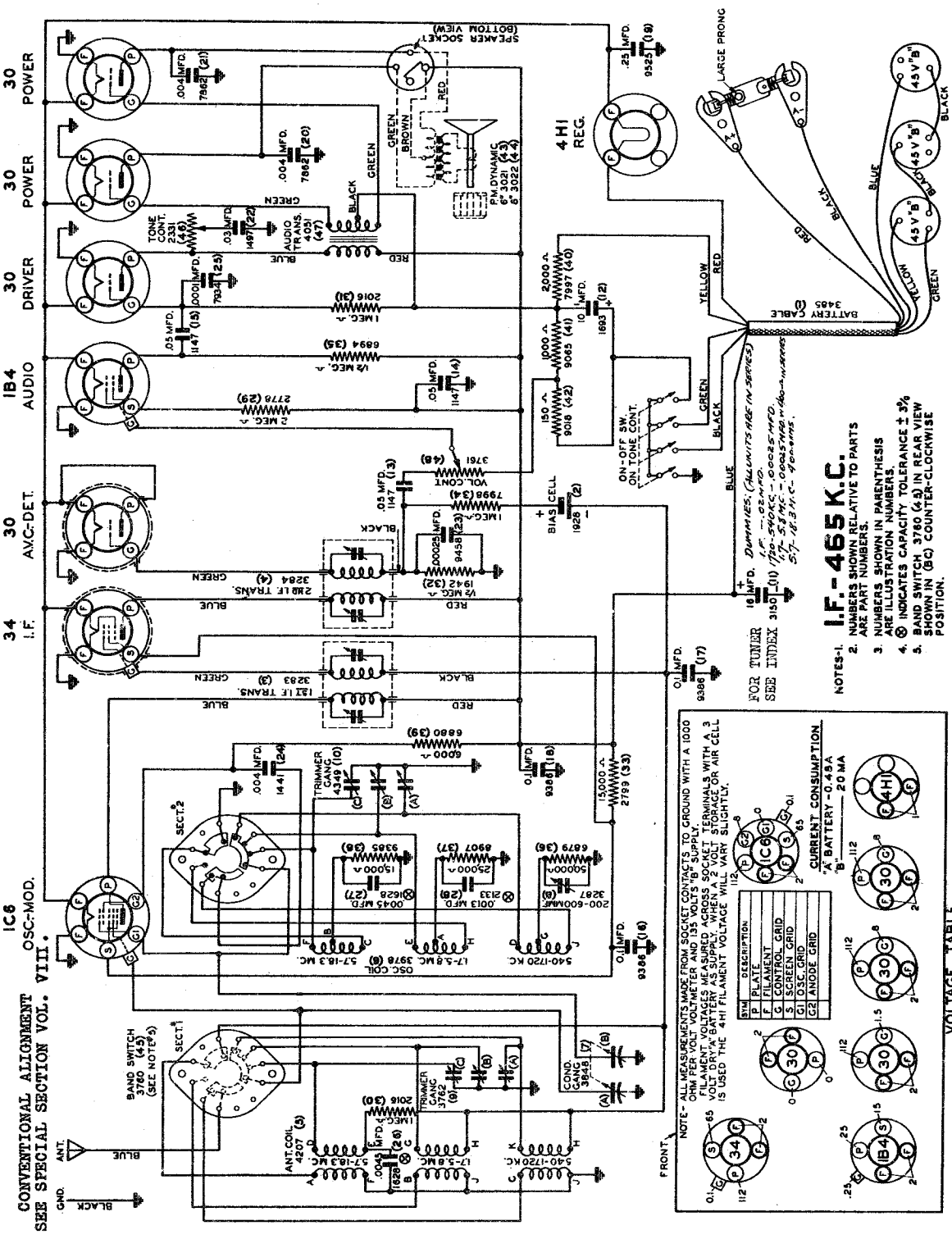
# SENTINEL RADIO CORP.

MODEL 91B
Schematic, Voltage
Socket, Alignment


I.F.-465 K.C.
NOTES-1. DUMMIES: (ALL UNITS ARE IN SERIES) I.F. COILS - 1000 OHMS EACH. OSC. COIL - 1000 OHMS. ON-OFF SW. & TONE CONT. - 1000 OHMS. ALL 1/2 WATT.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊗ INDICATES CAPACITY TOLERANCE ± 3%
5. BAND SWITCH 3760 (45) IN REAR VIEW SHOWN IN (BC) COUNTER-CLOCKWISE POSITION.
FOR TUNER SEE INDEX
CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.
IC6 OSC-MOD.
34 I.F.
30 A.V.C-DET.
1B4 AUDIO
30 DRIVER
30 POWER
30 POWER
4HI REG.
30 POWER
SPEAKER SOCKET (BOTTOM VIEW)
P.M. DYNAMIC 6" 3021 (43) 6" 3022 (44)
BATTERY CABLE 3485 (1)
LARGE PRONG
45 V "B"
45 V "B"
45 V "B"
BLACK
BLUE
YELLOW
GREEN
RED
BAND SWITCH 3760 (45) (SEE NOTE 5)
ANT.
GND.
ANT. COIL 4207 (3)
OSC. COIL 3978 (6)
TRIMMER GANG 4349 (10)
TRIMMER GANG 3762 (9)
COND. GANG 3945 (7)
17-5.8 MC
57-18.3 MC
540-1720 KC
FRONT
SECT. 1
SECT. 2
CURRENT CONSUMPTION
"A" BATTERY - 0.45A
"B" 20 MA
SYM. DESCRIPTION
P PLATE
F FILAMENT
G CONTROL GRID
S SCREEN GRID
G1 OSC. GRID
G2 ANODE GRID
NOTE - ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 135 VOLTS "B" SUPPLY.
FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 3 VOLT "A" BATTERY. SET OPERATED WITH 2 VOLT STORAGE OR AIR CELL IS USED THE 4HI FILAMENT VOLTAGE WILL VARY SLIGHTLY.
VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)
PART № 91-B
Looking at bottom of chassis, the three antenna trimmers on coil attached to front of chassis, reading from front to rear are; 1400 KC, 5 MC & 15 MC.
The three oscillator trimmers on the coil mounted on side of chassis, reading from chassis to end of coils are: 1720 KC, 6.8 MC & 18.3 MC.

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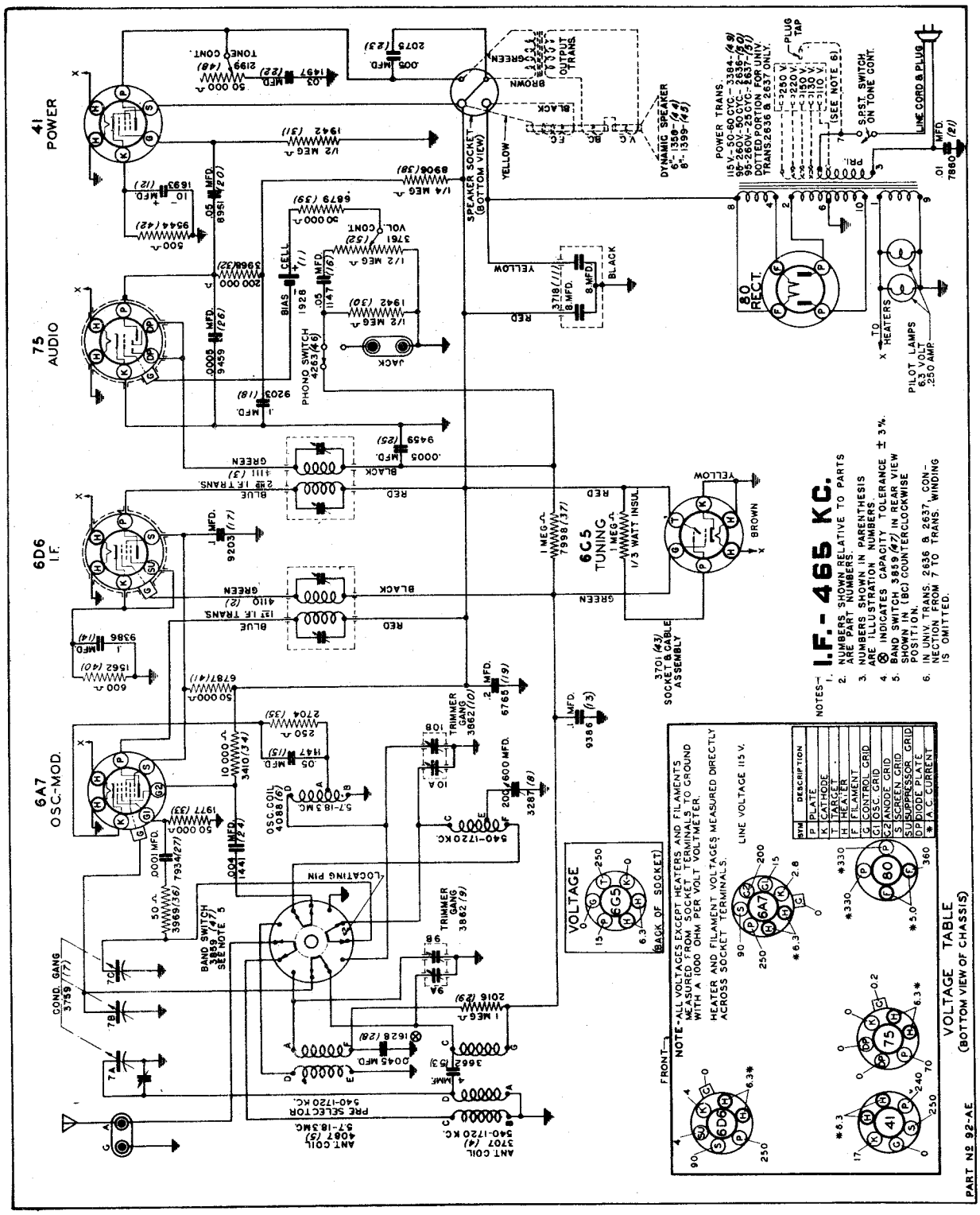
MODEL 92AE
Schematic, Voltage
Socket

# SENTINEL RADIO CORP.


I.F.-465 KC.
NOTES-
1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. ⊗ INDICATES CAPACITY TOLERANCE ± 3%.
4. BAND SWITCH 3859 (47) IN REAR VIEW SHOWN IN (BC) COUNTERCLOCKWISE POSITION.
5. IN UNIV. TRANS. 2636 & 2637, CONNECTION FROM 7 TO TRANS. WINDING IS OMITTED.
6. ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER.
HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
LINE VOLTAGE 115 V.
SYM DESCRIPTION
P PLATE
K CATHODE
T TARGET
H HEATER
F FILAMENT
G CONTROL GRID
G1 OSC. G. GRID
G2 SCREEN GRID
S SUPPRESSOR GRID
D DIODE PLATE
* A.C. CURRENT
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
PART Nº 92-AE
41 POWER
75 AUDIO
6D6 I.F.
6A7 OSC-MOD.
6G5 TUNING
80 RECT.
SPEAKER SOCKET (BOTTOM VIEW)
DYNAMIC SPEAKER
POWER TRANS.
115 V.-50-60 CYC.- 3384-(49)
95-260V.-90 CYC.- 8635-(50)
95-260V.-25 CYC.- 8637-(50)
DOTTED PORTION FOR UNIV. TRANS. 2636 & 2637 ONLY.
S.P.S.T. SWITCH ON TONE CONT.
LINE CORD & PLUG
PILOT LAMPS 6.3 VOLT .250 AMP.
TO HEATERS
PHONO SWITCH 4263(46)
BAND SWITCH 3859(47) SEE NOTE 5
TONE CONT. 2199 (48)
VOL. CONT. 3761 (52)
BIAS CELL 1928 (11)
OSC. COIL 4088(6)
ANT. COIL 4087 (5)
ANT. COIL 3707 (4)
PRE SELECTOR
540-1720 KC.
57-18.3 MC.
TRIMMER GANG 3862 (9)
TRIMMER GANG 3862 (10)
COND. GANG 3755 (77)
SOCKET & CABLE ASSEMBLY 3701 (43)
BACK OF SOCKET
FRONT
NOTE-

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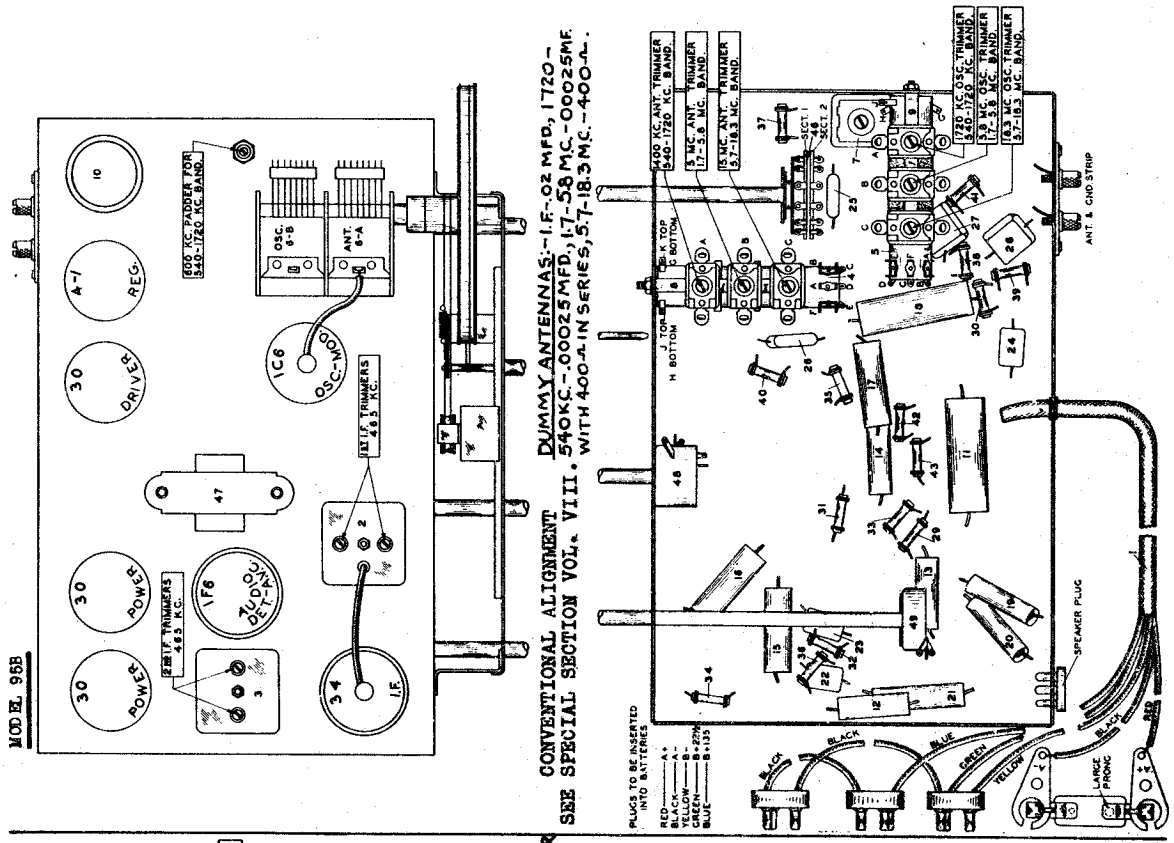
# SENTINEL RADIO CORP.

MODEL 92AE
MODEL 95B
Alignment, Trimmers
Chassis

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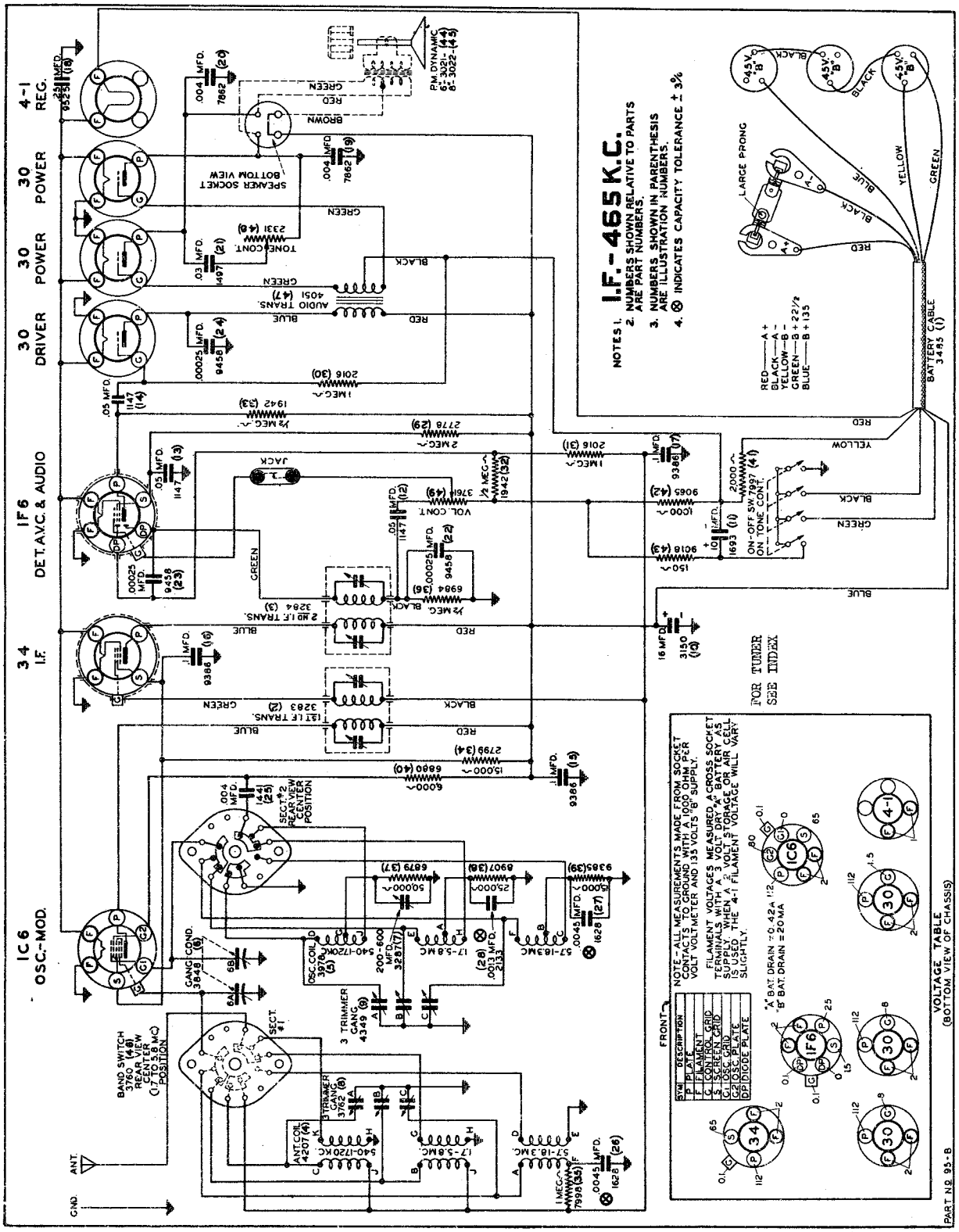
MODEL 95B
Schematic, Voltage
Socket

# SENTINEL RADIO CORP.

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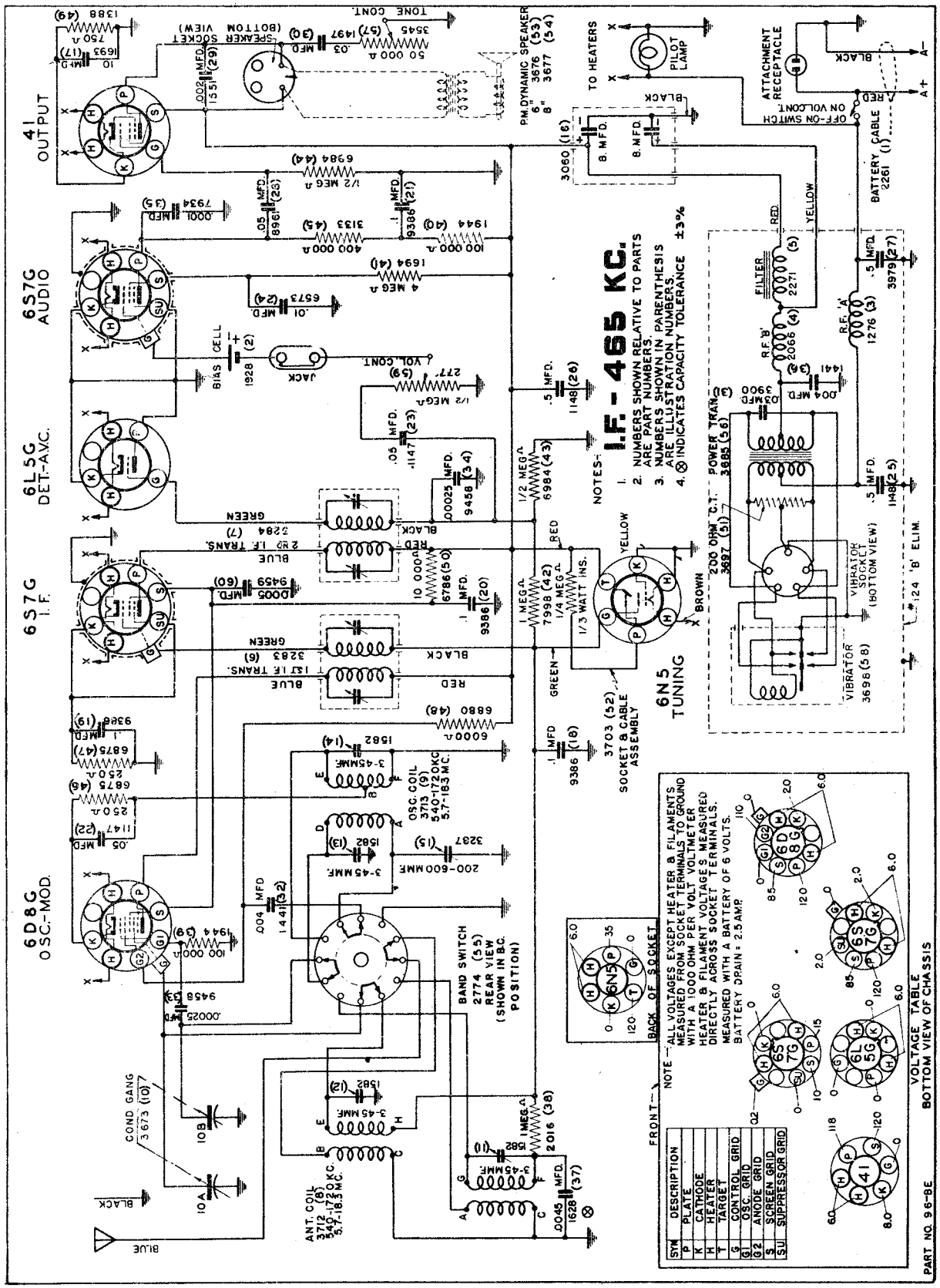
# SENTINEL RADIO CORP.

MODEL 96BE
Schematic, Voltage
Socket


I.F. - 465 KC.
NOTES-
1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. ⊗ INDICATES CAPACITY TOLERANCE ±3%
6D8G OSC.-MOD.
6S7G I.F.
6L5G DET.-A.V.C.
6S7G AUDIO
41 OUTPUT
6N5 TUNING
BAND SWITCH 2774 (55) REAR VIEW (SHOWN IN B.C. POSITION)
OSC. COIL 3713 (9) 540-1720 KC. 5.7-183 MC.
ANT. COIL 3712 (8) 540-1720 KC. 5.7-183 MC.
COND GANG 3673 (10)
3703 (52) SOCKET & CABLE ASSEMBLY
PM DYNAMIC SPEAKER 6" 3676 (53) 8" 3677 (54)
SPEAKER SOCKET (BOTTOM VIEW)
TONE CONT.
VOL. CONT.
BIAS CELL 1928 (2)
JACK
TO HEATERS
PILOT LAMP
ATTACHMENT RECEPTACLE
OFF-ON SWITCH ON VOL. CONT.
BATTERY CABLE 2261 (1)
FILTER 2271 (5)
R.F. 'B' 2066 (4)
R.F. 'A' 1276 (3)
POWER TRANS. 3885 (56)
200 OHM C.T. 3697 (51)
VIBRATOR 3696 (58)
VIBRATOR SOCKET (BOTTOM VIEW)
124 'B' ELIM.
FRONT
NOTE — ALL VOLTAGES EXCEPT HEATER & FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER
HEATER & FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
MEASURED WITH A BATTERY OF 6 VOLTS.
BATTERY DRAIN - 2.5 AMP.
SYM DESCRIPTION
P PLATE
K CATHODE
H HEATER
T TARGET
G CONTROL GRID
G1 OSC. GRID
G2 ANODE GRID
S SCREEN GRID
SU SUPPRESSOR GRID
VOLTAGE TABLE
BOTTOM VIEW OF CHASSIS
PART NO. 96-BE

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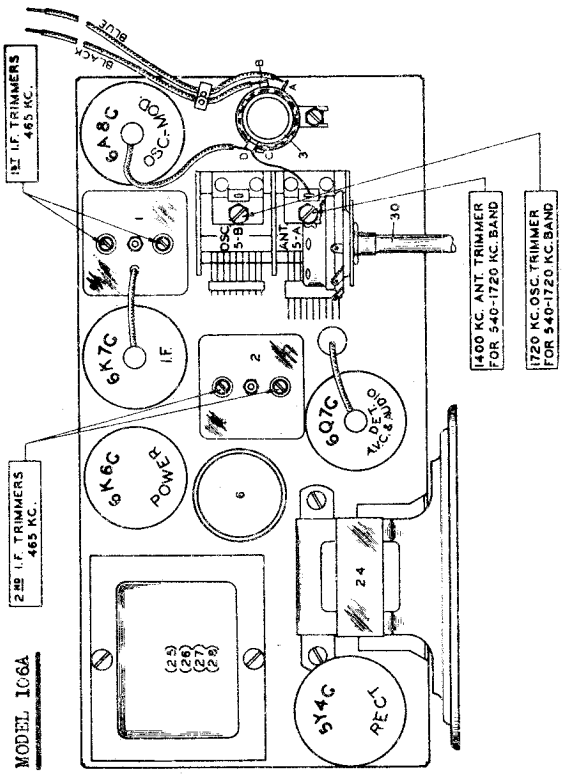
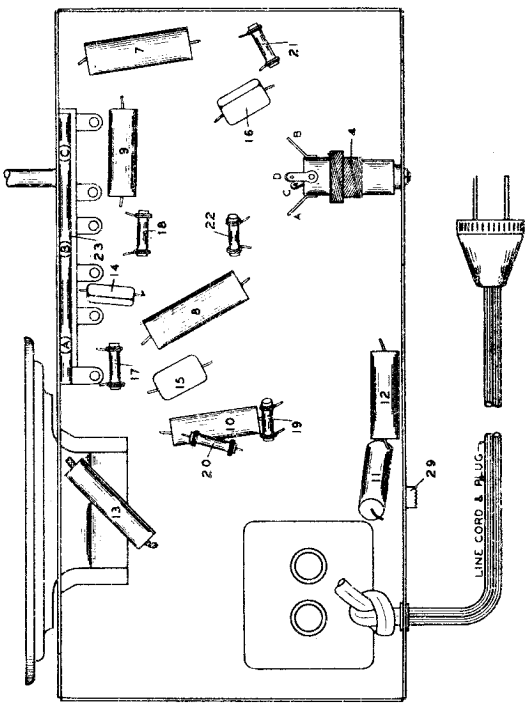
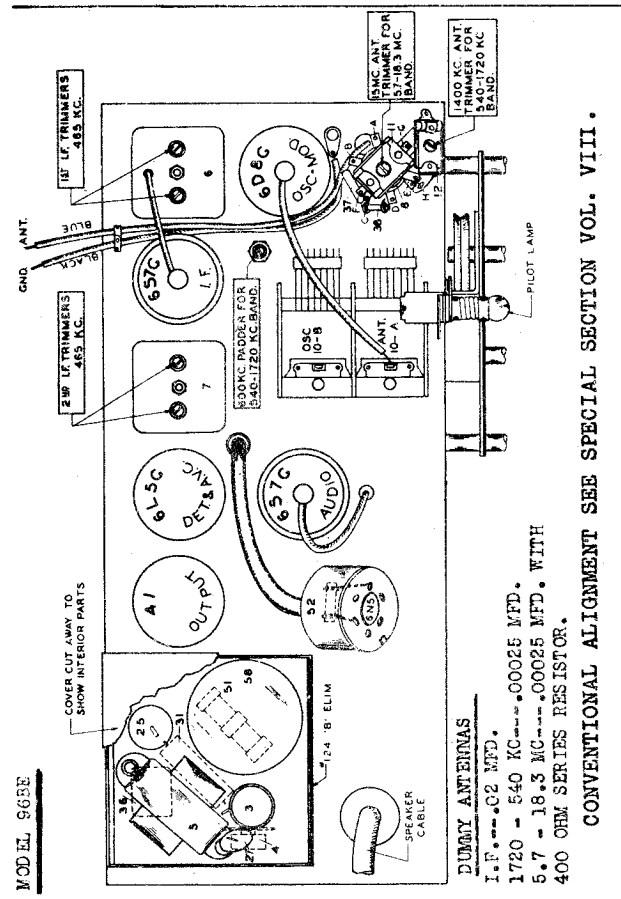
MODEL 96BE
Alignment, Trimmers
Chassis

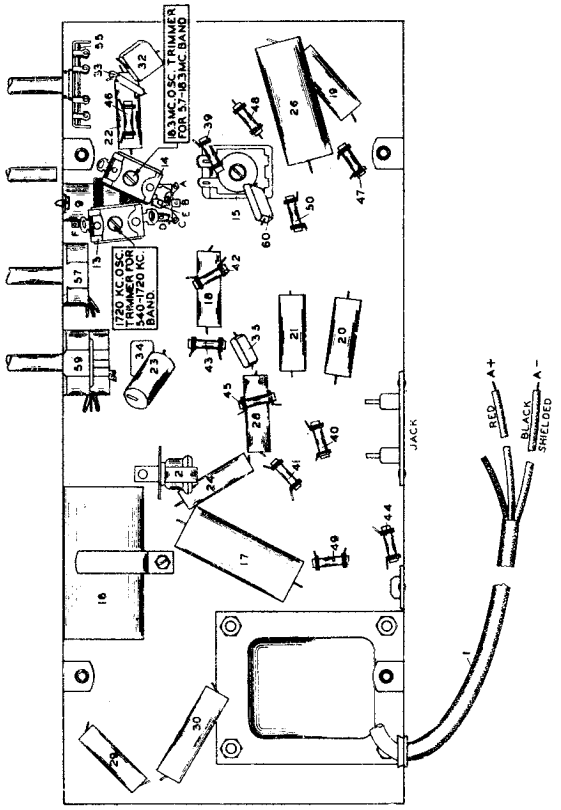
# SENTINEL RADIO CORP.

MODEL 106A
Trimmers, Chassis




DUMMY ANTENNAS
I.F. ---.02 MFD.
1720 - 540 KC ---.00025 MFD.
5.7 - 18.3 MC ---.00025 MFD. WITH
400 OHM SERIES RESISTOR.

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

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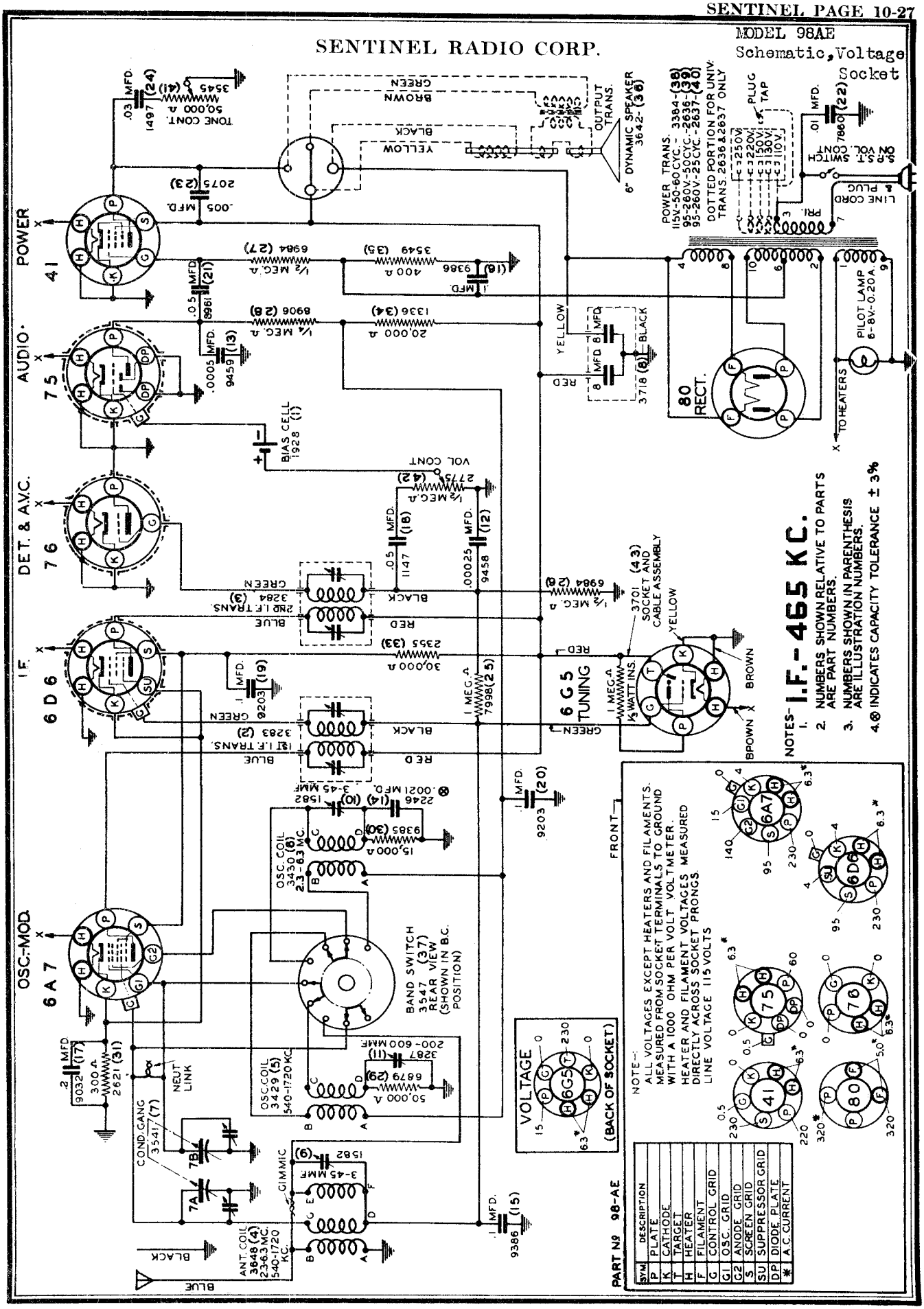
# SENTINEL RADIO CORP.

MODEL 98AE
Schematic, Voltage
Socket


6A7 OSC.-MOD.
6D6 I.F.
76 DET. & A.V.C.
75 AUDIO
41 POWER
80 RECT.
6G5 TUNING
I.F.-465 KC.
NOTES-
1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. 4.0 INDICATES CAPACITY TOLERANCE ± 3%
BAND SWITCH 3547 (37) REAR VIEW (SHOWN IN B.C. POSITION)
OSC. COIL 3430 (6) 2.3-6.3 MC.
OSC. COIL 3429 (5) 540-1720 KC.
ANT. COIL 3648 (4) 2363 MC 540-1720 KC
COND. GANG 3541 (7)
NEUT. LINK
GIMMIC
1ST I.F. TRANS. 3283 (2)
2ND I.F. TRANS. 3284 (3)
3701 (43) SOCKET AND CABLE ASSEMBLY
BIAS CELL 1928 (1)
VOL. CONT.
TONE CONT.
OUTPUT TRANS.
6" DYNAMIC SPEAKER 3642-(36)
POWER TRANS. 115V-50-60 CYC.-3384-(38) 95-260V-50CYC.-2636-(39) 95-260V-25CYC.-2637-(40)
DOTTED PORTION FOR UNIV. TRANS. 2636 & 2637 ONLY
PLUG TAP
LINE CORD PLUG
ON S.T. VOL. CONT. SWITCH
PILOT LAMP 6-8V-0.20A
TO HEATERS
FRONT
VOLTAGE (BACK OF SOCKET)
NOTE:- ALL VOLTAGES EXCEPT HEATERS AND FILAMENTS. MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET PRONGS. LINE VOLTAGE 115 VOLTS
PART Nº 98-AE
SYM DESCRIPTION
P PLATE
K CATHODE
T TARGET
H HEATER
F FILAMENT
G CONTROL GRID
G1 OSC. GRID
G2 ANODE GRID
S SCREEN GRID
SU SUPPRESSOR GRID
DP DIODE PLATE
* A.C. CURRENT

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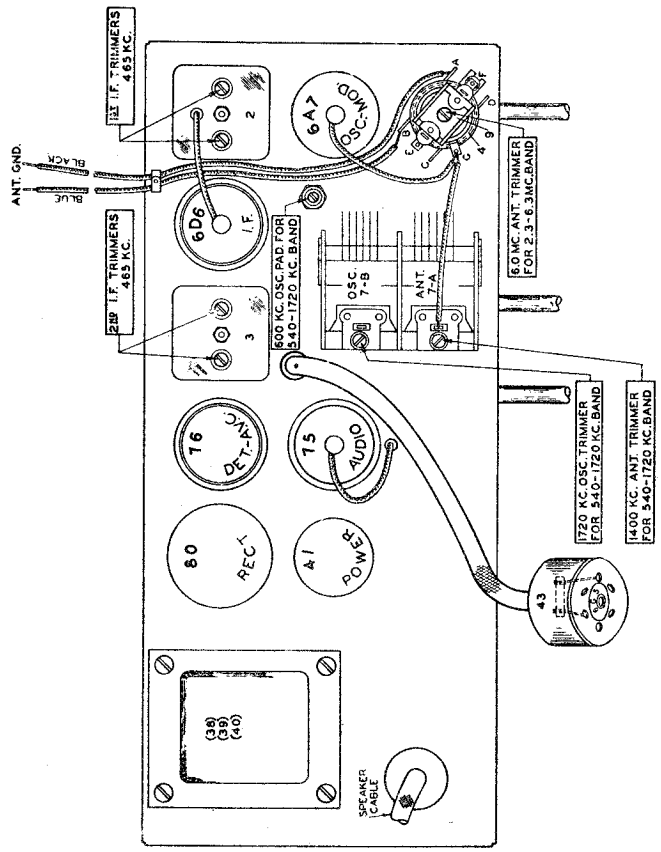
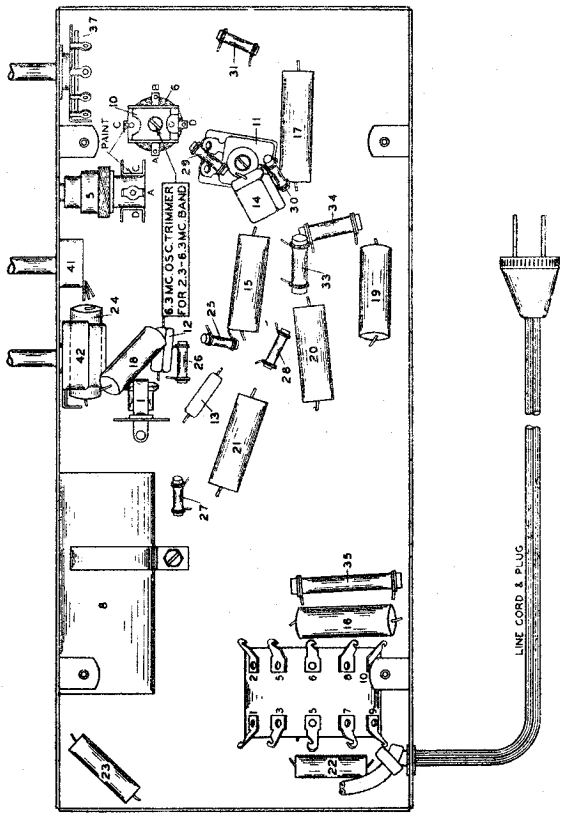
MODEL 98AE
Trimmers, Chassis
Alignment

# SENTINEL RADIO CORP.




**ALIGNMENT PROCEDURE:**

Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

NOTE: BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

**ALIGNING I.F. STAGE AT 465 KILOCYCLES:**

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

**ALIGNING 1720-540 KILOCYCLE BAND:**

(a) Remove test oscillator lead from grid of the 6A7 tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.

(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.

(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.

(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.

(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.

(h) While rocking the tuning condenser back and forth adjust 600 KC oscillator padder condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

**ALIGNING 2.3-6.3 MEGACYCLE BAND:**

(a) Replace .00025 Mfd. Test oscillator antenna lead series condenser with a 400 ohm resistor.

(b) Adjust band selector switch for 2.3-6.3 megacycles band operation, tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.

(c) Bring in 6.3 megacycle test oscillator signal to maximum output by adjusting 6.3 M.C. oscillator trimmer on top of coil located underneath chassis.

(d) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles, and adjust 6 M.C. antenna trimmer which is mounted on coil located on top of chassis for maximum sensitivity.

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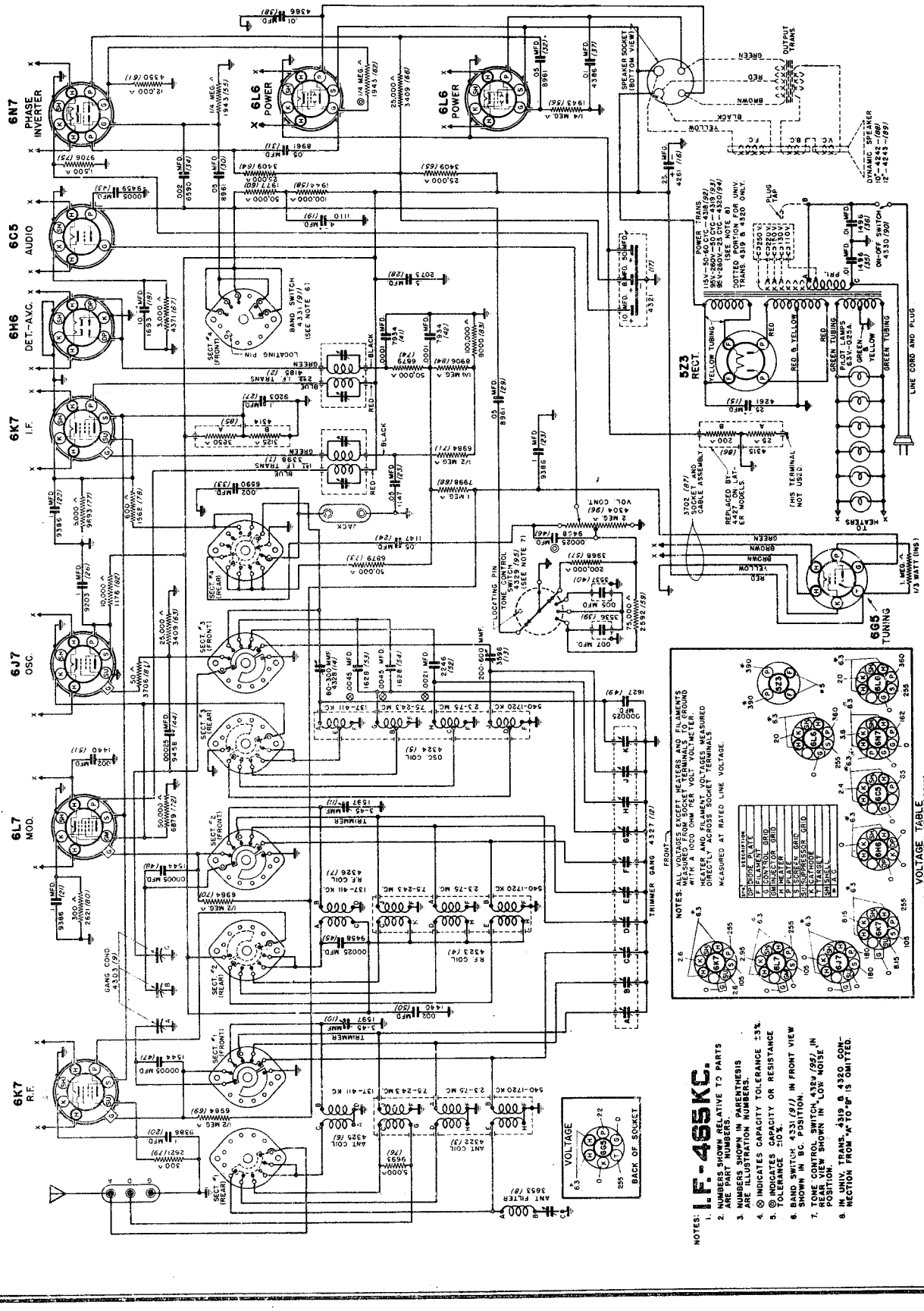
# SENTINEL RADIO CORP.

MODEL 99AE
Schematic, Voltage
Socket




NOTES:
1. I.F.-455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊗ INDICATES CAPACITY TOLERANCE ±3%.
5. ⊙ INDICATES CAPACITY OR RESISTANCE TOLERANCE ±10%.
6. BAND SWITCH 4331 (91) IN FRONT VIEW SHOWN IN BC. POSITION.
7. TONE CONTROL SWITCH 4328 (95) IN REAR VIEW SHOWN IN "LOW NOISE" POSITION.
8. IN UNIV. TRANS. 4319 & 4320 CONNECTION FROM "A" TO "B" IS OMITTED.

NOTES: ALL VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. MEASURED AT RATED LINE VOLTAGE.

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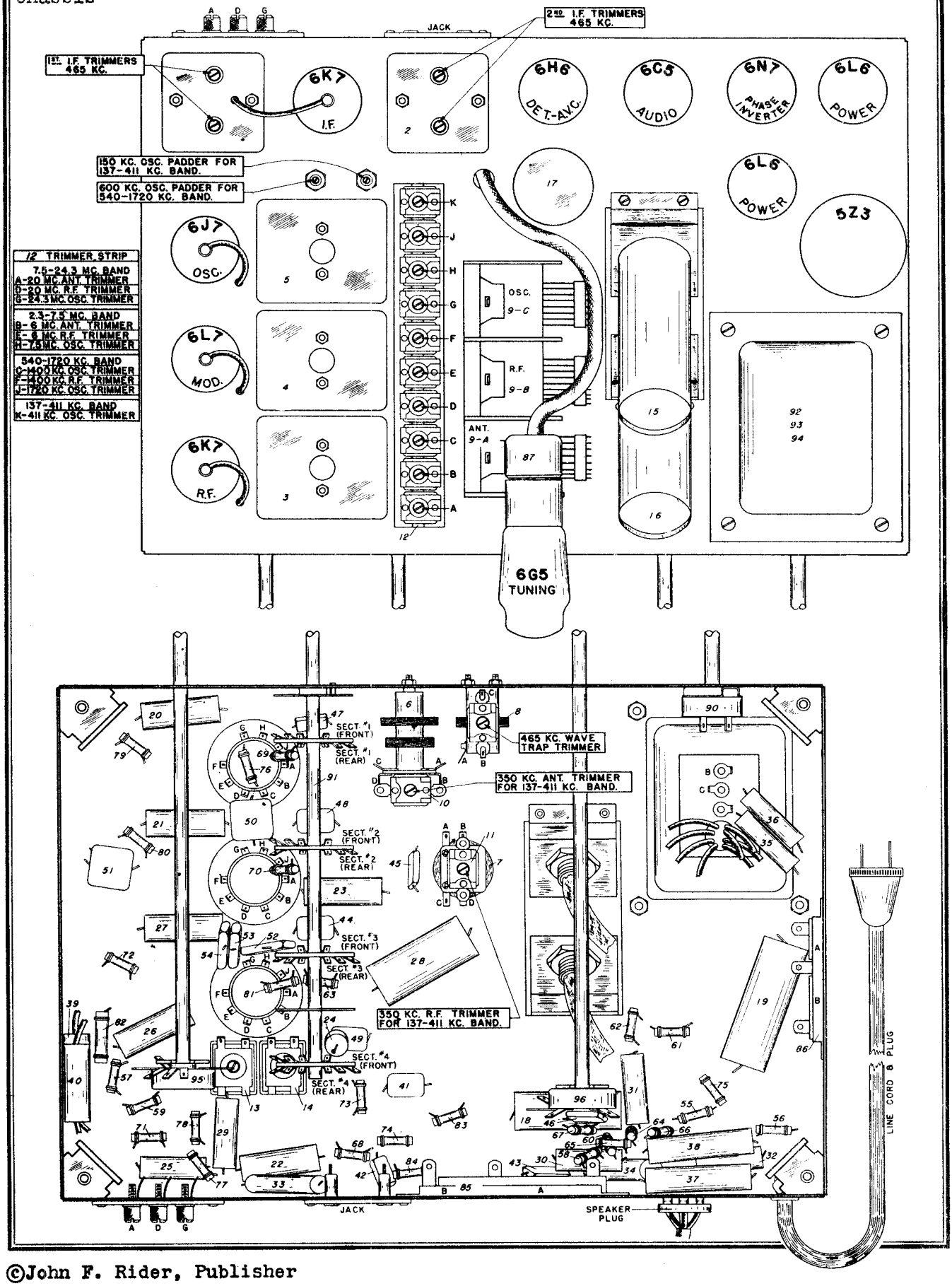
MODEL 99AE
Trimmers
Chassis

# SENTINEL RADIO CORP.

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# SENTINEL-ERLA MODEL 99AE

## ALIGNMENT PROCEDURE:

Lack of sensitivity, selectivity, or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

**NOTE:** BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMER AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON PARTS DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

### ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Connect the ground lead of the test oscillator to the chassis or set ground post. Connect the other lead of the test oscillator to the grid cap of the 6L7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

### ADJUSTING 465 KILOCYCLE WAVE TRAP:

(a) Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna "A" post and the low side to the set ground.

(b) Set test oscillator frequency to EXACTLY 465 kilocycles and adjust 465 kilocycle wave trap trimmer condenser for MINIMUM 465 kilocycle signal response.

### ALIGNING 137-411 KILOCYCLE BAND:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(b) Leave test oscillator lead connected to receiver antenna "A" post through a .00025 Mfd. series condenser.

(c) Adjust band selector switch for operation on 137-411 kilocycle band, tune receiver dial and set test oscillator frequency to EXACTLY 411 kilocycles.

(d) Bring in 411 kilocycle test signal to maximum output by adjusting 411 K.C. (K) oscillator trimmer.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 350 kilocycles. Adjust 350 K.C. antenna and R.F. trimmers for maximum sensitivity.

(f) Tune receiver dial and set test oscillator frequency to approximately 150 kilocycles—then while rocking gang condenser slightly to right and left adjust 150 kilocycle oscillator padder for maximum sensitivity.

### ALIGNING 1720-540 KILOCYCLE BAND:

(a) Leave .00025 Mfd. condenser in series with test oscillator lead. Adjust band selector switch for operation on the 1720-540 kilocycle band.

(b) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles. ADJUST 1720 KILOCYCLE OSCILLATOR TRIMMER (J) TO BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT.

(c) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. antenna (C) and R.F. (F) trimmers for maximum sensitivity.

(d) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum signal response.

### ALIGNING 2.3-7.5 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator lead series condenser with a 400 ohm carbon resistor.

(b) Adjust band selector switch to 2.3-7.5 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 7.5 megacycles—then adjust 7.5 megacycle oscillator (H) trimmer for maximum 7.5 megacycle test signal output.

(c) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles—adjust 6 M.C. antenna (B) and R.F. (E) trimmers for maximum sensitivity.

### ALIGNING 7.5-24.3 MEGACYCLE BAND:

(a) Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 7.5-24.3 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 24.3 megacycles.

(b) Adjust 24.3 M.C. oscillator trimmer (G) to bring in 24.3 megacycle test signal to maximum output.

**NOTE:** When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 24.3 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the FIRST PEAK which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 24.3 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 24.3 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 23.3 megacycles. Then vary the receiver dial slightly to the right and left of 23.3 megacycles and if the fundamental peak was used in aligning at 24.3 megacycles the test oscillator signal will be heard at approximately 23.3 megacycles on the receiver dial.

(c) Tune receiver dial and set test oscillator frequency to EXACTLY 20 megacycles.

(d) Adjust 20 M.C. antenna (A) and R.F. (D) trimmers for maximum 20 megacycle test signal response.

To assure most accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

**MODELS 144X, 144XE, 149A, 149AE, and 159AE.**

### ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment, check tuning dial adjustment by: Turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

Use an accurately calibrated test oscillator with some type of output measuring device.

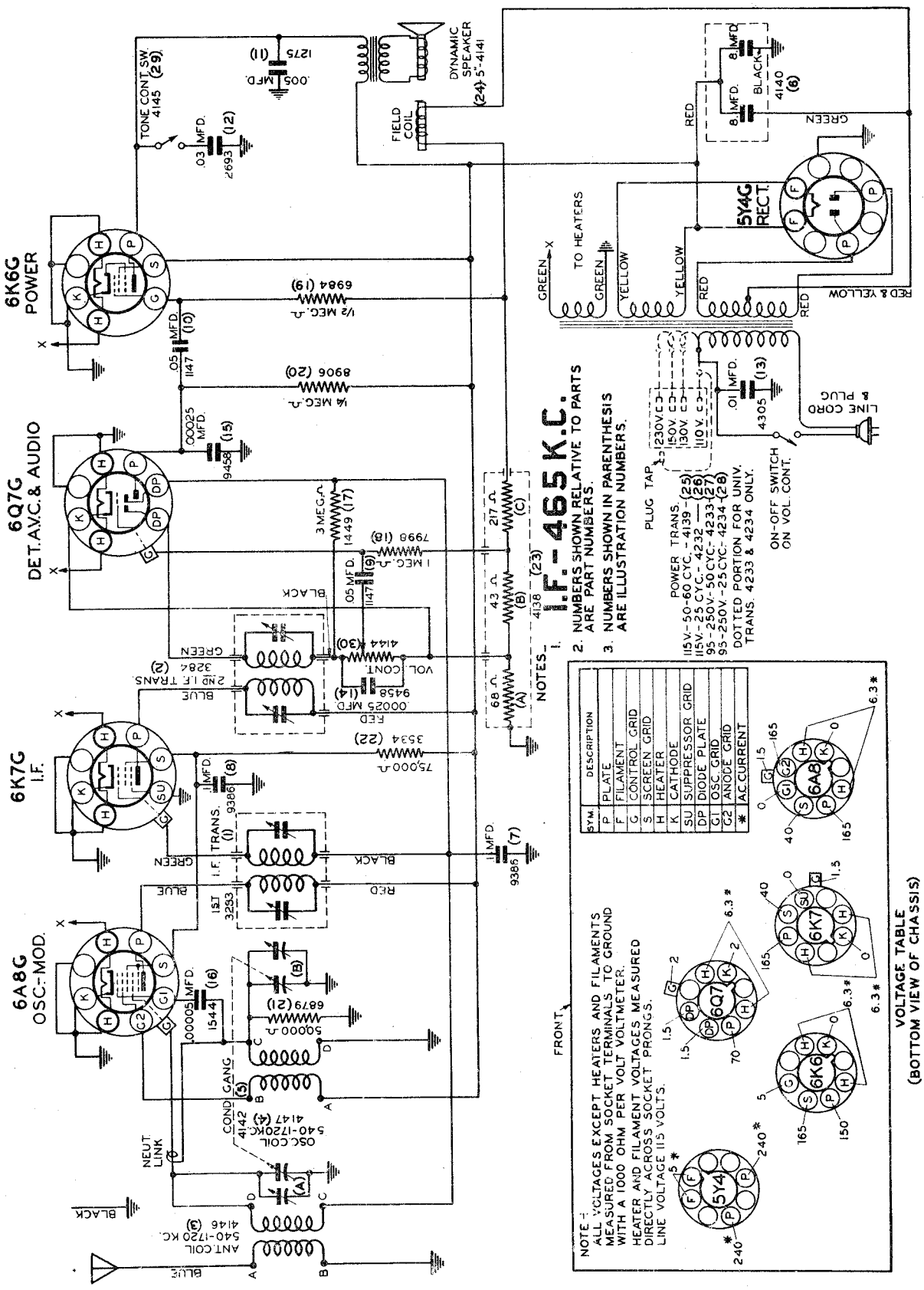
Have ground lead of test oscillator attached to chassis.

| Place band switch for operation on: | | Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | TEST OSCILLATOR: Attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below and: |
|---|---|---|---|---|---|---|
| I.F. alignment use any band position | | Any point where no interfering signal is received | Exactly 455 K.C. | .02 Mfd. condenser | High side to *grid cap of 6D8G tube. Do not remove cap. | Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output. |
| 1730 to 540 K.C. | 1 | Exactly 1730 K.C. | Exactly 1730 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | Adjust 1730 K.C. oscillator trimmer for maximum output. |
| | 2 | Exactly 1400 K.C. | Exactly 1400 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | Adjust 1400 K.C. antenna trimmer for maximum output. |
| | 3 | Approximately 600 K.C. | Approximately 600 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output. |
| 5.8 to 18.1 M.C. BAND | 1 | Exactly 18.1 M.C. | Exactly 18.1 M.C. | 400 Ohm carbon resistor | Receiver blue antenna lead | Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in. |
| | 2 | Exactly 15 M.C. | Exactly 15 M.C. | 400 Ohm carbon resistor | Receiver blue antenna lead | Adjust 15 M.C. antenna trimmer for maximum output. |

*grid cap of 6A7 tube.
MODELS 149A, 149AE, and 159AE

MODEL 106A
Schematic, Voltage
Socket

# SENTINEL RADIO CORP.

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# SENTINEL-ERLA MODEL 107AE

**ALIGNMENT PROCEDURE:**

Lack of sensitivity, selectivity, or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

**NOTE:** BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS AND PADDING CONDENSER WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

**ALIGNING I.F. STAGE AT 465 KILOCYCLES:**

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A7 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F. transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

**ALIGNING 1720-540 KILOCYCLE BAND:**

(a) Remove test oscillator lead from grid of the 6A7 tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.
(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(c) PLACE BAND SELECTOR SWITCH FOR 1720-540 K.C. OPERATION. PRESS IN MANUAL PUSH-BUTTON AND set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.
(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.
(h) While rocking the tuning condenser back and forth adjust 600 KC oscillator padder condenser which is accessible through the hole in the top of chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

**ALIGNING 2.3-6.3 MEGACYCLE BAND:**

(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.
(b) Adjust band selector switch for 2.3-6.3 megacycle band operation, tune receiver dial and set test oscillator frequency to EXACTLY 6.3 megacycles.
(c) Bring in 6.3 megacycle test oscillator signal to maximum output by adjusting 6.3 M.C. oscillator trimmer.
(d) Tune receiver dial and test oscillator frequency to EXACTLY 6 megacycles, and adjust 6 M.C. antenna trimmer for maximum sensitivity.

# MODEL 106A

FOR TRIMMER LOCATIONS AND CHASSIS, SEE INDEX

THIS RADIO IS DESIGNED SO THAT IT MAY BE PLACED IN A HORIZONTAL OR UPRIGHT POSITION. AS THE OPERATION AND PERFORMANCE OF THE RECEIVER IS THE SAME IN EITHER POSITION. IT IS A MATTER OF PERSONAL PREFERENCE AS TO WHICH POSITION TO USE.

The approximate position on the dial that any nine stations will be tuned in may be quickly determined—by pressing a paper tab having the station call letters into the round depressions on the front of the cabinet.

THE STATIONS SELECTED MUST OPERATE ON A FREQUENCY 40 KILOCYCLES OR MORE APART, OTHERWISE IT WILL BE IMPOSSIBLE TO PLACE THE CALL LETTER TABS IN THEIR PROPER POSITION IN CABINET DEPRESSIONS.

While it will be found that only the approximate location will be indicated, the station call tabs properly located will be an extremely helpful tuning aid.

To set the proper station call letter tabs into the cabinet depressions proceed as follows:

(a) Determine which nine stations call letters you wish to have on the cabinet—press call letter tabs out of the call letter sheets provided.
(b) Carefully tune in the selected station that broadcasts on the lowest frequency—the least number of kilocycles.
(c) Place a little mucilage or celluloid on back of paper tab. Press the paper call letter tab—so that the printed call letters of the station tuned in are at the same angle as the printing on the dial—into the round depression on the cabinet front that is nearest to the dial pointer. By placing call letter tab on angle the call letter can easily be read with cabinet in either a horizontal or upright position.
(d) Tune in the next selected station having the next lowest station frequency, pressing the call letter for this station into the round cabinet depression nearest to the dial pointer needle—continuing on in this way until station call letters have been placed into all nine cabinet depressions.

After the station call letters are set it will be a simple matter to determine the approximate dial position of any of these stations—just rotate tuning knob until dial pointer needle points to station call letter of desired station. It must be remembered that only the approximate tuning location will be indicated by the dial pointer needle—each station must be correctly tuned in by ROTATING THE TUNING CONTROL KNOB UNTIL A STATION IS TUNED IN WITH GREATEST CLARITY.

**ALIGNMENT PROCEDURE:**

Lack of sensitivity, selectivity, or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

**NOTE:** BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING. OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT. THE TRIMMERS AND PADDING CONDENSERS WILL BE REFERRED TO BY THEIR FUNCTION AS INDICATED ON THE PARTS DIAGRAM.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

**ALIGNING I.F. STAGE AT 465 KILOCYCLES:**

(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the 6A8G tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.
(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.
(c) Peak each of the second I.F transformer trimmers.
(d) Peak each of the first I.F. transformer trimmers.

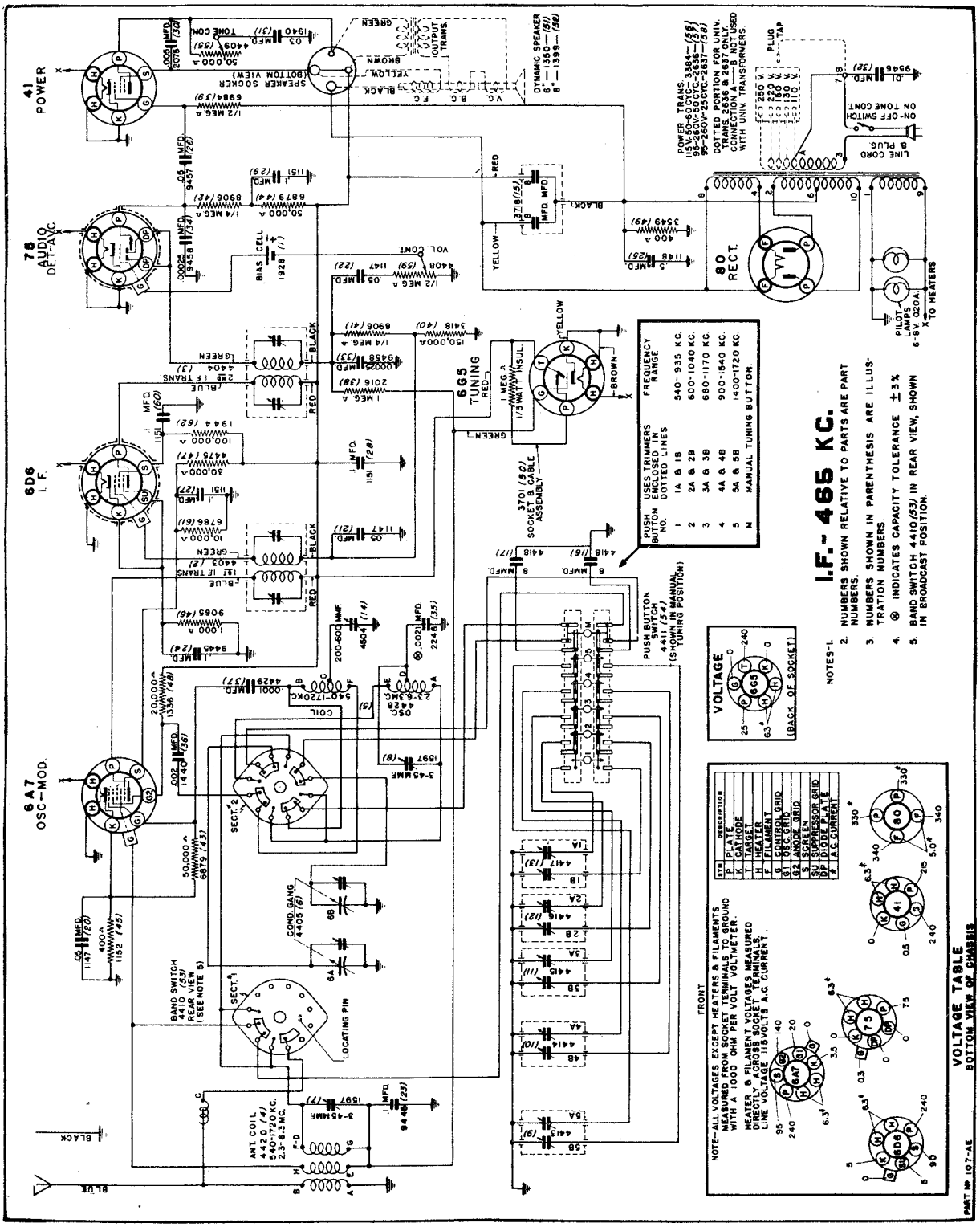
To assure most accurate trimmer setting repeat above adjustment several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

**ALIGNING 1720-540 KILOCYCLE BAND:**

(a) Remove test oscillator lead from grid of 6A8G tube and attach it to the receiver antenna lead through a .00025 Mfd. series condenser.
(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.
(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.
(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the gang condenser is the oscillator section.
(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.
(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.

MODEL 107AE
Schematic, Voltage
Socket

# SENTINEL RADIO CORP.


I.F.- 465 KC.
NOTES-1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. ⊗ INDICATES CAPACITY TOLERANCE ±3%
4. BAND SWITCH 4410 (53) IN REAR VIEW, SHOWN IN BROADCAST POSITION.
5. (BACK OF SOCKET)
VOLTAGE TABLE
BOTTOM VIEW OF CHASSIS
NOTE- ALL VOLTAGES EXCEPT HEATERS & FILAMENTS MEASURED FROM SET TERMINAL TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER.
HEATER & FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. LINE VOLTAGE 115 VOLTS A.C. CURRENT.
FREQUENCY RANGE
540- 935 KC.
600-1040 KC.
680-1170 KC.
900-1540 KC.
1400-1720 KC.
MANUAL TUNING BUTTON
PUSH BUTTON SWITCH 4411 (54) (SHOWN IN MANUAL TUNING POSITION)
FRONT
PART № 107-AE

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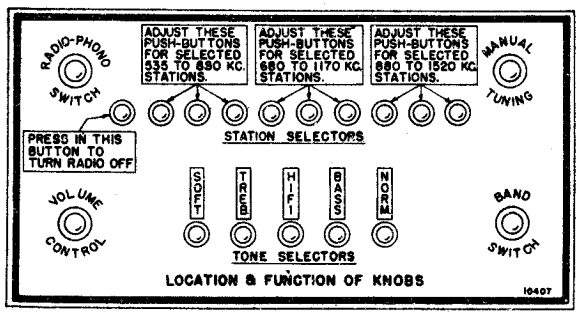
Sentinel Model 145AE




## PUSH- BUTTON ADJUSTMENT

**Nine stations operating in the 1500-540 kilocycle band may be automatically push button tuned by properly setting each station selector push button.**

**AS THE PUSH BUTTONS ARE NOT PRE-SET AT THE FACTORY FOR ANY DEFINITE STATIONS BE SURE TO SET EACH ONE.**

### Before Attempting to Set Push Buttons Be Sure to:

(a) Have aerial which will be used with the radio attached to the receiver when setting push buttons.

(b) Operate radio at least 15 minutes before adjusting push buttons.

(c) Obtain transmitter frequency—number of kilocycles—and call letters of the nine stations you wish to push button tune from radio log or newspaper radio station list.

### Adjust Push Buttons for Selected Stations by:

(a) Rotate band switch knob to the NEXT TO MAXIMUM RIGHT HAND POSITION—540-1730 KILOCYCLE BAND MANUAL TUNING POSITION.

(b) Using regular manual tuning knob carefully tune in one of the selected stations whose transmitter frequency is somewhere between 535-880 kilocycles. Make a mental note of the kind of program on this station, so that when push button is adjusted for this particular station (as instructed in paragraph (e)) it will be easy to recognize the station by the type of program being transmitted.

(c) Rotate band switch knob to maximum right hand position.

(d) Press in one of the three push buttons marked 535-880 kylocycles on diagram.
NOTE: STATION MAY DISAPPEAR, BE DISTORTED OR IN SOME INSTANCES ANOTHER STATION MAY BE HEARD.

(e) GRASP END OF PUSH BUTTON JUST PRESSED IN AND BY SLOWLY TURNING THIS BUTTON CAREFULLY TUNE IN THE SELECTED 535-880 KILOCYCLE STATION THAT WAS PREVIOUSLY TUNED IN WITH MANUAL CONTROL.
Slowly—turn first in one direction, then if the wanted station is not heard turn in opposite direction. WATCH TUNING EYE AND ADJUST SO THAT THE TWO OPEN ENDS OF THE GREEN INVERTED "V" ON THE TUNING EYE ARE CLOSEST TOGETHER—AT WHICH POINT THE SIGNAL WILL BE HEARD WITH GREATEST VOLUME AND CLEAREST TONE.

(f) Press station call letter of the station just tuned in out of call letter sheet supplied and insert into depression adjacent to push button just adjusted.

(g) After the first 535-880 kilocycle push button has been properly set, the other eight push buttons should be adjusted in the same manner preferably in the following order:

1. Set remaining two push buttons marked 535-880 kilocycles on diagram for any two stations operating between 535-880 kilocycles.
2. The three push buttons marked 680-1170 kilocycles on diagram should be adjusted for any three selected stations operating between 680 and 1170 kilocycles.
3. Adjust the three push buttons marked 880-1520 kilocycles on diagram for any three selected stations operating between 880 and 1520 kilocycles.

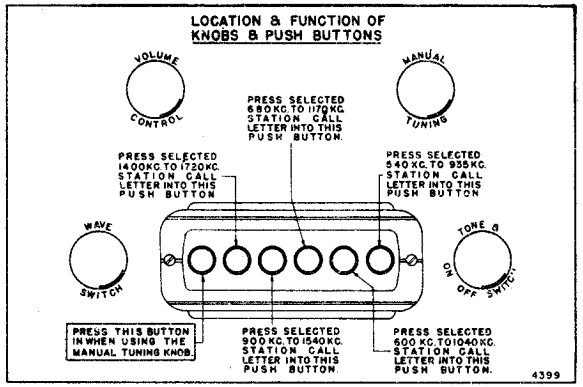
### IMPORTANT

**For Manual Tuning the Band Switch must be in next to maximum right hand position. When adjusting Push Buttons or when Push Button tuning after Push Buttons have been set, Band Switch must be in maximum right hand position.**

Sentinel Model 107AE

# INSTRUCTIONS FOR INSTALLING AND OPERATING "AUTOMATIC PUSH BUTTON"

**Five stations operating in the 1720-540 kilocycle broadcast band may be "AUTOMATIC PUSH-BUTTON" tuned by properly setting the ten trimmer screws accessible through holes in the back of the chassis.**


LOCATION & FUNCTION OF KNOBS & PUSH BUTTONS
VOLUME CONTROL
MANUAL TUNING
PRESS SELECTED 680 KC. TO 1170 KC. STATION CALL LETTER INTO THIS PUSH BUTTON.
PRESS SELECTED 1400 KC. TO 1720 KC. STATION CALL LETTER INTO THIS PUSH BUTTON
PRESS SELECTED 540 KC. TO 935 KC. STATION CALL LETTER INTO THIS PUSH BUTTON
WAVE SWITCH
TONE & ON OFF SWITCH
PRESS THIS BUTTON IN WHEN USING THE MANUAL TUNING KNOB.
PRESS SELECTED 900 KC. TO 1540 KC. STATION CALL LETTER INTO THIS PUSH BUTTON.
PRESS SELECTED 600 KC. TO 1040 KC. STATION CALL LETTER INTO THIS PUSH BUTTON.
4399

AS THE PUSH-BUTTONS ARE NOT PRE-SET AT THE FACTORY FOR ANY DEFINITE STATION BE SURE TO SET THEM BY:

(a) It is important to have the aerial, which will be used with the set, attached to the radio when adjusting the trimmers.

(b) BE SURE TO OPERATE THE SET AT LEAST ONE-HALF HOUR BEFORE ADJUSTING TRIMMERS. If set is not thoroughly warmed up when trimmers are adjusted, the trimmers may shift position after they become warm resulting in poor tone, weak signal, and excessive background noise.

(c) FOR BEST RESULTS SET PUSH-BUTTONS FOR LOCAL OR STRONG, NEARBY STATIONS ONLY. Obtain the transmitter frequency—number of kilocycles—and call letters of the stations you wish to "Push-Button" tune.

(d) Place band selector switch for operation on 1720-540 kilocycle band.

(e) Press in "MANUAL" tuning button—see diagram.

(f) It is advisable that if a station is selected whose transmitter frequency is somewhere between 540-935 kilocycles that the two trimmers marked "540-935 K.C." on paper label attached to back of chassis be adjusted first.

(g) Using "MANUAL" tuning knob carefully tune in selected station whose transmitter frequency is between 540-935 kilocycles.

(h) Press in push-button marked "540-935 K.C."—see diagram.
NOTE: STATION SIGNAL WILL DISAPPEAR, OR MAY BE DISTORTED, AND IN SOME INSTANCES ANOTHER STATION MAY BE HEARD.

(i) With a small screw driver carefully tune in the selected 540-935 kilocycle station by slowly adjusting trimmer 1A—then adjust trimmer 1B for maximum volume. BE SURE TO WATCH TUNING EYE AND ADJUST TRIMMERS SO THAT THE TWO OPEN ENDS OF THE GREEN INVERTED "V" ON THE TUNING EYE ARE CLOSEST TOGETHER. AT THIS POINT THE SIGNAL WILL BE HEARD WITH GREATEST VOLUME AND CLEAREST TONE.

(j) Moisten gummed back of selected 540-935 KC stations paper tab and press into round depression in 540-935 KC push-button.

(k) After trimmers 1A and 1B have been properly set for the selected station operating between 540-935 kilocycles, adjust other trimmers in the same manner and in the following order.

(l) Set trimmers 2A and 2B for selected station operating between 600-1040 kilocycles.

(m) Adjust trimmers 3A and 3B for the selected station operating between 680-1170 kilocycles.

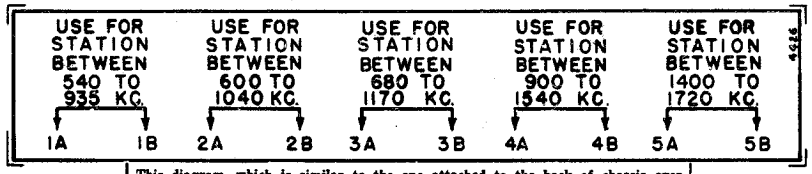
(n) Set trimmers 4A and 4B for selected station operating between 900-1540 kilocycles.

(o) Adjust trimmers 5A and 5B for selected station operating between 1400-1720 kilocycles.

AS THE TRIMMERS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED IT IS IMPORTANT THAT THE PROPER TRIMMERS BE USED.

It may be noticed that the transmitter frequency—number of kilocycles—of a selected station falls within the range of more than one group of trimmers. Generally the transmitter frequency of the selected station will fall well within the minimum and maximum range of one set of trimmers—this is the right group of trimmers to use—and somewhere near the minimum or maximum end of the other set of trimmers. For example, if a selected station transmitter frequency is 600 kilocycles it would be possible to use trimmers marked "1A and 1B" or trimmers marked "2A and 2B." Trimmers marked 2A and 2B should not be used because they would have to be loosely adjusted, which is objectionable because TRIMMERS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED. Inasmuch as 600 kilocycles falls well within the minimum-maximum range of trimmers marked "1A and 1B," these should be used instead.

In some instances it may be necessary after the set is operated for a period of time to reset the trimmers as they may drift due to heat, humidity, etc.

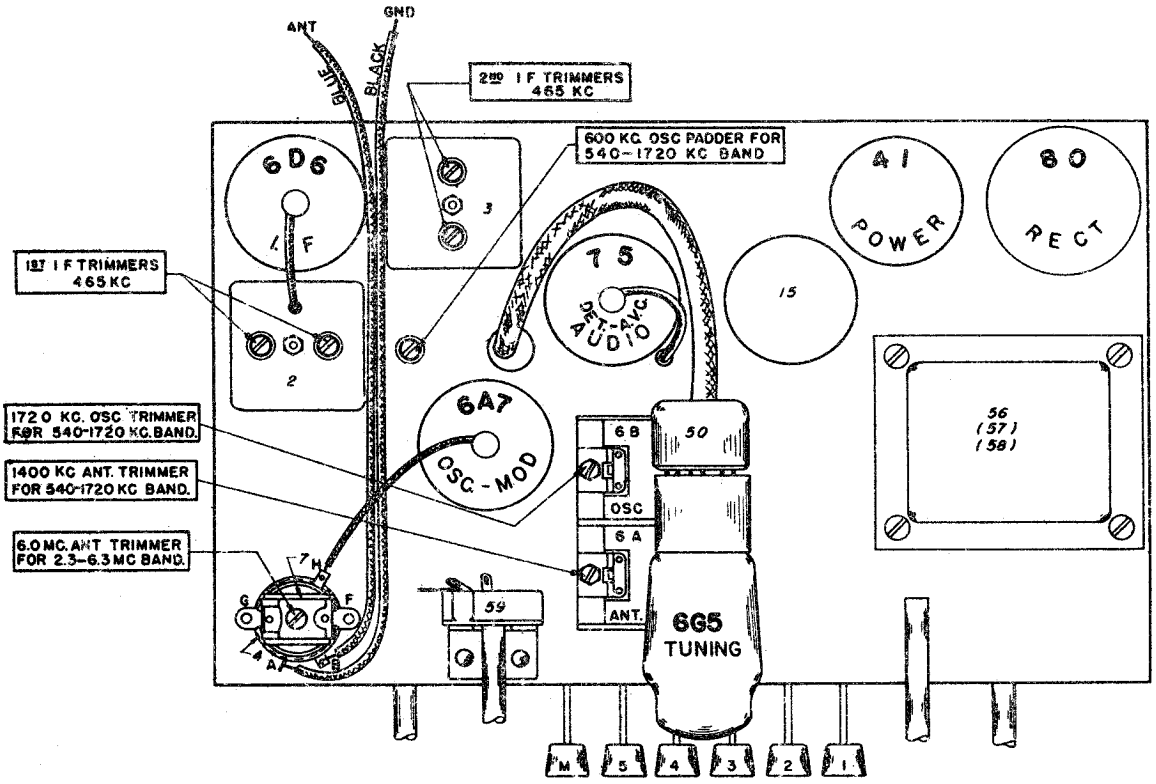

USE FOR STATION BETWEEN 540 TO 935 KC.
USE FOR STATION BETWEEN 600 TO 1040 KC.
USE FOR STATION BETWEEN 680 TO 1170 KC.
USE FOR STATION BETWEEN 900 TO 1540 KC.
USE FOR STATION BETWEEN 1400 TO 1720 KC.
1A 1B 2A 2B 3A 3B 4A 4B 5A 5B
4436

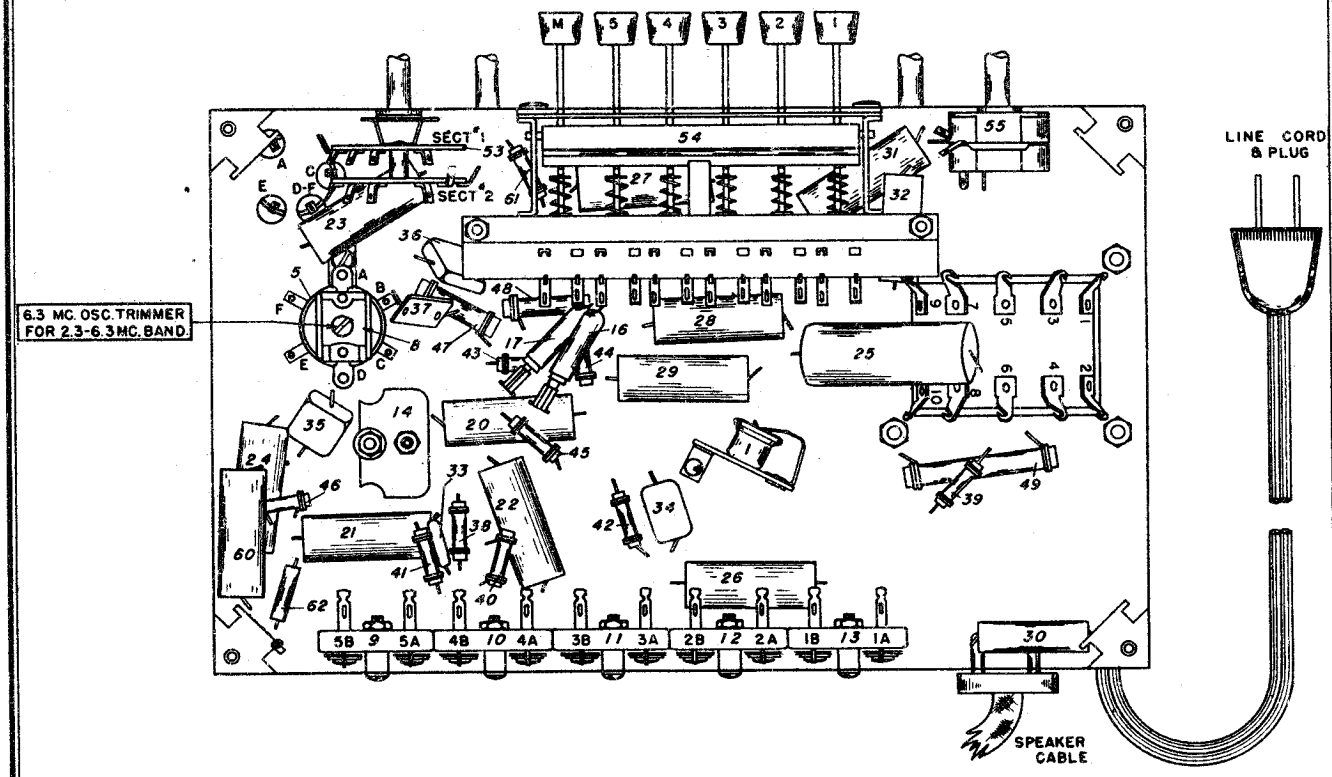
**This diagram, which is similar to the one attached to the back of chassis over trimmer holes, shows the minimum-maximum range of the five groups of trimmers.**

**IMPORTANT: WHEN LISTENING TO STATIONS ON BROADCAST BAND, THE "MANUAL PUSH BUTTON" OR ONE OF THE OTHER "PUSH BUTTONS" MUST BE PUSHED IN—OTHERWISE NO STATION WILL BE HEARD. DO NOT PRESS IN MORE THAN ONE "PUSH BUTTON" AT ONE TIME—IF MORE THAN ONE "PUSH BUTTON" IS PRESSED INWARD ONLY THE HIGHEST FREQUENCY STATION WILL BE HEARD.**

MODEL 107AE
Trimmers, Chassis

# SENTINEL RADIO CORP.

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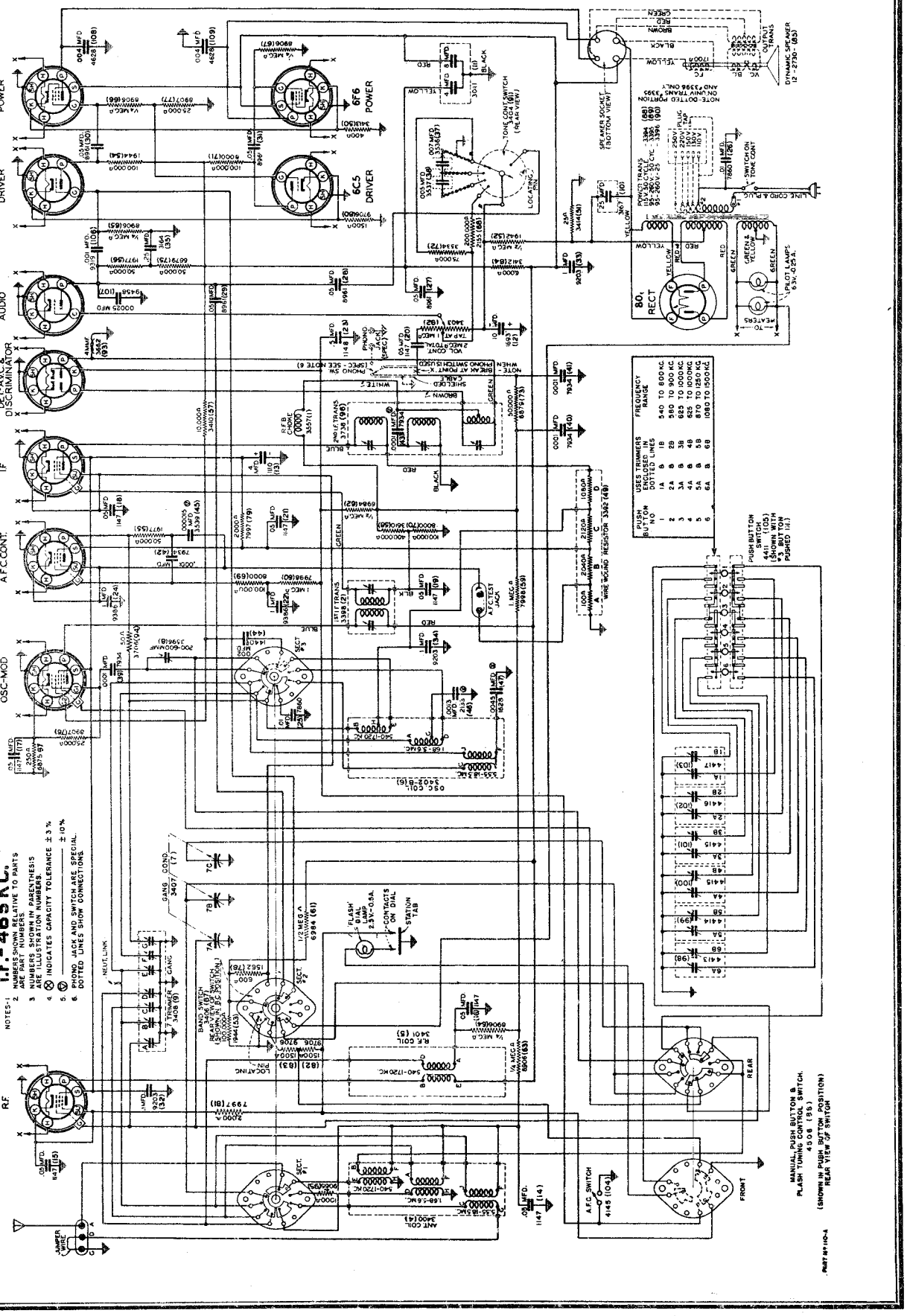
# SENTINEL RADIO CORP.

MODEL 110A
Schematic


I.F.-465 KC.
NOTES-1
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS
3. NUMBERS IN PARENTHESIS ARE ILLUSTRATION NUMBERS
4. ⊗ INDICATES CAPACITY TOLERANCE ±3%
5. ⊗ INDICATES RESISTANCE TOLERANCE ±10%
6. PHONO JACK AND SWITCH ARE SPECIAL. DOTTED LINES SHOW CONNECTIONS
6F6 POWER
6C5 DRIVER
6C5 AUDIO
6H6 DET. AVC & DISCRIMINATOR
6K7 IF
6J7 A.F.C. CONT.
6A8 OSC-MOD
6K7 R.F.
80 RECT
FREQUENCY RANGE
540 TO 800 KC.
580 TO 900 KC.
625 TO 1000 KC.
825 TO 1300 KC.
870 TO 1350 KC.
1060 TO 1500 KC.
PUSH BUTTON NO.
USES TRIMMERS SHOWN IN DOTTED LINES
PUSH BUTTON SWITCH 4411 (105) (SHOWN WITH BUTTON PUSHED (4))
WIRE WOUND RESISTOR 3362 (49)
A.F.C. TEST
A.F.C. SWITCH 4145 (104)
TONE CONT. SWITCH (REAR VIEW)
SPEAKER SOCKET (BOTTOM VIEW)
DYNAMIC SPEAKER 12-2730-(65)
POWER TRANS 105-125V-50 CYC. - 3394 (88) (89) (90) 95-260V-50 CYC. - 3395 95-260V-25 - 3396
SWITCH ON TONE CONT
LINE CORD & PLUG
PILOT LAMPS 6.3V-.025A.
OUTPUT TRANS
OSC COIL 3402-B(6)
ANT COIL 3400(43)
R.F. COIL 3401 (5)
1ST I.F. TRANS 3398 (12)
2ND I.F. TRANS 3398 (66)
BAND SWITCH REAR VIEW OF SWITCH
FLASH DIAL 23V-0.5A.
CONTACTS ON DIAL STATION TAB
MANUAL PUSH BUTTON & FLASH TUNING CONTROL SWITCH 4506 (86)
(SHOWN IN PUSH BUTTON POSITION)
REAR VIEW OF SWITCH
FRONT
REAR
JUMPER WIRE

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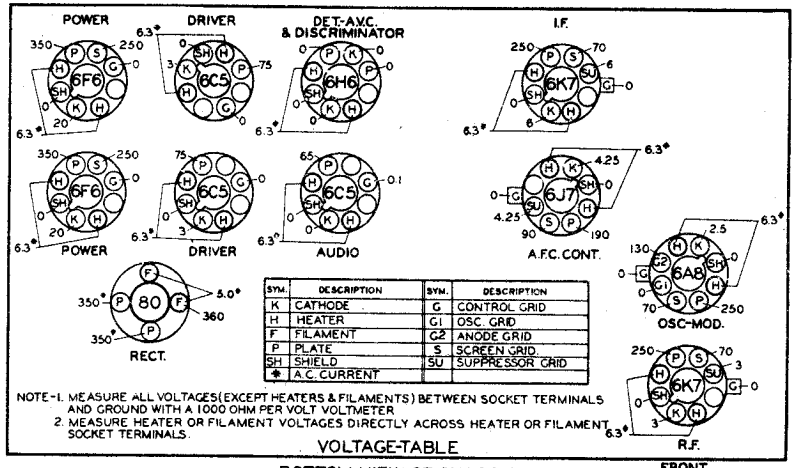



BOTTOM VIEW OF CHASSIS

## ALIGNMENT PROCEDURE:

SHOULD REALIGNMENT BE NECESSARY, THERE ARE SEVERAL PRECAUTIONS THAT MUST BE CAREFULLY OBSERVED, THESE ARE:

1. Do not align set until it has reached normal operating temperature. Place the receiver in operation at least 15 minutes before attempting to realign the set.
2. The importance of using the proper type of test equipment and FOLLOWING THE ALIGNMENT PROCEDURE EXACTLY AS GIVEN CANNOT BE TOO STRONGLY EMPHASIZED—failure to do so will result in low sensitivity, poor selectivity, incorrect dial calibration, distortion and unsatisfactory operation of the automatic frequency control.
3. It is absolutely necessary that an accurately calibrated test oscillator with some type of output measuring device and a double scale milliammeter—0 to 1 M. A. and 0 to 5 M.A. be used.

## ALIGNING I.F. STAGE AT 465 KILOCYCLES:

(a) Place automatic frequency control knob in the middle A.F.C. "off" position.

(b) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid cap of the 6A8 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(c) Set test oscillator to EXACTLY 465 kilocycles and turn volume control on full.

(d) Remove shields held in position by snap fasteners over A.F.C. test jack and over trimmer screw holes in the first and second I.F. transformer shield cans.

(e) Peak second I.F. transformer trimmers for maximum 465 kilocycle output by adjusting the two trimmers accessible through the two top holes in the second I.F. transformer shield can. DO NOT TOUCH DISCRIMINATOR (BOTTOM) SCREW.

(f) Peak each of the first I.F. transformer trimmers for maximum 465 kilocycle signal output.

## ALIGNING DISCRIMINATOR CIRCUIT:

(a) Place switch underneath push button plate assembly (above gang condenser) in A.F.C. "on" position. Leave test oscillator set to EXACTLY 465 KILOCYCLES and connect to grid of 6A8 tube through a .02 Mfd. Condenser—insert lead of double scale 0 to 1 and 0 to 5 milliammeter into A.F.C. test jack located on top of chassis adjacent to the 6J7 tube. To avoid possibility of damaging the meter should one of the milliammeter leads short to the metal chassis,

ALWAYS TURN OFF RECEIVER WHEN INSERTING OR REMOVING MILLIAMMETER LEADS FROM A.F.C. TEST JACK.

(b) Short out A.F.C. mute switch by grounding the second from the left (looking at the front of the chassis) of the four lugs mounted on top of the dial assembly. The proper lug to ground is indicated in the "Note X" on chassis top parts view.

(c) Turn receiver on, place A.F.C. switch knob in left position and if meter needle jumps off scale adjust output of test oscillator until an approximate 2 M.A. deflection is obtained on the 0 to 5 milliammeter scale.

(d) Place band selector switch for operation on 1720-540 K.C. broadcast band—and set receiver dial somewhere near 1000 kilocycles at a point where no station is heard.

(e) Rotate A.F.C. switch knob from maximum left hand to middle position and note whether the milliammeter reading changes as the position of the A.F.C. switch is changed. No change in reading indicates probable proper discriminator trimmer adjustment, while a noticeable change indicates improper discriminator trimmer adjustment.

(f) IMPORTANT: DO NOT ADJUST DISCRIMINATOR TRIMMER UNLESS IT IS ABSOLUTELY NECESSARY. Place A.F.C. switch in middle position and note milliammeter reading, then place A.F.C. switch in maximum left hand position. With A.F.C. switch in maximum left hand position, CAREFULLY ADJUST DISCRIMINATOR TRIMMER UNTIL MILLIAMMETER READING IS EXACTLY THE SAME IN BOTH POSITIONS.

NOTE: As the discriminator trimmer screw is screwed in (increasing capacity) the milliammeter reading should decrease and as the discriminator trimmer is unscrewed (decreasing capacity) the milliammeter reading should increase. IF WHEN ADJUSTING THE DISCRIMINATOR TRIMMER THE MILLIAMMETER READING DOES NOT SHARPLY INCREASE OR DECREASE AS THE TRIMMER IS ADJUSTED EVEN AFTER SEVERAL TURNS OF THE TRIMMER SCREW, THIS DOES NOT INDICATE PROPER BALANCING BUT DOES INDICATE INCORRECT ADJUSTMENT AND THE DISCRIMINATOR TRIMMER SHOULD BE SET TO ABOUT ½ CAPACITY AND THE ADJUSTMENT OF THE DISCRIMINATOR TRIMMER MADE ALL OVER AGAIN.

## ALIGNING 1720-540 KILOCYCLE BAND:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line, move needle to correct position.

(b) Remove test oscillator lead from grid of 6A8 tube and connect to receiver "A" antenna post through a .00025 Mfd. condenser.

(c) Place A.F.C. control knob in middle A.F.C. "off" position. Adjust band selector switch for operation on the 1720-540 kilocycle band.

(d) Set test oscillator frequency and receiver dial to EXACTLY 1720 kilocycles, and BRING IN 1720 KILOCYCLE TEST OSCILLATOR SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles. Adjust 1400 K.C. R.F. and antenna trimmers for maximum sensitivity.

(f) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum signal response.

## ALIGNING 1.68-5.6 MEGACYCLE BAND:

(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor.

(b) Adjust band selector switch to 1.68-5.6 megacycles, tune receiver dial and set test oscillator frequency to EXACTLY 5.6 megacycles. Bring in 5.6 megacycle test signal to maximum output by adjusting 5.6 M. C. oscillator trimmer.

(c) Tune receiver dial and test oscillator frequency to EXACTLY 5 Megacycles and adjust 5 M.C. antenna trimmer for maximum sensitivity.

## ALIGNING 5.55-18.5 MEGACYCLE BAND:

(a) Leave 400 ohm resistor in series with test oscillator lead and place band selector switch for operation on 5.55-18.5 megacycle band, tune receiver dial and set test oscillator frequency to EXACTLY 18.5 megacycles.

(b) Adjust 18.5 M.C. oscillator trimmer to bring in 18.5 megacycle test signal to maximum output.

NOTE: When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.5 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the FIRST peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.5 megacycles, always check to see if the proper peak has been used. To do this leave test oscillator frequency at 18.5 megacycles, increase the output of the test oscillator and tune receiver dial to approximately 17.5 megacycles. Then vary the receiver dial slightly to the right and left of 17.5 megacycles, and if the fundamental peak was used in aligning at 18.5 megacycles the test oscillator signal will be heard at approximately 17.5 megacycles on the receiver dial.

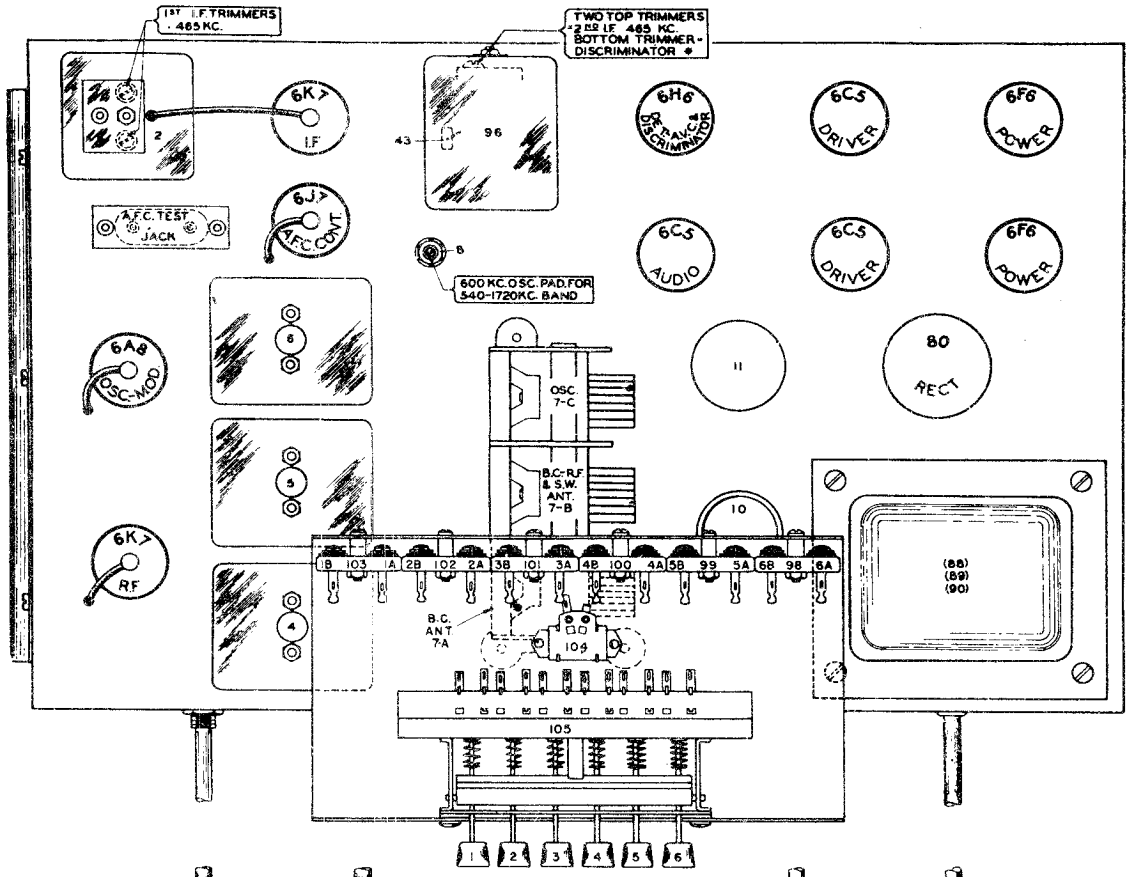
(c) Tune receiver dial and set test oscillator frequency to EXACTLY 15 megacycles.

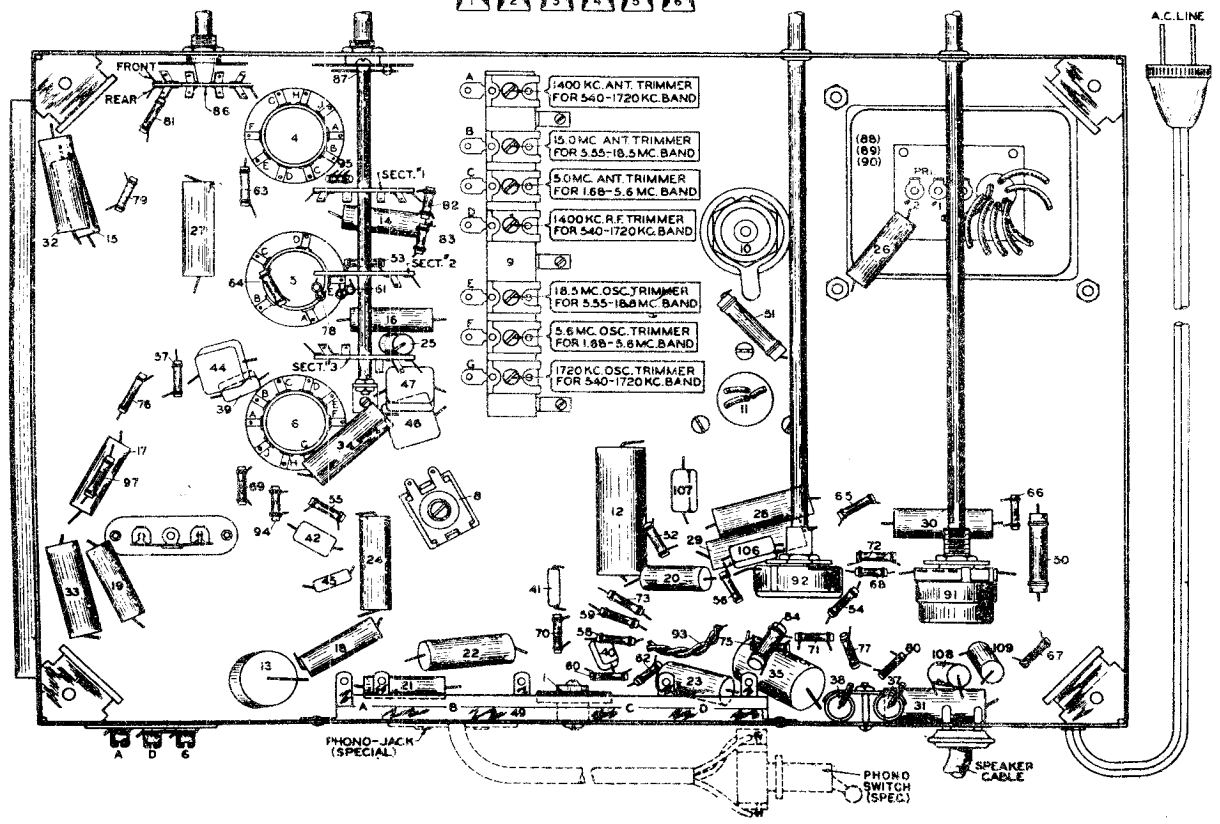
Rock gang condenser slightly to right and left and adjust 15 M.C. antenna trimmer for maximum 15 megacycle test signal response.

To assure more accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

# SENTINEL RADIO CORP.

MODEL 110A
Trimmers
Chassis





A.C. LINE
FRONT
REAR
1400 KC. ANT. TRIMMER FOR 540-1720 KC. BAND
15.0 MC. ANT. TRIMMER FOR 5.55-18.5 MC. BAND
5.0 MC. ANT. TRIMMER FOR 1.68-5.6 MC. BAND
1400 KC. R.F. TRIMMER FOR 540-1720 KC. BAND
18.5 MC. OSC. TRIMMER FOR 5.55-18.8 MC. BAND
5.6 MC. OSC. TRIMMER FOR 1.88-5.6 MC. BAND
1720 KC. OSC. TRIMMER FOR 540-1720 KC. BAND
SECT. "1"
SECT. "2"
SECT. "3"
PHONO-JACK (SPECIAL)
PHONO SWITCH (SPEC.)
SPEAKER CABLE

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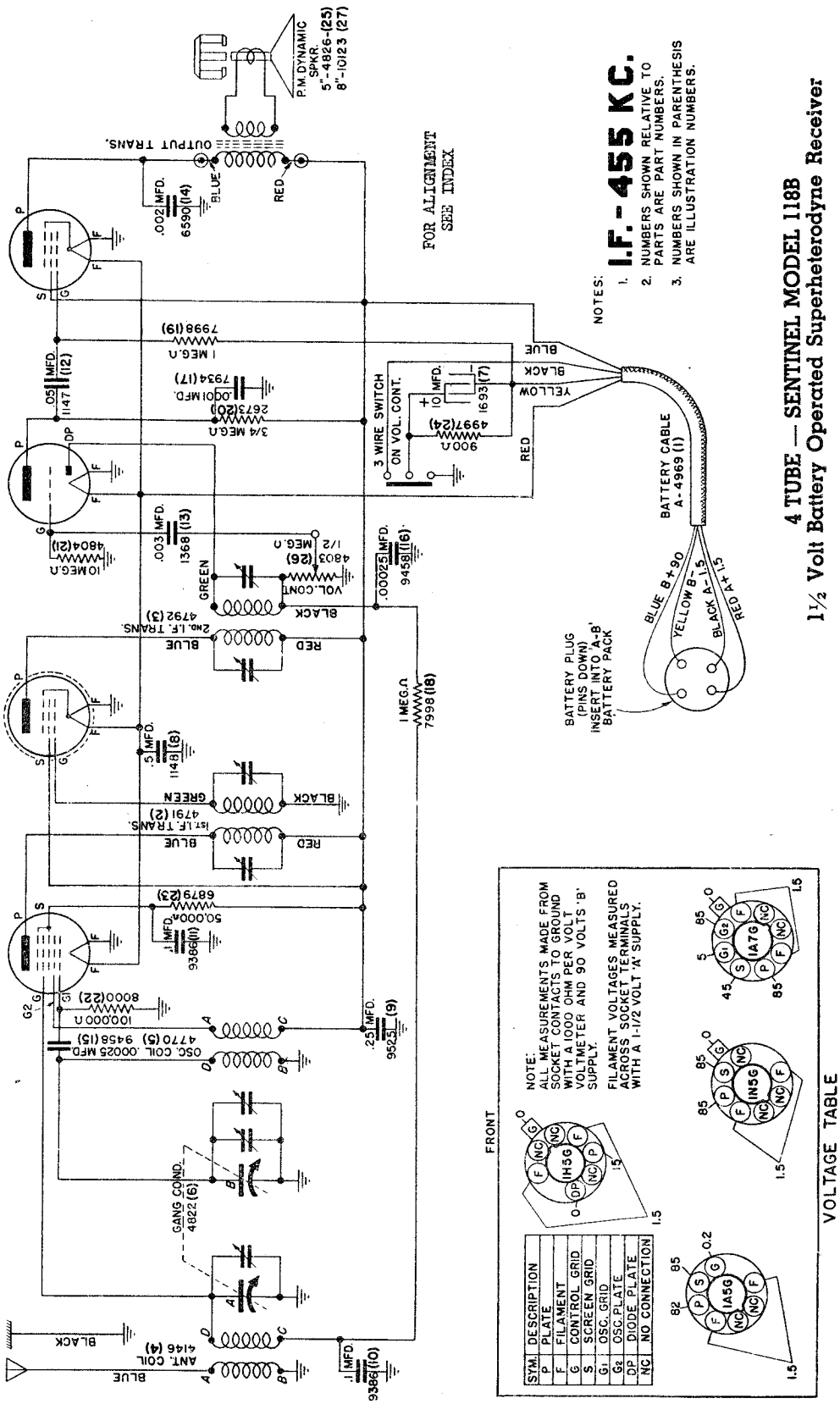
MODEL 118B
Schematic, Voltage
Socket

# SENTINEL RADIO CORP.

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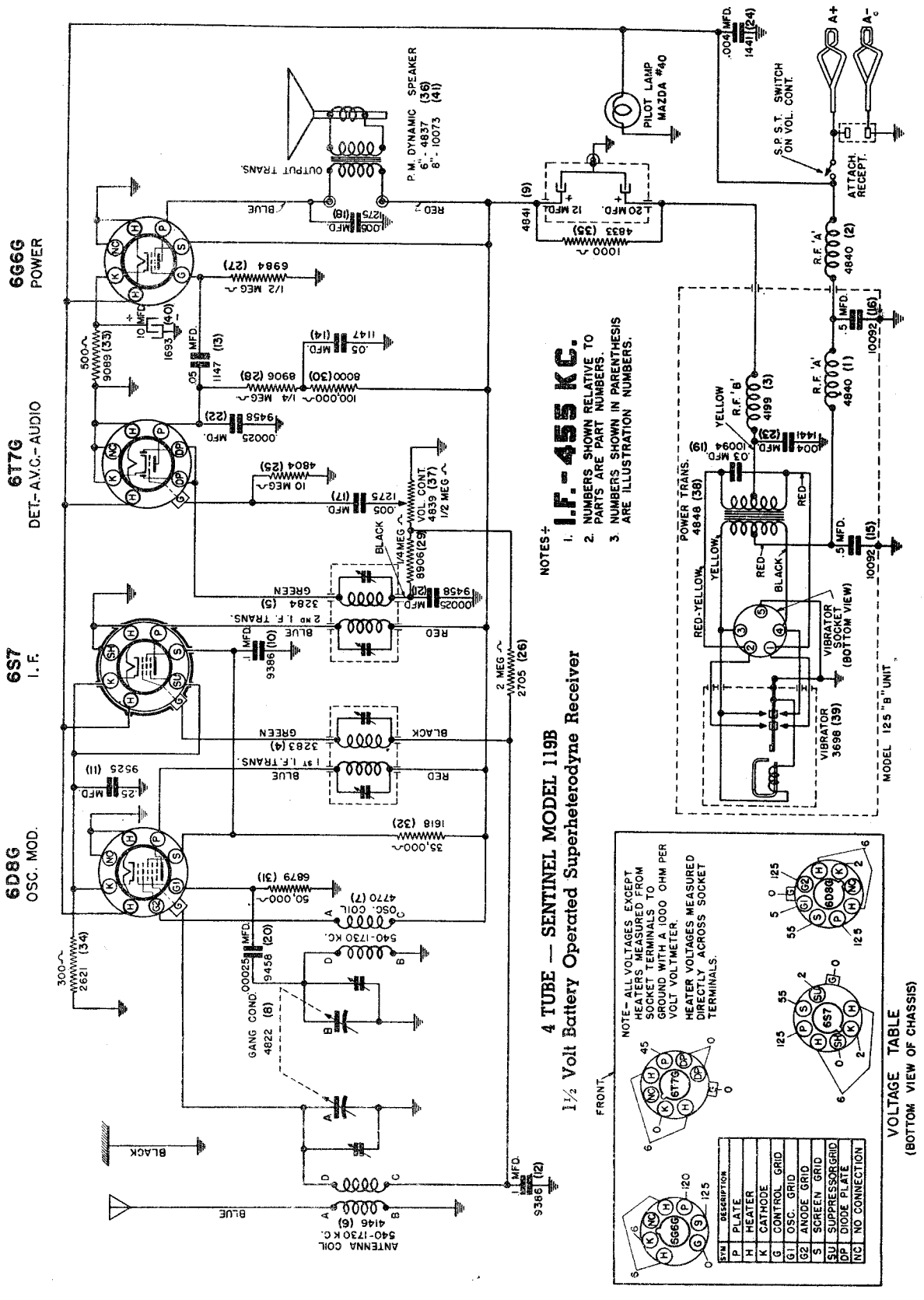
# SENTINEL RADIO CORP.

MODEL 119B
Schematic, Voltage
Socket


6G6G POWER
6T7G DET.-A.V.C.-AUDIO
6S7 I. F.
6D8G OSC. MOD.
P.M. DYNAMIC SPEAKER 6" - 4837 (36) 8" - 10073 (41)
OUTPUT TRANS.
PILOT LAMP MAZDA #40
S.P.S.T. SWITCH ON VOL. CONT.
ATTACH. RECEPT.
A+
A-
R.F. 'A' 4840 (2)
R.F. 'A' 4840 (1)
R.F. 'B' 4199 (3)
POWER TRANS. 4848 (38)
VIBRATOR SOCKET (BOTTOM VIEW)
VIBRATOR 3698 (39)
MODEL 125 "B" UNIT
VOL. CONT. 4839 (37) 1/2 MEG
GANG COND. 4822 (8)
OSC. COIL 4770 (7)
ANTENNA COIL 4146 (6)
1ST I.F. TRANS. 3283 (4)
2ND I.F. TRANS. 3284 (5)
NOTES:
1. I.F. - 455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4 TUBE — SENTINEL MODEL 119B
1½ Volt Battery Operated Superheterodyne Receiver
NOTE- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER.
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
FRONT
SYM DESCRIPTION
P PLATE
H HEATER
K CATHODE
G CONTROL GRID
G1 OSC. GRID
G2 ANODE GRID
S SCREEN GRID
SU SUPPRESSOR GRID
DP DIODE PLATE
NC NO CONNECTION
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)

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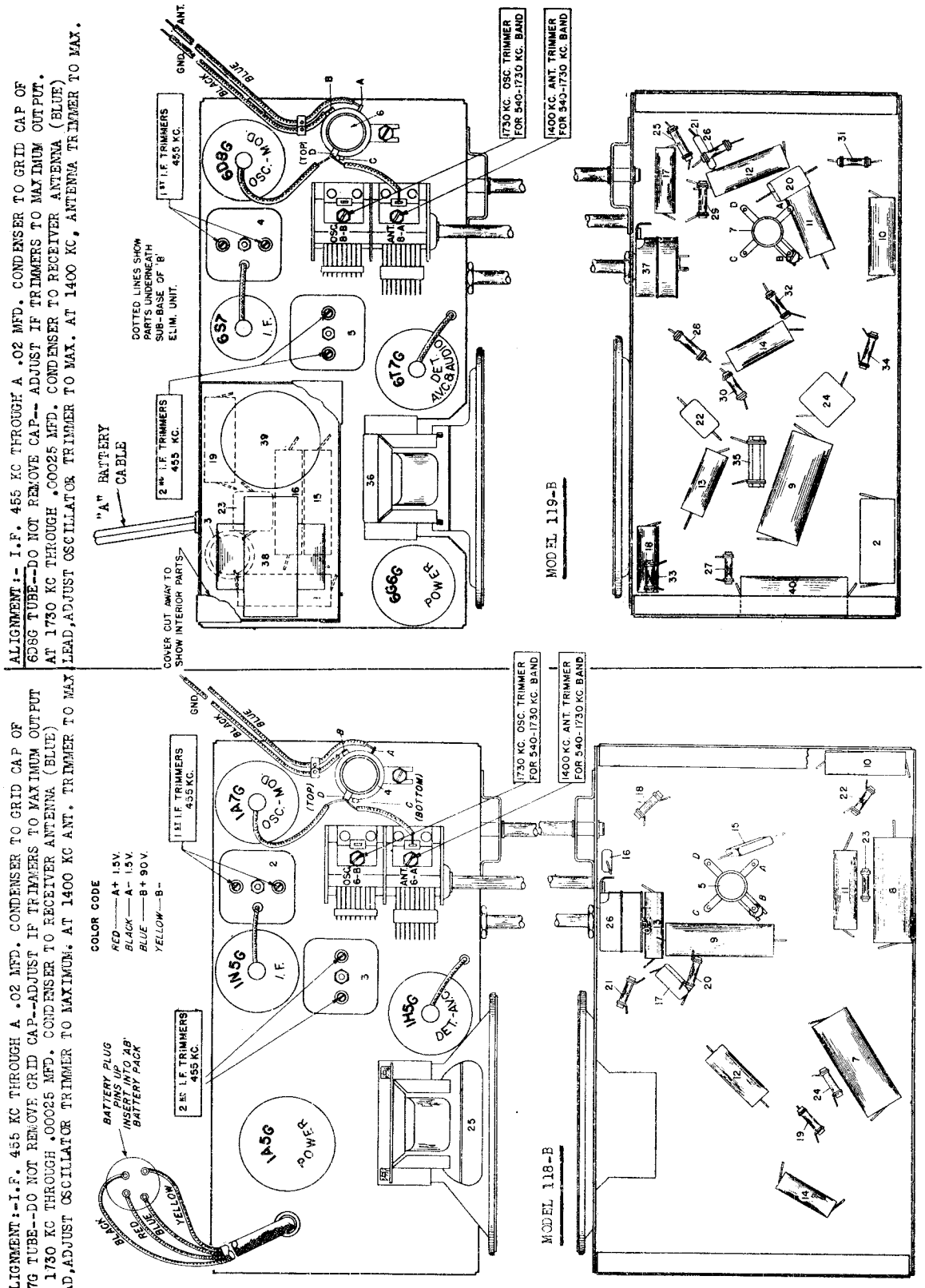
MODEL 118B
MODEL 119B
Alignment, Trimmers
Chassis

# SENTINEL RADIO CORP.


ALIGNMENT:- I.F. 455 KC THROUGH A .02 MFD. CONDENSER TO GRID CAP OF 6D8G TUBE--DO NOT REMOVE CAP-- ADJUST IF TRIMMERS TO MAXIMUM OUTPUT. AT 1730 KC THROUGH .00025 MFD. CONDENSER TO RECEIVER ANTENNA (BLUE) LEAD, ADJUST OSCILLATOR TRIMMER TO MAX. AT 1400 KC, ANTENNA TRIMMER TO MAX.
MODEL 119-B
ALIGNMENT:-I.F. 455 KC THROUGH A .02 MFD. CONDENSER TO GRID CAP OF 1A7G TUBE--DO NOT REMOVE GRID CAP--ADJUST IF TRIMMERS TO MAXIMUM OUTPUT AT 1730 KC THROUGH .00025 MFD. CONDENSER TO RECEIVER ANTENNA (BLUE) LEAD, ADJUST OSCILLATOR TRIMMER TO MAXIMUM. AT 1400 KC ANT. TRIMMER TO MAX
MODEL 118-B
COLOR CODE
RED — A+ 1.5V.
BLACK — A- 1.5V.
BLUE — B+ 90V.
YELLOW — B-
BATTERY PLUG PINS UP INSERT INTO 'AB' BATTERY PACK
"A" BATTERY CABLE
COVER CUT AWAY TO SHOW INTERIOR PARTS
DOTTED LINES SHOW PARTS UNDERNEATH SUB-BASE OF 'B' ELIM. UNIT.
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
1ST I.F. TRIMMERS 455 KC.
2ND I.F. TRIMMERS 455 KC.
ANT.
GND.
BLACK
BLUE
YELLOW
RED
6D8G OSC.-MOD.
6S7 I.F.
6T7G DET. AVC & AUDIO
6Q6G POWER
1A7G OSC.-MOD.
1N5G I.F.
1H5G DET.-AVC-AUDIO
1A5G POWER
OSC. B-B
ANT. B-A
OSC. 6-B
ANT. 6-A
(TOP)
(BOTTOM)

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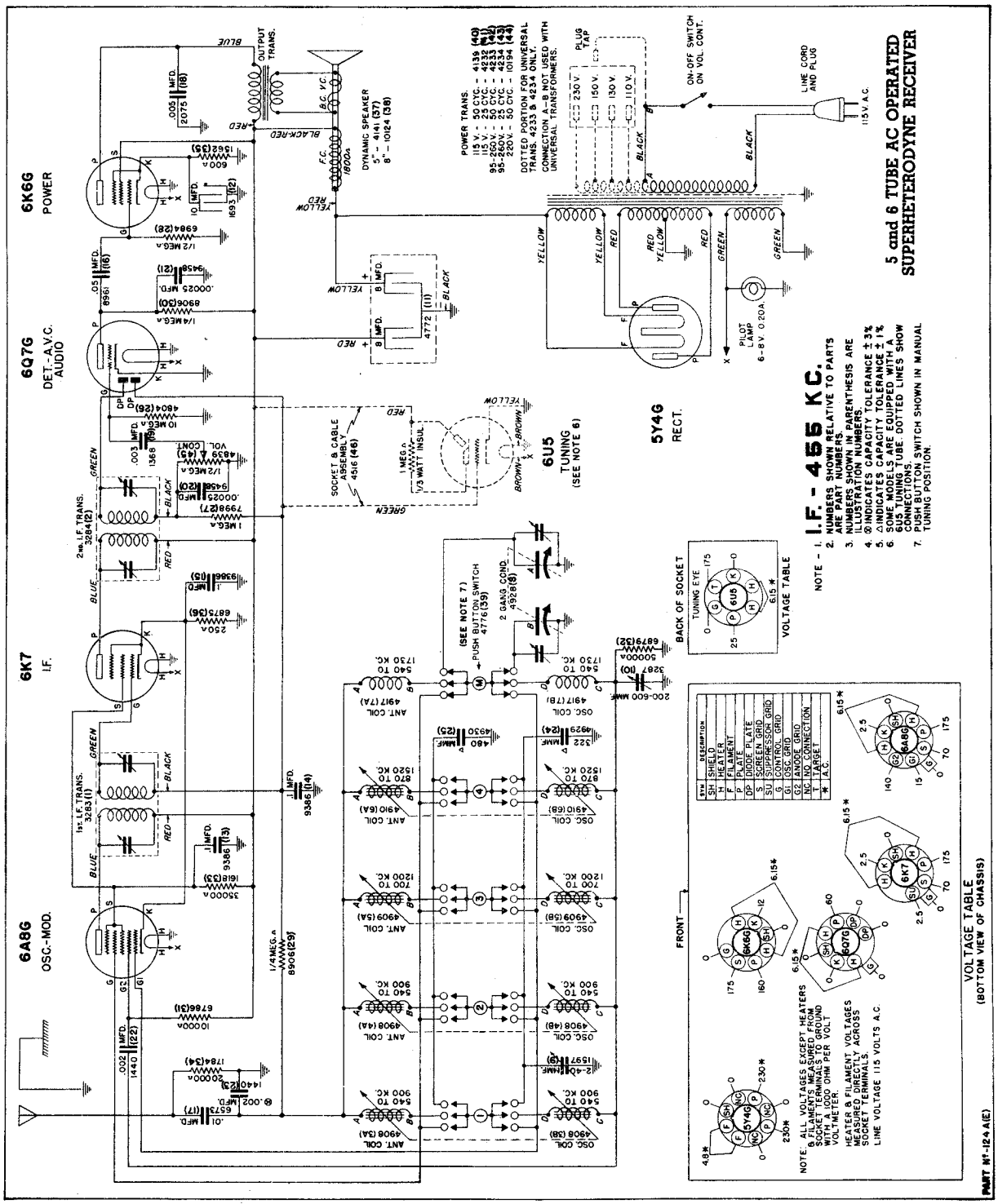
# SENTINEL RADIO CORP.

MODELS 124A, 124AE
Schematic, Voltage
Socket

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MODELS 124A, 124AE
Alignment, Trimmers
Chassis

# SENTINEL RADIO CORP.

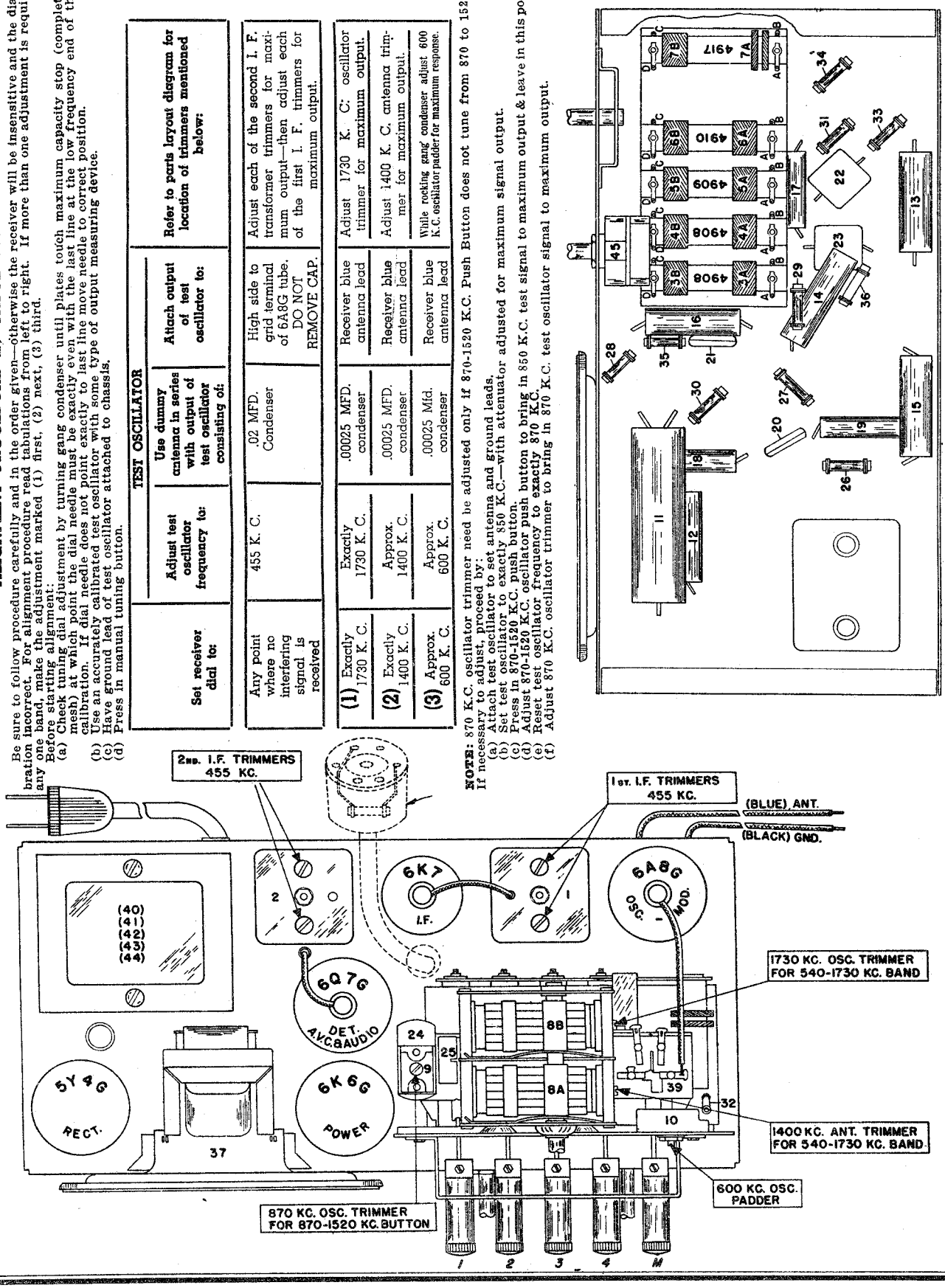
## ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:
(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely intermesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to chassis.
(d) Press in manual tuning button.

| Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | TEST OSCILLATOR: Attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|
| Any point where no interfering signal is received | 455 K. C. | .02 MFD. Condenser | High side to grid terminal of 6A8G tube. DO NOT REMOVE CAP. | Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. |
| (1) Exactly 1730 K. C. | Exactly 1730 K. C. | .00025 MFD. condenser | Receiver blue antenna lead | Adjust 1730 K. C. oscillator trimmer for maximum output. |
| (2) Exactly 1400 K. C. | Approx. 1400 K. C. | .00025 MFD. condenser | Receiver blue antenna lead | Adjust 1400 K. C. antenna trimmer for maximum output. |
| (3) Approx. 600 K. C. | Approx. 600 K. C. | .00025 Mfd. condenser | Receiver blue antenna lead | While rocking gang condenser adjust 600 K.C. oscillator padder for maximum response. |

**NOTE:** 870 K.C. oscillator trimmer need be adjusted only if 870-1520 K.C. Push Button does not tune from 870 to 1520 K.C. If necessary to adjust, proceed by:
(a) Attach test oscillator to set antenna and ground leads.
(b) Set test oscillator to exactly 850 K.C.—with attenuator adjusted for maximum signal output.
(c) Press in 870-1520 K.C. push button.
(d) Adjust 870-1520 K.C. oscillator push button to bring in 850 K.C. test signal to maximum output & leave in this position.
(e) Reset test oscillator frequency to exactly 870 K.C.
(f) Adjust 870 K.C. oscillator trimmer to bring in 870 K.C. test oscillator signal to maximum output.


2ND. I.F. TRIMMERS 455 KC.
1ST. I.F. TRIMMERS 455 KC.
(BLUE) ANT.
(BLACK) GND.
6K7 I.F.
6A8G OSC. - MOD.
6Q7G DET. A.V.C. & AUDIO
5Y4G RECT.
6K6G POWER
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
600 KC. OSC. PADDER
870 KC. OSC. TRIMMER FOR 870-1520 KC. BUTTON
1 2 3 4 M

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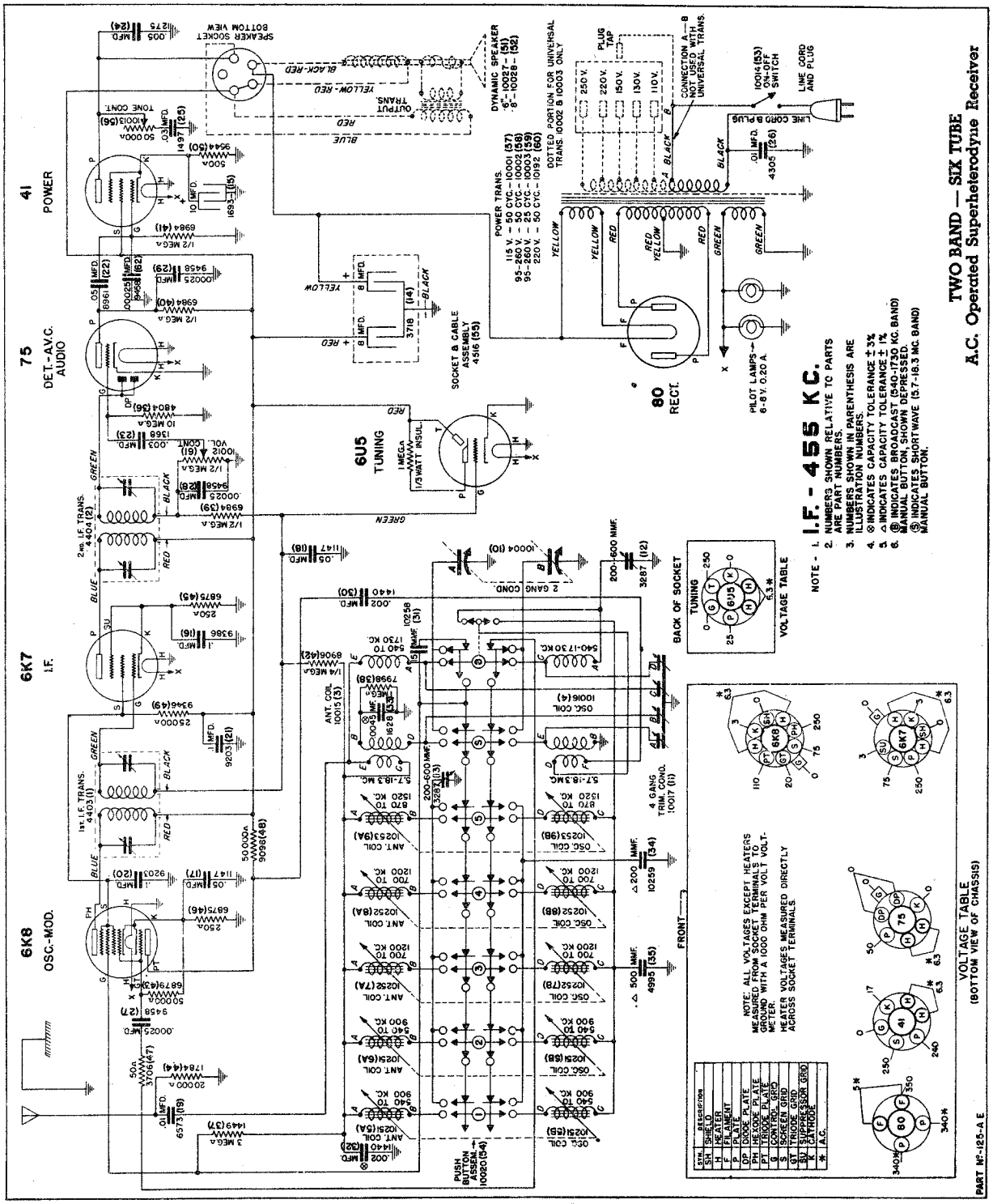
# SENTINEL RADIO CORP.

MODEL 125AE
Schematic, Voltage
Socket


TWO BAND — SIX TUBE
A.C. Operated Superheterodyne Receiver
I.F. - 455 KC.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
VOLTAGE TABLE
BACK OF SOCKET
NOTE - ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
PART No.-125-A E

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MODELS 142A, 142AE
MODEL 143L
Alignment

# SENTINEL RADIO CORP.

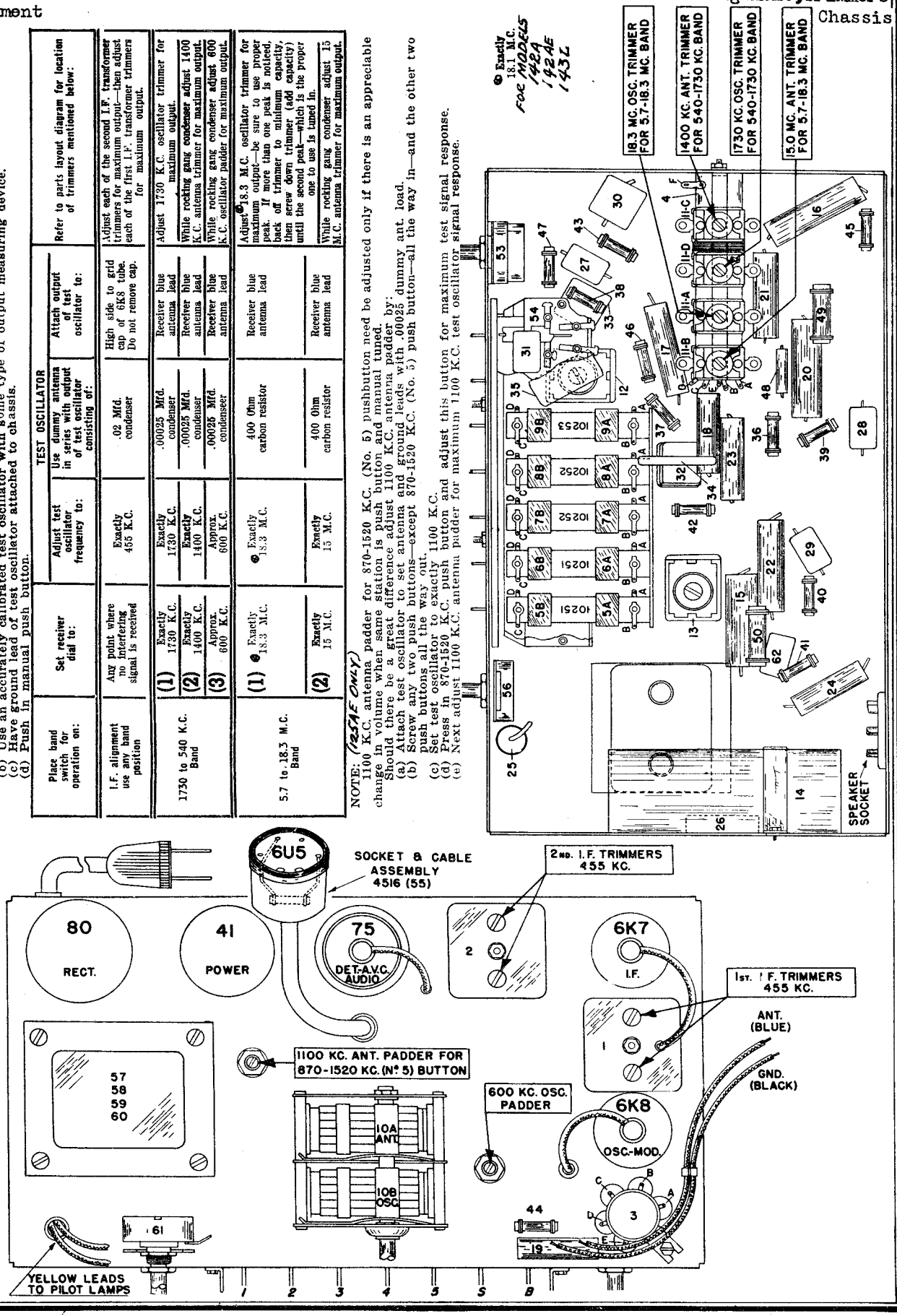
MODEL 125AE
Alignment, Trimmers
Chassis

## ALIGNMENT PROCEDURE IN TABULATED FORM

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to chassis.
(d) Push in manual push button.

| Place band switch for operation on: | Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | TEST OSCILLATOR: Attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
| I.F. alignment use any band position | Any point where no interfering signal is received | Exactly 455 K.C. | .02 Mfd. condenser | High side to grid cap of 6K8 tube. Do not remove cap. | Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output. |
| 1730 to 540 K.C. Band | (1) Exactly 1730 K.C. | Exactly 1730 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | Adjust 1730 K.C. oscillator trimmer for maximum output. |
| | (2) Exactly 1400 K.C. | Exactly 1400 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output. |
| | (3) Approx. 600 K.C. | Approx. 600 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output. |
| 5.7 to 18.3 M.C. Band | (1) Exactly 18.3 M.C. | Exactly 18.3 M.C. | 400 Ohm carbon resistor | Receiver blue antenna lead | Adjust 18.3 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in. |
| | (2) Exactly 15 M.C. | Exactly 15 M.C. | 400 Ohm carbon resistor | Receiver blue antenna lead | While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output. |

NOTE: (125AE ONLY)
1100 K.C. antenna padder for 870-1520 K.C. (No. 5) pushbutton need be adjusted only if there is an appreciable change in volume when same station is push button and manual tuned.
Should there be a great difference adjust 1100 K.C. antenna padder by:
(a) Attach test oscillator to set antenna and ground leads with .00025 dummy ant. load.
(b) Screw any two push buttons—except 870-1520 K.C. (No. 5) push button—all the way in—and the other two push buttons all the way out.
(c) Set test oscillator to exactly 1100 K.C.
(d) Press in 870-1520 K.C. push button and adjust this button for maximum test signal response.
(e) Next adjust 1100 K.C. antenna padder for maximum 1100 K.C. test oscillator signal response.


Exactly 18.1 M.C. FOR MODELS 142A 142AE 143L
18.3 MC. OSC. TRIMMER FOR 5.7-18.3 MC. BAND
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
15.0 MC. ANT. TRIMMER FOR 5.7-18.3 MC. BAND
SPEAKER SOCKET
6U5
SOCKET & CABLE ASSEMBLY 4516 (55)
2ND. I.F. TRIMMERS 455 KC.
80 RECT.
41 POWER
75 DET-A.V.C. AUDIO
6K7 I.F.
1ST. I.F. TRIMMERS 455 KC.
ANT. (BLUE)
GND. (BLACK)
1100 KC. ANT. PADDER FOR 870-1520 KC. (No. 5) BUTTON
600 KC. OSC. PADDER
6K8 OSC-MOD.
10A ANT.
10B OSC.
YELLOW LEADS TO PILOT LAMPS

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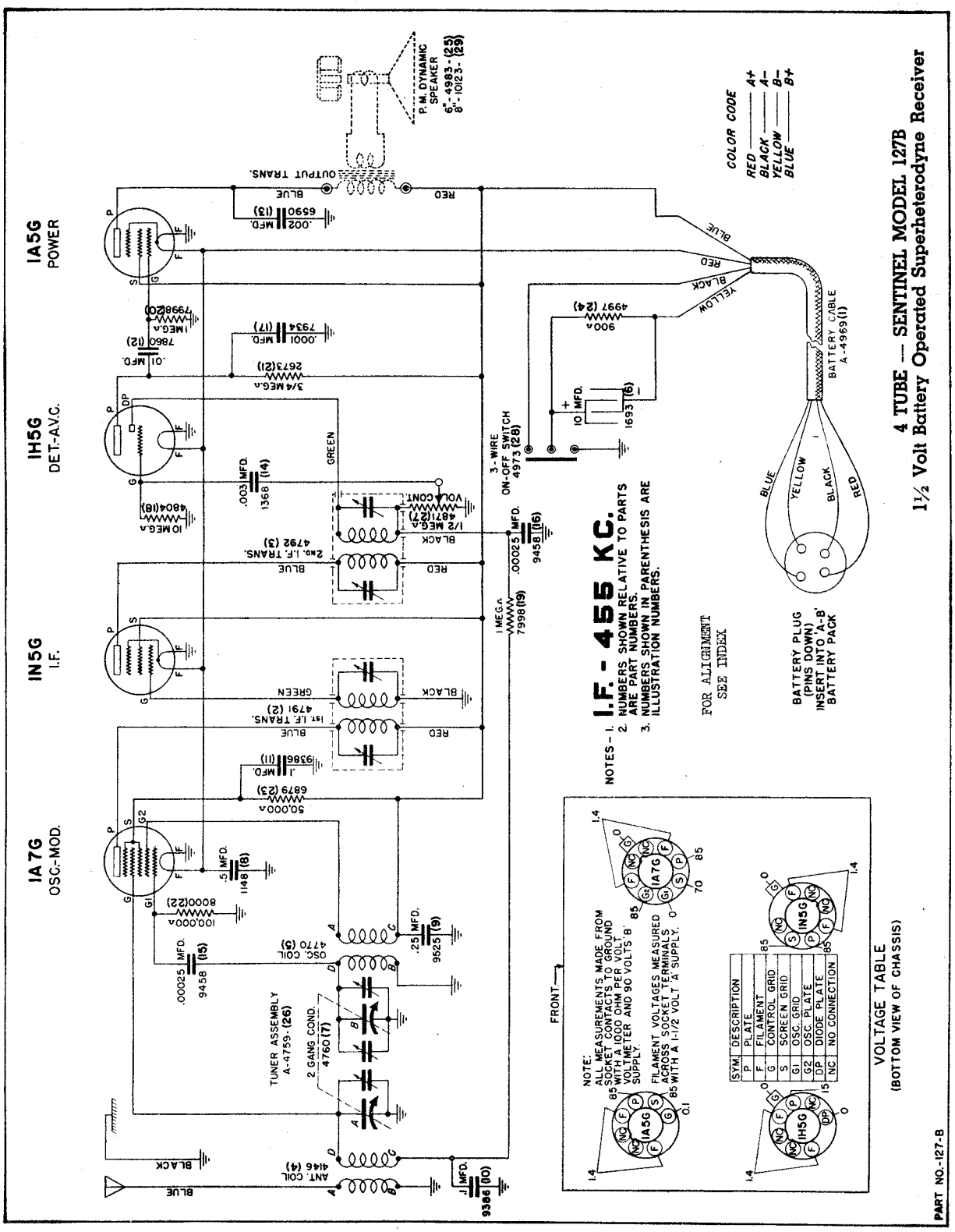
# SENTINEL RADIO CORP.

MODEL 127B
Schematic, Voltage
Socket


4 TUBE — SENTINEL MODEL 127B
1½ Volt Battery Operated Superheterodyne Receiver
I.F. - 455 KC.
NOTES - 1. NUMBERS SHOWN RELATIVE TO PARTS
2. NUMBERS SHOWN ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
FOR ALIGNMENT SEE INDEX
COLOR CODE
RED — A+
BLACK — A−
YELLOW — B−
BLUE — B+
1A5G POWER
1H5G DET.-A.V.C.
1N5G I.F.
1A7G OSC.-MOD.
P. M. DYNAMIC SPEAKER
OUTPUT TRANS.
3-WIRE ON-OFF SWITCH 4973 (28)
BATTERY CABLE A-4969 (1)
BATTERY PLUG (PINS DOWN) INSERT INTO 'A-B' BATTERY PACK
TUNER ASSEMBLY A-4759- (26)
2 GANG COND. 4760 (17)
VOLUME CONT.
FRONT
NOTE: ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1,000 OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY.
FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 1-1/2 VOLT 'A' SUPPLY.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
SYM. DESCRIPTION
P PLATE
F FILAMENT
G CONTROL GRID
S SCREEN GRID
G1 OSC. GRID
G2 OSC. PLATE
DP DIODE PLATE
NC NO CONNECTION
PART NO.-127-B

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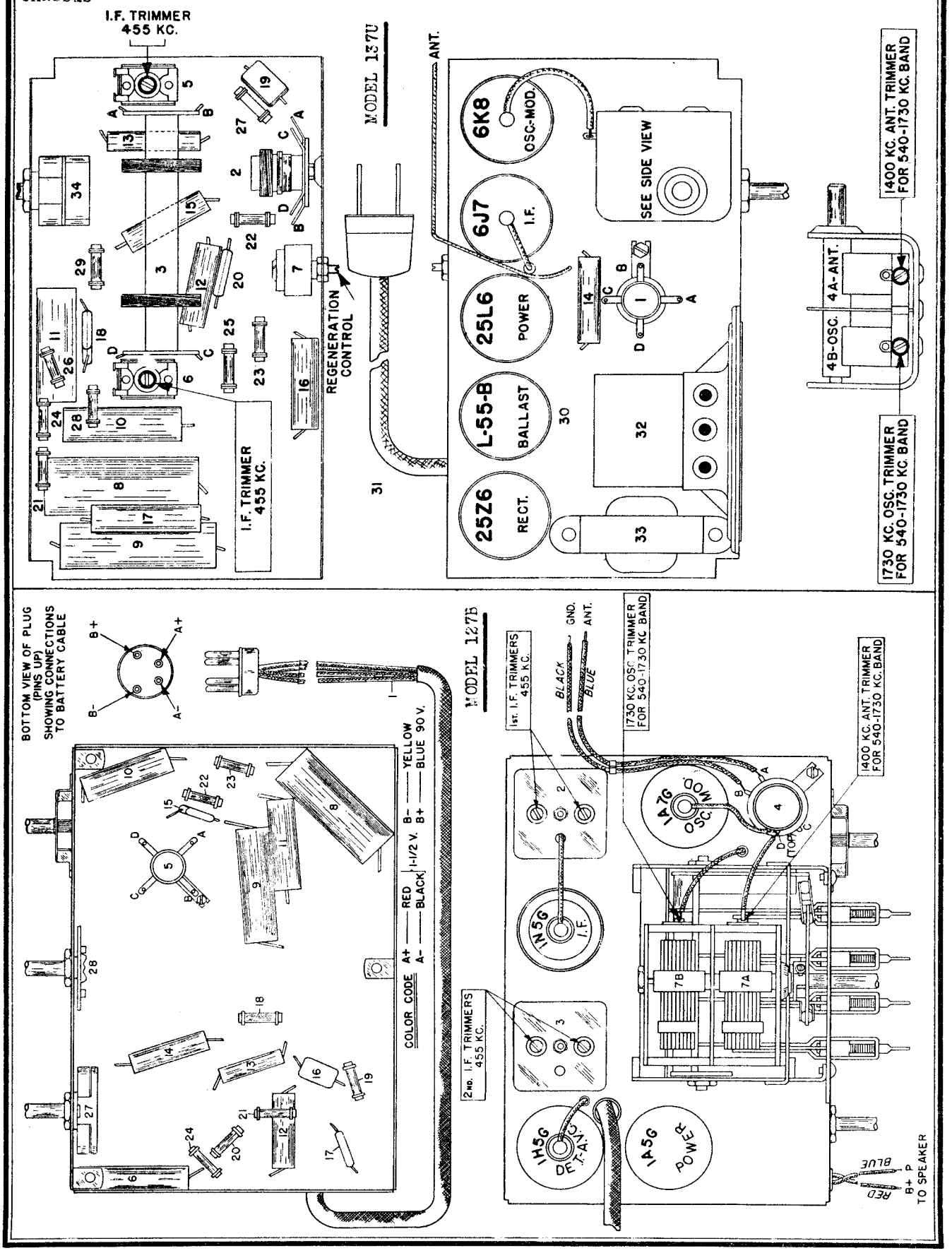
MODEL 127B
MODEL 137U
Trimmers
Chassis

# SENTINEL RADIO CORP.

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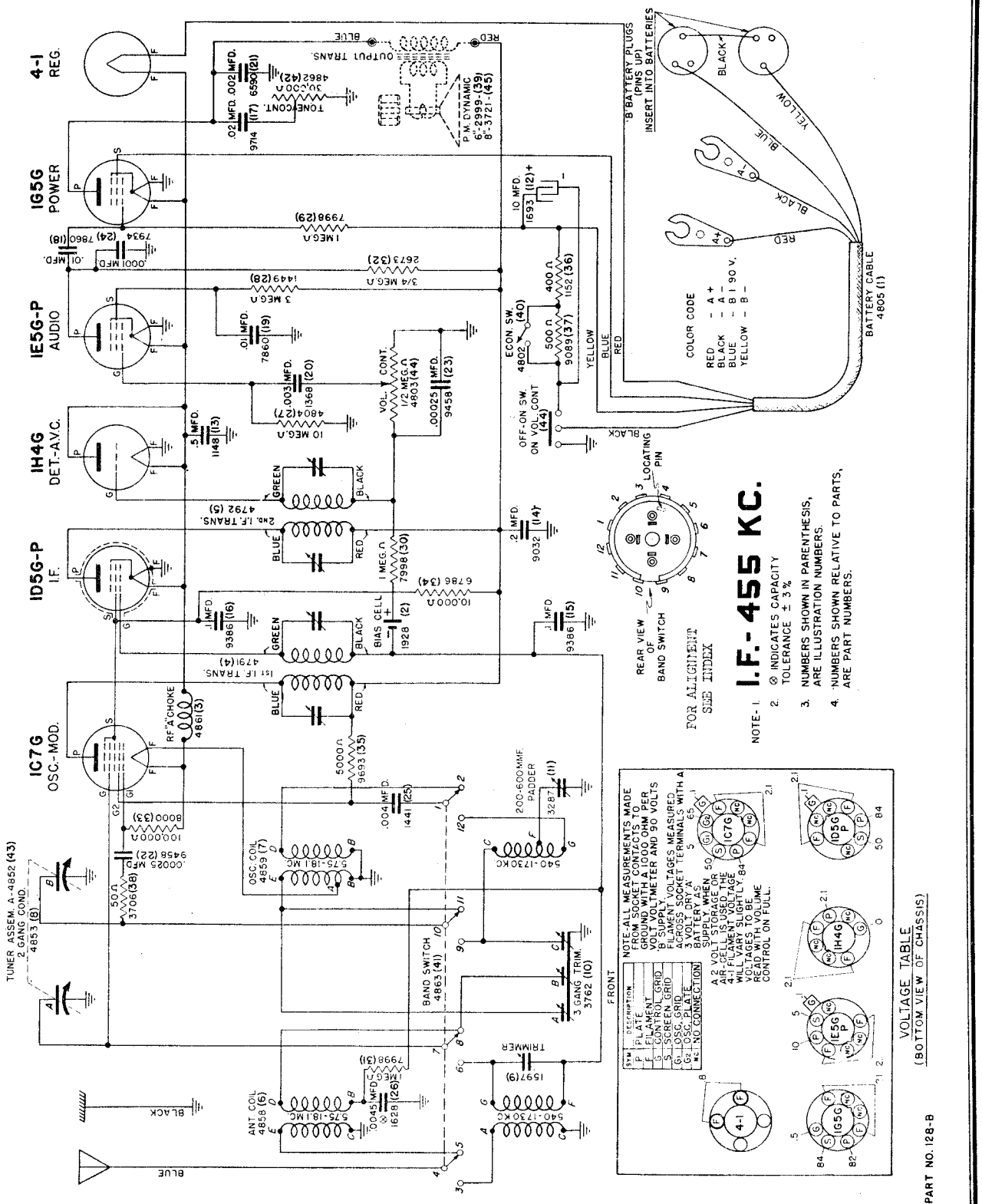
# SENTINEL RADIO CORP.

MODEL 128B
Schematic, Voltage
Socket

## TWO BAND—SIX TUBE INCLUDING BALLAST TUBE
### 2 Volt Battery Operated Superheterodyne Receiver


4-1 REG.
IG5G POWER
IE5G-P AUDIO
IH4G DET.-A.V.C.
ID5G-P I.F.
IC7G OSC.-MOD.
OUTPUT TRANS.
P.M. DYNAMIC
TONE CONT.
'B' BATTERY PLUGS (PINS UP) INSERT INTO BATTERIES
BATTERY CABLE 4805 (1)
COLOR CODE
RED - A +
BLACK - A -
BLUE - B 1 90 V.
YELLOW - B -
ECON. SW. (40)
OFF-ON SW. ON VOL. CONT. (44)
VOL. CONT. 1/2 MEG.Ω
2nd. I.F. TRANS.
1st. I.F. TRANS.
BIAS CELL
LOCATING PIN
REAR VIEW OF BAND SWITCH
FOR ALIGNMENT SEE INDEX
I.F.-455 KC.
NOTE-
1. ⊗ INDICATES CAPACITY TOLERANCE ± 3%
2. NUMBERS SHOWN IN PARENTHESIS, ARE ILLUSTRATION NUMBERS.
3. NUMBERS SHOWN RELATIVE TO PARTS, ARE PART NUMBERS.
TUNER ASSEM. A-4852 (43)
2 GANG COND. 4853 (8)
BAND SWITCH 4863 (41)
3 GANG TRIM. 3762 (10)
TRIMMER
ANT. COIL 4858 (6)
OSC. COIL 4859 (7)
FRONT
NOTE-ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY. VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 2 VOLT DRY A BATTERY AS SUPPLY WHEN FULLY CHARGED. 4-1 FILAMENT VOLTAGE WILL VARY SLIGHTLY. VOLTAGES TO BE READ WITH VOLUME CONTROL ON FULL.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
PART NO. 128-B

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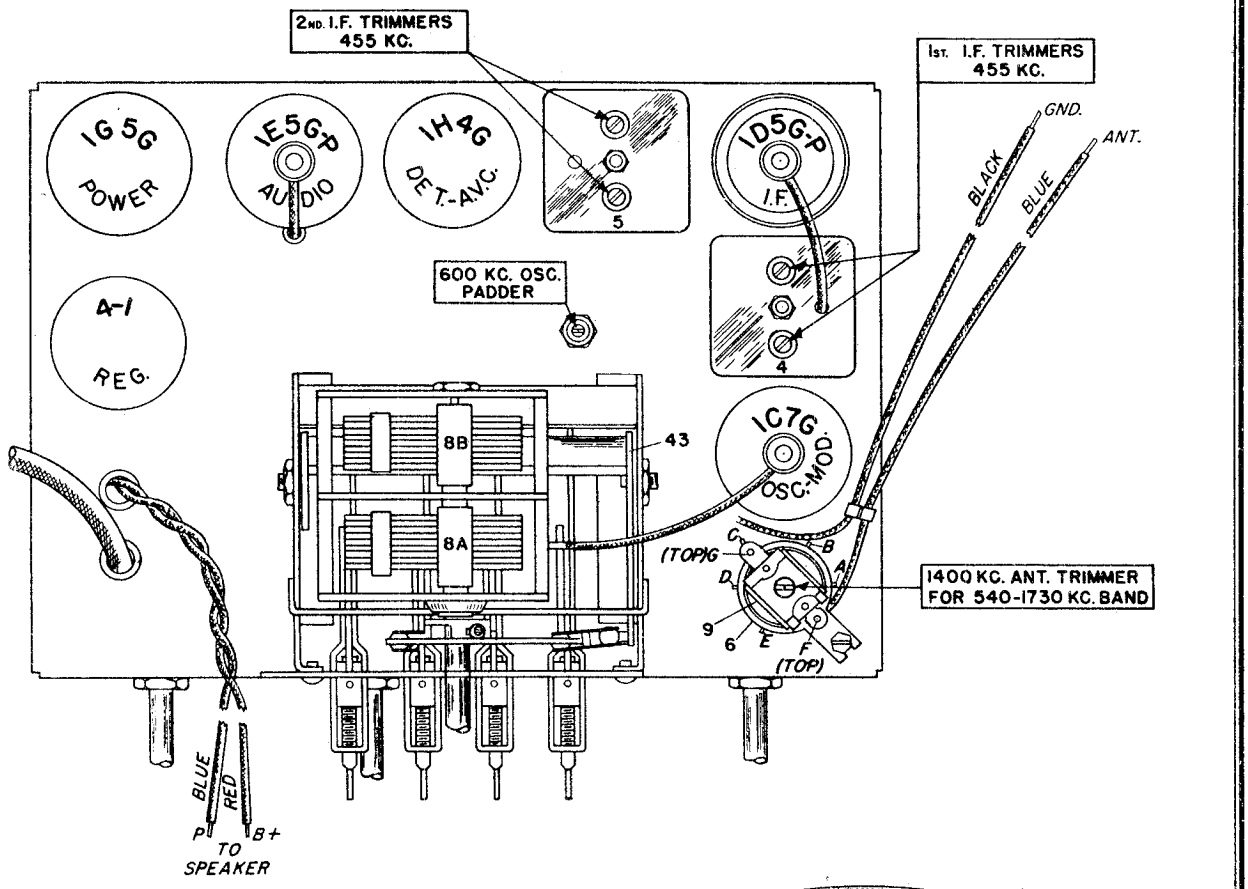
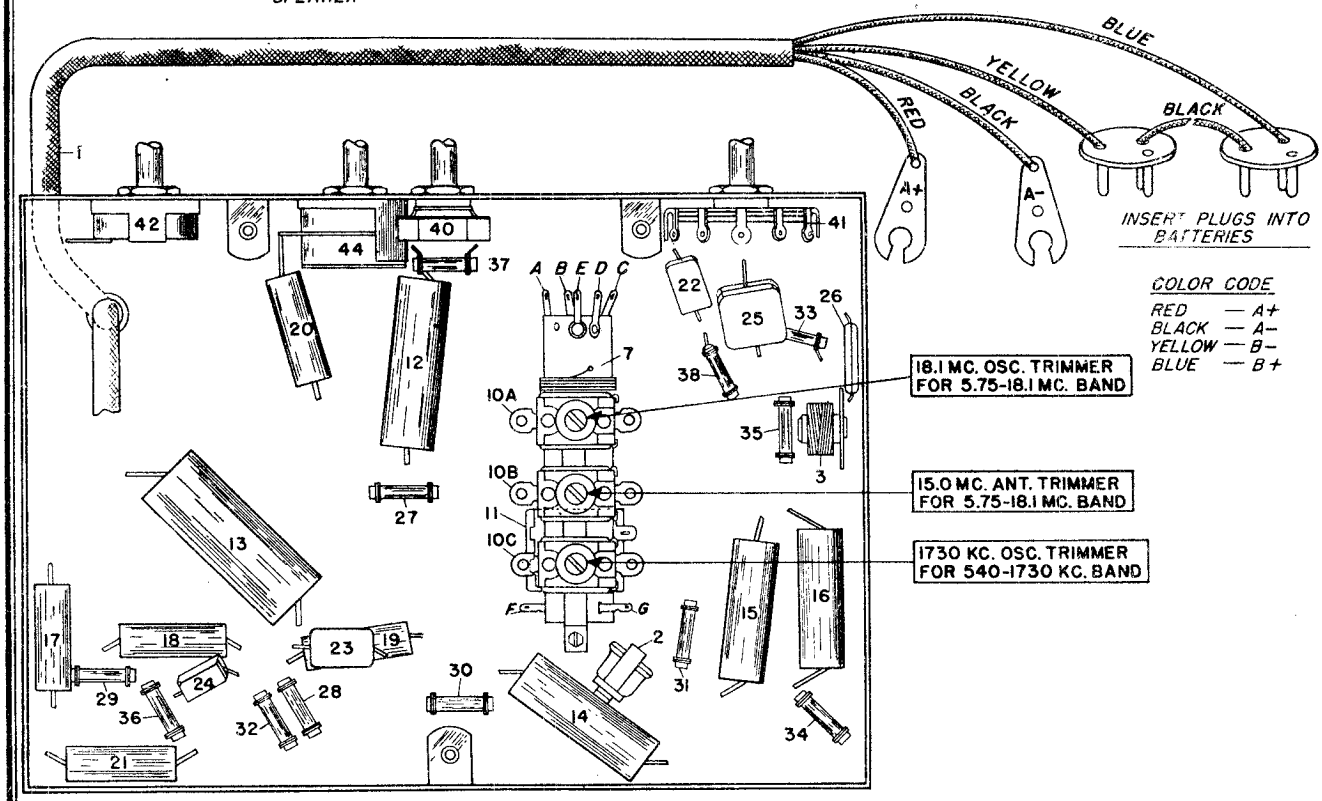
MODEL 128B
Trimmers
Chassis

# SENTINEL RADIO CORP.

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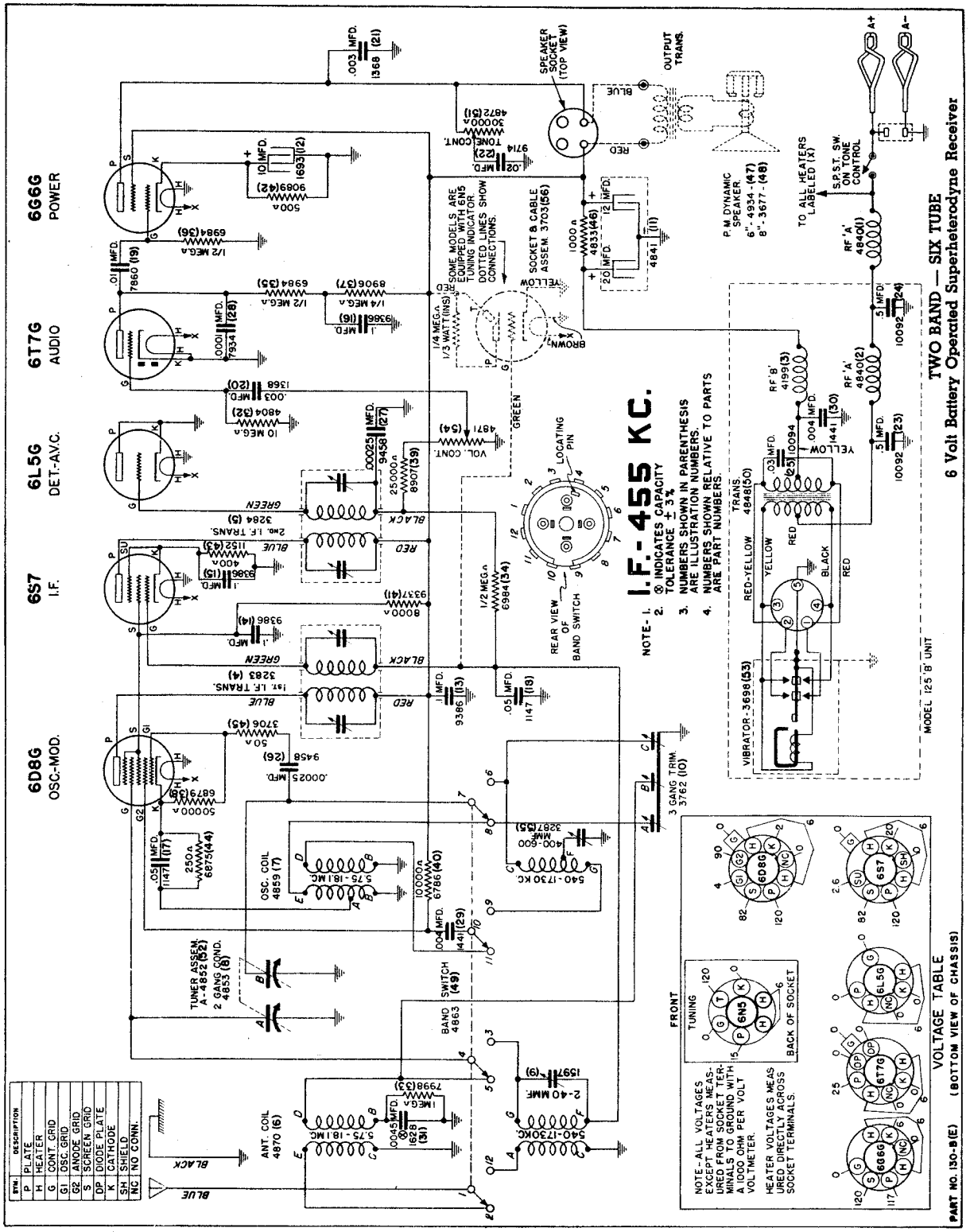
# SENTINEL RADIO CORP.

MODELS 130B, 130BE
Schematic, Voltage
Socket

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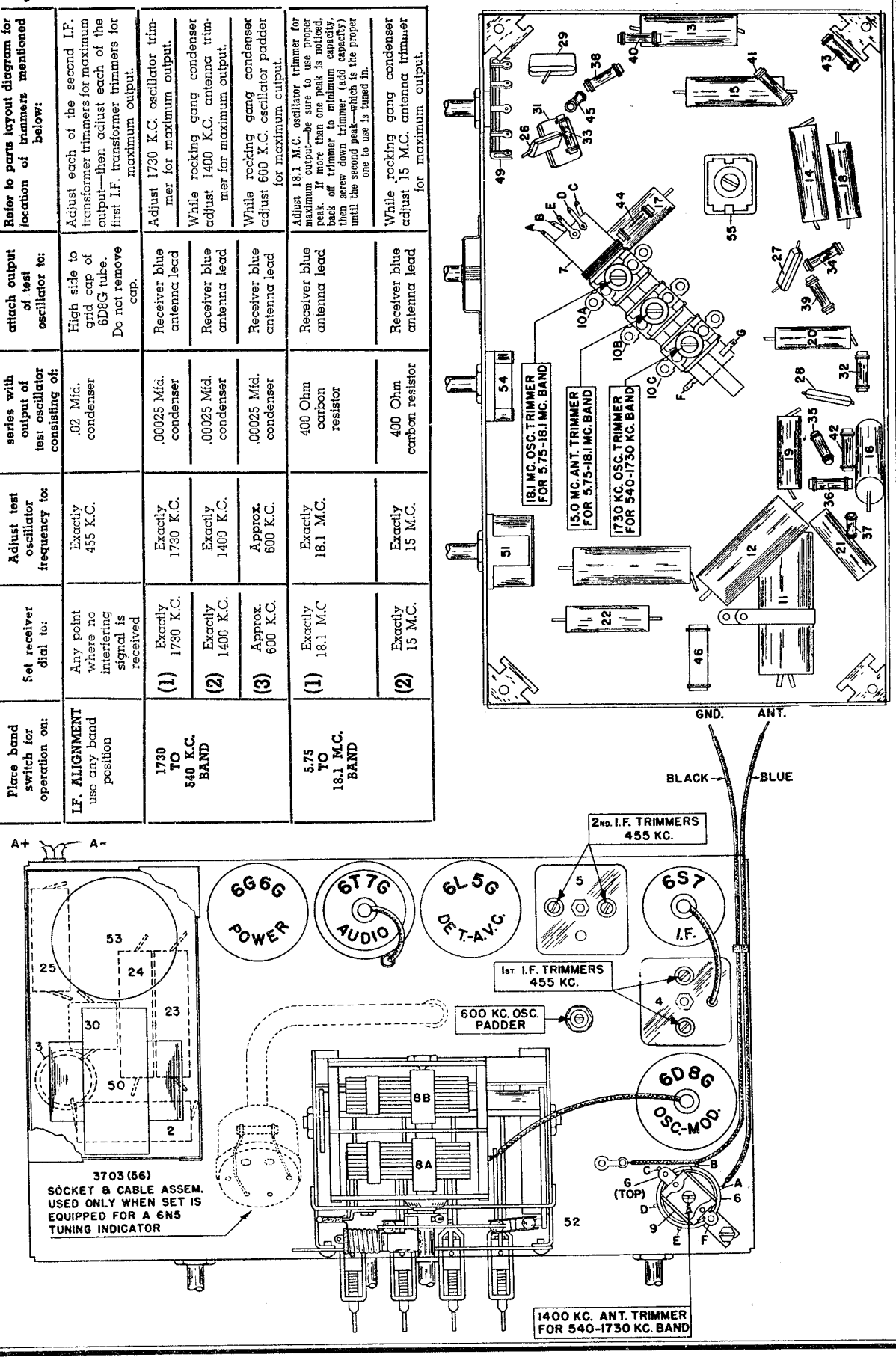
MODELS 130B, 130BE
Alignment, Trimmers
Chassis

# SENTINEL RADIO CORP.

## ALIGNMENT PROCEDURE IN TABULATED FORM

| Place band switch for operation on: | Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
| I.F. ALIGNMENT use any band position | Any point where no interfering signal is received | Exactly 455 K.C. | .02 Mfd. condenser | High side to grid cap of 6D8G tube. Do not remove cap. | Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output. |
| 1730 TO 540 K.C. BAND | (1) Exactly 1730 K.C. | Exactly 1730 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | Adjust 1730 K.C. oscillator trimmer for maximum output. |
| | (2) Exactly 1400 K.C. | Exactly 1400 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output. |
| | (3) Approx. 600 K.C. | Approx. 600 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output. |
| 5.75 TO 18.1 M.C. BAND | (1) Exactly 18.1 M.C. | Exactly 18.1 M.C. | 400 Ohm carbon resistor | Receiver blue antenna lead | Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in. |
| | (2) Exactly 15 M.C. | Exactly 15 M.C. | 400 Ohm carbon resistor | Receiver blue antenna lead | While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output. |


18.1 MC. OSC. TRIMMER FOR 5.75-18.1 MC. BAND
15.0 MC. ANT. TRIMMER FOR 5.75-18.1 MC. BAND
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
GND.
ANT.
BLACK
BLUE
A+
A-
6G6G POWER
6T7G AUDIO
6L5G DET.-A.V.C.
6S7 I.F.
6D8G OSC.-MOD.
2ND. I.F. TRIMMERS 455 KC.
1ST. I.F. TRIMMERS 455 KC.
600 KC. OSC. PADDER
3703(56) SOCKET & CABLE ASSEM. USED ONLY WHEN SET IS EQUIPPED FOR A 6N5 TUNING INDICATOR
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND

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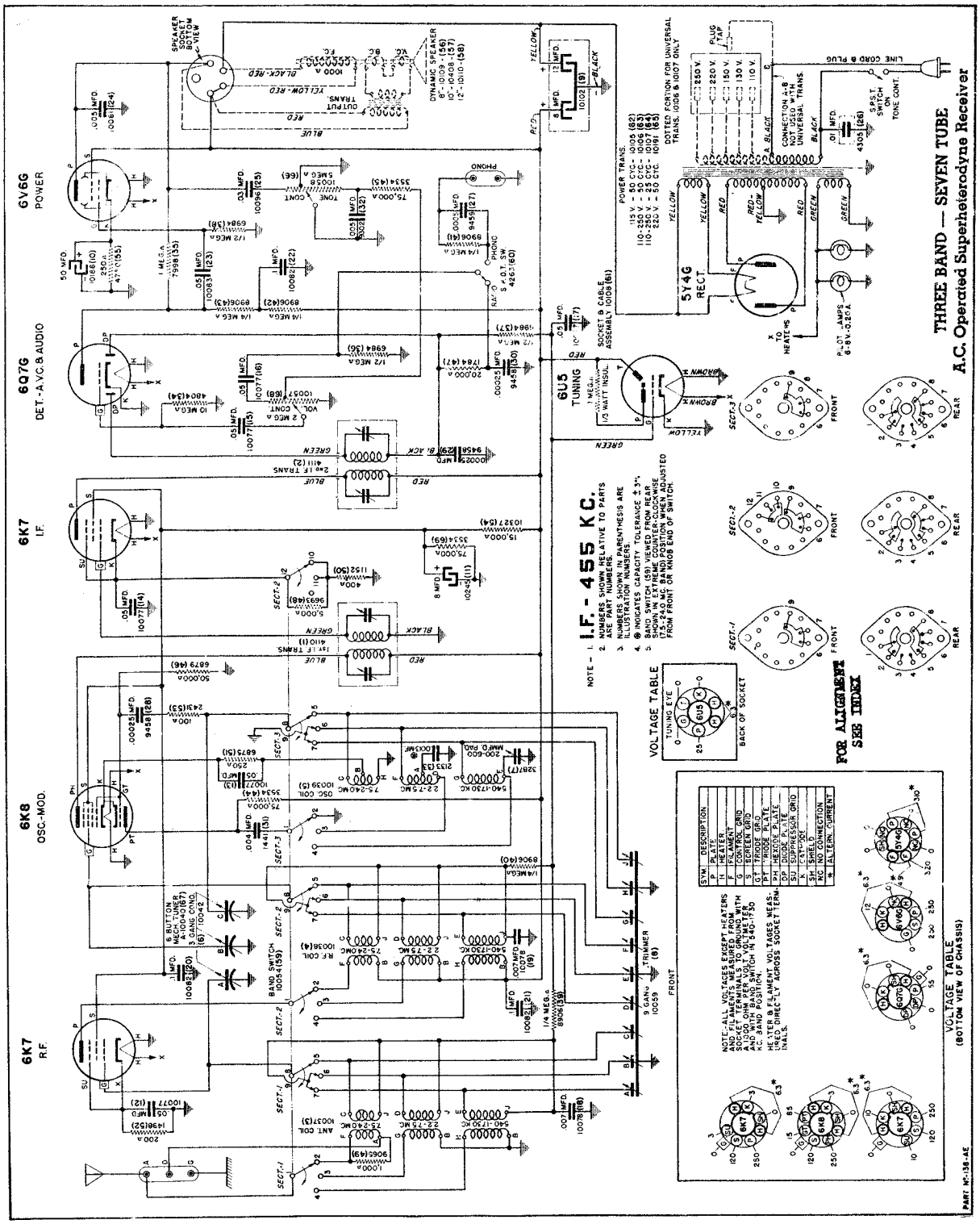
# SENTINEL RADIO CORP.

MODEL 138AE
Schematic, Voltage
Socket


THREE BAND — SEVEN TUBE
A.C. Operated Superheterodyne Receiver
I.F. - 455 KC.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
VOLTAGE TABLE
FOR ALIGNMENT SEE INDEX
6V6G POWER
6Q7G DET.-A.V.C.& AUDIO
6K7 I.F.
6K8 OSC.-MOD.
6K7 R.F.
5Y4G RECT
6U5 TUNING
6 BUTTON PUSH BUTTON ASS'Y A-10040(187)
3 GANG COND. (6) 10042
9 GANG TRIMMER (8) 10059
BAND SWITCH 10054(59)
SPEAKER SOCKET BOTTOM VIEW
DYNAMIC SPEAKER 8"-10109-(56) 10-10108-(57) 12"-10110-(58)
POWER TRANS. 115 V - 50 CYC - 10105 (62) 110-250 V - 25 CYC - 10106 (63) 110-250 V - 50 CYC. 10107 (64) 220 V - 50 CYC. 10191 (65)
DOTTED PORTION FOR UNIVERSAL TRANS. 1006 & 10107 ONLY
SOCKET & CABLE ASSEMBLY 10108(61)
LINE CORD & PLUG
S.P.S.T. SWITCH TONE CONT.
PILOT LAMPS 6.8V-0.20A
TO HEATERS
SECT-1
SECT-2
SECT-3
FRONT
REAR
BACK OF SOCKET
TUNING EYE
NOTE - 1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE PART NUMBERS.
3. VOLTAGES SHOWN IN RED.
4. ⊕ INDICATES CAPACITY TOLERANCE ± 3%.
5. BAND SWITCH (59) VIEWED FROM REAR SHOWN IN EXTREME COUNTER-CLOCKWISE POSITION. ROTOR SECTIONS ARE ADJUSTED FROM FRONT OR KNOB END OF SWITCH.
SYM. DESCRIPTION
P PLATE
H HEATER
K CATHODE
G CONTROL GRID
S SCREEN GRID
GT TRIODE GRID
PH HEATER PLATE
GP PENTODE GRID
DP DIODE PLATE
SU SUPPRESSOR GRID
SH SHIELD
NC NO CONNECTION
* ALTERN. CURRENT
NOTE:-ALL VOLTAGES EXCEPT HEATERS ARE TAKEN FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. ALL VOLTAGES MEASURED WITH H.S. SWITCH IN S.W. POSITION.
HEATER & FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
PART NO. 138-AE

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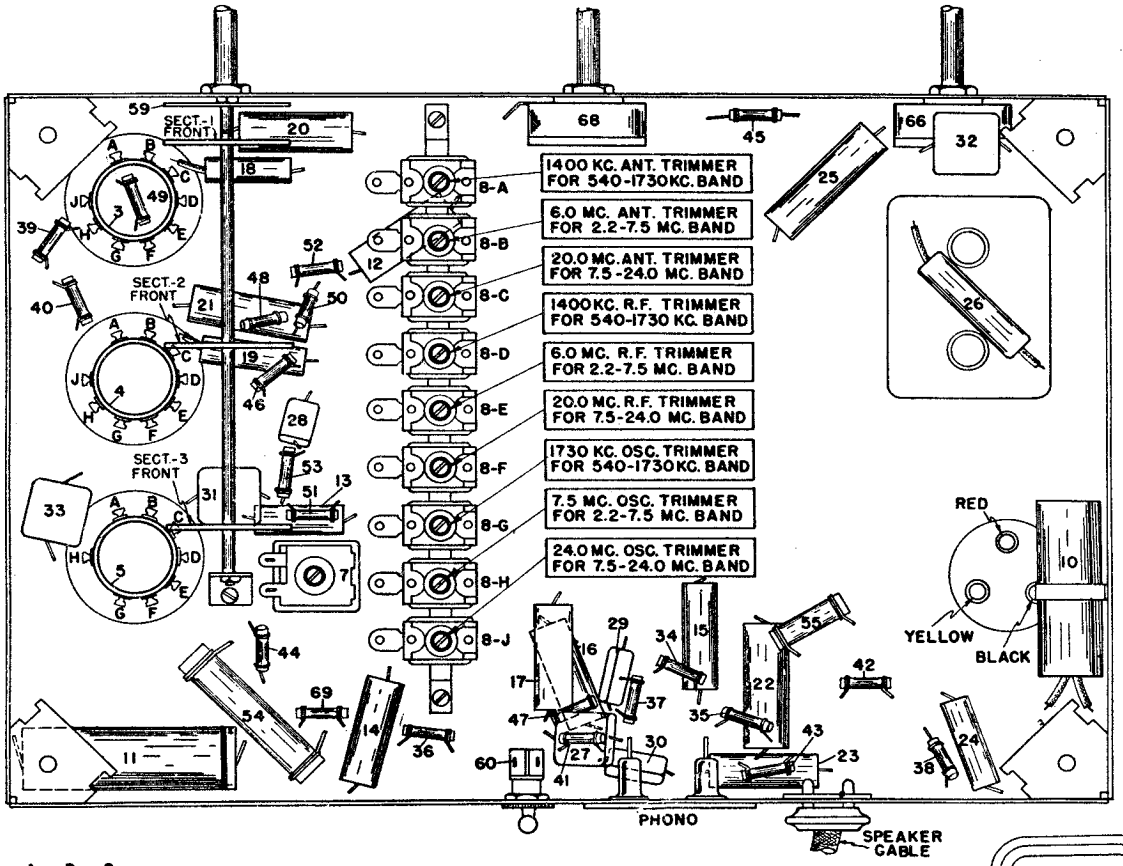
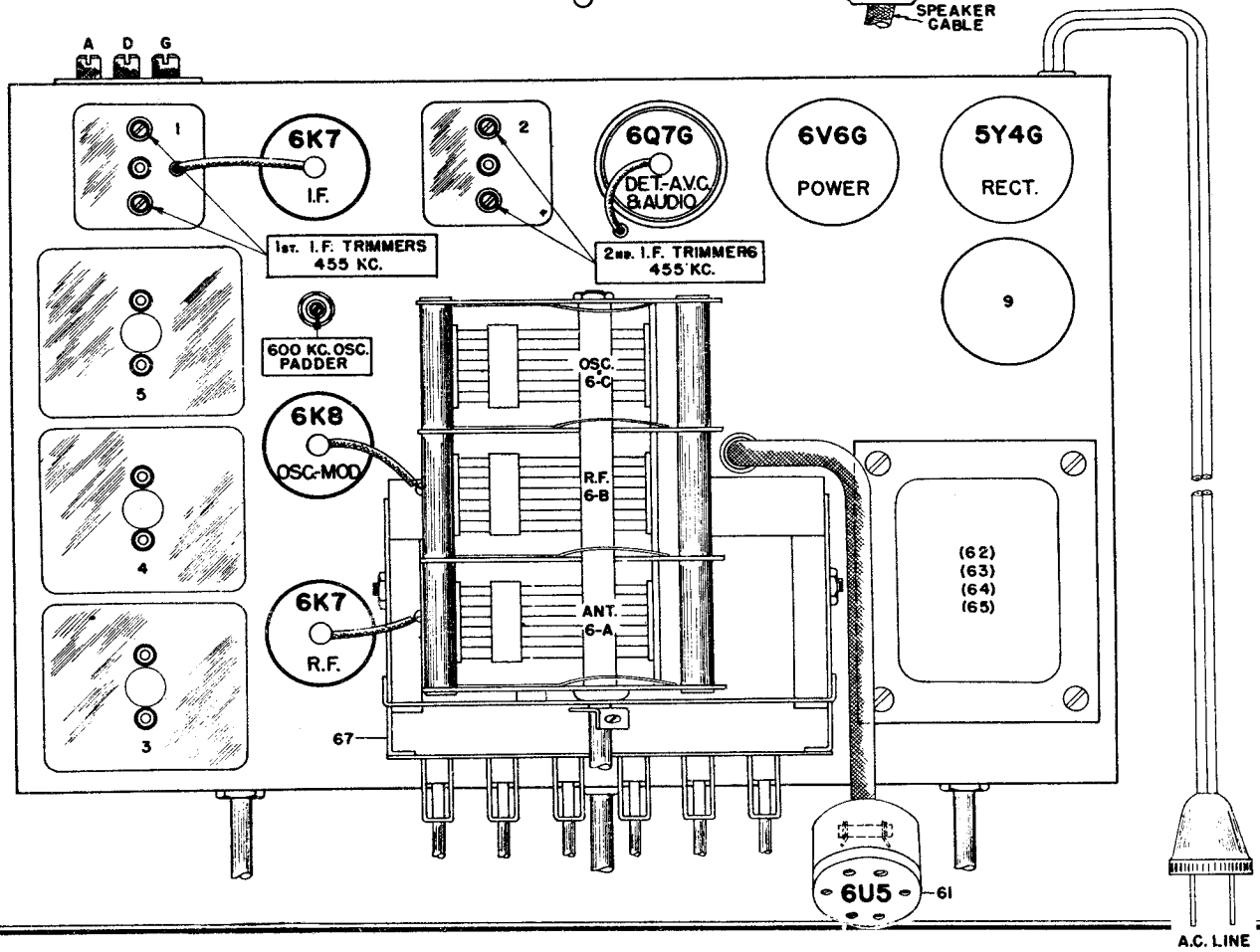
MODEL 138AE
Trimmers
Chassis

# SENTINEL RADIO CORP.


SECT-1 FRONT
SECT-2 FRONT
SECT-3 FRONT
8-A 1400 KC. ANT. TRIMMER FOR 540-1730KC. BAND
8-B 6.0 MC. ANT. TRIMMER FOR 2.2-7.5 MC. BAND
8-C 20.0 MC. ANT. TRIMMER FOR 7.5-24.0 MC. BAND
8-D 1400KC. R.F. TRIMMER FOR 540-1730 KC. BAND
8-E 6.0 MC. R.F. TRIMMER FOR 2.2-7.5 MC. BAND
8-F 20.0 MC. R.F. TRIMMER FOR 7.5-24.0 MC. BAND
8-G 1730 KC. OSC. TRIMMER FOR 540-1730KC. BAND
8-H 7.5 MC. OSC. TRIMMER FOR 2.2-7.5 MC. BAND
8-J 24.0 MC. OSC. TRIMMER FOR 7.5-24.0 MC. BAND
RED
YELLOW
BLACK
PHONO
SPEAKER CABLE

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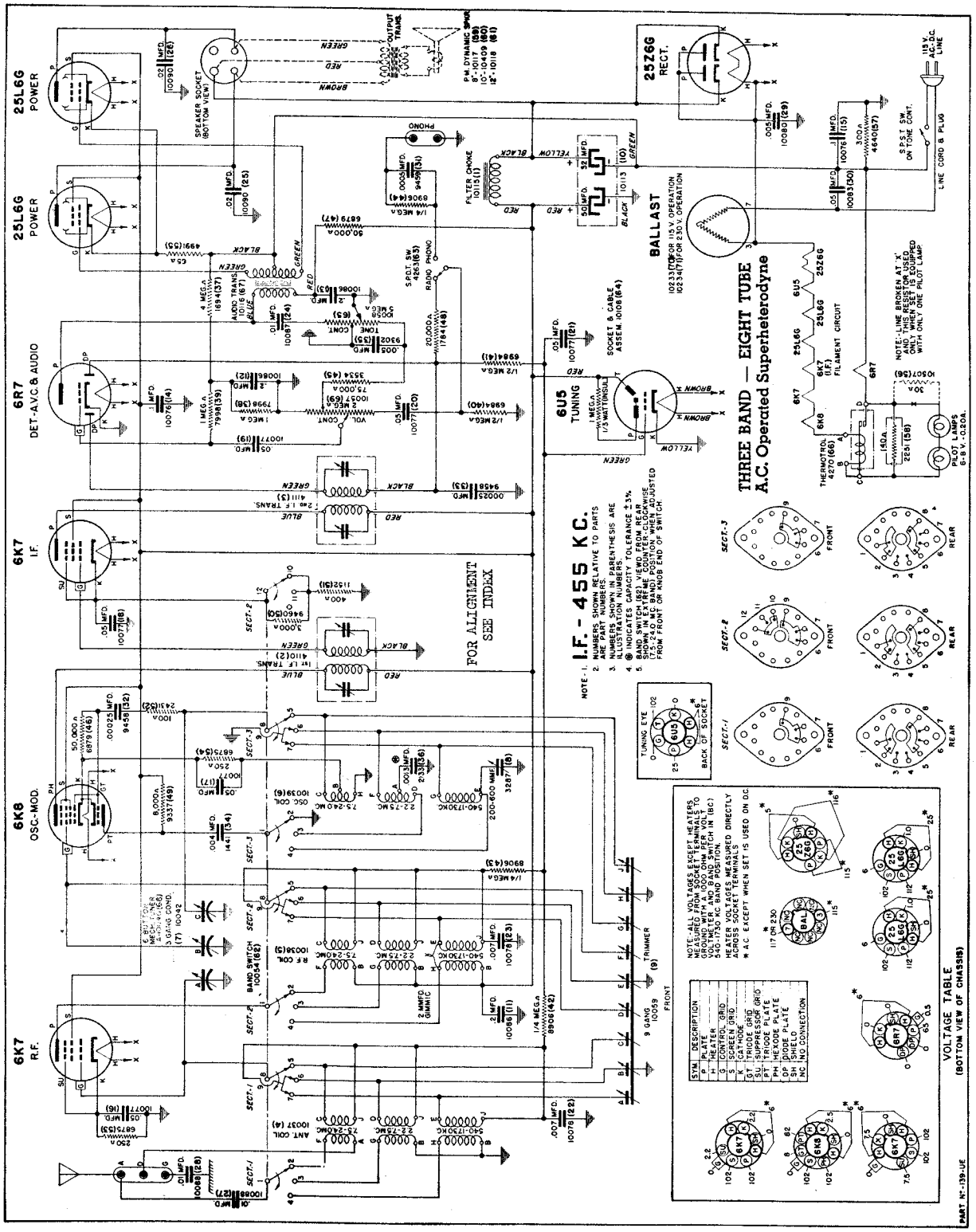
# SENTINEL RADIO CORP.

MODEL 139UE
Schematic, Voltage
Socket

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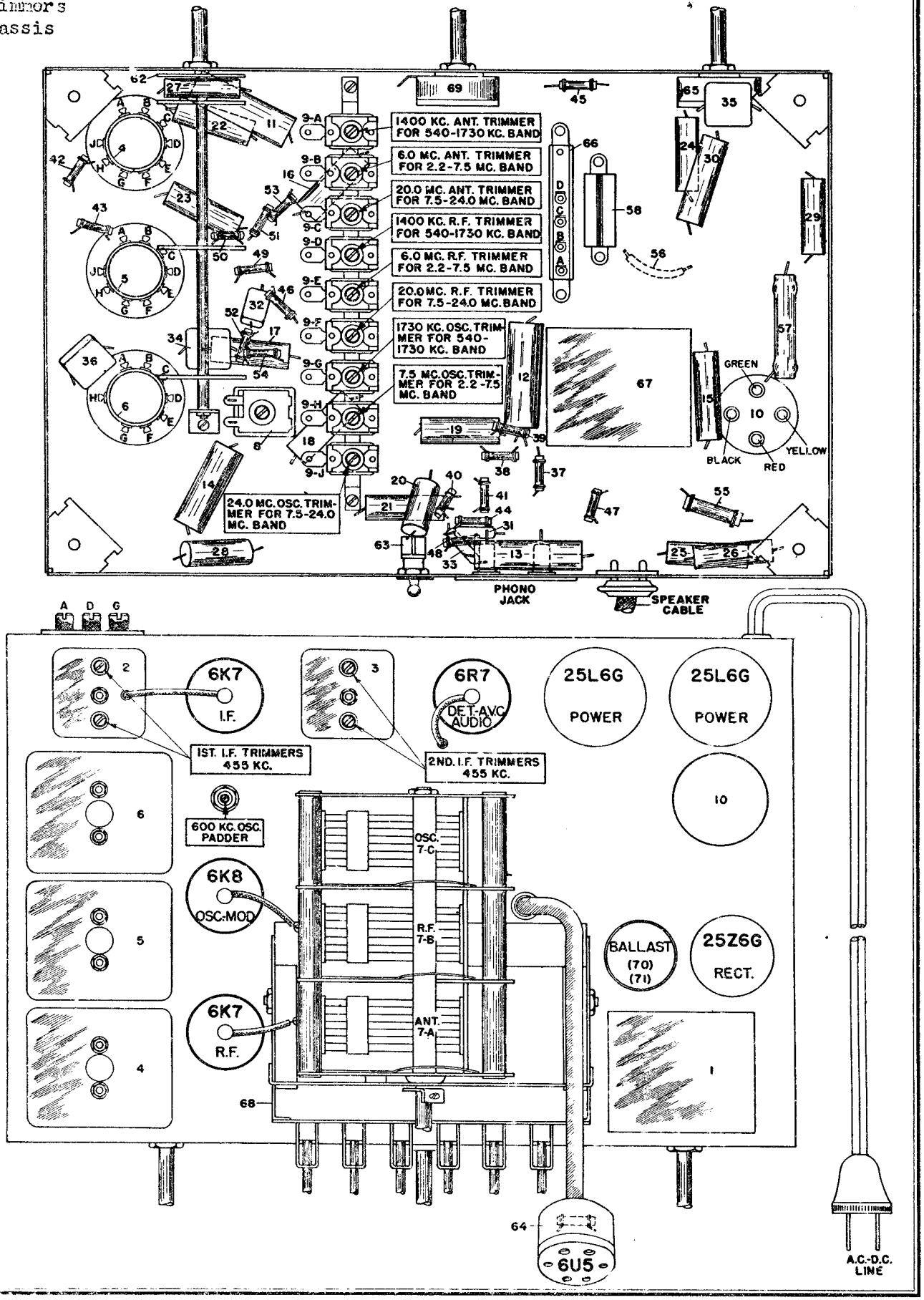
MODEL 139UE
Trimmers
Chassis

# SENTINEL RADIO CORP.

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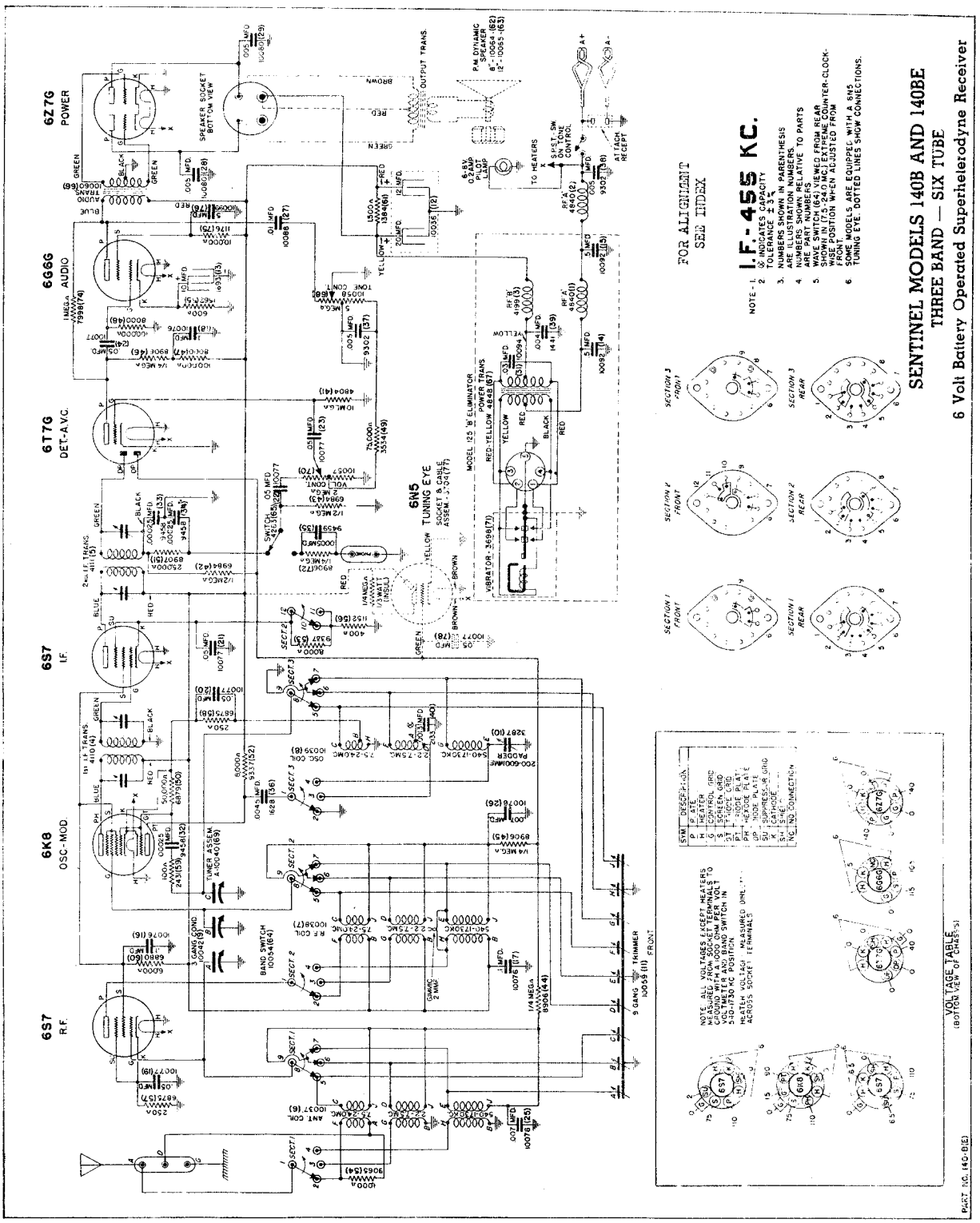
# SENTINEL RADIO CORP.

MODELS 140B, 140BE
Schematic, Voltage
Socket


SENTINEL MODELS 140B AND 140BE
THREE BAND — SIX TUBE
6 Volt Battery Operated Superheterodyne Receiver
I.F. 455 KC.
FOR ALIGNMENT SEE INDEX
NOTE - 1. ∞ INDICATES CAPACITY TOLERANCE ±3%
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. NUMBERS SHOWN RELATIVE TO PARTS ARE PARTS NUMBERS.
4. WAVE SWITCH (64) VIEWED FROM REAR SHOWN IN (7.5-24.0 MC) EXTREME COUNTER-CLOCK-WISE POSITION WHEN ADJUSTED FROM FRONT.
5. SOME MODELS ARE EQUIPPED WITH A 6N5 TUNING EYE. DOTTED LINES SHOW CONNECTIONS.
6Z7G POWER
6G6G AUDIO
6T7G DET-A.V.C.
6S7 I.F.
6K8 OSC-MOD
6S7 R.F.
6N5 TUNING EYE
SPEAKER SOCKET BOTTOM VIEW
OUTPUT TRANS.
P.M. DYNAMIC SPEAKER 8"-10064-(62) 12"-10065-(63)
6.3V 0.15A PILOT LAMP
TO HEATERS
SW-ST. SW VOLUME CONTROL
ANT. TRANS. 1ST I.F. TRANS. 2ND I.F. TRANS.
TONE CONT.
VOL. CONT.
SWITCH 4283(65)
MODEL 125 'B' ELIMINATOR
POWER TRANS. RED-YELLOW 4848 (67)
VIBRATOR - 3698(77)
SOCKET & CABLE ASSEM. - 3501(77)
TUNER ASSEM. A-10040 (69)
BAND SWITCH 10034(64)
3 GANG COND. 10042(69)
9 GANG TRIMMER 10059 (11) FRONT
RF COIL 10038(7)
OSC. COIL 10039 (8)
ANT. COIL 10037 (6)
PADDER 200-600MMF
SECT 1
SECT 2
SECT 3
SECT 4
SECTION 1 FRONT
SECTION 1 REAR
SECTION 2 REAR
SECTION 3 FRONT
SECTION 3 REAR
SECTION 4 FRONT
NOTE ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO CHASSIS WITH 1000 OHM PER VOLT VOLTMETER AND BAND SWITCH IN 540-1750 KC POSITION
MEDIUM VOLTAGE MEASURED UNDER ACROSS SPEAKER TERMINALS
SYMBOL DESCRIPTION
P PLATE
H HEATER
G CONTROL GRID
S SCREEN GRID
D DIODE PLATE
PT HEXODE PLATE
SU SUPPRESSOR GRID
K CATHODE
NC NO CONNECTION
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
PART NO. 140-B(E)

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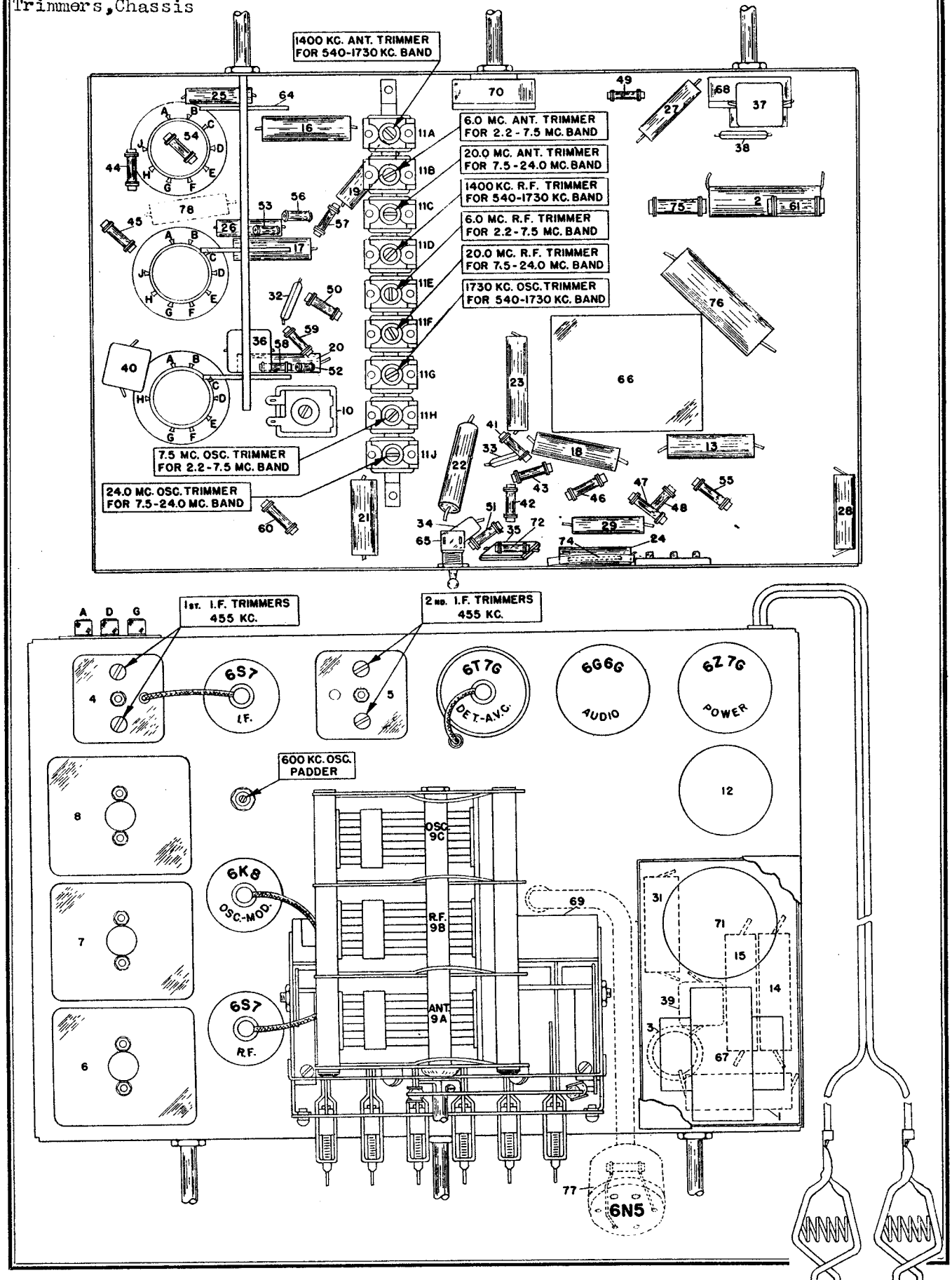
MODELS 140B, 140BE
Trimmers, Chassis

# SENTINEL RADIO CORP.


1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
6.0 MC. ANT. TRIMMER FOR 2.2 - 7.5 MC. BAND
20.0 MC. ANT. TRIMMER FOR 7.5 - 24.0 MC. BAND
1400 KC. R.F. TRIMMER FOR 540-1730 KC. BAND
6.0 MC. R.F. TRIMMER FOR 2.2 - 7.5 MC. BAND
20.0 MC. R.F. TRIMMER FOR 7.5 - 24.0 MC. BAND
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
7.5 MC. OSC. TRIMMER FOR 2.2 - 7.5 MC. BAND
24.0 MC. OSC. TRIMMER FOR 7.5 - 24.0 MC. BAND
1st. I.F. TRIMMERS 455 KC.
2nd. I.F. TRIMMERS 455 KC.
600 KC. OSC. PADDER
6S7 I.F.
6T7G DET.-A.V.C.
6G6G AUDIO
6Z7G POWER
6K8 OSC.-MOD.
6S7 R.F.
OSC. 9C
R.F. 9B
ANT. 9A
6N5
A-
A+

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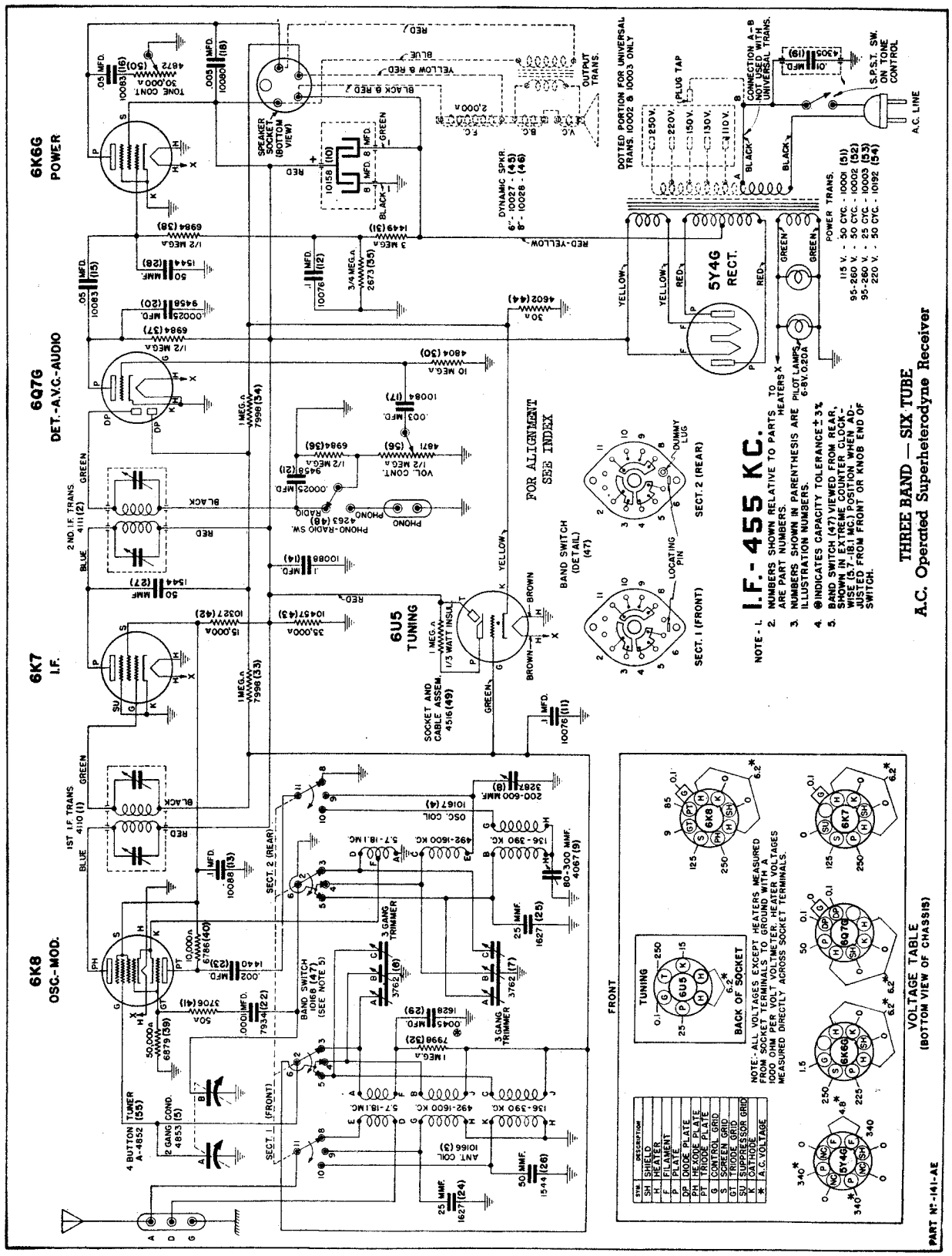
# SENTINEL RADIO CORP.

MODEL 141AE
Schematic, Voltage
Socket


6K6G
POWER
6Q7G
DET.-A.V.C.-AUDIO
6K7
I.F.
6K8
OSC.-MOD.
6U5
TUNING
5Y4G
RECT.
I.F.-455 KC.
THREE BAND — SIX TUBE
A.C. Operated Superheterodyne Receiver
FOR ALIGNMENT SEE INDEX
BAND SWITCH (DETAIL)
SECT. 1 (FRONT)
SECT. 2 (REAR)
DUMMY LUG
LOCATING PIN
NOTE - 1. I.F.-455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS. TO ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊕INDICATES CAPACITY TOLERANCE ± 3%
5. BAND SWITCH (47) VIEWED FROM REAR, SHOWN IN EXTREME COUNTER CLOCK-WISE (5.7-18.1 MC.) POSITION WHEN AD-JUSTED FROM FRONT OR KNOB END OF SWITCH.
DOTTED PORTION FOR UNIVERSAL TRANS. 10002 & 10003 ONLY
POWER TRANS.
115 V. - 50 CYC. - 10001 (51)
95-260 V. - 50 CYC. - 10002 (52)
95-260 V. - 25 CYC. - 10003 (53)
220 V. - 50 CYC. - 10192 (54)
S.P.S.T. SW. ON TONE CONTROL
A.C. LINE
PILOT LAMPS 6-8V. 0.20A
DYNAMIC SPKR. 6" - 10021 - (45) 8" - 10028 - (46)
SPEAKER SOCKET (BOTTOM VIEW)
OUTPUT TRANS.
2,000Ω
TONE CONT. 30,000Ω
VOL. CONT. 1/2 MEG.Δ
PHONO-RADIO SW.
PHONO
1ST I.F. TRANS 4110 (1)
2ND I.F. TRANS 4111 (2)
SOCKET AND CABLE ASSEM. 4516 (49)
BAND SWITCH 10168 (47) (SEE NOTE 5)
4 BUTTON TUNER A-4852
2 GANG COND. 4853 (5)
3 GANG TRIMMER
OSC. COIL 10167 (4)
ANT. COIL 10166 (3)
136-390 KC.
492-1600 KC.
5.7-18.1 MC.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
FRONT
BACK OF SOCKET
NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
PART Nº-141-AE

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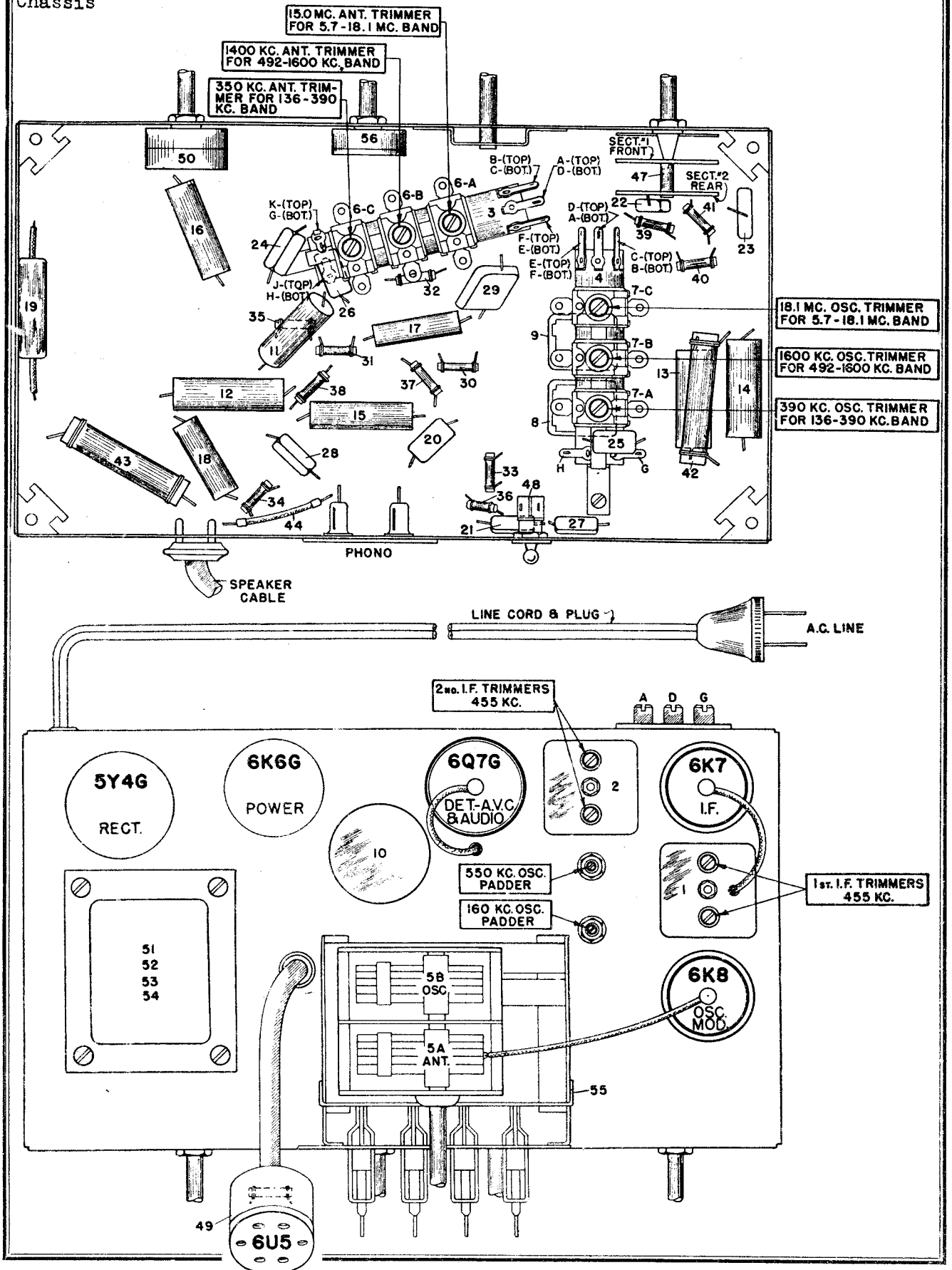
MODEL 141AE
Trimmers
Chassis

# SENTINEL RADIO CORP.

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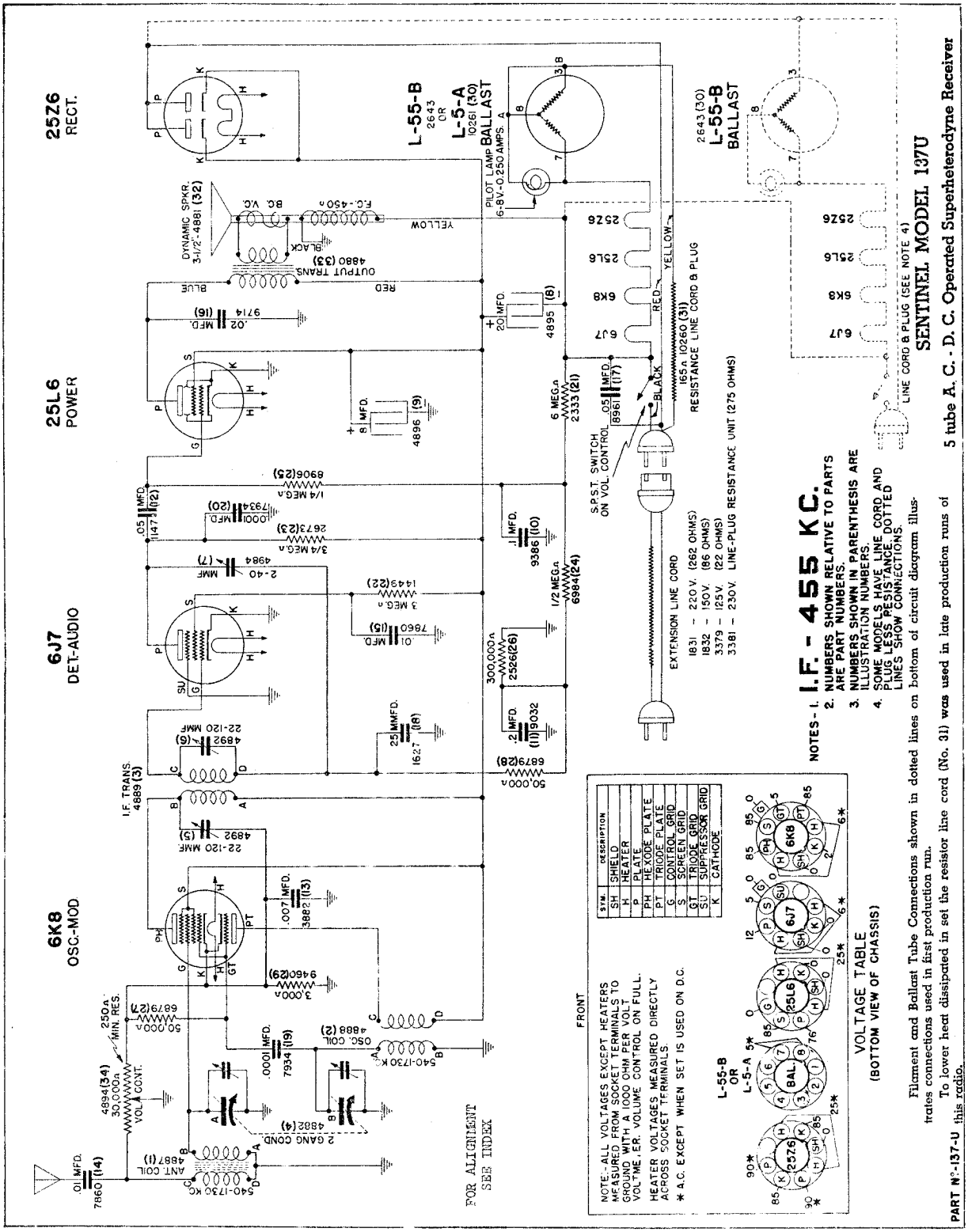
# SENTINEL RADIO CORP.

MODEL 137U
Schematic, Voltage
Socket


SENTINEL MODEL 137U
5 tube A. C. - D. C. Operated Superheterodyne Receiver
I.F. - 455 KC.
NOTES - 1.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. SOME MODELS HAVE LINE CORD AND PLUG LESS RESISTANCE. DOTTED LINES SHOW CONNECTIONS.
Filament and Ballast Tube Connections shown in dotted lines on bottom of circuit diagram illustrates connections used in first production run.
To lower heat dissipated in set the resistor line cord (No. 31) was used in late production runs of this radio.
PART N°-137-U
6K8 OSC.-MOD
6J7 DET.-AUDIO
25L6 POWER
25Z6 RECT.
L-55-B 2643 OR L-5-A 1026 (30) BALLAST
2643 (30) L-55-B BALLAST
DYNAMIC SPKR. 3-1/2"-4881 (32)
OUTPUT TRANS. 4880 (33)
PILOT LAMP 6.8V-0.250 AMPS.
S.P.S.T. SWITCH ON VOL. CONTROL
RESISTANCE LINE CORD & PLUG 165 Ω 10260 (31)
EXTENSION LINE CORD
1831 - 220 V. (262 OHMS)
1832 - 150 V. (86 OHMS)
3379 - 125 V. (22 OHMS)
3381 - 230 V. LINE-PLUG RESISTANCE UNIT (275 OHMS)
LINE CORD & PLUG (SEE NOTE 4)
I.F. TRANS. 4889 (3)
2 GANG COND. 4882 (4)
ANT. COIL 4887 (1)
OSC. COIL 4888 (2)
VOL. CONT. 30,000Ω 4894 (34)
250Ω MIN. RES.
.01 MFD. 7860 (14)
.02 MFD. 9714 (16)
.05 MFD. 1471 (2)
.1 MFD. 9386 (10)
.2 MFD. 9032 (11)
.007 MFD. 3882 (13)
.0001 MFD. 7934 (19)
.01 MFD. 7860 (15)
.05 MFD. 8961 (17)
8 MFD. 4896 (9)
20 MFD. 4895 (8)
25 MMFD. 1627 (18)
22-120 MMF 4892 (5)
22-120 MMF 4892 (6)
2-40 MMF 4984 (7)
1/4 MEGΩ 8906 (25)
3/4 MEGΩ 2673 (23)
1/2 MEGΩ 6984 (24)
6 MEGΩ 2333 (21)
3 MEGΩ 1443 (22)
300,000Ω 2526 (26)
50,000Ω 6879 (28)
3,000Ω 9460 (29)
50,000Ω 6879 (27)
540-1730 KC
FOR ALIGNMENT SEE INDEX
NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. VOLUME CONTROL ON FULL.
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
* A.C. EXCEPT WHEN SET IS USED ON D.C.
SYM. DESCRIPTION
SH SHIELD
H HEATER
P PLATE
PH HEXODE PLATE
PT TRIODE PLATE
G CONTROL GRID
S SCREEN GRID
GT TRIODE GRID
SU SUPPRESSOR GRID
K CATHODE
FRONT
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
L-55-B OR L-5-A
6K8
6J7
25L6
25Z6

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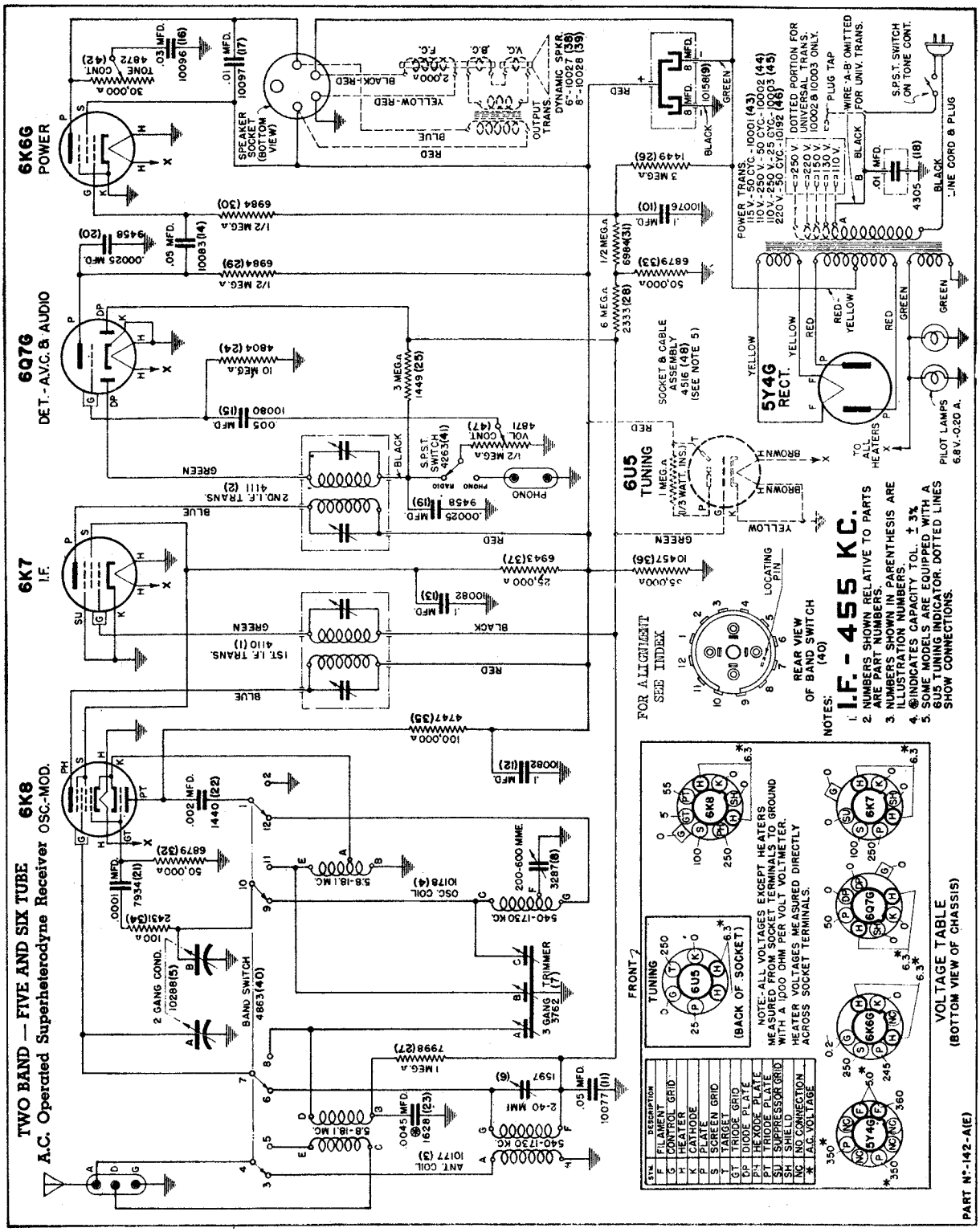
MODELS 142A, 142AE
Schematic, Voltage
Socket

# SENTINEL RADIO CORP.


TWO BAND — FIVE AND SIX TUBE
A.C. Operated Superheterodyne Receiver
6K6G POWER
6Q7G DET.-A.V.C. & AUDIO
6K7 I.F.
6K8 OSC.-MOD.
6U5 TUNING
5Y4G RECT.
I.F. - 455 KC.
NOTES:
1. I.F. - 455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
4. ⊕ INDICATES CAPACITY TOL. ± 3%
5. SOME MODELS ARE EQUIPPED WITH A 6U5 TUNING INDICATOR. DOTTED LINES SHOW CONNECTIONS.
FOR ALIGNMENT SEE INDEX
REAR VIEW OF BAND SWITCH (40)
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
NOTE: ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER.
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
PART N°-142-A(E)

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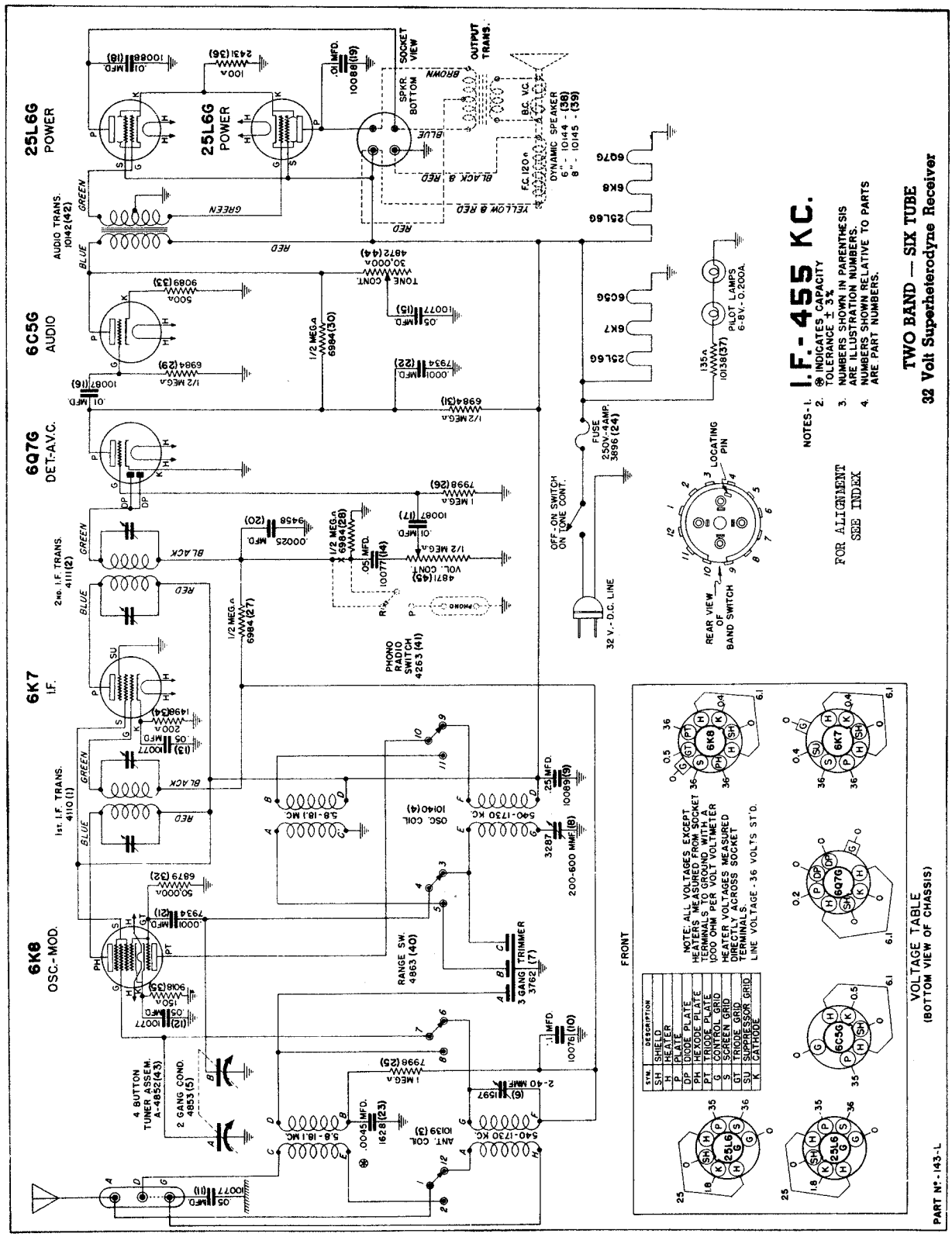
# SENTINEL RADIO CORP.

MODEL 143L
Schematic, Voltage
Socket


I.F.-455 KC.
TWO BAND — SIX TUBE
32 Volt Superheterodyne Receiver
NOTES-1. ⊛ INDICATES ± CAPACITY TOLERANCE ± 3%
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
4. FOR ALIGNMENT SEE INDEX
25L6G POWER
6C5G AUDIO
6Q7G DET.-A.V.C.
6K7 I.F.
6K8 OSC.-MOD.
AUDIO TRANS. 1042(42)
2nd I.F. TRANS. 4111(2)
1st I.F. TRANS. 4110(1)
4 BUTTON TUNER ASSEM. A-4852(43)
2 GANG COND. 4853(5)
PHONO RADIO SWITCH 4263(41)
RANGE SW. 4863(40)
3 GANG TRIMMER 3762(7)
OSC. COIL 1040(4)
ANT. COIL 1039(3)
OUTPUT TRANS.
SPKR. SOCKET VIEW
DYNAMIC SPEAKER 6" - 1044 - (38) 8" - 1045 - (39)
FUSE 250V-4AMP. 3896(24)
OFF-ON SWITCH ON TONE CONT.
32 V.-D.C. LINE
PILOT LAMPS 6-8V.-0.200A.
LOCATING PIN
REAR VIEW OF BAND SWITCH
FRONT
NOTE: ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
LINE VOLTAGE - 36 VOLTS ST'D.
SYM. DESCRIPTION
SH SHIELD
H HEATER
P DIODE PLATE
DP DIODE PLATE
PH HEXODE PLATE
PT TRIODE PLATE
G CONTROL GRID
S SCREEN GRID
GT TRIODE GRID
SU SUPPRESSOR GRID
K CATHODE
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
PART Nº.-143-L

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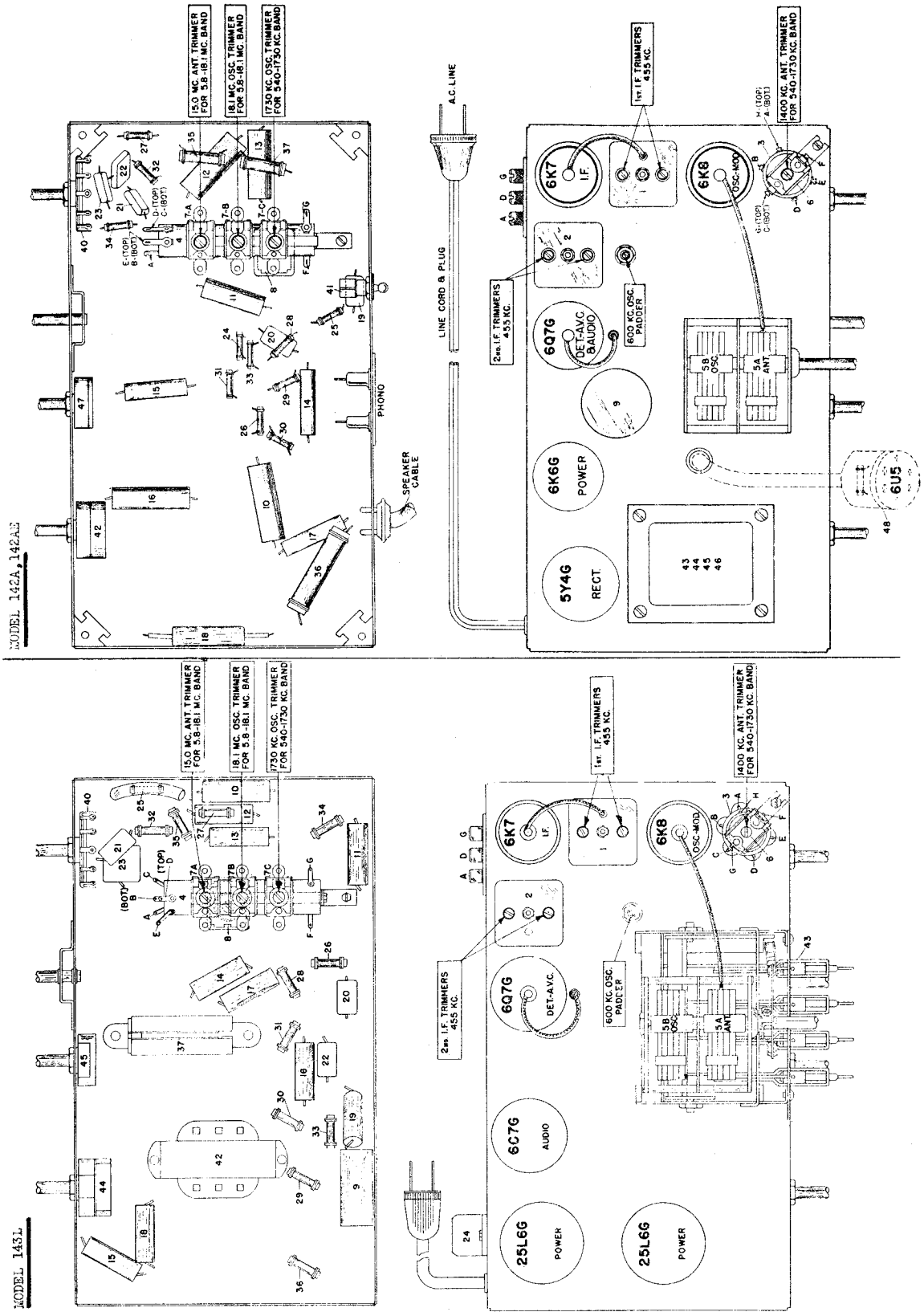
MODELS 142A,142AE
MODEL 143L
Trimmers,Chassis

# SENTINEL RADIO CORP.

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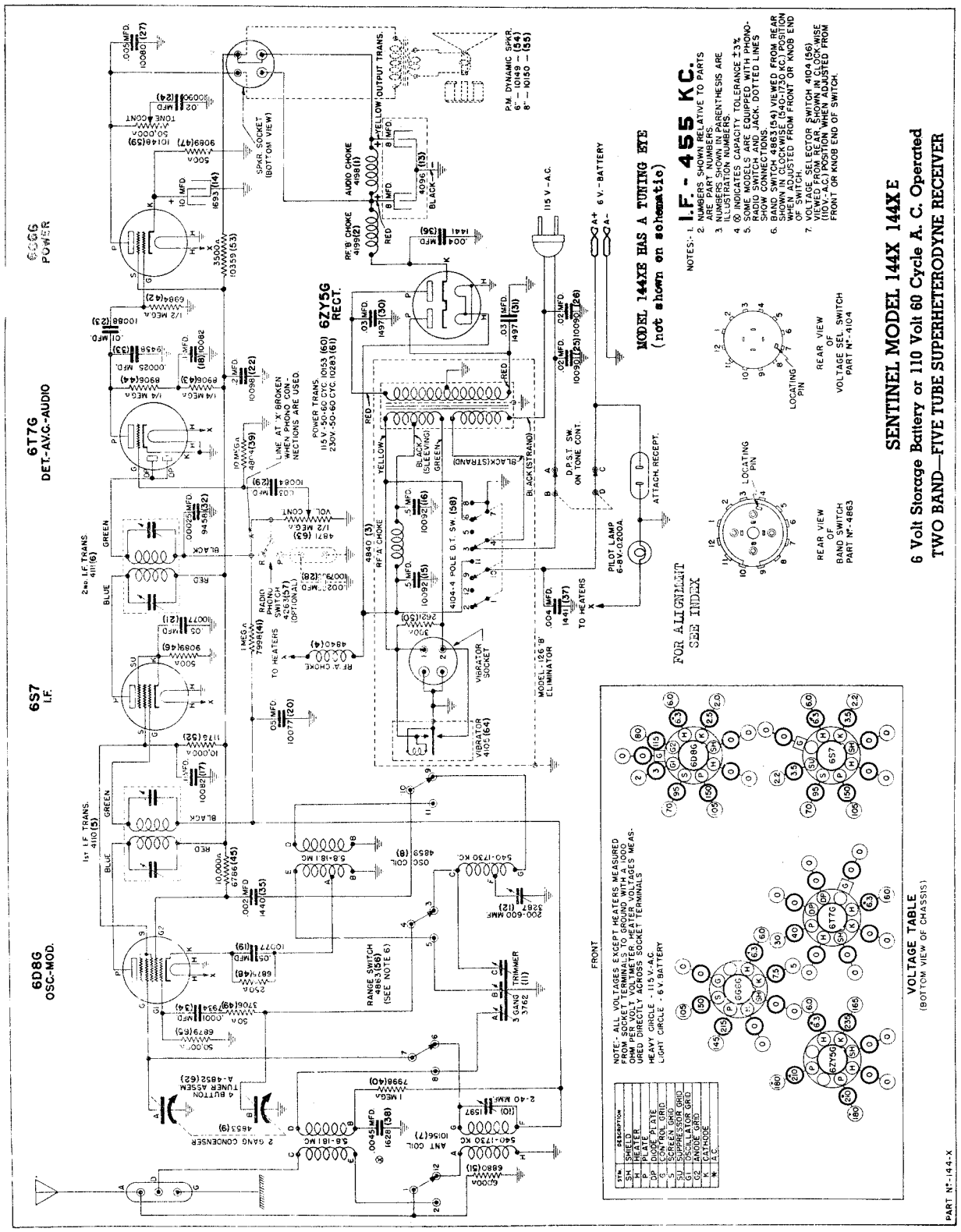
# SENTINEL RADIO CORP.

MODELS 144X, 144XE
Schematic, Voltage
Socket


SENTINEL MODEL 144X 144XE
6 Volt Storage Battery or 110 Volt 60 Cycle A. C. Operated
TWO BAND—FIVE TUBE SUPERHETERODYNE RECEIVER
I.F. - 455 KC.
MODEL 144XB HAS A TUNING EYE (not shown on schematic)
FOR ALIGNMENT SEE INDEX
6D8G OSC-MOD.
6S7 I.F.
6T7G DET.-AV.C.-AUDIO
6Y6G POWER
6Z Y5G RECT.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
REAR VIEW OF BAND SWITCH PART N°-4863
REAR VIEW VOLTAGE SEL. SWITCH PART N°-4104
LOCATING PIN
ATTACH. RECEPT.
PILOT LAMP 6-8V.-0.200A
D.P.S.T. SW. ON TONE CONT.
VIBRATOR SOCKET
MODEL-126 "B" ELIMINATOR
RANGE SWITCH 48B3156 (SEE NOTE 6)
3 GANG TRIMMER 3762 (11)
4 BUTTON TUNER ASSEM A-4852 (62)
2 GANG CONDENSER 4853 (9)
POWER TRANS. 115 V. 50-60 CYC. 10153 (60) 230V. 50-60 CYC. 10283 (61)
LINE AT 'X' BROKEN WHEN PHONO CONNECTIONS ARE USED.
RADIO PHONO SWITCH 4261157 (OPTIONAL)
SPKR. SOCKET (BOTTOM VIEW)
P.M. DYNAMIC SPKR. 6" — 10149 — (54) 8" — 10150 — (55)
AUDIO CHOKE 4198(1)
R.F. CHOKE 4199(2)
YELLOW OUTPUT TRANS
TONE CONT.
VOL. CONT.
115 V.-A.C.
6 V.-BATTERY
NOTES:- 1. NUMBERS SHOWN RELATIVE TO PARTS NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
2. ⊗ INDICATES CAPACITY TOLERANCE ±3%
3. SOME MODELS ARE EQUIPPED WITH PHONO-RADIO SWITCH AND JACK. DOTTED LINES SHOW CONNECTIONS.
4. BAND SWITCH 4863 (54) VIEWED FROM REAR SHOWN IN CLOCKWISE (540-1730 KC.) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.
5. VOLTAGE SELECTOR SWITCH 4104 (56) VIEWED FROM REAR SHOWN IN CLOCKWISE (110 V.-A.C.) POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.
NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHMS PER VOLT METER. HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS
HEAVY CIRCLE - 115 V.-A.C.
LIGHT CIRCLE - 6 V. BATTERY
FRONT
PART N°-144-X

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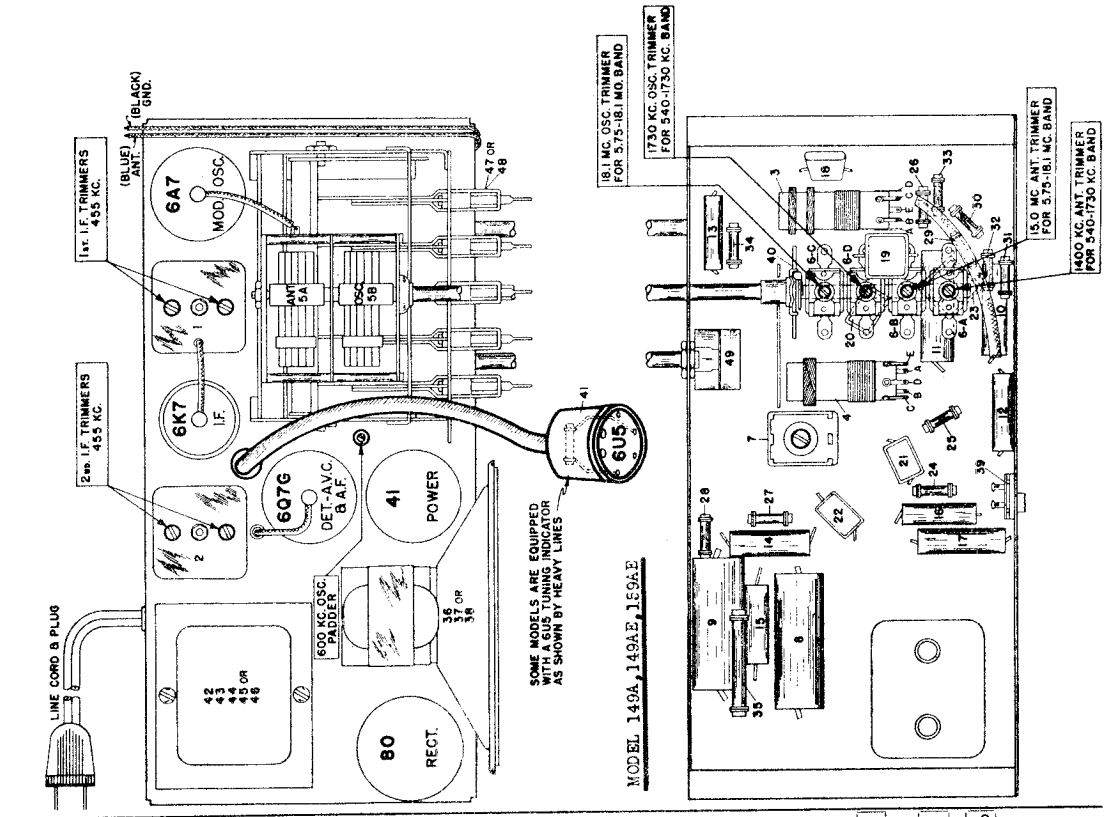
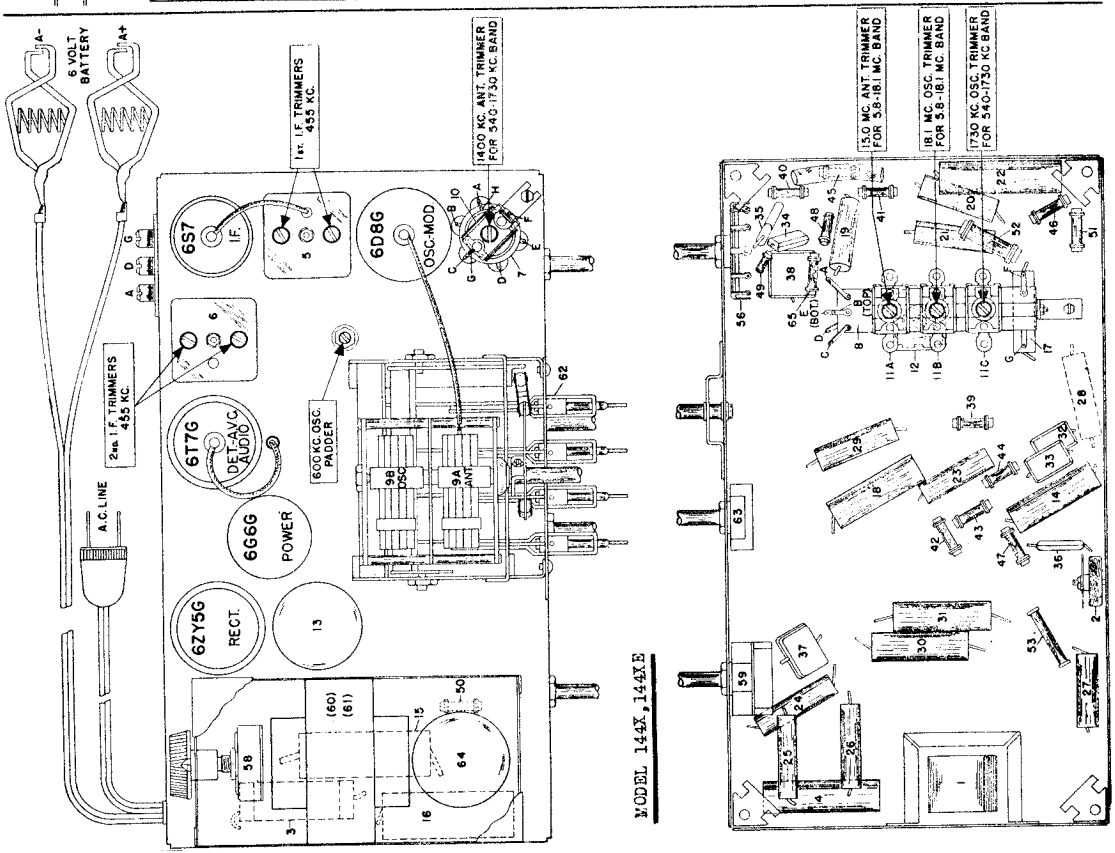
MODELS 144X,144XE
MODELS 149A,149AE,159AE
Trimmers,Chassis

# SENTINEL RADIO CORP.


1st. I.F. TRIMMERS 455 KC.
2nd. I.F. TRIMMERS 455 KC.
(BLUE) ANT.
(BLACK) GND.
6A7 MOD. OSC.
6K7 I.F.
6Q7G DET.-A.V.C. & A.F.
41 POWER
80 RECT.
600 KC. OSC. PADDER
LINE CORD & PLUG
SOME MODELS ARE EQUIPPED WITH A 6U5 TUNING INDICATOR AS SHOWN BY HEAVY LINES
18.1 MC. OSC. TRIMMER FOR 5.75-18.1 MC. BAND
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
15.0 MC. ANT. TRIMMER FOR 5.75-18.1 MC. BAND
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
MODEL 149A,149AE,159AE


6 VOLT BATTERY
A.C. LINE
1st. I.F. TRIMMERS 455 KC.
2nd. I.F. TRIMMERS 455 KC.
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
6S7 I.F.
6D8G OSC.-MOD.
6T7G DET.-A.V.C. AUDIO
6G6G POWER
6Z Y5G RECT.
600 KC. OSC. PADDER
15.0 MC. ANT. TRIMMER FOR 5.8-18.1 MC. BAND
18.1 MC. OSC. TRIMMER FOR 5.8-18.1 MC. BAND
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
MODEL 144X,144XE

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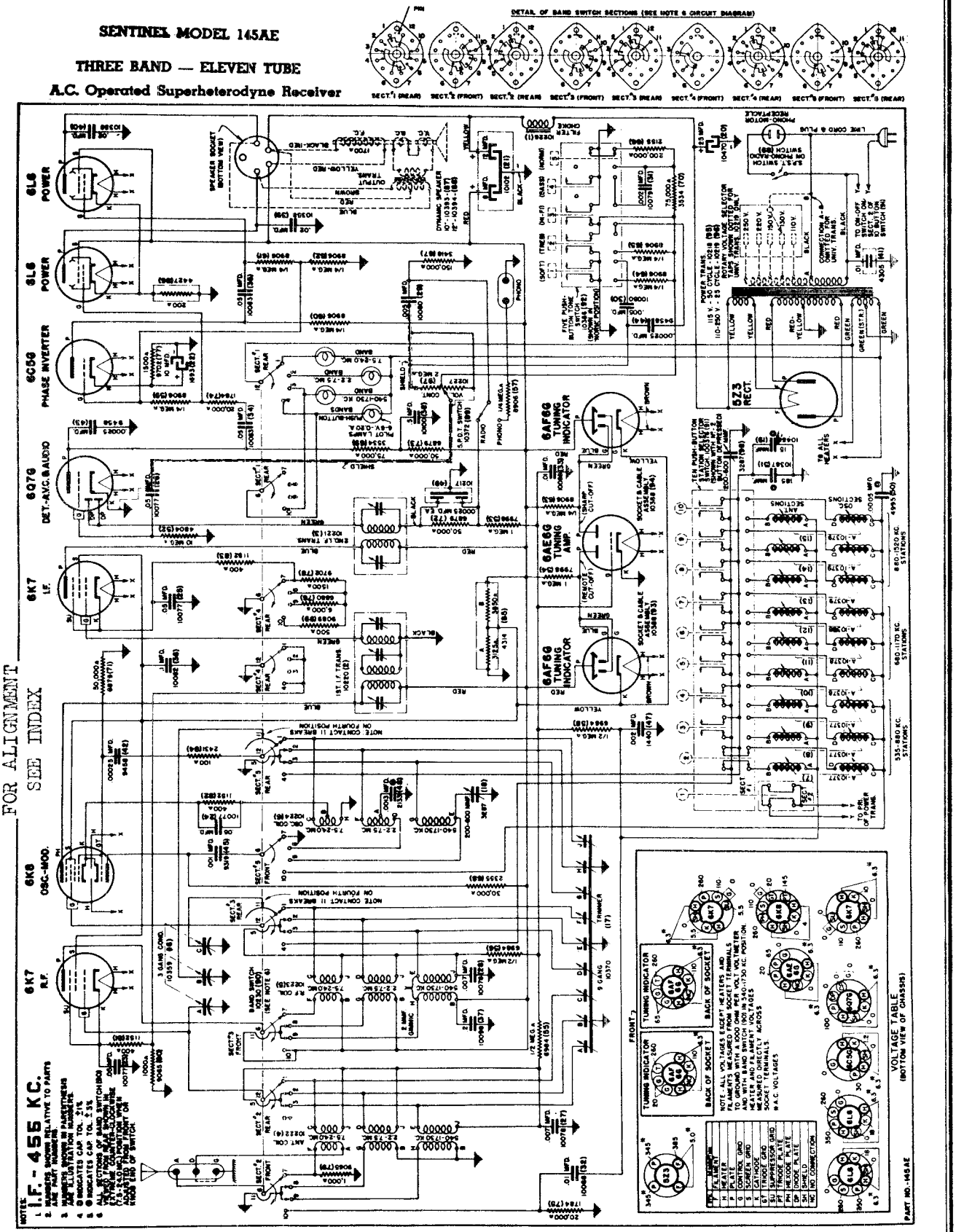
# SENTINEL RADIO CORP.

MODEL 145AE
Schematic, Voltage
Socket

**SENTINEL MODEL 145AE**

**THREE BAND — ELEVEN TUBE**

**A.C. Operated Superheterodyne Receiver**

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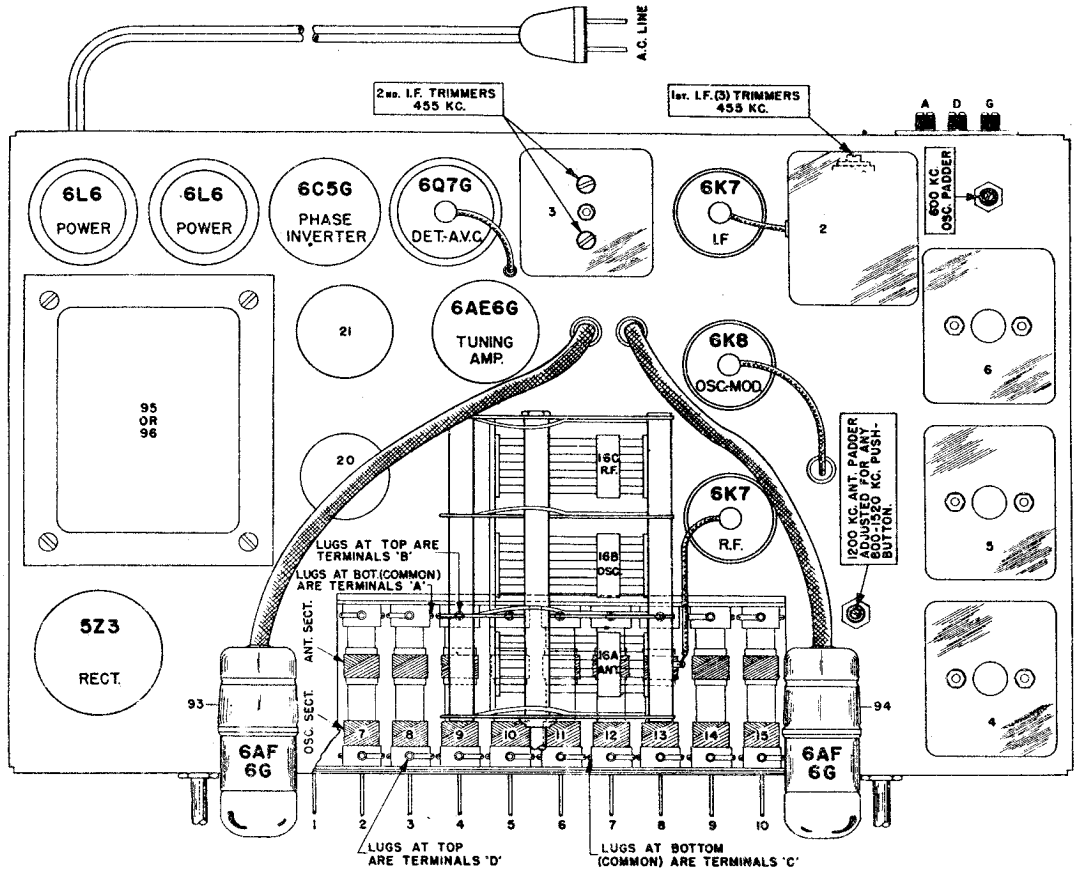
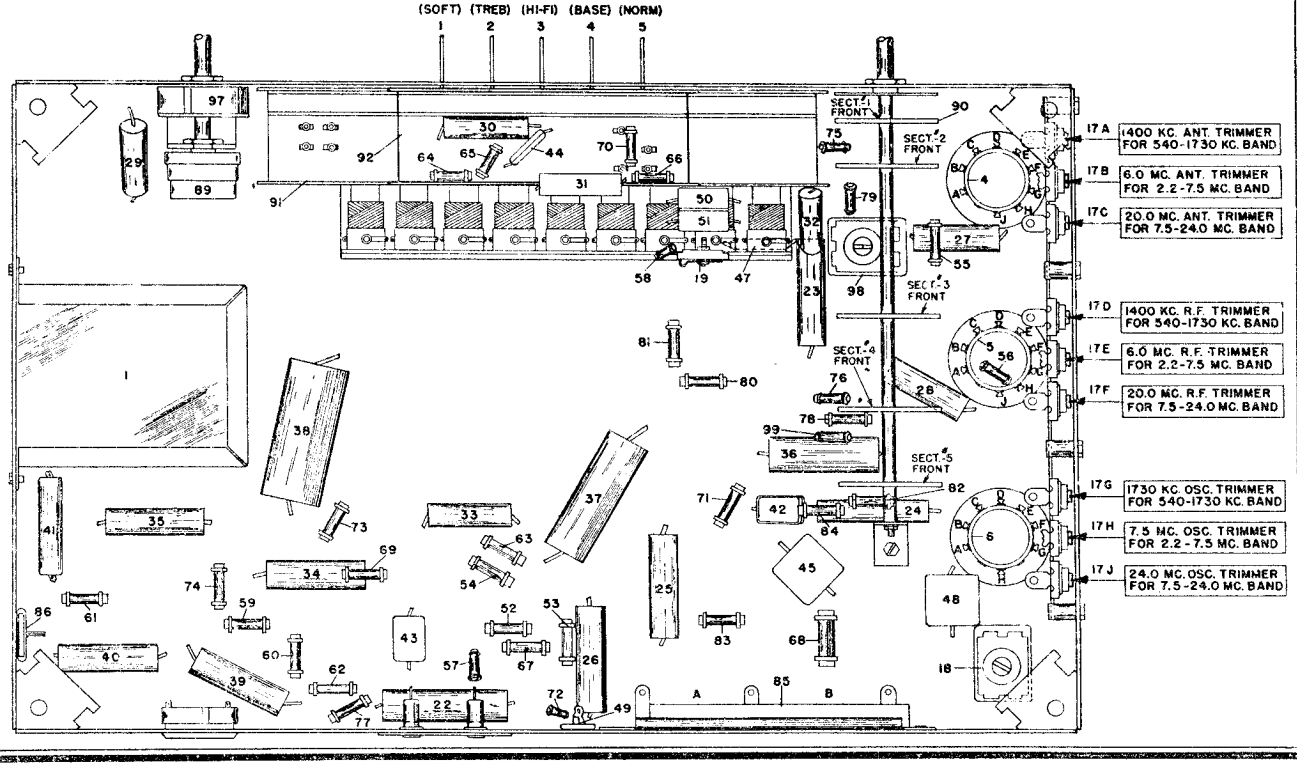
MODEL 145AE
Trimmers
Chassis

# SENTINEL RADIO CORP.





(SOFT) (TREB) (HI-FI) (BASE) (NORM)
1 2 3 4 5
SECT.-1 FRONT
SECT.-2 FRONT
SECT.-3 FRONT
SECT.-4 FRONT
SECT.-5 FRONT
17A 1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
17B 6.0 MC. ANT. TRIMMER FOR 2.2-7.5 MC. BAND
17C 20.0 MC. ANT. TRIMMER FOR 7.5-24.0 MC. BAND
17D 1400 KC. R.F. TRIMMER FOR 540-1730 KC. BAND
17E 6.0 MC. R.F. TRIMMER FOR 2.2-7.5 MC. BAND
17F 20.0 MC. R.F. TRIMMER FOR 7.5-24.0 MC. BAND
17G 1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
17H 7.5 MC. OSC. TRIMMER FOR 2.2-7.5 MC. BAND
17J 24.0 MC. OSC. TRIMMER FOR 7.5-24.0 MC. BAND

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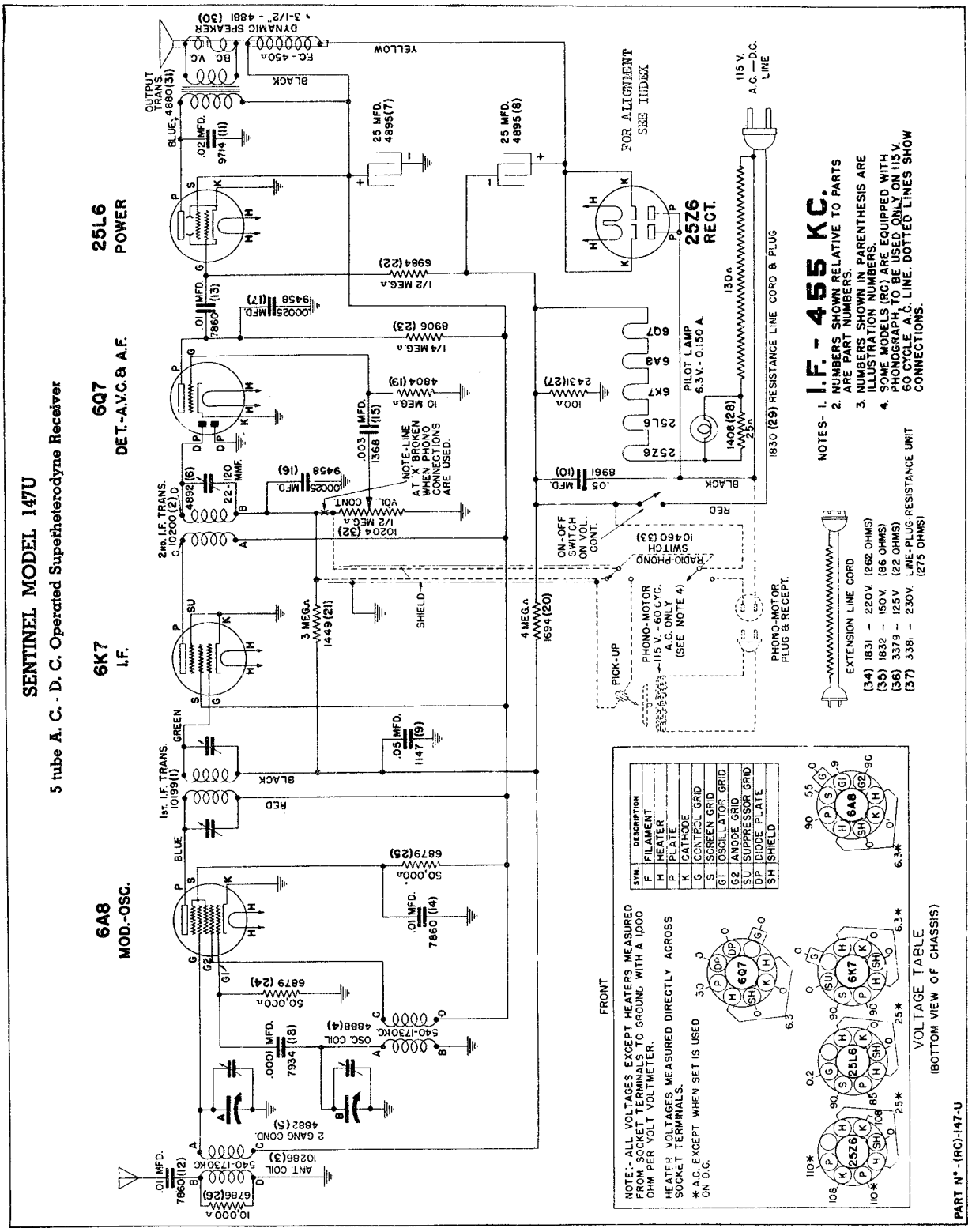
# SENTINEL RADIO CORP.

MODEL 147U
Schematic, Voltage
Socket


SENTINEL MODEL 147U
5 tube A. C. - D. C. Operated Superheterodyne Receiver
6A8 MOD.-OSC.
6K7 I.F.
6Q7 DET.-A.V.C.& A.F.
25L6 POWER
25Z6 RECT.
I.F. - 455 KC.
NOTES- 1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. SOME MODELS (RC) ARE EQUIPPED WITH PHONOGRAPH, TO BE USED ONLY ON 115 V. 60 CYCLE A.C. LINE. DOTTED LINES SHOW CONNECTIONS.
NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND, WITH A 1,000 OHM PER VOLT VOLTMETER.
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
* A.C. EXCEPT WHEN SET IS USED ON D.C.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
FRONT
PART N°-(RC)-147-U

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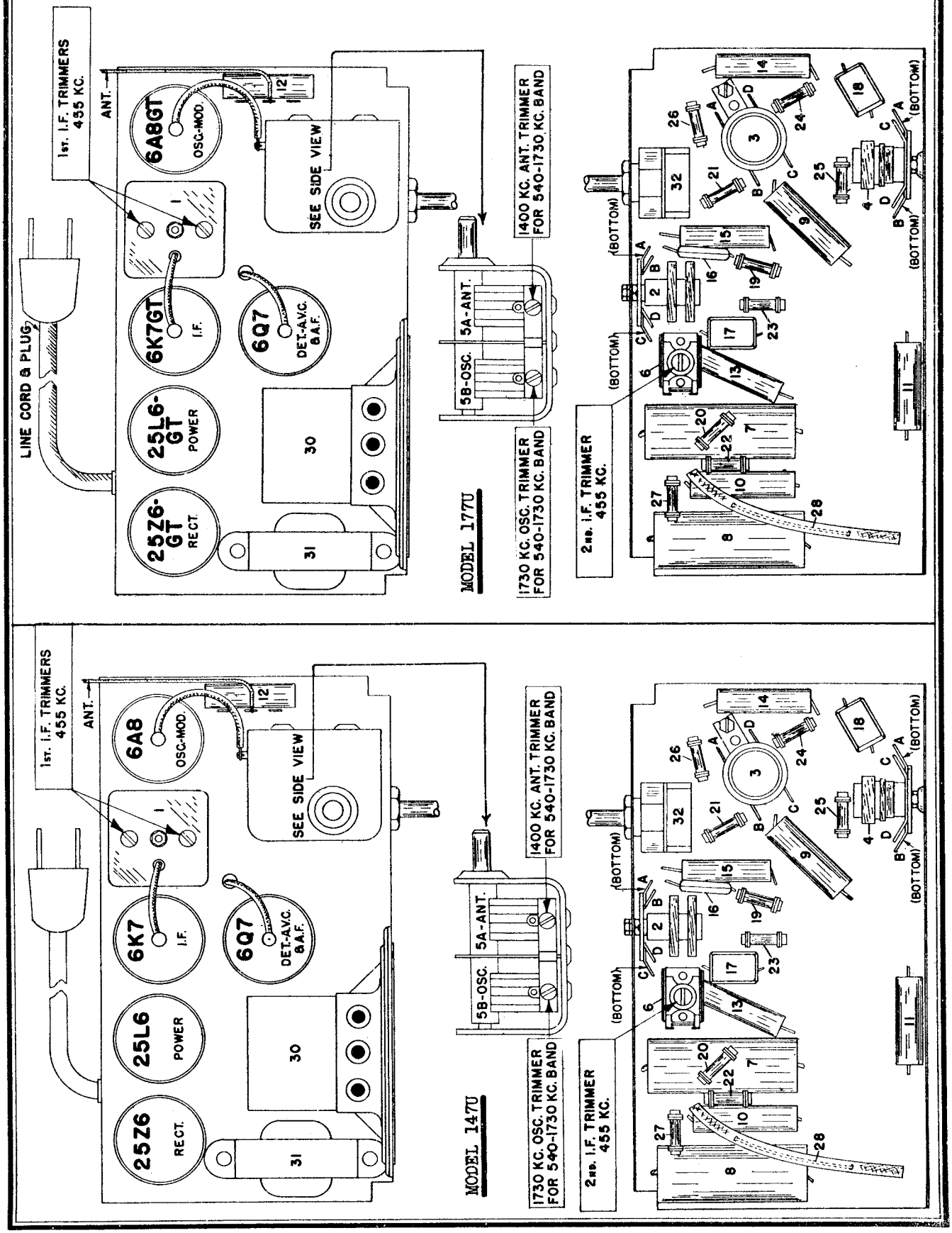
MODEL 147U
MODEL 177U
Trimmers, Chassis

# SENTINEL RADIO CORP.

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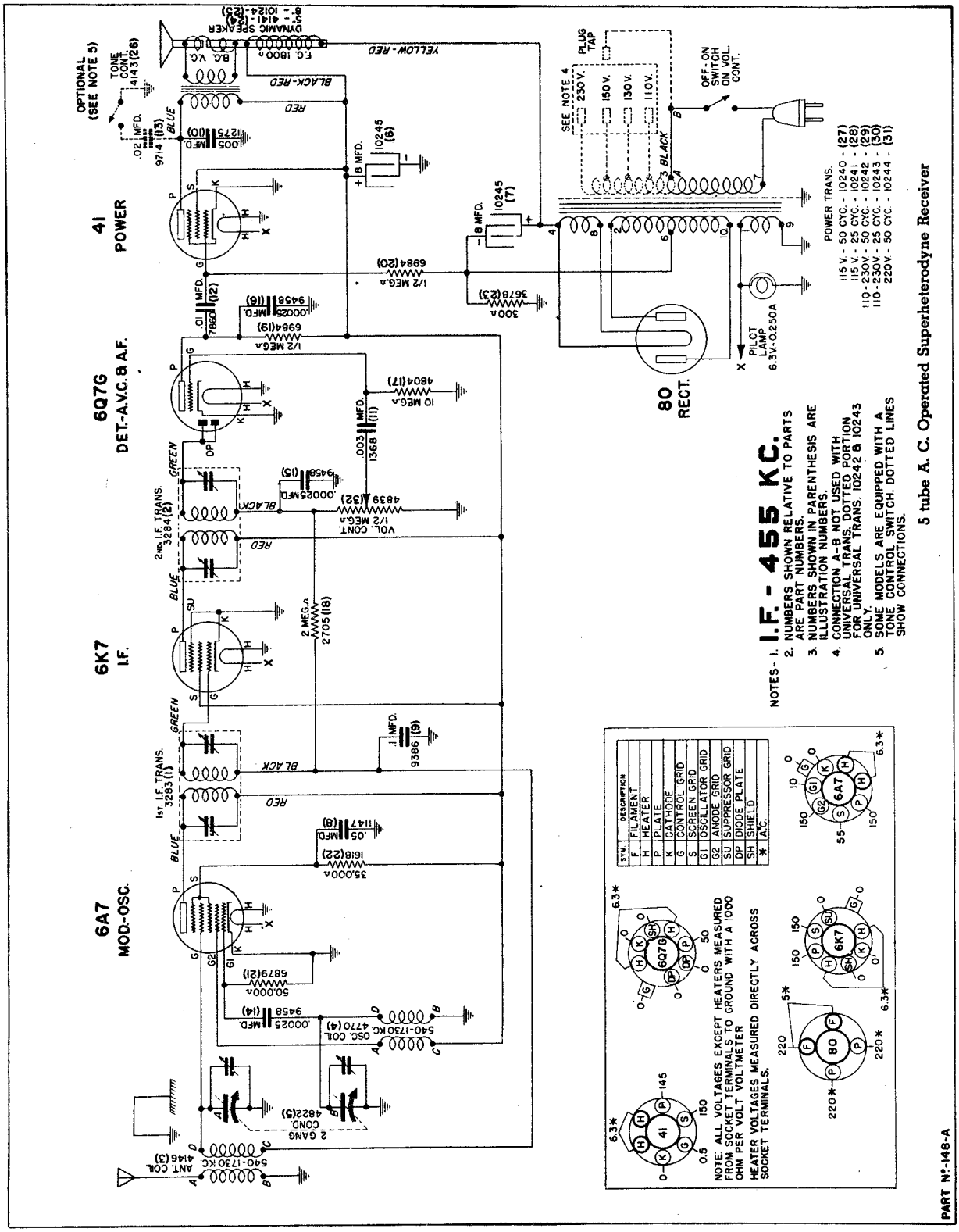
# SENTINEL RADIO CORP.

MODEL 148A
Schematic, Voltage
Socket


5 tube A. C. Operated Superheterodyne Receiver
I.F. - 455 KC.
NOTES- 1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. CONNECTION A-B NOT USED WITH UNIVERSAL TRANS. DOTTED PORTION FOR UNIVERSAL TRANS. 10242 & 10243 ONLY.
4. SOME MODELS ARE EQUIPPED WITH A TONE CONTROL SWITCH. DOTTED LINES SHOW CONNECTIONS.
6A7 MOD.-OSC.
6K7 I.F.
6Q7G DET.-A.V.C. & A.F.
41 POWER
80 RECT.
1st I.F. TRANS. 3283 (1)
2nd I.F. TRANS. 3284 (2)
ANT. COIL 4146 (3)
OSC. COIL 4770 (4)
TONE CONT. 4143 (26)
DYNAMIC SPEAKER
PLUG TAP
OFF-ON SWITCH ON VOL. CONT.
PILOT LAMP 6.3V.-0.250A
POWER TRANS.
115 V. - 50 CYC. - 10240 - (27)
115 V. - 25 CYC. - 10241 - (28)
110-230V. - 50 CYC. - 10242 - (29)
110-230V. - 25 CYC. - 10243 - (30)
220V. - 50 CYC. - 10244 - (31)
SYM DESCRIPTION
F FILAMENT
H HEATER
P PLATE
K CATHODE
G CONTROL GRID
S SCREEN GRID
G1 OSCILLATOR GRID
G2 ANODE GRID
SU SUPPRESSOR GRID
DP DIODE PLATE
SH SHIELD
* A.C.
NOTE: ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
PART No.-148-A

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MODEL 148A
Alignment, Trimmers
Chassis

# SENTINEL RADIO CORP.

MODEL 151BL
Alignment

## ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

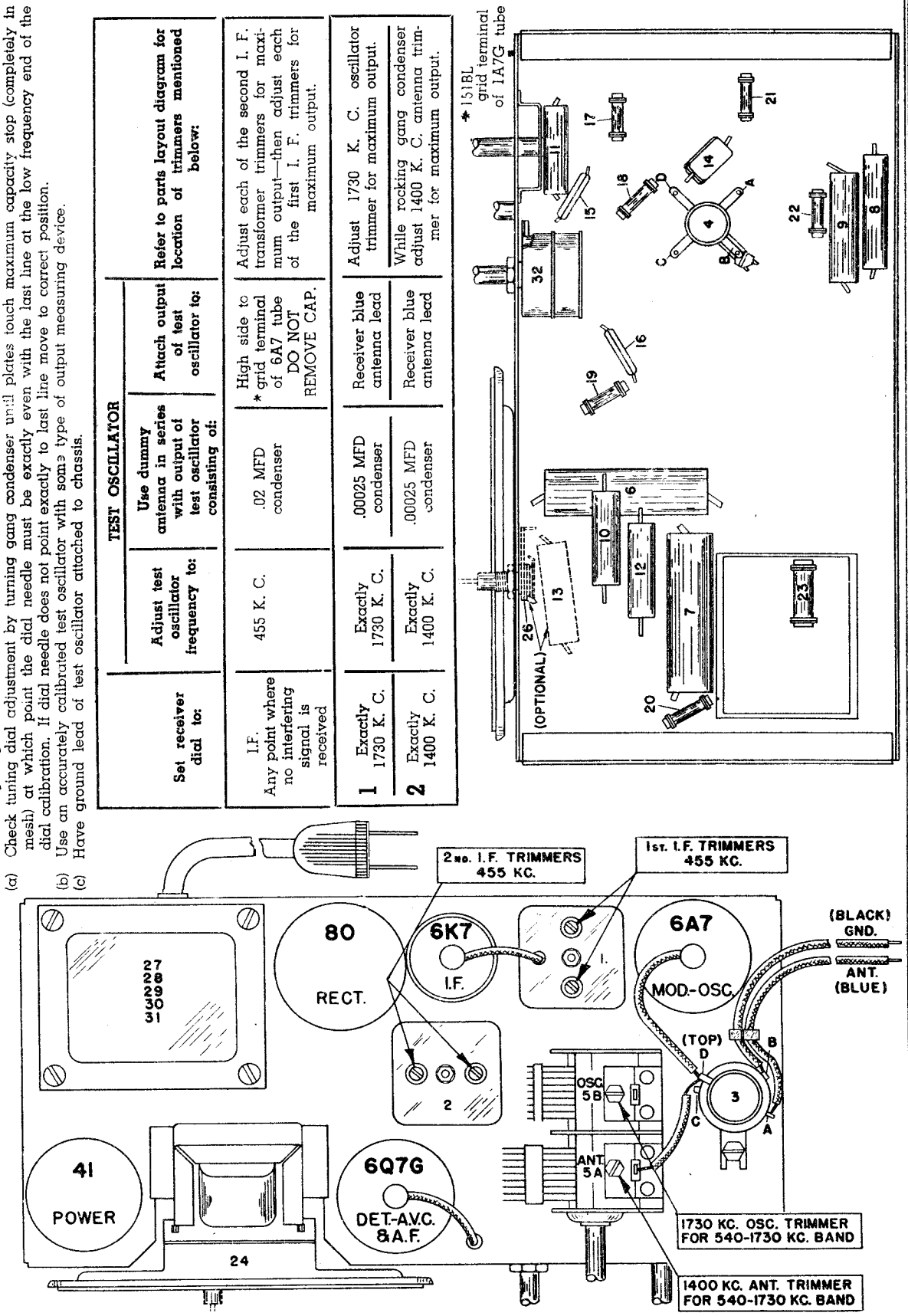
Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.

(b) Use an accurately calibrated test oscillator with some type of output measuring device.

(c) Have ground lead of test oscillator attached to chassis.

| | Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | TEST OSCILLATOR: Attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
| | I.F. Any point where no interfering signal is received | 455 K. C. | .02 MFD condenser | High side to * grid terminal of 6A7 tube DO NOT REMOVE CAP. | Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. |
| 1 | Exactly 1730 K. C. | Exactly 1730 K. C. | .00025 MFD condenser | Receiver blue antenna lead | Adjust 1730 K. C. oscillator trimmer for maximum output. |
| 2 | Exactly 1400 K. C. | Exactly 1400 K. C. | .00025 MFD condenser | Receiver blue antenna lead | While rocking gang condenser adjust 1400 K. C. antenna trimmer for maximum output. |

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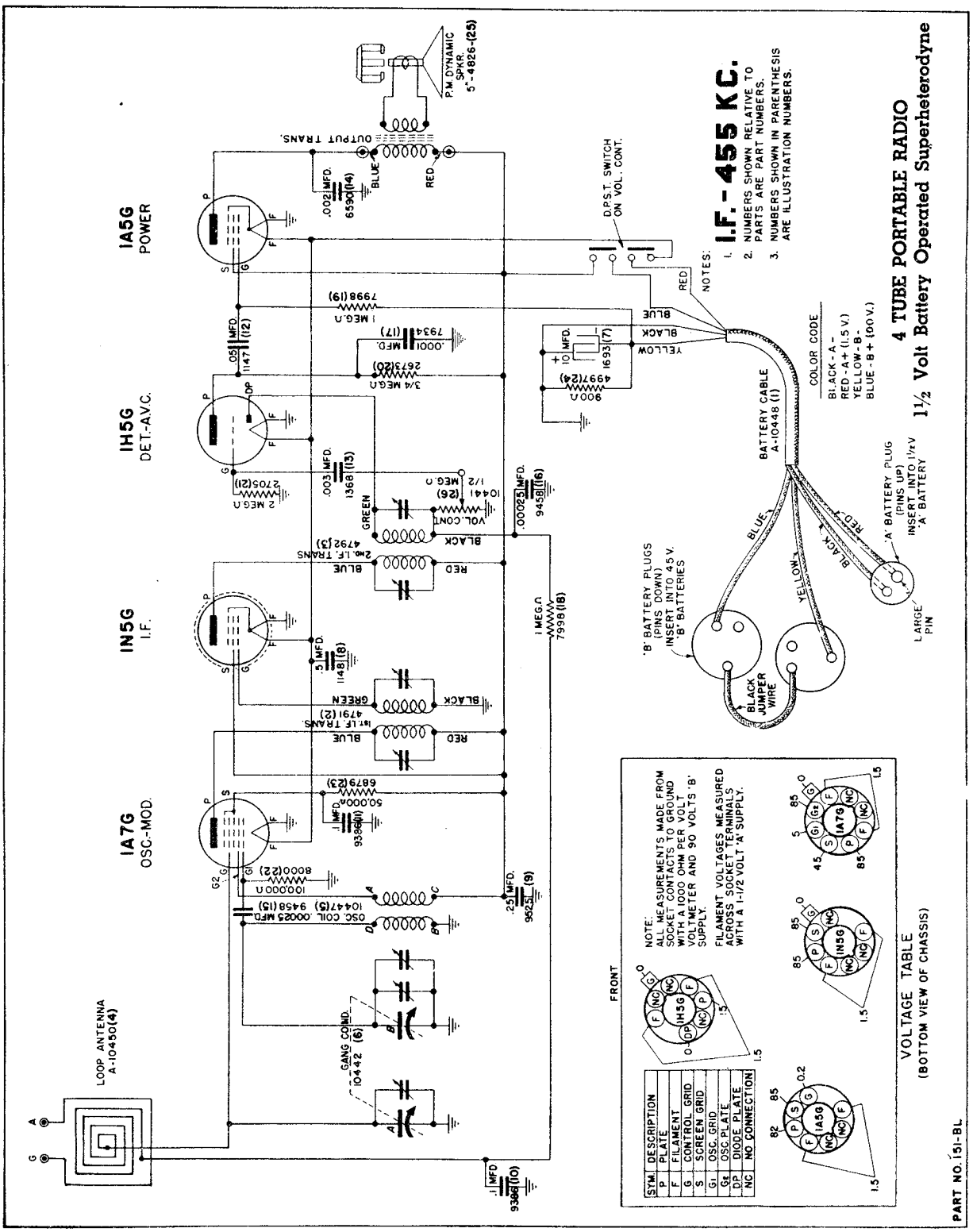
# SENTINEL RADIO CORP.

MODEL 151BL
Schematic, Voltage
Socket


4 TUBE PORTABLE RADIO
1½ Volt Battery Operated Superheterodyne
I.F. - 455 KC.
NOTES:
1. I.F. - 455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
1A5G POWER
1H5G DET.-A.V.C.
1N5G I.F.
1A7G OSC.-MOD.
LOOP ANTENNA A-10450(4)
GANG COND. 10442 (6)
OUTPUT TRANS.
P.M. DYNAMIC SPKR. 5"-4826-(25)
D.P.S.T. SWITCH ON VOL. CONT.
BATTERY CABLE A-10448 (1)
COLOR CODE
BLACK - A -
RED - A + (1.5 V.)
YELLOW - B -
BLUE - B + (90 V.)
'A' BATTERY PLUG (PINS UP) INSERT INTO 1½ V 'A' BATTERY
LARGE PIN
'B' BATTERY PLUGS (PINS DOWN) INSERT INTO 45 V. 'B' BATTERIES
BLACK JUMPER WIRE
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
NOTE: ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY.
FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 1-1/2 VOLT 'A' SUPPLY.
SYM. DESCRIPTION
P PLATE
F FILAMENT
G CONTROL GRID
S SCREEN GRID
G1 OSC. GRID
G2 OSC. PLATE
DP DIODE PLATE
NC NO CONNECTION
FRONT
PART NO. 151-BL

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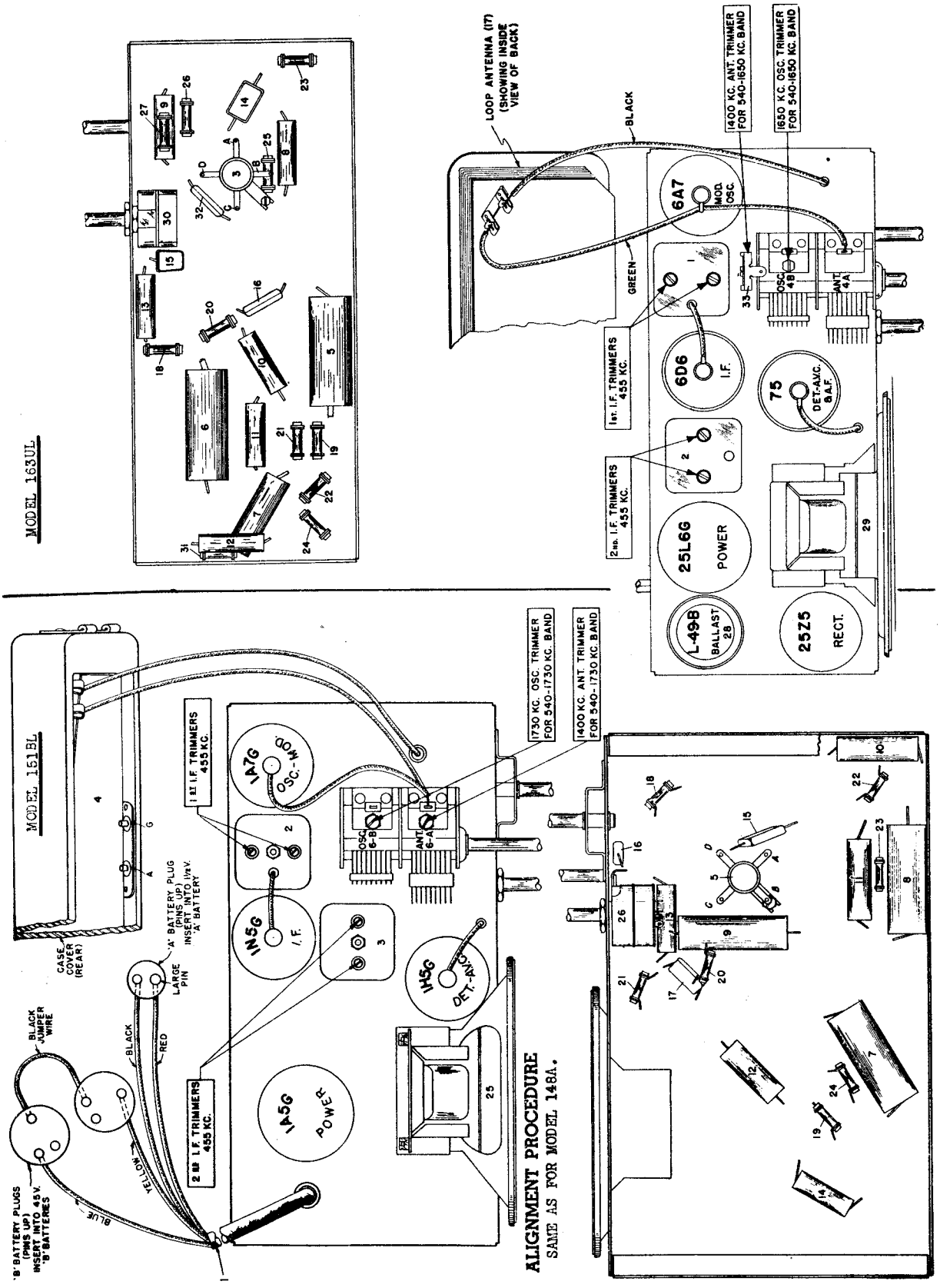
MODEL 151BL
MODEL 163UL
Trimmers, Chassis

# SENTINEL RADIO CORP.




**ALIGNMENT PROCEDURE**
SAME AS FOR MODEL 148A.

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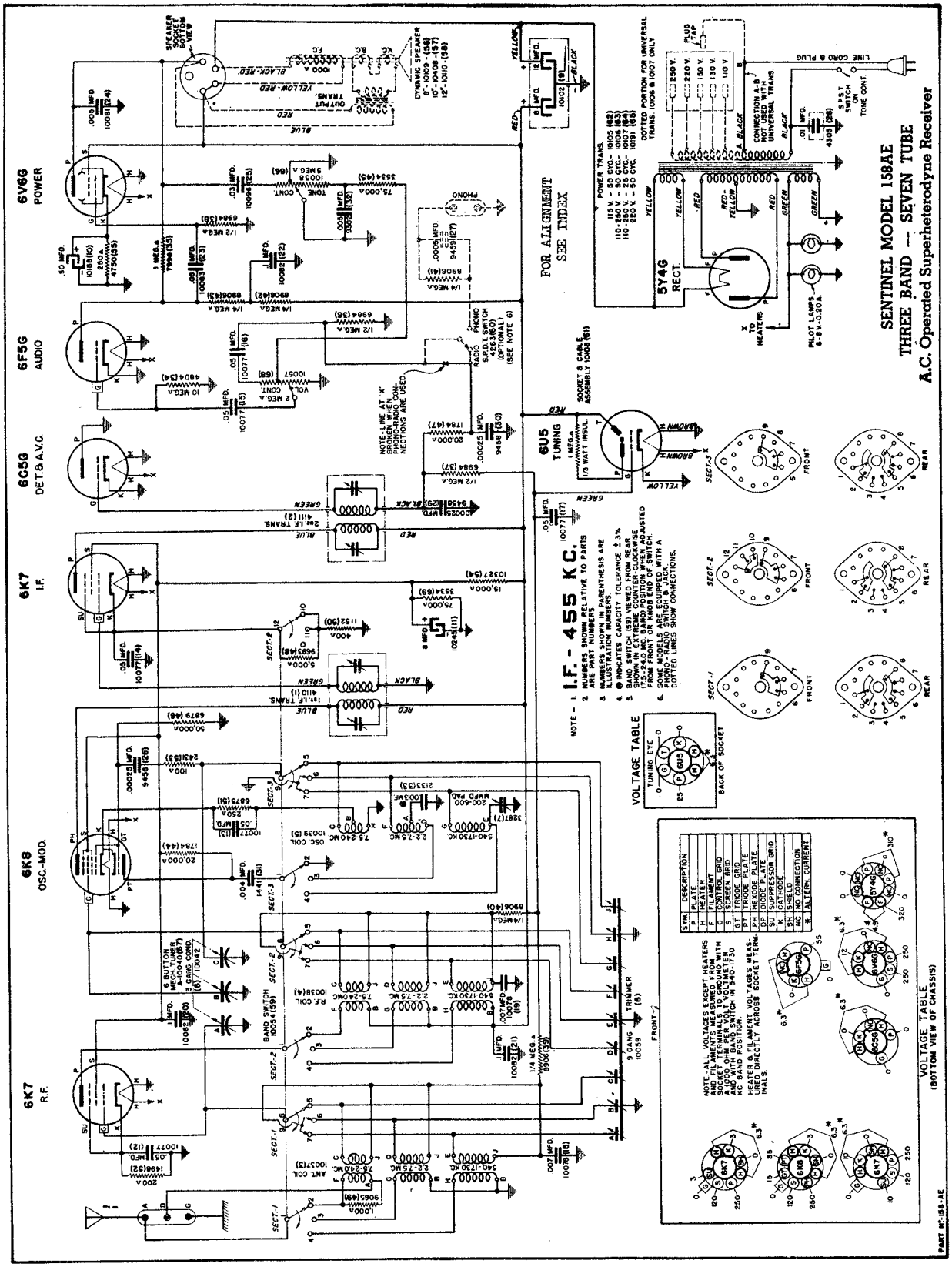
# SENTINEL RADIO CORP.

MODEL 158AE
Schematic, Voltage
Socket

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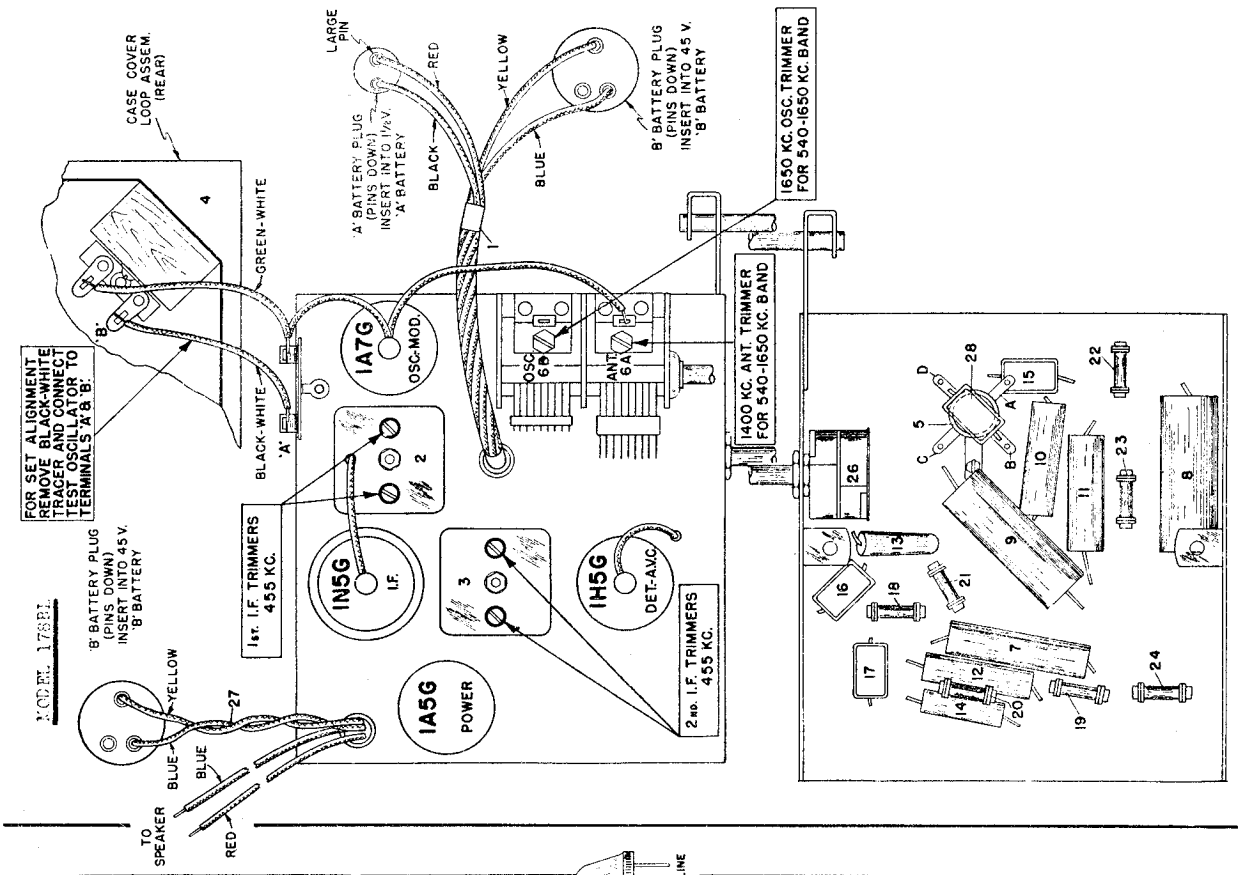
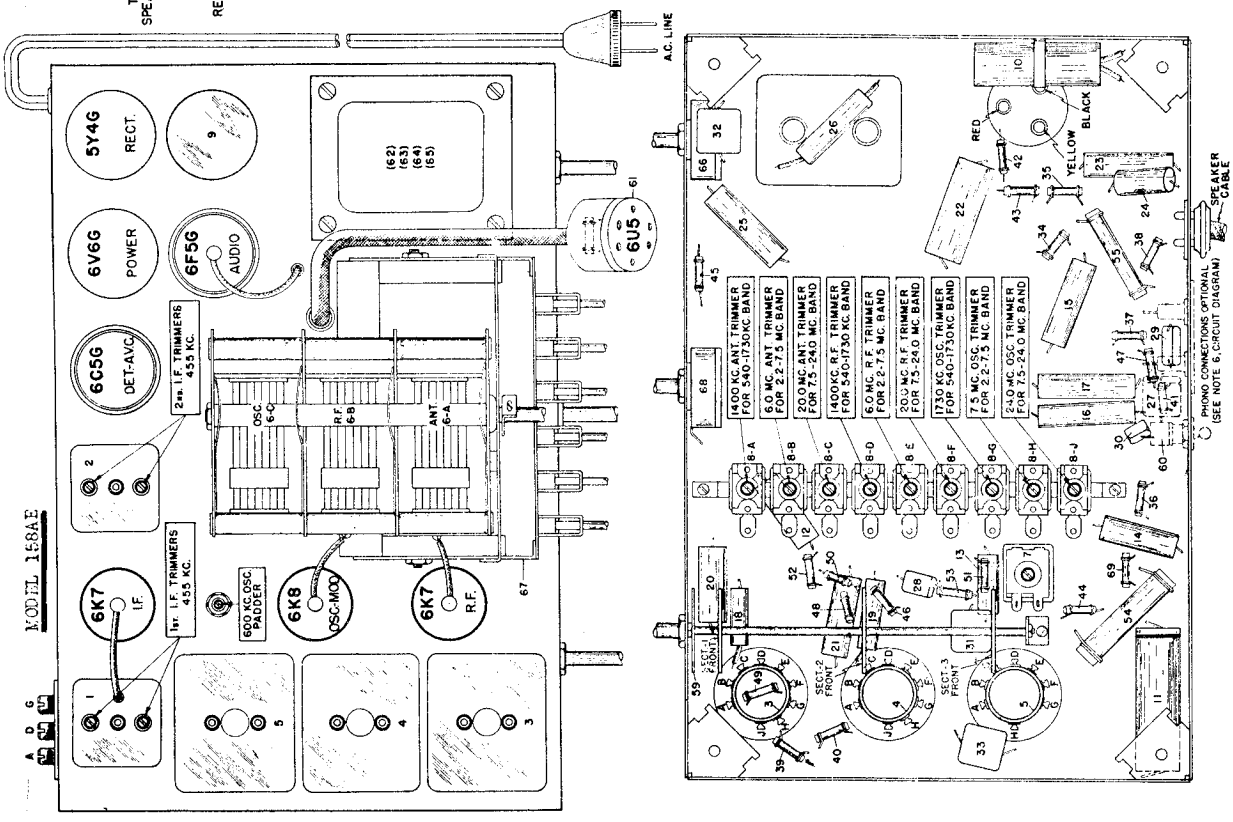
MODEL 158AE
MODEL 178BL
Trimmers, Chassis

# SENTINEL RADIO CORP.





MODEL 158AE
A.C. LINE
5Y4G RECT.
6V6G POWER
6F5G AUDIO
6C5G DET.-A.V.C.
6U5
6K7 I.F.
6K8 OSC-MOD.
6K7 R.F.
1st. I.F. TRIMMERS 455 KC.
2nd. I.F. TRIMMERS 455 KC.
600 KC. OSC. PADDER
OSC 6-C
R.F. 6-B
ANT 6-A
1400 KC. ANT. TRIMMER FOR 540-1730 KC. BAND
6.0 MC. ANT. TRIMMER FOR 2.2-7.5 MC. BAND
20.0 MC. ANT. TRIMMER FOR 7.5-24.0 MC. BAND
1400 KC. R.F. TRIMMER FOR 540-1730 KC. BAND
6.0 MC. R.F. TRIMMER FOR 2.2-7.5 MC. BAND
20.0 MC. R.F. TRIMMER FOR 7.5-24.0 MC. BAND
1730 KC. OSC. TRIMMER FOR 540-1730 KC. BAND
7.5 MC. OSC. TRIMMER FOR 2.2-7.5 MC. BAND
24.0 MC. OSC. TRIMMER FOR 7.5-24.0 MC. BAND
SECT. 1 FRONT
SECT. 2 FRONT
SECT. 3 FRONT
BLACK
YELLOW
RED
SPEAKER CABLE
PHONO CONNECTIONS OPTIONAL (SEE NOTE 6, CIRCUIT DIAGRAM)

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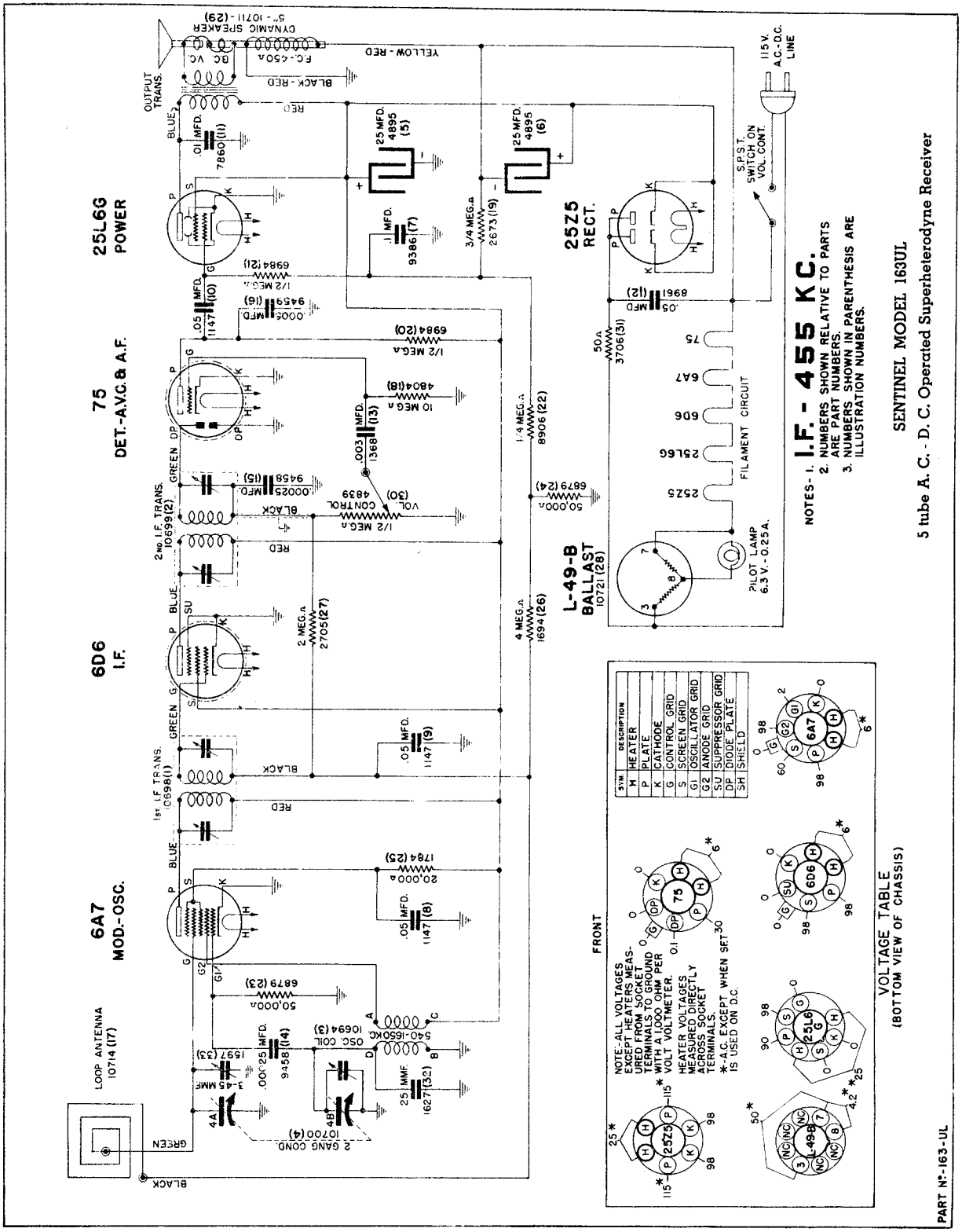
# SENTINEL RADIO CORP.

MODEL 163UL
Schematic, Voltage
Socket

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## ALIGNMENT PROCEDURE IN TABULATED FORM

**Before starting** alignment, check tuning dial adjustment **by: turn gang** condenser until plates touch maximum capacity stop **(completely in mesh)** at which point the dial indicator must be **exactly even** with the last line at the low frequency end of the **dial** calibration. If dial needle does not point exactly to last line move needle to correct position.

Use an accurately calibrated test oscillator with some type of output measuring device.

### MODEL 163UL

BEFORE ALIGNING, PLACE LOOP ANTENNA AND THE "A" AND "B" BATTERIES IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS THAT THEY WILL BE IN WHEN THE SET IS IN THE CABINET AND THE CABINET BACK CLOSED.

**When adjusting 1650 kilocycle oscillator trimmer and 1400 kilocycle antenna trimmer, place test oscillator in series with set loop by:**

1. Remove the black with white tracer wire used to connect loop antenna to Fahenstock clip on chassis.
2. Attach test oscillator to terminals marked "A" and "B" on parts layout diagram.

**IMPORTANT—No condenser should be in series with generator leads.**

| Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | TEST OSCILLATOR: Attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below—and: |
|---|---|---|---|---|
| I. F. Any point where no interfering signal is received | 455 K. C. | .02 MFD condenser | High side to grid terminal of 1A7G tube Low side to chassis DO NOT REMOVE CAP. | Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. |
| (1) Exactly 1650 K. C. | Exactly 1650 K. C. | None | Attach in series with "A" and "B" Loop Terminals | Adjust 1650 K. C. oscillator trimmer for maximum output. |
| (2) Approx. 1400 K. C. | Exactly 1400 K. C. | None | Attach in series with "A" and "B" Loop Terminals | Adjust 1400 K. C. antenna trimmer for maximum output. |

### MODEL 178BL

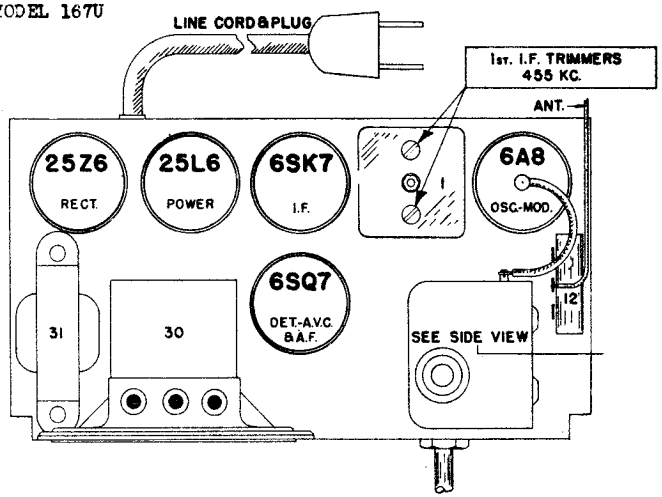
IMPORTANT: BEFORE ALIGNING, PLACE LOOP ANTENNA IN THE SAME APPROXIMATE POSITION IN THE BACK OF CHASSIS IT WILL BE IN WHEN THE SET IS IN THE CABINET AND THE BACK ATTACHED.

**When adjusting 1650 K.C. oscillator trimmer and 1400 K.C. antenna trimmer, couple test oscillator to set loop by placing lead from high side of test oscillator on top of or near set loop.** Be sure that neither the loop or test oscillator lead moves during alignment.

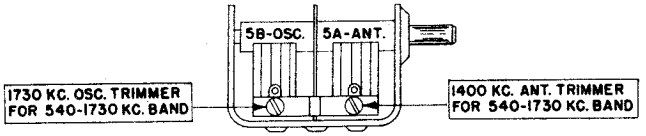
**DO NOT ATTACH LOW SIDE OF TEST OSCILLATOR TO RECEIVER—LEAVE UNCONNECTED.**

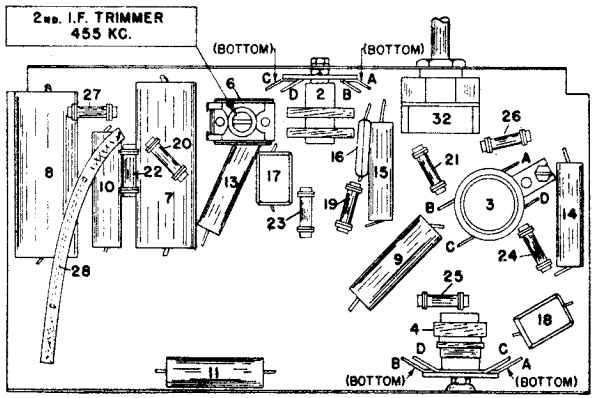
| Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | TEST OSCILLATOR: Attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below—and: |
|---|---|---|---|---|
| I. F. Any point where no interfering signal is received | 455 K. C. | .02 MFD condenser | High side to grid terminal of 6A7 tube DO NOT REMOVE CAP. | Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. |
| (1) Exactly 1650 K. C. | Exactly 1650 K. C. | None | Lay lead on top of or close to loop | Adjust 1650 K. C. oscillator trimmer for maximum output. |
| (2) Approx. 1400 K. C. | Exactly 1400 K. C. | None | Lay lead on top of or close to loop | Adjust 1400 K. C. antenna trimmer for maximum output. |

### MODEL 167U



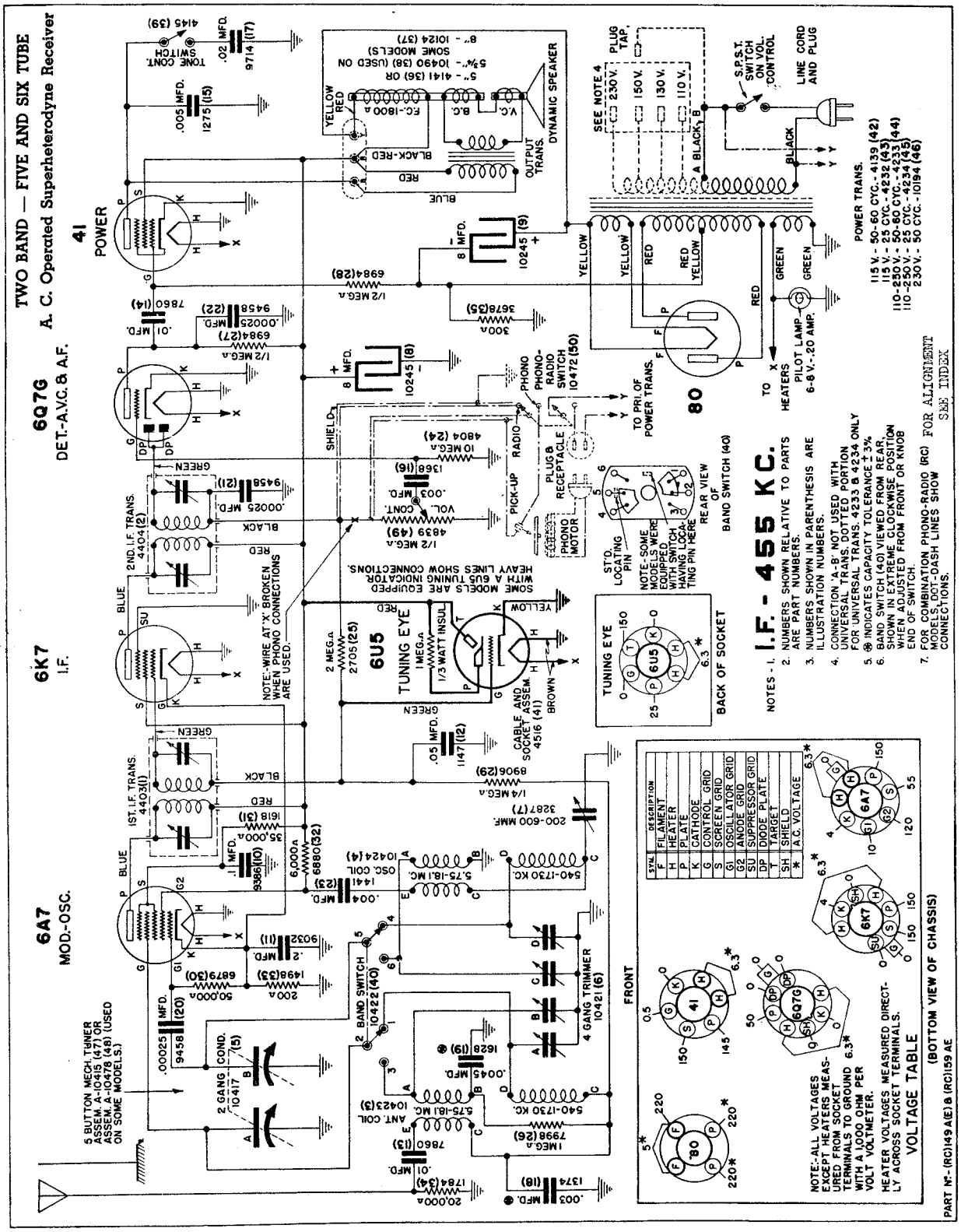

ALIGNMENT PROCEDURE
SEE INDEX.



# SENTINEL RADIO CORP.

MODELS 149A, 149AE, 159AE
Schematic, Voltage
Socket


TWO BAND — FIVE AND SIX TUBE
A. C. Operated Superheterodyne Receiver
6A7 MOD.-OSC.
6K7 I.F.
6Q7G DET.-A.V.C. & A.F.
41 POWER
80
6U5 TUNING EYE
I.F. - 455 KC.
NOTES - 1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. CONNECTION 'A-B' NOT USED WITH UNIVERSAL TRANS. DOTTED PORTION FOR UNIVERSAL TRANS. 4233 & 4234 ONLY
4. ⊛ INDICATES CAPACITY TOLERANCE ± 3%
5. BAND SWITCH (40) VIEWED FROM REAR. SHOWN IN EXTREME CLOCKWISE POSITION WHEN ADJUSTED FROM FRONT OR KNOB END OF SWITCH.
6. FOR COMBINATION PHONO-RADIO (RC) MODELS, DOT-DASH LINES SHOW CONNECTIONS.
7. FOR ALIGNMENT SEE INDEX
SYM. DESCRIPTION
F FILAMENT
H HEATER
P PLATE
K CATHODE
G CONTROL GRID
S SCREEN GRID
G1 OSCILLATOR GRID
G2 ANODE GRID
SU SUPPRESSOR GRID
DP DIODE PLATE
T TARGET
SH SHIELD
* A.C. VOLTAGE
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
NOTE:-ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1,000 OHM PER VOLT VOLTMETER.
PART Nº-(RC)149A(E) & (RC)159AE
POWER TRANS.
115 V.- 50-60 CYC.-4139 (42)
115 V.- 25 CYC.-4232 (43)
110-250 V.- 50-60 CYC.-4233 (44)
110-250 V.- 25 CYC.-4234 (45)
230 V.- 50 CYC.-10194 (46)
PILOT LAMP 6-8 V.-.20 AMP.
HEATERS
TO PRI. OF POWER TRANS.
PHONO-RADIO SWITCH 10472 (50)
PLUG & RECEPTACLE
PICK-UP
PHONO MOTOR
VOL. CONT. .003 MFD. 1368 (16)
1/2 MEG.A 4839 (49)
10 MEG.A 4804 (24)
SHIELD
8 MFD. 10245 (8)
OUTPUT TRANS.
DYNAMIC SPEAKER
FC.-1800Ω
V.C.
B.C.
YELLOW
RED
BLACK-RED
BLUE
5"- 4141 (36) OR 5¾"- 10490 (38) (USED ON SOME MODELS)
8"- 10124 (37)
TONE CONT. SWITCH 4145 (39)
.02 MFD. 9714 (17)
.005 MFD. 1275 (15)
S.P.S.T. SWITCH ON VOL. CONTROL
LINE CORD AND PLUG
PLUG TAP
SEE NOTE 4
230 V.
150 V.
130 V.
110 V.
A BLACK B
8 MFD. 10245 (9)
GREEN
RED YELLOW
YELLOW
RED
.1 MFD. 7860 (14)
.00025 MFD. 9458 (22)
1/2 MEG.Ω 6984 (28)
1/2 MEG.Ω 6984 (27)
3678 (35)
300Ω
2ND I.F. TRANS. 4404 (2)
1ST I.F. TRANS. 4403 (1)
.00025 MFD. 9458 (21)
.00025 MFD. 9458 (20)
NOTE:-WIRE AT 'X' BROKEN WHEN PHONO CONNECTIONS ARE USED.
SOME MODELS ARE EQUIPPED WITH A 6U5 TUNING INDICATOR. HEAVY LINES SHOW CONNECTIONS.
2 MEG.Ω 2705 (25)
1 MEG.Ω 1/3 WATT INSUL.
CABLE AND SOCKET ASSEM. 4516 (41)
.05 MFD. 1147 (12)
1/4 MEG.Ω 8906 (29)
200-600 MMF. 3287 (7)
.1 MFD. 9386 (10)
35,000Ω 1618 (31)
6,000Ω 6880 (32)
.004 MFD. 1441 (23)
OSC. COIL 10424 (4)
540-1730 KC.
5.75-18.1 MC.
.2 MFD. 9032 (11)
50,000Ω 6879 (30)
200Ω 1498 (33)
2 BAND SWITCH 10422 (40)
4 GANG TRIMMER 10421 (6)
.00045 MFD. 1628 (19) ⊛
ANT. COIL 10423 (3)
1MEG.Ω 7998 (26)
.01 MFD. 7860 (13)
20,000Ω 1784 (34)
.003 MFD. ⊛ 1374 (18)
2 GANG COND. 10417 (5)
.00025 MFD. 9458 (20)
5 BUTTON MECH. TUNER ASSEM. A-10415 (47) OR ASSEM. A-10478 (48) (USED ON SOME MODELS.)
STD. LOCATING PIN
REAR VIEW OF BAND SWITCH (40)
NOTE:-SOME MODELS WERE EQUIPPED WITH SWITCH HAVING LOCATING PIN HERE
TUNING EYE
BACK OF SOCKET
FRONT

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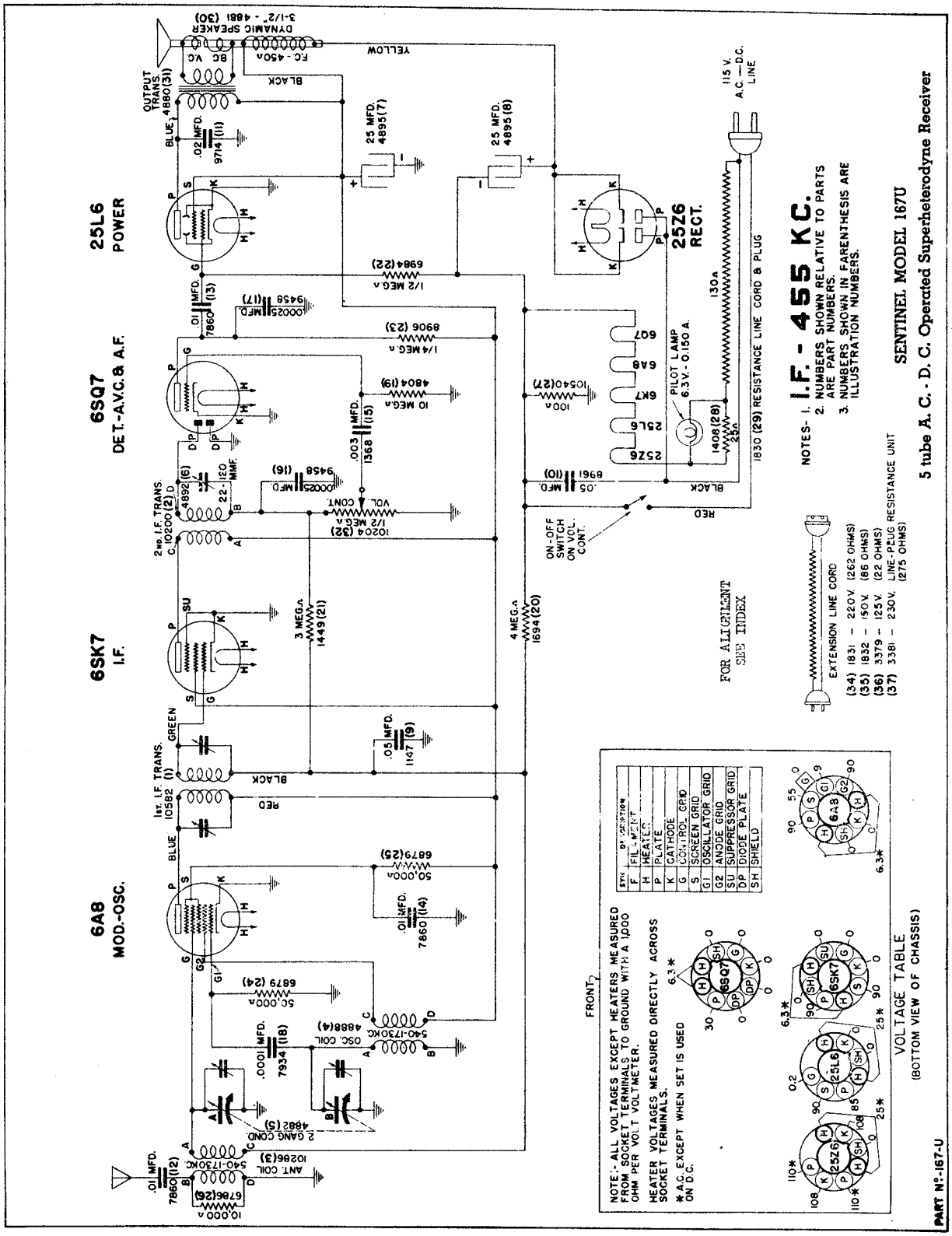
MODEL 167U
Schematic, Voltage
Socket

# SENTINEL RADIO CORP.


SENTINEL MODEL 167U
5 tube A. C. - D. C. Operated Superheterodyne Receiver
I.F. - 455 KC.
25L6 POWER
6SQ7 DET.-A.V.C.& A.F.
6SK7 I.F.
6A8 MOD.-OSC.
2526 RECT.
NOTES- 1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1,000 OHM PER VOLT VOLTMETER.
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
*A.C. EXCEPT WHEN SET IS USED ON D.C.
FRONT
PART No.-167-U

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## Sentinel Models 127B, 137U, 147U, 167U, and 177U.

### ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to gang condenser frame.

| Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | TEST OSCILLATOR: Attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below—and: |
|---|---|---|---|---|
| Any point where no interfering signal is received | 455 K. C. | .02 MFD condenser | (127B) High side to grid terminal of 1A7G tube DO NOT REMOVE CAP. 6A8 (137U, 147U, 167U, 177U (GT type)) | Adjust each of the second I. F. transformer trimmers for maximum output—then adjust each of the first I. F. trimmers for maximum output. |
| 1 Exactly 1730 K. C. | Exactly 1730 K. C. | .00025 MFD condenser | Receiver blue antenna lead | Adjust 1730 K. C. oscillator trimmer for maximum output. |
| 2 Exactly 1400 K. C. | Exactly 1400 K. C. | .00025 MFD condenser | Receiver blue antenna lead | Adjust 1400 K. C. antenna trimmer for maximum output. |

## Sentinel Model 128B

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment, check tuning dial adjustment by: Turn gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial indicator must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.

Use an accurately calibrated test oscillator with some type of output measuring device.

Have ground lead of test oscillator attached to chassis.

| Place band switch for operation on: | Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | TEST OSCILLATOR: Attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below and: |
|---|---|---|---|---|---|
| I.F. alignment use any band position | Any point where no interfering signal is received | Exactly 455 K.C. | .02 Mfd. condenser | High side to grid cap of 1C7G tube. Do not remove cap. | Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output. |
| 1730 to 540 K.C. | 1 Exactly 1730 K.C. | Exactly 1730 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | Adjust 1730 K.C. oscillator trimmer for maximum output. |
| | 2 Exactly 1400 K.C. | Exactly 1400 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | Adjust 1400 K.C. antenna trimmer for maximum output. |
| | 3 Approximately 600 K.C. | Approximately 600 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output. |
| 5.7 to 18.1 M.C. BAND | 1 Exactly 18.1 M.C. | Exactly 18.1 M.C. | 400 Ohm carbon resistor | Receiver blue antenna lead | Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in. |
| | 2 Exactly 15 M.C. | Exactly 15 M.C. | 400 Ohm carbon resistor | Receiver blue antenna lead | Adjust 15 M.C. antenna trimmer for maximum output. |

## Sentinel Model 141AE

| Place band switch for operation on: | Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | TEST OSCILLATOR: Attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
| I. F. ALIGNMENT use any band position | Any point where no interfering signal is received | Exactly 455 K.C. | .02 Mfd condenser | High side to grid cap of 6K8 tube. Do not remove cap. | Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output. |
| 1600 TO 492 K.C. BAND | (1) Exactly 1600 K.C. | Exactly 1600 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | Adjust 1600 K.C. oscillator trimmer for maximum output. |
| | (2) Approx. 1400 K.C. | Approx. 1400 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | While rocking gang condenser adjust 1400 K.C. antenna trimmer for maximum output. |
| | (3) Approx. 550 K.C. | Approx. 550 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | While rocking gang condenser adjust 550 K.C. oscillator padder for maximum output. |
| 136 TO 390 K.C. BAND | (1) Exactly 390 K.C. | Exactly 390 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | Adjust 390 K.C. oscillator trimmer for maximum output. |
| | (2) Approx. 350 K.C. | Approx. 350 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | Adjust 350 K.C. antenna trimmer for maximum output. |
| | (3) Approx. 160 K.C. | Approx. 160 K.C. | .00025 Mfd. condenser | Receiver blue antenna lead | While rocking gang condenser adjust 160 K.C. oscillator padder for maximum response. |
| 5.7 TO 18.1 M.C. BAND | (1) Exactly 18.1 M.C. | Exactly 18.1 M.C. | 400 Ohm carbon resistor | Receiver blue antenna lead | Adjust 18.1 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in. |
| | (2) Approx. 15 M.C. | Exactly 15 M.C. | 400 Ohm carbon resistor | Receiver blue antenna lead | While rocking gang condenser adjust 15 M.C. antenna trimmer for maximum output. |

### ALIGNMENT PROCEDURE IN TABULATED FORM

Be sure to follow procedure carefully and in the order given—otherwise the receiver will be insensitive and the dial calibration incorrect. For alignment procedure read tabulations from left to right. If more than one adjustment is required on any one band, make the adjustment marked (1) first, (2) next, (3) third.

Before starting alignment:

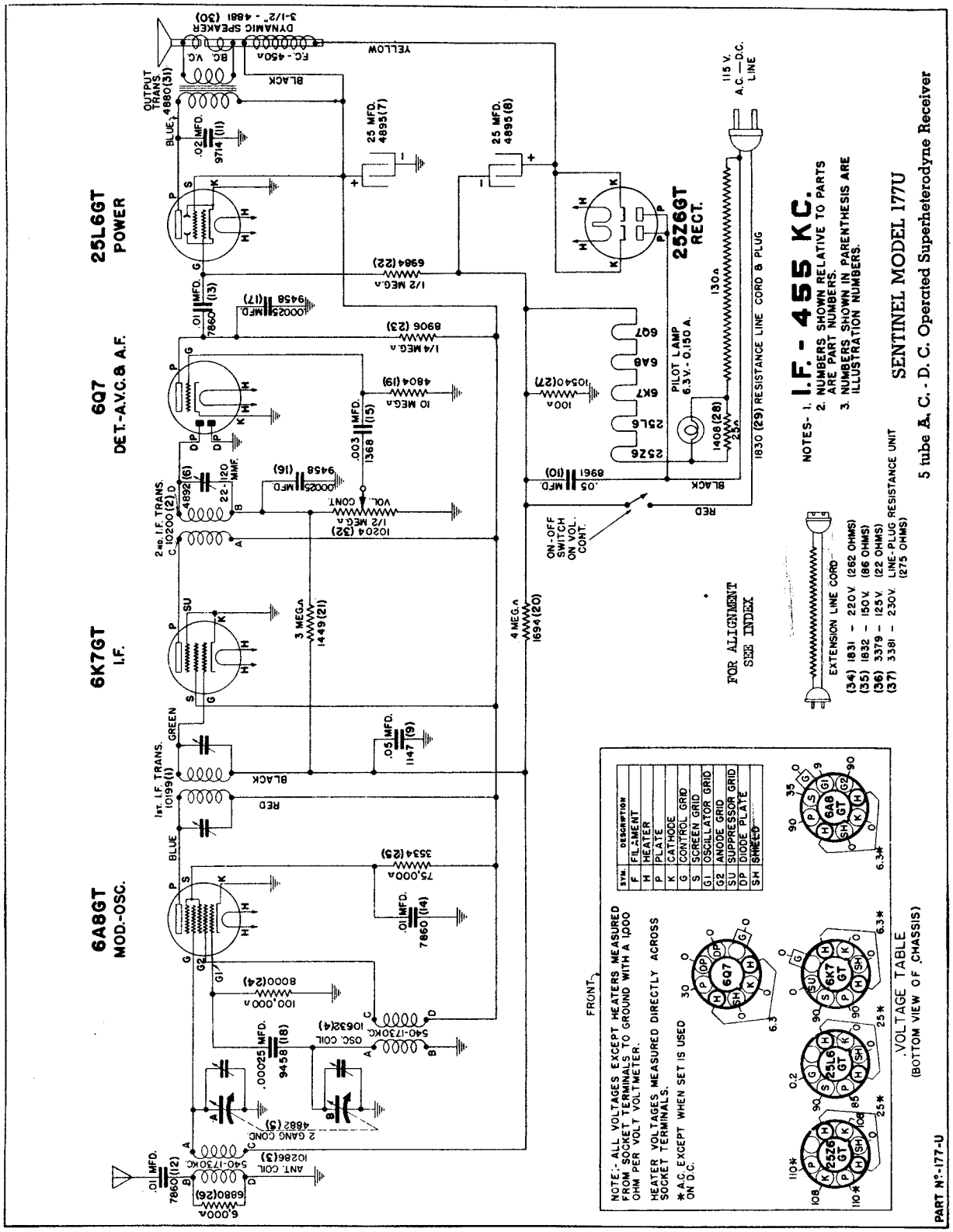
(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh) at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If dial needle does not point exactly to last line move needle to correct position.
(b) Use an accurately calibrated test oscillator with some type of output measuring device.
(c) Have ground lead of test oscillator attached to chassis.

## Models 138AE, 139UE, 140B, 140BE, 145AE and 158AE

| Place band switch for operation on: | Set receiver dial to: | TEST OSCILLATOR: Adjust test oscillator frequency to: | TEST OSCILLATOR: Use dummy antenna in series with output of test oscillator consisting of: | TEST OSCILLATOR: Attach output of test oscillator to: | Refer to parts layout diagram for location of trimmers mentioned below: |
|---|---|---|---|---|---|
| I.F. ALIGNMENT use any band position | Any point where no interfering signal is received. | Exactly 455 K.C. | .02 Mfd. condenser | High side to grid cap of 6K8 tube. Do not remove cap | Adjust each of the second I.F. transformer trimmers for maximum output—then adjust each of the first I.F. transformer trimmers for maximum output. |
| 1730 TO 540 K.C. BAND | (1) Exactly 1730 K.C. | Exactly 1730 K.C. | .00025 Mfd. condenser | Receiver antenna lead | Adjust 1730 K.C. oscillator trimmer for maximum output. |
| | (2) Exactly 1400 K.C. | Exactly 1400 K.C. | .00025 Mfd. condenser | Receiver antenna lead | While rocking gang condenser adjust 1400 K.C. antenna and R.F. trimmers for maximum output. |
| | (3) Approx. 600 K.C. | Approx. 600 K.C. | .00025 Mfd. condenser | Receiver antenna lead | While rocking gang condenser adjust 600 K.C. oscillator padder for maximum output. |
| 2.2 TO 7.5 M.C. BAND | (1) Exactly 7.5 M.C. | Exactly 7.5 M.C. | 400 Ohm carbon resistor | Receiver antenna lead | Adjust 7.5 M.C. oscillator trimmer for maximum output. |
| | (2) Exactly 6. M.C. | Exactly 6. M.C. | 400 Ohm carbon resistor | Receiver antenna lead | While rocking gang condenser adjust 6 M.C. antenna and R.F. trimmers for maximum output |
| 7.5 TO 24 M.C. BAND | (1) Exactly 24 M.C. | Exactly 24 M.C. | 400 Ohm carbon resistor | Receiver antenna lead | Adjust 24 M.C. oscillator trimmer for maximum output—be sure to use proper peak. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down trimmer (add capacity) until the second peak—which is the proper one to use is tuned in. |
| | (2) Approx. 20 M.C. | Exactly 20 M.C. | 400 Ohm carbon resistor | Receiver antenna lead | While rocking gang condenser adjust 20 M.C. antenna and R.F. trimmers for maximum output. |

MODEL 177U
Schematic, Voltage
Socket

# SENTINEL RADIO CORP.


6A8GT
MOD.-OSC.
6K7GT
I.F.
6Q7
DET.-A.V.C.& A.F.
25L6GT
POWER
25Z6GT
RECT.
I.F. - 455 KC.
NOTES- 1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
SENTINEL MODEL 177U
5 tube A. C. - D. C. Operated Superheterodyne Receiver
FOR ALIGNMENT SEE INDEX
ON-OFF SWITCH ON VOL. CONT.
PILOT LAMP 6.3V.-0.150 A.
1830 (29) RESISTANCE LINE CORD & PLUG
115 V. A.C. — D.C. LINE
DYNAMIC SPEAKER 3-1/2" - 4881 (30)
OUTPUT TRANS. 4880(31)
1st. I.F. TRANS. 10199(1)
2nd. I.F. TRANS. C. 10200 (2) D
ANT. COIL 10286(3)
OSC. COIL 10632(4)
2 GANG COND. 4882 (5)
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
NOTE:- ALL VOLTAGES EXCEPT HEATERS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1,000 OHM PER VOLT VOLTMETER.
HEATER VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
*A.C. EXCEPT WHEN SET IS USED ON D.C.
EXTENSION LINE CORD
(34) 1831 - 220 V. (262 OHMS)
(35) 1832 - 150 V. (86 OHMS)
(36) 3379 - 125 V. (22 OHMS)
(37) 3381 - 230 V. LINE-PLUG RESISTANCE UNIT (275 OHMS)
PART N°-177-U

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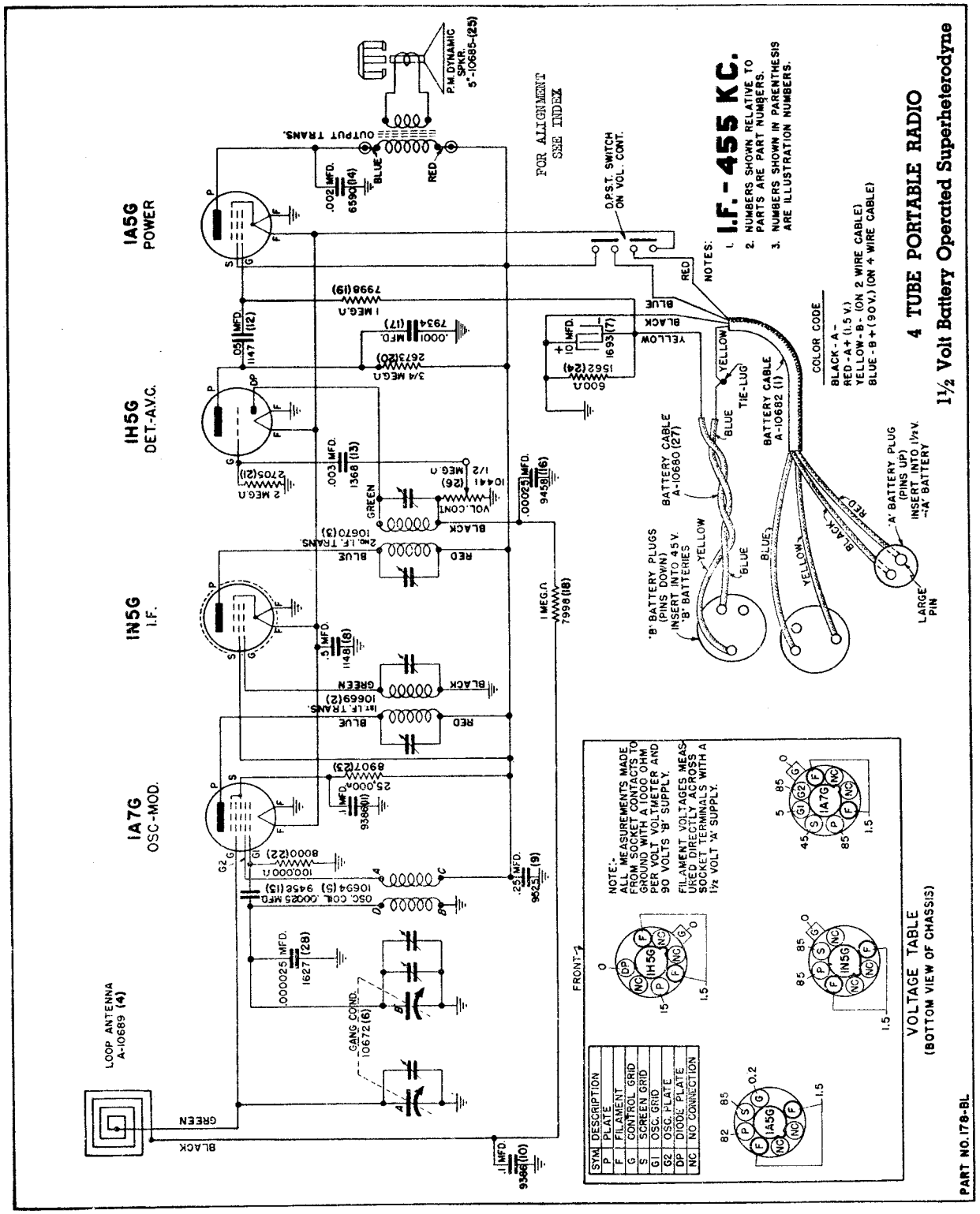
# SENTINEL RADIO CORP.

MODEL 178BL
Schematic, Voltage
Socket


4 TUBE PORTABLE RADIO
1½ Volt Battery Operated Superheterodyne
I.F. - 455 KC.
NOTES:
1. I.F. - 455 KC.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
3. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
COLOR CODE
BLACK - A -
RED - A + (1.5 V.)
YELLOW - B - (ON 2 WIRE CABLE)
BLUE - B + (90 V.) (ON 4 WIRE CABLE)
1A5G POWER
1H5G DET.-A.V.C.
1N5G I.F.
1A7G OSC.-MOD.
P.M. DYNAMIC SPKR. 5"-10685-(25)
OUTPUT TRANS.
D.P.S.T. SWITCH ON VOL. CONT.
FOR ALIGNMENT SEE INDEX
BATTERY CABLE A-10682 (1)
BATTERY CABLE A-10680 (27)
'B' BATTERY PLUGS (PINS DOWN) INSERT INTO 45 V. 'B' BATTERIES
'A' BATTERY PLUG (PINS UP) INSERT INTO 1½ V. -'A' BATTERY
LARGE PIN
TIE-LUG
VOL. CONT.
2ND I.F. TRANS.
INT. I.F. TRANS.
OSC. COIL
GANG COND.
LOOP ANTENNA A-10689 (4)
FRONT
NOTE:- ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 90 VOLTS 'B' SUPPLY.
FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS WITH A 1½ VOLT 'A' SUPPLY.
SYM. DESCRIPTION
P PLATE
F FILAMENT
G CONTROL GRID
S SCREEN GRID
G1 OSC. GRID
G2 OSC. PLATE
DP DIODE PLATE
NC NO CONNECTION
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
PART NO. 178-BL

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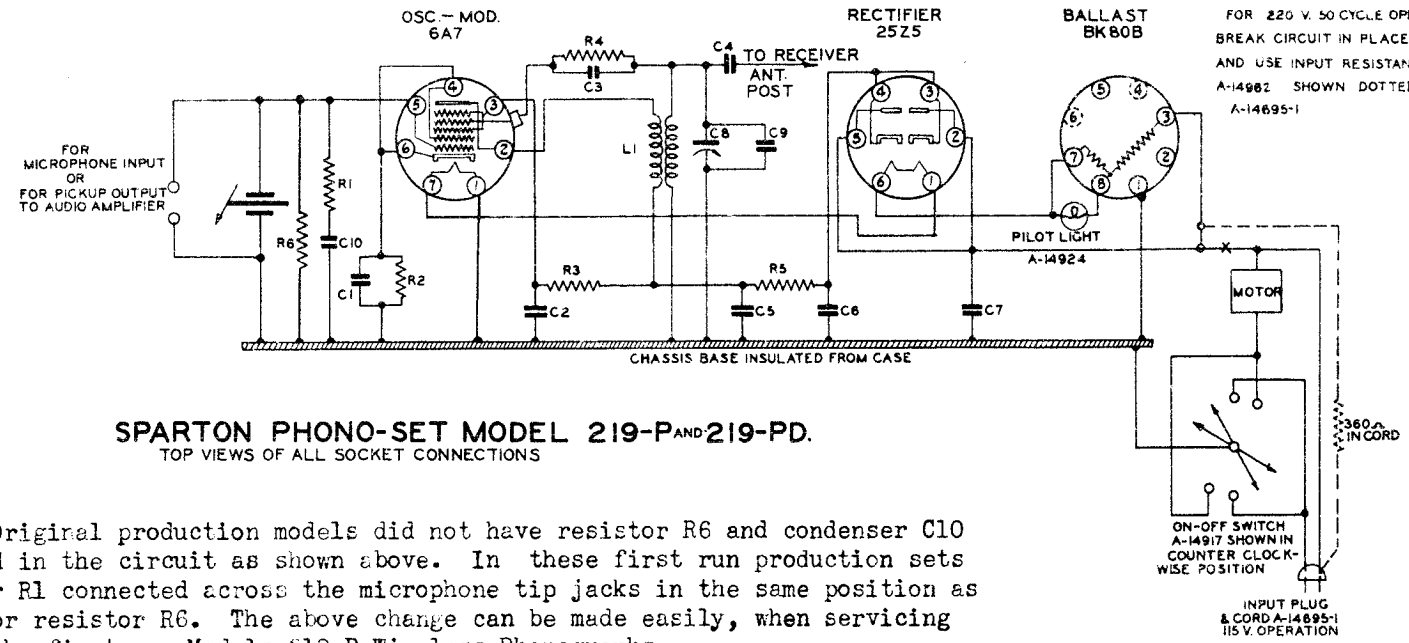



## SPARTON PHONO-SET MODEL 219-P AND 219-PD.

TOP VIEWS OF ALL SOCKET CONNECTIONS

NOTE: Original production models did not have resistor R6 and condenser C10 included in the circuit as shown above. In these first run production sets resistor R1 connected across the microphone tip jacks in the same position as shown for resistor R6. The above change can be made easily, when servicing any of the first run Models 219-P Wireless Phonographs.

The SPARTON Wireless Phonograph Models 219-P and 219-PD are shipped from the factory for operation at approximately 1550 kilocycles.

This frequency may be changed by adjusting a trimmer condenser which is reached through the hole in the bottom of the chassis. An insulated shaft screwdriver should be used. Turning the screw clockwise lowers the frequency and turning the screw counter-clockwise increases the frequency. The normal range of adjustment is from approximately 1200 kilocycles to approximately 1700 kilocycles.

### VOLTAGE CHART

Line Voltage: 115 volts
Control Switch in Center Position

Antenna Not Connected.
Microphone Not Connected.

| Tube | Function | Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 6A7 | Oscillator-Modulator | 0 | 120 | 80 | 4.5 | 0 | 4.5 | 6.3* | - | 0 |
| 25Z5 | Rectifier | 6.3* | 117* | 150 | 150 | 117* | 31.3* | - | - | - |
| BK-80B | Ballast | 0 | - | 117* | - | - | - | 31.3* | 37* | - |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

| | | |
|---|---|---|
| 110 V. 60 CYCLE MOTOR | C-3140 | MODEL 219-P |
| 110 V. 50 CYCLE MOTOR | C-3140-1 | |
| 110 V. 40 CYCLE MOTOR | C-3140-2 | |
| 110 V. 25 CYCLE MOTOR | C-3140-3 | |
| 220 V 50 CYCLE MOTOR | C-3140-4 | |
| 110 V. 60 CYCLE MOTOR | C-3154- | MODEL 219-PD |
| 110 V. 50 CYCLE MOTOR | C-3154-1 | |
| 110 V. 40 CYCLE MOTOR | C-3154-2 | |
| 110 V. 25 CYCLE MOTOR | C-3154-3 | |
| 220 V 50 CYCLE MOTOR | C-3154-4 | |

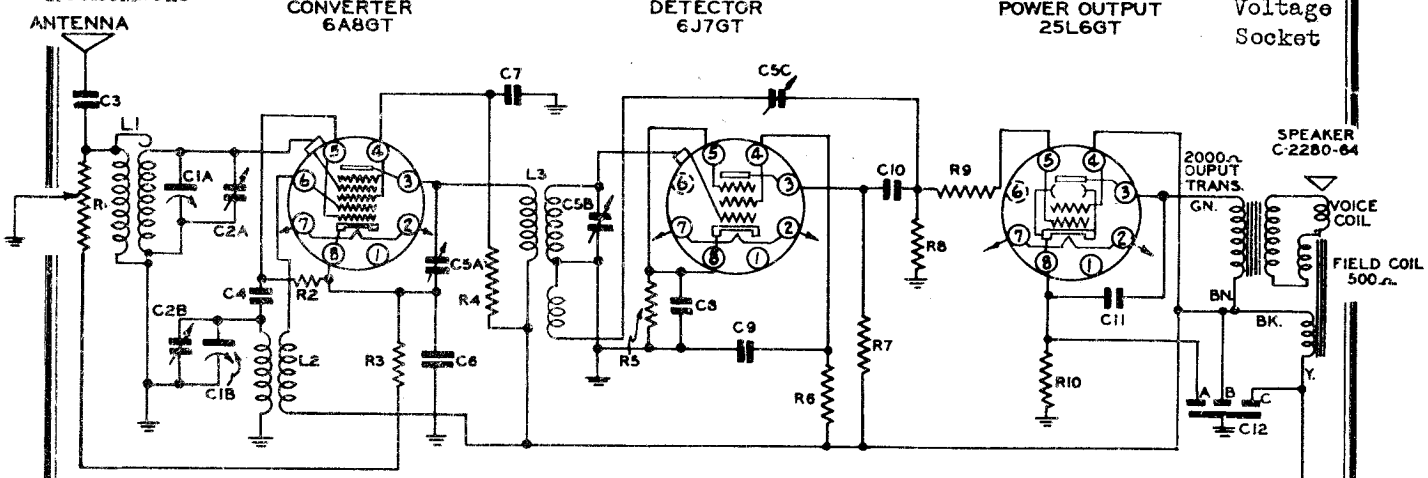
| | | |
|---|---|---|
| C1 | .1 MFD. 200 V. | C-3202-38C |
| C2 | .1 MFD. 200 V. | C-3202-38C |
| C3 | 50 MMFD. MICA | C-720-343 |
| C4 | 10 MMFD. MICA | C-720-367 |
| C5 | 10 MFD. 150 V. ELECT. | A-14927-1 |
| C6 | 15 MFD. 150 V. ELECT. | |
| C7 | .1 MFD. 200 V. | C-3202-38C |
| C8 | 95-470 MMFD. MICA TRIM. | A-14911-3A |
| C9 | 75 MMFD. | A-14922 |
| C10 | .008 MFD. 400 V. | C-3204-68C |
| R1 | 33,000 Ω .25 W. | C-2795-80B |
| R2 | 820 Ω .25 W. | C-2795-61B |
| R3 | 10000 Ω .25 W. | C-2795-74B |
| R4 | 10000 Ω .25 W. | C-2795-74B |
| R5 | 4700 Ω .5 W. | C-2796-70C |
| R6 | 180000 Ω .25 W. | C-2795-89B |
| L1 | OSCILLATOR COIL | A-14926-1 |

(Original) Effective November 1, 1938

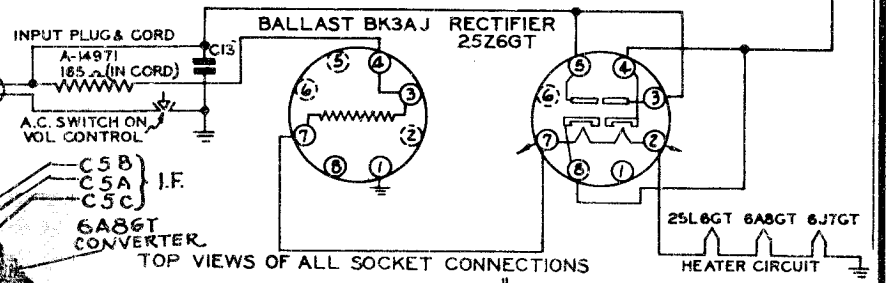
MODEL 409-GL
Schematic

# SPARKS WITHINGTON CO.

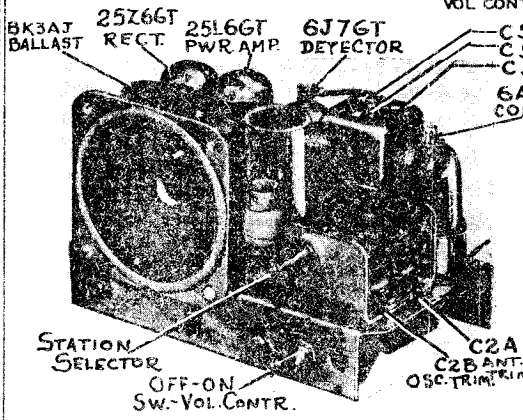
Trimmers, Alignment
Voltage
Socket




## MODEL 409-GL
## INTERMEDIATE FREQUENCY 456 K.C.




TOP VIEWS OF ALL SOCKET CONNECTIONS




| | | |
|---|---|---|
| C1A&B | VARIABLE CONDENSER | B-7288 |
| C2A&B | ON VARIABLE CONDENSER | |
| C3 | .001 MFD. 400 V. | C-3204-2C |
| C4 | 50 MMF. MICA | C-720-343 |
| C5AB&C | I.F. TRIMMER | A-14792 |
| C6 | .01 MFD. 200 V. | C-3202-76C |
| C7 | .05 MFD. 200 V. | C-3202-28C |
| C8 | 10 MFD. 25 V. | A-14782-2 |
| C9 | .01 MFD 200 V. | C-3202-20C |
| C10 | .01 MFD. 200 V. | C-3202-20C |
| C11 | .02 MFD. 400 V. | C-3204-78C |
| C12AB&C | 20-25-25 MFD. ELECT. | A-14972 |
| C13 | .05 MFD. 400 V. | C-3204-28C |

| | | |
|---|---|---|
| R1 | VOL. CONTROL & SWITCH | A-12708-A1 |
| R2 | 56000Ω .25W. | C-2795-83B |
| R3 | 390Ω .25W. | C-2795-57B |
| R4 | 39000Ω .25W. | C-2795-81B |
| R5 | 27000Ω .25W. | C-2795-79B |
| R6 | 6.2 MEGOHM .25W. | C-2795-250B |
| R7 | 560000Ω .25W. | C-2795-95B |
| R8 | 560000Ω .25W. | C-2795-95B |
| R9 | 100000Ω .25W. | C-2795-86B |
| R10 | 150Ω .5W. | C-2796-52C |
| L1 | B.C. ANT. COIL | A-14974 |
| L2 | B.C. OSC. COIL | A-14975 |
| L3 | I.F. TRANS. | A-12989-S |

## VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected †

| Tube | Function | Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 6A8GT | Converter | 0 | 11* | 115 | 42 | -2.8 | 115 | 5* | 1.8 | 0 |
| 6J7GT | Detector | 0 | 5.8* | ** | ** | ** | 115 | 0 | ** | 0 |
| 25L6GT | P.O. | 0 | 34* | 105 | 115 | 0 | 0 | 7* | 7.2 | - |
| 25Z6GT | Rectifier | 0 | 58* | 115* | 146* | 115* | 0 | 34* | 146* | - |
| BK3AJ | Ballast | 0 | 0 | 62* | 62* | 0 | 0 | 58* | 0 | - |

Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.
**Cannot be measured accurately with 1000 ohms per volt voltmeter.

† A regular outside antenna 50 feet in length excluding lead-in and 25 to 50 feet in height should be used for best results with this model.

## ALIGNMENT

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | (Set dial pointer to last mark on scale when condenser plates are flush)* | | | | | | |
| 2 | (Back off, i.e. turn counterclockwise, regeneration cond. C5C "red spot" before I.F. is aligned) | | | | | | |
| 3 | I.F. | 6A8GT | .1 mf. | 456 K.C. | Open | C5A,B | |
| 4 | (Adjust C5C "red spot" turning in clockwise until greatest sensitivity is obtained. If oscil. occurs, turn out C5C until oscil. stops) | | | | | | |
| 5 | Broadcast Band | Ant. | 200 mmf. | 1500 KC | 1500 KC | C2B Osc. | Peak accurately |
| 6 | | | | | | C2A Ant. | Peak accurately |
| 7 | (Check calibration and sensitivity at 600 KC, 1000 KC, 1500 KC) | | | | | | |
| 8 | (Connect set to regular antenna and check reception of stations. Readjust C5C if set howls or oscillates on strong signals. Then recheck sensitivity) | | | | | | |

*Model 409-GL chassis may be completely aligned without removing from cabinet.

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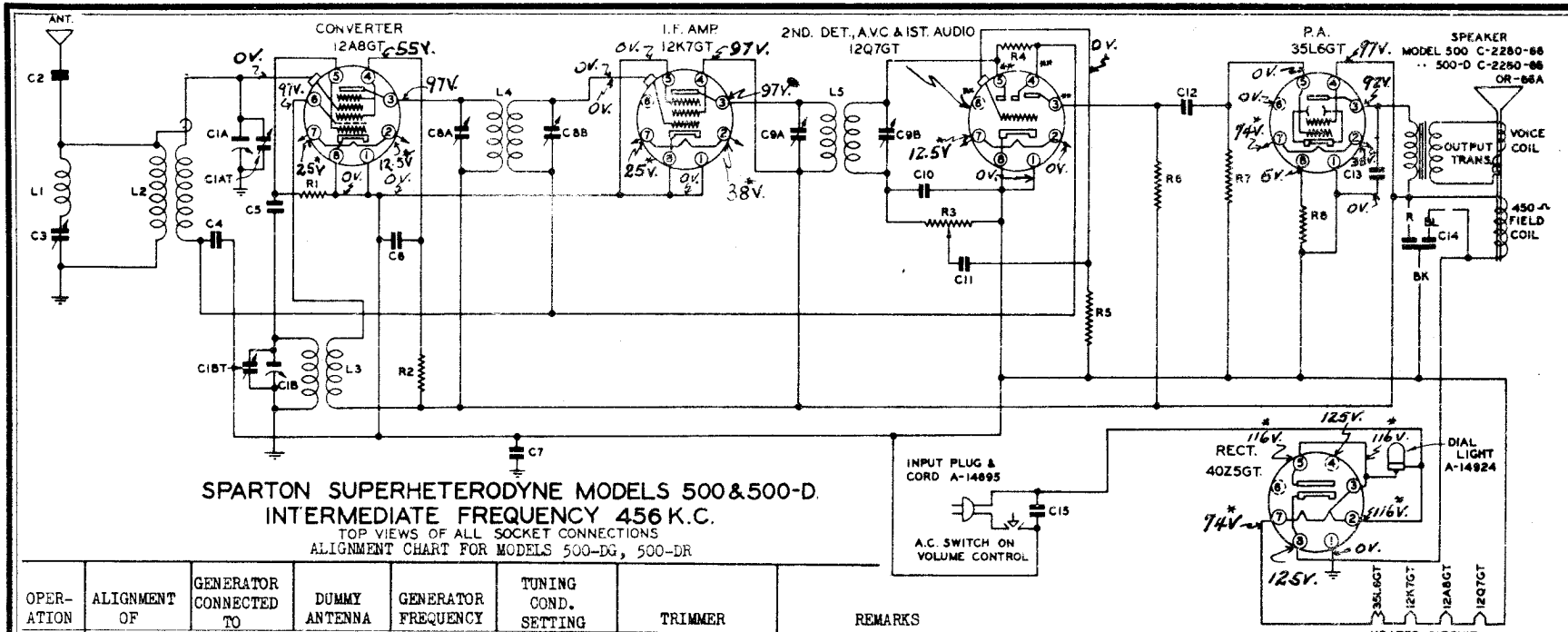



# SPARTON SUPERHETERODYNE MODELS 500 & 500-D.

## INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS

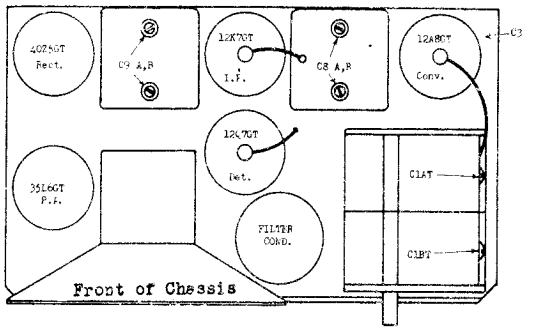
ALIGNMENT CHART FOR MODELS 500-DG, 500-DR

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | On Deluxe Models set pointer parallel to horizontal lines with condenser plates fully meshed. | | | | | | |
| 2 | I.F. | 12A8GT Grid Cap | 200 mmf. | 456 KC | Open | C9 A&B | 2nd I.F. |
| | | | | | | C8 A&B | 1st I.F. |
| 3 | Rejector | Ant. | 200 mmf. | 456 KC | Closed | C3 | Adjust to minimum |
| 4 | Broadcast Band | Ant. | 200 mmf. | 1500 KC | 1500 KC | C1BT Osc. | Peak at max. |
| | | | | | | C1AT Ant. | Peak at max. |
| 5 | (Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC) | | | | | | |
| 6 | (Check operations 1 to 5 inclusive) | | | | | | |

ALIGNMENT CHART FOR MODELS 500-W, 500-BV, 500-BW

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | I.F. | 12A8GT Grid Cap | 200 mmf. | 456 KC. | Open | C9 A&B | 2nd I.F. |
| | | | | | | C8 A&B | 1st I.F. |
| 2 | Rejector | Ant. | 200 mmf. | 456 KC | Closed | C3 | Adjust to minimum |
| 3 | Broadcast Band | Ant. | 200 mmf. | 1700 KC | Open | C1BT Osc. | Peak at max. |
| | | | | 1500 KC | 1500 KC | C1AT Ant. | Peak at max. |
| 4 | (Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC) | | | | | | |
| 5 | (Check operations 1 to 4 inclusive) | | | | | | |

Notes: Voltage and resistance readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits.
All measurements made with Weston Selective Analyzer No. 665, Type 2.
* AC volts.
**Cannot be measured with Weston Selective Analyzer No. 665, Type 2.
Line Voltage: 117 volts AC Position of Volume Control: Full with Antenna Disconnected
Voltage of each socket prong to Prong No. 1 of Type 12Q7GT




| | | |
|---|---|---|
| C1A&1B | VAR. COND. MODEL 500 | B-7288-1 |
| | MODEL 500-D | B-7288-2 |
| C1AT | B.C. ANT. TRIMMER | ON B-7288 COND. |
| C1BT | B.C. OSC. TRIMMER | ON B-7288 COND. |
| C2 | .001 MFD. 400V. | C-3204-58C |
| C3 | I.F. REJECTOR TRIMMER | A-14088-2 |
| C4 | .05 MFD. 200V. | C-3302-84A |
| C5 | 50 MMF. MOLDED | C-720-372 |
| C6 | .05 MFD. 200V. | C-3302-84A |
| C7 | .15 MFD. 400V. | C-3204-95U |
| C8 | NO.1 I.F. TRIMMER | B-7200-GG |
| C9 | NO.2 I.F. TRIMMER | B-7200-GN |
| C10 | 500 MMF. MOLDED | C-720-316 |
| C11 | .01 MFD. 200V. | C-3302-20A |
| C12 | .01 MFD. 200V. | C-3202-20C |
| C13 | .03 MFD. 400V. | C-3304-80A |
| C14 | 25-25 MFD. ELECT. | A-15124 |
| C15 | .01 MFD. 400V. | C-3304-20A |

| | | |
|---|---|---|
| R1 | 58,000 Ω .25W. | C-2795-83B |
| R2 | 22,000 Ω .25W. | C-2795-78B |
| R3 | 500,000 OHM MODEL 500 V.C. & SW. MODEL 500-D | A-15128 A-15129-1 |
| R4 | 1.8 MEGOHM .25W. | C-2795-101B |
| R5 | 5.6 MEGOHM .25W. | C-2795-107B |
| R6 | 270,000 Ω .25W. | C-2795-91B |
| R7 | 560,000 Ω .25W. | C-2795-95B |
| R8 | 150 Ω .5W. | C-2796-52C |
| L1 | I.F. REJECTOR COIL | A-14718-1 |
| L2 | B.C. ANTENNA COIL | A-14974-1 |
| L3 | B.C. OSC. COIL | A-14975 |
| L4 | NO.1 I.F. COIL | A-12084-32 |
| L5 | NO.2 I.F. COIL | A-12084-17 |

(Original) Effective May 1, 1939

# MODELS 510DG, 510DR, 510W 510BV, 510BW

Schematic, Voltage, Socket Trimmers, Alignment

SPARKS WITHINGTON CO.

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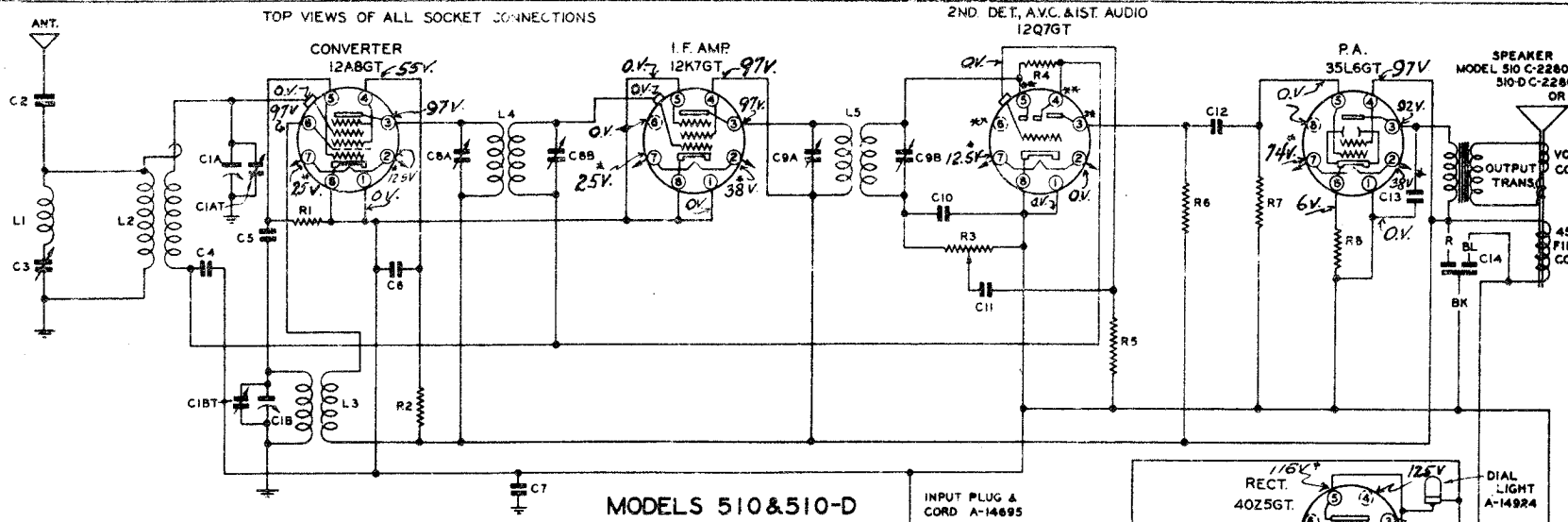



## MODELS 510&510-D

Notes: Voltage and resistance readings are for schematic diagram
Allow 1% + or - on all measurements.
Always use meter scale which will give greatest deflection within scale limits.
All measurements made with Weston Selective Analyzer No. 665, Type 2.
* AC volts.
**Cannot be measured with Weston Selective Analyzer No. 665, Type 2.

## INTERMEDIATE FREQUENCY 456 K.C.

Line Voltage: 117 volts AC  Position of Volume Control: Full with Antenna Disconnected
Voltage of each socket prong to Prong No. 1 of Type 12Q7GT

ALIGNMENT CHART FOR MODELS 510-DG, 510-DR

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | On Deluxe Models set pointer parallel to horizontal lines with condenser plates fully meshed. | | | | | | |
| 2 | I.F. | 12A8GT Grid Cap | 200 mmf. | 456 KC | Open | C9 A&B | 2nd I.F. |
| | | | | | | C8 A&B | 1st I.F. |
| 3 | Rejector | Ant. | 200 mmf. | 456 KC | Closed | C3 | Adjust to minimum |
| 4 | Broadcast Band | Ant. | 200 mmf. | 1500 KC | 1500 KC | C1BT Osc. | Peak at max. |
| | | | | | | C1AT Ant. | Peak at max. |
| 5 | (Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC) | | | | | | |
| 6 | (Check operations 1 to 5 inclusive) | | | | | | |

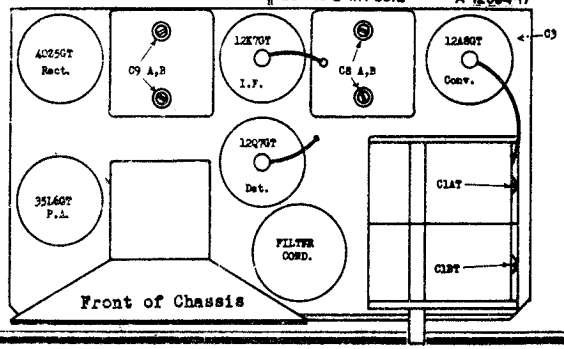
ALIGNMENT CHART FOR MODELS 510-W, 510-BV, 510-BW

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | I.F. | 12A8GT Grid Cap | 200 mmf. | 456 KC. | Open | C9 A&B | 2nd I.F. |
| | | | | | | C8 A&B | 1st I.F. |
| 2 | Rejector | Ant. | 200 mmf. | 456 KC | Closed | C3 | Adjust to minimum |
| 3 | Broadcast Band | Ant. | 200 mmf. | 1700 KC | Open | C1BT Osc. | Peak at max. |
| | | | | 1500 KC | 1500 KC | C1AT Ant. | Peak at max. |
| 4 | (Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC) | | | | | | |
| 5 | (Check operations 1 to 4 inclusive) | | | | | | |

(Original) Effective May 1, 1939

| | | |
|---|---|---|
| C1A&1B VAR. COND. | MODEL 510 | B-7288-1 |
| | MODEL 510-D | B-7288-2 |
| C1AT B.C. ANT. TRIMMER | ON B-7288 COND. | |
| C1BT B.C. OSC. TRIMMER | ON B-7288 COND. | |
| C2 .001 MFD. 400V. | | C-3204-58C |
| C3 I.F. REJECTOR TRIMMER | | A-14088-2 |
| C4 .05 MFD. 200V. | | C-3202-84C |
| C5 50 MMF. MOLDED | | C-720-372 |
| C6 .05 MFD. 200V. | | C-3202-84C |
| C7 .15 MFD. 400V. | | C-3204-95C |
| C8 NO.1 I.F. TRIMMER | | B-7200-GG |
| C9 NO.2 I.F. TRIMMER | | B-7200-GN |
| C10 500 MMF. MOLDED | | C-720-316 |
| C11 .01 MFD. 200V. | | C-3202-20C |
| C12 .01 MFD. 200V. | | C-3202-20C |
| C13 .03 MFD. 400V. | | C-3204-80C |
| C14 25-25 MFD. ELECT. | | A-15093 |
| C15 .01 MFD. 400V. | | C-3204-20C |

| | | |
|---|---|---|
| R1 | 56,000 Ω .25W. | C-2795-63B |
| R2 | 22,000 Ω .25 W. | C-2795-78B |
| R3 | 500,000 OHM MODEL 510 V.C. & SW. MODEL 510-D | A-15129 / A-15129-1 |
| R4 | 1.5 MEGOHM .25W. | C-2795-101B |
| R5 | 5.6 MEGOHM .25W. | C-2795-107B |
| R6 | 270,000 Ω .25W. | C-2795-91B |
| R7 | 560,000 Ω .25W. | C-2795-95B |
| R8 | 150 Ω .5 W. | C-2796-52C |
| L1 | I.F. REJECTOR COIL | A-14718-1 |
| L2 | B.C. ANTENNA COIL | A-14974-1 |
| L3 | B.C. OSC. COIL | A-14975 |
| L4 | NO.1 I.F. COIL | A-12064-32 |
| L5 | NO.2 I.F. COIL | A-12064-17 |



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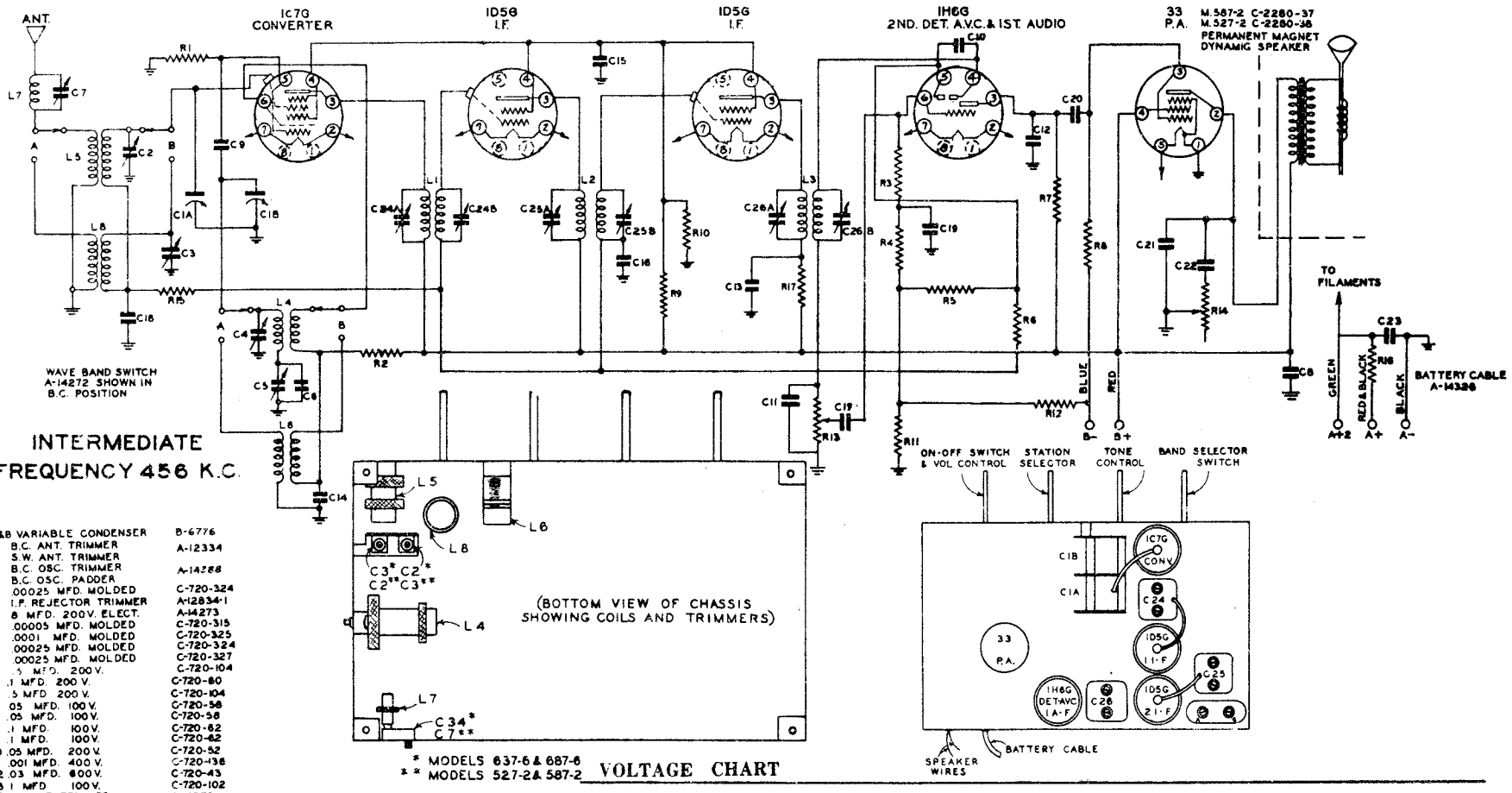
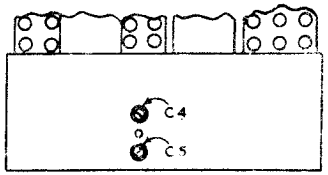



| | | |
|---|---|---|
| C1A&B | VARIABLE CONDENSER | B-6776 |
| C2 | B.C. ANT. TRIMMER | A-12334 |
| C3 | S.W. ANT. TRIMMER | |
| C4 | B.C. OSC. TRIMMER | A-14288 |
| C5 | B.C. OSC. PADDER | |
| C6 | .00025 MFD. MOLDED | C-720-324 |
| C7 | I.F. REJECTOR TRIMMER | A-12834-1 |
| C8 | 8 MFD. 200 V. ELECT. | A-14273 |
| C9 | .00005 MFD. MOLDED | C-720-315 |
| C10 | .0001 MFD. MOLDED | C-720-325 |
| C11 | .00025 MFD. MOLDED | C-720-324 |
| C12 | .00025 MFD. MOLDED | C-720-327 |
| C13 | .5 MFD. 200 V. | C-720-104 |
| C14 | .1 MFD. 200 V. | C-720-80 |
| C15 | .5 MFD. 200 V. | C-720-104 |
| C16 | .05 MFD. 100 V. | C-720-56 |
| C17 | .05 MFD. 100 V. | C-720-56 |
| C18 | .1 MFD. 100 V. | C-720-62 |
| C19 | .1 MFD. 100 V. | C-720-62 |
| C20 | .05 MFD. 200 V. | C-720-52 |
| C21 | .001 MFD. 400 V. | C-720-138 |
| C22 | .03 MFD. 600 V. | C-720-43 |
| C23 | 1 MFD. 100 V. | C-720-102 |
| C24 | NO. 1 I.F. TRIMMER | A-14375 |
| C25 | NO. 2 I.F. TRIMMER | A-14375 |
| C26 | NO. 3 I.F. TRIMMER | A-14375 |
| R1 | 47,000 Ω 2.5 W. | C-2795-82B |
| R2 | 10,000 Ω .5 W. | C-2798-74A |
| R3 | 470,000 Ω .25 W. | C-2795-94B |
| R4 | 220,000 Ω .25 W. | C-2795-90B |
| R5 | 470,000 Ω .25 W. | C-2795-94B |
| R6 | 1 MEGOHM .25 W. | C-2795-98B |
| R7 | 220,000 Ω .25 W. | C-2795-90B |
| R8 | 470,000 Ω .25 W. | C-2795-94B |
| R9 | 18,000 Ω 1 W. | C-2797-76A |
| R10 | 56,000 Ω 1 W. | C-2797-68A |
| R11 | 150 Ω .5 W. | C-2796-52A |
| R12 | 390 Ω .5 W. | C-2796-57A |
| R13 | VOLUME CONTROL & A.C. SWITCH | A-14274 |
| R14 | TONE CONTROL | A-12967 |
| R15 | 5600 Ω 2.5 W. | C-2795-71B |
| R16 | .5 OHMS WIREWOUND | B-5243-43 |
| R17 | 4700 Ω .25 W. | C-2795-70B |
| L1 | NO. 1 I.F. COIL | A-12084-14 |
| L2 | NO. 2 I.F. COIL | A-12084-14 |
| L3 | NO. 3 I.F. COIL | A-12084-15 |
| L4 | B.C. OSC. COIL | A-12055-7 |
| L5 | B.C. R.F. COIL | A-12056-4 |
| L6 | S.W. OSC. COIL | A-12062-11 |
| L7 | I.F. REJECTOR COIL | A-12664-3 |
| L8 | S.W. R.F. COIL | A-12061-5 |

* MODELS 637-6 & 687-6
** MODELS 527-2 & 587-2

FOR ALIGNMENT SEE INDEX




END VIEW OF CHASSIS

MODEL 527-2 & 587-2

## VOLTAGE CHART

"A" Battery Voltage: 2 volts
"B" Battery Voltage: 135 volts

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

| Tube | Function | Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 | Grid Cap |
| 1C7G | Converter | - | 0 | 115 | 64 | 0 | 110 | 2 | - | * |
| 1D5G | First I-F Ampligier | - | 0 | 113 | 56 | 0 | - | 2 | - | * |
| 2D5G | Second I-F Amplifier | - | 0 | 111 | 56 | 0 | - | 2 | - | * |
| 1H6G | Det-AVC-1st A-F Amplifier | - | 2 | 111 | * | * | * | 0 | - | * |
| 33 | Power Amplifier | 2 | 120 | * | 120 | 0 | - | - | - | - |

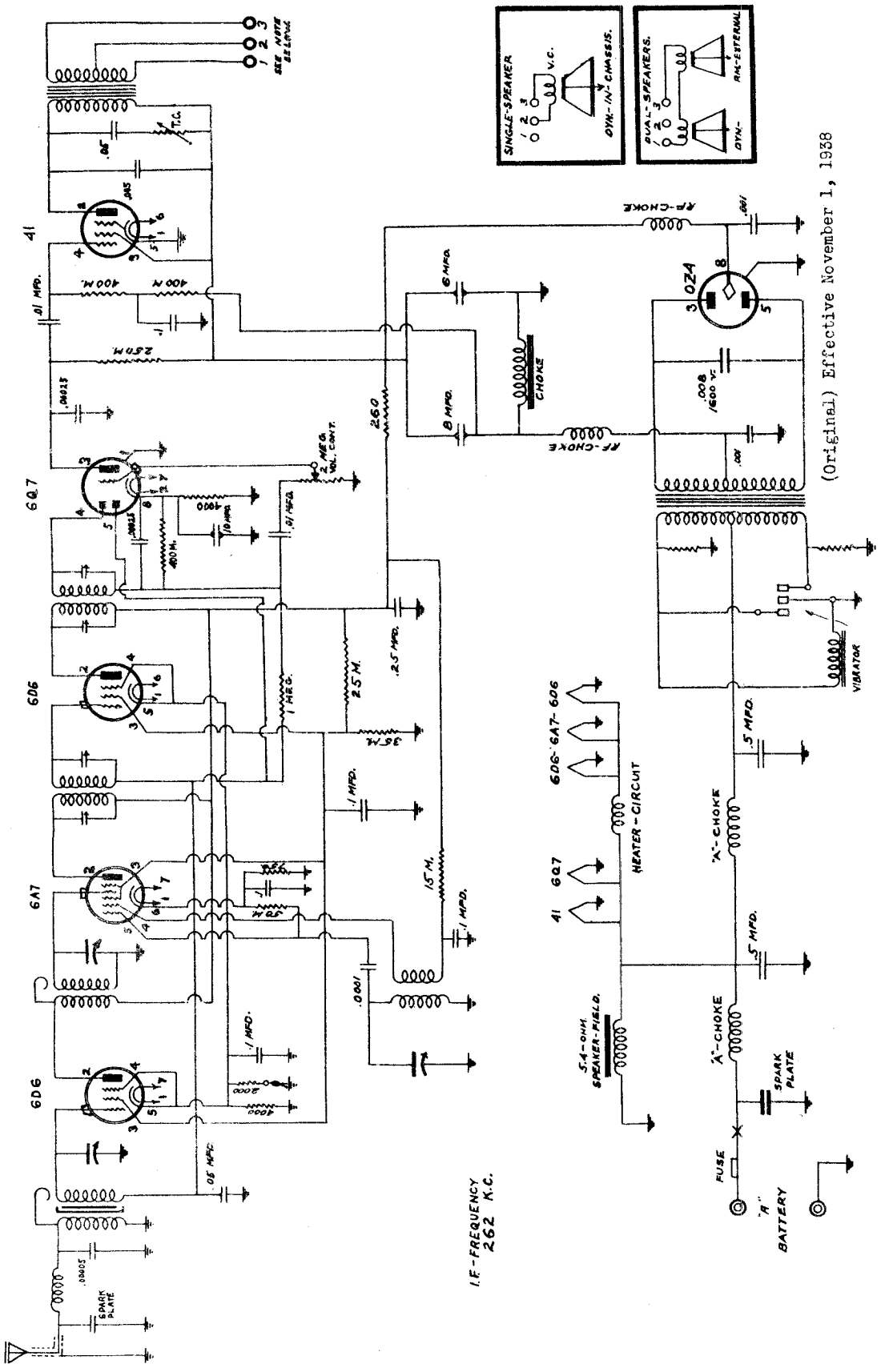
Notes: Voltage readings are for schematic diagram shown on page 2. Allow 15% + or- on all measurements. Always use meter scale which will give greatest deflection within scale limits. All measurements made with Weston Selective Analyzer No. 665, Type 2.

* Cannot be measured with Weston Selective Analyzer No. 665, Type 2.

(ORIGINAL) EFFECTIVE DEC 28, 1936

MODEL 699
Schematic
Speaker Connections

# SPARKS WITHINGTON CO.

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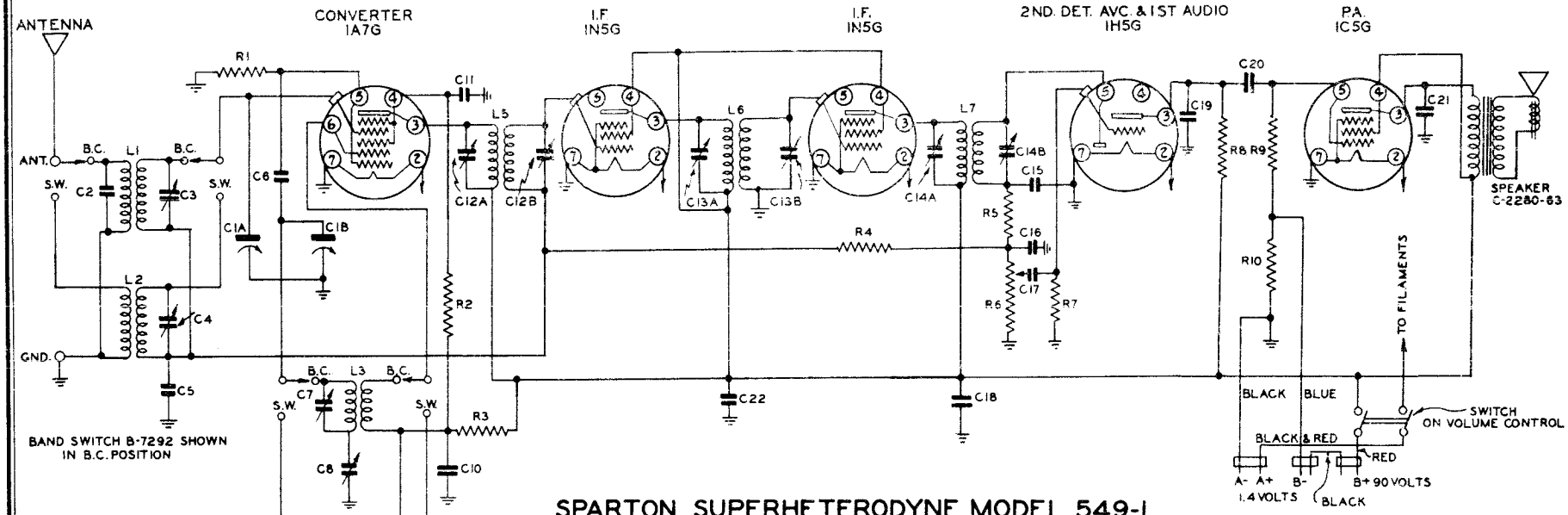



# SPARTON SUPERHETERODYNE MODEL 549-1
## INTERMEDIATE FREQUENCY 456 K.C.

| | | |
|---|---|---|
| C1A&B VARIABLE CONDENSER | | B-7293 |
| C2 | 25 MMF. MICA | C-720-369 |
| C3 | B.C. ANT. TRIMMER | A-14088-8 |
| C4 | S.W. ANT. TRIMMER | A-14088-8 |
| C5 | .05 MFD. 200 V. | C-3202-140C |
| C6 | 100 MMF. MICA | C-720-339 |
| C7 | B.C. OSC. TRIMMER | A-14088-8 |
| C8 | B.C. OSC. PADDER | A-14911-4A |
| C9 | 2670 MMF. MICA | C-720-370 |
| C10 | 8 MFD. 150 V. ELECT. | A-14958 |
| C11 | .05 MFD. 200V. | C-3202-28C |
| C12A&B NO.1 I.F. TRIMMER | | B-7200-GG |
| C13A&B NO.2 I.F. TRIMMER | | B-7200-GG |
| C14A&B NO.3 I.F. TRIMMER | | B-7200-GZ |
| C15 | 100 MMF. MICA | C-720-339 |
| C16 | 100 MMF. MICA | C-720-339 |
| C17 | .001 MFD. 400V. | C-3204-114C |
| C18 | 8 MFD. 150V. | A-14958 |
| C19 | 100 MMF. MICA | C-720-339 |
| C20 | .001 MFD. 400V. | C-3204-114C |
| C21 | .001 MFD. 1000V. | C-3210-114C |
| C22 | .1 MFD. 200V. | C-3202-38C |

| | | | |
|---|---|---|---|
| R1 | 220,000 Ω | .25W. | C-2795-90B |
| R2 | 68,000 Ω | .25W. | C-2795-84B |
| R3 | 4,700 Ω | .25W. | C-2795-175B |
| R4 | 270,000 Ω | .25W. | C-2795-91B |
| R5 | 51,000 Ω | .25W. | C-2795-200B |
| R6 | 100,000 Ω VOLUME CONT. | | A-14957 |
| R7 | 10 MEG. Ω | .25W. | C-2795-110B |
| R8 | 1 MEG. Ω | .25W. | C-2795-98B |
| R9 | 2.2 MEG. | 25W | C-2795-102B |
| R10 | 820 Ω | .25W. | C-2795-157B |

| | | |
|---|---|---|
| L1 | B.C. ANT. COIL | A-14663-2 |
| L2 | S.W. ANT. COIL | A-14960 |
| L3 | B.C. OSC. COIL | A-14959 |
| L4 | S.W. OSC. COIL | A-14967 |
| L5 | NO.1 I.F. COIL | A-12064-14 |
| L6 | NO.2 I.F. COIL | A-12064-31 |
| L7 | NO.3 I.F. COIL | A-12064-24 |

## VOLTAGE CHART

Condition of "A" Battery - Good (1.5 volts) Position of Volume Control: Full with Antenna Disconnected
Condition of "B" Battery - Good (90 volts) Position of Band Selector Switch: Broadcast Band

| Tube | Function | Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 1A7G | Converter | 80 | 1.4 | 80 | 30 | * | 70 | 0 | 69 | * |
| 1N5G | 1st I.F. Amp. | * | 1.4 | 78 | 80 | 0 | - | 0 | 0 | 0 |
| 1N5G | 2nd I.F. Amp. | 0 | 1.4 | 78 | 80 | 0 | 0 | - | 0 | 0 |
| 1H5G | 2nd Det.-AVC-1st Audio | 0 | 1.4 | * | 0 | -.1 | - | 0 | - | 0 |
| 1C5G | Power Amp. | 0 | 1.4 | 78 | 80 | 0 | 7.5 | 0 | - | 0 |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter.
*Cannot be accurately measured with Model 665 Weston analyzer. (Original) Effective Feb. 1, 1939

MODEL 549-1
Alignment,Socket,Trimmers
MODEL 699
Voltage,Alignment

SPARKS WITHINGTON CO.

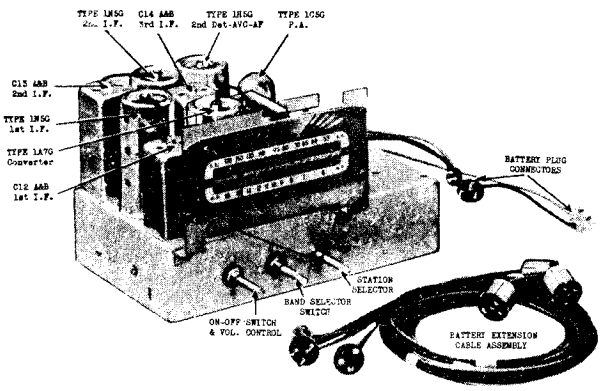
# Model 549-1

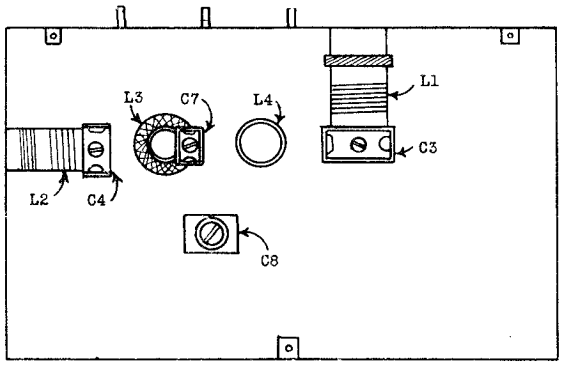
## ALIGNMENT

# Sparton Superheterodyne

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | (Set pointer to end of scale with tuning condenser gang closed) | | | | | | | |
| 2 | I.F. | 1A7G Grid | .1 mf. | 456 KC | BC | Open | C14 A,B | 3 I.F. Transformer |
| | | | | | | | C13 A,B | 2 I.F. Transformer |
| | | | | | | | C12 A,B | 1 I.F. Transformer |
| 3 | Broad-cast Band | Ant. | 200 mmf. | 1500 KC | BC | 1500 KC | C7 Osc. | Peak accurately |
| | | | | | | | C3 Ant. | Peak accurately |
| 4 | | | | 600 KC | BC | 600 KC | C8 Pad. | Rock C1A&B for max. output |
| 5 | (Repeat operation 3) | | | | | | | |
| 6 | (Check calibration and sensitivity at 600 KC, 900 KC, and 1500 KC) | | | | | | | |
| 7 | SW Band | Ant. | * | 18 MC | SW | 18 MC | C4 Ant. | ** |
| 8 | (Check calibration and sensitivity at 6 MC and 18 MC) | | | | | | | |
| 9 | (Check operations 1 to 8 inclusive) | | | | | | | |

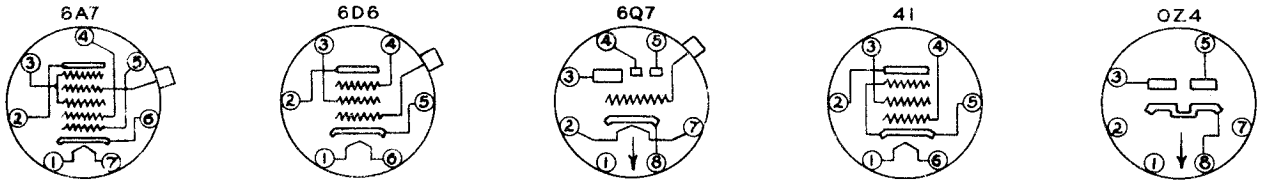
* 200 mmf. condenser and 100 ohm non-inductive resistor in series.
** Rock tuning control around 18 MC while adjusting this trimmer, and make sure that the signal is peaked on the fundamental rather than on the image.




CHASSIS DIAGRAM (Bottom View)

# Sparton Superheterodyne Model 699




## VOLTAGE CHART

Battery Voltage: 6.3 volts  Position of Volume Control: Full with Antenna Disconnected

| Tube | Function | Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 6D6 | R.F. Amp. | 0 | 200 | 75 | 6.2* | 6.2* | 5.5 | - | - | 0 |
| 6A7 | Converter | 5.5 | 200 | 75 | 105 | -1.5 | 5 | 0 | - | 0 |
| 6D6 | I.F. | 0 | 200 | 75 | 6.2* | 6.2* | 5.5 | - | - | 0 |
| 6Q7 | 2nd Det. AVC 1st Audio | 0 | 0 | 7.2 | .1 | .1 | .1 | 5.6 | 1.2 | 0 |
| 41 | P.A. | 5.6 | 195 | 200 | -.3 | 0 | 0 | - | - | - |
| OZ4 | Rectifier | 0 | 0 | 290** | 0 | 290** | 0 | 0 | 205 | - |

*Or 8.6 volts depending on position of sensitivity switch.
**AC volts.

## ALIGNMENT

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | I.F. | 6A7 Grid | .1 mf. | 262 | Closed | 2 trimmers | 2nd I.F. |
| | | | | | | 2 trimmers | 1st I.F. |
| 2 | Broad. Osc. | Ant. | 250 mmf. | 1580 | Open | Osc. | Adj. to max. |
| 3 | Broad. Ant. & R.F. | Ant. | 250 mmf. | 1400 | 1400 | Ant. | Adj. to max. |
| | | | | | | R.F. | Adj. to max. |
| 4 | Check sensitivity at 1000 KC and 600 KC. | | | | | | |
| 5 | Check operations 1 to 4 inclusive. | | | | | | |

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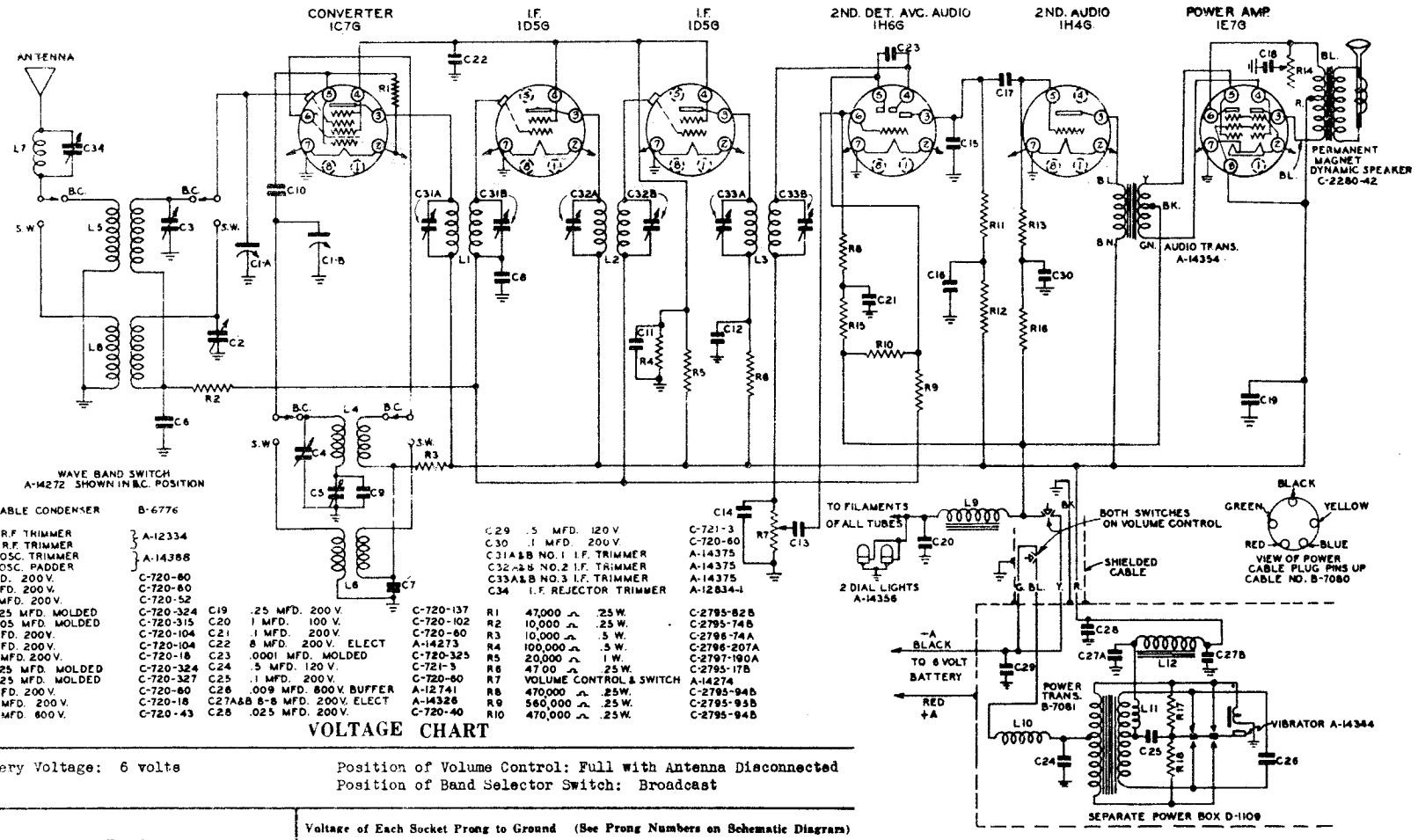
MODELS 637-6, 687-6
Schematic, Voltage




C1-A&B VARIABLE CONDENSER B-6776

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| C2 | S.W. R.F. TRIMMER | A-12334 | C19 | .25 MFD. 200 V. | C-720-137 | R1 | 47,000 Ω .25 W. C-2795-82B |
| C3 | B.C. R.F. TRIMMER | | C20 | .1 MFD. 100 V. | C-720-102 | R2 | 10,000 Ω .25 W. C-2795-74B |
| C4 | B.C. OSC. TRIMMER | A-14388 | C21 | .1 MFD. 200 V. | C-720-60 | R3 | 10,000 Ω .5 W. C-2796-74A |
| C5 | B.C. OSC. PADDER | | C22 | 8 MFD. 200 V. ELECT | A-14273 | R4 | 100,000 Ω .5 W. C-2796-207A |
| C6 | .1 MFD. 200 V. | C-720-60 | C23 | .0001 MFD. MOLDED | C-720-325 | R5 | 20,000 Ω 1 W. C-2797-190A |
| C7 | .1 MFD. 200 V. | C-720-60 | C24 | .5 MFD. 120 V. | C-721-3 | R6 | 47.00 Ω .25 W. C-2795-17B |
| C8 | .05 MFD. 200 V. | C-720-52 | C25 | .1 MFD. 200 V. | C-720-60 | R7 | VOLUME CONTROL & SWITCH A-14274 |
| C9 | .00025 MFD. MOLDED | C-720-324 | C26 | .009 MFD. 600 V. BUFFER | A-12741 | R8 | 470,000 Ω .25 W. C-2795-94B |
| C10 | .00005 MFD. MOLDED | C-720-315 | C27A&B | 8-8 MFD. 200 V. ELECT | A-14326 | R9 | 560,000 Ω .25 W. C-2795-95B |
| C11 | .5 MFD. 200 V. | C-720-104 | C28 | .025 MFD. 200 V. | C-720-40 | R10 | 470,000 Ω .25 W. C-2795-94B |
| C12 | .5 MFD. 200 V. | C-720-104 | | | | | |
| C13 | .02 MFD. 200 V. | C-720-18 | | | | | |
| C14 | .00025 MFD. MOLDED | C-720-324 | | | | | |
| C15 | .00025 MFD. MOLDED | C-720-327 | | | | | |
| C16 | .1 MFD. 200 V. | C-720-60 | | | | | |
| C17 | .02 MFD. 200 V. | C-720-18 | | | | | |
| C18 | .03 MFD. 600 V. | C-720-43 | | | | | |

| | | |
|---|---|---|
| C29 | .5 MFD. 120 V. | C-721-3 |
| C30 | .1 MFD. 200 V. | C-720-60 |
| C31A&B | NO.1 I.F. TRIMMER | A-14375 |
| C32A&B | NO.2 I.F. TRIMMER | A-14375 |
| C33A&B | NO.3 I.F. TRIMMER | A-14375 |
| C34 | I.F. REJECTOR TRIMMER | A-12834-1 |

| | | |
|---|---|---|
| R11 | 270,000 Ω .25 W. | C-2795-91B |
| R12 | 270,000 Ω .25 W. | C-2795-91B |
| R13 | 470,000 Ω .25 W. | C-2795-94B |
| R14 | TONE CONTROL | A-12967 |
| R15 | 470,000 Ω .25 W. | C-2795-94B |
| R16 | 220,000 Ω .25 W. | C-2795-90B |
| R17 | 150 Ω .5 W. | C-2796-8A |
| R18 | 150 Ω .5 W. | C-2796-8A |

| | | |
|---|---|---|
| L1 | NO.1 I.F. COIL | A-12064-14 |
| L2 | NO.2 I.F. COIL | A-12064-14 |
| L3 | NO.3 I.F. COIL | A-12064-15 |
| L4 | B.C. OSC. COIL | A-12055-7 |
| L5 | B.C. R.F. COIL | A-12056-4 |
| L6 | S.W. OSC. COIL | A-12062-11 |
| L7 | I.F. REJECTOR COIL | A-12666-3 |
| L8 | S.W. R.F. COIL | A-12061-5 |
| L9 | CHOKE COIL | A-14353 |
| L10 | R.F. CHOKE COIL | A-14351 |
| L11 | R.F. CHOKE COIL | A-12666-1 |
| L12 | FILTER CHOKE | A-12597 |

## VOLTAGE CHART

"A" Battery Voltage: 6 volts

Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

| Tube | Function | Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 | Grid Cap |
| 1C7G | Converter | - | 0 | 112 | 60 | .05† | 107 | 2 | - | .05† |
| 1D5G | First I-F Amplifier | - | 0 | 112 | 47 | - | - | 2 | - | .06† |
| 1D5G | Second I-F Amplifier | - | 0 | 108 | 48 | - | - | 2 | - | .05† |
| 1H6G | Det-AVC-1st A-F Amplifier | - | 0 | .2 | 0 | .04† | * | 2 | - | - |
| 1H4G | Second A-F Amplifier | - | 0 | 112 | - | * | - | 2 | - | - |
| 1E7G | Power Amplifier | - | - | 122 | 5.2 | 5.2 | 122 | 2 | 122 | - |

Notes: Voltage readings are for schematic diagram shown on back of this page. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits, except as noted below. All measurements made with Weston Selective Analyzer No. 665, Type 2.

* Cannot be measured with Weston Selective Analyzer No. 665, Type 2.
† 1 volt D-c scale

(ORIGINAL) EFFECTIVE DEC 28, 1936

## SPARTON SUPERHETERODYNE MODEL 637-6 & 687-6
## INTERMEDIATE FREQUENCY 456 K.C.

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Note: For proper alignment of these chasses, the procedure should be followed in the same order as given.

The dial pointer should be exactly parallel with the horizontal line of the dial scale when the condenser plates are fully meshed. If the pointer does not read correctly, loosen the two small set screws directly back of the diffusion disc and dial drum, hold the rotor plates fully meshed with the stator plates and set the pointer so that it is parallel with the horizontal lines on the kilocycle scale, then tighten the set screws.

IMPORTANT: Alignment of these models should not be attempted unless the voltage is maintained by a fully charged 6-volt storage battery.

## A. Alignment of Intermediate-Frequency Stages

1. Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

2. Turn the band selector switch to the broadcast position and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

3. Connect "antenna" of test oscillator to grid cap of Type 1C7G converter tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 1E7G tube to ground.

Note: It is advisable to read carefully the operating instructions included with the test oscillator being used in the alignment procedure.

4. Tune test oscillator to obtain a signal of 456 kilocycles.

5. Turn the volume control of receiver on full and adjust I-F condensers which are reached from the top of the chassis.

Note: Care should be taken when adjusting the I-F stages in order to insure proper and accurate adjustment.

6. Disconnect "antenna" lead of test oscillator from grid cap of converter tube Type 1E7G and connect to the antenna terminal of the chassis.

7. Tune test oscillator to a frequency of 456 kilocycles and adjust condenser C34*(reached from back of the chassis) to a point where the output of the receiver is at an absolute minimum. *C7 in Models 527-2, 587-2

Note: This condenser is the adjustment for the code rejector circuit and must be very carefully adjusted if best performance of the receiver is to be expected.

## B. Alignment of Broadcast Band

1. Connect 150 mmf. dummy antenna in series with the antenna lead, tune test oscillator and receiver to a frequency of 1500 kilocycles and adjust condensers C4 (broadcast band oscillator trimmer) and C3*(broadcast antenna trimmer) reached from the bottom of the chassis.
*C2 in Models 527-2, 587-2

2. Tune test oscillator and receiver to 600 kilocycles and adjust condenser C5 (broadcast oscillator padder) reached from the front of the chassis.

3. Retune test oscillator and receiver to 1500 kilocycles and check adjustments of condenser C4 and condenser C3*. Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.* C2 in Models 527-2, 587-2

## C. Alignment of Short-Wave Band

1. Turn the band selector switch to the short wave or "foreign" band.

2. Remove the 150 mmf. condenser from the test oscillator "antenna" lead and replace with a 400 ohm non-inductive resistor dummy antenna.

3. Tune test oscillator and receiver to a frequency of 15,000 kilocycles (15 megacycles) and adjust condenser C2*(short-wave antenna trimmer) reached from the bottom of the chassis. *C3 in Models 527-2, 587-2.

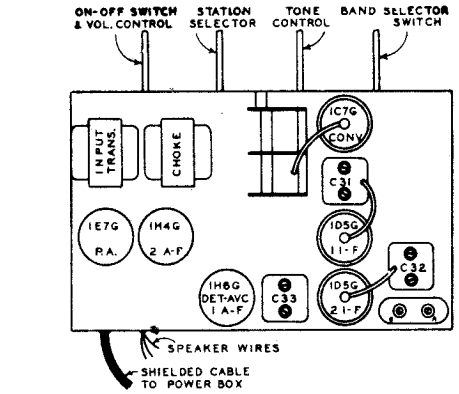
Caution: On this band care must be taken to adjust this condenser to the fundamental of the 15 megacycle signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver.

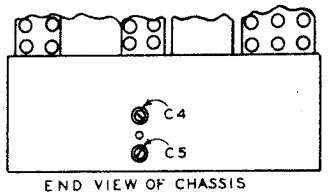
A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condenser for that band has probably been adjusted to the image instead of to the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector of the receiver to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore, a signal of this frequency may be found with the test oscillator generating a 15,000 kilocycle signal.

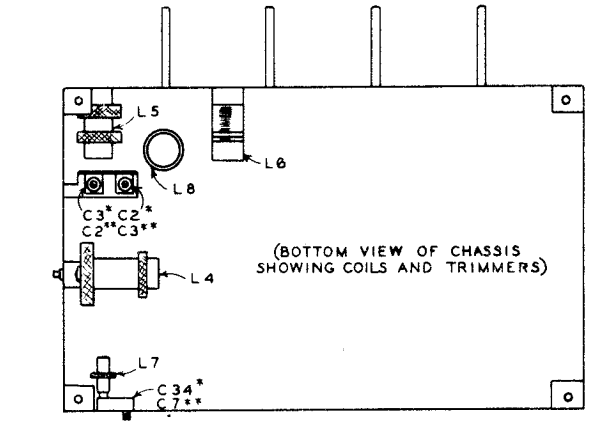
Note: There are no other trimmers for the short-wave or foreign band.

Important: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.




END VIEW OF CHASSIS




(BOTTOM VIEW OF CHASSIS SHOWING COILS AND TRIMMERS)

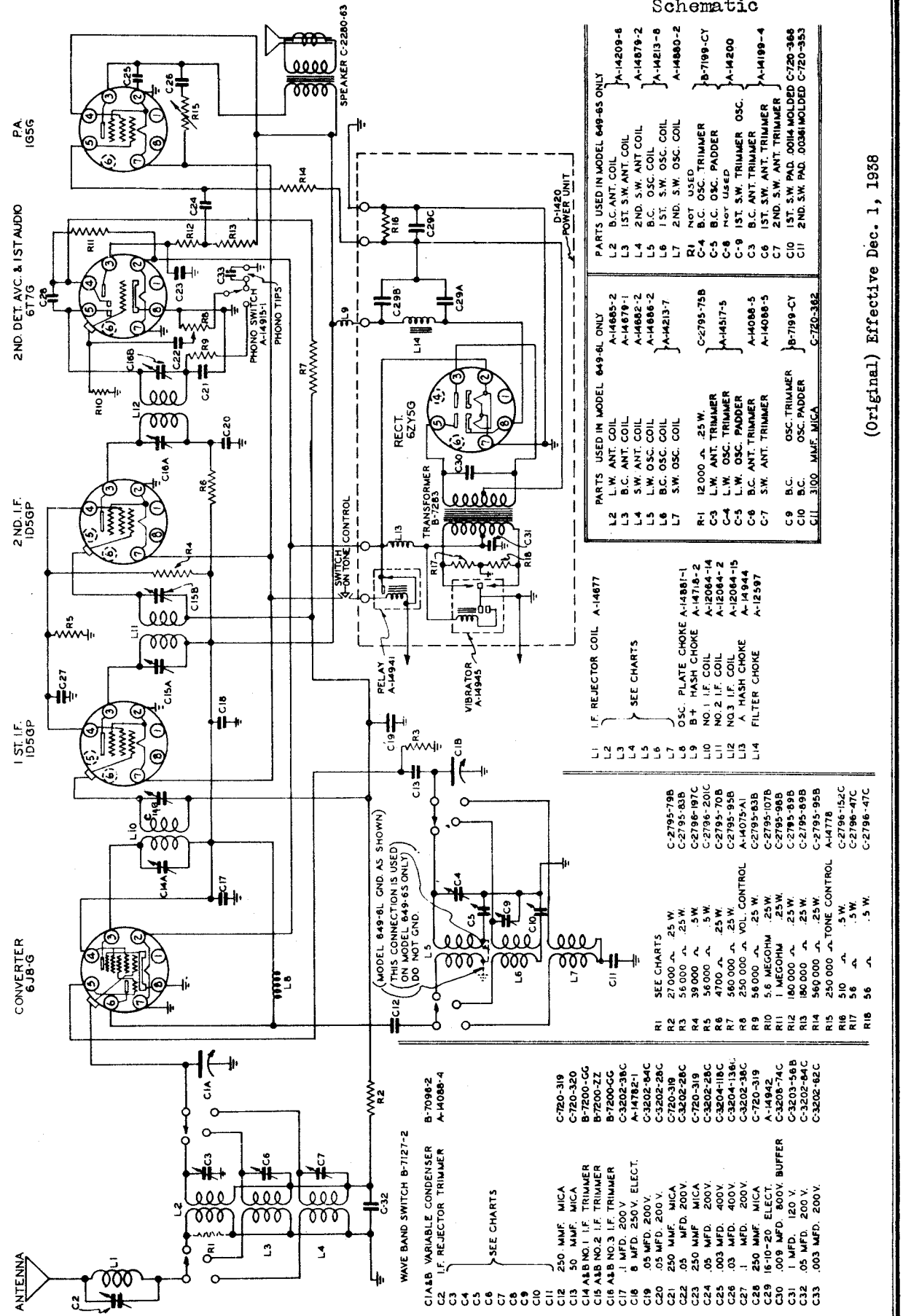
* MODELS 637-6 & 687-6
** MODELS 527-2 & 587-2

# SPARKS WITHINGTON CO.

## MODELS 649-6L, 649-6S
Schematic

## SPARTON SUPERHETERODYNE MODELS 649-6S & 649-6L
## INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS




| | | |
|---|---|---|
| C1A&B | VARIABLE CONDENSER | B-7096-2 |
| C2 | I.F. REJECTOR TRIMMER | A-14088-4 |
| C3 | | SEE CHARTS |
| C4 | | |
| C5 | | |
| C6 | | |
| C7 | | |
| C8 | | |
| C9 | | |
| C10 | | |
| C11 | 250 MMF. MICA | C-720-319 |
| C12 | 50 MMF. MICA | C-720-320 |
| C13 A&B | NO. 1 I.F. TRIMMER | B-7200-GG |
| C14 A&B | NO. 2 I.F. TRIMMER | B-7200-ZZ |
| C15 A&B | NO. 3 I.F. TRIMMER | B-7200-GG |
| C16 A&B | .1 MFD. 200 V | C-3202-38C |
| C17 | 8 MFD. 250 V. ELECT. | A-14782-1 |
| C18 | .05 MFD. 200 V. | C-3202-84C |
| C19 | .05 MFD. 200 V. | C-3202-28C |
| C20 | 250 MMF. MICA | C-720-319 |
| C21 | .05 MFD. 200 V. | C-3202-28C |
| C22 | 250 MMF MICA | C-720-319 |
| C23 | .05 MFD. 200 V. | C-3202-28C |
| C24 | .003 MFD. 400 V. | C-3204-118C |
| C25 | .03 MFD. 400 V. | C-3204-136C |
| C26 | .1 MFD. 200 V. | C-3202-38C |
| C27 | 250 MMF. MICA | C-720-319 |
| C28 | 16-10-20 ELECT. | A-14942 |
| C29 | .009 MFD. 800 V. BUFFER | C-3208-74C |
| C30 | 1 MFD. 120 V. | C-3203-56B |
| C31 | .05 MFD. 200 V. | C-3202-84C |
| C32 | .003 MFD. 200 V. | C-3202-62C |

| | | | |
|---|---|---|---|
| R1 | SEE CHARTS | | C-2795-79B |
| R2 | 27 000 Ω | .25 W. | C-2795-83B |
| R3 | 56 000 Ω | .25 W. | C-2796-197C |
| R4 | 39 000 Ω | .5 W. | C-2796-201C |
| R5 | 56 000 Ω | .5 W. | C-2795-70B |
| R6 | 4700 Ω | .25 W. | C-2795-95B |
| R7 | 560 000 Ω | .25 W. | A-14075-A1 |
| R8 | 250 000 Ω | VOL. CONTROL | C-2795-83B |
| R9 | 56 000 Ω | .25 W. | C-2795-107B |
| R10 | 5.6 MEGOHM | .25 W. | C-2795-98B |
| R11 | 1 MEGOHM | .25 W. | C-2795-89B |
| R12 | 180 000 Ω | .25 W. | C-2795-89B |
| R13 | 180 000 Ω | .25 W. | C-2795-89B |
| R14 | 560 000 Ω | .25 W. | C-2795-95B |
| R15 | 250 000 Ω | TONE CONTROL | A-14778 |
| R16 | 510 Ω | .5 W. | C-2796-152C |
| R17 | 56 Ω | .5 W. | C-2796-47C |
| R18 | 56 Ω | .5 W. | C-2796-47C |

| | | |
|---|---|---|
| L1 | I.F. REJECTOR COIL | A-14677 |
| L2 | | |
| L3 | | |
| L4 | | SEE CHARTS |
| L5 | | |
| L6 | | |
| L7 | | |
| L8 | OSC. PLATE CHOKE | A-14881-1 |
| L9 | B+ HASH CHOKE | A-14718-2 |
| L10 | NO. 1 I.F. COIL | A-12084-14 |
| L11 | NO. 2 I.F. COIL | A-12084-2 |
| L12 | NO. 3 I.F. COIL | A-12084-15 |
| L13 | A HASH CHOKE | A-14944 |
| L14 | FILTER CHOKE | A-12597 |

| PARTS USED IN MODEL 649-6L ONLY | | | |
|---|---|---|---|
| L2 | L.W. ANT. COIL | A-14685-2 | |
| L3 | B.C. ANT. COIL | A-14879-1 | |
| L4 | S.W. ANT. COIL | A-14882-2 | |
| L5 | L.W. OSC. COIL | A-14886-2 | |
| L6 | B.C. OSC. COIL | A-14213-7 | |
| L7 | S.W. OSC. COIL | | |
| R-1 | 12 000 Ω .25 W. | | |
| C-3 | L.W. ANT. TRIMMER | C-2795-75B | |
| C-4 | L.W. OSC. TRIMMER | A-14317-5 | |
| C-5 | L.W. OSC. PADDER | | |
| C-6 | B.C. ANT. TRIMMER | A-14088-5 | |
| C-7 | S.W. ANT. TRIMMER | A-14088-5 | |
| C-9 | B.C. OSC. PADDER | | B-7199-CY |
| C10 | B.C. OSC. TRIMMER | | B-7199-CY |
| C11 | 3100 MMF. MICA | | C-720-382 |

| PARTS USED IN MODEL 649-6S ONLY | | |
|---|---|---|
| L2 | B.C. ANT. COIL | A-14209-6 |
| L3 | 1ST. S.W. ANT. COIL | |
| L4 | 2ND. S.W. ANT COIL | A-14879-2 |
| L5 | B.C. OSC. COIL | A-14213-8 |
| L6 | 1ST. S.W. OSC. COIL | |
| L7 | 2ND. S.W. OSC. COIL | A-14880-2 |
| R1 | NOT USED | |
| C-4 | B.C. OSC. TRIMMER | B-7199-CY |
| C-5 | B.C. OSC. PADDER | |
| C-8 | NOT USED | A-14200 |
| C-9 | 1ST. S.W. TRIMMER OSC. | |
| C3 | B.C. ANT. TRIMMER | A-14199-4 |
| C6 | 1ST. S.W. ANT. TRIMMER | |
| C7 | 2ND. S.W. ANT. TRIMMER | |
| C10 | 1ST. S.W. PAD. .0014 MOLDED | C-720-368 |
| C11 | 2ND. S.W. PAD. .0036 MOLDED | C-720-353 |

(Original) Effective Dec. 1, 1938

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MODELS 649-6L,649-6S
Voltage,Socket,Chassis

SPARKS WITHINGTON CO.

# Sparton Superheterodyne Models

## 649-6L 649-6S

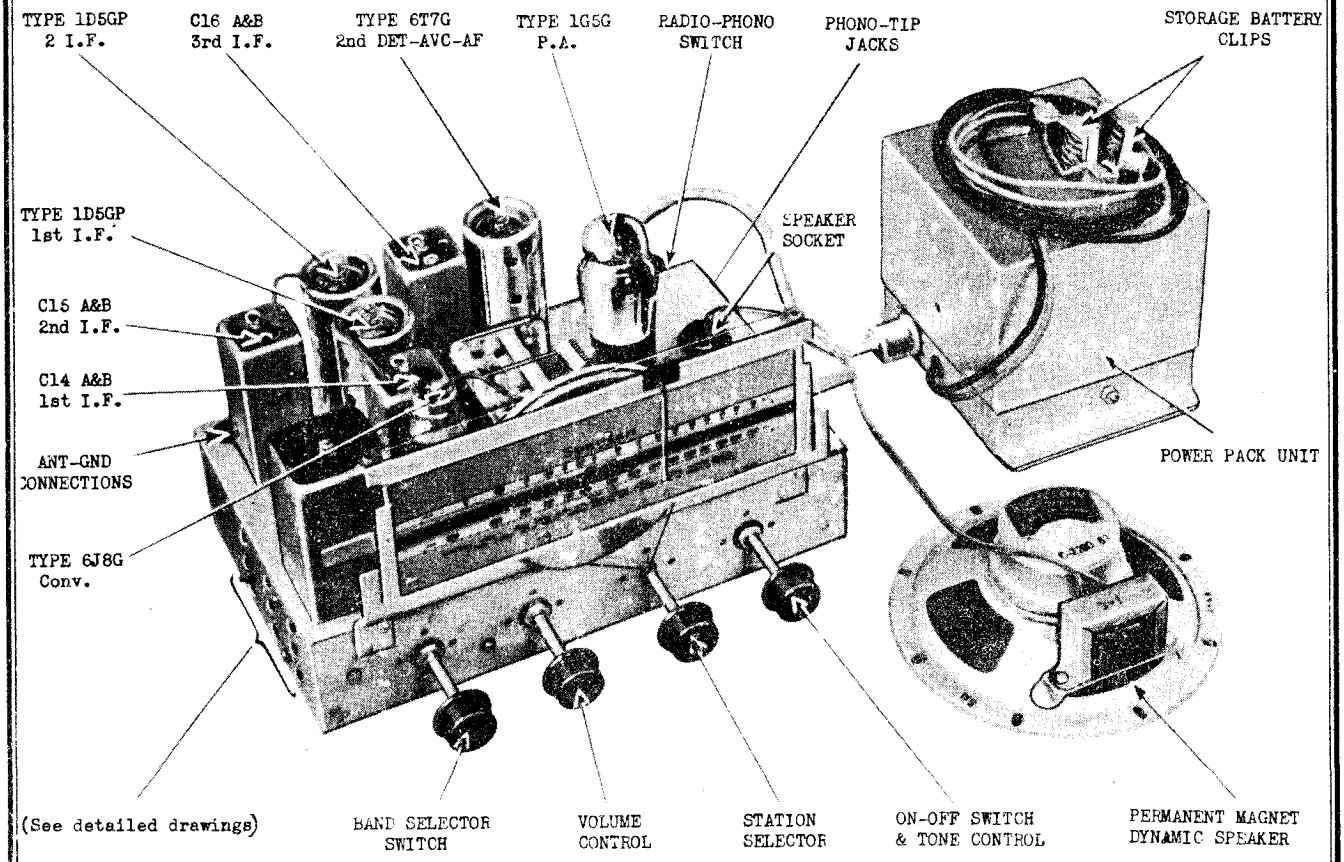
### VOLTAGE CHART

Battery Condition: Good
Battery Voltage: 6.3 volts

Position of Volume Control: Full with Antenna Disconnected
Band Selector Switch: Broadcast

| Tube | Function | Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 6J8G | Converter | 0 | 6.2 | 140 | 140 | -14 | 140 | 0 | 0 | .14 |
| 1D5GP | 1st I-F Amp. | 0 | 0 | 140 | 49 | 140 | - | 2.4 | 0 | .2 |
| 1D5GP | 2nd I-F Amp. | 0 | 2.4 | 130 | 49 | 0 | - | 0 | 0 | .2 |
| 6T7G | Det-AVC-1st A.F. | 0 | 0 | 3.6 A | -2 B | -2 B | - | 6.2 | 0 | .02 |
| 1G5G | Power Amplifier | 0 | 0 | 133 | 138 | -1 C | - | 2.4 | 0 | - |
| 6ZY5G | Rectifier | 0 | 6.3 | 180* | 0 | 180* | 6 | 0 | 150 | - |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are - DC voltages.
*AC
A - 10 V. Scale B - 25 V. Scale C - 1 V. Scale

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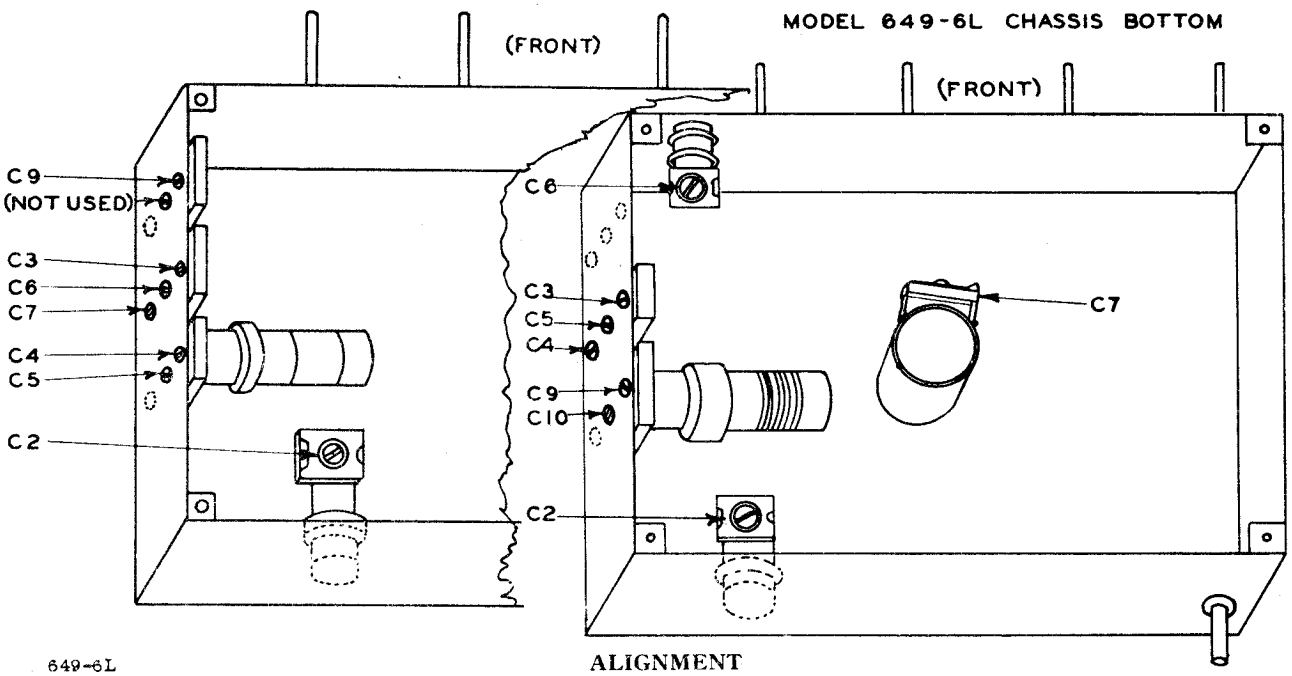
# SPARKS WITHINGTON CO.

MODELS 649-6L, 649-6S
Alignment, Trimmers

MODEL 649-6S CHASSIS BOTTOM




MODEL 649-6L CHASSIS BOTTOM




649-6L

## ALIGNMENT

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | (Set dial pointer to last calibrated mark below 550KC) | | | | | | | |
| 2 | I.F. | 6J8G Grid Cap | .1 mf. | 456 KC | BC | (Open) | C16 A&B<br>C15 A&B<br>C14 A&B | 3rd I.F.T.<br>2nd I.F.T.<br>1st I.F.T. |
| 3 | Rejector | Ant. | 200 mmf. | 456 KC | BC | (Open) | C2 | Adj. to minimum |
| 4 | Broadcast Band | Ant. | 200 mmf. | 1500 KC | BC | 1500 KC | C9 Osc.<br>C6 Ant. | |
| 5 | | | | 600 KC | BC | 600 KC | C10 Pad. | |
| 6 | (Repeat operation 4) | | | | | | | |
| 7 | (Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC) | | | | | | | |
| 8 | Long-Wave Band | Ant. | 200 mmf. | 400 KC | LW | 400 KC | C4 Osc.<br>C3 Ant. | |
| 9 | | | | 150 KC | LW | 150 KC | C5 Pad. | |
| 10 | (Repeat operation 8) | | | | | | | |
| 11 | (Repeat operations 8, 9 and 10 if necessary, to insure accurate alignment) | | | | | | | |
| 12 | (Check calibration and sensitivity at 150 KC, 260 KC and 400 KC) | | | | | | | |
| 13 | Short Wave Band | Ant. | * | 18 MC | SW | 18 MC | C8 Osc.<br>C7 Ant. | Rock dial |
| 14 | (Check calibration and sensitivity at 6 MC, 15 MC and 18 MC) | | | | | | | |

* 200 mmf. condenser and 100 ohm non-inductive resistor in series.

649-6S

## ALIGNMENT

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | (Set dial pointer to last calibrated mark below 550 KC) | | | | | | | |
| 2 | I.F. | 6J8G Grid Cap | .1 mf. | 456 KC | BC | (Open) | C16 A&B<br>C15 A&B<br>C14 A&B | 3rd I.F.T.<br>2nd I.F.T.<br>1st I.F.T. |
| 3 | Rejector | Ant. | 200 mmf. | 456 KC | BC | (Open) | C2 | Adj. to minimum |
| 4 | Broadcast | Ant. | 200 mmf. | 1500 KC | BC | 1500 KC | C4 Osc.<br>C3 Ant. | |
| 5 | Band | | | 600 KC | B.C. | 600 KC | C5 Pad. | |
| 6 | (Repeat operation 4) | | | | | | | |
| 7 | (Check calibration and sensitivity at 600 KC, 1000 KC, & 1500 KC) | | | | | | | |
| 8 | 1st short wave Band | Ant. | * | 7.0 MC | 1 SW | 7.0 MC | C9 Osc.<br>C6 Ant. | |
| 9 | (Check calibration and sensitivity at 2.5 MC, 4.0 MC & 7.0 MC) | | | | | | | |
| 10 | 2nd SW band | Ant. | * | 21.0 MC | 2 SW | 21.0 MC | C7 Ant. | ** |
| 11 | (Check calibration and sensitivity at 7.0 MC, 15 MC & 21 MC) | | | | | | | |

* 200 mmf. condenser and 100 ohm non-inductive resistor in series.

** Rock dial while trimming.

If dial reading is off calibration, some adjustment may be made by moving the oscillator condenser lead toward or away from the chassis base plate.

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## HOW TO ADJUST THE SPARTON SELECTRONNE

### MODELS 1068,1268,1568 ETC. AND 8618.

**NOTE:- Each paragraph refers to all Models unless otherwise indicated.**

Unless the 6H6G Discriminator tube is removed when the Selectronne is adjusted, automatic frequency control will prevent correct trimmer adjustments, with the result that unsatisfactory reception of stations may occur. With the 6H6G Discriminator tube left in the socket, automatic frequency control action will bring in the station and close the Viso-Glo before the trimmers have been completely adjusted.

2. Remove the Selectronne escutcheon plate from the front of the cabinet by means of the two screws. This exposes the steel plate with the slots for holding the station call letter tabs.

(MODELS 1068,1268,1568 ETC. ONLY)
3. The six buttons of the Selectronne are arranged in three groups according to frequency limits - 540 to 900 kc., 700 to 1300 kc. and 1000 to 1500 kc. (See illustration also back cover of Selectronne box). The six tabs corresponding to the six broadcast stations which have been chosen must be arranged in the steel plate so that the frequency (kilocycle) of each station will be included in the frequency limits of the proper group.

For example: A station having a frequency of 610 kc. should be placed in the 540 to 900 kc. group; a station at 950 should be placed in the 700 to 1300 kc. group, etc.

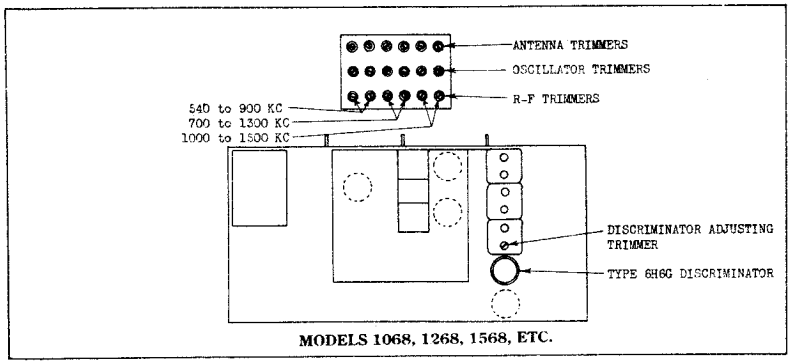
(MODEL 8618 ONLY)
3. The six buttons of the Selectronne are arranged in three groups according to frequency limits - 540 to 750 kc., 700 to 1250 kc. and 1100 to 1500 kc. (See illustration also back cover of Selectronne box). The six tabs corresponding to the six broadcast stations which have been chosen must be arranged in the steel plate so that the frequency (kilocycle) of each station will be included in the frequency limits of the proper group.

(MODEL 8618 ONLY)
For example: A station having a frequency of 610 kc. should be placed in the 540 to 750 kc. group; a station at 950 should be placed in the 700 to 1250 kc. group, etc.

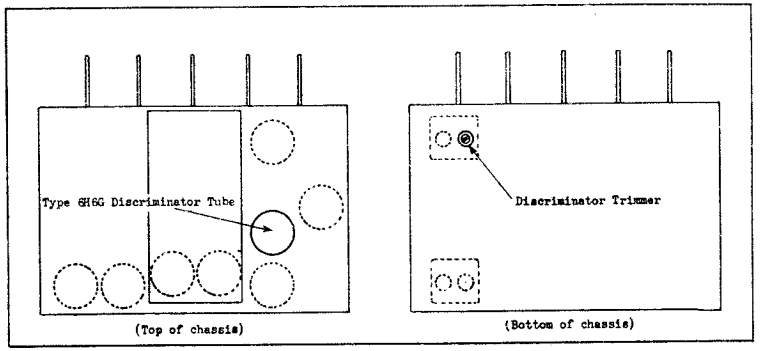
Note: Each group has considerable overlap to allow for the selection of six stations which may have frequency allocations comparatively close together.

4. Remove type 6H6G tube (Discriminator) from chassis (see illustration).

5. Adjust Selectronne trimmers for each one of the six stations as follows:




MODELS 1068, 1268, 1568, ETC.




CHASSIS DIAGRAM OF MODEL 8618

(A) Three trimmers are provided for each one of the six stations. They are reached through the three holes arranged in rows one above the other in the back cover of the Selectronne.

(B) Tune in the station in the usual way using manual tuning, watching the Viso-Glo so that the station will be perfectly "tuned in".

(MODEL 1068,1268,1568 ETC. ONLY)
(C) Push in the band selector switch knob. This will extinguish the dial lights and illuminate the Selectronne Indicator, showing that the Selectronne is now connected.

(MODEL 8618 ONLY)
(C) Turn the band selector switch knob to the extreme left (counter clockwise) to the automatic (Selectronne) position.

(D) Push in the Selectronne button which corresponds to the station just tuned in.

(E) Now from the back of the cabinet, with an ordinary screw-driver adjust the oscillator trimmer (center hole) in the row corresponding to the proper station, until the same station that was tuned in manually is heard. This station may be heard faintly until the remaining trimmers have been adjusted.

It is important that the same station is heard with this adjustment and not some other network station carrying the same program. Screw this trimmer to the right or left until the station is loudest.

Care should be taken in turning the adjusting screws so that they will not become disengaged from the trimmers by being turned out too far.

(MODEL 1068,1268,1568 ETC. ONLY)
(F) In the same manner adjust first the R.F. trimmer (bottom hole) and then the antenna trimmer (top hole) to this same station.

Note: Perfect adjustment of these trimmers is easily obtained by removing the Viso-Glo tube and socket from its clamp and turning the tube toward the back of the cabinet so that every adjustment of the trimmers may be watched in the Viso-Glo. Perfect adjustment is obtained when further turning of the trimmers will not result in any smaller shaded area between the green light sections of the Viso-Glo.

(MODEL 8618 ONLY)
(F) In the same manner adjust to this same station.

(MODEL 8618 ONLY)
NOTE: No Viso-Glo tube is supplied with this model. However, the chassis is wired for, and equipped with, a socket at the back of the chassis, for using a Type 6E5. Operation of this tube will be more easily observed if an extension cable and socket (or right-angle adapter) is used when making tuning adjustments.

(MODEL 8618 ONLY)
(G) Re-adjust the oscillator trimmer (bottom hole) while watching the Viso-Glo to see if the shaded area can be made smaller.

(MODEL 1068,1268,1568 ETC ONLY)
(G) Re-adjust the oscillator trimmer (center hole) while watching the Viso-Glo to see if the shaded area can be made smaller.

(MODEL 1068,1268,1568 ETC. ONLY)
(H) Check the above adjustments by pulling the band switch knob out and without touching the manual tuning controls, observe if the Viso-Glo shows any difference in the amount of shaded area in the tube as compared to the shaded area with the band switch knob pushed in. If the shaded area is larger with the band switch pushed in, readjust the Selectronne trimmers until the shaded area is equal to that obtained with the Band Switch knob pulled out.

6. Repeat the procedure in paragraph 5 for each of the six stations.

7. When all trimmers have been properly adjusted, replace Viso-Glo tube and socket in clamp, replace type 6H6G Discriminator tube and attach Selectronne escutcheon plate to front of cabinet.

8. Any of the six stations to which the SPARTON Selectronne has been adjusted, may now be instantly received simply by pushing the Selectronne button for the desired station with the Band Switch knob pushed in; that is, in the automatic position.

(MODEL 1068,1268 1568 ETC ONLY)
Note: In case all six of the buttons should become depressed through improper manipulation of the Selectronne, simply reach into the Selectronne box (from the back of the cabinet) through the side next to the Viso-Glo, and apply a slight pressure of the fingers under the latching bar which runs across the frame work in front of the trimmer box. This will immediately release all buttons.

(MODEL 8618 ONLY)
NOTE: In case all six of the buttons should become depressed through improper manipulation of the Selectronne, simply apply a slight extra pressure of the fingers to any one of the buttons. This will immediately release all buttons.

WARNING - Never attempt to adjust the Selectronne with the 6H6G Discriminator tube in the socket.

Unless the 6H6G Discriminator tube is removed when the Selectronne is adjusted, automatic frequency control will prevent correct trimmer adjustments, with the result that unsatisfactory reception of stations may occur. With the 6H6G Discriminator tube left in the socket, automatic frequency control action will bring in the station and close the Viso-Glo before the trimmers have been completely adjusted.

IMPORTANT

Always check the discriminator circuit to see if it is in proper adjustment and adjust it if necessary before adjusting the Selectronne.

TO CHECK THE ADJUSTMENT OF THE DISCRIMINATOR CIRCUIT, turn the automatic frequency control (A.F.C.) knob to the "Off" position. Tune in manually a strong station which will nearly close the Viso-Glo. Turn the A.F.C. knob to the "On" position. WATCH THE VISO-GLO. Repeat the procedure from "Off" to "On" several times. The Viso-Glo should show the same position. If there is any variation in the Viso-Glo, it is an indication that the Discriminator circuit is out of adjustment and must be adjusted before any attempt is made to adjust any station on the Selectronne.

IMPORTANT: The Type 6H6G Discriminator tube must be in its socket when adjusting the discriminator circuit, and out of its socket when adjusting the Selectronne trimmers.

TO ADJUST THE DISCRIMINATOR CIRCUIT. it is necessary to remove the chassis from the cabinet. Place the A.F.C. knob in the "Off" position and manually tune in a strong station so that the Viso-Glo closes as much as possible. Then switch the A.F.C. knob to the "On" position. Using an insulated (bakelite) screw-driver, turn the Discriminator circuit trimmer (see diagram on front of sheet) very slightly one way or the other until the Viso-Glo closes as far as possible. Then switch the A.F.C. knob to the "Off" position again. The Viso-Glo should show the same position. If it does not, adjust more accurately.

CAUTION - The blade of the screw driver positively must be an insulated (bakelite) one.

WARNING - Do not attempt to adjust the other trimmers. Only adjust the one shown in the diagram as "Discriminator Trimmer".

JUNE 1938

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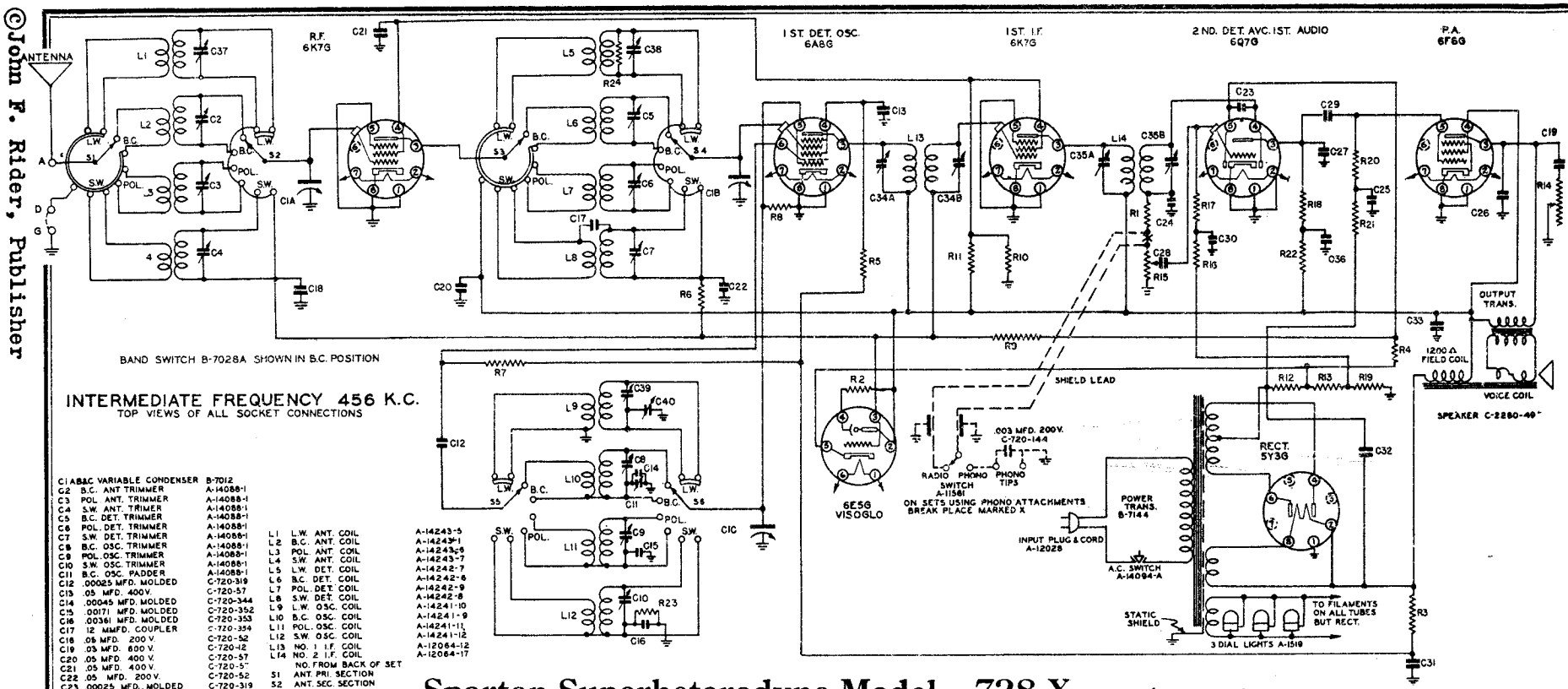



| | | |
|---|---|---|
| C1 | A&C VARIABLE CONDENSER | B-7012 |
| C2 | B.C. ANT TRIMMER | A-14088-1 |
| C3 | POL. ANT. TRIMMER | A-14088-1 |
| C4 | S.W. ANT. TRIMER | A-14088-1 |
| C5 | B.C. DET. TRIMMER | A-14088-1 |
| C6 | POL. DET. TRIMMER | A-14088-1 |
| C7 | S.W. DET. TRIMMER | A-14088-1 |
| C8 | B.C. OSC. TRIMMER | A-14088-1 |
| C9 | POL. OSC. TRIMMER | A-14088-1 |
| C10 | S.W. OSC. TRIMMER | A-14088-1 |
| C11 | B.C. OSC. PADDER | A-14088-1 |
| C12 | .00025 MFD. MOLDED | C-720-319 |
| C13 | .05 MFD. 400V. | C-720-57 |
| C14 | .00045 MFD. MOLDED | C-720-344 |
| C15 | .00171 MFD. MOLDED | C-720-352 |
| C16 | .00361 MFD. MOLDED | C-720-353 |
| C17 | 12 MMFD. COUPLER | C-720-334 |
| C18 | .05 MFD. 200 V. | C-720-52 |
| C19 | .03 MFD. 600 V. | C-720-12 |
| C20 | .05 MFD. 400 V. | C-720-57 |
| C21 | .05 MFD. 400 V. | C-720-57 |
| C22 | .05 MFD. 200 V. | C-720-52 |
| C23 | .00025 MFD., MOLDED | C-720-319 |
| C24 | .0001 MFD. MOLDED | C-720-325 |
| C25 | .1 MFD. 100 V. | C-720-62 |
| C26 | .003 MFD. 600 V. | C-720-153 |
| C27 | .00025 MFD. MOLDED | C-720-319 |
| C28 | .01 MFD. 200 V. | C-720-20 |
| C29 | .05 MFD. 400 V. | C-720-57 |
| C30 | 1 MFD. 100 V. | C-720-62 |
| C31 | .25 MFD. 350 V. ELECT. | A-14403 |
| C32 | 16 MFD 450 V. ELECT. | A-14073 |
| C33 | 30 MFD. 300 V. ELECT. | A-14072 |
| C34A&B | NO. 1 I.F. TRIMMER | A-14404 |
| C35A&B | NO. 2 I.F. TRIMMER | A-14399 |
| C36 | .1 MFD. 400 V. | C-720-61 |
| C37 | L.W. ANT. TRIMMER | A-14088-1 |
| C38 | L.W. DET. TRIMMER | A-14088-1 |
| C39 | L.W. OSC. TRIMMER | A-14088-1 |
| C40 | L.W. OSC. PADDER | A-14088-1 |

| | | |
|---|---|---|
| L1 | L.W. ANT. COIL | A-14243-5 |
| L2 | B.C. ANT. COIL | A-14243-1 |
| L3 | POL. ANT. COIL | A-14243-9 |
| L4 | S.W. ANT. COIL | A-14243-7 |
| L5 | L.W. DET. COIL | A-14242-7 |
| L6 | B.C. DET. COIL | A-14242-6 |
| L7 | POL. DET. COIL | A-14242-9 |
| L8 | S.W. DET. COIL | A-14242-8 |
| L9 | L.W. OSC. COIL | A-14241-10 |
| L10 | B.C. OSC. COIL | A-14241-9 |
| L11 | POL. OSC. COIL | A-14241-11 |
| L12 | S.W. OSC. COIL | A-14241-12 |
| L13 | NO. 1 I.F. COIL | A-12064-12 |
| L14 | NO. 2 I.F. COIL | A-12064-17 |
| | NO. FROM BACK OF SET | |
| S1 | ANT. PRI. SECTION | |
| S2 | ANT. SEC. SECTION | |
| S3 | DET. PRI. SECTION | |
| S4 | DET. SEC. SECTION | |
| S5 | OSC. PLATE SECTION | |
| S6 | OSC. GRID SECTION | |

| | | | |
|---|---|---|---|
| R1 | 56,000 Ω | .25 W. | C-2795-83B |
| R2 | 1 MEGOHM | .25 W. | C-2795-98B |
| R3 | 10,000 Ω | 1 W. | C-2797-74A |
| R4 | 1 MEGOHM | .25 W. | C-2795-98B |
| R5 | 30,000 Ω | .5 W. | C-2796-194A |
| R6 | 100,000 Ω | .25 W. | C-2795-25B |
| R7 | 22,000 Ω | .5 W. | C-2798-78C |
| R8 | 56,000 Ω | .25 W. | C-2795-83B |
| R9 | 470,000 Ω | .25 W. | C-2795-94B |
| R10 | 27,000 Ω | 1 W. | C-2797-79A |
| R11 | 22,000 Ω | 2 W. | C-2798-78A |
| R12 | 200 Ω | 2 W. | C-2798-142A |
| R13 | 8 Ω | .25 W. | B-7103-8 |
| R14 | 1 MEGOHM TONE CONTROL | | A-12987-A |
| R15 | 250,000 Ω VOL. CONTROL | | A-14075-A |
| R16 | 1 MEGOHM | .25 W. | C-2795-98B |
| R17 | 560,000 Ω | .25 W. | C-2795-95B |
| R18 | 270,000 Ω | .25 W. | C-2795-91B |
| R19 | 36 Ω | .25 W. | C-2795-124B |
| R20 | 270,000 Ω | .25 W. | C-2795-91B |
| R21 | 270,000 Ω | .25 W. | C-2795-91B |
| R22 | 100,000 Ω | .25 W. | C-2795-25B |
| R23 | 68,000 Ω | .25 W. | C-2795-24B |
| R24 | 100,000 Ω | .25 W. | C-2795-86B |

# Sparton Superheterodyne Model 728-X

(Original) Effective Jan. 2, 1938

Line Voltage: 115 volts

Position of Volume Control: Full with Antenna Disconnected

## VOLTAGE CHART

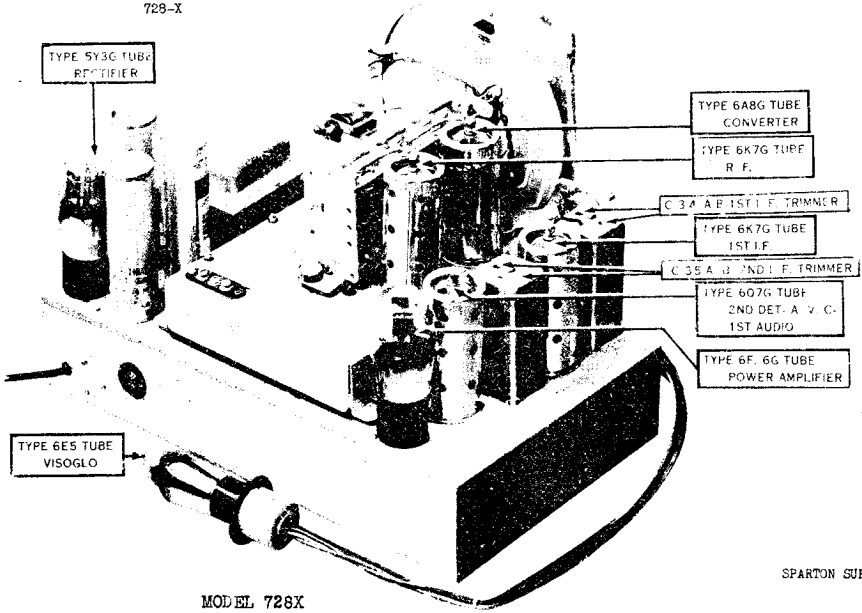
| Tube | Function | Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7* | No. 8 | Grid Cap |
| 6K7G | R.F. | 0 | 0 | 250 | 100 | 0 | - | 6.1 | 0 | -1. |
| 6A8G | 1st Det. Osc. | 0 | 0 | 250 | 109 | -22 | 148 | 6.1 | 0 | -.2 |
| 6K7G | 1st I.F. | 0 | 0 | 250 | 100 | 0 | - | 6.1 | 0 | -.2 |
| 6Q7G | 2nd Det. AVC - 1st Audio | 0 | 0 | 52 | -.2 | -.2 | - | 6.1 | 0 | -.2 |
| 6F6G | P.A. | 0 | 0 | 260 | 250 | -.4 | - | 6.1 | 0 | - |
| 5Y3 | Rect. | 0 | 330* | - | 310* | - | 310* | - | 330* | - |
| 6E5 | Viso-Glo | 6.1 | 1.9 | -2.2 | 250 | -3.3 | 0 | - | - | - |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

SPARKS WITHINGTON CO.



SPARTON SUPERHETERODYNE MODEL
728-X


TYPE 5Y3G TUBE RECTIFIER
TYPE 6A8G TUBE CONVERTER
TYPE 6K7G TUBE R.F.
C 34 A,B 1ST I.F. TRIMMER
TYPE 6K7G TUBE 1ST I.F.
C 35 A,B 2ND I.F. TRIMMER
TYPE 6Q7G TUBE 2ND DET. A.V.C. 1ST AUDIO
TYPE 6F. 6G TUBE POWER AMPLIFIER
TYPE 6E5 TUBE VISOGLO

MODEL 728X

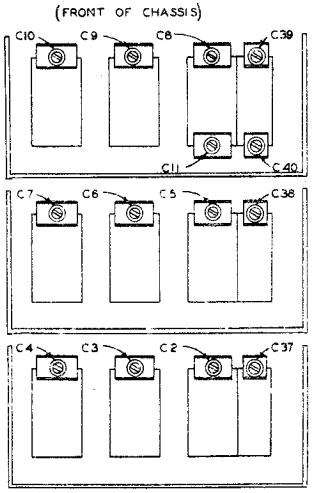
ALIGNMENT (see note)

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | I.F. | Conv. Grid | .1 mf. | 456 | BC | Open | C35A C35B | 2nd I.F. Trans. |
| | | | | | | | C34A C34B | 1st I.F. Trans. |
| 2 | Broadcast Band | Ant. | 200 mmf. | 1500 | BC | 1500 | C8 Osc. | |
| | | | | | | | C5 RF | |
| | | | | | | | C2 Ant. | |
| 3 | | Ant. | 200 mmf. | 600 | BC | 600 | C11 Pad | * |
| 4 | (Repeat operation 2) | | | | | | | |
| 5 | (Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC) | | | | | | | |
| 6 | Long Wave Band | Ant. | 200 mmf. | 400 | L.W. | 400 | C39 Osc. | |
| | | | | | | | C38 RF | |
| | | | | | | | C37 Ant. | |
| 7 | | Ant. | 200 mmf. | 150 | L.W. | 150 | C40 Pad | * |
| 8 | (Repeat operation 6. Also repeat operations 6, 7 and 8 if necessary) | | | | | | | |
| 9 | 1st short wave band | Ant. | 100 ohm 200 mmf. series | 7 MC. | 1st S.W. | 7 MC. | C9 Osc. | |
| | | | | | | | C6 RF | |
| | | | | | | | C3 Ant. | |
| 10 | (Check for calibration and sensitivity at 2.5 MC. and 7 MC.) | | | | | | | |
| 11 | 2nd short wave band | Ant. | 100 ohm 200 mmf. series | 21 MC. | 2nd S.W. | 21 MC. | C10 Osc. | Rock dial slightly while adjusting |
| | | | | | | | C7 RF | |
| | | | | | | | C4 Ant. | |
| 12 | (Check calibration and sensitivity at 8 MC. and 21 MC.) | | | | | | | |
| 13 | (Check operations 1 to 12 inclusive) | | | | | | | |

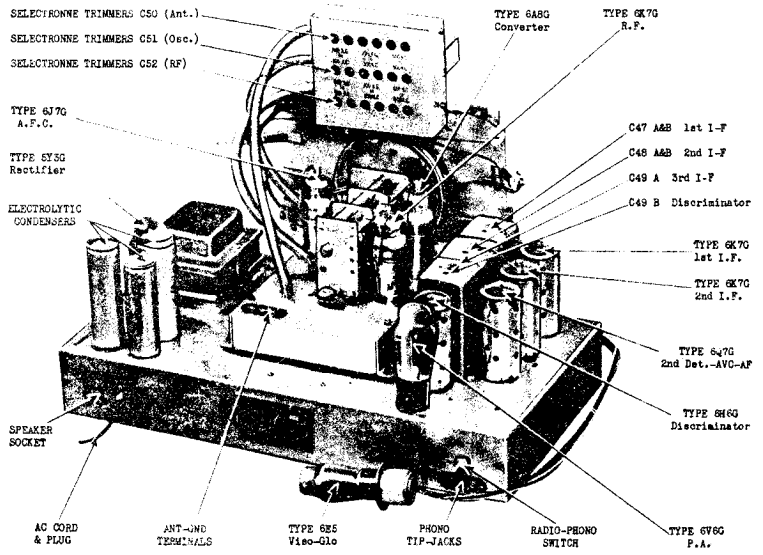
*Rock variable condenser slightly while adjusting for maximum output.

NOTE: Check to see that dial pointer points to last calibrated mark on right hand side of dial when variable condenser rotor plates are fully meshed with stator plates.

MODEL 728X
TRIMMER LOCATIONS
(under chassis)




SPARTON SUPERHETERODYNE MODEL
1089

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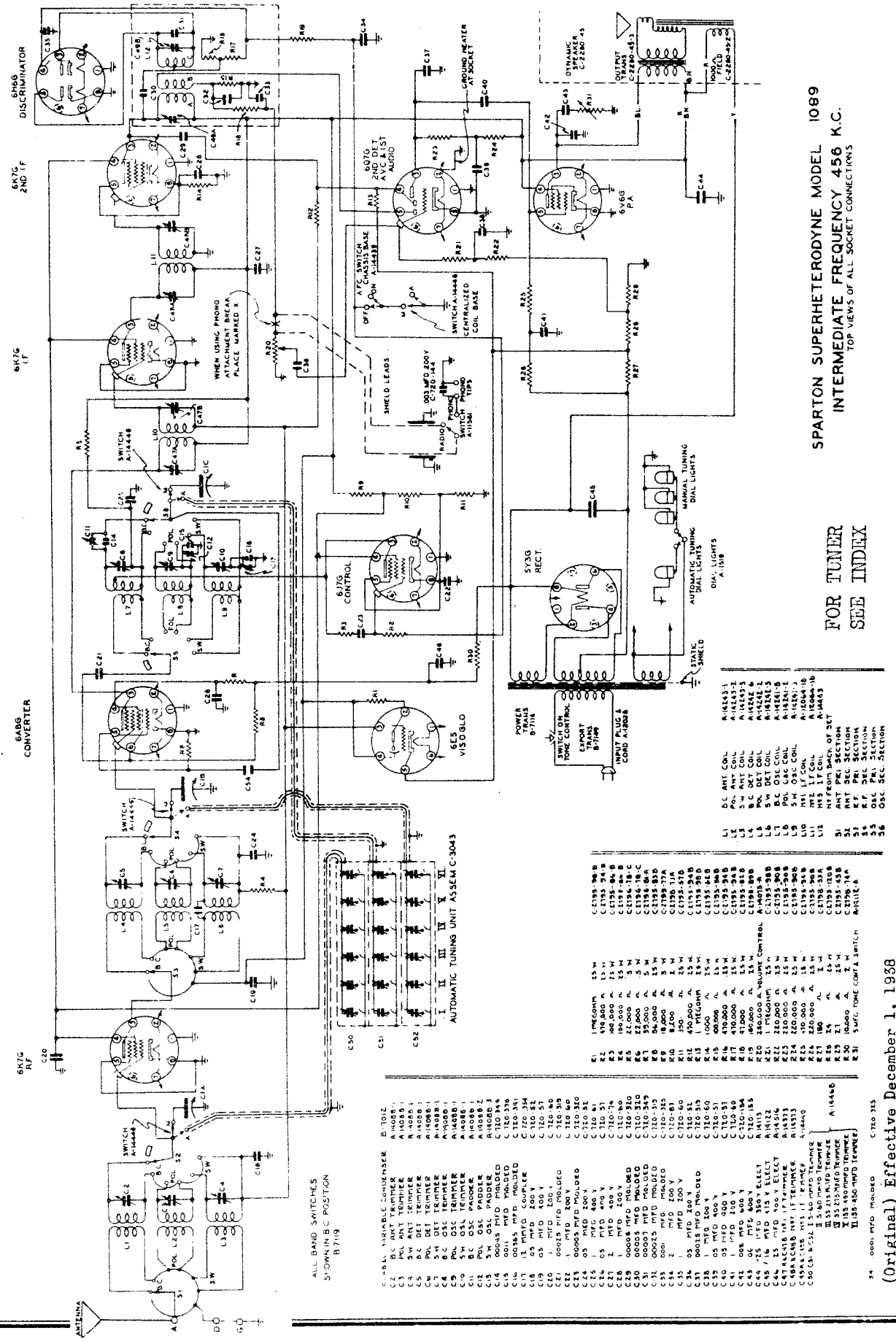
# SPARKS WITHINGTON CO.

MODEL 1089
Schematic


SPARTON SUPERHETERODYNE MODEL 1089
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS
FOR TUNER SEE INDEX
6H6G DISCRIMINATOR
6K7G 2ND I.F.
6K7G I.F.
6A8G CONVERTER
6K7G R.F.
6G7G 2ND DET. AVC & 1ST AUDIO
6J7G CONTROL
6E5 VISOGLO
5Y3G RECT.
6V6G P.A.
DYNAMIC SPEAKER C-2280-45
OUTPUT TRANS C-2280-453
POWER TRANS B-7114
EXPORT TRANS B-7149
INPUT PLUG & CORD A-1828
SWITCH TONE CONTROL
AUTOMATIC TUNING DIAL LIGHTS
MANUAL TUNING DIAL LIGHTS
DIAL LIGHTS A-1318
STATIC SHIELD
GROUND HEATER AT SOCKET
AFC SWITCH CENTRALIZED COIL BASE A-14448
SWITCH A-14448
SWITCH A-14448 CENTRALIZED COIL BASE
SHIELD LEADS
.003 MFD 200V C-720-144
PHONO SWITCH A-11368
WHEN USING PHONO ATTACHMENT BREAK PLACE MARKED X
ALL BAND SWITCHES SHOWN IN B.C. POSITION B-7119
AUTOMATIC TUNING UNIT ASSEM C-3043
ANTENNA
L1 B.C. ANT COIL A-14433-1
L2 POL. ANT COIL A-14433-2
L3 S.W. ANT COIL A-14433-3
L4 B.C. DET COIL A-14424-6
L5 POL. DET COIL A-14424-2
L6 S.W. DET COIL A-14424-3
L7 B.C. OSC COIL A-14424-B
L8 POL. OSC COIL A-14424-C
L9 S.W. OSC COIL A-14424-D
L10 I.F. COIL A-12644-1B
L11 I.F. COIL A-12644-1B
L12 I.F. COIL A-14443
NOTE FROM BACK OF SET
S1 ANT. PRI. SECTION
S2 ANT. SEC. SECTION
S3 R.F. PRI. SECTION
S4 R.F. SEC. SECTION
S5 OSC. PRI. SECTION
S6 OSC. SEC. SECTION
R1 1 MEGOHM 1/2 W C-2195-968
R2 470,000 Ω 1/2 W C-2195-949
R3 100,000 Ω 1/2 W C-2195-845
R4 47,000 Ω 1/2 W C-2195-825
R5 22,000 Ω 1/2 W C-2196-18-C
R6 22,000 Ω .5 W C-2196-18-A
R7 33,000 Ω .5 W C-2195-830
R8 56,000 Ω 1/2 W C-2195-830
R9 18,000 Ω 1/2 W C-2799-77A
R10 2,200 Ω 1/2 W C-2195-774
R11 350 Ω 1/2 W C-2195-670
R12 470,000 Ω 1/2 W C-2195-949
R13 1 MEGOHM 1/2 W C-2195-968
R14 1000 Ω 1/2 W C-2195-828
R15 68,000 Ω 1/2 W C-2195-840
R16 470,000 Ω 1/2 W C-2195-949
R17 470,000 Ω 1/2 W C-2195-949
R18 470,000 Ω 1/2 W C-2195-949
R19 180,000 Ω 1/2 W C-2195-898
R20 250,000 Ω VOLUME CONTROL A-14013-A
R21 1 MEGOHM 1/2 W C-2195-980
R22 220,000 Ω 1/2 W C-2195-908
R23 220,000 Ω 1/2 W C-2195-908
R24 220,000 Ω 1/2 W C-2195-908
R25 470,000 Ω 1/2 W C-2195-949
R26 220,000 Ω 1/2 W C-2195-908
R27 180 Ω 1/2 W C-2196-33A
R28 24 Ω 1/2 W C-2799-120B
R29 21 Ω 1/2 W C-2195-438
R30 10,000 Ω 2 W C-2196-74A
R31 5 MFD TONE CONT & SWITCH A-14416-A
C1 .0001 MFD MOLDED C-720-325
C2 B.C. ANT TRIMMER A-14068-1
C3 POL ANT TRIMMER A-14068-1
C4 S.W. ANT TRIMMER A-14068-1
C5 B.C. DET TRIMMER A-14068-1
C6 POL DET TRIMMER A-14068-1
C7 S.W. DET TRIMMER A-14068-1
C8 B.C. OSC TRIMMER A-14068-1
C9 POL OSC TRIMMER A-14068-1
C10 S.W. OSC TRIMMER A-14068-1
C11 B.C. OSC PADDER A-14068-3
C12 POL OSC PADDER A-14068-4
C13 S.W. OSC PADDER A-14068-5
C14 .00045 MFD MOLDED C-720-344
C15 .001 MFD MOLDED C-720-336
C16 .00365 MFD MOLDED C-720-341
C17 .11 MMFD COUPLER C-720-384
C18 .05 MFD 200 V C-720-82
C19 .05 MFD 400 V C-720-51
C20 .1 MFD 200 V C-720-60
C21 .00015 MFD MOLDED C-720-340
C22 .1 MFD 200 V C-720-60
C23 .00005 MFD MOLDED C-720-330
C24 .05 MFD 400 V C-720-51
C25 .1 MFD 400 V C-720-54
C26 .1 MFD 200 V C-720-60
C27 .00008 MFD MOLDED C-720-330
C28 .1 MFD 200 V C-720-60
C29 .00008 MFD MOLDED C-720-330
C30 .00005 MFD MOLDED C-720-310
C31 .00007 MFD MOLDED C-720-349
C32 .00025 MFD MOLDED C-720-315
C33 .2 MFD 200 V C-720-325
C34 .05 MFD 200 V C-720-60
C35 .05 MFD 400 V C-720-51
C36 .05 MFD 400 V C-720-51
C37 .05 MFD 400 V C-720-51
C38 .006 MFD 600 V C-720-184
C39 .06 MFD 600 V C-720-185
C40 .25 MFD 350 V ELECT A-14013
C41 .25 MFD 400 V ELECT A-14122
C42 .1 MFD 400 V ELECT A-14516
C43 .05 MFD 400 V ELECT A-14513
C44 .1 MFD 400 V ELECT A-14513
C45 A-14438 MMFD TRIMMER A-14440
C46 A-14434 MMFD TRIMMER A-14440
C47 A-14435 MMFD TRIMMER A-14440
C48 A-14436 MMFD TRIMMER A-14440
C49 A-14437 MMFD TRIMMER A-14440
C50 C51 C52 II-360 MMFD TRIMMER
II-355 215 MMFD TRIMMER
II-355 215 MMFD TRIMMER
II-355 450 MMFD TRIMMER
II-355 450 MMFD TRIMMER

(Original) Effective December 1, 1938

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MODEL 1089
Voltage, Alignment
Trimmers

# SPARKS WITHINGTON CO.

Viso-Glo tube in socket
AFC Switch "OFF"

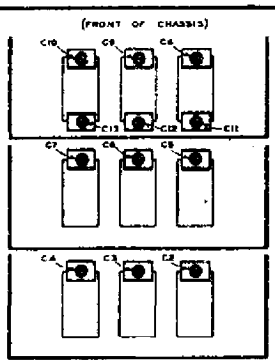
## ALIGNMENT (see note)

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | I.F. | Conv. Grid | .1 mf. | 456 | BC | Open | C47 A,B | 1st I.F. Trans. |
| | | | | | | | C48 A,B | 2nd I.F. Trans. |
| | | | | | | | C48 A | 3rd I.F. (Pri.) |
| 2 | Discrim. | Conv. Grid | .1 mf. | 456 | BC | Open | C49 B | Adjust to minimum |
| 3 | Broadcast Band | Ant. | 200 mmf. | 1500 | BC | 1500 | C8 Osc. | |
| | | | | | | | C5 RF | |
| | | | | | | | C2 Ant. | |
| 4 | | Ant. | 200 mmf. | 600 | BC | 600 | C11 Pad | |
| 5 | (Repeat operation 5) | | | | | | | |
| 6 | (Check calibration and sensitivity 1500 KC, 900 KC and 600 KC) * | | | | | | | |
| 7 | 1st Short Wave | Ant. | 100 ohm 200 mmf. series | 6 MC. | 1st S.W. | 6 MC. | C9 Osc. | |
| | | | | | | | C6 RF | |
| | | | | | | | C3 Ant. | |
| 8 | | Ant. | 200 mmf. | 1.95 MC. | 1st S.W. | 1.95 MC. | C12 Pad | |
| 9 | (Repeat operation 7) | | | | | | | |
| 10 | (Check calibration and sensitivity at 6 MC. and 1.95 MC.) | | | | | | | |
| 11 | 2nd Short-Wave Band | Ant. | 100 ohm 200 mmf. series | 18 MC. | 2nd S.W. | 18 MC. | C10 Osc. | Rock dial slightly while adjusting |
| | | | | | | | C7 R.F. | |
| | | | | | | | C4 Ant. | |
| 12 | | Ant. | | 6 MC. | 2nd S.W. | 6 MC. | C13 Pad | |
| 13 | (Repeat operation 11) | | | | | | | |
| 14 | (Check calibration and sensitivity at 18 MC. and 6 MC.) | | | | | | | |
| 15 | (Check operations 1 to 14 inclusive) | | | | | | | |

* Check AFC by connecting generator to converter grid cap and tuning generator and receiver to 1500 KC. Note output meter reading with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

TRIMMER LOCATIONS
(under chassis)




## VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected

| Tube | Function | Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7* | No. 8 | Grid Cap |
| 6K7G | R.F. | 0 | 0 | 300 | 75 | 0 | - | 6.3 | 0 | -.2 |
| 6A8G | Converter | 0 | 0 | 300 | 91 | -5.5 | 135 | 6.3 | 0 | -.2 |
| 6K7G | I.F. | 0 | 0 | 300 | 75 | 0 | - | 6.3 | 0 | -2.6 |
| 6K7G | 2nd I.F. | 0 | 0 | 300 | 75 | 4 | - | 6.3 | 4.1 | 0 |
| 6H6G | Discriminator | 0 | 0 | .5 | 0 | .5 | - | 6.3 | 0 | - |
| 6J7G | A.F.C. | 0 | 0 | 300 | 85 | 4.5 | - | 6.3 | 4.4 | 0 |
| 6Q7G | 2nd Det. AVC-1st audio | 0 | 0 | 100 | -.2 | -.1 | - | 6.3 | 0 | 0 |
| 6V6G | P.A. | 0 | 0 | 275 | 290 | .5 | .6 | 6.3 | 0 | - |
| 5Y3G | Rect. | - | 350* | - | 350* | - | 350* | - | 350* | - |
| 6E5 | Viso-Glo | 6.3 | 50 | -3 | 280 | -4 | 0 | - | - | - |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.

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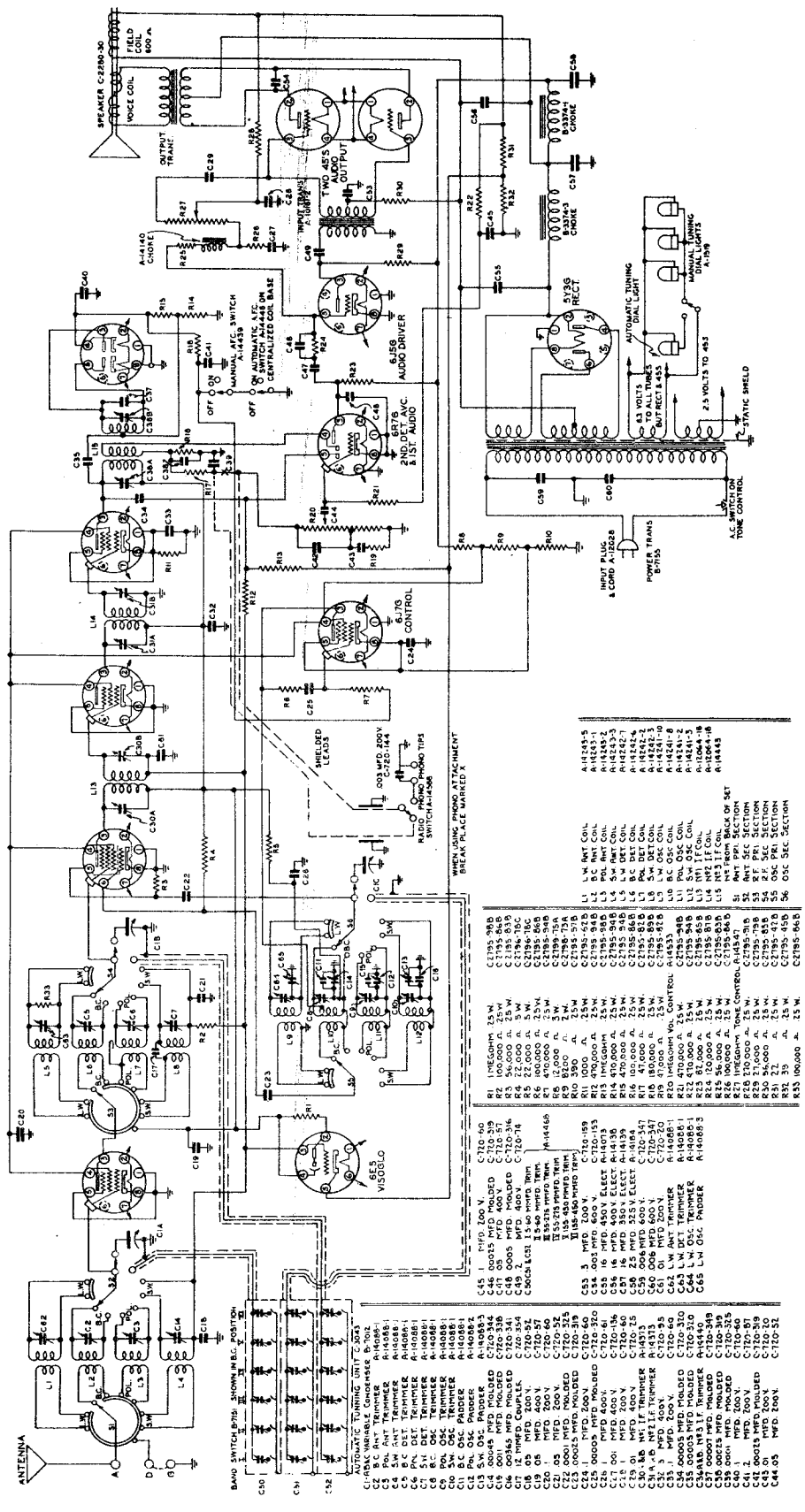
SPARKS WITHINGTON CO.

MODEL 1288LXP
Schematic

SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 1288-LXP
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS



NOTE: THE VOLTAGE DATA AND CHASSIS LAYOUT OF MODEL 1268 APPLY ALSO TO MODEL 1288 LXP FOR WHICH SEE INDEX

FOR TUNER SEE INDEX

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SPARKS WITHINGTON CO.

SPARTON SUPERHETERODYNE MODEL
1288-LXP

## ALIGNMENT

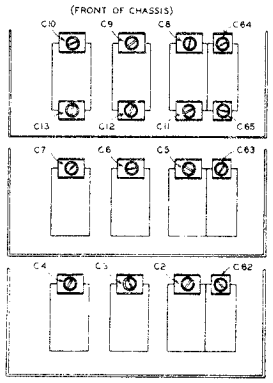
| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | I.F. | Conv. Grid | .1 mf. | 456 | BC | Open | C30 A,B | 1st I.F. Transformer |
| | | | | | | | C31 A,B | 2nd I.F. Transformer |
| | | | | | | | C32A | 3rd I.F. Trans. (Pri.) |
| 2 | Discrim. | Conv. Grid | .1 mf. | 456 | BC | Open | C36B | Adjust for minimum |
| 3 | Broadcast Band | Ant. | 200 mmf. | 1500 | BC | 1500 | C8 Osc. | |
| | | | | | | | C5 RF | |
| | | | | | | | C2 Ant. | |
| 4 | | Ant. | 200 mmf. | 600 | BC | 600 | C11 Pad | ** |
| 5 | (Repeat operation 3) | | | | | | | |
| 6 | (Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC) * | | | | | | | |
| 7 | Long Wave Band | Ant. | 200 mmf. | 400 | L.W. | 400 | C64 Osc. | |
| | | | | | | | C63 RF | |
| | | | | | | | C62 Ant. | |
| 8 | | Ant. | 200 mmf. | 150 | L.W. | 150 | C65 Pad | ** |
| 9 | (Repeat operation 7. Also repeat operations 7, 8 and 9 if necessary. | | | | | | | |
| 10 | 1st Short-Wave Band | Ant. | 100 ohm 200 mmf. series | 6 MC. | 1st S.W. | 6 MC. | C9 Osc. | |
| | | | | | | | C6 RF | |
| | | | | | | | C3 Ant. | |
| 11 | | Ant. | 200 mmf. | 1.95 MC. | 1st S.W. | 1.95 MC. | C12 Pad | |
| 12 | (Repeat operation 10) | | | | | | | |
| 13 | (Check calibration and sensitivity at 6 MC and 1.95 MC) | | | | | | | |
| 14 | 2nd Short Wave Band | Ant. | 100 ohm 200 mmf. series | 18 MC. | 2nd S.W. | 18 MC. | C10 Osc. | |
| | | | | | | | C7 RF | ** |
| | | | | | | | C4 Ant. | |
| 15 | | Ant. | | 6 MC. | 2nd S.W. | 6 MC. | C13 Pad | |
| 16 | (Repeat operation 14) | | | | | | | |
| 17 | (Check calibration and sensitivity at 18 MC. and 6 MC.) | | | | | | | |
| 18 | (Check operations 1 to 18 inclusive) | | | | | | | |

* Check AFC by connecting generator to converter grid cap and tuning generator and receiver to 1500 KC. Note output meter reading with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.

** Rock variable condenser slightly while adjusting for maximum output.

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.

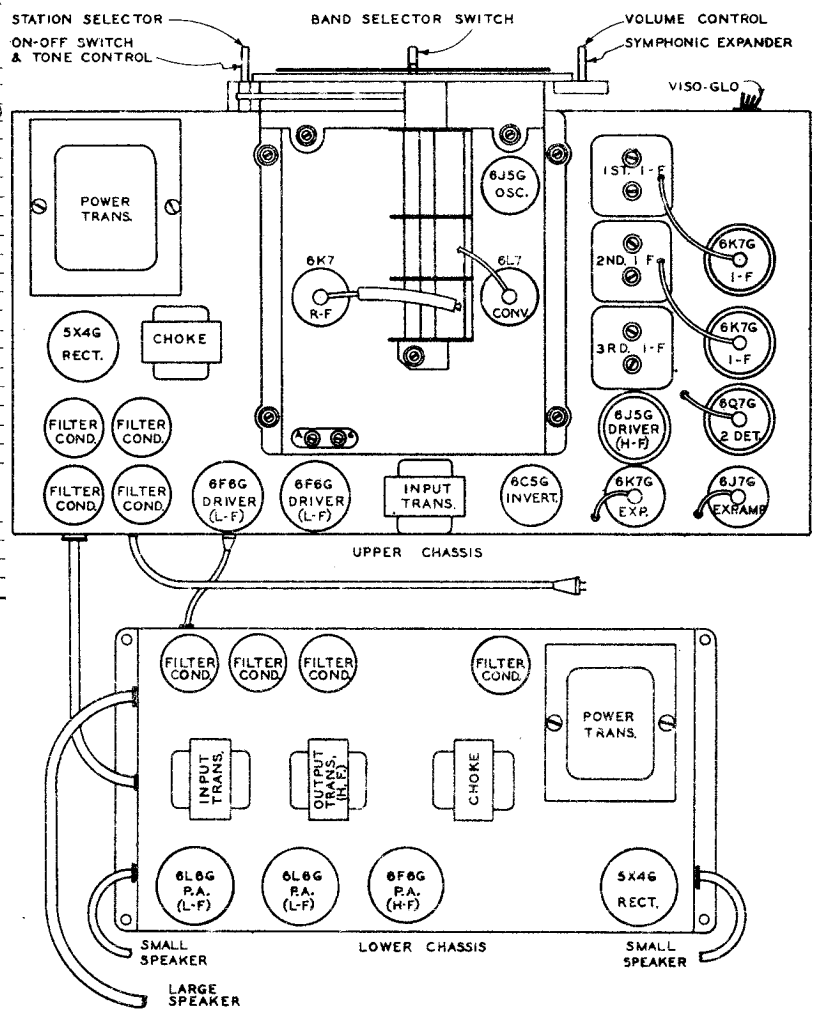
(Original) Effective Jan. 2, 1938




TRIMMER LOCATIONS
(under chassis)

## Model 1867

CHASSIS DIAGRAM

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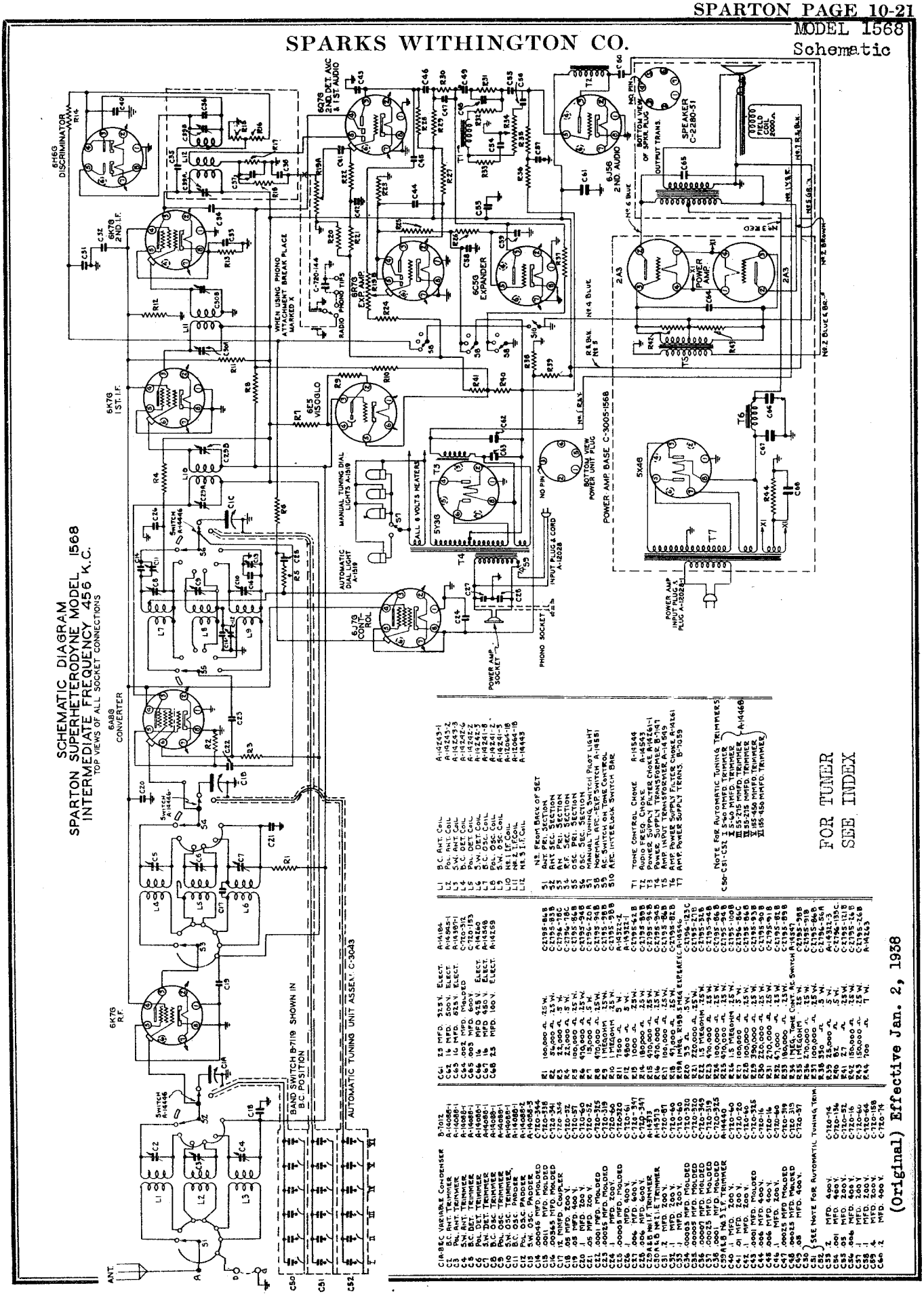
# SPARKS WITHINGTON CO.

MODEL 1568
Schematic


SCHEMATIC DIAGRAM
SPARTON SUPERHETERODYNE MODEL 1568
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS
6A8G CONVERTER
6K7G R.F.
6K7G 1ST. I.F.
6K7G 2ND I.F.
6H6G DISCRIMINATOR
6Q7G 2ND DET. AVC & 1ST AUDIO
6F8G EXP. AMP
6C5G EXPANDER
6J5G 2ND. AUDIO
6J7G CONT.
6G5 VISUOLO
5Y3G
5X4G
2A3
SPEAKER C-2280-S1
OUTPUT TRANS.
POWER AMP
POWER AMP BASE C-3005-1568
INPUT PLUG & CORD A-12028
PHONO SOCKET
POWER AMP SOCKET
POWER AMP INPUT PLUG A-12024
AUTOMATIC DIAL LIGHT A-1519
MANUAL TUNING DIAL LIGHTS A-1519
FIELD 2000 Ω
BAND SWITCH B-7119 SHOWN IN BC POSITION
AUTOMATIC TUNING UNIT ASSEY. C-3043
WHEN USING PHONO ATTACHMENT BREAK PLATE MARKED X
RADIO PHONO TIPS
ANT.
G.
SWITCH A-14446
SWITCH A-14524
SWITCH A-14525
SWITCH A-14526
BOTTOM VIEW OF SPKR. PLUG
BOTTOM VIEW POWER UNIT PLUG
NO PIN
ALL 6 VOLTS HEATERS
No. 6 Blue
No. 4 Blue
No. 8 Brn.
No. 8 Blk.
No. 2 Blue & Blk.
No. 2 Brown
No. 1 Red
No. 1 Yel. & Blk.
No. 1 Yel. & Wht.
No. 1 Red & Blk.
No. 1 Red & Wht.
No. 1 Red & Yel

# Sparton Superheterodyne Model

# 1568

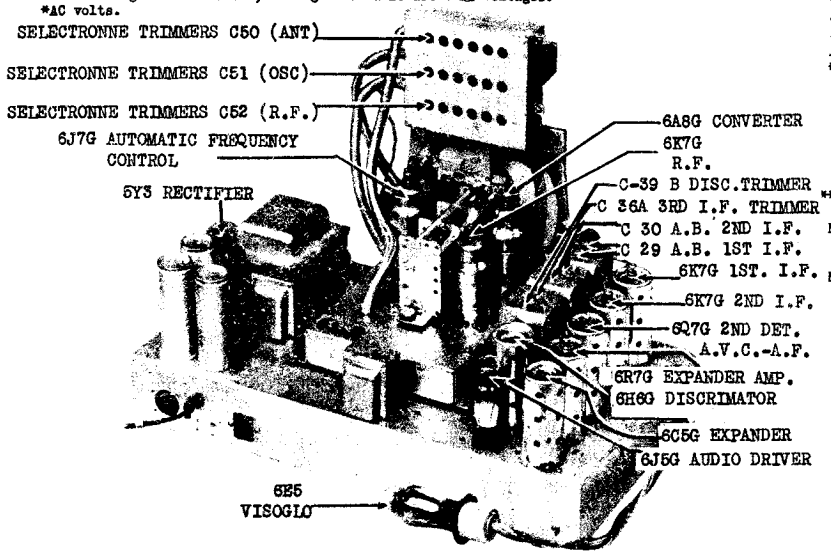


## VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected

| Tube | Function | Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7* | No. 8 | Grid Cap |
|---|---|---|---|---|---|---|---|---|---|---|
| 6K7G | R-F | 0 | 0 | 250 | 86 | 0 | - | 6 | 0 | - .2 |
| 6A8G | Converter | 0 | 0 | 250 | 86 | -7 | 140 | 6 | 0 | - .2 |
| 6J7G | AFC-Control | 0 | 0 | 225 | 86 | 4 | 0 | 6 | 4 | 0 |
| 6K7G | 1st. I-F | 0 | 0 | 250 | 86 | 0 | - | 6 | 0 | - 3 |
| 6K7G | 2nd. I-F | 0 | 0 | 250 | 86 | 4 | - | 6 | 4 | 0 |
| 6H6G | Discriminator | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 0 | - |
| 6Q7G | 1st. Audio Det-AVC | 0 | 0 | 145 | 0 | 0 | -3 | 6 | 0 | - .1 |
| 6J5G | Audio driver | 0 | 0 | 250 | - | .1 | .1 | 6 | 0 | - |
| 6R7G | Expander Amplifier | 0 | 0 | 56 | 0 | 0 | .1 | 6 | 0 | - .1 |
| 6C5G | Expander | 0 | 0 | 3.5 | .1 | .1 | 20 | 6 | 0 | - |
| 5Y3G | Rectifier | 0 | 400* | - | 400* | - | 400* | - | 400* | - |
| 6E5 | Viso-Glo | 0 | 20 | -.1 | 245 | 4 | 6 | - | - | - |
| (2) 2A3 | Power Amplifier | 60 | 350 | 0 | 60 | - | - | - | - | - |
| 5X4G | Rectifier | - | - | 330* | - | 330* | - | 370* | 370* | - |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
*AC volts.




CHASSIS ILLUSTRATION

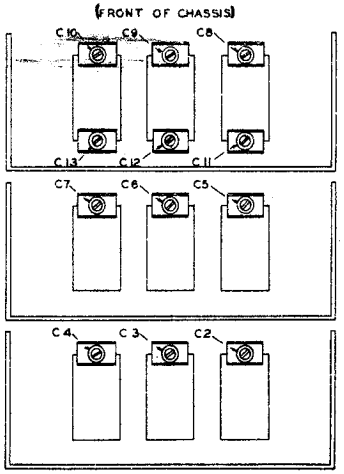
## ALIGNMENT See Note:

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | I.F. | Conv. Grid | .1 mf. | 456 | BC | Open | C29 A.B | 1st I.F. Trans. |
| | | | | | | | C30 A.B | 2nd I.F. Trans. |
| | | | | | | | C59 A | 3rd I.F. (Pri.) |
| 2 | Discrim. | Conv. Grid | .1 mf. | 456 | BC | Open | C59 B | Adjust to minimum |
| 3 | Broadcast Band | Ant. | 200 mmf. | 1500 | BC | 1500 | C8 Osc.<br>C5 RF<br>C2 Ant. | |
| 4 | | Ant. | 200 mmf. | 600 | BC | 600 | C11 Pad | ** |
| 5 | (Repeat operation 3) | | | | | | | |
| 6 | (Check calibration and sensitivity at 1500 KC, 900 KC and 600 KC) * | | | | | | | |
| 7 | 1st Short-Wave Band | Ant. | 100 ohm 200 mmf. series | 6 MC. | 1st S.W. | 6 MC. | C9 Osc.<br>C6 RF<br>C3 Ant. | |
| 8 | | Ant. | 200 mmf. | 1.95 MC. | 1st S.W. | 1.95 MC. | C12 Pad | ** |
| 9 | (Repeat operation 7) | | | | | | | |
| 10 | (Check calibration and sensitivity at 6 MC. and 1.95 MC.) | | | | | | | |
| 11 | 2nd Short-Wave Band | Ant. | 100 ohm 200 mmf. series | 18 MC. | 2nd S.W. | 18 MC. | C10 Osc.<br>C7 RF<br>C4 Ant. | Rock dial slightly while adjusting |
| 12 | | Ant. | | 6 MC. | 2nd S.W. | 6 MC. | C13 Pad | ** |
| 13 | (Repeat operation 11) | | | | | | | |
| 14 | (Check calibration and sensitivity at 18 MC. and 6 MC.) | | | | | | | |
| 15 | (Check operations 1 to 14 inclusive) | | | | | | | |

* Check AFC by connecting generator to converter grid cap and tuning generator and receiver to 1500 KC. Note output meter reading with AFC switch "off". Switch AFC "on" and if output changes appreciably, touch up discriminator trimmer until there is no change in sensitivity.
** Rock variable condenser slightly while adjusting for maximum output.

NOTE: Expander "OFF"
AFC Switch "OFF"
Viso-Glo Tube in Socket

NOTE: Check to see that dial pointer is parallel to horizontal lines on dial when variable condenser rotor plates are fully meshed with stator plates.




TRIMMER LOCATIONS
(under chassis)

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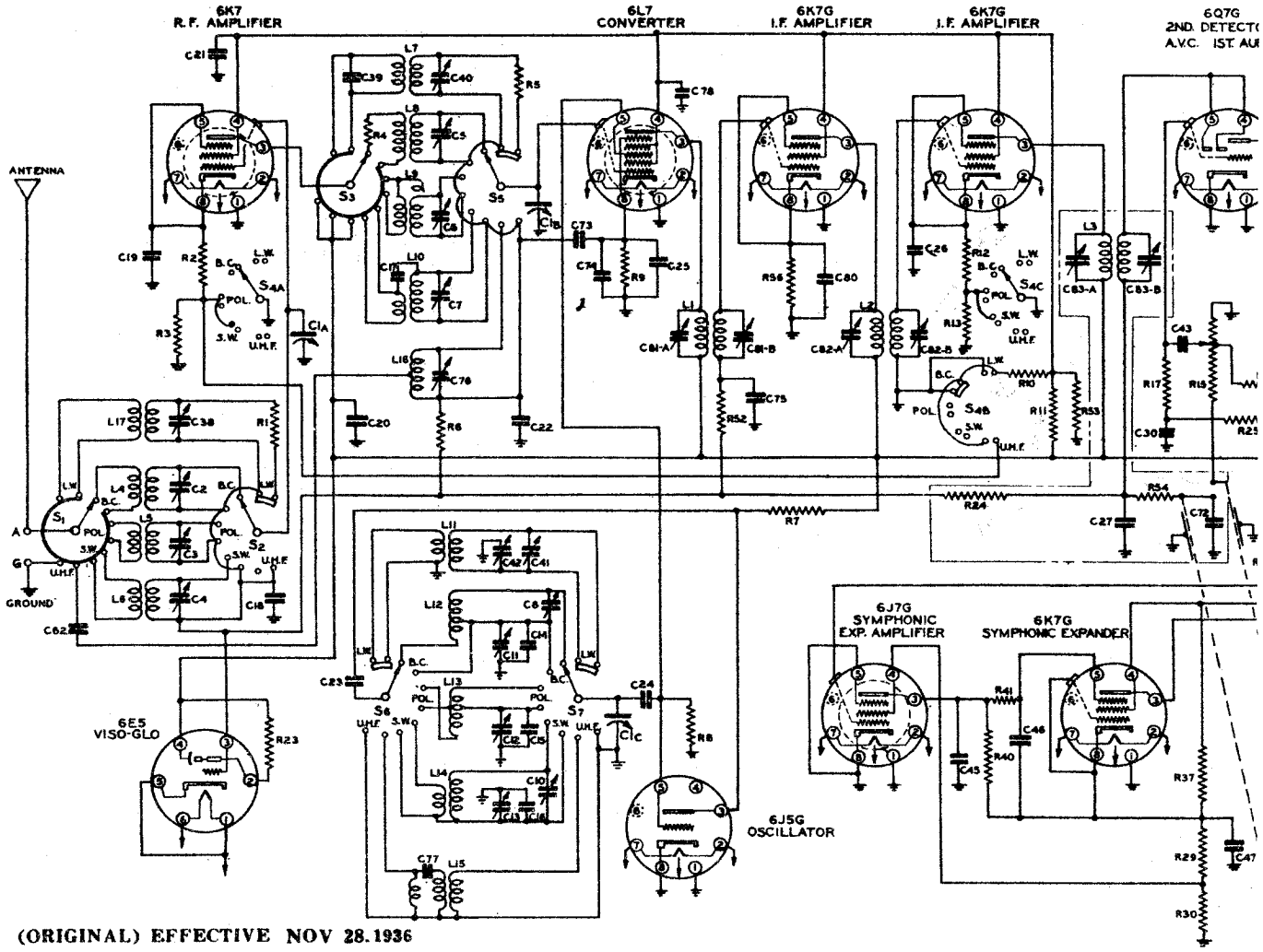


(ORIGINAL) EFFECTIVE NOV 28.1936

## SCHEMATIC DIAGRAM CHANGES

### (SERIAL NO'S. 000751 AND UP)

The following changes, which should be made in the Model 1867 schematic diagram are effective Nov. 30, 1936, and are included in all SPARTON Model 1867 chasses with serial numbers above 000750.

1. Replace condenser C49 Part No. C-720-152 (.005 mf. 200v.), by Part No. C-720-144 (.003 mf. 200v.). This condenser connects from ground to the mid-point between the tone control (R14) and resistor R65.

2. Add resistor
This resistor conne

3. Replace resi
by resistor Part No
tor is in the catho
tube.

| | | |
|---|---|---|
| C1-A,B,C | VARIABLE CONDENSER | B-7012 |
| C2 | B.C. ANTENNA TRIMMER | A-14088-1 |
| C3 | P.B. " | A-14088-1 |
| C4 | S.W. " | A-14088-1 |
| C5 | B.C. DETECTOR TRIMMER | A-14088-1 |
| C6 | P.B. " | A-14088-1 |
| C7 | S.W. " | A-14088-1 |
| C8 | B.C. OSCILLATOR TRIMMER | A-14088-1 |
| C10 | S.W. " | A-14088-1 |
| C11 | B.C. " PADDER | A-14088-1 |
| C12 | P.B. " " | A-14088-2 |
| C13 | S.W. " " | A-14088-3 |
| C14 | .00045 MFD. MICA | C-720-344 |
| C15 | .0011 MFD. MICA | C-720-338 |
| C16 | .00365 MFD. MICA | C-720-341 |
| C17 | COUPLER 12 MMFD. | A-10896 |
| C18 | .05 MFD. 200 V. | C-720-52 |
| C19 | .1 MFD. 100 V. | C-720-62 |
| C20 | .05 MFD. 400 V. | C-720-57 |
| C21 | .05 MFD. 400 V. | C-720-57 |
| C22 | .05 MFD. 200 V. | C-720-52 |
| C23 | .003 MFD. MICA | C-720-328 |
| C24 | .00005 MFD. MICA | C-720-343 |
| C25 | .1 MFD. 100 V. | C-720-62 |
| C26 | .1 MFD. 100 V. | C-720-62 |
| C27 | .0001 MFD. MICA | C-720-325 |
| C28 | .05 MFD. 400 V. | C-720-57 |
| C29 | .00025 MFD. MICA | C-720-319 |
| C30 | .1 MFD. 100 V. | C-720-62 |
| C31 | .1 MFD. 400 V. | C-720-61 |
| C32 | .00025 MFD. MICA | C-720-319 |
| C33 | .05 MFD. 400 V. | C-720-57 |
| C34 | .001 MFD. 200 V. | C-720-142 |
| C35 | 16 MFD. 425 V. ELECTROLYTIC | A-14315 |
| C36 | 16 MFD. 475 V. " | A-14310-1 |
| C37 | 16 MFD. 350 V. " | A-14139 |
| C38 | L.W. ANTENNA TRIMMER | A-14088-1 |
| C39 | .00025 MFD. MICA | C-720-319 |
| C40 | L.W. DETECTOR TRIMMER | A-14088-1 |
| C41 | L.W. OSCILLATOR TRIMMER | A-14088-1 |
| C42 | L.W. " PADDER | A-14088-3 |
| C43 | .025 MFD. 200 V. | C-720-40 |
| C44 | .006 MFD. 600 V. | C-720-17 |
| C45 | .3 MFD. 200 V. | C-720-91 |
| C46 | .2 MFD. 200 V. | C-720-87 |
| C47 | .5 MFD. 200 V. | C-720-104 |
| C48 | .001 MFD. 400 V. | C-720-136 |
| C49 | .005 MFD. 200 V. | C-720-152 |
| C50 | .01 MFD. 200 V. | C-720-20 |
| C51 | .05 MFD. 400 V. | C-720-46 |
| C52 | .05 MFD. 400 V. | C-720-46 |
| C53 | .006-.006 MFD. 600 V. | C-720-150 |
| C54 | .01 MFD. 200 V. | C-720-147 |
| C55 | .01 MFD. 200 V. | C-720-147 |
| C56 | .5 MFD. 200 V. | C-720-104 |
| C57 | .25 MFD. 325 V. ELECTROLYTIC | A-14184 |
| C58 | .1 MFD. 400 V. | C-720-61 |
| C59 | .3 MFD. 200 V. | C-720-148 |
| C60 | .0025 MFD. 400 V. | C-720-149 |
| C61 | .025-.025 MFD. 600 V. | C-720-141 |
| C62 | .0001 MFD. MICA | C-720-339 |
| C63 | 50 MFD. 50 V. ELECTROLYTIC | A-14306 |
| C64 | .015 MFD. 600 V. | C-720-140 |
| C65 | .015 MFD. 600 V. | C-720-140 |
| C66 | .5 MFD. 200 V. | C-720-151 |
| C67 | .00025 MFD. MICA | C-720-318 |
| C68 | 16 MFD. 475 V. ELECTROLYTIC | A-14310 |
| C69 | 25 MFD. 425 V. " | A-14305 |
| C70 | 16 MFD. 350 V. " | A-14139 |
| C71 | .1 MFD. 600 V. | C-720-139 |
| C72 | .0001 MFD. MICA | C-720-325 |
| C73 | .05 MFD. 100 V. | C-720-58 |
| C74 | .00025 MFD. MICA | C-720-324 |
| C75 | .1 MFD. 200 V. | C-720-64 |
| C76 | U.H.F. DET. TRIMMER | A-14088-3 |
| C77 | .000025 MFD. MICA | C-720-342 |
| C78 | .00025 MFD. MICA | C-720-324 |
| C79 | 10 K.C. CHOKE TRIMMER | A-12834-3 |
| C80 | .1 MFD. 100 V. | C-720-62 |
| C81-A,B | NO.1 I.F. TRIMMER | A-14373 |
| C82-A,B | NO.2 I.F. TRIMMER | A-14373 |
| C83-A,B | NO.3 I.F. TRIMMER | A-14375 |
| C84 | .003 MFD. 200 V. (PHONO SETS ONLY) | C-720-144 |
| C85 | .02 MFD. 200 V. | C-720-145 |

| | | |
|---|---|---|
| R1 | 100 Ω | .1 W. |
| R2 | 270 Ω | .25 W. |
| R3 | 1,000 Ω | .25 W. |
| R4 | 2,200 Ω | .1 W. |
| R5 | 100 Ω | .1 W. |
| R6 | 100,000 Ω | .25 W. |
| R7 | 22,000 Ω | .5 W. |
| R8 | 33,000 Ω | .25 W. |
| R9 | 560 Ω | .25 W. |
| R10 | 22,000 Ω | .5 W. |
| R11 | 10,000 Ω | 3. W. |
| R12 | 270 Ω | .25 W. |
| R13 | 470 Ω | .25 W. |
| R14 | 1 MEGOHM TONE CONTROL | |
| R15 | 500,000 Ω VOLUME CONTROL | |
| R16 | 56,000 Ω | .25 W. |
| R17 | 1 MEGOHM | .25 W. |
| R18 | 270,000 Ω | .25 W. |
| R19 | 100,000 Ω | .25 W. |
| R20 | 1 MEGOHM | .25 W. |
| R22 | 470,000 Ω | .25 W. |
| R23 | 1 MEGOHM | .25 W. |
| R24 | 1 MEGOHM | .25 W. |
| R25 | 470,000 Ω | .25 W. |
| R26 | 56,000 Ω | .25 W. |
| R27 | 680,000 Ω | .25 W. |
| R28 | 120,000 Ω | .25 W. |
| R29 | 8,200 Ω | 1. W. |
| R30 | 1,800 Ω | .5 W. |
| R31 | 4,700 Ω | .25 W. |
| R32 | 15 Ω | .25 W. |

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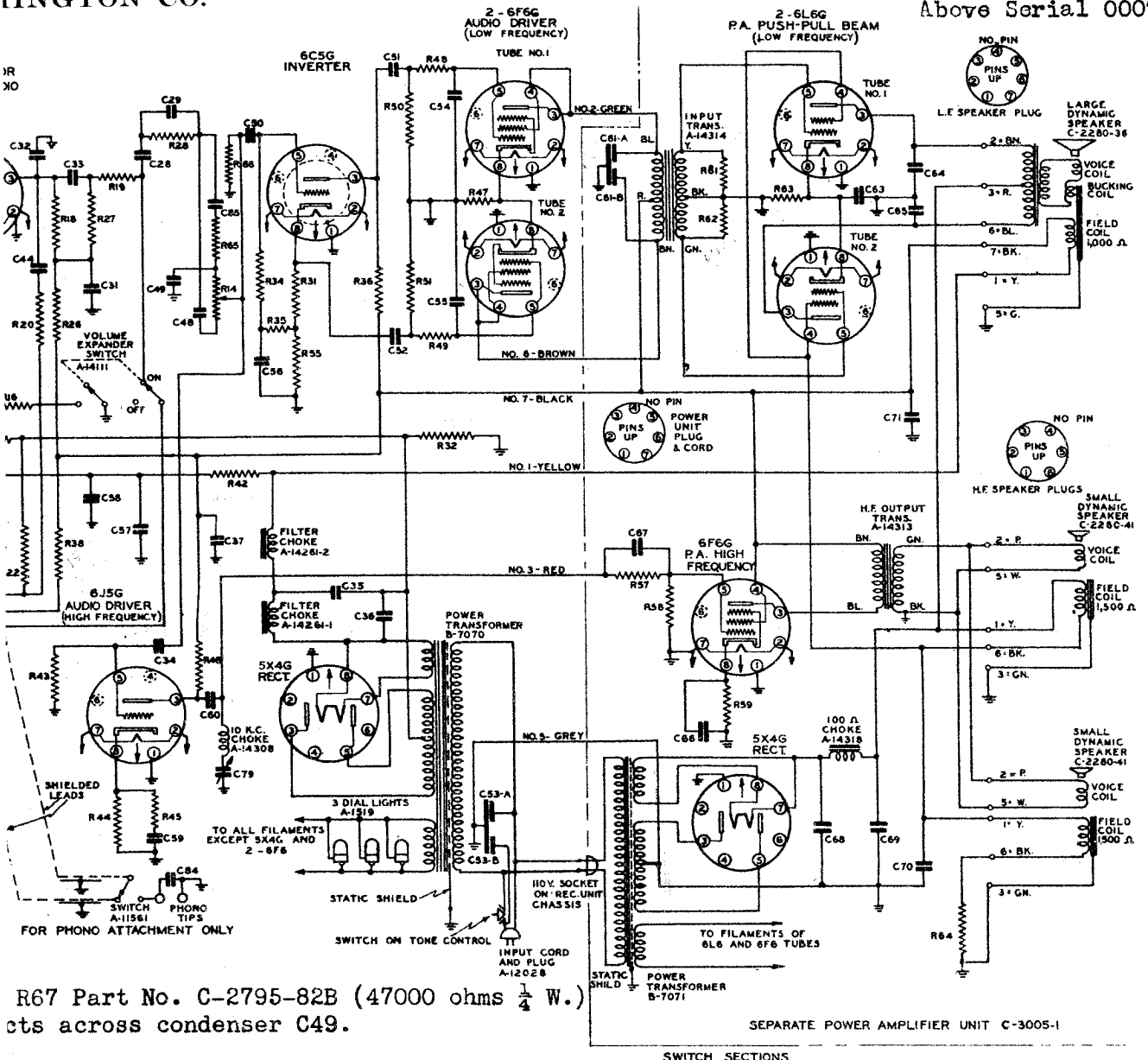
IINGTON CO.

MODEL 1867
Above Serial 000751




R67 Part No. C-2795-82B (47000 ohms ¼ W.)
cts across condenser C49.

stor R56 Part No. C-2795-63C (1200 ohms ¼ W.)
. C-2795-74C (10000 ohms ¼ W.). This resis-
de circuit of the Type 6K7G 1st. I-F Amplifier

SWITCH SECTIONS

NO. FROM BACK OF SET
- S1 ANT. PRIMARY
- S2 ANT. SECONDARY
- S3 R.F. PRIMARY
- S4-A, S4-B, S4-C } BIAS AND SCREEN VOLTAGE
- S5 R.F. SECONDARY
- S6 OSC. PRIMARY
- S7 OSC. SECONDARY

| | | | | |
|---|---|---|---|---|
| -2754-50B | | | | |
| -2795-55B | R34 | 1 MEGOHM | .25 W. | C-2795-31B |
| 795-62B | R35 | 470,000 Ω | .25 W. | C-2795-94B |
| 794-66B | R36 | 47,000 Ω | .25 W. | C-2795-82B |
| 794-50B | R37 | 750 Ω | .25 W. | C-2795-156B |
| 795-25B | R38 | 15,000 Ω | 2. W. | C-2796-187A |
| 796-78C | | | | |
| 795-80B | R40 | 470,000 Ω | .25 W. | C-2795-94B |
| 795-59B | R41 | 1 MEGOHM | .25 W. | C-2795-98B |
| 796-78C | R42 | 2,400 Ω | 2. W. | C-2796-168A |
| 799-74A | R43 | 1 MEGOHM | .25 W. | C-2795-31B |
| 795-55B | R44 | 1,000 Ω | .25 W. | C-2795-62B |
| 795-56B | R45 | 470 Ω | .25 W. | C-2795-56B |
| 4137 | R46 | 18,000 Ω | 1. W. | C-2797-77A |
| 4110 | R47 | 300 Ω | 1. W. | C-2797-146A |
| 2795-83B | R48 | 47,000 Ω | .25 W. | C-2795-82B |
| 2795-98B | R49 | 47,000 Ω | .25 W. | C-2795-82B |
| 2795-91B | R50 | 100,000 Ω | .25 W. | C-2795-86B |
| 2795-25B | R51 | 100,000 Ω | .25 W. | C-2795-86B |
| 2795-98B | R52 | 100,000 Ω | .25 W. | C-2795-25B |
| 2795-94B | R53 | 47,000 Ω | 1. W. | C-2797-23A |
| 2795-98B | R54 | 56,000 Ω | .25 W. | C-2795-83B |
| 795-98B | R55 | 47,000 Ω | .25 W. | C-2795-82B |
| 795-94B | R56 | Ω | .5 W. | C-2796- |
| 2795-83B | R57 | 100,000 Ω | .25 W. | C-2795-86B |
| 2795-96B | R58 | 100,000 Ω | .25 W. | C-2795-86B |
| 2795-87B | R59 | 470 Ω | 1. W. | C-2797-58A |
| 2797-181A | | | | |
| 2796-165A | Not | 47,000 Ω | .25 W. | C-2795-23B |
| 2795-70B | R62 | 47,000 Ω | .25 W. | C-2795-23B |
| 2795-115B | R63 | 220 Ω | 5. W. | A-14322 |
| | R64 | 5,000 Ω | 15 W. CANDOHM | A-14309 |
| | R65 | 180,000 Ω | .25 W. | C-2795-89B |
| | R66 | 470,000 Ω | .25 W. | C-2795-94B |

| | | |
|---|---|---|
| L1 | NO. 1 I.F. COIL | A-12064-2 |
| L2 | NO. 2 I.F. COIL | A-12064-2 |
| L3 | NO. 3 I.F. COIL | A-14254 |
| L4 | B.C. ANTENNA COIL | A-14243-1 |
| L5 | P.B. " " | A-14243-2 |
| L6 | S.W. " " | A-14243-3 |
| L7 | L.W. DETECTOR COIL | A-14242-4 |
| L8 | B.C. " " | A-14242-1 |
| L9 | P.B. " " | A-14242-2 |
| L10 | S.W. " " | A-14242-3 |
| L11 | L.W. OSCILLATOR " | A-14241-4 |
| L12 | B.C. " " | A-14241-1 |
| L13 | P.B. " " | A-14241-7 |
| L14 | S.W. " " | A-14241-6 |
| L15 | U.H.F. " " | A-14241-5 |
| L16 | U.H.F. DETECTOR COIL | A-14242-5 |
| L17 | L.W. ANTENNA " | A-14243-4 |

## SPARTON SUPERHETERODYNE MODEL 1867
## INTERMEDIATE FREQUENCY 456 K.C.

(FOR MODEL 1867 SERIAL NO'S. 000751 AND UP)

Early, Late Productions
Voltage

# SPARKS WITHINGTON CO.

MODEL 1867
Below Ser. 000751
Schematic Changes

(SERIAL NO. 000001 to 000750 INCLUSIVE)

The Schematic Diagram for the SPARTON Models 1867 (Serial Numbers 000001 to 000750 inclusive) is the same as shown except for the three general circuit changes as noted below:

(1) Change in Tone Control circuit as in Fig. 1.

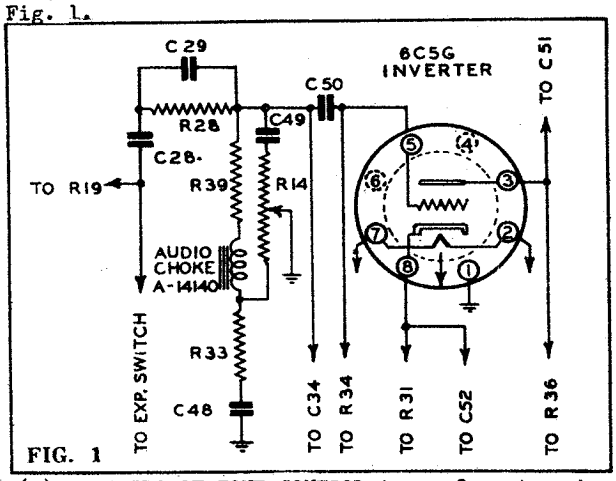



FIG. 1

(1) DETAILS OF TONE CONTROL to conform to schematic

| | | |
|---|---|---|
| Resistor R39 | (27000 ohms .25 w.) | removed |
| Resistor R33 | (100000 ohms .25 w.) | removed |
| Audio choke | (A-14140) | removed |
| Resistor R65 | (180000 ohms .25 w.) | added |
| Resistor R66 | (470000 ohms .25 w.) | added |
| Condenser C85 | (.02 mf. 200 v.) | added |

(Change in circuit as in Fig. 1)

(2) Change in Cathode Resistor Network of Type 6F6G High Frequency Power Amplifier as in Fig. 2.

(3) Change in Bias Resistor of Type 6K7G 1st. I-F Amplifier.

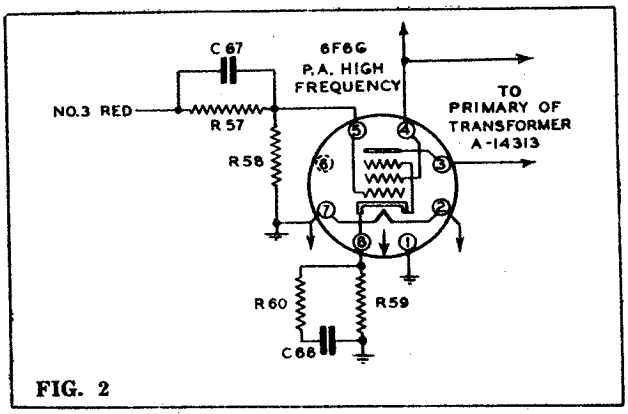



FIG. 2

(2) DETAILS OF RESISTOR NETWORK change in Cathode of Type 6F6G High Frequency Power Amplifier:

Resistor R60 (180 ohms .25 w.) removed.

(3) DETAILS OF BIAS RESISTOR change in Type 6K7G 1st. I-F Amplifier:

Substitute R56 1200 ohm .5 w. resistor (C-2796-63C) in place of 10000 ohm .5 w. resistor (C-2796-74C).

## VOLTAGE TABLE FOR EARLY AND LATE MODELS

Line Voltage: 110 volts
Symphonic Expander Control: Off
Position of Volume Control: Full with Antenna Disconnected
Position of Band Selector Switch: Broadcast

| Tube | Function | Voltage of Each Socket Prong to Ground (See Prong Numbers on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 | Grid Cap |
| 6K7 | R-F Amplifier | 0 | 6 | 272 | 117 | 0 | - | 0 | 0 | 0 |
| 6L7 | Converter | 0 | 6 | 260 | 140 | -35 | 0 | 0 | 0 | 0 |
| 6J5G | Oscillator | 0 | 6 | 260 | 0 | 0 | 0 | 0 | 0 | - |
| 6K7G | First I-F Amplifier | 0 | 6 | 270 | 110 | 0 | 0 | 0 | 0 | 0 |
| 6K7G | Second I-F Amplifier | 0 | 6 | 280 | 121 | 0 | 0 | 0 | 0 | 0 |
| 6Q7G | Det-AVC-First A-F Amplifier | 0 | 6 | [2] 200 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6J7G | Expander Amplifier | 0 | 6 | [3] .9 | [4] 16 | 0 | 0 | 0 | 0 | 0 |
| 6K7G | Symphonic Expander | 0 | 6 | [3] 1.2 | 97 | [3] .25 | 90 | 0 | 92 | 90 |
| 6C5G | Inverter | 0 | 6 | 233 | 265 | 0 | 0 | 0 | 0 | - |
| 6J5G | Driver (High Frequency) | 0 | 6 | 235 | 0 | 0 | 0 | 0 | 0 | - |
| (2)6F6G | Driver (Low Frequency) | 0 | 6 | 250 | 250 | 0 | 0 | 0 | 13 | - |
| 5X4G | Rectifier (Upper Chassis) | 0 | 0 | 375 | 0 | 375 | 0 | [1] .02 | [1] 5.2 | - |
| 6E5 | Viso-Glo | 6 | [3] 1.4 | 0 | 265 | 0 | 0 | - | - | - |
| 6F6G | Power Amplifier (High Frequency) | 0 | 0 | 280 | 280 | 0 | 0 | 6.3 | 0 | - |
| (2)6L6G | Power Amplifier (Low Frequency) | 0 | 0 | 395 | 305 | 0 | 0 | 6.3 | [4] 16.5 | - |
| 5X4G | Rectifier (Lower Chassis) | 0 | 0 | 380 | 0 | 380 | 0 | [1] 5.2 | [1] .1 | - |

Notes: Voltage readings are for schematic diagram. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits except as noted below. All measurements made with Weston Selective Analyzer No. 665, Type 2.

[1] 10 volts A-C [2] 250 volts D-C [3] 5 volts D-C [4] 25 volts D-C

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## STEP BY STEP PROCEDURE

NOTE: For proper alignment of these chassis, the procedure should be followed in the same order as given. The dial pointer should be exactly parallel with the horizontal line of the kilocycle scale when the condenser plates are fully meshed. If the pointer does not read correctly, loosen the set screw holding the pointer, hold the rotor plates fully meshed with the stator plates and set the pointer so that it is parallel with the horizontal lines on the kilocycle scale, then tighten the set screw.

### A. Alignment of Intermediate-Frequency Stages

(1) Turn on receiver and test oscillator and allow both to operate several minutes before attempting to adjust any condensers.

(2) Turn the band selector switch to the Broadcast position (with white diamond illuminated) and turn the station selector knob until the rotor plates are completely out of mesh with the stator plates.

(3) Connect "antenna" of test oscillator to the grid cap of Type 6L7 converter tube and "ground" of test oscillator to chassis frame of receiver. Connect output meter "high tap" from plate of Type 6L6G Low-Frequency power output tube to ground. NOTE: It is advisable to read carefully the operating instructions included with the test oscillator.

(4) Tune test oscillator to obtain a signal of 456 kilocycles.

(5) Turn tone control to low note (bass) position.

(6) Turn expander control to "off" position.

(7) Turn volume control of receiver on full and adjust I-F trimmers C81, C82 and C83 which are reached from the top of the chassis. NOTE: The intermediate frequency circuits are quite selective and care must be taken to insure proper adjustment.

### B. Alignment of Broadcast Band

(1) Disconnect "antenna" lead of test oscillator from grid cap of converter tube and connect in series with a 200 mmf. condenser dummy antenna to the antenna terminal of the chassis.

(2) Tune receiver and test oscillator to a frequency of 1500 kilocycles and adjust the following condensers in the order given:

C8 - Oscillator trimmer
C5 - R-F trimmer
C2 - Ant. trimmer

(3) Tune test oscillator and receiver to 600 kilocycles and adjust condenser C11 (oscillator padder).

(4) Retune test oscillator and receiver to 1500 kilocycles and check the adjustments of condensers C8, C5 and C2.

(5) Calibration of the broadcast band should also be checked at 900 kilocycles and 600 kilocycles.

NOTE: The operation of the expansion circuit may be checked at this point as follows:

(6) Tune test oscillator and receiver to 1500 kilocycles.

(7) Turn volume control of receiver to low volume position, and turn attenuator of test oscillator so that oscillator is delivering maximum output.

(8) Turn expander switch on. Watch output meter carefully and turn volume control of receiver to a point where about half scale deflection is obtained. The output reading should continue to increase for a few moments after the receiver volume control has stopped turning.

### C. Alignment of 10 KC. Filter

NOTE: The purpose of this filter circuit is to eliminate the 10,000 cycle note caused by the beating of any two stations operating simultaneously on adjacent channels. It is very important that this filter circuit be adjusted to exactly 10,000 cycles, otherwise the very purpose of the filter is defeated.

(1) Connect output meter from plate of Type 6F6G high-frequency power output tube to ground.

(2) Connect lead from audio oscillator to grid cap of Type 6Q7G 2nd det. tube.

(3) Turn receiver volume control to the off position and set tone control to give a convenient deflection on the output meter.

(4) Adjust condenser C79 (mounted directly in back of the Antenna Coil Section shield) so that minimum deflection of the output meter is obtained.

### D. Alignment of Long-Wave Band

(1) Turn the band selector switch to the long wave position (yellow diamond illuminated).

(2) Tune test oscillator and receiver to 345 kilocycles and adjust the following condensers in the order given:

C41 - Oscillator trimmer
C40 - R-F trimmer
C38 - Ant. trimmer

(3) Tune test oscillator and receiver to 150 kilocycles and adjust condenser C42 (oscillator padder).

(4) Retune test oscillator and receiver to 345 kilocycles and check the adjustments of condensers C41, C40 and C38.

### E. Alignment of 1st. Short-Wave Band

(1) Turn band selector switch to the 1st short-wave band (red diamond illuminated).

(2) Tune test oscillator and receiver to 6 megacycles and adjust the following condensers in the order given:

C9 - Oscillator trimmer
C6 - R-F trimmer
C3 - Ant. trimmer

(3) Tune test oscillator and receiver to 1.95 megacycles and adjust condenser C12 (oscillator padder).

(4) Retune test oscillator and receiver to 6 megacycles and check the adjustments of condensers C9, C6 and C3.

### F. Alignment of 2nd Short-Wave Band

(1) Connect the 100 ohm non-inductive dummy antenna resistor in series with the 200 mmf. condenser connected between the test oscillator "antenna" lead and the grid cap of the 6L7 converter tube.

(2) Turn the band selector switch to the 2nd short-wave band (blue diamond illuminated).

(3) Tune test oscillator and receiver to 18 megacycles and adjust the following condensers in the order given:

C10 - Oscillator trimmer
C7 - R-F trimmer
C4 - Ant. trimmer

(4) Tune test oscillator and receiver to 6 megacycles and adjust condenser C15 (oscillator padder).

(5) Retune test oscillator and receiver to 18 megacycles and check adjustments of condensers C10, C7 and C4.

IMPORTANT: To obtain the best sensitivity at 18 megacycles on this band, the dial should be turned back and forth slightly while adjusting the antenna and R.F. trimmers.

CAUTION: On this band care must be taken to adjust the various condengers to the fundamental of the signal and not to the image. The image signal is equal to the fundamental minus twice the intermediate frequency of the receiver. A set that is adjusted to the image frequency instead of to the fundamental may be detected by tuning over the band and checking the sensitivity at various points. If a dead spot appears near the center of the band, the adjustable condensers for that band have probably been adjusted to the image instead of the fundamental.

This type of mis-alignment may also be detected by tuning the test oscillator to a frequency of 15 megacycles and the station selector to approximately 15,900 kilocycles. If a strong signal is found approximately at this frequency, it indicates that the band has been adjusted to the image frequency. The normal image frequency for 15 megacycles or 15,000 kilocycles would be 15,000 kilocycles minus twice 456 kilocycles or approximately 14,100 kilocycles. Therefore a signal of this frequency may be found with the test oscillator generating a 15 megacycle signal.

### G. Alignment of Ultra High-Frequency Band

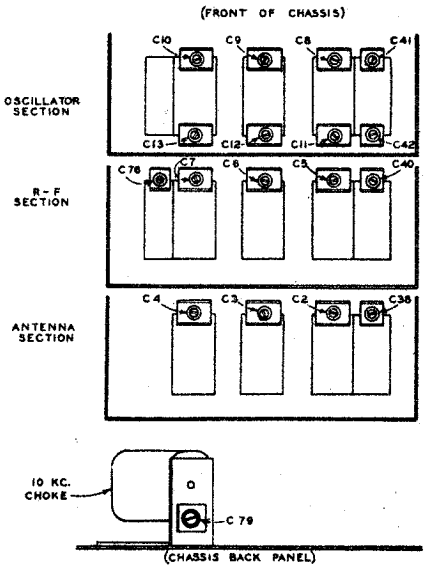
(1) Turn the band selector switch to the ultra high frequency band (tan diamond illuminated).

(2) Tune test oscillator and receiver to 50 megacycles and adjust condenser C76 (R-F trimmer).

(3) Check operation of receiver at 20 megacycles.

(Condenser C76 is the only adjustment in the ultra high frequency band).

CAUTION: All adjustments should be rechecked to assure accuracy and stability of adjustment and calibration.




TRIMMER LOCATIONS
SPARTON MODEL 1867

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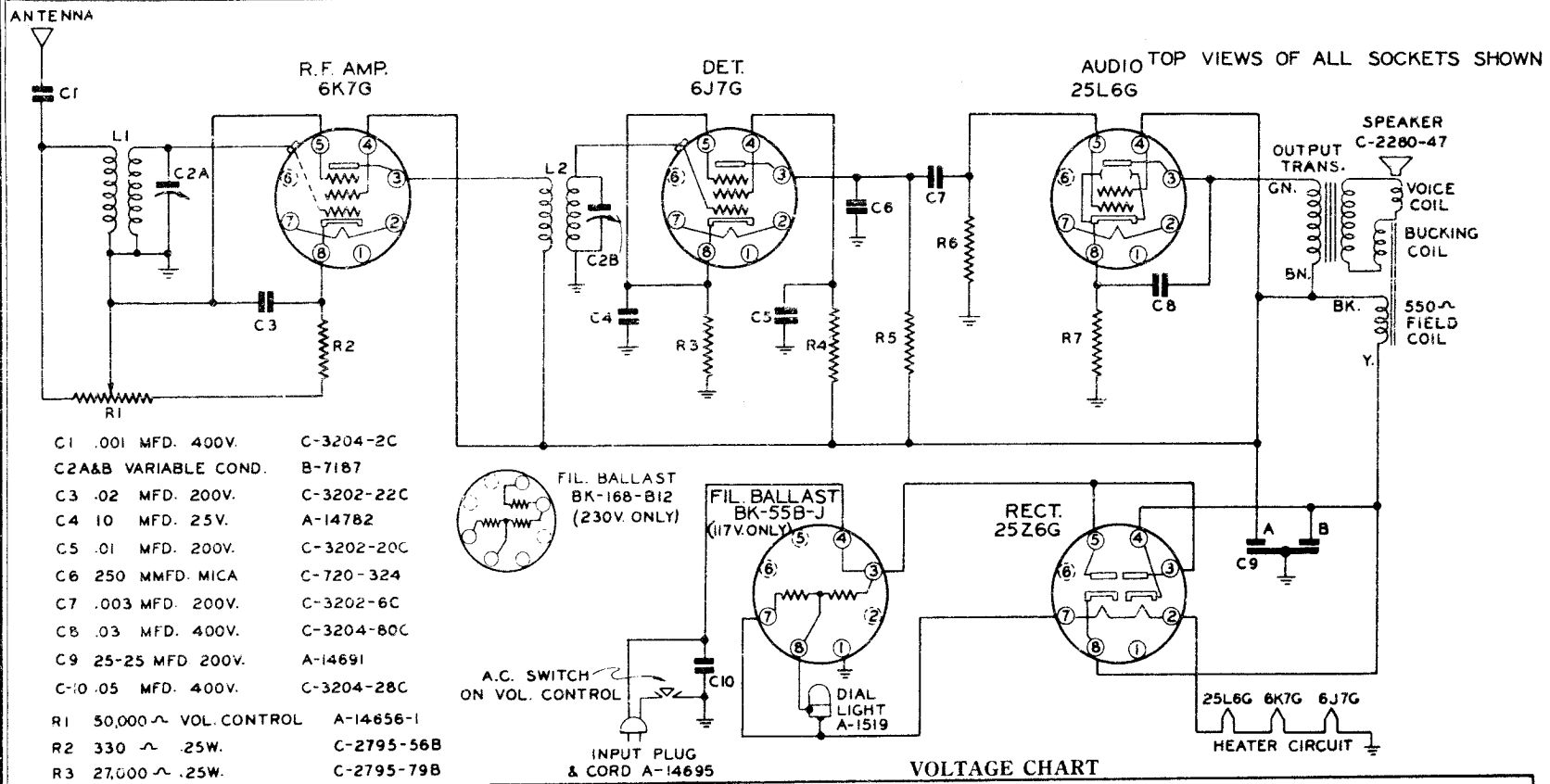
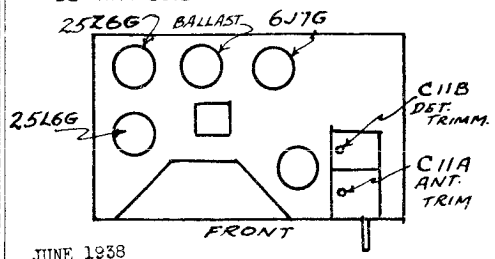
MODEL 5008
Schematic, Voltage
Alignment, Trimmers
Socket




| | | |
|---|---|---|
| C1 | .001 MFD. 400V. | C-3204-2C |
| C2A&B | VARIABLE COND. | B-7187 |
| C3 | .02 MFD. 200V. | C-3202-22C |
| C4 | 10 MFD. 25V. | A-14782 |
| C5 | .01 MFD. 200V. | C-3202-20C |
| C6 | 250 MMFD. MICA | C-720-324 |
| C7 | .003 MFD. 200V. | C-3202-6C |
| C8 | .03 MFD. 400V. | C-3204-80C |
| C9 | 25-25 MFD 200V. | A-14691 |
| C10 | .05 MFD. 400V. | C-3204-28C |
| R1 | 50,000 ∿ VOL. CONTROL | A-14656-1 |
| R2 | 330 ∿ .25W. | C-2795-56B |
| R3 | 27,000 ∿ .25W. | C-2795-79B |
| R4 | 6.2 MEGOHM .25W. | C-2795-250B |
| R5 | 560000 ∿ .25W. | C-2795-95B |
| R6 | 560000 ∿ .25W. | C-2795-95B |
| R7 | 150 ∿ .5W. | C-2795-52C |
| L1 | ANTENNA COIL | A-14663 |
| L2 | R.F. COIL | A-14664 |




## VOLTAGE CHART

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected

| Tube | Function | Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 6K7G | R.F. | 0 | 6 | 102 | 102 | 0 | - | 0 | 3 | 0 |
| 6J7G | Det. | 0 | 12 | 2.5 | 0 | .3 | - | 6 | 1.3 | 0 |
| 25L6G | Power Amp. | 0 | 36 | 90 | 102 | 0 | - | 12 | 7 | - |
| 25Z6G | Rect. | 0 | 60 | 115 | 134 | 115 | - | 36 | 134 | - |
| BK55B-J | Ballast | 0 | - | 115 | 115 | - | 0 | 55 | 60 | - |

## ALIGNMENT

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | (Set dial pointer on horizontal lines at end of scale with condenser closed) | | | | | | |
| 2 | Broadcast Band | Ant. | 200 mmf. | 1500 | 1500 | C11 A | |
| | | | | | | C11 B | |
| 3 | (Check calibration and sensitivity at 1000 kc. and 600 kc.) | | | | | | |
| 4 | (Check operations 1 to 3 inclusive) | | | | | | |

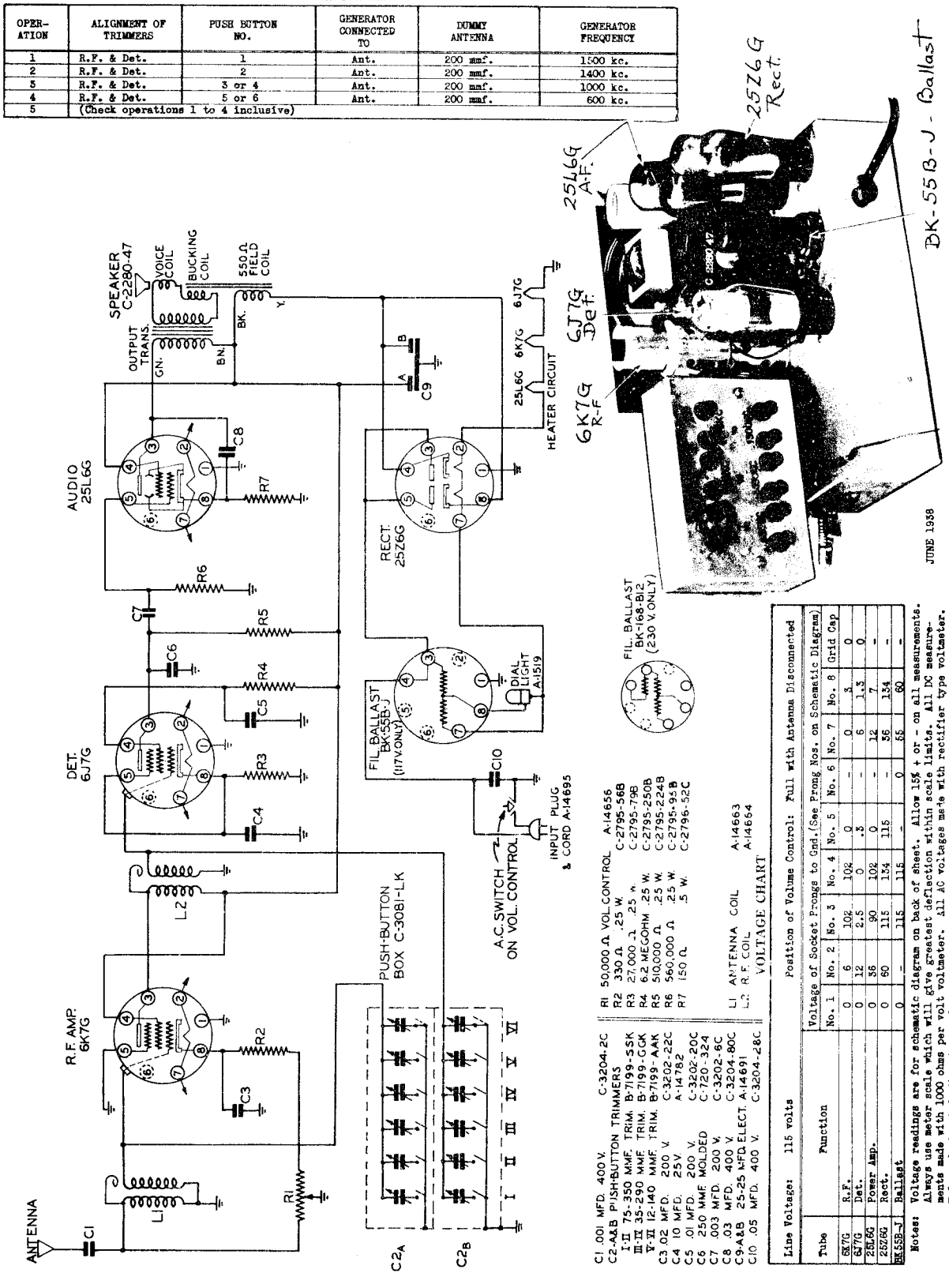
JUNE 1938

MODEL 5018
Schematic, Voltage
Alignment, Chassis

# SPARKS WITHINGTON CO.

## ALIGNMENT

| OPERATION | ALIGNMENT OF TRIMMERS | PUSH BUTTON NO. | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY |
|---|---|---|---|---|---|
| 1 | R.F. & Det. | 1 | Ant. | 200 mmf. | 1500 kc. |
| 2 | R.F. & Det. | 2 | Ant. | 200 mmf. | 1400 kc. |
| 3 | R.F. & Det. | 3 or 4 | Ant. | 200 mmf. | 1000 kc. |
| 4 | R.F. & Det. | 5 or 6 | Ant. | 200 mmf. | 600 kc. |
| 5 | (Check operations 1 to 4 inclusive) | | | | |




C1 .001 MFD. 400 V. C-3204-2C
C2-A&B PUSH-BUTTON TRIMMERS
I-II 75-350 MMF. TRIM. B-7199-SSK
III-IV 35-290 MMF. TRIM. B-7199-GCK
V-VI 12-140 MMF. TRIM. B-7199-AAK
C3 .02 MFD. 200 V. C-3202-22C
C4 .10 MFD. 25 V. A-14782
C5 .01 MFD. 200 V. C-3202-20C
C6 .250 MMF. MOLDED C-720-324
C7 .003 MFD. 200 V. C-3202-6C
C8 .03 MFD. 400 V. C-3204-80C
C9-A&B 25-25 MFD. ELECT. A-14691
C10 .05 MFD. 400 V. C-3204-28C

R1 50,000 Ω VOL. CONTROL A-14656
R2 330 Ω .25 W. C-2795-56B
R3 27,000 Ω .25 W. C-2795-79B
R4 6.2 MEGOHM .25 W. C-2795-250B
R5 510,000 Ω .25 W. C-2795-224B
R6 560,000 Ω .25 W. C-2795-95B
R7 150 Ω .5 W. C-2796-52C

L1 ANTENNA COIL A-14663
L2 R.F. COIL A-14664

VOLTAGE CHART

Position of Volume Control: Full with Antenna Disconnected

Line Voltage: 115 volts

| Tube | Function | Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagrams) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 6K7G | R.F. | 0 | 6 | 105 | 105 | 0 | - | 0 | 3 | 0 |
| 6J7G | Det. | 0 | 12 | 2.5 | 0 | .5 | - | 6 | 1.5 | 0 |
| 25L6G | Power Amp. | 0 | 36 | 90 | 105 | 0 | - | 12 | 7 | - |
| 25Z6G | Rect. | 0 | 60 | 115 | 134 | 115 | - | 56 | 134 | - |
| BK55B-J | Ballast | 0 | - | 115 | 115 | - | 0 | 55 | 60 | - |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements.
Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter.
Unless designated otherwise, voltages in table are + DC voltages.

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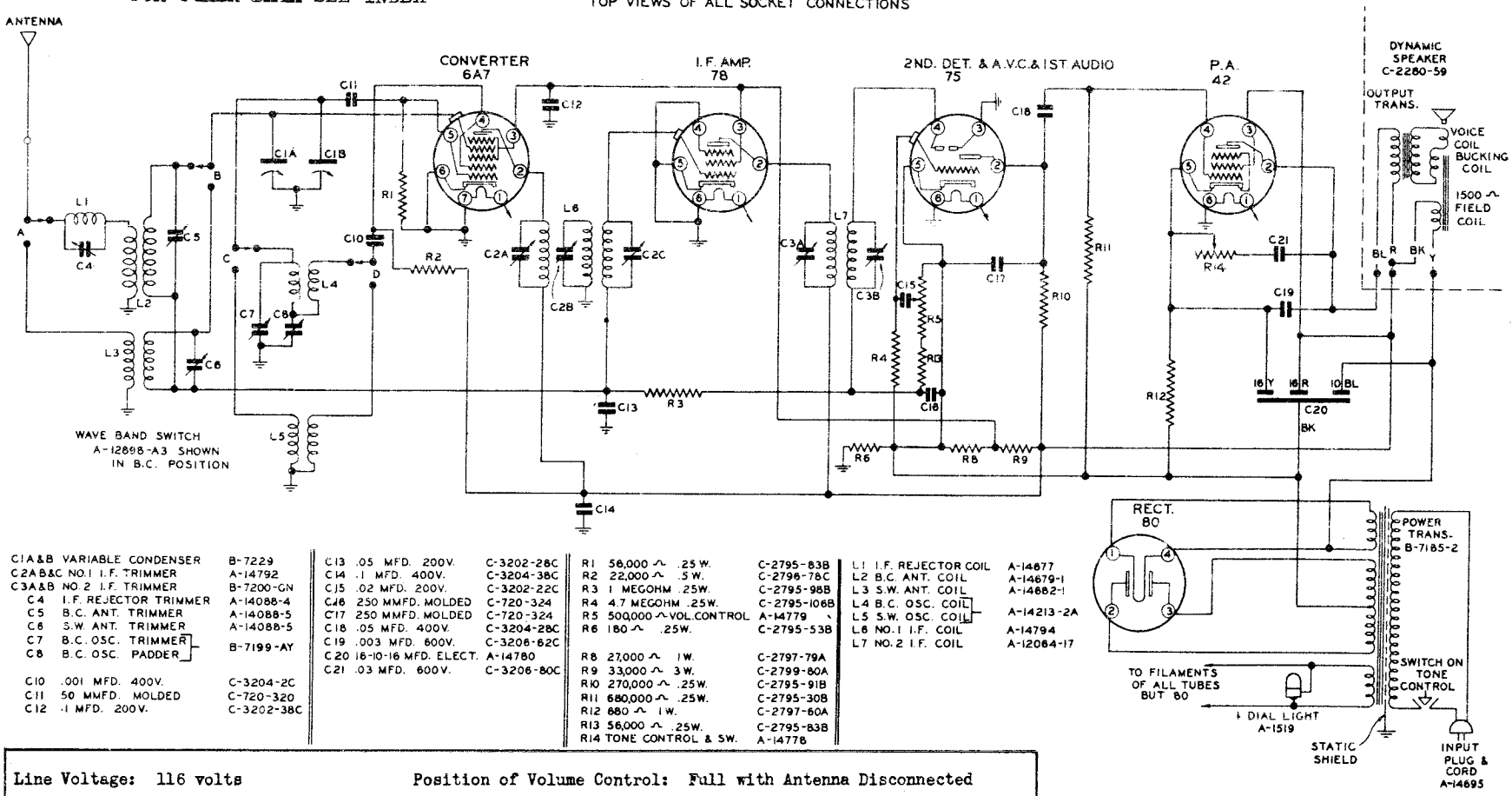
# SCHEMATIC DIAGRAM
# SPARTON SUPERHETERODYNE MODEL 5218
# INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS

FOR OTHER DATA SEE INDEX

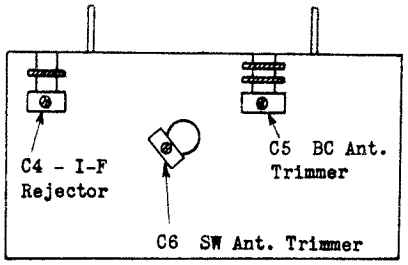



| | | | | | |
|---|---|---|---|---|---|
| C1A&B | VARIABLE CONDENSER | B-7229 | C13 .05 MFD. 200V. | C-3202-28C | R1 56,000 Ω .25 W. | C-2795-83B | L1 I.F. REJECTOR COIL | A-14677 |
| C2A B&C | NO.1 I.F. TRIMMER | A-14792 | C14 .1 MFD. 400V. | C-3204-38C | R2 22,000 Ω .5 W. | C-2796-78C | L2 B.C. ANT. COIL | A-14679-1 |
| C3A&B | NO.2 I.F. TRIMMER | B-7200-GN | C15 .02 MFD. 200V. | C-3202-22C | R3 1 MEGOHM .25W. | C-2795-98B | L3 S.W. ANT. COIL | A-14682-1 |
| C4 | I.F. REJECTOR TRIMMER | A-14088-4 | C16 250 MMFD. MOLDED | C-720-324 | R4 4.7 MEGOHM .25W. | C-2795-106B | L4 B.C. OSC. COIL | A-14213-2A |
| C5 | B.C. ANT. TRIMMER | A-14088-5 | C17 250 MMFD. MOLDED | C-720-324 | R5 500,000 Ω VOL.CONTROL | A-14779 | L5 S.W. OSC. COIL | |
| C6 | S.W. ANT. TRIMMER | A-14088-5 | C18 .05 MFD. 400V. | C-3204-28C | R6 180 Ω .25W. | C-2795-53B | L6 NO.1 I.F. COIL | A-14794 |
| C7 C8 | B.C. OSC. TRIMMER PADDER | B-7199-AY | C19 .003 MFD. 600V. | C-3206-62C | R8 27,000 Ω 1W. | C-2797-79A | L7 NO.2 I.F. COIL | A-12864-17 |
| C10 | .001 MFD. 400V. | C-3204-2C | C20 16-10-16 MFD. ELECT. | A-14780 | R9 33,000 Ω 3 W. | C-2799-80A | | |
| C11 | 50 MMFD. MOLDED | C-720-320 | C21 .03 MFD. 600V. | C-3206-80C | R10 270,000 Ω .25W. | C-2795-91B | | |
| C12 | .1 MFD. 200V. | C-3202-38C | | | R11 680,000 Ω .25W. | C-2795-30B | | |
| | | | | | R12 680 Ω 1W. | C-2797-60A | | |
| | | | | | R13 56,000 Ω .25W. | C-2795-83B | | |
| | | | | | R14 TONE CONTROL & SW. | A-14778 | | |

Line Voltage: 116 volts — Position of Volume Control: Full with Antenna Disconnected

| Tube | Function | Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 6A7 | Converter | 6.2 | 252 | 17 | 225 | -4.5 | 0 | 0 | - | 0 |
| 78 | I.F. Amp. | 6.2 | 252 | 17 | 0 | 0 | 0 | - | - | 0 |
| 75 | 2nd Det. AVC-Audio | 6.2 | 65 | 0 | -.2 | -.3 | 0 | - | - | -.2 |
| 42 | P.A. | 6.2 | 240 | 258 | 0 | 22 | 0 | - | - | - |
| 80 | Rectifier | 370 | 300 | 300 | 370 | - | - | - | - | - |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.




TRIMMER LOCATIONS UNDER CHASSIS

MODEL 5218
Alignment,Tuner
MODELS 6218,7618
Voltage,Alignment
Tuner

SPARKS WITHINGTON CO.

## HOW TO ADJUST THE SPARTON SELECTRONNE IN THE MODELS

# 5218 6218 7618

1. Select six favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. Remove the Selectronne escutcheon plate from the front of the cabinet by means of the two screws and insert the station call letter tabs. Any tab may be used for any button, but it is usually more convenient for the operator if the tabs are arranged in sequence so that the tab for the lowest frequency station (station having lowest number of kilocycles (K.C.)) will be at the extreme left.

3. Using a small screwdriver or other tool that will fit the slot in the end of the button, push the button in as far as it will go and turn to the right or left until the dial pointer has moved to the desired station frequency. Be sure the button is pushed all the way in and the station is tuned in accurately.

4. Repeat the procedure in paragraph 3 for each of the remaining five buttons.

5. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned properly.

6. Replace Selectronne escutcheon.

7. Any of the six stations to which the SPARTON Selectronne has been adjusted may now be received simply by pushing the Selectronne button for the desired station.

Model 6218,7618

## VOLTAGE CHART

**Line Voltage: 115 volts** — **Position of Volume Control: Full with Antenna Disconnected**

| Tube | Function | Voltage of Socket Prongs to Gnd.(See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 6A7 | Converter | 6.1 | 250 | 60 | 150 | -9 | 0 | 0 | - | 0 |
| 78 | I.F. Amp. | 6.1 | 250 | 60 | 0 | 0 | 0 | - | - | 0 |
| 75 | 2nd Det. AVC-Audio | 6.1 | 37 | 0 | -.5 | -1.5 | 0 | - | - | -.7 |
| 76 | Driver | 6.1 | 250 | 0 | 10 | 0 | - | - | - | - |
| 6AC5G | P.A. | 0 | 0 | 225 | 0 | 10 | 0 | 6.1 | - | - |
| 80 | Rectifier | 325 | 270 | 270 | 325 | - | - | - | - | - |
| 6E5 | Viso-Glo | 6.1 | 50 | .2 | 250 | 3 | 0 | - | - | - |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.
The Viso-Glo 6E5 is not used on Model 6218.

Models 5218; 6218,7618.

## ALIGNMENT

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | (Set dial pointer to last mark on scale when condenser plates are flush) | | | | | | | |
| 2 | I.F. | 6A7 Grid | .1 mf. | 456 KC | BC | Open | C5A,B;C2A,B,C | Adjust to approx. peak |
| 3 | | | | | | | C2B (Transfer) | Detune by tightening ½ t. |
| 4 | | | | | | | C5A,B;C2A,C | Peak accurately |
| 5 | | | | | | | C2B | Peak accurately* |
| 6 | Rejector | Ant. | 200 mmf. | 456 KC | BC | Open | C4 | Adjust to minimum |
| 7 | Broadcast Band | Ant. | 200 mmf. | 1500 KC | BC | 1500 KC | C7 BC osc trim | Peak accurately |
| 8 | | | | | | | C5 BC ant trim | Peak accurately |
| 9 | | | | 600 KC | BC | 600 KC | C8 BC osc pad | Peak accurately |
| 10 | (Repeat operations 7 and 8) | | | | | | | |
| 11 | (Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC) | | | | | | | |
| 12 | S.W. Band | Ant. | * | 18 MC | SW | 18 MC | C6 SW ant trim | ** |
| 13 | (Check calibration and sensitivity at 6.0 MC and 18 MC) | | | | | | | |
| 14 | (Check operations 1 to 13 inclusive) | | | | | | | |

*100 ohm non-inductive resistor and 200 mmf. condenser in series.
**Rock dial while making this adjustment. Make certain that adjustment is made on fundamental signal and not on image. Peak accurately.

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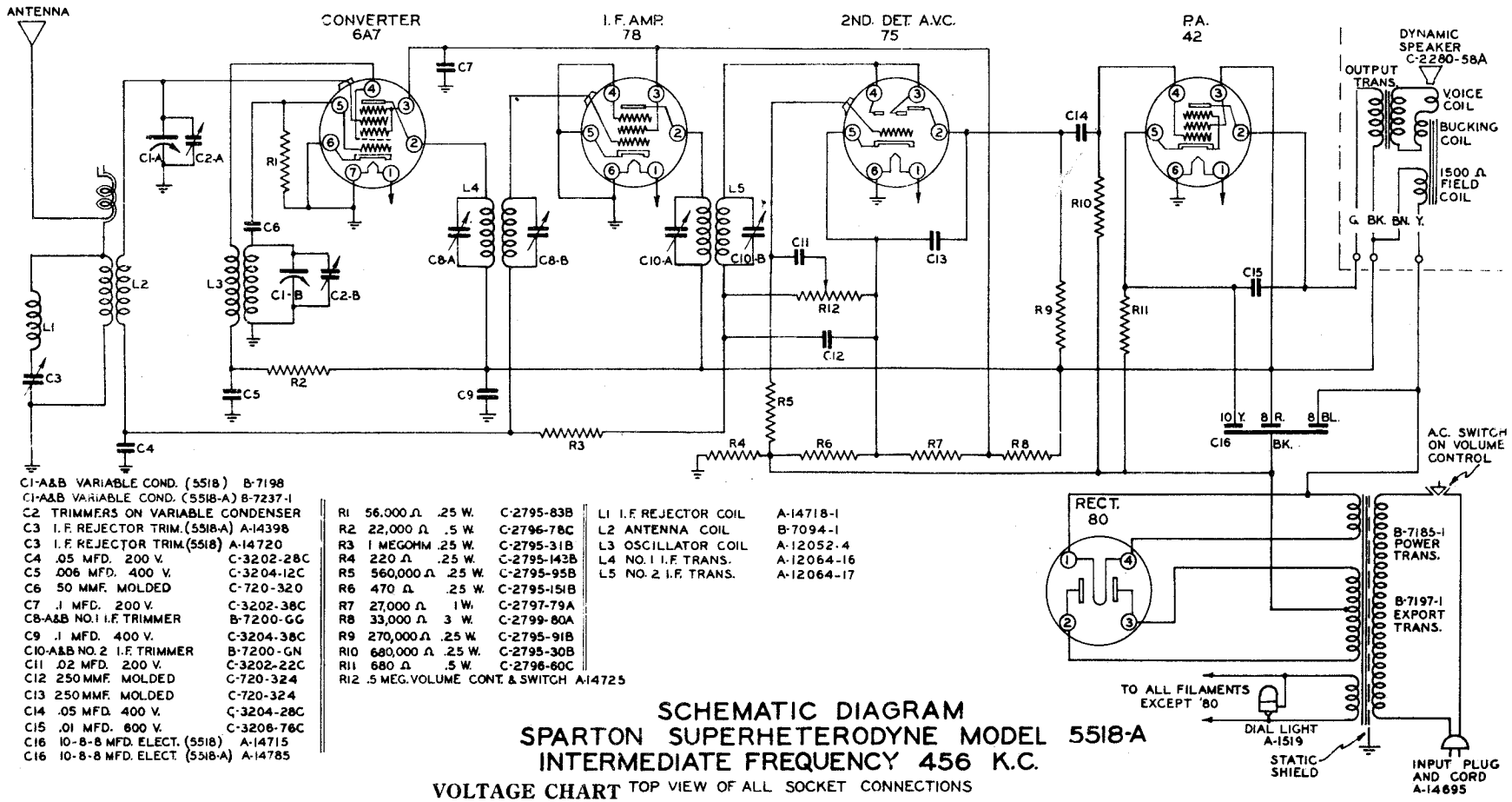



C1-A&B VARIABLE COND. (5518) B-7198
C1-A&B VARIABLE COND. (5518-A) B-7237-1

| | | |
|---|---|---|
| C2 | TRIMMERS ON VARIABLE CONDENSER | |
| C3 | I.F. REJECTOR TRIM.(5518-A) | A-14398 |
| C3 | I.F. REJECTOR TRIM.(5518) | A-14720 |
| C4 | .05 MFD. 200 V. | C-3202-28C |
| C5 | .006 MFD. 400 V. | C-3204-12C |
| C6 | 50 MMF. MOLDED | C-720-320 |
| C7 | .1 MFD. 200 V. | C-3202-38C |
| C8-A&B | NO.1 I.F. TRIMMER | B-7200-GG |
| C9 | .1 MFD. 400 V. | C-3204-38C |
| C10-A&B | NO. 2 I.F. TRIMMER | B-7200-GN |
| C11 | .02 MFD. 200 V. | C-3202-22C |
| C12 | 250 MMF. MOLDED | C-720-324 |
| C13 | 250 MMF. MOLDED | C-720-324 |
| C14 | .05 MFD. 400 V. | C-3204-28C |
| C15 | .01 MFD. 600 V. | C-3206-76C |
| C16 | 10-8-8 MFD. ELECT. (5518) | A-14715 |
| C16 | 10-8-8 MFD. ELECT. (5518-A) | A-14785 |

| | | |
|---|---|---|
| R1 | 56,000 Ω .25 W. | C-2795-83B |
| R2 | 22,000 Ω .5 W. | C-2796-78C |
| R3 | 1 MEGOHM .25 W. | C-2795-31B |
| R4 | 220 Ω .25 W. | C-2795-143B |
| R5 | 560,000 Ω .25 W. | C-2795-95B |
| R6 | 470 Ω .25 W. | C-2795-151B |
| R7 | 27,000 Ω 1 W. | C-2797-79A |
| R8 | 33,000 Ω 3 W. | C-2799-80A |
| R9 | 270,000 Ω .25 W. | C-2795-91B |
| R10 | 680,000 Ω .25 W. | C-2795-30B |
| R11 | 680 Ω .5 W. | C-2796-60C |
| R12 | .5 MEG. VOLUME CONT. & SWITCH | A-14725 |

| | | |
|---|---|---|
| L1 | I.F. REJECTOR COIL | A-14718-1 |
| L2 | ANTENNA COIL | B-7094-1 |
| L3 | OSCILLATOR COIL | A-12052-4 |
| L4 | NO. 1 I.F. TRANS. | A-12064-16 |
| L5 | NO. 2 I.F. TRANS. | A-12064-17 |

# SCHEMATIC DIAGRAM
## SPARTON SUPERHETERODYNE MODEL 5518-A
## INTERMEDIATE FREQUENCY 456 K.C.

### VOLTAGE CHART TOP VIEW OF ALL SOCKET CONNECTIONS

Line Voltage: 115 volts — Position of Volume Control: Full with Antenna Disconnected

| Tube | Function | Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 6A7 | Converter | 6.2 | 250 | 69 | 170 | -12 | 0 | 0 | - | 0 |
| 78 | I.F. Amp. | 6.2 | 250 | 69 | 0 | 0 | 0 | 0 | - | 0 |
| 75 | 2nd Det. AVC | 6.2 | 89 | -1.4 | -1.4 | -1.4 | 0 | 0 | - | 1.1 |
| 42 | Power Amp. | 6.2 | 225 | 250 | 0 | 17 | 0 | 0 | - | - |
| 80 | Rectifier | 350 | 300 | 300 | 350 | - | - | - | - | - |

Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

NOTE: Model 5518 has 6 push-buttons only -- no manual tuning. Models 5518A and 5518AX have 4 push-buttons and manual tuning. The same chassis is used in all three models with the exceptions as noted in the parts list.

JUNE 1958

MODELS 5518,5518A
5518AX

# SPARKS WITHINGTON CO.

Alignment,Chassis,Trimmers
MODELS 5518A,5518AX
Tuner Data

## ALIGNMENT

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|
| 1 | (Set dial pointer to end of scale with condenser gang closed) | | | | | | |
| 2 | I.F. | 6A7 Grid | .1 mf. | 456 | Closed | C10 A,B | (2nd I.F.) |
| | | | | | | C8 A,B | (1st I.F.) |
| 3 | Rejector | Ant. | 150 mmf. | 456 | Closed | C3 | Adjust to min. |
| 4 | Broadcast Band | Ant. | 150 mmf. | 1500 | 1500 | C2 A Ant. | |
| | | | | | | C2 B Osc. | |
| 5 | (Check for dial reading and sensitivity at 600 kc., 1000 kc.) | | | | | | |
| 6 | (Check operations 1 to 5 inclusive) | | | | | | |

1. Select four favorite nearby broadcast stations and detach the corresponding call letter tabs from the station call letter tab sheets.

2. The tabs should be inserted in the ends of the knobs. For convenience it is recommended that the call letter tabs be arranged in sequence so that the tab for the station having the highest frequency (greatest number of kilocycles (k.c.)) will be at the extreme left. This, however, is not vital, since the Selectronne will operate with any arrangement of the tabs.

3. TO ADJUST SELECTRONNE BUTTONS, loosen selected button by turning one-half turn to left (counter-clockwise). Push this loosened button in as far as it will go, and while in this position, tune in manually the station desired or indicated by tab in end of this loosened button. Then, with the button still pushed in as far as it will go, tighten by turning button to the right (clockwise) until it can be tightened no more.

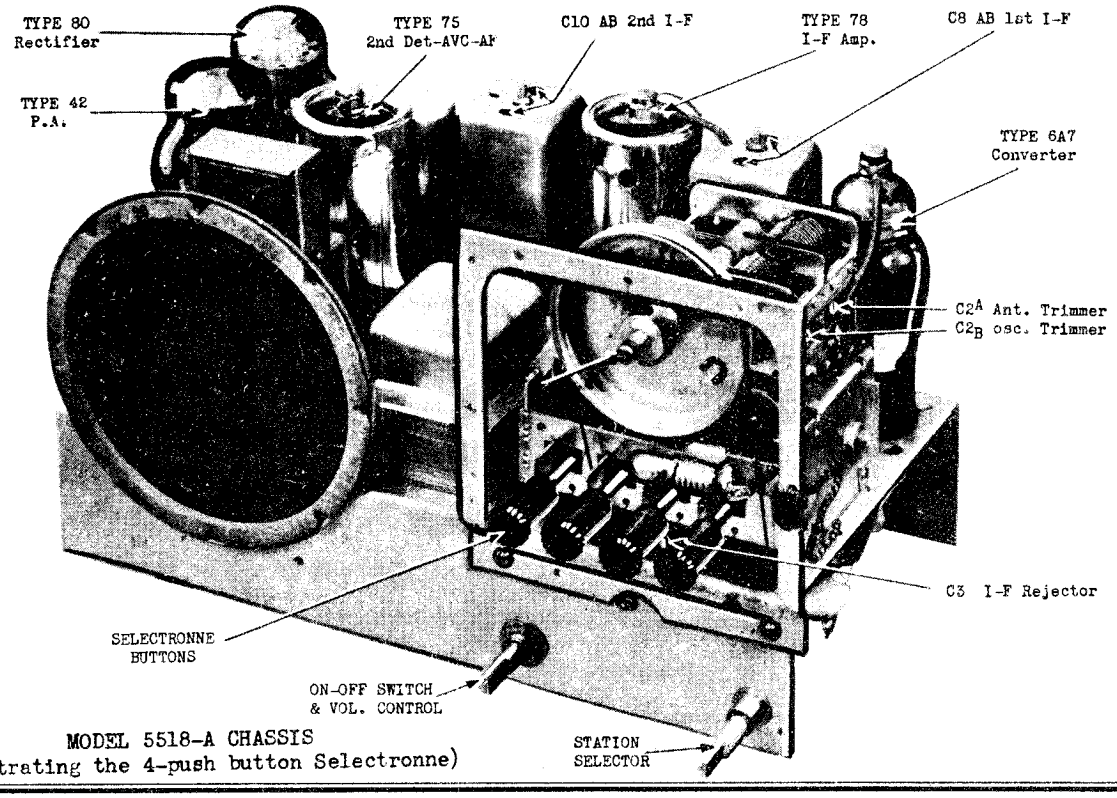
Be sure the station is tuned in accurately when pushed in button is tightened.

4. Repeat the procedure in paragraph 3 for each of the remaining three buttons and stations.

5. Be sure the Selectronne buttons have been tightened firmly.

6. Check all buttons by pushing them in, one at a time, to determine whether desired stations are tuned in properly.

7. Any of the four stations to which the SPARTON Selectronne has been adjusted may now be instantly received simply by pushing the Selectronne Button for the desired station.




MODEL 5518-A CHASSIS
(Illustrating the 4-push button Selectronne)

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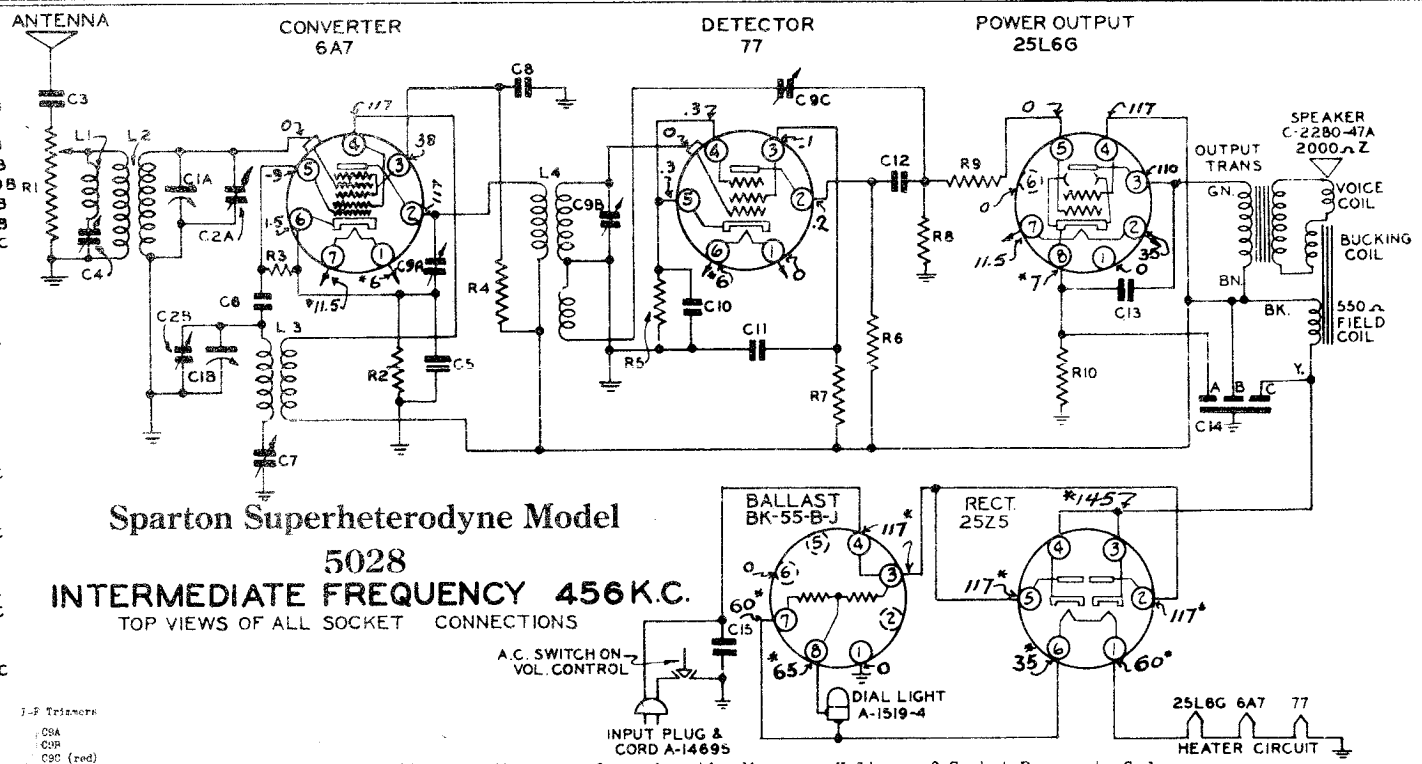
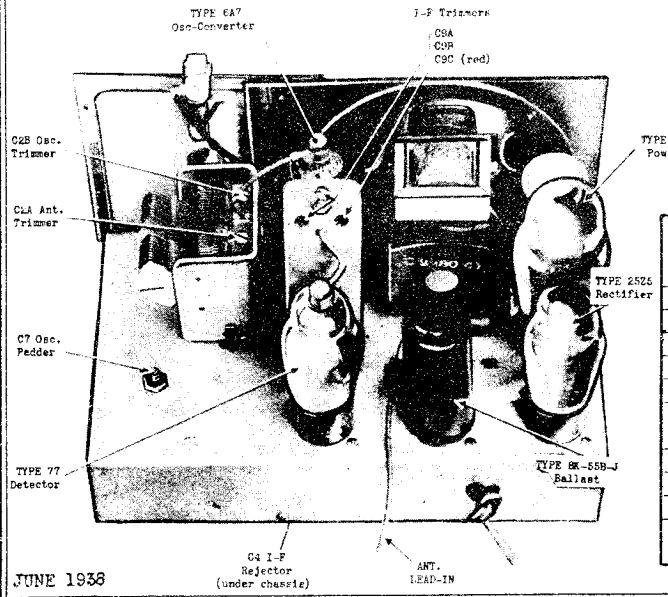
| | | |
|---|---|---|
| R1 | 50 000 Ω VOL. CONTROL | A-14656-1 |
| R2 | 390 Ω .25 W. | C-2795-57B |
| R3 | 56 000 Ω .25 W. | C-2795-83B |
| R4 | 39,000 Ω .25 W. | C-2795-81B |
| R5 | 27 000 Ω .25 W. | C-2795-79B |
| R6 | 560 000 Ω .25 W. | C-2795-95B |
| R7 | 6.2 MEGOHM .25 W. | C-2795-250B |
| R8 | 560 000 Ω .25 W. | C-2795-95B |
| R9 | 56 000 Ω .25 W. | C-2795-83B |
| R10 | 150 Ω .5 W. | C-2796-52C |
| L1 | I.F. REJECTOR COIL | A-14718-1 |
| L2 | ANT. COIL | A-14663-1 |
| L3 | OSC. COIL | A-12052-5 |
| L4 | NO. I I.F. COIL | A-12989-4 |
| C1A&B | VARIABLE CONDENSER } | B-7187 |
| C2A&B | ON VARIABLE COND. } | |
| C3 | .001 MFD. 400 V. | C-3204-2C |
| C4 | I.F. REJECTOR TRIM. | A-14398 |
| C5 | .01 MFD. 200 V. | C-3202-76C |
| C6 | 50 MMFD. MOLDED | C-720-343 |
| C7 | OSC. PADDER | A-14911-3A |
| C8 | .05 MFD. 200 V. | C-3202-28C |
| C9AB&C | I.F. TRIMMER | A-14792 |
| C10 | 10 MFD. 25 V. | A-14782 |
| C11 | .01 MFD. 200 V. | C-3202-20C |
| C12 | .05 MFD. 200 V. | C-3202-28C |
| C13 | .02 MFD. 400 V. | C-3204-78C |
| C14AB&C | 20-25-25 MFD. ELECT. | A-14907 |
| C15 | .05 MFD. 400 V. | C-3204-28C |




# Sparton Superheterodyne Model 5028

## INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS




Notes: Voltage readings are for schematic diagram. Voltage of Socket Prongs to Gnd. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages are + DC voltages. Allow 15% + or - on all measurements. *AC volts.

Line Voltage: 117 volts Position of Volume Control: Full with Antenna Disconnected

## ALIGNMENT

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | (Set dial pointer at horizontal lines at end of scale with condenser closed) | | | | | | | |
| 2 | (Back off, i.e., turn counter-clockwise, regeneration cond. C9C "red spot" before I.F. is aligned) | | | | | | | |
| 3 | I.F. | 6A7 grid | .1 mf. | 456 KC | * | Open | C9 A,B | |
| 4 | (Adjust C9C "red spot", turning in clockwise until oscil. occurs, turn out C9C until oscil. stops) | | | | | | | |
| 5 | Rejector | Ant. | 200 mmf. | 456 KC | * | Open | C4 | Adjust to minimum |
| 6 | Broadcast Band | Ant. | 200 mmf. | 1500 KC | * | 1500 KC | C2B Osc.<br>C1B Ant. | |
| 7 | | | | 600 KC | * | 600 KC | C7 Pad. | |
| 8 | (Repeat operation 6) | | | | | | | |
| 9 | (Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC) | | | | | | | |
| 10 | (Connect set to regular antenna and check reception of stations. Readjust C9C if set howls or oscillates on strong signals. Then recheck sensitivity) | | | | | | | |

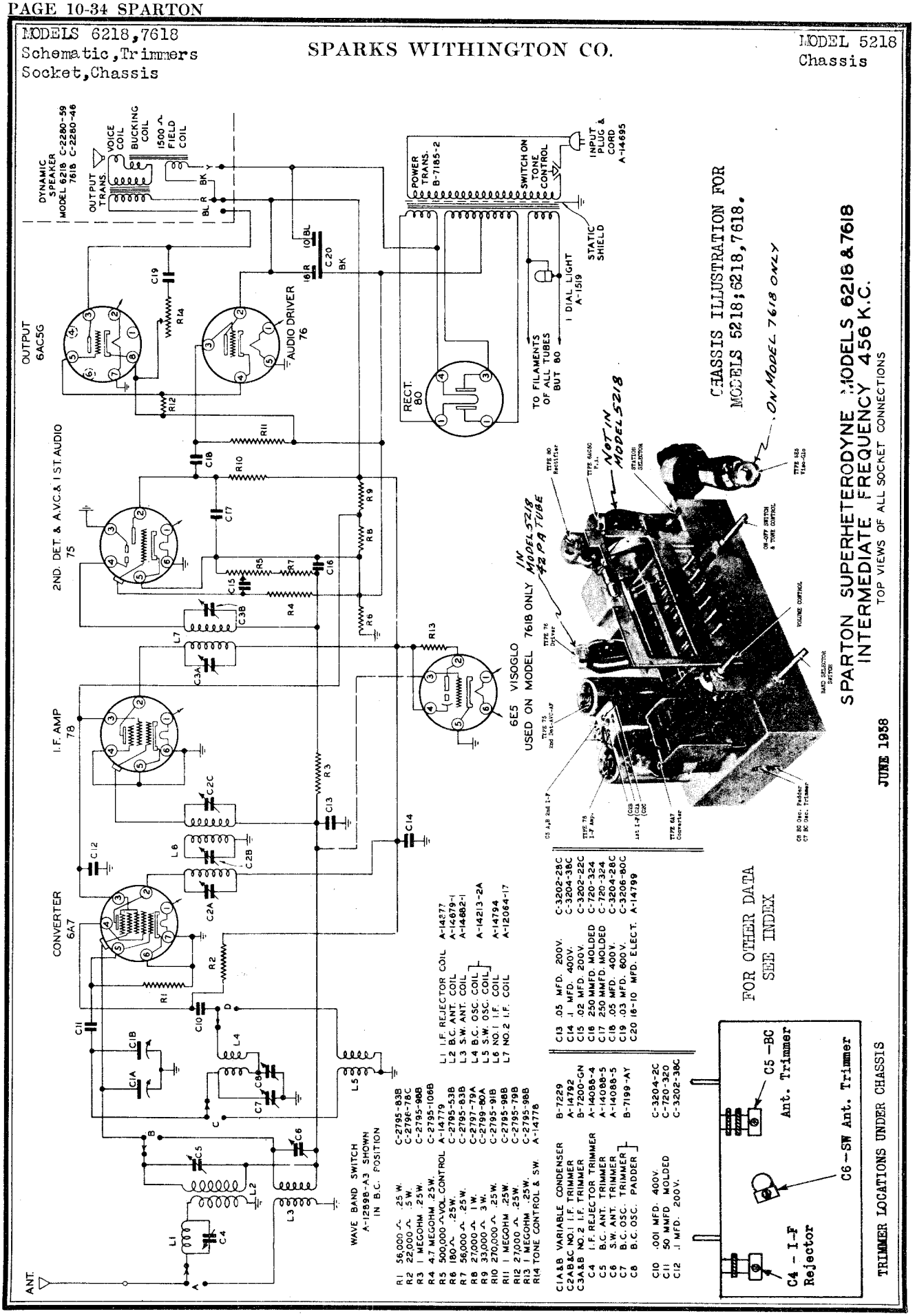
* This model has Broadcast Band only.

JUNE 1938

MODELS 6218, 7618
Schematic, Trimmers
Socket, Chassis

# SPARKS WITHINGTON CO.

MODEL 5218
Chassis


DYNAMIC SPEAKER MODEL 6218 C-2280-59 7618 C-2280-46
VOICE COIL
BUCKING COIL
1500 Ω FIELD COIL
OUTPUT TRANS.
OUTPUT 6AC5G
AUDIO DRIVER 76
2ND. DET. & A.V.C. & 1 ST. AUDIO 75
I.F. AMP 78
CONVERTER 6A7
POWER TRANS. B-7185-2
SWITCH ON TONE CONTROL
INPUT PLUG & CORD A-14695
RECT. 80
TO FILAMENTS OF ALL TUBES BUT 80
I DIAL LIGHT A-1519
STATIC SHIELD
6E5 VISOGLO USED ON MODEL 7618 ONLY
IN MODEL 5218 42 PG TUBE
NOT IN MODEL 5218
ANT.
WAVE BAND SWITCH A-12998-A3 SHOWN IN B.C. POSITION
L1 I.F. REJECTOR COIL A-14677
L2 B.C. ANT. COIL A-14679-1
L3 S.W. ANT. COIL A-14682-1
L4 B.C. OSC. COIL
L5 S.W. OSC. COIL
L6 NO. 1 I.F. COIL
L7 NO. 2 I.F. COIL
A-14213-2A
A-14794
A-12064-17
R1 56,000 Ω .25 W. C-2795-83B
R2 22,000 Ω .5 W. C-2796-78C
R3 1 MEGOHM .25 W. C-2795-98B
R4 4.7 MEGOHM .25 W. C-2795-106B
R5 500,000 Ω VOL. CONTROL A-14779
R6 180 Ω .25 W. C-2795-53B
R7 56,000 Ω .25 W. C-2795-83B
R8 27,000 Ω 1 W. C-2797-79A
R9 33,000 Ω 3 W. C-2799-80A
R10 270,000 Ω .25 W. C-2795-91B
R11 1 MEGOHM .25 W. C-2795-98B
R12 27,000 Ω .25 W. C-2795-79B
R13 1 MEGOHM .25 W. C-2795-98B
R14 TONE CONTROL & S.W. A-14778
C1A&B VARIABLE CONDENSER B-7229
C2A&C NO. 1 I.F. TRIMMER A-14792
C3A&B NO. 2 I.F. TRIMMER B-7200-GN
C4 I.F. REJECTOR TRIMMER A-14088-4
C5 B.C. ANT. TRIMMER A-14088-5
C6 S.W. ANT. TRIMMER A-14088-5
C7 B.C. OSC. TRIMMER B-7199-AY
C8 B.C. OSC. PADDER
C10 .001 MFD. 400V. C-3204-2C
C11 50 MMFD MOLDED C-720-320
C12 .1 MFD. 200V. C-3202-38C
C13 .05 MFD. 200V. C-3202-28C
C14 .1 MFD. 400V. C-3204-38C
C15 .02 MFD. 200V. C-3202-22C
C16 250 MMFD. MOLDED C-720-324
C17 250 MMFD. MOLDED C-720-324
C18 .05 MFD. 400V. C-3204-28C
C19 .03 MFD. 600V. C-3206-80C
C20 16-10 MFD. ELECT. A-14799
C5 - BC Ant. Trimmer
C6 - SW Ant. Trimmer
C4 - I-F Rejector
TRIMMER LOCATIONS UNDER CHASSIS
FOR OTHER DATA SEE INDEX
CHASSIS ILLUSTRATION FOR MODELS 5218; 6218, 7618.
ON MODEL 7618 ONLY
SPARTON SUPERHETERODYNE MODELS 6218 & 7618
INTERMEDIATE FREQUENCY 456 K.C.
TOP VIEWS OF ALL SOCKET CONNECTIONS
JUNE 1938

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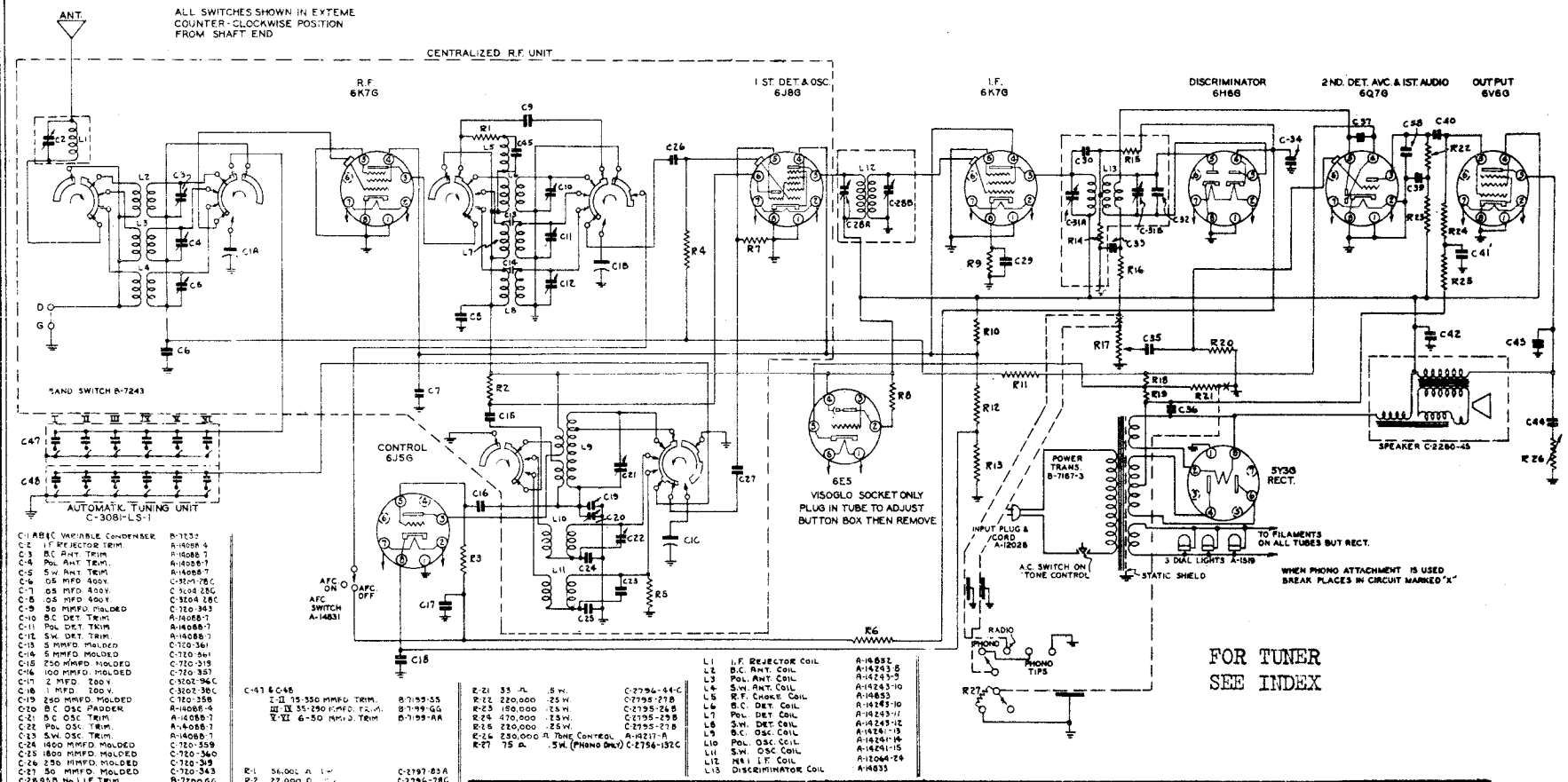



C1 A B & C VARIABLE CONDENSER B-7232
C2 I.F. REJECTOR TRIM. A-14088-4
C3 B.C. ANT. TRIM. A-14088-7
C4 Pos. ANT. TRIM. A-14088-7
C5 S.W. ANT. TRIM. A-14088-7
C6 .05 MFD. 400 V. C-3201-28C
C7 .05 MFD. 400 V. C-3204-28C
C8 .05 MFD. 400 V. C-3204-28C
C9 50 MMFD. MOLDED C-720-343
C10 B.C. DET. TRIM. A-14088-7
C11 Pos. DET. TRIM. A-14088-7
C12 S.W. DET. TRIM. A-14088-7
C13 5 MMFD. MOLDED C-720-361
C14 5 MMFD. MOLDED C-720-361
C15 250 MMFD. MOLDED C-720-319
C16 100 MMFD. MOLDED C-720-357
C17 .2 MFD. 200 V. C-3202-396
C18 .1 MFD. 200 V. C-3202-38C
C19 250 MMFD. MOLDED C-720-358
C20 B.C. OSC. PADDER A-14088-4
C21 B.C. OSC. TRIM. A-14088-7
C22 Pos. OSC. TRIM. A-14088-7
C23 S.W. OSC. TRIM. A-14088-7
C24 1400 MMFD. MOLDED C-720-359
C25 1800 MMFD. MOLDED C-720-360
C26 250 MMFD. MOLDED C-720-349
C27 50 MMFD. MOLDED C-720-343
C28 A & B No. 1 I.F. TRIM. B-7200 GG
C29 .1 MFD. 200 V. C-3202-38C
C30 25 MMFD. MOLDED C-720-382
C31 A & B No. 2 I.F. TRIM. B-7200 BG
C32 150 MMFD. SILVER CAP A-14836-15
C33 220 MMFD. MOLDED C-720-319
C34 .05 MFD. 400 V. C-3204-28C
C35 .02 MFD. 400 V. C-3204-22C
C36 .1 MFD. 200 V. C-3204-38C
C37 .02 MFD. 400 V. C-3204-22C
C38 .1 MFD. 200 V. C-3202-38C
C39 .02 MFD. 400 V. C-3204-22C
C40 30 MFD. 450 V. A-14828-E7
C41 .003 MFD. 600 V. C-3204-62C
C42 .03 MFD. 600 V. C-3204-24C
C43 15 MMFD. MOLDED C-720-340

C44 & C45
I-II 15-350 MMFD. TRIM. B-7199-55
III-IV 35-290 MMFD. TRIM. B-7199-GG
V-VI 6-50 MMFD. TRIM B-7199-AA

R1 56,000 Ω 1 W. C-2797-83A
R2 22,000 Ω 1 W. C-2796-78C
R3 390 Ω .25 W. C-2795-145B
R4 100,000 Ω .5 W. C-2796-25C
R5 10,000 Ω .25 W. C-2795-74B
R6 270,000 Ω .5 W. C-2795-91B
R7 56,000 Ω .5 W. C-2795-83B
R8 1 MEGOHM .25 W. C-2795-31B
R9 820 Ω .25 W. C-2795-61B
R10 10,000 Ω .5 W. C-2799-185A
R11 470,000 Ω .25 W. C-2795-29B
R12 8,200 Ω 1 W. C-2797-181A
R13 680 Ω .25 W. C-2795-60B
R14 1 MEGOHM .25 W. C-2795-31B
R15 1 MEGOHM .25 W. C-2795-31B
R16 47,000 Ω .25 W. C-2795-23B
R17 500,000 Ω VOL CONTROL A-14216-R
R18 1 MEGOHM .25 W. C-2795-31B
R19 120 Ω 2 W. C-2798-51A
R20 47 MEGOHM .25 W C-2795-35B

R21 33 Ω .5 W. C-2794-44-C
R22 220,000 .25 W C-2795-27B
R23 150,000 .25 W C-2795-24B
R24 470,000 .25 W. C-2795-29B
R25 270,000 .25 W. C-2795-27B
R26 250,000 Ω TONE CONTROL A-14217-A
R27 75 Ω .5 W. (PHONO ONLY) C-2796-132C

L1 I.F. REJECTOR COIL A-14832
L2 B.C. ANT. COIL A-14243-8
L3 POS. ANT. COIL A-14243-9
L4 S.W. ANT. COIL A-14243-10
L5 R.F. CHOKE COIL A-14853
L6 B.C. DET. COIL A-14245-10
L7 POS. DET. COIL A-14243-11
L8 S.W. DET. COIL A-14243-12
L9 B.C. OSC. COIL A-14241-13
L10 POS. OSC. COIL A-14241-14
L11 S.W. OSC. COIL A-14241-15
L12 NO. 1 I.F. COIL A-12064-24
L13 DISCRIMINATOR COIL A-14835

## SCHEMATIC DIAGRAM
## SPARTON SUPERHETERODYNE MODEL 8618
## INTERMEDIATE FREQUENCY 456 K.C.

TOP VIEWS OF ALL SOCKET CONNECTIONS

**JUNE 1938**

Line Voltage: 120 volts
Band Selector Switch - Broadcast

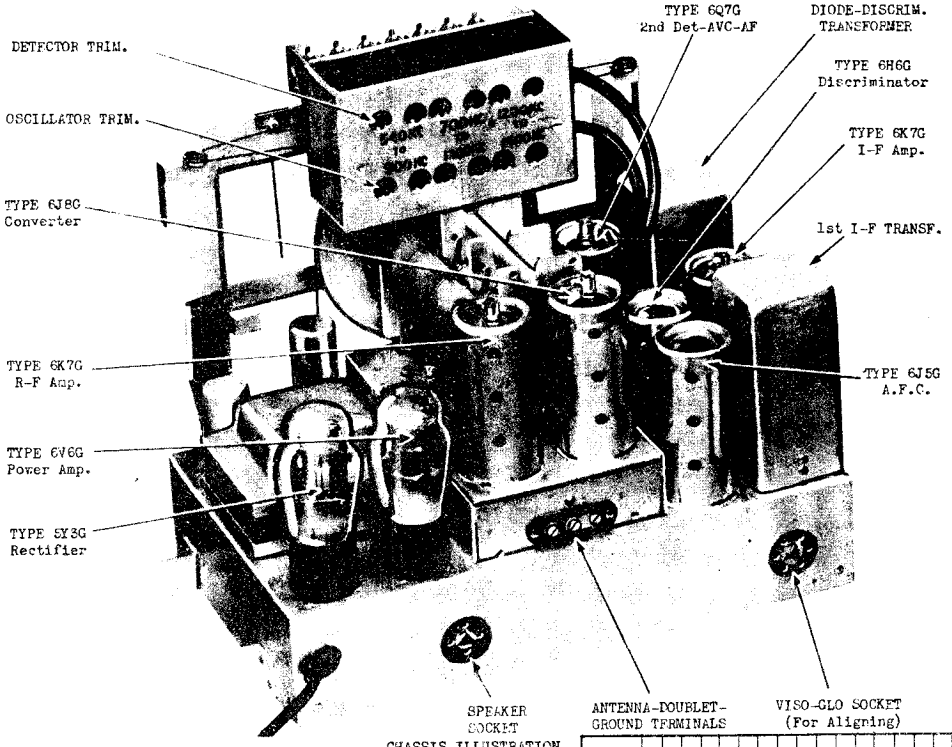
Position of Volume Control: Full with Antenna Disconnected
AFC Switch - OFF

| Tube | Function | Voltage of Socket Prongs to Gnd. (See Prong Nos. on Schematic Diagram) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | No. 1 | No. 2 | No. 3 | No. 4 | No. 5 | No. 6 | No. 7 | No. 8 | Grid Cap |
| 6K7G | R-F Amp. | 0 | 0 | 295 | 110 | 0 | - | 6.2 | 0 | 0 |
| 6J8G | Converter | 0 | 0 | 295 | 110 | -2 | 160 | 6.2 | 0 | 0 |
| 6K7G | I-F Amp. | 0 | 0 | 295 | 110 | 0 | - | 6.2 | 5 | 0 |
| 6H6G | Discriminator | 0 | 0 | .2 | 0 | .2 | - | 6.2 | 0 | - |
| 6J5G | AFC Control | 0 | 0 | 195 | 0 | 0 | - | 6.2 | 13 | - |
| 6Q7G | 2nd Det-AVC-AF | 0 | 0 | 16 | 0 | 0 | - | 6.2 | 0 | 0 |
| 6V6G | Power Amp. | 0 | 0 | 270 | 295 | -1 | - | 6.2 | 0 | - |
| 5Y3G | Rectifier | 0 | 380 | - | 380 | - | 380 | - | 380 | - |

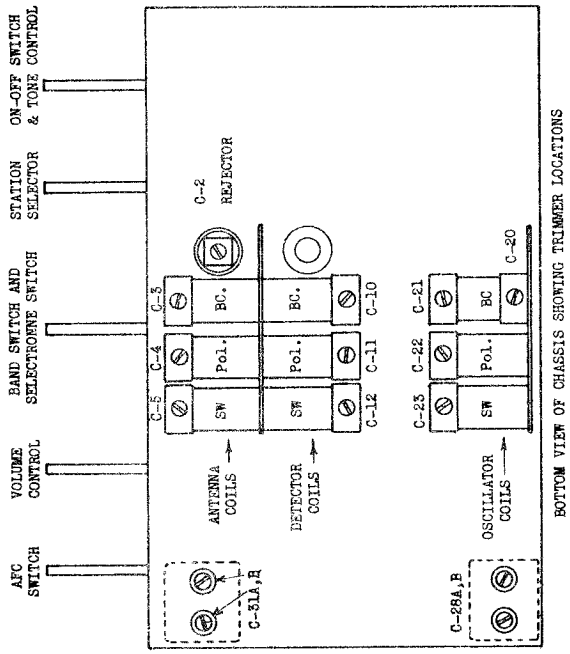
Notes: Voltage readings are for schematic diagram on back of sheet. Allow 15% + or - on all measurements. Always use meter scale which will give greatest deflection within scale limits. All DC measurements made with 1000 ohms per volt voltmeter. All AC voltages made with rectifier type voltmeter. Unless designated otherwise, voltages in table are + DC voltages.

MODEL 8618
Alignment, Socket
Trimmers, Chassis

# SPARKS WITHINGTON CO.




CHASSIS ILLUSTRATION




BOTTOM VIEW OF CHASSIS SHOWING TRIMMER LOCATIONS

## ALIGNMENT

| OPERATION | ALIGNMENT OF | GENERATOR CONNECTED TO | DUMMY ANTENNA | GENERATOR FREQUENCY | BAND SWITCH SETTING | TUNING COND. SETTING | TRIMMER | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 1 | (Set pointer to last mark below 550 KC with tuning condenser plates flush) | | | | | | | |
| 2 | I.F. | 6J8 Grid | .1 mfd. | 456 | BC | Open | C28,31(A,B) | Adjust to max. AFC off. |
| 3 | Rejector | Ant. | 200 mmf. | 456 | BC | Closed | C-2 | Adjust to minimum. |
| 4 | Broadcast Band | Ant. | 200 mmf. | 1500 | BC | 1500 | C21 Osc.<br>C10 RF<br>C-3 Ant. | |
| 5 | | | | 600 | BC | 600 | C20 Pad. | |
| 6 | (Repeat operation 4) | | | | | | | |
| 7 | (Check calibration and sensitivity at 600 KC, 1000 KC and 1500 KC) | | | | | | | |
| 8 | (Check operation of AFC circuit*) | | | | | | | |
| 9 | Police Band | Ant. | 100 ohm<br>200 mmf.<br>series | 5 MC. | Police | 5 MC. | C22 Osc.<br>C11 RF<br>C4 Ant. | |
| 10 | (Check calibration and sensitivity at 1.9 MC., 4.0 MC. and 5 MC.) | | | | | | | |
| 11 | Short Wave Band | Ant. | 100 ohm<br>200 mmf.<br>series | 15 MC. | S.W. | 15 MC. | C23 Osc.<br>C12 RF<br>C5 Ant. | |
| 12 | (Check calibration and sensitivity at 6.0 MC., 9.0 MC. and 15 MC.) | | | | | | | |

*Check operation of AFC circuit by connecting generator to grid cap of 6J8 and tune generator and receiver to 1500 KC. Increase generator signal so that Viso-Glo just closes. Tune accurately with AFC switch "OFF". Now snap AFC switch "ON" and note the sensitivity as indicated on the Viso-Glo. If the sensitivity changes, the AFC (Discriminator) is not properly aligned and should be touched up (trimmer C-31B) until the AFC switch can be snapped "ON" and "OFF" without any change on the Viso-Glo.

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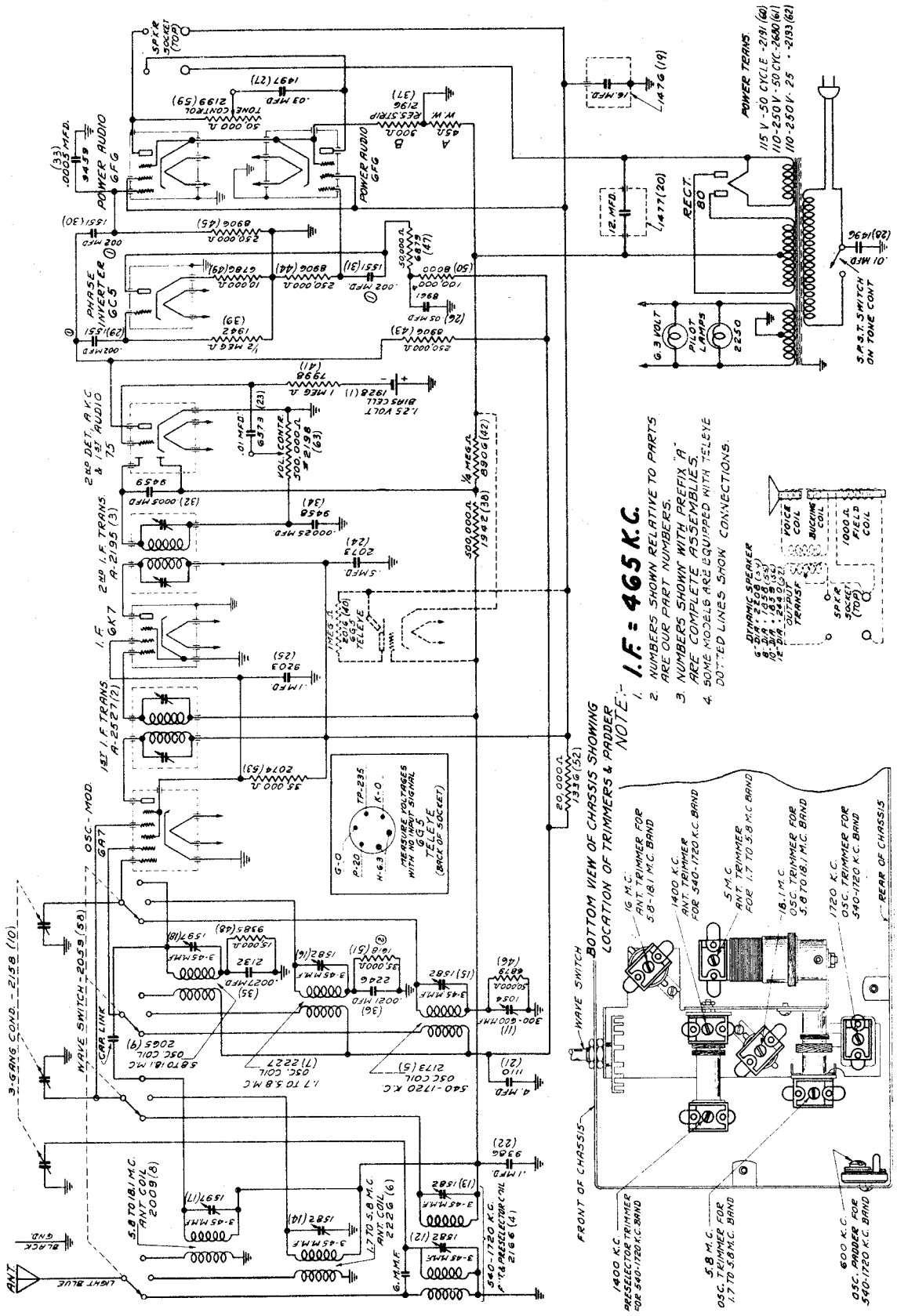
# SPIEGEL INC.

MODEL 134, Chassis 46A
Schematic, Trimmers


I.F. = 465 K.C.
NOTE:-
1. NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
2. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.
3. SOME MODELS ARE EQUIPPED WITH TELEYE
4. DOTTED LINES SHOW CONNECTIONS.
BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDER
FRONT OF CHASSIS
REAR OF CHASSIS
WAVE SWITCH
16 M.C. ANT. TRIMMER FOR 5.8-18.1 M.C. BAND
1400 K.C. ANT. TRIMMER FOR 540-1720 K.C. BAND
5 M.C. ANT. TRIMMER FOR 1.7 TO 5.8 M.C. BAND
18.1 M.C. OSC. TRIMMER FOR 5.8 TO 18.1 M.C. BAND
1720 K.C. OSC. TRIMMER FOR 540-1720 K.C. BAND
1400 K.C. PRESELECTOR TRIMMER FOR 540-1720 K.C. BAND
5.8 M.C. OSC. TRIMMER FOR 1.7 TO 5.8 M.C. BAND
600 K.C. OSC. PADDER FOR 540-1720 K.C. BAND
POWER TRANS.
115 V-50 CYCLE-2191 (60)
110-250 V-50 CYC.-2680 (61)
110-250 V-25 " -2193 (62)
RECT. 80
G.3 VOLT PILOT LAMPS 2250
S.P.S.T. SWITCH ON TONE CONT
POWER AUDIO GFG
PHASE INVERTER GC5
2ND DET. A.V.C. & 1ST AUDIO 75
1.25 VOLT BIAS CELL 1928
VOL. CONTR. 2198
2ND I.F. TRANS A-2195 (3)
I.F. 6K7
1ST I.F. TRANS A-2527 (2)
OSC.-MOD. 6A7
WAVE SWITCH-2059 (58)
3-GANG COND.-2158 (10)
CAR LINK
5.8 TO 18.1 M.C. OSC. COIL 2065 (9)
1.7 TO 5.8 M.C. OSC. COIL (7) 2227
540-1720 K.C. OSC. COIL 2173 (5)
5.8 TO 18.1 M.C. ANT. COIL 2009 (8)
1.7 TO 5.8 M.C. ANT. COIL 2226 (6)
540-1720 K.C. PRESELECTOR COIL 2166 (4)
MEASURE VOLTAGES WITH NO INPUT SIGNAL GC5 TELEYE (BACK OF SOCKET)
TELEYE
DYNAMIC SPEAKER
VOICE COIL
BUCKING COIL
FIELD COIL
OUTPUT TRANSF.
SPKR. SOCKET (TOP)
ANT
GND.
BLACK
LIGHT BLUE

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MODEL 134, Chassis 46A
Alignment, Voltage, Socket
Tuning Eye Notes

SPIEGEL INC.

## ALIGNMENT PROCEDURE:

Realignment of this receiver should never be necessary unless one of the oscillator, antenna, or I. F. coils has been replaced. Lack of sensitivity, selectivity, and poor tone quality may be due to any one or a combination of causes, such as weak or defective tubes or speaker, inadequate or excessively long antenna, open or grounded bias resistor, bypass condenser, etc. Under no circumstances should realignment be attempted until all other possible sources have been first thoroughly investigated and have been definitely proven not to be the cause.

If an I. F. tube is replaced it is advisable to realign the I. F. Amplifier particularly if the replacement tube is one of a different manufacture than the one in the receiver. It is important when aligning to carefully follow the procedure in the order given, otherwise the receiver will lack sensitivity and the dial calibration will be incorrect.

IT IS IMPERATIVE THAT AN ACCURATELY CALIBRATED OSCILLATOR BE USED WITH SOME TYPE OF OUTPUT MEASURING DEVICE.

**INTERMEDIATE ALIGNMENT:**

1. Connect the high side of the test oscillator output to the control grid of the 6D6 modulator tube through a .02 Mfd. condenser. Leave the grid cap connected to the grid terminal of the tube, and connect the ground side of the test oscillator to the receiver ground.
2. Set the test oscillator frequency to 465 kilocycles (this must be accurate).
3. Align the second intermediate transformer by turning one of the trimmer screws accessible through holes in the top of the transformer shields up and down (increasing and decreasing capacity) until maximum reading is obtained on the output meter, after which adjust the other trimmer screw of the same transformer for maximum sensitivity.
4. Adjust the first intermediate transformer in the same manner as the second I. F. transformer.

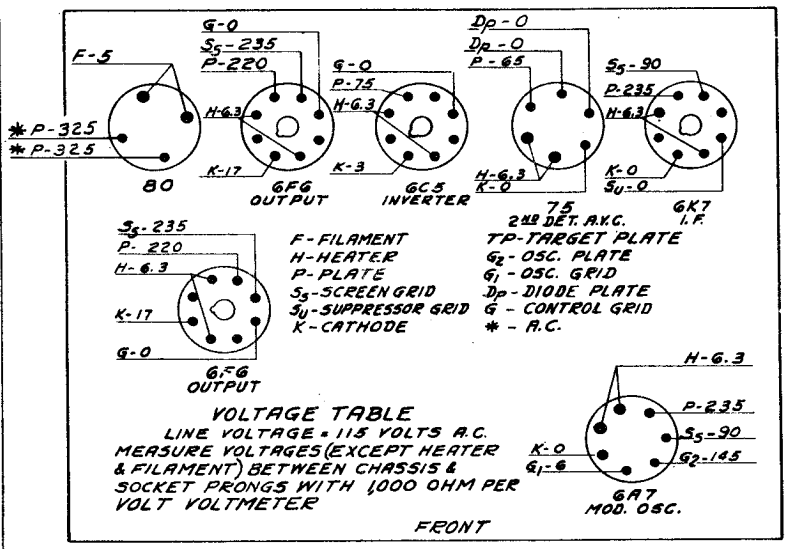
**TO ALIGN THE VARIABLE CONDENSER:**

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.
2. Place the band selector switch for operation on the 5.8 to 18.1 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.1 MEGACYCLES.

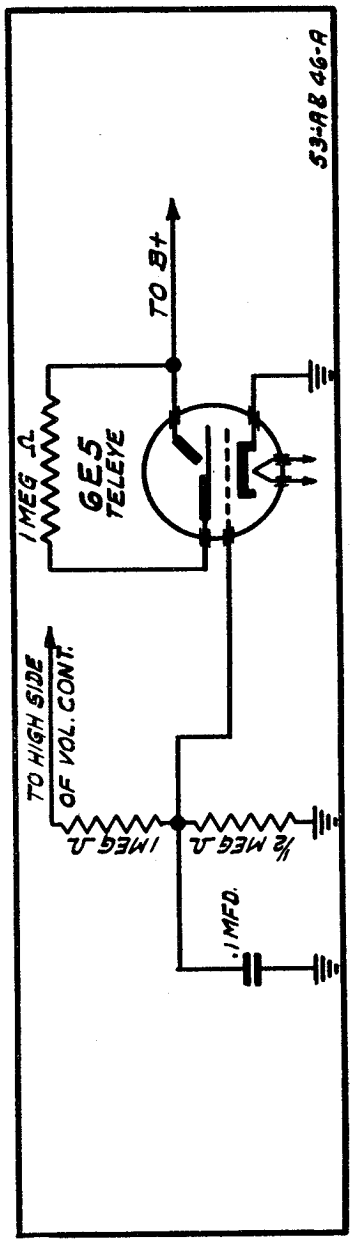
Tune in the 18.1 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.1 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER at 18.1 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillator trimmer at 18.1 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.1 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.1 megacycles, and if the fundamental peak was used in aligning at 18.1 megacycles the test oscillator signal will be heard at approximately 17.1 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.1 megacycle oscillator trimmer must be properly readjusted.

3. With band selector switch set for operation on 5.8 to 18.1 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 16 MEGACYCLES. Adjust 16 megacycle antenna trimmer for maximum 16 megacycle signal sensitivity.
4. Place band selector switch for operation on 1.7 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES. BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.
5. With the band selector switch set for operation on the 1.7 to 5.8 megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna trimmer for maximum 5 megacycle signal sensitivity.
6. Replace the 400 ohm resister in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1720 kilocycle band, tune receiver dial, and set test oscillator frequency to EXACTLY 1720 KILOCYCLES. NEXT BRING IN THE 1720 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1720 KILOCYCLE OSCILLATOR TRIMMER.
7. With band selector switch placed for operation on the 540 to 1720 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycle preselector and antenna trimmers for maximum 1400 kilocycle signal sensitivity.
8. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.




BOTTOM VIEW OF CHASSIS

Some of these model receivers were equipped with "Teleye" the cathode ray visual tuning indicator. A 6E5 tube was used in early production models, which was replaced by a 6G5 tube in later production. The parts and connections shown in the dotted lines on the complete circuit diagram are used only when a 6G5 "Teleye" tube is incorporated in the receiver. The diagram below shows 6E5 tube connections.

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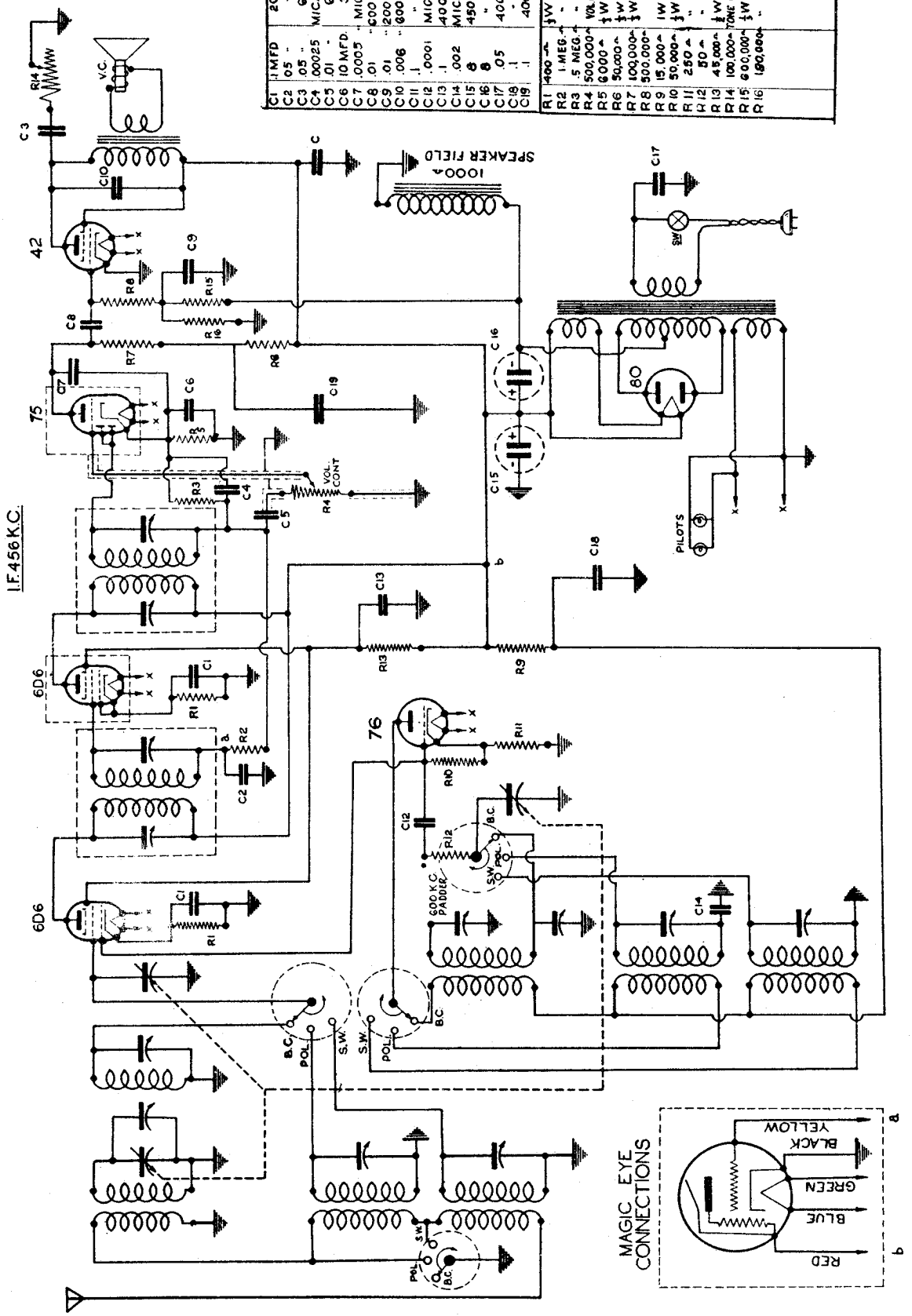
# SPIEGEL INC.

MODELS 160,180,184,6500,6504
6518,6546,6550,6562,6564
Chassis 603 (1936)
Schematic

| | | |
|---|---|---|
| C1 | .1 MFD | 200 V |
| C2 | .05 " | " |
| C3 | .05 " | 600 V |
| C4 | .00025 " | MICA |
| C5 | .01 " | 600 V |
| C6 | .10 MFD. | 35 V |
| C7 | .0005 " | MICA |
| C8 | .01 " | 600 V |
| C9 | .01 " | 200 V |
| C10 | .006 " | 600 V |
| C11 | .1 " | " " |
| C12 | .0001 " | MICA |
| C13 | .1 " | 400 V |
| C14 | .002 " | MICA |
| C15 | 8 " | 450 V |
| C16 | 8 " | " " |
| C17 | .05 " | 400 V |
| C18 | .1 " | " " |
| C19 | .1 " | 400 V |

| | | |
|---|---|---|
| R1 | 400 Ω | 1/2 W |
| R2 | 1 MEG. " | " " |
| R3 | .5 MEG. " | " " |
| R4 | 500,000 Ω | VOL CONT |
| R5 | 6000 Ω | 1 W |
| R6 | 50,000 Ω | 1 W |
| R7 | 100,000 Ω | 1 W |
| R8 | 500,000 Ω | 1 W |
| R9 | 15,000 Ω | 1 W |
| R10 | 30,000 Ω | 1 W |
| R11 | 250 Ω | " " |
| R12 | 50 Ω | " " |
| R13 | 45,000 Ω | 1 W |
| R14 | 100,000 Ω | TONE CONT |
| R15 | 600,000 Ω | 1 W |
| R16 | 190,000 Ω | " " |

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MODELS 178, 6708, 6754 (1936) Chassis 15

## ALIGNMENT DATA AND SERVICING

### GENERAL DATA

The alignment of this receiver requires the use of a test oscillator which will cover the frequencies of 456, 600, 1400, 1800, 4000, 6000, and 14,000 KC and an output meter which is to be connected across the primary or secondary of the output transformer. If possible, all alignments should be made with the volume control on maximum and the test oscillator output as low as possible, to prevent the AVC from operating and giving false readings.

### CORRECT ALIGNMENT PROCEDURE

The intermediate frequency (I.F.) stages should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, either or both of the Short Wave Bands may be aligned.

### I.F. ALIGNMENT

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all five I.F. trimmers to peak or maximum reading on the output meter. As there are two stages of I.F. in this receiver, there will be consequently three I.F. transformers to align. The I.F. transformer nearest the type (30) diode detector has only one trimmer, (single tuned) and should be the first adjustment. Next adjust the center I.F. transformer, which has two trimmers (double tuned) for maximum output; then adjust the two trimmers on the input I.F. transformer (double tuned) for peak.

### BROADCAST BAND ALIGNMENT

Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the broadcast oscillator trimmer to peak. (See drawing for location.) After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the preselector circuit. Then adjust the Broadcast Band R. F. trimmer to peak. This trimmer aligns the grid or input circuit of the 1C6 tube. (See drawing for position of Broadcast R. F. trimmer). Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the B. C. oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the exact way to adjust the oscillator to the R.F. section. (For location of B.C. padding condenser see drawing.) Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.
This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band.

### FOREIGN BAND ALIGNMENT

The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers marked and illustrated in the drawing as S.W. oscillator and S.W. trimmer. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. Set the receiver pointer to 14,000 KC (also test oscillator).
Then proceed to adjust these two trimmers for peak at 14,000 KC (adjust oscillator trimmer first) and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band.
**Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

### POLICE BAND

In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with a .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment.
Set the receiver pointer to 4000 KC (also test oscillator) and adjust the Police Band oscillator circuit trimmer to peak.
After this has been carefully done, the next step is to adjust the Police Band antenna trimmer to peak.
Now reset the dial pointer and the test oscillator to 1800 KC in preparation for adjusting the police band padding condenser.
Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated, but is the easiest way to correctly adjust the oscillator to the R.F. or antenna section. Return to 4000 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made 1800 KC.
If it is found that in returning to 4000 KC the pointer is accurately on scale, no further adjustment should be necessary (in this recheck). If the pointer is found off scale, it may be corrected and put on scale by readjustment of the police band oscillator trimmer. Alignment of the pointer can only be corrected by adjustment of the oscillator trimmer.
**Important:** The adjustment, the Police Band Oscillator Trimmer, Police Band Antenna Trimmers and Police Band Padding Trimmers are the only three adjustments required in aligning this band.

## SERVICE DATA FOR ALL BANDS

If it is suspected that the oscillator has stopped but is doubtful due to the presence of the usual amount of noise level, it is suggested that the oscillator plate voltage be checked. To ascertain whether the tube is oscillating, ground the oscillator grid of the 1C6 (short stator and rotor plates of oscillator section on gang condenser). If oscillating properly, grounding the grid will cause an appreciable drop in oscillator voltage.

| | |
|---|---|
| P189 | 1st & 2nd I. F. Transformer |
| P529 | Tube Shield, Small |
| P392 | A Battery Cord |
| P402 | Vibrator Unit |
| P411 | 500 Ohm Filter Choke |
| P452 | Tube Shield, Large |
| P456 | R. F. Choke |
| P457 | A. Choke |
| P551 | Type 30 Tube Socket |
| P553 | Type 34 Tube Socket |
| P554 | Type 1C6 Tube Socket |
| P687 | Type 19 Tube Socket |
| P686 | Single Tuned I. F. Transformer |
| P688 | Bias Cell |
| P786 | Gang Candohm |
| P719 | Input Audio Transformer |
| P767 | 1 Ohm Candohm |
| P768 | R. F. Choke Coil |
| P769 | R. F. Choke Coil B |
| P807A | Escutcheon Plate With Glass |
| P945 | Speaker Socket |
| P954 | Transformer With Brackets |
| P958 | Dual 8 MFD. Elec. Condenser |
| P973 | Speaker Plug |
| P975 | 6" Permanent Magnet Speaker |
| P980 | 8" Permanent Magnet Speaker |
| P1026 | Tone Control |
| P1038 | Large Knob |
| P1040 | Small Knob |
| P1129 | 3 Gang Variable Condenser |
| P1130 | Tilt Dial Complete |
| P1131 | Volume Control With Switch |
| P1135 | 2 Gang Wave Switch |
| P1138 | Broad Cast Oscillator Coil |
| P1137 | Pre-Selector Coil |
| P1140 | 3 Gang Trimmer Condenser |
| P617 | Padding Condenser |
| P1129 | 1600 MMF Padding Condenser |
| P1164 | 6 Volt .15 AMP. Pilot Light |
| P278 | 1,000 Ohm Resistor ¼ Watt |
| P136 | 250 Ohm Resistor ¼ Watt |
| P137 | 500,000 Ohm Resistor ¼ Watt |
| P162 | 1 Megohm Resistor ¼ Watt |
| P166 | 25,000 Ohm Resistor ¼ Watt |
| P168 | 8,000 Ohm Resistor ¼ Watt |
| P417 | 50,000 Ohm Resistor ¼ Watt |
| P142 | .10-200V Condenser |
| P147 | .00025 Mica Condenser |
| P148 | .05-200V Condenser |
| P335 | .01-600V Condenser |
| P339 | .02-200V Condenser |
| P395 | .50-10V Condenser |
| P480 | .0001 Mica Condenser |
| P1079 | .01-1000V Condenser |
| P672 | .001 Mica Condenser |
| P334 | .05-400V Condenser |
| | **STRAIGHT DIAL MODEL** |
| P1142 | Volume Control |
| P1058 | Tone Control |
| P1143 | Wave Switch |
| P1144 | Straight Dial CPT |
| P906A | Escutcheon Plate |

MODELS 160, 180, 184, 6500, 6504, 6518, 6546, 6550, 6562, 6564, MODEL 603, (1936)

In case of faulty operation of the receiver, first make sure that the antenna and ground are in good condition and properly attached to the receiver. Then determine if any of the tubes are faulty. In case of trouble within the receiver itself, the circuit diagram shown on the opposite page will be useful to the service man in locating and correcting the trouble.

**I. F. Alignment:**

Connect a test oscillator or signal generator through a .1 mfd. condenser to the grid of the 6D6 tube and set the oscillator to 456 KC. Use an output meter connected to the speaker if possible, to obtain the most accurate adjustments. Peak each I. F. stage to maximum response, reducing the output of the oscillator as far as possible for final adjustments.

**R. F. Alignment:**

With test oscillator set at 1400 KC, feed this signal into the antenna lead of the receiver through a .00025 condenser. With band switch in broadcast position, set the dial pointer to 1400 KC.

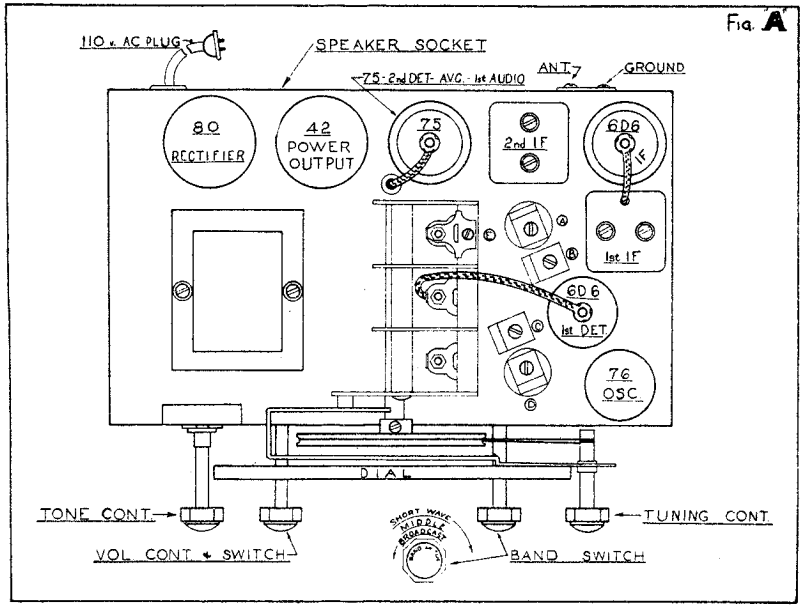
Adjust the broadcast oscillator trimmer (the small trimmer attached to the coil located approximately in front of the range switch) to peak at 1400 KC. Next adjust the trimmer on the preselector (this coil is mounted in the center at the front of the chassis). Then adjust the one trimmer on top of the gang condenser.

Now set the test oscillator to 600 KC. Adjust the broadcast padder condenser (the ceramic-base condenser adjustable through the right hand end of the chassis) in this manner: Move the dial slowly and repeatedly back and forth across the signal while adjusting the padder. Adjust for maximum gain.

Now set the range switch to middle wave band. Adjust the test oscillator to 4000 KC, and set the dial to 400 KC. Adjust the two trimmers located on the tops of the two short wave coils, on top of the chassis, for maximum gain.

Now set the range switch to the short wave position, adjust the test oscillator to 15 megacycles. Turn the dial to read 15 megacycles. Adjust for maximum gain the two trimmers located at the bases of the short wave coils.

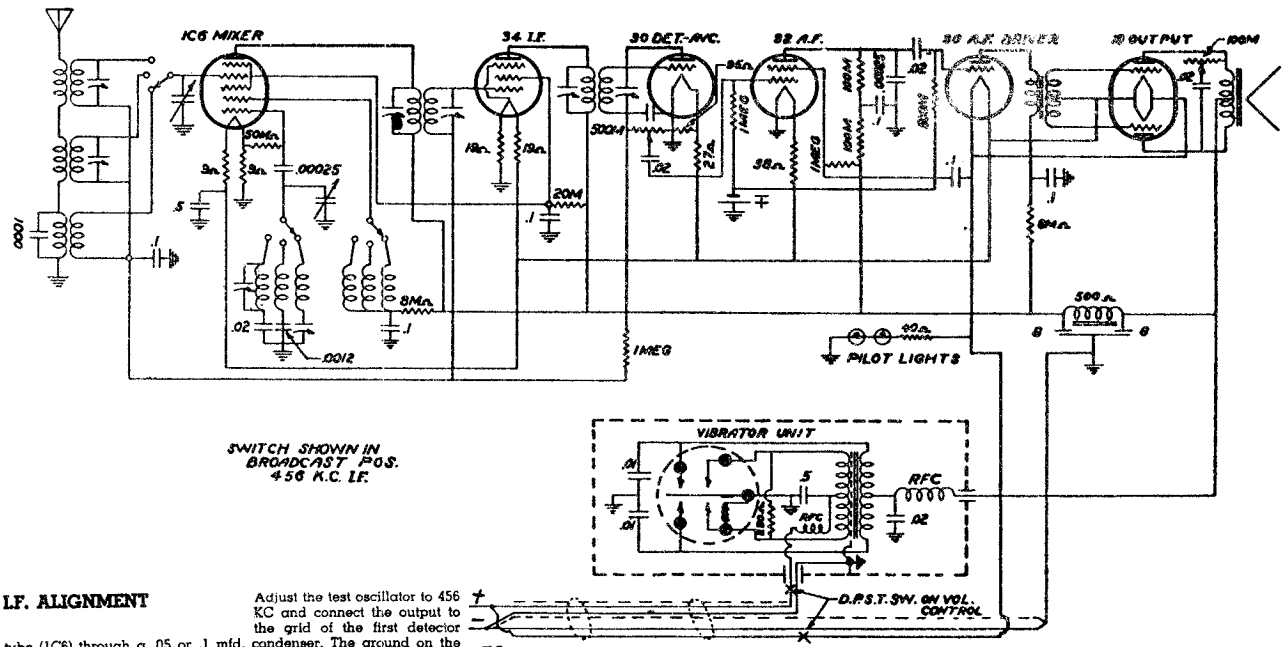
Fig. A



Schematic, Socket, Trimmers Alignment

# SPIEGEL INC.

MODELS 102, 104, 112, 114, 124 172, 6750, 6752 Chassis Z4




**I.F. ALIGNMENT**

Adjust the test oscillator to 456 KC and connect the output to the grid of the first detector tube (1C6) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

**BROADCAST BAND ALIGNMENT**

Adjust the oscillator to 1400 KC and connect the output to the antenna post marked "A" through a .0001 mfd. mica condenser to give the equivalent of an antenna about 60 feet. Set the receiver pointer to 1400 KC and adjust the rear gang condenser trimmer (oscillator circuit) to peak. After this has been carefully done, the next step is to adjust the front trimmer of the gang condenser to peak. The front condenser section tunes the RF or grid circuit of the 1C6 tube. Next, re-set the dial pointer on the receiver and the test oscillator to 600 KC. Slowly increase or decrease the oscillator padding condenser and at the same time continuously tune back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the R.F. section. The padding condenser is located on the left hand side of the chassis, directly to the left of the 1C6 tube and in front of the first I.F. transformer. Return to 1400 KC and again go over the adjustments of this frequency to be certain that they were not put slightly out of alignment when adjustment was made at 600 KC.

This completes the correct sequence of operations in properly aligning the receiver for the Broadcast Band, and **must always be done before** attempting to align the Short Wave Bands.

**FOREIGN BAND ALIGNMENT**

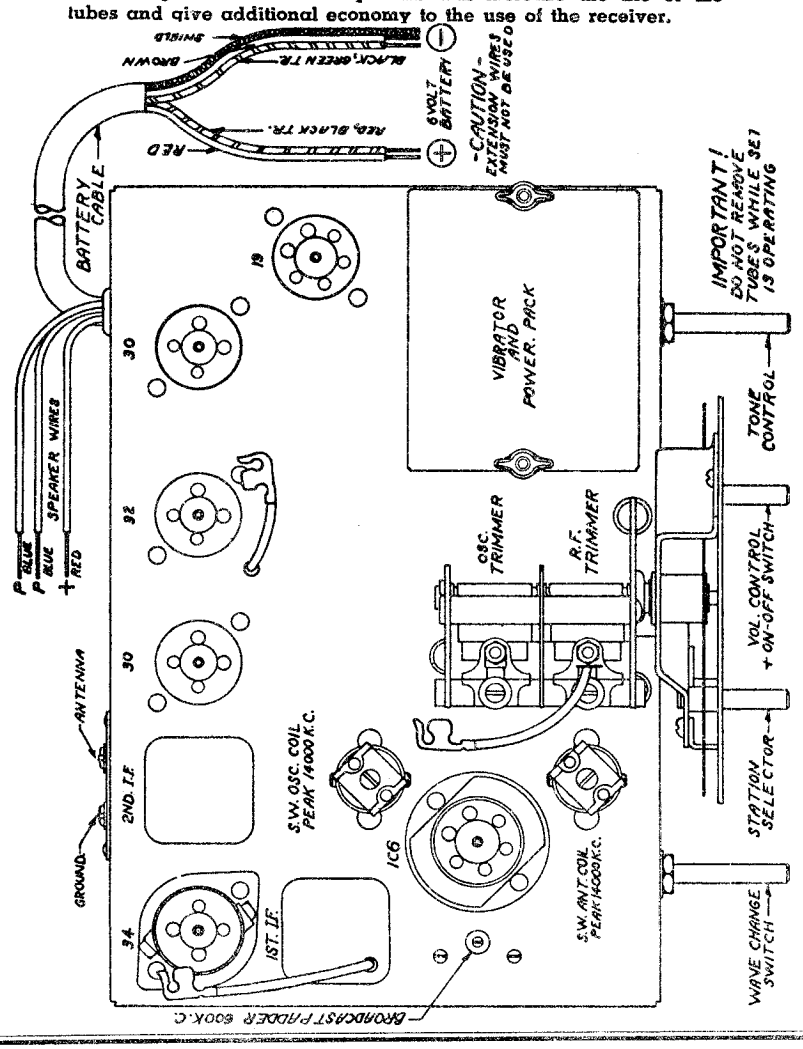
The Foreign Band of 19 to 49 meters can be adjusted by the two trimmers on the short wave coils located on the top of the chassis. Set the test oscillator to 14,000 KC. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. The oscillator coil is located near the 1st I.F. Transformer and the antenna or R.F. coil is located directly in front of the Short Wave oscillator coil and alongside the front section of the gang condenser. These two trimmers should be adjusted for peak at 14,000 KC and as the inherent design of the circuit has been expressly developed for simplicity in servicing, no other adjustments are necessary for aligning this band. **Note:** Always start this procedure by having the oscillator coil trimmer loose (out all the way), and the antenna coil trimmer fairly tight (in all the way); otherwise it is possible to make a false alignment on the image frequency. In order to prevent alignment on the image frequency, it is suggested that the following check be made: Readjust the pointer to 13,100 KC where the image frequency should be found. If properly aligned, the image frequency will be found to be weaker. If, however, the signal at 13,100 KC is found to be stronger than the signal at 14,000 KC, it signifies that alignment was incorrectly made on the image frequency.

**IMPORTANT:** Do not attempt any adjustment of the gang condenser trimmers in aligning the Foreign Band as this will throw the Broadcast Band out of alignment.

**POLICE BAND ALIGNMENT**

There is only one adjustment to be made in the alignment of the Police Band. Due to the circuit design and correct matching of the coils, no oscillator adjustment is necessary. Set the dial pointer to 4000 KC (also the test oscillator) and adjust the antenna coil trimmer to resonance. In preparing the test oscillator for alignment of this band, connect a 400 ohm carbon resistor in series with the .0001 mfd. condenser on the output lead of the test oscillator. This resistor is used with the test oscillator only on the Short Wave Bands and should not be used for Broadcast Band alignment. The two police band coils are under the chassis and the antenna coil trimmer is mounted on the end of the antenna coil. **Important:** This is the only adjustment necessary for the Police Band. Do not attempt any adjustment of the gang condenser trimmers in aligning the Police Band, otherwise the Broadcast Band will be thrown out of alignment.

**IMPORTANT NOTE: The battery must never be charged while set is in operation. If a windcharger is used, it should always be disconnected from the battery when the receiver is being used. An inexpensive single pole switch can be used for disconnecting the windcharger from the battery. This will increase the life of the tubes and give additional economy to the use of the receiver.**

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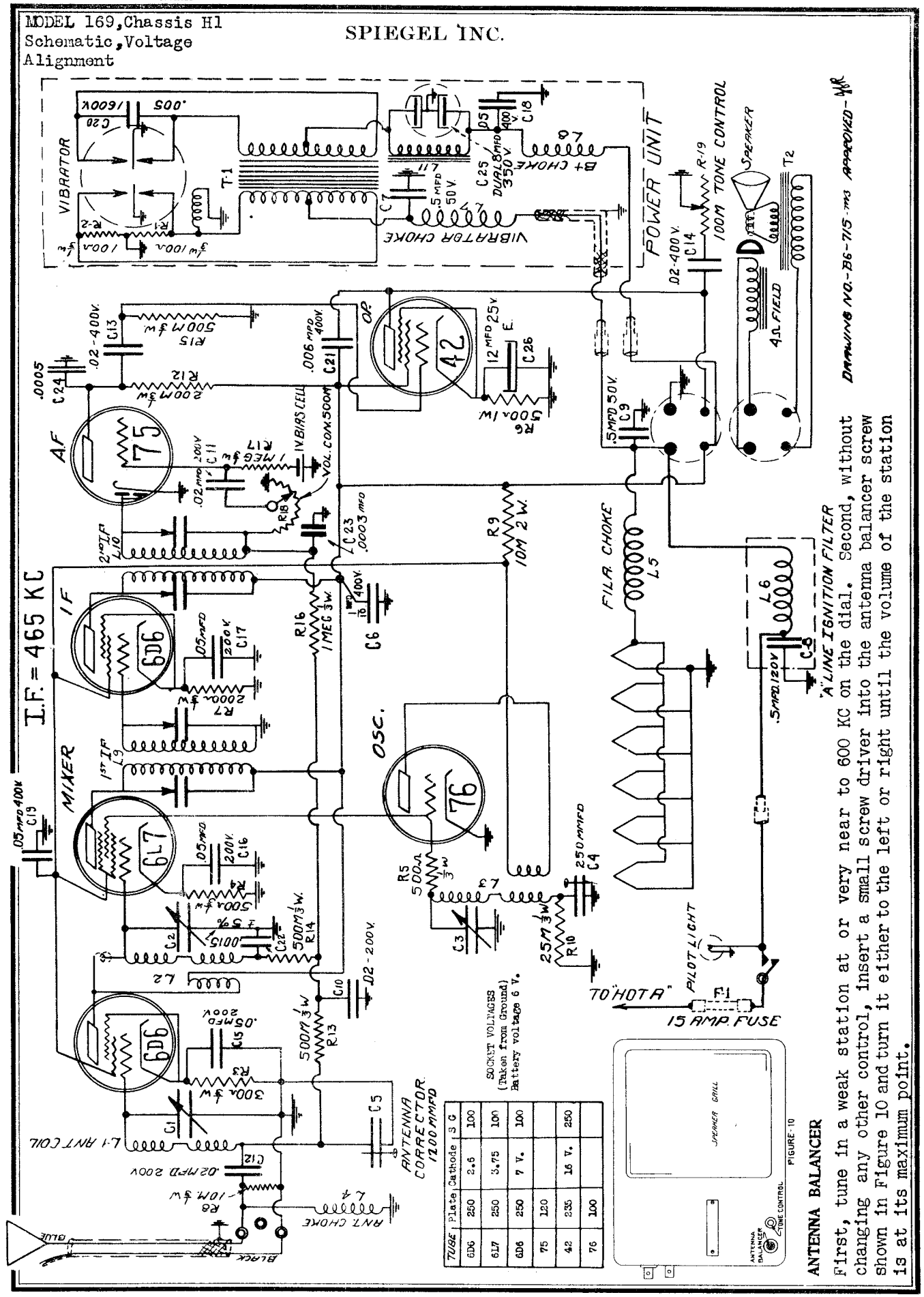
MODEL 169, Chassis H1
Schematic, Voltage
Alignment

# SPIEGEL INC.




| TUBE | Plate | Cathode | S G | |
|---|---|---|---|---|
| 6D6 | 250 | 2.6 | 100 | |
| 6B7 | 250 | 3.75 | 100 | |
| 6D6 | 250 | 7 V. | 100 | |
| 75 | 120 | | | |
| 42 | 235 | 15 V. | 250 | |
| 76 | 100 | | | |

FIGURE 10

**ANTENNA BALANCER**

First, tune in a weak station at or very near to 600 KC on the dial. Second, without changing any other control, insert a small screw driver into the antenna balancer screw shown in Figure 10 and turn it either to the left or right until the volume of the station is at its maximum point.

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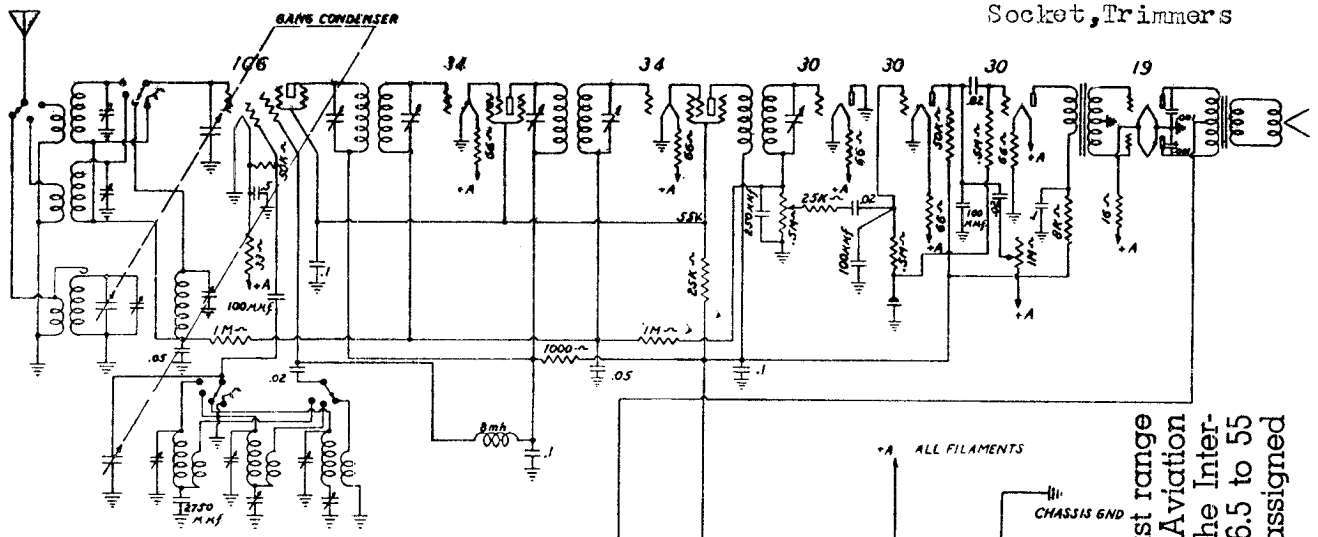
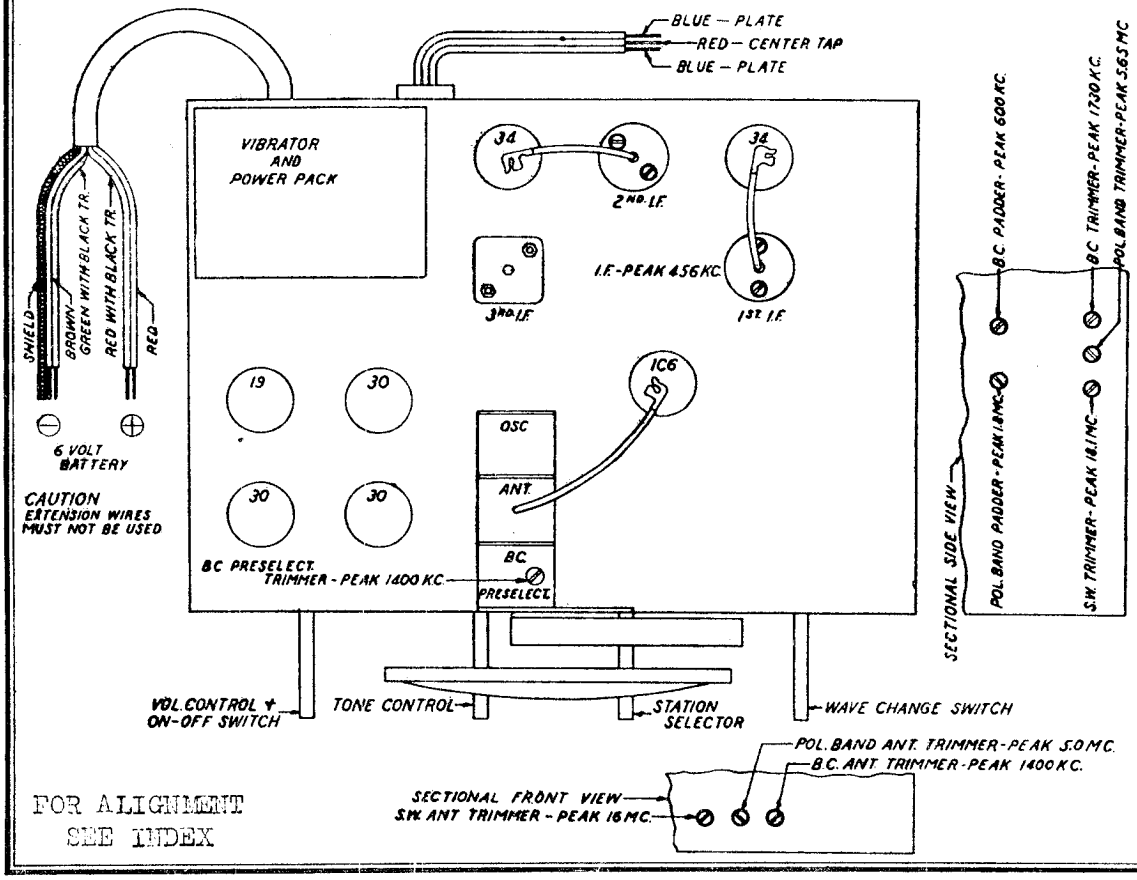
# SPIEGEL INC.

MODELS 178, 6708, 6754
Chassis M5 (1936)
Schematic, Voltage
Socket, Trimmers




FOR ALIGNMENT SEE INDEX

This receiver is designed to operate over three tuning ranges: the broadcast range which extends from 540 to 1700 Kilocycles (KC) (175 to 550 meters), Police and Aviation Band which extends from 1700 to 5500 Kilocycles (KC) (52 to 175 Meters) and the International Short Wave Band which extends from 5500 to 18,100 Kilocycles (KC) (16.5 to 55 meters). This latter range is the one which includes the four internationally assigned bands—the 19, 25, 31 and 49 meter bands.

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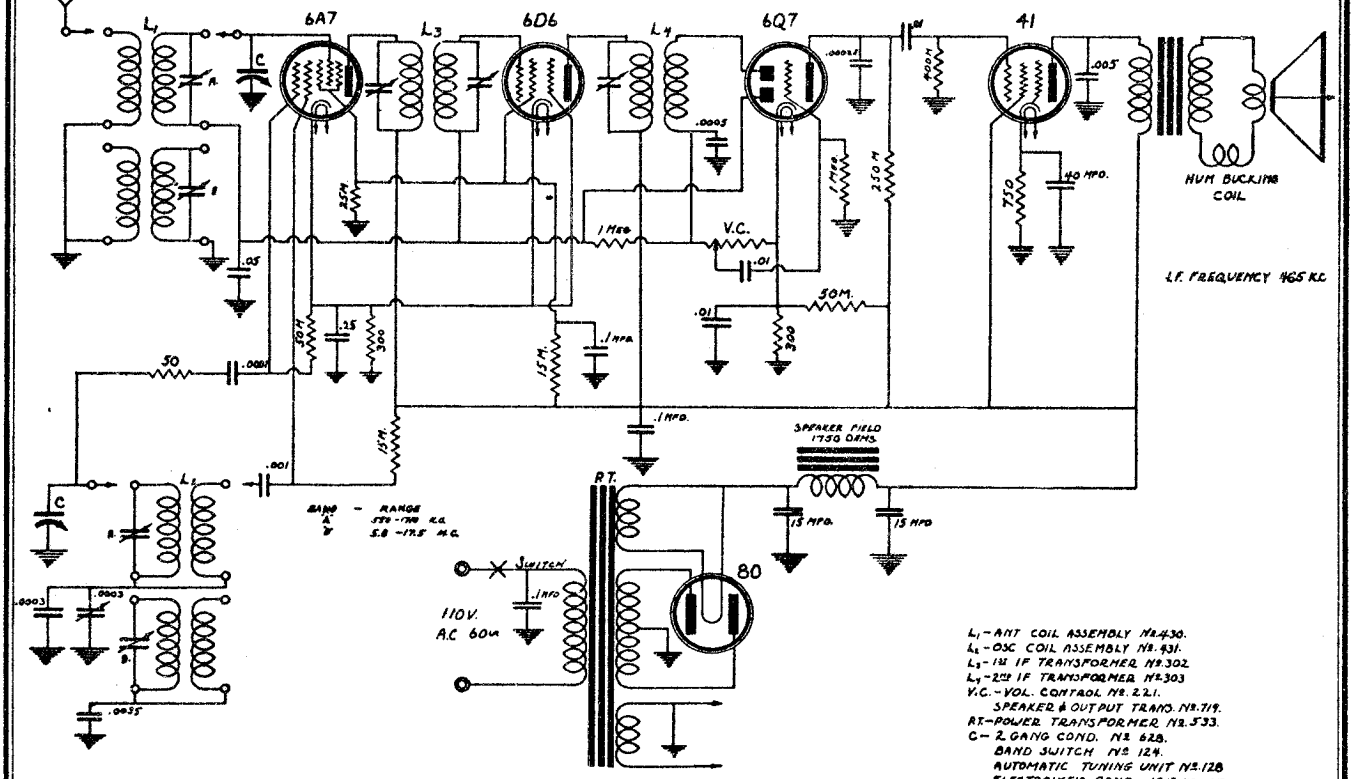
MODELS 1002,1003,Chassis 219
Schematic,Socket,Trimmers
Alignment

# SPIEGEL INC.




$L_1$ - ANT COIL ASSEMBLY N2.430.
$L_2$ - OSC COIL ASSEMBLY N2.431.
$L_3$ - 1st I.F. TRANSFORMER N2.302.
$L_4$ - 2nd I.F. TRANSFORMER N2.303.
V.C. - VOL. CONTROL N2. 221.
SPEAKER & OUTPUT TRANS. N2.719.
RT - POWER TRANSFORMER N2.533.
C - 2 GANG COND. N2. 628.
BAND SWITCH N2. 124.
AUTOMATIC TUNING UNIT N2.128
ELECTROLYTIC COND. -15-15-40- N2.1732.

**DO NOT ATTEMPT TO OPERATE THIS RECEIVER ON DIRECT CURRENT (D.C.) OR ANY OTHER VOLTAGE OR CYCLE AS PERMANENT INJURY TO THE SET WILL RESULT.**

**This receiver is designed to operate over two tuning ranges. The broadcast range which extends from 540 K.C. to 1730 and the foreign short wave band which extends from 5800 K.C. to 18000 K.C. The short wave range includes the five important short wave channels 19, 25, 31, 39 and 49 meter bands.**

## ALIGNMENT DATA

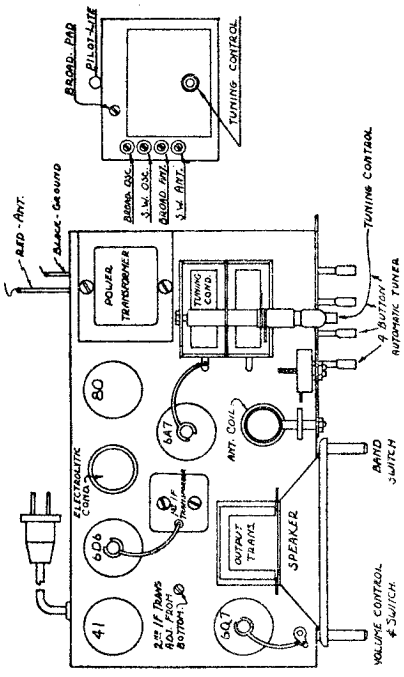
The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 465, 600, 1400, 6000, and 15000 K.C. and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

*INTERMEDIATE FREQUENCY:* Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

*BROADCAST BAND:* Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

*SHORT WAVE:* Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.

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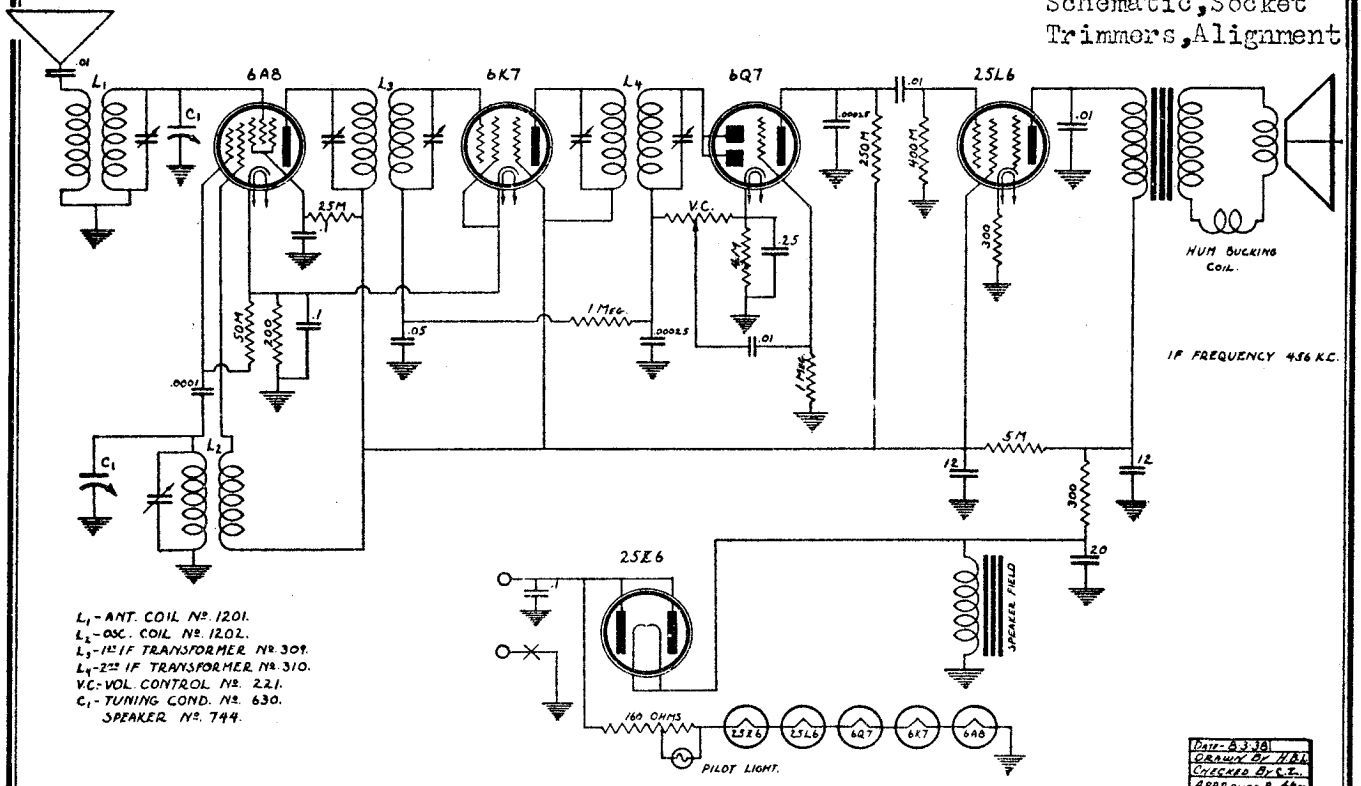
# SPIEGEL INC.

MODELS 1010, 1011
Chassis 216
Schematic, Socket
Trimmers, Alignment

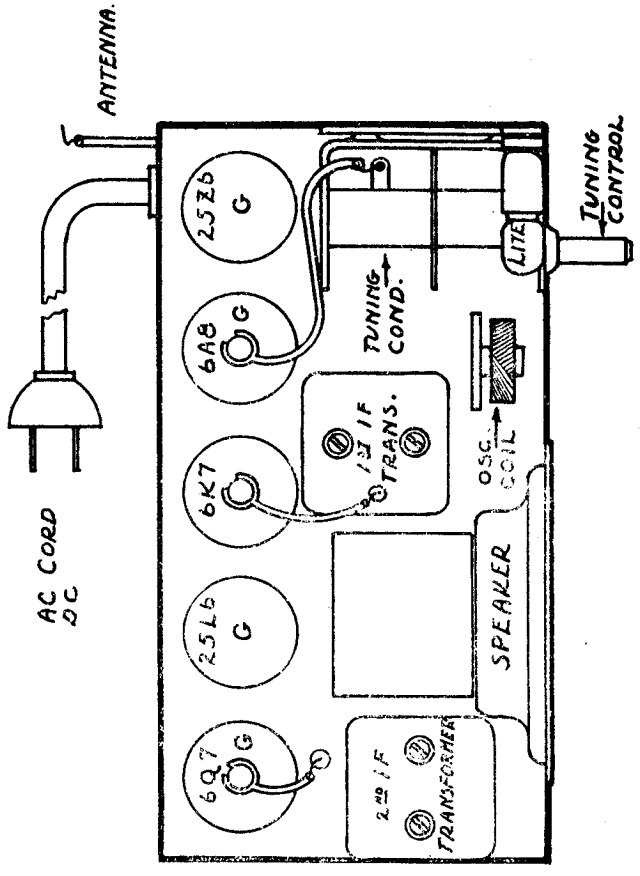



*INSTALLATION:* For operation on 110-120 volts, 60 cycle A.C. or D.C. power supply.

*ALIGNMENT:* All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

*INTERMEDIATE FREQUENCY:* Set oscillator to 456 KC. Feed this to the grid of the pentagrid (6A8) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

*BROADCAST BAND:* Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the antenna and oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC and check for alignment.

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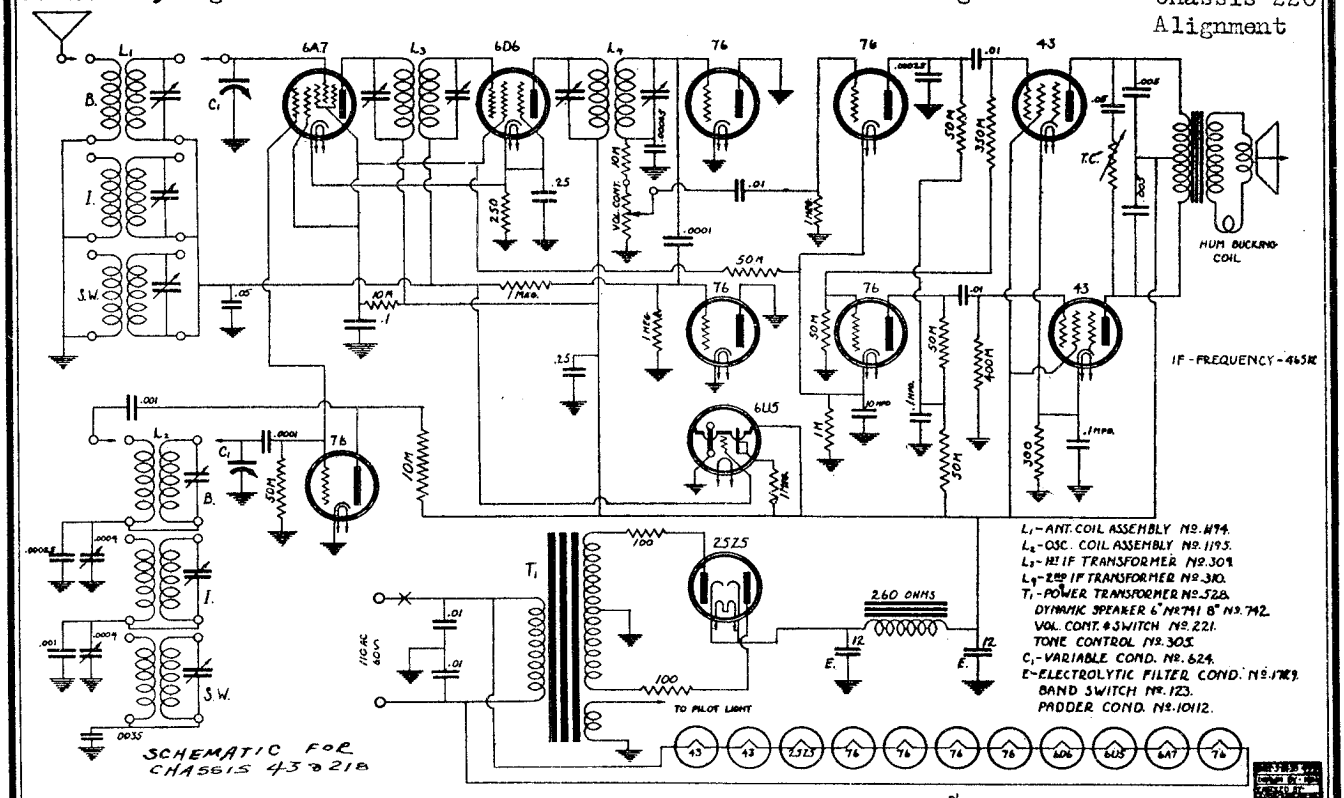
MODELS 2066, 2067, 2068
Chassis 43
Schematic, Alignment

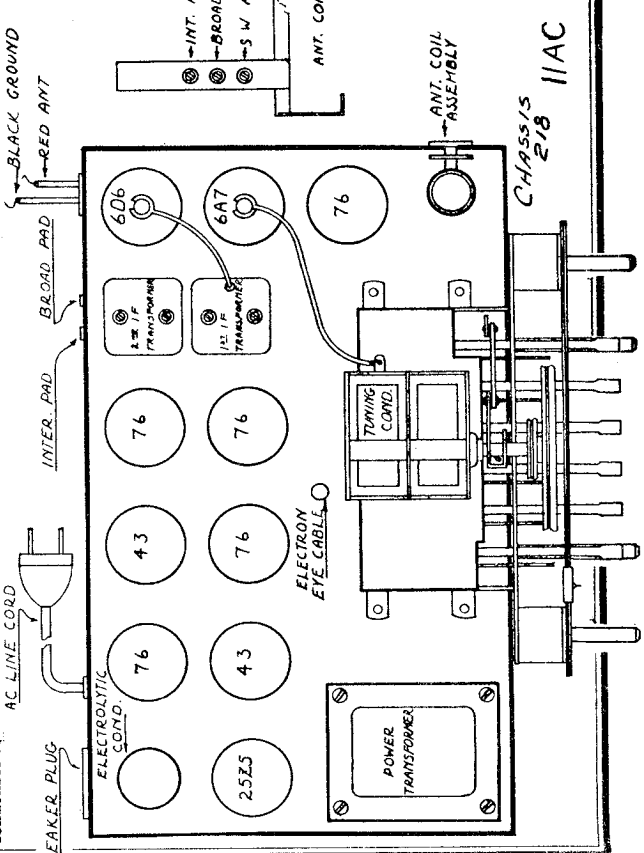
# SPIEGEL INC.

MODELS 1052, 1053, Chassis 218
Schematic, Socket, Trimmers
Alignment
Chassis 220
Alignment


6A7
6D6
76
43
6U5
2525
IF - FREQUENCY - 465K
HUM BUCKING COIL
TO PILOT LIGHT
2.60 OHMS
L1 - ANT. COIL ASSEMBLY NO. 1174.
L2 - OSC. COIL ASSEMBLY NO. 1175.
L3 - 1ST IF TRANSFORMER NO. 309.
L4 - 2ND IF TRANSFORMER NO. 310.
T1 - POWER TRANSFORMER NO. 520.
DYNAMIC SPEAKER 6" NO. 741 8" NO. 742.
VOL. CONT. & SWITCH NO. 221.
TONE CONTROL NO. 305.
C1 - VARIABLE COND. NO. 624.
E - ELECTROLYTIC FILTER COND. NO. 1169.
BAND SWITCH NO. 123.
PADDER COND. NO. 10112.
SCHEMATIC FOR CHASSIS 43 & 218

| SWITCH POSITION | BAND | RANGE IN KILOCYCLES |
|---|---|---|
| Left | Broadcast | 540— 1710 KC |
| Center | Intermediate | 1710— 5800 KC |
| Right | Short Wave (foreign) | 5800—17500 KC |

FOR CHASSIS 43 SOCKET LAYOUT SEE INDEX.




*ALIGNMENT:* The alignment of this receiver (Chassis 43, 218, 220) should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

*INTERMEDIATE FREQUENCY:* Set oscillator to 465 KC. Feed this to the grid of the (6A7) tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

*BROADCAST BAND:* Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

*INTERMEDIATE BAND:* For a dummy antenna use a .0002 mfd. mica condenser in series with a 400 ohm carbon resistor. Set band switch to the intermediate band position and feed a 5100 KC signal from the oscillator. Set dial pointer at 5100 KC. Adjust intermediate antenna and intermediate oscillator trimmers for maximum output. Re-set oscillator and set dial to approximately 1800 KC. Slowly increase or decrease the intermediate padding condenser while tuning back and forth across the signal with the station selector control until the maximum reading is obtained on the output meter. Re-check the 5100 KC adjustment.

*SHORT WAVE:* Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.

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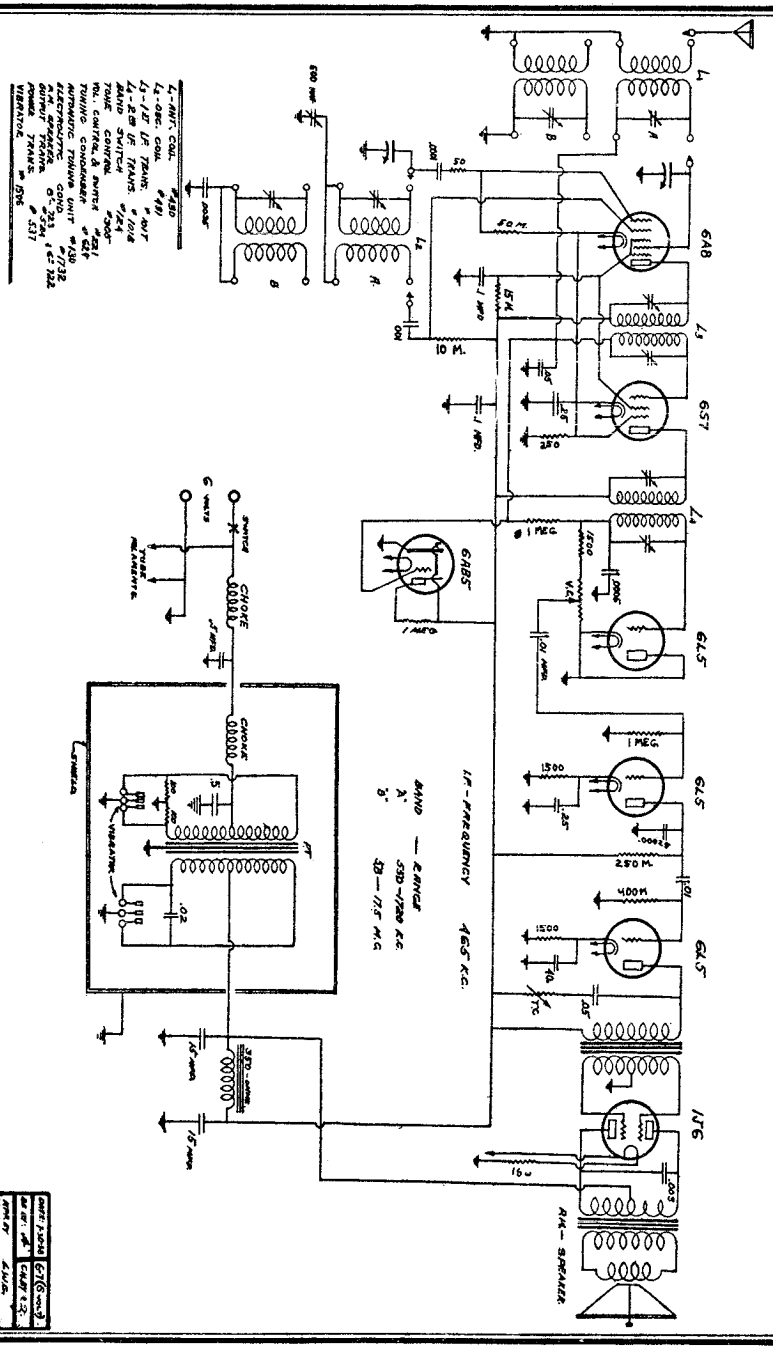
SPIEGEL INC. MODELS 1100 to 1103 inc. Ch. 2021
MODELS 1150 to 1153 inc. Ch. 212
Schematic & Alignment

# Automatic Tuner Dual Range
# 6 Volt Superheterodyne



This receiver is designed to operate over two tuning ranges. The broadcast range which extends from 540 K.C. to 1730 and the foreign short wave band which extends from 5800 K.C. to 18000 K.C. The short wave range includes the five important short wave channels 19, 25, 31, 39 and 49 meter bands.

## ALIGNMENT DATA

The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 465, 600, 1400, 6000, and 15000 K.C. and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

*INTERMEDIATE FREQUENCY:* Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

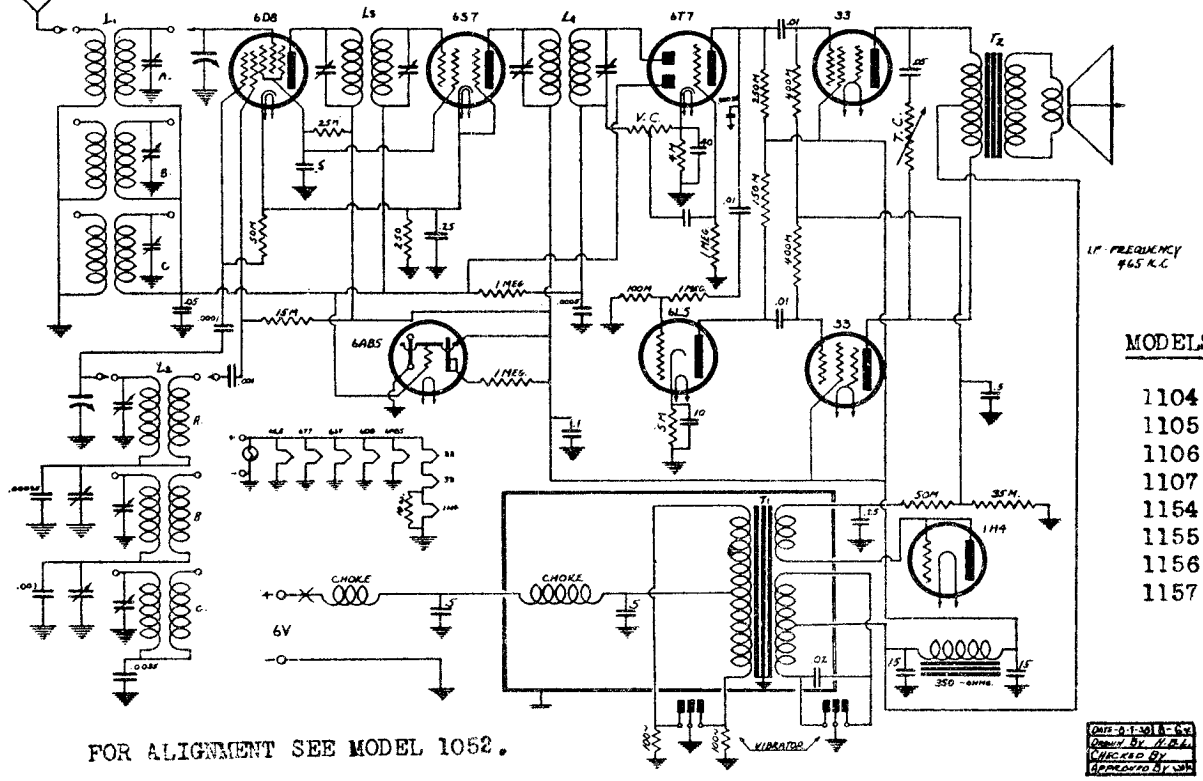
*BROADCAST BAND:* Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

*SHORT WAVE:* Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.

MODELS 1104 to 1107 inc.
1154 to 1157 inc.Ch.220
Schematic,Socket,Trimmers
MODELS 2066,2067,2068 Chassis 43
Socket,Trimmers

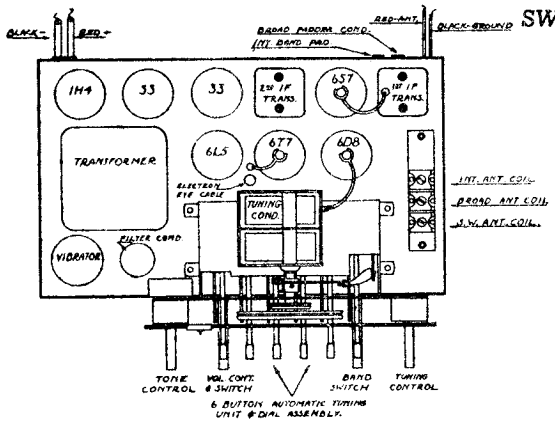
# SPIEGEL INC.




MODELS

1104
1105
1106
1107
1154
1155
1156
1157

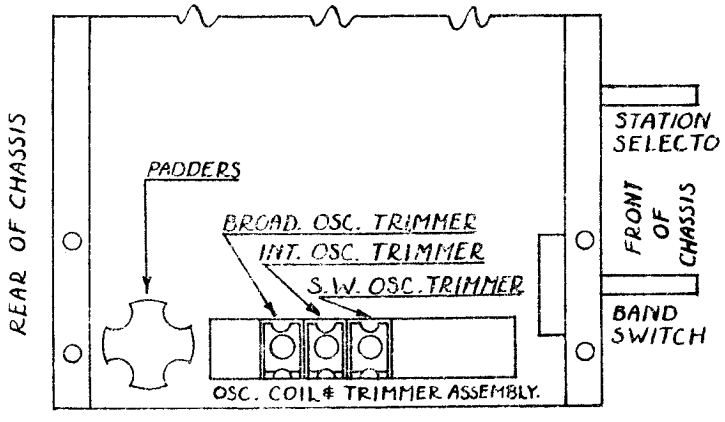
FOR ALIGNMENT SEE MODEL 1052.



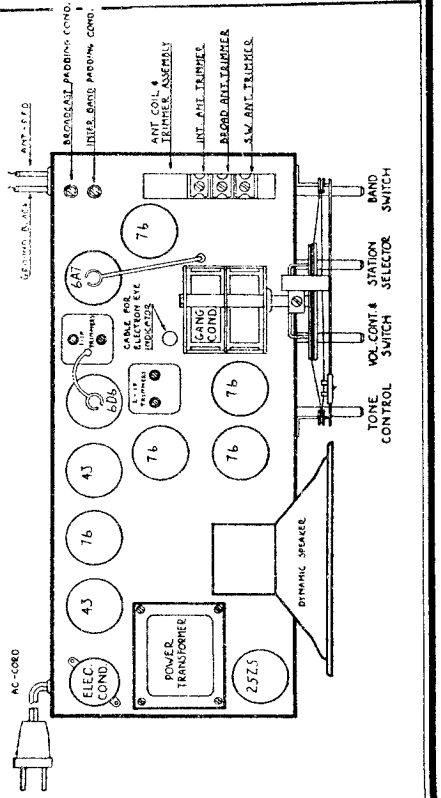

| SWITCH POSITION | BAND | RANGE IN KILOCYCLES |
|---|---|---|
| Left | Broadcast | 540— 1710 KC |
| Center | Intermediate | 1710— 5800 KC |
| Right | Short Wave (foreign) | 5800—17500 KC |

MODELS

2066
2067
2068




BOTTOM VIEW OF CHASSIS:

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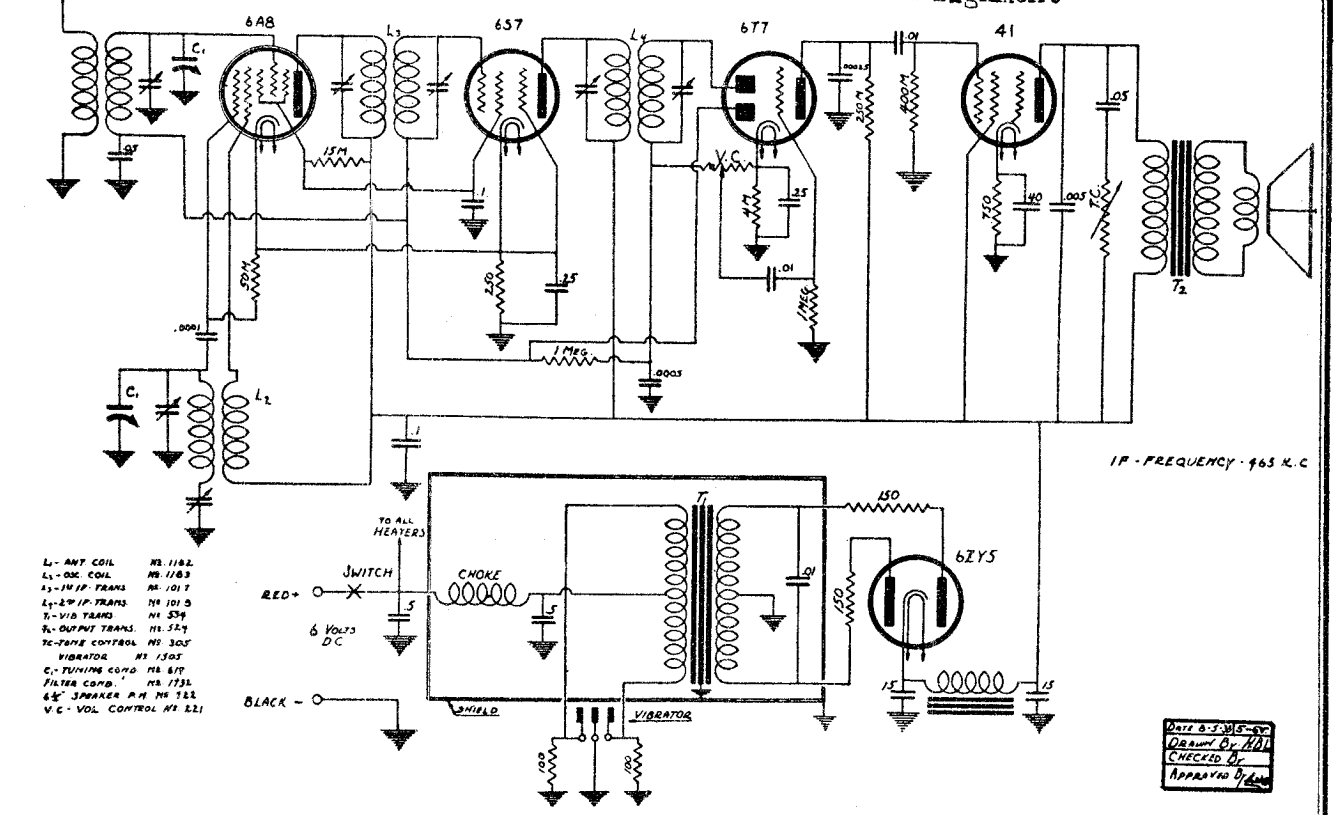
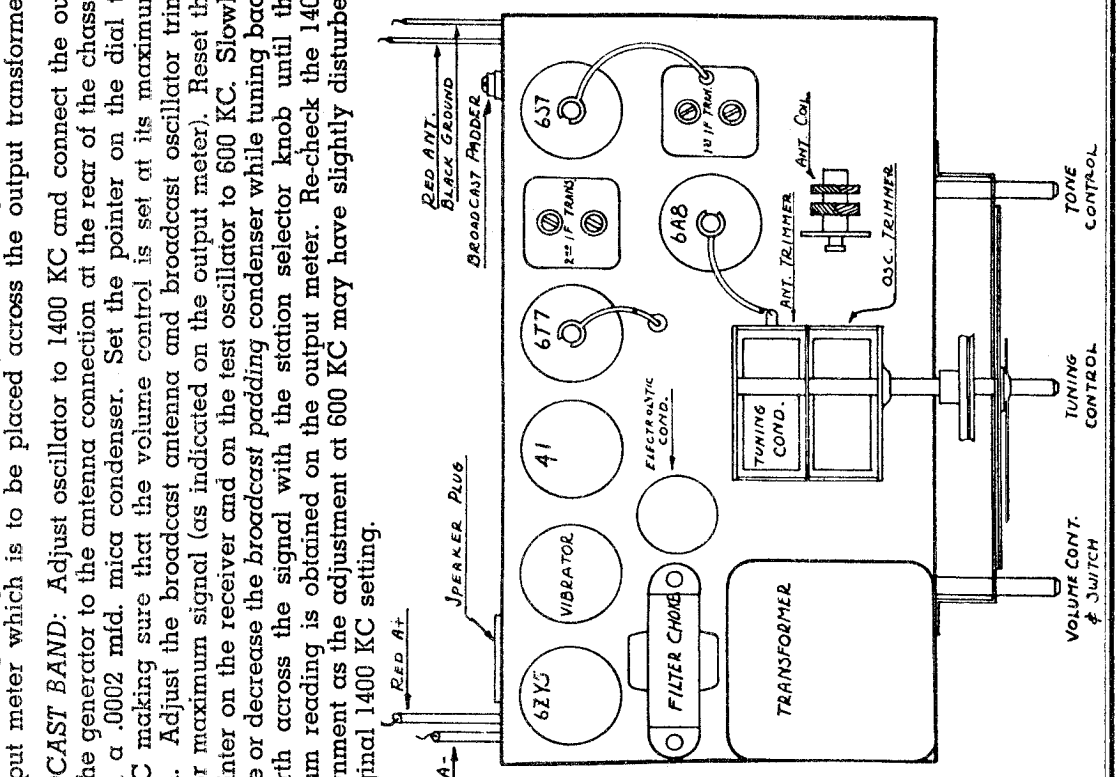
# SPIEGEL INC.

MODELS 1108 to 1111 inc.
Chassis 211
Schematic, Socket, Trimmers
Alignment




All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

*INTERMEDIATE FREQUENCY:* Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

*BROADCAST BAND:* Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Reset the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

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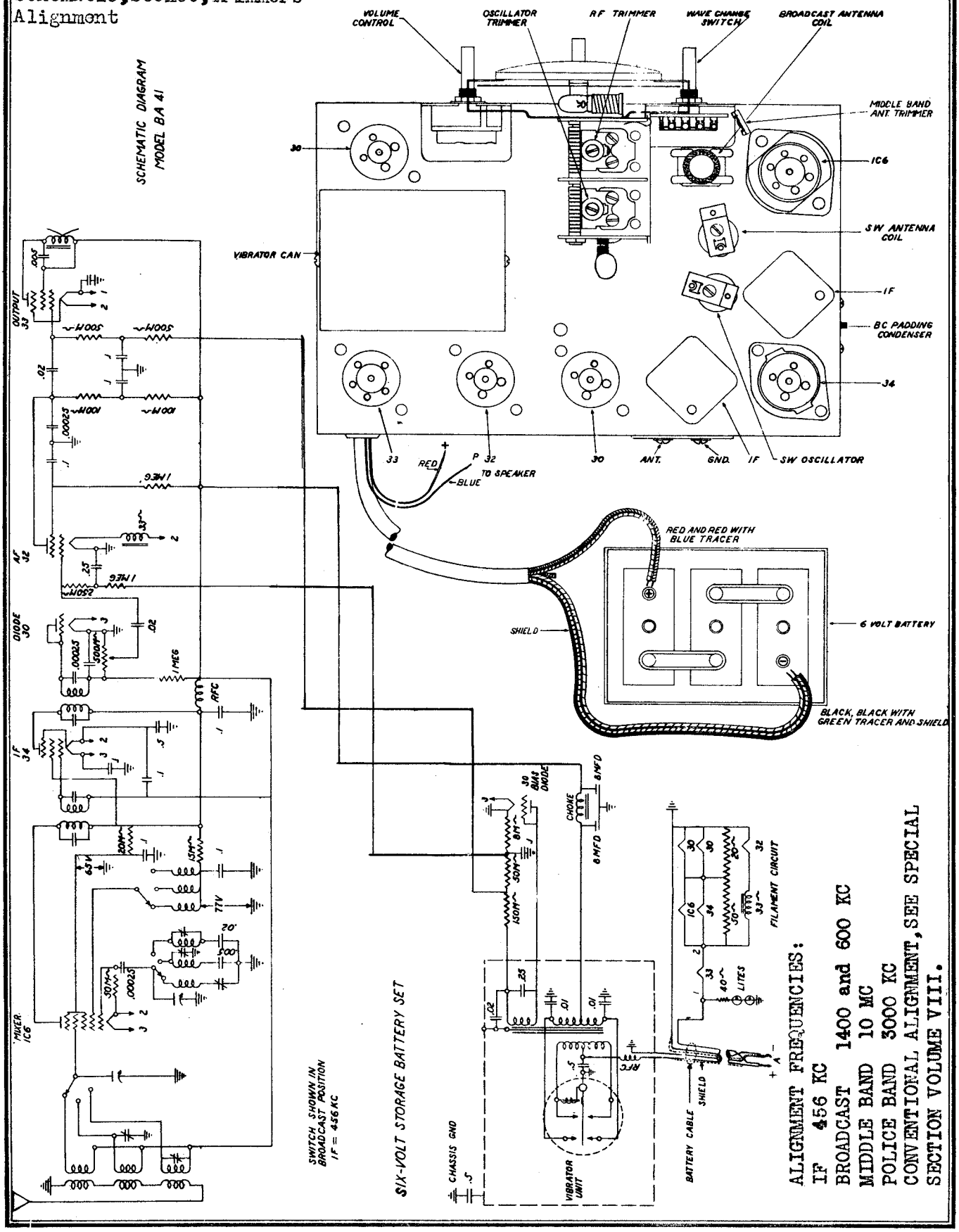
MODELS 1901,1907,1911,1921
1932,1955,1957,1961,1981
Chassis X6,BA41
Schematic,Socket,Trimmers
Alignment

# SPIEGEL INC.

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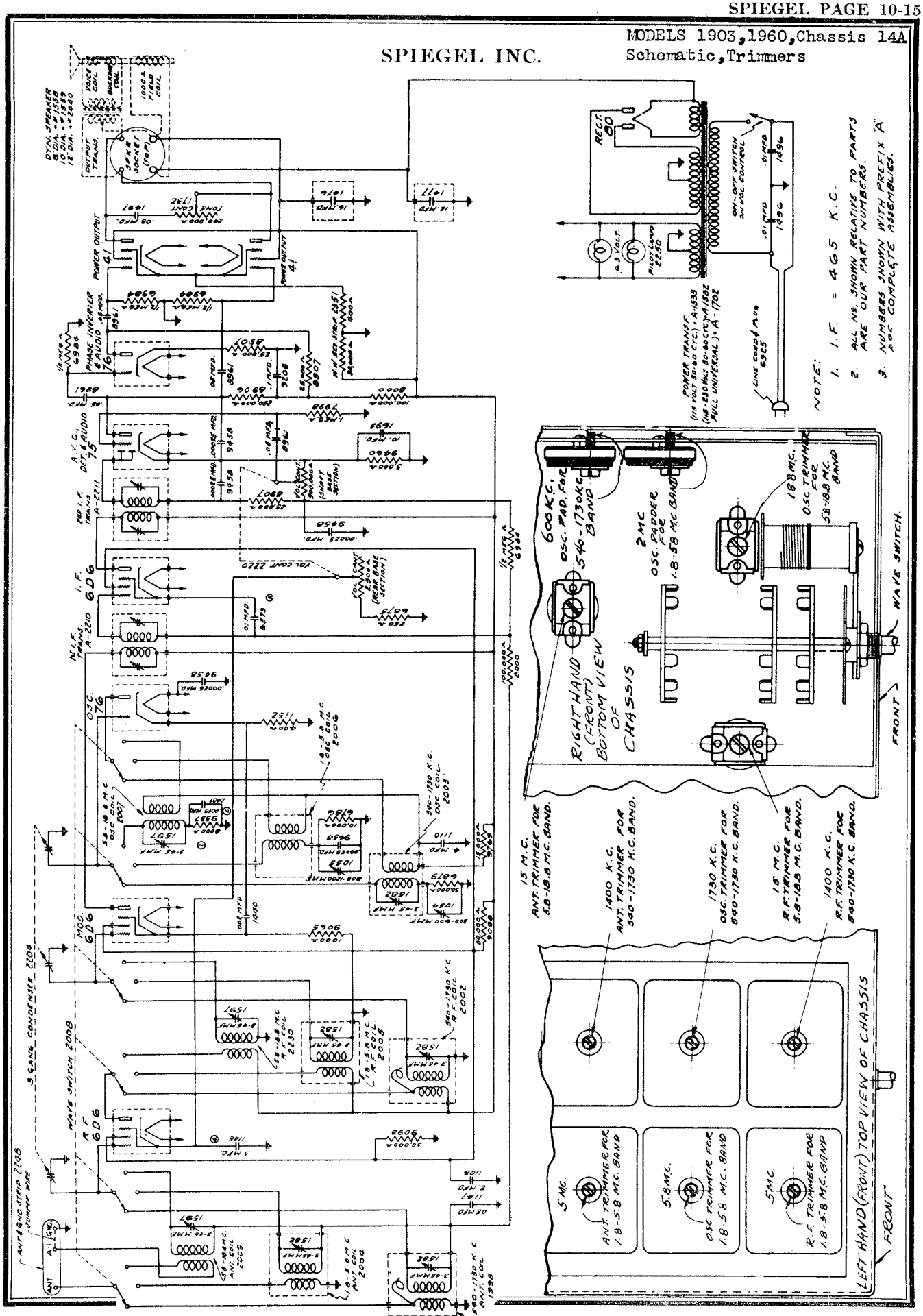
SPIEGEL INC.

MODELS 1903, 1960, Chassis 14A
Schematic, Trimmers


NOTE:
1. I.F. = 465 K.C.
2. ALL NO. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX 'A' ARE COMPLETE ASSEMBLIES.
RIGHT HAND (FRONT) BOTTOM VIEW OF CHASSIS
600 K.C. OSC. PAD. FOR 540-1730 K.C. BAND
2 MC OSC. PADDER FOR 1.8-5.8 M.C. BAND
18 M.C. OSC. TRIMMER FOR 5.8-18.8 M.C. BAND
WAVE SWITCH
FRONT
15 M.C. ANT. TRIMMER FOR 5.8-18.8 M.C. BAND.
1400 K.C. ANT. TRIMMER FOR 540-1730 K.C. BAND.
1730 K.C. OSC. TRIMMER FOR 540-1730 K.C. BAND.
18 M.C. R.F. TRIMMER FOR 5.8-18.8 M.C. BAND.
1400 K.C. R.F. TRIMMER FOR 540-1730 K.C. BAND.
LEFT HAND (FRONT) TOP VIEW OF CHASSIS
5 M.C. ANT. TRIMMER FOR 1.8-5.8 M.C. BAND
5.8 M.C. OSC. TRIMMER FOR 1.8-5.8 M.C. BAND
5 M.C. R.F. TRIMMER FOR 1.8-5.8 M.C. BAND
FRONT

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MODELS 1903,1960,Chassis 14A
Alignment,Voltage

# SPIEGEL INC.

**TO ALIGN THE VARIABLE CONDENSER:**

It is important when aligning the gang condenser, padding and trimmer condensers to follow the procedure carefully, otherwise the receiver will be insensitive and the dial calibration will be incorrect. The padding and trimmer condensers located underneath the chassis and inside of and accessible through the holes found in the top of the catacomb shield (mounted on top and in the left front corner of the receiver) will be referred to by their function as indicated on the circuit diagram.

1. Connect the high output side of the test oscillator through a 400 ohm resistor to the receiver antenna lead and the low side to the set ground.

2. Place the band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial, and set the test oscillator frequency to EXACTLY 18.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then tune in the 18.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE 18.8 MEGACYCLE OSCILLATOR TRIMMER. When adjusting this trimmer two peaks, the fundamental and the image peak will be noticed. CARE MUST BE TAKEN THAT THE FUNDAMENTAL PEAK AND NOT THE IMAGE PEAK IS USED FOR ALIGNING THE RECEIVER AT 18.8 MEGACYCLES. Always back off the trimmer to minimum capacity, then screw down the trimmer (add capacity) until the first peak which is the fundamental and the proper one to use is tuned in. If the trimmer is screwed down beyond the point where the first peak is received, the incorrect image peak will be tuned in. After completing adjustment of the oscillation trimmer at 18 megacycles always check to see if the proper peak has been used. To do this leave the test oscillator frequency at 18.8 megacycles, increase the output of the test oscillator and tune the receiver dial to approximately 17.8 megacycles. Then vary the receiver dial slightly to the right and left of 17.8 megacycles, and if the fundamental peak was used in aligning at 18.8 megacycles the test oscillator signal will be heard at approximately 17.8 megacycles on the receiver dial. If it is not possible to receive the signal, then the fundamental peak was not used and the 18.8 megacycle oscillator trimmer must be properly readjusted.

3. With band selector switch set for operation on 5.8 to 18.8 megacycle band tune the receiver dial and set test oscillator frequency to EXACTLY 15 MEGACYCLES. Adjust 15 megacycle antenna and R.F. trimmers to maximum 15 megacycle signal sensitivity.

4. Leave band selector switch for operation on the 5.8 to 18.8 megacycle band, tune the receiver dial and set the test oscillator frequency to approximately 6 megacycles. While rocking gang condenser slightly to right and left adjust 6 megacycle oscillator padder for maximum sensitivity.

5. Place band selector switch for operation on 1.8 to 5.8 megacycle band, tune the receiver dial, and set test oscillator frequency to EXACTLY 5.8 MEGACYCLES.

Rotate gang condenser so that plates are completely out of mesh and then BRING IN 5.8 MEGACYCLE SIGNAL TO MAXIMUM OUTPUT by adjusting 5.8 megacycle oscillator trimmer.

6. With the band selector switch set for operating on 1.8 to 5.8 Megacycle band tune receiver dial and set test oscillator frequency to EXACTLY 5 MEGACYCLES. Then adjust 5 megacycle antenna and R.F. trimmers for maximum 5 megacycle signal sensitivity.

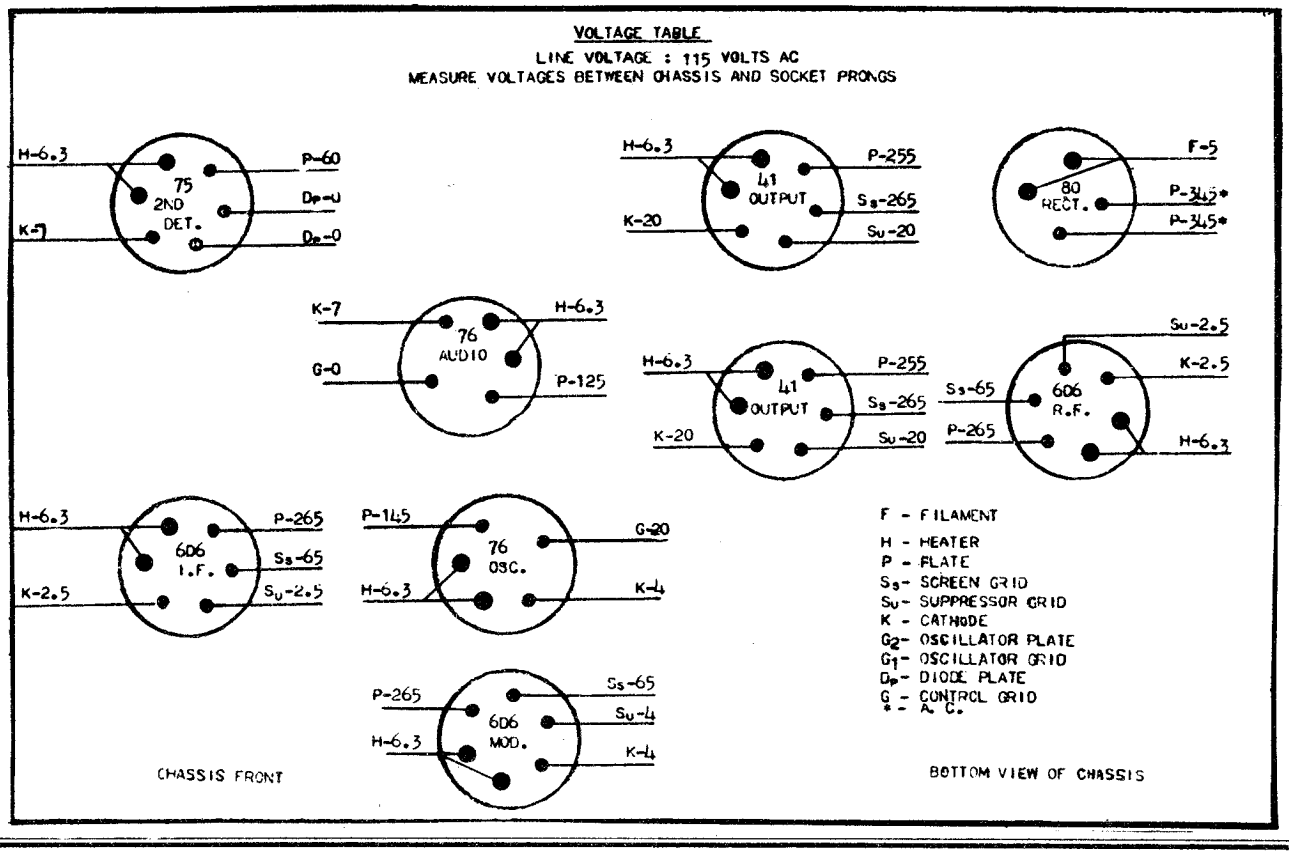
7. Leave band selector switch for operation on 1.8 to 5.8 megacycle band, tune receiver dial and set test oscillator frequency to approximately 2 megacycles. While rocking gang condenser slightly to right and left adjust 2 megacycle oscillator padder for maximum sensitivity.

8. Replace the 400 ohm resistor in series with test oscillator lead with a 200 Mmfd. condenser, place the band selector switch for operation on the 540 to 1730 kilocycle band and set test oscillator frequency to EXACTLY 1730 KILOCYCLES.

Rotate gang condenser so that plates are completely out of mesh and BRING IN THE 1730 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING 1730 KILOCYCLE OSCILLATOR TRIMMER.

9. With band selector switch placed for operation on the 540 to 1730 kilocycle band set test oscillator frequency and receiver dial to EXACTLY 1400 KILOCYCLES. Adjust 1400 kilocycles R. F. and antenna trimmers for maximum 1400 kilocycle signal sensitivity.

10. Leave band selector switch for operation on 540 to 1720 kilocycle band, tune receiver dial and set test oscillator frequency to approximately 600 kilocycles. While rocking gang condenser slightly to right and left adjust 600 kilocycle oscillator padder for maximum sensitivity.

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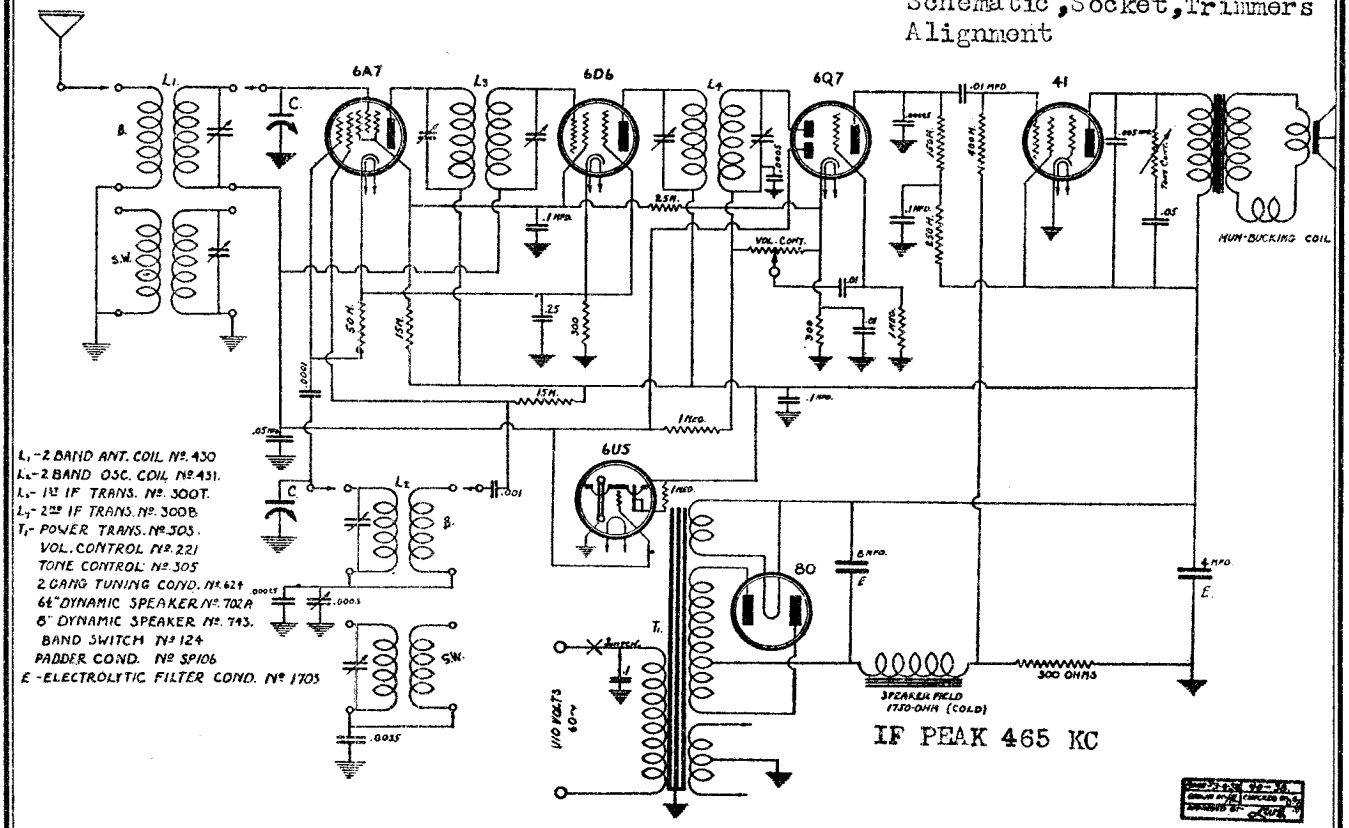
# SPIEGEL INC.

MODELS 2000,2001,2050,2051
2008,2009,2018,2019
Chassis 40
Schematic, Socket, Trimmers
Alignment


6A7
6D6
6Q7
41
6U5
80
L1 - 2 BAND ANT. COIL Nº 430
L2 - 2 BAND OSC. COIL Nº 431.
L3 - 1st IF TRANS. Nº 300T.
L4 - 2nd IF TRANS. Nº 300B.
T1 - POWER TRANS. Nº 303.
VOL. CONTROL Nº 221
TONE CONTROL Nº 305
2 GANG TUNING COND. Nº 624
6½" DYNAMIC SPEAKER Nº 702A
8" DYNAMIC SPEAKER Nº 743.
BAND SWITCH Nº 124
PADDER COND. Nº SP106
E - ELECTROLYTIC FILTER COND. Nº 1703
HUM-BUCKING COIL
SPEAKER FIELD (1750 OHM COLD)
300 OHMS
110 VOLTS 60~
IF PEAK 465 KC

## ALIGNMENT DATA

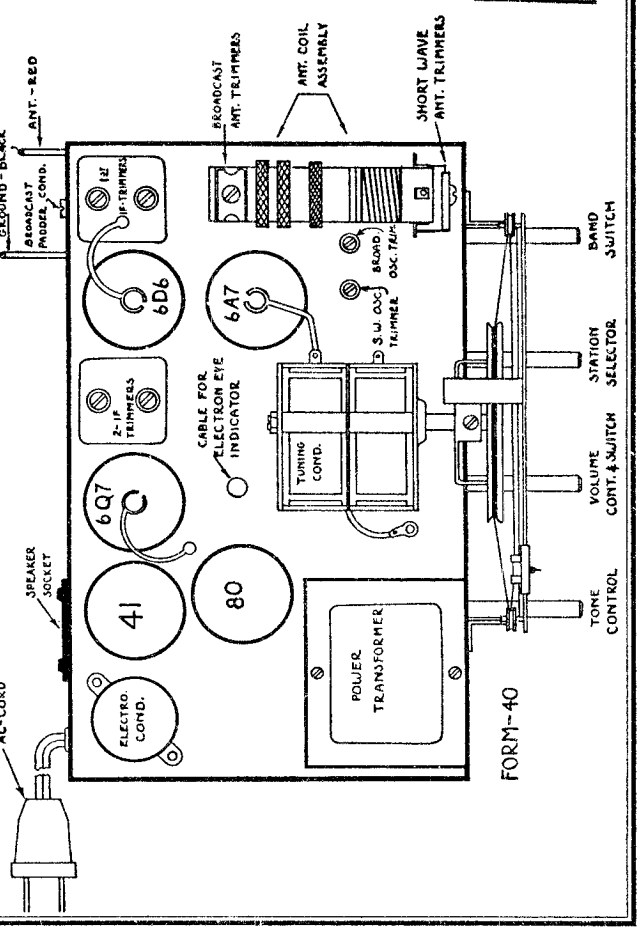
The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies, 465, 600, 1400, 6000, and 15600 K.C. and an output meter which is to be connected across the output transformer on the speaker. All alignments should be made with the volume control set at maximum and the output of the test oscillator set as low as possible to prevent the automatic volume control from operating and thus giving incorrect readings during alignment.

*INTERMEDIATE FREQUENCY:* Set oscillator to 465 KC. Feed this to the grid of the pentagrid (6A7) converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

*BROADCAST BAND:* Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mid. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

*SHORT WAVE:* Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

It is advisable to check the sensitivity at 6000 KC to determine whether the circuits are properly aligned. Should the receiver lack sensitivity at this frequency check the .0035 mica condenser for short circuit.

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MODELS 2000,2001,2050,2051
2008,2009,2018,2019
MODELS 2064,2065,4014,4064
4066 (1937)

SPIEGEL INC.

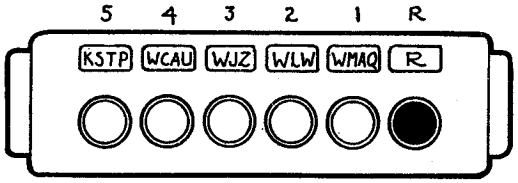
MODELS 2070,2071,4076 (1937)
Tuner Data

MODELS 2000, 2001, 2050, 2051, 2008, 2009,
2018, 2019 Chassis 40

# Push Button Station Selector

ADJUSTMENT

The five stations wanted should be decided upon as this will determine which button must be used. Button number 1 as indicated in figure one is used for stations whose transmitting frequencies are between 920 K.C. and 1500 K.C. (as shown on the dial). Buttons 2 and 3 for stations whose frequencies are between 750 and 1400 K.C. Button number 4 for stations whose frequency is from 590 to 1150 and button 5 for those stations whose frequencies are between 540 and 1000 K.C.




FRONT VIEW FIGURE 1

Fig. 1

If a desired station falls in the range of button 1, tune the radio to this station with the colored button on the push button control panel pressed in (this button releases the automatic tuner and provides for manual tuning of the receiver.)

Press in button 1 and with a screw driver turn adjusting screw 1B as shown in figure 2 until this same station is heard, then turn screw 1A until the station is heard with maximum volume as indicated by the closing of the electric eye on the front panel. Carefully re-adjust 1A and 1B again for maximum volume.

*DO NOT FORCE* the screws as the threads may be sheared and rendered useless. This may happen if you do not observe what range the station falls into, and thus use the wrong push button.

Proceed with button 2 in a similar way, first pressing in the manual tuning button and tuning to the desired station then pressing button 2 and adjusting screws 2B and 2A to the same program. Buttons 3, 4, and 5 are adjusted in a similar manner using screws 3B and 3A for the third button; 4B and 4A for the fourth button, etc.

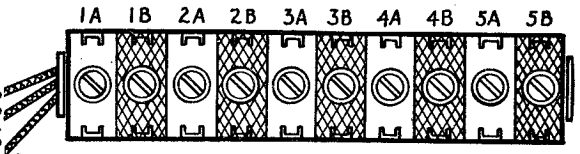



FIGURE 2

Fig. 2

*NOTE:*—In some models the odd color release button is located to the extreme left instead of to the right as indicated in figure one. Thus if the release button is to the extreme left the adjustment screws in figure 2 are reversed. Reading from left to right they become 5B-5A-4B-4A etc.

CAUTION

It is important that the adjustments be carefully made otherwise the reception of the radio station will be distorted and lacking in volume. In some instances it is advisable to re-adjust all the screws a few days after the initial setting to compensate for any drift due to room temperature, humidity, etc.

OPERATION

For manual tuning, press the release button and proceed to tune stations in the usual manner with the station selector knob.

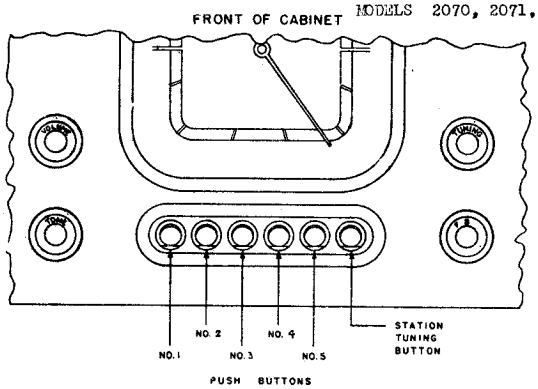
Do not attempt to press more than one button at a time as this will not tune any additional stations. Although this will not in any way injure the unit, it may result in the radio receiver squealing and having excessive interference.

To operate the automatic station tuning control it is only necessary to press in any one of the five station tuning buttons. This automatically disengages the manual tuning control from the electrical circuit. Thus it is possible to leave the dial tuned to any station and yet use the automatic push button station selector.

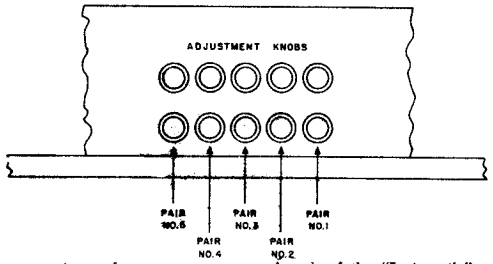
THE ODD COLORED RELEASE BUTTON SHOULD ALWAYS BE IN WHENEVER THE REGULAR TUNING KNOB IS USED TO SELECT THE STATIONS.

Station Call Letters may be inserted in the spaces provided and can be changed at will.

MODELS 2064, 2065, 4014, 4064, 4066 (1937) Chassis 745
MODELS 2070, 2071, 4076 (1937) Chassis 1105




If desired the tuning dial may be left set to a station which is not set up on one of the buttons. The "Dial Tuning" button will then tune in this station when it is pressed. This will give an extra **Instamatic** tuned station, making a total of six different stations which can be instantly tuned in by simply pressing a button.




The approximate frequency coverage of each of the **"Instamatic"** control buttons is as follows:

1—Stations between 540 and 1000 K.C.
2—Stations between 540 and 1000 K.C.
3—Stations between 750 and 1200 KC.
4—Stations between 750 and 1200 KC.
5—Stations between 1000 and 1500 KC.

## INSTAMATIC TUNING

The purpose of **Instamatic** tuning is to give the user instant, automatic tuning of any one of a selection of favorite broadcast stations. The control buttons are conveniently located just below the tuning dial. Pushing in any button will release any other button which happens to be already in. After the **Instamatic** tuning feature has been properly adjusted, this will instantly and automatically tune in the station selected by this button.

Before attempting to adjust or use **Instamatic** tuning, the "Installation" and "Operation" instructions must be carefully followed. When the receiver is operating satisfactorily using the tuning dial with the "Dial Tuning" button pressed in, the **Instamatic** feature may be easily adjusted by carefully following these instructions.

Located on the back of the chassis is a row of five pair of small bakelite adjustment knobs. Each pair of these knobs controls the tuning of the station for the **Instamatic** button which is in the same relative position.

With the receiver operating with the "Dial Tuning" button in and the wave switch on broadcast position, turn the tuning knob to the left until the 540 KC end of the band has been reached. Then turn the tuning knob to the right until a station, for which it it desired to have **Instamatic** tuning, is heard. Press in the Button No. 1. This is the button at the left hand end of the row. Reach around to the back of the receiver and turn upper knob of the Pair No. 1 until the same program is heard. Unless the wrong knob is being turned, several different stations will be heard during this procedure. If necessary to check that the same program is now tuned in, the "Dial Tuning" button may again be pressed. In this way it can be determined that the same station is tuned in with the **Instamatic** button as when the "Dial Tuning" button is in. If it is not the same station the adjustment knob should be turned again and these operations repeated until the same program is heard when either of these two buttons is pressed.

The bottom adjustment knob of the first pair is now turned until the station is heard the best. Both top and bottom knobs may then be adjusted to exact tuning by watching the magic eye and adjusting until the two edges of the green section are as close together as it is possible to get them.

The first **Instamatic** button is now properly adjusted for the station which was tuned in on the dial and the station's call letters may be pushed out of the station list, moistened on the back, and pressed into the hollow end of the button.

With the "Dial Tuning" button pressed in, the tuning knob is again turned to the right until the next station for which **Instamatic** tuning is wanted, is tuned in. The adjustment process for this station is the same as before, except that Button No. 2 and Pair No. 2 adjustment knobs are used. Proceeding in this way all five of the buttons may be properly adjusted for the stations desired.

It must be remembered that the "Dial Tuning" button must be pressed in whenever it is desired to tune in stations with the tuning knob, regardless of which wave band is in use. It must also be remembered that the wave switch must be in the broadcast position when **Instamatic** tuning is being used.

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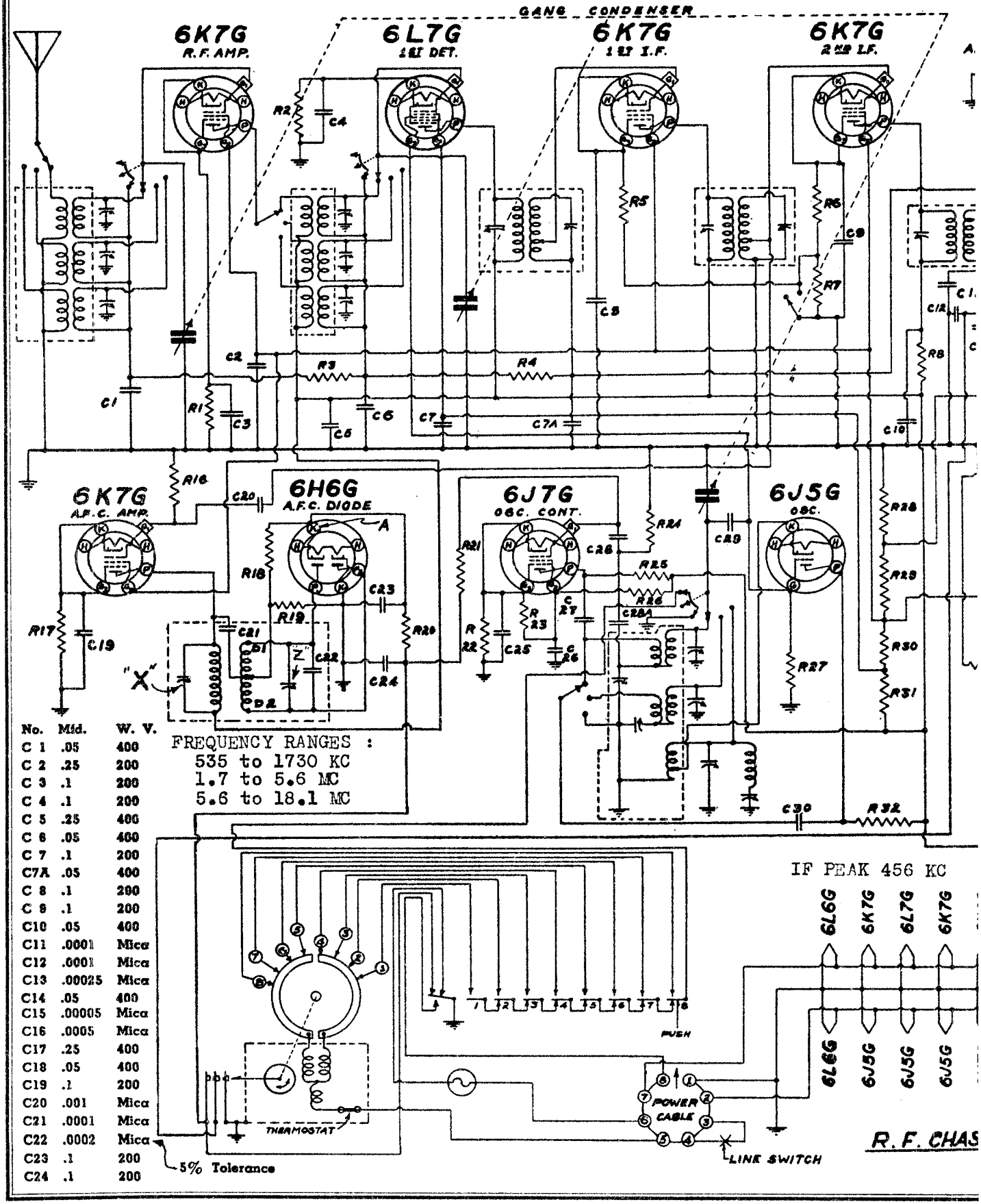


| No. | Mfd. | W. V. |
|---|---|---|
| C 1 | .05 | 400 |
| C 2 | .25 | 200 |
| C 3 | .1 | 200 |
| C 4 | .1 | 200 |
| C 5 | .25 | 400 |
| C 6 | .05 | 400 |
| C 7 | .1 | 200 |
| C7A | .05 | 400 |
| C 8 | .1 | 200 |
| C 9 | .1 | 200 |
| C10 | .05 | 400 |
| C11 | .0001 | Mica |
| C12 | .0001 | Mica |
| C13 | .00025 | Mica |
| C14 | .05 | 400 |
| C15 | .00005 | Mica |
| C16 | .0005 | Mica |
| C17 | .25 | 400 |
| C18 | .05 | 400 |
| C19 | .1 | 200 |
| C20 | .001 | Mica |
| C21 | .0001 | Mica |
| C22 | .0002 | Mica |
| C23 | .1 | 200 |
| C24 | .1 | 200 |

5% Tolerance

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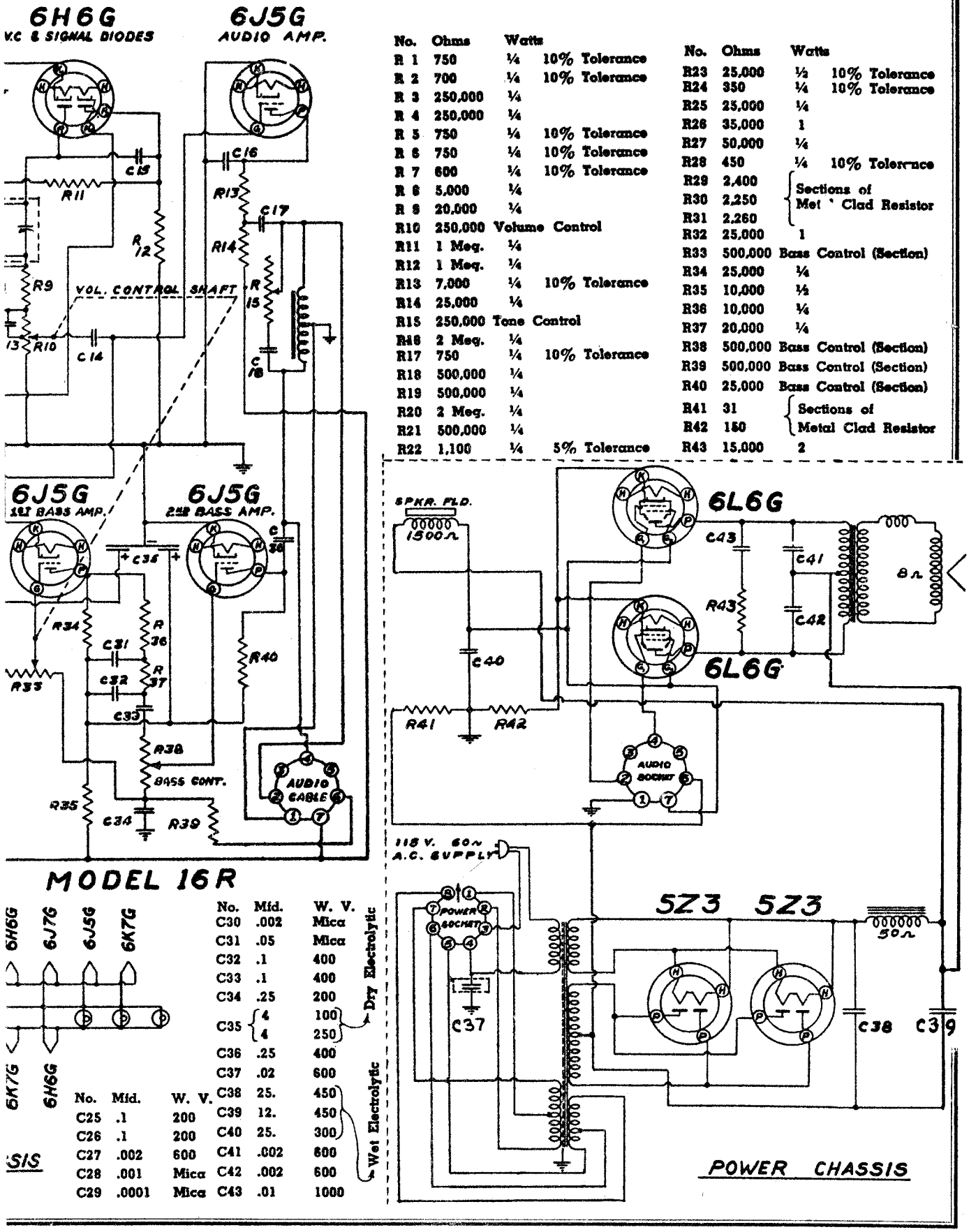
INC.

MODELS 2060,2061,4056,4074
Chassis 16R
Schematic




| No. | Ohms | Watts | |
|---|---|---|---|
| R 1 | 750 | ¼ | 10% Tolerance |
| R 2 | 700 | ¼ | 10% Tolerance |
| R 3 | 250,000 | ¼ | |
| R 4 | 250,000 | ¼ | |
| R 5 | 750 | ¼ | 10% Tolerance |
| R 6 | 750 | ¼ | 10% Tolerance |
| R 7 | 600 | ¼ | 10% Tolerance |
| R 8 | 5,000 | ¼ | |
| R 9 | 20,000 | ¼ | |
| R10 | 250,000 | Volume Control | |
| R11 | 1 Meg. | ¼ | |
| R12 | 1 Meg. | ¼ | |
| R13 | 7,000 | ¼ | 10% Tolerance |
| R14 | 25,000 | ¼ | |
| R15 | 250,000 | Tone Control | |
| R16 | 2 Meg. | ¼ | |
| R17 | 750 | ¼ | 10% Tolerance |
| R18 | 500,000 | ¼ | |
| R19 | 500,000 | ¼ | |
| R20 | 2 Meg. | ¼ | |
| R21 | 500,000 | ¼ | |
| R22 | 1,100 | ¼ | 5% Tolerance |

| No. | Ohms | Watts | |
|---|---|---|---|
| R23 | 25,000 | ½ | 10% Tolerance |
| R24 | 350 | ¼ | 10% Tolerance |
| R25 | 25,000 | ¼ | |
| R26 | 35,000 | 1 | |
| R27 | 50,000 | ¼ | |
| R28 | 450 | ¼ | 10% Tolerance |
| R29 | 2,400 | | Sections of Met ' Clad Resistor |
| R30 | 2,250 | | |
| R31 | 2,260 | | |
| R32 | 25,000 | 1 | |
| R33 | 500,000 | Bass Control (Section) | |
| R34 | 25,000 | ¼ | |
| R35 | 10,000 | ½ | |
| R36 | 10,000 | ½ | |
| R37 | 20,000 | ¼ | |
| R38 | 500,000 | Bass Control (Section) | |
| R39 | 500,000 | Bass Control (Section) | |
| R40 | 25,000 | Bass Control (Section) | |
| R41 | 31 | | Sections of Metal Clad Resistor |
| R42 | 150 | | |
| R43 | 15,000 | 2 | |

## MODEL 16R




| No. | Mid. | W. V. | |
|---|---|---|---|
| C25 | .1 | 200 | |
| C26 | .1 | 200 | |
| C27 | .002 | 600 | |
| C28 | .001 | Mica | |
| C29 | .0001 | Mica | |
| C30 | .002 | Mica | |
| C31 | .05 | Mica | |
| C32 | .1 | 400 | |
| C33 | .1 | 400 | |
| C34 | .25 | 200 | Dry Electrolytic |
| C35 | 4 | 100 | Dry Electrolytic |
| C35 | 4 | 250 | Dry Electrolytic |
| C36 | .25 | 400 | |
| C37 | .02 | 600 | |
| C38 | 25. | 450 | Wet Electrolytic |
| C39 | 12. | 450 | Wet Electrolytic |
| C40 | 25. | 300 | Wet Electrolytic |
| C41 | .002 | 600 | |
| C42 | .002 | 600 | |
| C43 | .01 | 1000 | |

SIS

# SPIEGEL INC.

MODELS 2060,2061,4056,4074
Chassis 16R
Socket,Trimmers,Tuner Data
Alignment

## INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC TUNER

It is very important to read the following instructions carefully before attempting to adjust the electric tuner. The electric tuner is made up of three integral units:

**PUSH BUTTON SWITCH** The push button switch consists of one (1) white button (extreme left), and eight (8) brown buttons whose numerical sequence is reckoned from left to right. The white button is provided for converting the set from automatic electric push button tuning to manual knob tuning. The brown buttons are provided for automatic electric tuning.

**SELECTOR MECHANISM** The selector mechanism is made up of the selector plate, eight (8) thumb screws, and the adjustment light bulb.

**ELECTRIC MOTOR** The power for this tuner is provided by a small, efficient electric motor, of the brushless variety. It is fitted with an automatic clutch and a silent gear train. The bearings and the oil retainer hold sufficient oil to lubricate the motor for a lifetime.

The first step to take in adjusting the electric push button device incorporated into this receiver is to choose eight (8) of the most powerful local stations, stations which are free from excess fading. Turn on the receiver (broadcast band) and press in the white button; tune in the station of the **lowest frequency**, using the station selector knob. Now hold the white button in and press in button number one (1), next to the white button. (See Figure 1). Both buttons are now locked into place; a small pilot lamp located at the rear of the chassis will light up unless the thumb screw at the rear accidently happens to be correctly set. Loosen thumb screw number one (See Figure 2 for order of thumb screws) enough to allow it to slide freely back and forth until the light goes out. Now tighten the thumb screw; the adjustment for the first station is now complete. Out of the station call letter sheet supplied remove the proper station call block and insert into the window directly above button number one (1). Now release button number one (1) by pressing the white button in as far as it will go.

With the white button still in, tune in the station of the next highest frequency and holding the white button, press in button number two (2). Both buttons are now locked into place. Loosen thumb screw number two (see Figure 2) and slide back and forth until a point is reached at which the pilot lamp in the rear goes out; tighten the thumb screw. Insert the proper station call into the window of button number two (2).

Follow this same procedure for the remaining stations. always choosing the station with the next high-




est frequency. After all eight (8) stations have been adjusted, check each adjustment by tuning in each station. NOTE: in the window above the white button insert the word "OFF" found in the call letter sheet.

## HOW TO TUNE IN STATIONS USING THE ELECTRIC PUSH BUTTON TUNER

In order to operate the receiver satisfactorily--using the electric push button tuner, the white button must be in released position, that is, all the way out. To tune in a station, merely press the selector button which designates the station desired. **Note:** Should the station fail to come in clearly, check the adjustment by following the adjustment procedure described in the paragraph above. If by chance all of the buttons are pressed in, they may be released by pressing any one button all the way in.

To change from electric tuning to manual selecting, simply press in the white button. When the white button is in, the set may be tuned as a conventional receiver. **Note:** If it is desired to tune Short Wave or Police while the set is being operated with push buttons, it is not necessary to change over from push button tuning to manual tuning. Simply turn the band switch and proceed to tune with the selector knob. When the band switch is returned to broadcast the station last selected by button will automatically tune in by itself.




I.F. ALIGNMENT - Generator at 456 KC, connected to control grid of 6L7 thru .05 MFD condenser, align 1st, 2nd, and Diode transformer trimmers to peak. Connect a 0-200 microammeter between the ungrounded cathode of the 6H6 AFC diode rectifier, and ground. The cathode indicated as point "A" in the schematic. Place a 100 MMFD condenser across the secondary of the discriminator transformer. These terminals are indicated as points "D1" and "D2" on the schematic. The condenser is used to detune the secondary circuit during the following primary adjustment : The primary is tuned by impressing an IF signal on the signal grid of the 6L7 and adjusting the trimmer marked "Y" on the schematic and the chassis layout, to give a maximum meter indication. Signal strength should be approximately 100000 micro volts for the adjustment. With reduced signal strength repeat the adjustments of the entire I.F. system, for maximum sensitivity. The volume control should be on full for all adjustments. Without disturbing the generator or any of the other adjustments, the trimmer "Z" ("Disc. Sec.) should be adjusted as follows :Remove the 100 MMFD condenser from across the discriminator secondary, increase the generator signal to approximately 100,000 micro volts, with volume control turned down to limit audio output, slowly turn the trimmer "Z" until a sudden sharp drop in current occurs the meter will now probably read in reverse and off scale. Reverse trimmer adjustment bringing meter reading to zero. Used only a non-metallic screw driver. It is sometimes convenient to use an offset of "remote zero" setting of the micro ammeter in making the adjustments so that zero current setting is higher on the scale. After the current has been brought to zero by the above described method the I.F. alignment and discriminator tuning is completed, and R.F. alignment may be accomplished.

BROADCAST BAND - Generator at 1730 KC, connected to the antenna thru a 200 MMFD condenser, variable condenser at minimum, peak oscillator trimmer. Generator at 1400 KC, tuning in signal, peak the RF and antenna trimers. Generator at 600 KC, while rocking variable condenser, peak the oscillator padding condenser.

POLICE BAND - Generator at 5600 KC, connected to antenna thru 400 Ohm resistor, variable condenser at minimum, peak oscillator trimmer. Generator at 5000 KC, tune in signal, peak RF and antenna trimmers. Generator at 1800 KC, while rocking variable across signal, pad the oscillator circuit for maximum response.

SHORTWAVE BAND - Generator at 18100 KC, gang condenser at minimum, peak oscillator trimmer. Generator at 16000 KC, locate signal on receiver, peak RF and antenna trimmers. Generator at 6000 KC. while rocking variable across signal, peak SW padding condenser.




POWER CHASSIS

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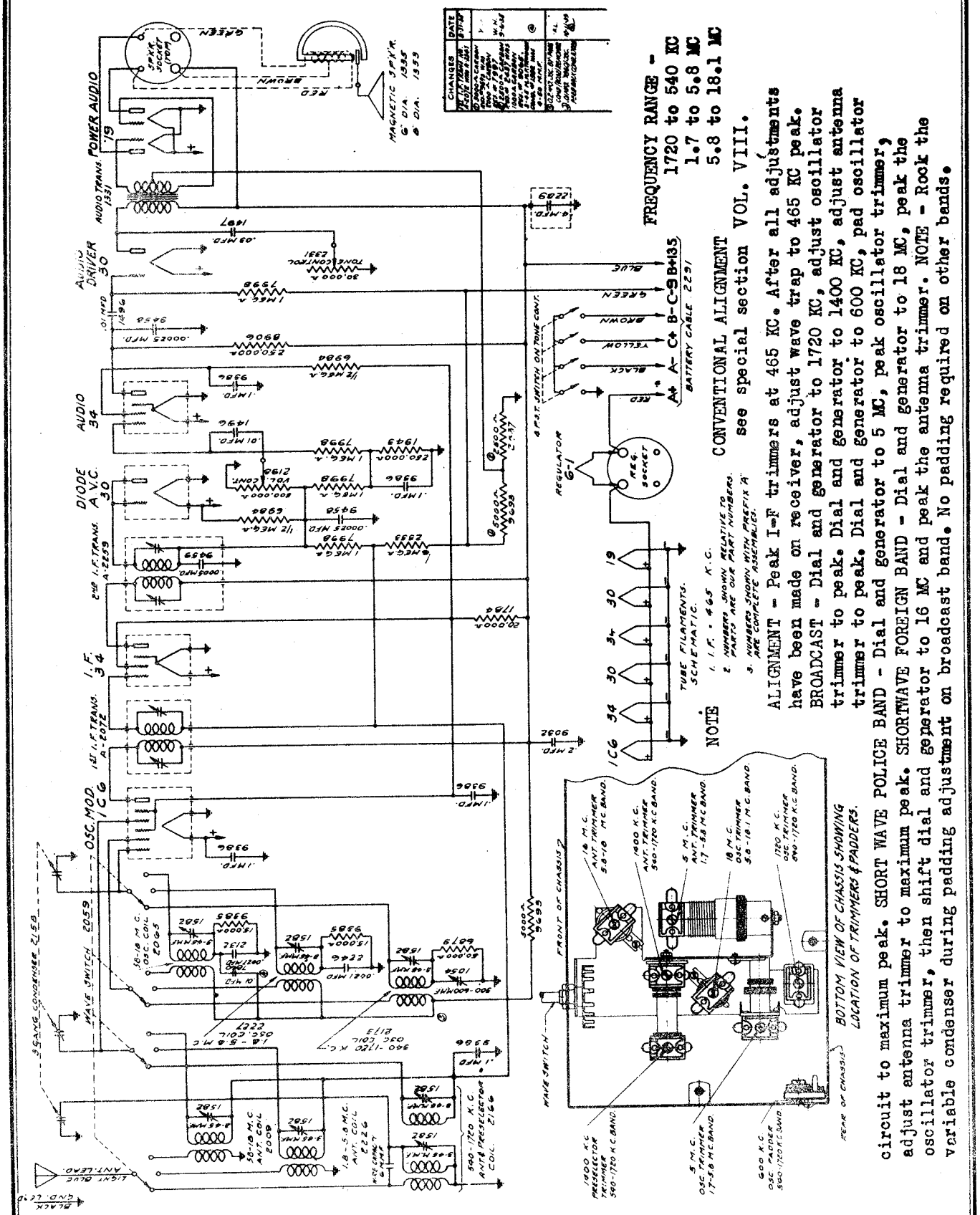
MODELS 1906, 1954
Chassis 39B
Schematic, Trimmers
Alignment

# SPIEGEL INC.


FREQUENCY RANGE -
1720 to 540 KC
1.7 to 5.8 MC
5.8 to 18.1 MC
CONVENTIONAL ALIGNMENT VOL. VIII.
see special section
ALIGNMENT - Peak I-F trimmers at 465 KC. After all adjustments have been made on receiver, adjust wave trap to 465 KC peak. BROADCAST - Dial and generator to 1720 KC, adjust oscillator trimmer to peak. Dial and generator to 1400 KC, adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator trimmer, circuit to maximum peak. SHORT WAVE POLICE BAND - Dial and generator to 5 MC, peak oscillator trimmer, adjust antenna trimmer to maximum peak. SHORTWAVE FOREIGN BAND - Dial and generator to 18 MC, peak the oscillator trimmer, then shift dial and generator to 16 MC and peak the antenna trimmer. NOTE - Rock the variable condenser during padding adjustment on broadcast band. No padding required on other bands.
NOTE
1. I.F. - 465 K.C.
2. NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX 'A' ARE COMPLETE ASSEMBLIES.
TUBE FILAMENTS SCHEMATIC.
BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS.
FRONT OF CHASSIS
REAR OF CHASSIS
BATTERY CABLE 2251
4 POLE SWITCH ON TONE CONT.
REGULATOR G-1
REG. SOCKET
POWER AUDIO 19
AUDIO TRANS. 1951
AUDIO DRIVER 30
AUDIO 34
DIODE A.V.C. 30
2nd I.F. TRANS. A-2059
I.F. 34
1st I.F. TRANS. A-2072
OSC. MOD. 1C6
3 GANG CONDENSER 2150
WAVE SWITCH 2059
ANT. LEAD
GND. LEAD
MAGNETIC SPKR. 6" DIA. 1335 8" DIA. 1353
SPKR. SOCKET (TOP)
TONE CONTROL 2331
1900 K.C. PRESELECTOR TRIMMER 540-1720 K.C. BAND
5 M.C. OSC TRIMMER 17-5.8 MC BAND
600 K.C. OSC PADDER 540-1720 K.C. BAND
18 M.C. ANT. TRIMMER 5.8-18 MC BAND
1900 K.C. ANT. TRIMMER 540-1720 K.C. BAND
5 M.C. ANT. TRIMMER 1.7-5.8 MC BAND
18 M.C. OSC TRIMMER 5.8-18.1 MC BAND
1720 K.C. OSC TRIMMER 540-1720 K.C. BAND

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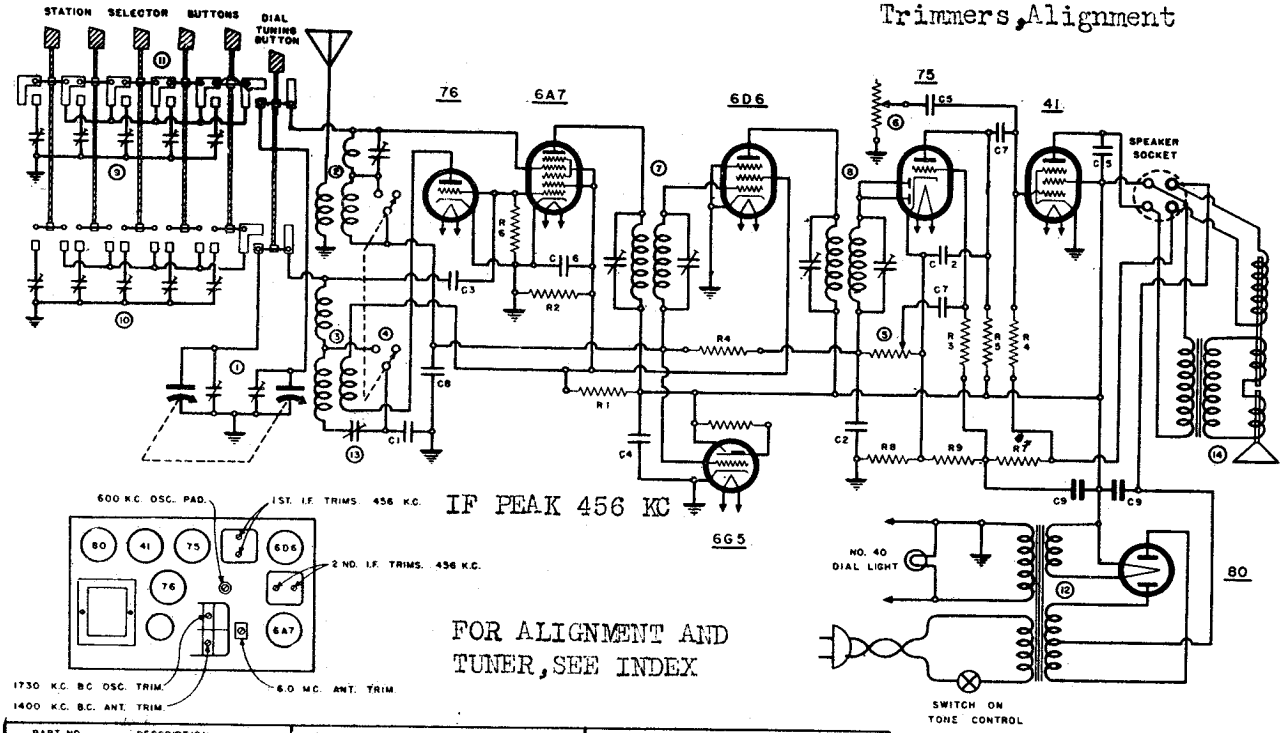
# SPIEGEL INC.

MODELS 2064, 2065, 4014, 4064
4066 Chassis 745 (1937)
Schematic, Voltage, Socket
Trimmers, Alignment



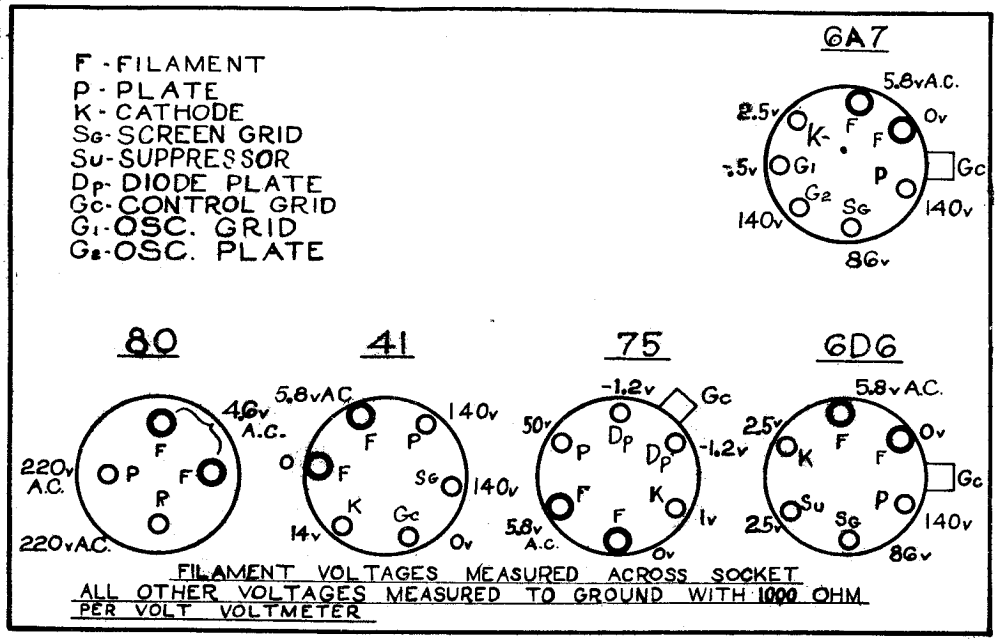

| PART NO. | DESCRIPTION |
|---|---|
| R1 60-152 | 6000 OHM 2W. CARBON RES. |
| R2 6117 | 25,000 - 1/2W - - |
| R3 6020 | 2 MEG - 1/3W - - |
| R4 6018 | 500,000 - - - - |
| R5 6024 | 250,000 - - - - |
| R6 6028 | 40,000 - - - - |
| R7 60-100 | 200 OHM 1W WIRE WOUND - |
| R8 60-101 | 50 - 1/2W - - |
| R9 60-104 | 20 - - - - |

| PART NO | DESCRIPTION |
|---|---|
| C1 15-101 | .00148 MFD. MICA COND. ±5% |
| C2 1504 | .00025 - - - |
| C3 1503 | .00005 - - - |
| C4 1602 | 1 MFD. 600V TUBULAR COND. |
| C5 1651 | .004 - - - - |
| C6 1607 | .05 - 400V. - - |
| C7 1603 | .01 - - - - |
| C8 1622 | .05 - 200V. - - |
| C9 18-213 | DUAL 8 MFD. 300V. ELECTROLYTIC |

| PART NO | DESCRIPTION 745 |
|---|---|
| 1 19-113 | 2 GANG CONDENSER |
| 2 10-173 | ANT. COIL |
| 3 10-147 | OSC. COIL |
| 4 69-108 | WAVE SWITCH |
| 5 24-105 | VOLUME CONTROL |
| 6 26-106 | TONE CONTROL WITH SWITCH |
| 7 10-201 | 1ST I.F. TRANSFORMER |
| 8 10-202 | 2 ND. I.F. " |
| 9 20-106 | ANT. TRIMMER STRIP |
| 10 20-107 | OSC. " " |
| 11 69-115 | PUSH BUTTON SWITCH |
| 12 80-137 | POWER TRANSFORMER |
| 13 20-100 | OSC. PADDING COND. |
| LT | RECTIFIER |

## SOCKET VOLTAGES

F - FILAMENT
P - PLATE
K - CATHODE
Sg - SCREEN GRID
Su - SUPPRESSOR
Dp - DIODE PLATE
Gc - CONTROL GRID
G1 - OSC. GRID
G2 - OSC. PLATE




FILAMENT VOLTAGES MEASURED ACROSS SOCKET
ALL OTHER VOLTAGES MEASURED TO GROUND WITH 1000 OHM PER VOLT VOLTMETER

## DESCRIPTION

This receiver is a 7 tube alternating current operated superteterodyne.

The tubes used are a 76 as oscillator, a 6A7 as modulator, a 6D6 as I. F. amplifier, a 75 as A. V. C. and audio rectifier and audio voltage amplifier, a 41 as power audio amplifier, an 80 as a power rectifier and a 6G5 as tuning indicator.

This receiver is made to cover 2 tuning bands, the standard broadcast band which ranges from 1730 K.C. to 535 K.C. and the middle or police band which has a frequency range of from 6.4 M.C. to 2.1 M.C.

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MODELS 2070,2071,4076
Chassis 1105
Schematic,Voltage
Socket

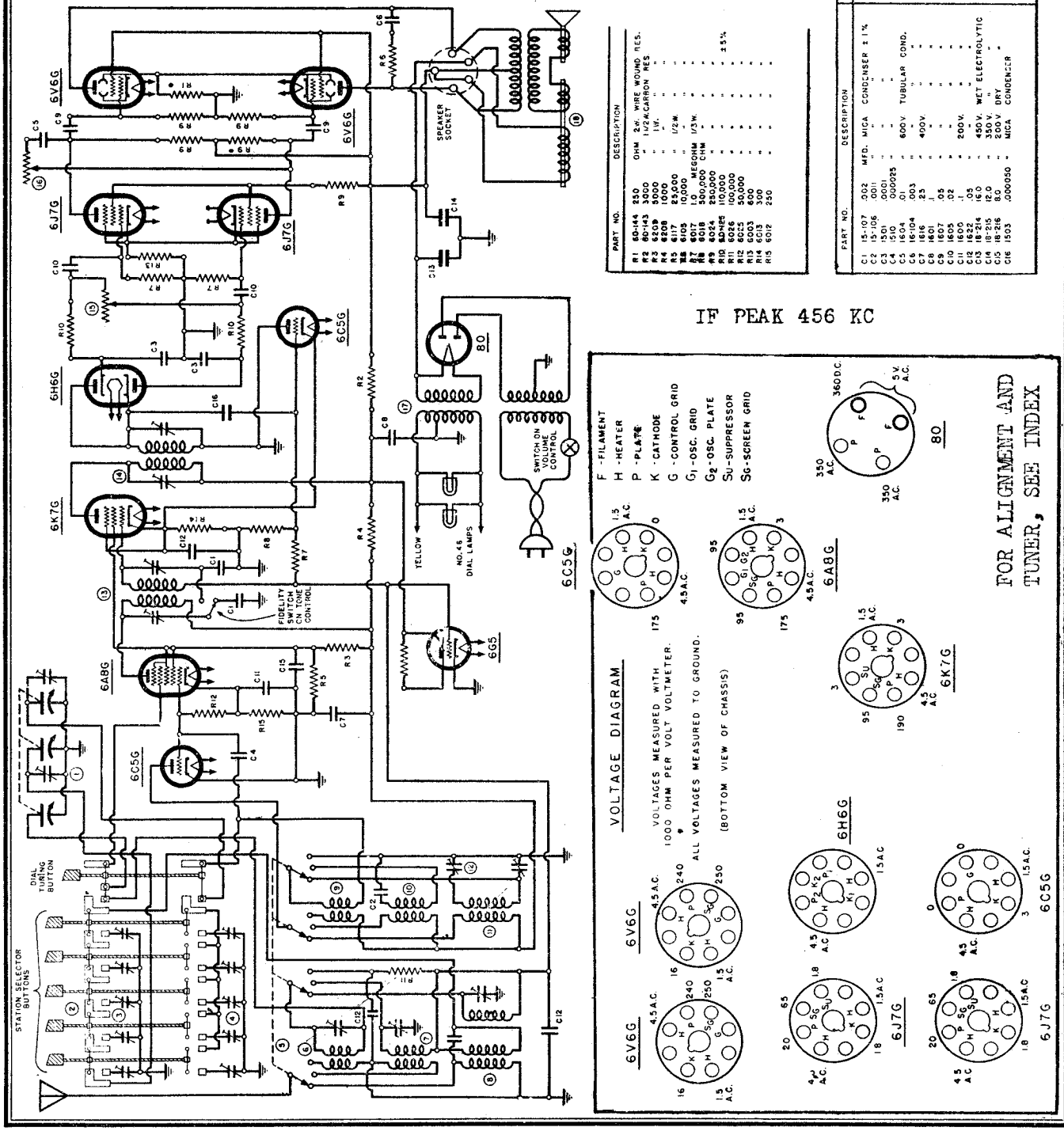
# SPIEGEL INC.

## DESCRIPTION

This receiver is an 11 tube alternating current operated superheterodyne.

The tubes used are a 6C5G oscillator, a 6A8G modulator, a 6K7G I.F. amplifier, a 6C5G A.V.C. rectifier, a 6H6G detector, a pair of 6J7G audio amplifiers, a pair of 6V6G power amplifiers, an 80 rectifier, and a 6G5 tuning indicator or magic eye.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C., to 535 K.C., the middle or police band which has a frequency range of from 5.4 M.C. to 1.7 M.C. and the high frequency or foreign band which is from 19 M.C. to 5.0 M.C.




| PART NO. | DESCRIPTION |
|---|---|
| R1 | 80-144 250 OHM 2-W WIRE WOUND RES. |
| R2 | 80-143 3000 " 1-1/2 " CARBON " |
| R3 | 6208 5000 " 1-W. " " |
| R4 | 6208 1000 " 1-W. " " |
| R5 | 6117 25,000 " 1/2-W. " " |
| R6 | 6105 10,000 " 1/2-W. " " |
| R7 | 6017 1.0 MEGOHM 1/3-W. " " |
| R8 | 6017 500,000 OHM " " " " |
| R9 | 6024 250,000 " " " " " " |
| R10 | 80-145 110,000 " " " " " " |
| R11 | 6026 100,000 " " " " " " |
| R12 | 6025 50,000 " " " " " " |
| R13 | 6003 800 " " " " " " |
| R14 | 6013 300 " " " " " " |
| R15 | 6012 250 " " " " " " |

| PART NO. | DESCRIPTION |
|---|---|
| C1 | 15-107 .002 MFD. MICA CONDENSER ± 1% |
| C2 | 15-106 .0011 " " " " " |
| C3 | 1501 .0001 " " " " " |
| C4 | 1510 .000025 " " " " " |
| C5 | 16-104 .003 " 600 V. TUBULAR COND. |
| C6 | 15-104 .003 " " " " |
| C7 | 1616 .25 " 400V " " |
| C8 | 1601 .1 " " " " " |
| C9 | 1607 .05 " " " " " |
| C10 | 1605 .02 " " " " " |
| C11 | 1605 .1 " 200 V. " " |
| C12 | 18-224 .1-.5 " 450 V. WET ELECTROLYTIC |
| C13 | 18-215 12.0 " 350 V. " " |
| C14 | 18-216 8.0 " 200 V DRY " |
| C15 | 1503 .000050 " MICA CONDENSER |

| PART NO. | DESCRIPTION | 1105 |
|---|---|---|
| 1 | 19-121 | 3 GANG CONDENSER |
| 2 | 69-115 | 6 BUTTON PUSH BUTTON SWITCH |
| 3 | 20-106 | ANT. TRIMMER STRIP |
| 4 | 20-107 | OSC. " |
| 5 | 69-107 | WAVE SWITCH |
| 6 | 10-183 | SW. ANT. COIL |
| 7 | 10-182 | POL. " " |
| 8 | 10-179A | B.C. ANT & PRESELECTOR COIL |
| 9 | 10-184 | S.W. OSC COIL |
| 10 | 10-181 | POL. " " |
| 11 | 10-180 | B.C. " " |
| 12 | 20-100 | B.C. OSC. PAD |
| 13 | 20-105 | OSC. I.F. TRANS. |
| 14 | 10-207 | 2ND. " " |
| 15 | 24-115 | VOLUME CONTROL WITH SWITCH |
| 16 | 26-112 | TONE CONTROL |
| 17 | 80-141 | POWER TRANS. |
| 18 | | SPEAKER |

IF PEAK 456 KC

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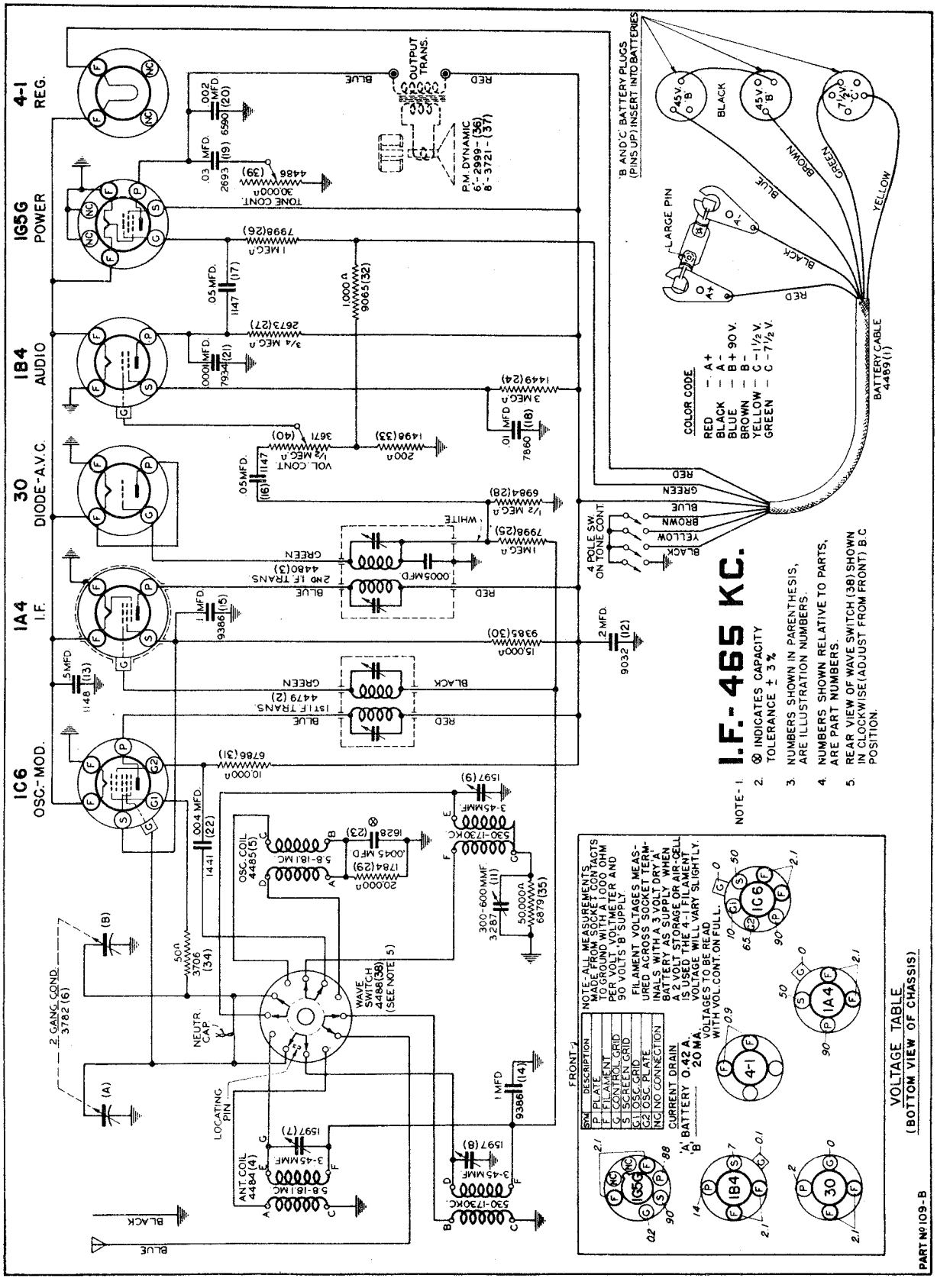
# SPIEGEL INC.

MODELS 2100 to 2103 inc.
2150 to 2153 inc.
Chassis 109B
Schematic, Voltage, Socket


I.F.- 465 KC.
NOTE- 1. ⊗ INDICATES CAPACITY TOLERANCE ± 3%
2. NUMBERS SHOWN IN PARENTHESIS, ARE ILLUSTRATION NUMBERS.
3. NUMBERS SHOWN RELATIVE TO PARTS, ARE PART NUMBERS.
4. REAR VIEW OF WAVE SWITCH (38) SHOWN IN CLOCKWISE (ADJUST FROM FRONT) B.C POSITION.
5.
COLOR CODE
RED — A+
BLACK — A-
BLUE — B+ 90 V.
BROWN — B-
YELLOW — C- 1½ V.
GREEN — C- 7½ V.
'B' AND 'C' BATTERY PLUGS (PINS UP) INSERT INTO BATTERIES
BATTERY CABLE 4459(1)
4 POLE SW. ON TONE CONT.
TONE CONT. 30,000Ω 4486 (39)
.03 MFD. 2693 (19) 6590 (20)
.002 MFD
OUTPUT TRANS.
P.M. DYNAMIC 6"- 2999- (36) 8"- 3721- (37)
4-1 REG.
IG5G POWER
IB4 AUDIO
30 DIODE-A.V.C.
IA4 I.F.
IC6 OSC.-MOD.
1 MEG. Ω 7998(26)
.05 MFD. 1147 (17)
1,000Ω 9065(32)
3/4 MEG. Ω 2673(27)
.0001 MFD. 7934 (21)
3 MEG. Ω 1449(24)
.01 MFD. 7860 (18)
1/3 MEG. Ω VOL. CONT. 3671 (40)
1496(33) 200Ω
.05 MFD. 1147 (16)
1/3 MEG. Ω 6984(28)
1 MEG. Ω 7998(25)
.005 MFD
2ND I.F. TRANS. 4480(3)
.1 MFD. 9386(15)
15,000Ω 9385(30)
.2 MFD. 9032 (12)
.5 MFD. 1148 (13)
1ST I.F. TRANS. 4479 (2)
10,000Ω 6786(31)
.004 MFD. 1441 (22)
OSC. COIL 4485(5)
5.8-18.1 MC
.0045 MFD. 1784(29)
20,000Ω
1628 (23) ⊗
3-45 MMF.
530-1730 KC
1597 (9)
300-600 MMF. 3287 (11)
50,000Ω 6879(35)
50Ω 3706 (34)
2 GANG COND. 3782 (6)
NEUTR. CAP.
WAVE SWITCH 4488(38) (SEE NOTE 5)
LOCATING PIN
ANT. COIL 4484 (4)
1597 (7)
1597 (8)
1 MFD. 9386(14)
BLACK
BLUE
FRONT
NOTE- ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT METER AND 90 VOLTS 'B' SUPPLY
FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 3 VOLT DRY 'A' BATTERY AS SUPPLY WHEN A 2 VOLT STORAGE OR WET CELL IS USED THE FILAMENT VOLTAGE WILL VARY SLIGHTLY.
VOLTAGES TO BE READ WITH VOL. CONT. ON FULL.
CURRENT DRAIN 'A' BATTERY 0.42 A. 'B' 20 MA.
SYM. DESCRIPTION
P PLATE
F FILAMENT
G CONTROL GRID
S SCREEN GRID
G1 OSC. GRID
G2 OSC. PLATE
NC NO CONNECTION
VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)
PART Nº 109-B

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**ALIGNMENT PROCEDURE:**

Lack of sensitivity and poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, low battery voltage, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

**NOTE:** IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER AND THAT THE PROCEDURE BE CAREFULLY FOLLOWED, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

THE TRIMMER AND PADDING CONDENSER WILL BE REFERRED TO BY THEIR FUNCTION, AS SHOWN IN PARTS DIAGRAM.

**ALIGNING I.F STAGE AT 465 KILOCYCLES:**

(a) Attach the ground lead of the test oscillator to the chassis. Connect the other lead to the grid of the 1C6 tube through a .02 Mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 KILOCYCLES and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

**ALIGNING 1730-530 KILOCYCLE BAND:**

(a) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(b) Remove test oscillator lead from grid of 1C6 tube and connect to receiver antenna lead through a .00025 Mfd. series condenser.

(c) Adjust band selector switch for operation on the 1730-530 kilocycle band.

(d) Set test oscillator frequency and receiver dial to EXACTLY 1730 kilocycles. Turn chassis on end and adjust 1730 kilocycle oscillator trimmer for maximum 1730 kilocycle test oscillator signal sensitivity.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles and adjust 1400 K. C. antenna trimmer for maximum sensitivity.

(f) Set test oscillator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 K.C. oscillator padder for maximum sensitivity.

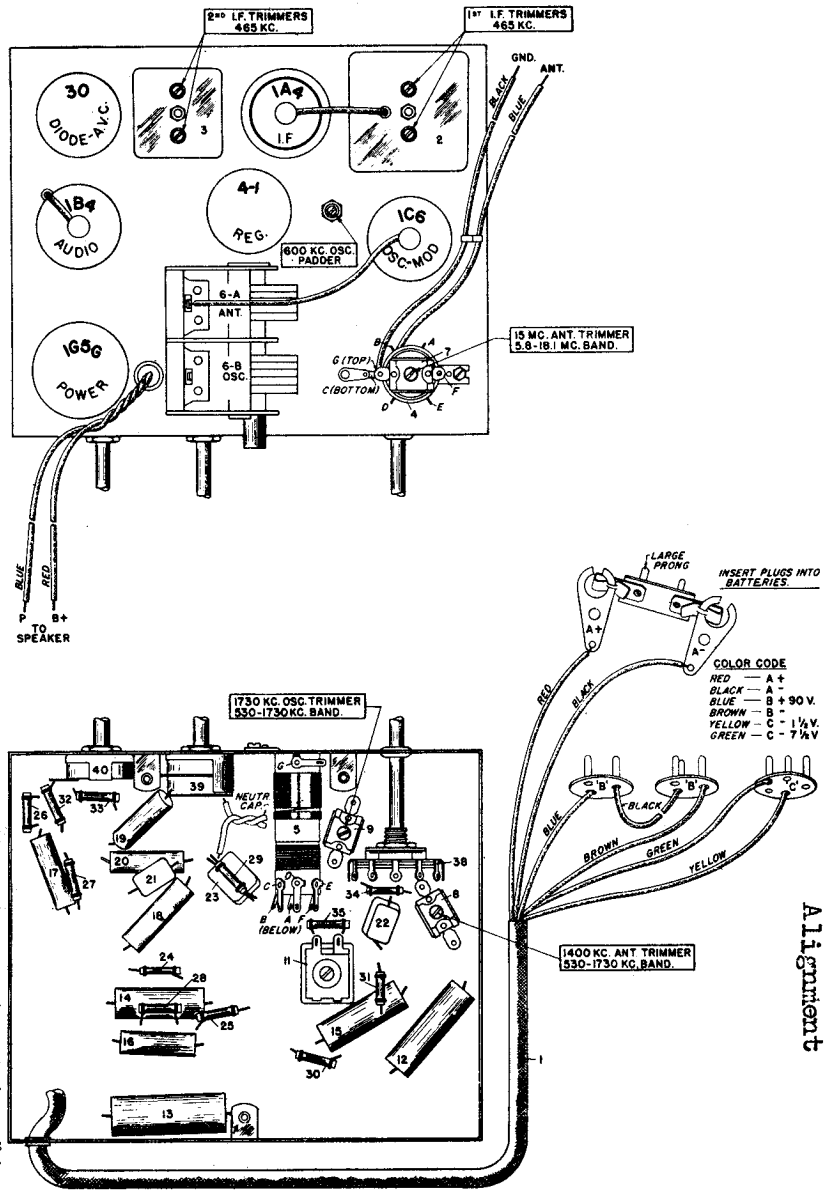
**ALIGNING 5.8-18.1 MEGACYCLE BAND:**

(a) Replace .00025 Mfd. test oscillator antenna lead series condenser with a 400 ohm resistor, and place band selector switch for operation on 5.8-18.1 megacycle band.

(b) Tune receiver dial and set test oscillator frequency to approximately 15 megacycles.

(c) Rock gang condenser slightly to right and left and adjust 15 M.C. antenna trimmer for maximum 15 megacycle test signal response.

To assure more accurate trimmer setting, repeat all above adjustments several times always using lowest possible test oscillator output consistent with readable output meter scale deflection.

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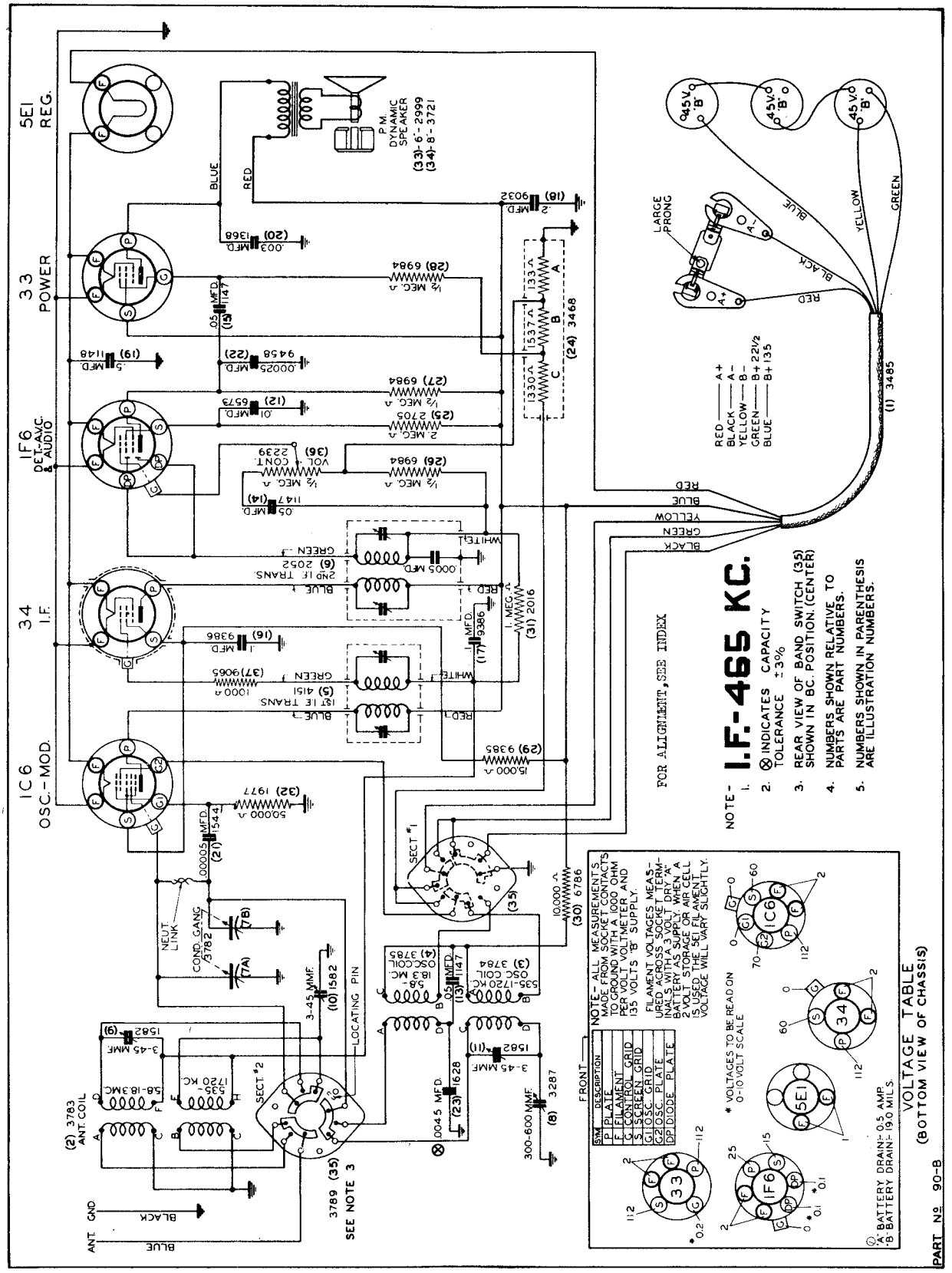
Schematic, Voltage, Socket

# SPIEGEL INC.

MODELS 2112, 2113, 2120,
2121 Chassis 90B
2108 to 2111
Chassis 1090B


5E1 REG.
3 3 POWER
IF6 DET.-A.V.C. & AUDIO
3 4 I.F.
IC6 OSC.-MOD.
P.M. DYNAMIC SPEAKER (33)-6'-2999 (34)-8'-3721
45 V. 'B'
LARGE PRONG
RED
BLACK
YELLOW
GREEN
BLUE
(1) 3485
NOTE- I. I.F.-465 KC.
2. ⊗ INDICATES CAPACITY TOLERANCE ±3%
3. REAR VIEW OF BAND SWITCH (35) SHOWN IN BC. POSITION. (CENTER)
4. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
5. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
FOR ALIGNMENT, SEE INDEX
NOTE- ALL MEASUREMENTS MADE FROM SOCKET CONTACTS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER AND 135 VOLTS 'B' SUPPLY.
FILAMENT VOLTAGES MEASURED ACROSS SOCKET TERMINALS WITH A 3 VOLT DRY 'A' BATTERY AS SUPPLY WHEN A 2 VOLT STORAGE OR AIR CELL IS USED THE 5E1 FILAMENT VOLTAGE WILL VARY SLIGHTLY.
SYM DESCRIPTION
P PLATE
F FILAMENT
C CONTROL GRID
S SCREEN GRID
G1 OSC. GRID
G2 OSC. PLATE
DP DIODE PLATE
FRONT
* VOLTAGES TO BE READ ON 0-10 VOLT SCALE
VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)
A- BATTERY DRAIN- 0.5 AMP.
B- BATTERY DRAIN- 19.0 MILS.
PART Nº 90-B
SEE NOTE 3
LOCATING PIN
NEUT. LINK
COND. GANG 3782
(2) 3783 ANT. COIL
ANT.
GND
BLACK
BLUE

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MODELS 2112,2113,2120,2121
2108 to 2111 incl.
Socket,Trimmers,Chassis

# SPIEGEL INC.

MODELS 2070,2071,4076
MODELS 4004,4052
MODEL 4068
Alignment

## MODELS 2070 - 2071 - 4076 , 4004 - 4052 , 4068.

### ALIGNMENT PROCEDURE

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two plate pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Press in the dial Tuning button. **Models 2070,2071,4076 and 40[illegible].**

Connect the signal generator to the grid cap of the 6A7 tube through a 1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the signal generator connected to the grid cap of the 6A7, turn the wave switch to the right hand (short wave) position. Set the dial and the signal generator to 15.0 M.C. Tune in the signal by adjusting the 15.0 M.C. oscillator trimmer. The signal will be heard at two different settings of the trimmer. The proper setting is the one where the signal is heard when the trimmer is the loosest. Also when the dial of the receiver is turned the signal will be heard again at about 14.0 M.C. If the signal is heard at about 16.0 M.C. on the dial instead of 14.0 M.C. the wrong setting has been used and should be corrected.

Set the wave switch on broadcast position, turn the dial to the extreme high frequency end. Feed a 1680 K. C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer and the 1500 K.C. broadcast preselector trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding a 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

**The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.**

## MODELS 2064 - 2065 - 4014 - 4064 - 4066.

### ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter) This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

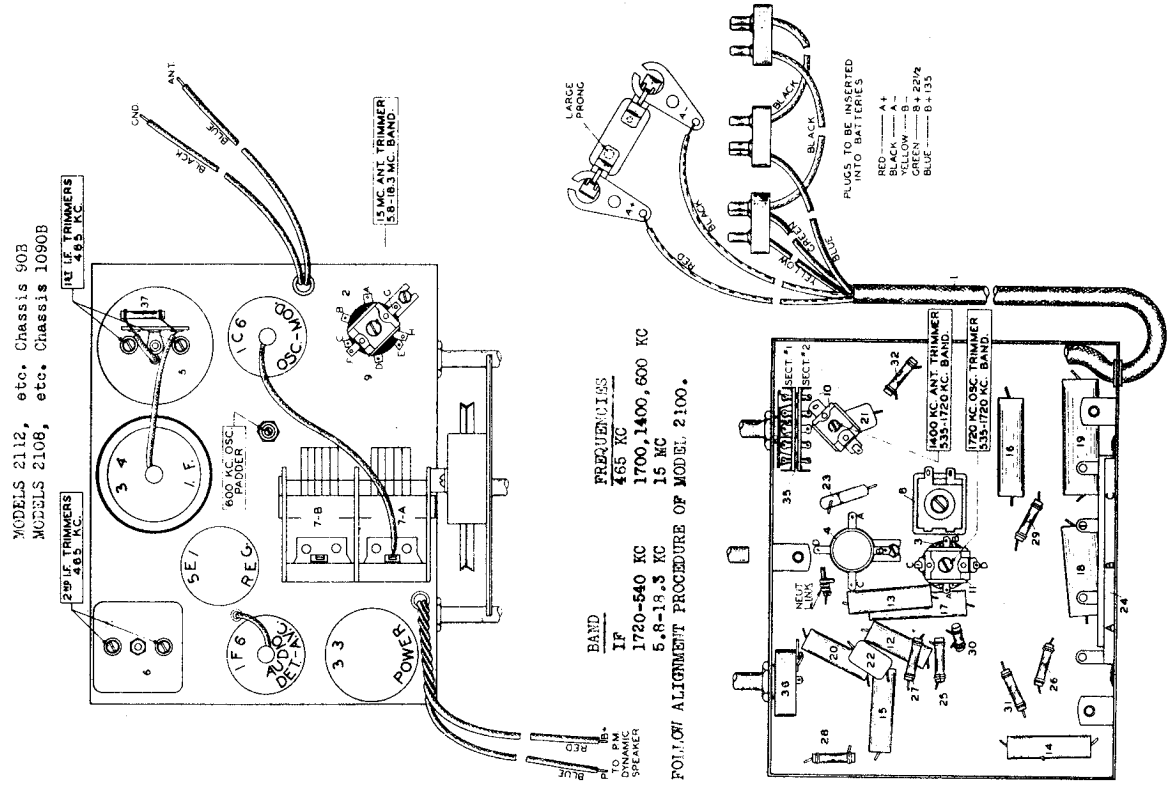
Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. With the wave switch on broadcast position, press in the dial tuning button and set the dial to about 1000 K.C. Then feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1730 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1730 K.C. broadcast oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. broadcast antenna trimmer to maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

The short wave band is aligned while feeding a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Turn the wave switch to short wave position and tune in the 6.0 M.C. signal. Adjust the 6.0 M.C. short wave trimmer to maximum output.

grid cap of the 6A8G tube **Models 2070,2071, and 4076.**

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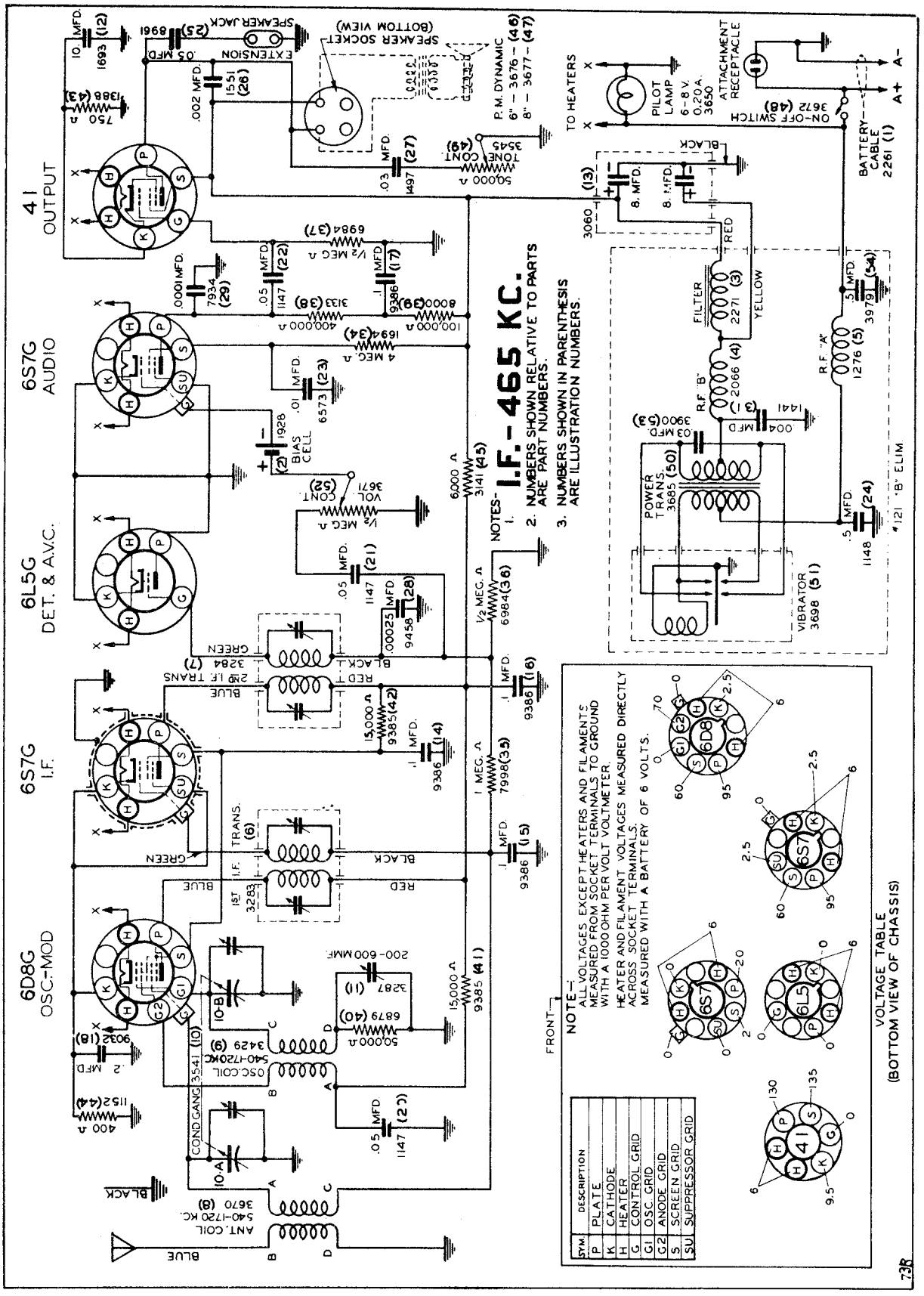
# SPIEGEL INC.

MODELS 2222 to 2229 inc.
Chassis 73B
Schematic, Voltage


I.F.-465 KC.
NOTES-
1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
6D8G OSC.-MOD
6S7G I.F.
6L5G DET. & A.V.C.
6S7G AUDIO
41 OUTPUT
POWER TRANS. 3685 (50)
VIBRATOR 3698 (51)
FILTER 2271 (3)
R.F. "A" 1276 (5)
R.F. "B" 2066 (4)
BATTERY CABLE 2261 (1)
ON-OFF SWITCH 3672 (48)
PILOT LAMP 6-8 V. 0.20 A. 3650
ATTACHMENT RECEPTACLE
SPEAKER SOCKET (BOTTOM VIEW)
P.M. DYNAMIC 6" - 3676 - (46) 8" - 3677 - (47)
TONE CONT. 3545 (49)
VOL. CONT. 3671 (52)
BIAS CELL 1928 (2)
ANT. COIL 540-1720 KC. 3670 (8)
OSC. COIL 540-1720 KC. 3541 (10)
COND. GANG
1ST I.F. TRANS. (6)
2ND I.F. TRANS. 3284 (7)
SPEAKER JACK 8961 (25)
EXTENSION .05 MFD.
.002 MFD. 1551 (26)
.03 MFD. 1497 (27)
8. MFD. (13) 3060
8. MFD. 3979 (34)
.5 MFD. 1148 (24)
.03 MFD. 3900 (53)
.004 MFD. 1441 (3)
.01 MFD. 6573 (23)
.05 MFD. 1147 (22)
.1 MFD. 9386 (17)
.05 MFD. 1147 (21)
.00025 MFD. 9458 (28)
.1 MFD. 9386 (14)
.1 MFD. 9386 (16)
.1 MFD. 9386 (15)
.05 MFD. 1147 (20)
.0001 MFD. 7934 (29)
.2 MFD. 9032 (18)
750 Ω 1388 (43)
400 Ω 1152 (44)
100,000 Ω 1694 (34)
400,000 Ω 3133 (38)
8000 Ω 9386 (39)
6000 Ω 3141 (45)
½ MEG. Ω 6984 (36)
1 MEG. Ω 7998 (35)
15,000 Ω 9385 (42)
15,000 Ω 9385 (41)
50,000 Ω 6879 (40)
200-600 MMF 3287 (11)
3429 (9)
10-B
10-A
½ MEG. Ω 6984 (37)
4 MEG. Ω 1694 (34)
½ MEG. Ω
TO HEATERS
BLACK
RED
YELLOW
GREEN
BLUE
FRONT
NOTE- ALL VOLTAGES, EXCEPT HEATERS AND FILAMENTS, MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER. HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS. MEASURED WITH A BATTERY OF 6 VOLTS.
SYM. DESCRIPTION
P PLATE
K CATHODE
H HEATER
G CONTROL GRID
G1 OSC. GRID
G2 ANODE GRID
S SCREEN GRID
SU SUPPRESSOR GRID
VOLTAGE TABLE (BOTTOM VIEW OF CHASSIS)
73R

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Lack of sensitivity, selectivity or poor tone quality may be due to any one or a combination of causes such as weak or defective tubes or speaker, improperly connected or low battery, open or grounded bias resistor, bypass condenser, inadequate or excessively long antenna, etc. Never attempt to realign set until all other possible sources of trouble have been first thoroughly investigated and definitely proven not to be the cause.

**NOTE:** BE SURE TO FOLLOW PROCEDURE CAREFULLY WHEN ALIGNING, OTHERWISE THE RECEIVER WILL BE INSENSITIVE AND THE DIAL CALIBRATION WILL BE INCORRECT.

IT IS ABSOLUTELY NECESSARY THAT AN ACCURATELY CALIBRATED TEST OSCILLATOR WITH SOME TYPE OF OUTPUT MEASURING DEVICE BE USED WHEN ALIGNING THE RECEIVER.

**ALIGNING I.F. STAGE AT 465 KILOCYCLES:**

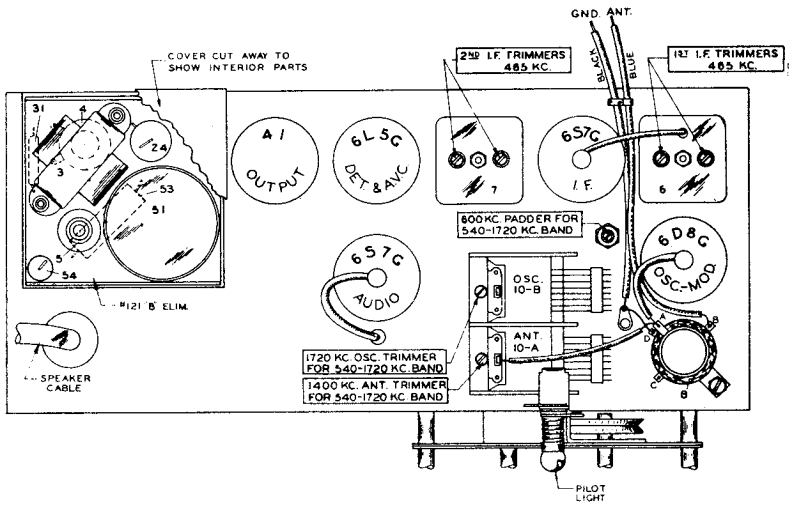
(a) Connect the ground lead of the test oscillator to the chassis or set ground lead. Connect the other lead of the test oscillator to the grid cap of the No. 6D8G modulator tube through a .02 Mfd. condenser. DO NOT REMOVE GRID CLIP.

(b) Set test oscillator to EXACTLY 465 kilocycles and turn receiver volume control on full.

(c) Peak each of the second I.F. transformer trimmers.

(d) Peak each of the first I.F. transformer trimmers.

To assure most accurate trimmer setting repeat above adjustment several times, always using lowest possible test oscillator output consistent with readable output meter scale deflection.




**ALIGNING ANTENNA AND OSCILLATOR CIRCUIT:**

(a) Connect the high output side of the test oscillator through a .00025 Mfd. condenser to the receiver antenna lead and the low side to the set ground.

(b) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at low frequency end of the dial calibration. If the dial needle does not point exactly to the last line move needle to correct position.

(c) Set receiver dial and test oscillator frequency to EXACTLY 1720 kilocycles.

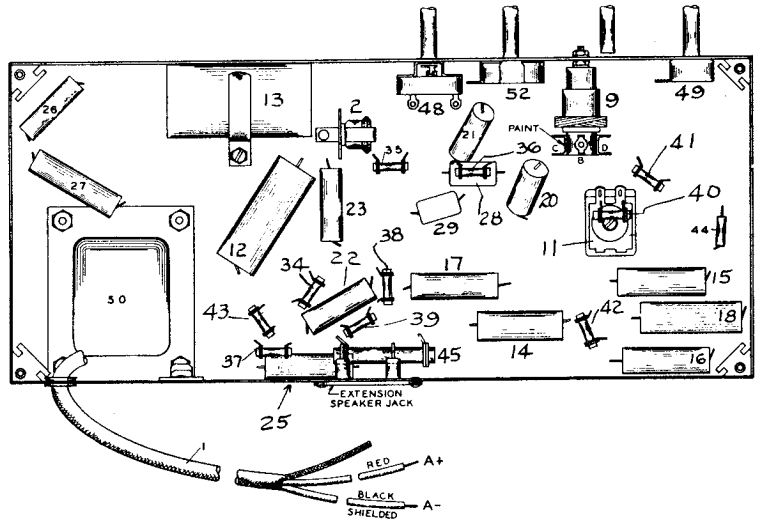
(d) Bring in 1720 KC test oscillator signal to maximum output by adjusting the trimmer condenser mounted on top of the oscillator section of the gang condenser. Looking at the front of the receiver the rear section of the condenser is the oscillator section.

(e) Tune receiver dial and set test oscillator frequency to EXACTLY 1400 kilocycles.

(f) Adjust trimmer on top of the front section gang condenser (antenna section) for maximum 1400 kilocycle test signal response.

(g) Tune receiver dial and set test oscillator frequency to approximately 600 kilocycles.

(h) While rocking the tuning condenser back and forth adjust 600 K.C. oscillator padder condenser which is accessible through the hole in the top of the chassis adjacent to the gang condenser for maximum 600 kilocycle signal response.

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SPIEGEL INC.

MODELS 2204 to 2207 inc. Chas. 23E
2200 to 2203 inc., 2220, 2221
2230 to 2233 inc. Chas. X-23
Schematic, Alignment, Notes

**Follow alignment procedure of Models 4006 - 4070.**

ALIGNMENT FREQUENCIES
IF 465 KC
BROADCAST 1400 and 600 KC
INTERMEDIATE 1800 KC
SHORT WAVE 15 MC

**TUNING EYE USED ON 23E CHASSIS ONLY.**

**Tuning eye used on 23 E Chassis - Models, 2204-2205-2206-2207.**
**Tuning eye not used on X-23 Chassis - Models, 2200-2202-2201-2203-2220-2221-2230-2231-2232-2233.**

$L_1$ - ANT. COIL COMPLETE No. 1191
$L_2$ - OSC. COMPLETE No. 1190
$T_1$ - BAND SWITCH No. 121
$T_2$ - POWER TRANS. No. 526
$T_3$ - SPEAKER No. 722
$T_4$ - VOL. CONT. & SWITCH No. 215
$T_5$ - EL. COND. No. 1720
$L_3$ - 1ST I.F. TRANS. No. 1017
$L_4$ - 2ND I.F. TRANS. No. 1018
$C_1$ - TUNING COND. No. 621

POSITION-1 — BROAD. BAND.
POSITION-2 — INT. BAND.
POSITION-3 — S.W. BAND.

17.5 to 555 meters.

FOR ALIGNMENT SEE INDEX

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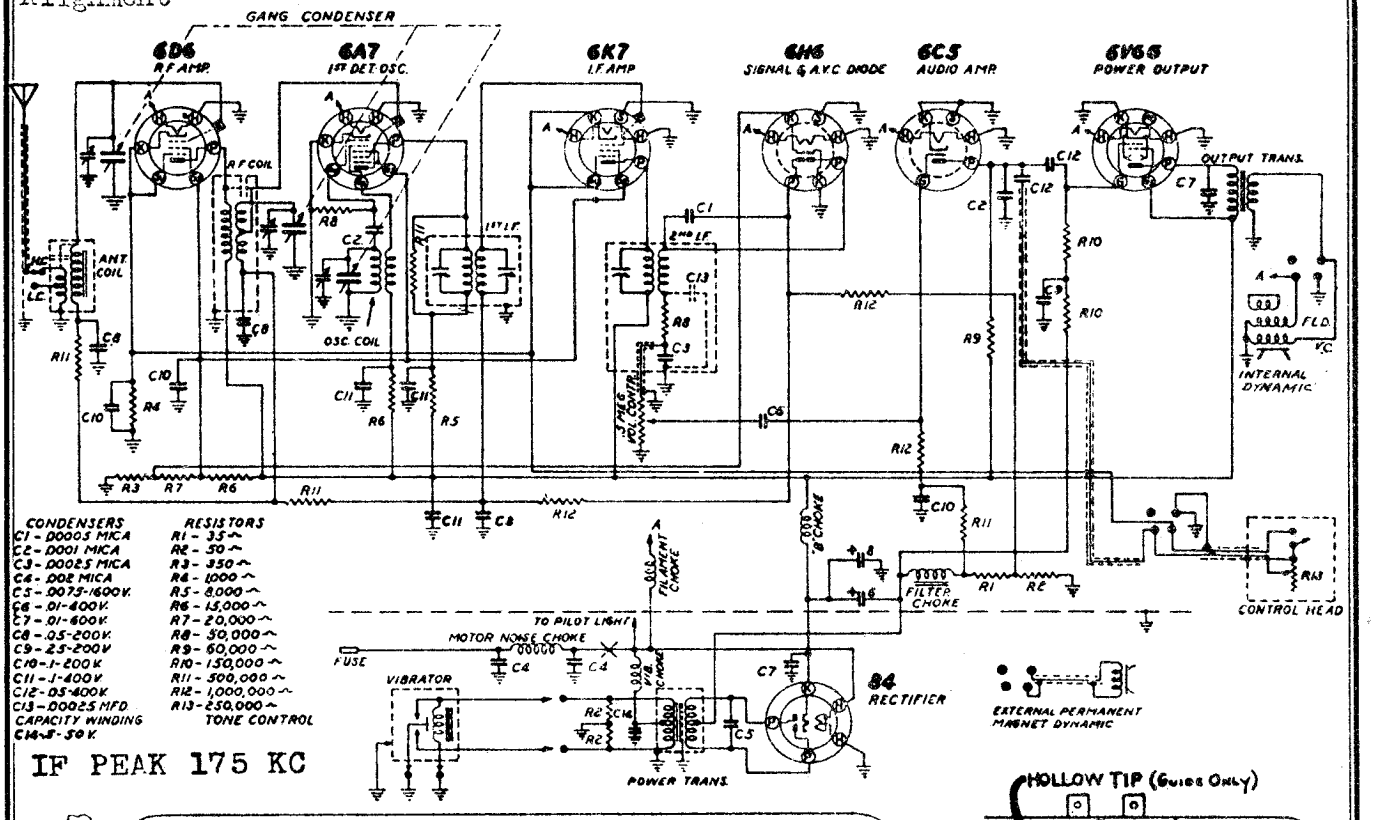
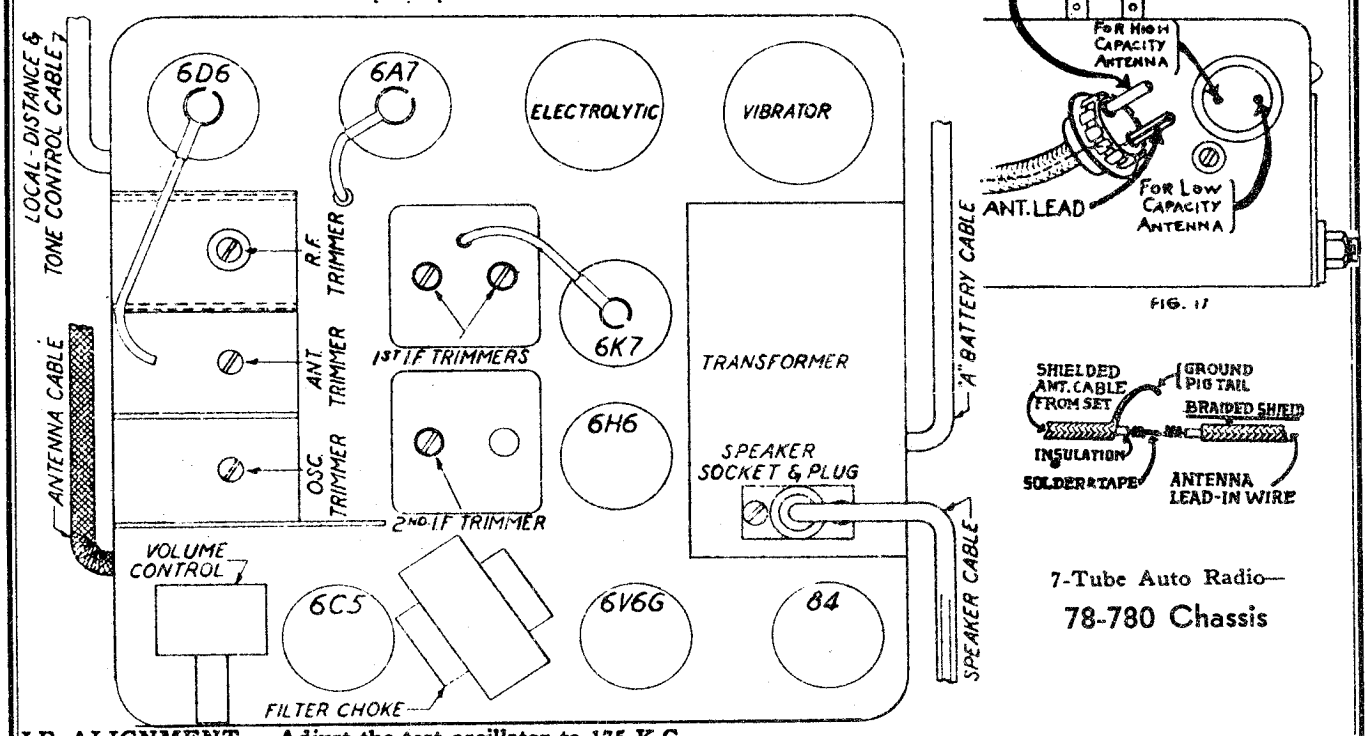
MODELS 2302, 2303 Chas. 78-780
Schematic, Socket, Trimmers
Alignment

# SPIEGEL INC.




IF PEAK 175 KC



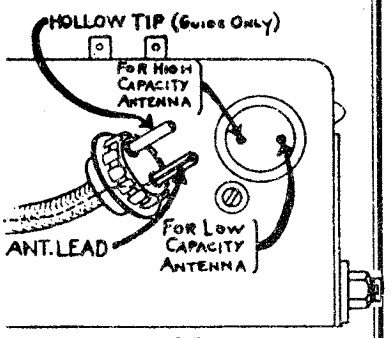




FIG. 17




7-Tube Auto Radio—
78-780 Chassis

**I.F. ALIGNMENT.** Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

**OSCILLATOR ALIGNMENT.** Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

**R.F. ALIGNMENT.** The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

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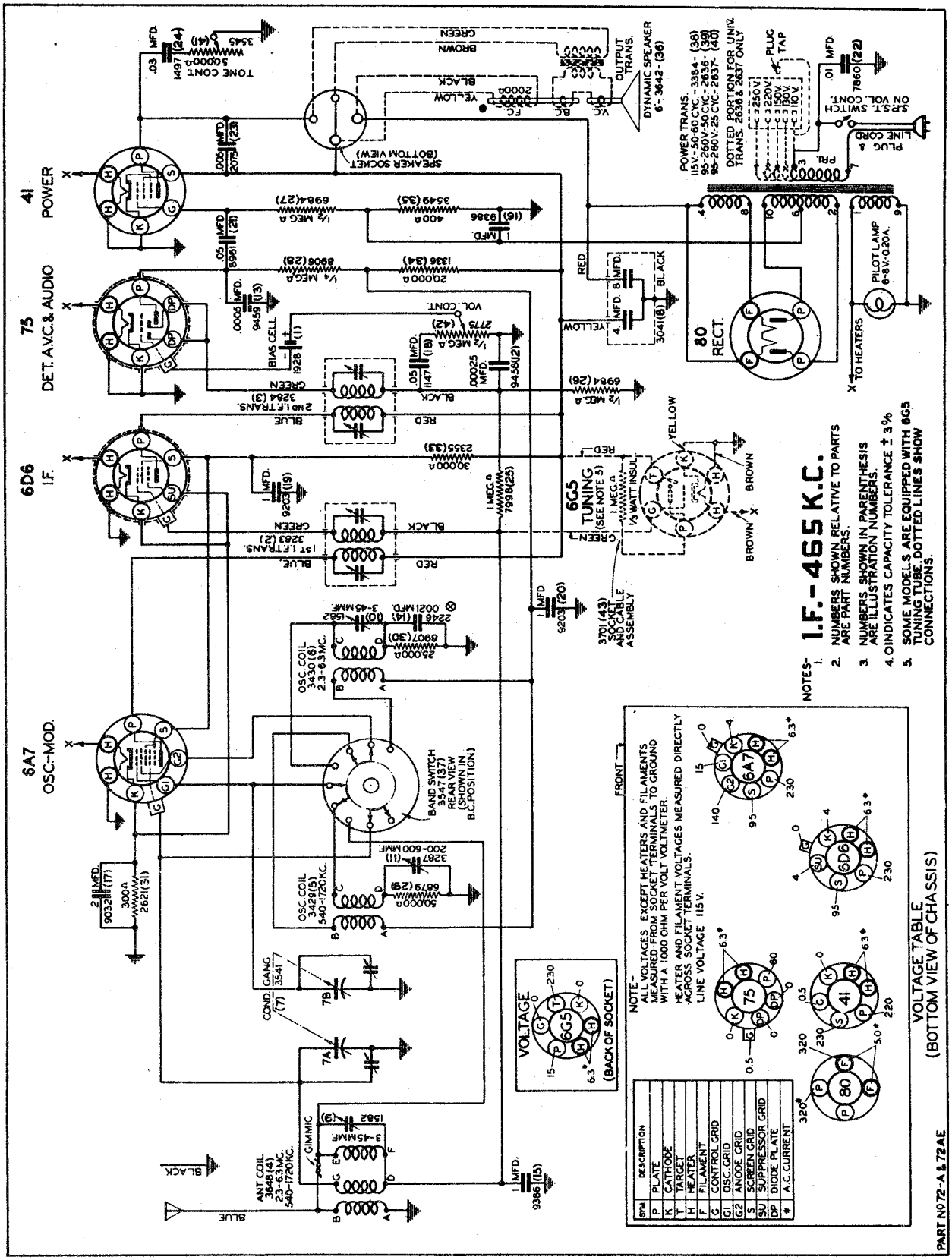
SPIEGEL INC.

MODELS 4002,4050,5020
Chassis 1072AE
Schematic,Voltage


I.F.-465 K.C.
NOTES-
1. NUMBERS SHOWN RELATIVE TO PARTS ARE PART NUMBERS.
2. NUMBERS SHOWN IN PARENTHESIS ARE ILLUSTRATION NUMBERS.
3. Ω INDICATES CAPACITY TOLERANCE ± 3%.
4. SOME MODELS ARE EQUIPPED WITH 6G5 TUNING TUBE. DOTTED LINES SHOW CONNECTIONS.
NOTE- ALL VOLTAGES, EXCEPT HEATERS AND FILAMENTS MEASURED FROM SOCKET TERMINALS TO GROUND WITH A 1000 OHM PER VOLT VOLTMETER.
HEATER AND FILAMENT VOLTAGES MEASURED DIRECTLY ACROSS SOCKET TERMINALS.
LINE VOLTAGE 115 V.
SYM DESCRIPTION
P PLATE
K CATHODE
T TARGET
H HEATER
F FILAMENT
G CONTROL GRID
G1 OSC. GRID
G2 ANODE GRID
S SCREEN GRID
SU SUPPRESSOR GRID
DP DIODE PLATE
+ A.C. CURRENT
VOLTAGE TABLE
(BOTTOM VIEW OF CHASSIS)
FRONT
(BACK OF SOCKET)
PART NO 72-A & 72AE

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MODELS 4002,4050,5020
Chassis 1072AE

# SPIEGEL INC.

Socket,Trimmers,Chassis Alignment

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII.

Peak IF at 465 KC. Connect oscillator at 6A7 grid cap. Use .02 mfd. series condenser, DO NOT REMOVE GRID CAP. Peak second and first IF trimmers.

1720-540 KC Band.

Connect oscillator to antenna lead through .00025 mfd. series condenser. Gang condenser at maximum capacity, calibrate dial so needle falls on last line in this position.

Set oscillator signal at 1720 KC, tune dial to 1400 KC. Trim osc. sect. of gang condenser to maximum output.

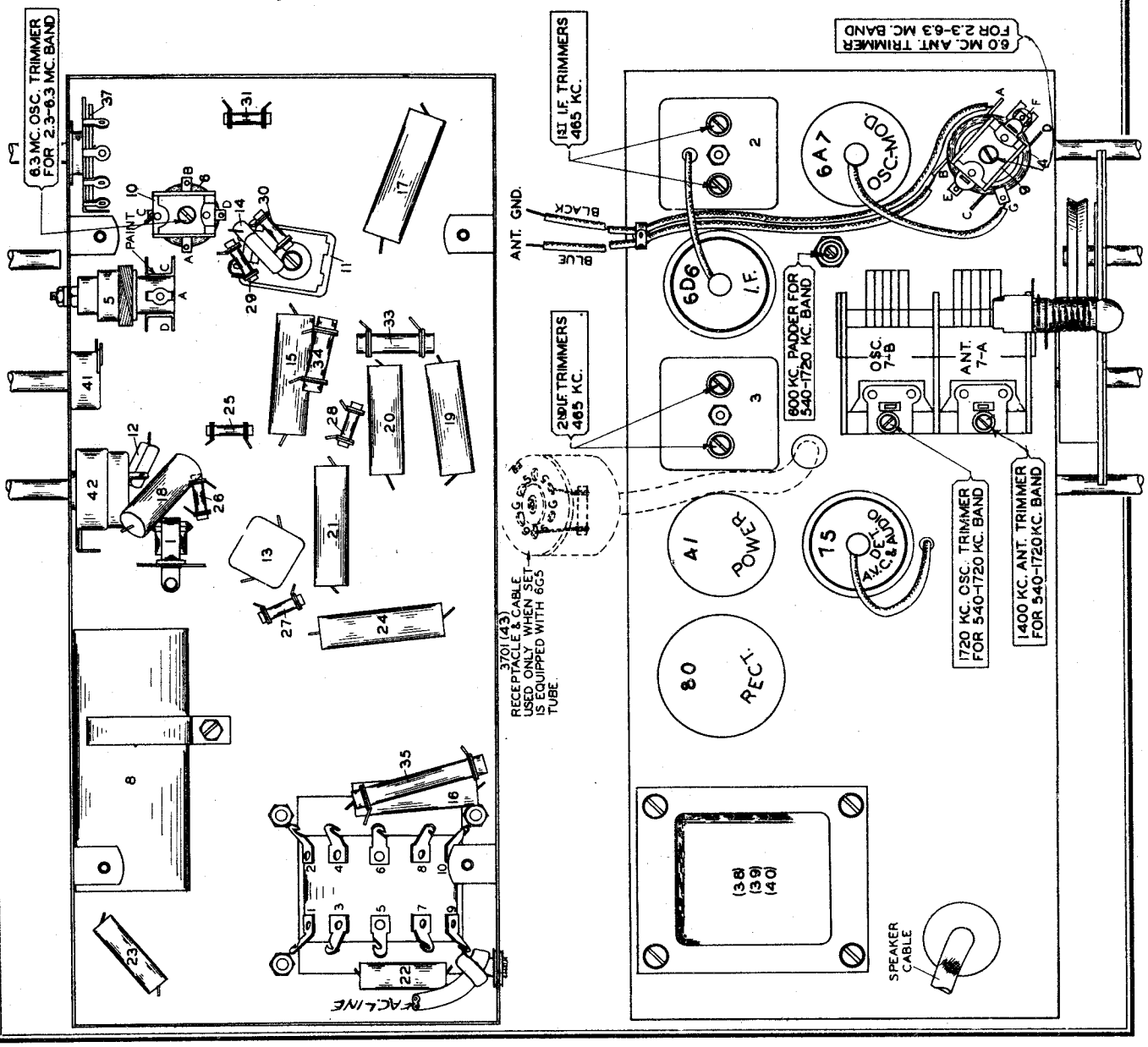
With signal generator at 1400 KC, trim antenna section of gang condenser for maximum output.

Now adjust 600 KC padder for maximum signal while rocking condenser.

2.3-6.3 MC Band

Signal at 6.3 MC through 400 ohm and .00025 mfd. dummy to antenna lead. Band switch in 2.3-6.3 MC position. Adjust 6.3 MC osc. trimmer to maximum output.

Tune dial to 6 MC. Signal at 6 MC. Adjust 6 MC antenna trimmer for maximum sensitivity.


6.3 MC. OSC. TRIMMER FOR 2.3-6.3 MC. BAND
1ST I.F. TRIMMERS 465 KC.
6.0 MC. ANT. TRIMMER FOR 2.3-6.3 MC. BAND
ANT. GND.
BLACK
BLUE
6A7 OSC-MOD
6D6 I.F.
2ND I.F. TRIMMERS 465 KC.
600 KC. PADDER FOR 540-1720 KC. BAND
OSC. 7-B
ANT. 7-A
41 POWER
75 DET. A.V.C. & AUDIO
80 RECT.
1720 KC. OSC. TRIMMER FOR 540-1720 KC. BAND
1400 KC. ANT. TRIMMER FOR 540-1720 KC. BAND
RECEPTACLE (43) USED ONLY WHEN SET IS EQUIPPED WITH 6G5 TUBE.
(38) (39) (40)
SPEAKER CABLE
AC LINE

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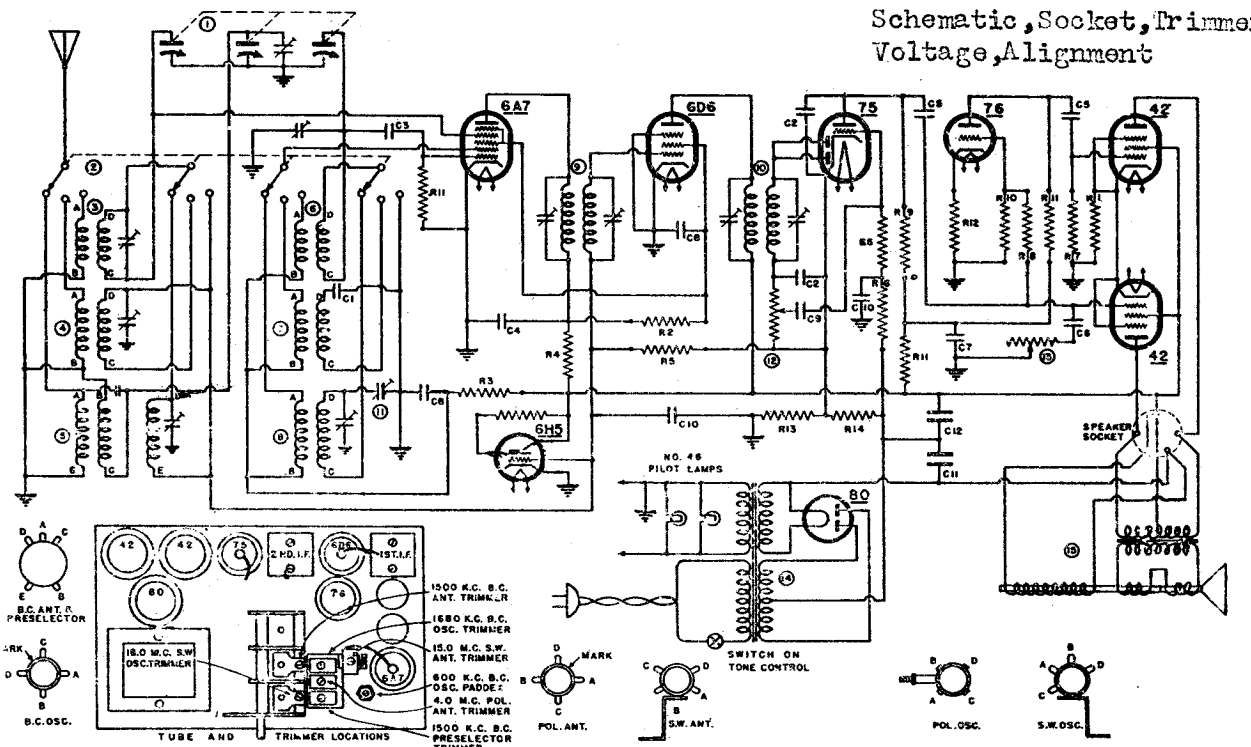
# SPIEGEL INC.

MODELS 4004, 4052
Chassis 871
Schematic, Socket, Trimmers
Voltage, Alignment



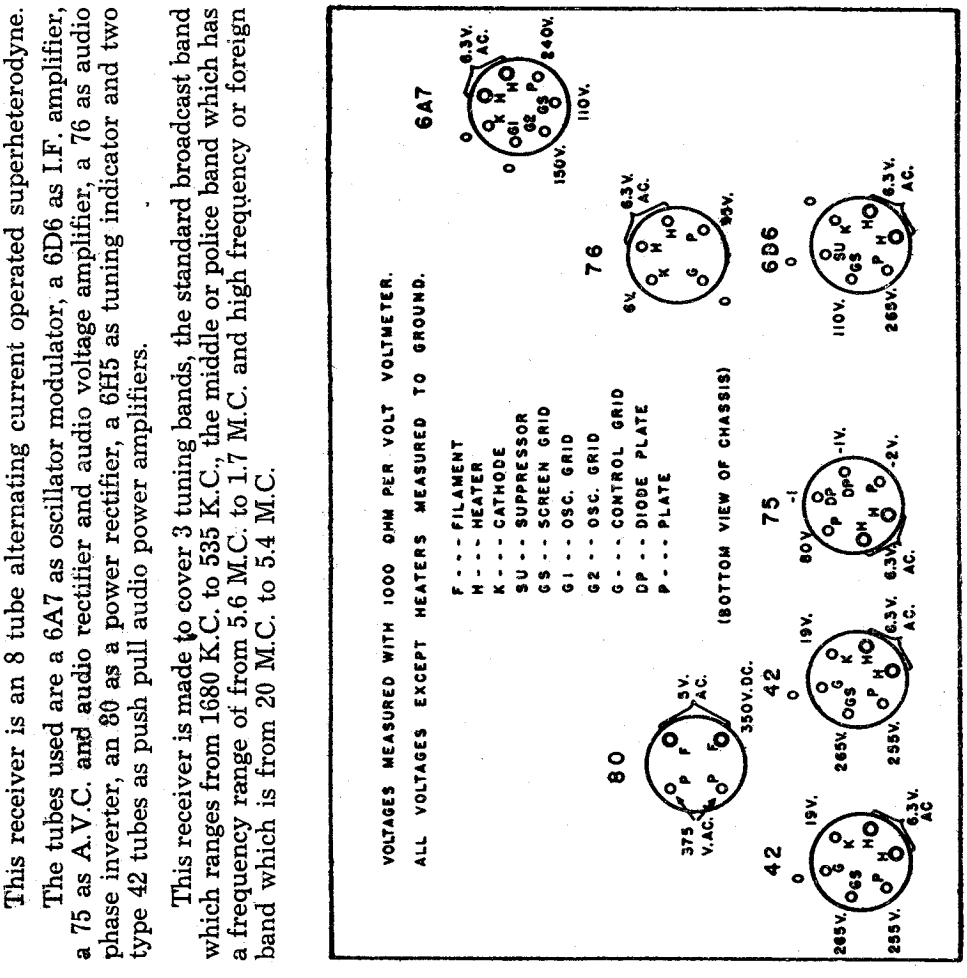

IF PEAK 456 KC

## DESCRIPTION

This receiver is an 8 tube alternating current operated superheterodyne.

The tubes used are a 6A7 as oscillator modulator, a 6D6 as I.F. amplifier, a 75 as A.V.C. and audio rectifier and audio voltage amplifier, a 76 as audio phase inverter, an 80 as a power rectifier, a 6H5 as tuning indicator and two type 42 tubes as push pull audio power amplifiers.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and high frequency or foreign band which is from 20 M.C. to 5.4 M.C.




CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

| PART NO. | DESCRIPTION | PART NO. | DESCRIPTION | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|
| R1 60-123 | 350 OHM 2 WATT CARBON RES. 10% | C1 15-102 | .0008 MFD. MICA CONDENSER 5% | 1 | 18-108 3 GANG VARIABLE CONDENSER |
| R2 6211 | 15,000 " " " " | C2 1504 | .00025 " " " " | 2 | 69-107 BAND SWITCH |
| R3 6180 | 20,000 " 1/2 " " | C3 1503 | .00005 " " " " | 3 | 10-132 SHORT WAVE ANTENNA COIL |
| R4 6115 | 1000 " " " " | C4 1602 | .1 " MFD. 600 VOLT PAPER CONDENSER | 4 | 10-135 POLICE BAND ANTENNA COIL |
| R5 6020 | 2 MEG " 1/3 " " | C5 1648 | .03 " " " " | 5 | 10-137 B.C. ANT. & PRESELECTOR COIL |
| R6 6017 | 100,000 " " " " | C6 1651 | .004 " " " " | 6 | 10-133 SHORT WAVE OSCILLATOR COIL |
| R7 6018 | 500,000 " " " " | C7 1646 | .25 " " " " | 7 | 10-136 POLICE BAND OSCILLATOR COIL |
| R8 60-124 | 350,000 " " " " 5% | C8 1601 | .1 " " " " | 8 | 10-134 B.C. OSCILLATOR COIL |
| R9 6024 | 250,000 " " " " | C9 1605 | .02 " " " " | 9 | 10-130 1 ST. I.F. TRANSFORMER |
| R10 60-125 | 110,000 " " " " 5% | C10 1622 | .05 " " " " | 10 | 10-131 2 ND. I.F. TRANSFORMER |
| R11 6025 | 50,000 " " " " | C11 18-202 | 10.0 " " 200 " ELECTROLYTIC COND. | 11 | 20-100 B.C. OSC. PADDING CONDENSER |
| R12 6016 | 5000 " " " " | C12 18-201 | 12.0 " " 300 " " " | 12 | 24-105 VOLUME CONTROL |
| R13 60-104 | 20 " " " " 5% | | | 13 | 26-600 POWER CORD WITH SWITCH |
| R14 60-126 | 10 " 1/2 " " WIRE " 5% | | | 14 | 60-120 POWER TRANSFORMER |
| | | | | 15 | SPEAKER |

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MODELS 4006,4070,Chas. 12AC
Schematic,Alignment,Trimmers
MODELS 2204 to 2207,2200 to 2203,
2230 to 2233 inc. 2220,2221
Alignment Procedure

# SPIEGEL INC.




*ALIGNMENT:* The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies: 465, 1400, 600, 5100, 1800 and 15,000 KC.

*INTERMEDIATE FREQUENCY:* Set oscillator to 465 KC. Feed this to the grid of the pentagrid converter tube. Adjust trimmers on the intermediate frequency transformers for peak readings as indicated on the output meter which is to be placed across the output transformer.

*BROADCAST BAND:* Set the band switch for broadcast reception. Adjust oscillator to 1400 KC and connect the output of the generator to the antenna connection at the rear of the chassis through a .0002 mfd. mica condenser. Set the pointer on the dial to 1400 KC making sure that the volume control is set at its maximum position. Adjust the broadcast antenna and broadcast oscillator trimmers for maximum signal (as indicated on the output meter). Adjust trimmer (underneath chassis) on R.F. coil for greatest output. Re-set the dial pointer on the receiver and on the test oscillator to 600 KC. Slowly increase or decrease the *broadcast padding* condenser while tuning back and forth across the signal with the station selector knob until the maximum reading is obtained on the output meter. Re-check the 1400 KC alignment as the adjustment at 600 KC may have slightly disturbed the original 1400 KC setting.

*INTERMEDIATE BAND:* For a dummy antenna use a .0002 mfd. mica condenser in series with a 400 ohm carbon resistor. Set band switch to the intermediate band position and feed a 5100 KC signal from the oscillator. Set dial pointer at 5100 KC. Adjust intermediate antenna and intermediate oscillator trimmers for maximum output. Re-set oscillator and set dial to approximately 1800 KC. Slowly increase or decrease the intermediate padding condenser while tuning back and forth across the signal with the station selector control until the maximum reading is obtained on the output meter. Re-check the 5100 KC adjustment.

*SHORT WAVE:* Set band switch on short wave position. Connect the antenna of the radio receiver to the output of the test oscillator through a 400 ohm carbon resistor. Set oscillator and receiver dial at 15 megacycles. Adjust the short wave antenna and short wave oscillator trimming condensers for maximum output as indicated by readings on the output meter. No other adjustments are necessary for aligning this band.

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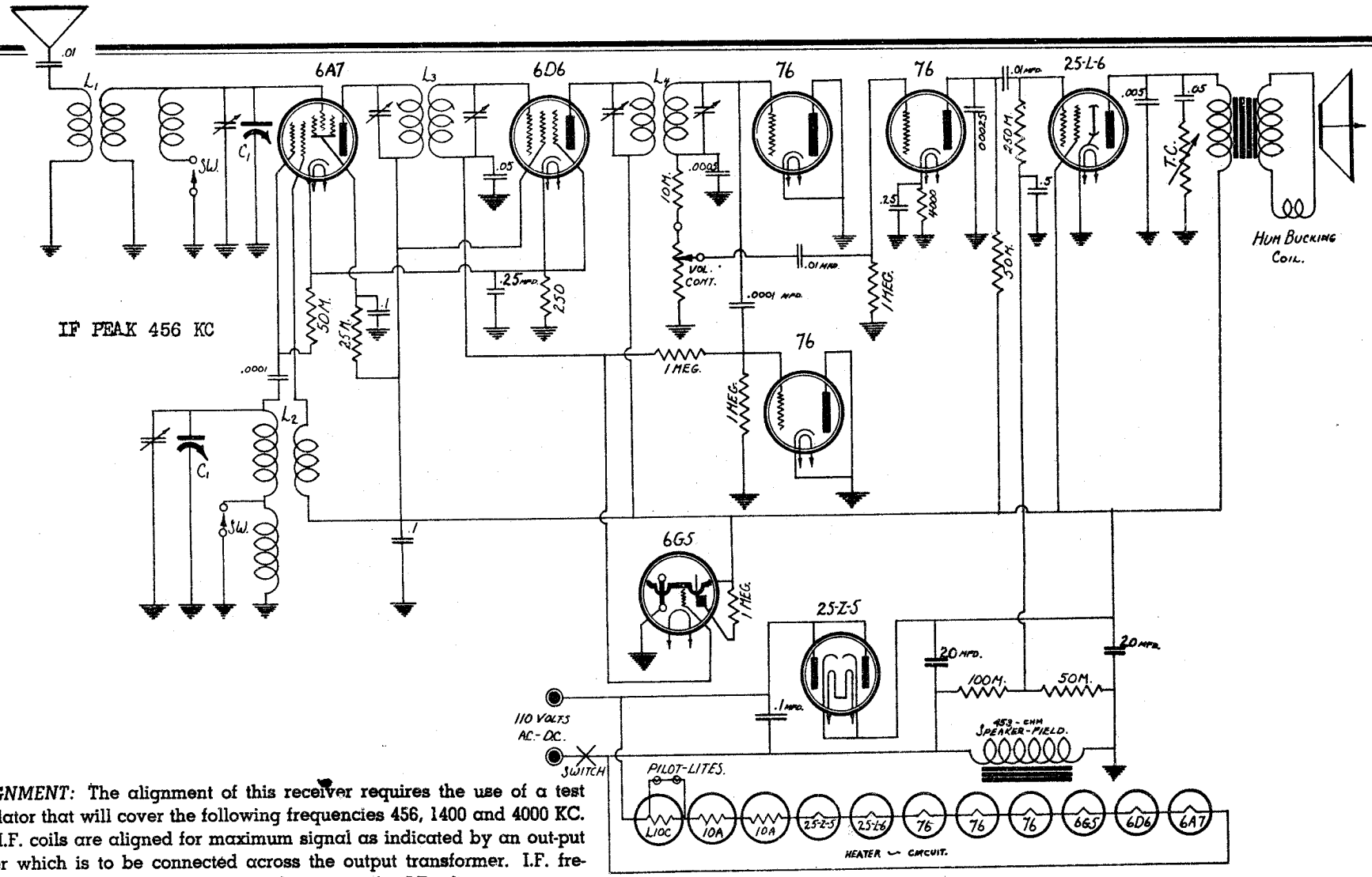
SPIEGEL INC.

MODEL 4010, Chassis 11X
Schematic Alignment




*ALIGNMENT:* The alignment of this receiver requires the use of a test oscillator that will cover the following frequencies 456, 1400 and 4000 KC. The I.F. coils are aligned for maximum signal as indicated by an out-put meter which is to be connected across the output transformer. I.F. frequency is 456 KC. There are four adjustments for I.F. alignment.

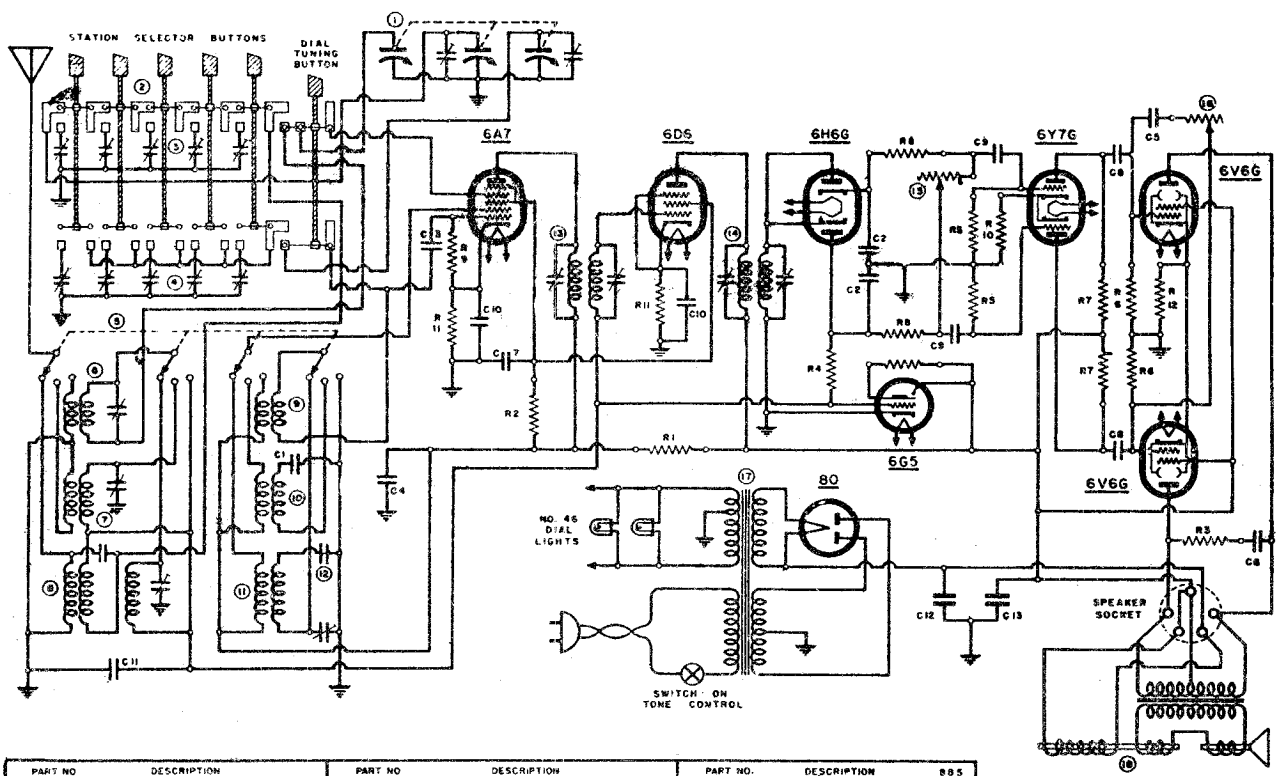
To align broadcast band it is only necessary to align receiver at 1400 KC because of the initial setting at the factory. A 200 mmfd. condenser is necessary for a dummy antenna. This is inserted in series with the test oscillator and the antenna connection of the radio receiver. Set oscillator and pointer on dial to 1400 KC and adjust the two trimmer condensers on the tuning condenser for maximum output. Turn Band Switch to Short Wave position. Feed a 4000 KC signal from the test oscillator and check receiver.

$L_1$ – ANT. COIL (COMPLETE) No. 1188.
$L_2$ – OSC. COIL (COMPLETE) No. 1189.
$L_3$ – 1-INTERMEDIATE FREQ. TRANS. No. 310.
$L_4$ – 2-INTERMEDIATE FREQ. TRANS. No. 309.
VOLUME CONTROL No. 215.
T.C. – TONE CONTROL No. 304A.
DYNAMIC SPEAKER No. 735.
$C_1$ – TUNING COND. No. 622.
SW. – BAND SWITCH No. 119.

| | |
|---|---|
| DATE – 11-14-37 | No. 200 M |
| DRAWN BY – H.B.L. | |
| CHECKED BY – C.J. | |
| APPROVED BY – [illegible] | |

MODEL 4068, Chassis 885
Schematic, Voltage, Socket

# SPIEGEL INC.




| PART NO | DESCRIPTION |
|---|---|
| R1 60-143 | 3000 OHM 1 1/2W CARBON RES |
| R2 6221 | 20,000 " 1W. " " |
| R3 60-114 | 10,000 " 1/2W. " " |
| R4 6020 | 2 MEG " 1/3W. " " |
| R5 6017 | 1 " " " " " |
| R6 6018 | 500,000 " " " " " |
| R7 6024 | 250,000 " " " " " |
| R8 60-125 | 110,000 " " " " ±5% |
| R9 6025 | 50,000 " " " " " |
| R10 6033 | 1000 " " " " " |
| R11 6012 | 250 " " " " " |
| R12 60-144 | 250 OHM 2W. WIRE WOUND " |

| PART NO | DESCRIPTION |
|---|---|
| C1 15-103 | .0011 MFD. MICA CONDENSER 4.5% |
| C2 1504 | .00025 " " " " |
| C3 1503 | .00005 " " " " |
| C4 1602 | 1 MFD. 600V. TUBULAR CONDENSER |
| C5 1611 | .005 " " " " |
| C6 1609 | .002 " " " " |
| C7 1601 | .1 " 400V " " |
| C8 1607 | .05 " " " " |
| C9 1605 | .02 " " " " |
| C10 1600 | 1 " 200 V. " " |
| C11 1622 | .05 " " " " |
| C12 18-202 | 10 " 400V. WET ELECTROLYTIC |
| C13 18-201 | 12 " 300V. " |

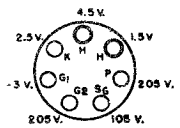
| PART NO. | DESCRIPTION 885 |
|---|---|
| 1 19-121 | 3 GANG CONDENSER |
| 2 69-115 | PUSH BUTTON SWITCH |
| 3 20-106 | ANT. TRIMMER STRIP |
| 4 20-107 | OSC. " " |
| 5 69-107 | WAVE SWITCH |
| 6 10-184 | S.W. ANT. COIL |
| 7 10-182 | POL. " " |
| 8 10-179A | B.C. ANT. & PRESELECTOR COIL |
| 9 10-183 | S.W. OSC. COIL |
| 10 10-181 | POL. " " |
| 11 10-180 | B.C. " " |
| 12 20-100 | B.C. OSC. PAD. COND. |
| 13 10-201 | 1 ST. I.F. TRANSFORMER |
| 14 10-202 | 2 ND. " " |
| 15 24-113 | VOLUME CONTROL |
| 16 28-110 | TONE CONTROL WITH SWITCH |
| 17 60-129 | POWER TRANSFORMER |
| 18 | SPEAKER |

IF PEAK 456 KC

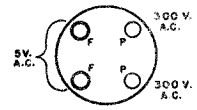
## VOLTAGE DIAGRAM

F -FILAMENT
H -HEATER
P -PLATE
K -CATHODE
G -CONTROL GRID
$G_1$ -OSC. GRID
$G_2$ OSC. PLATE
Sg-SCREEN GRID
Su SUPPRESSOR

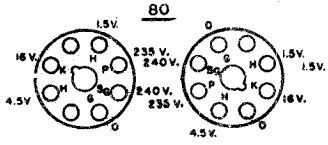
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
ALL VOLTAGES MEASURED TO GROUND.
(BOTTOM VIEW OF CHASSIS)



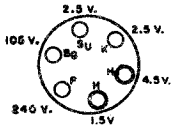

6A7




80




6V8G 6V6G 6Y7G 6H6G




6D6

885

## DESCRIPTION

This receiver is an 8 tube alternating current operated superheterodyne.

The tubes used are a 6A7 as oscillator modulator, a 6D6 as I.F amplifier, a 6H6G as A.V.C. and audio rectifier, a 6Y7G as audio voltage amplifier, an 80 as a power rectifier, a 6G5 as tuning indicator and two type 6V6G tubes as push pull audio power amplifiers.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.4 M.C. to 1.7 M.C. and the high frequency or foreign band which is from 19 M.C. to 5.0 M.C.

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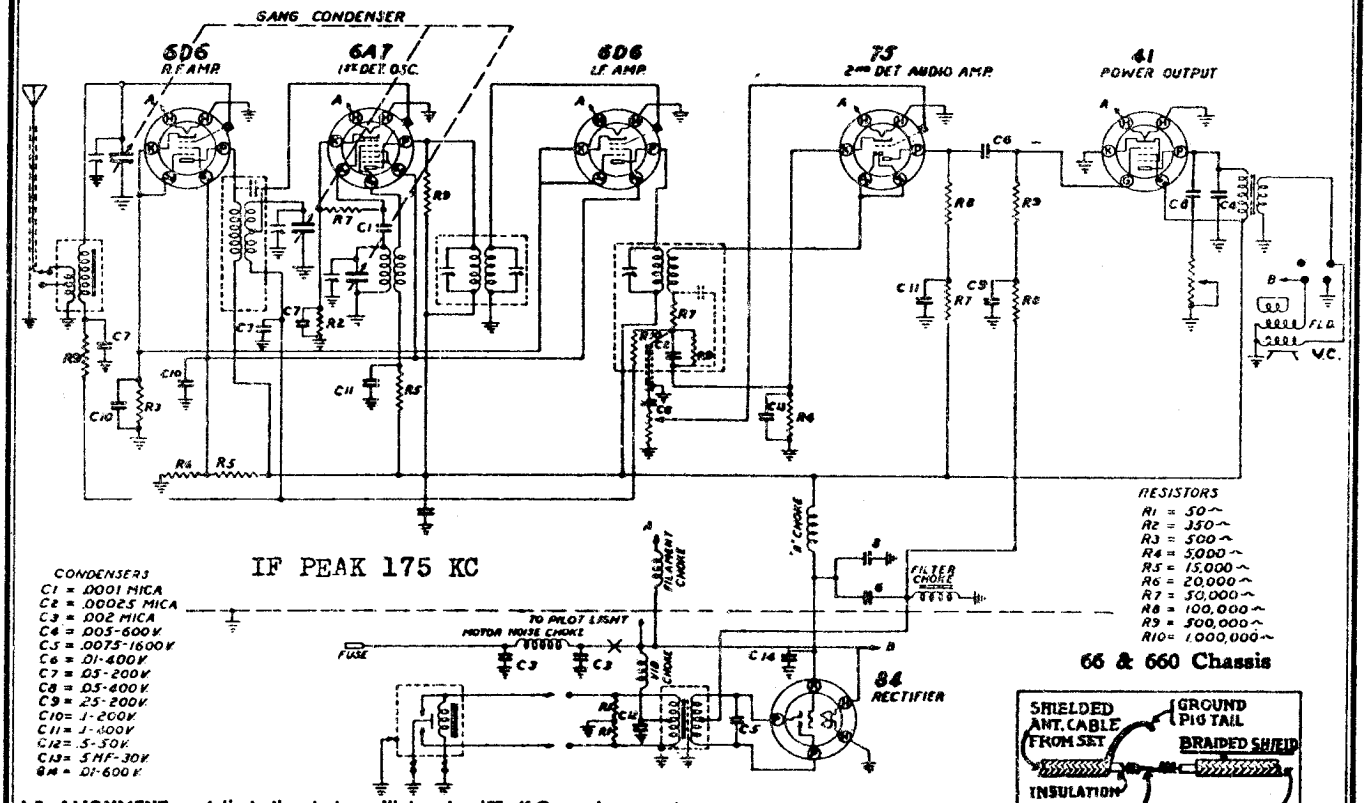
# SPIEGEL INC.

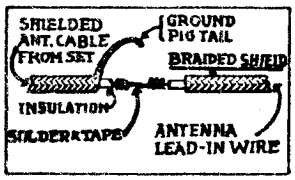
MODEL 4210, Chassis 66, 660
Schematic, Socket, Trimmers
Alignment, Connections




CONDENSERS
C1 = .0001 MICA
C2 = .00025 MICA
C3 = .002 MICA
C4 = .005-600V
C5 = .0075-1600V
C6 = .01-400V
C7 = .05-200V
C8 = .05-400V
C9 = .25-200V
C10 = 1-200V
C11 = 1-400V
C12 = .5-50V.
C13 = 5 MF-30V
C14 = .01-600V.

RESISTORS
R1 = 50Ω
R2 = 350Ω
R3 = 500Ω
R4 = 5,000Ω
R5 = 15,000Ω
R6 = 20,000Ω
R7 = 50,000Ω
R8 = 100,000Ω
R9 = 500,000Ω
R10 = 1,000,000Ω

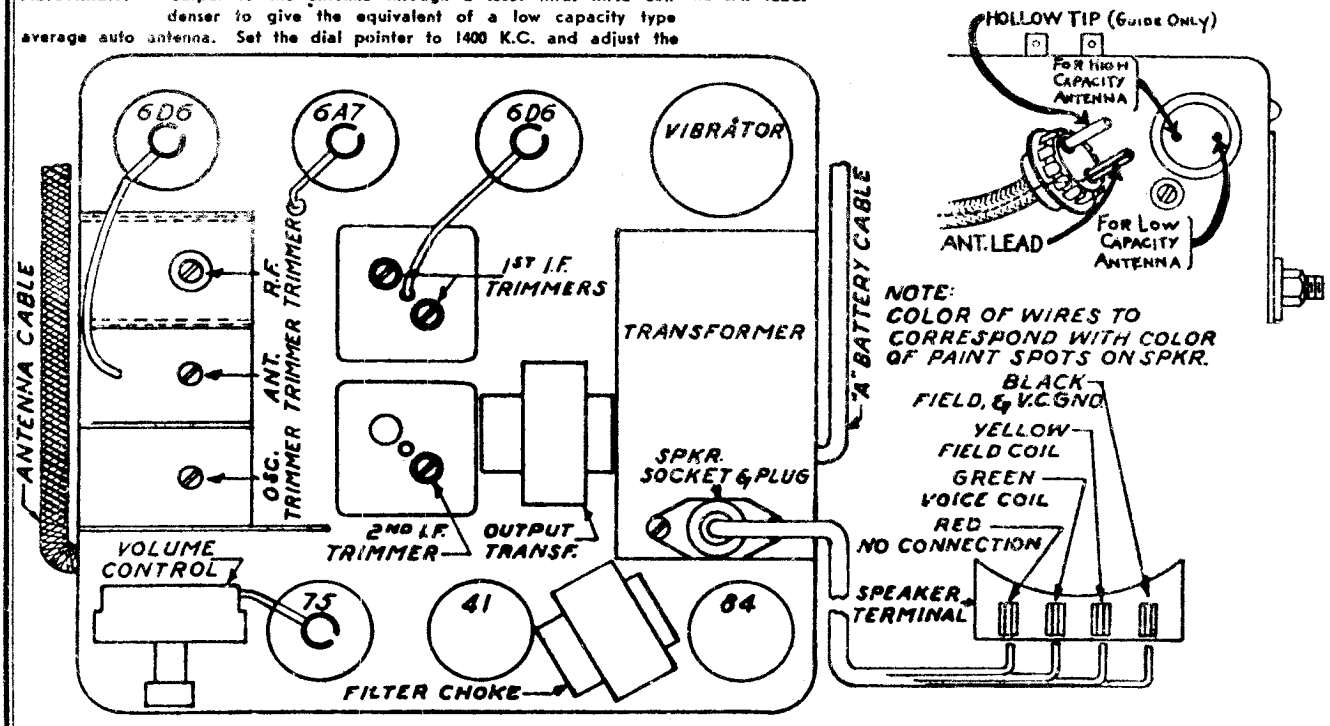
66 & 660 Chassis




**I.F. ALIGNMENT** Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

**OSCILLATOR ALIGNMENT** Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

**R.F. ALIGNMENT** The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the R.F. antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

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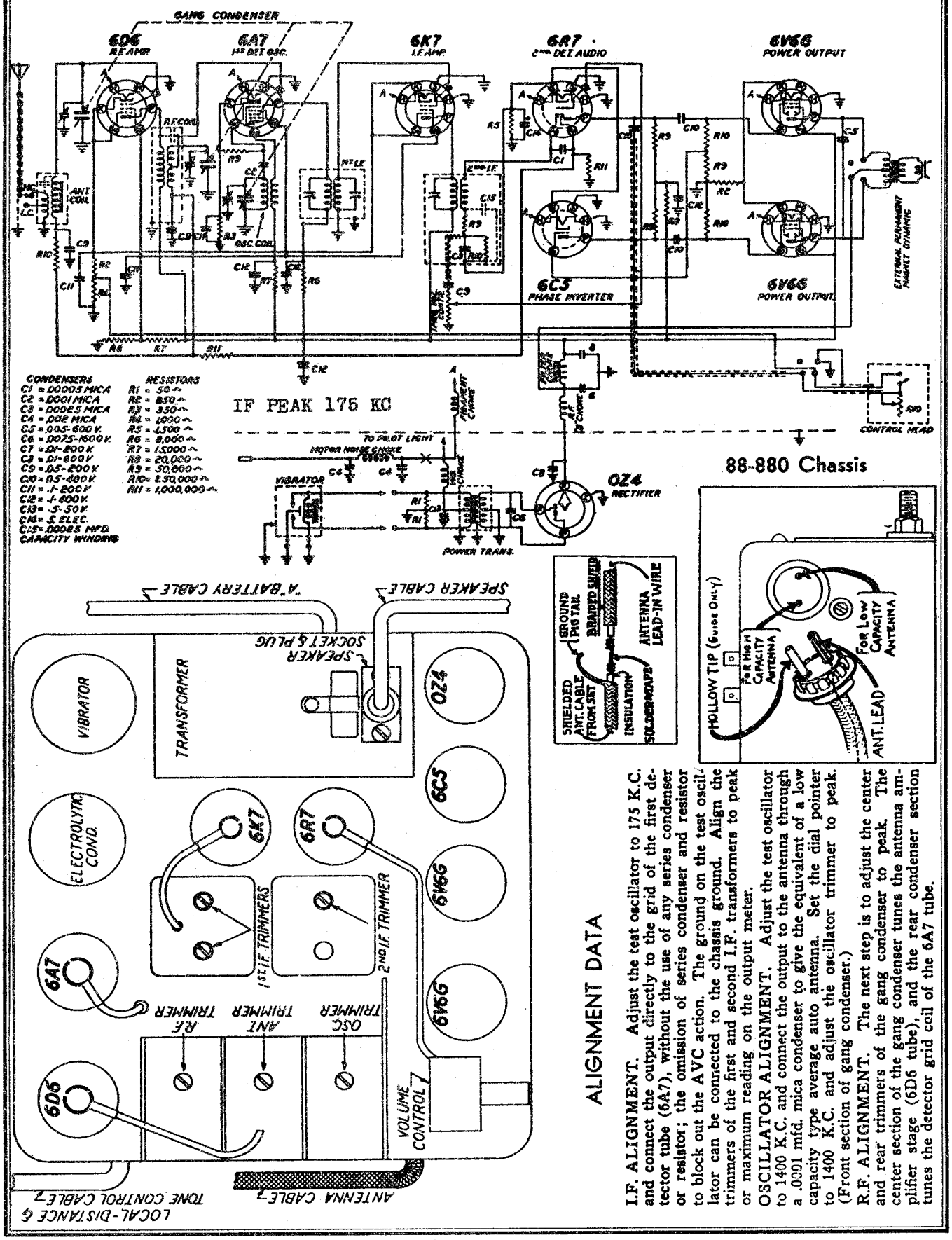
MODEL 4212, Chassis 88-880
Schematic, Socket, Trimmers
Alignment, Connections

# SPIEGEL INC.




## ALIGNMENT DATA

**I.F. ALIGNMENT.** Adjust the test oscillator to 175 K.C. and connect the output directly to the grid of the first detector tube (6A7), without the use of any series condenser or resistor; the omission of series condenser and resistor to block out the AVC action. The ground on the test oscillator can be connected to the chassis ground. Align the trimmers of the first and second I.F. transformers to peak or maximum reading on the output meter.

**OSCILLATOR ALIGNMENT.** Adjust the test oscillator to 1400 K.C. and connect the output to the antenna through a .0001 mfd. mica condenser to give the equivalent of a low capacity type average auto antenna. Set the dial pointer to 1400 K.C. and adjust the oscillator trimmer to peak. (Front section of gang condenser.)

**R.F. ALIGNMENT.** The next step is to adjust the center and rear trimmers of the gang condenser to peak. The center section of the gang condenser tunes the antenna amplifier stage (6D6 tube), and the rear condenser section tunes the detector grid coil of the 6A7 tube.

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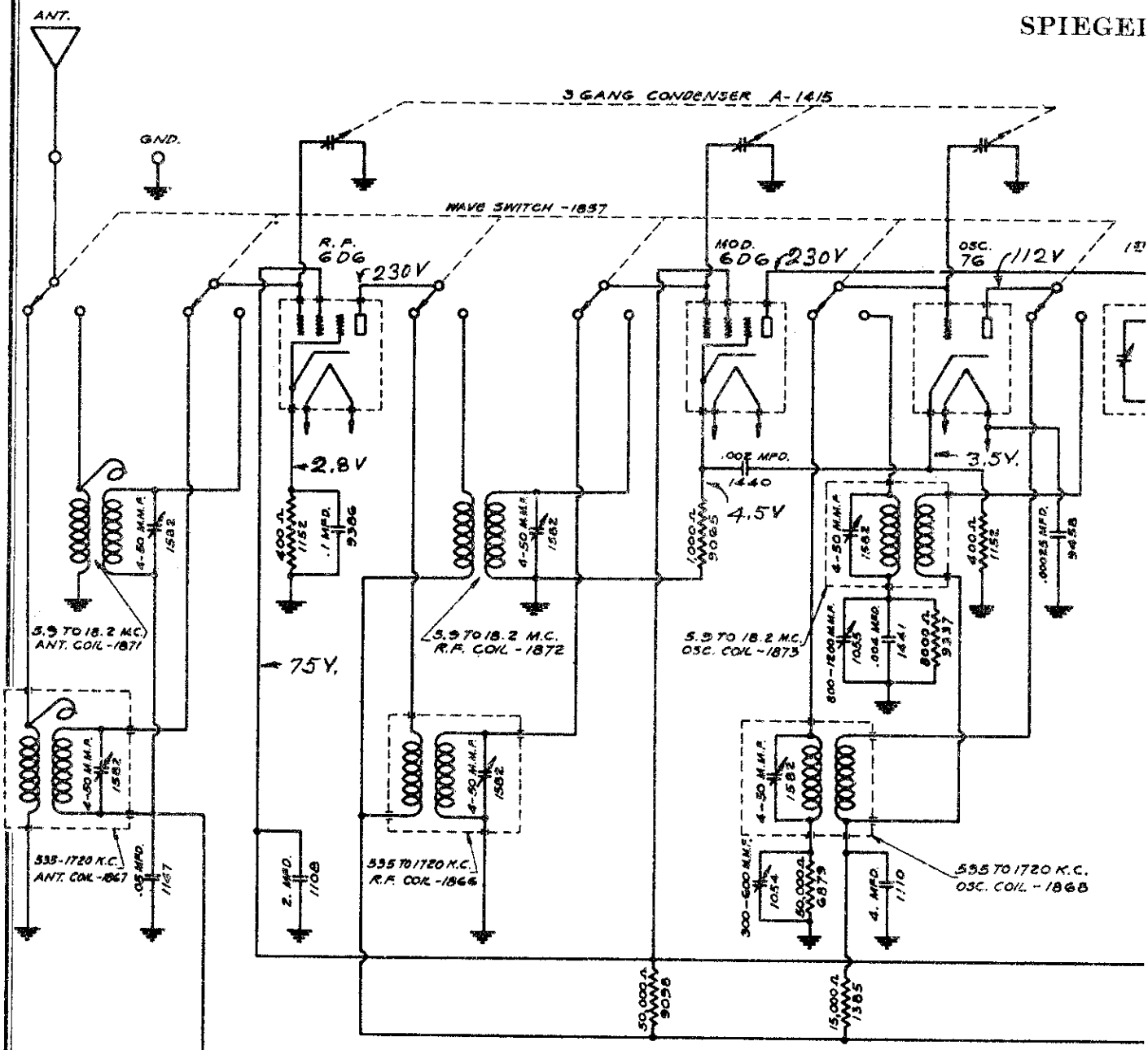


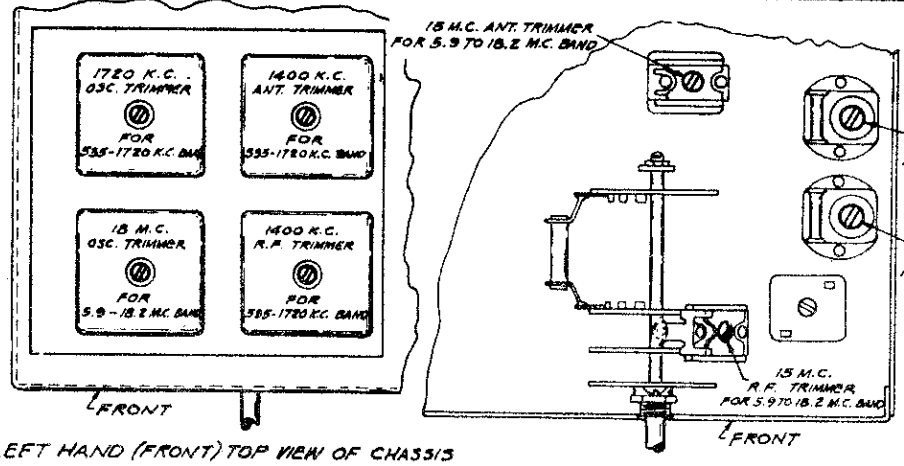
1720 K.C. OSC. TRIMMER FOR 535-1720 K.C. BAND
1400 K.C. ANT. TRIMMER FOR 535-1720 K.C. BAND
18 M.C. OSC. TRIMMER FOR 5.9-18.2 M.C. BAND
1400 K.C. R.F. TRIMMER FOR 535-1720 K.C. BAND
FRONT
18 M.C. ANT. TRIMMER FOR 5.9 TO 18.2 M.C. BAND
600 K.C. OSC. PADDER FOR 535 TO 1720 K.C. BAND
6.5 M.C. OSC. PADDER FOR 5.9 TO 18.2 M.C. BAND
15 M.C. R.F. TRIMMER FOR 5.9 TO 18.2 M.C. BAND
FRONT

LEFT HAND (FRONT) TOP VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS

RIGHT HAND (FRONT) BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS

FREQUENCY

CONVENTIONAL A
Peak I-F trimmers a
and generator to 14
oscillator circuit

to peak. Dial and g
while rocking the
FOREIGN band oscill

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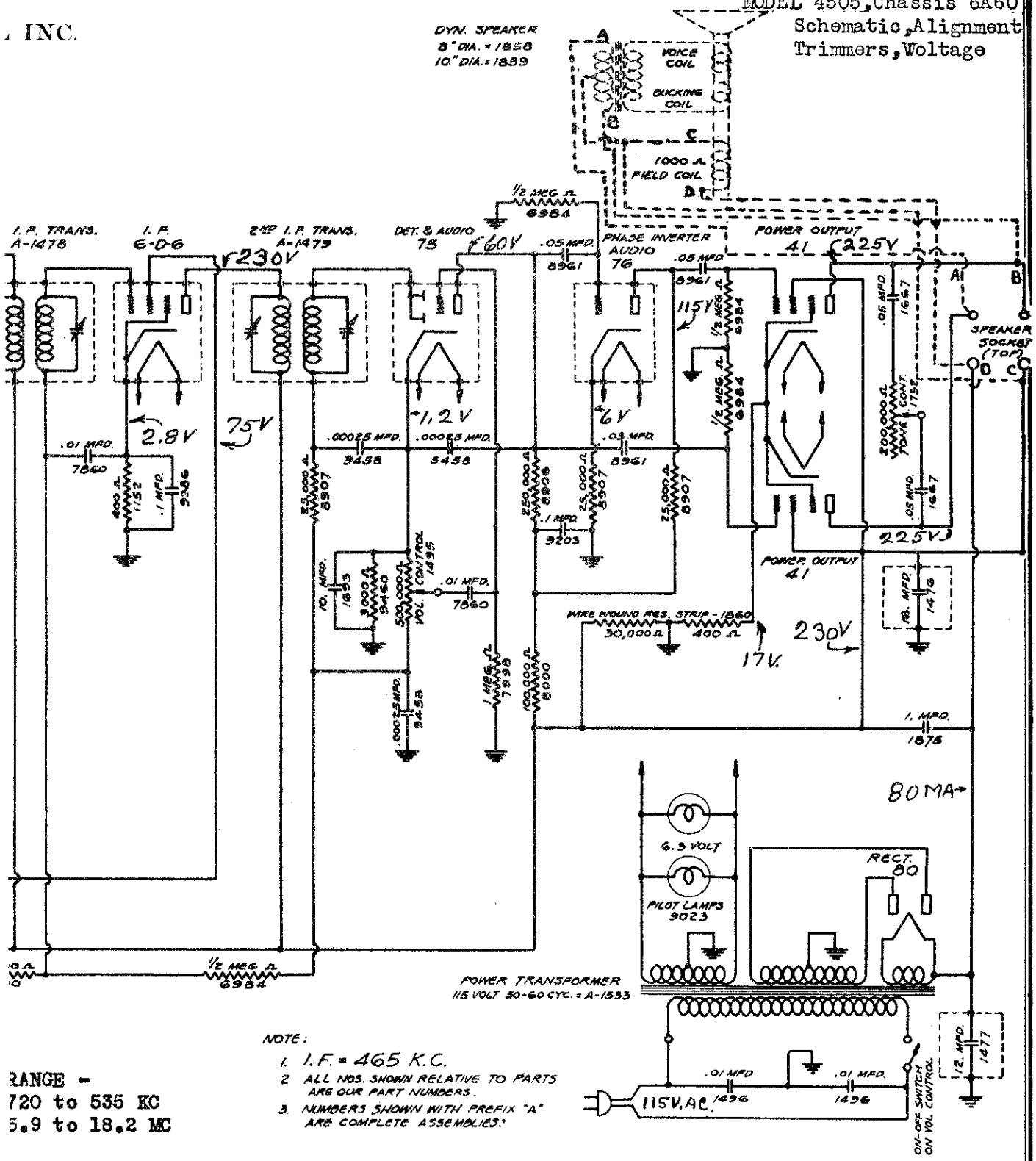
, INC.

MODEL 4505, Chassis 6A60
Schematic, Alignment
Trimmers, Voltage




NOTE:
1. I.F. = 465 K.C.
2. ALL NOS. SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

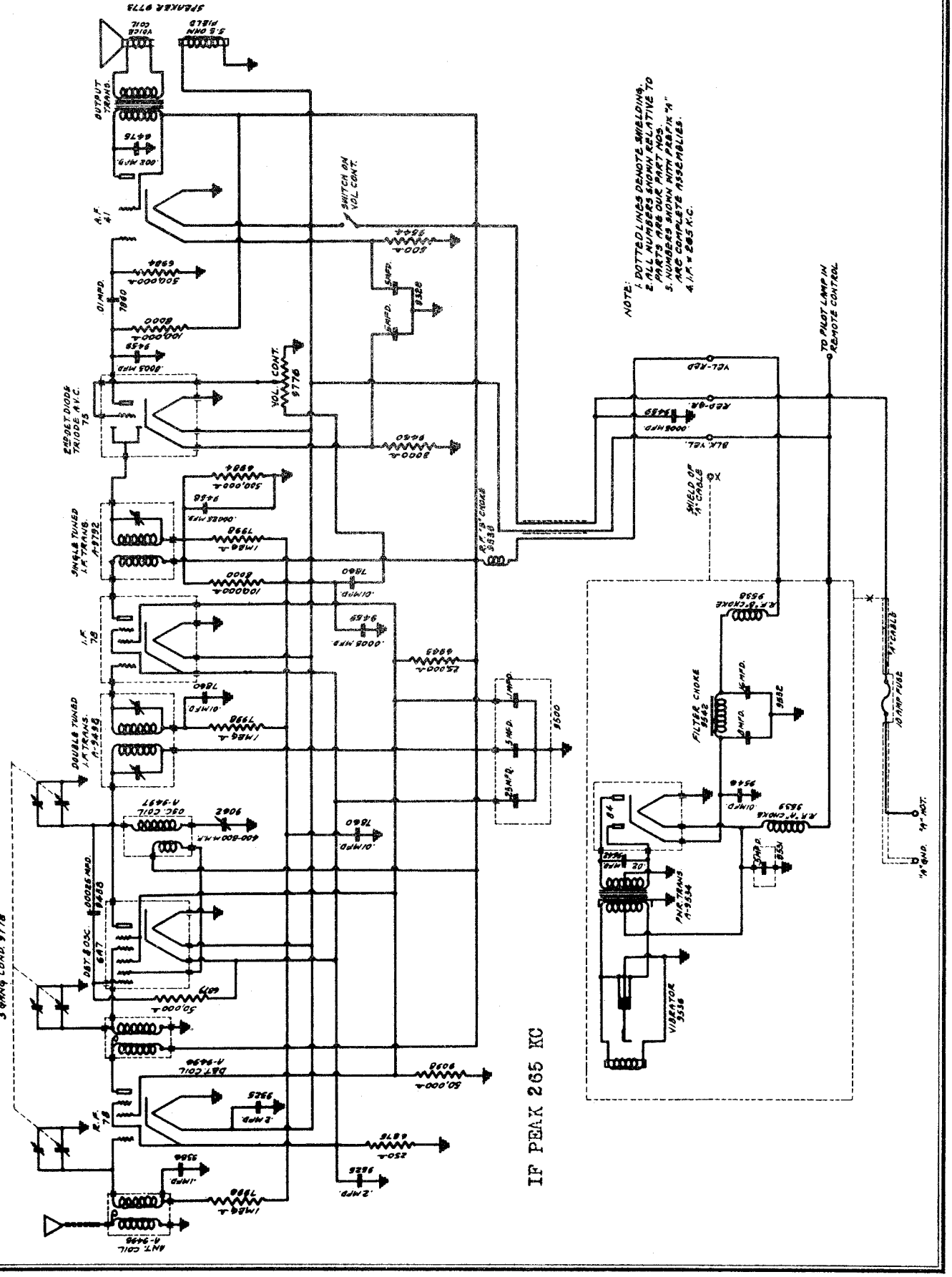
RANGE -
720 to 535 KC
5.9 to 18.2 MC

LIGNMENT - SEE SPECIAL SECTION. VOL. VIII.
: 465 KC. BROADCAST - Dial and trimmer to 1720 KC, peak oscillator trimmer. Dial
)0 KC, peak antenna and R-F trimmers. Dial and generator at 600 KC, pad the
for maximum peak, while rocking the variable gang condenser.

FOREIGN - Dial and generator at 18 MC, adjust the oscillator trimmer
nerator to 15 MC, adjust the R-F and antenna trimmers to maximum sensitivity
ariable condenser across the signal. Dial and generator at 6.5 MC, pad the
tor circuit to maximum peak while rocking the variable condenser

SPIEGEL INC.

MODEL 4519 Auto
Chassis 603 (1934)
Schematic

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MODEL 4519 Auto
Chassis 603 (1934)
Voltage, Alignment

# SPIEGEL INC.

## TUBE VOLTAGE

| Type of Tube | Position of Tube | Fil. Volts | Plate Volts | Cathode Volts | Screen Volts | Grid No.1 | Grid No.2 | Grid No.3 | Grid No.5 |
|---|---|---|---|---|---|---|---|---|---|
| 78 | Radio Frequency | 6 | 225 | 4 | 92 | | | | |
| 6A7 | Oscillator & Modulator | 6 | 225 | 4 | | 6.2 | 225 | 92 | 92 |
| 78 | Intermediate Frequency | 6 | 225 | 4 | 92 | | | | |
| 75 | 2nd Detector Diode & AVC | 6 | 135 | 1.5 | | | | | |
| 41 | Output | 6 | 218 | 13 | 225 | | | | |
| 84 | Rectifier | 6 | 260* | 235 | | | | | |

* A.C. each plate
Total "A" current - 6.2 amperes.

INTERMEDIATE FREQUENCY: Unless an intermediate transformer has become defective due to an open or burned out winding it should never be necessary to readjust the intermediate stage. Should this occur it is essential that an oscillator be used with some type of output measuring device to correctly tun the I.F. Transformers. Connect the high side of the oscillator output to the control grid cap (grid No. 4) of the 6A7 oscillator modulator tube leaving the grid cap disconnected. CONNECT A 50,000 OHM RESISTOR FROM THE CONTROL GRID CAP OF THE 6A7 TUBE TO THE ROTOR FRAME OF THE VARIABLE CONDENSER. If the output of the oscillator is too great the value of this resistor may be reduced. The ground side of the test oscillator should be connected to the chassis. Set the oscillator to 265 K.C. (this must be accurate) and adjust the output of the oscillator so that a convenient reading is obtained on the output meter. Align the first intermediate transformer by turning the intermediate frequency transformer trimmer screw up and down until maximum reading is obtained on the output meter. Both the primary and secondary trimmer screws should be adjusted in this manner. It is always best to recheck the grid side of the intermediate frequency transformer adjustment to make certain the alignment of the secondary has not been changed by the adjustment of the primary trimmer. The first I.F. transformer is double-tuned, the trimmers of which are accessible through the top of the I.F. can, one section of which is adjusted by turning the brass hex nut and other section by screwing in and out the set screw that is accessible through the hole provided in the brass hex nut. The second intermediate transformer has but one trimmer which is likewise accessible from the top of the intermediate transformer shield can. After both intermediate transformers are correctly adjusted the alignment of the intermediate stage is complete and the trimmers should not be further disturbed. The grid cap should be connected to the grid of the 6A7 tube and 50,000 ohm resistor removed.

VARIABLE CONDENSER ALIGNMENT: If the intermediate frequency stage has been realigned or if the antenna, R.F. or oscillator coil have been replaced it will be necessary to realign the variable condensers. If the receiver is not mounted in the set housing it will be necessary to place a metal shield along side of the variable condenser and flush against the side of the set chassis nearest the variable condenser trimmers. It is necessary to do this otherwise when the receiver is placed in the set housing the metal housing will detune the receiver. Three holes should be made in the shield to correspond with the hole provided in the set housing which permits alignment of the receiver when the set is in the housing. Be sure the shield is properly grounded to the receiver chassis. NOTE: When the receiver and "B" unite is removed from the set housing be sure to set the receiver on top of the "B" unit, otherwise considerable R.F. and audio hash will be encountered. Regardless of whether the receiver is mounted in the set housing or not the alignment procedure is the same. Adjust the variable condenser to minimum capacity. Connect the high output side of the set oscillator to set antenna lead and the low side to antenna shield lead or chassis. Then adjust the test oscillator to 1500 K. C. Next, BRING THIS SIGNAL IN BY ADJUSTING THE VARIABLE CONDENSER OSCILLATOR SECTION TRIMMER. Looking at the front of the receiver, the variable condenser trimmers are mounted on the left side of the set on the variable condenser and reading from the bottom up the trimmers are, oscillator, R.F. and antenna. After the oscillator section has been properly peaked, adjust the antenna and R.F. trimmers in the order mentioned. After the variable condenser trimmers have been correctly adjusted at 1500 K.C. tune the receiver to 600 K.C. and adjust the oscillator to this frequency. Then adjust the oscillator padding condenser which is located on the lefthand side to the rear of the chassis, to obtain maximum reading on the output meter. If the set is mounted in the receiver housing the padding condenser is accessible through the small hole in the side of the set housing. It may be necessary to turn the variable condenser slightly to the right and left to find the point where greatest output is obtained. If the alignment procedure is correctly followed the receiver will now track correctly over the entire tuning range. It is always advisable to align the receiver with the tubes to be used in the set whenever possible.

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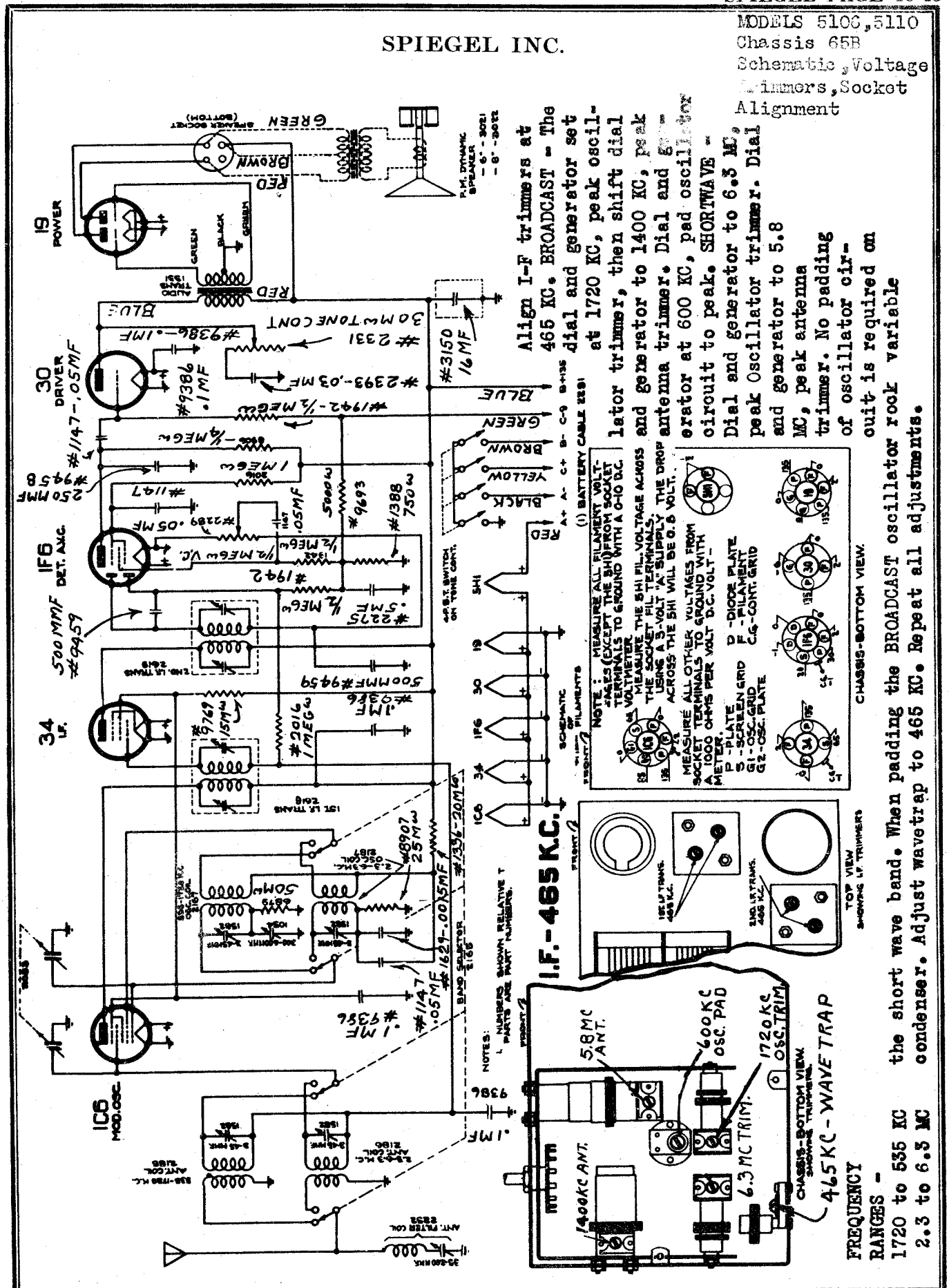
# SPIEGEL INC.

MODELS 5100,5110
Chassis 65B
Schematic, Voltage
Trimmers, Socket
Alignment




FREQUENCY RANGES -
1720 to 535 KC
2.3 to 6.3 MC

the short wave band. When padding the BROADCAST oscillator rock variable condenser. Adjust wavetrap to 465 KC. Repeat all adjustments.

Align I-F trimmers at 465 KC. BROADCAST - The dial and generator set at 1720 KC, peak oscillator trimmer, then shift dial and generator to 1400 KC, peak antenna trimmer. Dial and generator at 600 KC, pad oscillator circuit to peak. SHORTWAVE - Dial and generator to 6.3 MC, peak Oscillator trimmer. Dial and generator to 5.8 MC, peak antenna trimmer. No padding of oscillator circuit is required on

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MODELS 6502,6552,Chas. 7AC
Schematic,Socket,Trimmers,Alignment

# SPIEGEL INC.




## TUNING CONTROLS AND TUBE SOCKET GUIDE




## ALIGNMENT PROCEDURE

Correct alignment is of extreme importance in all-wave receivers. The receivers are properly aligned at the factory with precision equipment and realignment should not be attempted by the service technician until all other causes of faulty operation are corrected.

In order to properly realign the receiver the following equipment is necessary:

1. A signal generator which will provide an accurately calibrated signal at any frequency from 456 kilocycles to 18 megacycles. The generator should have adjustable signal output.
2. An output audio voltmeter of the low voltage type to be connected across the moving coil of the speaker. This should be capable of providing a readable deflection for relatively low output levels to avoid the effects of overload.
3. An insulated or non-metallic screw driver for the adjustment of trimmers.

## IF ALIGNMENT 456 KC

1. Connect the output meter (low scale) across the loud speaker voice coil. Turn the wave band switch to broadcast position. Turn the volume control to its maximum position.
2. Connect the test oscillator ground to chassis and the "hot" lead from the test oscillator to the grid of the 6L7 converter tube through a series .1 Mfd. condenser. Set test oscillator to 456 KC.
3. Adjust IF alignment screws of second IF transformer adjacent to 6F6 power tube to maximum output, reducing output of test oscillator to keep the meter reading on scale as alignment proceeds.
4. Adjust alignment of first IF transformer, (directly behind tuning condenser) to maximum output as described above.
5. Readjust these trimmers for accurate alignment. Always use the lowest possible output from the test oscillator to preclude the possibility of automatic volume control action confusing proper adjustment.

NOTE: Since coils are used in series it is absolutely necessary to align the high frequency bands first, in the order indicated.

## FOREIGN BAND 5.7 TO 18.5 MEGACYCLES

1. With test oscillator connected to the antenna and ground terminals through a 400 ohm resistor set oscillator at 16 megacycles.
2. Set the dial scale to 16 megacycles and adjust the oscillator trimmer condenser (C4-A) to resonance using the counterclockwise or low capacity point.
3. Adjust input circuit trimmer (C2-B) to maximum response, rocking the gang condenser back and forth a degree or two to obtain proper maximum.

## POLICE OR MIDDLE BAND 1.75 TO 5.8 MEGACYCLES

1. With the test oscillator connected as above set the oscillator and dial to 5.5 megacycles.
2. Adjust oscillator trimmer condenser (C4-C) for maximum response using the counterclockwise or low capacity point.
3. Adjust input circuit trimmer (C8-D) to maximum response rocking the gang condenser as described above.

## BROADCAST BAND 535 TO 1800 KC

1. With test oscillator connected to antenna and ground through a 200 Mfd. condenser set oscillator and receiver dial to 1600 kilocycles.
2. Adjust broadcast oscillator trimmer (C4-E) to obtain maximum response.
3. Adjust antenna circuit trimmer (C2-F) for maximum output.
4. Adjust preselector trimmer (C2-G) for maximum output.
5. Set test oscillator and dial to 600 kilocycles and tune in the signal, then adjust broadcast band padding condenser (C8-H) for maximum output. This padder is mounted on the aluminum coil deck near the panel and is adjusted through a hole provided in the back of the chassis pan. Rock the condenser back and forth a degree or two in order to obtain proper maximum.
6. Repeat the 1600 KC adjustments described above for greater accuracy.

## TRIMMER LAYOUT

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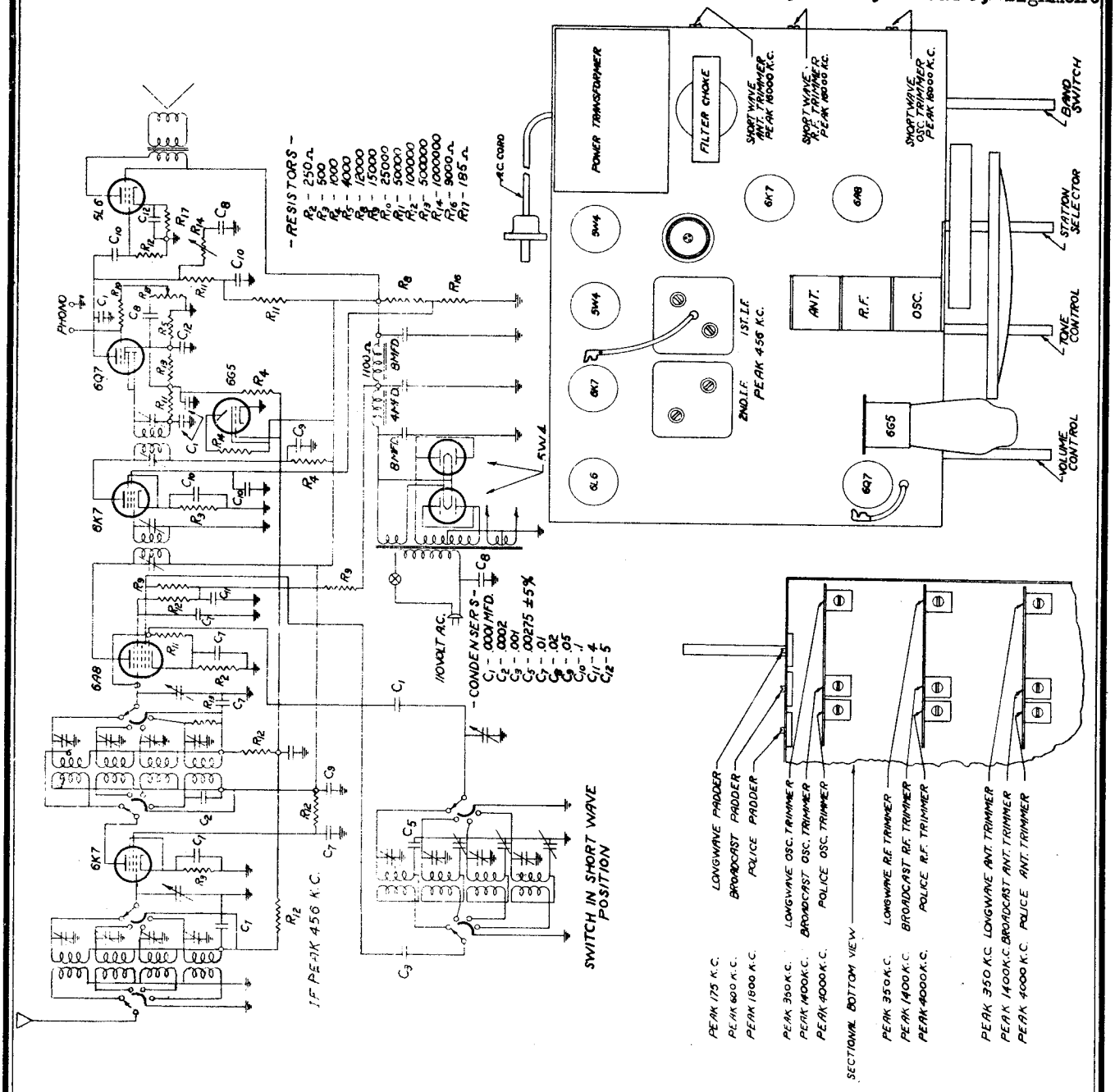
MODELS 6506,6554,Chas. AM3

## SPIEGEL INC. Schematic,Socket,Trimmers,Alignment




This radio receiver is designed for operation on standard American broadcasts, Police, Amateur, aviation, ships, foreign and U. S. governmental time and weather broadcasts. This vast coverage in radio entertainment and utility is divided into four parts or bands indicated on the tuning dial and the wave band indicating device.

The dial is calibrated with each band covering 340 degrees of tuning scale length and are each concentric with the center of the dial face. The innermost scale is calibrated from 150 to 375 K.C. (2000 to 800 meters) and covers the range necessary for receiving governmental time and weather reports. The second band from the center is for standard broadcasts covering from 550 to 1700 K.C. (175 to 545 meters). The third band from the center covers the intermediate short wave length broadcasts of Police, Amateur, Aircraft and ships and extends from 1700 to 5400 K.C. (55 to 180 meters). The fourth band covers all of the principle short wave channels for reception from countries all over the world. This band carries a calibration of from 5.5 to 18 megacycles (16.4 to 55 meters.) This short wave scale is the one which includes the five internationally assigned bands—the 19, 25, 31, 39 and 49 meter channels.

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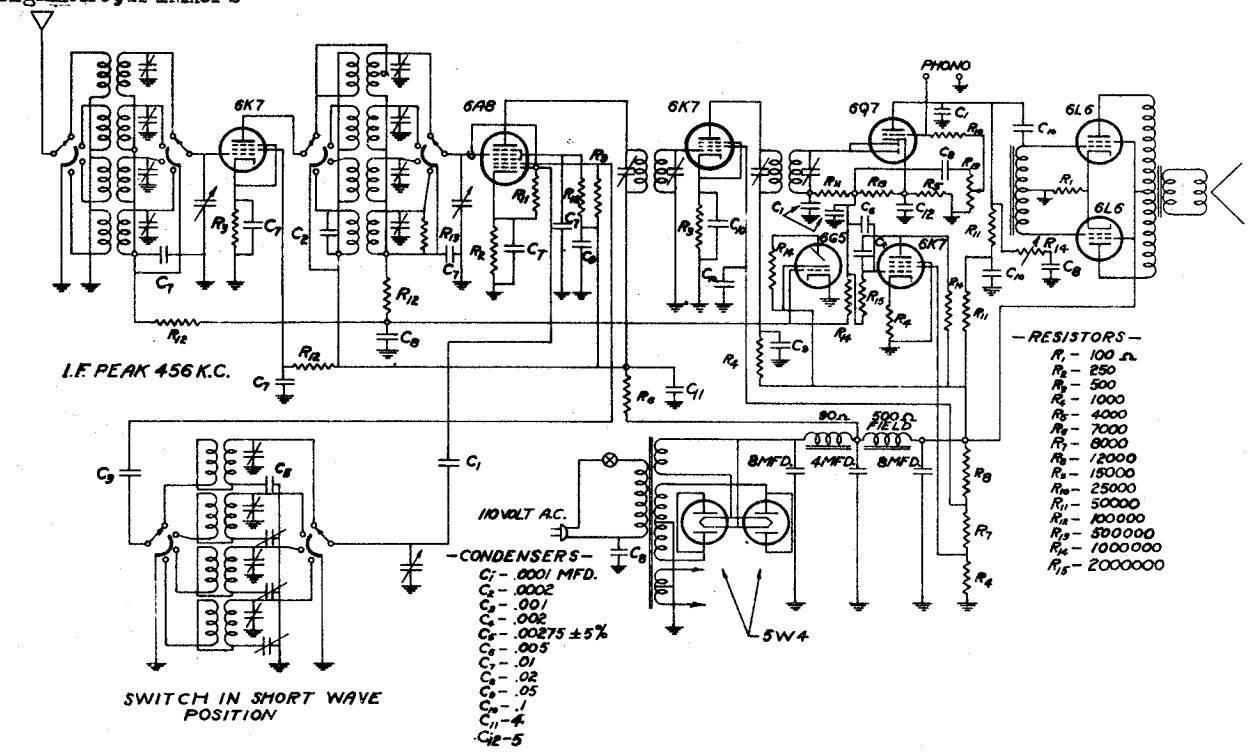
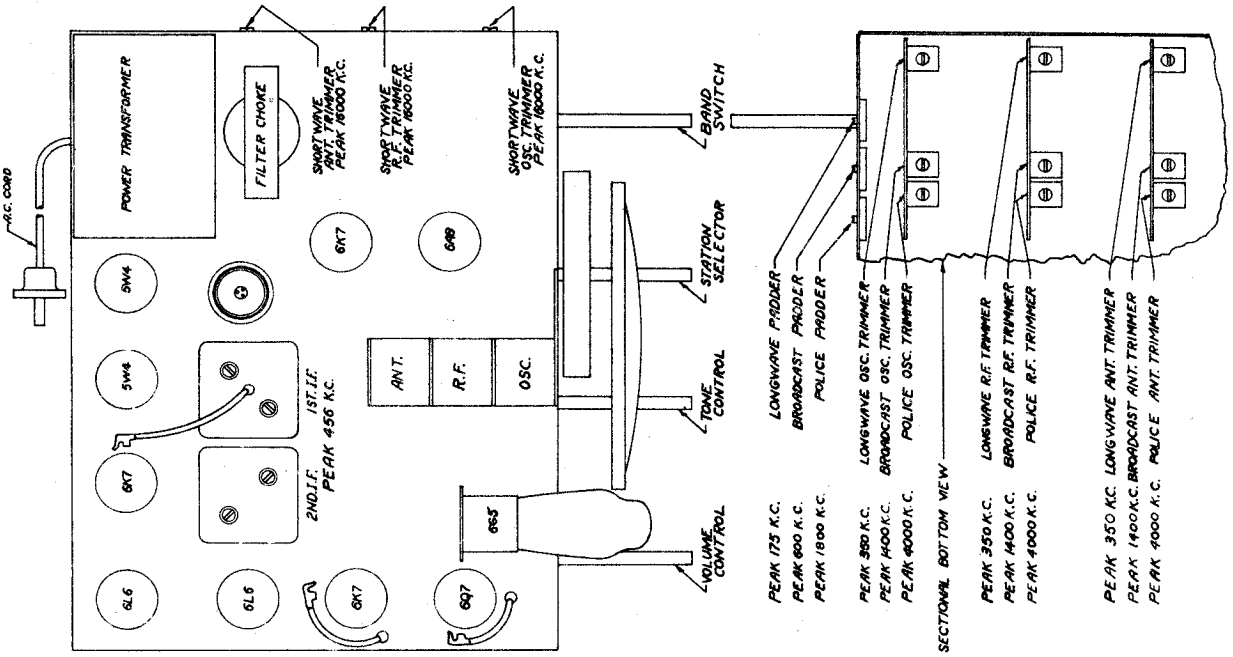
MODELS 6508, 6556, Chas. AM6
Schematic, Socket
Alignment, Trimmers

# SPIEGEL INC.

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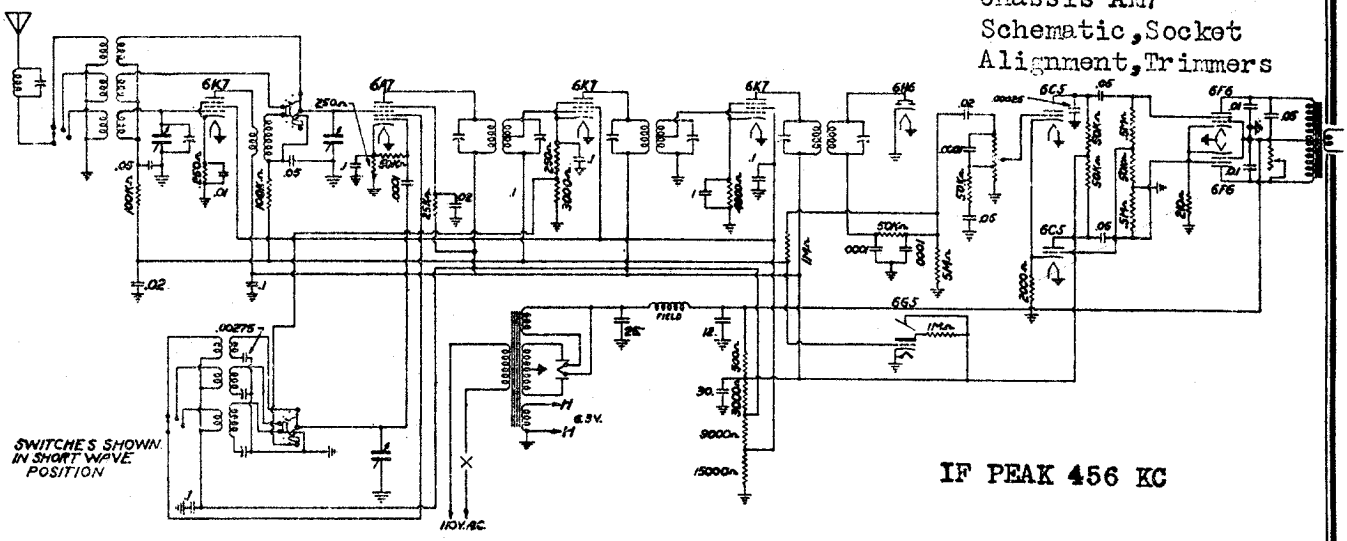
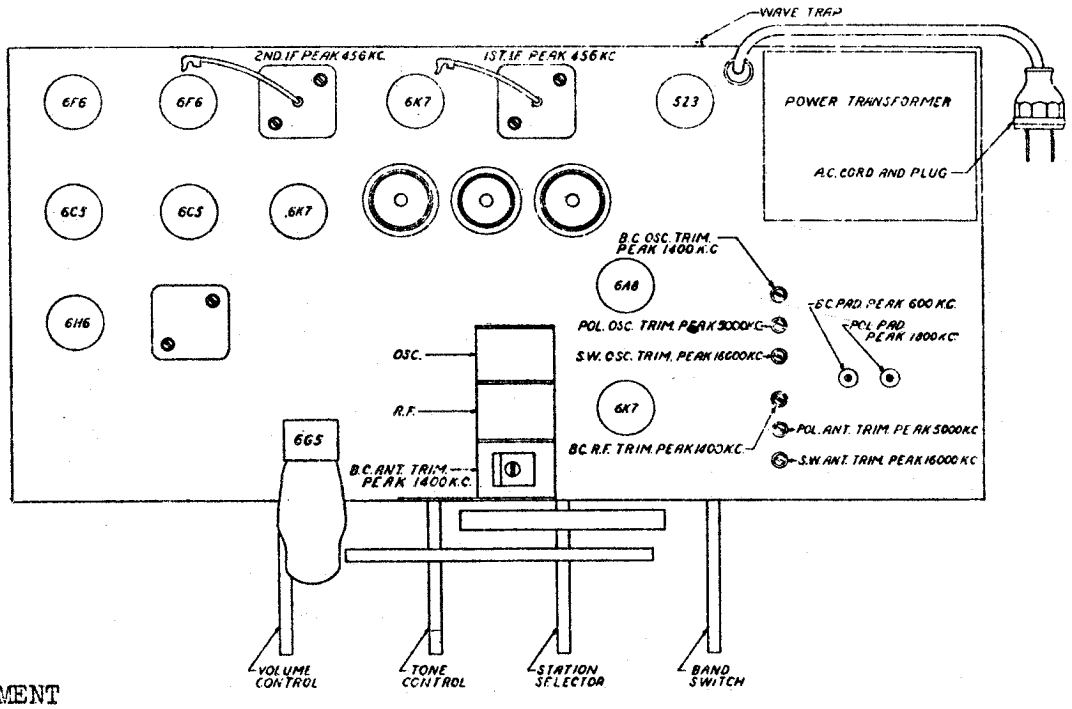
# SPIEGEL, INC.

MODELS 5054,5062,6570
6580,6582,6590
Chassis AM7
Schematic,Socket
Alignment,Trimmers




IF PEAK 456 KC


WAVE TRAP
2ND. I.F. PEAK 456 KC.
1ST. I.F. PEAK 456 KC
POWER TRANSFORMER
A.C. CORD AND PLUG
B.C. OSC. TRIM. PEAK 1400 K.C.
B.C. PAD. PEAK 600 KC.
POL. PAD PEAK 1800 KC.
POL. OSC. TRIM. PEAK 5000 KC.
S.W. OSC. TRIM. PEAK 16000 KC.
OSC.
R.F.
B.C. R.F. TRIM. PEAK 1400 KC.
POL. ANT. TRIM. PEAK 5000 KC.
S.W. ANT. TRIM. PEAK 16000 KC.
B.C. ANT. TRIM. PEAK 1400 K.C.
VOLUME CONTROL
TONE CONTROL
STATION SELECTOR
BAND SWITCH

ALIGNMENT

IF trimmer adj. at 456 KC through .05 or .1 mf dummy condenser.

BC osc. trimmer and ant. trimmer adj. at 1400 KC through .001 mf dummy. Padder at 600 KC. Recheck at 1400 KC.

Foreign Band: Through .0001 mf dummy, adj. at 14000 KC both the S.W. oscillator and S.W. trimmers. Check for image frequency at 13100 KC for proper weaker signal.

Police Band: Through 400 ohm resistor .0001 mf cond. series dummy, adjust osc. trimmer and ant. trimmer at 4000 KC. Padder adj. 1800 KC. Recheck at 4000 KC.

Wave Trap: At rear of chassis near grd. & ant.post adj. wave trap screw at 456 KC.

Dial Calibration - Government & Weather Reports - 150 to 375 KC.
Broadcast 550 to 1700 KC.
Police, Amateur, Aircraft & Ships 1700 to 5400 KC.
Short Wave 5.5 to 18 megacycles.

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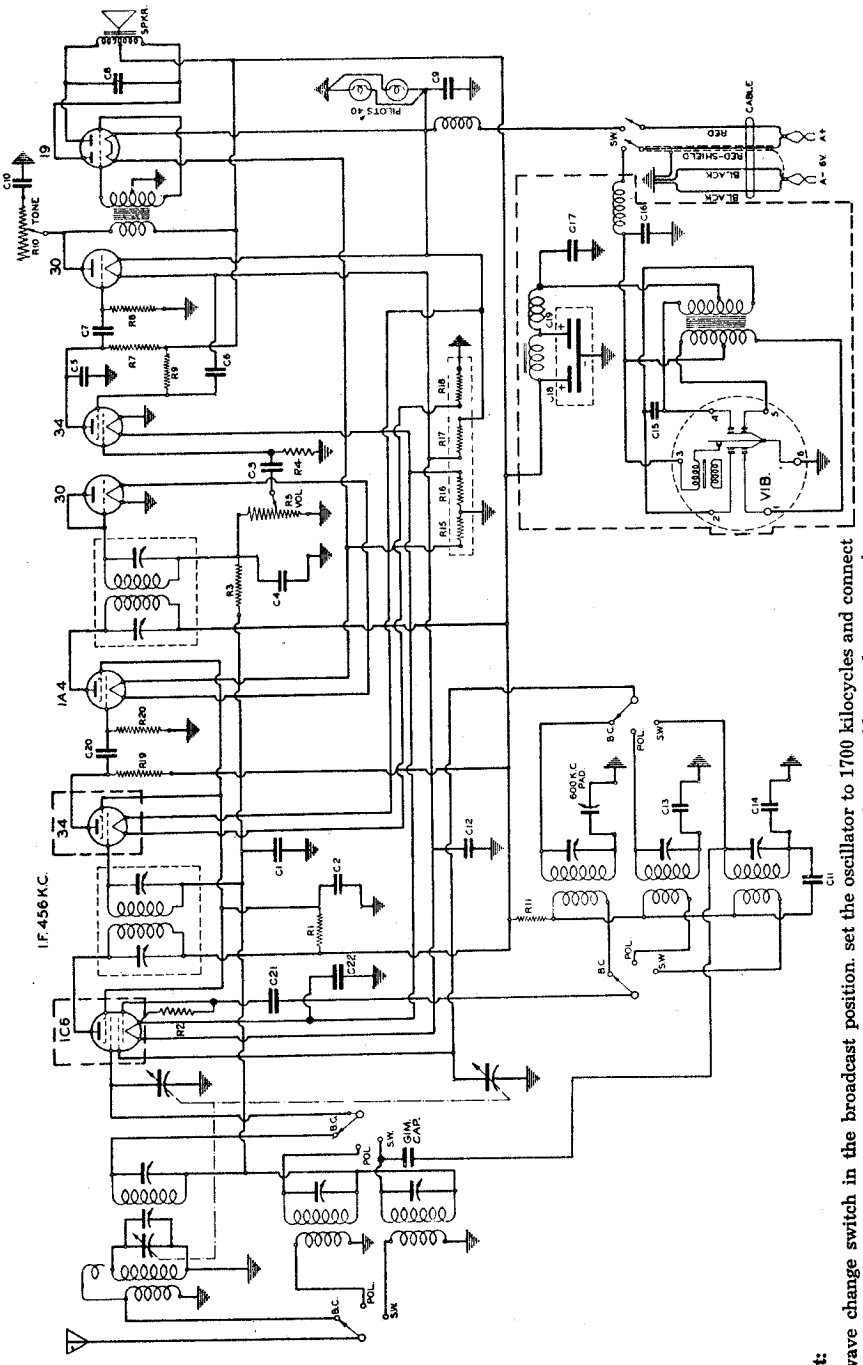
MODELS 5256,5260,6760,6770
6776 Chassis 700
Schematic,Socket,Alignment

# SPIEGEL INC.

**I. F. Alignment:**

Connect the oscillator through a .1 condenser to the grid of the 1C6 tube and set the oscillator to 456 kilocycles. Peak each I. F. stage to resonance as indicated by maximum output on the output meter.




| | | | |
|---|---|---|---|
| R1 | .25 M | OHMS | |
| R2 | .50 M | " | |
| R3 | 1 MEG. | " | |
| R4 | 1 MEG. | " | |
| R5 | 500 M | " | |
| R7 | 100 M | " | |
| R8 | 500 M | " | |
| R9 | 1 MEG. | " | |
| R10 | 50 M | " | |
| R11 | 3 M | " | |
| R15 | 20 | " | |
| R16 | 333 | " | |
| R17 | 333 | " | |
| R18 | 3.6 | " | |
| R19 | 25 M | " | |
| R20 | 250 M | " | |

| | | |
|---|---|---|
| C1 | .1 | MFD. |
| C2 | .05 | " |
| C3 | .01 | " |
| C4 | .00025 | " |
| C5 | .0005 | " |
| C6 | .1 | " |
| C7 | .05 | " |
| C8 | .006 | " |
| C9 | .1 | " |
| C10 | .01 | " |
| C11 | .001 | " |
| C12 | .1 | " |
| C13 | .0015 | " |
| C14 | .0027 | " |
| C15 | .0075 | " |
| C16 | .5 | " |
| C17 | .01 | " |
| C18 | .01 | " |
| C19 | 8 | " |
| C20 | .001 | " |
| C21 | .0001 | " |
| C22 | .1 | " |

**7-Tube, 6-Volt Battery Operated Superheterodyne**

**R. F. Alignment:**

With the wave change switch in the broadcast position, set the oscillator to 1700 kilocycles and connect in series with a .00025 condenser to the antenna of the receiver. Rotate the variable condenser to the 1700 setting of the dial and adjust the trimmer condenser of the broadcast oscillator to resonance. This trimmer is located on the right side of the chassis, second position from the front. Reset the test oscillator to 1400 kilocycles and adjust the antenna trimmer located on rear section of variable condenser. Adjust 1st detector trimmer under the chassis across preselector. Now set oscillator to 600 kilocycles and adjust padder located on side of chassis. Check alignment at 1000 kilocycles.

For aligning the police band, set test oscillator to 5 megacycles and switch to the police band position on the set. With the condenser rotated to this frequency setting as indicated on the dial, adjust oscillator trimmer located on the right side of the chassis, first position from the front. Now adjust antenna trimmer located on the front of the chassis, left position, to resonance.

The short wave band is aligned by setting the condenser to 18 megacycles and adjust the oscillator trimmer located on the right side of the chassis, third position from the front to resonance with an 18 megacycle signal from the test oscillator. Turn dial to 16 M. C. and adjust antenna trimmer through right hand hole in front of chassis, rocking variable condenser slightly back and forth to get maximum peak.

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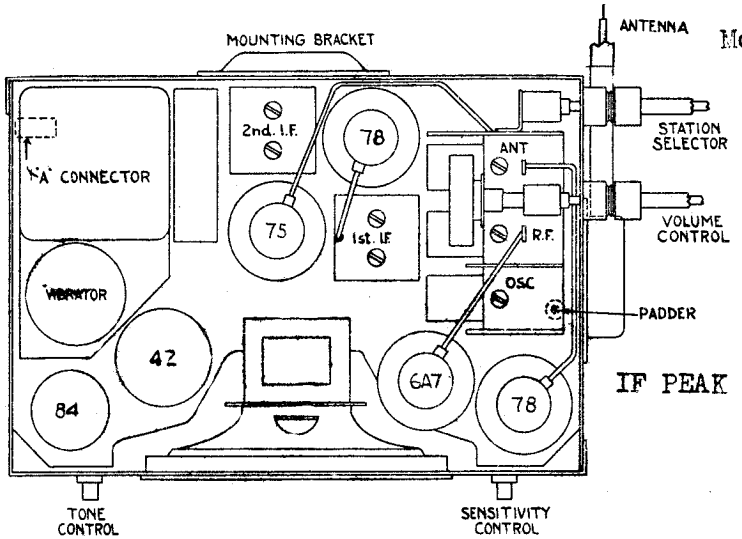
MODELS 6512, 6542, 6566
Chassis 14-142ES
Schematics, Socket, Trimmers
Alignment

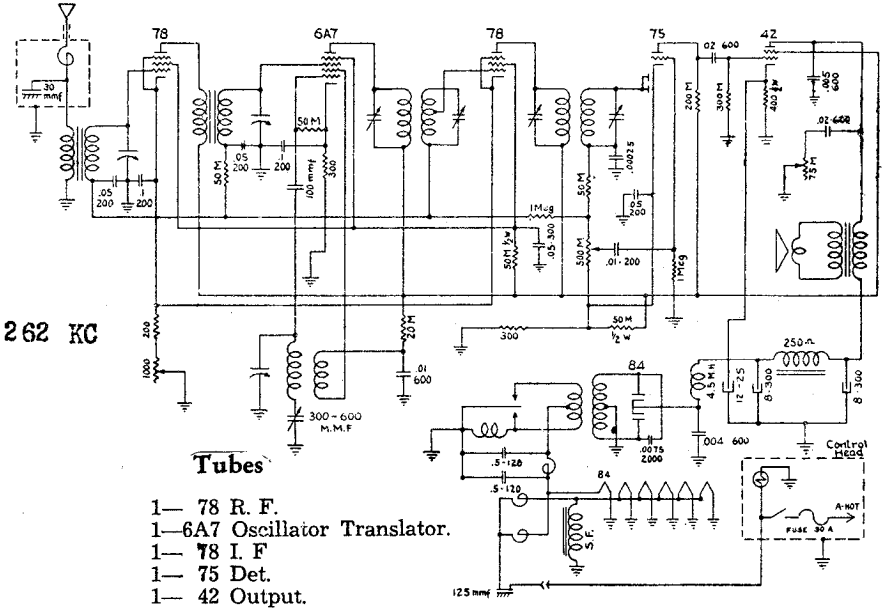
# SPIEGEL INC.

MODELS 6805 to 6808 inc.
6815 to 6818 inc. 6836
Chassis 14-112S

## Models 6805, etc.




IF PEAK 262 KC




ALIGNMENT FREQUENCIES:

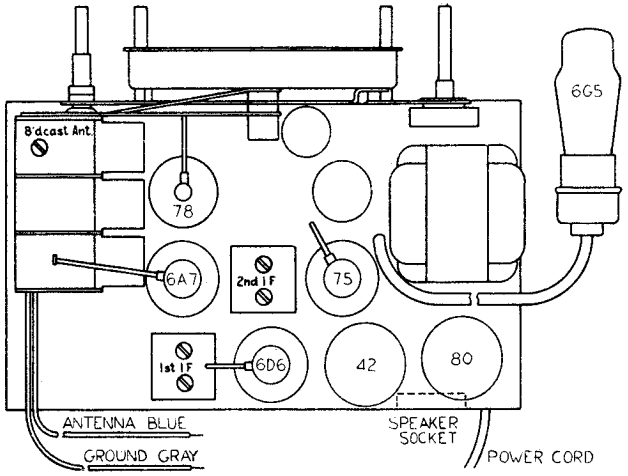
| | | | |
|---|---|---|---|
| IF | 262 KC | thru | .1mf dummy |
| OSC. | 1570 KC | thru | .00025 mf dummy |
| Ant. & RF | 1400 KC | " | " |
| PADDER | 600 KC | " | " |

**Tubes**

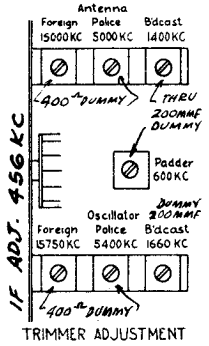
1— 78 R. F.
1—6A7 Oscillator Translator.
1— 78 I. F
1— 75 Det.
1— 42 Output.
1— 84 Rectifier.

FOR CONVENTIONAL ALIGNMENT SEE
SPECIAL SECTION VOL. V111

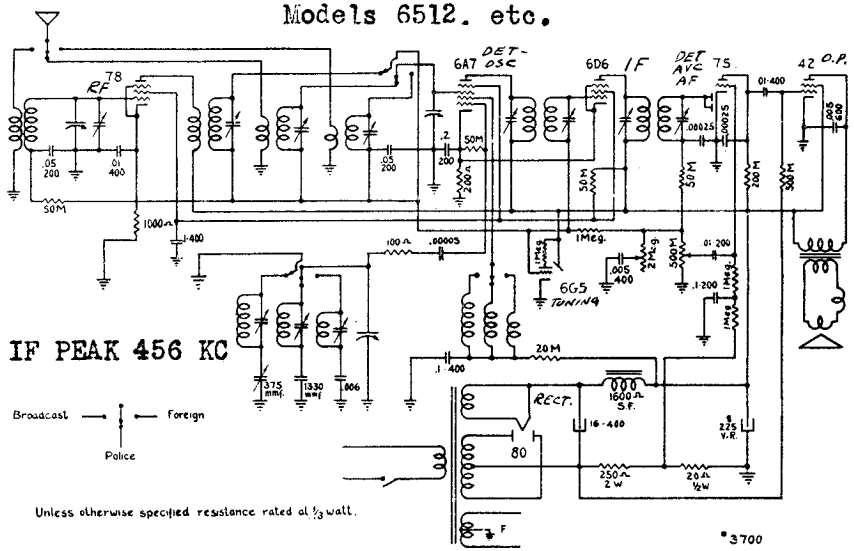
**procedure for alinement at 15,000 kc must be followed exactly to insure proper tracking. A dead spot at about 12,000 kc will result if antenna and oscillator circuits are not set in proper relation to each other.**




## Alignment Frequencies




## Models 6512. etc.




IF PEAK 456 KC

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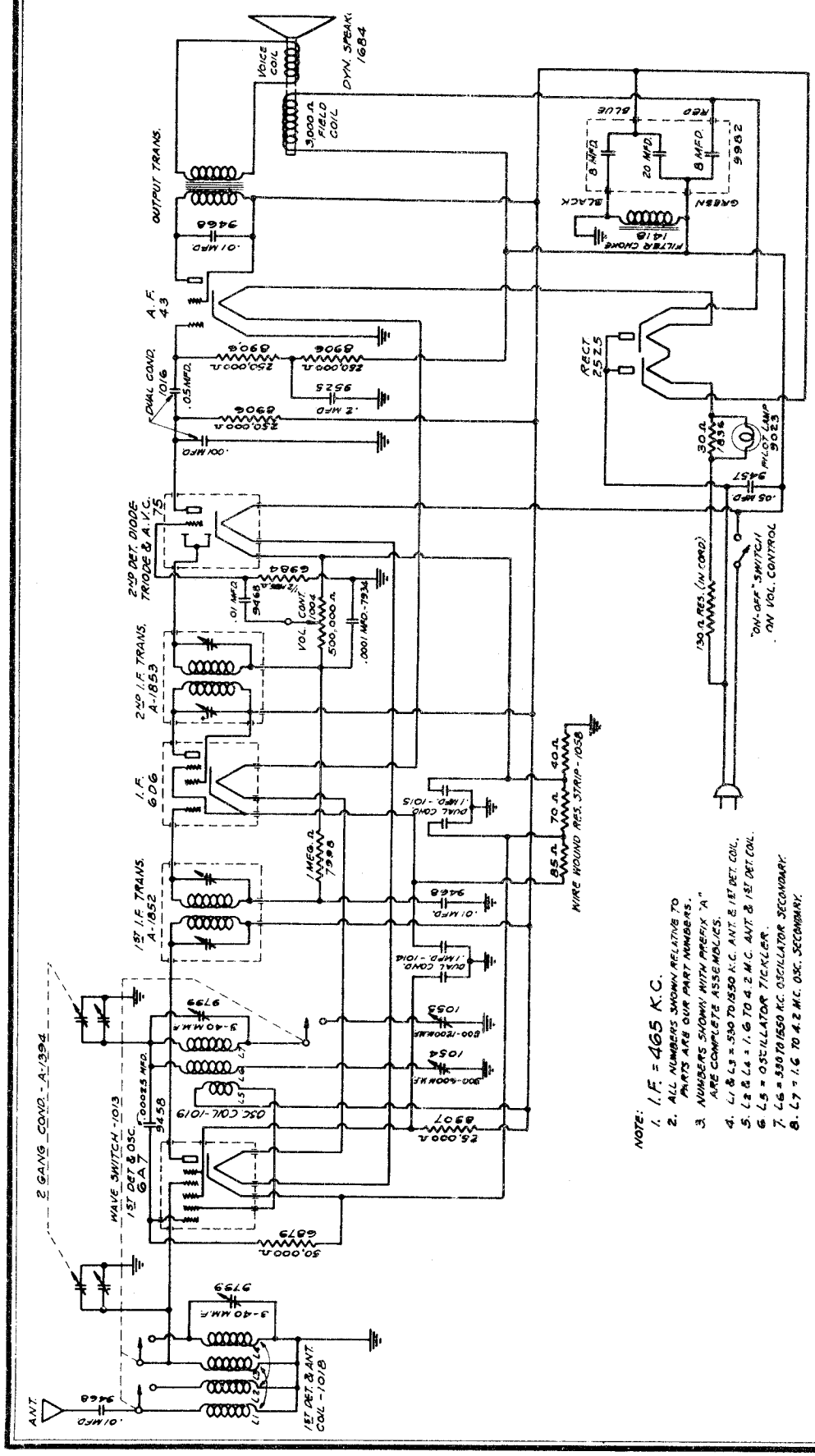
MODEL 9907, Chassis 5258
Schematic, Voltage
Alignment

# SPIEGEL INC.


2 GANG COND. - A-1394
WAVE SWITCH -1013
1ST DET & OSC.
6A7
OSC COIL -1019
1ST DET. & ANT. COIL -1018
ANT.
9468
.01 MFD.
9799
3-40 MMF.
9458
.0005 MFD.
9453
.01 MFD.
9468
.01 MFD.
9468
.01 MFD.
9468

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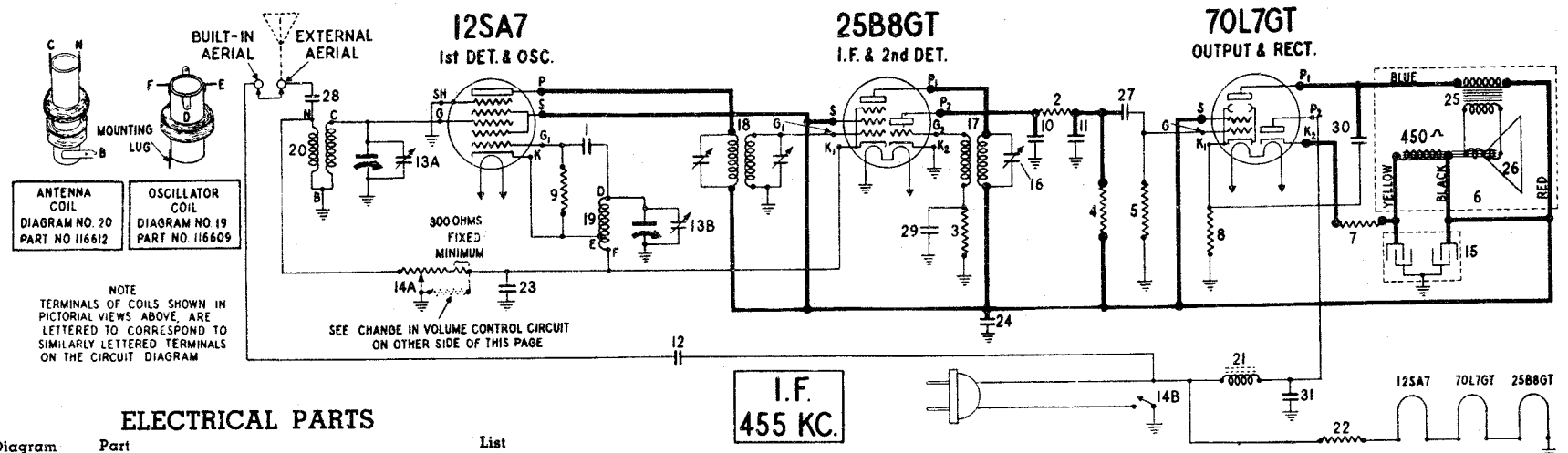

BUILT-IN AERIAL
EXTERNAL AERIAL
12SA7
1st DET. & OSC.
25B8GT
I.F. & 2nd DET.
70L7GT
OUTPUT & RECT.
MOUNTING LUG
ANTENNA COIL DIAGRAM NO. 20 PART NO 116612
OSCILLATOR COIL DIAGRAM NO 19 PART NO. 116609
NOTE TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS ABOVE, ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM
300 OHMS FIXED MINIMUM
SEE CHANGE IN VOLUME CONTROL CIRCUIT ON OTHER SIDE OF THIS PAGE
I.F. 455 KC.
BLUE
YELLOW
BLACK
RED
450
12SA7 70L7GT 25B8GT

## ELECTRICAL PARTS

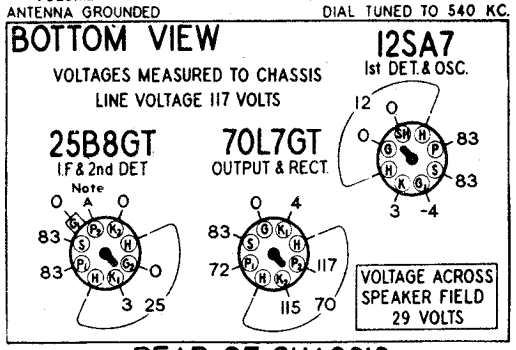
| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1 | 83783 | Condenser—mica 110 mmf. | $0.20 |
| 2 | 110566 | Resistor—carbon 33,000 ohms ¼ watt. | .12 |
| 3-4-5 | 112971 | Resistor—insulated 470,000 ohms ¼ watt | .15 |
| 6 | R-115053 | Speaker—dynamic 3" | 4.00 |
| 7 | 116013 | Resistor—wire wound 50 ohms 1 watt. | .18 |
| 8 | 116064 | Resistor—insulated 100 ohms (10%) ½ watt | .14 |
| 9 | 116066 | Resistor—insulated 68,000 ohms (10%) ¼ watt | .12 |
| 10-11-12 | 116224 | Condenser—mica 260 mmfd. 500 volt. | .15 |
| 13A-13B | 116578 | Condenser—2 gang | 2.50 |
| 14A-14B | 116579 | Volume control—20,000 ohms, with switch | 1.10 |
| 15 | 116587 | Condenser—electrolytic 20-20 mfd. 150 volt | .95 |
| 16 | 116599 | Trimmer condenser (2nd I.F.) | .15 |
| 17 | 116603 | Transformer—2nd I.F. | .70 |
| 18 | 116605 | Transformer—1st I.F. | .80 |
| 19 | 116609 | Coil—oscillator | .34 |
| 20 | 116612 | Coil—antenna | .60 |
| 21 | 116616 | R. F. Choke coil | .32 |
| 22 | 116618 | Resistor—65 ohms (10%), 2 W., w. w. | .20 |
| 23-24 | 116625 | Condenser—.1 mfd. 600 volt | .25 |
| 25 | R-116633 | Transformer—output for R-115053 speaker | 1.50 |
| 26 | R-116635 | Cone & Voice coil assembly for R-115053 speaker | 1.45 |
| 27 | 116640 | Condenser—.01 mfd. 600 volt | .15 |
| 28 | 116647 | Condenser—.004 mfd. 600 volt | .15 |
| 29 | 116819 | Condenser—.05 mfd. 600 volt | .20 |
| 30-31 | 116893 | Condenser—.02 mfd. 600 volt | .15 |

## MISCELLANEOUS PARTS

| Part Number | Description | List Price |
|---|---|---|
| 116637 | Cabinet—(walnut) | $2.65 |
| 116657 | Cabinet (sprayed ivory) for 07-313 | 2.65 |
| 112745 | Clip—coil mounting | .01 |
| 116576 | Insulator—fibre for base (inside) | .04 |
| 116716 | Insulator—fibre for base (outside) | .06 |
| 116532 | Knob—volume control (red) | .18 |
| 116533 | Knob—tuning (red) | .18 |
| 116886 | Knob—volume control (ivory) | .24 |
| 116887 | Knob—tuning (ivory) | .24 |
| 116584 | Rubber foot for bottom of cabinet | .02 |
| 116629 | Screw—No. 8-32x1⅛ Bind. H.M.S. | .01 |
| 116630 | Screw—No. 8-32x1½ Bind. H.M.S. | .01 |
| 116583 | Terminal Strip (for antenna) | .12 |
| 116592 | Tube shield | .10 |

## SOCKET VOLTAGES

VOLUME CONTROL SET AT MAXIMUM VOLUME POSITION
ANTENNA GROUNDED — DIAL TUNED TO 540 KC.




## REAR OF CHASSIS

**NOTE A:** Due to the high resistance of resistor No. 4, only a small voltage will be read on a meter having a resistance of 1000 ohms per volt.

May 26, 1939

MODEL A6, Air Pal
Chassis 07-31
Alignment, Trimmers
Antenna Notes, Change

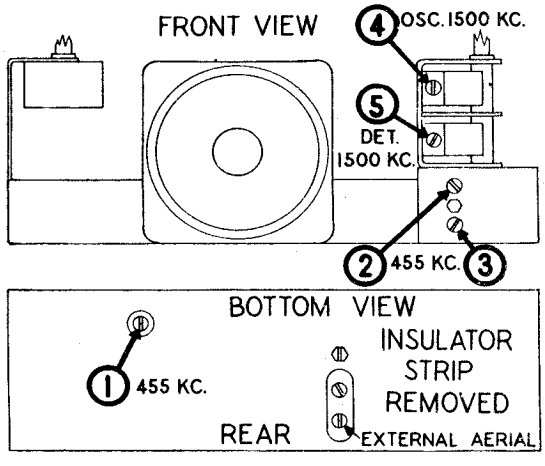
STEWART-WARNER CORP.

## ALIGNMENT PROCEDURE

**FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.**

1. **Solder the output meter leads from output plate ($P_1$) to screen (S) of the 7OL7GT tube (See voltage chart). The leads must be soldered since the bottom cover must be replaced during alignment. The output meter leads can be brought through the power cord opening.**
2. **Connect the ground lead of the signal generator through a .25 mfd. condenser to some portion of the chassis in the VICINITY OF THE GANG CONDENSER.**
3. **Remove the connector between the antenna terminals on the bottom of the set.**
4. **Turn the volume control to the maximum volume position and keep it in this position while aligning.**
5. **The tuning knob should be adjusted so that the nick which appears on the outer part of the knob is accurately centered and points away from the chassis when the gang condenser is in full mesh.**

| Dummy Ant. in Series with Sig. Gen. | Connection of Sig. Generator Output to Receiver | Signal Generator Frequency | Receiver Dial Setting | Trimmer Number | Trimmer Description | Type of Adjustment |
|---|---|---|---|---|---|---|
| .1 MFD. Condenser | Lug on bottom gang condenser | 455 KC | Any point where it does not affect signal | 1 | 2nd I.F. | Adjust for maximum output. Then repeat adjustment. (If the set oscillates, see precautions under heading "I. F. Oscillation".) |
| | | | | 2-3 | 1st I.F. | |
| 200 MMFD. Mica Condenser | Antenna Terminal on bottom (Terminal nearest back of chassis) | 1500 KC | 1500 KC | 4 | Broadcast Oscillator (Shunt) | Adjust trimmer for maximum output. |
| 200 MMFD. Mica Condenser | Antenna Terminal on bottom (Terminal nearest back of chassis) | 1500 KC | Tune to 1500 KC Generator Signal | 5 | Broadcast Antenna | Adjust for maximum output. |




## CHANGE IN VOLUME CONTROL CIRCUIT

On early releases of this model, a volume control was used which required a 4700 ohm resistor connected as shown by the dotted lines in the circuit diagram. In later production sets, a volume control with a different taper was used so the 4700 ohm resistor was not required. This later volume control carries the same part number.

When replacing a control using the resistor with a later type control, the connections are the same but the 4700 ohm resistor is omitted. Only the new controls are carried in stock by Stewart-Warner.

## I. F. OSCILLATION

When aligning this set, I. F. oscillation may be encountered if the following precautions are not observed:

1. Keep the bottom cover plate on during alignment.
2. Keep the signal generator leads as far from the chassis as possible in order to prevent unnecessary feed-back.
3. Connect the ground lead of the signal generator through a .25 mfd. condenser to some part of the chassis in the **VICINITY OF THE GANG CONDENSER.**
4. Keep the orange lead of the volume control away from the 2nd I.F. transformer. Separating this lead from the others surrounding it at the base of the 25B8GT tube will also help.

## BUILT-IN ANTENNA SYSTEM

The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when the terminals on the bottom of the chassis are connected together. In cases where noise is excessive or greater sensitivity is desired, remove the jumper connecting these terminals and connect an external antenna to the terminal marked "External Aerial." This is the terminal nearest the back of the set.

The Built-In Antenna Condenser No. 12 couples the primary of the antenna coil to one side of the power line, which acts as the antenna. The R. F. choke No. 21 is an iron-core choke whose impedance is high at broadcast frequencies. This choke serves to prevent condenser No. 31 from by-passing the signal voltage picked up by the power line. It also prevents feed-back into the antenna circuit of radio frequency energy generated in the set itself.

When aligning this receiver, the jumper connecting the antenna terminals on the bottom of the set should be removed. This will prevent picking up signals which might interfere with the alignment procedure.

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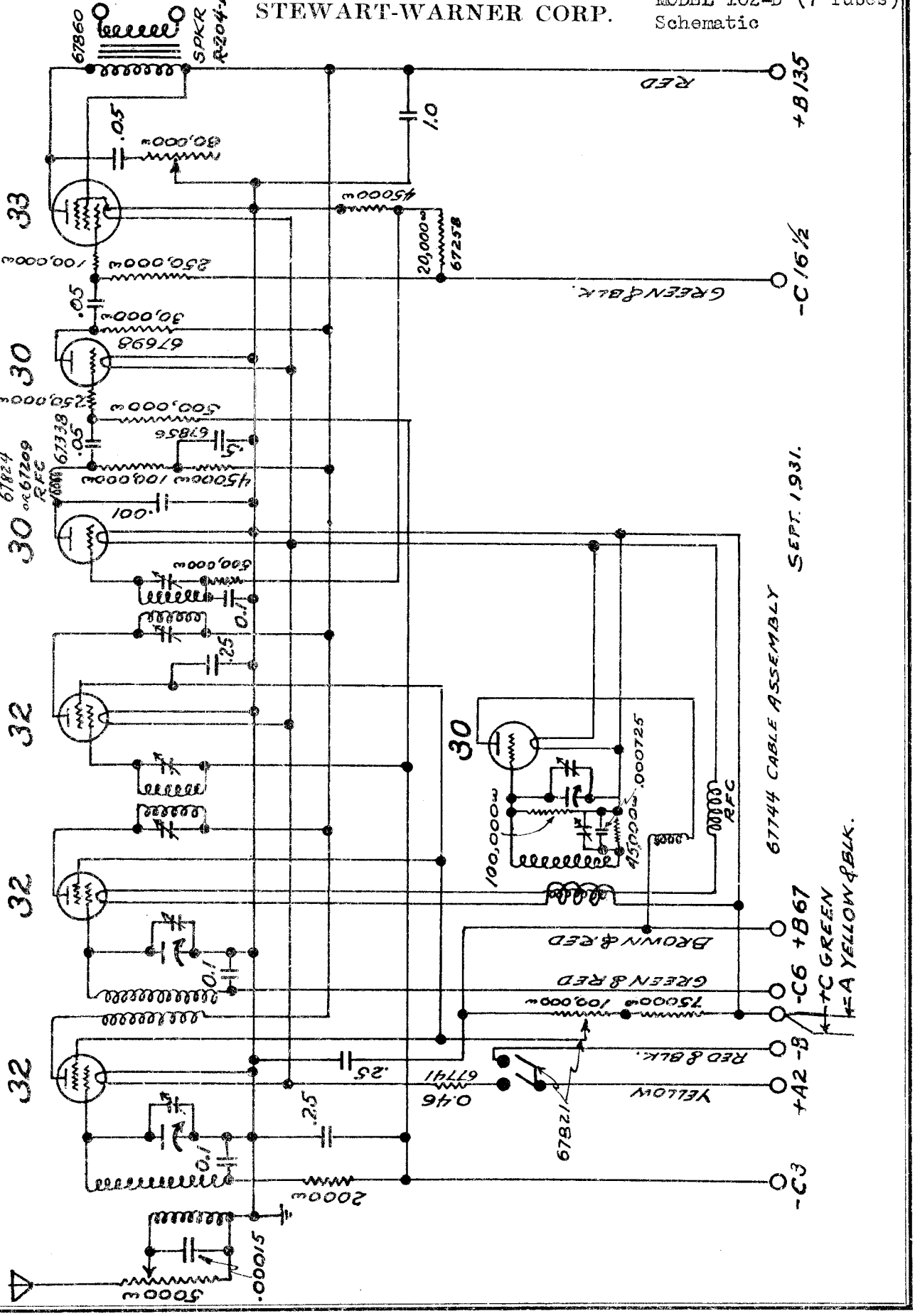
STEWART-WARNER CORP.

MODEL 102-D (7 Tubes)
Schematic

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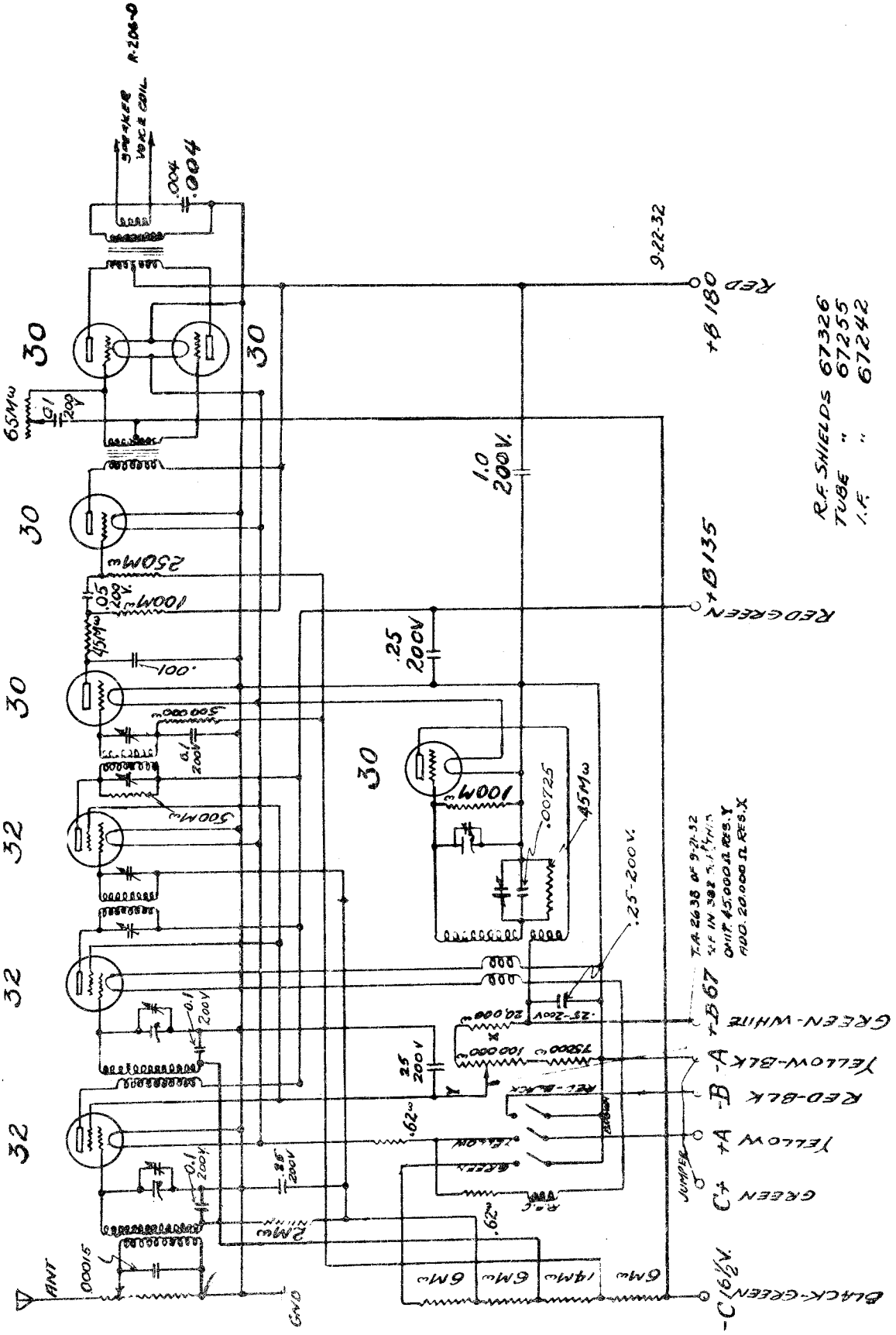
MODEL 102-D (8 Tubes)
Schematic

# STEWART-WARNER CORP.

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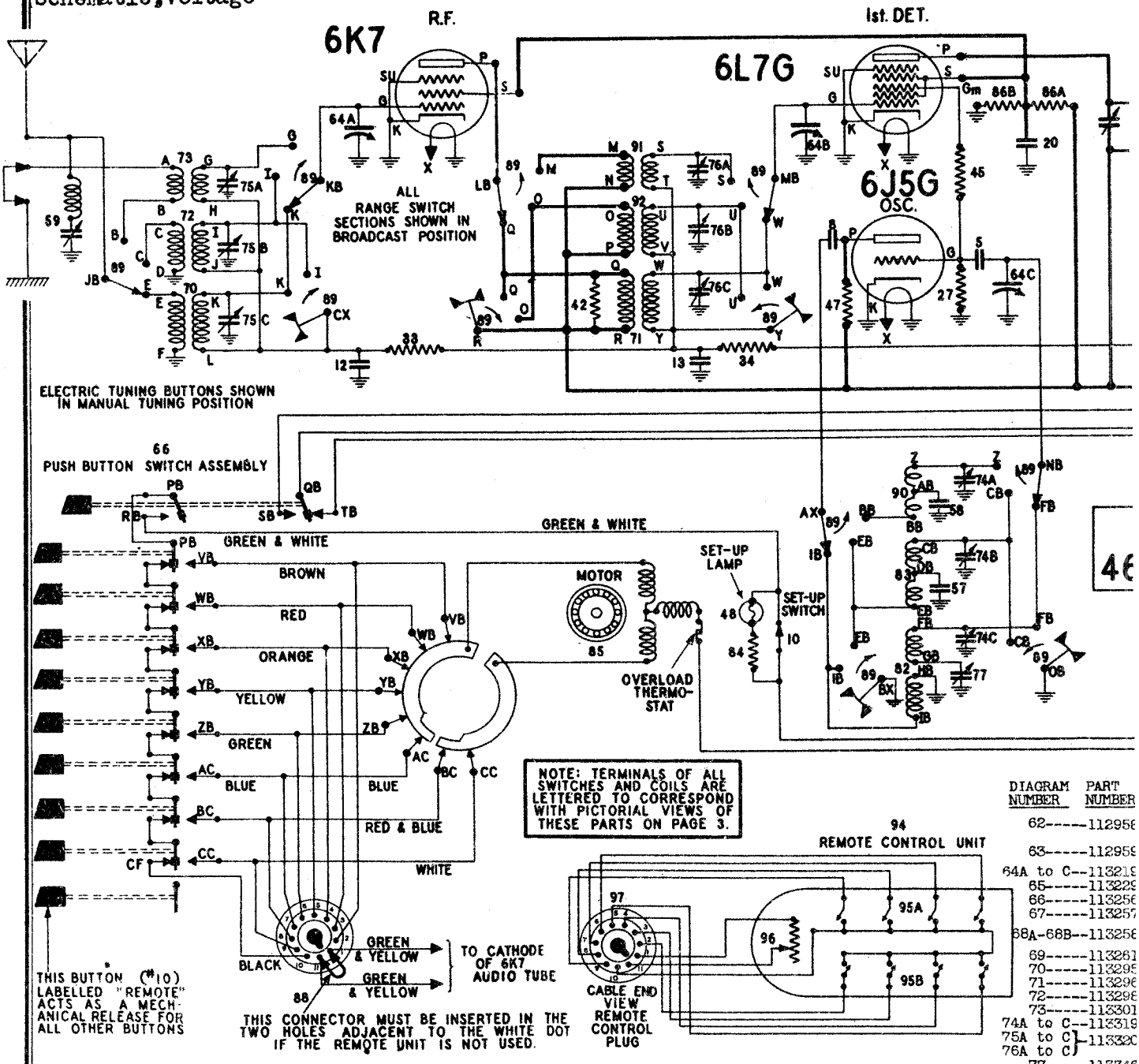
6K7
R.F.
6L7G
1st. DET.
6J5G
OSC.
ALL RANGE SWITCH SECTIONS SHOWN IN BROADCAST POSITION
ELECTRIC TUNING BUTTONS SHOWN IN MANUAL TUNING POSITION
66
PUSH BUTTON SWITCH ASSEMBLY
GREEN & WHITE
BROWN
RED
ORANGE
YELLOW
GREEN
BLUE
RED & BLUE
WHITE
MOTOR
SET-UP LAMP
SET-UP SWITCH
OVERLOAD THERMO-STAT
NOTE: TERMINALS OF ALL SWITCHES AND COILS ARE LETTERED TO CORRESPOND WITH PICTORIAL VIEWS OF THESE PARTS ON PAGE 3.
94
REMOTE CONTROL UNIT
THIS BUTTON (#10) LABELLED "REMOTE" ACTS AS A MECHANICAL RELEASE FOR ALL OTHER BUTTONS
THIS CONNECTOR MUST BE INSERTED IN THE TWO HOLES ADJACENT TO THE WHITE DOT IF THE REMOTE UNIT IS NOT USED.
TO CATHODE OF 6K7 AUDIO TUBE
CABLE END VIEW REMOTE CONTROL PLUG

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 83539 | Condenser - mica 260 mmfd. | $ .20 |
| 2-3-4 | 83783 | Condenser - mica 110 mmf. | .20 |
| 5 | 85061 | Condenser - mica 51 mmfd. | .15 |
| 6 | 88026 | Condenser - paper .02 mfd. 400 V. | .25 |
| 7 | 88029 | Condenser - paper .004 mfd. 400V. | .25 |
| 8-9 | 88030 | Condenser - paper .01 mfd. 400 V. | .25 |
| 10 | 88054 | Switch - for set.up | .30 |
| 11 | 88185 | Condenser - ceramic tube .006 mfd. 600 volt | .25 |
| 12-13-14-15 | 88189 | Condenser - paper .05 mfd. 200 V. | .25 |
| 16-17-18 | 88191 | Condenser - paper .1 mfd. 300 V. | .25 |
| 19 | 88990 | Condenser - paper .5 mfd. 150 V. | .35 |
| 20 | 89421 | Condenser - paper .1 mfd. 200 V. | .25 |
| 21 | 89532 | Condenser - paper .25 mfd. 200 V. | .32 |
| 22 | 89643 | Condenser - paper .25 mfd. 300 V. | .40 |
| 23 | 89826 | Condenser - paper .004 mfd. 750V. | .24 |
| 24 | 89937 | Condenser - elect. 30 mfd. 450 V. | 1.60 |
| 25-26 | 110377 | Condenser - elect. 10 mfd. 25 V. | .80 |
| 27-28-29-30-31-32 | 110552 | Resistor - carb. 47,000 ohms ½ W. | .12 |
| 33-34-35-36-37 | 110553 | Resistor - carb.220,000 ohms ½ W. | .12 |
| 38-39-40-41 | 110554 | Resistor - carb. 1 meg. 1/4 watt | .12 |
| 42 | 110557 | Resistor - carb. 4,700 ohm 1/4 W. | .12 |
| 43-44 | 110559 | Resistor - carb.470,000 ohms ½ W. | .12 |
| 45 | 110560 | Resistor - carb. 100 ohm ½ watt | .12 |
| 46 | 110564 | Resistor - carb.100,000 ohm ½ W. | .12 |
| 47 | 110568 | Resistor - carb. 15,000 ohm 1 W. | .15 |
| 48-49-50 | 110629 | Lamp - 6.3 volt - .25 amps. | .15 |
| 51 | 110975 | Resistor - W.W. 33 ohm 1/2 watt | .12 |
| 52 | 111214 | Condenser - paper .01 mfd. 600 V. | .24 |
| 53-54-55-56 | 111252 | Condenser - paper .05 mfd. 400 V. | .13 |
| 57 | 112426 | Condenser - mica 1650 mmfd.(3%) | .30 |
| 58 | 112427 | Condenser - mica 4050 mmfd.(3%) | .40 |
| 59 | 112796 | Coil - wave trap (with trimmer) | .50 |
| 60 | 112955 | Resistor - carb. 1000 ohms 1/4 watt (10%) | .12 |
| 61 | 112956 | Resistor - carb. 220,000 ohms 1/4 watt (10%) | .12 |

| DIAGRAM NUMBER | PART NUMBER |
|---|---|
| 62 | 112958 |
| 63 | 112959 |
| 64A to C | 113219 |
| 65 | 113229 |
| 66 | 113256 |
| 67 | 113257 |
| 68A-68B | 113258 |
| 69 | 113261 |
| 70 | 113295 |
| 71 | 113296 |
| 72 | 113298 |
| 73 | 113301 |
| 74A to C | 113319 |
| 75A to C<br>76A to C | 113320 |
| 77 | 113346 |
| 78 | 113361 |
| 79 | 113382 |
| 80 | 113394 |
| 81A-81B | 113399 |
| 82 | 113411 |
| 83 | 113412 |
| 84 | 113430 |
| 85 | 113450 |
| 86A-86B | 113469 |
| 87---R | 113482 |
| 88 | 113499 |
| 89 | 113599 |
| 90 | 113607 |
| 91 | 113608 |
| 92 | 113609 |
| 93---R | 115018 |

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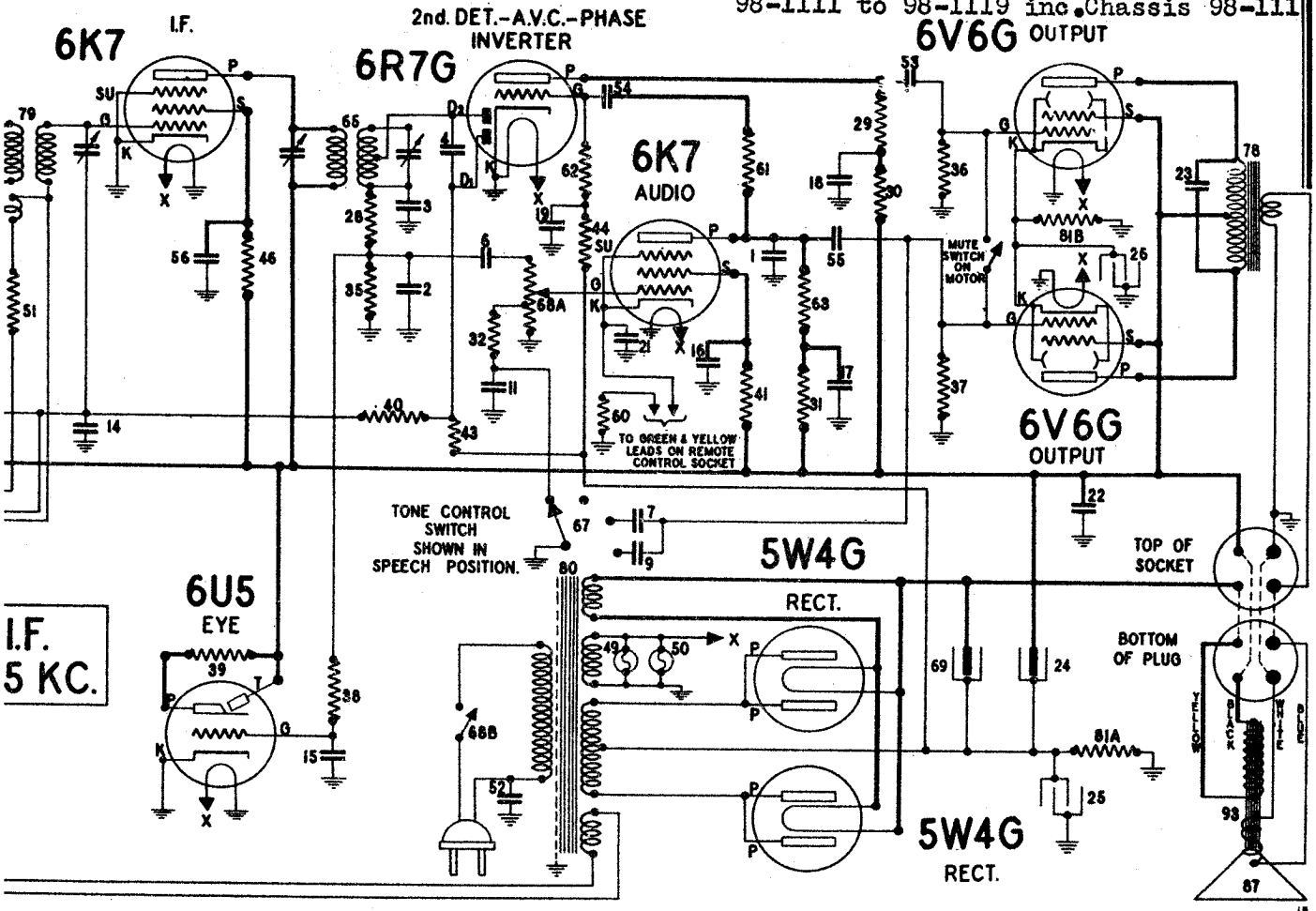
NER CORP.

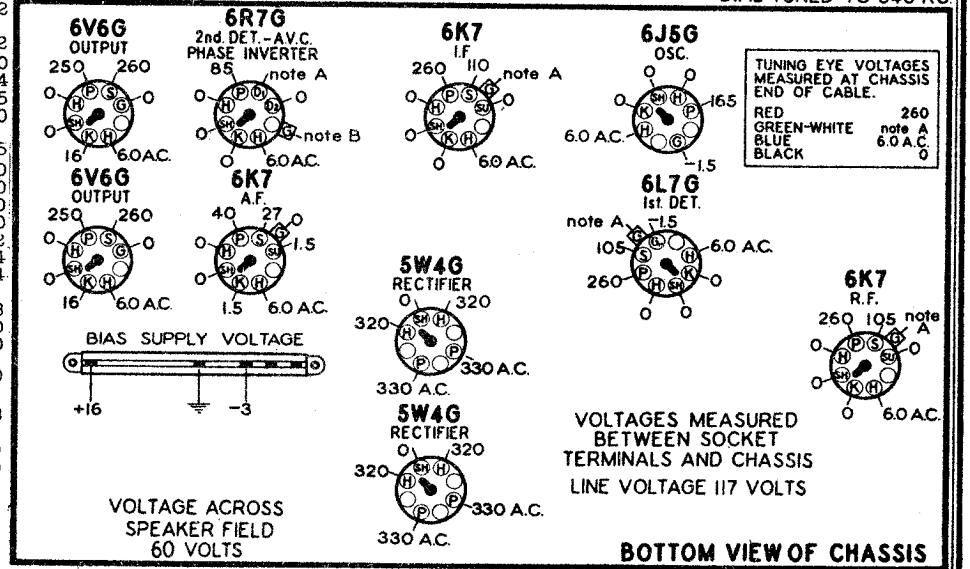
MODELS 91-1111 to 91-1119 inc. Chassis 91-111
98-1111 to 98-1119 inc. Chassis 98-111




| DESCRIPTION | LIST PRICE |
|---|---|
| Resistor - carb. 18,000 ohms 1/4 watt (10%) | .12 |
| Resistor - carb. 120,000 ohms 1/4 watt (10%) | .12 |
| -Condenser - variable gang | 6.80 |
| -Transformer - 2nd I. F. | 1.64 |
| -Push-Button Switch Assem. | 3.75 |
| -Switch - Tone control | .70 |
| Volume Control - 250,000 ohms with off-on switch | .95 |
| -Condenser - elect. 30 mfd. 450 V. | 1.40 |
| -Coil - antenna (B.C.) | 1.20 |
| -Coil - R. F. (B.C.) | 1.30 |
| -Coil - antenna (Police) | .50 |
| -Coil - antenna (S.W.) | .52 |
| -Condenser - trimmer - 3 section | .54 |
| -Condenser - trimmer - 3 section | .54 |
| -Condenser - padding | .38 |
| -Transformer - output | 2.90 |
| -Transformer - 1st I.F. | 2.40 |
| Transformer - power 117 volt 60 cycle | 9.00 |
| Resistor - Bias Strip<br>Section A - 20 ohms<br>Section B - 200 ohms | .38 |
| -Coil - oscillator (B.C.) | .50 |
| -Coil - oscillator (Police) | 1.20 |
| -Resistor - candohm 90 ohms | .26 |
| Motor - for electric tuning (supplied with tuning shaft & gear) | 7.80 |
| Resistor - Bleeder<br>Section A - 6800 ohms<br>Section B - 5600 ohms | .92 |
| Cone - voice coil for R-115016 speaker | 2.10 |
| Connector Link - for remote control plug | .01 |
| Switch - range | 2.10 |
| Coil - oscillator (S.W.) | .52 |
| Coil - R.F. (S.W.) | .60 |
| Coil - R.F. (Police) | .50 |
| Speaker - dynamic 12" | 10.00 |

## SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.




REAR OF CHASSIS

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7-G, 6K7-R.F., 6K7 I.F. and the diode plate (D) of the 6R7-G tubes is -3.0 volts measured across resistor 81A.

NOTE B: The bias for the control grid of the audio section of the 6R7-G is -3.0 volts measured across resistor 81A.

Tuner Data, Notes, Parts

# STEWART-WARNER CORP.

MODELS 91-1111 to 91-1119
98-1111 to 98-1119
910-1111 to 910-1119

## Drive Cord Data

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 113340 | Socket - dial lamp | .22 |
| 113347 | Gear - on range switch shaft | .20 |
| 113348 | Bracket - dial (R.H.) | .40 |
| 113349 | Bracket - dial (L.H.) | .38 |
| 113352 | Pulley - right end of roller dial shaft | .29 |
| 113353 | Dial End Cup - left side | .18 |
| 113356 | Escutcheon - for roller dial | 2.40 |
| 113357 | Escutcheon - around push buttons | 1.00 |
| 113402 | Drum - dial cord drive | .56 |
| 113404 | Socket - for "set-up" lamp | .20 |
| 113405 | Socket - 11 prong (for remote control) supplied with mtg. plate | .38 |
| 113431 | Dial Scale - celluloid cell | 1.50 |
| 113442 | Bracket - for tuning eye | .16 |
| 113443 | Knob - with gold stripe (for range switch) | .10 |
| 113463 | Rubber Bushing - chassis mtg. | .03 |
| 113492 | Light Shield - cardboard (over push button) | .06 |
| 113511 | Gear - fibre (on motor) | 1.30 |
| 113529 | Cap - cover for back of remote control socket | .16 |

## DIAL AND MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 87986 | Washer - embossed (for mtg. elect.) | $ .06 |
| 85076 | Terminal Strip - G.D.A. | .20 |
| 85321 | Connector - Ground | .01 |
| 85427 | Socket - octal base (standard) | .15 |
| 85827 | Set Screw - 8/32 square head | .02 |
| 88348 | Eyelet - for dial cord - Per dz. | .05 |
| 89746 | Washer - (paper) for back of knobs | .005 |
| 110496 | Plug - speaker (4 prong) | .12 |
| 110501 | Socket - 4 prong (for speaker) | .16 |
| 110629 | Washer - flat steel, for mtg. chassis | .01 |
| 111085 | Sleeve - felt for tuning eye | .03 |
| 111302 | Cord - dial drive 6 or 50 ft. lgths. Per Ft. | .05 |
| 112745 | Clip - coil mounting (osc. & ant.) | .01 |
| 112798 | Clip - for mtg. wave trap coil | .01 |
| 112874 | Screw - #10 X 1-1/8 chassis mtg. | .01 |
| 112876 | Screw - P.B. escutcheon mtg. #3 X 3/8 | .01 |
| 112879 | Screw - eye escutcheon mtg. #2 X 3/8 | .03 |
| 113019 | Clip - dial scale retaining | .01 |
| 113025 | Socket - octal base (with special ground) | .15 |
| 113041 | Knob - Push-on | .10 |
| 113077 | Shield - tube | .15 |
| 113102 | Push button only | .08 |
| 113135 | Escutcheon - for eye | .25 |
| 113177 | Spring - dial cord tension | .09 |
| 113186 | Tab - celluloid - for push button - Per dz. | .09 |
| 113201 | Semi-circular bridge - for "set-up" contacts | .60 |
| 113206 | Pulley - on auxiliary range switch shaft | .40 |
| 113207 | Gear - pinion on aux range switch shaft | .25 |
| 113208 | Dial End Cup - right side | .14 |
| 113233 | Disc & Bushing - on back of gang for electric tuner | 1.60 |
| 113260 | Pointer - dial | .14 |
| 113267 | Contact & Spring Assem. - for elect. tuner | .38 |
| 113283 | Cable - for tuning eye | .10 |
| 113286 | Shaft - auxiliary; for range switch | .15 |
| 113321 | Tabs - station call letters (4 sheets) (brown) - Per set | .40 |




FIG. 2.

1. Place the knot on the cord in slot B.
2. With the long free end of the cord (not the end with the spring attached), take 1¼ turns clockwise around pulley A, then thread the end up through hole C back of pulley D and up to the front of pulley E.
3. Turn pulley E until the slot F is up as shown in the figure. Now, with the free end of the cord wind clockwise; 1¼ turns around E, out through slot F, 1 turn around G, back through slot F, and 1¼ turns around E.
4. Place the knot on the cord in slot B.
5. With the long free end of the cord (not the end with the spring attached), take 1¼ turns clockwise around pulley A, then thread the end up through hole C back of pulley D and up to the front of pulley E.
6. Turn pulley E until the slot F is up as shown in the figure. Now, with the free end of the cord wind clockwise; 1¼ turns around E, out through slot F, 1 turn around G, back through slot F, and 1¼ turns around E.
7. Bring the cord down back of pulley H and leave it hang for the time being.
8. With the end of the cord to which the tension spring is attached, take 1¼ turns counterclockwise around pulley A, (when viewed from the right end) and then bring the cord up through hole C.
9. Tie the free end of the cord hanging over pulley H, to the upper end of the tension spring. The spring should be extended so it is approximately 1¼" long when the tension in the cord system is equalized.

If the Short Wave scale on the dial is not in the proper position under the pointer, loosen the set screw in hub G, rotate the dial scale to the proper position and tighten the set screw.

## REMOTE CONTROL UNIT PARTS

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 94 | 113600 | Remote Control Unit | 12.00 |
| 95A-95B | 113644 | Switch - two section (in remote control unit) | 4.20 |
| 96 | 113646 | Volume Control - (35,000 ohms) on remote control unit | .75 |
| | 113650 | Case - for remote control unit | 1.20 |
| | 113651 | Push Button - for remote control unit | .06 |
| 97 | 113653 | Plug - 11 prong (for remote control unit) | .48 |
| | 113673 | Cable - for remote control unit (20 ft.) | 9.00 |
| | 113658 | Tabs - station call letters (for remote control unit only) | .45 |

These chassis are 11 tube, Electric Push-Button Tuning, Superheterodyne receivers. The tuning ranges are 535 to 1730 KC, 2.2 to 7.0 MC, and 6.8 to 22.5 MC.

| Chassis Model | Used in Receiver Models | Voltage | Frequency |
|---|---|---|---|
| 91-111 | 91-111 to 91-1119 | 117 | 60 cycles |
| 98-111 | 98-111 to 98-1119 | 117 | 25 cycles |
| 910-111 | 910-111 to 910-1119 | 100-240 | 60 cycles |

Incorporated in each chassis is a ruggedly constructed Electric Push-Button Tuner Unit, which was primarily designed to give long-life and consistent accuracy of tuning. Aside from the automatic tuning system which incorporates several features described in the following paragraphs, which should be carefully read as they may aid him in rapidly locating the source of trouble.

VARIABLE SELECTIVITY: Two degrees of selectivity can be obtained by proper use of the first PUSH-button labelled "Manual". When the button is in the "out" position the tuning of the receiver will be broad. With this button in the "in" position the tuning will be sharp. Broadening is accomplished by inserting a resistor and coil in series with the secondary of the first I. F. transformer. The series coil is mutually coupled into the primary of the same I.F. transformer thereby causing a flattening of the overall selectivity.

AUDIO SYSTEM: The audio voltage developed across the diode load resistor is fed to the volume control which in turn couples, the desired amount of this audio voltage to the control grid of the 6K7 1st audio tube. The output of this stage is coupled to one of the 6V6-G output tubes. Also a portion of the output of the 6K7 is coupled through a voltage divider network consisting of resistors No. 44, 61 and 62 to the control grid of the 6Q7-G. This tube acts as the phase inverter and its output drives the other 6V6-G output tube. A mute switch connected across the control grids of the two 6V6-G output tubes is utilized to silence the receiver while the automatic tuning unit is in operation. This is accomplished by placing the mute switch on the back of the tuner motor. When the motor starts to operate the rotor grips into the magnetic field of the stator, which causes the end of the motor shaft to push against the mute switch and close its contacts.

## TYPICAL TROUBLES AND THEIR SYMPTOMS.

1. SYMPTOM: When electric tuner button is depressed pointer travels to end of station markings.
   REMEDY: Black and brown leads from motor to contactor drum are connected in reverse. Reverse connections at motor terminals.
2. SYMPTOM: When either the second or third button from the left or right end of the dial and the motor will run.
   REMEDY: This is caused by misalignment of contactor drum and gang condenser. Release set screw holding drum in place on shaft, and close the gang condenser completely. Place a slider contactor at each extremity of the slider bridge. Now set the contactor drum so that the division between the two sections (POINT "A" IN FIG. 1) is just below the contactor which you set at the extreme left end of the bridge (viewed from rear). The contactor on the extreme right of the bridge will now fall on point just above the dead spot indicated by the white arrow on the drum. NOTE: The contactor on each extreme end must contact the same sections of the contact drum or the drum is incorrectly set. After the setting has been performed retighten the set screw.
3. SYMPTOM: Tuner fails to operate.
   REMEDY: (1) The small black set-up switch on the back of the tuner must be set to the left hand position.
   (2) Overheating of the motor will open when temperature of motor reaches dangerous value (approx. 250° C). Thermostat will close automatically when motor cools down.

## REMOTE CONTROL UNIT

This Stewart-Warner radio is designed to permit tuning from a remote point such as your armchair or any point within 20 ft. of the receiver cabinet. A special "Remote Tuner Kit" part No. 113600 is available to adapt your receiver for remote control. It can be purchased from any Stewart-Warner Dealer, Distributor, or from Stewart-Warner Corporation, Chicago, Illinois. This accessory kit consists of a remote control unit incorporating eight push buttons and a remote volume control. The unit is connected by a flat flexible cable to an eleven prong plug, which fits into a corresponding socket at the left rear of the receiver chassis. Following are the instructions for installation of the remote control unit:

1. Turn off the radio set.
2. Remove the wire connector which joins the two holes adjoining the white dot on the eleven hole socket. IMPORTANT: If at any time you decide to discontinue the use of the remote control unit, remove the plug and reinsert this wire connector in the two holes adjoining the white dot. Failure to replace the connector will make the set inoperative.
3. Insert the remote control plug in its socket and locate the remote control unit at some convenient point within 20 ft. of the set. The unit may be placed beneath the rug, or along the floor.
4. PRESS IN the "REMOTE" BUTTON (#10) on the Push Keyboard and the unit is now ready for operation.

## HOW TO SET UP THE PUSH BUTTONS

1. Be sure that your set is first connected to a good antenna system.
2. Turn on the set and allow it to operate at least one-quarter hour before setting up the push buttons.
3. Make a list of eight nearby stations which you wish to tune in with automatic tuning buttons. Be sure to select nearby powerful stations, since weak stations will generally give poor results. Arrange the list so that the lowest frequency station appears first, the next lowest frequency, continuing in this manner until station with the highest frequency appears last. The frequency of your local stations may be obtained from your newspaper or radio call magazine.

Only buttons No. 2 to No. 9 are used for automatic tuning. IT IS IMPERATIVE THAT THESE BUTTONS BE SET-UP IN THE FOLLOWING ORDER: Button No. 2 must be set to tune in the station whose frequency is lowest in your list of eight stations. Button No. 3 must be set to tune in the station next higher in frequency. Continue to follow this procedure until Button No. 9 will be set to tune in the station whose frequency is highest in your list

4. Place the small black "set-up switch" button which appears on the back of the chassis. In the right hand position. (See label on back of chassis.) LEAVE THIS SWITCH IN THIS POSITION UNTIL ALL BUTTONS HAVE BEEN SET UP.
5. Push in the "Manual" button and use the tuning knob to tune in the station (lowest frequency on your list) that you have selected for Button No. 2. Be sure to tune in the Station Selector using the "Tuning Eye" as the correct tuning point is indicated when the two open ends of the inverted "V" shaped shadow in the "Tuning Eye" are closest together.
6. PUSH IN BUTTON No. 2. The lamp mounted on the back of the chassis just to the right of the selector drum will be illuminated when the button is depressed. (See Fig. 1.)

NOTE: If the lamp does not light up when the switch is in this position, it indicates that Button No. 2 is already correctly set to the desired station and no further adjustment need be made for this button.

7. Locate the contactor corresponding to Button No. 2. This contactor has a BROWN lead attached to it, (See Fig. 1 or label on back of the chassis) and is the contactor which the color of the wire associated with each button) and is the extreme right hand contact on the inner circle of the semi-circular bridge, when viewed from rear of chassis. Loosen the knurled nut on this contactor (not more than one-half turn.). Then slide this contactor along the bridge to the point indicated by the white arrowhead on the side of the round drum. When this point is reached, the lamp will go out. If the contactor is moved farther than the point at which the lamp extinguishes, the lamp will again be illuminated. Move the contactor back and forth between the two points. Then tighten the knurled nut as tightly as possible, with the finger. The lamp should still be out after tightening the contactor. If it is not, the contactor must be reset.
8. Set-up the remaining seven buttons in a similar manner. The contactors for the buttons can be identified as follows: (See Fig. 1 or label on back of chassis.)

| | |
|---|---|
| Button No. 2 - Brown Lead | Button No. 6 - Green Lead |
| Button No. 3 - Red Lead | Button No. 7 - Blue Lead |
| Button No. 4 - Orange Lead | Button No. 8 - Red-Blue Lead |
| Button No. 5 - Yellow Lead | Button No. 9 - White Lead |

9. Set-up the remaining seven buttons in a similar manner. The contactors for the buttons can be identified as follows: (See Fig. 1 or label on back of chassis.)
10. AFTER ALL BUTTONS HAVE BEEN SET-UP YOU MUST PLACE THE SMALL BLACK SET-UP SWITCH BUTTON IN THE LEFT HAND POSITION (white dot showing) OTHERWISE THE ELECTRIC TUNER MOTOR WILL NOT OPERATE. (See label on back of chassis just below this switch.) This re-connects the motor and enables you to tune to any of the eight selected stations by pushing the proper button.

To use the "Magic Keyboard" it is only necessary to push the button for the station you desire.

The "Magic Keyboard" push buttons may also be used on the Foreign or International bands. However, on these bands we recommend that, rather than setting up the buttons to some particular station, you set the button to some particular foreign, police, aircraft or amateur stations which you frequently desire to tune in. The frequencies of these bands are not recommended due to the extreme sharpness of tuning on these bands.

11. Label each button with the call letters of the station you have selected, using the call letter tabs and the celluloid cover provided with your receiver. The printed paper tab should be inserted in the slot by holding the ends and flexing the tab slightly, allowing it to snap into place. The celluloid cover tab should be flexed in a similar manner and placed on top of the paper tab.

## REPLACING THE ROLLER DIAL DRIVE CORD

1. Tie a tension spring, part number 113177, to one end of about 30" of special dial cord part no. 111302.
2. Tie a large knot in the cord, 8" from the tension spring.
3. Turn the range switch to the Short Wave position -- all the way counterclockwise. Pulley A on the range switch shaft should be in the position shown in Fig. 2.




FIG. 1.

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MODELS 91-1111 to 91-1119
98-1111 to 98-1119

# STEWART-WARNER CORP.

910-1111 to 910-1119
Alignment, Trimmers, Coils







**ALL TERMINALS ARE LETTERED TO CORRESPOND WITH THE SIMILARLY LETTERED TERMINALS SHOWN ON THE CIRCUIT DIAGRAM. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTERS.**




TUNER SWITCH




RANGE SWITCH FRONT DECK




RANGE SWITCH MIDDLE DECK




RANGE SWITCH REAR DECK




FOREIGN OSCILLATOR COIL




FOREIGN R.F. COIL

## ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 20 MC. are required.

**1** Connect the output meter across the voice coil or across the two plates of the two 6V6-G output tubes, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

**2** Connect the ground lead of the signal generator to the "G" post on the antenna terminal strip at the rear of the chassis, or to the metal chassis.

The ground and doublet terminals on this antenna terminal strip must be connected together throughout the alignment procedure.

**3** With the gang condenser in full mesh set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser to full mesh with the pointer properly set, then retighten the set screw.

**4** Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure. IMPORTANT:- If the remote control unit is plugged in, be sure that its volume control is also in the maximum volume position.

**-IMPORTANT-**

**THE FIRST PUSH-BUTTON ON THE LEFT, LABELLED "MANUAL" MUST BE PUSHED IN WHEN ALIGNING. FAILURE TO PUSH IN THIS BUTTON WILL MAKE CORRECT ALIGNMENT IMPOSSIBLE.**

| | CONNECTION OF SIGNAL GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POSITION (INDICATED BY ROLLER DIAL) | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| DUMMY ANT. IN SERIES WITH SIG. GEN. | ANTENNA TERMINAL | 465 KC. | BROADCAST (CLOCKWISE) | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 2ND I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | | 3-4 | 1ST I.F. | |
| .1 MFD. CONDENSER | CONTROL GRID OF 6L7-G TUBE | 465 KC. | BROADCAST (CLOCKWISE) | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 465 KC. | BROADCAST (CLOCKWISE) | 1500 KC. | 6 | BROADCAST OSCILLATOR (SHUNT) | ADJUST FOR MAXIMUM OUTPUT. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1500 KC. | BROADCAST (CLOCKWISE) | 1500 KC. | 7 | BROADCAST R. F. | ADJUST FOR MAXIMUM OUTPUT. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1500 KC. | BROADCAST (CLOCKWISE) | TUNE TO 1500 KC. GENERATOR SIGNAL | 8 | BROADCAST ANTENNA | |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 600 KC. | BROADCAST (CLOCKWISE) | TUNE TO 600 KC. GENERATOR SIGNAL | 9 | BROADCAST OSCILLATOR (SERIES PAD) | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 6 MC. | INTERMEDIATE (CENTER) | 6 MC. | 10 | INTERMEDIATE (POLICE) OSCILLATOR (SHUNT) | ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 6 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 6 MC. | INTERMEDIATE (CENTER) | TUNE TO 6 MC. GENERATOR SIGNAL | 11 | INTERMEDIATE R. F. | ADJUST FOR MAXIMUM OUTPUT |
| | | | | | 12 | INTERMEDIATE ANTENNA | |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 20 MC. | FOREIGN (COUNTER-CLOCKWISE) | 20 MC. | 13 | FOREIGN OSCILLATOR (SHUNT) | ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 19.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 20 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 20 MC. | FOREIGN (COUNTER-CLOCKWISE) | TUNE TO 20 MC GENERATOR SIGNAL | 14 | FOREIGN R. F. | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| | | | | | 15 | FOREIGN ANTENNA | |




BROADCAST ANTENNA COIL | BROADCAST R.F. COIL | BROADCAST OSCILLATOR COIL | INTERMEDIATE ANTENNA COIL | INTERMEDIATE R.F. COIL | INTERMEDIATE OSCILLATOR COIL | FOREIGN ANTENNA COIL

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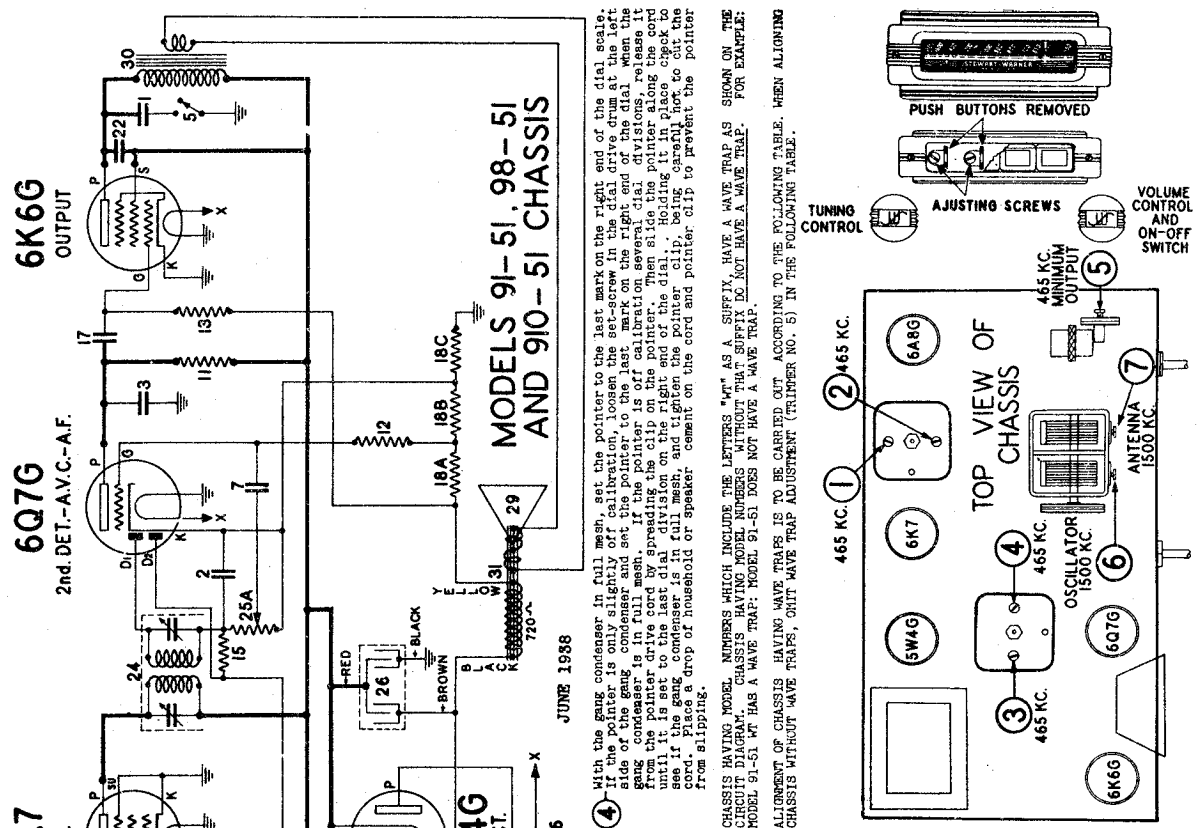
910-511 to 910-519 STEWART-WARNER CORP. MODELS 91-511 to 91-519
Chassis 910-51. Chassis 91-51
98-511 to 98-519
Schematic, Trimmers, Alignment Chassis 98-51







## ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil on between the plate of the 6K6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial. When the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

CHASSIS HAVING MODEL NUMBERS WHICH INCLUDE THE LETTERS "WT" AS A SUFFIX, HAVE A WAVE TRAP AS SHOWN ON THE CIRCUIT DIAGRAM. CHASSIS HAVING MODEL NUMBERS WITHOUT THAT SUFFIX DO NOT HAVE A WAVE TRAP. FOR EXAMPLE: MODEL 91-51 WT HAS A WAVE TRAP: MODEL 91-51 DOES NOT HAVE A WAVE TRAP.

ALIGNMENT OF CHASSIS HAVING WAVE TRAPS IS TO BE CARRIED OUT ACCORDING TO THE FOLLOWING TABLE. WHEN ALIGNING CHASSIS WITHOUT WAVE TRAPS, OMIT WAVE TRAP ADJUSTMENT (TRIMMER NO. 5) IN THE FOLLOWING TABLE.

| DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|
| .1 MFD. CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 1st I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | 3-4 | 2nd I.F. | |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 1500 KC | 1500 KC | 6 | BROADCAST OSCILLATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 1500 KC | TUNE TO 1500 KC GENERATOR SIGNAL | 7 | BROADCAST ANTENNA (Shunt) | ADJUST FOR MAXIMM OUTPUT. |

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MODELS 91-511 to 91-519
98-511 to 98-519
910-511 to 910-519

MODELS 97-521 to 97-529

# STEWART-WARNER CORP. Tuner, Drive Cord Data

## Voltage, Socket, Tuner, Drive Cord

| Chassis Model | Used In Receiver Models | Voltage | Frequency |
|---|---|---|---|
| 91-51 | 91-511 to 91-519 | 117 | 60 cycles |
| 98-51 | 98-511 to 98-519 | 117 | 25 cycles |
| 910-51 | 910-511 to 910-519 | 100-240 | 50-133 |

These chassis are 5 tube, single band push-button tuning superheterodyne receivers. The tuning range is 540 to 1725 KC. The intermediate frequency is 465 KC.

Incorporated in each chassis is a four-button mechanical push-button tuner unit. These push buttons may be set to any station desired by the method described below under "How To Set Up The Push-Button Tuner".

The accuracy of tuning when using the push-button tuner, depends to a large extent upon the amount of "play" in the moving parts of this system. In cases where slight inaccuracy in tuning occurs check the following points:

1. Check to see that the button is correctly set to the station. If not, reset the button.
2. The tension must be maintained between the two sections of the anti back-lash gear on the left side of the unit in order that it functions properly--both anti back-lash springs must be in place in the gear and compressed slightly.
3. Note the small adjusting lug over the push-button shafts at the point where they slide into the tuner. The lug is held in place by a hex-head screw. These lugs should be adjusted for a minimum amount of "play". In other words the push-button shaft must have a minimum of movement in a vertical direction.

### HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that your set is connected to a good antenna system.
2. Turn on the set and allow it to operate at least one-quarter hour before setting up the push buttons.
3. Select the four nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Any button may be set to any desired station.
4. Pull off the entire button cap by grasping the button and pulling outward on it. When the button is removed, a round head adjusting screw will be exposed to view.
5. Insert a screw-driver in this screw and loosen it (about one turn counter-clockwise will be sufficient).
6. Keeping the screw-driver in the screw slot, PUSH AGAINST THE SCREW-DRIVER UNTIL THE PUSH BUTTON IS FORCED ALL THE WAY IN. While the button is held in this position, grasp the tuning knob and tune in the desired station. Then retighten the adjusting screw, turning clockwise until reasonably tight.

   WARNING: Do not attempt to turn the screw until it reaches a definite stop. Merely turn until you meet with appreciable resistance. To turn further may result in damage to the mechanism.
7. The set-up for this button is now complete. Replace the push button by pushing it on firmly.
8. Set up the three remaining buttons in a similar manner.
9. Label each button with the call letters of the stations you have selected, using the call letter tabs and the celluloid covers packed with your receiver. The printed paper tab should be inserted in the button by holding the ends and flexing it slightly, allowing it to snap into place. The celluloid cover tab should be flexed in a similar manner and placed on top of the paper tab.
10. To use your push-button tuner it is only necessary for you to push in the button labeled with the call-letters of the desired station. Be sure that you push button all the way in.

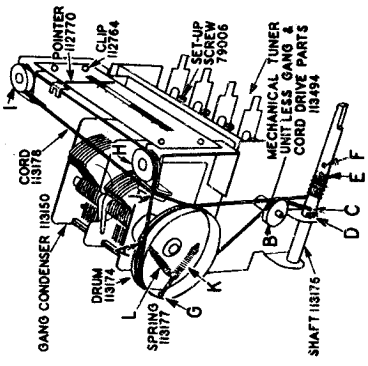


FIG. 1

### HOW TO REPLACE THE DIAL CORD

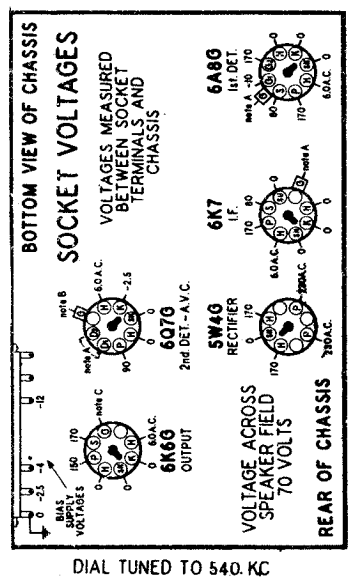
TO THREAD THE GANG CONDENSER DRIVE CORD PROCEED AS FOLLOWS:

1. Close the gang condenser and thread one end of the cord through eyelet G.
2. Carry the other end of the cord over the drum to the front around pulley H and then across to pulley I and counter-clockwise around it.
3. Continue back to pulley J and down the front of the drum.
4. Carry the end of the cord on around the drum and thread eyelet G.
5. Tie both ends extending through eyelet G to tension spring K. In so doing, allow enough slack in the cord so that when spring K is hooked in place in the drum, it will be extended only a very little. If the spring is extended too much, it will tend to make the push-buttons operate too hard because of overloading.
6. Set the dial pointer to the last dial division mark on the right and pull it into the cord. Be sure the gang condenser is closed before clipping the pointer to the cord.)

TO THREAD THE DIAL POINTER DRIVE CORD PROCEED AS FOLLOWS:

1. Close the gang condenser and thread one end of the cord through eyelet G.
2. Carry the other end of the cord over the drum to the front around pulley H and then across to pulley I and counter-clockwise around it.
3. Continue back to pulley J and down the front of the drum.
4. Carry the end of the cord on around the drum and thread eyelet G.
5. Tie both ends extending through eyelet G to tension spring K. In so doing, allow enough slack in the cord so that when spring K is hooked in place in the drum, it will be extended only a very little. If the spring is extended too much, it will tend to make the push-buttons operate too hard because of overloading.
6. Set the dial pointer to the last dial division mark on the right and pull it into the cord. Be sure the gang condenser is closed before clipping the pointer to the cord.

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1 | 83007 | Condenser - paper .02 mfd. 600 V. |
| 2-3 | 83539 | Condenser - mica 260 mmfd. |
| 4 | 85061 | Condenser - mica 51 mmfd. |
| 5 | 88054 | Switch - Tone Control |
| 6-7 | 68189 | Condenser - paper .05 mfd. 200 V. |
| 8 | 88191 | Condenser - paper .1 mfd. 300 V. |
| 9 | 110510 | Condenser - wire 3 mmfd. |
| 10 | 110552 | Resistor - carb. 47,000 ohms ½ W. |
| 11 | 110553 | Resistor - carb. 220,000 ohms ½ W. |
| 12 | 110554 | Resistor - carb. 1 meg. 1/4 watt |
| 13 | 110559 | Resistor - carb. 470,000 ohm ½ W. |
| 14 | 110565 | Resistor - carb. 33,000 ohms ½ W. |
| 15 | 110580 | Resistor - carb. 3.3 meg. 1/4 W. |
| 16 | 110629 | Lamp - 6.3 volt - .25 amps. |
| 17 | 111252 | Condenser - paper .05 mfd. 400 V. |
| 18A - 18C | 112740 | Resistor - Wire Wound (Section A - 217 ohms) (Section B - 43 ohms) (Section C - 68 ohms) |
| 19 | 112751 | Transformer - Power 117 V. 60 C. |
| | 113532 | Transformer - Power 117 V. 25 C. |
| | 113523 | Transformer - Power 100 to 240 volt 50 to 133 cycles |
| 20 | 112796 | Coil - Wave trap (with trimmer) |
| 21 | 112803 | Transformer - 1st I.F. |
| 22 | 113035 | Condenser - ceramic tube .006 mfd. 600 volt |
| 23 | 113042 | Coil - oscillator |
| 24 | 113047 | Transformer - 2nd I.F. |
| 25A - 25B | 113049 | Volume Control - 500,000 ohms with off-on switch |
| 26 | 113096 | Condenser - elect. 8-8 mfd. 350 V. |
| | 113536 | Condenser - elect. dual 8-8 mfd. 350 volt (for model 910-51 only) |
| 27 | 113097 | Coil - Antenna |
| 28A - 28B | 113150 | Condenser - variable gang |
| 29 | U-113239 | Cone - voice coil assembly for U-115008 Spkr. |
| 30 | U-113240 | Transformer - output for U-115008 speaker |
| 31 | U-115008 | Speaker - Dynamic (5 inch) |
| 2694 | | Screw-wood chassis mtg. #8 X 5/8" (models 91-513; 98-513 & 910-513) - Per C |
| 77223 | | Washer - Chassis mtg. (for models 910-513; 98-513; 91-513) |
| 79006 | | Screw - #6-32 X 7/8 Fil. Hd. Mach. (for setting up push button - Per C |
| 81145 | | Retaining Ring - for drive shaft - Per C |
| 85040 | | Screw - #6 Hex. Hd. for mtg. adjusting washer - Per C |
| 85299 | | Screw - chassis mtg. #10 X 3/8" (for models 910-513; 98-513 & 91-513 |
| 85427 | | Socket - octal base (standard) - Per doz. |
| 85815 | | Spring - between gear sections |
| 88348 | | Eyelet - for dial cord - Per doz. |
| 89746 | | Washer - (paper) for back of knobs |
| 110829 | | Washer - flat steel, for mtg. chassis |
| 112745 | | Clip - coil mtg. (osc. & ant.) |
| 112762 | | Pulley - dial cord drive (at left side) |
| 112764 | | Clip - dial scale retaining |
| 112765 | | Scale - dial |
| 112770 | | Pointer - dial |
| 112776 | | Celluloid cover - over dial face |
| 112798 | | Clip - for mtg. wave trap coil |
| 112771 | | Cup Washer for mtg. models 91-513; 98-513 & 910-513 |
| 112872 | | Screw - chassis mtg. #8 X 1½ O.H. (models 98-513; 910-513 & 91-513) |
| 112874 | | Screw - #10 X 1-1/8 chassis mtg. |
| 112878 | | Screw - escutcheon mtg. #2 X 3/8 (models 91-514; 98-514, 910-514) |
| 112879 | | Screw - escutcheon mtg. #2 X 3/8 |
| 112914 | | Escutcheon - dial |
| 113022 | | Knob - Round Volume or Tuning |
| 113025 | | Socket - octal base (with special ground) |
| 113052 | | Escutcheon - for dial (models 91-514; 98-514 & 910-514) |
| 113053 | | Escutcheon - for push buttons |
| 113054 | | Escutcheon - for push buttons (models 91-514; 98-514 & 910-514) |
| 113093 | | Socket - for dial lamp |
| 113103 | | Push Button |
| 113124 | | Speaker Grille Bar - (chrome plate) (for models 91-514; 98-514 & 910-514) |
| 113125 | | Speaker Grille Support Track (for models 91-514; 98-514 & 910-514) |
| 113136 | | Knob - octagon - volume or tuning |
| 113156 | | Gear - & bushing assembly for dial drive |
| 113169 | | Spring - for key return |
| 113170 | | Adjusting lug - for button shafts |
| 113171 | | Bracket - for dial & condenser mtg. |
| 113174 | | Dial Drum - and pinion assembly |
| 113176 | | Shaft - dial drive |
| 113177 | | Spring - dial cord tension |
| 113178 | | Cord - for dial drive (38" req.) supplied in 4 ft. lengths |
| 113189 | | Tab - celluloid - for push button - Per doz. |
| 113232 | | Mtg. plate - for spade models 91-513; 98-513 & 910-513 |
| 113321 | | Tabs - station call letters (4 sheets) (brown) - Per set |
| 113322 | | Tabs - station call letters (4 sheets) (black) - Per set |
| 113494 | | Mechanical Tuner assembly - keys and housing only |




DIAL TUNED TO 540 KC
ANTENNA GROUNDED

Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6K7, and the diode plates of the 6Q7-G tubes is -2.5 volts measured across resistor 18C.

NOTE B: The bias for the control grid of the triode section of the 6Q7-G is -4 volts measured across resistors 18B and 18C.

NOTE C: The bias for the control grid of the 6K6-G output tubes is -12 volts measured across resistors 18A, 18B and 18C.

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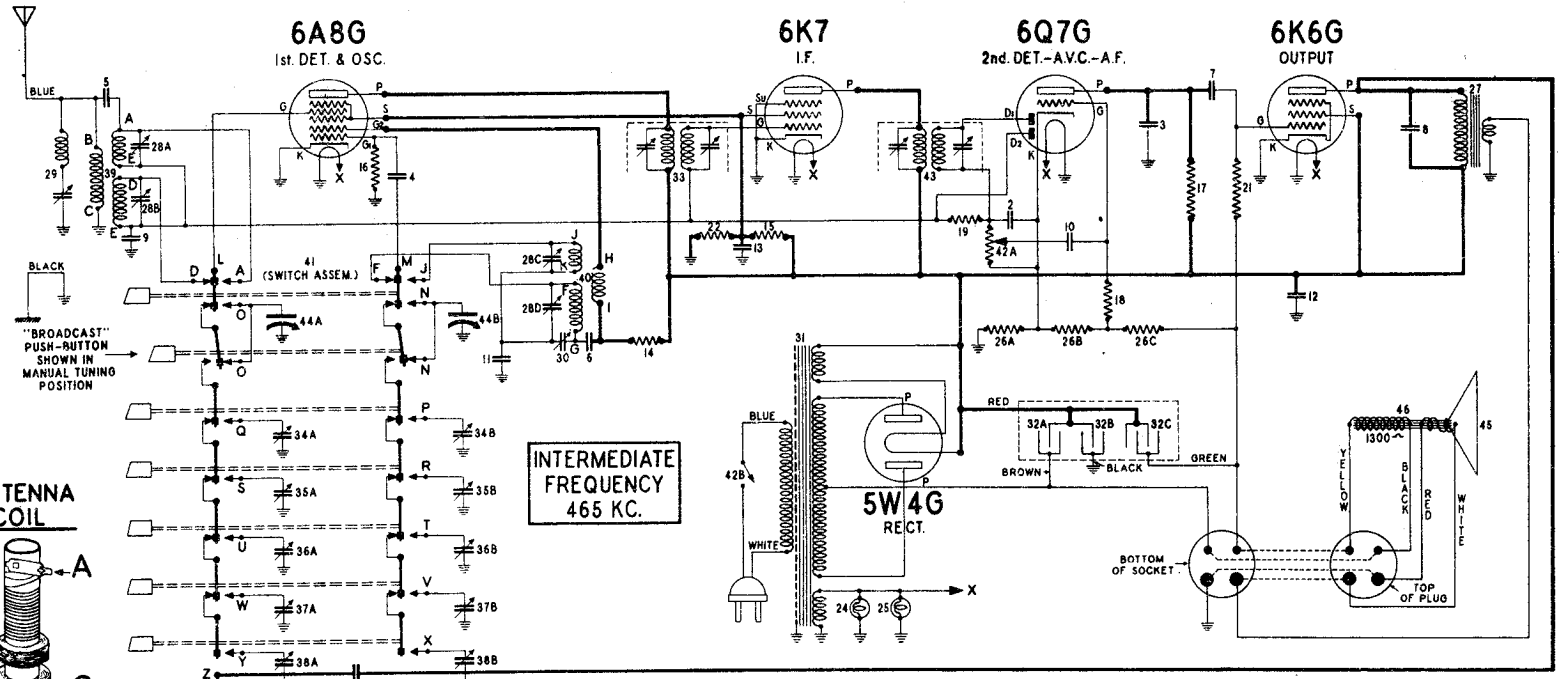
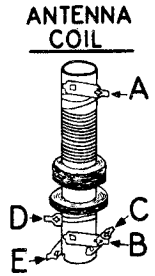
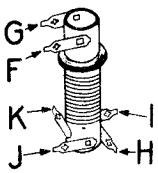
910-531 to 910-539
Chassis 910-53
Schematic, Voltage, Socket
Tuner Switch, Coils

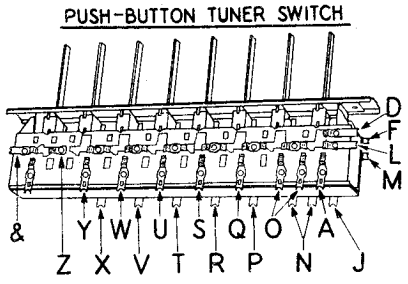
# STEWART-WARNER CORP.

MODELS 91-531 to 91-539
Chassis 91-53
98-531 to 98-539
Chassis 98-53



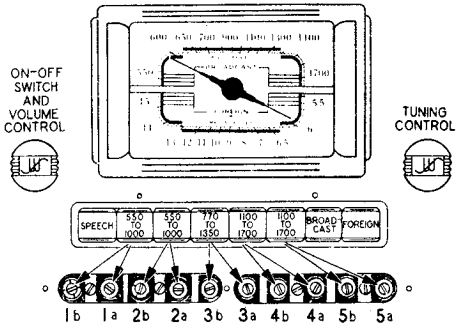



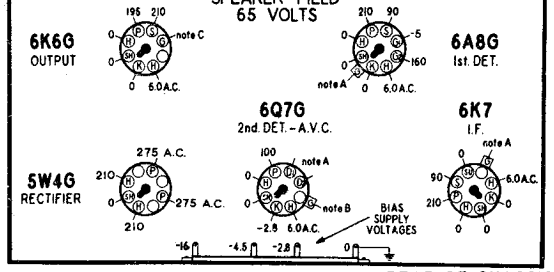

FIG.1

## SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 530 KC.

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

VOLTAGE ACROSS SPEAKER FIELD 65 VOLTS




Use a high resistance voltmeter of 1000 ohms per volt. **REAR OF CHASSIS**

NOTE A: The bias for the control grids of the 6A8-G, 6K7, and the diode plates of the 6Q7-G tubes is -2.8 volts measured across resistor 26A.

NOTE B: The bias for the control grid of the triode section of the 6Q7-G is -4.5 volts measured across resistors 26A and 26B.

NOTE C: The bias for the control grid of the 6K6-G output tubes is -16 volts measured across resistors 26A, 26B and 26C.

## NOTE

TERMINALS OF SWITCH AND COILS SHOWN IN PICTORIAL VIEWS ABOVE, ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM AT THE RIGHT. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.

# 91-53, 98-53 AND 910-53 CHASSIS

JUNE 1938

MODELS 91-531 to 91-539
Chassis 91-53
98-531 to 98-539
Chassis 98-53
910-531 to 910-539
Chassis 910-53
Alignment, Trimmers

# STEWART-WARNER CORP.

| Chassis Model | Used In Receiver Models | Voltage | Frequency |
|---|---|---|---|
| 91-53 | 91-531 to 91-539 | 117 | 60 cycles |
| 98-53 | 98-531 to 98-539 | 117 | 25 cycles |
| 910-53 | 910-531 to 910-539 | 100-240 | 50-133 |

These chassis are 5-tube, two band, push-button tuning superheterodyne receivers. The tuning ranges are 540 to 1725 KC and 5.4 to 15.4 MC. The I. F. is 465 KC.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

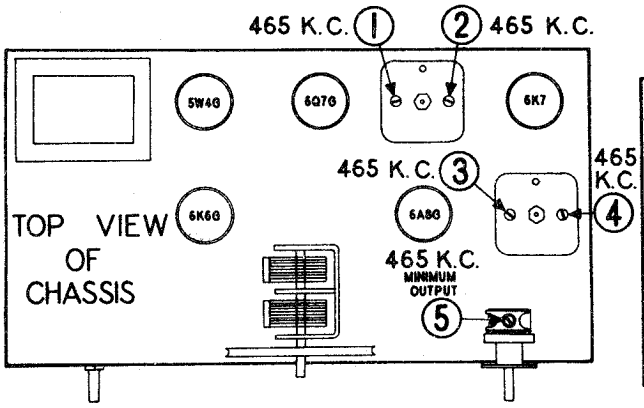
(1) Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

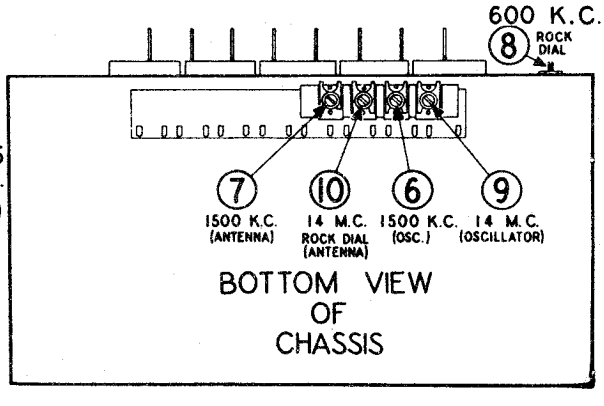
(2) Connect the ground lead of the signal generator to the black (ground) wire or the chassis.

(3) Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

(4) With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

| DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | BROADCAST BUTTON PUSHED IN | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 2nd I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | | 3-4 | 1st I.F. | |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 465 KC | BROADCAST BUTTON PUSHED IN | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 1500 KC | BROADCAST BUTTON PUSHED IN | 1500 KC | 6 | BROADCAST OSCILLATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 1500 KC | BROADCAST BUTTON PUSHED IN | TUNE TO 1500 KC GENERATOR SIGNAL | 7 | BROADCAST ANTENNA | ADJUST FOR MAXIMUM OUTPUT. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 600 KC | BROADCAST BUTTON PUSHED IN | TUNE TO 600 KC GENERATOR SIGNAL | 8 | BROADCAST OSCILLATOR (Series Pad) | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 14 MC | FOREIGN BUTTON PUSHED IN | 14 MC | 9 | FOREIGN OSCILLATOR (Shunt) | ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 14 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 14 MC | FOREIGN BUTTON PUSHED IN | 14 MC | 10 | FOREIGN ANTENNA | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |

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## HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that the set is connected to a good antenna system.

2. Turn on the set and allow it to operate for at least one-half hour before setting up the push buttons.

3. Make a list of the five nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS, as indicated in Fig. 1.

Each of the buttons on the Push-Button Tuner has a definite operating range, as shown in Fig. 1; therefore, it is imperative that you select a station which is in the operating range of a button before attempting to set up that button for the particular station. AS THE TRIMMER SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER BUTTON BE SELECTED. For example, suppose you want to set a button to station WLW whose frequency is 700 KC. Refer to Fig. 1 which shows that this frequency falls within the operating range of buttons No. 1 and No. 2 whose range is 550 to 1000 KC. Therefore, either of these buttons may be set to WLW.

4. Remove the escutcheon surrounding the push-buttons by taking out the five screws holding it to the cabinet. This will expose to view ten trimmer adjustment screws each pair of which is used to set a button for a station.

5. Push in the button which is labelled "Broadcast" and use the tuning knob to bring in the station that you desire on button No. 1. This is done so that you may identify the station by hearing its program.

6. Push in button No. 1 (See Fig. 1). You will note that when this button is pushed in, your station will probably not be heard. Using a small screw - driver, insert it in the second screw from the left (oscillator trimmer No. 1a, Fig. 1). Rotate the screw SLOWLY until the program that you have previously tuned in manually is again heard. If it cannot be heard, advance the volume control. BE SURE THAT YOU ADJUST THIS PARTICULAR TRIMMER SCREW (1a) TO THE POINT WHERE THE STATION IS HEARD WITH THE LEAST HISS OR DISTORTION AND NOT TO THE POINT OF GREATEST VOLUME. It is advisable that you turn the trimmer screw in and out so that it will tune across the station several times, in order that you may be sure that you have located this correct point. Now insert the screw-driver in the first trimmer screw on the left (antenna trimmer No. 1b, Fig. 1). Adjust this screw until the program is received with the maximum volume. Reduce the volume as necessary. Now go back to trimmer screw No. 1a and see if any improvement in reception can be made by adjusting it. Also repeat this operation for trimmer screw No. 1b.

NOTE: Trimmer screws indicated by letter "a" are oscillator trimmers. Trimmer screws indicated by letter "b" are antenna trimmers.

In some instances it may be found necessary after the set has been operated for a month or more, to readjust the push-button trimmers to compensate for a slight drift due to extreme climatic changes.

## HOW TO CHANGE THE OPERATING RANGE OF A BUTTON

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

| Part Number | Tuning Range | List Price |
|---|---|---|
| 112942 | 1100 to 1700 KC. | $ 0.36 |
| 112943 | 770 to 1350 KC. | .45 |
| 112944 | 550 to 1000 KC. | .50 |

To make the change proceed as follows:

1. Remove the chassis from the cabinet.

2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.

3. Unsolder the leads from the four terminals on the back of this dual trimmer.

4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.

5. From the above list select a dual trimmer which will cover the desired range.

6. Mount it on the front of the chassis with the 6/32 machine screw, and solder the leads to its four terminals.

The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

7. Set up button No. 2 for the selected station in a similar manner, using trimmer screws No. 2a and No. 2b. Proceed to set the remaining buttons in the same manner.

8. Label each button with the call letters of the stations you have selected, using the call letter tabs and the celluloid covers packed with the receiver. The printed paper tab should be inserted in the button by holding the ends and flexing it slightly, allowing it to snap into place. The celluloid cover tab should be flexed in a similar manner and placed on top of the paper tab.

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 83217 | Condenser - paper .04 mfd. 600 volt | .35 |
| 2-3 | 83539 | Condenser - mica 260 mmfd. | .20 |
| 4 | 85061 | Condenser - mica 51 mmfd. | .15 |
| 5 | 85454 | Condenser - mica 11 mmf. | .15 |
| 6-7 | 88030 | Condenser - paper .01 mfd. 400 volt | .25 |
| 8 | 88185 | Condenser - ceramic tube .006 mfd. 600 volt | .25 |
| 9-10 | 88189 | Condenser - paper .05 mfd. 200 volt | .25 |
| 11 | 88587 | Condenser - mica .0042 mfd. | .35 |
| 12 | 88682 | Condenser - paper .1 mfd. 400 volt | .25 |
| 13 | 89421 | Condenser - paper .1 mfd. 200 volt | .25 |
| 14 | 110550 | Resistor - carbon 10,000 ohms ½ W. | .15 |
| 15 | 110551 | Resistor - carbon 15,000 ohms 1 W. | .15 |
| 16 | 110552 | Resistor - carbon 47,000 ohms ½ W. | .12 |
| 17 | 110553 | Resistor - carbon 220,000 ohms ½ W. | .12 |
| 18-19 | 110554 | Resistor - carbon 1 meg. 1/4 watt | .12 |
| 21 | 110559 | Resistor - carbon 470,000 ohms ½ W. | .12 |
| 22 | 110562 | Resistor - carbon 22,000 ohms ½ W. | .12 |
| 24-25 | 110629 | Lamp - 6.3 volt - .25 amps. | .15 |
| 26A - 26B 26C | 112789 | Resistor - (Section A - 55 ohms) (Section B - 30 ohms) (Section C - 240 ohms) | .40 |
| 27 | 112790 | Transformer - output | 1.26 |
| 28A - 28B 28C - 28D | 112792 | Condenser - trimmer (4 section) | .60 |
| 29 | 112796 | Coil - wave trap (with trimmer) | .50 |
| 30 | 112799 | Condenser - padder (530-630 mmfd.) | .36 |
| 31 | 112800 | Transformer - power 117 V. 50-60 C. | 3.40 |
| | 112823 | Transformer - power 100-240 volt - 50-133 cycle | 6.50 |
| | 112836 | Transformer - power 117 V, 25 cycle | 5.00 |
| 32A - 32C | 112802 | Condenser - electrolytic (dry) (Section A - 8 mfd. 400 volt) (Section B - 4 mfd. 400 volt) (Section C - 4 mfd. 400 volt) | 1.80 |
| 33 | 112803 | Transformer - 1st I.F. | 1.20 |
| 34A - 34B 35A - 35B | 112942 | Condenser - dual push button trimmer (1100 KC to 1700 KC) | .36 |
| 36A - 36B | 112943 | Condenser - dual push button trimmer (770 KC to 1350 KC) | .45 |
| 37A - 37B 38A - 38B | 112944 | Condenser - dual push button trimmer (550 KC to 1000 KC) | .50 |
| 39 | 113011 | Coil - ant. - broadcast-short-wave | 1.20 |
| 40 | 113015 | Coil Assembly - oscillator | 1.00 |
| 41 | 113021 | Push Button Switch Assembly | 4.20 |
| 42A - 42B | 113024 | Volume Control (500,000 ohm) (with switch) | .80 |
| 43 | 113047 | Transformer - 2nd I.F. | 1.10 |
| 44A - 44B | 113126 | Condenser - variable gang | 2.50 |
| 45 | R-113243 | Cone - voice coil assembly for R-115009 speaker | 1.50 |
| | U-113344 | Cone - voice coil assembly for U-115015 speaker | 1.80 |
| 46 | R-115009 | Speaker - dynamic (6 inch) | 3.50 |
| | U-115015 | Speaker - dynamic (8 inch) | 6.00 |

| PART NUMBER | DESCRIPTION | |
|---|---|---|
| 81145 | Retaining Ring - for drive shaft---Per C | .50 |
| 85040 | Screw - #6 Hex. Head (self-tapping)-Per C | .35 |
| 85427 | Socket - octal base | .15 |
| 89746 | Washer - (paper) for back of knobs | .005 |
| 110496 | Plug - speaker (4 prong) | .12 |
| 110501 | Socket - 4 prong (for speaker) | .16 |
| 110829 | Washer - flat steel, for mtg. chassis | .01 |
| 111302 | Cord - dial drive 6 or 50 ft.lgths.Per Ft. | .05 |
| 111357 | Spring - drive cord tension | .03 |
| 111855 | Shield Base - for tube shields | .02 |
| 112233 | Drum and Bushing - for dial drive | .35 |
| 112745 | Clip - coil mounting (osc. & ant.) | .01 |
| 112747 | Nut - #6-32 Hex. | .01 |
| 112786 | Scale - dial | .68 |
| 112874 | Screw #10 X 1-1/8 Chassis Mtg. | .01 |
| 112945 | Shaft - tuning | .10 |
| 113019 | Clip - dial scale retaining | .01 |
| 113022 | Knob - for controls | .10 |
| 113025 | Socket - octal base (with special ground) | .15 |
| 113030 | Escutcheon - dial | 1.24 |
| 113039 | Dial - mtg. plate and bracket | .38 |
| 113040 | Light Shield - cardboard (between button holes and dial frame) | .06 |
| 113077 | Shield - tube | .15 |
| 113102 | Push Button - only | .08 |
| 113106 | Escutcheon Plate - for trimmer screws | .84 |
| 113114 | Pointer - dial | .12 |
| 113144 | Socket - for dial lamp | .22 |
| 113189 | Tab - celluloid - for push button-Per doz. | .09 |
| 113321 | Tabs - station call letters (4 sheets) (brown) | .40 |
| 113323 | Tab - trimmer range (550 to 1000)Per doz. | .09 |
| 113324 | Tab - trimmer range (770 to 1350)Per doz. | .09 |
| 113325 | Tab - trimmer range(1100 to 1700)Per doz. | .09 |
| 113326 | Tab - "Speech"---Per doz. | .09 |
| 113327 | Tab - "Broadcast"---Per doz. | .09 |
| 113328 | Tab - "Foreign"---Per doz. | .09 |
| 113544 | Screws - escutcheon mtg. #2 X 3/8 | .03 |
| 113545 | Screws - P.B. escutcheon mtg. #3 X 3/8 | .01 |
| 113556 | Shield - for pilot light | .07 |

MODELS 1471 to 1479
Chassis R-147
MODELS 1481 to 1489
Chassis R-148
Hum Elimination

# STEWART-WARNER CORP.

1937 Models
Speaker Cone Replacements

HUM ELIMINATION IN THE MODEL R-147 CHASSIS November 28, 1936

FOR RESIDUAL HUM: (Between-station hum)

1. Remove the .5 mfd. condense , part number 88990, connected from chassis, to the mounting nut of the ..put electrolytic condenser (the one nearest the power transformer). Replace the .5 mfd. condenser with a 10 mfd. 25 volt electrolytic condenser, our part number 89053. The positive terminal of this condenser must be connected to the chassis. This change should always be made in combination with the following one, since either change may increase the hum if made alone.
2. Locate the 210,000 ohm resistor connected from the plate of the 6C6 tube to one of the 5Z4 socket terminals.
   (a) Disconnect the end of this resistor going to the 5Z4 socket.
   (b) Connect the added 51,000 ohm resistor in series with the disconnected end of the above 210,000 ohm resistor and the lug on the 5Z4 socket from which it was unsoldered.
   (c) Connect the added .25 mfd. condenser from chassis to the junction of the above two resistors.
3. Remove the twisted green and brown wires connecting to the tone control and replace them with the shielded twisted pair supplied by Stewart-Warner. Ground the shield at both ends. Route the shielded wire so that the shielding does not ground the mounting nut on the electrolytic condenser nearest the power transformer.
4. Separate the single green volume control wire from the power transformer and the A.C. leads.
5. In all cases of either residual or modulation hum, tighten down the power transformer mounting screws after the set is hot.
6. Early production sets did not have the resistance-capacity filter consisting of the 260,000 ohm resistor and the .1 mfd. condenser in the grid circuit of the 6F5 . In these early sets a 1.1 megohm resistor was connected from the 6F5 grid to the bias resistor network. The later sets used a 760,000 ohm resistor connected from the grid to the filter resistor and condenser. If you are working on any of the early sets which do not have the filter, you should add a 260,000 ohm, 1/4 watt resistor in series with the end of the 1.1 megohm grid resistor which connects to the bias network. Then connect a .1 mfd., 150 volt condenser from chassis to the junction of the 260,000 ohm and 1.1 megohm resistors.

FOR MODULATION HUM: (On stations only ) - Make this change even though no modulation hum is heard in the shop.

1. Replace the .1 mfd. screen-grid by-pass condenser, diagram No. 28, connected to the 6A8 socket with the .5 mfd., 150 volt by-pass condenser, part number 88990 which was disconnected from the mounting nut of the input electrolytic condenser.

IMPORTANT

If there is still too much hum after making the above changes be sure to check for defective tubes.

The following material is required for this work:

1 - 89532 - .25 mfd. 200 volt Tubular Paper Condenser
1 - 89053 - 10 mfd., 25 volt Electrolytic Condenser
1 - 83080 - 51,000 ohm 1/4 watt Carbon Resistor
1 - Special Shielded Tone Control Cable

HUM ELIMINATION IN THE MODEL R-148 CHASSIS December 4, 1936

FOR MODULATION HUM: (On stations only) Make this change even though no modulation hum is heard in the shop.

1. Remove the .1 mfd., 150 volt condenser connected to the screen grid circuit of the 6K7 R.F. tube.
2. Replace it with a .5 mfd., 150 volt paper condenser, our part number 88990.

FOR RESIDUAL HUM: (Between-station hum)

1. Locate the red-blue wire running from the 5V4G socket heater terminal to the speaker socket.
   (a) Disconnect one end of the wire and re-route the wire along the back of the chassis so that it is at least two inches above the 6H6 and 6C5 sockets when the chassis is upside down. Re-connect the wire.
2. The blue and black twisted wire supplied by Stewart-Warner should be placed along the front of the chassis so it can be used to connect the heater terminals of the 6K7 R.F. and the 6L6 sockets. First connect the black wire to the grounded heater terminal of the 6K7 R.F. socket (the heater terminal near the front of the chassis) and the blue wire to the hot heater terminal of the same socket. The other end of the black wire must be connected to the grounded heater terminal of the 6L6 nearest the front of the chassis and the other end of the blue wire must be connected to the hot heater terminal of the other 6L6 socket (the one nearest the 6C5).
3. Remove the input audio transformer mounting screw nearest the front of the set. Rotate the transformer around its other mounting screw until the free end is toward the rear of the chassis. There is a hole in the chassis at the proper point to mount the transformer by means of the small machine screw, lock-washer and nut. Pull the transformer leads away from the tube sockets. Sometimes an intermediate position of the transformer will result in less hum but this necessitates drilling either one or two new mounting holes.
4. Tighten down the power transformer mounting bolts preferably when the set is hot.

SPEAKER CONE REPLACEMENT IN 1937 RADIO MODELS

We can now supply replacement cones which can be installed without special tools in all 1936-1937 Stewart-Warner speakers including staked spider models with the exception of some of the small five inch speakers. In describing the replacement of the cones we are dividing the various speaker models into three general groups as follows:

(A) - 8 and 12 INCH SPEAKERS WITH SPIDERS STAKED TO THE POLE PIECE

In order to facilitate the replacement of the cones in our 8 and 12 inch speakers with the spiders staked to the center of the pole piece, we will furnish special cones which can be installed without any special tools or equipment as described under "INSTALLING NEW CONES".

These cones have spiders fastened to the outside of the voice coils. The spiders are mounted on the speaker shells by means of screws. The necessary holes are already punched in the shell. The special cones are supplied complete with the necessary gaskets and mounting hardware under the part numbers in the table shown on page two of this bulletin.

(B) - SPEAKERS HAVING SPIDERS MOUNTED WITH SCREWS

The cones in these speakers can be replaced in the conventional manner as described later in this bulletin under "INSTALLING NEW CONES". The correct part numbers are tabulated below.

(C) - FIVE INCH SPEAKERS WITH SPIDERS STAKED TO THE POLE PIECE

Speakers in this group cannot be satisfactorily repaired without special equipment and therefore must be returned to the factory for repair. If the cone is damaged or if the speaker is out of the warranty the cost of replacing the cone will be the price of the cone plus a fifty cent labor charge. We will assume no transportation charges under these conditions.

INSTRUCTIONS FOR INSTALLING NEW CONES

1. In staked spider models cut the old cone around the outer edge and break the spider away from the washer under which it is mounted. This washer should be left in place. In models having the spider fastened with screws, remove the screws and then cut out the cone around the outer edge. Remove the cone, voice coil and spider assembly and clean away all traces of the old cone and cement where the cone was cemented to the frame.
2. Clean any particles from the air gap.
3. Spread an even coat of quick drying household or speaker cement over the face of the speaker frame. If two complete cardboard gaskets are packed with the cone put the thin one on the frame and cover it with cement. If only one complete gasket is enclosed it should be applied later as described in paragraph 8.
4. Set the replacement cone in place with the voice coil in the air gap. Make sure that the holes in the spider mounting line up with the holes in the speaker shell.
5. (a) In the R-247-A, R-258-D and R-266-A speakers, place the small spacing bushings between the spider and the shell. Insert the screws through the shell, spacers and spider, then put on the lock washers and screw the nuts on loosely.
   (b) In other speakers place the small brackets, Part No. 89028, over the spider mounting bracket with the ends in the slots in the shell, and place the mounting screws through the holes in the shell and screw them into the brackets. Leave the screws loose.
6. Insert three or four thin shims in the inside air gap to keep the voice coil centered.
7. Firmly press down the edges of the cone.
8. Cement the thick cardboard gasket to the edge of the cone, then lay the speaker on its face until the cement is thoroughly dry.
9. Tighten the spider mounting screws, and then remove the thin shims from the air gap.
10. Make sure that the voice coil is centered by pressing in on the cone near the outer edge and listening for evidence of rubbing. If the voice coil is rubbing, the spider mounting screws should be loosened and the voice coil centered so it does not rub.
11. Solder the flexible voice coil leads to the proper terminals.

REPLACEMENT CONE PART NUMBERS

(FOR ALL 1936-1937 SPEAKER MODELS)

| Speaker Model | Receiver Model | Replacement Cone part number | List Price of Replacement Cone |
|---|---|---|---|
| R-234-D..... | 1611D, 1621D..... | Magnetic - Replace speaker | |
| R-235-D..... | 1625D..... | Magnetic - Replace speaker | |
| R-243-A..... | 1421.. | (Early production-spider fastened with screw, order cone #88100) (Late production-with staked spider-return to factory for repair) | |
| R-244-A..... | 1425..... | 88133..... | 2.00 |
| R-245-A..... | 1601..... | 88328..... | 2.10 |
| R-246-A..... | 1441, 1671..... | Return to factory for repair | |
| R-247-A..... | 1451, 1461, 1696, 1721, & 1731.... | 110433..... | 1.35 |
| R-248-A..... | 1455, 1465, 1725, 1735..... | 110461..... | 2.60 |
| R-253-A..... | 1475, 1705, 1709..... | 110461..... | 2.60 |
| R-254-A..... | 1485..... | 89014..... | 2.25 |
| R-255-A..... | 1495..... | 89167..... | 2.50 |
| R-256-A..... | 1495..... | 89193..... | 2.40 |
| R-257-D..... | 1631D, 1641D ..... | 89428..... | 1.75 |
| R-258-D..... | 1635D, 1645D ..... | 110434..... | 1.35 |
| R-262-A..... | 1499-P ..... | 89193..... | 2.40 |
| R-263-A..... | 1499-P ..... | 89263..... | 1.80 |
| R-265-A..... | 1685 ..... | 89553..... | 1.75 |
| R-266-A..... | 1471-X, 1701-X..... | 110434..... | 1.35 |
| R-267-A..... | 1691, 1751-X..... | 89428..... | 1.75 |
| 89966..... | 1711..... | Return to factory for repair | |

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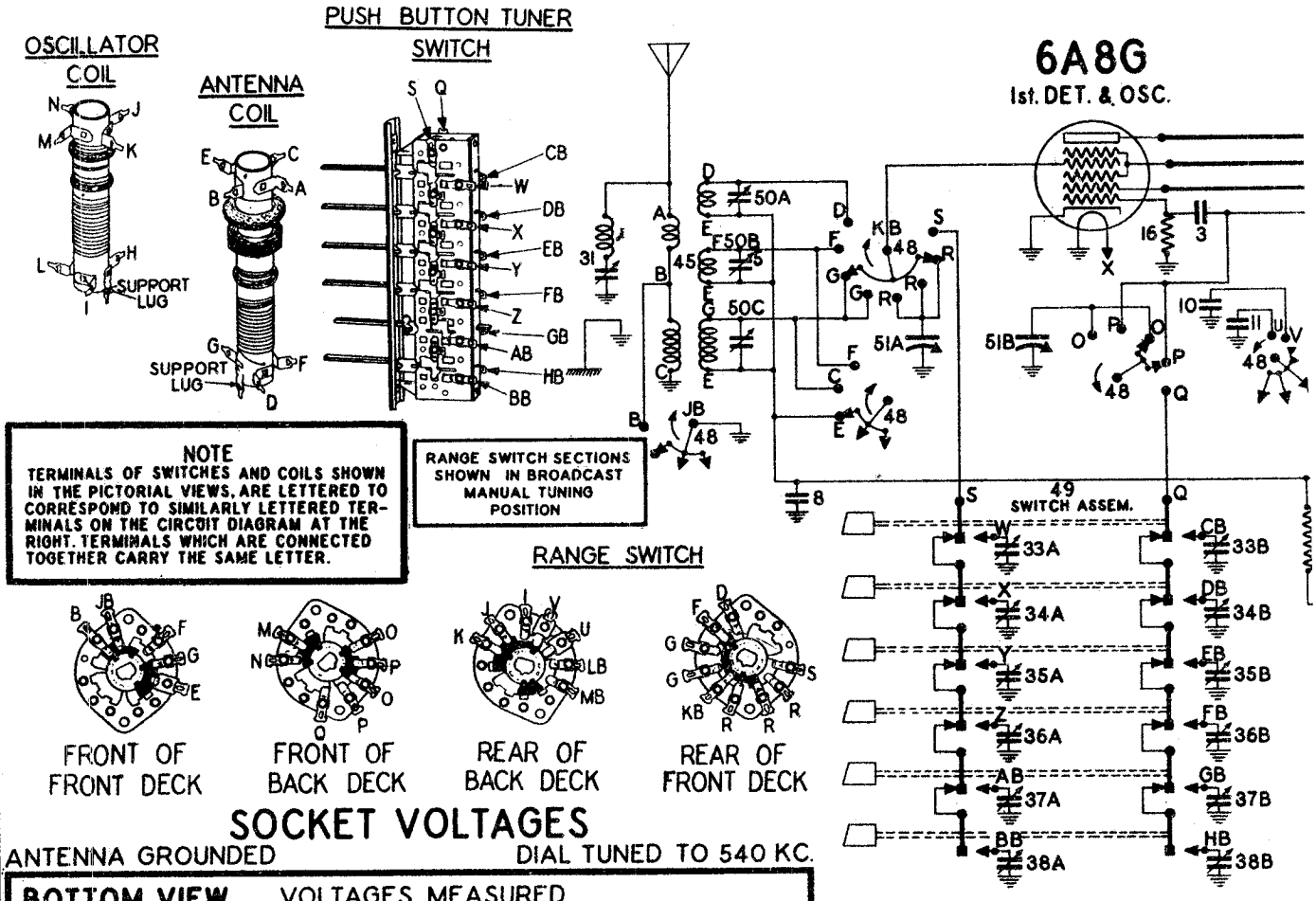



**NOTE**
TERMINALS OF SWITCHES AND COILS SHOWN IN THE PICTORIAL VIEWS, ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM AT THE RIGHT. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.

RANGE SWITCH SECTIONS SHOWN IN BROADCAST MANUAL TUNING POSITION

# SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.

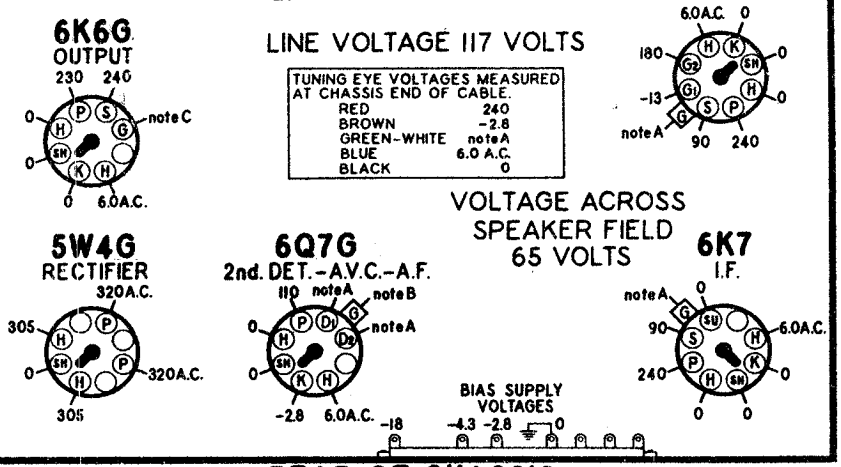
**BOTTOM VIEW OF CHASSIS**

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

LINE VOLTAGE 117 VOLTS

TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE.

| | |
|---|---|
| RED | 240 |
| BROWN | -2.8 |
| GREEN-WHITE | note A |
| BLUE | 6.0 A.C. |
| BLACK | 0 |




# REAR OF CHASSIS

Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6K7, 6U5, and the diode plates of the 6Q7-G tubes is -2.8 volts measured across resistor 40C.

NOTE B: The bias for the control grid of the triode sections of the 6Q7-G is -4.3 volts measured across resistor 40B and 40C.

NOTE C: The bias for the control grid of the 6K6-G output tubes is -18 volts measured across resistor 40A, 40B and 40C.

JUNE 1938

## ELECTRICAL PARTS

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION |
|---|---|---|
| 1 | 83217 | Condenser - paper .04 mfd. 60( |
| 2 | 83539 | Condenser - mica 260 mmfd. |
| 3 | 85061 | Condenser - mica 51 mmfd. |
| 4 | 85394 | Condenser - mica 510 mmf. |
| 5-6 | 88030 | Condenser - paper .01 mfd. 40( |
| 7 | 88185 | Condenser - ceramic tube .006 600 volt |
| 8-9 | 88189 | Condenser - paper .05 mfd. 200 |
| 10 | 88473 | Condenser - mica .00123 mfd. ( |
| 11 | 88681 | Condenser - mica .00255 mfd. ( |
| 12 | 89421 | Condenser - paper .1 mfd. 200 |
| 13 | 89937 | Condenser - elect. 30 mfd. 450 |
| 14 | 110377 | Condenser - elect. 10 mfd. 25 |
| 15 | 110550 | Resistor - carb. 10,000 ohms ½ |
| 16 | 110552 | Resistor - carb. 47,000 ohms ½ |
| 17 | 110553 | Resistor - carb.220,000 ohms ½ |
| 18-19-20 | 110554 | Resistor - carb. 1 meg. 1/4 wa |
| 21 | 110559 | Resistor - carb.470,000 ohms ½ |
| 22 | 110560 | Resistor - carb. 100 ohm 1/4 w |
| 23 | 110561 | Resistor - carb. 15,000 ohm 2 |
| 24 | 110568 | Resistor - carb. 15,000 ohm 1 |
| 25 | 110570 | Resistor - carb. 2.2 meg.1/4 w |
| 26-27-28 | 110629 | Lamp - 6.3 volt - .25 amp. |
| 29A to 29C | 112072 | Condenser - trimmer - 3 sectio |
| 30 | 112793 | Switch - tone control |
| 31 | 112796 | Coil - wave trap (with trimmer |
| 32 | 112803 | Transformer - 1st I.F. |
| 33A - 33B<br>34A - 34B | 112942 | Condenser - dual push button trimmer (1100 KC to 1700 KC |
| 35A - 35B<br>36A - 36B | 112943 | Condenser - dual push button trimmer (770 KC to 1350 KC). |
| 37A - 37B<br>38A - 38B | 112944 | Condenser - dual push button trimmer (550 KC to 1000 KC). |

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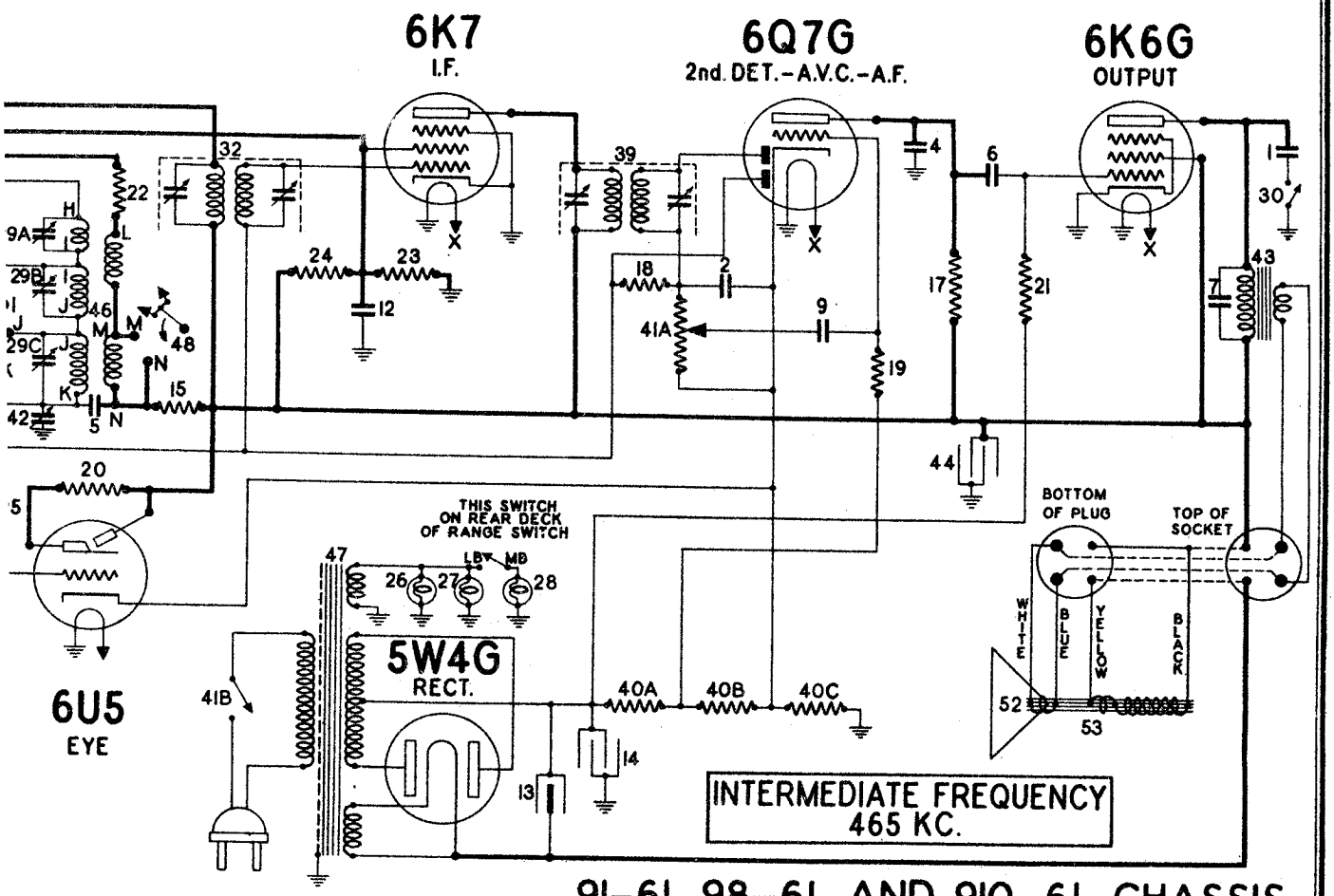
/ARNER CORP.

MODELS 91-611 to 91-619, Chassis 91-61
98-611 to 98-619, Chassis 98-61
910-611 to 910-619, Chassis 910-61
Schematic, Voltage, Socket, Coils




# 91-61, 98-61 AND 910-61 CHASSIS

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 39 | 113047 | Transformer - 2nd I.F. | 1.10 |
| 40A to 40C | 113057 | Resistor - Metal Clad: Section A - 160 ohms 1 watt; Section B - 25 ohms ½ watt; Section C - 40 ohms ½ watt | .48 |
| 41A - 41B | 113062 | Volume Control - (500,000 ohms with switch) | .92 |
| 42 | 113063 | Condenser - padder | .36 |
| 43 | 113064 | Transformer - output | 1.70 |
| 44 | 113066 | Condenser - elect. 8 mfd. 450 V. | .98 |
| 45 | 113068 | Coil - antenna | .94 |
| 46 | 113071 | Coil - oscillator | 1.20 |
| 47 | 113078 | Transformer - power 117 volt (50-60 cycle) | 4.00 |
| 47 | 113639 | Transformer - power 117 volt (25 cycle | 6.00 |
| 48 | 113083 | Switch - range | 1.80 |
| 49 | 113084 | Push Button Switch Assembly | 3.00 |
| 50A to 50C | 113095 | Condenser - trimmer (3 section) | 1.25 |
| 51A - 51B | 113250 | Condenser - variable gang | 3.00 |
| 52 | R-113342 | Cone - voice coil assem. for R-115011 speaker | 1.80 |
| 53 | R-115011 | Speaker - dynamic 8 inch | 8.00 |

## DIAL & MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 67568 | Washer - embossed (for mtg. elect.) | $ .05 |
| 81145 | Retaining Ring - for drive shaft - Per C | .50 |
| 85427 | Socket - octal base (standard) | .15 |
| 85785 | Terminal strip - antenna - ground | .15 |
| 88810 | Bushing - rubber; for chassis mtg. | .03 |
| 89748 | Washer - (paper) for back of knobs | .005 |
| 110496 | Plug - speaker (4 prong) | .12 |
| 110501 | Socket - 4 prong (for speaker) | .16 |
| 110829 | Washer - flat steel, for mtg. chassis | .01 |
| 111085 | Sleeve - felt for tuning eye | .03 |
| 111302 | Cord - dial drive 6 or 50 ft. lgths. Per ft. | .05 |
| 111357 | Spring - drive cord tension | .03 |
| 111855 | Shield Base - for tube shields | .02 |
| 112233 | Drum & Bushing - for dial drive | .35 |
| 112798 | Clip - for mtg. wave trap coil | .01 |
| 112874 | Screw #10 X 1 1/8 chassis mtg. | .01 |
| 112876 | Screw - P.B. escutcheon mtg. #3 X 3/8 | .01 |
| 112879 | Screw - eye escutcheon mtg. #2 X 3/8 | .03 |
| 113019 | Clip - dial scale retaining | .01 |
| 113025 | Socket - octal base (with special ground) | .15 |
| 113040 | Light Shield - cardboard (between button holes and dial frame | .06 |
| 113041 | Knob - push on | .10 |
| 113077 | Shield - tube | .15 |
| 113080 | Shaft - dial drive | .12 |
| 113086 | Bracket - dial frame & light | .34 |
| 113089 | Scale - dial | 1.20 |
| 113093 | Socket - for dial lamp | .18 |
| 113098 | Escutcheon - dial | 1.50 |
| 113099 | Escutcheon - push button | 1.44 |
| 113101 | Pointer | .18 |
| 113102 | Push Button - only | .08 |
| 113105 | Knob - Push on | .10 |
| 113130 | Cable & Plug - for tuning eye | .55 |
| 113189 | Tab - celluloid - for push button - Per dz. | .09 |
| 113321 | Tabs - station call letters (4 sheets) (brown) - Per set | .40 |
| 113323 | Tabs - trimmer range (550 to 1000) - Per dz. | .09 |
| 113324 | Tab - trimmer range (770 to 1350) | .01 |
| 113325 | Tab - trimmer range (1100 to 1700) | .01 |

| Chassis Model | Used in Receiver Models | Voltage | Frequency |
|---|---|---|---|
| 91-61 | 91-611 to 91-619 | 117 | 60 cycles |
| 98-61 | 98-611 to 98-619 | 117 | 25 cycles |
| 910-61 | 910-611 to 910-619 | 100-240 | 50-133 |

These chassis are 6 tube, three band, push-button tuning superheterodyne receivers. The tuning ranges are 540 to 1720 KC, 2.2 to 7.0 MC and 6.7 to 23 MC.

Incorporated in each chassis is a six-button tuner switch. Push-button tuning is obtained by substituting preset trimmers for the variable gang condenser. The push-button tuner switch provides a simple, rapid method of effecting this substitution.

When employing push-button tuning, the band switch must be in the Automatic ("A") position. This connects the tuner switch and disconnects the gang condenser, so that rotation of the Tuning Control will have no effect on the tuning.

## HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that your set is connected to a good antenna system.

2. Turn on the set and allow it to operate at least one-half hour before setting up the push-buttons.

3. Make a list of the frequencies of six nearby stations to which you wish to set-up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS, as indicated in Fig. 1.

Each of the buttons on your Push-Button Tuner has a definite operating range, as shown in Fig. 1, therefore, it is imperative that you select a station whose frequency is in the operating range of a button before attempting to set-up that button for the particular station. AS THE ADJUSTING SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER BUTTON BE SELECTED. The frequencies of your local stations may be obtained from your newspaper or radio call magazine. For example, suppose you want to set a button to station WLW whose frequency is 700 kilocycles. Refer to Fig. 1 which shows that this frequency falls within the operating range of buttons No. 1 or No. 2, whose range is 550 to 1000 KC. Therefore either button No. 1 or No. 2 can be used for the automatic tuning of WLW.

4. Remove the escutcheon around the push-buttons by taking out the five screws holding it to the cabinet. This will expose to view twelve adjusting screws, each pair of which is used to tune a button to its correct station.

5. Turn the band switch knob (Lower right) to the position in which the small "hump" on the knob will point to the letter "B" (Broadcast) on the cabinet. Now using the tuning knob (Upper right), tune in the station you desire to set to button No. 1. This is done so that you may identify the station by hearing its program.

6. Now turn the band switch knob until the "hump" points to the letter "A" (Automatic) on the cabinet. The word "Automatic" will appear illuminated in the upper right corner of the dial. You will note as the knob is turned to this position your station will not be heard. Now push in the first button on the left (No. 1 Fig. 1). Using a small screw-driver, insert it in the second screw from the left (No. 1a in Fig. 1) Rotate the screw SLOWLY until the program that you had previously tuned in manually is again heard. If it cannot be heard, advance the volume control. BE SURE THAT YOU ADJUST THIS PARTICULAR SCREW (1a) TO THE POINT WHERE THE TWO OPEN ENDS OF THE GREEN COLORED INVERTED "V" IN THE "TUNING EYE" ARE CLOSEST TOGETHER. It is advisable that you turn the screw in and out so that it will tune across the station several times in order that you may be sure that you have located this correct tuning point.

7. Next insert the screw-driver in the first screw on the left (No. 1b Fig. 1) and turn until the program is received with maximum volume, and the correct position is indicated by the ends of the inverted "V" in the "Tuning Eye" being closest together. Now go back to trimmer screw No. 1a and see if any improvement in reception can be made by adjusting it. Also repeat this operation for screw No. 1b.

NOTE: Trimmer screws indicated by letter "a" are oscillator trimmers. Trimmer screws indicated by letter "b" are antenna trimmers.

8. Set up button No. 2 for the selected station in a similar manner, using screws No. 2a and 2b, and proceed to set up the remaining buttons in the same fashion.

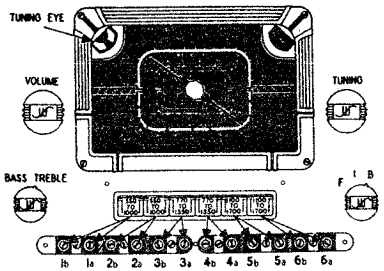



FIG. I

9. Label each button with the call letters of the stations you have selected, using the call letter tabs and celluloid covers packed with your receiver. The printed paper tab should be inserted in the button by holding the ends and flexing them slightly, allowing the tab to snap into place. The celluloid cover tab should be flexed in a similar manner and placed over the paper tab.

IMPORTANT

In some instances it may be necessary, after the set is operated for a month or more, to reset the screws as they may drift due to heat, humidity, etc.

## HOW TO CHANGE THE OPERATING RANGE OF A BUTTON

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

| Part Number | Tuning Range | List Price |
|---|---|---|
| 112942 | 1100 to 1700 KC. | $ 0.36 |
| 112943 | 770 to 1350 KC. | .45 |
| 112944 | 550 to 1000 KC. | .50 |

To make the change proceed as follows:

1. Remove the chassis from the cabinet.

2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.

3. Unsolder the leads from the four terminals on the back of this dual trimmer.

4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.

5. From the above list select a dual trimmer which will cover the desired range.

6. Mount it on the front of the chassis with the 6/32 machine screw, and solder the leads to its four terminals.

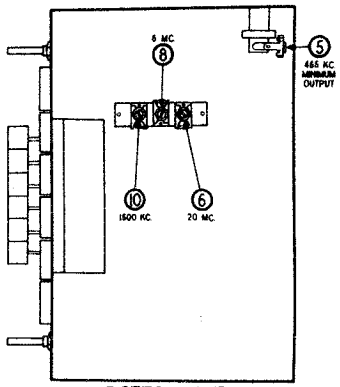
The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

## ALIGNMENT EQUIPMENT & PROCEDURE

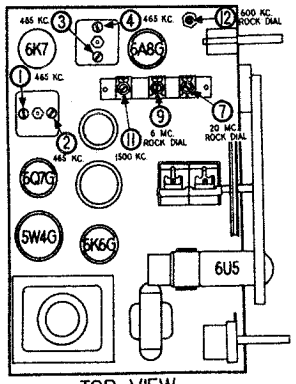
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 20 MC are required.

1. Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

| DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | BROADCAST "B" | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 2nd I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | | 3-4 | 1st I.F. | |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 465 KC | BROADCAST "B" | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 20 MC | FOREIGN "F" | 20 MC | 6 | FOREIGN OSCILLATOR (Shunt) | ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 19.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 20 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 20 MC | FOREIGN "F" | 20 MC | 7 | FOREIGN ANTENNA | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 6 MC | INTERMEDIATE "I" | 6 MC | 8 | INTERMEDIATE OSCILLATOR (Shunt) | ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 5.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 6 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 6 MC | INTERMEDIATE "I" | TUNE TO 6 MC GENERATOR SIGNAL | 9 | INTERMEDIATE ANTENNA | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1500 KC | BROADCAST "B" | 1500 KC | 10 | BROADCAST OSCILLATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1500 KC | BROADCAST "B" | TUNE TO 1500 KC GENERATOR SIGNAL | 11 | BROADCAST ANTENNA | ADJUST FOR MAXIMUM OUTPUT. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 600 KC | BROADCAST "B" | TUNE TO 600 KC GENERATOR SIGNAL | 12 | BROADCAST OSCILLATOR | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETURNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |




BOTTOM VIEW




TOP VIEW

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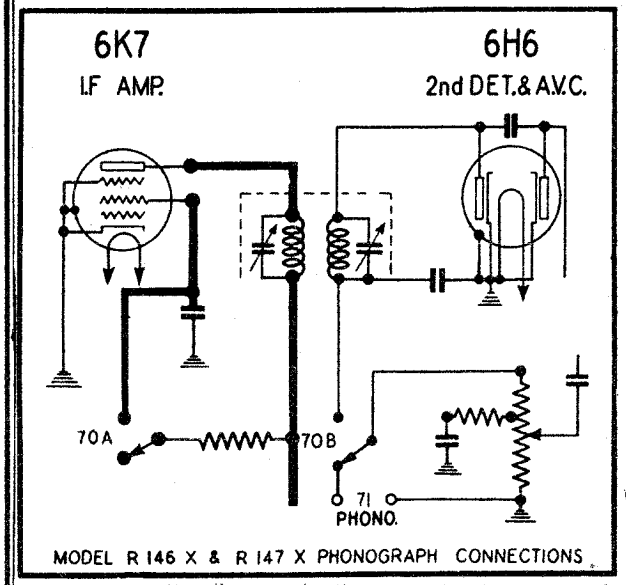
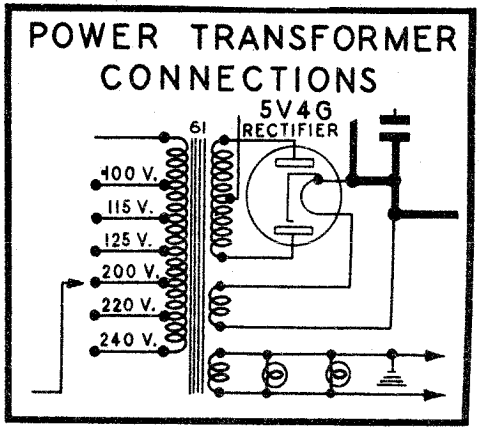
FOR OTHER SERVICING DATA ON THESE MODELS, SEE INDEX

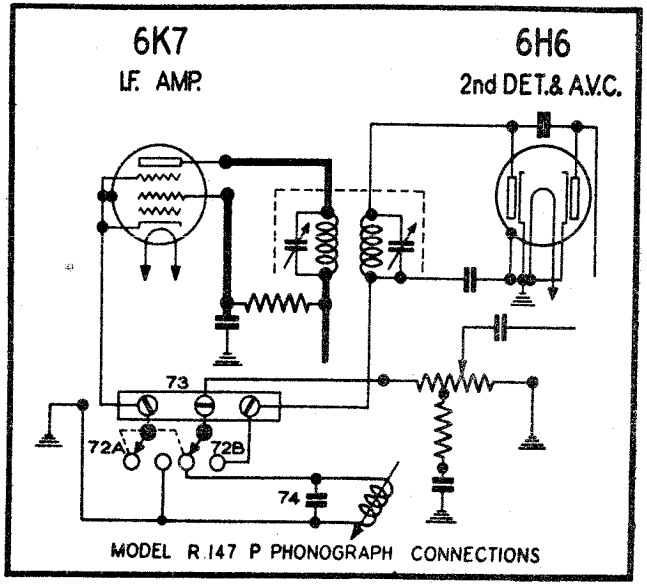
# SUPPLEMENTARY SERVICE DATA
# MODELS R-146-X, R-147-X, AND R-147-P.



MODEL R 146 X & R 147 X PHONOGRAPH CONNECTIONS




UNIVERSAL TRANSFORMER USED WITH MODELS R-146-X ; R-147-X ; AND R-147-P.



MODEL R 147 P PHONOGRAPH CONNECTIONS

The diagrams on this sheet show the phonograph and universal power transformer connections for the R-146-X, R-147-X and R-147-P chassis. Since these chassis are otherwise identical with the models R-146 and R-147, only additional parts for these models are listed to the right. All other parts and service data will be found in the R-146 or R-147 service manual.

### POWER TRANSFORMERS AND FUSES

Since the models R-146-X, R-147-X and R-147-P can be operated on a range of line voltages ranging from 100 to 240 volts different fuses must be used for different voltages. Proper values for different voltages are listed below.

| MODEL | 100 - 125 VOLTS | | 200 - 240 VOLTS | |
|---|---|---|---|---|
| | PART NUMBER OF FUSE | CURRENT RATING OF FUSE | PART NUMBER OF FUSE | CURRENT RATING OF FUSE |
| R-146-X | 38841 | 1 Amp. | 88055 | 3/4 Amp. |
| R-147-X | 89002 | 1.5 Amp. | 38841 | 1 Amp. |
| R-147-P | 89002 | 1.5 Amp. | 38841 | 1 Amp. |

### SPEAKERS AND OUTPUT TRANSFORMERS

The R-266-A 8-inch dynamic speaker is used with model R-1471-X, and the R-253-A 12-inch dynamic speaker is used with model R-1475-X. Please note that these speakers require different output transformers. Speakers and output transformers are listed below for the models R-146-X, R-147-X and R-147-P respectively.

| MODEL | SPEAKER | | OUTPUT TRANSFORMER |
|---|---|---|---|
| | PART NO. | SIZE | PART NO. |
| R-1461-X | R-247-A | 8-inch | 88529 |
| R-1465-X | R-248-A | 12-inch | 88796 |
| R-1471-X | R-266-A | 8-inch | 89622 |
| R-1475-X | R-253-A | 12-inch | 88870 |
| R-1479-P | R-253-A | 12-inch | 88870 |

ADDITIONAL PARTS USED ON

MODELS R-146-X, R-147-X and R-147-P

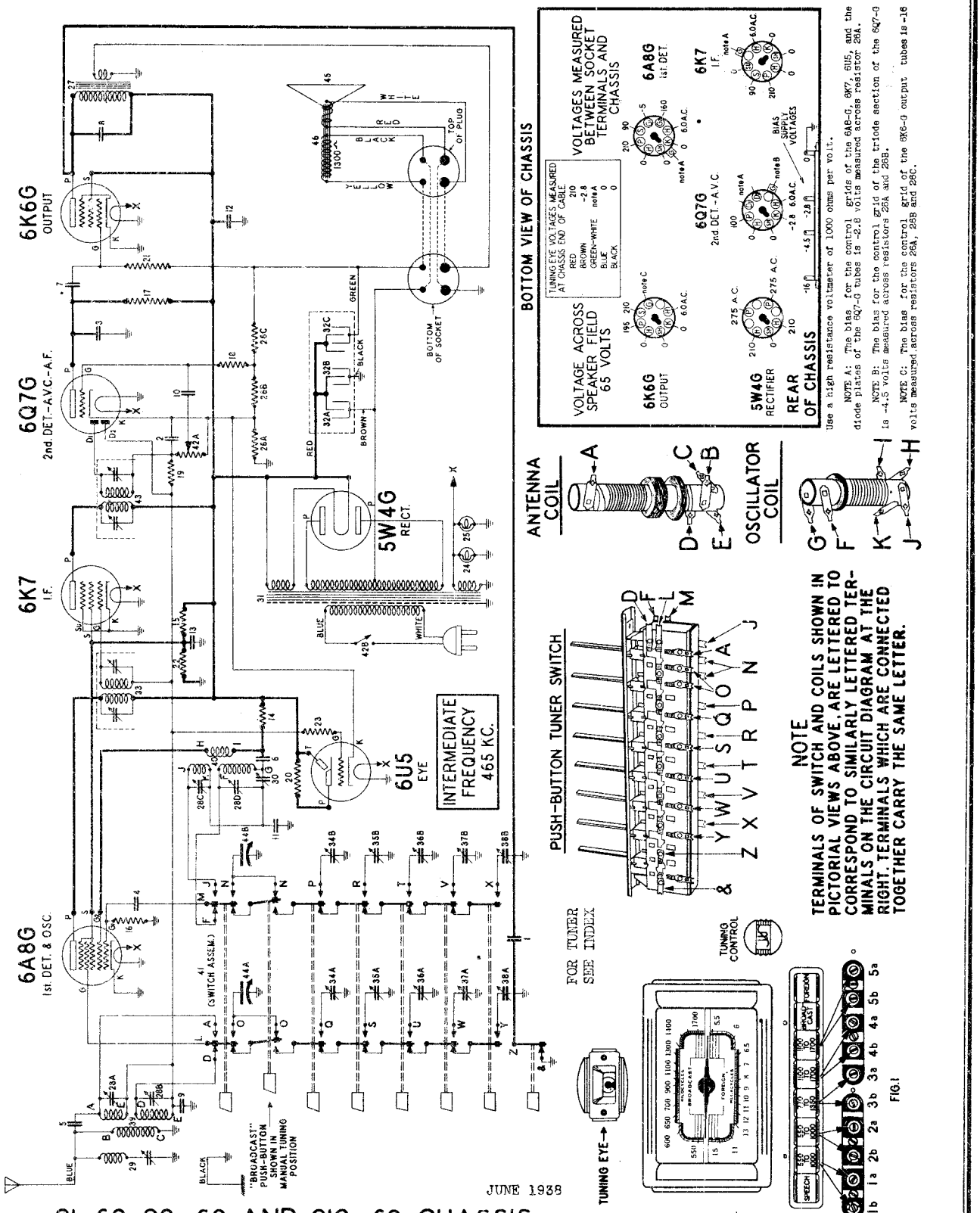
| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 38841 | Fuse, 1 ampere (to be used on models specified in above note) | $ .10 |
| 70A-70B | 84404 | Phonograph toggle switch (used on R-146-X, R-147-X) | 1.10 |
| 73 | 84412 | Phonograph Terminal Strip (used on R-147-P) | .03 |
| 72A-72B | 84566 | Phonograph toggle switch (used on R-147-P) | 1.50 |
| 74 | 85440 | .00351 mfd. mica condenser (used on R-147-P) | .40 |
| 1 | 88055 | Fuse, 3/4 ampere (used with model R-146-X) | .12 |
| 58 | 88529 | Output transformer (used with model R-1461-X) | 2.00 |
| 58 | 88796 | Output transformer (used with model R-1465-X) | 2.50 |
| 58 | 88870 | Output transformer (used with models R-1475-X and R-1479-P) | 2.50 |
| 63 | 89002 | Fuse, 1.5 ampere (used on model R-147-X and R-147-P) | .10 |
| 61 | 89303 | Universal power transformer 100 to 240 volts, 25 to 133 cycles (used with R-146-X) | 12.00 |
| | 89432 | Tuning eye escutcheon (used with R-1471-X) | .60 |
| 61 | 89433 | Universal power transformer 100 to 240 volts, 25 to 133 cycles (used with R-147-X and R-147-P) | 13.00 |
| 58 | 89622 | Output transformer for R-266-A speaker (used on R-1471-X) | 2.10 |
| 71 | 89709 | Phonograph terminal strip (used on R-146-X and R-147-X) | .15 |
| 69 | R247A | 8-inch dynamic speaker (used on R-1461-X) | 9.00 |
| 69 | R248A | 12-inch dynamic speaker (used on R-1465-X) | 11.50 |
| 69 | R253A | 12-inch dynamic speaker (used on R-1475-X and R-1479-P) | 11.00 |
| 69 | R266A | 8-inch dynamic speaker (used on R-1471-X) | 9.00 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

MODELS 91-621 to 91-629
Chassis 91-62
98-621 to 98-629
Chassis 98-62

# STEWART-WARNER CORP.

910-621 to 910-629
Chassis 910-62
Schematic, Voltage, Socket
Tuner Switch, Coils


6K6G
OUTPUT
6Q7G
2nd DET.-A.V.C.-A.F.
6K7
I.F.
6A8G
1st DET. & OSC.
5W4G
RECT.
6U5
EYE
INTERMEDIATE FREQUENCY 465 K.C.
"BROADCAST" PUSH-BUTTON SHOWN IN MANUAL TUNING POSITION
BOTTOM VIEW OF CHASSIS
VOLTAGE ACROSS SPEAKER FIELD 65 VOLTS
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
TUNING EYE VOLTAGES MEASURED AT CHASSIS END OF CABLE
RED 210
BROWN -2.8
GREEN-WHITE note A 0
BLUE 0
BLACK
6K6G OUTPUT
6A8G 1st DET.
6K7 I.F.
6Q7G 2nd DET.-A.V.C.
5W4G RECTIFIER
REAR OF CHASSIS
BIAS SUPPLY VOLTAGES
Use a high resistance voltmeter of 1000 ohms per volt.
NOTE A: The bias for the control grids of the 6A8-G, 6K7, 6U5, and the diode plates of the 6Q7-G tubes is -2.8 volts measured across resistor 28A.
NOTE B: The bias for the control grid of the triode section of the 6Q7-G is -4.5 volts measured across resistors 26A and 26B.
NOTE C: The bias for the control grid of the 6K6-G output tubes is -16 volts measured across resistors 26A, 26B and 26C.
ANTENNA COIL
OSCILLATOR COIL
PUSH-BUTTON TUNER SWITCH
NOTE
TERMINALS OF SWITCH AND COILS SHOWN IN PICTORIAL VIEWS ABOVE, ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM AT THE RIGHT. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.
FOR TUNER SEE INDEX
TUNING CONTROL
TUNING EYE
ON-OFF SWITCH AND VOLUME CONTROL
FIG.1

JUNE 1938

## 91-62, 98-62 AND 910-62 CHASSIS

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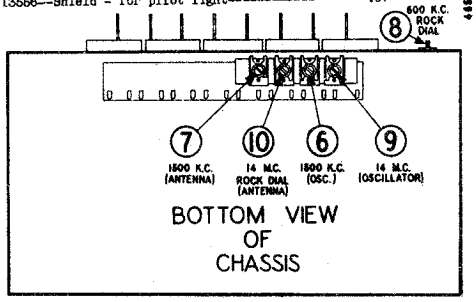
# MODELS 91-621 to 91-629, 98-621 to 98-629, 910-621 to 910-629

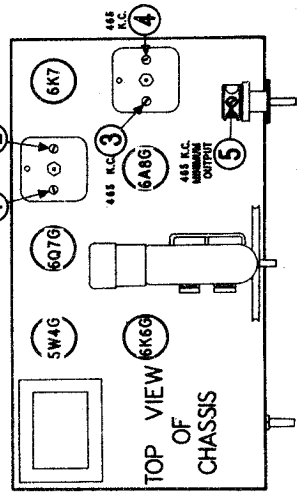
# STEWART-WARNER CORP.

## Alignment, Trimmers, Parts

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 83217 | Condenser - paper .04 mfd. 600 volt | .35 |
| 2-3 | 83539 | Condenser - mica 260 mmfd. | .20 |
| 4 | 85061 | Condenser - mica 51 mmfd. | .15 |
| 5 | 85454 | Condenser - mica 11 mmf. | .15 |
| 6-7 | 88030 | Condenser - paper .01 mfd. 400 volt | .25 |
| 8 | 88185 | Condenser - ceramic tube .006 mfd. 600 volt | .25 |
| 9-10 | 88189 | Condenser - paper .05 mfd. 200 volt | .25 |
| 11 | 88587 | Condenser - mica .0042 mfd. | .35 |
| 12 | 88682 | Condenser - paper .1 mfd. 400 volt | .25 |
| 13 | 89421 | Condenser - paper .1 mfd. 200 volt | .25 |
| 14 | 110550 | Resistor - carbon 10,000 ohms ½ W. | .15 |
| 15 | 110551 | Resistor - carbon 15,000 ohms 1 W. | .15 |
| 16 | 110552 | Resistor - carbon 47,000 ohms ½ W. | .12 |
| 17 | 110553 | Resistor - carbon 220,000 ohms ½ W. | .12 |
| 18-19-20 | 110554 | Resistor - carbon 1 meg. 1/4 watt | .12 |
| 21 | 110559 | Resistor - carbon 470,000 ohms ½ W. | .12 |
| 22 | 110562 | Resistor - carbon 22,000 ohms ½ W. | .15 |
| 23 | 110570 | Resistor - carbon 2.2 meg. 1/4 watt | .15 |
| 24-25 | 110629 | Lamp - 6.3 volt - .25 amps. | .15 |
| 26A - 26B - 26C | 112789 | Resistor - (Section A - 55 ohms) (Section B - 30 ohms) (Section C - 240 ohms) | .40 |
| 27 | 112790 | Transformer - output | 1.28 |
| 28A - 28B - 28C - 28D | 112792 | Condenser - trimmer (4 section) | .80 |
| 29 | 112796 | Coil - wave trap (with trimmer) | .50 |
| 30 | 112799 | Condenser - padder(530 - 630 mmfd.) | .36 |
| 31 | 112800 | Transformer - power 117 V. 50-60 C. | 3.40 |
| | 112823 | Transformer - power 100-240 volt - 50-133 cycle | 6.50 |
| | 112836 | Transformer - power 117 V. 25 cycle | 5.00 |
| 32A - 32C | 112802 | Condenser - electrolytic (dry) (Section A - 8 mfd. 400 volt) (Section B - 4 mfd. 400 volt) (Section C - 4 mfd. 400 volt) | 1.80 |
| 33 | 112803 | Transformer - 1st I.F. | 1.20 |
| 34A - 34B - 35A - 35B | 112942 | Condenser - dual push button trimmer (1100 KC to 1700 KC) | .36 |
| 36A - 36B | 112943 | Condenser - dual push button trimmer (770 KC to 1350 KC) | .45 |
| 37A - 37B - 38A - 38B | 112944 | Condenser - dual push button trimmer (550 KC to 1000 KC) | .50 |
| 39 | 113011 | Coil - ant. - broadcast-short-wave | 1.20 |
| 40 | 113015 | Coil Assembly - oscillator | 1.00 |
| 41 | 113021 | Push Button Switch Assembly | 4.20 |
| 42A - 42B | 113024 | Volume Control (500,000 ohm) (with switch) | .90 |
| 43 | 113047 | Transformer - 2nd I.F. | 1.10 |
| 44A - 44B | 113126 | Condenser - variable gang | 2.50 |
| 45 | R-113243 | Cone - voice coil assembly for R-115009 speaker | 1.50 |
| | R-113342 | Cone - voice coil assembly for R-115011 or R-115014 spkrs. | 1.80 |
| 46 | R-115009 | Speaker - dynamic (8 inch) | 3.80 |
| | R-115014 | Speaker - dynamic (8 inch) | 7.00 |
| | 111357 | Spring - drive cord tension | .03 |
| | 111855 | Shield Base - for tube shields | .02 |
| | 112233 | Drum and Bushing - for dial drive | .35 |
| | 112745 | Clip - coil mounting (osc. & ant.) | .01 |
| | 112747 | Nut - #6-32 Hex. | .01 |
| | 112786 | Scale - dial | .68 |
| | 112874 | Screw #10 X 1-1/8 Chassis Mtg. | .01 |
| | 112875 | Screw - P.B. escutcheon mtg. #3 X 3/8 | .01 |
| | 112879 | Screw - escutcheon mtg. #2 X 3/8 | .03 |
| | 112945 | Shaft - tuning | .10 |
| | 113019 | Clip - dial scale retaining | .01 |
| | 113022 | Knob - for controls | .10 |
| | 113025 | Socket - octal base (with special ground) | .15 |
| | 113030 | Escutcheon - dial | 1.24 |
| | 113039 | Dial - mtg. plate and bracket | .38 |
| | 113040 | Light Shield - cardboard (between button holes and dial frame) | .12 |
| | 113077 | Shield - tube | .06 |
| | 113102 | Push Button - only | .15 |
| | 113106 | Escutcheon Plate - for trimmer screws | .08 |
| | 113114 | Pointer - dial | .84 |
| | 113127 | Bracket & Clip - for tuning eye | .12 |
| | 113130 | Cable & Plug - for tuning eye | .25 |
| | 113135 | Escutcheon - for eye | .55 |
| | 113144 | Socket - for dial lamp | .25 |
| | 113189 | Tab - celluloid - for push button-Per doz. | .22 |
| | 113321 | Tabs - station call letters(4 sheets) (brown) | .09 |
| | 113323 | Tab - trimmer range (550 to 1000)-Per doz. | .40 |
| | 113324 | Tab - trimmer range (770 to 1350)-Per doz. | .09 |
| | 113325 | Tab - trimmer range (1100 to 1700)Per doz. | .09 |
| | 113326 | Tab - "Speech"-Per doz. | .09 |
| | 113327 | Tab - "Broadcast"-Per doz. | .09 |
| | 113328 | Tab - "Foreign"-Per doz. | .09 |
| | 113556 | Shield - for pilot light | .07 |
| | 81145 | Retaining Ring - for drive shaft----Per C | .80 |
| | 85040 | Screw - #8 Hex. Head (self-tapping)-Per C | .35 |
| | 85427 | Socket - octal base | .15 |
| | 89745 | Washer - (paper) for back of knobs | .005 |
| | 110498 | Plug - speaker (4 prong) | .12 |
| | 110501 | Socket - 4 prong (for speaker) | .15 |
| | 110629 | Washer - flat steel, for mtg. chassis | .01 |
| | 111085 | Sleeve - felt for tuning eye | .03 |
| | 111302 | Cord - dial drive 6 or 50 ft. lgths.Per Ft. | .05 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.




| Chassis Model | Used In Receiver Models | Voltage | Frequency |
|---|---|---|---|
| 91-62 | 91-621 to 91-629 | 117 | 60 cycles |
| 98-62 | 98-621 to 98-629 | 117 | 25 cycles |
| 910-62 | 910-621 to 910-629 | 100-240 | 50-133 |

These chassis are 6-tube, two band push-button tuning superheterodyne receivers. The tuning ranges are 540 to 1725 KC and 5.4 to 15.4 MC. The I. F. is 465 KC.

Incorporated in each chassis is an eight-button tuner switch. The first button on the left, labelled "Speech," is a tone control. The two buttons on the right, labelled "Broadcast" and "Foreign", are used for band change. The other five buttons are for push-button tuning.

Push-button tuning is secured by substituting pre-set trimmers for the variable gang condenser. The push-button tuner switch provides a simple, rapid method for effecting this substitution.

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

1. Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

| DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | BAND SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | BROADCAST BUTTON PUSHED IN | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 2nd I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | | 3-4 | 1st I.F. | |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 465 KC | BROADCAST BUTTON PUSHED IN | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 1500 KC | BROADCAST BUTTON PUSHED IN | 1500 KC | 6 | BROADCAST OSCILLATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 1500 KC | BROADCAST BUTTON PUSHED IN | TUNE TO 1500 KC GENERATOR SIGNAL | 7 | BROADCAST ANTENNA | ADJUST FOR MAXIMUM OUTPUT. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 600 KC | BROADCAST BUTTON PUSHED IN | TUNE TO 600 KC GENERATOR SIGNAL | 8 | BROADCAST OSCILLATOR (Series Pad) | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 14 MC | FOREIGN BUTTON PUSHED IN | 14 MC | 9 | FOREIGN OSCILLATOR (Shunt) | ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 14 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 14 MC | FOREIGN BUTTON PUSHED IN | 14 MC | 10 | FOREIGN ANTENNA | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |

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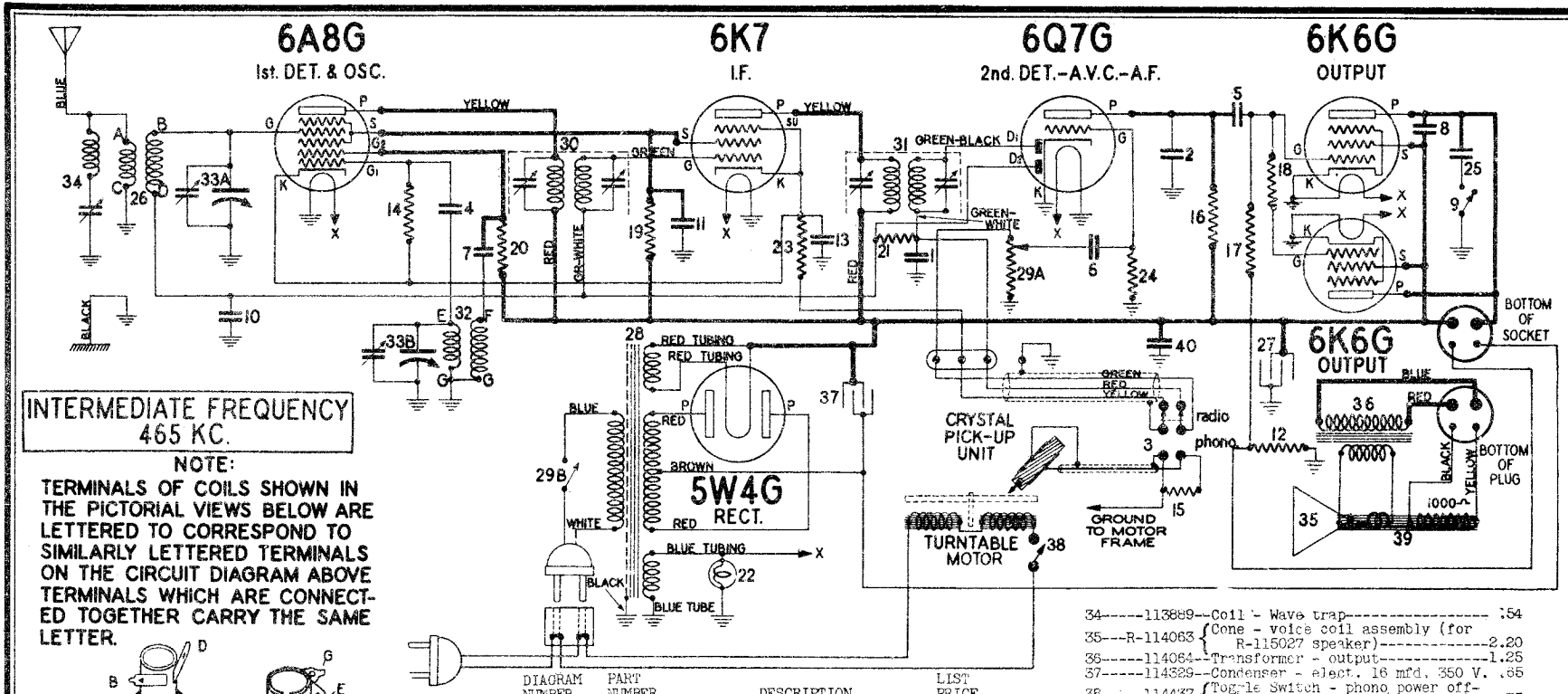
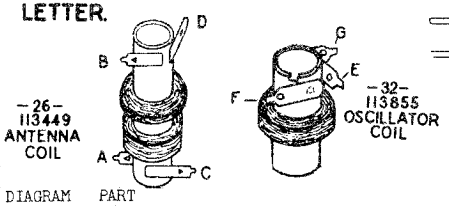



## INTERMEDIATE FREQUENCY 465 KC.

**NOTE:**

**TERMINALS OF COILS SHOWN IN THE PICTORIAL VIEWS BELOW ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM ABOVE TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.**




| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1-2 | 83539 | Condenser - mica 260 mmfd. | .20 |
| 3 | 84566 | Switch-"Phono Radio"-D.P.D.T. | 1.50 |
| 4 | 85061 | Condenser - mica 51 mmfd. | .15 |
| 5-6 | 88026 | Condenser - paper .02 mfd. 400 V. | .25 |
| 7-8 | 88030 | Condenser - paper .01 mfd. 400 V. | .25 |
| 9 | 88054 | Switch - tone control | .30 |
| 10 | 88189 | Condenser - paper .05 mfd. 200 V. | .25 |
| 11 | 88191 | Condenser - paper .1 mfd. 300 V. | .25 |
| 12 | 88462 | Resistor - W.W. 270 ohm 1 W. (10%) | .15 |
| 13 | 89532 | Condenser - paper .25 mfd. 200 V. | .32 |
| 14-15 | 110552 | Resistor - carb. 47000 ohm ½ watt | .12 |
| 16 | 110553 | Resistor - carb. 220000 ohm ½ W. | .12 |
| 17 | 110559 | Resistor - carb. 470000 ohm ½ W. | .12 |
| 18 | 110560 | Resistor - carb. 100 ohms 1/4 W. | .12 |
| 19 | 110566 | Resistor - carb. 33000 ohms ½ W. | .12 |
| 20 | 110569 | Resistor - carb. 10000 ohms ½ W. | .12 |
| 21 | 110580 | Resistor - carb. 3.3 meg. ½ watt | .12 |
| 22 | 110629 | Lamp - 6.3 volt - .25 amps. | .15 |
| 23 | 112974 | Resistor - carb. 220 ohm ½W.(10%) | .15 |
| 24 | 112975 | Resistor - carb. 10 meg. 1/4 watt | .12 |
| 25 | 113034 | Condenser - paper .04 mfd. 600 volt (substitute 83217) | .15 |
| 26 | 113449 | Coil - antenna | .78 |
| 27 | 113808 | Condenser - elect. 8 mfd. 300 V. | .66 |
| 28 | 113813 | Transformer - power 117V. - 60C. | 5.00 |
| 29A - 29B | 113852 | Volume control - 500,000 ohm (with switch) | .96 |
| 30 | 113853 | Transformer - 1st I.F. | 1.25 |
| 31 | 113854 | Transformer - 2nd I.F. | 1.20 |
| 32 | 113855 | Coil - Oscillator | .48 |
| 33A - 33B | 113869 | Condenser - gang | 3.30 |
| 34 | 113889 | Coil - Wave trap | .54 |
| 35 | R-114063 | Cone - voice coil assembly (for R-115027 speaker) | 2.20 |
| 36 | 114064 | Transformer - output | 1.25 |
| 37 | 114329 | Condenser - elect. 16 mfd. 350 V. | .65 |
| 38 | 114437 | Toggle Switch - phono power off-on switch | .75 |
| 39 | R-115027 | Speaker - dynamic (6 inch) | 4.90 |
| 40 | 88191 | Condenser - paper .1 mfd. 300 V. | .25 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

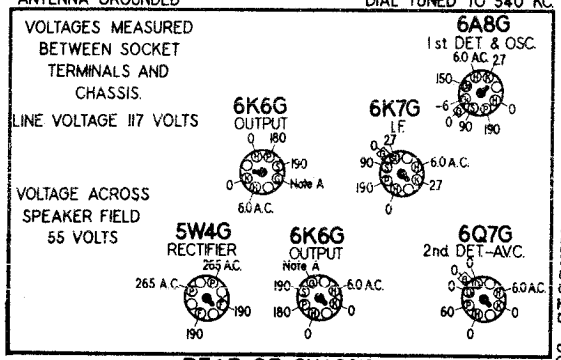
## SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS.

LINE VOLTAGE 117 VOLTS

VOLTAGE ACROSS SPEAKER FIELD 55 VOLTS




Use a high resistance voltmeter of at least 1000 ohms per volt.
NOTE A: The bias for the control grids of the 6K6-G tubes is -15 volts measured across resistor number 12.

The triode section of the 6Q7G tube utilizes a circuit arrangement which gives a minimum of distortion and excellent gain with zero bias on the grid. At high signal levels, this circuit gives less distortion than if the tube is operated with a fixed bias. The proper operation of this circuit depends largely on the high resistance of the grid resistor, No. 24 in the circuit diagram. This resistor is rated at 10 megohms. Do not substitute any lower value since this would increase distortion and decrease amplification.

November 15, 1938

MODELS 91-641 to 91-649
98-641 to 98-649
910-641 to 910-649

# STEWART-WARNER CORP.

Alignment, Trimmers
Phono. Data, Tuner Data

## ALIGNMENT EQUIPMENT & PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1500 KC. are required.

1— Connect the output meter across the voice coil or between the plate of either of the 6K6G tubes and ground through a .1 mfd. condenser, (these tubes are connected in parallel, not push-pull). The connection will depend upon the type of meter. (The more sensitive type should be connected across the voice coil.)

2— Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.

3— Turn the volume control to the maximum volume position and leave it in this position throughout the entire alignment procedure.

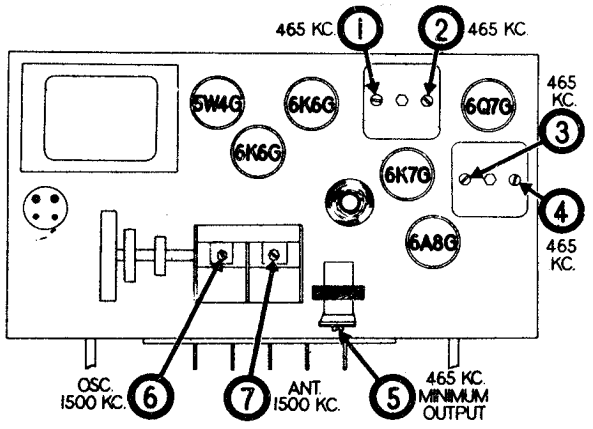
4— With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is only slightly off calibration, loosen the set screw in the pointer cord drive drum, which is the outer drum on the left hand side of the gang condenser and with the gang condenser in full mesh turn the drum until the pointer is in the correct position. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last division on the left end of the dial scale. Hold the pointer in place and check to see if the gang condenser is still fully meshed, then tighten the pointer clip being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

| DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|
| .1 MFD. CONDENSER | CONTROL GRID OF 6A8G TUBE (Do not remove grid clip) | 465 KC. | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1—2 | 2ND I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | 3—4 | 1ST I.F. | |
| 200 MMFD. MICA CONDENSER | ANTENNA LEAD | 465 KC. | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT USING STRONG GENERATOR SIGNAL. |
| 200 MMFD. MICA CONDENSER | ANTENNA LEAD | 1500 KC. | 1500 KC. | 6 | BROADCAST OSCILLATOR | ADJUST FOR MAXIMUM OUTPUT. |
| 200 MMFD. MICA CONDENSER | ANTENNA LEAD | 1500 KC. | 1500 KC. | 7 | BROADCAST ANTENNA | ADJUST FOR MAXIMUM OUTPUT. |

## DIAL AND MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 112745 | Clip - coil mounting (osc. & ant.) | .01 |
| 112798 | Clip - for mtg. wave trap coil | .01 |
| 113178 | Cord - band indicator (28" required) (supplied in 4 ft. lengths) | .30 |
| 113882 | Condenser - drive drum & pinion gear | .70 |
| 113884 | Dial drive drum and hub | .42 |
| 113812 | Dial Frame & Pulley Assembly | .54 |
| 114321 | Dial Scale | .50 |
| 113661 | Dial Scale Retainer | .03 |
| 113755 | Escutcheon - dial | .40 |
| 113758 | Escutcheon - push button | .32 |
| 113156 | Gear - and bushing assembly for dial drive | .22 |
| 113022 | Knob - round - volume or tuning | .10 |
| 113170 | Adjusting Lug - for button shafts | .01 |
| 110496 | Plug - speaker (4 prong) | .12 |
| 113856 | Pointer | .06 |
| 112762 | Pulley - dial cord drive (at left side) | .04 |
| 113762 | Push Button | .04 |
| 113880 | Push Button Tuner Unit Assembly | 4.60 |
| 81145 | Retaining Ring - for drive shaft - Per C | .50 |
| 113463 | Rubber Bushing - motor mtg. | .03 |
| 113672 | Rubber Grommet (on tuning shaft) | .02 |
| 85040 | Screw-#6 Hex.Hd. for mtg. adjusting washer - Per C | .35 |
| 112874 | Screw - #10 X 1 1/8 chassis mtg. | .01 |
| 112879 | Screw - escutcheon mtg. #2 X 3/8 | .03 |
| 114431 | Screw #6-40 X 7/8 - for setting up buttons | .01 |
| 85427 | Set Screw - 8/32 square head | .02 |
| 113860 | Shaft - tuning | .08 |
| 113875 | Socket - for dial lamp | .15 |
| 110501 | Socket - 4 prong (for speaker) | .16 |
| 113025 | Socket - octal base (with special ground) | .15 |
| 85427 | Socket - octal base (standard) | .15 |
| 113177 | Spring - dial cord tension | .09 |
| 85815 | Spring - between gear sections | .01 |
| 113169 | Spring - for key return | .01 |
| 114041 | Tabs - station call letters | .35 |
| 84412 | Terminal strip - phono | .03 |
| 110829 | Washer - flat steel - for mtg. chassis | .01 |
| 89746 | Washer - (paper) for back of knobs | .005 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.




The connections to the phonograph unit are made at the terminal strip located on the back of the radio chassis. IMPORTANT: If the receiver chassis is removed from the cabinet for test, you must put a jumper wire between the two outside terminals of this terminal strip. Also the center terminal must be grounded to the chassis.

## PHONOGRAPH CONNECTIONS

This receiver is equipped with a phonograph turntable and a crystal pickup unit for phonograph operation. The phonograph turntable motor is wired directly to the line cord. A socket is inserted in parallel with this power supply line into which is plugged the short power cord from the radio chassis.

The crystal pickup unit is switched into the audio amplifier section of the radio by means of a double pole double throw switch located in the top panel. With this switch in the phonograph position the receiver volume control is disconnected from the low side of the 2nd I.F. transformer and connected across the crystal pickup unit. The radio frequency section of the receiver is at the same time silenced by the opening of the cathodes of the 6A8G and 6K7G tubes.

## HOW TO SET-UP AND USE THE PUSH BUTTON TUNER.

1. Connect receiver to good antenna system.
2. Remove escutcheon surrounding push buttons.
3. Select five nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give better results when tuned manually. Any button may be used for a station on any part of the dial.
4. Loosen the screw at the side of the push button shaft (about one turn counter-clockwise will be sufficient).
5. Keep the screw driver inserted in the screw slot and push against the screw. At the same time tune in the station using the tuning knob. YOU MUST PUSH AGAINST THE SCREW DRIVER DURING THE ENTIRE TIME THAT YOU ARE TUNING. Be sure that you tune in the station to the point where the program is heard with the least hiss and deepest tone, and not to the point of greatest volume.
   Now, still pushing against the screw driver, retighten the screw, turning it to the right (clockwise) until it is REASONABLY TIGHT. To turn further may result in damage to the mechanism.
6. The set up for this button is now complete. Set-up the remaining buttons in the same manner and replace the escutcheon.

TESTING When the phonograph pickup leads are disconnected as this model chassis is removed from the cabinet for testing, the set will not operate unless the proper connections are made at the phonograph terminal strip. The two outside terminals must be connected together and the center terminal must be grounded to the chassis.

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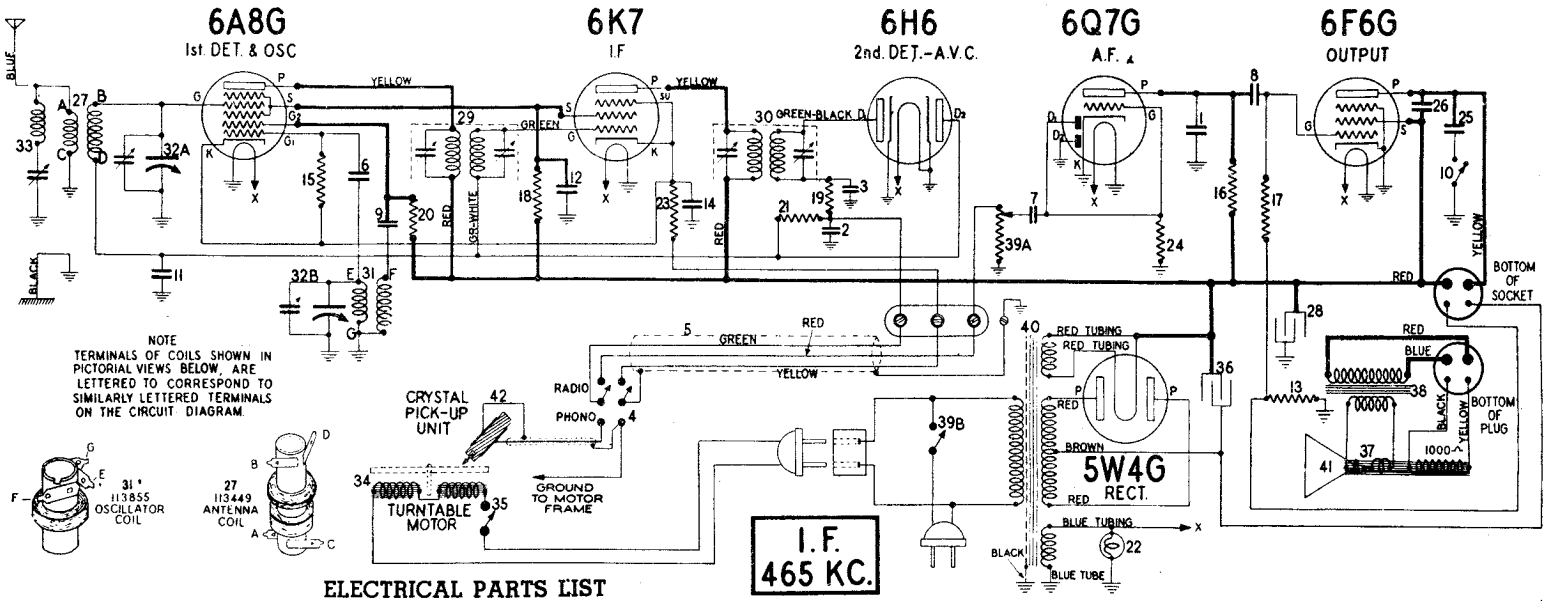
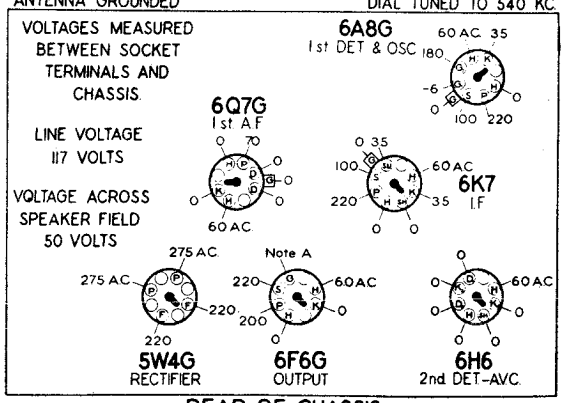
# THIS APPLIES ONLY TO THE 91-648 RECEIVER IDENTIFIED BY THE LETTER S STAMPED ON BACK OF CHASSIS.




## ELECTRICAL PARTS LIST

| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1 | 83539 | Condenser—mica 260 mmfd. | $0.20 |
| 2-3 | 83783 | Condenser—mica 110 mmf. | .20 |
| 4 | 84566 | Switch—"phono-radio" D.P.D.T. | 1.50 |
| 5 | 84572 | Cable—Shielded for Phono. Pickup. | .60 |
| 6 | 85061 | Condenser—mica 51 mmfd. | .15 |
| 7-8 | 88026 | Condenser—paper .02 mfd. 400 Volt | .25 |
| 9 | 88030 | Condenser—paper .01 mfd. 400 Volt | .25 |
| 10 | 88054 | Switch for tone control | .30 |
| 11 | 88189 | Condenser—paper .05 mfd. 200 Volt | .25 |
| 12 | 88191 | Condenser—paper .1 mfd. 300 Volt | .25 |
| 13 | 88462 | Resistor—W. W. 270 ohms 1 W. 10% | .15 |
| 14 | 89532 | Condenser—paper .25 mfd. 200 Volt | .32 |
| 15 | 110552 | Resistor—carbon 47,000 ohms 1/4 W. | .12 |
| 16 | 110553 | Resistor—carbon 220,000 ohms 1/4 W. | .12 |
| 17 | 110559 | Resistor—carbon 470,000 ohms 1/4 W. | .12 |
| 18-19 | 110566 | Resistor—carbon 33,000 ohms 1/4 W. | .12 |
| 20 | 110569 | Resistor—carbon 10,000 ohms 1/4 W. | .12 |
| 21 | 110580 | Resistor—carbon 3.3 meg. 1/4 watt | .12 |
| 22 | 110629 | Dial bulb—6.3 volt .25 amps. | .15 |
| 23 | 112974 | Resistor—carbon 220 ohms 1/4 W. (10%) | .15 |
| 24 | 112975 | Resistor—carbon 10 meg. 1/4 watt | .12 |
| 25 | 113034 | Condenser—paper .04 mfd. 600 volt | $0.15 |
| 26 | 113035 | Condenser—paper .006 mfd. 600 V. | .14 |
| 27 | 113449 | Antenna coil | .78 |
| 28 | 113808 | Condenser—electrolytic 8 mfd. 350 V. | .66 |
| 29 | 113853 | Transformer—1st I.F. | 1.25 |
| 30 | 113854 | Transformer—2nd I.F. | 1.20 |
| 31 | 113855 | Coil—oscillator | .48 |
| 32A-32B | 113869 | Condenser—gang | 3.30 |
| 33 | 113889 | Coil—wave trap | .54 |
| 34 | 114400 | Phono. motor & turntable | 10.50 |
| 35 | 114437 | Toggle Switch—phono. power off-on switch | .75 |
| 36 | 114972 | Condenser—elect. 16 mfd. 450 V. | .78 |
| 37 | U-115048 | Speaker—dynamic 6" | 5.40 |
| 38 | U-116212 | Output transformer for U-115048 speaker | 1.50 |
| 39A-39B | 116274 | Volume control 500,000 ohms with switch | .96 |
| 40 | 116283 | Transformer—power 110 V 60 C. | 3.50 |
| 41 | U-116296 | Cone & voice coil assembly for U-115048 speaker | 1.70 |
| 42 | 116300 | Phono. pickup head | 7.50 |

## SOCKET VOLTAGES




REAR OF CHASSIS

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grid of the 6F6G tube is —13.5 volts measured across resistor number 13.

MODEL 91-648, Chassis 91-64 (With "S" stamped on chassis)
Schematic, Voltage, Socket
S-WARNER CORP.

MODEL 91-648,Ch. 91-64
(With "S" stamped on chassis) STEWART-WARNER CORP.
Alignment,Trimmers,Tuner
Phono.Connections

**THIS APPLIES ONLY TO THE 91-648 RECEIVER IDENTIFIED BY THE LETTER S STAMPED ON BACK OF CHASSIS.**

## ALIGNMENT PROCEDURE

**FOR ALIGNMENT, an output meter and an accurately calibrated signal generator are required.**

1. **Connect the output meter across the voice coil or between the plate of the 6F6G output tube and ground through a .1 mfd. condenser. The connection will depend upon the type of meter. (The more sensitive type should be connected across the voice coil.)**
2. **Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.**
3. **Turn the volume control to the maximum volume position and leave it in this position throughout the entire alignment procedure.**
4. **With the gang condenser in full mesh, the pointer should be at the last dial division at the left end of the dial scale. With the gang condenser in this position the set screw on the large drum should be nearly straight down.**
5. **IF YOU DISCONNECT THE PHONOGRAPH PICK-UP CABLE, PUT A JUMPER BETWEEN THE TWO OUTSIDE TERMINALS OF THE TERMINAL STRIP, AND GROUND THE CENTER TERMINAL TO CHASSIS.**

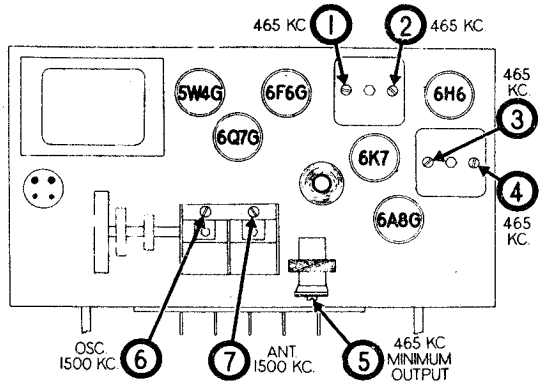
| Dummy Ant. in Series with Sig. Gen. | Connection of Sig. Generator Output to Receiver | Signal Generator Frequency | Receiver Dial Setting | Trimmer Number | Trimmer Description | Type of Adjustment |
|---|---|---|---|---|---|---|
| .1 Mfd. Condenser | Control Grid of 6A8G Tube (Do not remove grid clip) | 465 KC | Any Point Where It Does Not Affect the Signal | 1-2 | 2nd I.F. | Adjust for Maximum Output. Then Repeat Adjustment. |
| | | | | 3-4 | 1st I.F. | |
| 400 Ohm Carbon Resistor | Antenna Lead | 465 KC | Any Point Where It Does Not Affect the Signal | 5 | Wave Trap | Adjust for Minimum Output Using Strong Generator Signal. |
| 400 Ohm Carbon Resistor | Antenna Lead | 1500 KC | 1500 KC | 6 | Broadcast Oscillator | Adjust for Maximum Output. |
| 400 Ohm Carbon Resistor | Antenna Lead | 1500 KC | Tune to 1500 KC Generator Signal | 7 | Broadcast Antenna | Adjust for Maximum Output. |

## DIAL AND MISCELLANEOUS PARTS

| Part No. | Description | List Price |
|---|---|---|
| 113170 | Adjusting Lug for Push Button shaft | $0.01 |
| 112745 | Clip—for coil mtg. | .01 |
| 112798 | Clip—for wave trap coil mtg. | .01 |
| 89912 | Clip—Grounding for Tube Base | .02 |
| 113178 | Cord—dial drive (supplied in 4 ft. lengths) | .30 |
| 113882 | Drive drum (small) and Pinion Gear for gang condenser | .70 |
| 113884 | Dial drive drum and hub (large) | .42 |
| 113812 | Dial Frame and Pulley Assembly | .54 |
| 114321 | Dial scale | .50 |
| 113861 | Dial Scale Retainer Clip | .03 |
| 113755 | Escutcheon for dial | .40 |
| 113756 | Escutcheon for push buttons | .32 |
| 113022 | Knob | .10 |
| 114320 | Mechanical Push Button Mechanism, complete | 7.50 |
| 84571 | Needle Cup for Phonograph | .10 |
| 110496 | Plug for speaker | .12 |
| 113856 | Pointer—dial | .06 |
| 113762 | Push Buttons | .04 |
| 116165 | Receptacle for 2 prong plug for phono. motor | .50 |
| 81145 | Retaining Clip for tuning shaft Per C | .50 |
| 114598 | Rubber tube for tuning shaft | .01 |
| 85040 | Screw—for mtg. adjusting lug No. 6x1/4 Hex. Hd. | .35 |
| 112874 | Screw—chassis mtg. No. 10x1 1/8" | .01 |
| 114431 | Screw—for setting up push buttons No. 6-40x7/8 | .01 |
| 114914 | Screw—for mtg. escutcheon, Phillips head Per doz. | .15 |
| 116185 | Screw—for push button escutcheon mtg. No. 2x3/8 | .01 |
| 116423 | Screw—Needle, for head | .01 |
| 85827 | Set Screw—No. 8-32 Square Head | .02 |
| 113860 | Shaft—tuning | .08 |
| 88164 | Shield Cap | .06 |
| 88161 | Shield, tube Per section | .08 |
| 89911 | Shield—Base | .04 |
| 85427 | Socket—octal base (standard) | .15 |
| 113025 | Socket—octal base (with special ground) | .15 |
| 110501 | Socket for speaker plug | .16 |
| 113875 | Socket—for dial lamp | .15 |
| 113169 | Spring—return for push buttons | .01 |
| 113177 | Spring—for dial cord tension | .09 |
| 114041 | Tabs—station call letters | .35 |
| 84412 | Terminal Strip—phono. | .03 |
| 116410 | Turntable | 2.00 |
| 116530 | Washer—for back of knob paper | .005 |
| 110829 | Washer—for chassis mtg. | .01 |

## PHONOGRAPH CONNECTIONS

This receiver is equipped with a phonograph turntable and a crystal pickup unit for phonograph operation. The crystal pickup unit is switched into the audio amplifier section of the radio by means of a double-pole double-throw switch adjacent to the turntable. With this switch in the phonograph position (marked P) the receiver volume control is disconnected from the low side of the 2nd I.F. transformer and connected across the crystal pickup unit. The radio frequency




section of the receiver is at the same time silenced by the opening of the cathodes of the 6A8G and 6K7 tubes.

The connections to the phonograph unit are made at the terminal strip located on the back of the radio chassis. **IMPORTANT: If the receiver chassis is removed from the cabinet for test, you must put a jumper wire between the two outside terminals of this terminal strip. Also the center terminal must be grounded to the chassis.**

## HOW TO SET UP AND USE THE PUSH BUTTON TUNER

1. Connect receiver to good antenna system and operate for fifteen minutes, then remove escutcheon surrounding push buttons.
2. Select five nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give better results when tuned manually. Any button may be used for a station on any part of the dial.
3. Loosen the screw at the side of the push button shaft (about one turn counter-clockwise will be sufficient). Keep the screw driver inserted in the screw slot and push against the screw. At the same time carefully tune in the station using the tuning knob. YOU MUST PUSH AGAINST THE SCREW DRIVER DURING THE ENTIRE TIME THAT YOU ARE TUNING.
   Now, still pushing against the screw driver, retighten the screw, turning it to the right (clockwise) until it is REASONABLY TIGHT. To turn further may result in damage to the mechanism.
4. The setup for this button is now complete. Set up the remaining buttons in the same manner and replace the escutcheon

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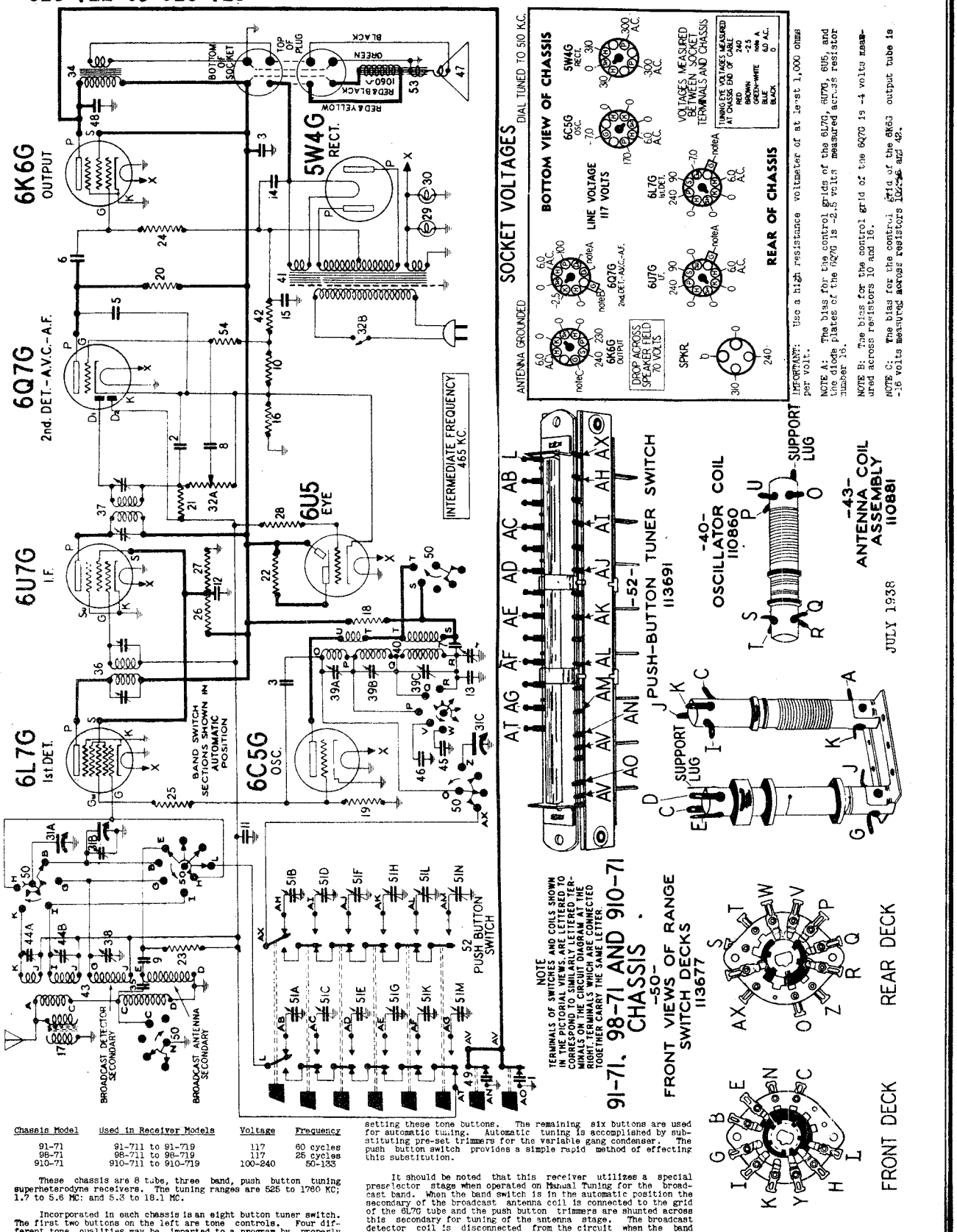
MODELS 91-711 to 91-719
Chassis 91-71
98-711 to 98-719
Chassis 98-71
910-711 to 910-719

# STEWART-WARNER CORP.

Chassis 910-71
Schematic, Voltage, Coils
Tuner Switch, Notes


6K6G OUTPUT
6Q7G 2nd. DET.-A.V.C.-A.F.
6U7G I.F.
6L7G 1st DET.
6C5G OSC.
6U5 EYE
5W4G RECT.
INTERMEDIATE FREQUENCY 465 KC.
BAND SWITCH SECTIONS SHOWN IN AUTOMATIC POSITION
BROADCAST DETECTOR SECONDARY
BROADCAST ANTENNA SECONDARY
SOCKET VOLTAGES
DIAL TUNED TO 510 KC.
ANTENNA GROUNDED
BOTTOM VIEW OF CHASSIS
REAR OF CHASSIS
LINE VOLTAGE 117 VOLTS
DROP ACROSS SPEAKER FIELD 70 VOLTS
IMPORTANT: Use a high resistance voltmeter of at least 1,000 ohms per volt.
NOTE A: The bias for the control grids of the 6L7G, 6U7G, 6U5, and the diode plates of the 6Q7G is -2.5 volts measured across resistor number 15.
NOTE B: The bias for the control grid of the 6Q7G is -4 volts measured across resistors 10 and 16.
NOTE C: The bias for the control grid of the 6K6G output tube is -18 volts measured across resistors 10 and 42.
J PUSH-BUTTON TUNER SWITCH 113691
-52-
-40- OSCILLATOR COIL 110860
-43- ANTENNA COIL ASSEMBLY 110881
JULY 1938
NOTE
TERMINALS OF SWITCHES AND COILS SHOWN IN THE PICTORIAL VIEWS ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM AT THE RIGHT. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.
91-71, 98-71 AND 910-71 CHASSIS
-50-
FRONT VIEWS OF RANGE SWITCH DECKS 113677
FRONT DECK
REAR DECK

| Chassis Model | Used in Receiver Models | Voltage | Frequency |
|---|---|---|---|
| 91-71 | 91-711 to 91-719 | 117 | 60 cycles |
| 98-71 | 98-711 to 98-719 | 117 | 25 cycles |
| 910-71 | 910-711 to 910-719 | 100-240 | 50-133 |

These chassis are 8 tube, three band, push button tuning superheterodyne receivers. The tuning ranges are 525 to 1760 KC; 1.7 to 5.6 MC; and 5.3 to 18.1 MC.

Incorporated in each chassis is an eight button tuner switch. The first two buttons on the left are tone controls. Four different tone qualities may be imparted to a program by properly setting these tone buttons. The remaining six buttons are used for automatic tuning. Automatic tuning is accomplished by substituting pre-set trimmers for the variable gang condenser. The push button switch provides a simple rapid method of effecting this substitution.

It should be noted that this receiver utilizes a special preselector stage when operated on Manual Tuning for the broadcast band. When the band switch is in the automatic position the secondary of the broadcast antenna coil is connected to the grid of the 6L7G tube and the push button trimmers are shunted across this secondary for tuning of the antenna stage. The broadcast detector coil is disconnected from the circuit when the band switch is in the automatic position.

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MODELS
91-711 to 91-719
98-711 to 98-719

# STEWART-WARNER CORP.

910-711 to 910-719
Alignment, Trimmers

## ALIGNMENT EQUIPMENT & PROCEDURE

For alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 16.0 MC. are required.

1- Connect the output meter across the voice coil or between the plate of the 6K6G tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

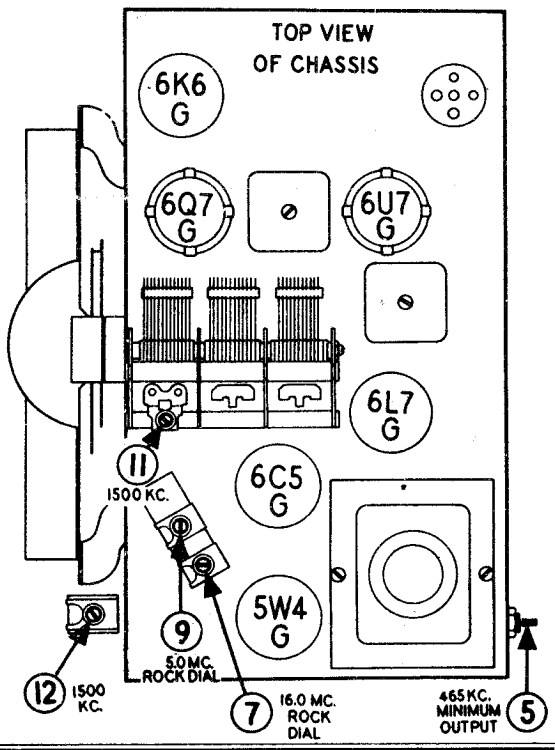
2- Connect the ground lead of the signal generator to the chassis of the receiver.

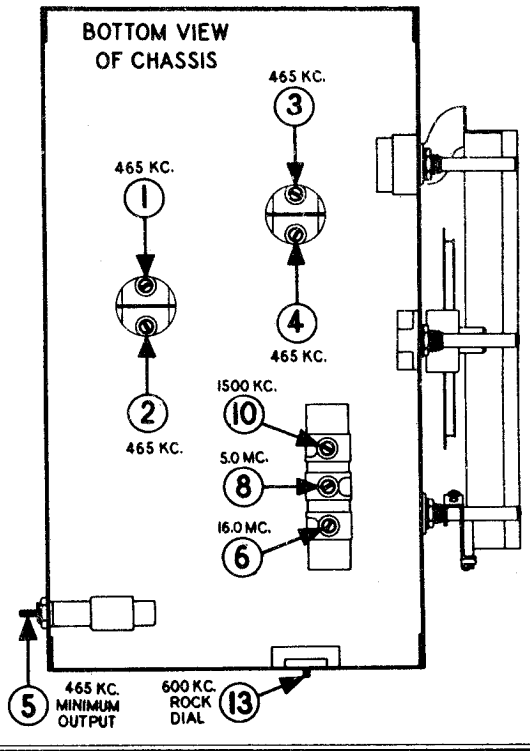
3- Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

4- With the gang condenser in full mesh set the pointer on the last scale division on the low frequency end of the dial. This may be accomplished by releasing the clip on the pointer slider; where it attaches to the dial cord.

IMPORTANT: THE BROADCAST BAND MUST BE ALIGNED AFTER THE SHORT-WAVE BAND.

| DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR | CONNECTION OF SIG. GEN. OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RANGE SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 6L7G TUBE | 465 KC. | BROADCAST (MANUAL TUNING) | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 1ST I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT |
| | | | | | 3-4 | 2ND I.F. | |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 465 KC. | BROADCAST (MANUAL TUNING) | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 16 MC. | SHORT WAVE (Counter-clockwise) | 16 MC. | 6 | SHORT WAVE OSCILLATOR | ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 16 MC. | SHORT WAVE (Counter-clockwise) | TUNE TO 16 MC. GENERATOR SIGNAL | 7 | SHORT WAVE ANTENNA | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 5.0 MC. | POLICE | 5.0 MC. | 8 | POLICE OSCILLATOR | ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 5.0 MC. | POLICE | TUNE TO 5.0 MC. GENERATOR SIGNAL | 9 | POLICE ANTENNA | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1500 KC. | BROADCAST (MANUAL TUNING) | 1500 KC. | 10 | BROADCAST OSCILLATOR (Shunt) | ADJUST FOR MAXIMUM OUTPUT. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1500 KC. | BROADCAST (MANUAL TUNING) | TUNE TO 1500 KC. GEN. SIG. | 11 | ANTENNA | ADJUST FOR MAXIMUM OUTPUT. |
| | | | | | 12 | DETECTOR | |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 600 KC. | BROADCAST (MANUAL TUNING) | TUNE TO 600 KC. GENERATOR SIGNAL | 13 | BROADCAST OSCILLATOR (Series Pad) | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |

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## HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that your set is connected to the customers antenna and that the push button trimmers are set-up using this antenna (not the antenna in the service shop) otherwise the antenna trimmer will be incorrectly aligned.

2. Turn the set on and allow it to operate at least one-quarter hour before setting up the push buttons.

3. Make a list of six nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results, also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS AS INDICATED IN FIG. 1.
   Each of the buttons on your Push Button Tuner has a definite operating range, as shown in Fig. 1; therefore it is imperative that you select a station which is in the operating range of a button before attempting to set up that button for the particular station. AS THE TRIMMER SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER TRIMMER SCREWS ARE USED. The frequency of your local stations may be obtained from your newspaper or radio call magazine. For example, suppose you want to set a button to station WLW whose frequency falls within the operating range of buttons No. 3 or No. 4, whose range is 550 to 1000 kilocycles. IT SHOULD BE NOTED THAT WHENEVER IT IS POSSIBLE TO USE BUTTONS, HAVING DIFFERENT RANGES, TO SET TO A GIVEN STATION, THE CORRECT BUTTON TO USE WILL BE THAT ONE FOR WHICH THE TRIMMER SCREWS ARE NOT TOO LOOSELY SET. "DRIFTING" IS A DIRECT RESULT OF LOOSE TRIMMER SCREWS AND THEREFORE SUCH SETTINGS OF TRIMMER SCREWS SHOULD BE AVOIDED IF POSSIBLE.

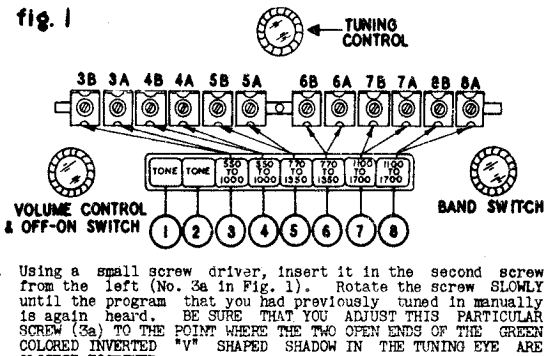
4. Remove the escutcheon surrounding the push buttons by taking out the five screws holding it to the cabinet. This will expose to view twelve trimmer adjusting screws, which are used to set each button to its correct station.

5. Turn the band switch to the BROADCAST MANUAL TUNING POSITION (position next to the extreme clockwise setting). Then use the tuning knob to bring in the station that you desire to set to button No. 3. This is done so that you may identify the station by hearing its program.

6. Now turn the band switch to the AUTOMATIC POSITION (extreme clockwise). You will note as this is done your station will not be heard.

7. Push in button No. 3 and turn your volume control to the maximum clockwise position.

fig. 1




8. Using a small screw driver, insert it in the second screw from the left (No. 3a in Fig. 1). Rotate the screw SLOWLY until the program that you had previously tuned in manually is again heard. BE SURE THAT YOU ADJUST THIS PARTICULAR SCREW (3a) TO THE POINT WHERE THE TWO OPEN ENDS OF THE GREEN COLORED INVERTED "V" SHAPED SHADOW IN THE TUNING EYE ARE CLOSEST TOGETHER. It is advisable that you turn the trimmer screw in and out so that it will tune across the station several times in order that you may be sure that you have located this correct tuning point.

9. Now insert the screw driver in the first trimmer screw on the left (No. 3b Fig. 1) and turn until the program is received with maximum volume, and the correct position is indicated by the ends of the inverted "V" in the tuning eye being closest together. Now go back to trimmer screw No. 3a and see if any improvement in reception can be made by adjusting it. Also repeat this operation for trimmer screw No. 3b.

10. Set up button No. 4 for the selected station in a similar manner, using trimmer screws No. 4a and No. 4b. The remaining buttons can all be set-up in the same fashion.

11. Label each button with the call letters of the stations you have selected, using the call letter tabs and the celluloid covers packed with your receiver. The printed paper tab should be inserted in the button by holding the ends and flexing it slightly, allowing it to snap into place. The celluloid cover tab should be flexed in a similar manner and placed on top of the paper tab.

12. In some instances it may be necessary, after the set is operated for a month or more, to reset the trimmers as they may drift due to heat, humidity, etc.

## HOW TO REPLACE THE DIAL CORD

Before attempting to replace the dial cord, fully mesh the gang condenser. The holes in drum A should be in the top position as shown in the diagram above.

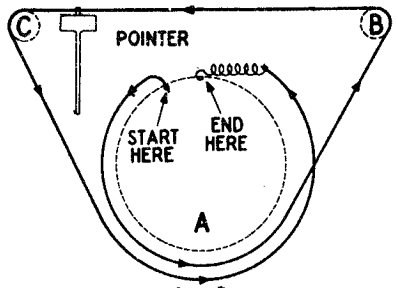



fig. 2

The pointer drive cord should be 33 inches or more in length. Place one end of the cord through the left hole in drum; then knot the end. Run the free end of the cord down around the drum and up to pulley B. Continue over pulley B to pulley C, then down to drum A. Bring the cord up around drum A. Tie the cord to the end of the tension spring so that the spring will be extended to about 1-1/8 inches, when hooked to the slot in the drum. Now place the pointer on its track so that it points to the last scale division on the low frequency end of the dial, then clip it to the cord.

## DIAL DRIVE AND MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 67449 | Screw - 8 X 3/8" Self Tapping (for dial brackets) | .03 |
| 67568 | Washer - embossed (for mtg. electrolytic) | .05 |
| 81066 | Cord - dial drive (35" lengths) - Per Ft. | .05 |
| 81089 | Spring - for tightening drive rope | .10 |
| 85427 | Socket - octal base (standard) | .15 |
| 85785 | Terminal Strip - antenna - ground | .15 |
| 86161 | Shield - tube (short section) | .08 |
| 86162 | Shield - tube (long section) | .08 |
| 86164 | Shield Cap - tube, grid type | .06 |
| 88810 | Rubber Mounting Bushing | .03 |
| 89746 | Washer - (paper) for back of knobs | .005 |
| 89911 | Shield - tube base | .04 |
| 89912 | Clip - grounding, for tube base | .02 |
| 110496 | Plug - speaker (4 prong) | .12 |
| 110501 | Socket - 4 prong (for speaker) | .16 |
| 110827 | Socket - dial lamp | .12 |
| 110679 | Knob - tuning | .20 |
| 110690 | Drum - and disc assembly | .48 |
| 110693 | Bracket - dial support (R.H.) | .25 |
| 110694 | Bracket - dial support (L.H.) | .25 |
| 110707 | Frame - dial; with scale complete | 1.70 |
| 110711 | Scale - dial | .85 |
| 110715 | Shaft - dial drive (with brkt. & indic. assem.) | 1.00 |
| 110785 | Pointer - dial | .14 |
| 110817 | Speed nut - retainer for escutcheon to cabinet | .01 |
| 110829 | Washer - flat steel, for mtg. chassis | .01 |
| 110830 | Screw - #10 X 1 for chassis mtg. | .03 |
| 111030 | Escutcheon - with glass window | 1.30 |
| 111085 | Sleeve - felt for tuning eye | .03 |
| 112879 | Screw - escutcheon mtg. #2 X 3/8 | .03 |
| 113040 | Light Shield - cardboard (between button holes and dial frame) | .06 |
| 113102 | Push Button - (See 113717 for special tone button) | .08 |
| 113189 | Tab - Celluloid - for push button - Per dz. | .09 |
| 113321 | Tabs - station call letters (4 sheets) (brown) - Per set | .40 |
| 113323 | Tab - Trimmer range (550 to 1000) - Per dz. | .09 |
| 113324 | Tab - Trimmer range (770 to 1350) | .01 |
| 113325 | Tab - Trimmer range (1100 to 1700) | .01 |
| 113692 | Escutcheon - around push buttons | 1.10 |
| 113694 | Cable & Plug - for tuning eye | .74 |
| 113717 | Push button for tone control only | .10 |

## ELECTRICAL PARTS

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 83007 | Condenser - paper .02 mfd. 600 volt | .35 |
| 2 | 83539 | Condenser - mica 260 mmfd. | .20 |
| 3 | 85061 | Condenser - mica 51 mmfd. | .15 |
| 4 | 85285 | Condenser - padding | .40 |
| 5 | 85394 | Condenser - mica 510 mmf. | .25 |
| 6 | 88026 | Condenser - paper .02 mfd. 400 volt | .25 |
| 7 | 88030 | Condenser - paper .01 mfd. 400 volt | .25 |
| 8-9 | 88189 | Condenser - paper .05 mfd. 200 volt | .25 |
| 10 | 88465 | Wire Wound Resistor 25 ohms ½ watt | .15 |
| 11 | 88534 | Condenser - paper .05 mfd. 150 volt | .25 |
| 12 | 89421 | Condenser - paper .1 mfd. 200 volt | .25 |
| 13 | 89564 | Condenser - mica 345 mmfd. (3%) | .40 |
| 14 | 89937 | Condenser - elect. 30 mfd. 450 volt | 1.60 |
| 15 | 110377 | Condenser - elect. 10 mfd. 25 volt | .80 |
| 16 | 110534 | Resistor - wire wound 40 ohm ½ watt | .12 |
| 17 | 110536 | Coil - wave trap | 1.02 |
| 18 | 110550 | Resistor - carbon 10,000 ohms ½ W. | .15 |
| 19 | 110552 | Resistor - carbon 47,000 ohms ½ W. | .12 |
| 20 | 110553 | Resistor - carbon 220,000 ohms ½ W. | .12 |
| 21-22 | 110554 | Resistor - carbon 1 meg. 1/4 watt | .12 |
| 23-24 | 110559 | Resistor - carbon 470,000 ohms ½ W. | .12 |
| 25 | 110560 | Resistor - carbon 100 ohm 1/4 watt | .12 |
| 26 | 110561 | Resistor - carbon 15,000 ohms 2 W. | .30 |
| 27 | 110562 | Resistor - carbon 22,000 ohms ½ W. | .12 |
| 28 | 110570 | Resistor - carbon 2.2 meg. 1/4 watt | .15 |
| 29-30 | 110629 | Lamp - 6.3 volt - .25 amps. | .15 |
| 31A to C | 110743 | Condenser - variable gang | 4.50 |
| 32A-32B | 110766 | Volume Control - 1 meg. (with on-off switch) | .90 |
| 33 | 110768 | Condenser - elect. 8 mfd. 450 volt | 1.25 |
| 34 | 110789 | Transformer - output | 1.65 |
| 35 | 110850 | Condenser - wire - 7 mmf. | .18 |
| 36 | 110851 | Transformer - 1st I.F. | 1.85 |
| 37 | 110853 | Transformer - 2nd I.F. | 1.65 |
| 38 | 110854 | Condenser - trimmer (single section) | .24 |
| 39A to C | 110859 | Condenser - trimmer (3 section for osc. coil) | .65 |
| 40 | 110860 | Coil - osc. (less trimmers) | 1.40 |
| 41 | 110862 | Transformer - power (115 V. 60 cycle) | 5.00 |
| 41 | 112076 | Transformer - power (115 V. 25 cycle) | 7.50 |
| 42 | 110872 | Resistor - wire wound 160 ohms 1 W. | .12 |
| 43 | 110881 | Coil - assembly (antenna & preselector) with trimmers | .90 |
| 44A-44B | 110862 | Condenser - trimmer (2 section for ant. coil | .44 |
| 45 | 110906 | Condenser - mica .00332 mfd. (3%) | .40 |
| 46 | 110907 | Condenser - mica 960 mmfd. (3%) | .30 |
| 47 | 110945 | Cone - and voice coil assem. (for R-279A spkr.) | 1.80 |
| 48-49 | 111214 | Condenser - paper .01 mfd. 600 volt | .24 |
| 41 | 112076 | Transformer - power (115 V. 25 cycle) | 7.50 |
| 50 | 113677 | Range Switch | 1.20 |
| 51A to N | 113690 | Trimmer condenser for push button complete assembly | 2.75 |
| 52 | 113691 | Push button switch (8 keys) | 4.20 |
| 53 | R-279-A | Speaker - dynamic 10 inch | 8.00 |
| 54 | 110554 | Resistor - carbon 1 meg. 1/4 watt | .12 |

MODELS 91-811 to 91-819
Chassis 91-81
98-811 to 98-819
Chassis 98-81
910-811 to 910-819
Chassis 910-81
Tuner Data,
Drive Cord Data

# STEWART-WARNER CORP.

| CHASSIS MODEL | USED IN RECEIVER MODELS | VOLTAGE | FREQUENCY |
|---|---|---|---|
| 91-81 | 91-811 to 91-819 | 117 | 60 cycles |
| 98-81 | 98-811 to 98-819 | 117 | 25 Cycles |
| 910-81 | 910-811 to 910-819 | 100-240 | 50-133 |

These chassis are 8 tube, three band, push button tuning superheterodyne receivers. The tuning ranges are 530 to 1730 KC, 2.2 to 7.0 MC and 6.8 to 22.5 MC.

Incorporated in each chassis is an eight button tuner switch. The first two buttons on the left are tone controls. Four different tone qualities may be imparted to a program by properly setting these tone buttons. The remaining six buttons are used for automatic tuning. Automatic tuning is accomplished by substituting pre-set trimmers for the variable gang condenser. The push-button switch provides a simple rapid method of effecting this substitution.

It should be noted that the R.F. stage in this receiver operates only on the Broadcast Band. When the band switch is in the "Automatic", "Intermediate" or "Foreign" positions this R.F. stage is not utilized.

A feature of this set is the special push-pull output stage. Instead of using a push-pull input transformer or a separate phase inverter tube the phase inversion is accomplished as follows. One of the 6K6G output tubes has a 3,300 ohm load resistor in its screen circuit across which is built up an audio voltage which is 180 electrical degrees out of phase with respect to the input grid voltage. This phase inverted voltage obtained across the screen resistor is now applied to the grid of the other output tube in this push-pull output combination. NOTE: It can be readily seen from the above explanation that if the 6K6G output tube, from which the phase inversion voltage is obtained, is removed from the set or becomes defective, it will be impossible for any signal to be heard in the speaker.

## HOW TO SET UP THE PUSH-BUTTON TUNER

1. Be sure that the customer has an adequate antenna system and that the push button trimmers are set-up using this antenna (not the antenna in the service shop) otherwise the antenna trimmer will be incorrectly aligned.

2. Turn on the set and allow it to operate at least one quarter-hour before setting up the push buttons.

3. Make a list of the frequencies, of six nearby stations to which you wish to set-up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS, as indicated in Fig. 1.

Each of the buttons on your Push Button Tuner has a definite operating range, as shown in Fig. 1, therefore, it is imperative that you select a station whose frequency is in the operating range of a button before attempting to set-up that button for the particular station.

AS THE ADJUSTING SCREWS SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED, IT IS IMPORTANT THAT THE PROPER BUTTON BE SELECTED. The frequencies of your local stations may be obtained from your newspaper or radio call magazine. For example, suppose you want to set a button to station WLW whose frequency is 700 kilocycles. Refer to Fig. 1 which shows that this frequency falls within the operating range of buttons No. 3 or No. 4, whose range is 550 to 1000 KC. Therefore either button No. 3 or No. 4 can be used for the automatic tuning of WLW.

IT SHOULD BE NOTED THAT WHENEVER IT IS POSSIBLE TO USE TWO BUTTONS, HAVING DIFFERENT RANGES, TO SET TO A GIVEN STATION, THE CORRECT BUTTON TO USE WILL BE THAT ONE FOR WHICH THE TRIMMER SCREWS ARE NOT TOO LOOSELY SET. "DRIFTING" IS A DIRECT RESULT OF LOOSE TRIMMER SCREWS AND THEREFORE SUCH SETTINGS OF TRIMMER SCREWS SHOULD BE AVOIDED IF POSSIBLE.

4. Remove the escutcheon around the push-button by taking out the six screws holding it to the cabinet. This will expose to view twelve adjusting screws, each pair of which is used to tune a button to its correct station. The trimmers associated with each button are shown in Figure 1.

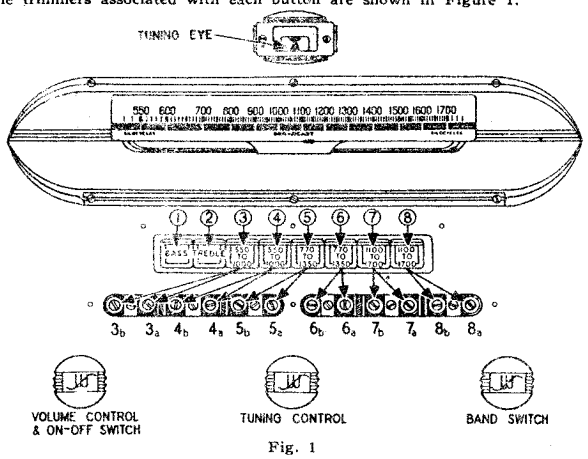

TUNING EYE
550 600 700 800 900 1000 1100 1200 1300 1400 1500 1600 1700
1 2 3 4 5 6 7 8
3b 3a 4b 4a 5b 5a 6b 6a 7b 7a 8b 8a
VOLUME CONTROL & ON-OFF SWITCH
TUNING CONTROL
BAND SWITCH

Fig. 1

5. Turn the band switch control (Right hand knob) clockwise until the BROADCAST SCALE appears on the roller dial. Then using the tuning knob (center) tune in the station you desire to set to button No. 3. This is done so that you may identify the station by hearing its program.

6. Now turn the band switch knob to the extreme clockwise position (The words "MAGIC KEYBOARD" will now appear in the dial scale opening). You will note when this switch is turned the station tuned in will not be heard.

7. Now push in the third button from the left (No. 3 in Fig. 1). Using a small screw driver insert it in the second screw from the left (No. 3a in Fig. 1). Rotate the screw SLOWLY until the program that you have previously tuned in manually is again tuned in. If it cannot be heard, advance the volume control. BE SURE THAT YOU ADJUST THIS PARTICULAR SCREW (3a) TO THE POINT WHERE THE TWO OPEN ENDS OF THE INVERTED "V" SHADOW IN THE "TUNING EYE" ARE CLOSEST TOGETHER. It is advisable that you turn the screw in and out so that it will tune across the station several times in order that you may be sure that you have located this correct tuning point.

8. Next insert the screw-driver in the first screw on the left (No. 3b Fig. 1) and turn it until the program is received with maximum volume. The correct position is indicated by the ends of the inverted "V" in the "Tuning Eye" being closest together. Now go back to screw No. 3a and see if any improvement in the reception can be made by adjusting it. Also repeat this operation for screw No. 3b.

9. Set up button No. 4 for the selected station in a similar manner, using screws No. 4a and 4b, and proceed to set up the remaining buttons in the same fashion, always tuning in the station initially with the "a" screw for that particular button.

10. Label each button with the call letters of the station you have selected using the call letter tabs and celluloid covers packed with your receiver. The printed paper tab should be inserted in the button by holding the ends and flexing them slightly and then allowing the tab to snap into place. The celluloid cover tab should be flexed in a similar manner and placed over the paper tab.

### IMPORTANT

11. In some instances it may be necessary, after the set is operated for a month or more, to reset the screws as they may change their setting due to heat, humidity, etc.

## HOW TO CHANGE THE OPERATING RANGE OF A BUTTON

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

| Part Number | Tuning Range | List Price |
|---|---|---|
| 112942 | 1100 to 1700 KC. | $0.36 |
| 112943 | 770 to 1350 KC. | .45 |
| 112944 | 550 to 1000 KC. | .50 |

To make the change proceed as follows:

1. Remove the chassis from the cabinet.

2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.

3. Unsolder the leads from the four terminals on the back of this dual trimmer.

4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.

5. From the above list select a dual trimmer which will cover the desired range.

6. Mount it on the front of the chassis with the 6/32 machine screw, and solder the leads to its four terminals.
The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

## REPLACING THE ROLLER DIAL DRIVE CORD

1. Tie a tension spring, part number 113177, to one end of about 30" of special dial cord part No. 111302.

2. Tie a large knot in the cord, 6¼" from the tension spring.

3. Turn the range switch to the Short-Wave position—all the way counter-clockwise. Pulley A on the range switch shaft should be in the position shown in Fig. 2.

4. Place the knot on the cord in slot B.

5. With the long free end of the cord (not the end with the spring attached), take 1½ turns clockwise around pulley A, then thread the end up through hole C back of pulley D and up to the front of pulley E.

6. Turn pulley E until the slot F is up as shown in the figure. Now, with the free end of the cord wind clockwise; 1½ turns around E, out through slot F, 1 turn around G, back through slot F, and 1¼ turns around E.

7. Bring the cord down back of pulley H and leave it hang for the time being.

8. With the end of the cord to which the tension spring is attached, take 1½ turns counter-clockwise around pulley A, (when viewed from the right end) and bring the cord up through hole C.

9. Tie the free end of the cord hanging over pulley H, to the upper end of the tension spring. The spring should be extended so it is approximately 1½" long when the tension in the cord system is equalized.

If the Short Wave scale on the dial is not in the proper position under the pointer, loosen the set screw in hub G, rotate the dial scale to the proper position and tighten the set screw.

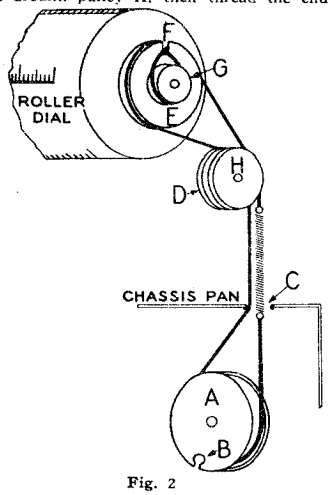



Fig. 2

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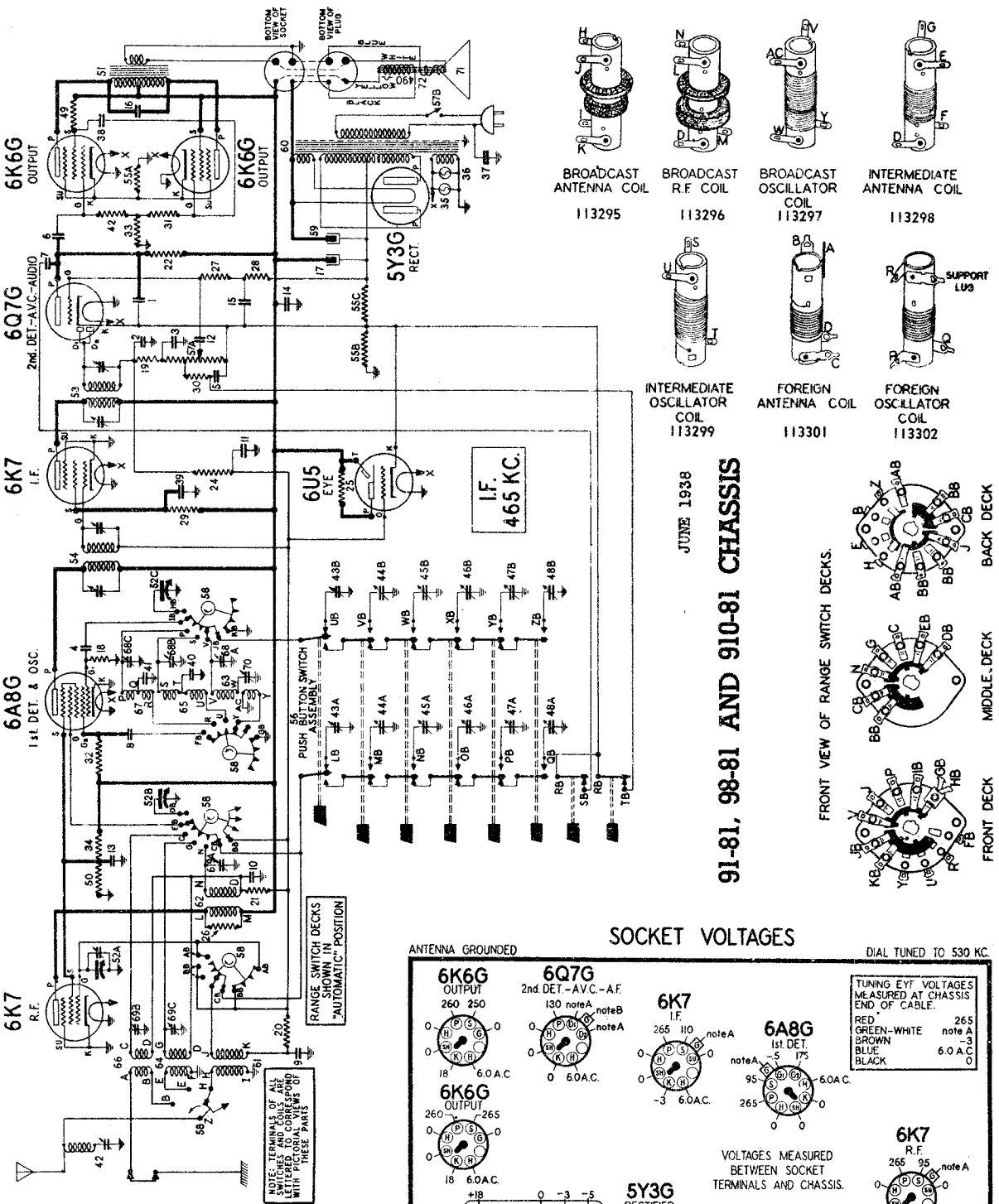
MODELS 91-811 to 91-819
98-811 to 98-819
910-811 to 910-819

# STEWART-WARNER CORP.

Schematic, Voltage, Socket
Tuner Switch, Coils


6K6G OUTPUT
6K6G OUTPUT
6Q7G 2nd. DET.-AVC.-AUDIO
5Y3G RECT.
6K7 I.F.
6U5 EYE
I.F. 465 KC.
6A8G 1st. DET. & OSC.
6K7 R.F.
PUSH BUTTON SWITCH ASSEMBLY
RANGE SWITCH DECKS SHOWN IN "AUTOMATIC" POSITION
NOTE: TERMINALS OF ALL SWITCHES ARE LETTERED TO CORRESPOND WITH PICTORIAL VIEWS OF THESE PARTS
PUSH-BUTTON TUNER SWITCH
TB SB JB JCB
RB RB QB PB OB NB MB LB
ZB YB XB WB VB UB

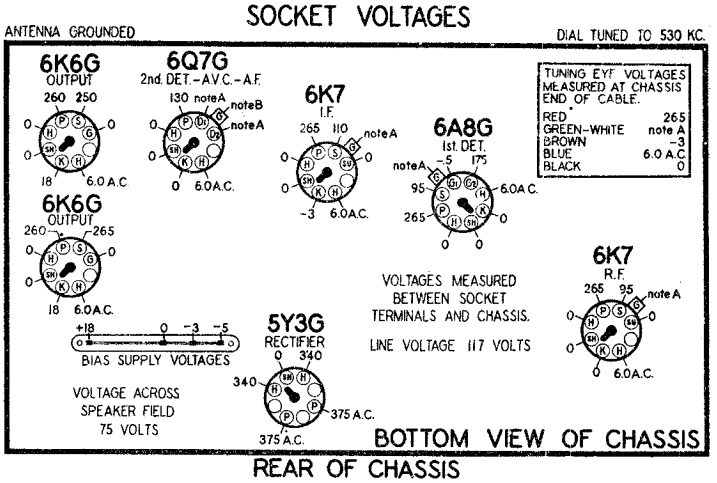



JUNE 1938

## 91-81, 98-81 AND 910-81 CHASSIS




## SOCKET VOLTAGES




Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8-G, 6K7 R. F., 6K7 I. F., 6U5 and the diode plates of the 6Q7-G tubes is -3 volts measured across resistor 55B.

NOTE B: The bias for the control grid of the triode section of the 6Q7-G tube is -5 volts measured across resistors 55B and 55C.

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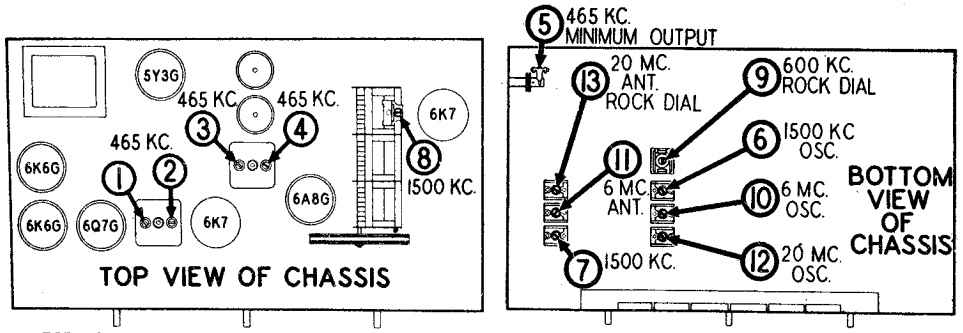
# MODELS 91-811 to 91-819, 98-811 to 98-819, 910-811 to 910-819 — STEWART-WARNER CORP.

## Alignment, Trimmers, Parts




FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 20 MC are required.

(1) Connect the output meter across the voice coil or across the plates of the 6K6G output tubes depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2) Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis. NOTE: The "G" and "D" terminals on this terminal strip must be connected together.

(3) Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.

(4) With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser to full mesh with the pointer properly set, then retighten the set screw.

| Dummy Ant. in Series with Sig. Gen. | Connection of Sig. Generator Output to Receiver | Signal Generator Frequency | Band Switch Position (Indicated by Roller Dial) | Receiver Dial Setting | Trimmer Number | Trimmer Description | Type of Adjustment |
|---|---|---|---|---|---|---|---|
| .1 MFD Condenser | Control Grid of 6A8-G Tube | 465 KC | Broadcast | Any Point Where It Does Not Affect the Signal | 1-2 | 2nd I.F. | Adjust for Maximum Output. Then Repeat Adjustment. |
| | | | | | 3-4 | 1st I.F. | |
| 400 OHM Carbon Resistor | Antenna Terminal | 465 KC | Broadcast | Any Point Where It Does Not Affect the Signal | 5 | Wave Trap | Adjust for Minimum Output. Using a Strong Generator Signal. |
| 400 OHM Carbon Resistor | Antenna Terminal | 1500 KC | Broadcast | 1500 KC | 6 | Broadcast Oscillator (Shunt) | Adjust for Maximum Output. |
| 400 OHM Carbon Resistor | Antenna Terminal | 1500 KC | Broadcast | Tune to 1500 KC Generator Signal | 7 | Broadcast Detector | Adjust for Maximum Output. |
| | | | | | 8 | Broadcast Antenna | |
| 400 OHM Carbon Resistor | Antenna Terminal | 600 KC | Broadcast | Tune to 600 KC Generator Signal | 9 | Broadcast Oscillator (Series) | Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is Obtained. |
| 400 OHM Carbon Resistor | Antenna Terminal | 6 MC | Intermediate | 6 MC | 10 | Intermediate Oscillator | Adjust for Maximum Output. Check to see if Proper Peak was Obtained by Tuning in Image at Approx. 5.1 MC. If Image does not appear, Realign at 6MC. with Trimmer, Screw farther Out. Recheck Image. |
| 400 OHM Carbon Resistor | Antenna Terminal | 6 MC | Intermediate | Tune to 6 MC Generator Signal | 11 | Intermediate Antenna | Adjust for Maximum Output. |
| 400 OHM Carbon Resistor | Antenna Terminal | 20 MC | Foreign | 20 MC | 12 | Foreign Oscillator | Adjust for Maximum Output. Check to see if Proper Peak was obtained by Tuning in Image at Approx. 19.1 MC. If Image does not appear Realign at 20MC with Trimmer Screw farther Out. Recheck Image. |
| 400 OHM Carbon Resistor | Antenna Terminal | 20 MC | Foreign | Tune to 20 MC Generator Signal | 13 | Foreign Antenna | Adjust for Maximum Output. Try to Increase Output by Detuning Trimmer and Retuning Receiver Dial until Maximum Output is obtained. |

## DIAL AND MISCELLANEOUS PARTS

| Part No. | Description | List Price |
|---|---|---|
| 111302 | Cord—dial drive 6 or 50 ft. lengths.....Per ft. | .05 |
| 111855 | Shield Base—for tube shields mtg. | .02 |
| 112344 | Shield—tube, 1 x 2½ x 3 | .10 |
| 112876 | Screw—P. B. escutcheon mtg. No. 3 x ⅜ | .01 |
| 112879 | Screw—eye escutcheon mtg. No. 2 x ⅜ | .03 |
| 113019 | Clip—dial scale retaining | .01 |
| 113025 | Socket—octal base (with special ground) | .15 |
| 113040 | Light Shield—cardboard (between button holes and dial frame) | .06 |
| 113041 | Knob—tuning or volume control | .10 |
| 113077 | Shield—tube | .15 |
| 113102 | Push Button—only (See 113717 for Tone Button) | .08 |
| 113135 | Escutcheon—for eye | .25 |
| 113177 | Spring—dial cord tension | .09 |
| 113189 | Tab—celluloid—for push button | .09 |
| 113205 | Thrust Plate—for tuning shaft | .02 |
| 113206 | Pulley—on auxiliary range switch shaft | .20 |
| 113207 | Gear—on range switch shaft | .40 |
| 113208 | Dial End Cup—right side | .14 |
| 113260 | Pointer—dial | .14 |
| 113281 | Shaft—tuning | .12 |
| 113282 | Cable and Plug—for tuning eye | .66 |
| 113290 | Shaft—auxiliary range switch | .12 |
| 113300 | Dial Scale—(celluloid) (3 sheets) (brown) | .45 |
| 113321 | Tabs—station call letters (4 sheets) (brown) | .40 |
| 113323 | Tab—trimmer range (550 to 1000)Per doz. | .09 |
| 113324 | Tab—trimmer range (770 to 1350) | .01 |
| 113325 | Tab—trimmer range (1100 to 1700) | .01 |
| 113338 | Drum—dial drive | .54 |
| 113340 | Socket—dial lamp | .22 |
| 113347 | Gear—on range switch shaft | .20 |
| 113348 | Bracket—dial (R.H.) | .40 |
| 113349 | Bracket—dial (L.H.) | .42 |
| 113352 | Pulley—Right End of Roller Dial Shaft | .20 |
| 113353 | Dial End Cup—left side | .16 |
| 113354 | Escutcheon—dial | 2.50 |
| 113355 | Escutcheon—around push-buttons | 1.00 |
| 113442 | Bracket—for tuning eye mtg. | .16 |
| 113443 | Rubber Bushing—chassis mtg. | .03 |
| 113717 | Tone Control Push Button (with nick) | .10 |
| 113718 | Celluloid Window (for escutcheon) | .85 |

## ELECTRICAL PARTS

| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1 | 83539 | Condenser—mica 260 mmfd. | $ 0.20 |
| 2-3 | 83783 | Condenser—mica 110 mmf. | .20 |
| 4 | 85061 | Condenser—mica 51 mmfd. | .15 |
| 5-6 | 88026 | Condenser—paper .02 mfd. 400 volt | .25 |
| 7 | 88029 | Condenser—paper .01 mfd. 400 volt | .25 |
| 8 | 88030 | Condenser—paper .05 mfd. 400 volt | .25 |
| 9-10-11-12 | 88189 | Condenser—paper .05 mfd. 200 volt | .25 |
| 13-14 | 88682 | Condenser—paper .1 mfd. 400 volt | .25 |
| 15 | 89421 | Condenser—paper .1 mfd. 200 volt | .25 |
| 16 | 89826 | Condenser—paper .004 mfd. 730 volt | .24 |
| 17 | 89914 | Condenser—paper .25 mfd. 400 volt | 1.20 |
| 18-19 | 110552 | Resistor—carb. 47,000 ohms ¼ watt | .12 |
| 20-21-22-23 | 110553 | Resistor—carb. 220,000 ohms ¼ watt | .12 |
| 24-25 | 110554 | Resistor—carb. 1 meg. ¼ watt | .12 |
| 26 | 110557 | Resistor—carb. 4700 ohm ¼ watt | .12 |
| 27-28 | 110558 | Resistor—carb. 100,000 ohm ¼ watt | .12 |
| 29 | 110564 | Resistor—carb. 470 ohm ¼ watt | .12 |
| 30-31 | 110565 | Resistor—carb. 22,000 ohm ¼ watt | .12 |
| 32 | 110568 | Resistor—carb. 15,000 ohm 1 watt | .15 |
| 33 | 110578 | Resistor—carb. 68,000 ohm ¼ watt | .12 |
| 34 | 110596 | Resistor—carb. 15,000 ohm 3 watt | .25 |
| 35-36 | 111214 | Condenser—paper .01 mfd. 600 volt | .24 |
| 37 | 111232 | Condenser—paper .05 mfd. 400 volt | .13 |
| 38-39 | 112426 | Condenser—mica 1650 mmfd. (3%) | .30 |
| 40 | 112427 | Condenser—mica 4050 mmfd. (3%) | .40 |
| 41 | 112946 | Coil—wave trap (with trimmer) | .55 |
| 42A-42B | 112942 | Condenser—Dual Push Button trimmer (1100 KC to 1700 KC) | .36 |
| 43A-43B | | | |
| 44A-44B | | | |
| 45A-45B | 112943 | Condenser—Dual Push Botton trimmer (770 KC to 1350 KC) | .45 |
| 46A-46B | | | |
| 47A-47B | 112944 | Condenser—Dual Push Button Trimmer (550 KC to 1000 KC) | .50 |
| 48A-48B | | | |
| 49 | 112952 | Resistor—carb. 3300 ohm ¼ watt | .10 |
| 50 | 112954 | Resistor—carb. 10,000 ohm 1 watt | .16 |
| 51 | 113667 | Transformer—output (for model 910-81) | 2.10 |
| 52A to 52C | 113216 | Condenser—mica 2,000 mmfd. | 2.40 |
| 53 | 113229 | Transformer—2nd I. F. | 6.50 |
| 54 | 113237 | Transformer—1st I. F. | 1.64 |
| 55A to 55C | 113251 | Resistor—wire wd. (Sec. A, 240 ohms Sec. B, 26 ohms Sec. C, 18 ohms | $0.42 |
| 56 | 113253 | Push Button Switch Assem. | 3.80 |
| 57A-57B | 113254 | Volume Control—250,000 ohms (with switch) | .94 |
| 58 | 113255 | Switch—range | 2.10 |
| 59 | 113261 | Condenser—elect. 30 mfd. 450 volt | 1.40 |
| | 113271 | Transformer—power 117 V. 60 cycle | 6.00 |
| | 113672 | Transformer—power 117 V. 25 cycle | 10.50 |
| 60 | 113670 | Transformer—power 100-240 V. 50-133 cycles) | 12.00 |
| 61 | 113295 | Coil—antenna (B.C.) | 1.20 |
| 62 | 113296 | Coil—R.F. (B.C.) | 1.30 |
| 63 | 113297 | Coil—oscillator (B.C.) | .48 |
| 64 | 113298 | Coil—antenna (police) | .50 |
| 65 | 113299 | Coil—oscillator (police) | .44 |
| 66 | 113301 | Coil—antenna (S.W.) | .52 |
| 67 | 113302 | Coil—oscillator (S.W.) | .55 |
| 68A to 68C | 113319 | Condenser—trimmer—3 section | .54 |
| 69A to 69C | 113320 | Condenser—trimmer—3 section | .54 |
| 70 | 113346 | Coil—wave trap | .88 |
| 71 | R-113482 | Coil—voice coil for R-115016 spkr. | 2.10 |
| 60 | 113662 | Transformer—power 117 volt 25 cycle | 10.50 |
| 51 | 113667 | Transformer—output (for model 910-81) | 2.40 |
| 60 | 113670 | Transformer—power 100-240 volt 50-133 cycles | 12.00 |
| 72 | R-115016 | Speaker—dynamic 12 inch | 10.00 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

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## ELECTRICAL PARTS

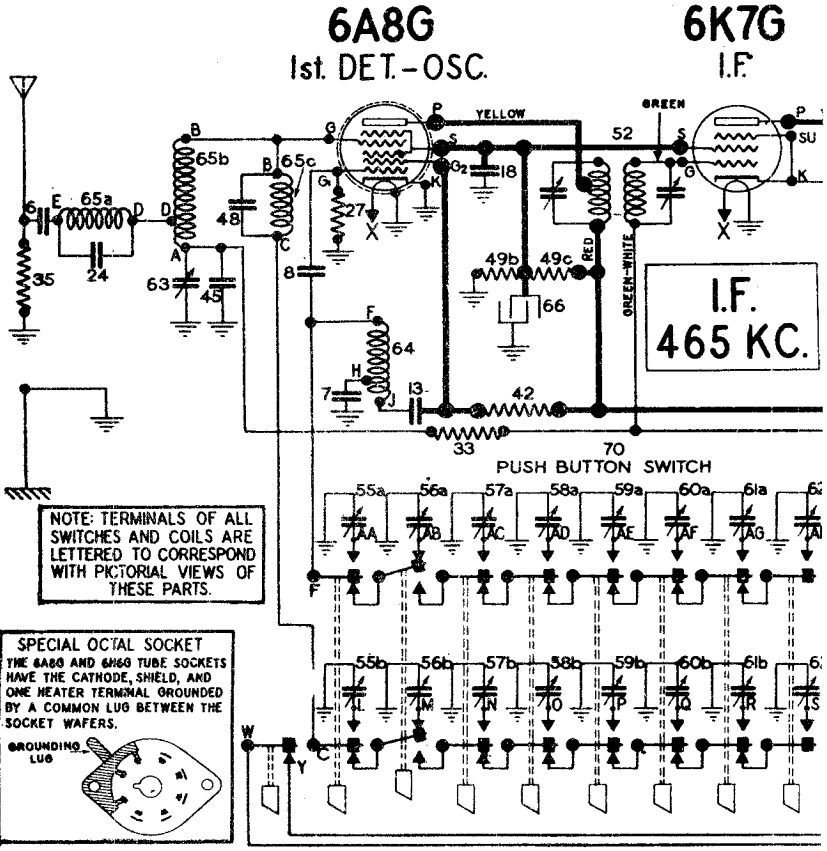
| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 83539 | Condenser - mica 260 mmfd. | .20 |
| 2-3-4-5 | 83783 | Condenser - mica 110 mmf. | .20 |
| 6 | 83784 | Condenser - mica .0011 mfd. | .25 |
| 7 | 84371 | Condenser - mica .0004 mfd. 10% | .20 |
| 8 | 85061 | Condenser - mica 51 mmfd. | .15 |
| 9-10-11-12 | 88026 | Condenser - paper .02 mfd. 400 volt | .25 |
| 13-14-15 | 88030 | Condenser - paper .01 mfd. 400 volt | .25 |
| 16 | 88191 | Condenser - paper .1 mfd. 300 volt | .25 |
| 17-18 | 89421 | Condenser - paper .1 mfd. 200 volt | .25 |
| 19 | 89532 | Condenser - paper .25 mfd. 200 volt | .32 |
| 20 | 89643 | Condenser - paper .25 mfd. 300 volt | .40 |
| 21 | 89937 | Condenser - elect. 30 mfd. 450 volt | 1.60 |
| 22-23 | 110377 | Condenser - elect. 10 mfd. 25 volt | .80 |
| 24 | 110510 | Condenser - wire 3 mmfd. | .12 |
| 25-26<br>27-28 | 110552 | Resistor - carb. 47,000 ohms ½ watt | .12 |
| 29-30-31 | 110553 | Resistor - carb. 220,000 ohms ½ watt | .12 |
| 32-33-34 | 110554 | Resistor - carbon 1 megohm 1/4 watt | .12 |
| 35 | 110557 | Resistor - carb. 4,700 ohms 1/4 watt | .12 |
| 36 | 110559 | Resistor - carb. 470,000 ohms ½ watt | .12 |
| 37-38-39<br>40-41 | 110564 | Resistor - carb. 100,000 ohms ½ watt | .12 |
| 42 | 110592 | Resistor - carb. 22,000 ohms 1 watt | .12 |
| 43-44 | 110629 | Lamp - 6.3 volt - .25 amps. | .15 |
| 45 | 111122 | Condenser - mica 3,580 mmfd. (3%) | .48 |
| 46 | 112182 | Resistor - wire wound 27 ohm ½ watt | .12 |
| 47 | 112961 | Resistor - carb. 2,700 ohm 1/4 watt | .12 |
| 48 | 113886 | Condenser - mica .0002 mfd. (3%) | .22 |
| 49A to 49D | 113895 | Resistor - Bleeder<br>Section A - 1500 ohms<br>Section B - 2800 ohms<br>Section C - 2800 ohms<br>Section D - 170 ohms | 1.15 |
| 50 | 113896 | Transformer - output | 1.92 |
| 51 | 113939 | Filter Choke | 2.10 |
| 52 | 113941 | Transformer - 1st I.F. | 1.54 |
| 53 | 113946 | Transformer - 2nd I.F. | 1.50 |
| 54 | 113948 | Transformer - power 117 V.50-60 C. | 9.20 |
| 55A-55B<br>56A-56B | 113953 | Condenser - trimmer (1170 to 1350KC) | .46 |
| 57A-57B<br>58A-58B<br>59A-59B<br>60A-60B | 113954 | Condenser - trimmer(650 to 1300 KC) | .60 |
| 61A-61B<br>62A-62B | 113955 | Condenser - trimmer (540 to 770 KC) | .62 |
| 63 | 113956 | Condenser - padder | .34 |
| 64 | 113957 | Coil - oscillator | .42 |
| 65A-65B-65C | 113959 | Coil - antenna | 1.10 |
| 66 | 113961 | Condenser - elect. 10 mfd. 200 volt | .60 |
| 67 | 113962 | Condenser - elect. 10 mfd. 450 volt | .72 |
| 68 | 113963 | Condenser - elect. 16 mfd. 450 volt | .68 |
| 69 | 113965 | Condenser - elect. 16 mfd. 450 volt | 1.04 |
| 70 | 113966 | Switch - push button | 5.40 |
| 71 | 113967 | Volume control | .84 |
| 72 | 113968 | Switch - tone control | .66 |
| 73 | J-114138 | Cone - voice coil assembly for J-115029 speaker | 2.90 |
| 74 | J-115029 | Speaker - dynamic (10 in.) | 8.90 |

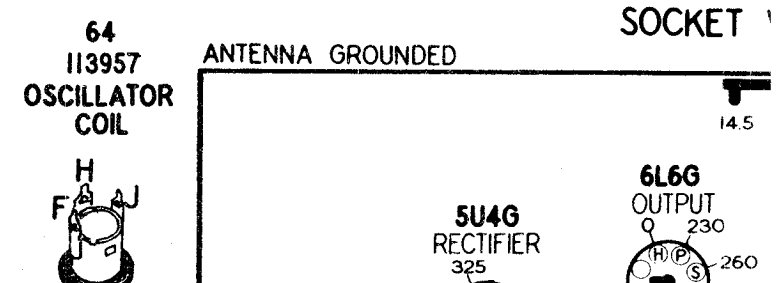
## DIAL & MISCELLANEOUS PARTS.

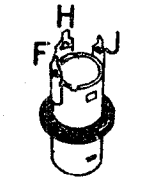
| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 114451 | Cabinet Leg - Front | 1.00 |
| 114452 | Cabinet Leg - Rear | 1.00 |
| 112745 | Clip for coil mounting | .01 |
| 114297 | Escutcheon - for push buttons | 1.60 |
| 114211 | Knobs - for volume or tone | .16 |
| 110496 | Plug - Speaker (4 prong) | .12 |
| 113651 | Push button | .08 |
| 114096 | Screw - chassis mtg. #10-32 X 1¼ | .02 |
| 112879 | Screw - escutcheon mtg. #2 X 3/8 | .03 |
| 113077 | Shield - tube | .15 |
| 81834 | Socket - 6 prong | .10 |
| 110501 | Socket - 4 prong (for speaker) | .16 |
| 114223 | Socket - dial lamp | .18 |
| 114811 | Socket - octal base (standard) | .15 |
| 114512 | Socket - octal base (with special ground) | .15 |
| 114250 | Tabs - station call letters | .55 |
| 85785 | Terminal strip - antenna - ground | .15 |
| 89709 | Terminal strip - phono | .15 |
| 87568 | Washer - embossed (for mtg. electrolytic) | .05 |
| 110829 | Washer - flat steel, for mtg. chassis | .01 |
| 89746 | Washer - (paper) for back of knobs) | .005 |

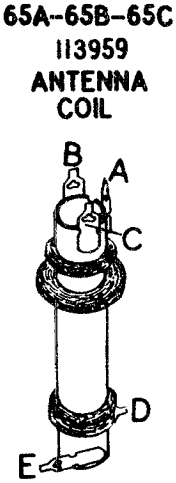
PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

# MODELS 91-82, 98-82 AND 910-82 CHASSIS


6A8G
1st. DET.-OSC.
6K7G
I.F.
YELLOW
GREEN
RED
GREEN-WHITE
I.F.
465 KC.
PUSH BUTTON SWITCH
NOTE: TERMINALS OF ALL SWITCHES AND COILS ARE LETTERED TO CORRESPOND WITH PICTORIAL VIEWS OF THESE PARTS.
SPECIAL OCTAL SOCKET
THE 6A8G AND 6H6G TUBE SOCKETS HAVE THE CATHODE, SHIELD, AND ONE HEATER TERMINAL GROUNDED BY A COMMON LUG BETWEEN THE SOCKET WAFERS.
GROUNDING LUG




Use a high resistance voltmeter of at least 1000 o

NOTE A: The bias for the control grids of the 6J5 plate of the 6H6-G tubes is -3.5 volts measured ac

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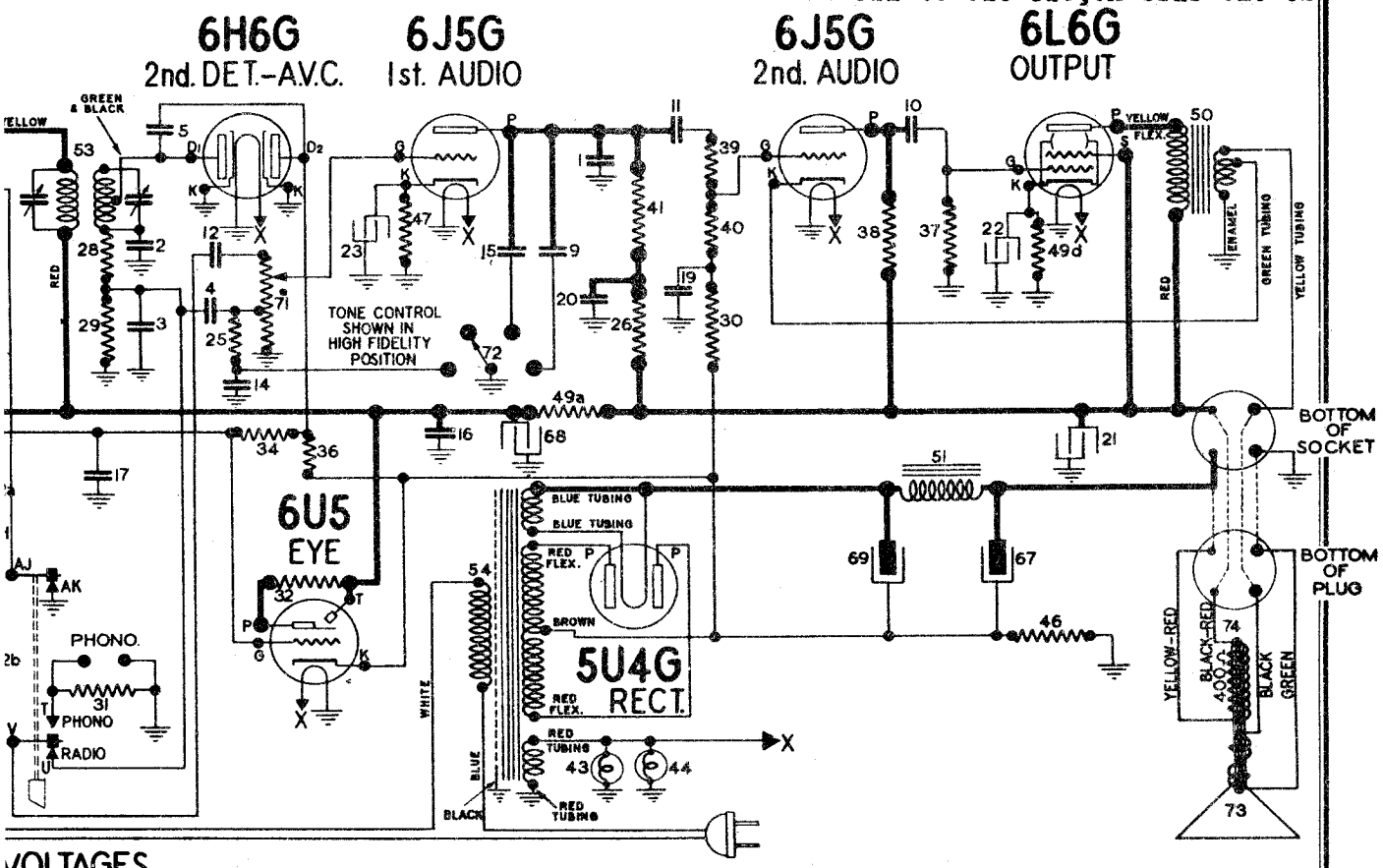
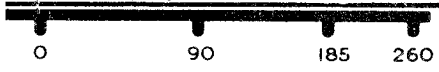
NER CORP.

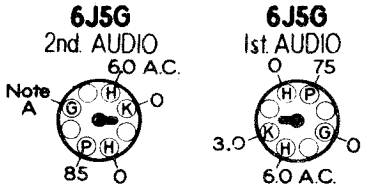
MODELS 91-821 to 91-829, Chassis 91-82
98-821 to 98-829, Chassis 98-82
910-821 to 910-829, Chassis 910-82

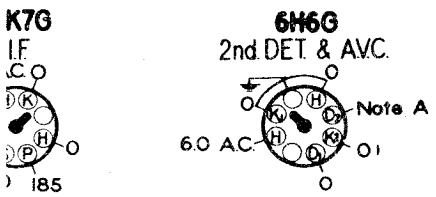



## VOLTAGES

PHONO. PUSH BUTTON IN OUT POSITION

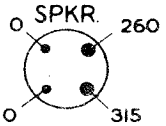


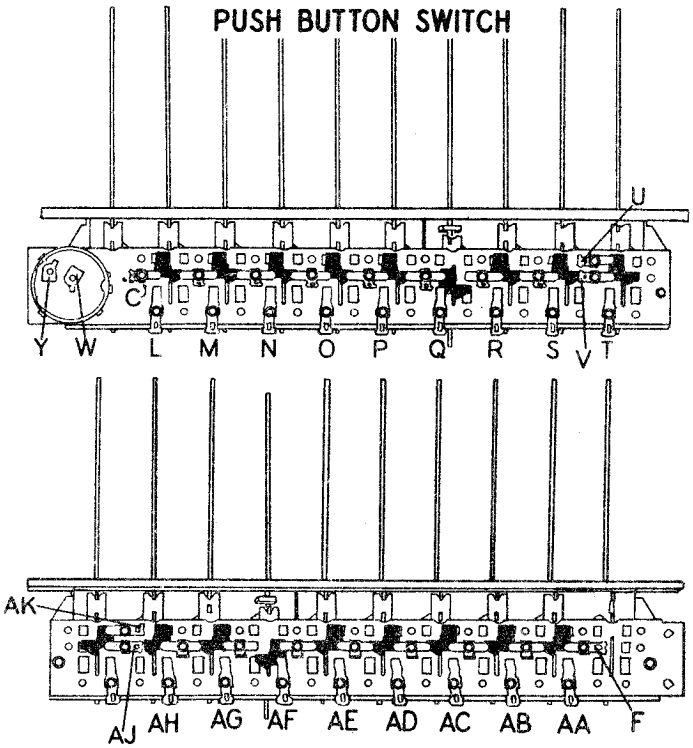

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS

LINE VOLTAGE 117 VOLTS




BOTTOM VIEW OF CHASSIS

70
113966
PUSH BUTTON SWITCH




hms per volt.

-G 2nd audio. 6A8-G, 6K7-G, 6U5, and the diode
ross resistor No. 46.

NOVEMBER 1938

STEWART-WARNER CORP.

MODELS 91-821 to 91-829
98-821 to 98-829
910-821 to 910-829
Alignment, Trimmers
Antenna Data

# ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1.5 MC are required.

(1)—Connect the output meter across the voice coil or, in series with .1 mfd. condenser, from the plate of the 6L6-G output tube to ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2)—Connect the ground lead of the signal generator to the "G" post on the antenna terminal strip at the rear of the chassis, or to the metal chassis. The ground and antenna terminals on the antenna terminal strip must be connected together throughout the alignment procedure.

(3)—Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

| DUMMY ANT IN SERIES WITH SIGNAL GENERATOR | CONNECTION OF SIGNAL GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | PUSH IN PUSH BUTTON | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|
| .1 MFD. CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC. | PUSH IN ANY BUTTON EXCEPT NO. 1 OR 10 | 2 | 2ND I.F. | ADJUST FOR MAXIMUM OUTPUT THEN REPEAD ADJUSTMENT |
| | | | | 3-4 | 1ST I.F. | |
| 200 MMFD. CONDENSER | ANTENNA TERMINAL | 465 KC. | #9 (TRIMMER #9a & 9b TUNED TO APPROXIMATELY 600 KC.) | 5 | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |

## -IMPORTANT-

## RE-TUNE PUSH-BUTTON TRIMMERS TO STATIONS AS RE-ALIGNING THE I.F. STAGES MAY HAVE CAUSED DETUNING OF THE STATIONS TO WHICH THE BUTTONS WERE SET.

## DESCRIPTION OF ANTENNA CIRCUIT AND ITS FUNCTIONS

Since the antenna circuit of this receiver differs radically from the conventional type, a detailed explanation of the functions of the various sections of this special circuit, and the reasons for the above alignment procedure is given below.

The purposes of this antenna circuit are (1) to transfer the incoming station signal, with maximum gain, to the grid of the first detector tube, (2) to reduce to a minimum, code interference or other undesired signals in the vicinity of the intermediate frequency (465 KC.) (3) to reduce to a minimum the response of image signals. The three coils which perform these functions are wound on a single form and are indicated by No. 65a, No. 65b and No. 65c in the figure at the lower right.

The primary circuit of this antenna system consists of an antenna in series with condenser No. 6, the condenser and coil combination between points E and D, the section of coil 65b between points D and A and the two condensers Nos. 63 and 45 to ground. The resistor No. 35 is shunted directly across this antenna primary circuit and its purposes will be covered later.

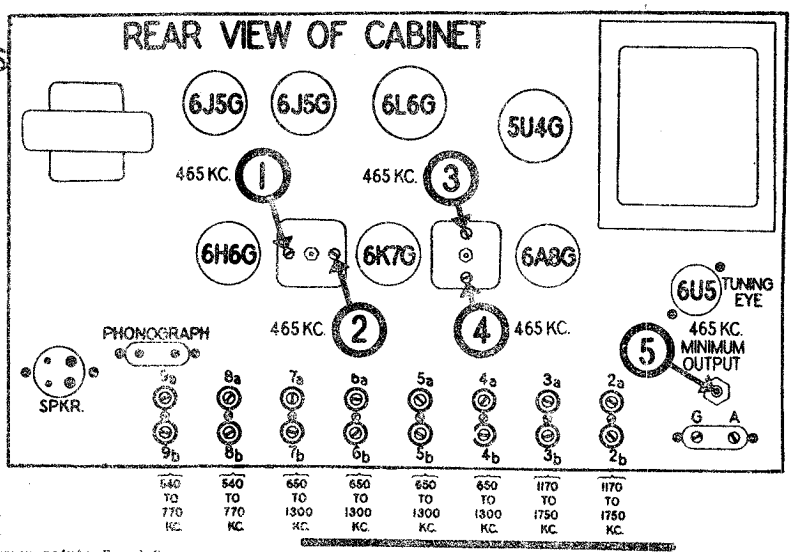
The secondary circuit consists of the two parallel condensers Nos. 63 and 45 which are in series with the section of the antenna coil between points A and B, also in series with the coil and condenser combination between points B and C, and the antenna section of the push button trimmer condenser No. 55b. The Secondary circuit is tuned to resonance with the incoming station signal, by the push button trimmer condenser No. 55b.

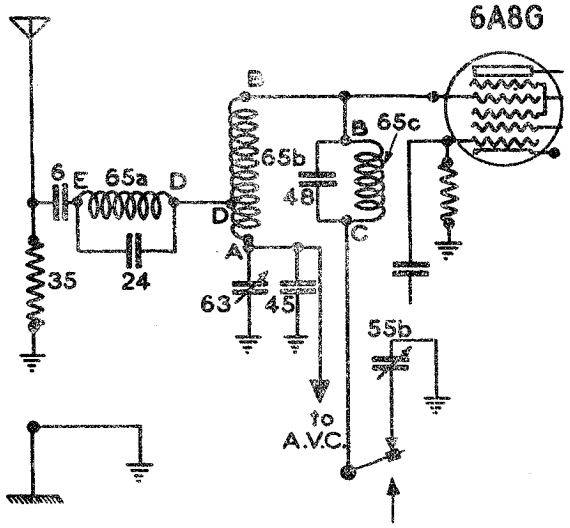
Reduction of image response is accomplished with the aid of the section No. 65c of the antenna coil. This section of the antenna coil acts as a wave trap resonated 930 KC higher than the signal. It is a part of a series resonant circuit made up of the 65c section of the coil and the push button trimmer condenser #55b. This circuit will be approximately resonant to the image signals AT ALL TIMES and will effectively reduce image interference caused by code or police stations operating at the high frequency end of the broadcast band. The purpose of condenser No. 48 is to cause this image reduction circuit to "track" properly.

The wave trap circuit for reduction of 465 KC code signals is composed of the section DA of coil 65b which is in series with condensers No. 63 and 45 (condenser No. 63 is trimmer No. 5 in the above alignment chart). It should be noted that coil section D-A is inductively coupled to the B-D section of the coil and is considered a part of the wave trap circuit. Trimmer condenser No. 63 is adjusted for minimum output with a 465 KC incoming signal at the antenna. At minimum output the voltage developed across coil A-B will be balanced out by the voltage developed across condensers No. 63 and 45 which is 180° out of phase with the voltage developed across the coil. Therefore, it will be seen that any 465 KC interference signals will only develop a very very small voltage between the control grid of the 6A8-G and ground thus effectively eliminating 465 KC code interference.

The 65a section of the antenna coil between points E and D when considered in series with section D-A and condenser 63 and 45, has a resonant peak at 600 KC. The purpose of this circuit being to increase the gain of the receiver on the low end of the Broadcast band. Condenser No. 24 which is shunted across coil section 65a has for its purpose the reduction of image responses from signals in the vicinity of 2.5 MC.

Condenser No. 6 is a direct current blocking condenser which keeps the bias voltage and the voltage developed by the A.V.C. system from being shorted out to ground by resistor No.




35. Resistor No. 35 was shunted across the primary antenna circuit for two reasons: (1) to make the overall sensitivity of the receiver more uniform and (2) to eliminate detuning effects in the secondary antenna circuit when different types of antenna systems are used with this receiver.

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MODELS 91-821 to 91-829
98-821 to 98-829
910-821 to 910-829
Tuner Data, Phono., Notes

# STEWART WARNER CORP.

| Chassis Model | Used in Receiver Models | Voltage | Frequency |
|---|---|---|---|
| 91-82 | 91-821 to 91-829 | 117 | 60 cycles |
| 98-82 | 98-821 to 98-829 | 117 | 25 cycles |
| 910-82 | 910-821 to 910-829 | 100-240 | 50-133 |

These chassis are 8 tube single band push button tuning superheterodyne receivers. The tuning range covered by the eight tuning buttons is 540 to 1750 kilocycles. These receivers also incorporate the new Peri-dynamic speaker system which is an exclusive Stewart-Warner feature and was designed for the express purpose of giving you the ultimate in tone quality and high fidelity reception.

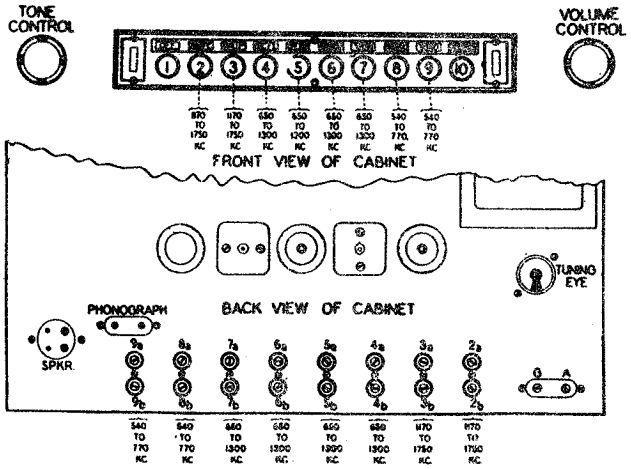
For greatest ease and simplicity in tuning, these chassis are provided with eight push buttons (Nos. 2 to 9 in Fig. 1). These buttons automatically tune in the stations for which they are labelled. Two other buttons are provided on the keyboard (Nos. 1 and 10 in Fig. 1). Button No. 1 is pushed in only WHEN IT IS DESIRED TO TURN THE RECEIVER OFF. Button No. 10 is pushed in when you desire to use the phonograph pick up. TO TURN THE RECEIVER ON MERELY PUSH ANY ONE OF THE BUTTONS FROM NO. 2 TO 9.

## HOW TO SET UP THE PUSH BUTTONS.

The push buttons of your radio receiver are not previously set to stations at the factory. Therefore, unless your dealer has already set and labelled the various push buttons, it will be necessary to make the following adjustments before any stations can be received by using these buttons, proceed as outlined below:

1. Be sure that your set is connected to a good antenna system.

2. Turn on the set at least one quarter hour before setting up the push buttons.


TONE CONTROL
VOLUME CONTROL
1 2 3 4 5 6 7 8 9 10
1170 TO 1750 KC
1170 TO 1750 KC
650 TO 1300 KC
650 TO 1300 KC
650 TO 1300 KC
650 TO 1300 KC
540 TO 770 KC
540 TO 770 KC
FRONT VIEW OF CABINET
TUNING EYE
PHONOGRAPH
SPKR.
BACK VIEW OF CABINET
9a 8a 7a 6a 5a 4a 3a 2a
9b 8b 7b 6b 5b 4b 3b 2b
G A
540 TO 770 KC
540 TO 770 KC
650 TO 1300 KC
650 TO 1300 KC
650 TO 1300 KC
650 TO 1300 KC
1170 TO 1750 KC
1170 TO 1750 KC

3. Make a list of the frequencies or eight nearby stations to which you wish to set up the buttons. Be sure to select the most powerful nearby stations, since weak signals will not give as satisfactory results.

4. Each of the buttons on your push button tuner has a definite tuning range, as shown in Fig. 1 (both back and front view of cabinet.) It is imperative that, in setting up the buttons, you select stations whose frequency is in the indicated tuning range of that button. The correct frequencies of your local stations may be obtained from your newspaper or radio call magazine. EXAMPLE: This example illustrates the proper way to select a station to be set to a particular button. Suppose you want to set station WLW, whose frequency is 700 KC., to some button on your receiver. Referring to Fig. 1 will show that this frequency falls within the operating range of Buttons No. 4, 5, 6 and 7. Therefore any of these buttons may be used to set up this station. Failure to select the proper button will result in the incorrect setting of the trimmer adjusting screw and will also cause "drifting".

5. Place the receiver in such a position that the back of the cabinet is readily accessible. Refer to Fig. 1 (showing the back of the cabinet.) In the figure, the eight pairs of trimmer adjusting screws are numbered to correspond to the numbers of push buttons shown in the front view of Fig. 1. These screws are used to tune the receiver to the station selected for each button.

6. Push in Button No. 2. Then insert a screw driver in Trimmer Screw No. 2a and turn this screw to the left or right until the desired station is heard. The point at which the screw will be correctly set will be indicated when the open ends of the "V" shadow in the tuning eye are closest together. If the station cannot be heard, advance the volume control. By having available a daily radio log from your newspaper, you can identify the station by knowing what its scheduled program is.

7. Now insert the screw driver in Trimmer Screw No. 2b and turn it to the right or left until the open ends of the "V" shaped shadow in the tuning eye are closest together. Now re-check the setting of Trimmer Screw No. 2a using the tuning eye shadow to indicate the correct setting.

8. The set-up for Button No. 2 is now complete.

9. Push in Button No. 2 and set up trimmers. No. 3a and 3b to the desired station in a similar manner.

10. Set up the remaining six buttons using their corresponding trimmer screws.

11. Call letter tabs are supplied with your receiver, with which to label the various push buttons. Select the tabs bearing the call letters of the stations to which you have set the buttons, moisten them on their gummed side, and insert them in their proper place in the escutcheon openings above the push buttons.

12. In some instances it may be necessary, after the set is operated for a month or more, to re-set the trimmer adjusting screws as they may change their setting due to heat and humidity. Changes in the setting of the trimmer screws will cause poor tone quality.

## USE OF THE TUNING EYE.

The tuning eye is located at the rear of the chassis (as shown in Fig. 1) and should be used when setting up the push buttons to the various stations. Its purpose is to indicate visually the exact point at which the receiver is correctly tuned to a station. Any station is correctly tuned in when the two open ends of the "V" shadow in the tuning eye are closest together. On strong signals the ends will come together - on weaker stations, they will be more separated. REGARDLESS OF WHETHER YOU ARE TUNING IN A STRONG OR A WEAK STATION, THE TRIMMER SCREWS SHOULD ALWAYS BE ADJUSTED TO THE POINT WHERE THE ENDS OF THE "V" IN THE EYE ARE CLOSEST TOGETHER.

NOTE: This tuning eye should be removed from its socket in the chassis after the push buttons have all been set-up. Failure to remove this tube may result in buzzing or rattling sounds such as described below under "Rattles and Buzzes".

## CONNECTING A PHONOGRAPH PICK-UP UNIT.

The connections to your receiver from a high impedance pick-up unit are made to the terminal strip on the back of the chassis (see Fig. 1, back view, for this terminal strip labelled "PHONOGRAPH"). The two leads from the phonograph pick-up unit are connected to the two terminals on this strip. In case hum is encountered when using this unit, reverse the connections to this terminal strip. If the hum persists, make sure that the receiver has a ground wire connected to it as described under "GROUND CONNECTIONS."

## HOW TO CHANGE THE OPERATING RANGE OF A BUTTON.

The operating range of a button may be changed by merely changing the dual trimmer used with that button. Dual trimmers with the ranges indicated below can be obtained from your Stewart-Warner distributor, or directly from the Stewart-Warner Corporation, under the following part numbers:

| Part Number | Tuning Range | List Price |
|---|---|---|
| 113953 | 1170 to 1750 KC. | .46 |
| 113954 | 650 to 1300 KC. | .60 |
| 113955 | 540 to 770 KC. | .62 |

To make the change proceed as follows:

1. Remove the chassis from the cabinet.

2. By referring to Fig. 1, determine the dual trimmer associated with the button whose range you wish to change.

3. Unsolder the leads from the four terminals on the back of this dual trimmer.

4. Remove the 6/32 machine screw holding the dual trimmer to the front of the chassis.

5. From the above list select a dual trimmer which will cover the desired range.

6. Mount it on the chassis with the 6/32 machine screw, and solder the leads to its four terminals.

The button is now ready to be set to any strong station whose frequency is within the range of this new trimmer unit.

## RATTLES & BUZZES.

If during normal operation, buzzing or rattling sounds are heard in the receiver, they will in all probability originate in one or more of the sources listed in this paragraph. These rattles or buzzes generally occur with the tone control in the bass position and with the volume control advanced to a fairly loud level. Check the following for probable sources of noise.

(1) Loose tube shields. See that shields are properly located, and making good mechanical contact with tube shield base.
(2) Loose elements in any of the tubes. This applies especially to the 6U5 tuning eye tube. This tube should be removed from the chassis after the buttons have been set-up.
(3) Loose escutcheon or cabinet parts. Check for mechanical vibration of any parts not securely fastened.

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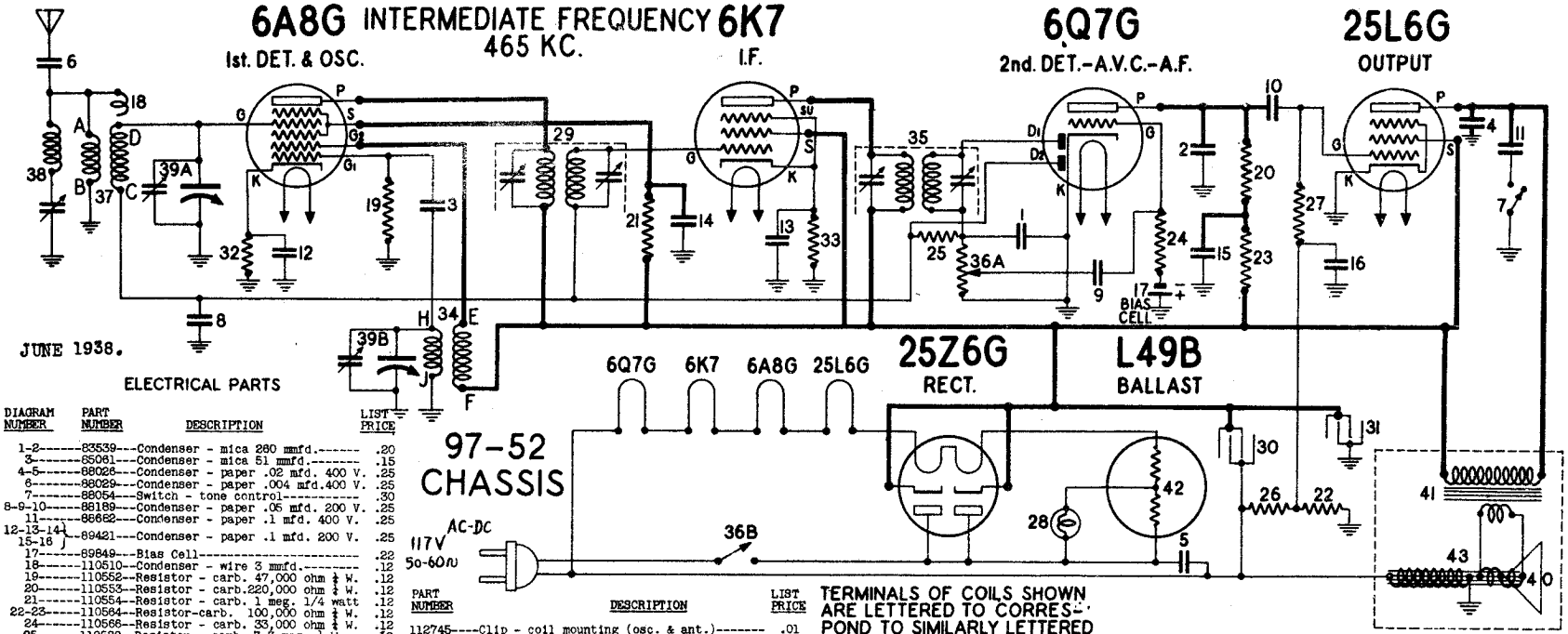
# STEWART-WARNER CORP.




JUNE 1938.

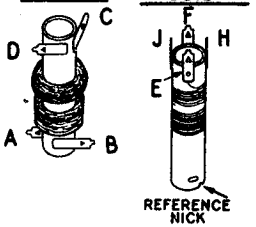
## ELECTRICAL PARTS

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1-2 | 83539 | Condenser - mica 280 mmfd. | .20 |
| 3 | 85061 | Condenser - mica 51 mmfd. | .15 |
| 4-5 | 88026 | Condenser - paper .02 mfd. 400 V. | .25 |
| 6 | 88029 | Condenser - paper .004 mfd.400 V. | .25 |
| 7 | 88054 | Switch - tone control | .30 |
| 8-9-10 | 88189 | Condenser - paper .05 mfd. 200 V. | .25 |
| 11 | 86662 | Condenser - paper .1 mfd. 400 V. | .25 |
| 12-13-14-15-16 | 89421 | Condenser - paper .1 mfd. 200 V. | .25 |
| 17 | 89849 | Bias Cell | .22 |
| 18 | 110510 | Condenser - wire 3 mmfd. | .12 |
| 19 | 110552 | Resistor - carb. 47,000 ohm ½ W. | .12 |
| 20 | 110553 | Resistor - carb.220,000 ohm ½ W. | .12 |
| 21 | 110554 | Resistor - carb. 1 meg. 1/4 watt | .12 |
| 22-23 | 110564 | Resistor-carb. 100,000 ohm ½ W. | .12 |
| 24 | 110566 | Resistor - carb. 33,000 ohm ½ W. | .12 |
| 25 | 110580 | Resistor - carb. 3.3 meg. ½ W. | .12 |
| 26-27 | 110584 | Resistor - carb.330,000 ohm ½ W. | .12 |
| 28 | 110629 | Lamp - 6.3 volt - .25 amps | .15 |
| 29 | 112803 | Transformer - 1st I.F. | 1.20 |
| 30-31 | 112898 | Condenser - elect. 16 mfd.150 V. | .50 |
| 32-33 | 112951 | Resistor - carb. 400 ohms ½ watt | .12 |
| 34 | 113042 | Coil - oscillator | .45 |
| 35 | 113047 | Transformer - 2nd I.F. | 1.10 |
| 36A - 36B | 113049 | Volume Control - 500,000 ohms with off on switch | 1.00 |
| 37 | 113097 | Coil - Antenna | .74 |
| 38 | 113119 | Coil - wave trap (with trimmer) | .50 |
| 39A - 39B | 113150 | Condenser - variable gang | 3.00 |
| 40 | R-113241 | Cone - voice coil assem. for R-115012 speaker | 1.25 |
| 41 | R-113343 | Transformer - output for R-115-012 speaker | 1.00 |
| 42 | 113365 | Ballast Resistor (tube)L-49-B | .50 |
| 43 | R-115012 | Speaker - Dynamic 5 inch | 4.12 |

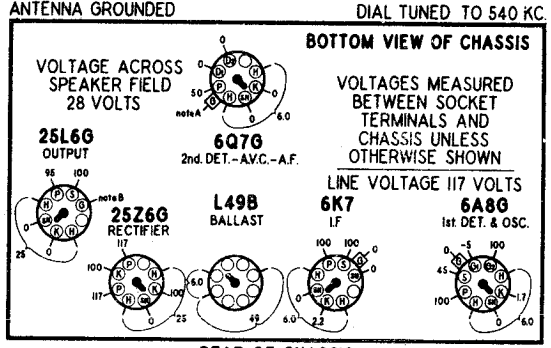
## DIAL & MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 2694 | Screw - wood, chassis mtg. #8 X 5/8" (model 97-523) Per C | .80 |
| 77223 | Washer - chassis mtg. (model 97-523) | .01 |
| 79006 | Screw - #6-32 X 7/8 Fil. Hd. Mach. (for setting up push button | .01 |
| 81145 | Retaining Ring - for drive shaft Per C | .50 |
| 85040 | Screw - #6 Hex. Hd. for mtg. adjusting washer Per C | .35 |
| 85299 | Screw - chassis mtg. #10 X 3/8" (for models 97-523) | .02 |
| 85427 | Socket - octal base (standard) | .15 |
| 85815 | Spring - between gear sections | .01 |
| 86348 | Eyelet - for cord drive Per dz. | .05 |
| 89746 | Washer - (paper) for back of knobs | .005 |
| 110829 | Washer - flat steel, for mtg. chassis | .01 |
| 112745 | Clip - coil mounting (osc. & ant.) | .01 |
| 112762 | Pulley - dial cord drive (at left side) | .04 |
| 112764 | Clip - dial scale retaining | .01 |
| 112765 | Scale - dial | .24 |
| 112770 | Pointer - dial | .08 |
| 112776 | Celluloid Cover - over dial face | .28 |
| 112798 | Clip - for mtg. wave trap coil | .01 |
| 112847 | Socket - for dial lamp | .22 |
| 112871 | Cup washer - for mtg. model 97-523 | .01 |
| 112872 | Screw - chassis mtg. #8 X 1¼ O.H. (model 97-523) | .02 |
| 112874 | Screw - #10 X 1-1/8 chassis mtg. | .01 |
| 112878 | Screw - escutcheon mtg. #2 X 3/8 (model 97-524) | .05 |
| 112879 | Screw - escutcheon mtg. #2 X 3/8 | .03 |
| 112914 | Escutcheon - dial | .35 |
| 113022 | Knob - round - volume or tuning | .10 |
| 113052 | Escutcheon - for dial (model 97-524) | .42 |
| 113053 | Escutcheon - for push buttons | .32 |
| 113054 | Escutcheon -for push buttons(model 97-524) | .40 |
| 113103 | Push Button - (Walnut) | .06 |
| 113104 | Push Button Only - (Black) | .08 |
| 113124 | Speaker Grille Bar - (Chrome Plate) (model 97-524) | .26 |
| 113125 | Speaker Grille Support Track (model 97-524) | .05 |
| 113136 | Knob - octagon - volume or tuning | .20 |
| 113156 | Gear - & bushing assembly for dial drive | .22 |
| 113169 | Spring - for key return | .01 |
| 113170 | Adjusting Lug - for button shafts | .01 |
| 113171 | Bracket - for dial & condenser mtg. | .64 |
| 113176 | Shaft - dial drive | .18 |
| 113177 | Spring - dial cord tension | .09 |
| 113178 | Cord - for dial drive (38" req.) supplied in 4 ft. lengths | .30 |
| 113189 | Tab - celluloid - for push button-Per dz. | .09 |
| 113232 | Mtg. Plate - for spade model 97-523 | .34 |
| 113321 | Tabs - station call letters (4 sheets) (Brown) Per set | .40 |
| 113322 | Tabs - station call letters (4 sheets) (Black) Per set | .40 |
| 113494 | Mechanical Tuner Assembly - keys and housing only | 3.00 |

TERMINALS OF COILS SHOWN ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM.




## SOCKET VOLTAGES




# MODELS 97-521 TO 97-529

FOR PUSH BUTTON AND DRIVE CORD DATA, SEE CHASSIS 91-51.

NOTE A: The bias for the control grid of the 6Q7-G tube is -1.0 volt, supplied by the bias cell. Due to the high resistance of the cell, the voltmeter will indicate only a fraction of a volt.

NOTE B: The bias for the control grid of the 25L6-G output tube is -10 volts measured across resistor 22.

MODELS 97-521 to 97-529
Chassis 97-52
Alignment, Trimmers

# STEWART WARNER CORP.

| Chassis Model | Used In Receiver Models | Voltage |
|---|---|---|
| 97-52 | 97-521 to 97-529 | 117 volts A.C. or D.C. |

This chassis is a 5 tube, single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-49-B ballast resistor tube. The tuning range of this receiver is 540 to 1725 KC. The intermediate frequency is 465 KC.

Incorporated in each chassis is a four-button mechanical push-button tuner unit. These push buttons may be set to any station desired by the method described below under "How To Set Up The Push-Button Tuner".

The accuracy of tuning when using the push-button tuner, depends to a large extent upon the amount of "play" in the moving parts of this system. In cases where slight inaccuracy in tuning occurs check the following points:
1. Check to see that the button is correctly set to the station. If not, reset the button.
2. The tension must be maintained between the two sections of the anti back-lash gear on the left side of the unit in order that it functions properly--both anti back-lash springs must be in place in the gear and compressed slightly.
3. Note the small adjusting lug over the push-button shafts at the point where they slide into the tuner. The lug is held in place by a hex-head screw. These lugs should be adjusted for a minimum amount of "play" In other words the push-button shaft must have a minimum of movement in a vertical direction.

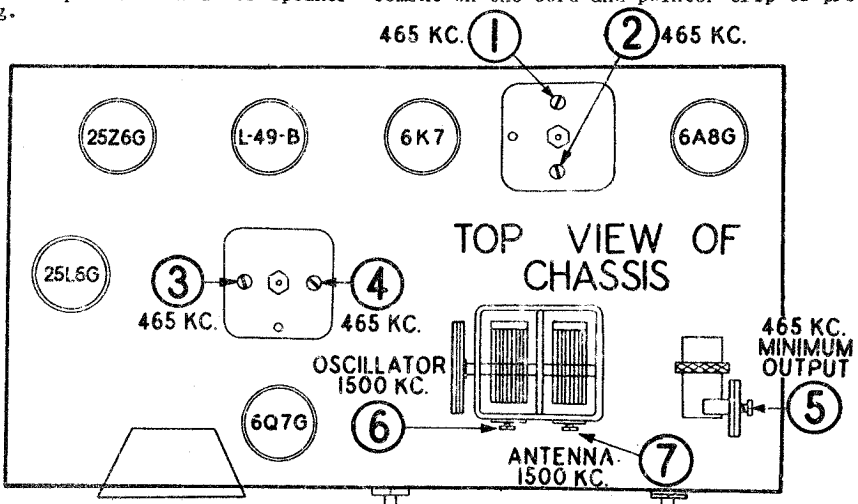
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

(1) Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2) Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.

(3) Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

(4) With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.




| DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR CUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 1st I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | 3-4 | 2nd I.F. | |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |
| 400 OHM CARBON. RESISTOR | ANTENNA LEAD (Blue Wire) | 1500 KC | 1500 KC | 6 | BRCADCAST OSCILLATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| 400 OHM CARBON RESISTOR | ANTENNA LEAD (Blue Wire) | 1500 KC | TUNE TO 1500 KC GENERATOR SIGNAL | 7 | BROADCAST ANTENNA (Shunt) | ADJUST FOR MAXIMUM OUTPUT. |

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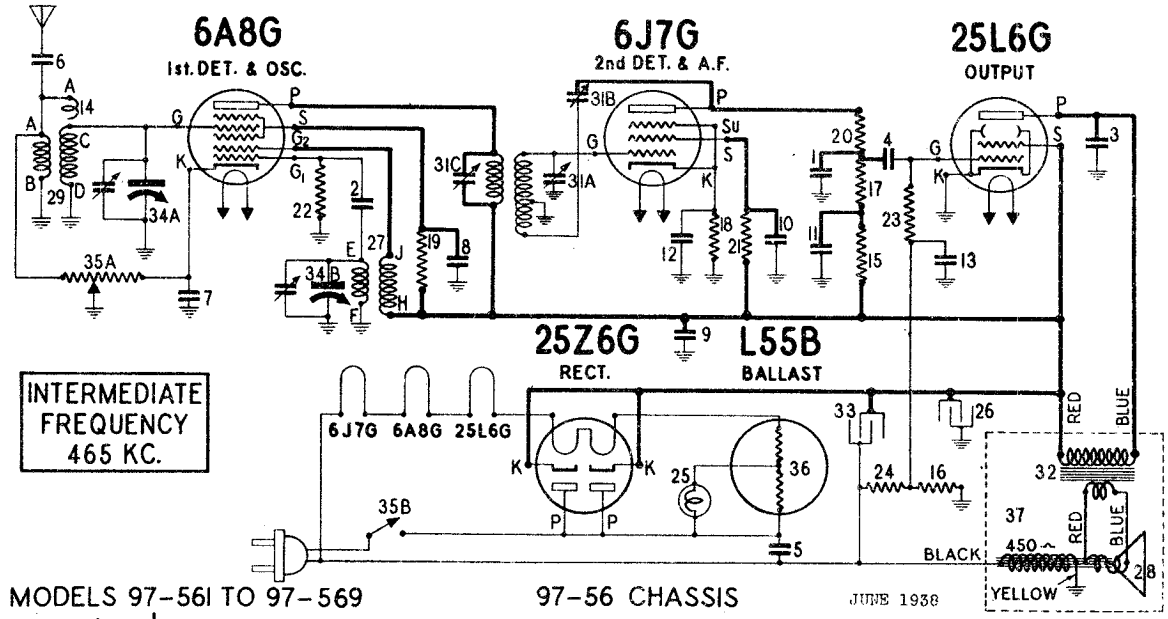
Schematics, Voltage, Socket

# STEWART-WARNER CORP.

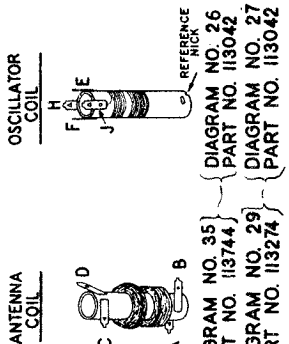
MODELS 97-561 to 97-569
Chassis 97-56
97-561S to 97-569S
Chassis 97-56S




MODELS 97-561 TO 97-569 — 97-56 CHASSIS — JUNE 1938

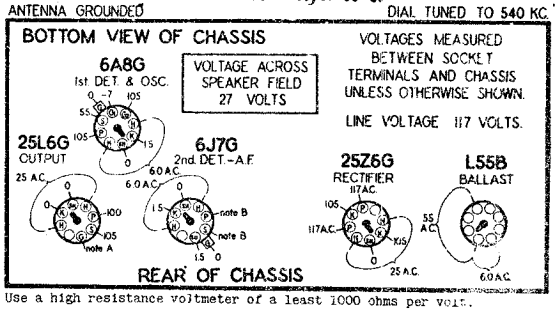
## NOTE

TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS BELOW ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM ABOVE. TERMINALS WHICH ARE CONNECTED TOGETHER CARRY THE SAME LETTER.




## SOCKET VOLTAGES CHASSIS 97-56, 97-56-S.

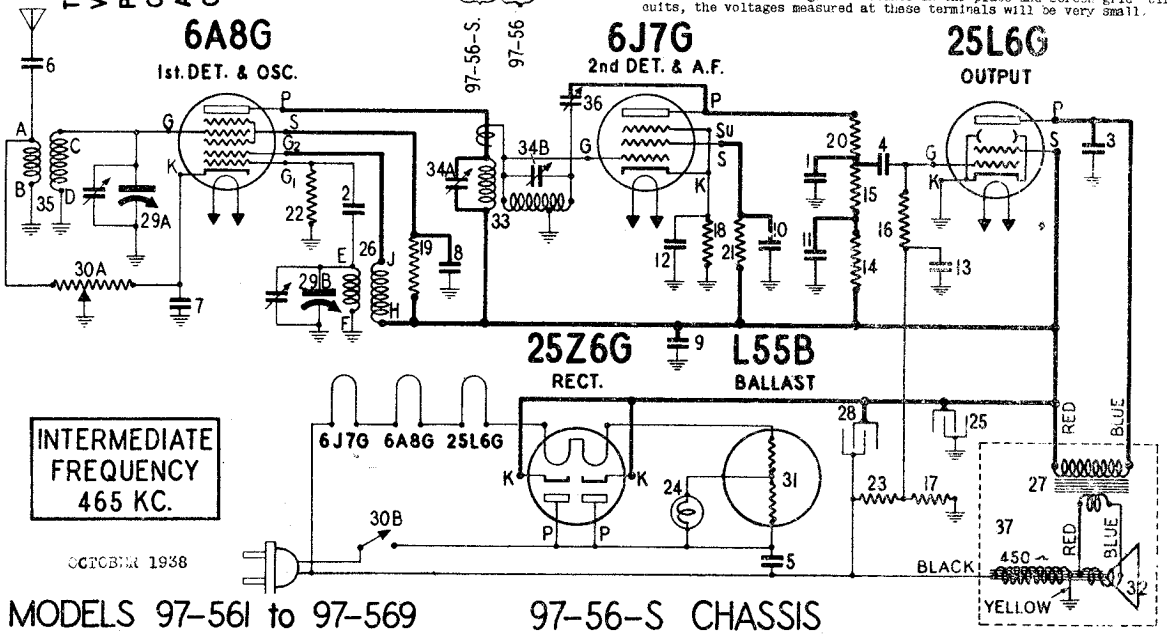
ANTENNA GROUNDED — DIAL TUNED TO 540 KC.




Use a high resistance voltmeter of a least 1000 ohms per volt.

NOTE A: The bias for the control grid of the 25L6G output tube is -6.0 volts. Due to the high resistance in this grid circuit the voltage measured will be extremely small.

NOTE B: Due to the high resistance in the plate and screen grid circuits, the voltages measured at these terminals will be very small.




OCTOBER 1938

MODELS 97-561 to 97-569 — 97-56-S CHASSIS

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MODELS 97-561 to 97-569
97-561S to 97-569S
Tuner Data, Alignment
MODELS 97-571 to 97-579
Tuner Data

# STEWART WARNER CORP.

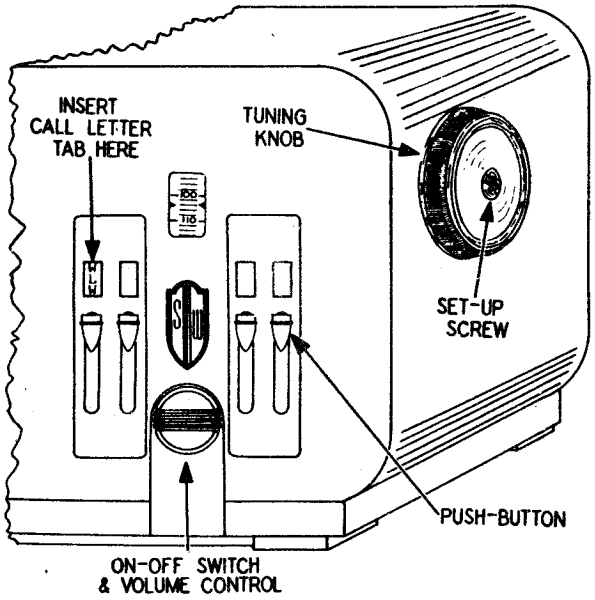
CHASSIS 97-56, 97-56S AND 97-57

## HOW TO SET UP THE PUSH-BUTTON TUNER.

1. Be sure that your set is connected to a good antenna system.

2. Turn on the set and allow it to operate at least one-quarter hour before setting up the push buttons.

3. Select the four nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak signals will generally give poor results. Any button may be set to any desired station.




4. The large tuning knob at the side of your set has a screw located in the center. Grasp this tuning knob firmly and then using a screw-driver or a coin turn the screw counter-clockwise not more than two whole turns. (When viewed from the side of the cabinet.)

5. Push down any one of the four buttons that you wish to set to a station. Be sure to push the button all the way down, otherwise the setting will be incorrect.

6. Holding the push-button down firmly, turn the tuning knob until the station you desire is tuned in. Tune in strong nearby stations for best results. Be sure to tune in the stations correctly by tuning to the point where the program is heard with the least hiss or distortion and not to the point of greatest volume.

7. Release the push button that you have just set up. WARNING: Do not attempt to use any button until you have completed the set-up of all four buttons. Do not re-tighten the set-up screw until all buttons have been set-up.

8. Proceed to set-up the next button by pushing down on the button firmly and tuning in the desired station, using the tuning knob. The rest of the buttons should be set-up in a similar manner.

9. After all of the buttons have been set-up YOU MUST RE-TIGHTEN THE SCREW IN THE TUNING KNOB; OTHERWISE ALL SETTINGS OF THE BUTTONS WILL BE DESTROYED. GRASP THE KNOB FIRMLY AND THEN USE A SCREW DRIVER OR A COIN TO TIGHTEN THE SCREW SECURELY.

10. The push buttons should now be labelled with their proper call letters. The call letter sheets are supplied with your receiver. The individual call letter tab should be moistened on its gummed side and stuck to the small square in the cabinet panel just above the push button.

### 97-56 CHASSIS ONLY

## THE INTERMEDIATE FREQUENCY AMPLIFIER.

This 97-56 chassis employs one stage of intermediate frequency amplification. The intermediate frequency transformer is adjusted to 465 KC and is tuned in the usual manner. In addition to the two trimmers used in tuning the windings to their proper frequency, this transformer has mounted on it an additional trimmer condenser which is used to feed back a portion of the intermediate frequency signal appearing in the plate circuit of the 6J7-G tube. This signal is introduced into the 6J7-G grid circuit through a coupling coil, which is a part of the secondary coil. This regeneration increases the amplification and selectivity obtainable from this stage, and makes the performance of this set comparable to that which is obtained from a set employing an additional I.F. transformer.

When aligning the intermediate frequency amplifier, the output of the signal generator is set at 465 KC and is coupled to the grid of the 6A8-G tube in the customary manner. The primary and secondary windings are tuned by adjusting Trimmer Screws No. 1 and No. 2 until a maximum deflection is obtained on the output meter. If the set has a tendency to oscillate when adjusting these trimmer screws, turn Trimmer Screw No. 5 to the left (counter-clockwise) until the oscillation ceases. The signal generator is next coupled to the antenna lead, and Trimmers No. 3 and No. 4 are aligned for maximum output, using a generator frequency of 1500 KC. Now connect the set to the CUSTOMER'S antenna and tune in a station on the low frequency end of the dial. The regeneration control, Trimmer No. 5 is now adjusted to give maximum output of the set, consistent with good stability and tone quality. After changing the setting of Trimmer No. 5 it is necessary to re-adjust Trimmers No. 1 and No. 2, as their setting will be found to have changed slightly. The output of the signal generator is set at 465 KC and is coupled to the grid of the 6A8-G tube through a .1 mfd. condenser and Trimmers No. 1 and No. 2 adjusted, as was done previously.

## A-C OPERATION

When the set is used on alternating current, all D-C potentials are supplied by a 25Z6G rectifier tube and its associated filter circuit. The tube is connected for half-wave rectification of the A-C supply.

If any hum is noticed when the set is used on A-C, reversing the power plug in the receptacle will sometimes reduce the hum level. When the set has not been used for some time, or the filter condensers have been replaced, a slight hum may be audible when the set is first turned on. This hum may not clear up immediately upon reversal of the power plug. However, it will probably be eliminated after approximately five minutes operation by which time the anode plates of the electrolytic capacitors in the filter system will have reformed.

## D-C OPERATION

If the set fails to operate after allowing time for the tubes to reach their normal operating temperatures, reverse the power plug in the receptacle. When the set is used on direct current, the 25Z6G rectifier tube and the filter system remains in the circuit and serve two purposes. If the power cord should be plugged in with incorrect polarity, the 25Z6G tube protects the filter condensers from damage. On correct D-C polarity the 25Z6G tube passes the D-C and the filter circuit aids in smoothing the supply voltage, thus minimizing line noises.

### 97-56-S CHASSIS ONLY

## I.F. TRANSFORMER & REGENERATION CONTROL

This 97-56-S chassis employs only one intermediate frequency transformer, the windings of which are capacitively coupled. The two trimmers used to tune the primary and secondary of this transformer are mounted on the transformer assembly, and are accessible from the rear of the chassis. Also associated with this intermediate frequency transformer is an additional trimmer condenser, which is accessible through a hole in the rear of the chassis. This condenser is used to feed back a portion of the intermediate frequency signal appearing in the plate circuit of the 6J7-G tube. This signal is introduced into the 6J7-G grid circuit through a coupling coil, which is a part of the secondary coil. The regeneration obtained increases the amplification and selectivity obtainable from the intermediate frequency transformer, and makes the performance of this set comparable to that which is obtained from a set employing an intermediate frequency stage.

## ADJUSTMENT OF REGENERATION CONTROL.

IF DISTANT STATIONS COME IN WITH INSUFFICIENT VOLUME: Through the opening near the bottom of the center of the back of the cabinet; you will see an adjusting screw. Using a non-metallic instrument (a piece of wood whittled in the shape of a screw driver will serve the purpose), turn this screw to the left (counter-clockwise). As you turn counter-clockwise the volume will be increased up to a certain point at which the set will begin to squeal. Turn the screw back until the squeal just disappears and good tone quality is obtained.

IF THE RECEIVER HOWLS OR SQUEALS: Using the same screw mentioned above and a non-metallic instrument (a piece of wood whittled in the shape of a screw driver will serve the purpose) turn the screw clockwise very, very slightly until the squeal or howl ceases.

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MODELS 97-561 to 97-569
97-561S to 97-569S

# STEWART WARNER CORP.

## Alignment, Trimmers

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

2. Connect the ground lead of the signal generator to the chassis of the receiver through a .1 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as one side of the power line may be grounded in the signal generator.

3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

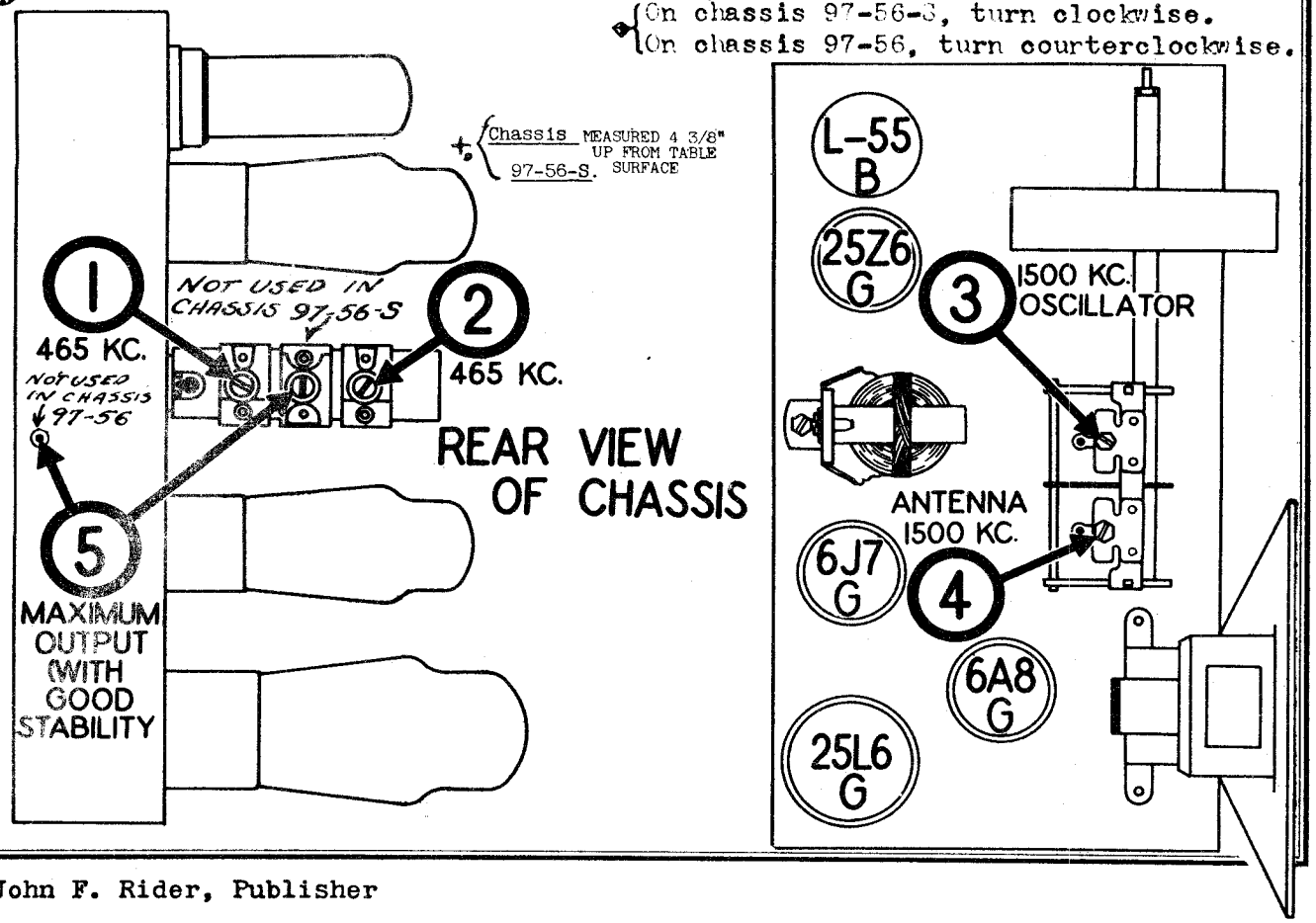
4. With the gang condenser in full mesh, set the indicator to the last mark on the top end of the dial scale. If the pointer is only slightly off calibration, it may be possible to slip the dial drum just enough to correct for this slight mis-calibration. If the dial is several divisions off calibration, loosen the set screw on the condenser shaft. Then grasp the end of the tuning shaft and turn the dial until the last division of the scale is directly under the indicator, when the gang is in full mesh. Then retighten the set-screw.

97-56

4. TO CALIBRATE THE DIAL:- Remove the chassis from the cabinet and set it on a flat surface (insulated from ground). Release the set screw in the collar which connects the gang condenser shaft with the tuning unit. Holding the gang in full mesh turn the dial until the last dial division (just below 55) on the low frequency end is exactly 4 3/8 inch above the table surface. Now retighten the set screw in the coupler collar. The 4 3/8 inch division on the ruler (when measured vertically from table surface) is to be used as the dial indicator for all calibrations and alignment.

| DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|
| .1 MFD. CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | I. F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. IF OSCILLATION OCCURS TURN REGENERATION CONTROL TRIMMER #5 ONE-QUARTER TURN |
| 200 MMFD. CONDENSER | ANTENNA LEAD (BLUE WIRE) | 1500 KC | 1500 KC | 3 | BROADCAST OSCILLATOR (SHUNT) | ADJUST FOR MAXIMUM OUTPUT. |
| 200 MMFD. CONDENSER | ANTENNA LEAD (BLUE WIRE) | 1500 KC | TUNE TO 1500 KC GEN. SIG. | 4 | BROADCAST ANTENNA (SHUNT) | ADJUST FOR MAXIMUM OUTPUT. |
| CONNECT RECEIVER TO CUSTOMERS ANTENNA OR TO A .50 MMFD. MICA CONDENSER IN SERIES WITH THE SIGNAL GENERATOR. | | TUNE IN A WEAK SIGNAL ON THE LOW FREQUENCY END OF THE DIAL. A WEAK SIGNAL IS REQUIRED SO THAT VOLUME CONTROL MAY BE SET TO MAXIMUM VOLUME POSITION. | | 5 | REGENERATION CONTROL | ADJUST TRIMMER TO GIVE MAXIMUM OUTPUT, CONSISTENT WITH GOOD STABILITY AND TONE QUALITY. |
| ✱ .1 MFD. CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | I. F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |

✱ THIS ADJUSTMENT MUST AGAIN BE MADE AFTER THE REGENERATION CONTROL TRIMMER HAS BEEN SET.

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MODELS 97-561 to 97-569
97-561S to 97-569S STEWART-WARNER CORP.
Parts Lists

# 97-56 CHASSIS

## ELECTRICAL PARTS

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 83539 | Condenser - mica 260 mmfd. | .20 |
| 2 | 83783 | Condenser - mica 110 mmf. | .20 |
| 3-4-5 | 88026 | Condenser - paper .02 mfd. 400 volt | .25 |
| 6 | 88029 | Condenser - paper .004 mfd. 400 volt | .25 |
| 7-8-9-10-11 | 89421 | Condenser - paper .1 mfd. 200 volt | .25 |
| 12-13 | 89532 | Condenser - paper .25 mfd. 200 volt | .32 |
| 14 | 110510 | Condenser - wire 3 mmfd. | .12 |
| 15-16 | 110553 | Resistor - carbon 220,000 ohm 1/4 watt | .12 |
| 17 | 110559 | Resistor - carbon 470,000 ohm 1/4 watt | .12 |
| 18 | 110565 | Resistor - carbon 22,000 ohm 1/4 watt | .12 |
| 19 | 110566 | Resistor - carbon 33,000 ohm 1/4 watt | .12 |
| 20 | 110569 | Resistor - carbon 10,000 ohm 1/4 watt | .12 |
| 21 | 110570 | Resistor - carbon 2.2 meg. 1/4 watt | .15 |
| 22 | 110578 | Resistor - carbon 68,000 ohm 1/4 watt | .12 |
| 23 | 110584 | Resistor - carbon 330,000 ohm 1/4 watt | .12 |
| 24 | 110591 | Resistor - carbon 680,000 ohm 1/4 watt | .12 |
| 25 | 110629 | Lamp - 6.3 volt - .25 amps. | .15 |
| 26 | 112898 | Condenser - electrolytic 16 mfd. 150 volt | .50 |
| 27 | 113042 | Coil - oscillator | .45 |
| 28 | R-113241 | Cone - voice coil assem. for R-115013 spkr. | 1.25 |
| 29 | 113274 | Coil - antenna | .65 |
| 30 | 113275 | Transformer - I.F. (with trimmer) | 1.44 |
| 31A to 31C | 113278 | Condenser - trimmer (3 section for I.F.) | .46 |
| 32 | R-113343 | Transformer - output for R-115013 spkr. | 1.00 |
| 33 | 113472 | Condenser - electrolytic 40 mfd. 150 volt | .56 |
| 34A - 34B | 113478 | Condenser - variable gang | 3.20 |
| 35A - 35B | 113501 | Volume Control-20,000 ohms with on-off switch | .92 |
| 36 | 113506 | Ballast Resistor - L55B | .65 |
| 37 | R-115013 | Speaker - dynamic 5 inch | 4.75 |

## DIAL & MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 83624 | Screw - Self Tapping 8 X 1/4 for mounting I.F. transformer | $ .01 |
| 85427 | Socket - tube, 8 prong | .15 |
| 85827 | Set Screw - 8/32 square head | .02 |
| 112745 | Clip - coil mounting (osc. & ant. | .01 |
| 113500 | Mechanical Tuner Unit - less tenite tips for push buttons | 3.90 |
| 113504 | Collar - Coupling (between tuner unit and gang cond. shaft) | .08 |
| 113510 | Tip - for push button (walnut) | .05 |
| 113529 | Tip - for push button (ivory) | .05 |
| 113530 | Knob - tuning (walnut) | .26 |
| 113531 | Knob - tuning (ivory) | .30 |
| 113537 | Screw for tuning knob & set-up | .18 |
| 113543 | Socket - dial lamp | .18 |
| 113550 | Tabs - station call letters | .28 |
| 113557 | Key - for push button tuner (left hand) | .24 |
| 113558 | Clutch Spring - for tuner (on cam shaft) | .04 |
| 113559 | Spring - for key return | .02 |
| 113560 | Dial Scale - Celluloid Strip | .22 |
| 113572 | Key - for push button (right hand) | .24 |
| 113573 | Knob - Volume (walnut) | .18 |
| 113574 | Knob - Volume (ivory) | .18 |

Chassis Model: 97-56
Used in Receiver Models: 97-561 to 97-569
Voltage: 117 volts A.C. or D.C.

This chassis is a 5 tube single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-55-B ballast resistor tube. The tuning range of the receiver is 540 to 1720 KC.

IMPORTANT: In cases where it is found that the push-button tuner does not tune in stations correctly due to extreme sharpness in tuning it is only necessary to back off (turn counter clockwise) the regeneration control trimmer (#5) slightly. This will make tuning broader and will result in more accurate tuning when using the push button tuner.

# 97-56-S CHASSIS

## ELECTRICAL PARTS

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 83539 | Condenser - mica 260 mmfd. | .20 |
| 2 | 83783 | Condenser - mica 110 mmf. | .20 |
| 3-4-5 | 88026 | Condenser - paper .02 mfd. 400 volt | .25 |
| 6 | 88029 | Condenser - paper .004 mfd. 400 volt | .25 |
| 7-8-9-10-11 | 89421 | Condenser - paper .1 mfd. 200 volt | .25 |
| 12-13 | 89532 | Condenser - paper .25 mfd. 200 volt | .32 |
| 14 | 110553 | Resistor - carbon 220,000 ohm 1/4 watt | .12 |
| 15-16 | 110559 | Resistor - carbon 470,000 ohm 1/4 watt | .12 |
| 17 | 110564 | Resistor - carbon 100,000 ohm 1/4 watt | .12 |
| 18 | 110565 | Resistor - carbon 22,000 ohm 1/4 watt | .12 |
| 19 | 110566 | Resistor - carbon 33,000 ohm 1/4 watt | .12 |
| 20 | 110569 | Resistor - carbon 10,000 ohm 1/4 watt | .12 |
| 21 | 110570 | Resistor - carbon 2.2 meg. 1/4 watt | .15 |
| 22 | 110578 | Resistor - carbon 68,000 ohm 1/4 watt | .12 |
| 23 | 110584 | Resistor - carbon 330,000 ohm 1/4 watt | .12 |
| 24 | 110629 | Lamp - 6.3 volt-.25 amps. | .15 |
| 25 | 112898 | Condenser - electrolytic 16 mfd. 150 volt | .50 |
| 26 | 113042 | Coil - oscillator | .45 |
| 27 | R-113343 | Transformer - output for R-115013 speaker | 1.00 |
| 28 | 113472 | Condenser - electrolytic 40 mfd. 150 volt | .56 |
| 29A - 29B | 113478 | Condenser - variable gang | 3.20 |
| 30A - 30B | 113501 | Volume control-20,000 ohms with on-off switch | .92 |
| 31 | 113506 | Ballast Resistor - L553 | .65 |
| 32 | R-113737 | Cone - voice coil assem. for R-115025 speaker | 1.90 |
| 33 | 113738 | Transformer - I.F. (with trimmer) | 1.26 |
| 34A - 34B | 113743 | Condenser - trimmer (2 section for I.F.) | .30 |
| 35 | 113744 | Coil - antenna | .72 |
| 36 | 113745 | Condenser - trimmer (regen. control) | .28 |
| 37 | R-115025 | Speaker - dynamic - 5" (sub. R-115013) | 4.80 |

## DIAL & MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 83624 | Screw - self tapping 8 X 1/4 for mounting I.F. transformer | .01 |
| 85427 | Socket - tube, 8 prong | .15 |
| 85827 | Set screw - 8/32 square head | .02 |
| 88161 | Shield Tube - (short section) | .08 |
| 88162 | Shield Tube - (long section) | .08 |
| 88164 | Shield Cap - tube, grid type | .06 |
| 89911 | Shield - Tube, base | .04 |
| 89912 | Clip - grounding, for tube base | .02 |
| 112745 | Clip - coil mounting (osc. & ant.) | .01 |
| 113500 | Mechanical Tuner Unit - less tenite tips for push buttons | 3.90 |
| 113504 | Collar - Coupling (between tuner unit and gang condenser shaft) | .08 |
| 113537 | Screw for tuning knob & set-up | .18 |
| 113543 | Socket - dial lamp | .18 |
| 113548 | Felt Pad - behind push buttons | .01 |
| 113550 | Tabs - station call letters | .28 |
| 113557 | Key-for push button tuner (left hand) | .24 |
| 113558 | Clutch spring - for tuner (on cam shaft) | .04 |
| 113559 | Spring - for key return | .02 |
| 113560 | Dial Scale - celluloid strip | .22 |
| 113572 | Key - for push button (right hand) | .24 |
| 113582 | Dial Window - celluloid | .12 |
| 113636 | Screw - #8 X 3/4" for chassis mtg. | .01 |
| 113638 | Screw - Back cover retaining | .01 |
| 113699 | Screw - #8 X 1" for chassis mtg. | .01 |

Chassis Model: 97-56-S
Used in Receiver Models: 97-561 to 97-569
Voltage: 117 Volts A.C. or D.C.

This chassis is a 5 tube single band push-button tuning superheterodyne receiver. It is designed for operation on either alternating or direct current, and incorporates an L-55-B ballast resistor tube. The tuning range of the receiver is 540 to 1720 KC.

IMPORTANT: In cases where it is found that the push-button tuner does not tune in stations correctly due to extreme sharpness in tuning it is only necessary to turn the regeneration control trimmer (#5) slightly clockwise. This will make tuning broader and will result in more accurate tuning when using the push button tuner.

## KNOBS AND PUSH-BUTTONS

WHEN ORDERING GIVE COLOR AS WELL AS PART NUMBER

97-56-S

| COLOR | COLOR NUMBER | PUSH BUTTON | TUNING KNOB | VOLUME KNOB |
|---|---|---|---|---|
| Walnut | -- | 113510 | 113530 | 113573 |
| Ivory | -- | 113529 | 113531 | 113574 |
| Navy Blue | #30 | 113785 | 113786 | 113787 |
| Orange | #74 | 113777 | 113778 | 113779 |
| White | -- | 113783 | 113796 | 113805 |
| Gold | #73 | 113796 | 113805 | 113823 |
| Old Gold | #45 | 113805 | 113823 | 113832 |
| Burnt Orange | #76 | 113823 | 113832 | 113841 |
| Black | #20 | 113832 | 113841 | 113911 |
| Gray | #24 | 113841 | 113911 | 113912 |
| Red | #61 | 113911 | 113912 | 113913 |

| PUSH BUTTON & CONTROL KNOB PRICES | COLOR | LIST PRICE | 113922 | 114126 |
|---|---|---|---|---|
| Yellow | #72 | 113920 | 113921 | 114125 |
| Blue | #36 | 114124 | 114125 | 114126 |

| DESCRIPTION | LIST PRICE |
|---|---|
| Tuning Knob - Walnut only | .30 |
| Tuning Knob - Ivory only | .40 |
| Tuning Knob - All other colors | .18 |
| Volume Knob - Walnut or Ivory | .22 |
| Volume Knob - All other colors | .05 |
| Push Button - Walnut or Ivory | .05 |
| Push Button - All other colors | .09 |

Prices subject to change without notice.

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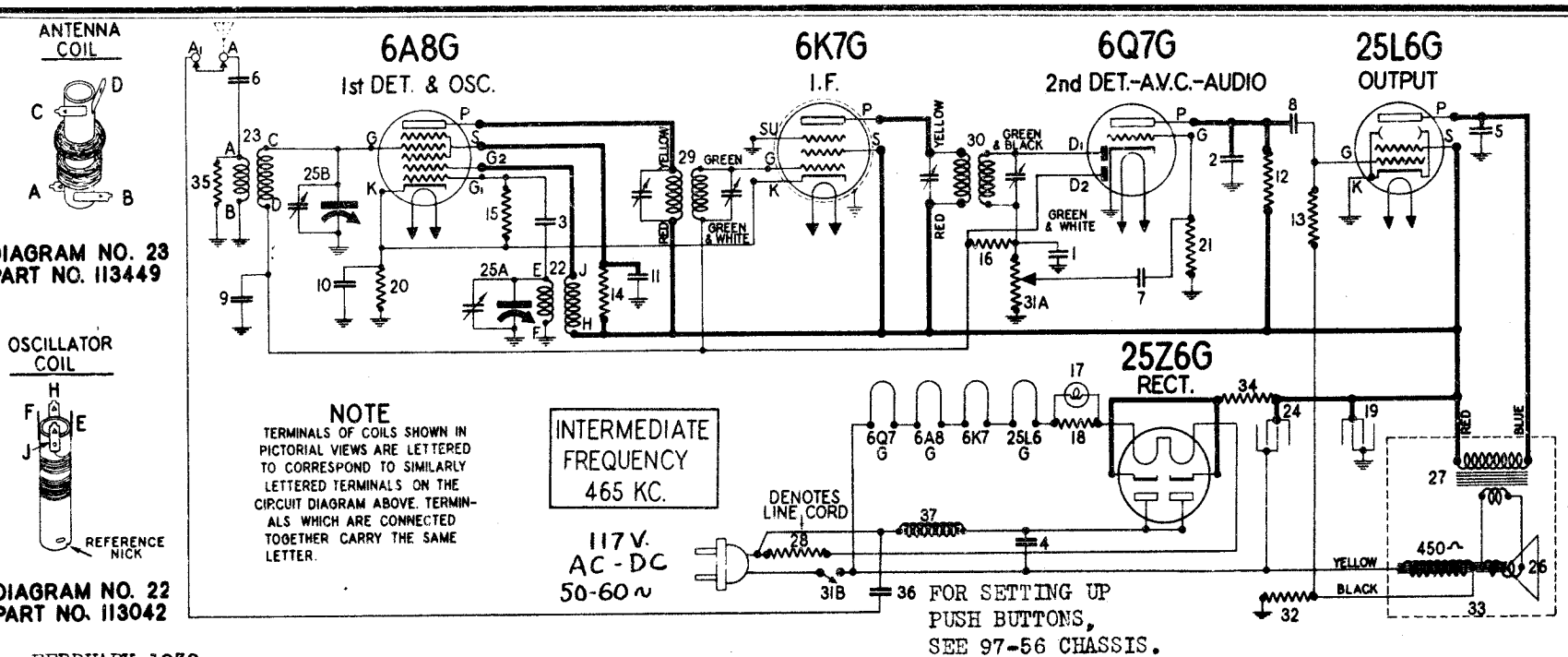



FEBRUARY 1939.

# MODELS 97-571 to 97-579
# 97-57 CHASSIS

## CIRCUIT CHANGE

Resistor No. 18 connected in parallel with the dial bulb has been changed to a 3 watt molded wire wound resistor, Part No. 116479. This size is being used in place of the original 1/2 watt rating, to prevent failure of the resistor if the dial bulb burns out. The 3 watt resistor should be used for replacement in all cases.

## TUBE CHANGE

A small percentage of these chassis was equipped with 6K7 metal I.F. tubes but most of them are using the 6K7G glass tube. Because of shield requirements, these tubes cannot be used interchangeably. In other words, a metal tube must be used to replace a metal tube, while in a chassis originally equipped with a glass I.F. tube, a glass tube must be used as a replacement.

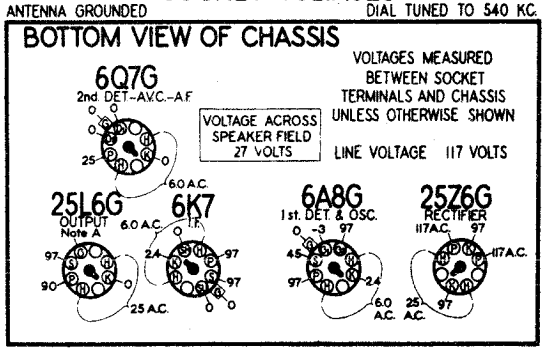
## CORRECTING OSCILLATION & SQUEALING

If a "squeal" develops with the volume control fairly well advanced, separate the 6Q7G grid lead and the speaker wires as much as possible by pulling the grid lead to the side of the 6Q7G nearest the variable condenser.

If there is a loud heterodyne whistle when tuning in stations, the I.F. stage may be oscillating. If this happens, move the lead from the 6A8G cathode to the 6Q7G cathode as close to the chassis and as far from other wires as possible. If necessary, connect a .05 mfd. 200 volt condenser to one of the above cathode terminals which does not already have such a condenser connected directly to it.

## SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.




REAR OF CHASSIS

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A:- The bias for the control grid of the 25L6-G tube is -6.7 volts, measured across resistor number 32.

MODELS 97-571 to 97-579
Alignment, Trimmers, Parts
Antenna Notes

# STEWART WARNER CORP.

## ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1—Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and ground through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.

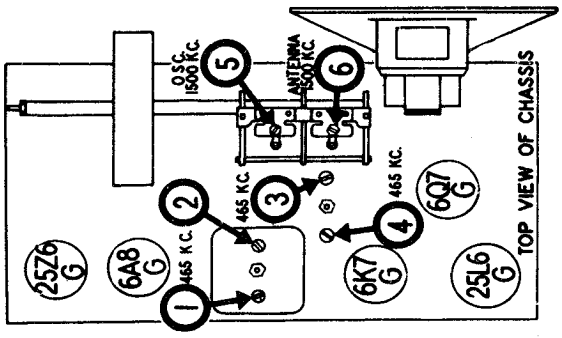
2—Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.

3—Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

4—TO CALIBRATE THE DIAL:- Remove the chassis from the cabinet and set it on a flat surface (insulated from ground). Release the set screw in the collar which connects the gang condenser shaft with the tuning unit. Holding the gang in full mesh turn the dial until the last dial division (just below 55) on the low frequency end is exactly 4 3/8 inch above the table surface. Now retighten the set screw in the coupler collar. The 4 3/8 inch division on the ruler (when measured vertically from table surface) is to be used as the dial indicator for all calibrations and alignment.

| DUMMY ANT IN SERIES WITH SIGNAL GENERATOR | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|
| 200 MMFD. MICA CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 1ST I. F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT |
| | | | | 3-4 | 2ND I. F. | |
| 200 MMFD. MICA CONDENSER | ANTENNA LEAD (Blue Wire) | 1500 KC | 1500 KC | 5 | BROADCAST OSCILLATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| 200 MMFD. MICA CONDENSER | ANTENNA LEAD (Blue Wire) | 1500 KC | TUNE TO 1500 KC GENERATOR SIGNAL | 6 | BROADCAST ANTENNA (Shunt) | ADJUST FOR MAXIMUM OUTPUT. |

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1-2 | 83539 | --Condenser - mica 260 mmfd. | .20 |
| 3 | 83783 | --Condenser - mica, 110 mmf. | .20 |
| 4 | 111252 | --Condenser - paper .05 mfd. 400 V. | .13 |
| 5 | 88026 | --Condenser - paper .02 mfd. 400 V. | .25 |
| 6 | 88029 | --Condenser - paper .004 mfd. 400 V. | .25 |
| 7-8 | 88030 | --Condenser - paper .01 mfd. 400 V. | .25 |
| 9-10 | 88189 | --Condenser - paper .05 mfd. 200 V. | .25 |
| 11 | 89421 | --Condenser - paper .1 mfd. 200 V. | .25 |
| 12 | 110553 | --Resistor - carb. 220,000 ohms ½ W. | .12 |
| 13 | 110559 | --Resistor - carb. 470,000 ohms ½ W. | .12 |
| 14 | 110566 | --Resistor - carb. 33,000 ohms ½ W. | .12 |
| 15 | 110578 | --Resistor - carb. 68,000 ohms ½ W. | .12 |
| 16 | 110580 | --Resistor - carb. 3.3 meg. 1/4 watt | .12 |
| 17 | 110629 | --Lamp - 6.3 volt - .25 amps. | .15 |
| 18 | 110975 | --Resistor - W. W. 33 ohms ½ W.(10%) | .12 |
| 19 | 112898 | --Condenser - elect. 16 mfd. 150 V. | .50 |
| 20 | 112974 | --Resistor - carb. 220 ohm ½ W.(10%) | .15 |
| 21 | 112975 | --Resistor - carbon 10 meg. 1/4 watt | .12 |
| 22 | 113042 | --Coil - oscillator | .45 |
| 23 | 113449 | --Coil - antenna | .78 |
| 24 | 113472 | --Condenser - elect. 40 mfd. 150 V. | .56 |
| 25A - 25B | 113478 | --Condenser - variable gang | 3.20 |
| 26 | R-114061 | Cone - voice coil assembly (for R-115039 speaker) | 1.50 |
| 27 | R-114062 | --Transformer - output | 1.20 |
| 28 | 114797 | Power cord - (series resistance 143 ohms) Brown | .98 |
| | 114951 | Power Cord - (series resistance 143 ohms) Ivory | 1.00 |
| 29 | 114802 | --Transformer - 1st I.F. | 1.10 |
| 30 | 114804 | --Transformer - 2nd I.F. | .85 |
| 31A - 31B | 114814 | Volume control 1 megohm with off-on switch | .96 |
| 32 | 114815 | --Resistor - W.W. 110 ohms ½ W.(10%) | .14 |
| 33 | R-115039 | --Speaker - dynamic 5 inch | 3.95 |
| 34 | 116013 | --Resistor - W.W. 50 ohms 1 watt | .18 |
| 35 | 110569 | --Resistor - carb. 10,000 ohms ½ W. | .12 |
| 36 | 116224 | --Condenser - mica 260 mmfd. 500 V. | .15 |
| 37 | 116232 | --R. F. Choke | .48 |




## KNOBS & PUSH BUTTONS

WHEN ORDERING GIVE COLOR AS WELL AS PART NUMBER

| COLOR | PUSH BUTTON | TUNING KNOB | VOLUME KNOB |
|---|---|---|---|
| IVORY | 113529 | 113531 | 113574 |
| LITE WALNUT | 114710 | 114711 | 114712 |
| METALLIC BLUE | 116132 | 116133 | 116134 |
| METALLIC GREEN | 116137 | 116138 | 116139 |
| METALLIC RED | 116141 | 116142 | 116143 |

PUSH BUTTON & CONTROL KNOB PRICES

| COLOR | PUSH BUTTON | TUNING KNOB | VOLUME KNOB |
|---|---|---|---|
| IVORY | .05 | .30 | .18 |
| LITE WALNUT | .05 | .28 | .18 |
| METALLIC COLORS | .09 | .40 | .22 |

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 112745 | ------C11p - coil mounting (osc. & ant.) | .01 |
| 89912 | -------C11p - grounding, for tube base | .02 |
| 113558 | ------Clutch Spring - for tuner (on cam shaft) | .04 |
| 113504 | ------Collar - Coupling (between tuner unit and gang condenser shaft) | .08 |
| 85321 | -------Connector - for Internal Antenna | .01 |
| 113560 | ------Dial Scale - celluloid strip | .22 |
| 113562 | ------Dial Window - celluloid | .12 |
| 113557 | -------Key - for push button tuner (left hand) | .24 |
| 113572 | -------Key - for push button tuner (right hand) | .24 |
| 113500 | ------Mechanical Tuner Unit - less tenite tips for push buttons | 3.90 |

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 113699 | ------Screw - #8 X 1" for chassis mounting | .01 |
| 113537 | ------Screw - for tuning knob (antique bronze) | .18 |
| 113538 | ------Screw - for tuning knob (chrome head) | .14 |
| 112865 | ------Shield - base; for tubes | .03 |
| 88165 | -------Shield Cap - for tubes (plain) | .06 |
| 112864 | -------Shield - for tubes | .08 |
| 88161 | -------Shield Tube - (short section) | .08 |
| 85427 | -------Socket - octal base (standard) | .15 |
| 113543 | ------Socket - dial lamp | .18 |
| 113559 | ------Spring - for key return | .02 |
| 113550 | ------Tabs - station call letters | .28 |
| 118223 | ------Terminal Strip - A - $A_1$ | .12 |

## BUILT-IN ANTENNA SYSTEM

The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when terminals A and $A_1$ on the back of the chassis are connected together. In cases where noises are excessive or greater sensitivity is desired, remove the jumper connecting terminals A and $A_1$ and connect an external antenna to terminal A.

In some locations, due to peculiar power line conditions, hum or noise may be excessive when the Built-In Antenna is used. In such cases reverse the power line plug. If this doesn't correct the condition, remove the connector between A and $A_1$ on the back of the chassis, and connect an external antenna to **A**.

MODELS 97-571 to 97-579 97-57 CHASSIS

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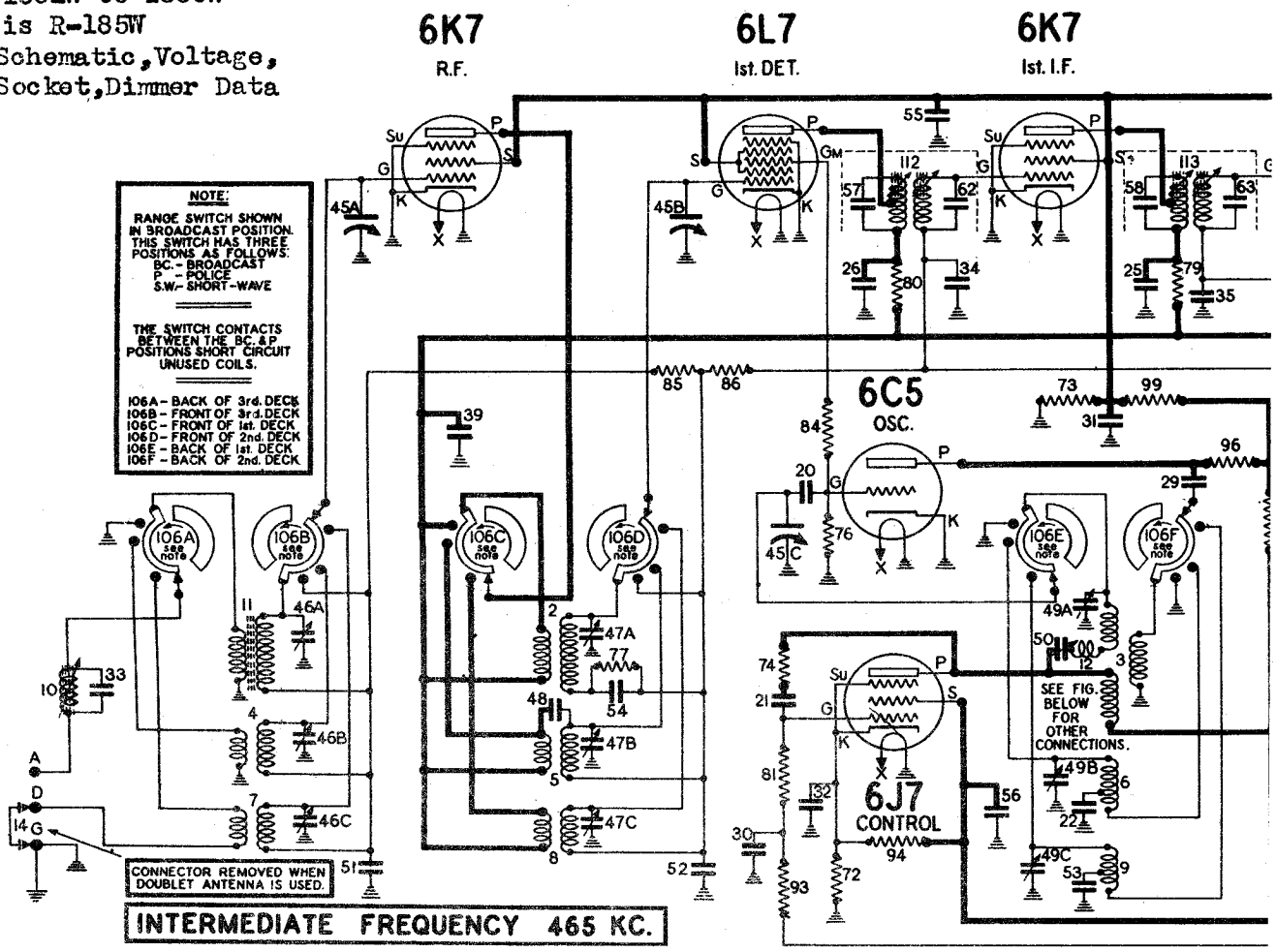
# R-185 CHASSIS (RECEIVER MODELS 1851 TO 1859)

Chassis R-185B
1851W to 1859W
Chassis R-185W
Schematic, Voltage, Socket, Dimmer Data

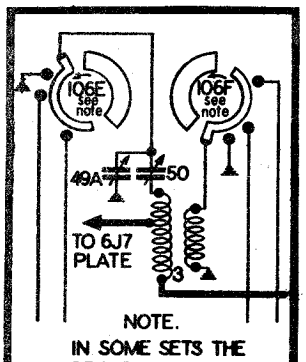
STEWART-WA

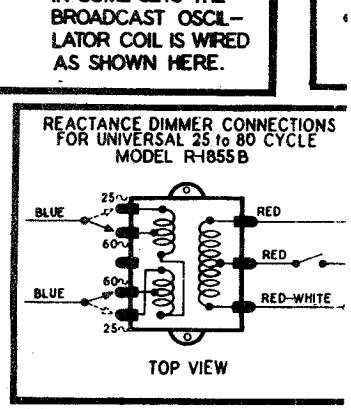

6K7
R.F.
6L7
1st. DET.
6K7
1st. I.F.
6C5
OSC.
6J7
CONTROL
NOTE:
RANGE SWITCH SHOWN IN BROADCAST POSITION. THIS SWITCH HAS THREE POSITIONS AS FOLLOWS:
BC.- BROADCAST
P - POLICE
S.W.- SHORT-WAVE
THE SWITCH CONTACTS BETWEEN THE BC. & P POSITIONS SHORT CIRCUIT UNUSED COILS.
106A - BACK OF 3rd. DECK
106B - FRONT OF 3rd. DECK
106C - FRONT OF 1st. DECK
106D - FRONT OF 2nd. DECK
106E - BACK OF 1st. DECK
106F - BACK OF 2nd. DECK
CONNECTOR REMOVED WHEN DOUBLET ANTENNA IS USED.
SEE FIG. BELOW FOR OTHER CONNECTIONS.
INTERMEDIATE FREQUENCY 465 KC.

| DIAGRAM NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 1 | 111330--Choke - filter (for model R-185-A and R-185-B) | $1.50 |
| | 112330--Choke - filter (model R-185-W only) | 1.50 |
| 2 | 111056--Coil - R. F. (broadcast) | 1.25 |
| 3 | 111057--Coil - oscillator (broadcast) | 1.05 |
| 4 | 111058--Coil - antenna (police) | .80 |
| 5 | 111059--Coil - R. F. (police) | 1.00 |
| 6 | 111060--Coil - oscillator (police) | 1.00 |
| 7 | 111062--Coil - antenna (short wave) | .90 |
| 8 | 111063--Coil - R. F. (short wave) | .90 |
| 9 | 111064--Coil - oscillator (short wave) | .85 |
| 10 | 111079--Coil - wave trap | 1.20 |
| 11 | 111103--Coil - antenna (broadcast) | 1.62 |
| 12 | 111486--Coil - compensating inductance | .38 |
| 13 | 112103--Coil - reactance dimmer (60 cycle only) | 2.50 |
| | 112204--Coil - reactance dimmer (25 to 80 cycle) for model R-185-B only) | 3.25 |
| | 112328--Coil - reactance dimmer (for model R-185-W only) | 2.70 |
| 14 | 85321--Connector - ground | .01 |
| 15-16-17-18 | 87763--Condenser - mica, 110 mmfs | .20 |
| 19 | 85376--Condenser - shielded .012 mfd. 1000 volt- | .40 |
| 20 | 85061--Condenser - mica, 51 mmfd. | .15 |
| 21 | 85394--Condenser - mica, 510 mmf. | .25 |
| 22 | 85467--Condenser - mica, 1370 mmfd. (3%) | .30 |
| 23 | 88026--Condenser - paper .02 mfd. 400 volt | .25 |
| 24 | 88029--Condenser - paper .004 mfd. 400 volt | .25 |
| 25-26-27-28-29 | 88030--Condenser - paper .01 mfd. 400 volt | .25 |
| 30 | 86048--Condenser - paper .1 mfd. 150 volt | .25 |
| 31 | 86191--Condenser - paper .1 mfd. 300 volt | .25 |
| 32 | 88193--Condenser - paper .25 mfd. 150 volt | .35 |
| 33 | 88205--Condenser - mica, 2100 mmfd. | .35 |
| 34-35 | 88534--Condenser - paper .05 mfd. 150 volt | .25 |
| 36-37 | 88660--Condenser - electrolytic 8 mfd. 450 volt- | .95 |
| 38-39-40 | 88682--Condenser - paper .1 mfd. 400 volt | .25 |
| 41 | 89937--Condenser - electrolytic 30 mfd. 450 volt | 1.60 |
| 42-43 | 110377--Condenser - electrolytic 10 mfd. 25 volt | .60 |
| | 112113--Condenser - elec. 10 mfd. 50 volt (for model 185-W only) | .85 |
| 45A to 45C | 111073--Condenser - variable gang | 6.25 |
| 46A to 46C 47A to 47C | 111078--Condenser - trimmer (3 section) for R.F. or antenna (all bands) | .75 |
| 48 | 111080--Condenser - 3 mmfd. (wire) | .10 |
| 49A to 49C | 111089--Condenser - trimmer (3 section) for oscillator (all bands) | .75 |
| 50 | 111115--Condenser - pad (single section) | .63 |
| 51-52 | 111117--Condenser - low loss .05 mfd. 150 volt | .35 |
| 53 | 111122--Condenser - mica, 3560 mmfd. (3%) | .48 |
| 54 | 111123--Condenser - mica, 7750.mmfd. (5%) | .85 |
| 55-56 | 111288--Condenser - electrolytic 4 mfd. 200 volt- | .75 |
| | 112467--Condenser - electrolytic 4 mfd. 200 volt (used on model R-185-W only) | .80 |
| 57-58 | 111342--Condenser - mica, 200 mmfd. (5%) | .18 |
| 59 | 111346--Condenser - mica, 2000 mmfd. 1000 volt | .22 |
| 60A - 60B | 111384--Condenser - shielded (Section A - .02 mfd. - 600 volt) (Section B - .03 mfd. - 600 volt) | .85 |
| 61A - 61B | 111468--Condenser - elect. Dual 10 mfd. 25 volt | .85 |

| DIAGRAM NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 62-63-64-65 | 111575--Condenser - mica, 220 mmfd. (5%) | .20 |
| 66-67-68-69 | 110829--Lamp - 6.3 V. .25 amps. | .15 |
| 70 | 110911--Lamp - dimmer reactor 2.5 volt .5 amp. | .15 |
| 71 | 111380--Motor - 6 volt - 60 cycles | 4.40 |
| | 112254--Motor - 6 volt - 25 to 80 cycles | 5.50 |
| 72 | 88460--Resistor - wire wound 150 ohm 1/2 watt | .12 |
| 73 | 110551--Resistor - carbon 15,000 ohm 1 watt | .15 |
| 74-75-76 | 110552--Resistor - carbon 47,000 ohm 1/4 watt | .12 |
| 77 | 110553--Resistor - carbon 220,000 ohm 1/4 watt | .12 |
| 78 | 110554--Resistor - carbon 1 megohm 1/4 watt | .12 |
| 79-80 | 110557--Resistor - carbon 4,700 ohm 1/4 watt | .12 |
| 81-82-83 | 110558--Resistor - carbon 470,000 ohm 1/4 watt | .12 |
| 84 | 110560--Resistor - carbon 100 ohm 1/4 watt | .12 |
| 85-86-87-88 | 110564--Resistor - carbon 100,000 ohm 1/4 watt(20%) | .12 |
| 89 | 110565--Resistor - carbon 22,000 ohm 1/4 watt | .12 |
| 90 | 110573--Resistor - carbon 2,200 ohm 1/4 watt | .12 |
| 91 | 110577--Resistor - carbon 3,300 ohm 1/4 watt | .12 |
| 92 | 110578--Resistor - carbon 68,000 ohm 1/4 watt | .12 |
| 93 | 110580--Resistor - carbon 3.3 megohm 1/4 watt | .12 |
| 94 | 110582--Resistor - carbon 12,000 ohm 1 watt | .15 |
| 95 | 110585--Resistor - carbon 4,700 ohm 1/2 watt | .12 |
| 96 | 110592--Resistor - carbon 22,000 ohm 1 watt | .12 |
| 97 | 110593--Resistor - carbon 18,000 ohm 3 watt | .20 |
| 98 | 110594--Resistor - carbon 390,000 ohm 1/4 watt | .12 |
| 99 | 110595--Resistor - carbon 12,000 ohm 3 watt | .20 |
| 100A - 100B | 111358--Resistor - volume control (1 meg.) (with off-on switch) | 1.40 |
| 101 | 111515--Resistor - wire wound 27 ohm 1/2 watt(5%) | .12 |
| 102 | 111638--Resistor - wire wound 200 ohm 2 watt (5%) | .18 |
| | 111111--R.F. unit - coils, range switch, gang and trimmers complete | 25.00 |
| 103 | R-262--Speaker - dynamic 12 inch | 8.75 |
| 104 | 111490--Cone - voice coil assem. for R-292 Spkr. | 2.50 |
| 105A - 105B | 84404--Switch - phono toggle | 1.10 |
| 106A - 106F | 111077--Switch - range | 3.30 |
| 107 | 111218--Switch - for reactance dimmer | .28 |
| 108 | 111351--Switch - tone control | .60 |
| 109 | 111674--Switch - multiple contact (above tuning shaft) | .95 |
| 110 | 112564--Switch - at rear: | 1.25 |
| 111 | 89709--Terminal Strip - phono (for model 186-W only | .15 |
| 112 | 111338--Transformer - 1st I.F. | 2.70 |
| 113 | 111675--Transformer - 2nd I.F. | 2.00 |
| 114 | 111340--Transformer - I.F. discriminator | 2.70 |
| 115 | 111334--Transformer - output (for models R-185-A or R-185-B) | 2.50 |
| | 112329--Transformer - output (for model R-185-W) | 2.75 |
| 116 | 111447--Transformer - power 115 volt - 60 cycle | 8.00 |
| | 112176--Transformer - power 115 volt - 25 cycle | 11.00 |
| | 112300--Transformer - power 100 to 240 volt 50 to 133 cycles | 11.00 |
| 117 | 111331--Transformer - impedance coupler(for models R-185-A or R-185-B) | 2.10 |
| | 112331--Transformer - impedance coupler(for models R-185-W only) | 2.35 |
| 118 | 112633--Plug - for mechanism connecting(8 prong) | .20 |
| 119 | 112630--Socket & Bracket - for electrical connections to mechanism | .75 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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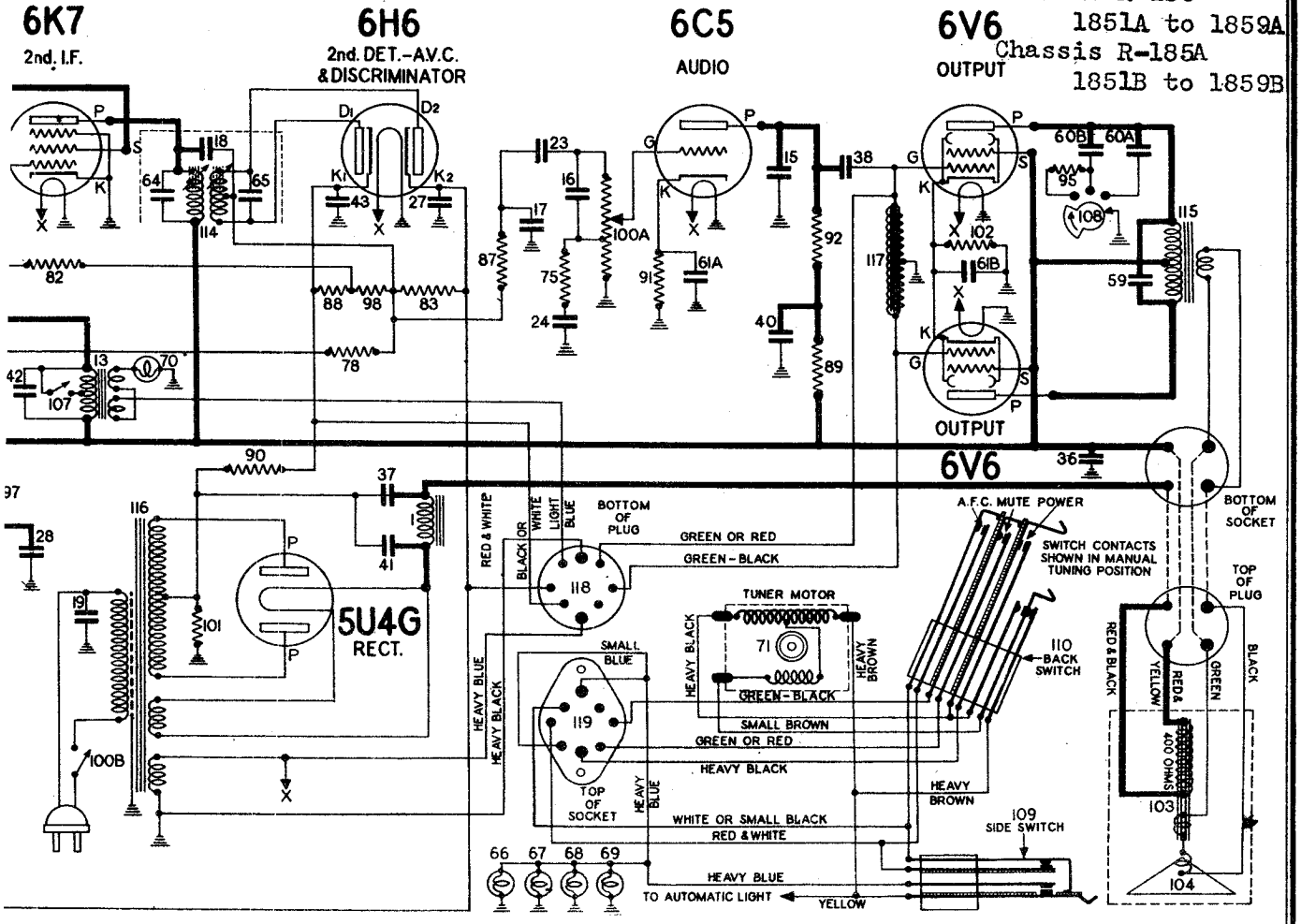
RNER CORP.

MODELS 1851 to 1859
Chassis R-185
1851A to 1859A
Chassis R-185A
1851B to 1859B

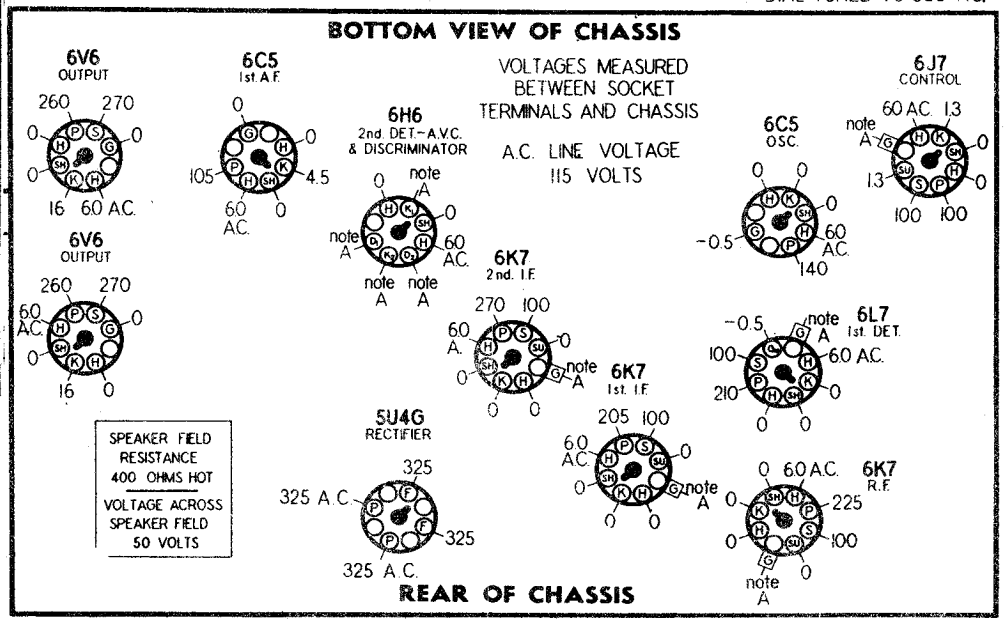



## SOCKET VOLTAGES

DECEMBER 1937

ANTENNA GROUNDED

DIAL TUNED TO 525 KC.



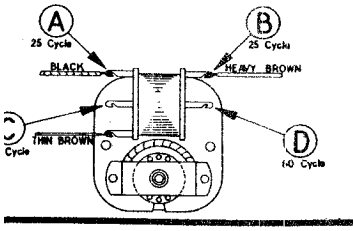

IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6L7 1st Det., 6K7 R.F., 6K7 1st I.F. and 6K7 2nd I.F. tubes, also the voltage on the 6H6 diodes and cathodes and the control grid of the 6J7, is -3.6 volts measured across resistor number 101.

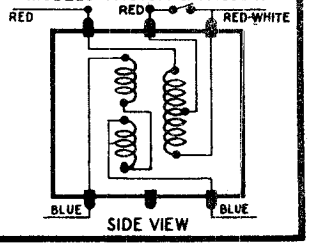
### NNECTIONS FOR UNIVERSAL UNER MOTOR USED ON 5 TO 80 CYCLE MODELS.

42 CYCLE OPERATION — CONNECT BLACK WIRE TO A, BROWN WIRE TO B

42 to 80 CYCLE OPERATION — CONNECT BLACK WIRE TO C AND BROWN WIRE TO D




### REACTANCE DIMMER CONNECTIONS 60 CYCLES & 50 TO 133 CYCLES MODELS R-1855A & R-1855W



1851W to 1859W
Alignment

# STEWART WARNER CORP.

MODELS 1851 to 1859
1851A to 1859A
1851B to 1859B

The model R-185 chassis, is a 11 tube, three band, automatic tuning, superheterodyne receiver. It has an intermediate frequency of 465 KC. and tuning range of 525 KC. to 18,100 KC. The circuit is of the latest design incorporating such refinements as a special high efficiency R.F. unit, automatic frequency control, reactance dimmer, tuning indicator, and iron core I.F. transformers.

## ALIGNMENT EQUIPMENT & PROCEDURE

(1)—Before attempting to align the receiver check to see that the dial pointer is opposite the last scale division on the low frequency end of the dial when the gang condenser is in full mesh. Also when the gang condenser is in full mesh the stop pin on the left side of the tuner should be resting against the back stop. If after examination it is found that the gang is in full mesh and the stop pin is against the back stop, but the pointer is set to the wrong position, it will only be necessary to loosen the set screw on the dial drive gear at the left side of the mechanism; then grasp the large drum on the same side of the tuner and turn it until the pointer is set correctly. Now retighten the set screw on the gear being careful to see that the gear is meshing properly.

On the other hand if the stop pin does not rest against the back stop with the gang condenser in full mesh, loosen the set screw on the gang condenser side of the flexible coupler. Then turn the tuning knob until the stop pin rests against the back stop on the tuner. Now retighten the set screw in the flexible coupler and proceed to set the pointer to its correct position by the method described in the previous paragraph.

(2)—Connect the output meter across the two plates of the two 6V6 power output tubes or across the voice coil of the speaker, depending on the type of meter. The more sensitive type should be connected across the voice coil.

(3)—Connect the ground lead of the signal generator to the chassis and leave it there throughout the entire alignment procedure.

(4)—Turn the volume control to the maximum volume position.

(5)—Keep the Ground and Doublet connections on the antenna terminal strip connected together throughout the entire alignment procedure.

IMPORTANT: ALLOW RECEIVER TO WARM UP 15 MINUTES BEFORE ALIGNING. SEE THAT NONE OF THE PUSH BUTTONS ARE DEPRESSED WHEN ALIGNING.

| TYPE OF DUMMY ANT. IN SERIES WITH SIG.GEN. | POINT TO CONNECT OUTPUT OF SIGNAL GENERATOR. | SIGNAL GENERATOR FREQUENCY | RANGE SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER (see diag. next page) | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 6L7 TUBE | 465 KC. | BROADCAST (Counter-clockwise) | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 1ST I.F. | Adjust for maximum output. Then repeat adjustment. |
| | | | | | 3-4 | 2ND I.F. | |
| | | | | | 5 | 3RD I.F. | |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 465 KC. | BROADCAST (Counter-clockwise) | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 6 | WAVE TRAP | Adjust for minimum output using a strong generator signal. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1500 KC. | BROADCAST (Counter-clockwise) | 1500 KC. | 7 | BROADCAST OSCILLATOR (Shunt) | Adjust trimmer to bring in signal. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1500 KC. | BROADCAST (Counter-clockwise) | TUNE TO 1500 KC. GENERATOR SIGNAL | 8 | BROADCAST DETECTOR | Adjust for maximum output. |
| | | | | | 9 | BROADCAST ANTENNA | |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 600 KC. | BROADCAST (Counter-clockwise) | TUNE TO 600 KC. GENERATOR SIGNAL | 10 | BROADCAST OSCILLATOR (Series Pad) | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 5 MC. | POLICE (Center) | 5 MC. | 12 | POLICE OSCILLATOR (Shunt) | Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 4.1 MC. If image does not appear realign at 5 MC. with trimmer screw farther out. Recheck image. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 5 MC. | POLICE (Center) | TUNE TO 5 MC. GENERATOR SIGNAL | 13 | POLICE DETECTOR | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| | | | | | 14 | POLICE ANTENNA | |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 16 MC. | SHORT-WAVE (Clockwise) | 16 MC. | 15 | SHORT-WAVE OSCILLATOR (Shunt) | Adjust to bring in signal. Check to see if proper peak was obtained by tuning in image at approx. 15.1 KC. If image does not appear realign at 16 KC. with trimmer screw farther out. Recheck image. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 16 MC. | SHORT-WAVE (Clockwise) | 16 MC. | 16 | SHORT-WAVE DETECTOR | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| | | | | | 17 | SHORT-WAVE ANTENNA | |

## THE AFC MUST NOW BE ALIGNED.

### A.F.C. ALIGNMENT.

IMPORTANT: The following adjustment must be made after every re-adjustment of the I.F. and broadcast band trimmers.

The A.F.C. Discriminator should be adjusted as follows:

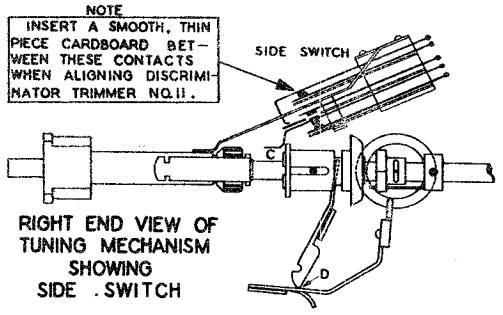
1. Be sure no buttons are depressed. Loosely couple the output of the signal generator to the 6L7 control grid by clipping the signal generator output lead to the insulation on the control grid wire, or connect to the grid clip through a 50 mmfd. mica condenser. BE SURE THE RANGE SWITCH IS IN THE BROADCAST (COUNTER-CLOCKWISE) POSITION.
2. Adjust the signal generator to resonance with I.F. system by tuning the signal generator dial for maximum output meter deflection. Be sure that the receiver dial is at some point where it has no tuning effect on the generator signal. Switch off the modulation.
3. With the signal generator connected and operating as in #2, connect antenna and manually tune in powerful local station in region of 1000 KC. or lower. (Avoid stations around 930 KC. which might beat with second harmonic of test oscillator.)
4. Adjust receiver tuning dial to obtain zero beat between the test oscillator and the incoming signal. (A very slight adjustment is all that is required. Be careful not to tune off signal.)
5. Refer to the figure on the right. It is now necessary to open the A.F.C. contacts & allow it to function. This may be done by placing a piece of smooth cardboard between the A.F.C. contacts as shown in the figure. Be careful not to bend or malform the switch in any way.
6. Now, adjust the secondary of the discriminator transformer (Trimmer #11) to restore zero beat. NOTE: This trimmer should be adjusted to the point where the frequency of the beat note increases rapidly if the trimmer is turned in either direction. Other zero beat points may be found with the trimmer all the way in or all the way out, but these settings are incorrect.

If this operation has been performed correctly, the opening or closing of the A.F.C. contacts on the side switch by inserting or removing the cardboard, should not change the beat note by more than a slight rumble.

NOTE:- Where a second signal generator is available step #3 above may be varied as follows:

Connect second signal generator (set at about 1000 KC.) to antenna and tune in its signal. Switch off modulation and proceed as before.

This method is somewhat preferable to the first as the zero beat setting is more easily determined when both signals are unmodulated.




RIGHT END VIEW OF TUNING MECHANISM SHOWING SIDE SWITCH

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# TESTING THE A.F.C. SYSTEM.

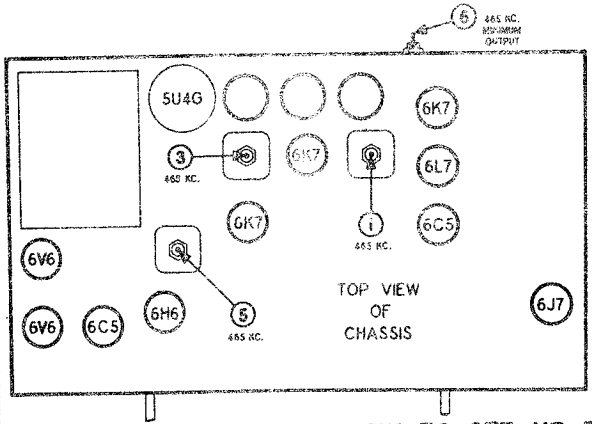
Connect the antenna and tune in a powerful local station. Remove the cardboard that you placed between the A.F.C. contacts on the side switch when aligning. The A.F.C. is now off.

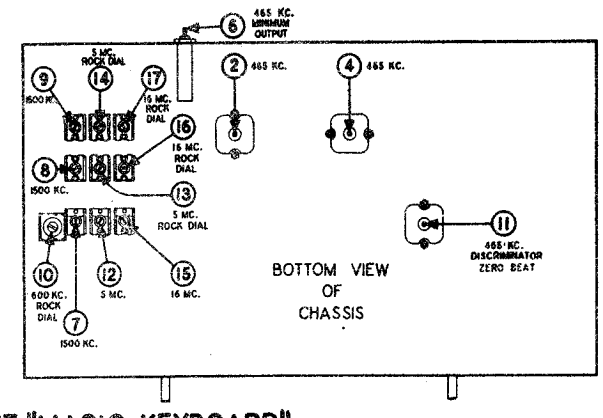
Next, detune the receiver dial until the music or speech becomes somewhat distorted. Now place a piece of smooth cardboard between the A.F.C. contacts on the side switch as shown in the illustration on the bottom of the previous page. This allows A.F.C. to function and it should improve the quality of the program.

Similarly detune the receiver dial in the opposite direction, with the cardboard removed from between the A.F.C. contacts (contacts closed). Then place the cardboard between the contacts again and check for improved quality of reception.

It will be noted that the correction for mistuning afforded by the A.F.C. system is not as marked at stations near the low frequency end of the dial scale as it is at the higher broadcast frequencies. This is characteristic of A.F.C. systems. However, if opening the A.F.C. contacts on the side switch (by inserting the piece of cardboard between the contacts) has no effect on the signal, or if it corrects for mistuning in one direction only, check the receiver as follows:

1. Re-align I.F., broadcast band, and discriminator trimmers.
2. Check all the tubes in the receiver. Defective 6H6 and 6J7 tubes, also the R.F., 1st Detector, and I.F. tubes may cause poor A.F.C. action.
3. If the above procedure fails to remedy the defect in A.F.C. action, check the entire A.F.C. circuit itself for possible troubles.




# HOW TO SET-UP THE "MAGIC KEYBOARD"

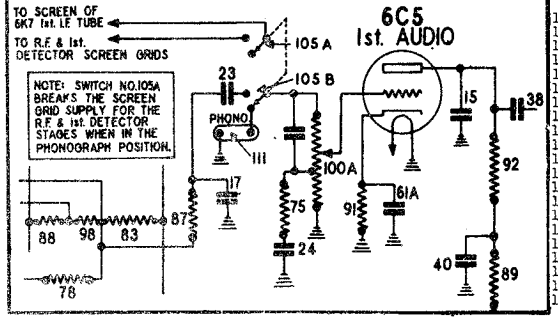
SELECTING THE PROPER STATIONS: When setting up the "Magic Keyboard" select powerful nearby stations. Avoid weak or fading stations.

LABELLING THE PUSH BUTTONS: Call letter labels are supplied with each set. To label any button remove the cap of the push button, BY PULLING ON THE TOP END. Remove the black cardboard disc, and insert the call letter tab. IN REPLACING THE CAP START AT THE BOTTOM AND PRESS ON THE TOP.

STEP BY STEP PROCEDURE:

1. Connect a good outside aerial to the receiver and allow the receiver to operate for 20 minutes before setting-up.
2. Pull off the large tuning knob. As this knob is removed another small "set-up" knob on the same shaft will appear partly hidden behind the panel face.
3. Pull out this set-up knob AS FAR AS IT WILL GO.
4. Rotate the set-up knob clockwise. After dial pointer reaches the end of the dial scale continue to turn the knob clockwise until you have forced it to a definite stop. This last twist unlocks the cams.
5. Push any button you wish to set to a station. The tuner will operate and carry the pointer to some new point on the dial scale.
6. Tune the receiver to the desired station with the metal set-up knob. TUNE CAREFULLY AND WATCH THE "REACTANCE DIMMER" FOR THE POINT OF MINIMUM ILLUMINATION SO THAT THE RECEIVER WILL BE CORRECTLY TUNED TO THE STATION.
7. Push in the next button you want to set up for a station. This automatically completes the setting up of the previous station, and causes its button to pop out. Do not push in any buttons that are already set up and which you do not wish to change, since pushing a button with the cams unlocked will shift its setting.
8. Tune in the station for the button that is now depressed.
9. Set-up other buttons as desired in the same manner, that is, push in the button, tune in the station, then push in the next button.
10. To release the last button grasp the set-up knob on the station selector shaft and push it in until the last button is released. Then pull the knob out again.
11. Turn the set-up knob to the LEFT (Counter-clockwise). CONTINUE TO TURN THE KNOB TO THE LEFT even after the pointer reaches the end of the dial scale. FORCE THE KNOB COUNTER-CLOCKWISE TO A DEFINITE STOP.
12. Push the "set-up" knob back into the cabinet again and replace the large tuning knob.
13. Your "Magic Keyboard" is now ready for operation.

# PHONOGRAPH CONNECTIONS FOR MODEL R-1855-W




# DIAL DRIVE & MISCELLANEOUS PARTS.

FOR A COMPLETE PARTS LIST SEE THE SPECIAL "MAGIC KEYBOARD"

Wherever the word RIGHT or LEFT appears in the following list, it is understood that you are standing in front of the receiver.

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 111930 | Band Indicator - and frame assembly | $ .40 |
| 112658 | Belt - for range switch drive | .06 |
| 111261 | Bolt - chassis mtg. (#14 X 1-1/4) | .03 |
| 111260 | Bushing - rubber (for chassis mtg.) | .06 |
| 111892 | Bushing - hard rubber, mystic mechanism mtg. to chassis | .02 |
| 111858 | Clip - for pulley retaining | .01 |
| 110782 | Cord - for band ind. (2 ft. required) | Per Ft. .04 |
| 111302 | Cord - dial drive (6 ft. lengths) | .30 |
| 111226 | Escutcheon - for dial (with glass) | 3.00 |
| 111227 | Escutcheon - around push button opening | 1.20 |
| 111865 | Frame - dial, with scale | 2.50 |
| 111496 | Knob - tuning or volume | .20 |
| 111497 | Knob - range or tone | .20 |
| 111197 | Lever - for band indicator (on shaft) | .12 |
| 111370 | Link & Lever - for range sw. drive (used in early production) | .20 |
| 112633 | Plug - for mechanism connecting (8 prong) | .20 |
| 110496 | Plug - speaker (4 prong) | .12 |
| 111859 | Pointer - for dial, with slider | .18 |
| 111622 | Pulley - dial cord drive | .35 |
| 111630 | Pulley & Bracket - for band indicator | .10 |
| 112628 | Pulley - on range switch shaft under chassis | .20 |
| 84214 | Retaining Ring - for dial drum shafts | .02 |
| 89837 | Retaining Spring - for retaining escut.to cabinet | .01 |
| 111222 | Scale - dial | 1.20 |
| 110716 | Screw - band indicator pivot | .03 |
| 111116 | Screw - #5 X 5/8, mystic mechanism mtg. | .02 |
| 85827 | Set Screw - 8/32 square head | .12 |
| 111403 | Set Screw - 8/32, fluted head | .12 |
| 112138 | Set Screw - 8/32 slotted head | .03 |
| 111373 | Shaft - for range switch | .08 |
| 85427 | Socket - octal base | .15 |
| 110501 | Socket - 4 prong (for spkr.) | .16 |
| 110627 | Socket - dial lamp & automatic lamp | .12 |
| 111008 | Socket - reactance dimmer lamp | .12 |
| 112630 | Socket & Bracket - for elect. conn. to mech. | .75 |
| 111232 | Spring - torsion for band indicator | .05 |
| 111862 | Spring - drive cord tension | .03 |
| 112490 | Spring - in flexible coupler | .02 |
| 111676 | Stud - lower left idler pulley | .10 |
| 112667 | Stud - for pulley mtg. (for top pulleys) | .10 |
| 112005 | Tabs - station call letters (6 sheets) | .60 |
| 85066 | Terminal Strip - G.D.A. | .20 |
| 89709 | Terminal Strip - Phono. | .15 |
| 67568 | Washer - embossed (for mtg. electrolytic cond.) | .05 |
| 89746 | Washer - (paper) for back of knobs | .005 |
| 89027 | Washers - spring for range shaft | .01 |
| 111262 | Washer - flat steel mtg. (15/16" O.D.) | .02 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

# "MAGIC KEYBOARD" PARTS LIST

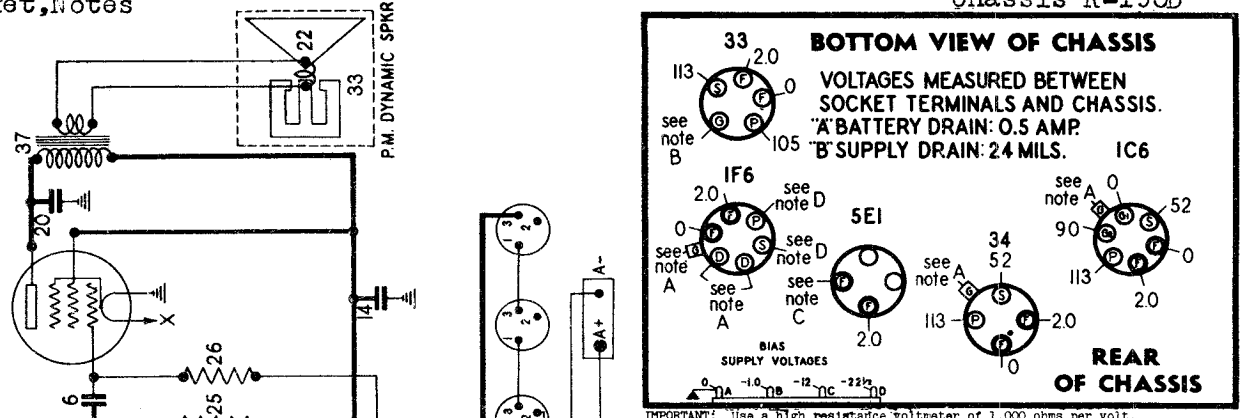
FOR A COMPLETE PARTS LIST SEE THE SPECIAL "MAGIC KEYBOARD"

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 112727 | Mystic Mechanism - complete with all dials - ready to mount on chassis | $60.00 |
| 111350 | Mystic Mechanism only, less dial frame assembly | 35.00 |
| 112428 | Button Body - for tuner | .10 |
| 112545 | Button Cap - for push button | .06 |
| 111876 | Button Window - celluloid for push button | .01 |
| 112547 | Button Reinforcing Disc - for push button | .01 |
| 111633 | Button Retaining Spring - inside push button | .02 |
| 111577 | Button Spring - in push button | .005 |
| 111576 | Button Washer - in push button | .005 |
| 112563 | Cam - bakelite - less operating arm | .10 |
| 111146 | Clutch - bushing, spring and gear | .55 |
| 111137 | Drive Ring - rubber | .05 |
| 111380 | Motor - 6 volt 60 cycles | 4.40 |
| 112354 | Motor - 6 volt, 25 to 80 cycles | 5.50 |
| 112736 | Plug - with cable for tuner connections | .75 |
| 111138 | Spring - horseshoe shaped on clutch | .02 |
| 111674 | Switch Side - multiple contact(above tuning shaft) | .95 |
| 112564 | Switch Back - (multiple contact) | 1.25 |
| 112521 | Tip - adjustable for key stop and kickout arm | .06 |
| 112483 | Wrench - for fluted hd. set screws #6 | .07 |
| 112484 | Wrench - for fluted hd. set screws #8 | .07 |
| 117468 | Spring Benders | .75 |

Schematic, Voltage Socket, Notes

# STEWART-WARNER CORP.

MODELS 1901 to 1909
Chassis R-190D




IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.
NOTE A: The bias for the control grids of the 1C6, 34, 1F6 and the diode plates of the 1F6 is -1.0 volt measured across section AB of resistor number 32.
NOTE B: The bias for the control grid of the 33 output tube is -12 volts measured across section AC of resistor number 32.
NOTE C: This voltage will vary between 2 and 3 volts depending upon the terminal voltage of the A battery.
NOTE D: Due to the high resistance in these circuits (1/2 megohm in the plate and 2 megohms in the screen) only a slight deflection of the voltmeter will be obtained unless a vacuum tube voltmeter is used.

NEW BATTERIES DIAL TUNED TO 540 KC.

## SOCKET VOLTAGES

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 112207 | Coil - antenna, broadcast & S.W. | $.95 |
| 2 | 112208 | Coil - oscillator, broadcast | .95 |
| 3 | 112209 | Coil - oscillator, S.W. | .95 |
| 4 | 83429 | Condenser - paper .5 mfd. 300 volt | .55 |
| 5-6-7 | 83437 | Condenser - paper .05 mfd. 200 volt | .30 |
| 8-9 | 83974 | Condenser - paper .1 mfd. 200 volt | .30 |
| 10 | 80030 | Condenser - paper .01 mfd. 200 volt | .25 |
| 11 | 81155 | Condenser - mica 500 mmf. | .25 |
| 12 | 81157 | Condenser - mica 250 mmfd. | .30 |
| 13 | 88173 | Condenser - mica 50 mmf. | .20 |
| 14 | 89962 | Condenser - paper .2 mfd. 200 volt | .23 |
| 15 | 112046 | Condenser - padding (300-600 mmfd.) | .50 |
| 16A-16B | 112212 | Condenser - variable gang | 4.00 |
| 17-18-19 | 112213 | Condenser - trimmer (3-45 mmfd.) | .25 |
| 20 | 112214 | Condenser - paper .003 mfd. 400 volt | .25 |
| 21 | 112215 | Condenser - mica .0045 mfd. | .50 |
| 22 | 112221 | Cone - voice coil assem. for 6" spkr. | 1.90 |
| | 112222 | Cone - voice coil assem. for 8" spkr. | 2.05 |
| 23 | 66022 | Resistor - carbon 50,000 ohms 1 watt | .18 |
| 24-25-26 | 67262 | Resistor - carbon 1/2 meg. 1/4 watt | $.12 |
| 27 | 67302 | Resistor - carbon 2 meg. 1/2 watt | .25 |
| 28 | 67939 | Resistor - carbon 1 meg. 1/2 watt | .25 |
| 29 | 61727 | Resistor - carbon 1,000 ohms 1/4 w. | .20 |
| 30 | 83285 | Resistor - carbon 10,000 ohms 1/2 w. | .25 |
| 31 | 112051 | Resistor - carbon 15,000 ohms 1/3 w. | .15 |
| 32 | 112216 | Resistor - wire wound (Sect. AB - 130 ohms) (Sect. BC - 1540 ohms) (Sect. CD - 1330 ohms) | .75 |
| 33 | 112217 | Speaker - P.M. Dynamic, 6 inch (1901) | 7.50 |
| | 112218 | Speaker - P.M. Dynamic, 8 inch (1905) | 9.00 |
| 34A-34B | 112219 | Switch, range | 1.35 |
| 35 | 112210 | Transformer - 1st I.F. | 2.00 |
| 36 | 112211 | Transformer - 2nd I.F. | 2.00 |
| 37 | 112223 | Transformer - output (for 6" spkr.) | 1.60 |
| | 112569 | Transformer - output (for 8" spkr.) | 2.00 |
| 38 | 112220 | Volume control - 1/2 meg. | .95 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

OCTOBER 1937

# R-190-D CHASSIS CIRCUIT DESCRIPTION MODELS 1901 to 1909

The Model R-190-D chassis is a five tube battery receiver using "A" and "B" batteries. The standard superheterodyne circuit which this receiver employs includes automatic volume control and a class A single pentode output system. The tuning range covers the standard broadcast range from 540 to 1720 KC. and the popular short wave bands from 5.7 to 18.5 MC. Automatic volume control is accomplished by supplying the filtered A.V.C. voltage to the control grids of both the 1C6 and 34 tubes.

An unusual arrangement of a combined off-on switch and range switch is also utilized in the circuit of this receiver. The action of this switch is as follows: 1. In the extreme counter-clockwise position the receiver is turned off with both the "A" and "B" supply circuits open. 2. With the switch in the middle position the "A" and "B" supplies are connected and the antenna and oscillator coils for the broadcast band are now in circuit to permit tuning on that band. 3. In the extreme clockwise position, the receiver will tune in the short wave band.

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MODELS 1901 to 1909
Chassis R-190D
Alignment, Trimmers
Battery Connections

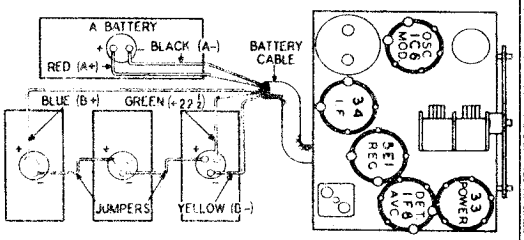
STEWART-WARNER CORP.

# POWER SUPPLY & BATTERY CONNECTIONS

The power supply of this receiver consists of three "B" batteries and one "A" battery. No "C" battery is needed as the first 22-1/2 volts of the "B" battery supply serves as a "C" battery. Proper intermediate bias voltages are secured from the tapped candohm resistor number 32

The +22-1/2 volt tap on the "B" battery is the negative connection for the plate supply and it is connected to "A-" and ground. This allows a maximum plate supply voltage of 113-1/2 volts with fresh batteries.

The "A" supply may be a 2-1/2 volt Air Cell, a 3 volt dry battery, or a 2 volt storage battery since the filaments of all tubes in the receiver are supplied through a type 5E1 voltage regulator tube. The purpose of this tube is to maintain a safe filament voltage with battery voltages ranging from 2 to 3 volts. The voltage drop across the tube will decrease as the battery voltage decreases thus maintaining nearly a constant filament potential.




If a 2 volt storage cell is to be used and the tubes in the receiver are not new it is desirable to remove the 5E1 voltage regulator tube and replace it by a plug which merely shorts out the two large terminals of the 5E1 tube socket. This plug may be made up by removing the base of an old 4 prong tube and connecting the two large pins together with a piece of wire. BE CAREFUL NOT TO CONNECT ANYTHING TO EITHER OF THE SMALL PINS OR THE OTHER TUBES MAY BE BURNED OUT.

In order to simplify connections to the batteries, plugs are provided and the method of connection to the batteries is shown in the diagram on the right.

# ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 16 MC. are required.

(1)— Connect the output meter across the voice coil or between the plate of the 33 tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)

(2)— Connect the ground lead of the signal generator to the chassis of the receiver.

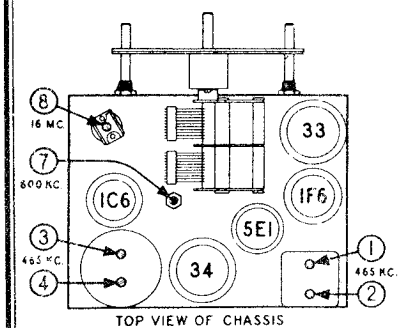
(3)— Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

(4)— With the gang condenser in full mesh set the pointer on the horizontal black line below 540 KC. on the dial.

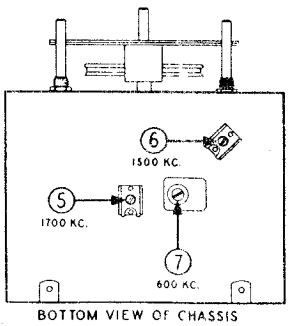
(5)— Using a bakelite screw driver proceed to align in exactly the same order as shown in the table below.

| ORDER OF ALIGN. | DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RANGE SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|---|
| A | .1 MFD. CONDENSER | CONTROL GRID OF 34 TUBE (Do not remove grid clip) | 465 KC. | BROADCAST (Center Position) | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1<br>2 | 2ND. I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| B | DITTO | CONTROL GRID OF 1C6 TUBE (Do not remove grid clip) | DITTO | DITTO | DITTO | 3<br>4 | 1ST. I.F. | ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2. SEE NOTE A BELOW. |
| C | 400 OHM CARBON RESISTOR | ANTENNA LEAD | 1700 KC. | DITTO | 1700 KC. | 5 | BROADCAST OSCILLATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| D | DITTO | DITTO | 1500 KC. | DITTO | TUNE TO 1500 KC. GENERATOR SIGNAL | 6 | BROADCAST ANTENNA | ADJUST FOR MAXIMUM OUTPUT. |
| E | DITTO | DITTO | 600 KC. | DITTO | TUNE TO 600 KC. GENERATOR SIGNAL | 7 | BROADCAST OSCILLATOR (Series Pad) | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| F | DITTO | DITTO | 16 MC. | SHORT-WAVE (Clockwise) | TUNE TO 16 MC. GENERATOR SIGNAL | 8 | SHORT-WAVE ANTENNA | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |

NOTE A: Now repeat adjustment of trimmers 3 and 4 again for greater sensitivity. This may cause oscillation. If oscillation occurs repeat steps A and B and disregard the adjustment mentioned in this note, i.e., after adjusting 1 and 2, do not repeat adjustment of 3 and 4. Important: Please note that in repeating step A, the signal generator must be connected to the 34 control grid. In step B, the connection is to the 1C6 grid.



TOP VIEW OF CHASSIS



BOTTOM VIEW OF CHASSIS

## DIAL DRIVE & MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 112206 | Cable - battery (with plugs) | $ .90 |
| 112224 | Dial - complete assembly | 2.70 |
| 112067 | Escutcheon - with window | 1.75 |
| 112226 | Knob - tuning | .25 |
| 112227 | Knob - volume and range switch | .25 |
| 112228 | Plug - "B" battery (3 prong) | .15 |
| 112229 | Plug - "A" battery (2 prong) | .12 |
| 112230 | Pointer - dial | .35 |
| 112225 | Scale - dial | 1.00 |

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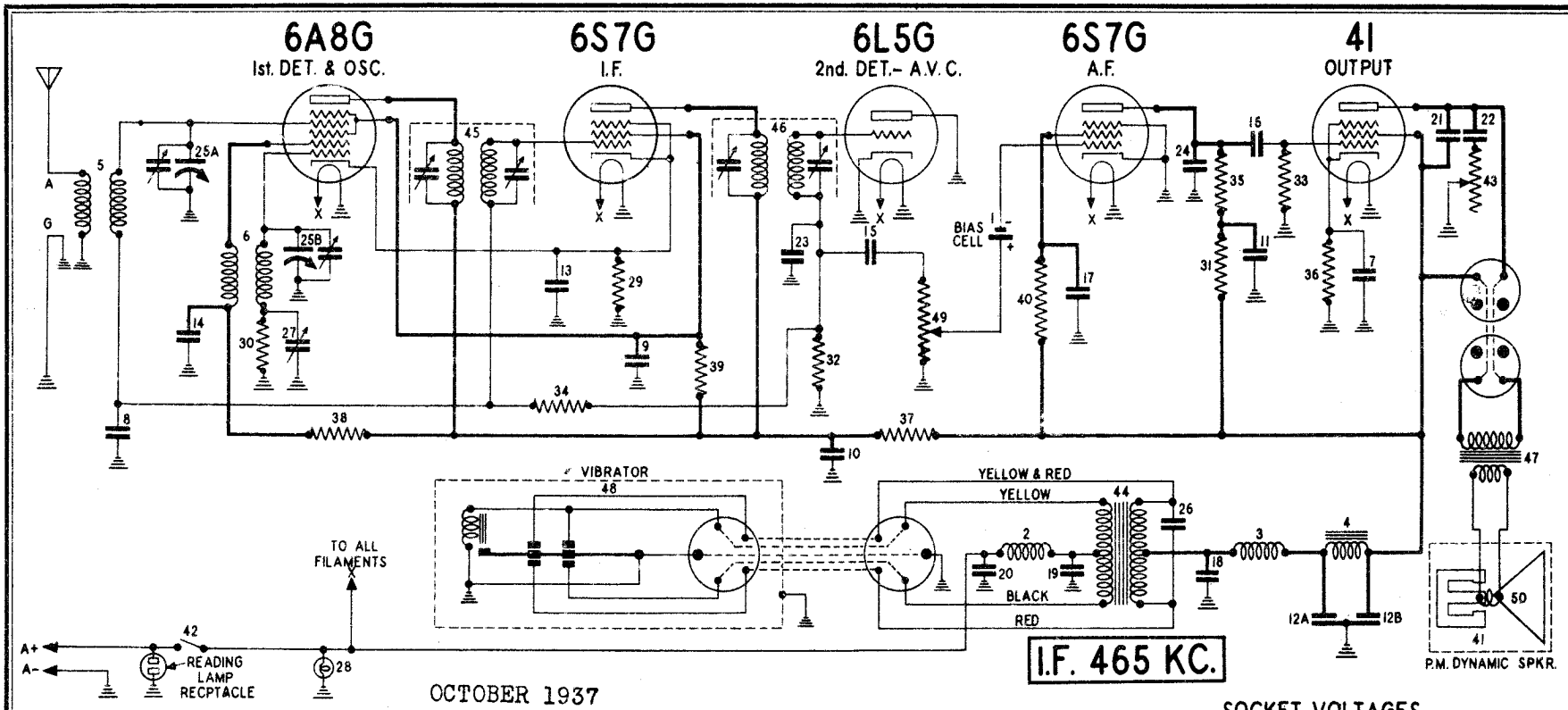



OCTOBER 1937

# MODELS 1911 to 1919 R-191-D CHASSIS

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 89849 | Cell - bias (1.25 volt) | $ .22 |
| 2 | 112041 | Choke - R.F. ("A" supply) | .60 |
| 3 | 112042 | Choke - R.F. ("B" supply) | .50 |
| 4 | 112043 | Choke - filter | 1.40 |
| 5 | 112044 | Coil - antenna | 1.00 |
| 6 | 112045 | Coil - oscillator | 1.00 |
| 7 | 89053 | Condenser - electrolytic 10 mfd.25 volt | .92 |
| 8-9 10-11 | 83974 | Condenser - paper .1 mfd. 200 volt | .25 |
| 12A-12B | 110804 | Condenser - electrolytic (Sect. A 8 mfd. 200 volt) (Sect. B 8 mfd. 200 volt) | 1.60 |
| 13 | 89962 | Condenser - paper .2 mfd. 200 volt | .23 |
| 14-15-16 | 83437 | Condenser - paper .05 mfd. 200 volt | .30 |
| 17 | 86030 | Condenser - paper .01 mfd. 400 volt | .25 |
| 18 | 84200 | Condenser - mica .004 mfd. | .50 |
| 19-20 | 83429 | Condenser - paper .5 mfd. 300 volt | .55 |
| 21 | 83436 | Condenser - paper .002 mfd. 600 volt | .25 |
| 22 | 84650 | Condenser - paper .03 mfd. 600 volt | .25 |
| 23 | 81157 | Condenser - mica 250 mmfd. | .30 |
| 24 | 81158 | Condenser - mica 100 mmf. | .25 |
| 25A-25B | 112046 | Condenser - variable gang | 4.00 |
| 26 | 112047 | Condenser - buffer .03 mfd. 600 volt | .25 |
| 27 | 112048 | Condenser - padding (300-600 mmf.) | .60 |
| 28 | 84058 | Lamp - pilot 6.3 volt .2 amp. | $ .15 |
| 29 | 87981 | Resistor - carbon 400 ohm 1/4 watt | .25 |
| 30 | 89959 | Resistor - carbon 50,000 ohm 1/4 watt | .19 |
| 31 | 87260 | Resistor - carbon 100,000 ohm 1/4 watt | .15 |
| 32-33 | 87262 | Resistor - carbon 1/2 meg. 1/4 watt | .12 |
| 34 | 87939 | Resistor - carbon 1 megohm 1/2 watt | .25 |
| 35 | 67851 | Resistor - carbon 400,000 ohm 1/4 watt | .25 |
| 36 | 112049 | Resistor - carbon 750 ohm 1/3 watt | .15 |
| 37 | 112050 | Resistor - carbon 6,000 ohm 1/2 watt | .15 |
| 38-39 | 112051 | Resistor - carbon 15,000 ohm 1/3 watt | .15 |
| 40 | 112052 | Resistor - carbon 4 megohm 1/3 watt | .15 |
| 41 | 112053 | Speaker - P.M. dynamic (6 inch) R-1911-D | 8.50 |
| | 112054 | Speaker - P.M. dynamic (8 inch) R-1915-D | 9.50 |
| 42 | 112055 | Switch - on-off (S.P.S.T.) | .75 |
| 43 | 112056 | Tone control - 50,000 ohms | 1.05 |
| 44 | 112057 | Transformer - power | 3.50 |
| 45 | 112058 | Transformer - 1st I.F. | 2.00 |
| 46 | 112059 | Transformer - 2nd I.F. | 2.00 |
| 47 | 112060 | Transformer - output for 6 inch spkr. | 1.70 |
| | 112570 | Transformer - output for 8 inch spkr. | 2.00 |
| 48 | 111128 | Vibrator - synchronous | 4.50 |
| 49 | 112061 | Volume control - 1/2 megohm | .90 |
| 50 | 112221 | Cone - voice coil assem. for 6" spkr. | 1.90 |
| | 112222 | Cone - voice coil assem. for 8" spkr. | 2.05 |

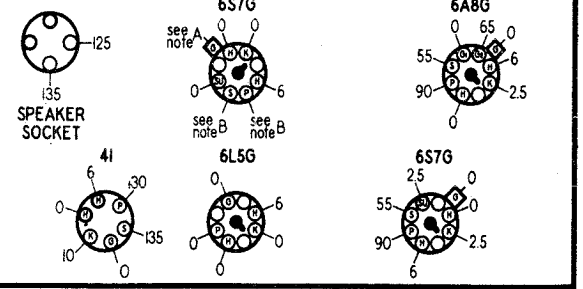
PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

## SOCKET VOLTAGES

BATTERY VOLTAGE 6.0 — SET TUNED TO 530 KC.

**BOTTOM VIEW OF CHASSIS**

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS
BATTERY DRAIN - 2.7 AMPERES 'B' SUPPLY DRAIN - 21 MILLIAMPERES




**REAR OF CHASSIS**

IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grid of the 6S7-G A.F. tube is 1.0 volt supplied by the bias cell. Due to the high resistance of the cell, the voltmeter will only indicate a fraction of a volt.

NOTE B: Because of the high resistance in the plate and screen circuits of the 6S7-G A.F. tube only a slight deflection of the voltmeter will be obtained unless a vacuum tube voltmeter is used.

MODELS 1911 to 1919
Chassis R-191D

# STEWART-WARNER CORP.

Alignment, Trimmers
Circuit Data

## CIRCUIT DESCRIPTION

The model R-191-D chassis is a six volt battery powered superheterodyne receiver. It has an intermediate frequency of 465 KC. and the tuning range is from 540 to 1720 KC.

The incoming signal picked up by the antenna is induced in the tuned secondary of the antenna coil and impressed on the control grid of the 6A8G first detector and oscillator tube. The oscillator circuit is tuned to a frequency 465 KC. higher than that of the incoming signal, and the resultant 465 KC. output is amplified in the I.F. stage, using a 6S7G tube. The amplified I.F. voltage is impressed on the grid of the 6L5G second detector tube. The plate of the 6L5G tube is grounded and the grid acts as the plate of a linear diode detector and A.V.C. source. The direct current voltage developed across the 1/2 megohm diode load resistor is used as A.V.C. voltage and applied to the control grids of the 6A8G and 6S7G (I.F.) tubes through a resistance capacity filter system. Self bias is obtained across the cathode resistor 29 to maintain bias at all times.

The potentiometer type volume control 49 serves as a continuously variable voltage divider of the audio voltage developed. Any portion of the audio voltage can be applied to the control grid of the 6S7G A.F. tube. It should be noted that the bias for the 6S7G A.F. tube is obtained from a bias cell. The 6S7G A.F. tube is resistance coupled to the 41 power output tube. Grid bias for the output tube is obtained across the cathode resistor 36.

The continuously variable resistor type tone control regulates the high note content of the audio output.

All tube heaters are connected directly to the six volt supply circuit. "B" voltage is supplied by a synchronous full wave vibrator (48). The complete "B" supply, consisting of vibrator, power transformer, chokes and condensers, is housed in a metal shield to eliminate interference. R.F. filter chokes in the power supply input and output circuit prevent interference from getting into the "A" and "B" leads.

## ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1800 KC. are required.

1. Connect the output meter between the plate of the 41 tube and ground, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure. Turn tone control to brilliant position.
4. With the gang condenser in full mesh set the pointer on the black horizontal line below 550 KC. on the dial.
5. Proceed to align in exactly the same order as shown in the table below.

| ORDER OF ALIGN. | DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| A | .1 MFD. CONDENSER | CONTROL GRID OF 6A8G TUBE | 465 KC. | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1<br>2 | 1ST I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| B | .1 MFD. CONDENSER | CONTROL GRID OF 6A8G TUBE | 465 KC. | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 3<br>4 | 2ND I.F. | ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2. |
| C | 250 MMF. CONDENSER | ANTENNA LEAD | 1700 KC. | 1700 KC. | 5 | OSCILLATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| D | 250 MMF. CONDENSER | ANTENNA LEAD | 1500 KC. | TUNE TO 1500 KC. GENERATOR SIGNAL | 6 | ANTENNA | ADJUST FOR MAXIMUM OUTPUT. |
| E | 250 MMF. CONDENSER | ANTENNA LEAD | 600 KC. | TUNE TO 600 KC. GENERATOR SIGNAL | 7 | OSCILLATOR (Series Pad) | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |




TOP VIEW OF CHASSIS

## DIAL DRIVE & MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 112064 | Cable - battery | $1.40 |
| 112065 | Dial - complete assembly | 2.50 |
| 112067 | Escutcheon - with window | 1.75 |
| 112068 | Knob - all controls | .25 |
| 110782 | Cord - for dial drive (2 ft.) | .10 |
| 112066 | Scale - dial (riveted to support) | .80 |
| 111357 | Spring - drive cord tension | .03 |
| 112069 | Shield - for vibrator and "B" supply | 1.50 |

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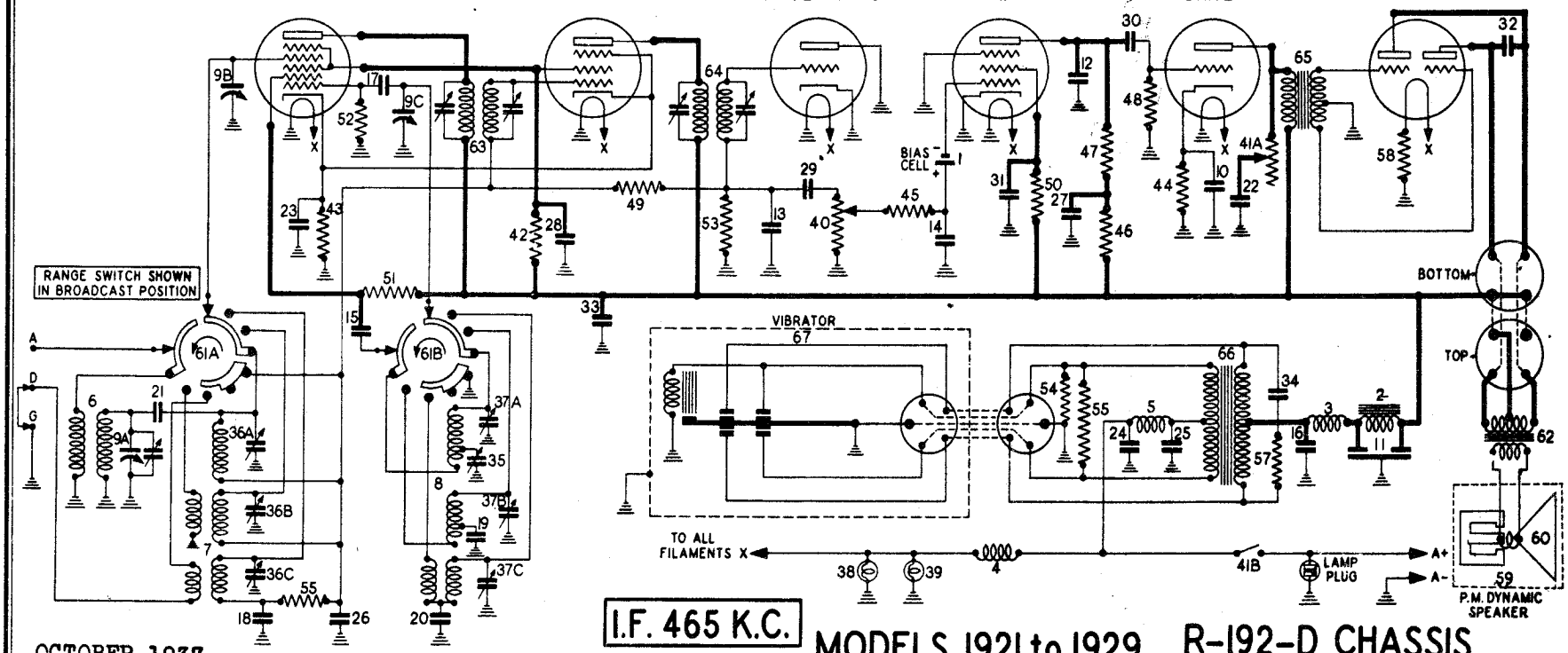



# I.F. 465 K.C.

# MODELS 1921 to 1929 R-192-D CHASSIS

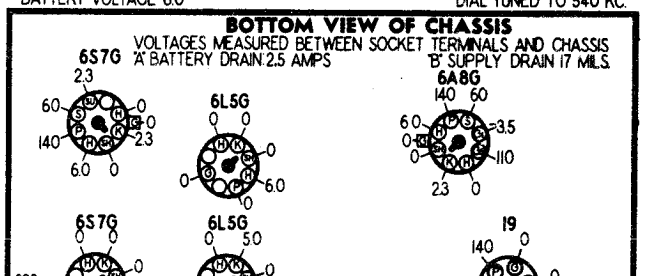
OCTOBER 1937

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 89849 | Cell - Bias (1.25 volt) | $ .22 |
| 2 | 112043 | Choke - filter | 1.40 |
| 3 | 112042 | Choke - R.F. ("B" supply) | .50 |
| 4-5 | 112041 | Choke - R.F. ("A" supply) | .60 |
| 6 | 112239 | Coil - antenna (Broadcast) | 1.50 |
| 7 | 112240 | Coil - antenna (Police and Short Wave) | 1.25 |
| 8 | 112241 | Coil - oscillator | 1.25 |
| 9A-9B-9C | 112242 | Condenser - gang | 5.85 |
| 10 | 110377 | Condenser - electrolytic 10 mfd. 25 volt | .80 |
| 11 | 112244 | Condenser - elec. dual 8 mfd. 150 volts | 1.70 |
| 12-13 | 81157 | Condenser - mica 250 mmfd. | .30 |
| 14 | 81158 | Condenser - mica 100 mmfd. | .25 |
| 15-16 | 84200 | Condenser - mica .004 mfd. | .50 |
| 17 | 86173 | Condenser - mica 50 mmfd. | .20 |
| 18 | 112215 | Condenser - mica 4500 mmfd. | .50 |
| 19 | 112245 | Condenser - mica 1300 mmf. | .35 |
| 20 | 112246 | Condenser - mica 2700 mmf. | .35 |
| 21 | 112261 | Condenser - mica 4 mmf. | .15 |
| 22 | 84850 | Condenser - paper .03 mfd. 600 volt | .25 |
| 23 | 87297 | Condenser - paper .25 mfd. 200 volt | .40 |
| 24-25 | 83429 | Condenser - paper .5 mfd. 200 volt | .55 |
| 26-27-28 | 83974 | Condenser - paper .1 mfd. 200 volt | .25 |
| 29-30-31 | 88030 | Condenser - paper .01 mfd. 400 volt | .25 |
| 32 | 83011 | Condenser - paper .004 mfd. 400 volt | .30 |
| 33 | 89962 | Condenser - paper .2 mfd. 200 volt | .23 |
| 34 | 112047 | Condenser - buffer .03 mfd. 800 volt | .25 |
| 35 | 112048 | Condenser - padder (200-600 mmfd.) | .60 |
| 36A to C, 37A to C | 112243 | Condenser - trimmer (3 section) | 1.70 |
| 38-39 | 83278 | Lamp - dial 6.3 volt | .15 |
| 40 | 112255 | Resistor - volume control 1/2 megohm | 1.05 |
| 41A-41B | 112253 | Resistor - tone control 50,000 ohms (with "on-off" switch) | $1.20 |
| 42 | 84241 | Resistor - carbon 31,000 ohms 1/2 watt | .20 |
| 43 | 83293 | Resistor - carbon 300 ohms 1/4 watt | .25 |
| 44 | 84236 | Resistor - carbon 2500 ohms 1/2 watt | .12 |
| 45 | 89959 | Resistor - carbon 50,000 ohms 1/4 watt | .19 |
| 46 | 81381 | Resistor - carbon 150,000 ohms 1/2 watt | .25 |
| 47 | 81161 | Resistor - 250,000 ohms 1/2 watt | .20 |
| 48 | 87262 | Resistor - carbon 1/2 meg. 1/4 watt | .12 |
| 49 | 87939 | Resistor - carbon 1 meg. 1/2 watt | .25 |
| 50 | 112052 | Resistor - carbon 4 megohm 1/3 watt | .15 |
| 51 | 81152 | Resistor - 10,000 ohms 1/4 watt | .20 |
| 52 | 86022 | Resistor - carbon 50,000 ohms 1 watt | .25 |
| 53 | 81509 | Resistor - carbon 500,000 ohms 1/2 watt | .35 |
| 54 | 84129 | Resistor - wire wound 100 ohms 1/2 watt | .20 |
| 55 | 87939 | Resistor - carbon 1 megohm 1/2 watt | .25 |
| 56 | 84888 | Resistor - wire wound 300 ohms 1/2 watt | .15 |
| 57 | 112550 | Resistor - carbon 3,000 ohms 1 watt | .20 |
| 58 | 112248 | Resistor - wire wound 15.4 ohms 1 watt | .25 |
| 59 | 112250 | Speaker - dynamic 6 inch-Model 1921-D | 7.50 |
| | 112251 | Speaker - dynamic 8 inch-Model 1925-D | 6.50 |
| 60 | 112263 | Cone - voice coil (6" speaker) | 1.90 |
| | 112264 | Cone - voice coil (8" speaker) | 2.05 |
| 61A-61B | 112252 | Switch - range | 1.50 |
| 62 | 112262 | Transformer - output (6" speaker) | 1.70 |
| | 112571 | Transformer - output (8" speaker) | 1.70 |
| 63 | 112058 | Transformer - 1st I.F. | 2.00 |
| 64 | 112059 | Transformer - 2nd I.F. | 2.00 |
| 65 | 112254 | Transformer - push-pull input | 2.00 |
| 66 | 112057 | Transformer - power | 3.50 |
| 67 | 111126 | Vibrator - synchronous | 4.50 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

## SOCKET VOLTAGES

BATTERY VOLTAGE 6.0 — DIAL TUNED TO 540 KC.




IMPORTANT: Use a high resistance voltmeter of 1,000 ohms per volt.

NOTE A: The bias for the control grid of the 6S7G A.F. tube is -1.0 volt supplied by the bias cell. Due to the high resistance of the cell, the voltmeter will indicate only a fraction of a volt.

NOTE B: Because of the high resistance of the plate and screen circuits of the 6S7G A.F. tube only a ight deflection of the voltmeter will be obtained.

MODELS 1921 to 1929
Chassis R-192D
Alignment, Trimmers

STEWART-WARNER CORP.

# MODEL R-192-D CHASSIS (RECEIVER MODELS 1921 to 1929)

The model R-192-D is a six volt battery powered superheterodyne receiver. The circuit employed includes automatic volume control and a push pull class B output system.

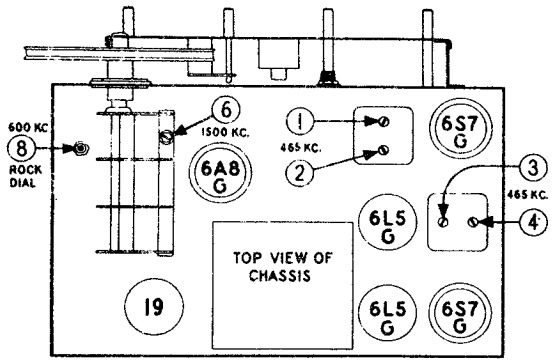
The 6L5G second detector is connected as a diode, the plate being grounded and the control grid acting as a diode plate. "B" voltage is supplied by a synchronous full-wave vibrator.

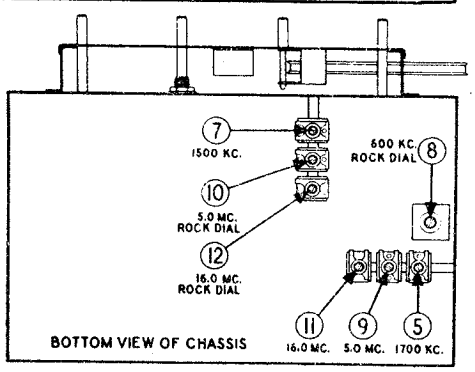
## ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 18 MC. are required.

1. Connect the output meter across the plates of the 19 tube, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver and keep it connected in this manner throughout the entire alignment procedure.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure. Turn tone control to brilliant position.
4. With the gang condenser in full mesh set the pointer on the black horizontal line below 550 KC. on the dial.
5. Proceed to align in exactly the same order as shown in the table below.

| ORDER OF ALIGN. | DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RANGE SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|---|
| A | .1 MFD. CONDENSER | CONTROL GRID OF 6A8G TUBE | 465 KC. | BROADCAST Clockwise | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1<br>2 | 1ST I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| B | .1 MFD. CONDENSER | CONTROL GRID OF 6A8G TUBE | 465 KC. | BROADCAST Clockwise | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 3<br>4 | 2ND. I.F. | ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2. |
| C | 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1700 KC. | BROADCAST Clockwise | 1700 KC. | 5 | BROADCAST OSCILLATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| D | 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1500 KC. | BROADCAST Clockwise | TUNE TO 1500 KC. GEN.SIG. | 6 | BROADCAST ANTENNA | ADJUST FOR MAXIMUM OUTPUT. |
| E | 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 1500 KC. | BROADCAST Clockwise | TUNE TO 1500 KC. GEN.SIG. | 7 | BROADCAST 1ST DET. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMER 6. |
| F | 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 600 KC. | BROADCAST Clockwise | TUNE TO 600 KC. GENERATOR SIGNAL | 8 | BROADCAST OSCILLATOR Series Pad | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| G | 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 5.0 MC. | POLICE (Center) | 5.0 MC. | 9 | POLICE OSCILLATOR | ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 4.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 5.0 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| H | 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 5.0 MC. | POLICE (Center) | TUNE TO 5.0 MC. GENERATOR SIGNAL | 10 | POLICE ANTENNA | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| I | 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 16.0 MC. | SHORT-WAVE Counter-clockwise | 16.0 MC. | 11 | SHORT-WAVE OSCILLATOR | ADJUST TO BRING IN SIGNAL. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 15.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 16 MC. WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| J | 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 16.0 MC. | SHORT-WAVE Counter-clockwise | TUNE TO 16 MC. GENERATOR SIGNAL | 12 | SHORT-WAVE ANTENNA | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |




## DIAL DRIVE & MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 112651 | Arm - for band indicator drive | $ .25 |
| 112064 | Cable - battery | 1.40 |
| 110782 | Cord - for band indicator (2 ft.) | .10 |
| 112257 | Dial - complete mechanism | 7.50 |
| 112259 | Escutcheon - with celluloid | 2.80 |
| 112228 | Knob - all controls | .25 |
| 112652 | Link - for band indicator | .06 |
| C0170 | Plug - for extension lamp | .15 |
| 112260 | Pointer - for dial | .30 |
| 112653 | Retaining ring - for drive shaft | .05 |
| 112258 | Scale - dial | $1.50 |
| 112654 | Shaft - for pointer | .10 |
| 112655 | Shaft - dial drive | .10 |
| 112089 | Shield - for vibrator & "B" supply | 1.50 |
| 89283 | Socket - dial lamp | .10 |
| 111357 | Spring - drive cord tension | .03 |
| 112256 | Terminal strip - G.D.A. | .35 |
| 112657 | Pulley - for pointer drive (on pointer shaft) | .20 |
| 112656 | Drum - & flexible coupler | 1.20 |

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Schematic, Voltage Socket

# STEWART-WARNER CORP.

MODELS 3041 to 3049
Chassis R-304, R-304A

The model R-304 chassis is a five tube superheterodyne receiver. It has an intermediate frequency of 465 KC. and a tuning range from 540 to 1720 KC.

## SOCKET VOLTAGES

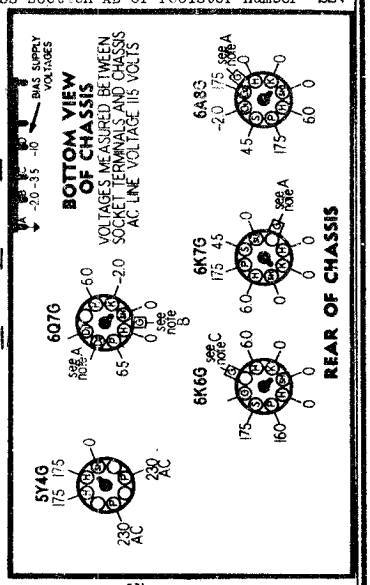
VOLUME CONTROL ON FULL — DIAL TUNED TO 540 KC

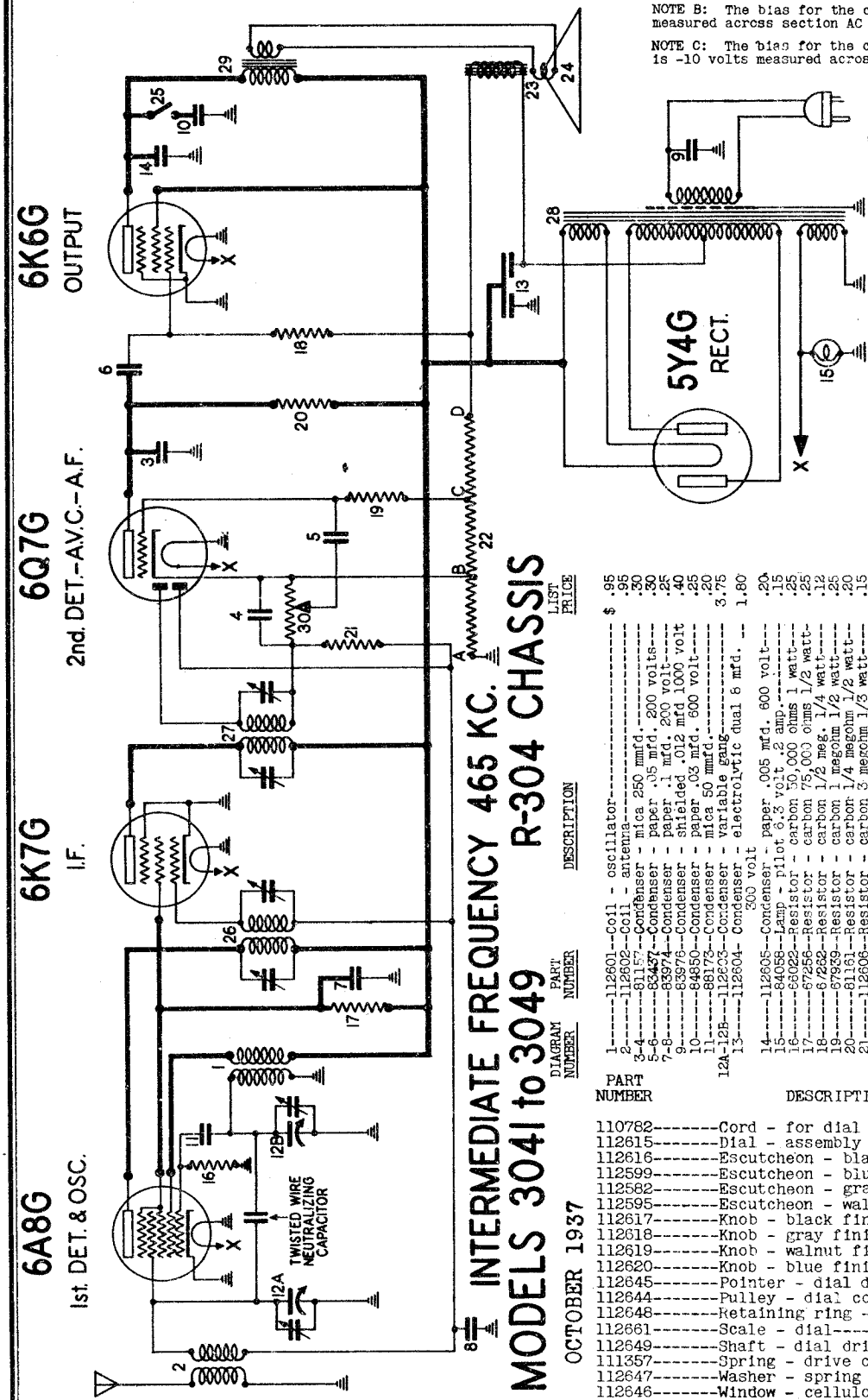
IMPORTANT: Use a high resistance voltmeter of 1000 ohms per volt.

NOTE A: The bias for the control grids of the 6A8G, 6K7G and the diode plates of the 6Q7G is -2.0 volts measured across section AB of resistor number 22.

NOTE B: The bias for the control grid of the 6Q7G is -3.5 volts measured across section AC of resistor number 22.

NOTE C: The bias for the control grid of the 6K6G output tube is -10 volts measured across section AD of resistor number 22.




## INTERMEDIATE FREQUENCY 465 KC.
## MODELS 3041 to 3049 R-304 CHASSIS

OCTOBER 1937

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 112601 | Coil - oscillator | $ .95 |
| 2 | 112602 | Coil - antenna | .95 |
| 3-4 | 81157 | Condenser - mica 250 mmfd. | .30 |
| 5-6 | 83437 | Condenser - paper .05 mfd. 200 volts | .30 |
| 7-8 | 83974 | Condenser - paper .1 mfd. 200 volt | .25 |
| 9 | 83976 | Condenser - shielded .012 mfd 1000 volt | .40 |
| 10 | 84850 | Condenser - paper .03 mfd. 600 volt | .25 |
| 11 | 88173 | Condenser - mica 50 mmfd. | .20 |
| 12A-12B | 112603 | Condenser - variable gang | 3.75 |
| 13 | 112604 | Condenser - electrolytic dual 8 mfd. 300 volt | 1.80 |
| 14 | 112605 | Condenser - paper .005 mfd. 600 volt | .20 |
| 15 | 84058 | Lamp - pilot 6.3 volt .2 amp. | .15 |
| 16 | 86022 | Resistor - carbon 50,000 ohms 1 watt | .25 |
| 17 | 67256 | Resistor - carbon 75,000 ohms 1/2 watt | .25 |
| 18 | 67232 | Resistor - carbon 1/2 meg. 1/4 watt | .12 |
| 19 | 67939 | Resistor - carbon 1 megohm 1/2 watt | .25 |
| 20 | 81161 | Resistor - carbon 1/4 megohm 1/2 watt | .20 |
| 21 | 112608 | Resistor - carbon 3 megohm 1/3 watt | .15 |
| 22 | 112607 | Resistor - wire wound (Section AB - 63 ohms; Section BC - 43 ohms; Section CD - 217 ohms) | .65 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 23 | 112608 | Speaker - dynamic 5 inch | 5.25 |
| 24 | 112559 | Cone - and voice coil for 5 inch speaker | 1.25 |
| 25 | 112613 | Switch - tone control | .30 |
| 26 | 112058 | Transformer - 1st I.F. | 2.00 |
| 27 | 112059 | Transformer - 2nd I.F. | 2.00 |
| 28 | 112609 | Transformer - power 115 volt 50-60 cycle | 4.00 |
| | 112612 | Transformer - power 95 to 260 volt 25 to 133 cycle | 9.00 |
| 29 | 112660 | Transformer - output | 1.50 |
| 30 | 112614 | Volume control - 500,000 ohms (with off-on switch) | 1.25 |

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 110782 | Cord - for dial drive (6 ft.) | $ .25 |
| 112615 | Dial - assembly complete | .95 |
| 112616 | Escutcheon - black-(R-3041) | .55 |
| 112599 | Escutcheon - blue-(R-3044) | .55 |
| 112582 | Escutcheon - gray-(R-3042) | .55 |
| 112595 | Escutcheon - walnut-(R-3043) | .55 |
| 112617 | Knob - black finish-(R-3041) | .20 |
| 112618 | Knob - gray finish-(R-3042) | .20 |
| 112619 | Knob - walnut finish-(R-3043) | .25 |
| 112620 | Knob - blue finish-(R-3044) | .20 |
| 112645 | Pointer - dial drive | .35 |
| 112644 | Pulley - dial cord drive | .30 |
| 112648 | Retaining ring - for drive shaft | .02 |
| 112661 | Scale - dial | .40 |
| 112649 | Shaft - dial drive | .35 |
| 111357 | Spring - drive cord tension | .02 |
| 112647 | Washer - spring type | .02 |
| 112646 | Window - celluloid | .45 |

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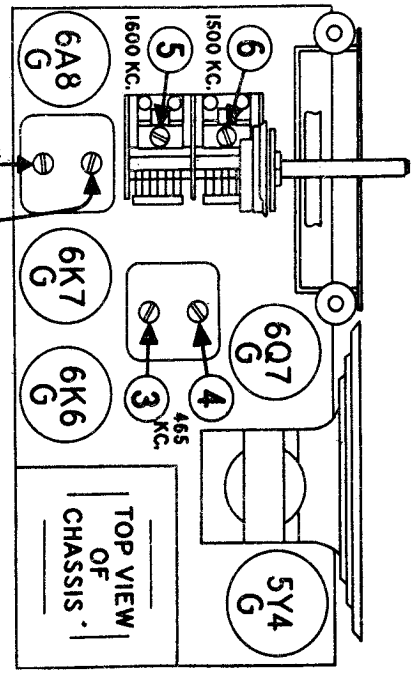
# ALIGNMENT EQUIPMENT & PROCEDURE

For proper alignment, an output meter and an accurately calibrated signal generator with a tuning range from 465 KC. to 1600 KC. are required.

1. Connect the output meter between the plate of the 6K6G tube and ground, or across the voice coil, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the chassis of the receiver.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh set the pointer to the 540 KC. division on the dial.
5. Proceed to align in exactly the same order as shown in the table below.

| ORDER OF ALIGN. | DUMMY ANT. IN SERIES WITH SIG. GEN. | CONNECTION OF SIG. GENERATOR OUTPUT TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| A | .1 MFD. CONDENSER | CONTROL GRID OF 6A8G TUBE | 465 KC. | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1<br>2 | 1ST I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| B | .1 MFD. CONDENSER | CONTROL GRID OF 6A8G TUBE | 465 KC. | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 3<br>4 | 2ND I.F. | ADJUST TRIMMERS 3 & 4 FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT OF TRIMMERS NO. 1 & 2. |
| C | 400 OHM CARBON RESISTOR | ANTENNA LEAD | 1600 KC. | 1600 KC. | 5 | OSCILLATOR | ADJUST TO BRING IN SIGNAL. SEE NOTE BELOW TABLE. |
| D | 400 OHM CARBON RESISTOR | ANTENNA LEAD | 1500 KC. | TUNE TO 1500 KC. GENERATOR SIGNAL | 6 | ANTENNA | ADJUST FOR MAXIMUM OUTPUT. |



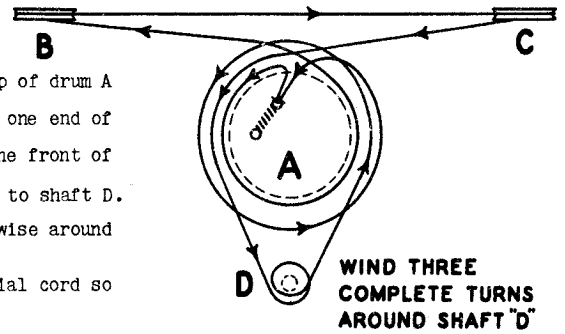

NOTE: The oscillator section of the gang is provided with two trimmers connected in parallel, one on the top (No. 5) and one on the bottom. Normally the bottom trimmer will require no adjustment, but if trimmer No. 5 has to be turned too far out or too far in the bottom trimmer should be adjusted until trimmer No. 5 peaks about half way in.

**MODELS 3041 to 3049 CHASSIS R-304, R-304-A**

DIAL CORD INSTALLATION: The dial cord to be used should be approximately 27 inches long.

Open the gang condenser all the way (plates all out) and unclip the tension spring from drum A.

1. Thread both ends of the dial cord through the opening at the top of drum A and tie them to one end of the tension spring.
2. Wind one complete turn counter-clockwise around drum A. (Use only one end of the cord).
3. Run the cord around pulley B from back to front, then across to the front of pulley C.
4. Run the cord around pulley C, over drum A(in back of windings)down to shaft D.
5. Wind three complete turns around shaft D.
6. Run the cord up to drum A and wind one complete turn counter-clockwise around the drum.
7. Fasten the tension spring to the clip inside the drum.
8. With the gang condenser fully closed clip the pointer to the dial cord so that it comes opposite the 540 KC. marking on the dial.




ELIMINATION OF OSCILLATION: Some of the model R-304 receivers may oscillate or "growl" especially when tuned to weak stations or between stations. This oscillation can always be eliminated by connecting a ground to the receiver. However, if the set is to be used without a ground, it can be kept from oscillating by connecting a buffer condenser from one side of the power line to the chassis within the receiver. The condenser should have a capacity of .01 mfd. and a voltage rating of 1000 volts.

Later production receivers are built with such a line buffer condenser to prevent oscillation. Sets using the condenser can be identified by the letter "S" on the back of the chassis also on the packing carton near the serial number.

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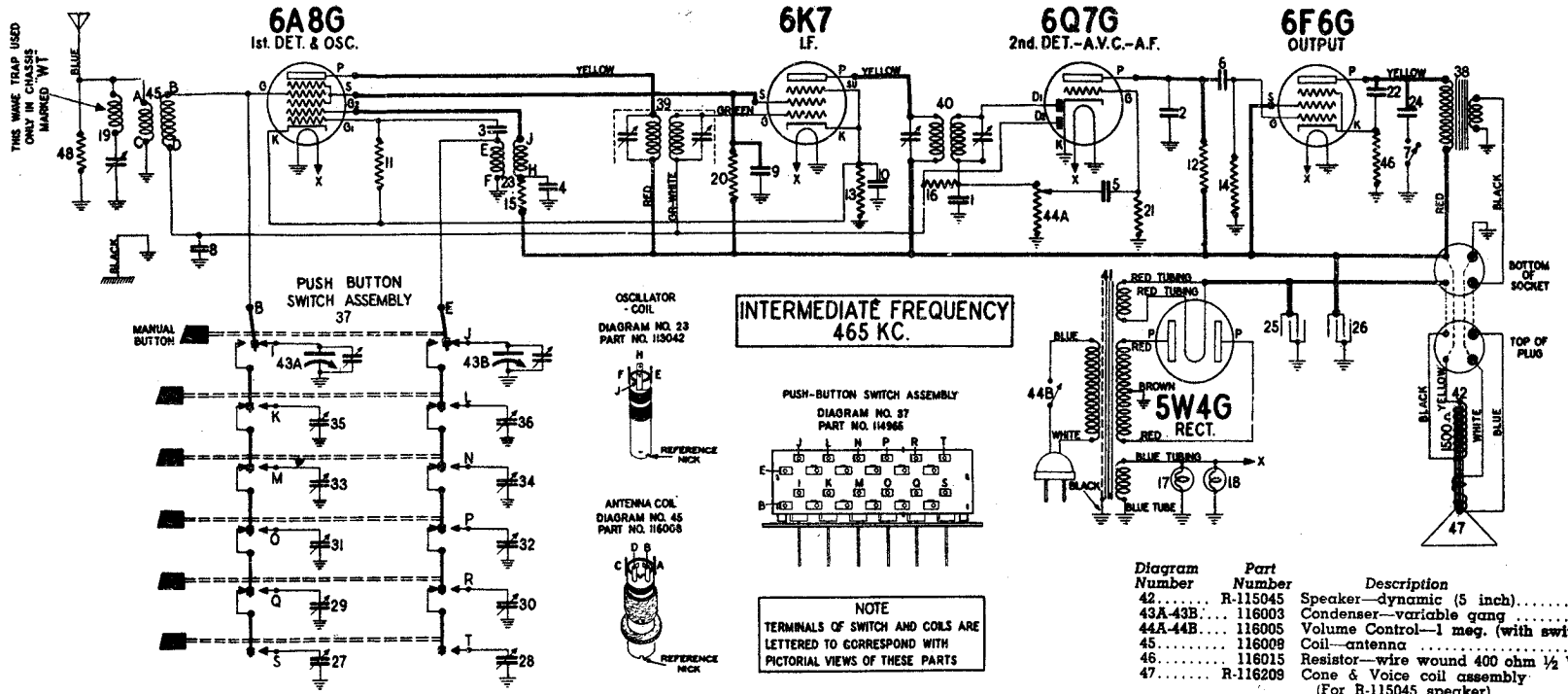
# STEWART-WARNER CORP.



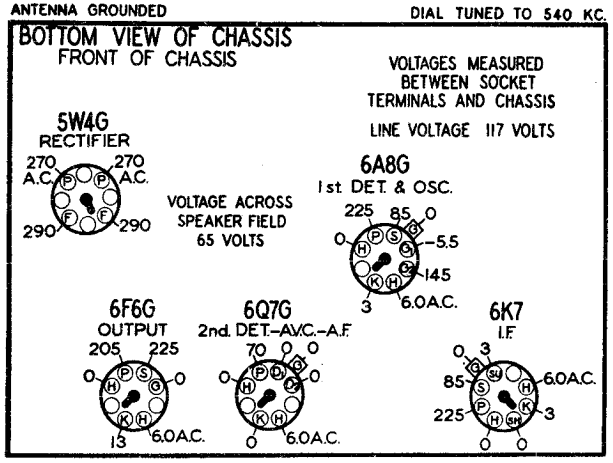





NOTE
TERMINALS OF SWITCH AND COILS ARE LETTERED TO CORRESPOND WITH PICTORIAL VIEWS OF THESE PARTS

## SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.




Use a high resistance voltmeter of at least 1000 ohms per volt.

## ELECTRICAL PARTS

| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1-2 | 83539 | Condenser—mica 260 mmfd. | $0.20 |
| 3 | 85061 | Condenser—mica 51 mmfd. | .15 |
| 4-5-6 | 88030 | Condenser—paper .01 mfd. 400 volt | .25 |
| 7 | 88054 | Switch—tone control | .30 |
| 8 | 88189 | Condenser—paper .05 mfd. 200 volt | .25 |
| 9 | 88682 | Condenser—paper .1 mfd. 400 volt | .25 |
| 10 | 89532 | Condenser—paper .25 mfd. 200 volt | .32 |
| 11 | 110552 | Resistor—carb. 47,000 ohms ¼ watt | .12 |
| 12 | 110553 | Resistor—carb. 220,000 ohms ¼ watt | .12 |
| 13 | 110556 | Resistor—carb. 330 ohms ¼ watt | .12 |
| 14 | 110559 | Resistor—carb. 470,000 ohms ¼ watt | .12 |
| 15 | 110562 | Resistor—carb. 22,000 ohms ½ watt | .12 |
| 16 | 110580 | Resistor—carb. 3.3 meg. ¼ watt | .12 |
| 17-18 | 110629 | Lamp—6.3 volt .25 amp. | .15 |
| 19 | 112796 | Wave trap (with trimmer) (Model 01-52 WT only) | .50 |
| 20 | 112960 | Resistor—carb. 47,000 ohms ½ watt | .12 |
| 21 | 112975 | Resistor—carb. 10 meg. ¼ watt | .12 |
| 22 | 113035 | Condenser—paper .006 mfd. 600 volt | .14 |
| 23 | 113042 | Coil—oscillator | .45 |
| 24 | 113202 | Condenser—paper .02 mfd. 600 volt | .15 |
| 25-26 | 114258 | Condenser—elect. 8 mfd. 450 volts | .98 |
| 27-28-29-30 | 116501 | Push Button Trim. (550 KC to 1000 KC) | .40 |
| 31-32-33-34 | 116502 | Push Button Trim. (700 KC to 1400 KC) | .40 |
| 35-36 | 116503 | Push Button Trim. (850 KC to 1720 KC) | .40 |
| 37 | 114965 | Switch Assembly—for push buttons | 2.85 |
| 38 | 114994 | Transformer—output | 1.25 |
| 39 | 114996 | Transformer—1st I.F. | 1.00 |
| 40 | 114997 | Transformer—2nd I.F. | .85 |
| 41 | 114999 | Transformer—power 117 volt 60 cycle | 3.50 |
| 42 | R-115045 | Speaker—dynamic (5 inch) | 4.50 |
| 43A-43B | 116003 | Condenser—variable gang | 2.90 |
| 44A-44B | 116005 | Volume Control—1 meg. (with switch) | .96 |
| 45 | 116008 | Coil—antenna | .70 |
| 46 | 116015 | Resistor—wire wound 400 ohm ½ W. | .12 |
| 47 | R-116209 | Cone & Voice coil assembly (For R-115045 speaker) | 1.40 |
| 48 | 110569 | Resistor—carb. 10,000 ohms ¼ watt | .12 |

## DIAL & MISCELLANEOUS PARTS

| Part No. | Description | List Price |
|---|---|---|
| 114955 | Clamp—for dial cord | $0.01 |
| 112745 | Clip—for oscillator coil mtg. | .01 |
| 112798 | Clip—for mtg. wave trap coil | .01 |
| 113019 | Clip—dial scale retaining | .01 |
| 116009 | Clip—for antenna coil mtg. | .01 |
| 114954 | Dial Cord—(19" required) | Per Ft. .03 |
| 116006 | Dial scale | .22 |
| 112233 | Drum & Bushing—for dial drive | .35 |
| 113146 | Escutcheon—for dial | .84 |
| 113022 | Knobs—for tuning or volume | .10 |
| 113138 | Mtg. Plate & Bracket for dial | .42 |
| 110496 | Plug—speaker (4 prong) | .12 |
| 114977 | Pointer—for dial | .16 |
| 113102 | Push Button | .08 |
| 81145 | Retaining ring—for drive shaft | Per C .50 |
| 85827 | Set Screw—8/32 Square head | .02 |
| 112874 | Screw—No. 10 x 1⅛ Chassis Mtg. | .01 |
| 114914 | Screw—Special Head—for mtg. escutcheon | Dz. .15 |
| 112945 | Shaft—tuning | .10 |
| 110501 | Socket—4 prong (for speaker) | .16 |
| 114876 | Socket—octal base | .15 |
| 114878 | Socket—octal base—with special ground | .15 |
| 114980 | Socket—for dial lamp | .15 |
| 114968 | Spring—dial cord tension | .03 |
| 113189 | Tab—celluloid—for push button | Per Dz. .09 |
| 113321 | Tabs—station call letters (4 sheets brown) | Per Set .40 |
| 116530 | Washer—(paper) for back of knobs | .005 |
| 110829 | Washer—flat steel, for mtg. chassis | .01 |
| 111456 | Washer—spring washer | Per C .50 |

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# 01-52, 08-52 and 010-52 CHASSIS

## ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil).
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.
5. Push in the "MANUAL" button, and keep it depressed during the entire alignment procedure.

| Dummy Ant. in Series with Sig. Gen. | Connection of Sig. Generator Output to Receiver | Signal Generator Frequency | Receiver Dial Setting | Trimmer Number | Trimmer Description | Type of Adjustment |
|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 2nd I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | 3-4 | 1st I.F. | |
| 200 MMFD. MICA CONDENSER | ANTENNA LEAD (Blue Wire) | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 USED ONLY ON CHASSIS MARKED "WT" | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT USING A STRONG GENERATOR SIGNAL. |
| 200 MMFD. MICA CONDENSER | ANTENNA LEAD (Blue Wire) | 1500 KC | 1500 KC | 6 | BROADCAST OSCILLATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| 200 MMFD. MICA CONDENSER | ANTENNA LEAD (Blue Wire) | 1500 KC | TUNE TO 1500 KC GENERATOR SIGNAL | 7 | BROADCAST ANTENNA (Shunt) | ADJUST FOR MAXIMUM OUTPUT. |

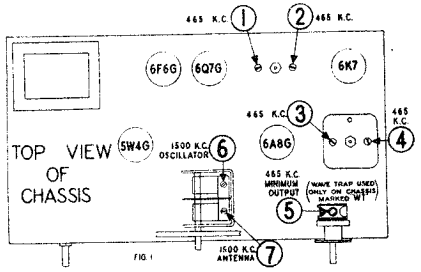


FIG. 1

## SETTING UP PUSH BUTTONS

Fig. 2 is a bottom view of the cabinet, showing the station selector trimmer condensers used with the push buttons. The arrows in this diagram indicate the two trimmers for each button.

In setting up a station on any push button, the trimmer marked "a" is the oscillator trimmer and must be adjusted first to tune in the desired station. The trimmer marked "b" is the antenna trimmer, and is to be adjusted until the desired station is heard with the deepest tone.

When setting up buttons, always allow the set to warm up thoroughly so that all parts of the chassis may attain normal operating temperatures. This will minimize frequency drift in the tuned circuits.

Select the most powerful nearby stations for automatic tuning, since weak signals will not give as good results.

Also select stations whose frequencies fall within the range indicated in Fig. 2. It is often possible to set the trimmers to tune in stations falling outside of the indicated frequency ranges, but the trimmers are then too tight or too loose and may not hold their settings.

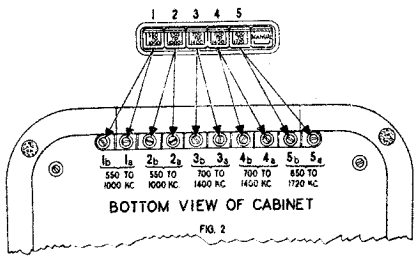


FIG. 2

# 01-53, 01-53S, 010-53 and 010-53S CHASSIS

## ALIGNMENT EQUIPMENT & PROCEDURE

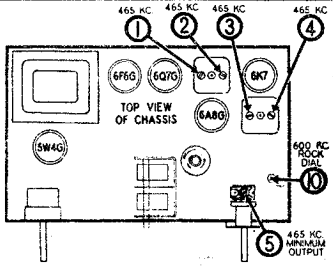
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

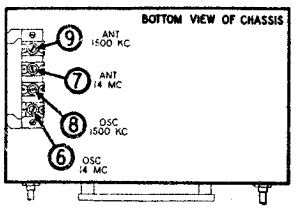
1. Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground in series with a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

| Dummy Ant. in Series with Sig. Gen. | Connection of Sig. Generator Output To Receiver | Signal Generator Frequency | Band Switch Position | Receiver Dial Setting | Trimmer Number | Trimmer Description | Type of Adjustment |
|---|---|---|---|---|---|---|---|
| .1 MFD. Condenser | Control Grid of 6A8-G Tube | 465 KC | Broadcast Clockwise | Any Point Where It Does Not Affect The Signal | 1-2 | 2nd I. F. | Adjust for maximum output. Then repeat adjustment. |
| | | | | | 3-4 | 1st I. F. | |
| 200 MMFD. Mica Condenser | Antenna Terminal or Antenna Lead | 465 KC | Broadcast Clockwise | Any Point Where It Does Not Affect The Signal | 5 | Wave Trap | Adjust for minimum output using a strong generator signal. |
| 400 OHM Carbon Resistor | Antenna Terminal or Antenna Lead | 14 MC | Foreign (Counter-Clockwise) | 14 MC | 6 | Foreign Oscillator (Shunt) | Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 13.1 MC. If image does not appear realign at 14 MC. with trimmer screw farther out. Recheck image. |
| 400 OHM Carbon Resistor | Antenna Terminal or Antenna Lead | 14 MC | Foreign (Counter-Clockwise) | 14 MC | 7 | Foreign Antenna | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |
| 200 MMFD. Mica Condenser | Antenna Terminal or Antenna Lead | 1500 KC | Broadcast Clockwise | 1500 KC | 8 | Broadcast Oscillator (Shunt) | Adjust for maximum output. |
| 200 MMFD. Mica Condenser | Antenna Terminal or Antenna Lead | 1500 KC | Broadcast Clockwise | Tune To 1500 KC Generator Signal | 9 | Broadcast Antenna | Adjust for maximum output. |
| 200 MMFD. Mica Condenser | Antenna Terminal or Antenna Lead | 600 KC | Broadcast Clockwise | Tune To 600 KC Generator Signal | 10 | Broadcast Oscillator (Series Pad) | Adjust for maximum output. Try to increase output by detuning trimmer and retuning receiver dial until maximum output is obtained. |

## DIAL & MISCELLANEOUS PARTS

| Part Number | Description | List Price |
|---|---|---|
| 114955 | Clamp for dial cord | $0.01 |
| 112745 | Clip--for coil mounting | .01 |
| 112798 | Clip--for mounting wave trap coil | .01 |
| 113019 | Clip for dial scale retaining | .01 |
| 85321 | Connector Link | .01 |
| 114954 | Dial Cord (19" required) | Per Ft. .03 |
| 114976 | Dial scale | .24 |
| 116429 | Dial Scale (Model 010-53S) | .23 |
| 112233 | Drum & Bushing--for dial drive | .35 |
| 113146 | Escutcheon for dial | .84 |
| 113022 | Knob--for any control | .10 |
| 113138 | Mounting Plate & Bracket for dial | .42 |
| 110496 | Plug--speaker (4 prong) | .12 |
| 114977 | Pointer for dial | .16 |
| 113102 | Push Button | .08 |
| 81145 | Retaining Ring for drive shaft | Per C .50 |
| 114148 | Rotor--for voltage switch on power transformer | .50 |
| 85827 | Set Screw--8-32 Square Head | .02 |
| 112874 | Screw--No. 10 x 11/4 Chassis Mounting | .01 |
| 114914 | Screw--Special head for mounting escutcheon | Per dz. .15 |
| 85040 | Screw--No. 6 x 1/4 S. H. H. S. | Per C .35 |
| 112945 | Shaft--tuning | .10 |
| 110501 | Socket--4 prong (for speaker plug) | .16 |
| 114876 | Socket octal base | .15 |
| 114878 | Socket--octal base (with special ground) | .15 |
| 114980 | Socket--dial lamp | .15 |
| 114968 | Spring--dial cord tension | .03 |
| 113189 | Tab--celluloid (for push button) | Per Dz. .09 |
| 113321 | Tabs--station call letters (4 sheets) | Per Set .40 |
| 116536 | Terminal Strip (G.E.A.) (Model 01-53S) | .15 |
| 85785 | Terminal Strip (G.A.) (Model 010-53S) | .15 |
| 116530 | Washer--paper; behind knob | .005 |
| 110829 | Washer--flat steel for mounting chassis | .01 |
| 111456 | Washer--spring washer | Per C .50 |

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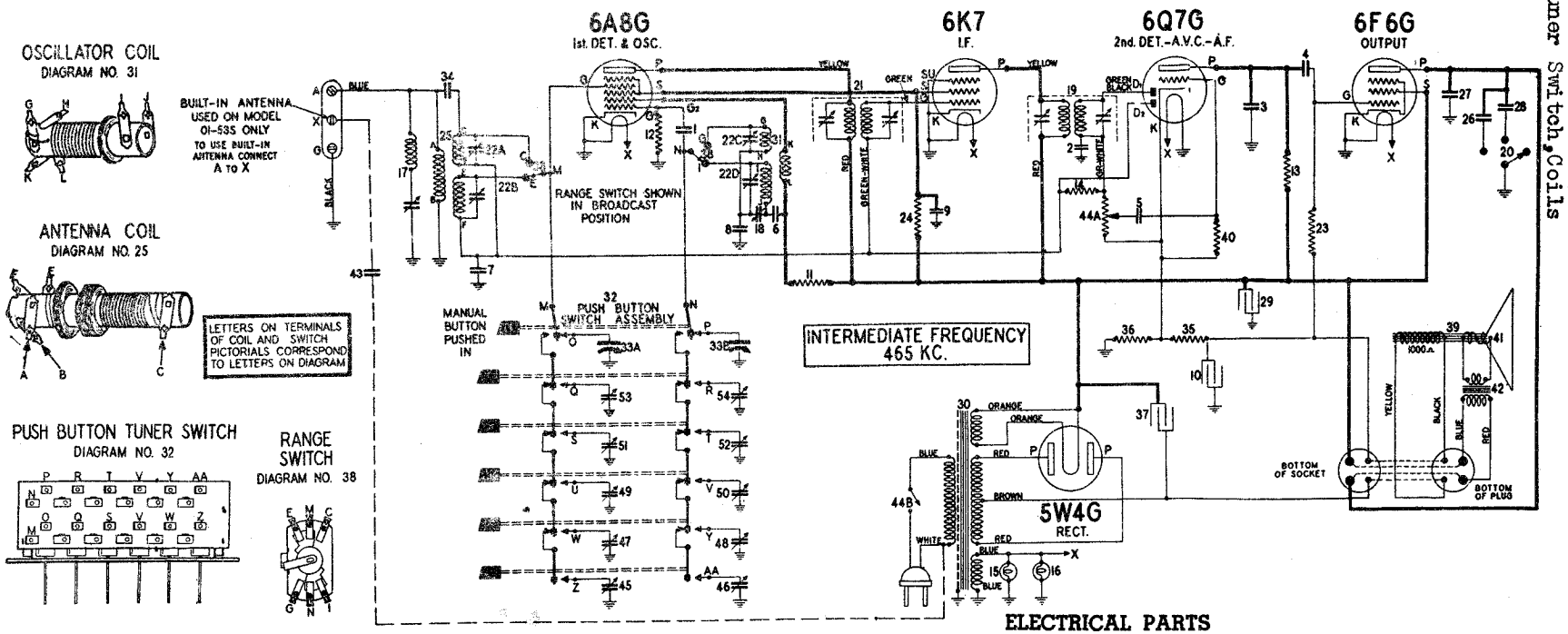
01-531S to 01-539S
Chassis 01-53S to 010-539S
Chassis 010-53S
Schematic, Voltage, Socket
Tuner Switch, Coils

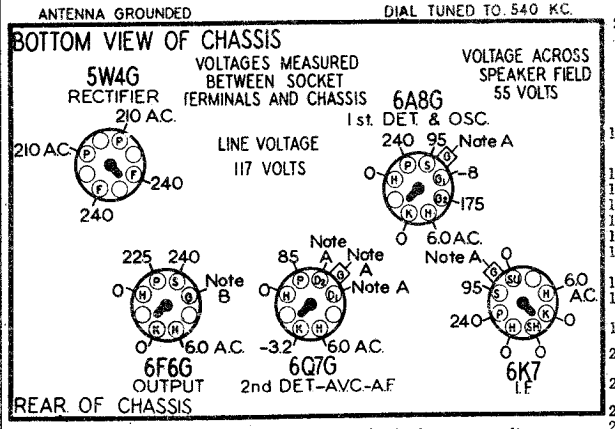
# STEWART-WARNER CORP.

MODELS 01-531 to 01-539
Chassis 01-53 to 010-531 to 010-539
Chassis 010-53




## SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.




Use a high resistance voltmeter of at least 1000 ohms per volt.

**NOTE A:** The bias for the control grids of the 6A8-G, 6K7, and 6Q7-G tubes and on the diode plates of the 6Q7-G tube is —3.2 volts measured across resistor 36. **NOTE B:** The bias for the control grid of the 6F6-G tube is —16 volts measured across resistors 35 and 36.

## ELECTRICAL PARTS

| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1 | 85061 | Condenser—mica 51 mmfd. | $0.15 |
| 2-3 | 85394 | Condenser—mica 510 mmf. | .25 |
| 4 | 88826 | Condenser—paper .02 mfd. 400 volt | .25 |
| 5-6 | 88030 | Condenser—paper .01 mfd. 400 volt | .25 |
| 7 | 88189 | Condenser—paper .05 mfd. 200 volt | .25 |
| 8 | 88587 | Condenser—mica .0042 mfd. | .35 |
| 9 | 88682 | Condenser—paper .1 mfd. 400 volt | .25 |
| 10 | 110377 | Condenser—electrolytic 10 mfd. 35 volt | .80 |
| | 112113 | Condenser—electrolytic 10 mfd. 50 V. (Model 010-53 & 010-53S) | .85 |
| 11 | 110550 | Resistor—carbon 10,000 ohm ½ watt | .15 |
| 12 | 110552 | Resistor—carbon 47,000 ohms ¼ watt | .12 |
| 13 | 110553 | Resistor—carbon 220,000 ohms ¼ watt | .12 |
| 14 | 110580 | Resistor—carbon 3.3 meg. ¼ watt | .12 |
| 15-16 | 110629 | Lamp—dial 6.3 volt .25 amps. | .15 |
| 10 | 112113 | Condenser-electrolytic 10 mfd. 50 V. (Model 010-53 & 010-53S) | .85 |
| 17 | 112796 | Wave trap (with trimmer) | .50 |
| 18 | 112799 | Condenser—padder (530 to 630 mmfd.) | .36 |
| 19 | 112804 | Transformer—2nd I.F. | 1.10 |
| | 116362 | Transformer—2nd I.F. (Model 010-53S) | 1.00 |
| 20 | 112870 | Switch—tone control | .40 |
| 21 | 112884 | Transformer—1st I.F. | 1.20 |
| | 116358 | Transformer—1st I.F. (Model 010-53S) | 1.00 |
| 22A to 22D | 112893 | Condenser—trimmer 4 section | .60 |
| 23 | 112971 | Resistor—insulated 470,000 ohms ¼ watt | .15 |
| 24 | 112999 | Resistor—carbon 33,000 ohms 1 watt | .20 |
| 25 | 113011 | Coil—antenna | 1.20 |
| | 116421 | Coil—antenna (Model 010-53S) | .90 |
| 26 | 113034 | Condenser—paper .04 mfd. 600 volt | .15 |
| 27 | 113035 | Condenser—paper .006 mfd. 600 volt | .14 |
| 28 | 113202 | Condenser—paper .02 mfd. 600 volt | .15 |
| 29 | 114258 | Condenser—electrolytic 8 mfd. 450 volt | .98 |
| 30 | 114530 | Power transformer 117 volt 60 cycle | 3.50 |
| | 116352 | Power transformer 100-240 V., 40-133 cycles | 7.75 |
| 31 | 114959 | Coil—oscillator | .75 |
| | 116419 | Coil—oscillator (Model 010-53S) | .65 |
| 32 | 114965 | Switch—for push buttons | 2.85 |
| 33A-33B | 114966 | Condenser—variable gang | 2.85 |
| | 116430 | Condenser—gang (Model 010-53S) | 2.50 |
| 34 | 114969 | Condenser—mica 15 mmfd. | .12 |
| 35 | 114970 | Resistor—wire wound 240 ohms 1 watt | .15 |
| 36 | 114971 | Resistor—wire wound 60 ohms ½ watt | .12 |
| 37 | 114972 | Condenser—electrolytic 16 mfd. 450 volt | .78 |
| 38 | 114988 | Switch—range | .60 |
| 39 | U-115043 | Speaker—dynamic (6 in.) | 4.50 |
| 40 | | Resistor—insulated 10 meg. ¼ watt | .12 |
| 41 | U-116211 | Cone—assem. (for U-115043 speaker) | 1.65 |
| 42 | U-116212 | Output transformer (for U-115043 speaker) | 1.50 |
| 43 | 116224 | Condenser—mica 260 mmfd. (Model 01-53S) | .15 |
| 44A-44B | 116236 | Volume control, 500,000 ohms, with switch | .96 |
| | 116352 | Power transformer 100-240 V., 40-133 cycles | 7.75 |
| | 116358 | Transformer—1st I.F. (Model 010-53S) | 1.00 |
| | 116362 | Transformer—2nd I.F. (Model 010-53S) | 1.00 |
| | 116419 | Coil—oscillator (Model 010-53S) | .65 |
| | 116421 | Coil—antenna (Model 010-53S) | .90 |
| | 116430 | Condenser—gang (Model 010-53S) | 2.50 |
| 45-46-47-48 | 116501 | Push Button Trimmer (550 KC to 1000 KC) | .40 |
| 49-50-51-52 | 116502 | Push Button Trimmer (700 KC to 1400 KC) | .40 |
| 53-54 | 116503 | Push Button Trimmer (850 KC to 1720 KC) | .40 |

MODELS 01-541 to 01-549
Chassis 01-54
01-541S to 01-549S
Chassis 01-54S
01-541WT to 01-549WT
Chassis 01-54WT

# STEWART-WARNER CORP.

08-541 to 08-549
Chassis 08-54
010-541 to 010-549
Chassis 010-54
010-541S to 010-549S
Schematic, Voltage, Socket




## ELECTRICAL PARTS

| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1..... | 85061 | Condenser—mica 51 mmfd. | $0.15 |
| 2-3..... | 83539 | Condenser—mica 260 mmfd. | .20 |
| 4-5-6.... | 88030 | Condenser—paper .01 mfd. 400 volt. | .25 |
| 7..... | 88054 | Switch—tone control | .30 |
| 8..... | 88189 | Condenser—paper .05 mfd. 200 volt. | .25 |
| 9..... | 88191 | Condenser—paper .1 mfd. 300 volt. | .25 |
| 10..... | 89532 | Condenser—paper .25 mfd. 200 volt. | .32 |
| 11..... | 110552 | Resistor—carbon 47,000 ohms ¼ watt | .12 |
| 12..... | 110553 | Resistor—carbon 220,000 ohms ¼ watt | .12 |
| 13..... | 110558 | Resistor—carbon 33,000 ohms ½ watt | .12 |
| 14..... | 110559 | Resistor—carbon 470,000 ohms ½ watt | .12 |
| 15..... | 110569 | Resistor—carbon 10,000 ohms ¼ watt | .12 |
| 16..... | 110580 | Resistor—carbon 3.3 meg. ¼ watt | .12 |
| 17..... | 110629 | Lamp—dial 6 volt .25 amp. | .15 |
| 18..... | 112796 | Wave trap (Models 01-54 WT, 010-54 and 010-54S chassis only) | .50 |
| 19..... | 112975 | Resistor—carbon 10 meg. ¼ watt | .12 |
| 20..... | 112994 | Resistor—carbon 220 ohm ¼ watt | .12 |
| 21..... | 113035 | Condenser—ceramic tube .006 mfd. 600 volt | .14 |
| 22..... | 113042 | Coil—oscillator | .45 |
| 23..... | 113046 | Transformer—1st I.F. | 1.00 |
| | 116425 | Transformer—1st I.F. (Model 010-54S only) | 1.10 |
| 24A-24B | 113049 | Volume control—500,000 ohms with switch | 1.00 |
| 25A-25B | 113150 | Condenser—variable gang | 3.00 |
| 26..... | 113202 | Condenser—paper .02 mfd. 600 volt. | .15 |
| 27..... | 113449 | Coil—antenna | .78 |
| 28-29 | 114258 | Condenser—electrolytic 8 mfd. 450 volt | .98 |
| 30..... | U-115047 | Speaker—dynamic; 5 inch | 4.00 |
| 31..... | 116015 | Resistor—wire wound 400 ohms ½ watt | .12 |
| 32..... | 116179 | Transformer—2nd I.F. | 1.00 |
| | 116426 | Transformer—2nd I.F. (Model 010-54S only) | 1.05 |
| 33..... | 116180 | Transformer—power 117 volt 60 cycle | 3.75 |
| | 116336 | Transformer—power 100-240 volt; 40-133 cycles | 7.75 |
| 34..... | U-116304 | Transformer—output, for U-115047 speaker | 1.50 |
| 35..... | U-116305 | Cone & Voice coil—for U-115047 speaker | 1.50 |
| 36..... | 116336 | Transformer—power 100-240 volt; 40-133 cycles | 7.75 |
| 23..... | 116425 | Transformer—1st I.F. (Model 010-54S only) | 1.10 |
| 32..... | 116426 | Transformer—2nd I. F. (Model 010-54S only) | 1.05 |

**NOTE:** Terminals of coils shown in pictorial views are lettered to correspond to similarly lettered terminals on the circuit diagram.

## DIAL & MISCELLANEOUS PARTS

| Part No. | Description | List Price |
|---|---|---|
| 113170 | Adjusting Lug—for button shafts | $0.01 |
| 113171 | Bracket—for dial & condenser mtg. | .64 |
| 112776 | Celluloid Cover—over dial face | .28 |
| 112745 | Clip—coil mtg. (Oscillator & antenna) | .01 |
| 112764 | Clip—dial scale retaining | .01 |
| 112798 | Clip—for mtg. wave trap | .01 |
| 113178 | Cord—dial (supplied in 4 ft. lengths) | .30 |
| 113174 | Dial Drum—and pinion assembly | .44 |
| 116175 | Dial scale | .30 |
| 112814 | Escutcheon—dial | .35 |
| 113053 | Escutcheon—for push buttons | .32 |
| 113156 | Gear—and bushing assembly for dial drive | .22 |
| 113022 | Knob—tone & volume control | .10 |
| 113494 | Mechanical tuner assembly—keys & housing only | 3.00 |
| 112770 | Pointer—dial | .08 |
| 112762 | Pulley—dial cord drive | .04 |
| 113103 | Push button (walnut) | .06 |
| 114148 | Rotor cap for voltage switch on transformer | .50 |
| 81145 | Retaining Ring—for drive shaft | .50 |
| 114598 | Rubber Tubing—for drive shaft | .01 |
| 85040 | Screw No. 6 Hex. Hd. for mtg. adjusting washer | Per C |
| 85827 | Set Screw—8/32 Square Head | .35 |
| 112874 | Screw—No. 10x1⅛" Chassis Mtg. | .02 |
| 114431 | Screw—No. 6-40x⅜ for setting up buttons | .01 |
| 114914 | Screw—Special head for mtg. escutcheon | .01 |
| 113176 | Shaft—dial drive | .15 |
| 112768 | Socket—for dial lamp | .18 |
| 114876 | Socket—octal base | .15 |
| 114878 | Socket—octal base—with special ground | .15 |
| 85815 | Spring—between gear sections | .01 |
| 113169 | Spring—for key return | .01 |
| 113177 | Spring—dial cord tension | .09 |
| 113189 | Tab—celluloid for push button | Per Dz. .09 |
| 113321 | Tabs—station call letters (4 sheets) (Brown) | .40 |
| 116530 | Washer—paper for back of knobs | .005 |
| 110829 | Washer—flat steel for mtg. chassis | .01 |

## SOCKET VOLTAGES

DIAL TUNED TO 540 KC.
ANTENNA GROUNDED




Use a high resistance voltmeter of at least 1,000 ohms per volt.

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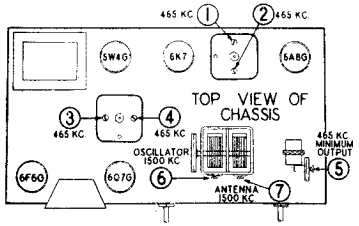
# 01-54, 01-54S, 08-54, 010-54, and 010-54S CHASSIS

## ALIGNMENT EQUIPMENT & PROCEDURE

FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6-G output tube and ground, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.

| Dummy Ant. in Series with Sig. Gen. | Connection of Sig. Generator Output to Receiver | Signal Generator Frequency | Receiver Dial Setting | Trimmer Number | Trimmer Description | Type of Adjustment |
|---|---|---|---|---|---|---|
| .1 Mfd Condenser | Control Grid of 6A8-G Tube | 465 KC | Any Point Where It Does Not Affect the Signal | 1-2 | 1st I.F. | Adjust for Maximum Output. Then Repeat Adjustment. |
| | | | | 3-4 | 2nd I.F. | |
| 200 MMFD. Mica Condenser | Antenna Lead (Blue Wire) | 465 KC | Any Point Where It Does Not Affect the Signal | 5 Not Used In Chassis Model 01-54 | Wave Trap | Adjust for Minimum Output Using A Strong Generator Signal. |
| 200 MMFD. Mica Condenser | Antenna Lead (Blue Wire) | 1500 KC | 1500 KC | 6 | Broadcast Oscillator (Shunt) | Adjust Trimmer To Bring In Signal. |
| 200 MMFD. Mica Condenser | Antenna Lead (Blue Wire) | 1500 KC | Tune To 1500 KC Generator Signal | 7 | Broadcast Antenna (Shunt) | Adjust for Maximum Output. |




### HOW TO SET UP PUSH BUTTONS

1. Before setting up buttons, turn on set for at least 15 minutes. To set up a push button, pull off the button cap by grasping the button and pulling outward on it. When the button is removed, the set-up screw will be exposed to view (See Fig. 1). Insert a screw-driver in this screw and loosen it (about one turn counter-clockwise will be sufficient).
2. Keeping the screw-driver in the screw slot, PUSH AGAINST THE SCREW-DRIVER UNTIL THE PUSH BUTTON SHAFT IS FORCED ALL THE WAY IN. While the button is held in this position, grasp the tuning knob and tune in the desired station. Then retighten the adjusting screw, turning clockwise until reasonably tight.

**WARNING: Do not attempt to turn the screw until it reaches a definite stop. Merely turn until you meet with appreciable resistance. To turn further may result in damage to the mechanism.**

### HOW TO REPLACE THE DIAL DRIVE CORD

1. Close the gang condenser. The set screw in the drum, Fig. 1, must be on the top side.
2. Tie one end of the dial cord to the spring L and thread the other end through hole A and down the front of the drum to the tuning shaft. Continue around the shaft, then over pulley B and up the rear side of the drum.
3. Thread the cord through hole A and tie the other end to spring L. Tie the cord so that spring L will be extended to about ¾ inch.

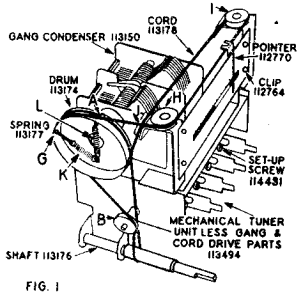



FIG. 1

### HOW TO REPLACE DIAL POINTER DRIVE CORD

1. Close the gang condenser and thread one end of the cord through eyelet G and tie it to spring K.
2. Carry the other end of the cord over the drum to the front around pulley H and then across to pulley I and counter-clockwise around it.
3. Continue back to pulley J and down the front of the drum. Carry the end of the cord on around the drum and thread through eyelet G.
4. Tie both ends extending through eyelet G to tension spring K. **IMPORTANT: In so doing, allow enough slack in the cord so that when spring K is hooked in place in the drum, it will be extended only a very little. If the spring is extended too much, it will tend to make the push button operate too hard because of overloading.**
5. Be sure the gang condenser is closed, then set the dial pointer to the last dial division mark on the right and clip it to the cord.

# 01-61, 01-61S, 010-61 and 010-61S CHASSIS

## ALIGNMENT EQUIPMENT & PROCEDURE

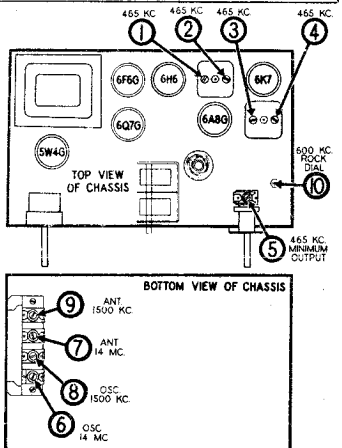
FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

1. Connect the output meter across the voice coil or between the plate of the 6K6-G output tube and ground in series with a .1 mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the black (ground) wire or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

| Dummy Ant. in Series with Sig. Gen. | Connection of Sig. Generator Output To Receiver | Signal Generator Frequency | Band Switch Position | Receiver Dial Setting | Trimmer Number | Trimmer Description | Type of Adjustment |
|---|---|---|---|---|---|---|---|
| .1 MFD. Condenser | Control Grid of 6A8-G Tube | 465 KC | Broadcast Clockwise | Any Point Where It Does Not Affect The Signal | 1-2 | 2nd I. F. | Adjust for maximum output. Then repeat adjustment. |
| | | | | | 3-4 | 1st I. F. | |
| 200 MMFD. Mica Condenser | Antenna Terminal or Antenna Lead | 465 KC | Broadcast Clockwise | Any Point Where It Does Not Affect The Signal | 5 | Wave Trap | Adjust for minimum output using a strong generator signal. |
| 400 OHM Carbon Resistor | Antenna Terminal or Antenna Lead | 14 MC | Foreign (Counter-Clockwise) | 14 MC | 6 | Foreign Oscillator (Shunt) | Adjust for maximum output. Check to see if proper peak was obtained by tuning in image at approx. 13.1 MC. If image does not appear realign at 14 MC. with trimmer screw farther out. Recheck image. |
| 400 OHM Carbon Resistor | Antenna Terminal or Antenna Lead | 14 MC | Foreign (Counter-Clockwise) | 14 MC | 7 | Foreign Antenna | Adjust for maximum output. Try to increase output by de-tuning trimmer and retuning receiver dial until maximum output is obtained. |
| 200 MMFD. Mica Condenser | Antenna Terminal or Antenna Lead | 1500 KC | Broadcast Clockwise | 1500 KC | 8 | Broadcast Oscillator (Shunt) | Adjust for maximum output. |
| 200 MMFD. Mica Condenser | Antenna Terminal or Antenna Lead | 1500 KC | Broadcast Clockwise | Tune To 1500 KC Generator Signal | 9 | Broadcast Antenna | Adjust for maximum output. |
| 200 MMFD. Mica Condenser | Antenna Terminal or Antenna Lead | 600 KC | Broadcast Clockwise | Tune To 600 KC Generator Signal | 10 | Broadcast Oscillator (Series Pad) | Adjust for maximum output. Try to increase output by de-tuning trimmer and retuning receiver dial until maximum output is obtained. |

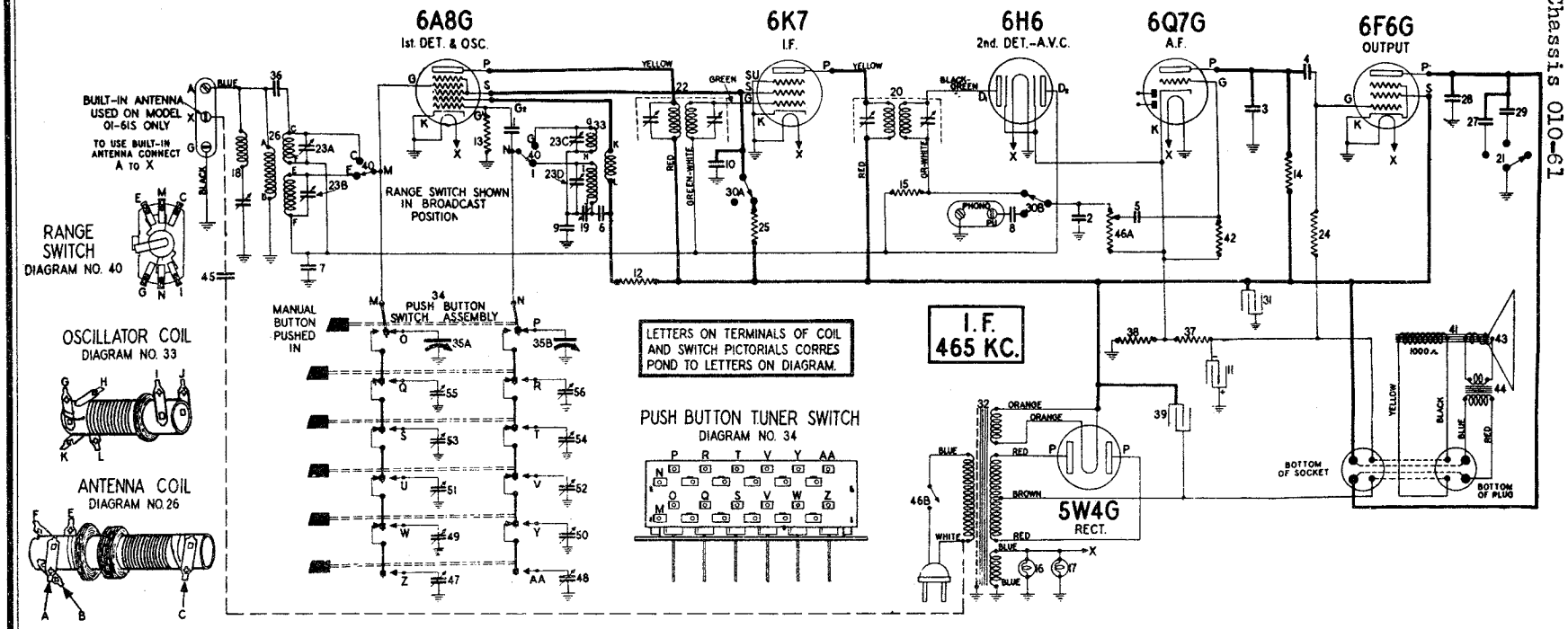
### DIAL & MISCELLANEOUS PARTS

| Part Number | Description | List Price |
|---|---|---|
| 114955 | Clamp for dial cord | $0.01 |
| 112745 | Clip for coil mounting | .01 |
| 112798 | Clip for mounting wave trap coil | .01 |
| 113019 | Clip for dial scale retaining | .01 |
| 85321 | Connector Link | .01 |
| 114954 | Dial Cord (19" required) | Per Ft. .03 |
| 114976 | Dial scale | .24 |
| 116428 | Dial scale (Model 010-61S) | .24 |
| 112233 | Drum & Bushing for dial drive | .35 |
| 113146 | Escutcheon for dial | .84 |
| 113022 | Knobs for tuning or volume | .10 |
| 113138 | Mounting Plate & Bracket for dial | .42 |
| 110496 | Plug—speaker (4 prong) | .12 |
| 114977 | Pointer for dial | .16 |
| 113102 | Push Button | .08 |
| 81145 | Retaining Ring for drive shaft | Per C .50 |
| 114148 | Rotor for voltage switch on power transformer | .50 |
| 85040 | Screw No. 6 Hex. Hd. | Per C .35 |
| 112874 | Screw—No. 10 x 1⅛ Chassis Mounting | .01 |
| 114814 | Screw—Special head for mounting escutcheon | Per dz. .15 |
| 85827 | Set Screw 8-32 Square Head | .02 |
| 112945 | Shaft tuning | .10 |
| 88161 | Shield for 6Q7G tube (half section) | .08 |
| 88164 | Shield cap | .06 |
| 89912 | Shield Ground clip | .02 |
| 110501 | Socket—4 prong (for speaker) | .16 |
| 114876 | Socket—octal base | .15 |
| 114878 | Socket—octal base with special ground | .15 |
| 114980 | Socket—for dial lamp | .15 |
| 114968 | Spring—dial cord tension | .03 |
| 113189 | Tab—celluloid for push button | Per Dz. .09 |
| 113321 | Tabs—station call letters (4 sheets) (Brown) | Per Set .40 |
| 85785 | Terminal Strip G.A. (Model 010-61S) | .15 |
| 84407 | Terminal Strip phono | .12 |
| 116536 | Terminal Strip G.X.A. (Model 01-61S) | .15 |
| 89746 | Washer—paper for back of knobs | .005 |
| 110929 | Washer—flat steel, for mounting chassis | .01 |

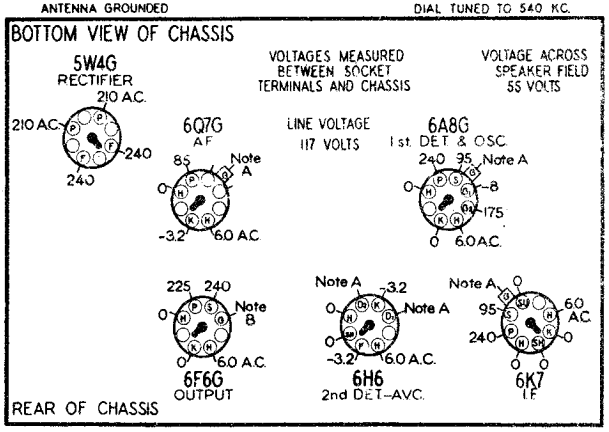


# STEWART-WARNER CORP.






## SOCKET VOLTAGES




Use a high resistance voltmeter of at least 1000 ohms per volt.

**NOTE A:** The bias for the control grids of the 6A8-G, 6K7, and 6Q7-G tubes and on the diode plates of the 6H6 tube is —3.2 volts measured across resistor 38. **NOTE B:** The bias for the control grid of the 6F6-G tube is —16 volts measured across resistors 37 and 38.

## ELECTRICAL PARTS

| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1 | 85061 | Condenser—mica 51 mmfd. | $0.15 |
| 2-3 | 85394 | Condenser—mica 510 mmf. | .25 |
| 4 | 88026 | Condenser—paper .02 mfd. 400 volt | .25 |
| 5-6 | 88030 | Condenser—paper .01 mfd. 400 volt | .25 |
| 7-8 | 88189 | Condenser—paper .05 mfd. 200 volt | .25 |
| 9 | 88587 | Condenser—mica .0042 mfd. | .35 |
| 10 | 88682 | Condenser—paper .1 mfd. 400 volt | .25 |
| 11 | 110377 | Condenser—electrolytic 10 mfd. 35 volt | .80 |
| | 112113 | Condenser—electrolytic 10 mfd. 50 volt (Model 010-61 & 010-61S) | .85 |
| 12 | 110550 | Resistor—carbon 10,000 ohms ½ watt | .15 |
| 13 | 110552 | Resistor—carbon 47,000 ohms ¼ watt | .12 |
| 14 | 110553 | Resistor—carbon 220,000 ohms ¼ watt | .12 |
| 15 | 110580 | Resistor—carbon 3.3 meg. ¼ watt | .12 |
| 16-17 | 110629 | Lamp—6.3 volt—.25 amps. | .15 |
| 11 | 112113 | Condenser—electrolytic 10 mfd. 50 volt Model 010-61 & 010-61S) | .85 |
| 18 | 112796 | Coil—wave trap (with trimmer) | .50 |
| 19 | 112799 | Condenser—padder (530 to 630 mmfd.) | .36 |
| 20 | 112804 | Transformer—2nd I.F. | 1.10 |
| | 116362 | Transformer—2nd I.F. (Model 010-61S) | 1.00 |
| 21 | 112870 | Switch—tone control | .40 |
| 22 | 112884 | Transformer—1st I.F. | 1.20 |
| | 116358 | Transformer—1st I.F. (Model 010-61S) | 1.00 |
| 23A to 23D | 112893 | Condenser—trimmer 4 section | .60 |
| 24 | 112971 | Resistor—insulated 470,000 ohms ¼ watt | .15 |
| 25 | 112999 | Resistor—carbon 33,000 ohms 1 watt | .20 |
| 26 | 113011 | Coil—antenna | 1.20 |
| | 116421 | Coil—antenna (Model 010-61S) | .90 |
| 27 | 113034 | Condenser—paper .04 mfd. 600 volt | .15 |
| 28 | 113035 | Condenser—paper .006 mfd. 600 volt | .14 |
| 29 | 113202 | Condenser—paper .02 mfd. 600 volt | .15 |
| 30A-30B | 114141 | Switch—radio phono (D.P.D.T.) | .44 |
| 31 | 114258 | Condenser—electrolytic 8 mfd. 450 volts | .98 |
| 32 | 114530 | Power transformer 117 volt 60 cycle | 3.50 |
| | 116352 | Power transformer 100-240 V., 40-133 cycles | 7.75 |
| 33 | 114959 | Coil—oscillator | .75 |
| | 116419 | Coil—oscillator (Model 010-61S only) | .65 |
| 34 | 114965 | Switch assembly—for push buttons | 2.85 |
| 35A-35B | 114966 | Condenser—variable gang | 2.85 |
| | 116430 | Condenser—variable gang (Model 010-61S) | 2.50 |
| 36 | 114969 | Condenser—mica 15 mmfd. | .12 |
| 37 | 114970 | Resistor—wire wound 240 ohms 1 watt | .15 |
| 38 | 114971 | Resistor—wire wound 60 ohms ½ watt | .12 |
| 39 | 114972 | Condenser—electrolytic 16 mfd. 450 volt | .78 |
| 40 | 114988 | Switch—range | .60 |
| 41 | U-115043 | Speaker—dynamic 6" | 4.50 |
| 42 | 116050 | Resistor—insulated 10 meg. ¼ watt | .12 |
| 43 | U-116211 | Cone—assembly (for U-115043 speaker) | 1.65 |
| 44 | U-116212 | Output transformer (for U-115043 speaker) | 1.50 |
| 45 | 116224 | Condenser—260 mmfd. (Model 01-61S) | .15 |
| 46A-46B | 116236 | Volume control—500,000 ohms (with switch) | .96 |
| | 116352 | Power transformer—100-240 V., 40-133 C. | 7.75 |
| | 116358 | Transformer—1st I.F. (Model 010-61S) | 1.00 |
| | 116362 | Transformer—2nd I.F. (Model 010-61S) | 1.00 |
| | 116419 | Coil—oscillator (Model 010-61S) | .65 |
| | 116421 | Coil—antenna (Model 010-61S) | .90 |
| | 116430 | Condenser—variable gang (Model 010-61S) | 2.50 |
| 47-48-49-50 | 116501 | Push button trimmer (550 KC to 1000 KC) | .40 |
| 51-52-53-54 | 116502 | Push button trimmer (700 KC to 1400 KC) | .40 |
| 55-56 | 116503 | Push button trimmer (850 KC to 1720 KC) | .40 |

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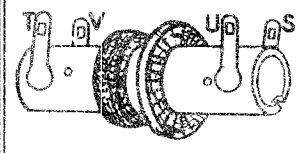



DIAGRAM NO. 41
PART NO. 113295
BROADCAST
ANTENNA COIL

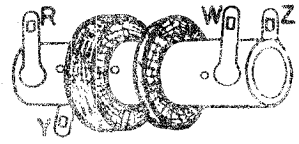



DIAGRAM NO. 42
PART NO. 113296
BROADCAST
R.F. COIL

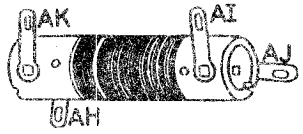



DIAGRAM NO. 43
PART NO. 113297
BROADCAST
OSC. COIL

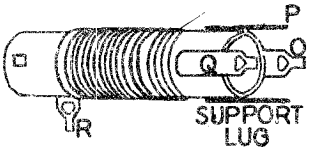



DIAGRAM NO. 49
PART NO. 114893
SHORT WAVE
ANTENNA COIL

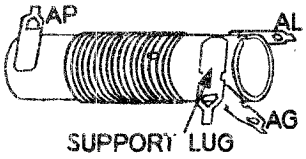



DIAGRAM NO. 48
PART NO. 114892
SHORT WAVE
OSC. COIL

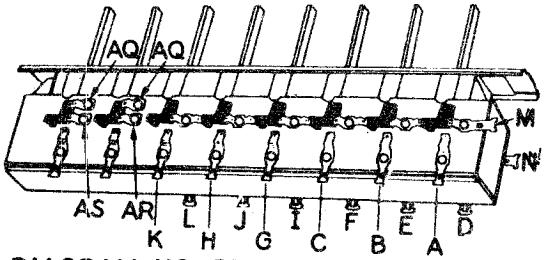
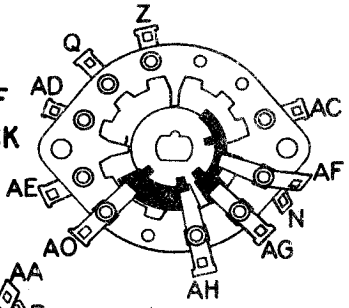



DIAGRAM NO. 52 PART NO. 114920
PUSH BUTTON SWITCH




FRONT OF
FRONT DECK

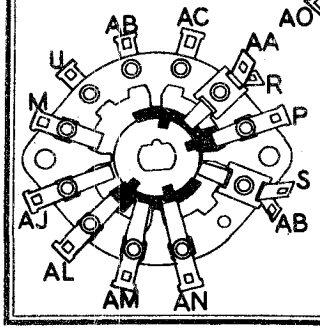
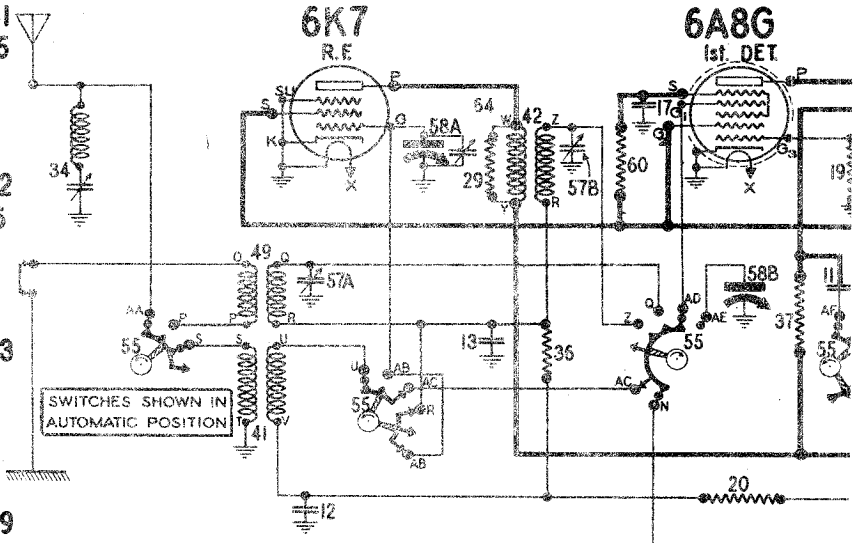



DIAGRAM NO. 55
PART NO. 114929
RANGE SWITCH

FRONT OF
REAR DECK




## ELECTRICAL PARTS

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1 | 83783 | Condenser - mica, 110 mmf. | .20 |
| 2 | 85061 | Condenser - mica 51 mmfd. | .15 |
| 3-4 | 85394 | Condenser - mica 510 mmf. | .25 |
| 5-6-7-8-9 | 88026 | Condenser - paper .02 mfd.400V. | .25 |
| 10 | 88029 | Condenser - paper.004 mfd.400V. | .25 |
| 11 | 88030 | Condenser - paper .01 mfd.400V. | .25 |
| 12-13-14 | 88189 | Condenser - paper .05 mfd.200V. | .25 |
| 15 | 88587 | Condenser - mica .0042 mfd. | .35 |
| 16-17 | 88682 | Condenser - paper .1 mfd. 400V. | .25 |
| 18 | 89421 | Condenser - paper .1 mfd. 200V. | .25 |
| 19 | 110552 | Resistor-carb. 47,000 ohms ½ W. | .12 |
| 20-21 / 22-23 | 110553 | Resistor - carbon 220,000 ohms 1/4 watt | .12 |
| 24-25 | 110554 | Resistor-carb. 1 meg. 1/4 watt | .12 |
| 26 | 110559 | Resistor-carb. 470,000 ohms ½W. | .12 |
| 27 | 110564 | Resistor-carb. 100,000 ohms ½W. | .12 |
| 28 | 110565 | Resistor-carb. 22,000 ohms ½ W. | .12 |
| 29 | 110573 | Resistor-carb. 2,200 ohms ½ W. | .12 |
| 30-31 | 110629 | Lamp - 6.3 volt .25 amps | .15 |
| 32 | 111252 | Condenser - paper .05 mfd.400V. | .13 |
| 33 | 111346 | Condenser - mica 2,000 mmfd. 1000 volt | .22 |
| 34 | 112796 | Coil - wave trap(with trimmer) | .50 |
| 35 | 112971 | Resistor-insul.470,000 ohm ½W. | .15 |
| 36 | 112987 | Resistor-insul.220,000 ohm ½W. | .15 |
| 37 | 112997 | Resistor - carb.22,000 ohms 1W. | .15 |
| 38 | 112998 | Resistor-insul.22,000 ohms 2 W. | .20 |
| 39 | 113229 | Transformer - 2nd I.F. | 1.64 |
| 40 | 113237 | Transformer - 1st I.F. | 1.20 |
| 41 | 113295 | Coil - antenna (B.C.) | 1.20 |
| 42 | 113296 | Coil - R.F. (B.C.) | 1.30 |
| 43 | 113297 | Coil - oscillator (B.C.) | .48 |
| 44 | 113346 | Condenser - padding | .38 |
| 45 | 113965 | Condenser-elect. 16 mfd.450 V. | 1.04 |
| 46A - 46B | 114141 | Switch - radio phono(D.P.D.T.) | .44 |
| 47A to 47F | 116501 | Trimmer Condenser(100-450 mmfd) | .40 |
| 47G to 47J | 116502 | Trimmer Condenser( 25-300 mmfd) | .40 |
| 47K - 47L | 116503 | Trimmer Condenser( 15-200 mmfd) | .40 |
| 48 | 114892 | Oscillator Coil - short wave | .60 |
| 49 | 114893 | Antenna Coil - short wave | .60 |
| 50 | 114897 | Transformer-power 117 V. 60 C. | 4.35 |
| 51 | 114906 | Resistor - metal clad: Section A - 190 ohms; Section B - 17 ohms; Section C - 26 ohms | .44 |
| 52 | 114920 | Push Button Switch Assembly | 3.60 |
| 53 | 114927 | Transformer - output | 1.50 |
| 54A - 54B | 114928 | Volume control 1 meg. with off-on switch | 1.00 |
| 55 | 114929 | Range Switch | 1.85 |
| 56A - 56B / 57A - 57B | 114937 | Condenser - trimmer 2 sections | .30 |
| 58A -B -C | 114949 | Condenser - variable gang | 6.00 |
| 59 | R-115042 | Speaker - dynamic 10" | 8.75 |
| 60 | 116059 | Resistor-insul. 22,000 ohms ½W. | .12 |
| 61 | R-116210 | Cone & Voice Coil Assembly for R-115042 Speaker | 2.25 |
| 62 | 116262 | Condenser-elect. 16 mfd. 450 V. | .78 |
| 63 | 116263 | Condenser-elect. 4 mfd. 450 V. | .58 |
| 64 | 113468 | Trimmer - Single Section (Used on some sets only) | .15 |

TERMINALS OF SWITCH
PICTORIAL VIEWS ARE
TO SIMILARLY LETTERED
DIAG

## DIAL AND

| PART NUMBER | DI |
|---|---|
| 114032 | Bracket & |
| 114034 | Bracket & |
| 114042 | Clamp - f |
| 112745 | Clip - co |
| 112798 | Clip - fo |
| 85321 | Connector |
| 111302 | Cord - di |
| 114921 | Dial back |
| 114915 | Dial mtg. |
| 114922 | Dial scal |
| 113338 | Drum - di |
| 114912 | Escutcheo |
| 114624 | Escutcheo |
| 113041 | Knob for |
| 116335 | Knob for |
| 110496 | Plug - sp |
| 116302 | Pointer & |
| 113149 | Push butt |
| 113463 | Rubber bu |
| 112874 | Screw - # |
| 114914 | Screw-spe |
| 116185 | Screw-#2 cheon |
| 85827 | Set Screw |
| 114025 | Shaft - t |
| 112864 | Shield - |
| 112865 | Shield - |
| 113094 | Socket - |
| 114117 | Socket - |
| 114876 | Socket - |
| 114878 | Socket - |
| 110501 | Socket - |
| 113177 | Spring - |
| 116311 | Tabs - st |
| 114698 | Tabs - ce |
| 84407 | Terminal |
| 85066 | Terminal |
| 67568 | Washer - |
| 116530 | Washer - |
| 110629 | Washer - |

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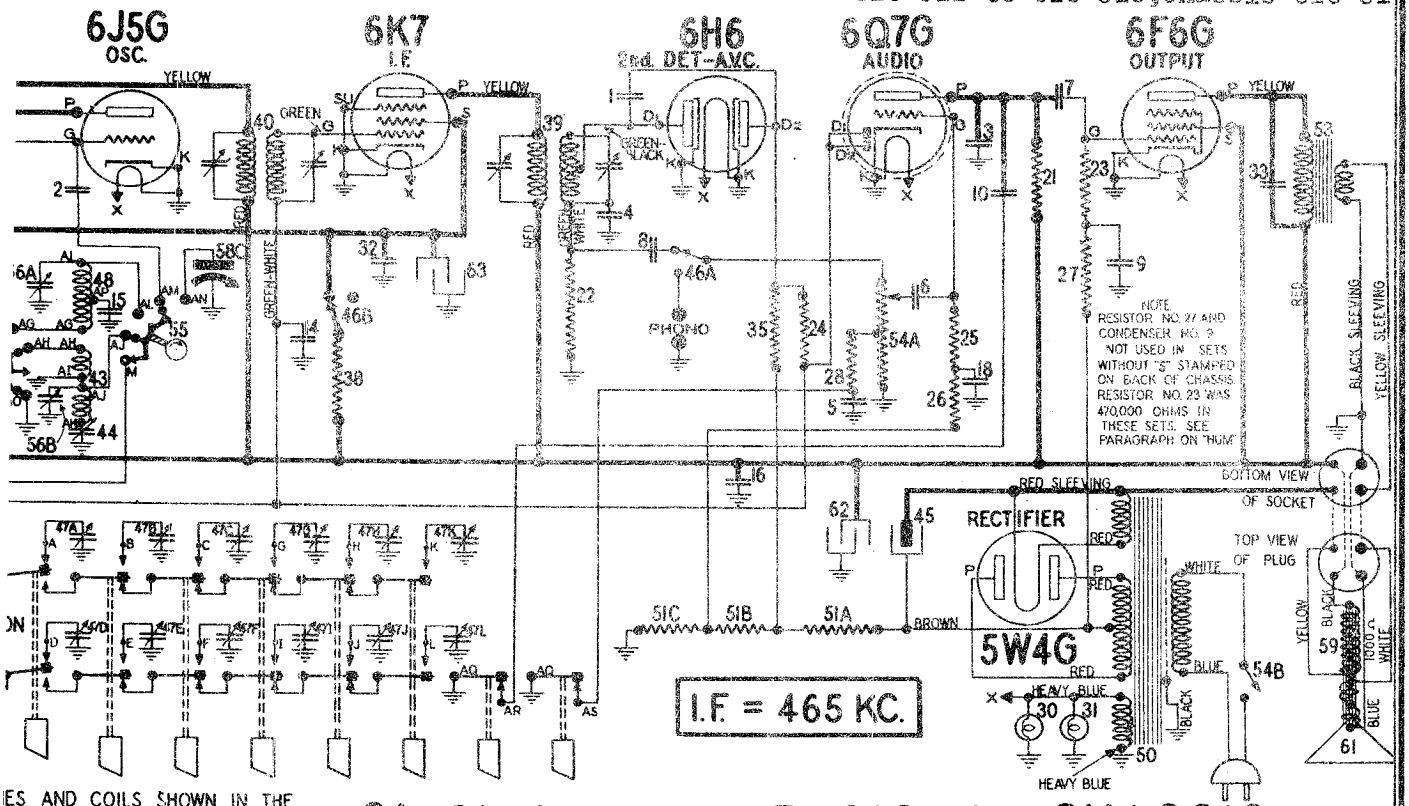
ARNER CORP.

MODELS 01-811 to 01-819, Chassis 01-81
08-811 to 08-819, Chassis 08-81
010-811 to 010-819, Chassis 010-81

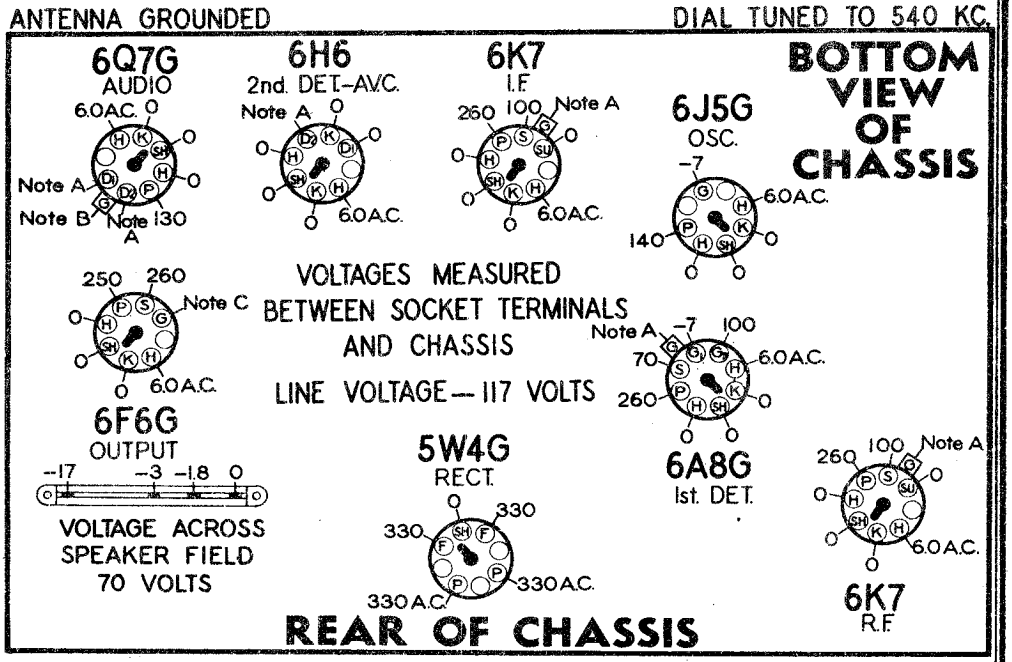



ES AND COILS SHOWN IN THE
LETTERED TO CORRESPOND
ED TERMINALS ON THE CIRCUIT
RAM ABOVE.

# 01-81, 08-81 AND 010-81 CHASSIS

## SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC.




## MISCELLANEOUS PARTS

| DESCRIPTION | LIST PRICE |
|---|---|
| Pulley Assembly - right hand- | .34 |
| Pulley Assembly - left hand-- | .34 |
| or dial scale---------- | .10 |
| ll mounting---------- | .01 |
| mtg. wave trap coil---------- | .01 |
| - ground---------- | .01 |
| al drive 6 or 50 ft. lengths ---------- Per Ft. | .05 |
| ground - brown suede paper---- | .10 |
| plate---------- | .38 |
| e - glass---------- | .84 |
| al drive---------- | .54 |
| n for dial---------- | 2.25 |
| n for push buttons---------- | 1.28 |
| tuning or volume---------- | .10 |
| range switch---------- | .15 |
| eaker (4 prong)---------- | .12 |
| slide assembly---------- | .15 |
| on---------- | .08 |
| shing - chassis mtg.---------- | .03 |
| 10 X 1 1/8 chassis mtg.-------- | .01 |
| cial head-for mtg. escutcheon- ---------- Per Doz. | .15 |
| X 3/8 for push button escut- mtg.---------- | .01 |
| - 8/32 square head---------- | .02 |
| uning---------- | .18 |
| for tubes---------- | .05 |
| base, for tubes---------- | .03 |
| pilot light assem.---------- | .15 |
| dial lamp---------- | .18 |
| octal base---------- | .15 |
| octal base with spec. ground-- | .15 |
| speaker (4 prong)---------- | .16 |
| dial cord tension---------- | .09 |
| ation call letter sheets ---------- Per Set | .35 |
| lluloid for push buttons------ | .03 |
| Strip - phono---------- | .12 |
| Strip - G.D.A.---------- | .20 |
| embossed (for mtg. elect.)---- | .05 |
| (paper) for back of knobs----- | .005 |
| flat steel, for mtg. chassis-- | .01 |

Use a high resistance voltmeter of at least 1000 ohms per volt.

NOTE A: The bias for the 6K7 R.F., 6A8G, 6K7 I.F., Diode Plates $D_1$ and $D_2$ of the 6Q7G and Diode Plate $D_2$ of the 6H6 tube is -3 volts, measured across resistors 51B and 51C.

NOTE B: The bias for the control grid of the 6Q7G tube is -1.8 volts, measured across resistor 51C.

NOTE C: The bias for the control grid of the 6F6G tube is -17 volts, measured across resistors 51A, 51B and 51C.

STEWART-WARNER CORP.

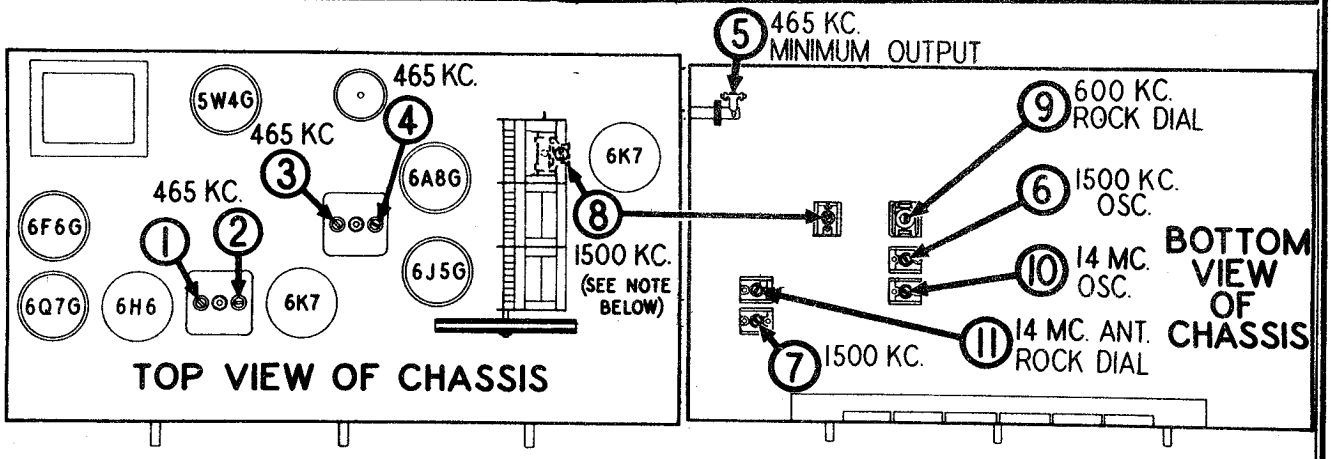
MODELS 01-811 to 01-819
08-811 to 08-819
010-811 to 010-819
Alignment, Trimmers

# ALIGNMENT EQUIPMENT & PROCEDURE

ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 14 MC are required.

1. Connect the output meter across the voice coil or between the plate of the 6F6G output tube and ground, in series with a .1 mfd. condenser depending upon the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the receiver chassis or to the "G" terminal at the back of the chassis. NOTE:- The "G" and "D" terminals on this terminal strip must be connected together.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the alignment procedure.
4. With the gang condenser in full mesh, set the pointer to the last mark on the left end of the dial scale. If the pointer is incorrectly set, it is only necessary to loosen the set screw on the dial cord drive drum and push the gang condenser in full mesh with the pointer properly set, then retighten the set screw.

| DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR | CONNECTION OF SIG. GENERATOR TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RANGE SWITCH POSITION | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| .1 MFD CONDENSER | CONTROL GRID OF 6A8G TUBE | 465 KC | BROADCAST | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1 - 2 | 2ND I.F. | ADJUST FOR MAXIMUM OUTPUT. THEN REPEAT ADJUSTMENT. |
| | | | | | 3 - 4 | 1ST I.F. | |
| 200 MMFD. MICA CONDENSER | ANTENNA TERMINAL | 465 KC | BROADCAST | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 5 | WAVE TRAP | ADJUST FOR MINIMUM OUTPUT. USING A STRONG GENERATOR SIGNAL. |
| 200 MMFD. MICA CONDENSER | ANTENNA TERMINAL | 1500 KC | BROADCAST | 1500 KC | 6 | BROADCAST OSCILLATOR (SHUNT) | ADJUST FOR MAXIMUM OUTPUT. |
| 200 MMFD. MICA CONDENSER | ANTENNA TERMINAL | 1500 KC | BROADCAST | TUNE TO 1500 KC GENERATOR SIGNAL | 7 | BROADCAST DETECTOR | ADJUST FOR MAXIMUM OUTPUT. |
| | | | | | 8 | BROADCAST ANTENNA | |
| 200 MMFD. MICA CONDENSER | ANTENNA TERMINAL | 600 KC | BROADCAST | TUNE TO 600 KC GENERATOR SIGNAL | 9 | BROADCAST OSCILLATOR (SERIES) | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 14 MC | FOREIGN | 14 MC | 10 | FOREIGN OSCILLATOR | ADJUST FOR MAXIMUM OUTPUT. CHECK TO SEE IF PROPER PEAK WAS OBTAINED BY TUNING IN IMAGE AT APPROX. 13.1 MC. IF IMAGE DOES NOT APPEAR REALIGN AT 14 MC WITH TRIMMER SCREW FARTHER OUT. RECHECK IMAGE. |
| 400 OHM CARBON RESISTOR | ANTENNA TERMINAL | 14 MC | FOREIGN | TUNE TO 14 MC GENERATOR SIGNAL | 11 | FOREIGN ANTENNA | ADJUST FOR MAXIMUM OUTPUT. TRY TO INCREASE OUTPUT BY DETUNING TRIMMER AND RETUNING RECEIVER DIAL UNTIL MAXIMUM OUTPUT IS OBTAINED. |




NOTE: ON SOME SETS TRIMMER NO. 8 IS LOCATED ON THE REAR SECTION OF THE GANG CONDENSER, WHILE ON OTHERS IT IS LOCATED UNDERNEATH THE CHASSIS.

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MODELS 01-811 to 01-819
08-811 to 08-819
010-811 to 010-819
Tuner, Drive Cord Data

# STEWART-WARNER CORP.

## CIRCUIT FEATURES

This chassis is an 8 tube, two band, push button tuning superheterodyne receiver. The tuning ranges are 530 to 1730 KC and 5.5 to 16 MC.

Incorporated in each chassis is an eight button tuner switch. The first two buttons on the left are tone controls. Four different tone qualities may be imparted to a program by properly setting these tone buttons. The remaining six buttons are used for automatic tuning. Automatic tuning is accomplished by substituting pre-set trimmers for the variable gang condenser. The push-button switch provides a simple rapid method of effecting this substitution.

It should be noted that the R.F. stage in this receiver operates only on the Broadcast Band. When the band switch is in the "Automatic", "Intermediate" or "Foreign" positions this R.F. stage is not utilized.

## HOW TO SET UP THE PUSH BUTTON TUNER

1. Connect your set to a good antenna system.
2. Turn on the set and allow it to operate at least one-quarter hour before setting up the push buttons.
3. Make a list of the frequencies of six nearby stations to which you wish to set up the buttons. Be sure to select nearby, powerful stations, since weak stations will generally give better results when tuned manually. Also BE SURE TO SELECT STATIONS FALLING WITHIN THE TUNING RANGE OF THE INDIVIDUAL BUTTONS, AS INDICATED IN Fig. 1.

Each of the buttons on your "Magic Keyboard" can be made to tune in stations in a definite frequency range as shown in Fig. 1. It is imperative that you select a station whose frequency is in the operating range of a button before attempting to set-up that button for the particular station. IT IS IMPORTANT THAT THE PROPER BUTTONS BE SELECTED AS THE ADJUSTING SCREW SHOULD NEVER BE TOO LOOSELY OR TOO TIGHTLY ADJUSTED. For example, suppose you want to set a button to station KDKA whose frequency is 980 kilocycles. Refer to Fig. 1, which shows that this frequency falls within the operating range of buttons No. 6 or No. 7, whose range is 630 to 1490 KC or of button No. 8 whose range is 720 to 1700 KC. Therefore either buttons No. 6, No. 7 or No. 8 can be used for the automatic tuning of stations KDKA.

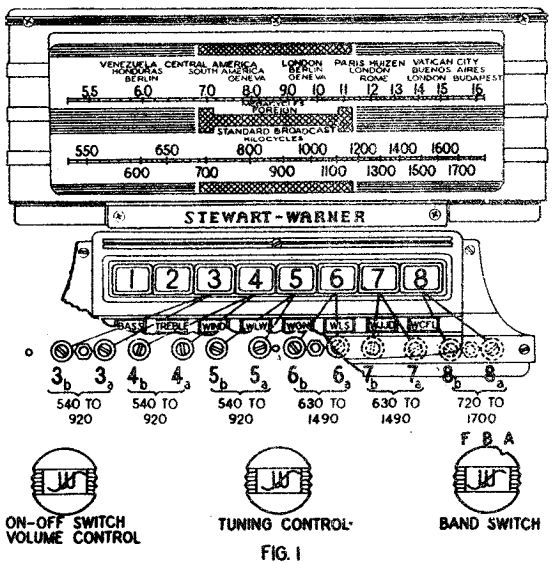


FIG. 1

4. Remove the escutcheon around the push buttons taking out the six screws holding it to the cabinet. This will expose to view six pairs of adjusting screws, each pair of which is used to tune in a station that you wish to set-up on a particular button.
5. Turn the band switch (Right hand knob) to the center (B) position, as indicated by the notch on the band switch knob. Then using the tuning knob (center) tune in the station you desire to set to button No. 3. This is done so that you may identify the station by hearing its program.
6. Now turn the band switch knob to the extreme clockwise position. The notch on the band switch knob will now indicate the "A" (Automatic) position. You will note when this switch is turned, the station previously tuned in will not be heard.
7. Now push in the third button from the left (No. 3 in Fig. 1). Using a small screw driver, insert it in the second screw from the left (No. 3a in Fig. 1). Rotate the screw SLOWLY until the program that you have previously tuned in manually is again tuned in. If it cannot be heard, advance the volume control. BE SURE THAT YOU ADJUST THIS PARTICULAR SCREW (3a) TO THE POINT WHERE THE PROGRAM IS HEARD WITH THE DEEPEST TONE. It is advisable that you turn the screw in and out so that you will tune across the station several times in order that you may be sure you have located the correct tuning point.
8. Next insert the screw driver in the first screw on the left (No. 3b, Fig. 1) and turn it until the program is received with deepest tone. Now go back to screw No. 3a and see if any improvement in the reception can be made by adjusting it. Also repeat this adjustment for screw No. 3b.
9. Set up button No. 4 for the selected station in a similar manner, using screws No. 4a and 4b, and proceed to set up the remaining buttons in the same fashion, always tuning in the station initially with the "a" screw for that particular button.
10. Call letter tabs and celluloid windows are supplied with your receiver. The tabs are used to label the six push buttons set up for stations. The celluloid tabs are supplied as a perforated sheet which is to be broken into eight sections. Select the proper call letter tabs from the station call letter sheets supplied. Place the call letter tab in back of the celluloid window and insert it in its proper slot in the push button escutcheon.
11. Replace the escutcheon with its six retaining screws.

IMPORTANT

12. In some instances it may be necessary, after the set is operated for a month or more, to reset the screws as they may change their setting due to heat, humidity, etc.

## REPLACING THE DIAL POINTER DRIVE CORD

1. Tie a large knot in one end of about 51" of special dial cord, part No. 111302.

2. Thread the free end of the cord through hole A in drum C (threading from the inside of the drum out) See Fig. 2.

3. After pulling the cord through hole A, make one half turn around the drum C in a counter-clockwise direction (viewed from the front), using the front groove in the drum.

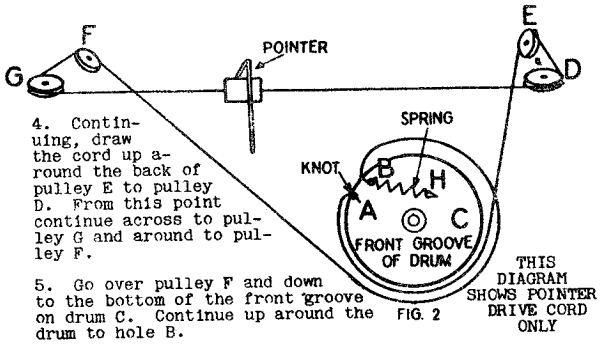


FIG. 2

THIS DIAGRAM SHOWS POINTER DRIVE CORD ONLY

4. Continuing, draw the cord up around the back of pulley E to pulley D. From this point continue across to pulley G and around to pulley F.

5. Go over pulley F and down to the bottom of the front groove on drum C. Continue up around the drum to hole B.

6. Draw the cord through hole B and tie it to the end of the tension spring in such a manner that when the spring is clipped on to lug H it will be extended to about 1¾" long.

## HUM

In some of the first sets produced Resistor No. 23 in the 6F6G grid circuit was 470,000 ohms, also condenser No. 9 and Resistor No. 27 were omitted. The hum level in these sets can be reduced by adding these two parts and Changing Resistor No. 23 to 220,000 ohms. All chassis with this circuit change are stamped with the letter "S" on the back.

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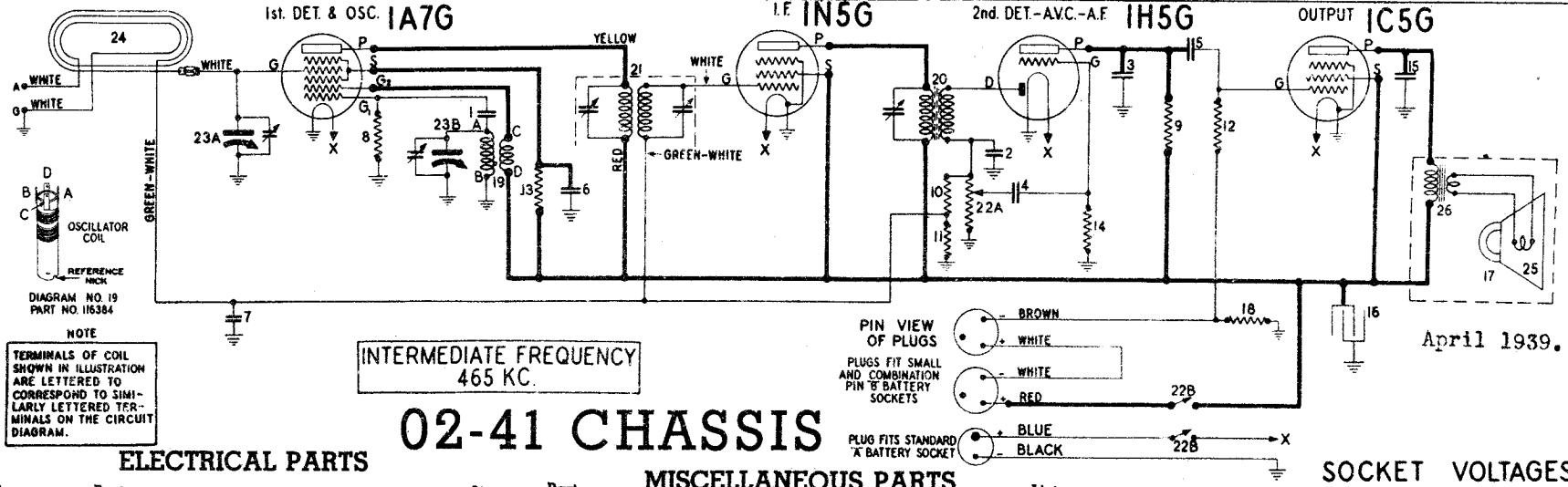



April 1939.

# 02-41 CHASSIS

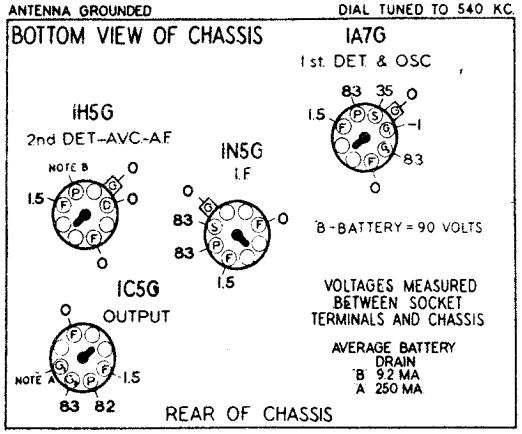
## ELECTRICAL PARTS

| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1-2-3 | 85061 | Condenser—mica 51 mmfd. | $0.15 |
| 4-5 | 88030 | Condenser—paper .01 mfd. 400 volt | .25 |
| 6-7 | 88189 | Condenser—paper .05 mfd. 200 volt | .25 |
| 8 | 110553 | Resistor—carbon 220,000 ohms ¼ watt | .12 |
| 9 | 110554 | Resistor—carbon 1 megohm ¼ watt | .12 |
| 10-11-12 | 110570 | Resistor—carbon 2.2 meg. ¼ watt | .15 |
| 13 | 110578 | Resistor—carbon 68,000 ohms ¼ watt | .12 |
| 14 | 110580 | Resistor—carbon 3.3 meg. ¼ watt | .12 |
| 15 | 113035 | Condenser—ceramic tube .006 mfd. 600 volt | .14 |
| 16 | 113118 | Condenser—electrolytic 8 mfd. 150 volt | .56 |
| 17 | R-115049 | Speaker—P.M. dynamic (5¼") | 6.25 |
| 18 | 116061 | Resistor—800 ohm ¼ watt 10% | .12 |
| 19 | 116384 | Coil—oscillator | .45 |
| 20 | 116385 | Transformer—2nd I.F. | .90 |
| 21 | 116386 | Transformer—1st I.F. | 1.20 |
| 22A-22B | 116393 | Volume control—1 meg. (with on-off switch) | .96 |
| 23A-23B | 116401 | Condenser—variable gang | 2.75 |
| 24 | 116437 | Loop antenna assembly | 1.60 |
| 25 | R-116461 | Cone and voice coil for R-115049 speaker | 1.55 |
| 26 | R-116462 | Transformer—output for R-115049 speaker | .90 |

## MISCELLANEOUS PARTS

| Part Number | Description | List Price |
|---|---|---|
| 116399 | Cable—for batteries | $0.60 |
| 116441 | Cabinet | 6.25 |
| 112745 | Clip—coil mounting | .01 |
| 113019 | Clip—dial scale retaining | .01 |
| 113178 | Cord—dial (supplied in 4 ft. lengths) | .30 |
| 116442 | Dial scale | .18 |
| 116418 | Grille—for speaker | .40 |
| 116405 | Indicator—on-off | .18 |
| 116411 | Indicator lever assembly | .09 |
| 116416 | Knob—for tuning or volume | .12 |
| 116488 | Nut—No. 8—32 wing nut | .01 |
| 116409 | Pointer | .05 |
| 81145 | Retaining ring—for drive shaft | Per C .50 |
| 116455 | Screw—chassis mounting (No. 10x⅝) | .01 |
| 85827 | Set screw—No. 8-32 square head | .02 |
| 116403 | Shaft, tuning | .08 |
| 116395 | Shield—tube | .08 |
| 116396 | Shield cap—tube | .02 |
| 116392 | Shield base—tube | .03 |
| 114876 | Socket—octal base | .15 |
| 113169 | Spring—for indicator lever | .01 |
| 111981 | Spring—for dial cord tension | .03 |
| 85785 | Terminal strip—antenna—ground | .15 |
| 84015 | Washer—paper, for back of knobs | .01 |
| 116414 | Window dial | .25 |

## SOCKET VOLTAGES




**NOTE A:** The bias for the control grid of the 1C5G tube is —7.5 volts measured across resistor 18.

**NOTE B:** Due to the high resistance of plate Resistor No. 9 only a slight deflection will be obtained when using a meter having a resistance of 1000 ohms per volt.

In this receiver, the loop antenna on the back of the cover of the case, takes the place of the usual antenna coil. Thus when the trimmer in this circuit is aligned, the chassis, the loop antenna, and the batteries must be mounted in the cabinet in their correct position.

Holes are provided in the bottom of the case to permit the adjustment of both antenna and oscillator trimmers with the receiver completely assembled. These two adjustments should be made with a signal generator but without an output meter since it is impractical to keep the output meter connected when the back is mounted on the cabinet. That is, the antenna and oscillator trimmers can be adjusted by ear using a signal generator. The I F trimmers must be adjusted with an output meter in the conventional way.

MODELS 02-411 to 02-419
Chassis 02-41
Alignment, Trimmers
Loop, Battery Data

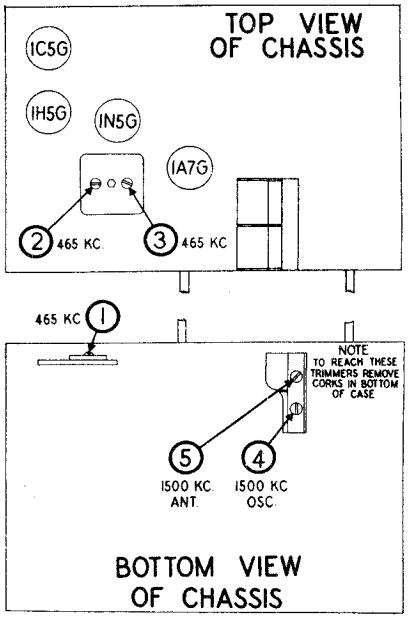
STEWART-WARNER CORP.

# ALIGNMENT EQUIPMENT & PROCEDURE

**FOR ALIGNMENT** an output meter and an accurately calibrated signal generator are required.

1. Connect the output meter across the voice coil or between the plate of the 1C5G output tube and ground through a 0.1 Mfd. condenser, depending on the type of meter. (The more sensitive type should be connected across the voice coil.)
2. Connect the ground lead of the signal generator to the Ground Terminal or the chassis.
3. Turn the volume control to the maximum volume position and keep it in this position while aligning.
4. With the gang condenser in full mesh, set the dial pointer in a horizontal position. If the pointer is incorrectly set, it is merely necessary to move the pointer to the correct position by hand, while holding the gang in the full mesh position.

| Dummy Ant. in Series with Sig. Gen. | Connection of Sig. Generator Output to Receiver | Signal Generator Frequency | Receiver Dial Setting | Trimmer Number | Trimmer Description | Type of Adjustment |
|---|---|---|---|---|---|---|
| .1 MFD. Condenser | Control Grid of 1A7G | 465 KC | Any Point Where It Does Not Affect Signal | 1 | 2nd I.F. | Adjust for maximum output. Then repeat adjustment. |
| | | | | 2-3 | 1st I.F. | |
| Before proceeding further with alignment, disconnect the output meter, and replace chassis, batteries and loop in cabinet, being sure to connect the loop. Using a weak signal from the signal generator, make the following adjustments by ear. The trimmers may be reached through the holes in the bottom of the cabinet by removing corks. | | | | | | |
| 400 Ohm Carbon Resistor | Antenna Terminal On Bottom Of Cabinet | 1500 KC | 1500 KC | 4 | Broadcast Oscillator (Shunt) | Adjust trimmer for maximum output. |
| 400 Ohm Carbon Resistor | Antenna Terminal On Bottom Of Cabinet | 1500 KC | Tune To 1500 KC Generator Signal | 5 | Broadcast Antenna | Adjust for maximum output. |




## LOOP ANTENNA

A built-in loop antenna is incorporated in this receiver. Due to the directional effect of this type of antenna it will often be possible to increase the signal volume by rotating the entire set.

In some locations it may be desirable to install an external antenna to increase the volume of weak or distant stations. This external antenna should be connected to the screw marked A on the terminal strip located on the bottom of the receiver case. Connect a ground wire to the post marked G on the same terminal strip.

**NOTE: You must connect a ground wire to this receiver when using a separate outside aerial, otherwise you will not obtain a satisfactory increase in signal pickup.**

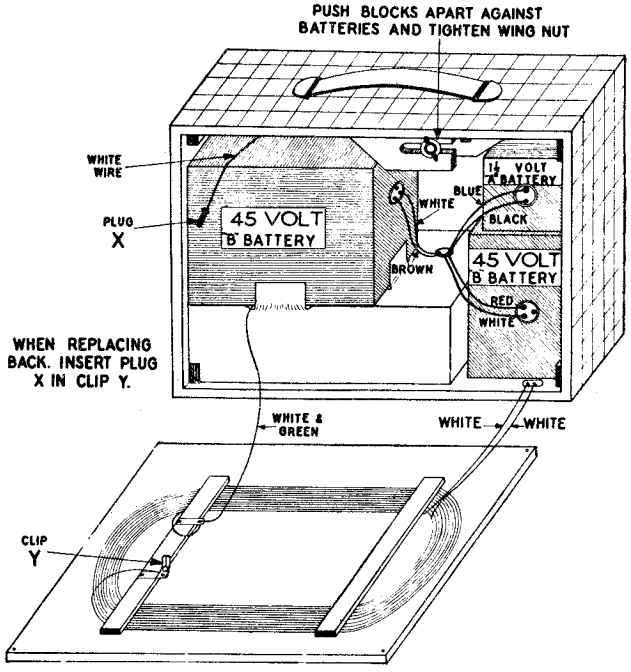
## INSTALLATION OF BATTERIES

The following 1½ volt "A" batteries will fit the space provided: Burgess No. 4FAPI, Eveready No. 742, or Ray-O-Vac No. P94A.

"B" batteries of the proper size are Burgess B30PI, Eveready No. 762 and Ray-O-Vac No. 5303.

A plug and clip connection on the loop is provided to facilitate the installation of batteries. Before replacing the back of the cabinet always be sure that this plug is pushed into the clip and that the blocks are holding the batteries firmly in their positions.

Do not permit any of the battery cable plugs to come in contact with the receiver chassis or any battery terminal other than that to which it is to be connected.

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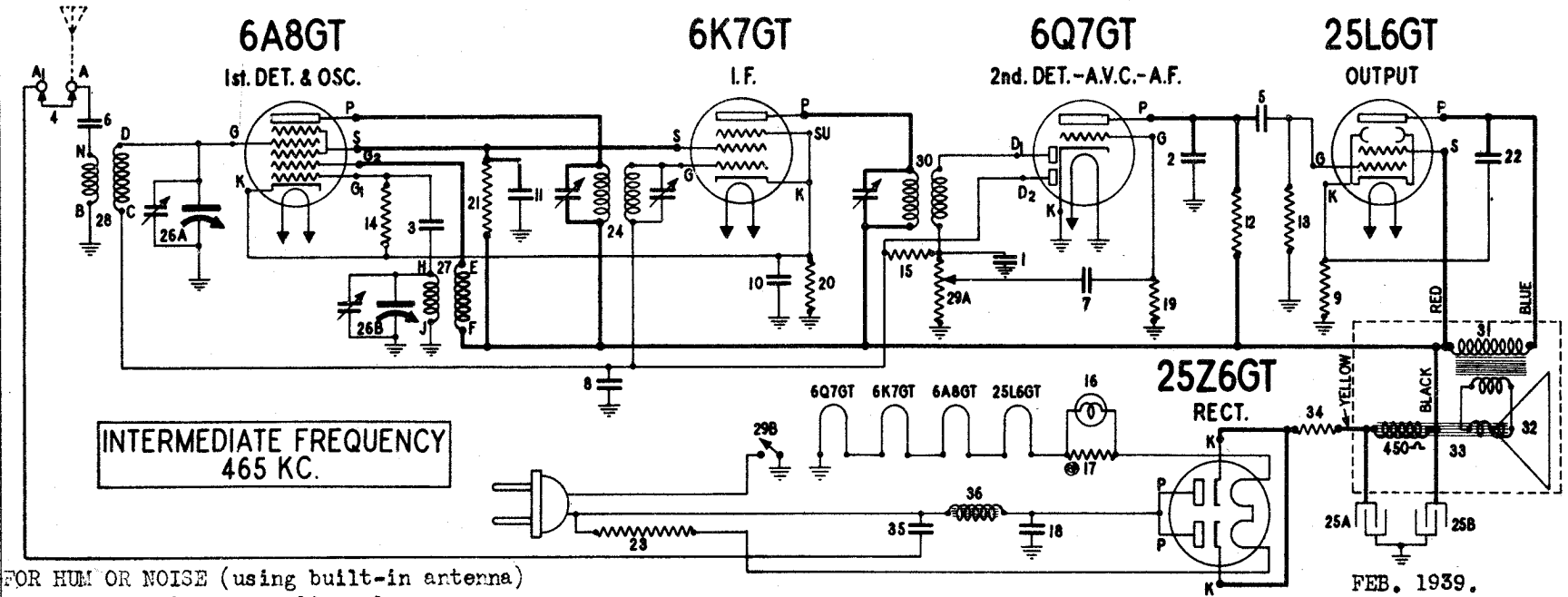
Chassis 07-513
Schematic, Voltage
Socket, Coils, Changes
To prevent filter condenser and rectifier tube failure caused by line surges, a 50 ohm resistor is connected in the rectifier cathode circuit.

# STEWART-WARNER CORP.

MODELS 07-511 to 07-519
Chassis 07-51 07-513 to 07-519




FEB. 1939.

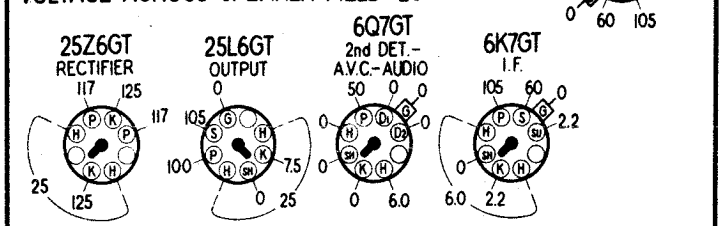
FOR HUM OR NOISE (using built-in antenna)
1. Try reversirg power line plug.
2. If not corrected, Remove connector between A and A1, on back of chassis, and connect an external antenna to A.

## BOTTOM VIEW OF CHASSIS

VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS UNLESS OTHERWISE SHOWN.

LINE VOLTAGE 117 VOLTS.

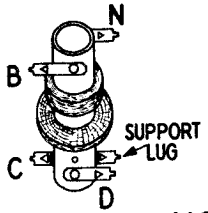
VOLTAGE ACROSS SPEAKER FIELD 20 VOLTS.



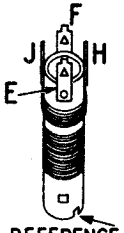

## REAR OF CHASSIS

IMPORTANT: Use a high resistance voltmeter of at least 1000 ohms per volt.

ANTENNA COIL
DIAGRAM NO. 28
PART NO. 114873




OSCILLATOR COIL
DIAGRAM NO. 27
PART NO. 114872




**NOTE**

TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS ABOVE ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM.

| DIAGRAM NUMBER | PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| 1-2 | 83539 | Condenser - mica 260 mmfd. | .20 |
| 3 | 83783 | Condenser - mica 110 mmf. | .20 |
| 4 | 85321 | Connector - ground | .01 |
| 5 | 88026 | Condenser - paper .02 mfd. 400 volt- | .25 |
| 6-7 | 88029 | Condenser - paper .004 mfd. 400 volt | .25 |
| 8 | 88189 | Condenser - paper .05 mfd. 200 volt- | .25 |
| 9 | 89276 | Resistor - wire wound 140 ohms ½ W.- | .12 |
| 10-11 | 89421 | Condenser - paper .1 mfd. 200 volt- | .25 |
| 12 | 110554 | Resistor - carb. 220,000 ohms ½ watt | .12 |
| 13 | 110559 | Resistor - carb. 470,000 ohms ½ watt | .12 |
| 14 | 110578 | Resistor - carb. 66,000 ohms ½ watt- | .12 |
| 15 | 110580 | Resistor - carb. 3.3 meg. 1/4 watt- | .12 |
| 16 | 110629 | Lamp - 6.3 volt - .25 amps. | .15 |
| ⓒ17 | 110975 | Resistor - wire wound 33 ohms 3W(10%) | .12 |
| 18 | 111252 | Condenser - paper .05 mfd. 400 volt- | .13 |
| 19 | 112975 | Resistor - carbon 10 meg. 1/4 watt- | .12 |
| 20 | 112994 | Resistor - carbon 220 ohms 1/4 watt- | .16 |
| 21 | 112995 | Resistor - carb. 15,000 ohms 1/4 W.- | |
| 22 | 114108 | Condenser - paper .03 mfd. 750 volt- | .25 |
| 23 | 114797 | Power cord (dropping resist. 143 ohms -10%) Brown | .98 |
| 24 | 114802 | Transformer - 1st I.F. | 1.10 |
| 25A - 25B | 114868 | Cond. - dual elect. 16 mfd. 150 V. | |
| 26A - 26B | 114870 | Condenser - variable gang | |
| 27 | 114872 | Oscillator coil | |
| 28 | 114873 | Antenna coil | |
| 29A - 29B | 114879 | Volume control - 1 meg. with switch- | |
| 30 | 114880 | Transformer - 2nd I.F. | |
| 31 | R-114885 | Transformer-output(for R-115041 spkr) | |
| | 0-116342 | Transformer-output(for 0-115041 spkr) | |
| 32 | R-114886 | Cone & Voice Coil(for R-115041 spkr) | |
| | 0-116343 | Cone & Voice Coil(for 0-115041 spkr) | |
| 33 | R-115041 | Speaker - dynamic (4 inch) | |
| 34 | 116013 | Resistor - 50 ohms 1 watt | .18 |
| 35 | 116224 | Condenser - mica 260 mmfd. 500 volt- | |
| 36 | 116232 | R. F. Choke | |
| 31 | 0-116342 | Output transformer for 0-115041 spkr. | |
| 32 | 0-116343 | Cone & Voice Coil(for 0-115041 spkr) | |

ⓒResistor No. 17 changed to a 3 watt molded wire-wound resistor, Part 116479 to prevent failure of the resistor if the dial bulb burns out.

MODELS 07-511 to 07-519
07-511S to 07-519S STEWART-WARNER CORP.
Alignment, Trimmers
Antenna Notes

# 07-51 CHASSIS

# ALIGNMENT PROCEDURE

ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.

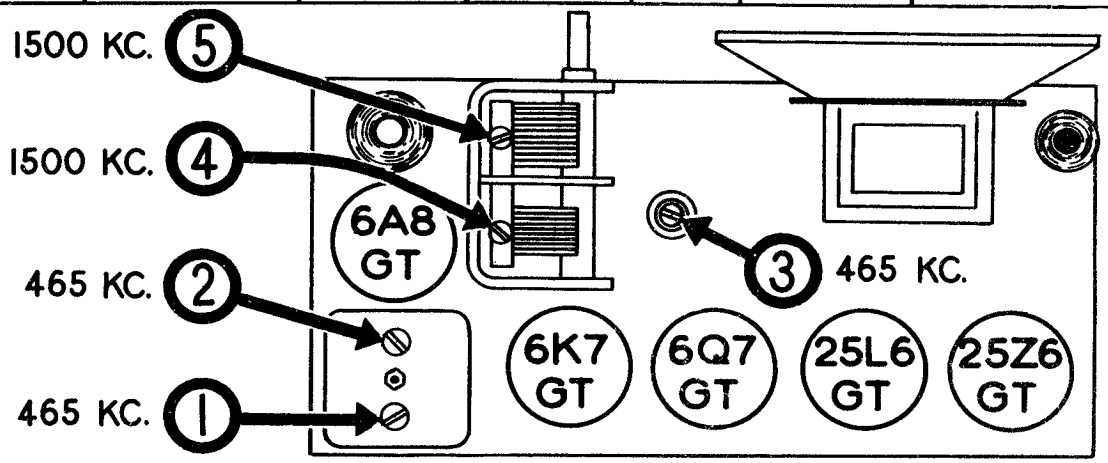
Connect the output meter across the voice coil or between the plate of the 25L6-GT output tube and ground through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.

Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.

Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.

Remove the connector between Terminals A and $A_1$.

| DUMMY ANT. IN SERIES WITH SIGNAL GENERATOR | CONNECTION OF SIG. GENERATOR TO RECEIVER | SIGNAL GENERATOR FREQUENCY | RECEIVER DIAL SETTING | TRIMMER NUMBER | TRIMMER DESCRIPTION | TYPE OF ADJUSTMENT |
|---|---|---|---|---|---|---|
| 200 MMFD. MICA CONDENSER | CONTROL GRID OF 6A8-G TUBE | 465 KC | ANY POINT WHERE IT DOES NOT AFFECT THE SIGNAL | 1-2 | 1ST I. F. | ADJUST FOR MAXIMUM OUTPUT THEN REPEAT ADJUSTMENT |
| | | | | 3 | 2ND I. F. | |
| 200 MMFD. MICA CONDENSER | ANTENNA TERMINAL (A) | 1500 KC | 1500 KC | 4 | BROADCAST OSCILLIATOR (Shunt) | ADJUST TRIMMER TO BRING IN SIGNAL. |
| 200 MMFD. MICA CONDENSER | ANTENNA TERMINAL (A) | 1500 KC | TUNE TO 1500 KC GENERATOR SIGNAL | 5 | BROADCAST ANTENNA (Shunt) | ADJUST FOR MAXIMUM OUTPUT. |




## BUILT-IN ANTENNA SYSTEM

The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where Powerful broadcast stations exist. This Built-In Antenna will function when terminals A and $A_1$ on the back of the chassis are connected together. In cases where noises are excessive or greater sensitivity is desired, remove the jumper connecting terminals A and $A_1$ and connect an external antenna to terminal A.

Refer to the circuit diagram on the opposite page. Condenser No. 35 couples the primary of the antenna coil to one side of the power line, which acts as the antenna. The R. F. choke No. 36 is an iron-core choke whose impedance is high at broadcast frequencies. This choke serves to prevent feed-back into the antenna circuit, of radio frequency energy generated in the set itself. It also prevents condenser No. 18 from by-passing the signal voltage picked up by the power line.

When aligning this receiver, the jumper connecting terminals A and $A_1$ should be removed. This will prevent picking up signals which might interfere with the alignment procedure. When the I. F. channel is being aligned, the gang condenser should be set at a point where no interfering signal will be received.

## MISCELLANEOUS PARTS

| PART NUMBER | DESCRIPTION | LIST PRICE |
|---|---|---|
| 112745 | Clip - coil mounting | .01 |
| 114878 | Socket - octal base | .15 |
| 114982 | Socket - for dial lamp | .20 |
| 116223 | Terminal Strip - for antenna ($A$-$A_1$) | .12 |

### CABINETS

| | | |
|---|---|---|
| 114900 | Cabinet - ivory (plaskon) for 07-512 | 5.50 |
| 114950 | Cabinet - walnut; for 07-511 | 3.00 |
| 116338 | Cabinet - sprayed ivory for 07-513 | 4.25 |
| 116339 | Cabinet - metallic blue | 4.25 |
| 116340 | Cabinet - metallic red | 4.25 |
| 116341 | Cabinet - metallic green | 4.25 |

### CABINET BACKS

| | | |
|---|---|---|
| 116369 | Cabinet back (ivory) for 07-512 | .10 |
| 116370 | Cabinet back (ivory) for 07-512-S | .10 |
| 116371 | Cabinet back (walnut) for 07-511 & 07-513 | .10 |

### TUNING KNOBS

| | | |
|---|---|---|
| 114973 | Knob - tuning (red) | .45 |
| 116297 | Knob - tuning (ivory) | .40 |

### VOLUME KNOBS

| | | |
|---|---|---|
| 114867 | Knob - volume (red) | .08 |
| 116299 | Knob - volume (ivory) | .08 |

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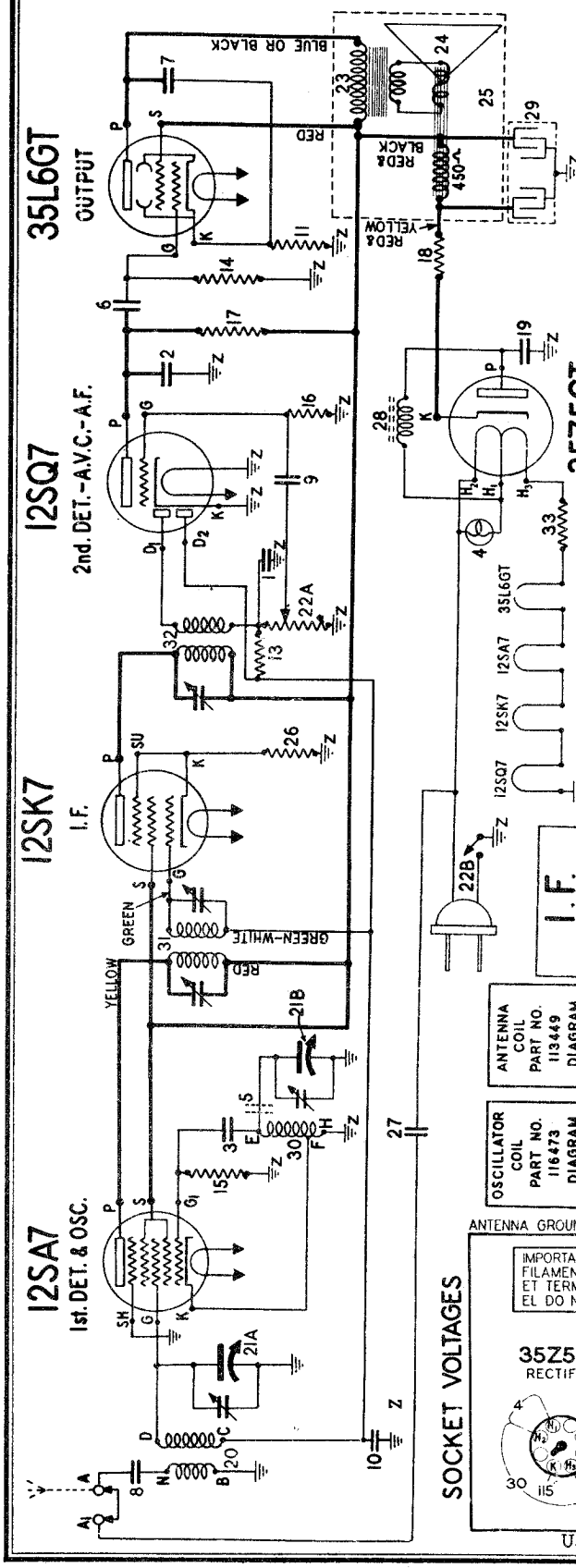
07-551 to 07-559

Chassis 07-55
Schematic, Voltage
Socket, Notes

MODELS 07-511H to 07-519H

# STEWART-WARNER CORP Chassis 07-51H




## APPLIES ONLY TO CHASSIS STAMPED 07-51H OR 07-55.

| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1-2 | 83539 | Condenser—mica 260 mmfd. | $0.20 |
| 3 | 83783 | Condenser—mica, 110 mmf. | .20 |
| 4 | 85296 | Lamp—dial 6 to 8 volt .25 amps. | .16 |
| 5 | 88026 | Condenser—paper .02 mfd. 400 volt (07-55 only) | .25 |
| 6-7 | 88026 | Condenser—paper .02 mfd. 400 volt. | .25 |
| 8-9 | 88029 | Condenser—paper .004 mfd. 400 volt. | .25 |
| 10 | 88189 | Condenser—paper .05 mfd. 200 volt. | .25 |
| 11 | 89276 | Resistor—wire wound 140 ohms ½ watt. | .12 |
| | 89421 | Condenser—paper .1 mfd. 200 volt. | .25 |
| 13-14 | 110559 | Resistor—carbon 470,000 ohms ¼ watt. | .12 |
| 15 | 110578 | Resistor—carbon 68,000 ohms ¼ watt. | .12 |
| 16 | 110580 | Resistor—carbon 3.3 meg. ¼ watt. | .12 |
| 17 | 110591 | Resistor—carbon 680,000 ohms ¼ watt. | .12 |
| 18 | 110975 | Resistor—wire wound 33 ohms ½ watt (10%) | .12 |
| 19 | 111252 | Condenser—paper .05 mfd. 400 volt. | .13 |
| 20 | 113449 | Coil—antenna | .78 |

| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 21A-21B | 114870 | Condenser—variable gang | 2.85 |
| 22A-22B | 114879 | Volume control—1 meuohm; with switch | .96 |
| 23 | R-114885 | Transformer—output for R-115041 speaker | 1.75 |
| | 0-116342 | Transformer—output for 0-115041 speaker | 1.75 |
| | 0-116487 | Transformer—output for 0-115050 speaker | 1.25 |
| | R-116524 | Transformer—output for R-115051 speaker | 1.65 |
| 24 | R-114886 | Cone & voice coil assembly for R-115041 & R-115051 speaker | $1.00 |
| | 0-116343 | Cone & voice coil assembly for 0-115041 & 0-115050 speaker | 1.50 |
| 25 | 0-115041 | Speaker—dynamic 4" (07-51H) | 4.70 |
| | R-115041 | Speaker—dynamic 4" (07-51H) | 4.70 |
| | 0-115050 | Speaker—dynamic 4" (07-55) | 3.75 |
| | R-115051 | Speaker—dynamic 4" (used on some 07-51H) | 3.75 |
| 26 | 116062 | Resistor—150 ohms ± 20% ¼ watt | .12 |
| 27 | 116224 | Condenser—mica 260 mmfd. 500 volt | .15 |
| 28 | 116232 | R. F. Choke | .48 |
| | 0-116342 | Transformer—output for 0-115041 speaker | 1.75 |
| | 0-116343 | Cone & voice coil assembly for 0-115041 & 0-115050 speaker | 1.50 |
| 29 | 116470 | Condenser—electrolytic 20-20 mfd. 150 volt | .85 |
| 30 | 116473 | Coil—oscillator | .35 |
| 31 | 116474 | Transformer—1st I.F. | 1.10 |
| 32 | 116475 | Transformer—2nd I.F. | 1.00 |
| | 0-116487 | Transformer—output for 0-115050 speaker | 1.25 |
| | R-116524 | Transformer—output for R-115051 speaker | 1.65 |
| 33 | 116527 | Resistor—100 ohms ± 10% 3 watt W.W. | .26 |

NOTE
TERMINALS OF COILS SHOWN IN PICTORIAL VIEWS ABOVE, ARE LETTERED TO CORRESPOND TO SIMILARLY LETTERED TERMINALS ON THE CIRCUIT DIAGRAM

### GROUNDS MARKED "Z"

07-55 CHASSIS: ALL GROUNDS MARKED "Z" ARE NOT CONNECTED DIRECTLY TO CHASSIS BUT ARE CONNECTED TOGETHER AND GROUNDED TO CHASSIS THROUGH .1 MFD. CONDENSER (PART NO. 89421.

07-51H CHASSIS: GROUNDS MARKED "Z" CONNECTED DIRECTLY TO CHASSIS.

ANTENNA GROUNDED

DIAL TUNED TO 540 KC

IMPORTANT ALWAYS MEASURE ALL VOLTAGES, EXCEPT FILAMENT, BETWEEN THIS LUG AND THE TUBE SOCKET TERMINALS ON THE 07-55 CHASSIS. IN THIS MODEL DO NOT MEASURE VOLTAGES TO CHASSIS.

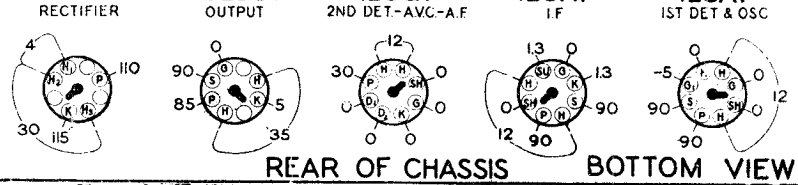
VOLUME CONTROL

LINE VOLTAGE 117 VOLTS

VOLTAGE ACROSS SPEAKER FIELD 25 VOLTS

## SOCKET VOLTAGES

35Z5GT RECTIFIER
35L6GT OUTPUT
12SQ7 2ND DET.-A.V.C.-A.F.
12SK7 I.F.
12SA7 IST DET & OSC




Use a high resistance voltmeter of at least 1,000 ohms per volt.

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MODELS 07-511H to 07-519H
Chassis 07-51H
07-551 to 07-559
Chassis 07-55
Alignment, Trimmers
Antenna Data

STEWART-WARNER CORP.

# ALIGNMENT PROCEDURE

**FOR ALIGNMENT: An output meter and an accurately calibrated signal generator are required.**

1. On the 07-51H, connect the output meter across the voice coil or between the plate of the 35L6GT output tube and chassis through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil. THE CONNECTIONS FOR THE 07-55 ARE THE SAME EXCEPT CONNECT THE GROUND LEAD TO THE POINT SHOWN IN FIG. 2 INSTEAD OF TO CHASSIS.
2. When aligning the 07-51H chassis, connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. FOR THE GROUND LEAD CONNECTION TO THE 07-55 CHASSIS, REFER TO "BOTTOM VIEW," FIG. 2.
3. Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.
4. Remove the connector between Terminals A and $A_1$.

| Dummy Ant. in Series with Sig. Gen. | Connection of Sig. Generator To Receiver | Signal Generator Frequency | Receiver Dial Setting | Trimmer Number | Trimmer Description | Type of Adjustment |
|---|---|---|---|---|---|---|
| 200 MMFD. Mica Condenser | Trimmer Lug On Front Section Of Variable Condenser | 465 KC | 1750 KC | 1 | 2nd I.F. | Adjust for Maximum Output, Then Repeat Adjustment. |
| | | | | 2-3 | 1st I.F. | |
| 200 MMFD. Mica Condenser | Antenna Terminal (A) | 1500 KC | 1500 KC | 4 | Broadcast Oscillator (Shunt) | Adjust for Maximum Output. |
| 200 MMFD. Mica Condenser | Antenna Terminal (A) | 1500 KC | Tune To 1500 KC Generator Signal | 5 | Broadcast Antenna (Shunt) | Adjust for Maximum Output. |

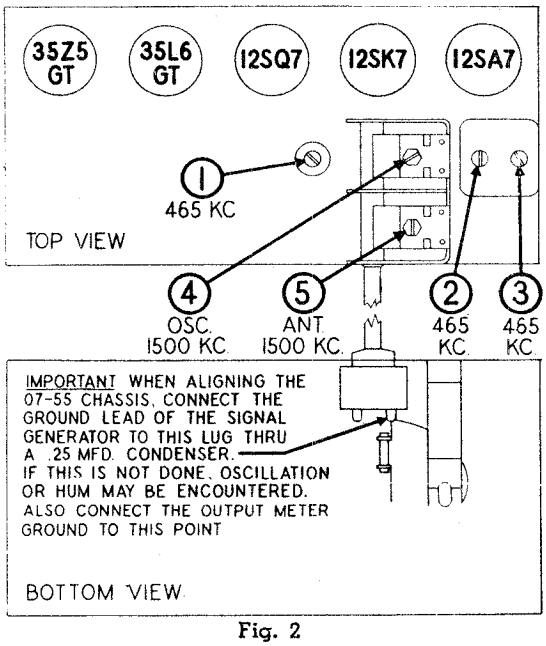


Fig. 2

## BUILT-IN ANTENNA SYSTEM

The Built-In Antenna incorporated in this receiver will generally give very satisfactory results in localities where powerful broadcast stations exist. This Built-In Antenna will function when terminals A and $A_1$ on the back of the chassis are connected together. In cases where noise is excessive or greater sensitivity is desired, remove the jumper connecting terminals A and $A_1$ and connect an external antenna to terminal A.

The Built-In Antenna Condenser No. 27 couples the primary of the antenna coil to one side of the power line, which acts as the antenna. The R. F. choke No. 28 is an iron-core choke whose impedance is high at broadcast frequencies. This choke serves to prevent condenser No. 19 from by-passing the signal voltage picked up by the power line. It also prevents feed-back into the antenna circuit of radio frequency energy generated in the set itself.

When aligning this receiver, the jumper connecting terminals A and $A_1$ should be removed. This will prevent picking up signals which might interfere with the alignment procedure.

## MISCELLANEOUS PARTS

| Part No. | Description | List Price |
|---|---|---|
| 116485 | Asbestos Pad-Model 07-55 only | $0.03 |
| 116467 | Base—Condenser Mounting | .04 |
| 116471 | Cover for elect. condenser—(07-55) only | .05 |
| 116651 | Clamp for power cord—(07-55) only | .02 |
| 112745 | Clip—coil mounting | .01 |
| 114982 | Socket—for dial lamp | .20 |
| 114876 | Socket—octal base | .15 |
| 85040 | Screw—No. 6 Hex. Hd.—Per C | .35 |
| 116223 | Terminal strip—antenna ($A$-$A_1$) | .12 |

### CABINETS

| | | |
|---|---|---|
| 116750 | Cabinet (wood)—(07-514H) and (07-554) | 7.00 |
| 116341 | Cabinet (metallic green)—(07-513H) (07-553) | 2.75 |
| 116340 | Cabinet (metallic red)—(07-513H) (07-553) | 2.75 |
| 116339 | Cabinet (metallic blue)—(07-513H) (07-553) | 2.75 |
| 116338 | Cabinet (sprayed ivory)—(07-513H) (07-553) | 2.75 |
| 114950 | Cabinet (walnut)—(07-511H) (07-551) | 2.00 |
| 114900 | Cabinet (ivory plaskon)—(07-512H) (07-512H-S) (07-552S) (07-552) | 3.40 |

### CABINET BACK

| | | |
|---|---|---|
| 116497 | Cabinet Back (walnut) (07-511H) (07-513H) | .12 |
| 116496 | Cabinet Back (ivory) (07-513H) (07-512H) | .12 |
| 116481 | Cabinet Back (ivory) (07-552S) | .12 |
| 116480 | Cabinet Back (walnut) (07-551) (07-553) | .12 |
| 116477 | Cabinet Back (ivory) (07-551) (07-553) (07-552) | .12 |

### TUNING KNOBS

| | | |
|---|---|---|
| 116297 | Knob—tuning (ivory)—(07-513H) (07-553) | .40 |
| 114975 | Knob—tuning (walnut)—(07-511H) (07-551) (07-514H) | .45 |
| 114973 | Knob—tuning (red)—(07-512H) (07-512H-S) (07-513H) (07-553) (07-552) (07-552S) | .45 |

### VOLUME KNOBS

| | | |
|---|---|---|
| 116299 | Knob—tuning (ivory) (07-513H) (07-553) | .08 |
| 114933 | Knob—tuning (walnut) (07-511H) (07-514H) (07-551) | .12 |
| 114867 | Knob—tuning (red) (07-512H-S) (07-512H) (07-513H) (07-552S) (07-552) (07-553) | .08 |

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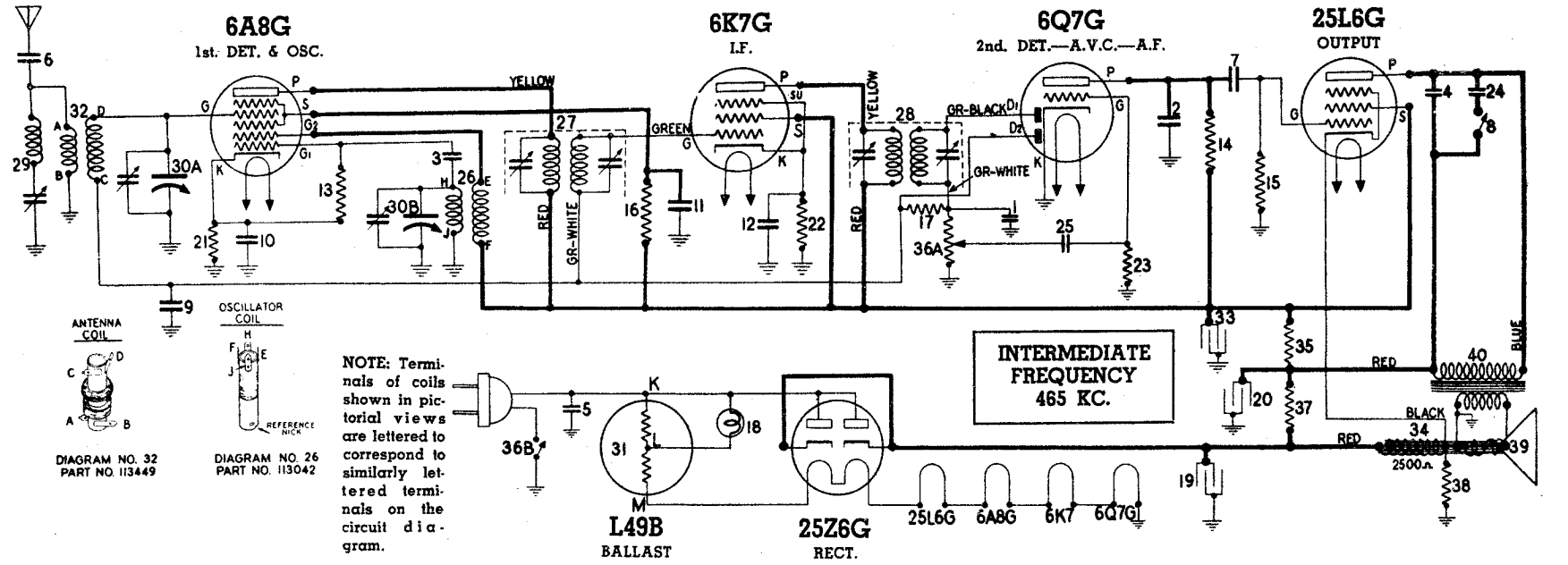
# STEWART-WARNER CORP.












**NOTE: Terminals of coils shown in pictorial views are lettered to correspond to similarly lettered terminals on the circuit diagram.**

## ELECTRICAL PARTS

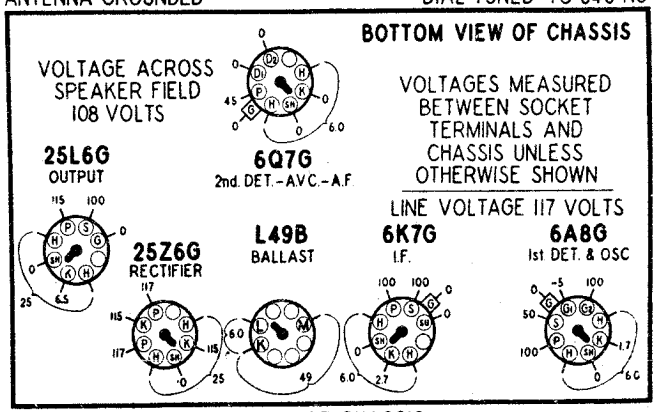
| Diagram Number | Part Number | Description | List Price |
|---|---|---|---|
| 1-2 | 83539 | Condenser—mica 260 mmfd. | $0.20 |
| 3 | 85061 | Condenser—51 mmfd. | .15 |
| 4-5 | 88026 | Condenser—paper .02 mfd. 400 volt | .25 |
| 6 | 88029 | Condenser—paper .004 mfd. 400 volt | .25 |
| 7 | 88030 | Condenser—paper .01 mfd. 400 volt | .25 |
| 8 | 88054 | Switch—tone control | .30 |
| 9 | 88189 | Condenser—paper .05 mfd. 200 volt | .25 |
| 10-11-12 | 89421 | Condenser—paper .1 mfd. 200 volt | .25 |
| 13 | 110552 | Resistor—carbon 47,000 ohms ¼ watt | .12 |
| 14 | 110553 | Resistor—carbon 220,000 ohms ¼ watt | .12 |
| 15 | 110559 | Resistor—carbon 470,000 ohms ¼ watt | .12 |
| 16 | 110566 | Resistor—carbon 33,000 ohms ¼ watt | .12 |
| 17 | 110580 | Resistor—carbon 3.3 meg. ¼ watt | .12 |
| 18 | 110629 | Lamp—6.3 volt .25 amps. | .15 |
| 19-20 | 112898 | Condenser—electrolytic 16 mfd. 150 v. | .50 |
| 21-22 | 112951 | Resistor—carbon 400 ohms ¼ watt | .12 |
| 23 | 112975 | Resistor—carbon 10 meg. ¼ watt | .12 |
| 24 | 113034 | Condenser—paper .04 mfd. 600 volt | .15 |
| 25 | 113035 | Condenser—paper .006 mfd. 600 volt | .14 |
| 26 | 113042 | Coil—oscillator | .45 |
| 27 | 113046 | Transformer—1st I.F. | 1.00 |
| 28 | 113047 | Transformer—2nd I.F. | 1.10 |
| 29 | 113119 | Coil—wave trap (with trimmer) | .50 |
| 30A-30B | 113150 | Condenser—variable gang | 3.00 |
| 31 | 113365 | Ballast Resistor (tube) L-49-B | .50 |
| 32 | 113449 | Coil—antenna | .78 |
| 33 | 113472 | Condenser—electrolytic 40 mfd. 150 v. | .56 |
| 34 | U-115044 | Speaker—dynamic 5" | 4.80 |
| 35 | 116060 | Resistor—carbon 1500 ohms ½ watt | .15 |
| 36A-36B | 116272 | Volume control—1 meg. with switch | .94 |
| 37 | 116275 | Resistor—wire wound 50 ohms ½ watt | .15 |
| 38 | 116301 | Resistor—wire wound 80 ohms 1 watt | .15 |
| 39 | U-116306 | Cone—voice coil for U-115044 speaker | 1.40 |
| 40 | U-116307 | Output transformer for U-115044 spkr. | 1.75 |

## DIAL & MISCELLANEOUS PARTS

| Part No. | Description | List Price |
|---|---|---|
| 113170 | Adjusting lug—for button shafts | $0.01 |
| 113171 | Bracket—for dial and condenser mtg. | .64 |
| 112776 | Celluloid cover—over dial face | .28 |
| 112745 | Clip—for coil mtg. | .01 |
| 112764 | Clip—dial scale retaining | .01 |
| 112798 | Clip—for wave trap mtg. | .01 |
| 113178 | Cord—dial (supplied in 4 ft. lengths) | .30 |
| 113174 | Dial Drum—and pinion assembly | .44 |
| 116175 | Dial scale | .30 |
| 113053 | Escutcheon—for push buttons | .32 |
| 112914 | Escutcheon—dial | .35 |
| 113156 | Gear and Bushing assembly for dial drive | .22 |
| 113022 | Knob—tone and volume control | .10 |
| 113494 | Mechanical tuner assembly; keys & housing only | 3.00 |
| 112770 | Pointer—dial | .08 |
| 112762 | Pulley—dial cord drive | .04 |
| 113103 | Push button (walnut) | .06 |
| 81145 | Retaining Ring—for tuning shaft | Per C .50 |
| 114598 | Rubber tube on tuning shaft | .01 |
| 85040 | Screw—No. 6 x ¼ Hex. Hd. for Mtg. Adjust. Lug | .35 |
| 112874 | Screw for chassis mtg. 10 x 1⅛" | .01 |
| 114431 | Screw—No. 6-40 x 7/8" for setting up buttons | .01 |
| 114914 | Screw special head for mtg. escutcheon | Per dz. .15 |
| 85827 | Set Screw—8-32 square head | .02 |
| 113176 | Shaft—dial drive | .18 |
| 112864 | Shield—for tubes | .08 |
| 112865 | Shield—base; for tubes | .03 |
| 112847 | Socket—for dial lamp | .22 |
| 114876 | Socket—octal base | .15 |
| 113189 | Spring—for key return | .01 |
| 113177 | Spring—dial cord tension | .09 |
| 113189 | Tab—celluloid for push button | Per dz. .09 |
| 113321 | Tabs—station call letters for push buttons | .40 |
| 116530 | Washer—paper for back of knobs | .005 |
| 110829 | Washer for chassis mtg. | .01 |

## SOCKET VOLTAGES

ANTENNA GROUNDED — DIAL TUNED TO 540 KC


BOTTOM VIEW OF CHASSIS
VOLTAGE ACROSS SPEAKER FIELD 108 VOLTS
VOLTAGES MEASURED BETWEEN SOCKET TERMINALS AND CHASSIS UNLESS OTHERWISE SHOWN
LINE VOLTAGE 117 VOLTS
25L6G OUTPUT
6Q7G 2nd. DET.-A.V.C.-A.F.
25Z6G RECTIFIER
L49B BALLAST
6K7G I.F.
6A8G 1st DET. & OSC

REAR OF CHASSIS

**Use a high resistance voltmeter of at least 1,000 ohms per volt.**

MODELS 07-631 to 07-639
Chassis 07-63
Alignment, Trimmers, Tuner
Drive Cord Data

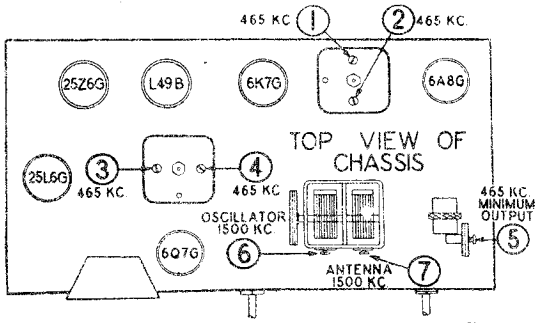
STEWART-WARNER CORP.

# ALIGNMENT EQUIPMENT & PROCEDURE

**FOR ALIGNMENT: An output meter and an accurately calibrated signal generator with a tuning range from 465 KC to 1500 KC are required.**

1. **Connect the output meter across the voice coil or between the plate of the 25L6-G output tube and chassis through a .1 mfd. condenser, depending upon the type of meter. The more sensitive type should be connected across the voice coil.**
2. **Connect the ground lead of the signal generator to the chassis of the receiver through a .25 mfd. condenser and keep it connected in this manner throughout the entire alignment procedure. Failure to do this may have serious results as the signal generator may be connected to one side of the power line, or it may be grounded externally.**
3. **Turn the volume control to the maximum volume position and keep it in this position throughout the entire alignment procedure.**
4. **With the gang condenser in full mesh, set the pointer to the last mark on the right end of the dial scale. If the pointer is only slightly off calibration, loosen the set-screw in the dial drive drum at the left side of the gang condenser and set the pointer to the last mark on the right end of the dial when the gang condenser is in full mesh. If the pointer is off calibration several dial divisions, release it from the pointer drive cord by spreading the clip on the pointer. Then slide the pointer along the cord until it is set to the last dial division on the right end of the dial. Holding it in place check to see if the gang condenser is in full mesh, and tighten the pointer clip, being careful not to cut the cord. Place a drop of household or speaker cement on the cord and pointer clip to prevent the pointer from slipping.**

| Dummy Ant. in Series with Sig. Gen. | Connection of Sig. Generator Output to Receiver | Signal Generator Frequency | Receiver Dial Setting | Trimmer Number | Trimmer Description | Type of Adjustment |
|---|---|---|---|---|---|---|
| 200 MMFD. Mica Condenser | Control Grid of 6A8-G Tube | 465 KC | Any Point Where It Does Not Affect The Signal | 1-2 | 1st I.F. | Adjust for Maximum Output. Then Repeat Adjustment. |
| | | | | 3-4 | 2nd I.F. | |
| 200 MMFD. Mica Condenser | Antenna Lead (Blue Wire) | 465 KC | Any Point Where It Does Not Affect The Signal | 5 | Wave Trap | Adjust for Minimum Output Using a Strong Generator Signal. |
| 200 MMFD. Mica Condenser | Antenna Lead (Blue Wire) | 1500 KC | 1500 KC | 6 | Broadcast Oscillator (Shunt) | Adjust Trimmer to Bring in Signal. |
| 200 MMFD. Mica Condenser | Antenna Lead (Blue Wire) | 1500 KC | Tune To 1500 KC Generator Signal | 7 | Broadcast Antenna (Shunt) | Adjust for Maximum Output. |




## HOW TO SET UP PUSH BUTTONS

1. Before setting up buttons, turn on set for at least 15 minutes. To set up a push button, pull off the button cap by grasping the button and pulling outward on it. When the button is removed, the set-up screw will be exposed to view (See Fig. 1). Insert a screw-driver in this screw and loosen it (about one turn counter-clockwise will be sufficient).
2. Keeping the screw-driver in the screw slot, PUSH AGAINST THE SCREW-DRIVER UNTIL THE PUSH BUTTON SHAFT IS FORCED ALL THE WAY IN. While the button is held in this position, grasp the tuning knob and tune in the desired station. Then retighten the adjusting screw, turning clockwise until reasonably tight.

**WARNING: Do not attempt to turn the screw until it reaches a definite stop. Merely turn until you meet with appreciable resistance. To turn further may result in damage to the mechanism.**

## HOW TO REPLACE THE DIAL DRIVE CORD

1. Close the gang condenser. The set screw in the drum, Fig. 1, must be on the top side.
2. Tie one end of the dial cord to the spring L and thread the other end through hole A and down the front of the drum to the tuning shaft. Continue around the shaft, then over pulley B and up the rear side of the drum.

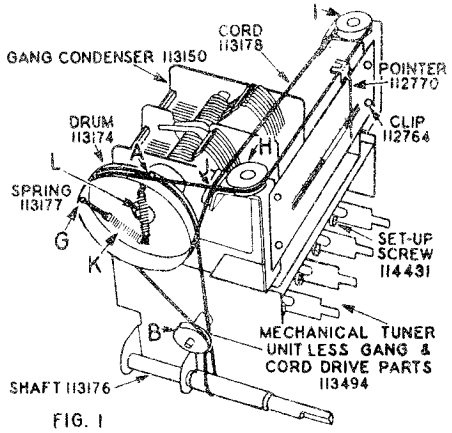



FIG. 1

3. Thread the cord through hole A and tie the other end to spring L. Tie the cord so that spring L will be extended to about ¾ inch.

## HOW TO REPLACE DIAL POINTER DRIVE CORD

1. Close the gang condenser and thread one end of the cord through eyelet G and tie it to spring K.
2. Carry the other end of the cord over the drum to the front around pulley H and then across to pulley I and counter-clockwise around it.
3. Continue back to pulley J and down the front of the drum. Carry the end of the cord on around the drum and thread through eyelet G.
4. Tie both ends extending through eyelet G to tension spring K.
   **IMPORTANT: In so doing, allow enough slack in the cord so that when spring K is hooked in place in the drum, it will be extended only a very little. If the spring is extended too much, it will tend to make the push button operate too hard because of overloading.**
5. Be sure the gang condenser is closed, then set the dial pointer to the last dial division mark on the right and clip it to the cord

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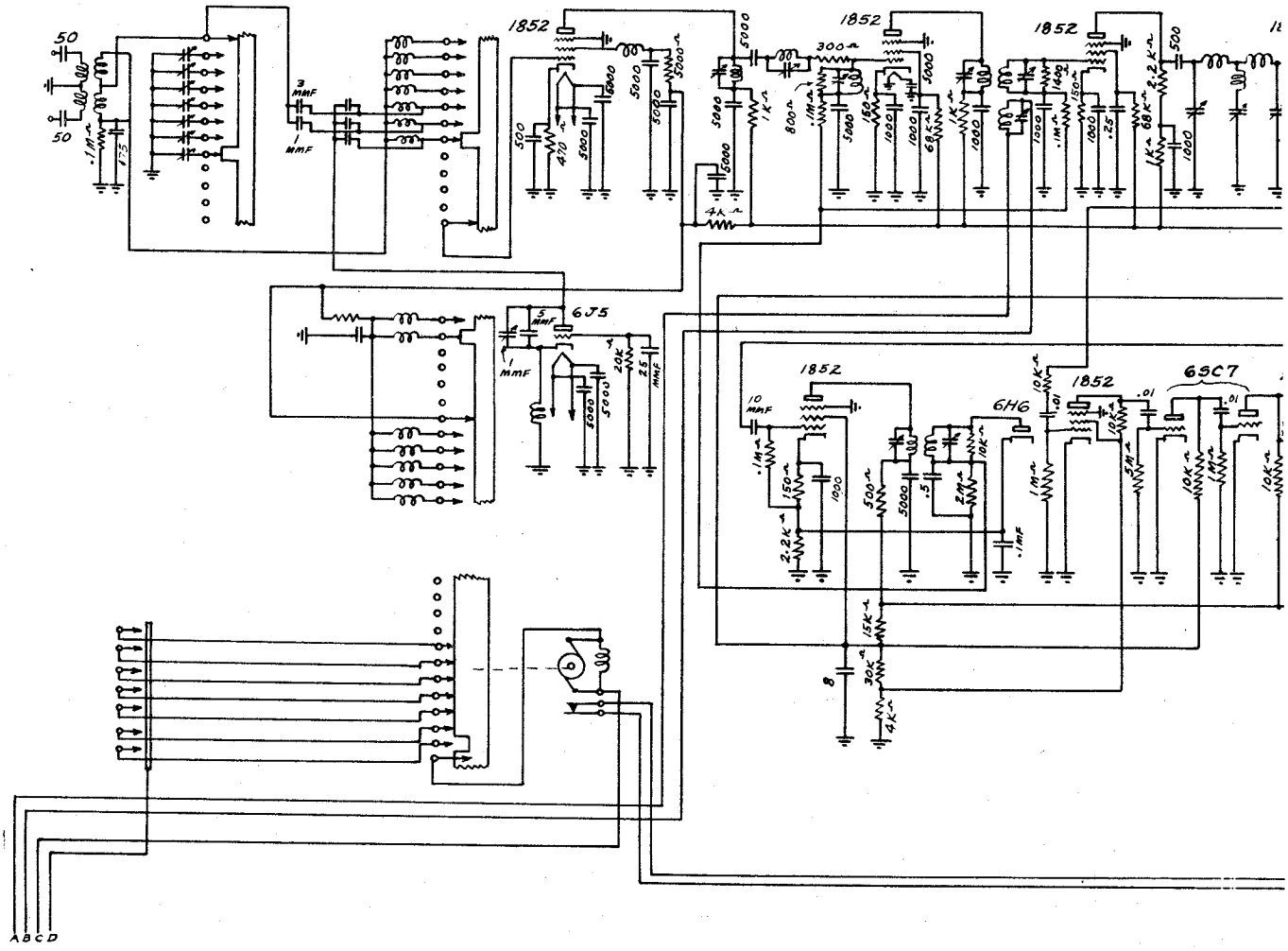


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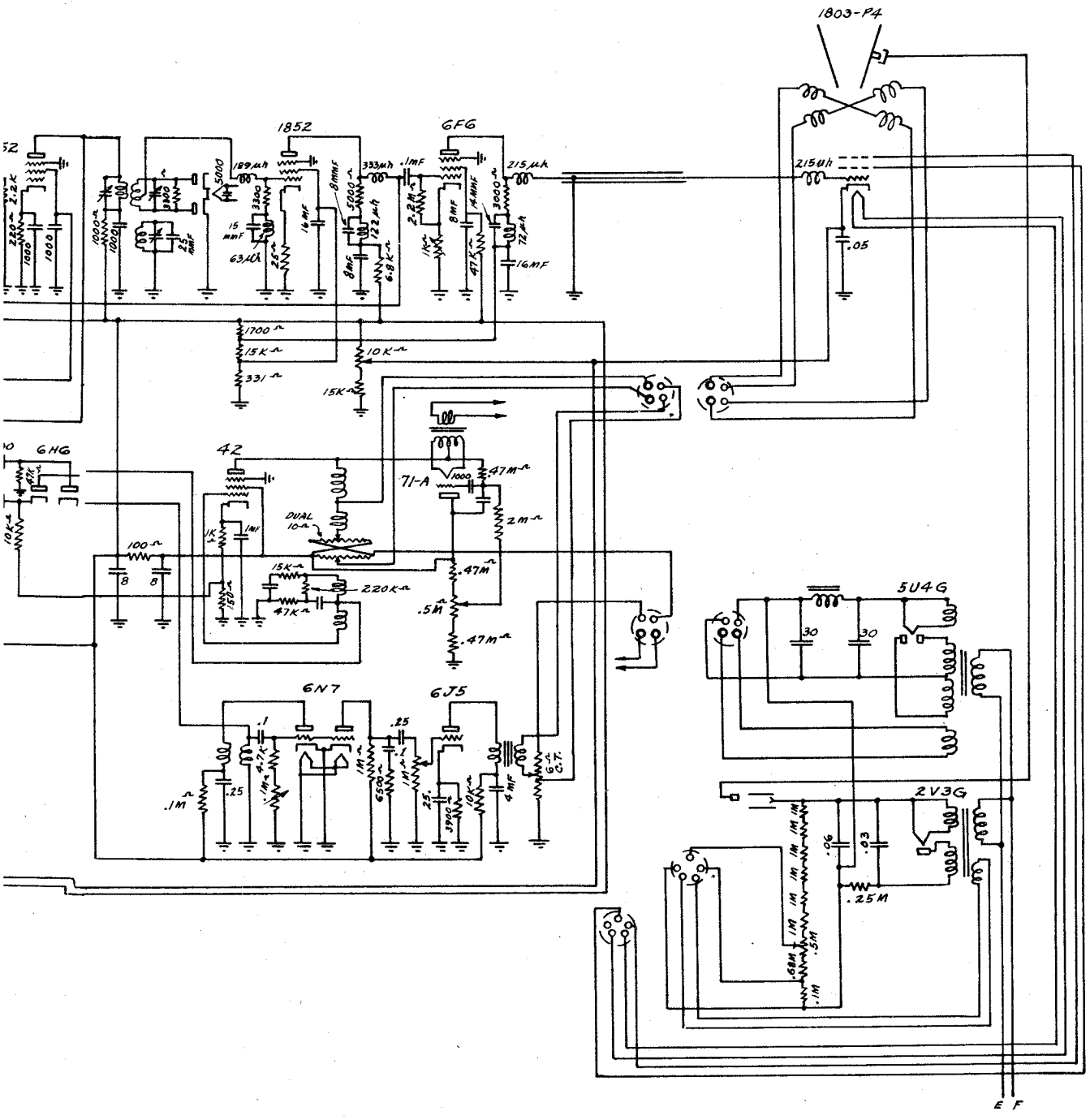
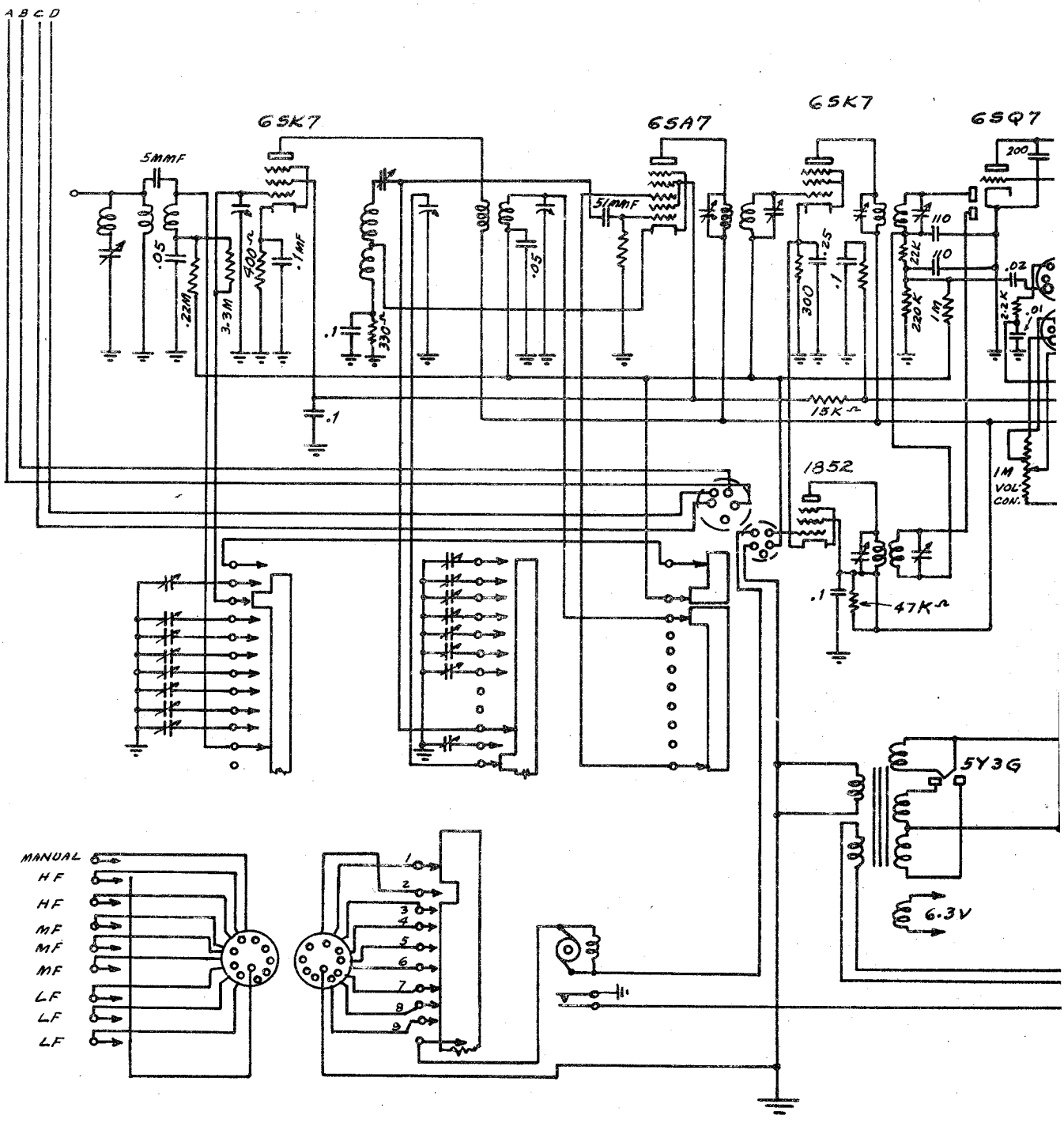
RNER CORP.

MODEL T-1210
Video Schematic



MODEL T-1210
Sound Schematic

STEWART W

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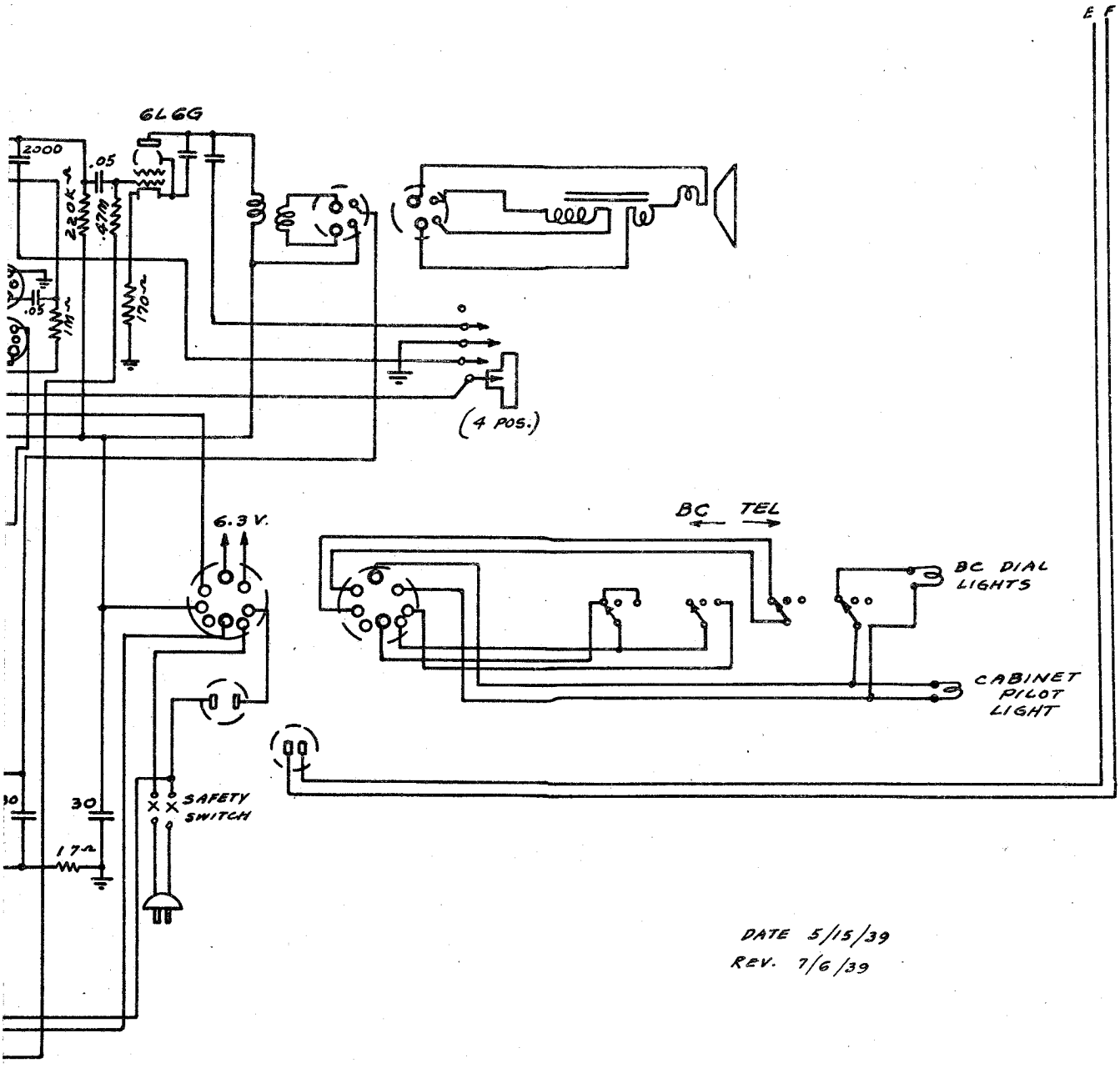


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REV. 7/6/39

MODELS 255L, 255LB

# STROMBERG-CARLSON TEL. MFG. CO. Schematic

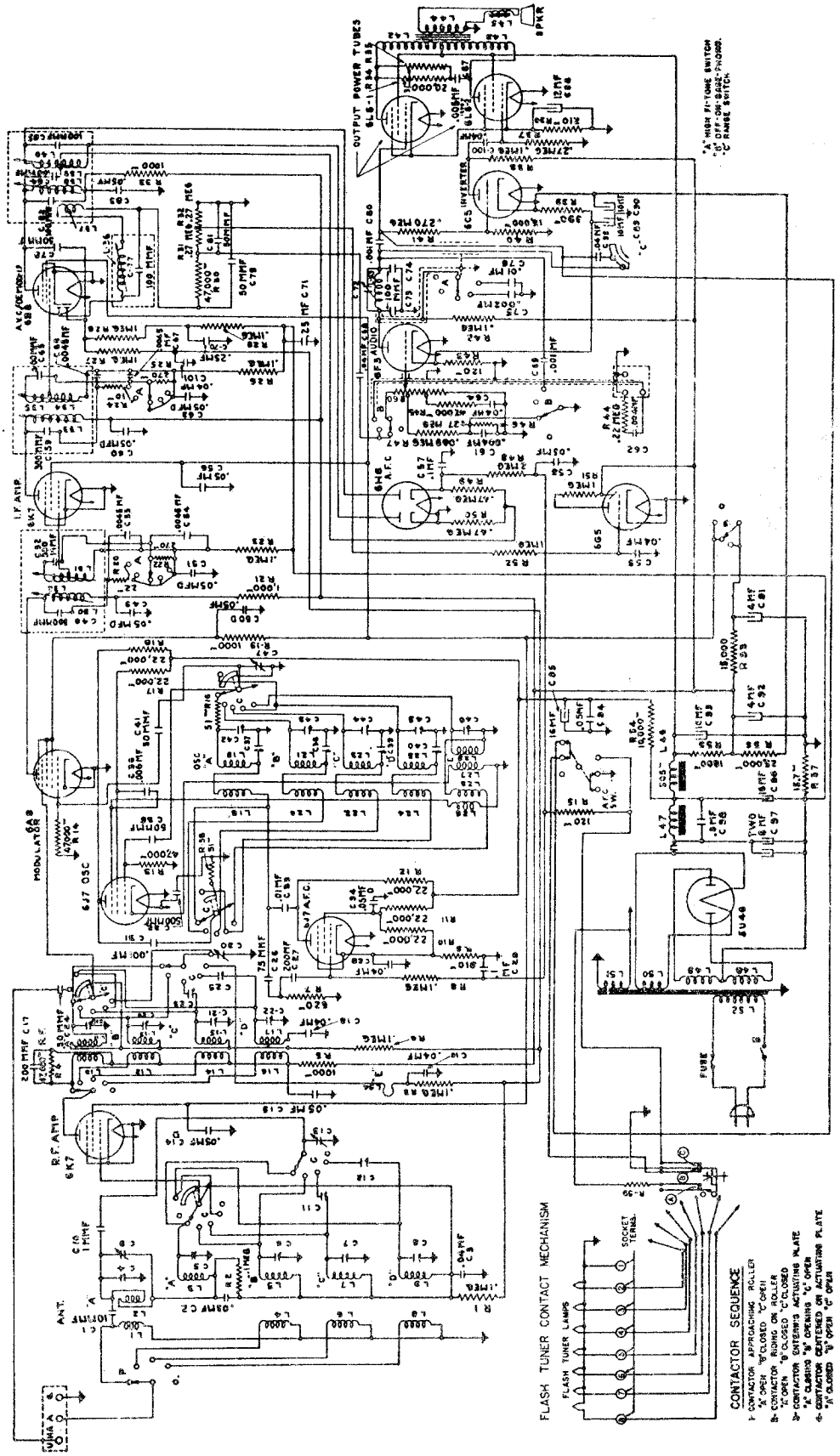


Fig. 2. Schematic Circuit.

## APPARATUS SPECIFICATIONS

No. 255-L ..... 50 to 60 Cycles; P-27633 Chassis; P-27504 Loud Speaker
No. 255-LB ..... 25 to 60 Cycles; P-27634 Chassis; P-27504 Loud Speaker

IF PEAK 465 KC

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MODELS 255L, 255LB
Chassis Views

STROMBERG-CARLSON TEL. MFG. CO.

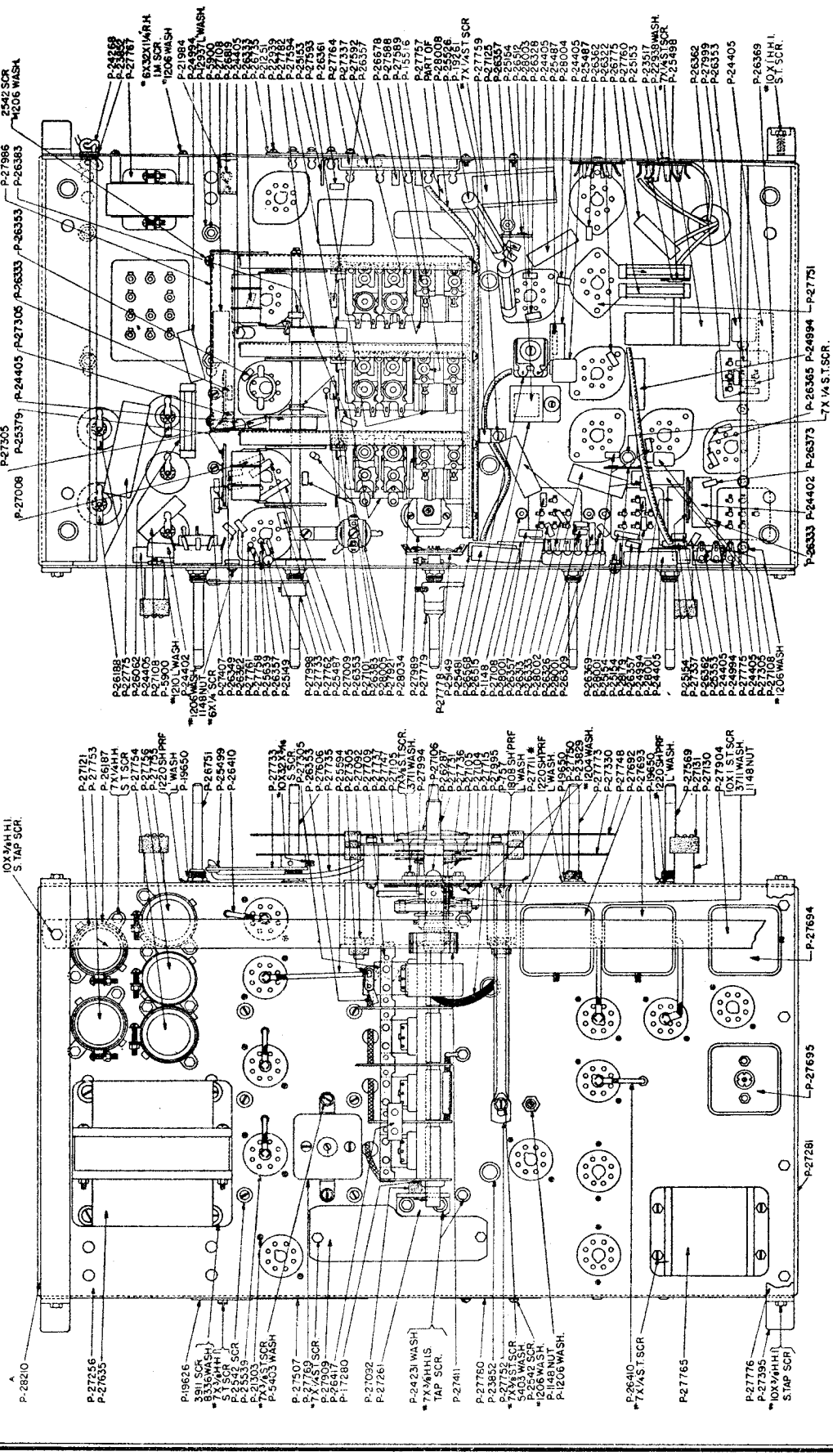

Fig. 6. Chassis Assembly.

## Stromberg-Carlson

# No. 255 Radio Receivers

| | |
|---|---|
| Type of Circuit | Superheterodyne with Automatic Frequency Control |
| Tuning Ranges | A—530 to 1600 Kc.; B—1600 to 4800 Kc.; C—4800 to 11,000 Kc. D—11,000 to 22,000 Kc.; E—22,000 to 60,000 Kc. |
| Number and Types of Tubes | 2 No. 6K7, 1 No. 6A8, 2 No. 6J7, 1 No. 6B8, 1 No. 6H6, 1 No. 6F5 1 No. 6C5, 2 No. 6L6, 1 No. 6G5, 1 No. 5U4G |
| Input Voltage Rating | 105 to 125 Volts A. C. |
| Power Frequency Rating | 25 to 60 Cycles and 50 to 60 Cycles |
| Input Power Rating | 145 Watts |
| Frequency of Intermediate Amplifier | 465 Kilocycles |

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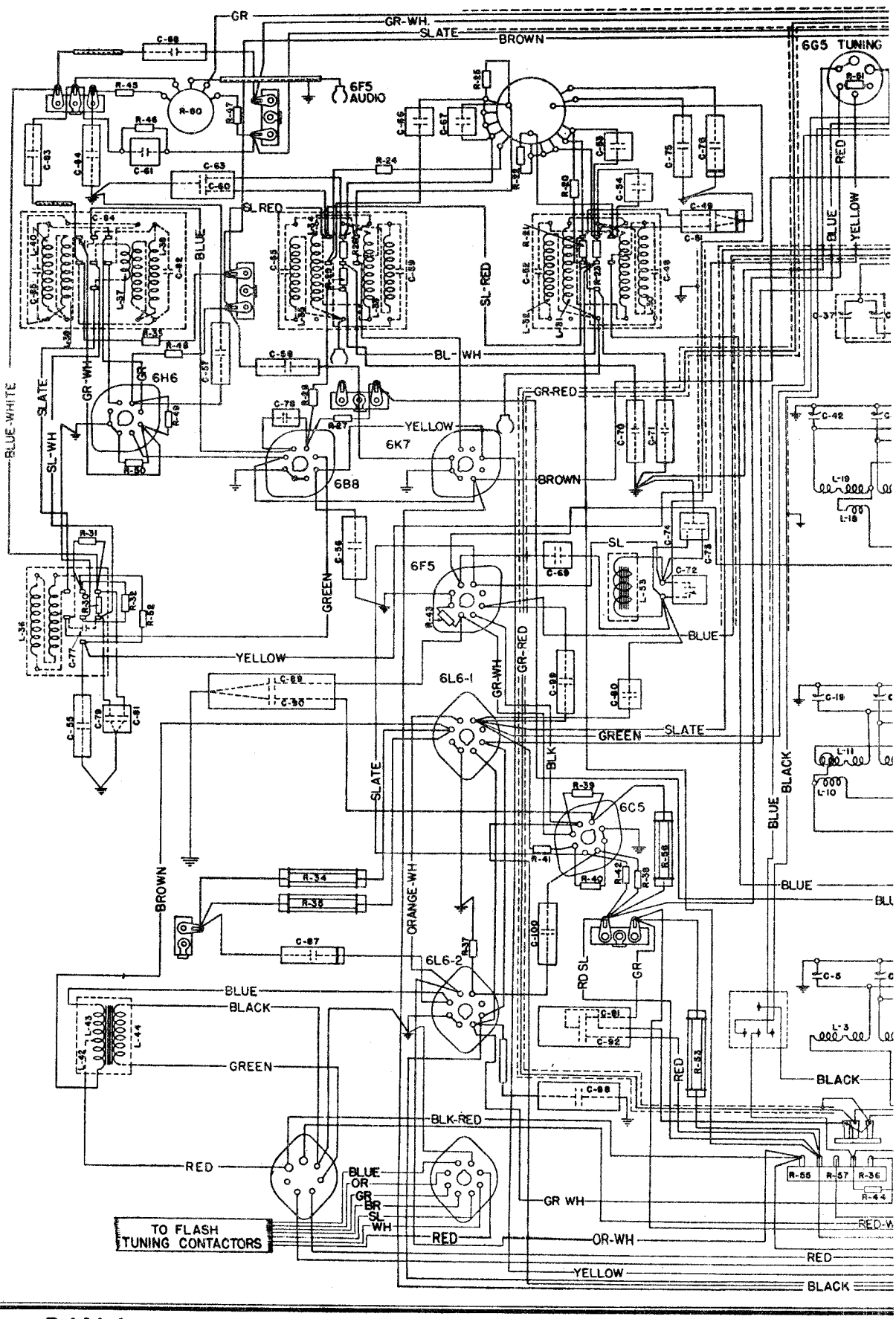


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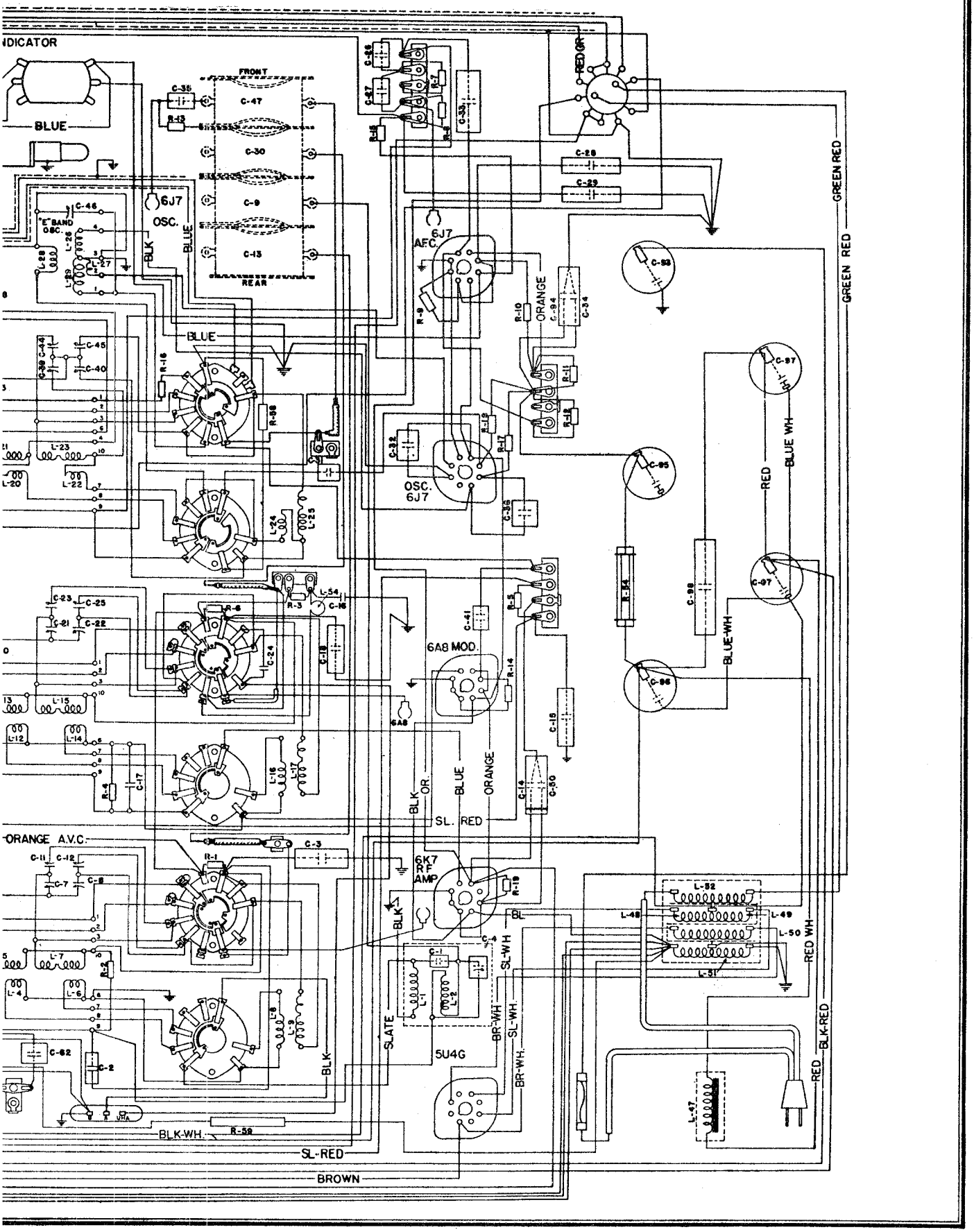
SON TEL. MFG. CO.

MODELS 255L, 255LB
Chassis Wiring



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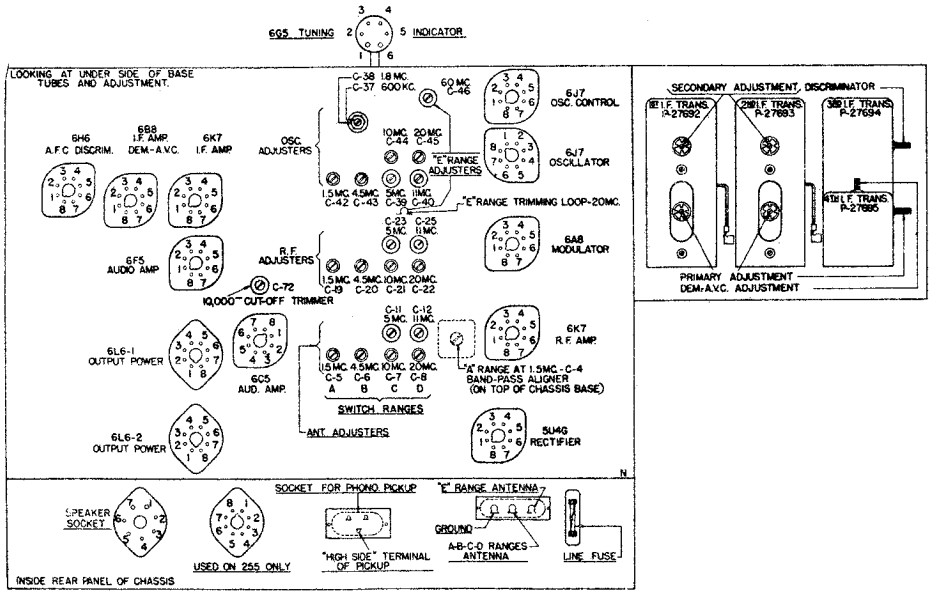


**Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Adjustments.**

## NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1 shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

| | | | *Terminals of Sockets* | | | | | | | | *Heater Voltages Between Heater Terminals* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tube | *Circuit* | *Cap* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | *Socket Terminal Numbers* | *Volts* |
| 6K7 | R. F. Amp. | 0 | 0 | 0 | +230 | +90 | 0 | +80 | *6.1* | 0 | 2-7 | *6.1* |
| 6A8 | Modulator | 0 | 0 | 0 | +230 | +80 | —2.0 | +80 | *6.1* | 0 | 2-7 | *6.1* |
| 6J7 | Oscillator | 0 | 0 | *6.1* | +60 | +180 | 0 | 0 | 0 | 0 | 2-7 | *6.1* |
| 6J7 | Oscillator Control | 0 | 0 | 0 | +190 | +110 | +5.8 | 0 | *6.1* | +5.8 | 2-7 | *6.1* |
| 6K7 | I. F. Amp. | 0 | 0 | 0 | +235 | +90 | 0 | 0 | *6.1* | 0 | 2-7 | *6.1* |
| 6B8 | I. F. Amp.—Dem.—A. V. C. | 0 | 0 | *6.1* | +225 | —0.1 | —0.1 | +90 | 0 | 0 | 2-7 | *6.1* |
| 6H6 | A. F. C. Discriminator | — | 0 | 0 | —0.25 | 0 | —0.2 | —0.2 | *6.1* | 0 | 2-7 | *6.1* |
| 6F5 | Audio Amp. | 0 | 0 | 0 | +135 | +135 | 0 | 0 | *6.1* | +1.3 | 2-7 | *6.1* |
| 6C5 | Audio Amp. | — | 0 | 0 | +100 | +135 | 0 | +1.3 | *6.1* | +5.2 | 2-7 | *6.1* |
| 6L6 No. 1 | Audio Output | — | 0 | 0 | +300 | +305 | 0 | 0 | *6.1* | +22 | 2-7 | *6.1* |
| 6L6 No. 2 | Audio Output | — | 0 | 0 | +300 | +305 | 0 | 0 | *6.1* | +22 | 2-7 | *6.1* |
| 6G5 | Tuning Indicator | — | *6.1* | +0.5 | —0.2* | +245 | 0 | 0 | — | — | 1-6 | *6.1* |
| 5U4G | Rectifier | — | 0 | +430 | — | *395* | — | *395* | — | +430 | 2-8 | *4.8* |
| Speaker Socket | | — | +420 | 0 | 0 | +430 | +430 | 0 | +320 | — | | |

A. C. voltages are indicated by italics. Receiver tuned to 1000 kc., no signal.

## CONTINUITY TEST FOR NO. 255 RECEIVER.

ALSO MODEL 250 Nov. 1, 1937.

For making a continuity test on the No. 255 Receivers, use the same test chart and instructions as are used on the No. 250 Receivers with the addition of the following tests for the Flash Tuner Unit:

1. Remove Flash Tuner Lamp Plug from Flash Tuner Lamp Socket. (This socket is located next to the speaker socket on rear of chassis).

2. Operate A.F.C. to "ON" position (This switch is located directly under dial on front of chassis). Operate tuning dial until Finger No. 2 on Flash Tuner Unit makes contact on Switch (See Flash Tuner Sketch on Page 8 of Engineering Data Sheet for the No. 255 Receiver for the correct location of fingers). Read from No. 1 terminal of Flash Tuner Socket to chassis base, reading should be "S". Operate A.F.C. switch to "OFF" position. Reading should be "S"

   Read from No. 2 terminal of Flash Tuner Socket to chassis base, reading should be "0".

   Operate A.F.C. Switch to "ON" position. Read from No. 2 terminal of Flash Tuner Socket to chassis base, reading should be $10^W$.

3. Operate tuning dial until Finger No. 3 on Flash Tuner Unit makes contact on switch. Read from No. 3 terminal of Flash Tuner socket to chassis base, reading should be $10^W$.

   Operate A.F.C. switch to "OFF" position. Read from No. 3 terminal of Flash Tuner socket to chassis base, reading should be "0".

4. Proceed in the same manner to test the rest of this circuit.

   Operate the A.F.C. Switch to "ON" position. Operate the tuning dial until the next finger to be tested makes contact on switch. Move the test prong of the meter to the terminal of the Flash Tuner socket which corresponds to the finger to be tested. The readings for each of the contacts should be $10^W$ with A.F.C. Switch operated to "ON" position and "0" with A.F.C. Switch in "OFF" position.

NOTE:
The readings from the Flash Tuner Socket are usually taken from the top of the socket. Therefore, the terminals will be numbered in a counter-clockwise direction.

MODELS 255L,255LB

Phonograph Data **STROMBERG-CARLSON TEL. MFG. CO.**

Flash Tuner Assembly




Fig. 5. Section View of Flash Tuner Contactors Assembly.

If the Stromberg-Carlson No. 10 Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong plug furnished with the receiver and the pick-up. This shielded cable should be of the low capacity type, in order to prevent the excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.


FLASH TUNER LAMP UNIT PLUG
CONTACTORS
KNURLED NUT FOR HOLDING CONTACTORS IN DESIRED POSITIONS
CABLE CONNECTING TO LAMP UNIT SOCKET
FLASH TUNER LAMP UNIT SOCKET
CONTACTOR CLAMPING FRAME FOR HOLDING GANG TUNING CAPACITOR AND CONTACTORS IN POSITION WHILE TIGHTENING KNURLED NUT.

Fig. 4. Showing Flash Tuner Lamp Unit With Escutcheon Plate Removed (Top Figure) and Rear View of Receiver Showing Flash Tuner Mechanism (Bottom Figure).

## PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

A socket having three contacts is provided on the rear of the chassis base, and is wired to the "Off-On-Bass-Phonograph" switch assembly located on the front of the receiver. A three prong plug is also inserted in the socket so that if at any time it is desired to use an electric pick-up and phonograph unit in conjunction with this receiver, it may readily be accomplished.

In order to obtain the best quality of phonograph reproduction when using an electric pick-up and phonograph unit with this receiver, a Stromberg-Carlson No. 10 Record Player is recommended. This record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit. To attach this instrument to a No. 255 Receiver, it is only necessary to remove the three-prong plug furnished with the receiver and insert the three-prong plug which comes with the unit into the three-prong socket located on the rear of the chassis base. Then, the power supply plug of the phonograph unit should be inserted into a suitable power supply receptacle, and the unit will be ready for use.

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## ALIGNMENT DATA

### Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a counter-clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

### Intermediate Frequency and A. F. C. Circuit Adjustments

The intermediate frequency system employed in this receiver is a complex circuit. The first I. F. amplifier is coupled to the second I. F. amplifier through the No. 6K7 tube. The second and third I. F. transformers are coupled through the pentode section of the No. 6B8 tube. The third I. F. transformer is in effect a distributing network rather than a transformer only; it contains a primary winding coupled to two other networks. One of these networks links the diode stage (Demodulator-A. V. C.) with the I. F. signal, while the other network resembles the secondary of a push-pull transformer and constitutes the tuned "Discriminator" circuit. This "Discriminator" network operating into the No. 6H6 tube supplies the characteristic voltage demanded by the oscillator control tube. The fourth I. F. transformer feeds the diode plates of the No. 6B8 tube.

The intermediate frequency used in these receivers is 465 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed:

1. Operate the Range Switch of the receiver to the "A" range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity Control to its "Normal" position, the Automatic Frequency Control knob to the "Off" position and the "Off-On-Bass" Control knob to its "Normal" position. **Never attempt to align the R. F. or I. F. circuits of this receiver with the Fidelity Control knob set at any position other than the "Normal Fidelity" position, and the Automatic Frequency Control knob set at the "On" position unless specifically directed in the following paragraphs.**
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 465 kilocycles from the signal generator, using a 0.1 Mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post terminal.
3. Now noting from Figure 1, the alignment adjustments for the First, Second, Third, and Fourth I. F. Transformers, align the I. F. circuits in the following manner:

   Adjust the third I. F. transformer primary circuit for maximum output.

   Adjust the fourth I. F. transformer circuit for maximum output.

   Adjust the third I. F. transformer "Discriminator" circuit midway between the peaks where maximum output is obtained.

   Adjust the second I. F. transformer secondary circuit for maximum output.

   Adjust the second I. F. primary circuit for maximum output.

   Adjust the first I. F. secondary circuit for maximum output.

   Adjust the first I. F. primary circuit for maximum output.

Carefully make all the above adjustments, watching carefully the output meter and reduce the output of the test oscillator as required.

To make the final adjustment of the "Discriminator" circuit proceed as follows:

Check the position of the A. F. C. control knob which should be set to the "off" position. **Before making this circuit adjustment be sure that the I. F. Amplifier is tuned exactly to 465 kilocycles.** With the signal generator still set at a frequency of 465 kilocycles, adjust the signal generator's output control so that a signal of 50,000 to 100,000 microvolts is fed into the No. 6A8 Modulator tube. Now observe the reading of the milliammeter which is connected in series with the cathode of the No. 6J7 oscillator control tube. Rotate the A. F. C. Control knob to the "on" position, and observe whether there is any difference in the reading of the milliammeter. When this circuit is correctly adjusted, there should be no difference in the reading of the milliammeter when the A. F. C. Control knob is rotated from the "off" to the "on" position. If there is any difference in the milliammeter reading while rotating the Automatic Frequency Control knob to the "off" and "on" position, at a rate of about two cycles per second, adjust the "Discriminator" circuit by means of the screw adjustment located on the third I. F. transformer until the meter reading has the same value regardless of whether the A. F. C. Control knob is rotated to the "on" or "off" position. When this condition is obtained the "Discriminator" circuit of these receivers is properly adjusted.

### Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, the A. F. C. Control knob should be rotated to the "off" position, the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass-Phonograph" Control knob should also be set for "Normal" operation.

### Alignment of Ultra-Short Wave Range (Also referred to as "E" Band)

In order to align the circuits of this range, it is desirable to have a signal generator whose high frequency range will go to 60 megacycles. Such equipment, however, is rare and costly, and in most cases it will be necessary to make use of a signal generator whose high frequency range does not extend beyond 20 megacycles, using harmonics of 20 megacycles for aligning this range on 60 megacycles.

In aligning the radio frequency circuits for this range, replace the 0.1 mfd. capacitor which was placed in series with the signal generator's output lead for the I. F. alignment with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post marked "U. H. A." located on the rear of the receiver chassis. The ground terminal (or low side) of the signal generator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the "E" range position and set the signal generator's frequency and the receiver's tuning dial to 60 megacycles.
2. Adjust the aligning capacitor C-46 until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 20 megacycles and adjust the "E" range trimming loop, L-54, until maximum voltage output is obtained on the output meter. The adjustment of this loop is obtained by distorting its normally circular shape until it offers the correct inductive effect. If the oscillator does not track with the tuning dial scale at this frequency, it will be necessary to also adjust the oscillator's tuning loop.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 60 megacycles and repeat operation No. 2.

### Alignment of Short-Wave Range (Also referred to as "D" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminals of the signal generator as was used for aligning the Ultra-Short Wave Range. Connect this lead to the antenna binding post marked "A" located on the rear of the receiver chassis, and align as follows:

1. Operate the Range Switch on the receiver chassis to the "D" range position and set the signal generator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust aligning capacitors C-45, C-22, and C-8 respectively; and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 11 megacycles and adjust aligning capacitors C-40, C-25, and C-12 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 20 megacycles and repeat operation No. 2.

### Alignment of Short-Wave Range (Also referred to as "C" Band)

In aligning the radio frequency circuits for this range use the same artificial antenna and binding post on the receiver chassis as was used for aligning the "D" range.

1. Operate the Range Switch on the receiver chassis to the "C" range position and set the signal generator's frequency and the receiver's tuning dial to 10 megacycles.
2. Adjust the aligning capacitors C-44, C-21, and C-7 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 5 megacycles and adjust the aligning capacitors C-39, C-23, and C-11 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 10 megacycles and repeat operation No. 2.

### Alignment of Aircraft Range (Also referred to as "B" Band)

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Operate the Range Switch on the receiver chassis to the "B" range position and set the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles.
2. Adjust the aligning capacitor's C-43, C-20, and C-6 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
3. Set the signal generator's frequency and the receiver's tuning dial to 1.8 megacycles and adjust the aligning capacitor C-28 and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 4.5 megacycles and repeat operation No. 2.

### Alignment of Standard Broadcast Range (Also referred to "A" Band)

In aligning the radio frequency circuits for this range, replace the 400-ohm resistor in series with the signal generator's output with a 200-micro-microfarad capacitor and align this range as follows:

1. Operate the Range Switch to the "A" range position and set the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles (1500 kilocycles).
2. Adjust the aligning capacitors C-42, C-19, C4, and C-5 respectively; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.

MODELS 255L, 255LB
Alignment, Part 2 STROMBERG-CARLSON TEL. MFG. CO.
Parts List

## REPLACEMENT PARTS

| Piece Number | Schematic Circuit Designation | Part |
|---|---|---|
| 21584 | | Fuse Block Assembly |
| 22775 | C98 | Capacitor, .4 Mfd. |
| 23517 | | Tube Socket, 7 Prong |
| 24268 | | Cord, Power Supply |
| 24314 | C1 | Capacitor, Type "O", 10 Mmfd. |
| 24402 | C29, C57 | Capacitor, .1 Mfd. |
| 24405 | C3, C10, C18, C28, C55, C64, C68, C99, C100, C101 | Capacitor, .04 Mfd. |
| 24558 | C94 | Capacitor, Type "O", 100 Mmfd. |
| 24994 | C15, C56, C66, C83 | Capacitor, .05 Mfd. |
| 25149 | C33, C76 | Capacitor, .01 Mfd. |
| 25481 | C75 | Capacitor, .002 Mfd. |
| 25487 | C31, C69, C80 | Capacitor, Type "W", .001 Mfd. |
| 25498 | C89, C90 | Electrolytic Capacitor, 10 Mfd., 75 Volts; 10 Mfd.,25 Volts |
| 25526 | R53 | Resistor, Type "F", 15,000 Ohms |
| 25539 | | Tube Socket, 8 Prong |
| 26062 | R54 | Resistor, Type "F", 10,000 Ohms |
| 26287 | | Pilot Lamp |
| 26309 | R24 | Resistor, Type "E", 10 Ohms |
| 26313 | R20 | Resistor, Type "E", 22 Ohms |
| 26322 | R15, R43 | Resistor, Type "E", 120 Ohms |
| 26326 | R52, R55 | Resistor, Type "E", 270 Ohms |
| 26328 | R29 | Resistor, Type "E", 390 Ohms |
| 26333 | R5, R19, R21, R33 | Resistor, Type "E", 1,000 Ohms |
| 26349 | R10, R11, R13, R17 | Resistor, Type "E", 22,000 Ohms |
| 26353 | R4, R13, R14, R30, R45 | Resistor, Type "E", 47,000 Ohms |
| 26357 | R2, R8, R23, R26, R29, R38 R42 | Resistor, Type "E", .1 Megohm |
| 26361 | R44 | Resistor, Type "E", .22 Megohm |
| 26362 | R31, R32, R37, R46 | Resistor, Type "E", .27 Megohm |
| 26365 | R49, R50 | Resistor, Type "E", .47 Megohm |
| 26369 | R27, R28, R51, R52 | Resistor, Type "E", 1 Megohm |
| 26373 | R48 | Resistor, Type "E", 2.2 Megohms |
| 26383 | R1, R3, R6 | Resistor, Type "EI", .1 Megohm |
| 26410 | | Grid Clip Assembly |
| 27636 | L48, L49, L50, L51, L52 | Power Transformer (25 to 60 Cycles Chassis) |
| 27643 | L8, L9 | Antenna Transformer, "D" Range |
| 27644 | L16, L17 | R. F. Transformer, "D" Range |
| 27645 | L24, L25 | Oscillator Transformer, "D" Range |
| 27692 | L30, L31, L32 | First I. F. Transformer |
| 27693 | L33, L34, L35 | Second I. F. Transformer |
| 27694 | L37, L38, L39, L40 | Third I. I. Transformer |
| 27695 | L36 | Fourth I. F. Transformer |
| 27710 | C9, C14, C30, C47 | Gang Tuning Capacitor |
| 27715 | | Coupling Assembly (Tuning Drive) |
| 27720 | | Gear and Bracket Assembly |
| 27728 | | Spring |
| 27731 | | Drive Assembly |
| 27732 | | Mask Assembly |
| 27733 | | Lever Assembly, Mask Actuator |
| 27735 | | Bolt |
| 27736 | | Spring Washer |
| 27737 | | Indicator Frame Assembly |
| 27748 | | Dial |
| 27751 | | Tube Socket, 8 Prong |
| 27752 | | Brace, Dial Support |
| 27753 | C97 | Electrolytic Capacitor, 8 Mfd., 500 Volts |
| 27754 | C96 | Electrolytic Capacitor, 16 Mfd., 480 Volts |
| 27755 | C93 | Electrolytic Capacitor, 16 Mfd., 350 Volts |
| 27756 | C95 | Electrolytic Capacitor, 16 Mfd., 300 Volts |
| 27757 | C91, C92 | Electrolytic Capacitor, 4 Mfd., 250 Volts; 4 Mfd., 100 Volts |
| 27758 | C26 | Capacitor, Type "O", 75 Mmfd. |
| 27759 | C88 | Capacitor, 12 Mfd., 30 Volts |
| 27760 | C87 | Capacitor, .005 Mfd., 1,000 Volts |
| 27761 | R7 | Resistor, Type "E", 620 Ohms |
| 27762 | R9 | Resistor, Type "EH", 910 Ohms |
| 27764 | R36, R55, R57 | Resistor, "B" Voltage Divider |
| 27765 | L42, L43, L44 | Output Transformer |
| 27767 | L47 | Choke Assembly |
| 27769 | L1, L2 | Antenna Transformer, "A" Range |
| 27773 | | Switch Assembly, High Fidelity-Tone Control |
| 27778 | | Switch, A. F. C. |
| 27779 | | Crank Arm |
| 27782 | C2 | Capacitor, .03 Mfd. |
| 27882 | C4 | Capacitor, H. F. Aligner for "A" Range Antenna Transformer |
| 27916 | L26, L27, L28, L29 | Oscillator Transformer, "E" Range |
| 27921 | C46 | Capacitor, Aligner, "E" Range |
| 27986 | | Shield, "D" and "E" Range Coils |
| 27988 | L54 | Antenna Transformer Tuning Loop, "E" Range |
| 27989 | C37, C38 | L. F. Aligners for "A" and "B" Range Oscillators |
| 27994 | | Pilot Lamp Socket Assembly |
| 27996 | | Cable Assembly (Tuning Indicator Unit) |
| 27998 | C27 | Capacitor, Type "O", 200 Mmfd. |
| 27999 | C79, C81 | Capacitor, Type "WD", 50 Mmfd. |
| 28001 | C53, C54, C66, C67 | Capacitor, Type "W", .0015 Mfd. |
| 28002 | C70, C71 | Capacitor, .25 Mfd., 150 Volts |
| 28003 | R40 | Resistor, Type "E", 15,000 Ohms |
| 28004 | R41 | Resistor, Type "E",.27 Megohm |
| 28005 | R16, R58 | Resistor, Type "E", 51 Ohms |
| 28008 | | Cable Assembly, Phonograph Switch to Phonograph Socket |
| 28034 | C39, C40, C42, C43, C44, C45 | Capacitors, Aligning |
| 28179 | R47 | Resistor, Type "EB", 68,000 Ohms |
| 26417 | C10 | Capacitor (Gimmick) |
| 26512 | C73, C74 | Capacitor, Two, Type "W", 100 Mmfd. |
| 26515 | L53 | Coil Assembly (High Frequency Cut-Off Filter) |
| 26531 | | Socket (Tuning Indicator Tube) |
| 26563 | C72 | Capacitor (High Frequency Cut-Off Filter) |
| 26678 | | Socket, Phonograph Unit |
| 26735 | | Antennas and Ground Binding Posts |
| 26751 | | Switch Assembly, "Off-On-Bass-Phono" Control |
| 26775 | R34, R35 | Resistor, Type "F", 20,000 Ohms |
| 26819 | | Fuse, 5 Amperes |
| 27008 | C36 | Capacitor, Type "W", .006 Mfd. |
| 27009 | C32 | Capacitor, Type "2", 500 Mmfd. |
| 27073 | C77, C82, C85 | Capacitor, 100 Mmfd. |
| 27092 | | Rubber Bushing |
| 27101 | C17 | Capacitor, Type "O", 200 Mmfd. |
| 27105 | | Washer, Felt |
| 27100 | | Washer, Dial Clamp |
| 27108 | C14, C34, C49, C50, C51, C60 C63, C94 | Capacitor, Two, .05 Mfd. |
| 27121 | | Insulating Tube |
| 27125 | R56 | Resistor, Type "F", 25,000 Ohms |
| 27305 | C24, C35, C41, C78 | Capacitor, Type "O", 50 Mmfd. |
| 27309 | C48, C52, C59, C65 | Fixed Capacitor, First I. F. Transformer |
| 27337 | C61, C62 | Capacitor, Type "W", .004 Mfd. |
| 27407 | R18 | Resistor, Type "EB", 22,000 Ohms |
| 27411 | | Clamp Assembly |
| 27504 | L45, L46 | Loud Speaker |
| 27539 | R60 | Potentiometer, Volume Control |
| 27588 | C5, C8, C7, C8, C11, C12 | Capacitors, Aligning |
| 27589 | C19, C20, C21, C22, C23, C25 | Capacitors, Aligning |
| 27592 | L3, L4, L5, L6, L7 | Bi-Resonator Coil "A" Range, Antenna Transformer "B" and |
| 27593 | L10, L11, L12, L13, L14, L15 | R. F. Transformer, "A", "B", and "C" Ranger "C" Ranges |
| 27594 | L18, L19, L20, L21, L22, L23 | Oscillator Transformer, "A", "B", and "C" Ranges |
| 27608 | | Range Switch Assembly |
| 27635 | L48, L49, L50, L51, L52 | Power Transformer (50 to 60 Cycles Chassis) |

## MISCELLANEOUS PARTS

| | | |
|---|---|---|
| 27800 | | Knob Assembly (Used on Volume, Range Switch and Off-On-Bass-Phonograph Controls' Shafts) |
| 27801 | | Knob Assembly (Used on Fidelity and A. F. C. Controls' Shafts) |
| 27802 | | Knob Assembly (For Rapid Station Selector Control Shaft) |
| 27803 | | Knob Assembly (For Vernier Station Selector Control Shaft) |
| 27628 | | Felt Washer (Used on Volume, Fidelity, Range Switch, A. F. C. and Off-On-Bass Phonograph Controls' Shafts) |
| 27630 | | Felt Washer (Used on Rapid Station Selector Control Shaft) |

3. Set the signal generator's frequency and the receiver's tuning dial to 0.6 megacycles (600 kilocycles) and adjust the aligning capacitor C-37; and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum voltage output is obtained on the output meter.
4. Reset both the signal generator's frequency and the receiver's tuning dial to 1.5 megacycles and repeat operation No. 2.

### Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

### Instructions for Setting Up the A. F. C. Flash Tuning Unit

1. Remove the flash tuner lamp unit escutcheon plate by removing the four screws.
2. Remove the lists of station letters from the P-28420 package assembly which is tacked inside of the cabinet.
3. Remove the seven paper squares on which are printed the words "Tone", "Beauty", "Value", "Action", "Flash", "Tuning", and "Radio" from the square frames located on the rear side of the lamp unit escutcheon plate.
4. Remove the station letters of the seven stations which it is desired to set up in the flash tuning unit from the list of stations. It will be noted that the letters of the stations are printed on partly cut squares to facilitate ease in removing the desired letters. Insert one of these seven station letters into each frame of the flash tuner lamp unit. The recommended method of inserting these station letters into the frames of the escutcheon plate is to arrange them according to the frequency of the stations as follows:

   Looking at the front of the escutcheon plate the station having the highest frequency should appear in the top right-hand frame, and then in successive order according to frequency the remaining station letters should be inserted into the other frames; the top left-hand frame containing the station letters of the station having the lowest frequency. In inserting these letters into the frames be sure to have the letters located between two pieces of transparent material.
5. Fasten the escutcheon plate again to the lamp unit by means of the four screws. The receiver is now ready to be operated and the flash unit contactors located on the rear of the chassis base adjusted for the seven favorite stations.
6. Rotate the "On-Off-Bass-Phonograph" Control knob from its complete counter-clockwise position, slightly clockwise from this position which turns the set "on" (indicated by illumination of the dial). Wait a few seconds to reach operating temperature. Check the position of the Automatic Frequency Control knob which should be rotated to the "Off" position, and set the Fidelity Control knob to the "Normal" position. Now carefully tune in the desired station having the highest frequency, watching the tuning indicator so that the receiver will be exactly tuned to this station.
7. After carefully tuning in the desired station rotate the A. F. C. Control knob to the "On" position. Now, noting from Figure 4, the sketch which shows the contactor clamping frame and knurled nut, hold the clamping frame with one hand and loosen the knurled nut with the other hand. Then move the contactor, numbered 2, so that its point is engaged between the two small rollers of the switching mechanism as also shown in Figure 4. When the point is properly engaged between the rollers, the lamp of the lamp unit which is located behind the station letters of the station being tuned in will light. When this condition is obtained, retighten the large knurled nut and at the same time securely hold the gang tuning capacitor and the contactors from rotating by means of the extended portion of the contactor clamping frame. **It is extremely important to keep the gang tuning capacitor and the contactors from rotating when tightening the large knurled nut.**
8. Now rotate the A. F. C. Control knob to the "off" position and note whether the tuning has been shifted by watching the tuning indicator. If a change is noted it will be necessary to repeat operation No. 7.
9. When no change is noticed after performing the above operations Nos. 7 and 8, the remaining six favorite stations should be set up in the same manner.

With the A. F. C. flash tuning unit in operation, the receiver will be automatically kept in tune with any one of the seven favorite stations as long as the station is operating or provided it has no unusual fading characteristics. If a distant station which is very weak is set up in the flash tuning unit, it will be found that the Automatic Frequency Control will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

### A. F. C. FLASH TUNER PARTS

| | | |
|---|---|---|
| 24100 | | Spring Washer. |
| 26045 | | Lever |
| 26055 | | Rod for Actuating A. F. C. Switching Mechanism |
| 26061 | | Lever and Spring Combination |
| 26084 | | Contactor Spring Assembly |
| 26097 | | Contact Disc for Contactor |
| 26098 | | Contactor |
| 26099 | | Insulation Disc between Contactors |
| 26101 | | Blue Wire of Cable Connecting to Flash Tuner Lamp Unit Socket |
| 26102 | | Orange Wire of Cable Connecting to Flash Tuner Lamp Unit Socket |
| 26103 | | Green Wire of Cable Connecting to Flash Tuner Lamp Unit Socket |
| 26104 | | Brown Wire of Cable Connecting to Flash Tuner Lamp Unit Socket |
| 26105 | | Slate Wire of Cable Connecting to Flash Tuner Lamp Unit Socket |
| 26106 | | White Wire of Cable Connecting to Flash Tuner Lamp Unit Socket |
| 26107 | | Red Wire of Cable Connecting to Flash Tuner Lamp Unit Socket |
| 26256 | | Locking Ring Spring |
| 26323 | | A. F. C. Switch Cable Assembly |
| 26437 | R59 | Resistor, Flexible, 10 Ohms |

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MODELS 320H, 320HB
320T, 320TB
Schematic, Socket
Trimmers

# STROMBERG-CARLSON TEL. MFG. CO.

| | |
|---|---|
| Type of Circuit | Superheterodyne |
| Tuning Ranges | A—530 to 1700 Kc.; C—5900 to 18,000 Kc. |
| Number and Types of Tubes | 1 No. 6A8, 1 No. 6K7, 1 No. 6Q7G, 1 No. 6V6G, 1 No. 80 |
| Voltage Rating | 105 to 125 Volts, A. C. |
| Input Power Frequency | 25 to 60 Cycles and 50 to 60 Cycles |
| Input Power Rating | 40 Watts |
| Frequency of Intermediate Amplifier | 455 Kilocycles |

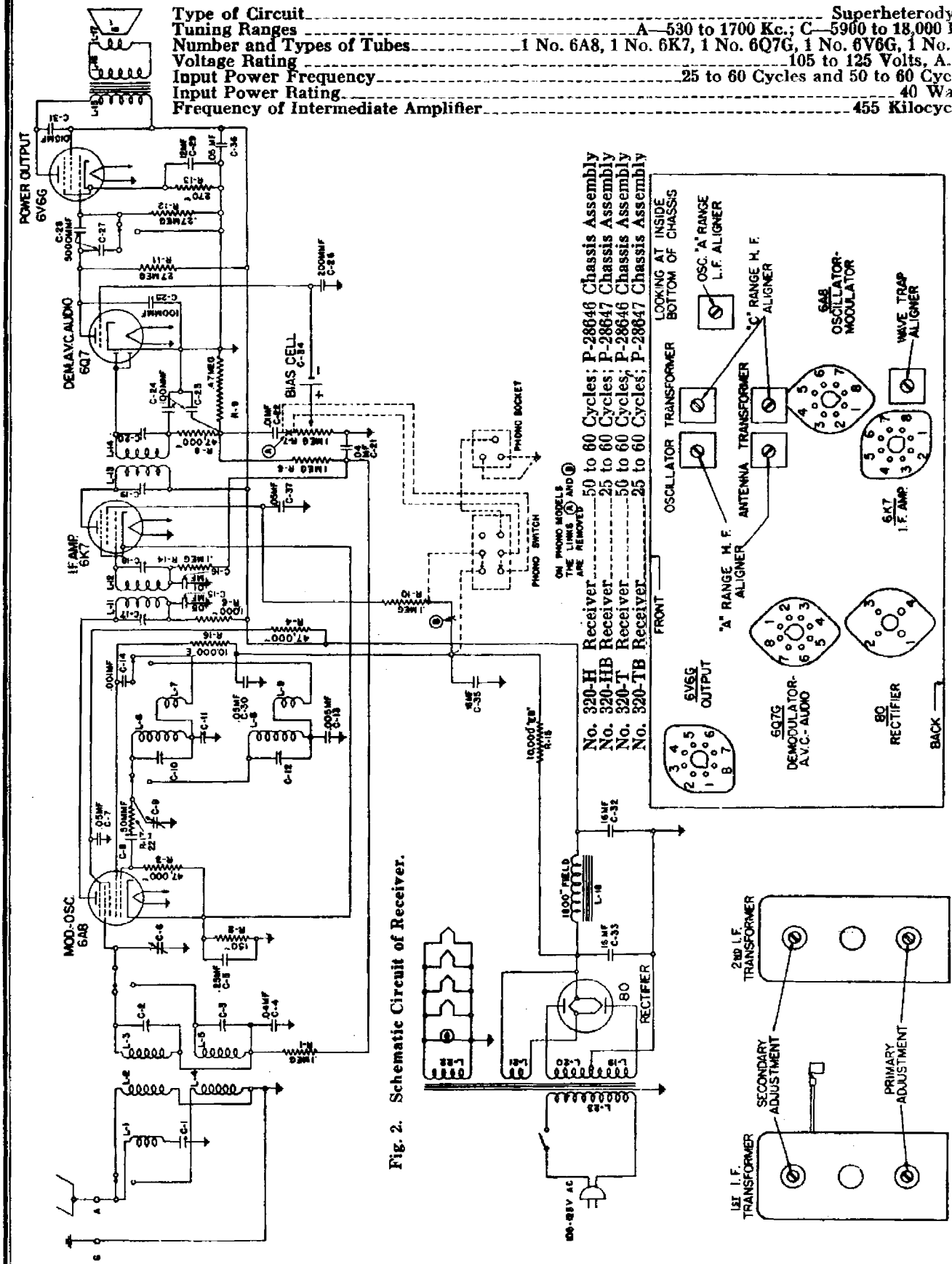


Fig. 1. Terminal Layout

Fig. 2. Schematic Circuit of Receiver.

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MODELS 320H,320HB
320T,320TB **STROMBERG-CARLSON TEL. MFG. CO.**
Chassis Wiring,Voltage

| | | | *Terminals of Sockets* | | | | | | | | *Heater Voltages Between Heater Terminals* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Tube* | *Circuit* | *Cap* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | *Socket Terminal Numbers* | *Volts* |
| 6A8 | Mod.—Osc. | 0 | 0 | 0 | +174 | +64 | —7.2 | +176 | *6.1* | +1.8 | 2–7 | *6.1* |
| 6K7 | I. F. Amp. | 0 | 0 | 0 | +176 | +62 | +1.8 | +210 | *6.1* | +1.8 | 2–7 | *6.1* |
| 6Q7G | Dem.—A. V. C. —Audio | 0 | 0 | 0 | +65* | 0 | 0 | +65* | *6.1* | 0 | 2–7 | *6.1* |
| 6V6G | Audio Output | — | 0 | 0 | +167 | +176 | 0 | 0 | *6.1* | +8.2 | 2–7 | *6.1* |
| 80 | Rectifier | — | +260 | *258* | *258* | +260 | — | — | — | — | 1–4 | *4.8* |

**Receiver tuned to 1000 Kc., no signal. A. C. voltages are indicated by italics.**

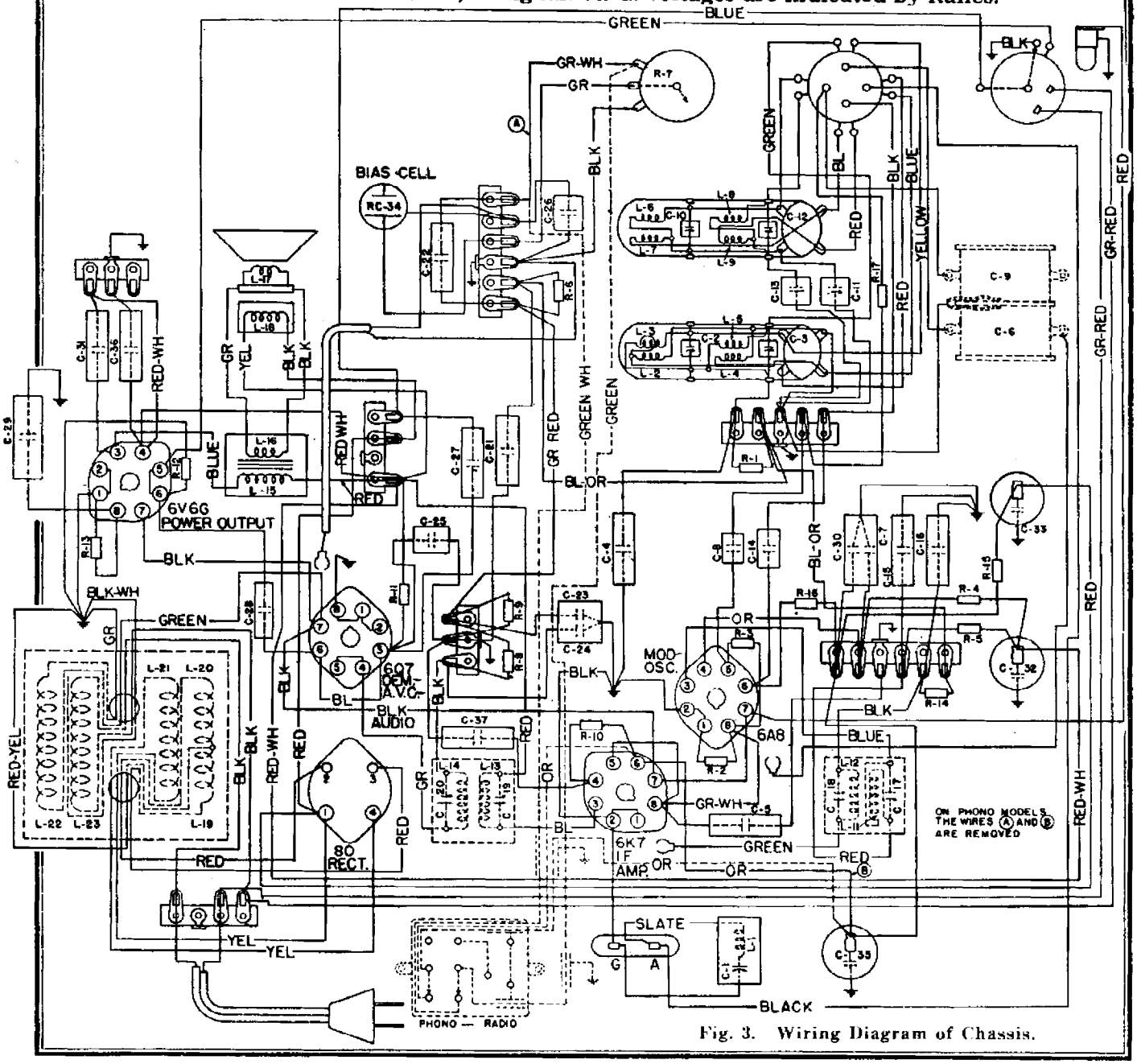


Fig. 3. Wiring Diagram of Chassis.

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## ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these alignment adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. **Never attempt to make any alignment adjustments using a strong signal.** Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"). Figure 1, shows the location of all the aligning capacitors in these receivers.

In making any alignment adjustments on these receivers, it will not be necessary to remove the chassis from the cabinet. The aligning capacitors for the intermediate frequency circuits of these receivers are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf depending upon the style of cabinet.

### Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the gang tuning capacitor in this position, the dial pointer should center over the inside, lower right-hand border line (line immediately below the .53 megacycle calibration mark on the "Broadcast" scale).

### Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Rotate the Range Switch control knob to the Standard Broadcast Range position (arrow on knob pointing in direction of letters BR.).

   Set the dial pointer to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position which is the "normal" position. Rotate the Volume control knob to its maximum clockwise position (maximum volume).

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.

3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

   Secondary of second I. F. transformer.
   Primary of second I. F. transformer.
   Secondary of first I. F. transformer.
   Primary of first I. F. transformer.

   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

### Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

**Alignment of Short Wave Range (Also Referred to as "C" Range)**

In aligning the radio-frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" range high frequency aligner for maximum output.
3. Adjust the antenna's "C" range high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

**Alignment of Standard Broadcast Range (Also Referred to as "A" Range)**

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Range Switch control knob to the Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the oscillator's "A" range high frequency aligner for maximum output.
3. Adjust the antenna's "A" range high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

### Wave Trap Adjustment

In adjusting the wave trap circuit, set the Range Switch control knob to the Standard Broadcast range position and set the dial pointer to 1000 kilocycles.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a **minimum** indication is obtained on the output meter.

## PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

In order to obtain reproduction of phonograph records in conjunction with the No. 320 Receiver, the following instructions should be followed:

To equip these receivers for phonograph operation, it will be necessary to purchase and install a Stromberg-Carlson, P-28909 Switch Assembly. The rear of the chassis base of these receivers is already drilled for mounting this switch assembly. Complete instructions on how to install and operate this switch are furnished with each P-28909 Switch Assembly.

To obtain the best quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

If a Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong socket and plug of the P-28909 Switch Assembly and the pick-up. This shielded cable should be of the low capacity type, in order to prevent excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket and plug of the P-28909 Switch Assembly, and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

## REPLACEMENT PARTS

| Piece Number | Circuit Designation | Part |
|---|---|---|
| 17948 | | Spring Washer |
| 22988 | | Socket, 4 Prong |
| 24405 | C4, C21 | Capacitor, .04 Mfd. |
| 24559 | C25 | Capacitor, Type "O", 100 Mmfd. |
| 24994 | C15, C36, C37 | Capacitor, .05 Mfd. |
| 25149 | C16, C22 | Capacitor, .01 Mfd. |
| 25487 | C14 | Capacitor, Type "W", .001 Mfd. |
| 25539 | | Socket, 8 Prong |
| 26029 | C17, C18, C19, C20 | Aligning Capacitors, I. F. Transformers |
| 26061 | | Switch Assembly, "Off-On-Tone" Control |
| 26096 | | Cone Assembly, Loud Speaker |
| 26114 | R7 | Potentiometer, Volume Control |
| 26151 | C27, C28 | Capacitor, .005 Mfd. |
| 26313 | R17 | Resistor, Type "E", 22 Ohms |
| 26323 | R2 | Resistor, Type "E", 150 Ohms |
| 26326 | R13 | Resistor, Type "E", 270 Ohms |
| 26333 | R5 | Resistor, Type "E", 1000 Ohms |
| 26345 | R16 | Resistor, Type "E", 10,000 Ohms |
| 26353 | R3, R4, R8 | Resistor, Type "E", 47,000 Ohms |
| 26357 | R1, R10, R14 | Resistor, Type "E", .1 Megohm |
| 26362 | R11, R12 | Resistor, Type "E", .27 Megohm |
| 26365 | P9 | Resistor, Type "E", .47 Megohm |
| 26369 | R6 | Resistor, Type "E", 1 Megohm |
| 26512 | C23, C24 | Capacitor Assembly, Type "WD" (2-100 Mmfd. |
| 27081 | C1 | Tuning Capacitor, Wave Trap |
| 27101 | C26 | Capacitor, Type "O", 200 Mmfd. |
| 27108 | C7, C30 | Capacitor Assembly (2-.05 Mfd.) |
| 27149 | L1 | Wave Trap Coil |
| 27170 | R15 | Resistor, Type "EB", 10,000 Ohms |
| 27305 | C8 | Capacitor, Type "O", 50 Mmfd. |
| 27538 | C13 | Capacitor, Type "W", .005 Mfd. |
| 27685 | C29 | Electrolytic Capacitor, 20 Mfd., 25 Volts |
| 28002 | C5 | Capacitor, .25 Mfd. |
| 28025 | | Pilot Lamp |
| 28594 | C31 | Capacitor, .015 Mfd., 200 Volts, A.C. |
| 28652 | | Cord (Power Supply) |
| 28654 | C33 | Electrolytic Capacitor, 16 Mfd., 300 Volts |
| 28655 | C32 | Electrolytic Capacitor, 16 Mfd., 200 Volts |
| 28656 | C35 | Electrolytic Capacitor, 16 Mfd., 250 Volts |
| 28660 | L2, L3, L4, L5 | Coil Assembly, Antenna Transformer |
| 28661 | L6, L7, L8, L9 | Coil Assembly, Oscillator Transformer |
| 28663 | L13, L14 | Second I. F. Transformer |
| 28664 | L11, L12 | First I. F. Transformer |
| 28665 | L15, L16 | Transformer Assembly, Audio Output |
| 28667 | L17, L18 | Loud Speaker Assembly |
| 28670 | C6, C9 | Gang Tuning Capacitor and Bracket Assembly |
| 28685 | | Range Switch |
| 28692 | | Tuning Dial |
| 28694 | | Pilot Lamp Socket Assembly |
| 28695 | | Dial Pointer |
| 28696 | C34 | Bias Cell |
| 28787 | C11 | I. F. Aligning Capacitor ("A" Range) |
| 28805 | C3, C10, C12 | H. F. Aligning Capacitors, Antenna and Oscillator Transformers |
| 28806 | C2 | H. F. Aligning Capacitor, Antenna Transformer, "A" Range |
| 28901 | L19, L20, L21, L22, L23 | Power Transformer (50 to 60 Cycles Chassis) |
| 28902 | L19, L20, L21, L22, L23 | Power Transformer (25 to 60 Cycles Chassis) |
| 29128 | | Large Pulley For Dial Drive |
| 29129 | | Spring for Dial Drive |

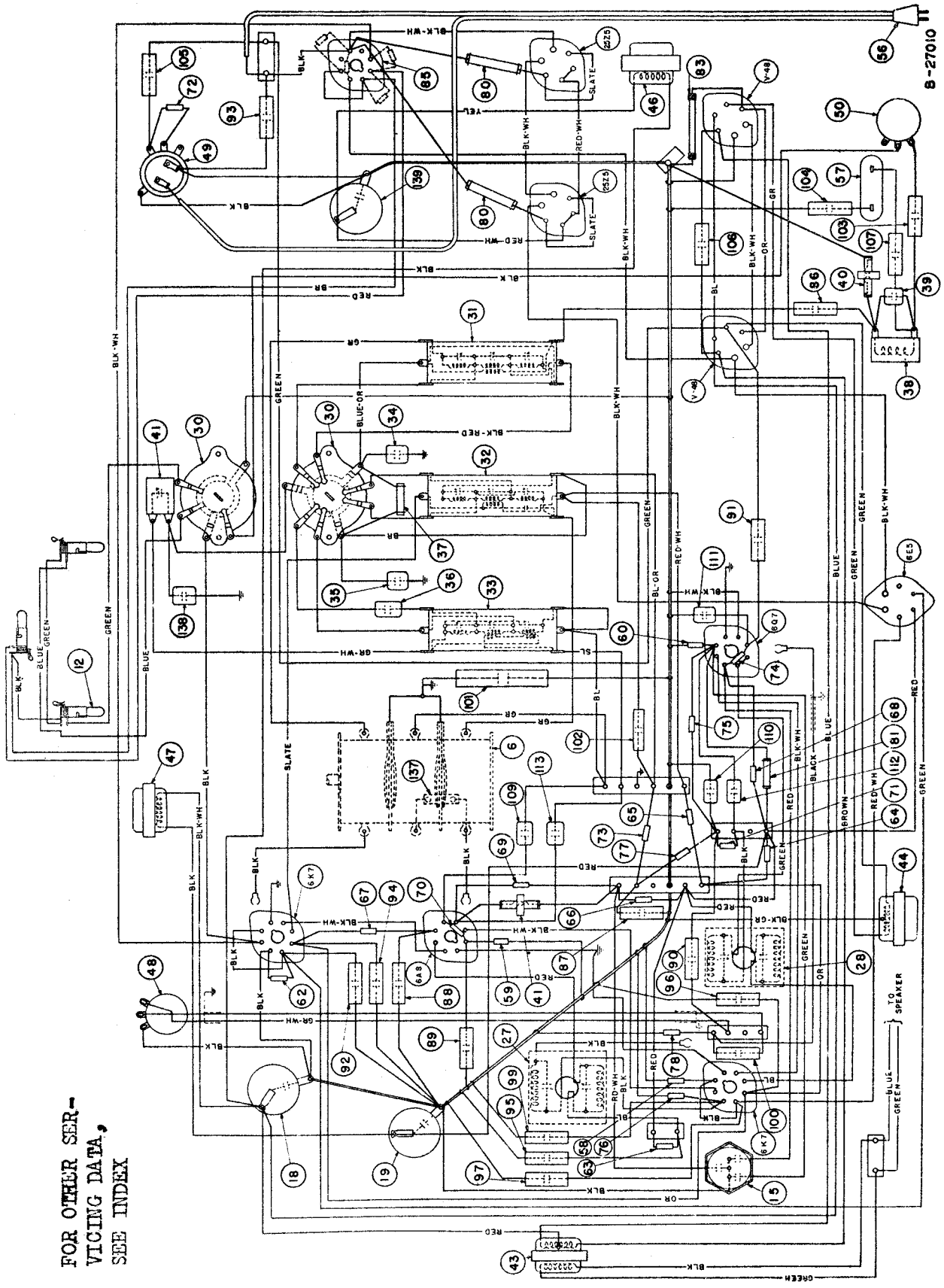
### MISCELLANEOUS PARTS

| | |
|---|---|
| | Black Cord for Drive |
| 27628 | Felt Washer (2 Required, Used on Volume and Off-On-Tone Control Shafts) |
| 27630 | Felt Washer (Used on Station Selector Control Shaft) |
| 27802 | Knob (Used on Station Selector Control Shaft) |
| 28827 | Knob (Used on Range Switch Control Shaft) |
| 28843 | Knob (Two Required, Used on Volume and Off-On-Tone Control Shafts) |

MODELS 127H, 127M
Chassis Wiring

# STROMBERG-CARLSON TEL. MFG. CO.

No. 127-H ..... 50 to 60 Cycles ..... P-26845 Chassis Assembly; P-26887 Loud Speaker
No. 127-M ..... 50 to 60 Cycles ..... P-26845 Chassis Assembly; P-26887 Loud Speaker




FOR OTHER SERVICING DATA, SEE INDEX

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MODELS 325J, 325JB
325N, 325NB
325S, 325SB
Schematic, Socket
Trimmers

# STROMBERG-CARLSON TEL. MFG. CO.

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Type of Circuit | Superheterodyne with Electric Tuning |
| Tuning Ranges | A—530 to 1700 Kc.; C—5800 to 18,000 Kc. |
| Number and Type of Tubes | 1 No. 6A8, 1 No. 6K7, 1 No. 6Q7G, 1 No. 6V6G, 1 No. 80 |
| Voltage Rating | 105 to 125 Volts |
| Power Frequency Rating | 25 to 60 Cycles and 50 to 60 Cycles |
| Input Power Rating | 42 Watts |
| Frequency of Intermediate Amplifier | 455 Kilocycles |

## APPARATUS SPECIFICATIONS

| | | |
|---|---|---|
| No. 325-J | Receiver | 50 to 60 Cycles; P-28816 Chassis Assembly |
| No. 325-JB | Receiver | 25 to 60 Cycles; P-28817 Chassis Assembly |
| No. 325-N | Receiver | 50 to 60 Cycles; P-28816 Chassis Assembly |
| No. 325-NB | Receiver | 25 to 60 Cycles; P-28817 Chassis Assembly |
| No. 325-S | Receiver | 50 to 60 Cycles; P-28816 Chassis Assembly |
| No. 325-SB | Receiver | 25 to 60 Cycles; P-28817 Chassis Assembly |

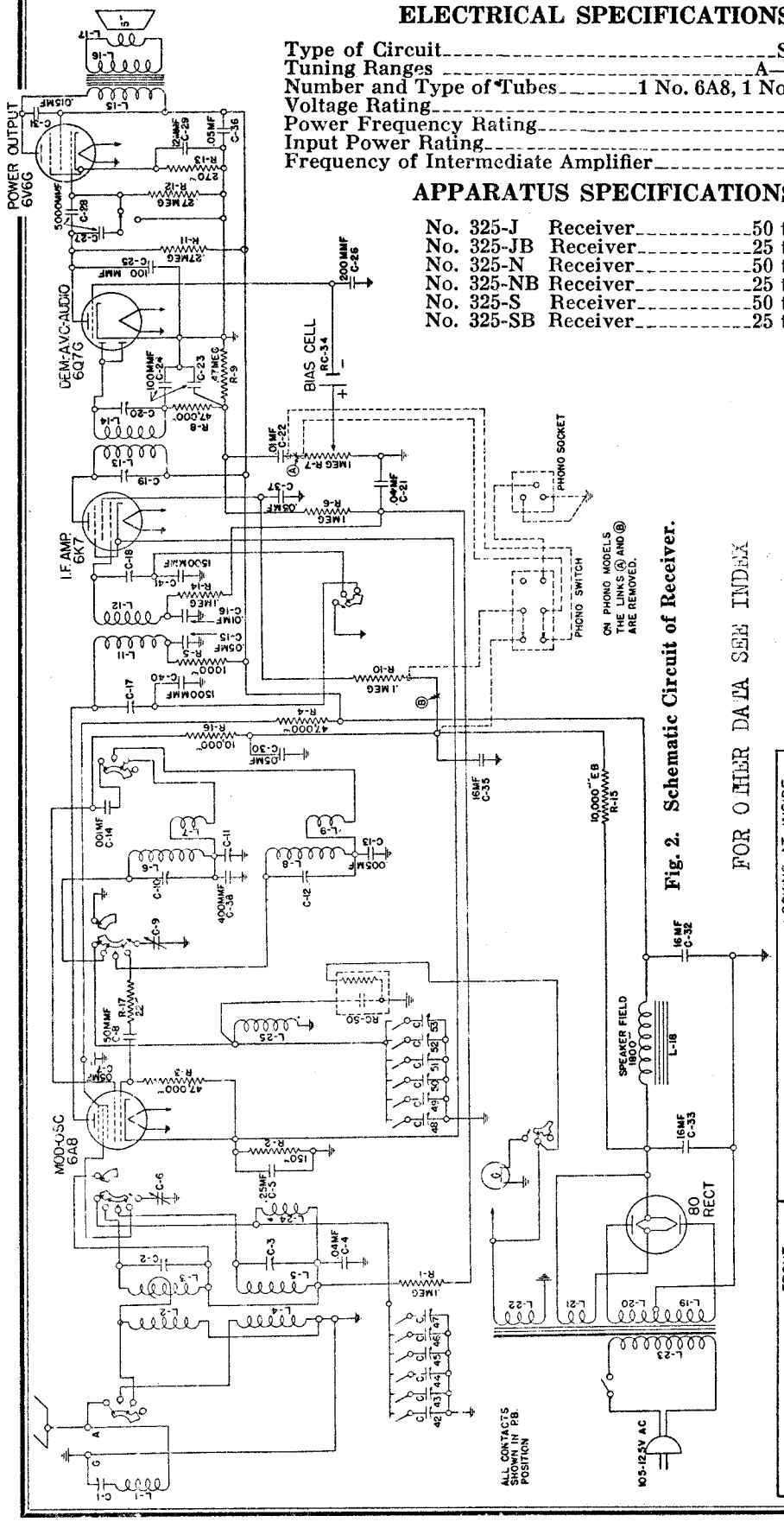


Fig. 2. Schematic Circuit of Receiver.

FOR OTHER DATA SEE INDEX

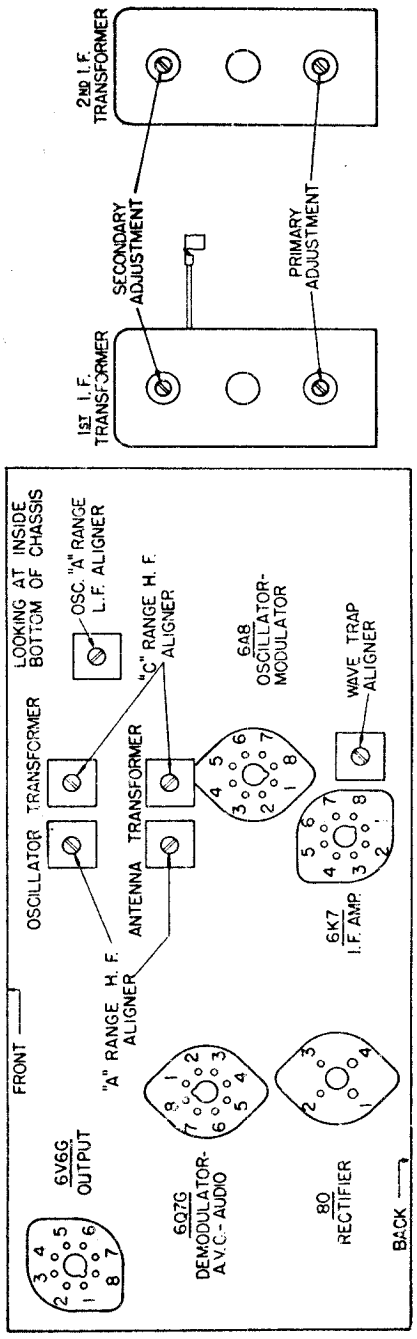


Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

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MODELS 325J,325JB
325N,325NB
325S,325SB

# STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring

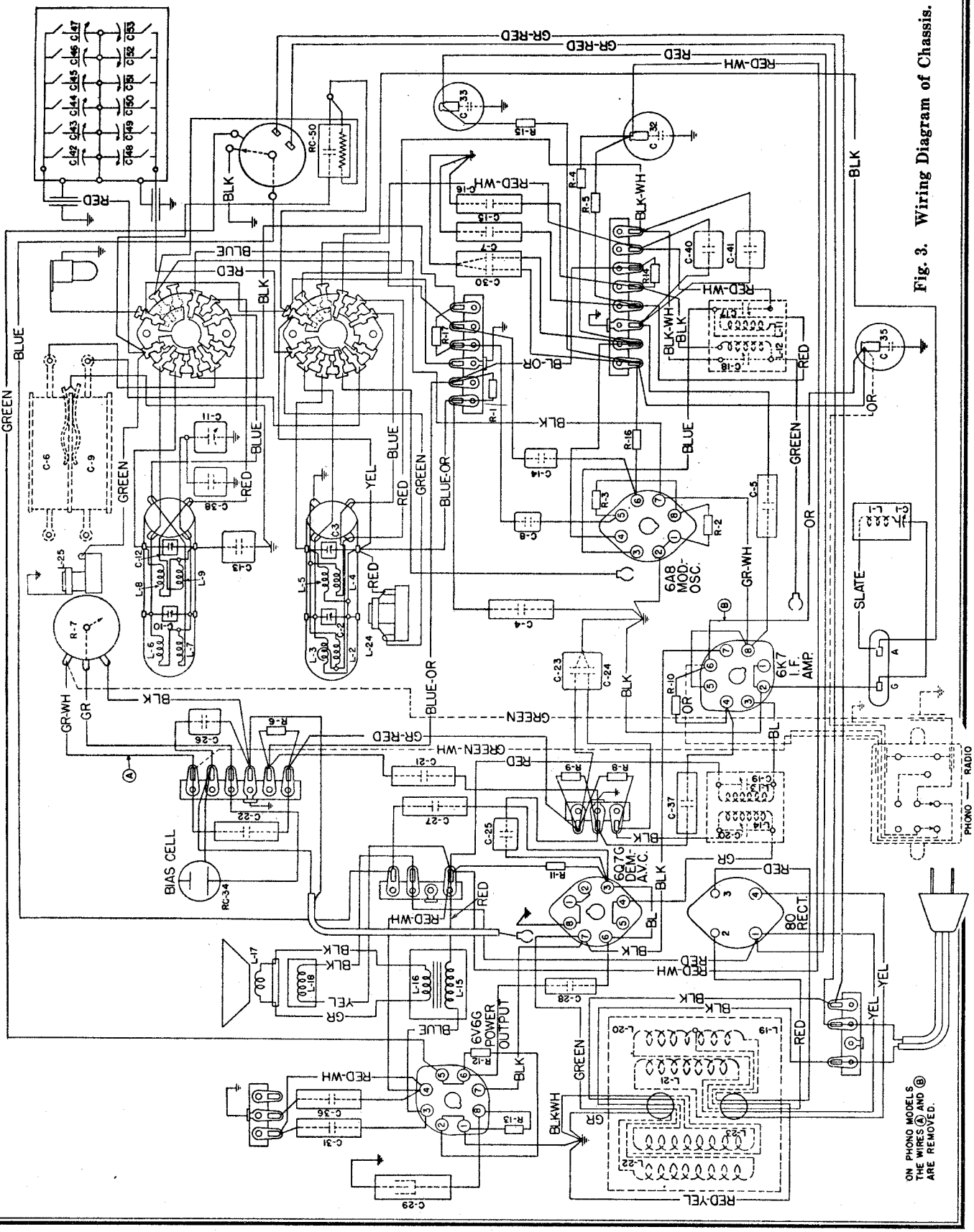


Fig. 3. Wiring Diagram of Chassis.

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## NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

| | | | *Terminals of Sockets* | | | | | | | | *Heater Voltages Between Heater Terminals* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Tube* | *Circuit* | *Cap* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | *Socket Terminal Numbers* | *Volts* |
| 6A8 | Mod.—Osc. | 0 | 0 | 0 | +174 | +64 | —7.2 | +176 | *6.1* | +1.8 | 2-7 | *6.1* |
| 6K7 | I. F. Amp. | 0 | 0 | 0 | +176 | +62 | +1.8 | +210 | *6.1* | +1.8 | 2-7 | *6.1* |
| 6Q7G | Dem.—A. V. C. —Audio | 0 | 0 | 0 | +65* | 0 | 0 | +65* | *6.1* | 0 | 2-7 | *6.1* |
| 6V6G | Audio Output | — | 0 | 0 | +167 | +176 | 0 | 0 | *6.1* | +8.2 | 2-7 | *6.1* |
| 80 | Rectifier | — | +260 | *258* | *258* | +260 | — | — | — | — | 1-4 | *4.8* |

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

## ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these alignment adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-27657 and P-27658 aligning tools be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. **Never attempt to make any alignment adjustments using a strong signal.** Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"). Figure 1, shows the location of all the aligning capacitors in these receivers.

In making any alignment adjustments on these receivers, it will not be necessary to remove the chassis from the cabinet. The aligning capacitors for the intermediate frequency circuits of these receivers are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are easily accessible either through the bottom of the cabinet or through the bottom of the cabinet shelf depending upon the style of cabinet.

### Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the gang tuning capacitor in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

### Intermediate Frequency Adjustments

The intermediate frequency used in these is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Rotate the Electric Tuning and Range Switch control knob to the Standard Broadcast Range position (arrow on knob pointing in direction of letters BR.).

   Set the dial pointer to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position which is the "normal" position. Rotate the Volume control knob to its maximum clockwise position (maximum volume).

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1-microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.

3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

   Secondary of second I. F. transformer.

   Primary of second I. F. transformer.

   Secondary of first I. F. transformer.

   Primary of first I. F. transformer.

   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

### Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

#### Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" range high frequency aligner for maximum output.
3. Adjust the antenna's "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

#### Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Range Switch control knob to the Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the oscillator's "A" range high frequency aligner for maximum output.
3. Adjust the antenna's "A" range high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

### Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the Standard Broadcast range position and set the dial pointer to 1000 kilocycles.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

## PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

In order to obtain reproduction of phonograph records in conjunction with the No. 325 Receiver, the following instructions should be followed.

To equip these receivers for phonograph operation, it will be necessary to purchase and install a Stromberg-Carlson, P-28909 Switch Assembly. The rear of the chassis base of the receiver is already drilled for mounting this switch assembly. Complete instructions on how to install and operate this switch are furnished with each P-28909 Switch Assembly.

To obtain the best quality of phonograph reproduction from this receiver, a Stromberg-Carlson Record Player is recommended. The record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong socket and plug of the P-28909 Switch Assembly, and the pick-up. This shielded cable should be of the low capacity type, in order to prevent excessive cutting of high frequencies which is caused when a shielded cable having high capacity is used. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket and plug of the P-28909 Switch Assembly, and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

MODELS 325
MODELS 335,336
MODELS 340,341
MODELS 345
MODELS 350
Electric Tuning Data

# STROMBERG-CARLSON TEL. MFG. CO.

MODELS 335L,335LB
336P,336PB
Alignment,

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counterclockwise position about 1/3 turn). Also be sure that the Range Switch control knob is set to the range which is located on the rear of the chassis base is rotated to the "Set-Up" position. When the aligning adjustments have been completed the electric tuning switch should be rotated back to the "Operate" position. Figure 1, shows the location of all the aligning capacitors in these receivers.

In making any alignment adjustments on the No. 335 receivers, it will not be necessary to remove the chassis from the cabinet. The aligning adjustments for the intermediate frequency circuits of these receivers are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are easily accessible through the bottom of the cabinet or through the bottom of the cabinet shelf depending upon the style of cabinet.

In making any aligning adjustments of the radio frequency circuits of the No. 336-P Receiver, it will be necessary to remove the chassis from the cabinet. The aligning adjustments for the intermediate frequency circuits are easily accessible from the rear of the receiver, and the aligning capacitors for the radio frequency circuits are placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

## Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitor in this receiver. To do this, set the gang tuning capacitor to its maximum capacity position. Then, with the gang tuning capacitor in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

## Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning standard broadcast position (arrow on knob pointing in direction of letters "BR."). Set the dial pointer by means of the Station Selector knob to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob to the extreme clockwise position. Rotate the Volume control knob to its maximum clockwise position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning switch located at the rear of the chassis base, so that the slotted shaft points in the direction of the word "Set-Up" (maximum clockwise rotation). Rotate the Volume control knob to its maximum clockwise position (maximum output).
2. Apply power to the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube through a .05 microfarad capacitor. Connect the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post on the receiver.
3. Now, refer to Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

   Secondary of second I. F. transformer.

   Primary of second I. F. transformer.

   Secondary of first I. F. transformer.

   Primary of first I. F. transformer.

   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

## Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

### Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This resistor should then be connected in series with the test oscillator's output lead. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" range high frequency aligner for maximum output.
3. Adjust the oscillator's "A" range high frequency aligner for maximum output.
4. Adjust the antenna's "A" range high frequency y aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
7. Repeat both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

## Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast position (arrow on knob pointing in direction of letters "BR."). Set the dial pointer to 1000 kilocycles and the Electric Tuning Switch, located on the back of the receiver chassis, to the "Set-Up" position.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and connect this lead to the grid (terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set for 1000 kilocycles and the receiver's amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

**IMPORTANT:** When all the aligning adjustments have been completed, it is important that the Electric Tuning Switch (located on the rear of the receiver chassis) be reset to the "Operate" position.

## PROCEDURE FOR OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

### FOR NO. 335 RECEIVERS ONLY

To equip these receivers for phonograph operation, it will be necessary to purchase and install in the receiver Stromberg-Carlson Model P-29807 Switch Assembly. The rear of the chassis base of these receivers is already drilled for mounting this switch assembly. Complete instructions on how to install and operate this switch are furnished with each P-29807 Switch Assembly.

To obtain the best quality of phonograph reproduction when using an electric pick-up and phonograph unit with this receiver, a Stromberg-Carlson Record Player is recommended. This record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong socket mounted in the P-29807 Switch Assembly and the pick-up. This shielded cable should be of the low capacity type, in order to prevent excessive cutting off of high frequencies. Where a shielded cable having high capacity is used, The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket mounted in the P-29807 Switch Assembly, and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

### INSTRUCTIONS FOR SETTING UP THE ELECTRIC TUNING ARRANGEMENT

MODELS 325,335,336,337,340,341,345, AND 350

1. Before proceeding to set up the stations for electric tuning, the radio receiver should be turned "on" for approximately twenty to thirty minutes.
2. Set the Range Switch Control Knob to the manual tuning position for the Standard Broadcast range (arrow on knob pointing in direction of the letters BR.).

   If the particular model is a No. 336-P Receiver, check the position of the "Radio-Phono" control knob. If the control is provided, this knob should be rotated so that the arrow on the knob points in the direction of the word "Radio".
3. Remove the list of station letters from the P-28731 package assembly which is tacked inside of the cabinet.
4. Remove the two screws which hold the electric tuning escutcheon plate (metal plate). Then, remove the plate and the escutcheon, the strip of transparent material and the strip of paper on which the six stars are printed.
5. Remove the five screws which hold the electric tuning escutcheon to the front panel.
6. From the lists of stations, remove the call letters of the six stations which it is desired to set up for electric tuning. These six stations **should preferably be selected and set up in the daytime so that the best results will be obtained at all times.**

   CAUTION: Each button adjustment for electric tuning has assigned frequency limits. These limits are designated from 540 kilocycles to 1720 kilocycles. Only those stations having carrier frequencies within these limits (visible when the electric tuning escutcheon is removed from the cabinet). The six stations should be selected so that the frequency of each station will be within the assigned frequency limits of its associated push button.

   It will be noted that the station letters are printed on partially cut squares to facilitate ease in removing the desired station letters. In setting up these six favorite stations, the following order should be followed:

   Looking at the front of the receiver, the station letters of the station having the highest frequency should be inserted into the farthest left-hand square of the escutcheon. The next highest station should be inserted into the next square to the right, and so on. There are five squares on the escutcheon, and the five stations into the other five squares of the electric tuning escutcheon; the station letters of the station having the lowest frequency being inserted into the farthest right-hand square of the escutcheon.

   After the six station call letters have been inserted into the escutcheon, the transparent strip should be replaced over the station call letters and the escutcheon plate then fastened into its position on the electric tuning escutcheon by means of the two screws.

   The tuning adjustments for the six favorite stations can now be made, starting with the station having the highest frequency and proceeding as follows:
7. **IMPORTANT:** By aid of a screwdriver, rotate the slotted shaft of the Electric Tuning Switch, which is located at the rear of the chassis base, so that the slotted shaft points in the direction of the word, "Set-up" (maximum clockwise rotation).
8. With the receiver turned "on", and the Range Switch control knob set to the standard broadcast position (arrow on knob pointing in direction of letters BR.), tune the receiver in the conventional manner for setting up in the electric tuning arrangement the highest frequency of the six chosen stations. Then, rotate the Range Switch control knob to the electric tuning position (arrow on knob pointing in direction of the small star).
9. With the electric tuning escutcheon still removed from the cabinet, push in the push button rod for the station having the highest frequency (provided, of course, that the station chosen has a frequency which is within the assigned frequency limits for this button). Now, looking in on the electric tuning unit, rotate the slotted shaft of the electric tuning unit so that the arrow on the shaft points in the direction of the word, designated 1480 to 1680 kilocycles to the position where the desired station is tuned in.

   In order to check whether the program being received is from the desired station, simply rotate the Range Switch control knob to the manual tuning position (arrow on knob pointing in direction of letters BR.), and with the receiver tuned in manually to the desired station a quick check can be made, then rotate the Range Switch control knob back to the electric tuning position. **Exact resonance with the desired station should be obtained by observing the tuning indicator.**

   **IMPORTANT:** Always use the tuning indicator unit when setting up stations for electric tuning in order to determine when resonance with the desired station is obtained.
10. When the oscillator tuning adjustment has been properly made as mentioned in paragraph 9 above, the screw of the antenna (ANT.) tuning adjustment designated 1560 to 1030 kilocycles should be rotated to the position where exact resonance with the desired station is again obtained by observing the tuning indicator.

    When these adjustments have been properly made, the station having the highest frequency is correctly set up for electric tuning selection.
11. Now proceed to set up the remaining five stations in the same manner as mentioned in Paragraphs 7, 8, 9 and 10 above, proceeding according to the frequency of the remaining stations.
12. **IMPORTANT:** When all of the adjustments have been made for the six desired stations, the slotted shaft of the Electric Tuning Switch located on the rear of the chassis base, should be rotated so that the slotted shaft points in the direction of the word, "Operate" (maximum counter-clockwise rotation).

    The electric tuning escutcheon should then be refastened into its position on the cabinet by means of the two Phillips screws.

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MODELS 335L, 335LB
336P, 336PB

# STROMBERG-CARLSON TEL. MFG. CO.

Schematic

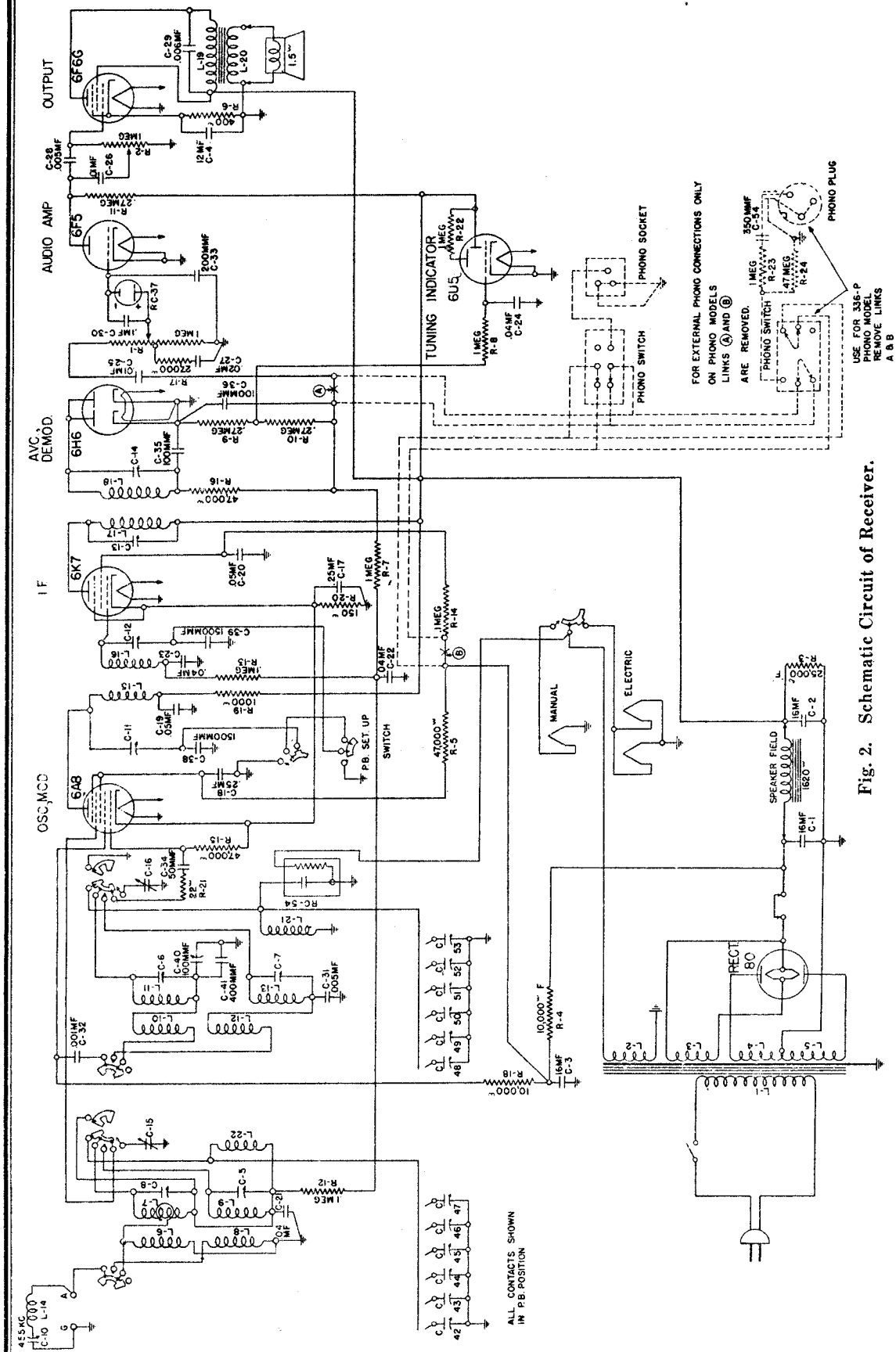


Fig. 2. Schematic Circuit of Receiver.

| | |
|---|---|
| Type of Circuit | Superheterodyne with Electric Tuning |
| Tuning Ranges | Range "A", 530 to 1700 Kc.; Range "C", 5900 to 18,000 Kc. |
| Number and Type of Tubes | 1 No. 6A8; 1 No. 6K7; 1 No. 6H6; 1 No. 6F5; 1 No. 6U5; 1 No. 6F6G; 1 No. 80 |
| Power Supply Voltage | 105 to 125 Volts, A. C. |
| Power Frequency Rating | 50 to 60 Cycles and 25 to 60 Cycles |
| Input Power Rating: | |
| Radio Models Only | 65 Watts |
| Radio-Phono. Models | 80 Watts |
| Frequency of Intermediate Amplifier | 455 Kilocycles |

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MODELS 335L,335LB
336P,336PB

# STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring

No. 335-L Receiver----------50 to 60 Cycles; P-28818 Chassis Assembly; P-27605 Loud Speaker
No. 335-LB Receiver----------25 to 60 Cycles; P-28819 Chassis Assembly; P-27605 Loud Speaker
No. 336-P Receiver----------60 Cycles Only; P-29415 Chassis; P-29439 Phono Unit; P-29464 Loud Speaker
No. 336-PB Receiver----------25 Cycles Only; P-29416 Chassis; P-29440 Phono Unit; P-29464 Loud Speaker

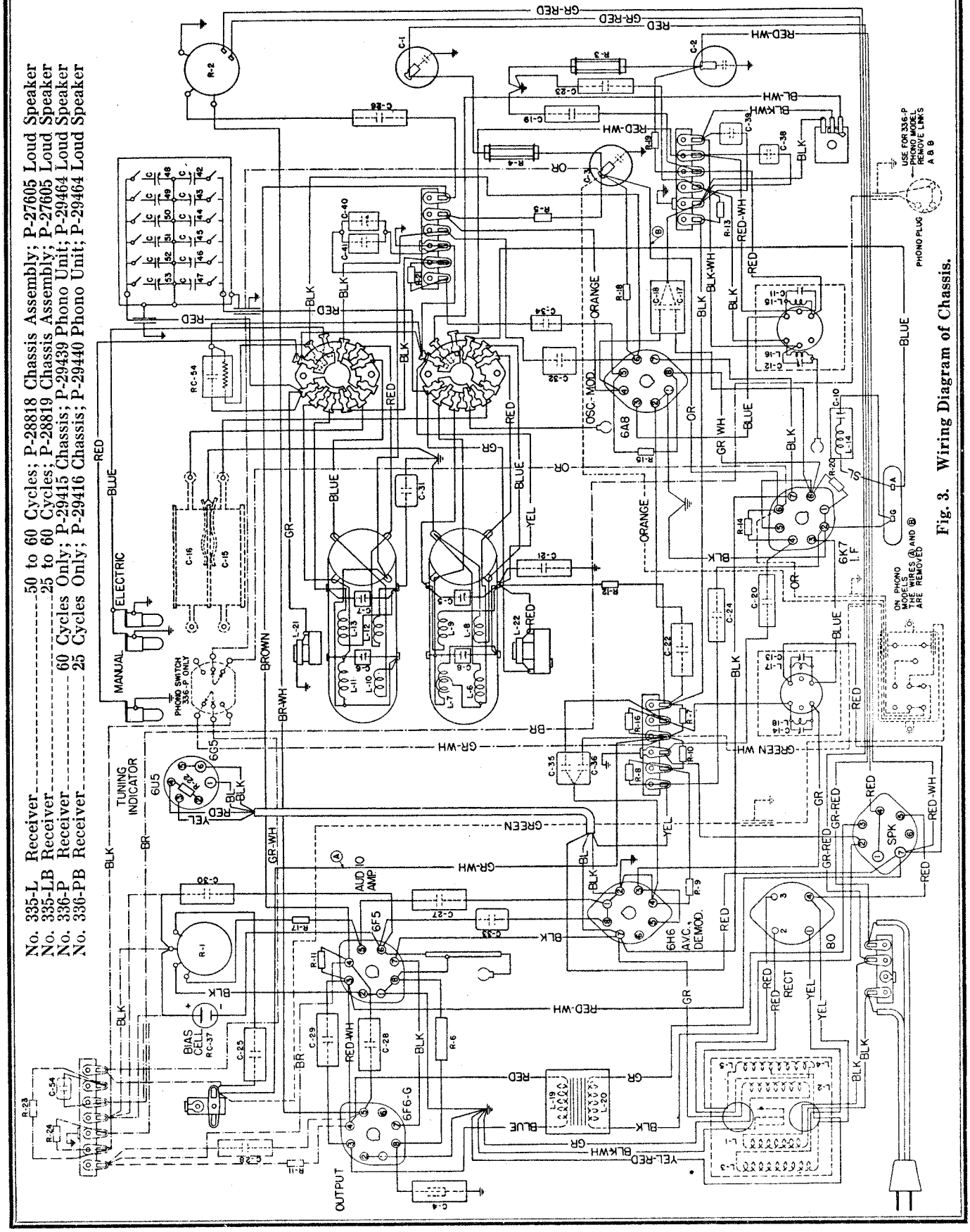


Fig. 3. Wiring Diagram of Chassis.

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MODELS 337H, 337HB
337L, 337LB

# STROMBERG-CARLSON TEL. MFG. CO.

Schematic

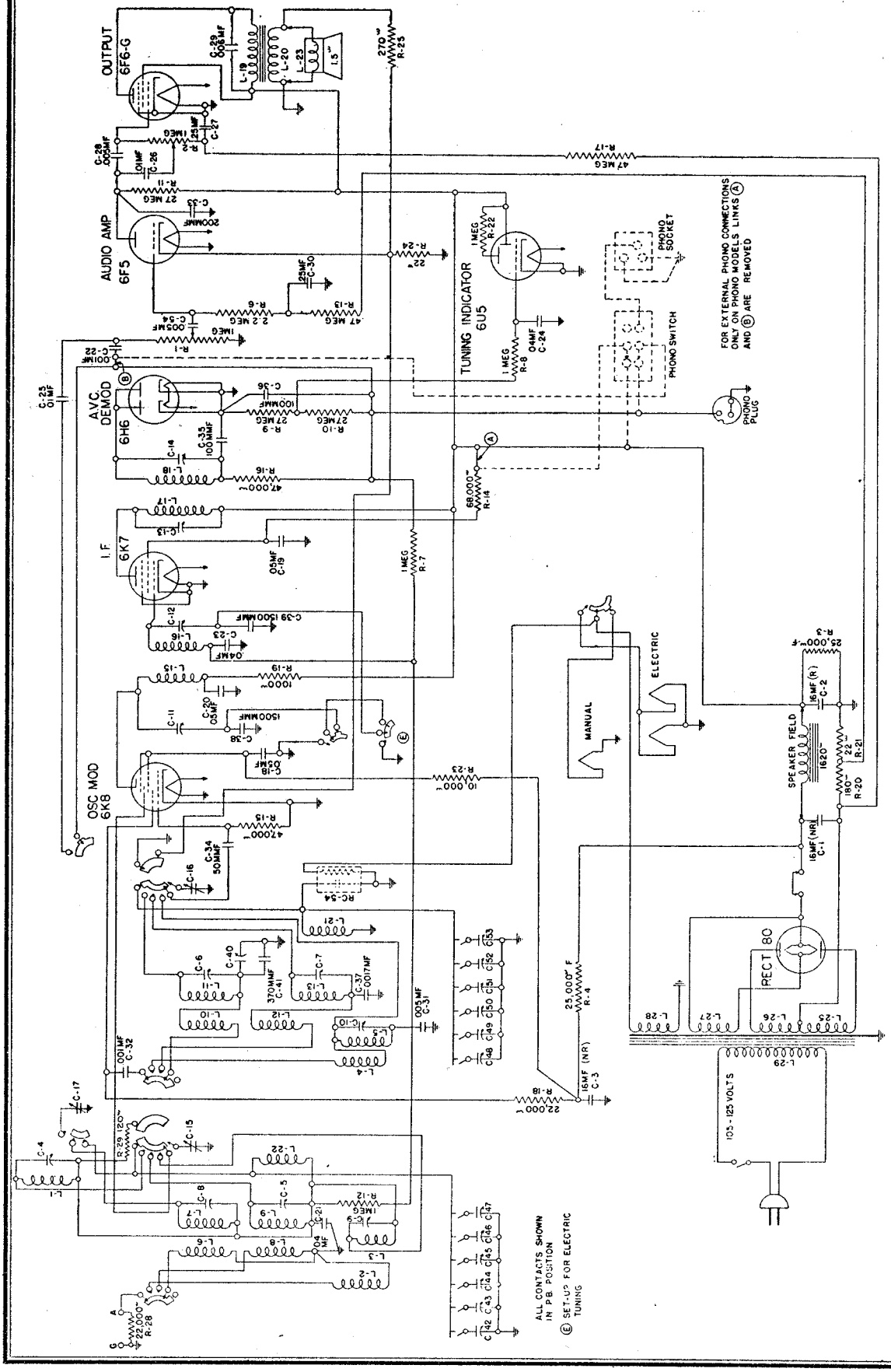


**Fig. 2. Schematic Circuit of Receiver.**

| | |
|---|---|
| Type of Circuit | Superheterodyne with Electric Tuning |
| Tuning Ranges | .53 to 1.7 Mc.; 2.25 to 7.6 Mc.; 7.6 to 23 Mc. |
| Number and Type of Tubes | 1 No. 6K8, 1 No. 6K7, 1 No. 6H6, 1 No. 6F5, 1 No. 6F6G, 1 No. 6U5, 1 No. 80 |
| Voltage Rating | 105 to 125 Volts |
| Power Frequency Rating | 25 to 60 Cycles and 50 to 60 Cycles |
| Input Power Rating | 70 Watts |
| Frequency of Intermediate Amplifier | 455 Kilocycles |

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MODELS 337H, 337HB
337L, 337LB

# STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring

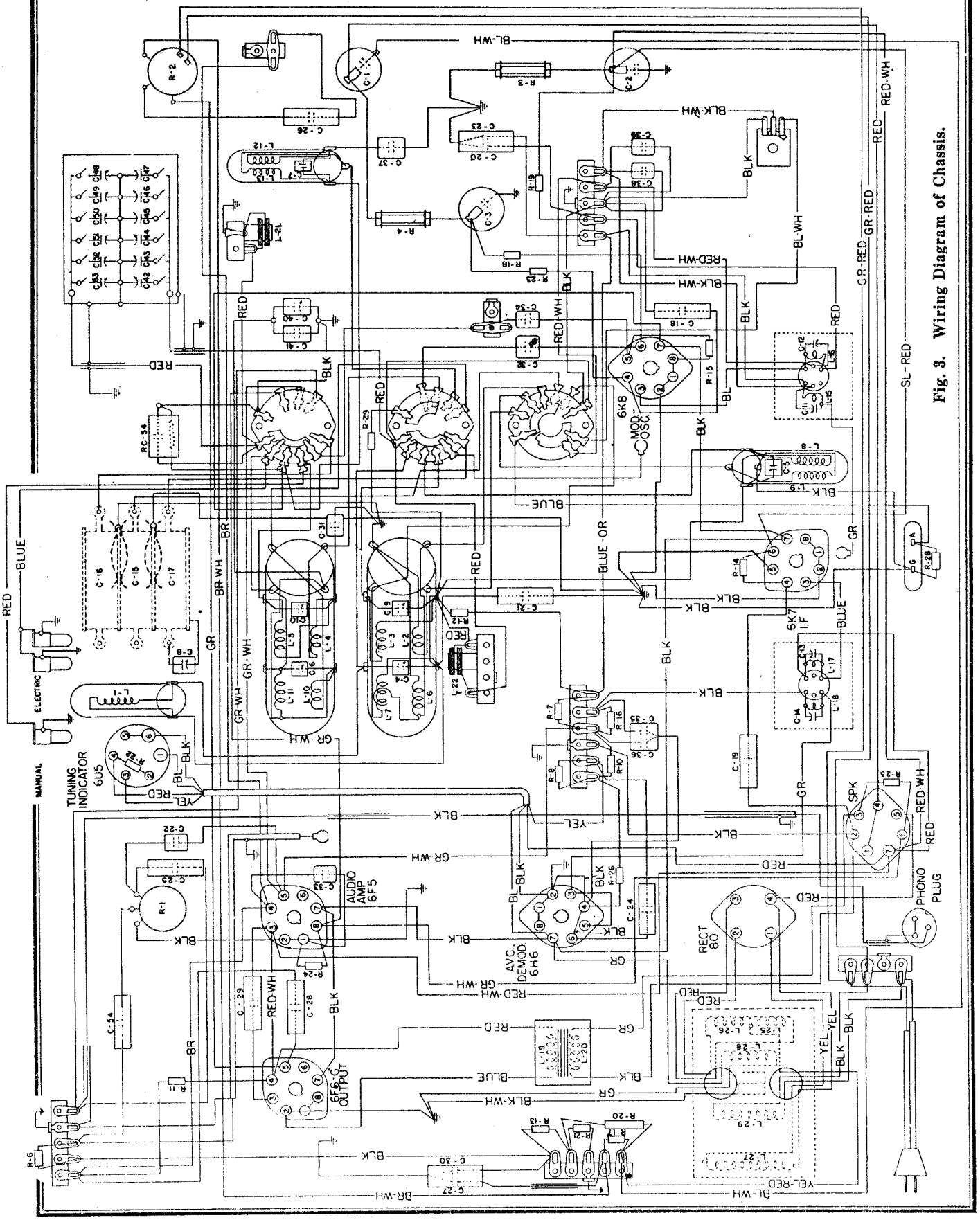


Fig. 3. Wiring Diagram of Chassis.

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MODELS 337H, 337HB
337L, 337LB

# STROMBERG-CARLSON TEL. MFG. CO.

Alignment, Phono. Tuner Data

## OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS

These receivers are equipped with a three-contact phonograph socket, which is connected to the receiver circuit by a short, shielded cable which protrudes from the rear of the chassis base. A three-prong plug is also furnished for connecting the pick-up cable to the phonograph socket.

To obtain the best quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The Record Player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

In order to prevent radio signals from interfering with the phonograph reproduction, it is necessary to set the station selector at some point in either Short Wave range that is devoid of signals. The Record Player's turntable switch should then be pushed to the "on" position. When the turntable has attained speed, raise the pick-up lever and gently place the needle on the record groove nearest the outside rim. Volume should be adjusted for phonograph reproduction as near to the maximum clockwise position (maximum volume) as possible. For radio reception, i. e., by means of the "Volume" and "Off-On-Tone" control knobs located on the front panel of the radio receiver.

If the Stromberg-Carlson Record Player is not used and the electric pick-up is of the high impedance type, it will be necessary to connect a shielded cable between the three-prong socket plug and the pick-up. For best reproduction, this shielded cable should be of the low capacity type. The length of this shielded cable should be kept as short as possible. To connect the shielded cable to the three-prong plug, remove the metal cover of the plug and solder the shield of the cable to that prong which is farthest away from the other two prongs; a short connecting wire must also be soldered from this prong to the upper right-hand prong when looking at the rear of the plug, that is, the side opposite to the prong side. The inside wire conductor of the shielded cable should then be soldered to the other terminal of the plug.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket plug and the pick-up. The transformer should be located as near to the receiver as possible, in which case it will not be necessary to use a shielded cable.

### Instructions for Setting Up the Electric Tuning Arrangement

1. Before proceeding to set up the stations for electric tuning, the radio receiver should be turned "on" for approximately twenty to thirty minutes.
2. Set the Range switch control knob to the manual tuning position for the Standard Broadcast range (arrow on knob pointing in direction of the letter "A").
3. Remove the list of station letters from the P-28781 package assembly which is tacked inside of the cabinet.
4. Remove the two screws which hold the electric tuning escutcheon plate (metal plate). Then, remove from the escutcheon, the strip of transparent material and the strip of paper on which the six stars are printed.
5. Remove the five screws which hold the electric tuning escutcheon to the front panel.
6. From the lists of stations, remove the call letters of the six stations which it is desired to set up for electric tuning. These six stations should preferably be selected and set up in the daytime so that the best service will be obtained at all times.

   CAUTION: Each button adjustment for electric tuning has assigned frequency limits. These limits are designated for each adjustment on the cover plate which covers the electric tuning adjusting capacitors (visible when the electric tuning escutcheon is removed from the cabinet). The six stations should be selected so that the frequency of each station will be within the assigned frequency limits of its associated push button.

   It will be noted that the station letters are printed on partially cut squares to facilitate ease in removing the desired station letters. In setting up these six favorite stations, the following order should be followed:

   Looking at the front of the receiver, the station letters of the station having the highest frequency should be inserted into the farthest left-hand square of the escutcheon. Then, in successive order, according to the frequency, insert the station letters of the remaining five stations into the other five squares of the electric tuning escutcheon; the station letters of the station having the lowest frequency being inserted into the farthest right-hand square of the escutcheon.

   After the six station call letters have been inserted into the escutcheon, the transparent strip should be replaced over the station call letters, and the escutcheon plate then fastened into its position on the electric tuning escutcheon by means of the two screws.

   The tuning adjustments for the six favorite stations can now be made, starting with the station having the highest frequency and proceeding as follows:

7. IMPORTANT: By aid of a screwdriver, rotate the slotted shaft of the electric tuning switch, which is located at the rear of the chassis base, so that the slot of the shaft points in the direction of the word, "Set-Up" (maximum clockwise rotation).
8. With the receiver turned "on", and the Range Switch control knob set to the standard broadcast position (arrow on knob pointing in direction of letter "A"), tune the receiver in the conventional manner by means of the station selector knobs to that station having the highest frequency (of the six chosen for setting up in the electric tuning arrangement) and carefully note the program which it is broadcasting. Then, rotate the Range Switch control knob to the electric tuning position, arrow on knob pointing in direction of the small star (large star and station letters become illuminated).

   Manual or electric tuning for the Standard Broadcast range is easily obtainable by simply rotating the Range Switch control knob so that the arrow on the knob points in the direction of the designation for the desired type of tuning. When manually tuning the receiver in either the Short Wave or Standard Broadcast Wave ranges, the electric tuning arrangement is made inoperative and the dial of the receiver is illuminated. When the Range Switch control knob is set for electric tuning (arrow on Range Switch control knob pointing in direction of the small star), the dial illumination ceases and the station letters of the six stations which are set up for electric tuning become illuminated. When manually tuning these receivers or when setting up the six desired stations for electric tuning resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle.

   1. Set the Electric Tuning and Range Switch control knob to the manual tuning standard broadcast position (arrow on knob pointing in direction of letter "A"). Set the dial pointer by means of the Station Selector knobs to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob to slightly clockwise from its most counter-clockwise position, which is the "normal" position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning Set-Up Switch, located at the rear of the chassis base, so that the slot of the shaft points in the direction of the word, "Set-Up" (maximum clockwise rotation). Rotate the Volume control knob to its maximum clockwise position (maximum volume).
   2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6K8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6K8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
   3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

      Secondary of second I. F. transformer.

      Primary of second I. F. transformer.

      Secondary of first I. F. transformer.

      Primary of first I. F. transformer.

      Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

### Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

CAUTION: Be sure that the Electric Tuning Set-Up Switch is set to the "Set-Up" position.

#### Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver's chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.
3. Adjust the antenna "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

#### Alignment of Short Wave Range (Also Referred to as "B" Range)

In aligning the radio frequency circuits for this range, use the same artificial antenna and antenna binding post as was used for aligning the "C" range, and align this range as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 7 megacycles.
2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.
3. Adjust the antenna "B" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

#### Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.
3. Adjust the antenna "A" range high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Repeat both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

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## APPARATUS SPECIFICATIONS

No. 337-H ..... 50 to 60 Cycles; P-29588 Chassis Assembly; P-27557 Speaker
No. 337-HB ..... 25 to 60 Cycles; P-29589 Chassis Assembly; P-27557 Speaker
No. 337-L ..... 50 to 60 Cycles; P-29588 Chassis Assembly; P-27605 Speaker
No. 337-LB ..... 25 to 60 Cycles; P-29589 Chassis Assembly; P-27605 Speaker

A special temperature controlled compensating capacitor is used in the oscillator circuit of these receivers when operating the electric tuning arrangement in order to eliminate drift in the oscillator's frequency. These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control.

## NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in full operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

| | | | *Terminals of Sockets* | | | | | | | | *Heater Voltages Between Heater Terminals* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Tube* | *Circuit* | *Cap* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | *Socket Terminal Numbers* | *Volts* |
| 6K8 | Mod., Osc. | 0 | 0 | 0 | +230 | +92 | −6.5 | +73 | *6.3* | 0 | 2–7 | *6.3* |
| 6K7 | I. F. Amp. | 0 | 0 | 0 | +230 | +70 | — | +230 | *6.3* | 0 | 2–7 | *6.3* |
| 6H6 | Dem., A. V. C. | — | 0 | 0 | 0 | 0 | 0 | 0 | *6.3* | 0 | 2–7 | *6.3* |
| 6F5 | Audio Amp. | 0 | 0 | 0 | +230 | +56 | 0 | 0 | *6.3* | 0 | 2–7 | *6.3* |
| 6F6G | Audio Output | — | 0 | 0 | +212 | +227 | 0 | — | *6.3* | 0 | 2–7 | *6.3* |
| 6U5 | Tuning Ind. | — | 0 | 0 | +220 | 0 | +45* | *6.3* | — | — | 1–6 | *6.3* |
| 80 | Rectifier | — | +350 | *345* | *345* | +350 | — | — | — | — | 1–4 | *4.8* |
| Speaker Socket | | — | +350 | 0 | 0 | +350 | +350 | 0 | +230 | — | | |

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

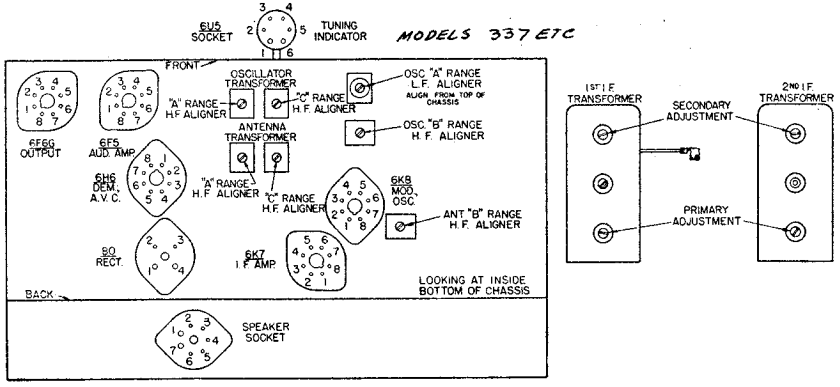



Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Capacitors.

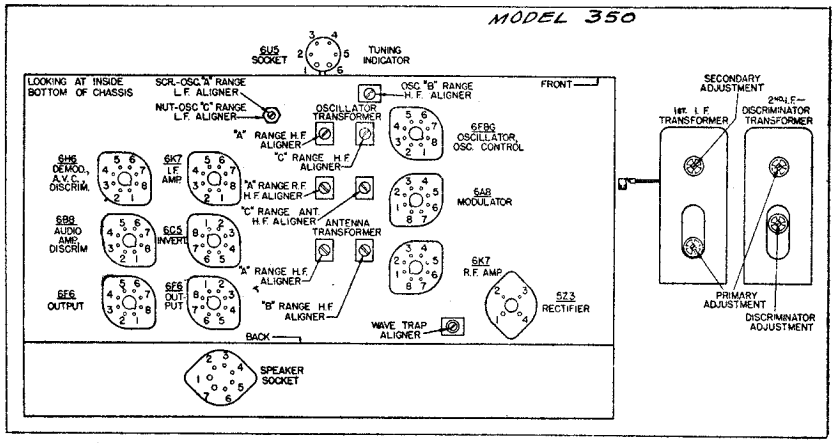



Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments for the R. F., I. F. and Discriminator Circuits.

## NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with all the tubes in their respective sockets except the No. 6U5 tube. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value, in which case the 500 volt scale was used.

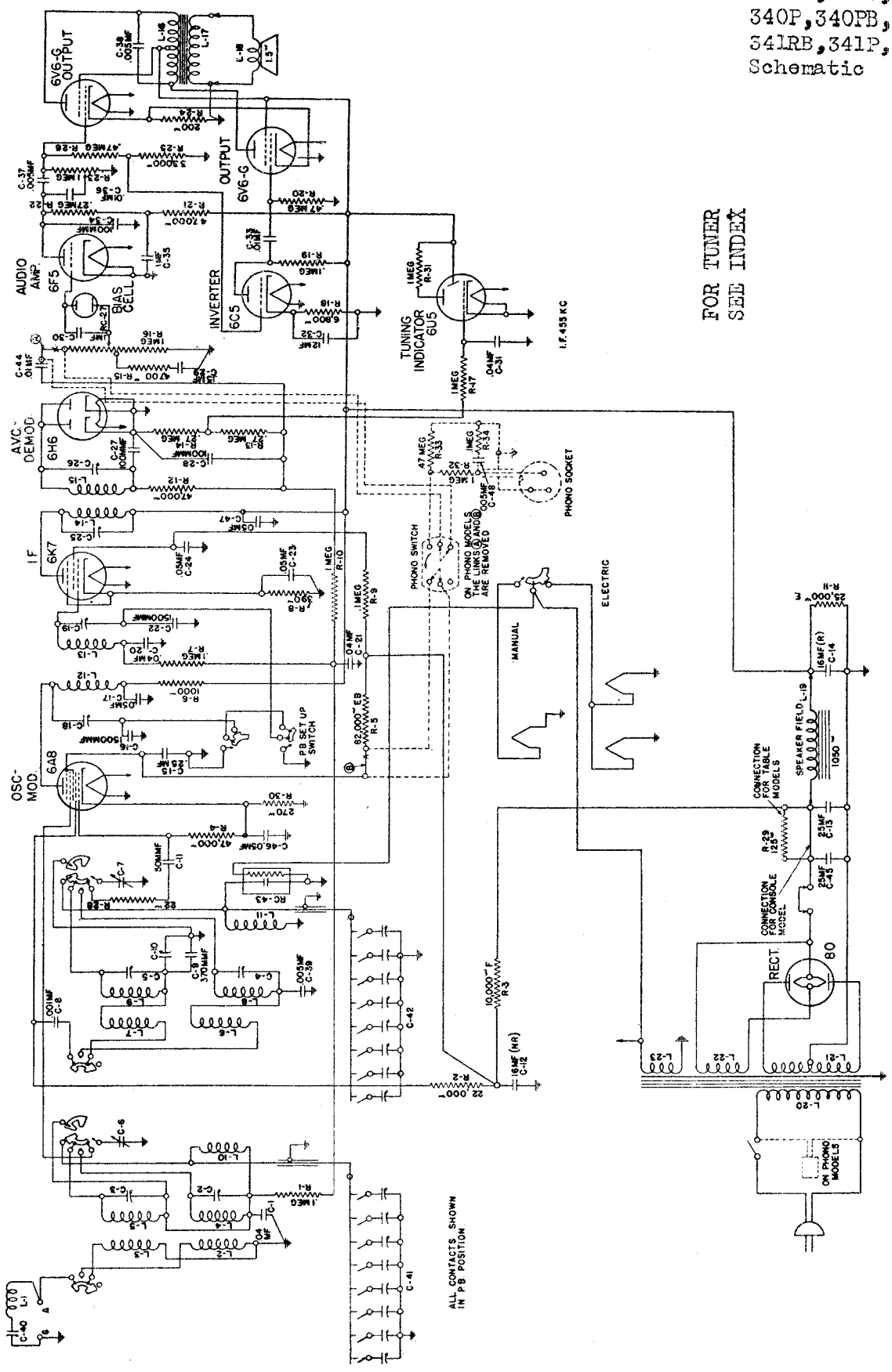
MODEL 350

| | | | *Terminals of Sockets* | | | | | | | | *Heater Voltages Between Heater Terminals* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Tube* | *Circuit* | *Cap* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | *Socket Terminal Numbers* | *Volts* |
| 6K7 | R. F. Amp. | 0 | 0 | 0 | +205 | +99 | 0 | 0 | *6.2* | 0 | 2–7 | *6.2* |
| 6A8 | Modulator | 0 | 0 | 0 | +227 | +99 | −5.9 | +99 | *6.2* | 0 | 2–7 | *6.2* |
| 6F8-G | Oscillator and Oscillator Control | 0 | 0 | 0 | +153 | +7.8 | −5.9 | +152 | *6.2* | 0 | 2–7 | *6.2* |
| 6K7 | I. F. Amp. | 0 | 0 | 0 | +210 | +57 | 0 | +57 | *6.2* | 0 | 2–7 | *6.2* |
| 6H6 | Discriminator, Demodulator, A. V. C. | — | 0 | 0 | 0 | 0 | 0 | 0 | *6.2* | 0 | 2–7 | *6.2* |
| 6B8 | Discriminator, Audio Amp. | 0 | 0 | 0 | +20* | 0 | 0 | +38* | *6.2* | 0 | 2–7 | *6.2* |
| 6C5 | Audio Inv. | — | 0 | 0 | +120 | +215 | 0 | 0 | *6.2* | +5.9 | 2–7 | *6.2* |
| 6F6 | Audio Output | — | 0 | 0 | +300 | +308 | 0 | 0 | *6.2* | +19 | 2–7 | *6.2* |
| 6F6 | Audio Output | — | 0 | 0 | +300 | +308 | 0 | 0 | *6.2* | +19 | 2–7 | *6.2* |
| 6U5† | Tuning Ind. | — | *6.2* | +19 | 0 | +217 | −3 | 0 | — | — | 1–6 | *6.2* |
| 5Z3 | Rectifier | — | +410 | *397* | *397* | +410 | — | — | — | — | 1–4 | *4.8* |
| Speaker Socket | | — | +390 | 0 | 0 | +410 | +410 | 0 | +308 | — | — | — |

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

# STROMBERG-CARLSON TEL. MFG. CO.

MODELS 340F,340FB
340H,340HB,340M
340MB,340V,340VB
340P,340PB,341R
341RB,341P,341PB
Schematic




FOR TUNER SEE INDEX

Fig. 2. Schematic Circuit of Receiver.

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MODELS 340F,340FB
340H,340HB,340M
340MB,340V,340VB
340P,340PB,341R
341RB,341P,341PB
Chassis Wiring

## STROMBERG-CARLSON TEL. MFG. CO.

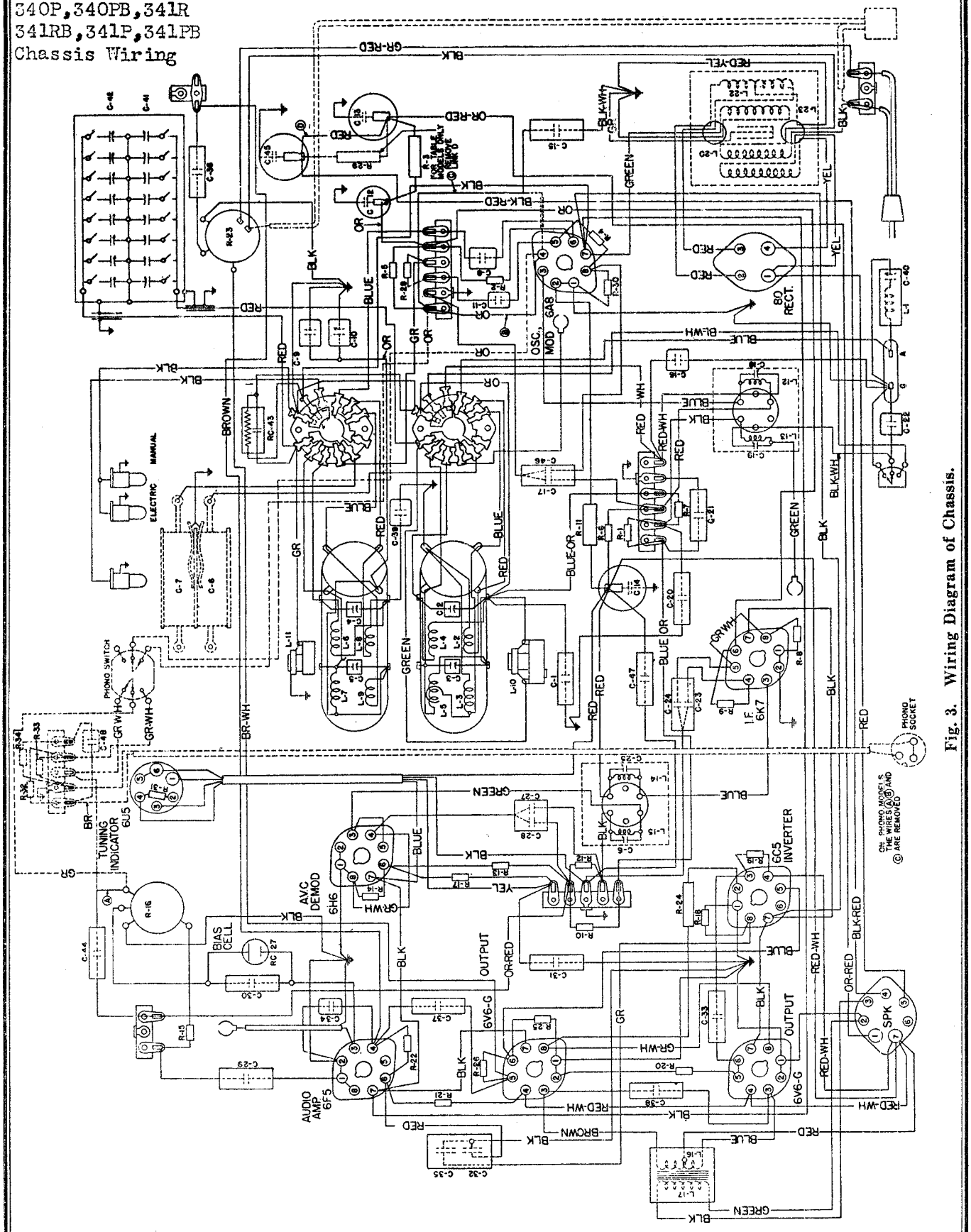


Fig. 3. Wiring Diagram of Chassis.

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# Stromberg-Carlson Nos. 340 and 341 Radio Receivers

STROMBERG-CARLSON TELEPHONE MANUFACTURING COMPANY
ROCHESTER, NEW YORK

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Type of Circuit | Superheterodyne with Electric Tuning |
| Tuning Ranges | Range "A", 530 to 1700 Kc.; Range "C", 5900 to 18,000 Kc. |
| Number and Type of Tubes | 1 No. 6A8; 1 No. 6K7; 1 No. 6H6; 1 No. 6F5; 1 No. 6C5; 2 No. 6V6-G; 1 No. 6U5; 1 No. 80 |
| Power Supply Voltage | 105 to 125 Volts, A. C. |
| Power Frequency Rating | 50 to 60 Cycles and 25 to 60 Cycles |
| Input Power Rating: | |
| Radio Models Only | 80 Watts |
| No. 340-P Radio-Phono Model | 100 Watts |
| No. 341-P Radio-Phono Model | 100 Watts |
| Frequency of Intermediate Amplifier | 455 Kilocycles |

## APPARATUS SPECIFICATIONS

| | | |
|---|---|---|
| No. 340-F | Receiver | 50 to 60 Cycles; P-28961 Chassis Assembly; P-26170 Speaker |
| No. 340-FB | Receiver | 25 to 60 Cycles; P-28962 Chassis Assembly; P-26170 Speaker |
| No. 340-H | Receiver | 50 to 60 Cycles; P-28961 Chassis Assembly; P-26170 Speaker |
| No. 340-HB | Receiver | 25 to 60 Cycles; P-28962 Chassis Assembly; P-26170 Speaker |
| No. 340-M | Receiver | 50 to 60 Cycles; P-28961 Chassis Assembly; P-26170 Speaker |
| No. 340-MB | Receiver | 25 to 60 Cycles; P-28962 Chassis Assembly; P-26170 Speaker |
| No. 340-V | Receiver | 50 to 60 Cycles; P-28961 Chassis Assembly; P-26171 Speaker |
| No. 340-VB | Receiver | 25 to 60 Cycles; P-28962 Chassis Assembly; P-26171 Speaker |
| No. 340-P | Receiver | 60 Cycles Only; P-29419 Chassis Assembly; P-26171 Speaker; P-29717 Phono Unit |
| No. 340-PB | Receiver | 25 Cycles Only; P-29420 Chassis Assembly; P-26171 Speaker; P-29718 Phono Unit |
| No. 341-R | Receiver | 50 to 60 Cycles; P-29051 Chassis Assembly; P-26170 Speaker |
| No. 341-RB | Receiver | 25 to 60 Cycles; P-29052 Chassis Assembly; P-26170 Speaker |
| No. 341-P | Receiver | 60 Cycles Only; P-28968 Chassis Assembly; P-26170 Speaker; P-29443 Phono Unit |
| No. 341-PB | Receiver | 25 Cycles Only; P-28969 Chassis Assembly; P-26170 Speaker; P-29444 Phono Unit |

## CIRCUIT DESCRIPTION

These receivers are nine tube, instantaneous "Electric Tuning" superheterodyne receivers employing metal tubes and a highly efficient dynamic speaker. There are two tuning ranges, the frequency limits of each range being listed under the "Electrical Specifications", given above.

The electric tuning circuit is arranged so that eight favorite stations located in the Standard Broadcast range may be set up for instantaneous selection by means of the push buttons. **(Local and other stations that give the best daytime and evening service should be selected.)** To properly set up the electric tuning arrangement for the eight favorite Standard Broadcast stations, read the section, "Instructions for Setting Up the Electric Tuning Arrangement", appearing on page of this book. Manual or electric tuning for the Standard Broadcast range is easily obtainable by simply rotating the Range Switch control knob so that the arrow on the knob points in the direction of the designation for the desired type of tuning. When manually tuning the receiver in either the Standard Broadcast or Short Wave ranges, the electric tuning arrangement is made inoperative and the dial of the receiver is illuminated. When the Range Switch control knob is set for electric tuning (arrow on Range Switch control knob pointing in direction of the star), the dial illumination ceases and the station letters of the eight stations which are set up for electric tuning become illuminated. When manually tuning these receivers or when setting up the eight desired stations for electric tuning, resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle.

A special temperature controlled compensating capacitor is used in the oscillator circuit of these receivers when operating the electric tuning arrangement in order to eliminate drift in the oscillator's frequency. These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control.

In addition to the above features, the No. 340-P Receiver is also equipped with a single record playing phonograph unit, and the No. 341-P Receiver is equipped with an automatic record changer phonograph unit. These phonograph units use a crystal type pick-up in conjunction with a specially equalized circuit.

The chassis used in the table models differ from the chassis used in the console models in that a 125-ohm resistor, R-29, is added in the rectifier filament circuit. In addition, the chassis used in the No. 341 Receivers differs from the chassis used in the No. 340 Receivers in the type of electrolytic filter capacitors which are used. Also, the radio phonograph models are equipped with a radio-phono switch.

The various tubes are used in these receivers as follows: The No. 6A8 tube functions as both the Modulator and Oscillator tube. The No. 6K7 tube is used in the I. F. Amplifier and the No. 6H6 tube is used as both the Demodulator and Automatic Volume Control tube. The No. 6F5 tube is used in the Audio Amplifier and the No. 6C5 tube is used as the Phase Inverter tube of the Audio Amplifier circuit. The two No. 6V6-G tubes are used in the Audio Power Output Stage. The No. 6U5 tube is used for indicating resonance in the tuning indicator system and the No. 80 tube is the Rectifier tube of the Power Supply Unit.

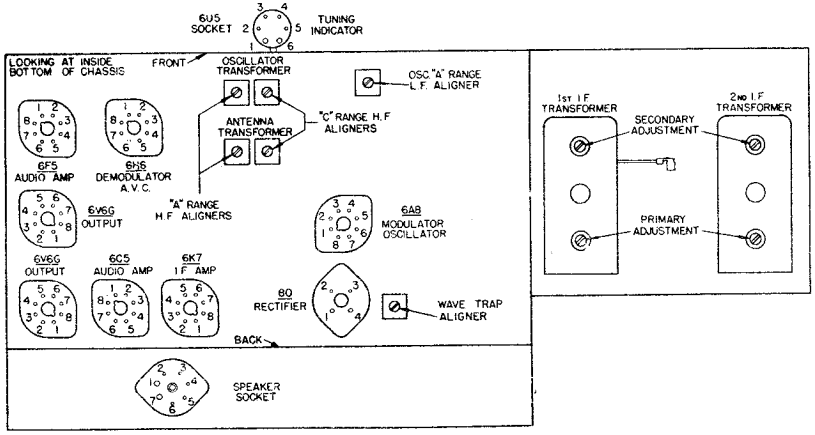


**Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Capacitors.**

## NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in full operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 1000 volt scale was used.

Due to the use of the 125-ohm resistor, R-29, in the chassis used in table models, some socket terminals in the voltage table have two listed voltages; the lower voltage being obtained from those chassis which are equipped with this resistor, and the upper voltages are those obtained from chassis not equipped with this resistor.

| | | | *Terminals of Sockets* | | | | | | | | *Heater Voltages Between Heater Terminals* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Tube* | *Circuit* | *Cap* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | *Socket Terminal Numbers* | *Volts* |
| 6A8 | Mod., Osc. | 0 | 0 | 0 | +245<br>+240 | +109 | −14 | +205 | *6.3* | +2.35 | 2-7 | *6.3* |
| 6K7 | I. F. Amp. | 0 | 0 | 0 | +250<br>+244 | +109* | 0 | +290 | *6.3* | +3.3 | 2-7 | *6.3* |
| 6H6 | Dem., A. V. C. | — | 0 | 0 | 0 | 0 | 0 | 0 | *6.3* | 0 | 2-7 | *6.3* |
| 6F5 | Audio Amp. | 0 | 0 | 0 | 0 | +100* | 0 | +220*<br>+218* | *6.3* | 0 | 2-7 | *6.3* |
| 6C5 | Audio Inv. | — | 0 | 0 | +138*<br>+136* | +250<br>+244 | 0 | 0 | *6.3* | +4.8 | 2-7 | *6.3* |
| 6V6-G | Audio Output | — | 0 | 0 | +244<br>+237 | +250<br>+244 | 0 | 0 | *6.3* | +13.8 | 2-7 | *6.3* |
| 6V6-G | Audio Output | — | 0 | 0 | +244<br>+237 | +250<br>+244 | 0 | 0 | *6.3* | +13.8 | 2-7 | *6.3* |
| 6U5 | Tuning Ind. | — | *6.3* | +139*<br>+135* | 0 | +250<br>+244 | 0 | 0 | — | — | 1-6 | *6.3* |
| 80 | Rectifier | — | +370 | *372* | *372* | +370 | — | — | — | — | 1-4 | *5* |
| Speaker Socket | | | +370 | 0 | 0 | +370 | +370 | 0 | — | — | | |

Receiver tuned manually to 1000 kc., no signal. A. C. voltages are indicated by italics.

P-29976 Issue 1 Printed in U. S. A.

MODELS 340F,340FB
340H,340HB,340M
340MB,340V,340VB

# STROMBERG-CARLSON TEL. MFG. CO.

340P,340PB,341R
341RB,341P,341PB
Alignment

## ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

In making any alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response (position where knob is rotated from its maximum counter-clockwise position, slightly clockwise to position where set turns "on"), and that the slotted shaft of the electric tuning set-up switch, located on the rear of the chassis base, points in the direction of the word "Set-Up". When the aligning adjustments have been completed the slotted shaft of the electric tuning set-up switch should be rotated so that the slot points in the direction of the word, "Operate". Figure 1, shows the location of all the aligning capacitors in these receivers.

### Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. Then, with the gang tuning capacitors in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

### Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning standard broadcast position (arrow on knob pointing in direction of letters "BR."). Set the dial pointer by means of the Station Selector knobs to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position, which is the "normal" position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning Set-Up switch located at the rear of the chassis base, so that the slotted shaft points in the direction of the word "Set-Up" (max-mum clockwise rotation). Rotate the Volume control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal.
3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:
   - Secondary of second I. F. transformer.
   - Primary of second I. F. transformer.
   - Secondary of first I. F. transformer.
   - Primary of first I. F. transformer.

Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

### Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

#### Alignment of Short Wave Range (Also Referred to as "C" Range)

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the Short Wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 17 megacycles.
2. Adjust the oscillator's "C" range high frequency aligner for maximum output.
3. Adjust the antenna's "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

#### Alignment of Standard Broadcast Range (Also Referred to as "A" Range)

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the oscillator's "A" range high frequency aligner for maximum output.
3. Adjust the antenna's "A" range high frequency aligner for maximum output.
4. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
5. Adjust the oscillator's "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2 and 3.

### Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast position (arrow on knob pointing in direction of letters "BR."). Set the dial pointer to 1000 kilocycles and the Electric Tuning Set-Up Switch, located on the back of the receiver chassis, to the "Set-Up" position.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a minimum indication is obtained on the output meter.

**IMPORTANT:** When all the aligning adjustments have been completed, it is important that the Electric Tuning Set-Up Switch (located on the rear of the receiver chassis) be re-set to the "Operate" position.

## OBTAINING REPRODUCTION FROM PHONOGRAPH RECORDS FOR NOS. 340 AND 341 RECEIVERS NOT EQUIPPED WITH A RECORD PLAYING UNIT

In order to obtain reproduction of phonograph records in conjunction with these receivers, the following instructions should be followed.

To equip these receivers for phonograph operation, it will be necessary to purchase and install a Stromberg-Carlson, P-29712 Package Assembly. The rear of the chassis base of the receiver is already drilled for this assembly. Complete instructions on how to install and operate this assembly are furnished with each P-29712 Package Assembly.

To obtain the best quality of phonograph reproduction from these receivers, a Stromberg-Carlson Record Player is recommended. The record player is equipped with a correctly designed single record playing motor unit, and uses a crystal type pick-up in conjunction with a specially equalized circuit.

If the Stromberg-Carlson Record Player is not used and the electric pick-up to be used is of the high impedance type, it will be necessary to connect a low capacity shielded cable between the three-prong socket and plug of the P-29712 Package Assembly, and the pick-up. This shielded cable should be of the low capacity type. The length of the shielded cable used should be kept as short as possible.

If a pick-up of the low impedance type is used, it will be necessary to connect a "matching transformer" between the three-prong socket and plug of the P-29712 Package Assembly, and the pick-up. The transformer should be located as near to the receiver as possible in which case it will not be necessary to use a shielded cable.

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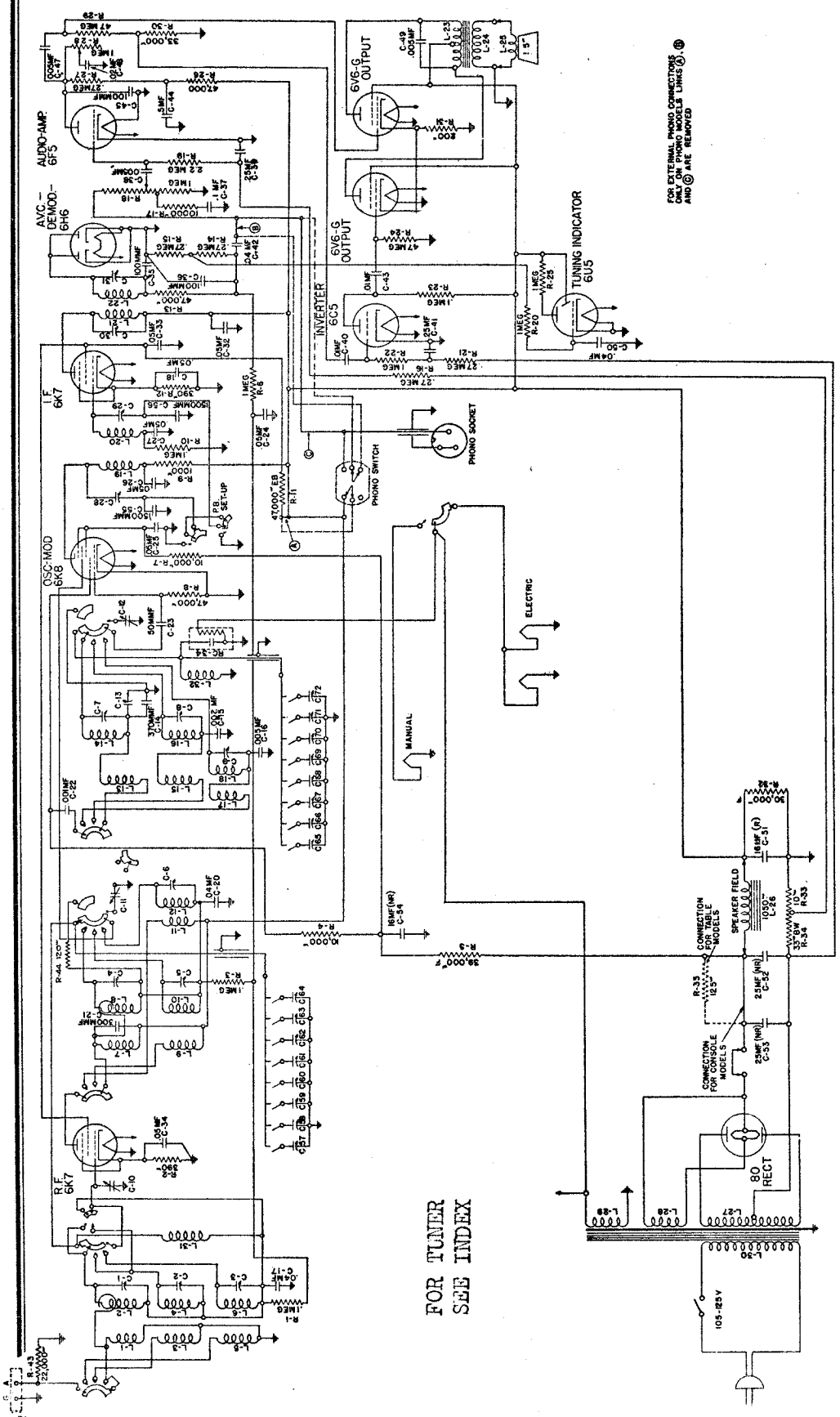
MODELS 345F, 345FB
345M, 345MB

# STROMBERG-CARLSON TEL. MFG. CO.

Schematic




## ELECTRICAL SPECIFICATIONS

Type of Circuit.....Superheterodyne with Electric Tuning
Tuning Ranges.....A—.53 to 1.7 Mc.; B—2.25 to 7.6 Mc.; C—7.6 to 23 Mc.
Number and Type of Tubes.....1 No. 6K8, 2 No. 6K7, 1 No. 6H6, 1 No. 6F5, 1 No. 6C5, 2 No. 6V6G, 1 No. 6U5, 1 No. 80
Voltage Rating.....105 to 125 Volts
Power Frequency Rating.....25 to 60 Cycles and 50 to 60 Cycles
Input Power Rating.....85 Watts
Frequency of Intermediate Amplifier.....455 Kilocycles

## APPARATUS SPECIFICATIONS

No. 345-F Receiver.....50 to 60 Cycles; P-29447 Chassis Assembly; P-26170 Speaker
No. 345-FB Receiver.....25 to 60 Cycles; P-29448 Chassis Assembly; P-26170 Speaker
No. 345-M Receiver.....50 to 60 Cycles; P-29447 Chassis Assembly; P-26170 Speaker
No. 345-MB Receiver.....25 to 60 Cycles; P-29448 Chassis Assembly; P-26170 Speaker

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MODELS 345F, 345FB
345M, 345MB

# STROMBERG-CARLSON TEL. MFG. CO.

Chassis Wiring

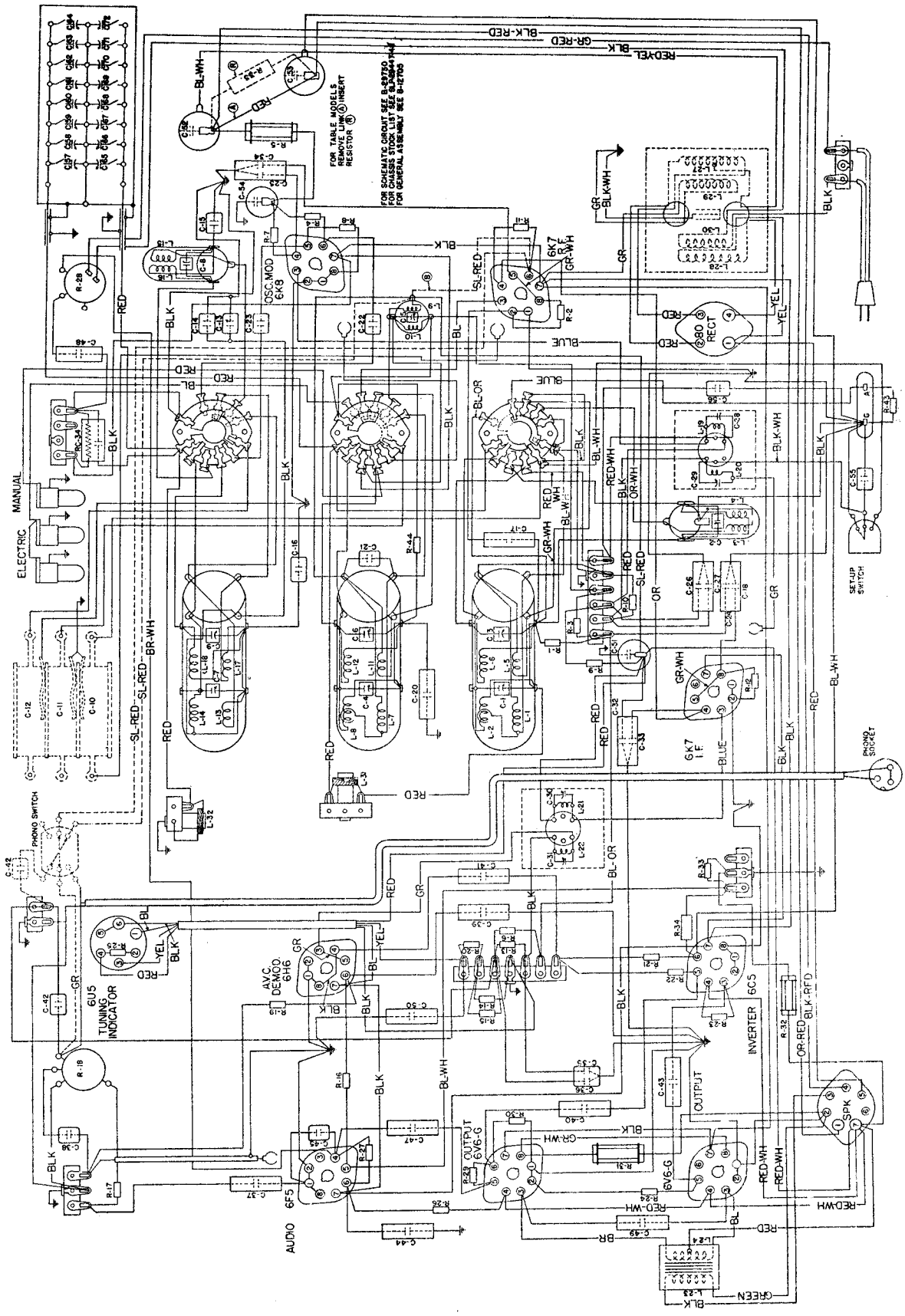


Fig. 3. Wiring Diagram of Chassis.

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## NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in full operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

| | | | *Terminals of Sockets* | | | | | | | | *Heater Voltages Between Heater Terminals* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Tube* | *Circuit* | *Cap* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | *Socket Terminal Numbers* | *Volts A. C.* |
| 6K7 | R. F. Amp. | 0 | 0 | 0 | +240 | +81 | +2.5 | +240 | *6.3* | +2.5 | 2-7 | *6.3* |
| 6K8 | Mod., Osc. | 0 | 0 | 0 | +215 | +73 | −6.0 | +81 | *6.3* | 0 | 2-7 | *6.3* |
| 6K7 | I. F. Amp. | 0 | 0 | 0 | +240 | +81 | +2.5 | 0 | *6.3* | +2.5 | 2-7 | *6.3* |
| 6H6 | Dem., A. V. C. | — | 0 | 0 | 0 | 0 | 0 | 0 | *6.3* | 0 | 2-7 | *6.3* |
| 6F5 | Audio Amp. | 0 | 0 | 0 | 0 | +83* | −1.0 | +190 | *6.3* | 0 | 2-7 | *6.3* |
| 6C5 | Audio Inv. | — | 0 | 0 | +105 | +240 | +.1 | −5.0 | *6.3* | 0 | 2-7 | *6.3* |
| 6V6G | Audio Output | — | 0 | 0 | +235 | +240 | 0 | 0 | *6.3* | +14 | 2-7 | *6.3* |
| 6V6G | Audio Output | — | 0 | 0 | +235 | +240 | 0 | 0 | *6.3* | +14 | 2-7 | *6.3* |
| 6U5 | Tuning Ind. | — | *6.3* | +20* | +.1 | +240 | 0 | 0 | — | — | 1-6 | *6.3* |
| 80 | Rectifier | — | +370 | *360* | *360* | +370 | — | — | — | — | 1-4 | *4.9* |
| Speaker Socket | | — | +370 | 0 | 0 | +370 | +370 | 0 | +240 | — | — | — |

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

## ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no re-adjustments are necessary. However, should it become necessary to make any re-adjustments, the alignment procedure given in the following paragraphs should be carefully followed. In order to make these aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

To accurately align the circuits in these receivers, it is necessary to use a high grade, modulated test oscillator (Signal Generator), the output voltage of which can be varied. In conjunction with this test oscillator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker.

**IMPORTANT:** In making any R. F. or I. F. alignment adjustments, always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained. Never attempt to make any alignment adjustments using a strong signal. Before proceeding with the alignment of any R. F. or I. F. circuits in these receivers be sure that the "Off-On-Tone" control knob is set for maximum treble response, and that the Electric Tuning Set-Up Switch, located on the rear of the chassis base, is rotated to the "Set-Up" position. When the aligning adjustments have been completed the Electric Tuning Set-Up Switch should be rotated back to the "Operate" position. Figure 1, shows the location of all the aligning capacitors in these receivers.

### Dial Adjustment

Before aligning the circuits of any of these receivers, the tuning dial must be properly aligned to track with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Station Selector" knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. Then, with the gang tuning capacitors in this position, the dial pointer should be placed on the horizontal center line of the dial. To do this, align the pointer with the short black line located at the extreme right-hand edge of the dial plate.

### Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. In making these circuit adjustments always align the circuits in the order given in these instructions.

1. Set the Electric Tuning and Range Switch control knob to the manual tuning Standard Broadcast range position (arrow on knob pointing in direction of letter "A"). Set the dial pointer by means of the Station Selector knobs to the extreme low frequency position on the receiver's dial. Rotate the "Off-On-Tone" control knob slightly clockwise from its most counter-clockwise position. By aid of a screwdriver rotate the slotted shaft of the Electric Tuning Set-Up Switch located at the rear of the chassis base, so that the slot points in the direction of the word "Set-Up". Rotate the Volume control knob to its maximum clockwise position (maximum volume).
2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6K8 modulator-oscillator tube, a modulated signal of 455 kilocycles from the test oscillator, using a 0.1 microfarad capacitor in series with the connection between the output terminal of the test oscillator and the grid of the No. 6K8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the test oscillator should be connected to either the chassis base or the ground binding post terminal of the receiver.
3. Now, noting from Figure 1, the aligning capacitors for the first and second I. F. transformers, align the I. F. circuits in the following manner:

   Secondary of second I. F. transformer.

   Primary of second I. F. transformer.

   Secondary of first I. F. transformer.

   Primary of first I. F. transformer.

   Adjusting the circuits to obtain maximum reading on the output meter, reducing the output of the test oscillator as required.

### Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

**CAUTION:** Be sure that the Electric Tuning Set-Up Switch is set to the "Set-Up" position.

**Alignment of Short Wave Range, "C"**

In aligning the radio frequency circuits for this range, replace the 0.1 microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver's chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Rotate the Electric Tuning and Range Switch control knob to the "C" Short Wave range position, and set the test oscillator's frequency and the receiver's tuning dial to 20 megacycles.
2. Adjust the receiver's oscillator "C" range H. F. aligner for maximum output.
3. Adjust the R. F. transformer "C" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "C" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.

**Alignment of Short Wave Range, "B"**

In aligning the radio frequency circuits for this range, use the same artificial antenna (400 ohm resistor) and antenna binding post as was used for aligning the "C" range, and align as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the "B" Short Wave range position, and set the test oscillator's frequency and the receiver's tuning dial to 7 megacycles.
2. Adjust the receiver's oscillator "B" range H. F. aligner for maximum output.
3. Adjust the R. F. transformer's "B" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "B" range H. F. aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.

**Alignment of Standard Broadcast Range, "A"**

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Rotate the Electric Tuning and Range Switch control knob to the manual tuning Standard Broadcast range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range H. F. aligner for maximum output.
3. Adjust the R. F. transformer's "A" range H. F. aligner for maximum output.
4. Adjust the antenna "A" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range L. F. aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitors slightly back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillators frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

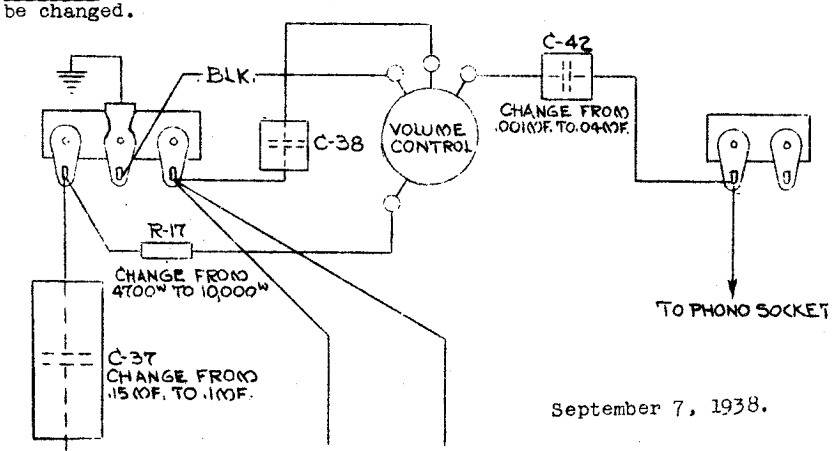
## Increasing Bass Reponse Of 345 Receivers

Remove the 4700 ohm resistor (R-17) from the volume control tap and replace with a 10,000 ohm resistor, Pc. 26345.

Remove the .15 mf capacitor (C-37) from the volume control tap and replace with a .1 mf capacitor, Pc. 24402.

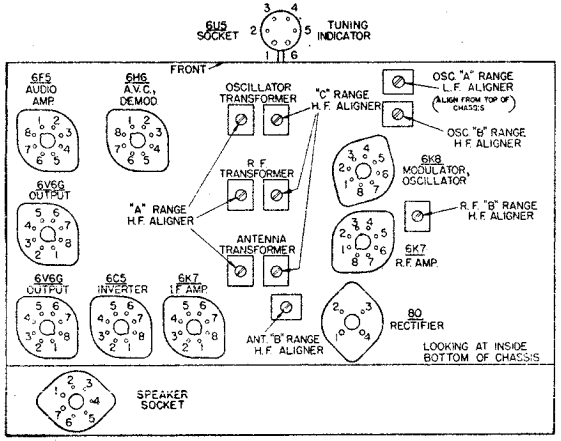
Remove the .001 mf capacitor (C-42) from the high side of the volume control and replace with a .04 mf capacitor, Pc. 24405.

Caution: Do not mistake capacitor C-38 for one of the capacitors to be changed.




September 7, 1938.

VOLUME CONTROL CIRCUIT



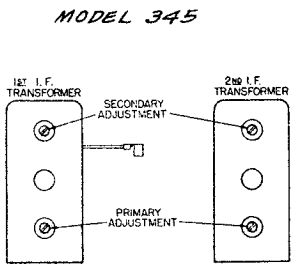




Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Various Aligning Capacitors.

## APPARATUS SPECIFICATIONS

No. 335-L Receiver.....50 to 60 Cycles; P-28818 Chassis Assembly; P-27605 Loud Speaker
No. 335-LB Receiver.....25 to 60 Cycles; P-28819 Chassis Assembly; P-27605 Loud Speaker
No. 336-P Receiver.....60 Cycles Only; P-29415 Chassis; P-29439 Phono Unit; P-29464 Loud Speaker
No. 336-PB Receiver.....25 Cycles Only; P-29416 Chassis; P-29440 Phono Unit; P-29464 Loud Speaker

## NORMAL VOLTAGE READINGS

The values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with the tubes in their respective sockets. The receiver is, therefore, in full operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value in which case the 250 volt scale was used.

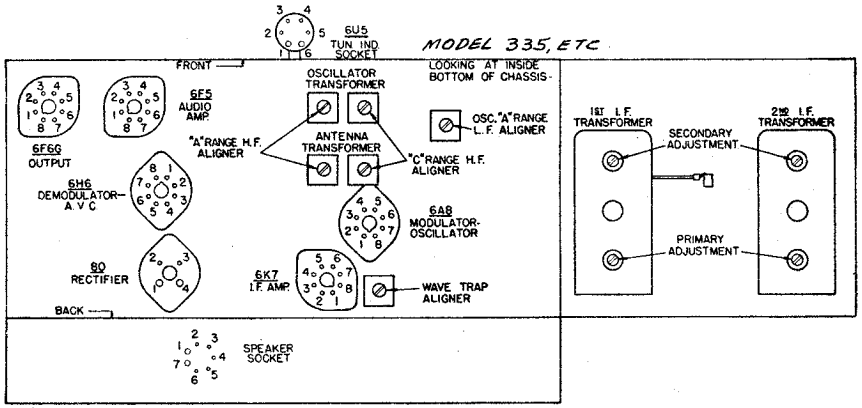



Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Capacitors.

| | | | Terminals of Sockets MODELS 335 ETC. | | | | | | | | Heater Voltages Between Heater Terminals | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Tube* | *Circuit* | *Cap* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | *Socket Terminal Numbers* | *Volts* |
| 6A8 | Mod., Osc. | 0 | 0 | 0 | +245 | +68 | −10 | +235 | *6.2* | +2.8 | 2–7 | *6.2* |
| 6K7 | I. F. Amp. | 0 | 0 | 0 | +250 | +78 | +2.8 | +280 | *6.2* | +2.8 | 2–7 | *6.2* |
| 6H6 | Dem., A. V. C. | — | 0 | 0 | 0 | 0 | 0 | 0 | *6.2* | 0 | 2–7 | *6.2* |
| 6F5 | Audio Amp. | 0 | 0 | 0 | +250 | +56 | 0 | 0 | *6.2* | 0 | 2–7 | *6.2* |
| 6F6G | Audio Output | — | 0 | 0 | +235 | +250 | 0 | 0 | *6.2* | +14.5 | 2–7 | *6.2* |
| 6U5 | Tuning Ind. | — | *6.2* | +18* | −1.5 | +250 | 0 | 0 | — | — | 1–6 | *6.2* |
| 80 | Rectifier | — | +360 | *350* | *350* | +360 | — | — | — | — | 1–4 | *5.0* |
| Speaker Socket | | | +360 | 0 | 0 | +360 | +360 | 0 | +250 | — | | |

Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics.

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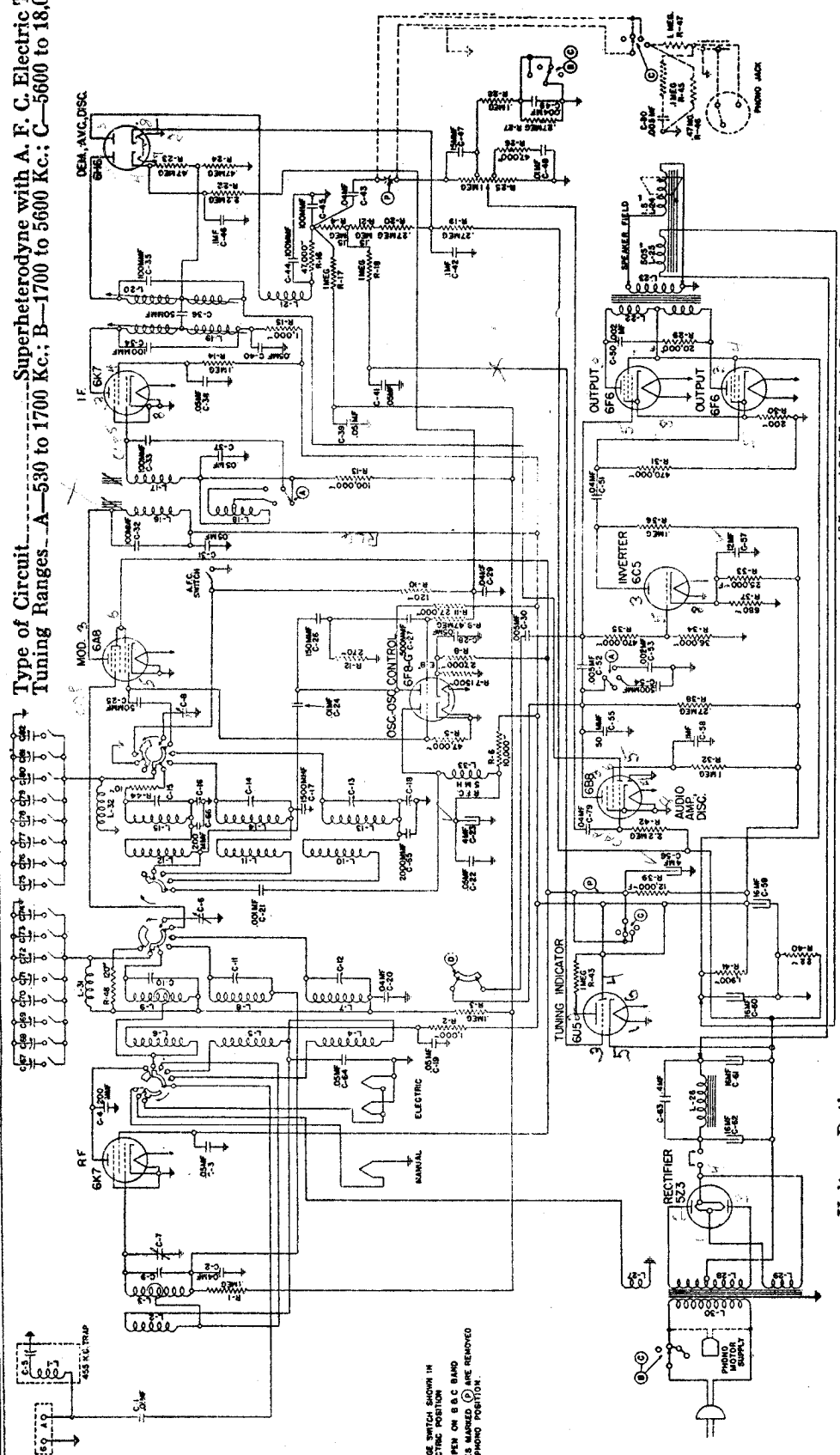
MODELS 350M,350MB
350R,350RB,350P
350PB,350V,350VB
Schematic

# STROMBERG-CARLSON TEL. MFG. CO.

Type of Circuit.....Superheterodyne with A. F. C. Electric Tuning
Tuning Ranges..A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc.




## APPARATUS SPECIFICATIONS

| | |
|---|---|
| Voltage Rating | 105 to 125 Volts, A. C. |
| Power Frequency Rating | See "Apparatus Specifications" |
| Input Power Rating: | |
| Radio Models Only | 120 Watts |
| Radio-Phono. Models | 140 Watts |
| Frequency of Intermediate Amplifier | 455 Kilocycles |

| | |
|---|---|
| No. 350-M Receiver | 50 to 60 Cycles; P-29043 Chassis; P-27504 Speaker |
| No. 350-MB Receiver | 25 to 60 Cycles; P-29044 Chassis; P-27504 Speaker |
| No. 350-R Receiver | 50 to 60 Cycles; P-29043 Chassis; P-27504 Speaker |
| No. 350-RB Receiver | 25 to 60 Cycles; P-29044 Chassis; P-27504 Speaker |
| No. 350-P Receiver | 60 Cycles Only; P-29066 Chassis; P-27504 Speaker; P-29443 Phono. Motor Unit |
| No. 350-PB Receiver | 25 Cycles Only; P-29067 Chassis; P-27504 Speaker; P-29444 Phono. Motor Unit |
| No. 350-V Receiver | 50 to 60 Cycles; P-29043 Chassis; P-27504 Speaker |
| No. 350-VB Receiver | 25 to 60 Cycles; P-29044 Chassis; P-27504 Speaker |

FOR TUNER
SEE INDEX

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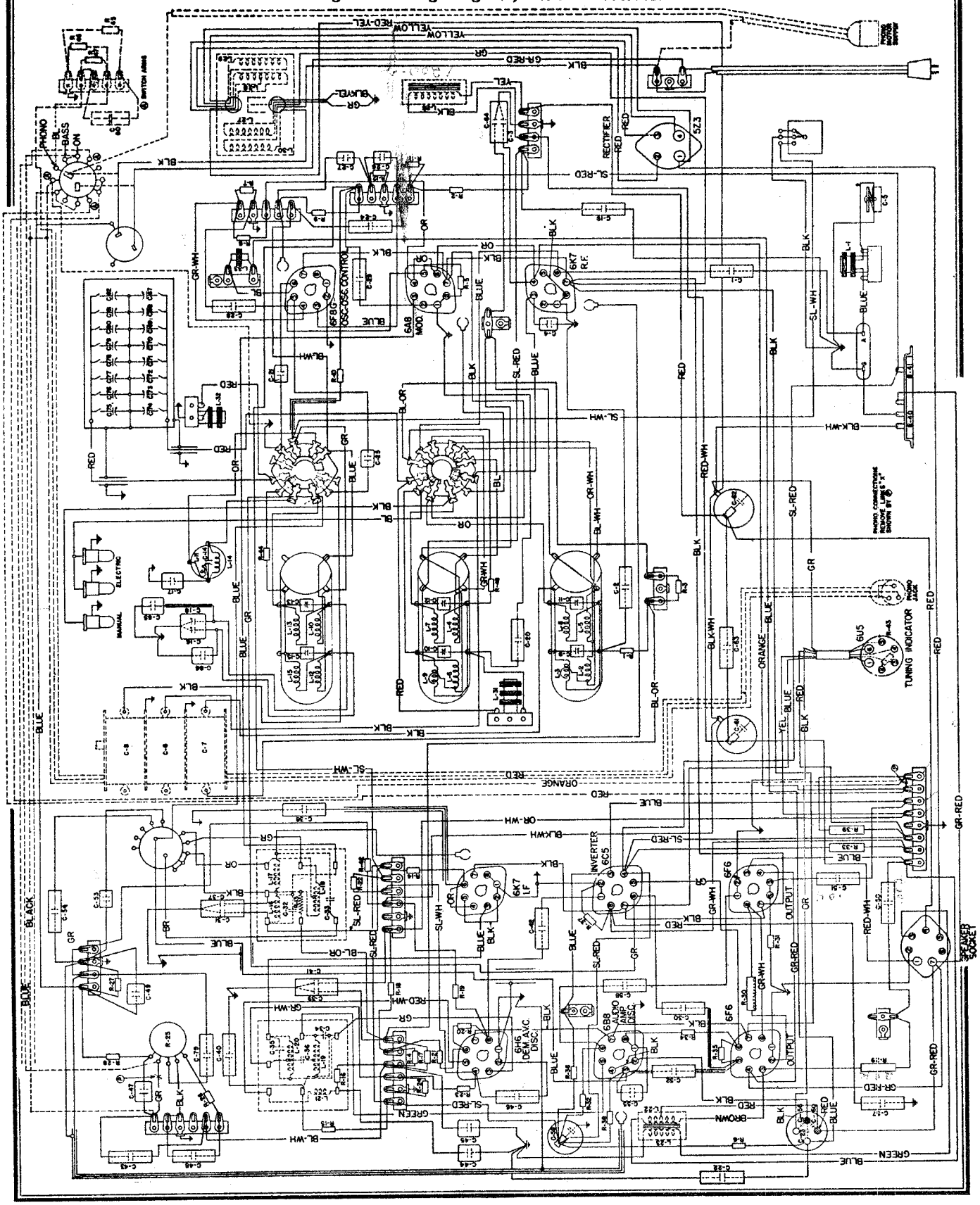
MODELS 350M,350MB
350R,350RB,350P
350PB,350V,350VB
Chassis Wiring

STROMBERG-CARLSON TEL. MFG. CO.

**Fig. 3. Wiring Diagram, No. 350 Receiver.**

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## ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a milliammeter having a range of 0 to 10 milliamperes connected in series with that cathode of the No. 6F8-G tube which is used in the oscillator control circuit by means of an adapter plug inserted between the tube and its socket. The leads to the meter should not be longer than 15", and should be shunted at the socket connections by a capacitor of not less than 0.25 Mfd.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

Before proceeding with the alignment of any circuits in these receivers, except when specifically directed, be sure that the Fidelity Control knob is set for the "Normal" position. The "Off-On-Bass" control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed in these instructions. Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

### Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitor. To check whether the dial is set correctly with respect to the gang tuning capacitor, rotate the "Rapid Station Selector" knob in a clockwise direction so that the gang tuning capacitor is set to its maximum capacity position. Then, with the receiver turned "on", the illuminated dial indicator line should be exactly centered over the dial alignment lines (black lines) which are located at the extreme low frequency end of each scale on the dial. If these lines do not center over the illuminated dial indicator line, loosen the two set screws located on the hub of the dial. Then, rotate the dial so that these alignment lines are centered over the illuminated dial indicator line. The two set screws of the dial hub should then be securely tightened.

### Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

1. Operate the Range Switch of the receiver to the manual tuning, Standard Broadcast range position, and set the tuning dial to its extreme low frequency position. Set the Fidelity control knob to its "Normal" position, and the "Off-On-Bass" control knob to its normal position.

   CAUTION: **Never attempt to align the R. F. or I. F. circuits of this receiver with the Fidelity control knob set at any position other than the "Normal" position and the Range Switch control knob set at the "Electric" tuning position unless specifically directed in the following paragraphs. Also, do not make any aligning adjustments of the R. F., I. F., or "Discriminator" circuits with the A. F. C. switch (which is located on rear of the chassis base) set at the "set-up" position.**

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 455 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.

3. Now, noting from Fig. 1, the alignment adjustments for the First and Second I. F. transformers, align the I. F. circuits in the following order:

   Adjust the Second I. F. transformer primary circuit for maximum output.

   Adjust the First I. F. transformer primary circuit for maximum output.

   Adjust the First I. F. transformer secondary circuit for maximum output.

   Carefully make all of the above adjustments, watching carefully the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

4. To adjust the Discriminator circuit proceed as follows:

   Check the position of the Range Switch control knob which should be set to the manual tuning Standard Broadcast position.

   CAUTION: **Before adjusting this circuit be sure that the I. F. amplifier is tuned exactly to 455 kilocycles.** With the signal generator still set at a frequency of 455 kilocycles, adjust the signal generator's output control so that a signal of 50,000 to 100,000 microvolts is fed into the No. 6A8 modulator tube. Now, observe the reading of the milliammeter which is connected in series with the cathode of the No. 6F8-G oscillator control tube, and rotate the Range Switch control knob to the "Electric" position, observing whether there is any difference in the reading of the milliammeter. When this circuit is correctly adjusted, there should be no difference in the reading of the milliammeter when the Range Switch control knob is rotated from the manual tuning Standard Broadcast to the "Electric" position. If there is any difference in the milliammeter reading while rotating this control knob from the manual tuning Standard Broadcast to the "Electric" position and vice versa, adjust the "Discriminator" circuit by means of the screw adjustment until the meter reading has the same value regardless of whether the Range Switch control knob is rotated to the manual tuning Standard Broadcast or "Electric" position. When this condition is obtained, the Discriminator circuit is properly adjusted.

### Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, the Fidelity Control knob should be set for "Normal" operation, and the "Off-On-Bass" control knob should also be set for "Normal" operation.

**Alignment of Short Wave Range (Also Referred to as "C" Range)**

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 16 megacycles.
2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.
3. Adjust the antenna "C" range high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
4. Set the test oscillator's frequency and the receiver's tuning dial to 6 megacycles.
5. Adjust the receiver's oscillator "C" range low frequency aligner (series aligner), and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
6. Reset both the test oscillator's frequency and the receiver's tuning dial to 16 megacycles and repeat operations Nos. 2 and 3.

**Alignment of Medium Wave Range (Also Referred to "B" Range)**

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 5 megacycles.
2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.
3. Adjust the antenna "B" range high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

**Alignment of Standard Broadcast Range (Also Referred to as "A" Range)**

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the manual tuning Standard Broadcast "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.
3. Adjust the R. F. interstage "A" range high frequency aligner for maximum output.
4. Adjust the antenna's "A" range high frequency aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

### Wave Trap Adjustment

In adjusting the wave trap circuit, set the Electric Tuning and Range Switch control knob to the manual tuning, Standard Broadcast position (arrow on knob pointing in direction of gold dot). Set the tuning dial to 1000 kilocycles.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a **minimum** indication is obtained on the output meter.

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MODELS 235H, 235HB
235L, 235LB

**STROMBERG-CARLSON TEL. MFG. CO.**

Continuity Test

Continuity test chart for No. 235 Receivers.

Jan. 17, 1938.

1. Test speaker socket with speaker left out.

2. Plug speaker in speaker socket for all other tests.

3. Set A.F.C. Switch on rear of chassis base to "Operate" position for all tests unless otherwise specified.

4. Before making continuity test, disconnect one end of the spring from the Manual-Electric switch lever. Pull Manual-Electric switch lever out for "Manual" operation. Push Manual-Electric switch lever in for "Electric" operation.

A. Operate A.F.C. switch on rear of chassis to "Set Up" position; should read 120W.

Operate A.F.C. switch on rear of chassis to "Operate" position; should read 4 M.

B. Operate A.F.C. switch on rear of chassis to "Set Up" position; should read 550,000W.

Operate A.F.C. switch on rear of chassis to "Operate" position; should read 4 M.

C. Operating volume control clockwise should read from "S" to 800,000W.

FOR OTHER SERVICING DATA, SEE INDEX

Other tests not shown on chart.

Test from Electric tuning pilot lamp socket. Operate Manual-Electric switch to "Manual" position; should read "O". Operate Manual-Electric switch to "Electric" position; should read "S".
Test from main dial pilot lamp socket. Operate Manual-Electric switch to "Manual" position; should read "S". Operate Manual-Electric switch to "Electric" position; should read "O".
Test from Ant. terminal on back of chassis base. Operate range switch to "A" band; should read 8W. Operate range switch to "B" band; should read 1W. Operate range switch to "C" band; should read .5W.
Test from Grd. terminal on back of chassis base; should read "S".
Test from terminals of A.C. plug to chassis base; should read "O".
Test between terminals of AC plug; should read 8W with A.C. switch closed; should read "O" with A.C. switch open.
Test from the Stator Plates of the oscillator section of the variable capacitor (located near front of chassis) to the switch side of the .001 capacitor (located next to the "A" and "B" band series aligner). Operate range switch to "A" band; should read 10W. Operate range switch to "B" band; should read 2W. Operate range switch to "C" band; should read 1W.

| Tube | Circuit | Grid Clip | Terminals of Sockets 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6-J-5 | Osc.Control | | S | S | 55000W | A | B | 30000W | S | 2700W |
| 6-A-8 | Mod. Osc. | 1.8M | S | S | 11000W | 55000W | 55000W | 20000W | S | 300W |
| 6-K-7 | I.F.Amp. | 3. M | S | S | 12000W | 150000W | 400W | 20000W | S | 400W |
| 6-H-6 | Discrimin. Dem. | | S | S | 450000W | 1. M | 450000W | 450000W | S | S |
| 6-B-8 | A.V.C.Audio | C | S | S | 550000W | S | 800000W | 800000W | S | 270W |
| 6-F-6 | Output | | S | S | 11000W | 11000W | 900000W | 20000W | S | 400W |
| 6-U-5 | Tuning Ind. | | S | 1.1M | 1.5M | 12000W | 270W | S | | |
| 5-Y-4G | Rectifier | | 0 | 0 | 170W | 0 | 200W | 0 | 12000W | 12000W |
| Spk. Output | Socket Rear of Chas. | | 300000W | S | S | 300000W | 0 | 0 | 12000W | |

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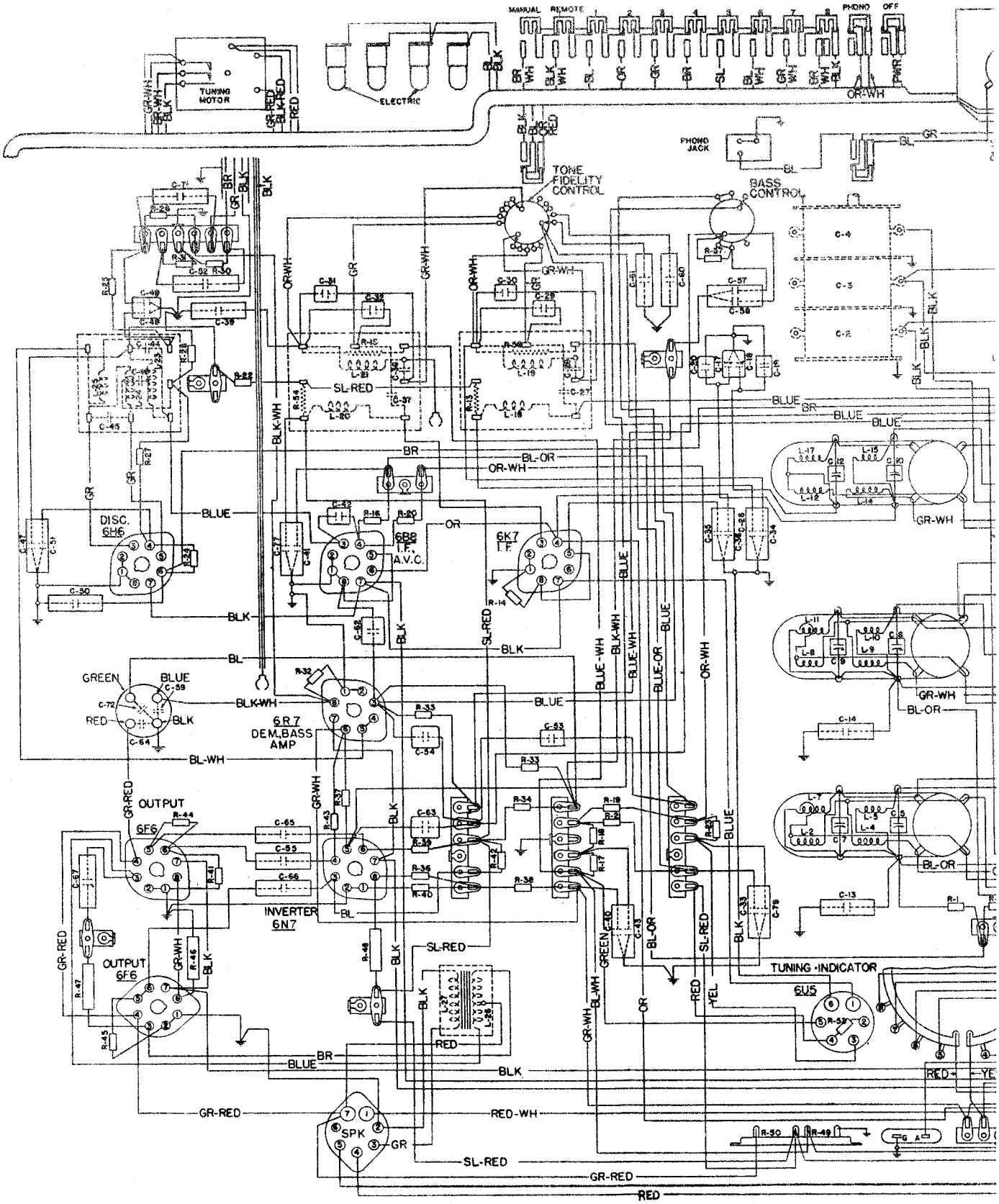


Fig. 3. Wiring Diagram of Chassis.

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MODELS 360M, 360MB
Chassis Wiring

## CIRCUIT DESCRIPTION

The Stromberg-Carlson No. 360 Radio Receivers are twelve tube, "Electric Tuning", adjustable high fidelity receivers with three tuning ranges. The electric tuning circuit combines a highly efficient motor and selector circuit in combination with an automatic frequency control circuit. The electric tuning circuit is arranged so that eight favorite stations located in the Standard Broadcast range may be set up for selection by means of the push buttons (local and other stations that give the best daytime and evening service should be selected).

These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control. A separate "Bass" control is also provided to increase or decrease the response at the lower (bass) audio frequencies if this is desired.

These receivers are also equipped with a special arrangement of the Stromberg-Carlson, Selector dial indicator. This design of dial arrangement enables the operator to easily identify the service and frequency range to which the range switch control knob is set by means of the yellow disc (located at the right-hand edge of the dial), which moves in a vertical direction in conjunction with the rotation of the Range Switch control knob.

MODELS 360M, 360MB

# STROMBERG-CARLSON TEL. MFG. CO. Schematic

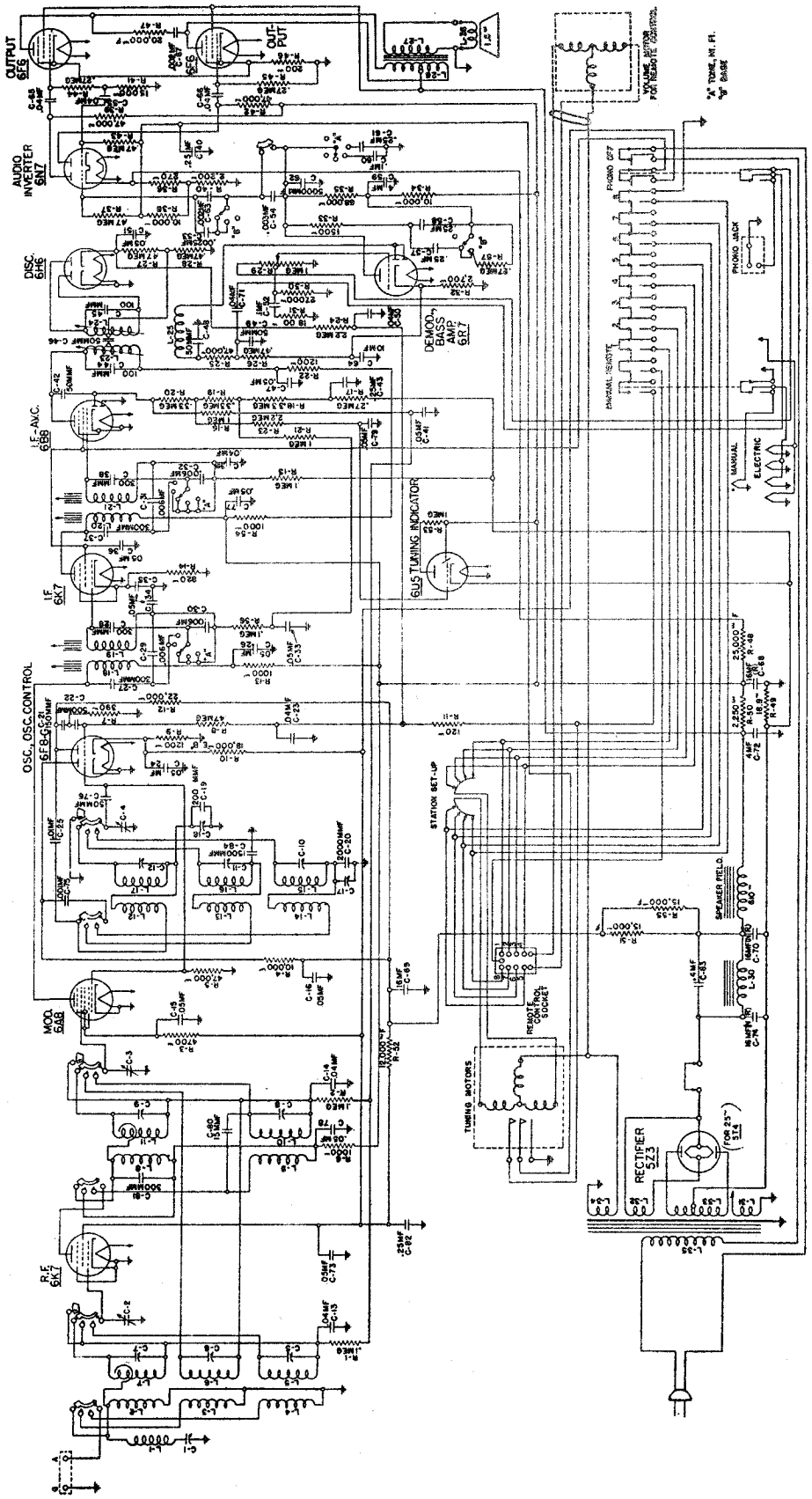

Fig. 2. Schematic Circuit of Receiver.

For data on setting up electric tuning system and remote control see Index.

## ELECTRICAL SPECIFICATIONS

| | |
|---|---|
| Type of Circuit | Superheterodyne with A. F. C. Electric Tuning |
| Tuning Ranges | A—530 to 1700 Kc.; B—1700 to 5600 Kc.; C—5600 to 18,000 Kc. |
| Number and Type of Tubes | { 2 No. 6K7, 1 No. 6A8, 1 No. 6F8-G, 1 No. 6B8, 1 No. 6H6, 1 No. 6R7, 1 No. 6N7, 2 No. 6F6, 1 No. 6U5, 1 No. 5Z3 |
| Voltage Rating | 105 to 125 Volts, A. C. |
| Power Frequency Rating | See "Apparatus Specifications" |
| Input Power Rating | 140 Watts |
| Frequency of Intermediate Amplifier | 455 Kilocycles |

## APPARATUS SPECIFICATIONS

| | |
|---|---|
| No. 360-M Receiver | 50 to 60 Cycles; P-29068 Chassis; P-29072 Speaker |
| No. 360-MB Receiver | 25 to 60 Cycles; P-29069 Chassis; P-29072 Speaker |

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## ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

If the above conditions are not obtained, the signal generator should be set to exact resonance with the intermediate frequency amplifier (455 kilocycles) as mentioned in 1 above and the secondary adjustment of the Third I. F. Discriminator transformer should be rotated so zero voltage is indicated on the voltmeter connected across C-51.

Now, adjust the signal generator's frequency a slight amount (approximately 5 kilocycles) each side of 455 kilocycles, noting at the same time the reading of the voltmeter; a decrease in the signal generator's frequency (from 455 kilocycles) should make the voltmeter give an increased reading from zero and an increase in the signal generator's frequency (455 kilocycles) should make the voltmeter give a decreased indication from zero.

### Radio Frequency Adjustments

The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.

When making any aligning adjustments of these circuits, all controls should be set at the positions mentioned for the Intermediate Frequency adjustments.

**Alignment of Short Wave Range (Also Referred to as "C" Range)**

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial to 16 megacycles.
2. Adjust the receiver's oscillator "C" range high frequency aligner for maximum output.
3. Adjust the R. F. interstage "C" range high frequency aligner for maximum output and at the same time rotate the gang tuning capacitors back and forth through resonance until maximum output is obtained.
4. Adjust the antenna "C" range high frequency aligner for maximum output, at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
5. Set the test oscillator's frequency and the receiver's tuning dial to 6 megacycles.
6. Adjust the receiver's oscillator "C" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and the receiver's tuning dial to 16 megacycles and repeat operations Nos. 2, 3 and 4.

**Alignment of Medium Wave Range (Also Referred to as "B" Range)**

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial to 5 megacycles.
2. Adjust the receiver's oscillator "B" range high frequency aligner for maximum output.
3. Adjust the antenna "B" range high frequency aligner for maximum output, and at the same time rotate the gang tuning capacitor back and forth through resonance until maximum output is obtained.

**Alignment of Standard Broadcast Range (Also Referred to as "A" Range)**

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch to the manual tuning Standard Broadcast "A" range position and set the test oscillator's frequency and the receiver's tuning dial to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range high frequency aligner for maximum output.
3. Adjust the R. F. interstage "A" range high frequency aligner for maximum output.
4. Adjust the antenna's "A" range high frequency aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial to 0.6 megacycles.
6. Adjust the receiver's oscillator "A" range low frequency aligner (series aligner) for maximum output, and at the same time rotate the gang tuning capacitor slightly back and forth through resonance until maximum output is obtained.
7. Reset both the test oscillator's frequency and receiver's tuning dial to 1.5 megacycles and repeat operations Nos. 2, 3 and 4.

### Wave Trap Adjustment

In adjusting the wave trap circuit, set the Range Switch control knob to the Standard Broadcast position (arrow on knob pointing in direction of gold dot). Push the push button located under the designation "Manual On" and set the tuning dial to 1000 kilocycles.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a high resistance voltmeter having a resistance of at least 1000 ohms per volt.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

Before proceeding with the alignment of any circuits in these receivers, be sure that the Treble Control knob is set for the "Normal" position. The "bass" control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed otherwise in these instructions. Figure 1 shows the location of all the aligning capacitors or adjustments for this receiver.

### Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Manual Stations" selector knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. With the gang tuning capacitors at this position, the dial pointer should be centered over the two dial alignment marks located near the extreme right-hand edge of the dial. One of these marks is a vertical line located beneath the standard broadcast scale, and the other mark is a small triangle located beneath the short wave scale of the dial. If the dial pointer does not center over these two marks, the screw located at the bottom of the dial pointer assembly should be loosened so that the pointer can be centered over the two marks. When this has been accomplished the screw should be securely tightened again.

### Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

1. Push in the push button which is located under the designation, "Manual On". Operate the Range Switch of the receiver to the Standard Broadcast range position, and set the tuning dial pointer to its extreme low frequency position. Set the Treble control knob and the Bass control knob to their normal positions.

   **CAUTION: Never attempt to align the R. F. or I. F. circuits of this receiver with the Treble control knob set at any position other than the "Normal" position. Also, do not make any aligning adjustments of the R. F., I. F., or "Discriminator" circuits with any push button other than the one located under the designation "Manual On" pushed in.**

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 455 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.
3. Now, noting from Figure 1, the alignment adjustments for the First, Second, and Third I. F.-Discriminator transformers, align the I. F. circuits in the following order:

   Secondary of Third I. F.-Discriminator transformer for maximum output.

   Primary of Third I. F.-Discriminator transformer for maximum output.

   Secondary of Second I. F. transformer for maximum output.

   Primary of Second I. F. transformer for maximum output.

   Secondary of First I. F. transformer for maximum output.

   Primary of First I. F. transformer for maximum output.

   Carefully make all of the above adjustments, watching the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

### Adjustment of the Discriminator Circuit

1. **Before making this circuit adjustment be sure that the I. F. amplifier and signal generator are exactly in resonance at 455 kilocycles.**

   All controls should be set the same as instructed for the intermediate frequency adjustments. Connect a high resistance voltmeter having a resistance of at least 1000 ohms per volt across the capacitor, C-51. The signal generator should remain connected to the grid of the No. 6A8 modulator tube in the same manner as connected when making the aligning adjustments of the intermediate frequency amplifier circuits. The signal generator's output control should be adjusted so that a signal of 10,000 microvolts is fed into the modulator tube. Under these conditions the voltmeter connected across C-51 should read zero.

Connect a 200-micro-microfarad capacitor in series with the output terminal of the modulated test oscillator and the antenna binding post on the receiver, and the ground terminal of the test oscillator to the ground binding post on the receiver. Then, with the modulated test oscillator set at the frequency of the intermediate amplifier, 455 kilocycles, supply a fairly strong signal to the receiver and adjust the wave trap aligner until a **minimum** indication is obtained on the output meter.

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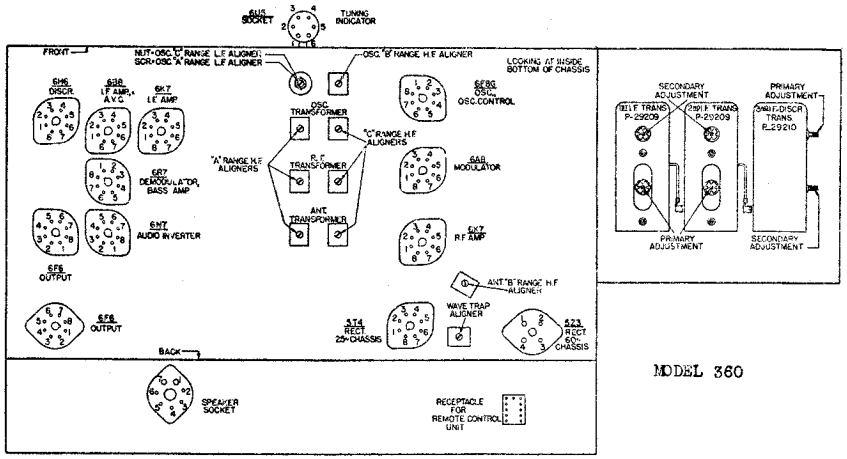


MODEL 360

**Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments.**

## NORMAL VOLTAGE READINGS

The various values of voltages listed in the following table are obtained by measuring between the various tube socket contacts and the chassis base, with all the tubes in their respective sockets. The receiver is, therefore, in operation when the measurements are made. Figure 1, shows the terminal layout of the sockets with the proper terminal numbers.

Voltages are given for a line voltage of 120 volts, and allowance should be made for differences when the line voltage is higher or lower. A meter having a resistance of 1000 ohms per volt should be used for measuring the D. C. voltages. Voltage values shown are those obtained on the lowest possible scale of a meter having the following ranges: 0-2.5, 0-10, 0-100, 0-250, 0-500, 0-1000 volts except when an asterisk appears after any given voltage value, in which case the 500 volt scale was used, or when a double asterisk appears the 1000 volt scale was used.

| | | | *Terminals of Sockets* | | | | | | | | *Heater Voltages Between Heater Terminals* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Tube* | *Circuit* | *Cap* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | *Socket Terminal Numbers* | *Volts* |
| 6K7 | R. F. Amp. | 0 | 0 | 0 | +230 | +104 | 0 | +82 | *6.2* | 0 | 2-7 | *6.2* |
| 6A8 | Modulator | 0 | 0 | 0 | +227 | +82 | −8.6** | +82 | *6.2* | 0 | 2-7 | *6.2* |
| 6F8-G | Oscillator and Oscillator Control | 0 | 0 | 0 | +172 | +8.3 | −8.6** | +170 | *6.2* | 0 | 2-7 | *6.2* |
| 6K7 | I. F. Amp. | 0 | 0 | 0 | +240 | +104 | +3.3 | 0 | *6.2* | +3.3 | 2-7 | *6.2* |
| 6B8 | I. F. Amp. and A. V. C. | 0 | 0 | 0 | +218 | 0 | 0 | +104 | *6.2* | 0 | 2-7 | *6.2* |
| 6R7 | Demodulator and Bass Amp. | 0 | 0 | 0 | +100* | 0 | 0 | +25* | *6.2* | +3.8 | 2-7 | *6.2* |
| 6H6 | Discriminator | — | 0 | 0 | 0 | 0 | 0 | 0 | *6.2* | 0 | 2-7 | *6.2* |
| 6N7 | Audio Inv. | — | 0 | 0 | +160 | 0 | 0 | +155 | *6.2* | +29 | 2-7 | *6.2* |
| 6F6 | Audio Output | — | 0 | 0 | +312 | +320 | 0 | 0 | *6.2* | +19.5 | 2-7 | *6.2* |
| 6F6 | Audio Output | — | 0 | 0 | +312 | +320 | 0 | 0 | *6.2* | +19.5 | 2-7 | *6.2* |
| 6U5 | Tuning Ind. | — | *6.2* | +12.4 | −1.4 | +237 | −2.8 | 0 | — | — | 1-6 | *6.2* |
| 5Z3 | Rectifier | — | +435 | *429* | *426* | +435 | — | — | — | — | 1-4 | *4.8* |
| Speaker Socket | | — | +415 | 0 | 0 | +440 | +449 | 0 | +320 | — | | |
| Voltage Across Motor Winding | | 22 | Receiver tuned manually to 1000 Kc., no signal. A. C. voltages are indicated by italics. | | | | | | | | | |

MODEL 370

## CIRCUIT DESCRIPTION

The Stromberg-Carlson No. 370 Radio Receivers are fourteen tube, "Electric Tuning", adjustable high fidelity receivers with four tuning ranges. The electric tuning circuit combines a highly efficient motor and selector circuit in combination with an automatic frequency control circuit. The electric tuning circuit is arranged so that eight favorite stations located in the Standard Broadcast range may be set up for selection by means of the push buttons (local and other stations that give the best daytime and evening service should be selected). To properly set up the electric tuning arrangement for the eight favorite broadcast stations, read the section, "Instructions for Setting Up Electric Tuning Arrangement"

When manually tuning these receivers or when setting up the eight desired stations for electric tuning, resonance with a signal is indicated by means of the tuning indicator tube which operates on the cathode-ray principle. The strength of a received signal may be determined by observing the size of the aperture appearing on the target of the tube; the stronger a received signal the greater the reduction in the size of the aperture.

These receivers are also provided with a low level bass frequency compensating circuit in conjunction with the volume control circuit so that balanced reproduction is obtained for any setting of the volume control. A separate "Bass" control is also provided to increase or decrease the response at the lower (bass) audio frequencies if this is desired.

These receivers are also equipped with a special arrangement of the Stromberg-Carlson, Selector dial indicator. This design of dial arrangement enables the operator to easily identify the service and frequency range to which the range switch control knob is set by means of the yellow disc (located at the right-hand edge of the dial), which moves in a vertical direction in conjunction with the rotation of the range switch control knob.

The various tubes are used in these receivers as follows: One No. 6K7 is used in the R. F. Amplifier and the other two are used in the I. F. Amplifier. The No. 6A8 tube is used as the Modulator tube and the No. 6F8-G tube is used for both Oscillator and Oscillator Control tube. One No. 6H6 tube is used as the Demodulator and Automatic Volume Control tube and the other No. 6H6 tube is used in the Discriminator circuit for Automatic Frequency control. The No. 6R7 tube is used in the Bass Amplifier and the No. 6F5 tube is used in the Audio Amplifier. The No. 6C5 tube is used as the Phase Inverter tube of the Audio Amplifier circuit and the two No. 6L6 tubes are used in the Audio Power Output Stage. The No. 6U5 tube is used for indicating resonance in the Tuning Indicator System. The No. 5Z3 tube is the Rectifier tube of the power supply for these receivers designed for operation on a power supply having a frequency of 50 to 60 cycles; models of these receivers designed for operation on a power supply having a frequency of 25 to 60 cycles, use a No. 5T4 tube as the Rectifier tube of the power supply.

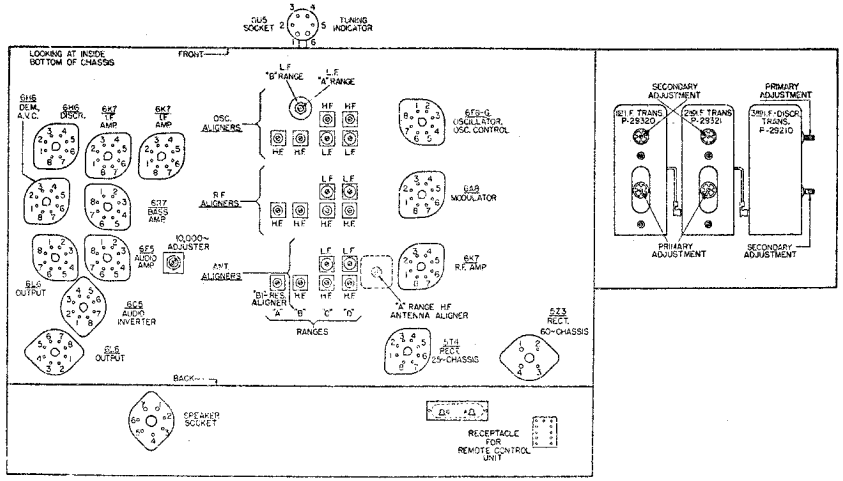


**Fig. 1. Terminal Layout for Voltage Measurement Chart and Location of the Aligning Adjustments.**

MODELS 370M, 370MB
Schematic

# STROMBERG-CARLSON TEL. MFG. CO.

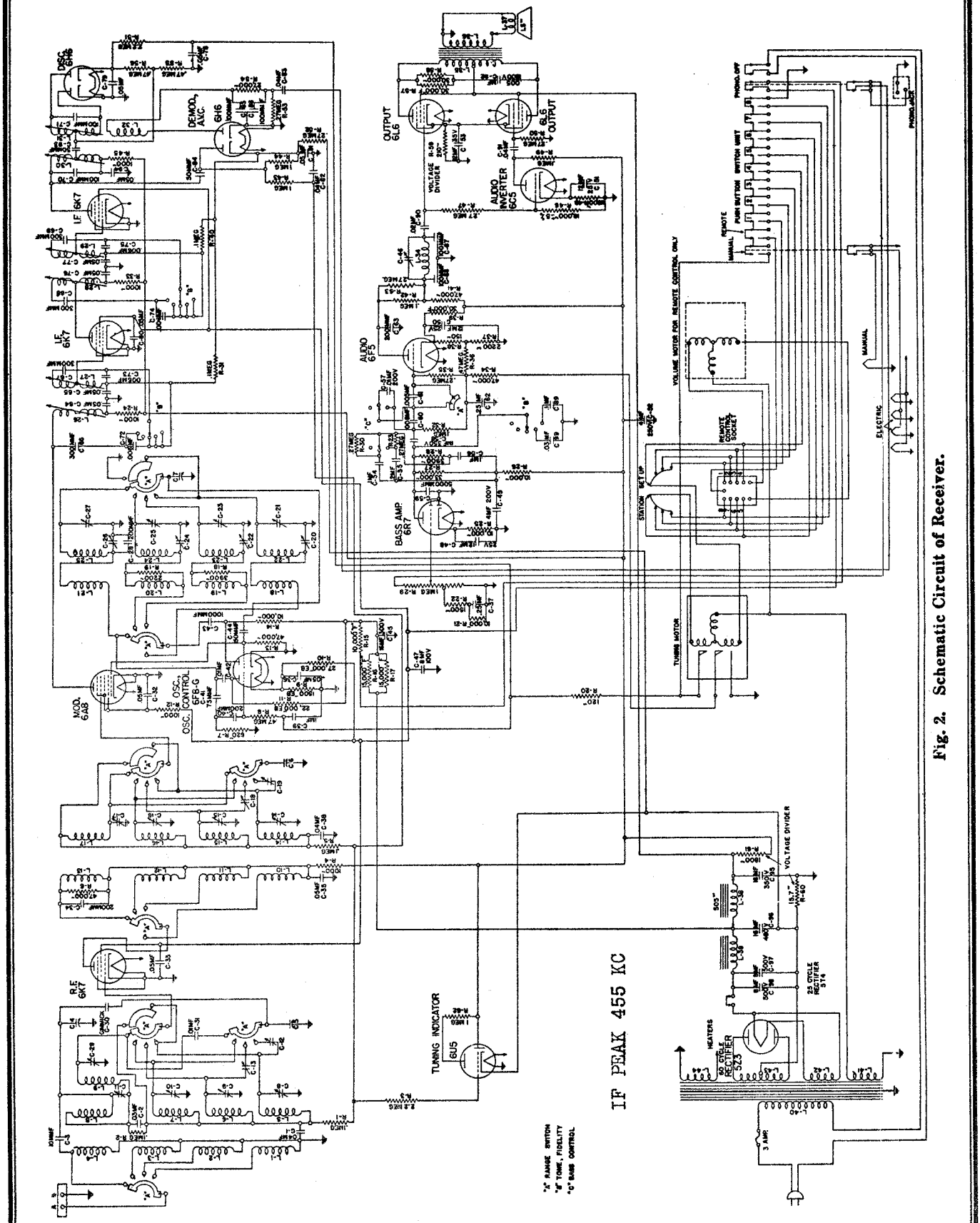


Fig. 2. Schematic Circuit of Receiver.

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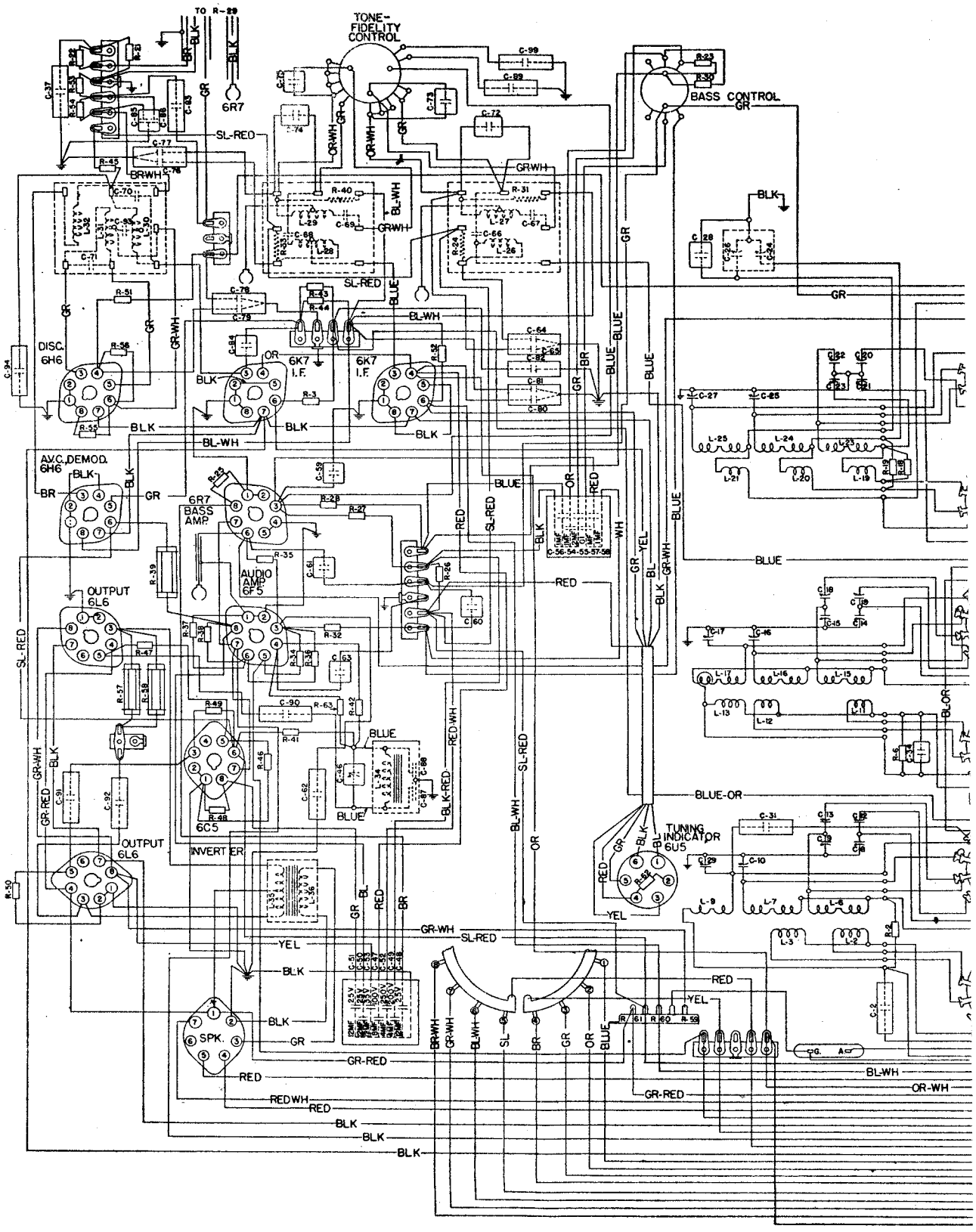
**No. 370-M Receiver**.....50 to 60 Cycles; P-29070 Chassis; P-29072 Speaker
**No. 370-MB Receiver**.....25 to 60 Cycles; P-29071 Chassis; P-29072 Speaker

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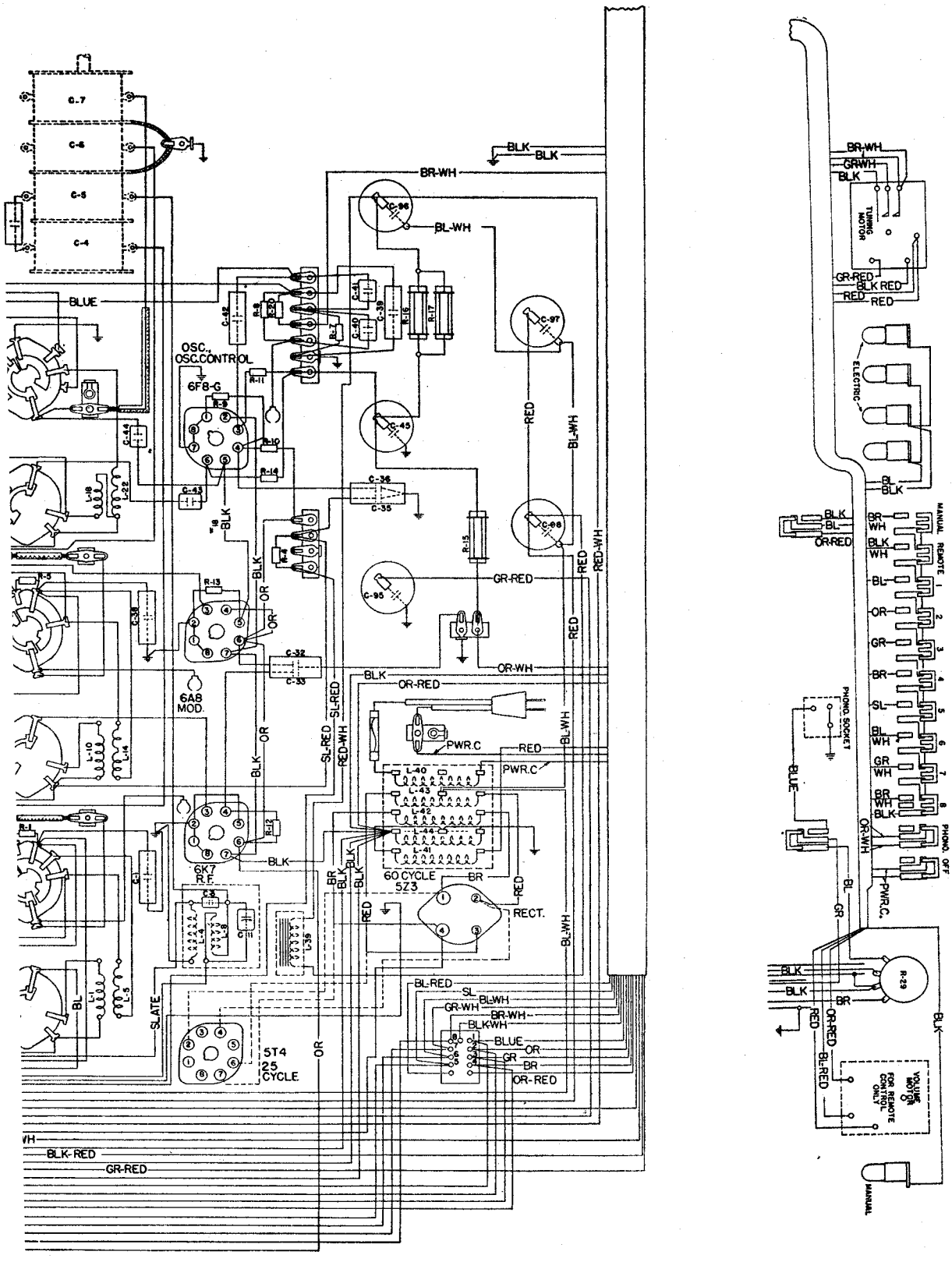
MODELS 370M, 370MB
Chassis Wiring

## TEL. MFG. CO.

| | |
|---|---|
| Voltage Rating | 105 to 125 Volts, A. C. |
| Power Frequency Rating | See "Apparatus Specifications" |
| Input Power Rating | 155 Watts |
| Frequency of Intermediate Amplifier | 455 Kilocycles |



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## ALIGNMENT DATA

All alignment adjustments are accurately made at the factory on these receivers, and ordinarily no readjustments are necessary. However, should it become necessary to make any readjustments, the procedure given in these instructions should be carefully followed. The preferred method of aligning these receivers is by the use of a suitable cathode ray oscillograph and frequency modulator unit in conjunction with the standard signal generator.

To accurately align circuits in these receivers, it is necessary to use a high grade signal generator capable of being modulated 30% and having an output voltage of at least 100,000 microvolts; it will also be necessary to have this output voltage controlled so that only a few microvolts may be fed into the receiver. In conjunction with the signal generator, a sensitive output meter should be used for determining the maximum signal voltage developed across the voice coil of the loud speaker. In addition to this equipment, it will be necessary when making a final adjustment of the "Discriminator" tuned circuit to use a high resistance voltmeter having a resistance of at least 1000 ohms per volt.

In order to make the aligning adjustments in an easy and satisfactory manner, it is recommended that the Stromberg-Carlson P-24608 aligning tool be used.

Before proceeding with the alignment of any circuits in these receivers, be sure that the Treble Control knob is set for the "Normal" position. The "Bass" control should also be set for the "Normal" position. In making any alignment adjustments always adjust the test oscillator's output voltage to the minimum value where a good alignment may still be obtained, except when specifically directed otherwise in these instructions. Figure 1 shows the location of all the aligning capacitors or adjustments for these receivers.

### Dial Adjustment

Before aligning the circuits of these receivers, the tuning dial must be properly aligned to "track" with the gang tuning capacitors. To check whether the dial is set correctly with respect to the gang tuning capacitors, rotate the "Manual Stations" selector knob in a clockwise direction so that the gang tuning capacitors are set to their maximum capacity position. With the gang tuning capacitors at this position, the dial pointer should be centered over the two dial alignment marks located near the extreme right-hand edge of the dial. One of these marks is a vertical line located beneath the standard broadcast scale, and the other mark is a small triangle located beneath the short wave scale of the dial. If the dial pointer does not center over these two marks, the screw located at the bottom of the dial pointer assembly should be loosened so that the pointer can be centered over the two marks. When this has been accomplished the screw should be securely tightened again.

### Intermediate Frequency Adjustments

The intermediate frequency used in these receivers is 455 kilocycles. Because of the necessity of obtaining the proper shape of resonance curve of these stages in a high fidelity receiver, it is recommended that unless it is absolutely essential, these I. F. adjustments be untouched. In the factory these adjustments are made using a visual system which allows the operator to see the exact shape of the resonance curve. For this reason it is best to have these adjustments made at the factory. However, in the case where this cannot be done, the following procedure should be followed.

1. Push in the push button which is located under the designation, "Manual On". Operate the Range Switch of the receiver to the Standard Broadcast range position, and set the tuning dial pointer to its extreme low frequency position. Set the Treble control knob and the Bass control knob to their normal positions.

   CAUTION: **Never attempt to align the R. F. or I. F. circuits of this receiver with the Treble control knob set at any position other than the "Normal" position. Also, do not make any aligning adjustments of the R. F., I. F., or "Discriminator" circuits with any push button other than the one located under the designation "Manual On" pushed in.**

2. Apply between the chassis base (or ground binding post) of the receiver and the grid of the No. 6A8 modulator tube, a modulated signal of 455 kilocycles from the signal generator, using a 0.1 mfd. capacitor in series with the connection between the output terminal of the signal generator and the grid of the No. 6A8 tube. Do not remove the chassis grid lead connecting to this tube. The ground (or low side) terminal of the signal generator should be connected to either the chassis base or the ground binding post.

3. Now, noting from Figure 1, the alignment adjustments for the First, Second, and Third I. F.–Discriminator transformers, align the I. F. circuits in the following order:

   Secondary of Third I. F.–Discriminator transformer for maximum output.
   Primary of Third I. F.–Discriminator transformer for maximum output.
   Secondary of Second I. F. transformer for maximum output.
   Primary of Second I. F. transformer for maximum output.
   Secondary of First I. F. transformer for maximum output.
   Primary of First I. F. transformer for maximum output.

   Carefully make all of the above adjustments, watching the output meter so that the peak reading is obtained for each adjustment. As each adjustment is made reduce the output of the test oscillator as required.

### Adjustment of the Discriminator Circuit

1. **Before making this circuit adjustment be sure that the I. F. amplifier and signal generator are exactly in resonance at 455 kilocycles.**

   All controls should be set the same as instructed for the intermediate frequency adjustments. Connect a high resistance voltmeter having a resistance of at least 1000 ohms per volt across the capacitor, C-79. The signal generator should remain connected to the grid of the No. 6A8 modulator tube in the same manner as connected when making the aligning adjustments of the intermediate frequency amplifier **circuits. The signal generator's output control should be adjusted so that a signal of 10,000 microvolts is fed into the modulator tube. Under these conditions the voltmeter connected across the capacitor, C-79, should read zero.**

   **If the above conditions are not obtained, the signal generator should be set to exact resonance with the intermediate frequency amplifier (455 kilocycles) as mentioned in 1 above, and the secondary adjustment of the Third I. F.-Discriminator transformer should be rotated so zero voltage is indicated on the voltmeter connected across the capacitor, C-79.**

   **Now, adjust the signal generator's frequency a slight amount (approximately 5 kilocycles) each side of 455 kilocycles, noting at the same time the reading of the voltmeter; a decrease in the signal generator's frequency (from 455 kilocycles) should make the voltmeter give an increased reading from zero and an increase in the signal generator's frequency (455 kilocycles) should make the voltmeter give a decreased indication from zero.**

### Radio Frequency Adjustments

**The alignment of the radio frequency circuits in these receivers should be very carefully made and in the order specified.**

**When making any aligning adjustments of these circuits, all controls, with the exception of the "Manual Stations" control, should be set at the positions mentioned for the Intermediate Frequency adjustments.**

**Alignment of 11 to 22 Megacycles Short Wave Range (Referred to as "D" Range)**

In aligning the radio frequency circuits for this range, replace the 0.1-microfarad capacitor which was placed in series with the test oscillator's output lead for the I. F. alignments, with a 400-ohm carbon type resistor. This lead should then be connected to the antenna binding post located on the rear of the receiver chassis. The ground terminal (or low side) of the test oscillator should be connected to the ground binding post on the receiver.

1. Operate the Range Switch on the receiver chassis to the 11 to 22 megacycles short wave ("D") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 20 megacycles.
2. Adjust the receiver's oscillator "D" range H. F. (high frequency) aligner for maximum output.
3. Adjust the R. F. interstage "D" range H. F. aligner for maximum output.
4. Adjust the antenna "D" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 11 megacycles.
6. Adjust the receiver's oscillator "D" range L. F. (low frequency) aligner for maximum output.
7. Adjust the R. F. interstage "D" range L. F. aligner for maximum output.
8. Adjust the antenna "D" range L. F. aligner for maximum output.
9. Reset both the test oscillator's frequency and the receiver's tuning dial pointer to 20 megacycles and repeat operations Nos. 2, 3, and 4.

**Alignment of 4.8 to 11 Megacycles Short Wave Range (Referred to as "C" Range)**

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short-wave range.

1. Operate the Range Switch on the receiver chassis to the 4.8 to 11 megacycles short wave ("C") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 10 megacycles.
2. Adjust the receiver's oscillator "C" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "C" range H. F. aligner for maximum output.
4. Adjust the antenna "C" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 5 megacycles.
6. Adjust the receiver's oscillator "C" range L. F. aligner for maximum output.
7. Adjust the R. F. interstage "C" range L. F. aligner for maximum output.
8. Adjust the antenna "C" range L. F. aligner for maximum output.
9. Reset both the test oscillator's frequency and the receiver's tuning dial pointer to 10 megacycles and repeat operations Nos. 2, 3, and 4.

**Alignment of Medium Wave Range (Referred to as "B" Range)**

In aligning the radio frequency circuits for this range, use the same artificial antenna (400-ohm carbon type resistor) in series with the output terminal of the test oscillator as was used for aligning the short wave ranges.

1. Operate the Range Switch on the receiver chassis to the Medium Wave ("B") range position, and set the test oscillator's frequency and the receiver's tuning dial pointer to 4.5 megacycles.
2. Adjust the receiver's oscillator "B" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "B" range H. F. aligner for maximum output.
4. Adjust the antenna "B" range H. F. aligner for maximum output.
5. Set the test oscillator's frequency and the receiver's tuning dial pointer to 1.8 megacycles.
6. Adjust the receiver's oscillator "B" range L. F. aligner for maximum output.
7. Reset both the test oscillator's frequency and the receiver's tuning dial pointer to 1.4 megacycles and repeat operations Nos. 2, 3, and 4.

**Alignment of Standard Broadcast Range (Referred to as "A" Range)**

In aligning the radio frequency circuits for this range, replace the 400-ohm carbon type resistor in series with the test oscillator's output lead with a 200-micro-microfarad capacitor and align these circuits as follows:

1. Operate the Range Switch on the receiver chassis to the Standard Broadcast ("A") range position and set the test oscillator's frequency and the receiver's tuning dial pointer to 1.5 megacycles.
2. Adjust the receiver's oscillator "A" range H. F. aligner for maximum output.
3. Adjust the R. F. interstage "A" range H. F. aligner for maximum output.
4. Adjust the Bi-Resonator's aligner for maximum output.
5. Adjust the antenna's "A" range H. F. aligner for maximum output.
6. Set the test oscillator's frequency and the receiver's tuning dial pointer to 0.6 megacycles.
7. Adjust the receiver's oscillator "A" range L. F. aligner for maximum output.
8. Reset both the test oscillator's frequency and receiver's tuning dial pointer to 1.5 megacycles and repeat operations Nos. 2, 3, 4, and 5.

### Adjustment of 10 Kilocycle Audio Cut-Off Filter

The adjustment of this filter is correctly made at the factory and no additional adjustment is required.

## INSTRUCTIONS FOR SETTING UP ELECTRIC TUNING SYSTEM

1. Before proceeding with setting up the eight favorite broadcast stations for electric tuning, it is preferable that the radio receiver be turned "on" for approximately twenty minutes. This is accomplished by simply pushing in the push button immediately below the designation, "Manual On" (indicated by illumination of the dial).
2. Check the position of the "Treble" control knob. When setting up or tuning in stations, this control knob should be set at the "Normal" position (pointer on knob pointing in direction of gold dot).
3. Set the Range switch control knob to the "Broadcast" position (pointer on knob pointing in direction of gold dot).
4. Remove the lists of station letters from the P-28781 package assembly which is tacked inside of the cabinet.
5. Remove the three screws which hold the electric tuning escutcheon plate (metal plate) to the electric tuning escutcheon. Then, remove from the escutcheon, the strip of transparent material and the strip of paper on which the eight stars are printed.
6. From the lists of stations, remove the call letters of the eight stations which it is desired to set up for electric tuning. **These eight stations should preferably be selected and set up in the daytime so that the best service will be obtained at all times.**

   **CAUTION:** When setting up these stations it is necessary to see that the separation of these stations on the dial is sufficient to allow adjacent "Adjustable Station Brushes" to be properly located in the adjusting slot.

   It will be noted that the station letters are printed on partially cut squares to facilitate ease in removing the desired station letters. In setting up these eight favorite stations, the following order should be followed:

   Looking at the front of the receiver, the station letters of the station having the highest frequency should be inserted into the farthest left-hand square of the escutcheon. Then, in successive order, according to the frequency, insert the station letters of the remaining seven stations into the other seven squares of the electric tuning escutcheon; the station letters of the station having the lowest frequency being inserted into the farthest right-hand square of the escutcheon.

   After the eight station call letters have been inserted into the escutcheon, the transparent strip should be replaced over the station call letters, and the escutcheon plate then fastened into its position on the electric tuning escutcheon by means of the three screws.

   The tuning adjustments for the eight favorite stations can now be made, starting with the station having the highest frequency and proceeding as follows:
7. With the Range switch control knob set to the "Broadcast" position, and the "Manual On" button pushed in, tune the receiver in the conventional manner by means of the "Manual Stations" (Station Selector) control knob to that station having the highest frequency.

   **IMPORTANT: When manually tuning in a station, or when setting up a station in the electric tuning system, exact resonance with the desired station should always be obtained by observing the tuning indicator.**
8. Facing the rear of the receiver, it will be observed that the commutator assembly located on the rear of the gang tuning capacitor has a calibrated dial and dial pointer. After manually tuning in the favorite broadcast station as mentioned in paragraph 7 above, it will be seen that the commutator dial's pointer also indicates the frequency of the station; now, slide the "Adjustable Station Brush" (which is nearest to the high frequency end of the commutator dial) in the slot until it is directly in line (and centered) with the end of the commutator's dial pointer.
9. Now, in successive order, according to frequency, proceed to set up the remaining seven favorite stations in the same manner as was mentioned in paragraphs 7 and 8 above for the favorite station having the highest frequency.

   When the eight adjustable station brushes have all been set up for the eight stations, the brush nearest to the low frequency end of the commutator's dial should be set at the frequency of the station having the lowest frequency.



10. After the eight favorite stations' brushes have all been positioned in the commutator's slot as mentioned in paragraphs 7, 8, and 9 above, loosen about one turn, the clamping screw of the tuning indicator. Remove the tuning indicator unit (with its clamp) from its metal bracket and allow the unit to rest on the chassis base with the end of the tuning indicator tube facing the rear of the receiver.
11. Repeat the operation mentioned in paragraph 7 above, for the favorite station having the highest frequency, being careful to obtain exact resonance with this station by means of the tuning indicator.

    When resonance with this station is obtained, watch the aperture appearing on the target of the tuning indicator tube and push in the button which is located under the station's letters (dial illumination ceases and station letters become illuminated). If the aperture of the tuning indicator changes, move the adjustable station brush slightly in either direction and recheck for resonance by switching back to manual tuning. Repeat this process until the condition is obtained where there is no change in the aperture of the tuning indicator tube when the station is switched from manual to electric tuning.
12. Proceed to check the settings of the adjustable station brushes for the remaining seven chosen stations according to frequency in exactly the same manner as mentioned in 11, above.

    When this has been accomplished, again mount the tuning indicator unit into its proper operating position. This completes the operations necessary for setting up the eight favorite stations.

    **IMPORTANT:** With the electric tuning system in operation, the receiver will be automatically kept in tune with any one of the eight favorite stations as long as the station is operating or provided it has no unusual fading characteristics. If a distant station which is very weak is set up in the electric tuning unit, it will be found that the automatic frequency control circuit will not hold this station if a strong signal is present in either adjacent channel. This same phenomenon will occur if two stations in adjacent channels are almost of equal signal strength with the weakest signal fading slightly; with this condition the strong signal will have a tendency to "pull in" when the receiver is tuned to the station which is slightly weaker and fading.

| | | | *Terminals of Sockets* | | | | | | | | *Heater Voltages Between Heater Terminals* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Tube* | *Circuit* | *Cap* | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | *Socket Terminal Numbers* | *Volts* |
| 6K7 | R. F. Amp. | 0 | 0 | 0 | +235 | +95 | 0 | +95 | *6.2* | 0 | 2-7 | *6.2* |
| 6A8 | Modulator | 0 | 0 | 0 | +240 | +95 | −6.9 | +95 | *6.2* | 0 | 2-7 | *6.2* |
| 6F8-G | Oscillator and Oscillator Control | 0 | 0 | 6.2 | +150 | +8.5 | −6.9 | +165 | 0 | 0 | 2-7 | *6.2* |
| 6K7 | 1st I. F. Amp. | 0 | 0 | 0 | +235 | +95 | 0 | −2.6 | *6.2* | 0 | 2-7 | *6.2* |
| 6K7 | 2nd I. F. Amp. | 0 | 0 | 0 | +235 | +95 | 0 | −2 | *6.2* | 0 | 2-7 | *6.2* |
| 6H6 | Demodulator and A. V. C. | — | 0 | 0 | −0.25 | 0 | 0 | +240 | *6.2* | 0 | 2-7 | *6.2* |
| 6H6 | Discriminator | — | 0 | 0 | 0 | 0 | 0 | 0 | *6.2* | 0 | 2-7 | *6.2* |
| 6R7 | Bass Amp. | 0 | 0 | 0 | +170 | 0 | 0 | 0 | *6.2* | +8 | 2-7 | *6.2* |
| 6F5 | Audio Amp. | 0 | 0 | 0 | 0 | +110 | 0 | +15 | *6.2* | +16 | 2-7 | *6.2* |
| 6C5 | Audio Inv. | — | 0 | 0 | +120 | — | 0 | +240 | *6.2* | +5 | 2-7 | *6.2* |
| 6L6 | Audio Output | — | 0 | 0 | +310 | +320 | 0 | — | *6.2* | +23 | 2-7 | *6.2* |
| 6L6 | Audio Output | — | 0 | 0 | +310 | +320 | 0 | — | *6.2* | +23 | 2-7 | *6.2* |
| 6U5 | Tuning Ind. | — | *6.2* | +18 | −1.25 | +235 | −2.6 | 0 | — | — | 1-6 | *6.2* |
| 5Z3 | Rectifier | — | +425 | *400* | *400* | +425 | — | — | — | — | 1-4 | *4.6* |
| Speaker Socket | | — | +310 | 0 | 0 | +425 | +425 | — | +415 | — | | |
| Voltage Across Motor Wdg. | | 20 AC | | | | | | | | | | |

Receiver tuned manually to 1000 kc., no signal. A. C. voltages are indicated by italics.



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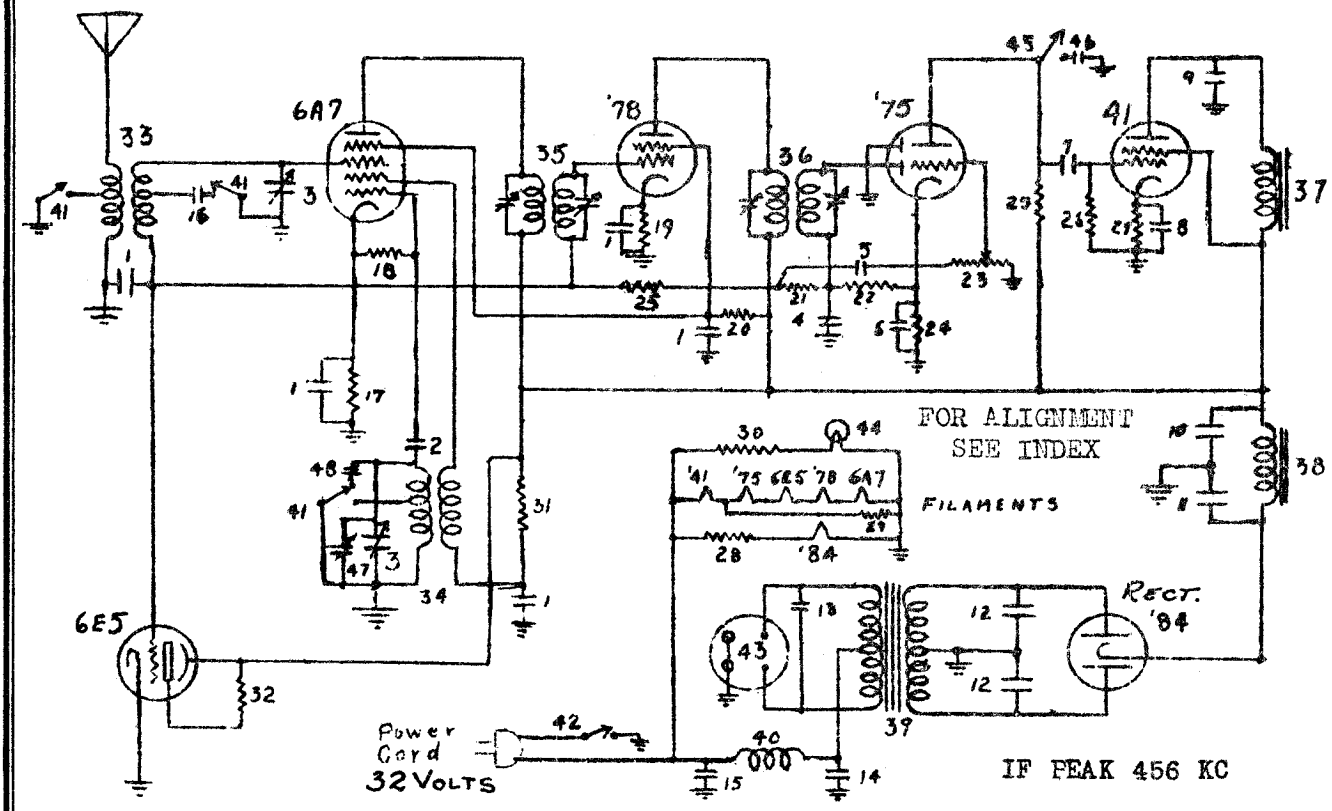
# L'TATRO MFG. CO.

MODELS EQ-39, FQ-39
Schematic




## VOLTAGES --

| | |
|---|---|
| Plates 6A7, 78, and 41 ... | 210 volts. |
| Plate 75 ..... ... | 60 v. |
| Screen 41 ..... | 210 v. |
| Screens 6A7 and 78 ..... | 65 v. |
| Anode grid 6A7 ..... | 160 v. |

Cathodes (as measured by a 1000 ohm per volt meter)

| | |
|---|---|
| 6A7 and 78 ... .... | 3 v. |
| 75 ..... | 1 v. |
| 41 ..... | 14v. |

| | | | | | |
|---|---|---|---|---|---|
| 1 | .1 mfd. | 17 | 400 ohms | 34 | Oscillator coil |
| 2 | .0001 mfd. | 18 | 50M ohms | 35 | I.F. Coil |
| 3 | Gang condenser | 19 | 800 ohms | 36 | I.F. Coil |
| 4 | .00025 mfd. | 20 | 50M ohms | 37 | Speaker |
| 5 | .01 mfd. | 21 | 25M ohms | 38 | Filter choke |
| 6 | 10 mfd. electr. | 22 | ½ Megohm | 39 | Power trans. |
| 7 | .01 mfd. | 23 | ½ Meg. control | 40 | R.F. Choke |
| 8 | 10 mfd. electr. | 24 | 10M ohms | 41 | Band switch |
| 9 | .01 mfd. | 25 | ½ megohm | 42 | Power switch |
| 10 | 8 mfd. electr. | 26 | 1 megohm | 43 | Vibrator |
| 11 | 16 mfd. electr. | 27 | 650 ohms | 44 | Pilot light |
| 12 | .01 mfd. 1600 v. | 28 | 50 ohms | 45 | Tone switch |
| 13 | . 25 mfd. | 29 | 200 ohms | 46 | .002 mfd. |
| 14 | .5 mfd | 30 | 160 ohms | 47 | S.W. Padder |
| 15 | 20 mfd. | 31 | 10M ohms | 48 | B.C. Padder |
| 16 | .002 mfd. | 32 | ½ megohm | | |
| | | 33 | Antenna coil | | |

The antenna for the Model EQ (table model) and FQ (console) should be about 100 feet long and as high as possible. No ground connection is necessary. A continuously variable tone control is used in Model FQ

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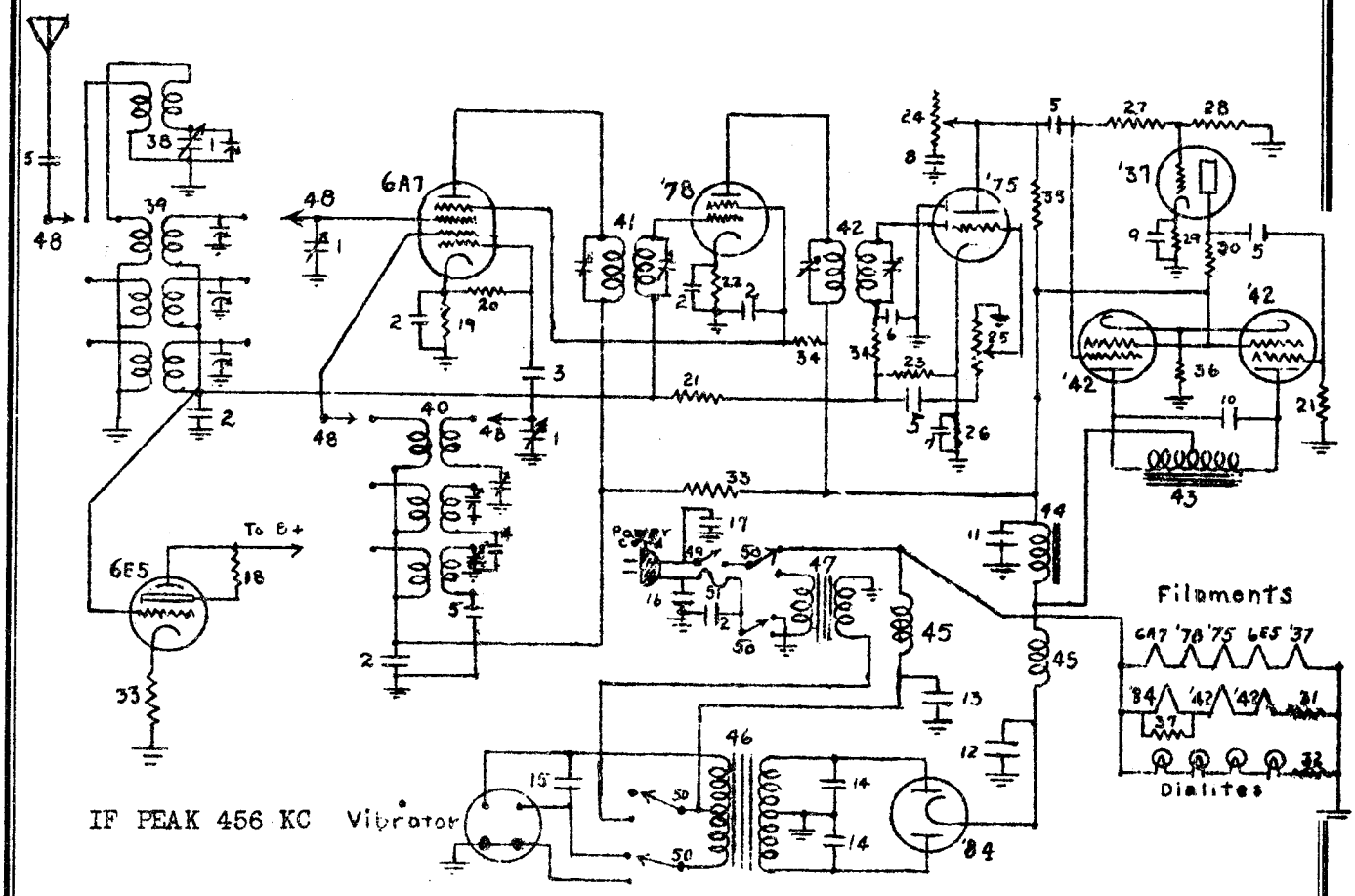
MODELS HQ-39
Schematic

# L'TATRO MFG. CO.




-- VOLTAGES---

| | | | |
|---|---|---|---|
| Plates 6A7,78,and 42's ... | 200 v. | Cathode 6A7 ..... | .25 v |
| Plate 37 ..... | 50 v. | " 78 ..... | 2 v. |
| Plate 75 ..... | 30 v. | " 75 ..... | .5 v |
| Screens 6A7 and 78 ..... | 50 v. | " 37 ..... | 4 v. |
| | | " 42's ..... | 15 v. |

| | | | | | |
|---|---|---|---|---|---|
| 1 | Gang condenser | 18 | ½ megohm | 35 | ½ megohm |
| 2 | .1 mfd. | 19 | 53 ohms | 36 | 400 ohms |
| 3 | .0001 mica | 20 | 25M ohms | 37 | 33 ohms |
| 4 | .002 mfd. | 21 | ½ megohm | 38 | Preselector coil |
| 5 | .01 mfd. | 22 | 800 ohms | 39 | Antenna coil |
| 6 | .0005 mfd. | 23 | ½ megohm | 40 | Oscillator coil |
| 7 | 10 mfd. electr. | 24 | ½ meg. control | 41 | I.F. coil |
| 8 | .005 mfd. | 26 | 7500 ohms | 42 | I.F. coil |
| 9 | 5 mfd. electr. | 27 | ½ megohm | 43 | Speaker |
| 10 | .0025 mfd. | 28 | 25M ohms | 44 | Filter choke |
| 11 | 8 mfd. electr. | 29 | 3500 ohms | 45 | R.F. choke |
| 12 | 16 mfd. electr. | 30 | 100M ohms | 46 | Power trans. |
| 13 | .25 mfd. | 31 | 20 ohms | 47 | Stepdown trans. |
| 14 | .02 mfd. | 32 | 50 ohms | 48 | Band switch |
| 15 | .25 mfd. | 33 | 800 ohms | 49 | Off-on switch |
| 16 | 1 mfd. | 34 | 50M ohms | 50 | Power switch |
| 17 | .25 mfd. | 25 | ½ meg. control | 51 | 2 amp. fuse |

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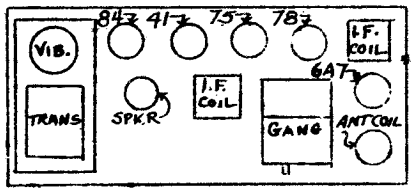
## ALIGNMENT PROCEDURE

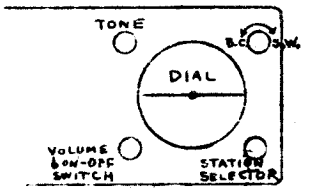
**Model** EQ-39 and FQ-39

Adjust IF coils to 456 KC.
Switch to shortwave band; turn dial to 5 MC and adjust trimmer on the rear section of the gang condenser to maximum output.
Switch to broadcast band and turn dial to 1400 KC. Adjust trimmer connected to switch to maximum output. Track antenna by adjusting trimmer on antenna section of the gang condenser.
Switch to shortwave, turn dial to 5 MC and track antenna by adjusting trimmer on top of the antenna coil.

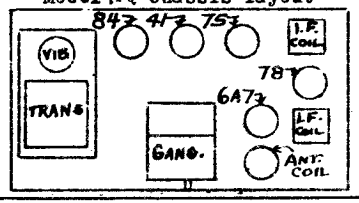
Model EQ chassis layout



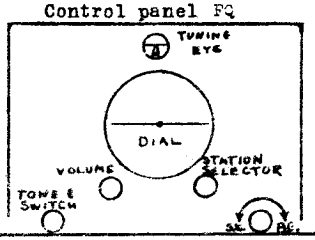

Control panel, EQ




Model FQ chassis layout




Control panel FQ

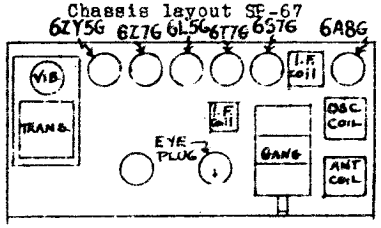



MODELS SP-67, TP-67 --- ALIGNMENT PROCEDURE ---

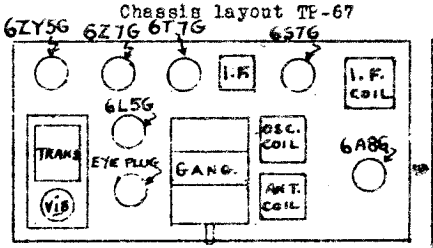
Turn dial to closed gang position to make certain that the dial needle coincides with the end of the scale. Turn dial to about midpoint and adjust the I.F. coils to 456 KC.
Switch to shortwave band, set dial needle to 15 MC and adjust bottom trimmers in antenna and oscillator coils to maximum output.
Switch to police band (middle band) set dial at 5 MC and adjust the second trimmers from the bottom to maximum output.
Switch to broadcast, set dial at 1400 KC and adjust the third trimmers from the bottom. Then adjust the padder located on the front section of the gang condenser. Turn to 600 KC and adjust the top trimmer in the oscillator coil. This is the series tracking condenser.

The type 6A8G tube has been found to give better oscillator performance than the 6D8G and is used in present production. The switch which turns the tuning eye and dialites off and on is located on the back of the panel.

Chassis layout SP-67



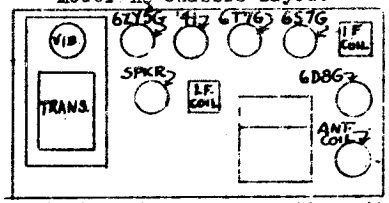

Chassis layout TP-67



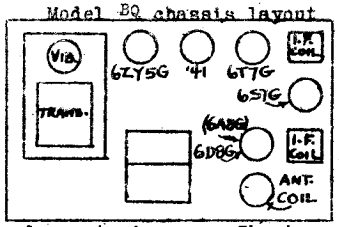

MODELS AQ-69, BQ-69 ALIGNMENT PROCEDURE

Adjust IF coils to 456 KC.
Switch to shortwave band ; turn dial to 5 MC and adjust trimmer on the rear section of the gang condenser to maximum output.
Switch to broadcast and turn dial to 1400 KC. Adjust trimmer connected to switch to maximum output. Track antenna by adjusting trimmer on the antenna section of the gang condenser.
Switch to shortwave, turn dial to 5 MC and track antenna by adjusting trimmer on top of the antenna coil.

Model AQ chassis layout




Model BQ chassis layout




Model RP has the same circuit as the QP plus a tuning eye. The type 6A8G tube has been found to give better oscillator performance than the 6D8G and is used in all Model RP's except those built in the earlier part of the season.

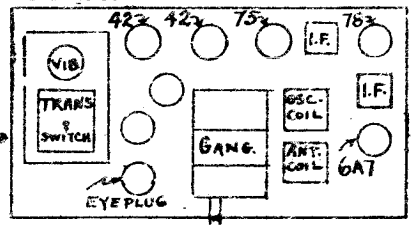
Model HQ-39 may be operated on either 32 volts DC or 110 volts AC. To switch the set for 110 volt operation, the following instructions must be carried out:

1. Disconnect set from 32 volt line.
2. Remove cover from power pack and pull out vibrator.
3. Replace cover and fit switch lever back into slot in switch shaft.
4. Remove screw holding lever and throw switch to right.
5. Reset screw in hole at the right.

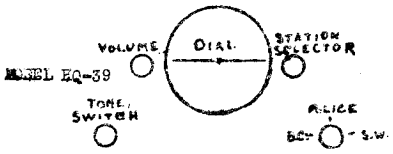
If set is inoperative, check fuse. ( 2 amp. 250 volt. An ordinary car fuse may be substituted). The fuse protects the set from lightning as well as from line voltage overloads.

-- ALIGNMENT PROCEDURE --

Turn dial to closed gang position and make certain that the dial needle coincides with the end of the scale. Turn dial to about midpoint and adjust IF coils to 456 KC.
Switch to shortwave band, set dial needle to 15 MC and adjust bottom trimmers on antenna and oscillator coils to maximum output.
Switch to police band (middle band) and set dial at 5 MC. Adjust second trimmers from the bottom to maximum output.
Switch to broadcast, set dial at 1400 KC and adjust the third trimmers from the bottom. Then adjust the padder located on the front section of the gang condenser. Turn to 600 KC and adjust the top trimmer in the oscillator coil. This is the series tracking condenser.




Knob arrangement

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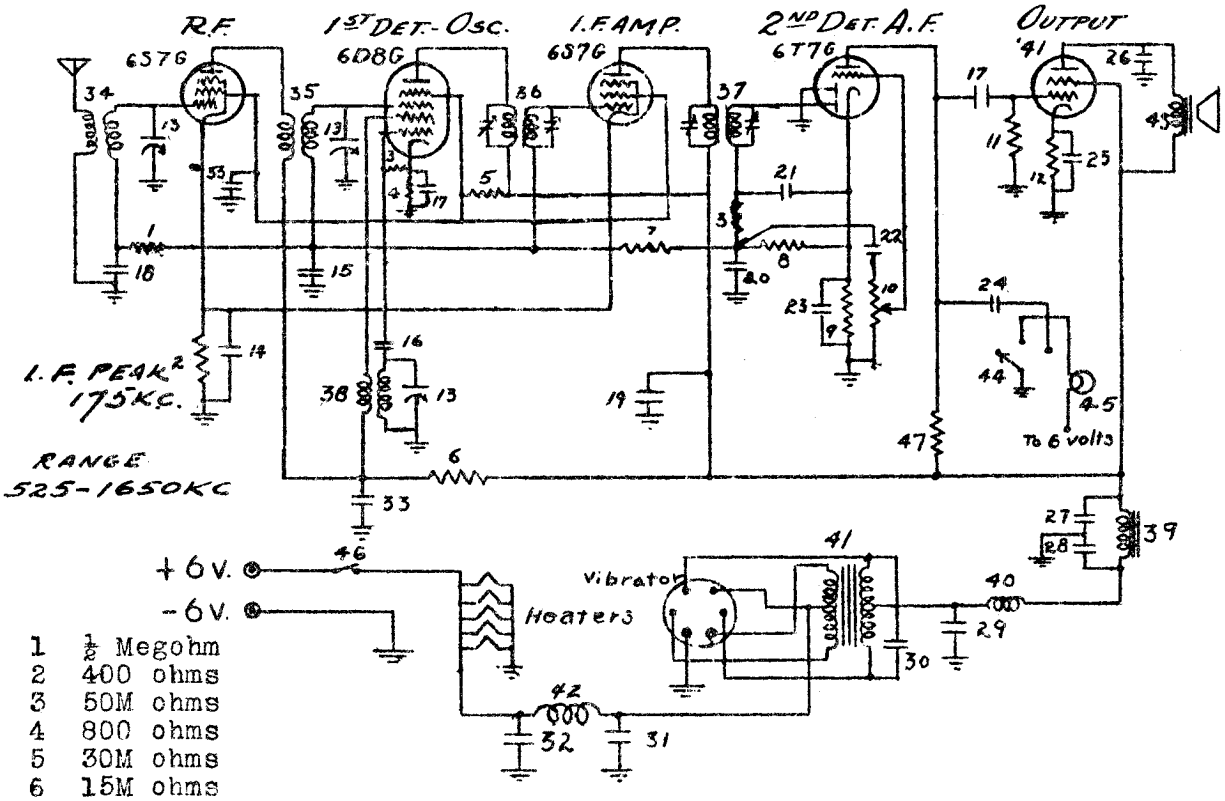
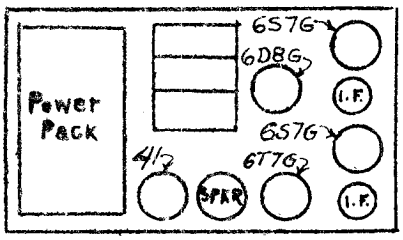
MODELS NO-65,00-65
Schematic, Socket
Trimmers, Alignment

# L'TATRO MFG. CO.




| | | | | | |
|---|---|---|---|---|---|
| 1 | ½ Megohm | 24 | .02 mfd. | 32 | .25 mfd. |
| 2 | 400 ohms | 25 | 10 mfd electr. | 33 | .05 mfd. |
| 3 | 50M ohms | 26 | .002 mfd. | 34 | Ant. coil |
| 4 | 800 ohms | 27 | 8 mfd. electr. | 35 | Int. coil |
| 5 | 30M ohms | 28 | 8 mfd. electr. | 36 | I.F. coil |
| 6 | 15M ohms | 29 | .10 mfd. | 37 | I.F. coil |
| 7 | 1 Megohm | 30 | .005 mfd. | 38 | Osc. coil |
| 8 | ½ Megohm | 31 | .5 mfd. | 39 | Filter choke |
| 9 | 15M ohms | | | 40 | RF Filter choke |
| 10 | Volume control | | | 41 | Power trans. |
| 11 | 1 Megohm | | | 42 | RF choke |
| 12 | 650 ohms | | | 43 | Speaker |
| 13 | 3 gang cond. | | | 44 | Tone-light switch |
| 14 | .10 mfd. | | | 45 | Pilot light |
| 15 | .01 mfd. | | | 46 | Switch (with #10) |
| 16 | .0001 mfd. | | | 47 | 100M ohms |
| 17 | .01 mfd. | | | | |
| 18 | .01 mfd. | | | | |
| 19 | .10 mfd. | | | | |
| 20 | .00025 mfd. | | | | |
| 21 | .0002 mfd. | | | | |
| 22 | .025 mfd. | | | | |
| 23 | 10 mfd. electr. | | | | |

Alignment procedure

To adjust I.F. coils Oscillator at 175KC to grid of 6D8G tube; adjust I.F. trimmers to maximum output.

To adjust R.F. coils Set oscillator at 1400 KC connect to antenna lead, dial at 1400 KC, adjust oscillator padder located on the rear of the gang condenser, to maximum. Then adjust the two other padders on the gang condenser to maximum output.

Voltages: (As measured by a 1000 ohm per volt meter)

B + 140 - 150 volts

| | | Cathode voltages | |
|---|---|---|---|
| Anode grid 6D8G | 60-70 v. | 6S7G's | 2 volts |
| Plate RF 6S7G | 60-70 v. | 6D8G | 2.5 volts |
| Screens 6D8G & 6S7G | 50-60 v. | 6T7G | 1 volt |
| | | 41 | 11 volts |

Voltages on the Model NO(table model) are somewhat lower than the above. Some changes in circuit constants in sets built prior to Aug. 1937, will be found. "Motorboating on this set can be corrected by seperating the grid leads on the gang condenser as far as possible.

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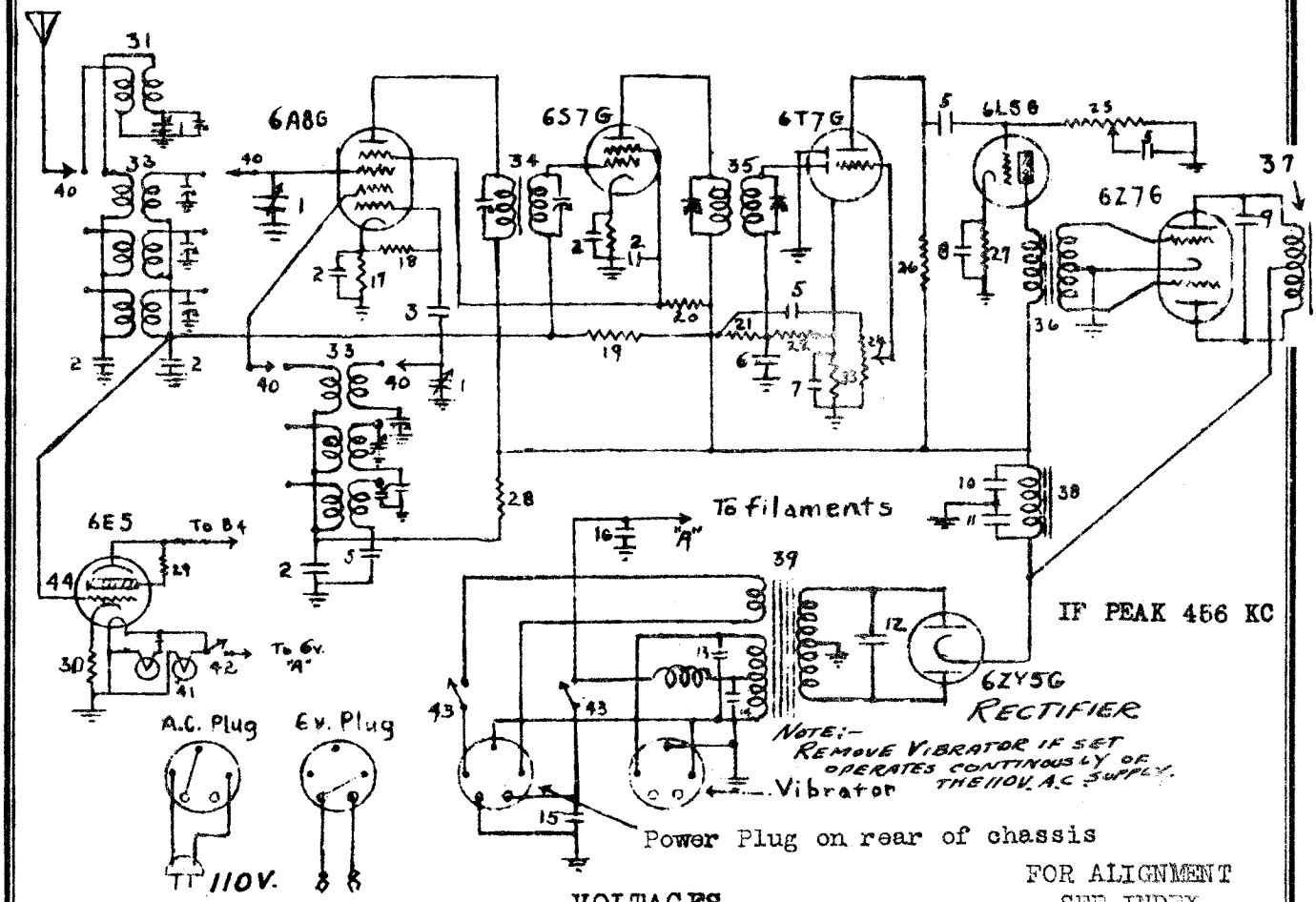
# L'TATRO MFG. CO.

MODELS SP-67, TP-67
Schematic




FOR ALIGNMENT SEE INDEX

## -- VOLTAGES --

Plates 6A8G, 6S7G, 6L5G, 6Z7G and oscillator grid of 6A8G 140 v
Plate 6T7G ..... 12 v.
Screens 6A8G and 6S7G ..... 40 v.

Cathodes: 6A8G and 6S7G 1.5 v.
6T7G ... .5 v.
6L5G .... 5 v.

Voltages when set is on AC are higher.

| | | | | | |
|---|---|---|---|---|---|
| 1 | Gang condenser | 16 | .25 mfd. | 31 | Preselector coil |
| 2 | .10 mfd. | 17 | 400 ohms | 32 | Antenna coil |
| 3 | .00025 mfd | 18 | 25M ohms | 33 | Oscillator coil |
| 4 | .002 mfd. | 19 | 1 megohm | 34 | Iron core I.F. |
| 5 | .01 mfd. | 20 | 50M ohm | 35 | I.F. coil |
| 6 | .00025 mfd. | 21 | 25M ohm | 36 | Input trans. |
| 7 | 10 mfd. electr. | 22 | ½ megohm | 37 | Speaker |
| 8 | 5 mfd. electr. | 23 | 5M ohms | 38 | Filter choke |
| 9 | .0025 mfd. | 24 | ½ meg. control | 39 | Power trans. |
| 10 | 8 mfd. electr. | 25 | Tone control | 40 | Band switch |
| 11 | 16 mfd. electr. | 26 | ¼ megohm | 41 | Pilot lights |
| 12 | .005 mfd. 1600 v. | 27 | 1500 ohms | 42 | Tuning eye and dialite switch |
| 13 | 10 mfd. electr. | 28 | 10M ohms | 43 | Power switch |
| 14 | .5 mfd. | 29 | ½ megohm. | 44 | Tuning eye |
| 15 | .10 mfd. | 30 | 1500 ohms | | |

The TP-67 is a console model; the SP-67 is a table model. The antenna should be as high as possible and about 100 feet long. A good ground is essentaal for good reception. The blue wire from the set is the antenna lead. If the set is to be operated on 110 volts continuously, the vibrator should be removed.

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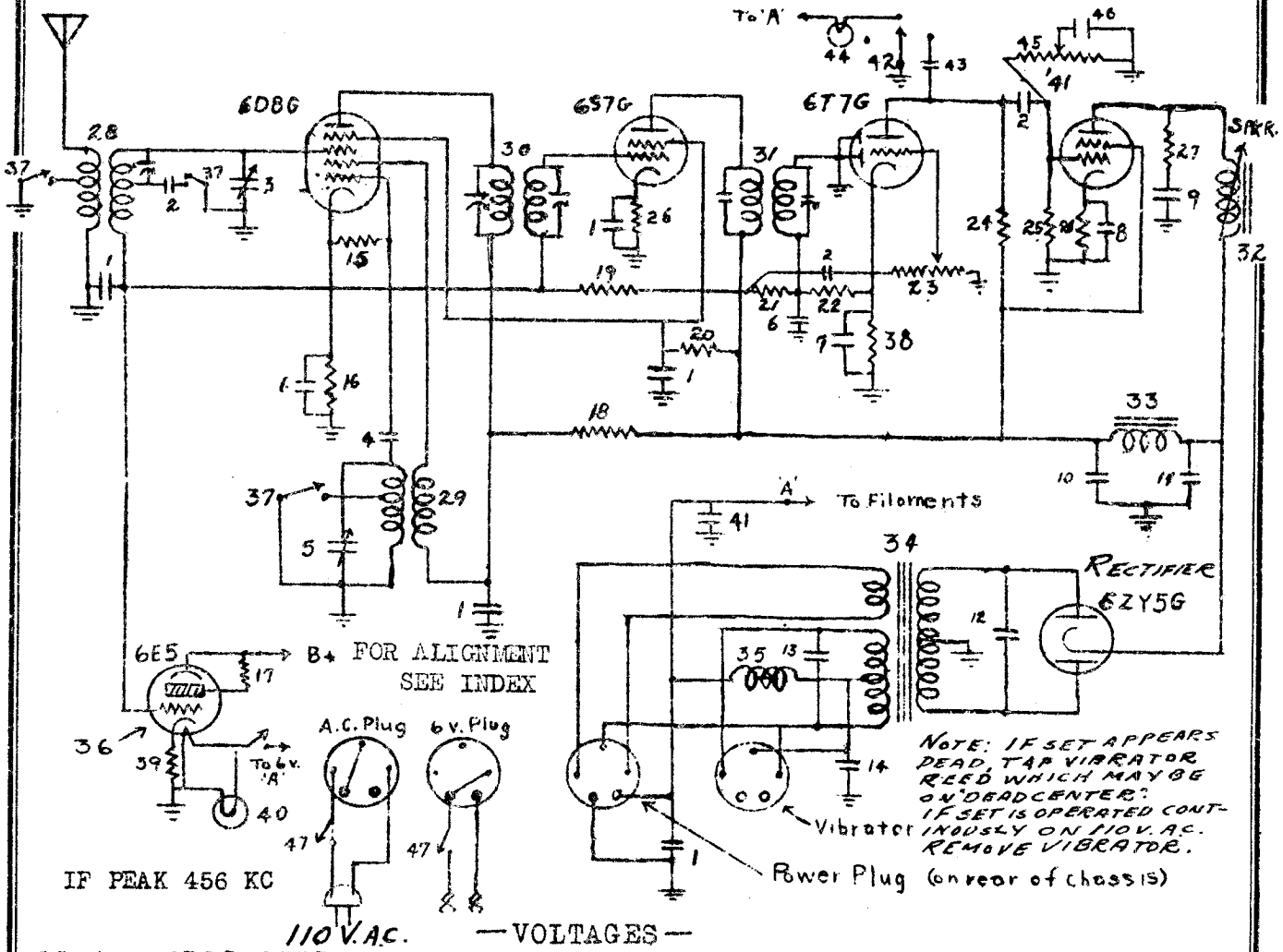
MODELS AQ-69, BQ-69
Schematic

# L'TATRO MFG. CO.




## —VOLTAGES—

Plates 6D8G, 6S7G, and 41 150 volts
Plate 6T7G 50 volts
Screens 6D8G and 6S7G 50 volts.

Cathode 6D8G 0.5 volt
" 6S7G 1.5 volt
" 6T7G 0.5 volt
" 41 13 volts

When set is on AC, voltages will be somewhat higher.

| | | | | | |
|---|---|---|---|---|---|
| 1 | .1 mfd. | 18 | 1500 ohms | 35 | RF choke |
| 2 | .01 mfd. | 19 | ½ Megohm | 36 | Tuning eye |
| 3 | Ant. section of gang | 20 | 50M ohms | 37 | Band switch |
| 4 | .0002 mfd. | 21 | 25M ohms | 38 | 7500 ohms |
| 5 | Osc. section of gang | 22 | ½ Megohm | 39 | 650 ohms |
| 6 | .0002 mfd. | 23 | ½ Meg. control | 40 | Pilot light |
| 7 | 10 mfd electr. | 24 | ½ Megohm | 41 | .5 mfd. |
| 8 | 5 mfd. electr. | 25 | 1 Megohm | 42 | Tone-light switch |
| 9 | .002 mfd. | 26 | 800 ohms | 43 | .0025 mfd. |
| 10 | 8 mfd. electr. | 27 | 10M ohms | 44 | Pilot light |
| 11 | 16 mfd. electr. | 28 | Ant. coil | 45 | Tone control |
| 12 | .005 mfd. 1600 v. | 29 | Osc. coil | 46 | .005 mfd. |
| 13 | 10 mfd. 50 v. | 30 | I.F. coil | 47 | Power switch |
| 14 | .5 mfd. | 31 | I.F. coil | 48 | Tuning eye and dialite switch |
| 15 | 50M ohms | 32 | Speaker | | |
| 16 | 400 ohms | 33 | Filter choke | | |
| 17 | ½ Megohm | 34 | Power trans. | | |

Items 36, 45 and 46 are used in Model BQ only. Items 42, 43 and 44 are used in Model AQ only.

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# TRANSFORMER CORP. OF AMER.

MODEL TC-31
Schematic
Alignment

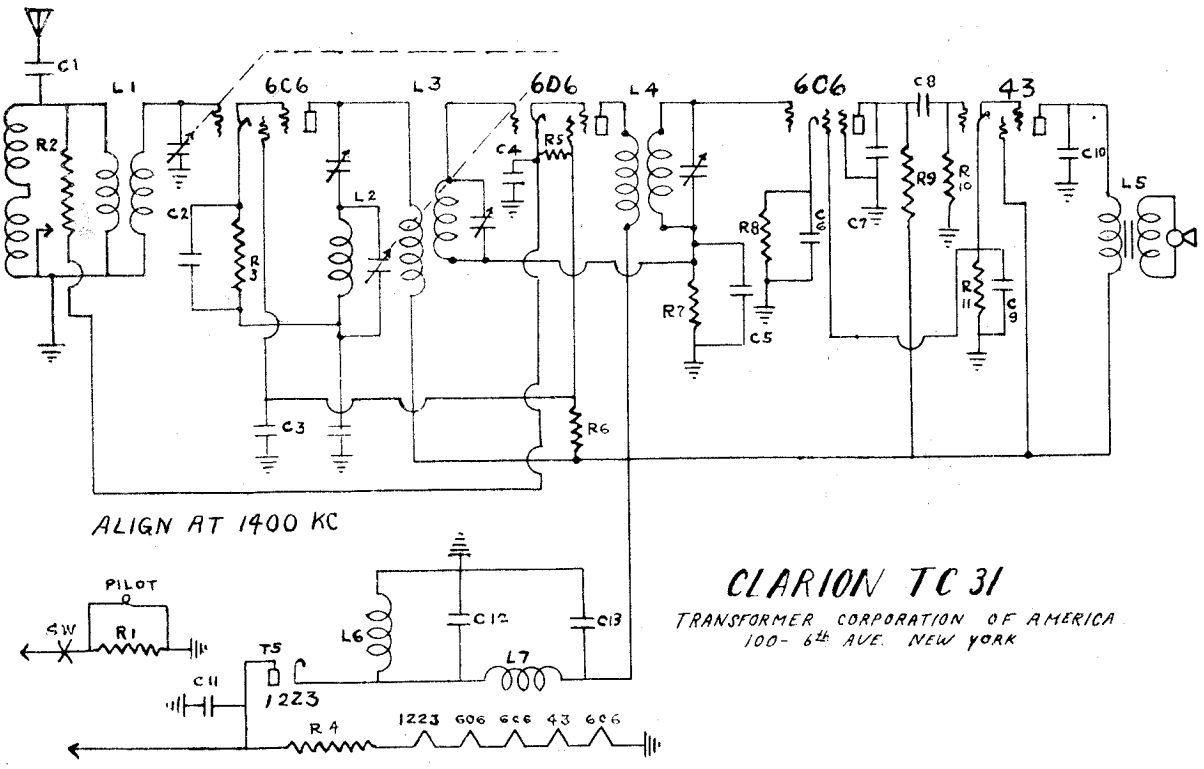
SERVICE SUGGESTIONS

CIRCUIT: The receiver uses a superhet circuit. The tubes used are: type 6C6 as oscillator and modulator, a type 6D6 in the I.F. stage, a type 6C6 as second detector and audio amplifier and a type 43 output tube. The I.F. is 456 K.C.

ALIGNING THE SET: Only in rare cases will it be found necessary to adjust any trimmers. If the volume is low, everything else should be checked before attempting to align the set. The only case where the fault is in the alignment is when both low volume and poor selectivity are present. To align the I.F.'s set the test oscillator to 456 K.C. and connect it to the grid of the first 6C6 tube and adjust the upper screw on the first I.F. transformer and the screw on the second I.F. (small round can) for maximum output. Now set the test oscillator to 1400 K.C. The signal should come in between 15 and 20 on the dial. Adjust the two trimmers on the tuning condenser for maximum output. Check at 600 K.C. The lower trimmer on the first I.F. transformer is the oscillator coupling condenser and should not be changed.

Price and Parts List for Clarion TC-31

| Stock No. | Code No. | Description | Price |
|---|---|---|---|
| TPE2010 | L1 | Antenna Coil | $ .95 |
| TPE2020 | L2 | Oscillator coil | .95 |
| TPE2030 | L3 | First I. F. | 1.50 |
| TPE2040 | L4 | Second I. F. | 1.50 |
| TPE2050 | L5 | Speaker Transformer } Speaker Field } | 4.50 |
| TPE2060 | L6 | Choke | 1.25 |
| TPE2070 | L7 | Pilot shunt | .25 |
| TPE2080 | R1 | Volume control and switch | 1.10 |
| TPE2090 | R2&SW | 7500 ohm carbon resistor | .19 |
| TPE2100 | R3 | Filament resistor 200 ohms | 1.10 |
| TPE2110 | R4 | 50,000 ohm carbon resistor | .19 |
| TPE2120 | R5 | 10,000 ohm carbon resistor | .19 |
| TPE2130 | R6 | 500,000 ohm carbon resistor | .19 |
| TPE2140 | R7 | 25,000 ohm carbon resistor | .19 |
| TPE2150 | R8 | 300,000 ohm carbon resistor | .19 |
| TPE2160 | R9 | 500,000 ohm carbon resistor | .19 |
| TPE2170 | R10 | 750 ohm carbon resistor | .19 |
| TPE2180 | R11 | .1 mfd. paper condenser | .14 |
| TPE2190 | C1 | .002 mfd. paper condenser | .14 |
| TPE2200 | C2 | .1 mfd. paper condenser | .14 |
| TPE2210 | C3 | .1 mfd. paper condenser | .14 |
| TPE2220 | C4 | .1 mfd. paper condenser | .14 |
| TPE2230 | C5 | 10 mfd. electrolytic condenser | .70 |
| TPE2240 | C6 | .001 mfd. paper condenser | .13 |
| TPE2250 | C7 | .05 mfd. paper condenser | .14 |
| TPE2260 | C8 | 10 mfd. electrolytic condenser | .70 |
| TPE2270 | C9 | .006 mfd. paper condenser | .15 |
| TPE2280 | C10 | .05 mfd. paper condenser | .14 |
| TPE2290 | C11 | 16 mfd. electrolytic condenser | .90 |
| TPE2300 | C12 | 8 mfd. electrolytic condenser | .60 |
| TPE2310 | C13 | 1/3 watt carbon resistor any value | .19 |

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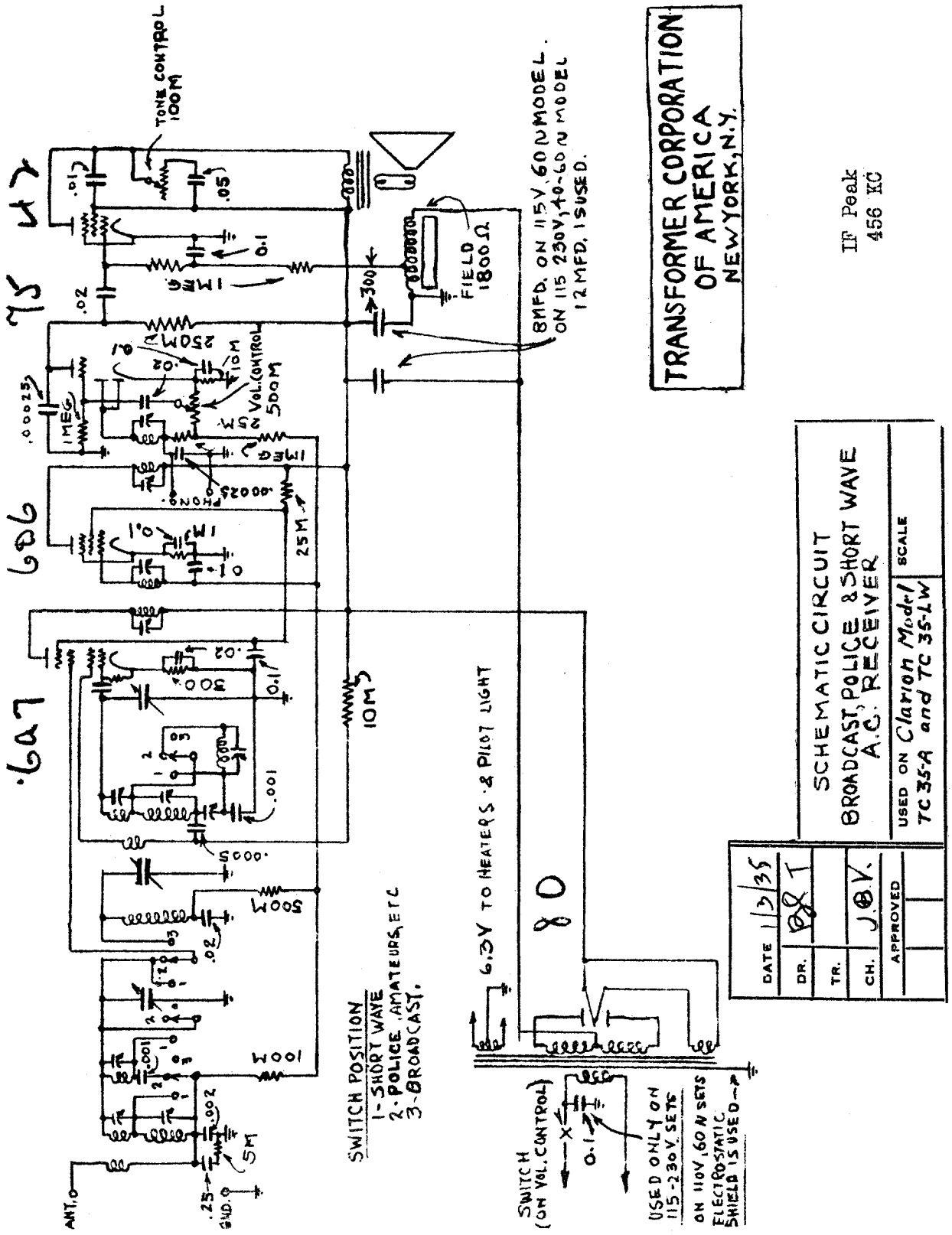
MODELS TC35A
TC35LW, Early
Schematic

# TRANSFORMER CORP. OF AMERICA

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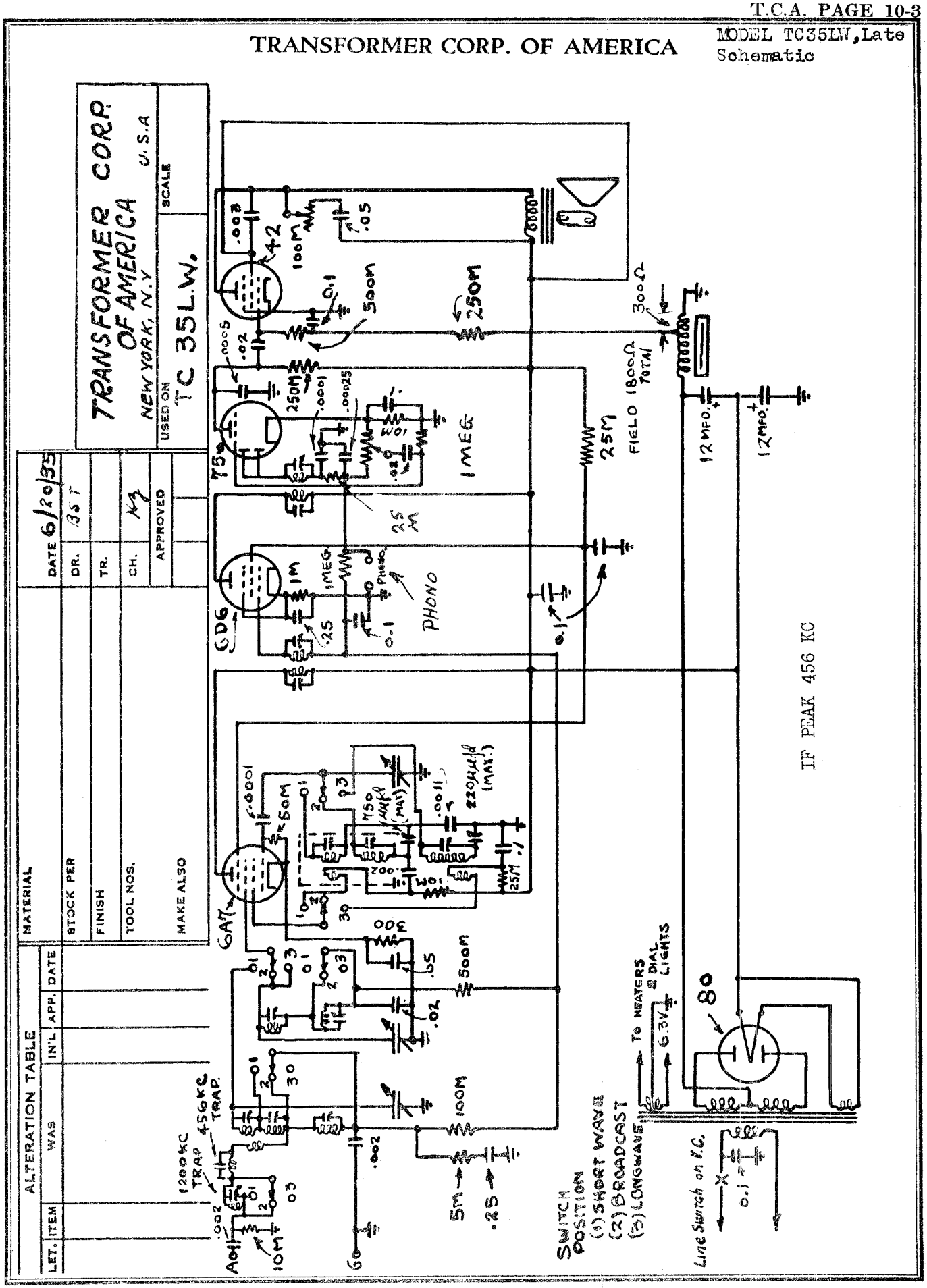
# TRANSFORMER CORP. OF AMERICA

MODEL TC35LW, Late
Schematic

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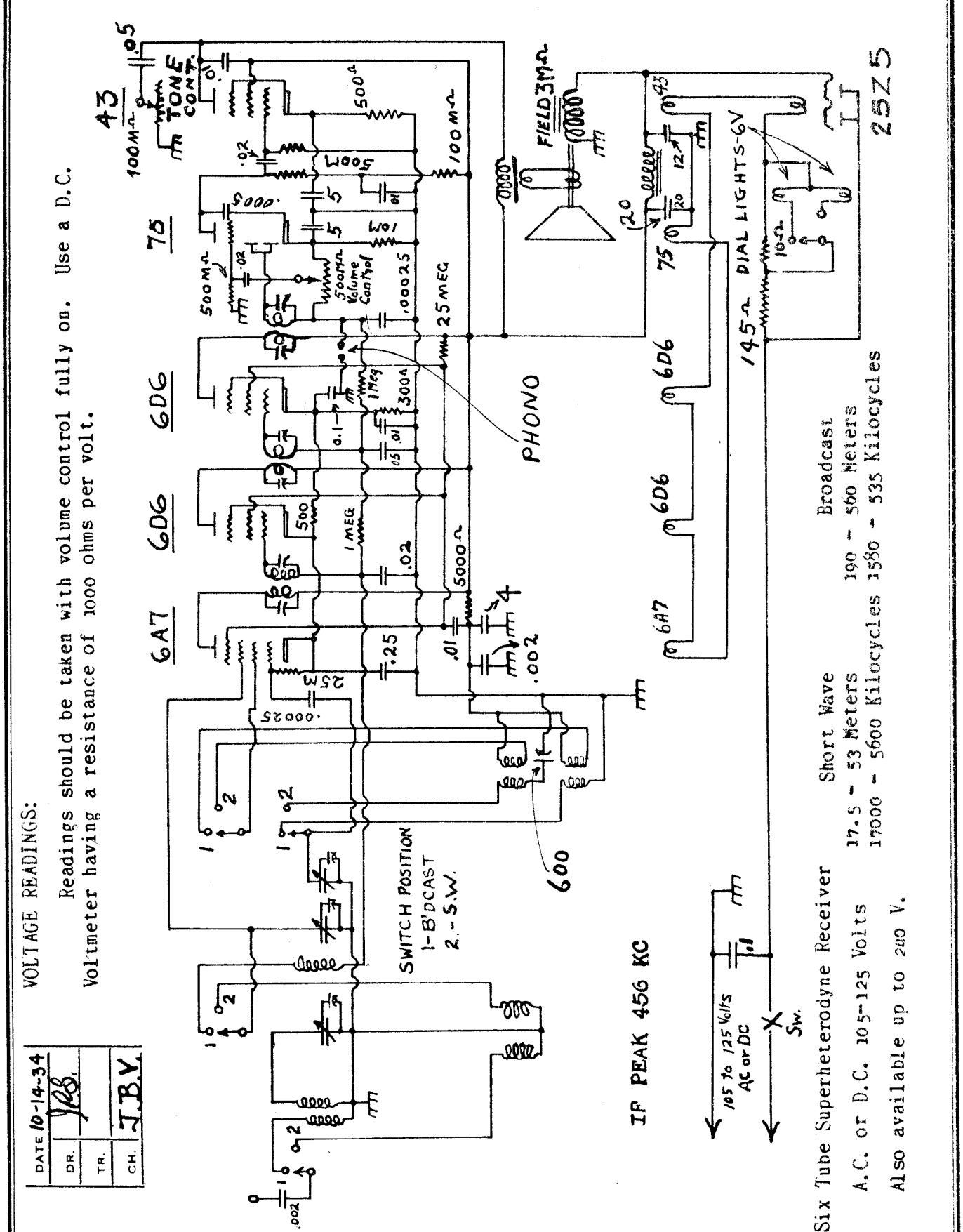
MODEL TC36
Schematic

# TRANSFORMER CORP. OF AMERICA




VOLTAGE READINGS:

Readings should be taken with volume control fully on. Use a D.C. Voltmeter having a resistance of 1000 ohms per volt.

| | |
|---|---|
| DATE | 10-14-34 |
| DR. | JGB. |
| TR. | |
| CH. | T.B.V. |

Six Tube Superheterodyne Receiver

A.C. or D.C. 105-125 Volts

Also available up to 240 V.

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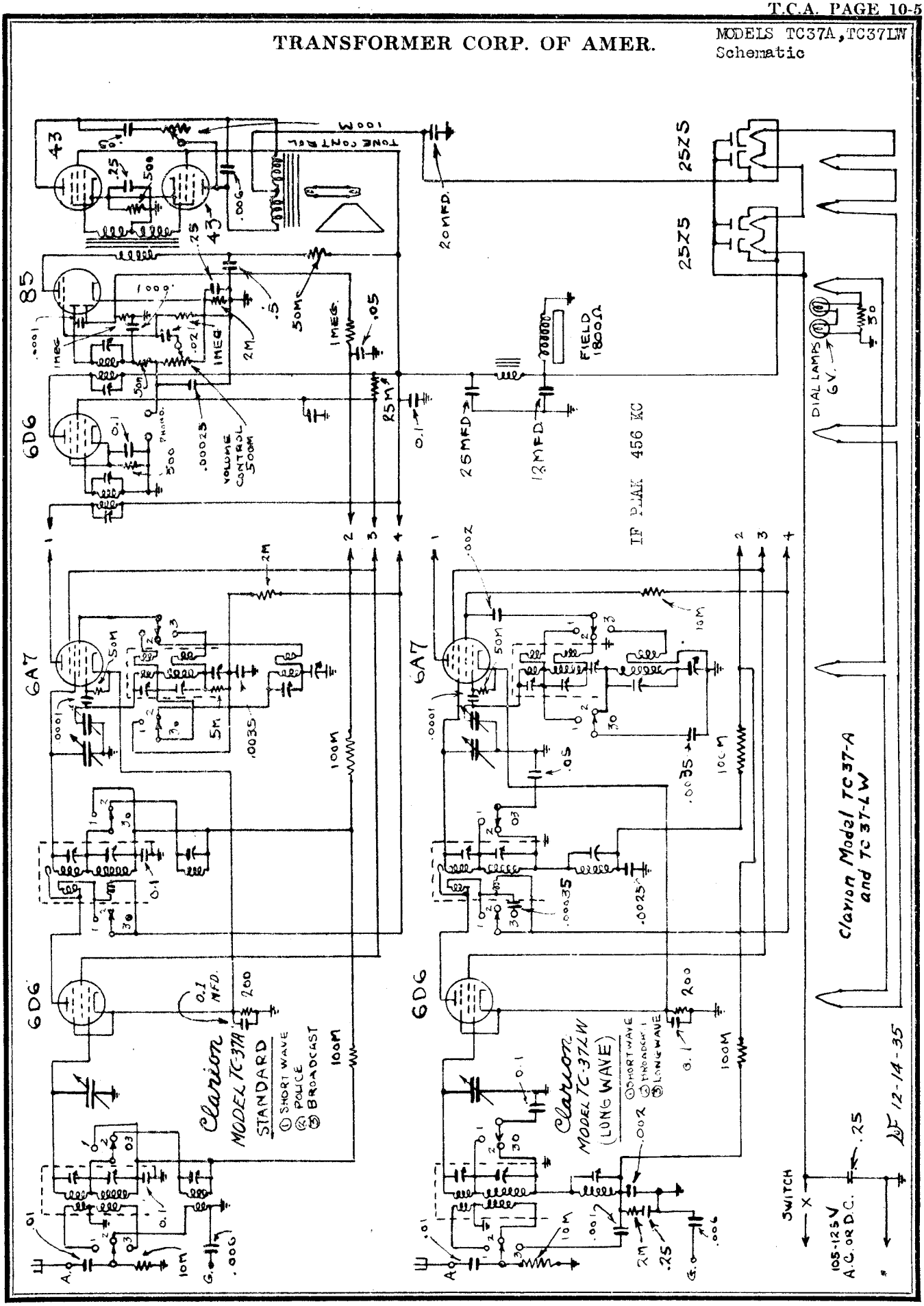
# TRANSFORMER CORP. OF AMER.

MODELS TC37A, TC37LW
Schematic

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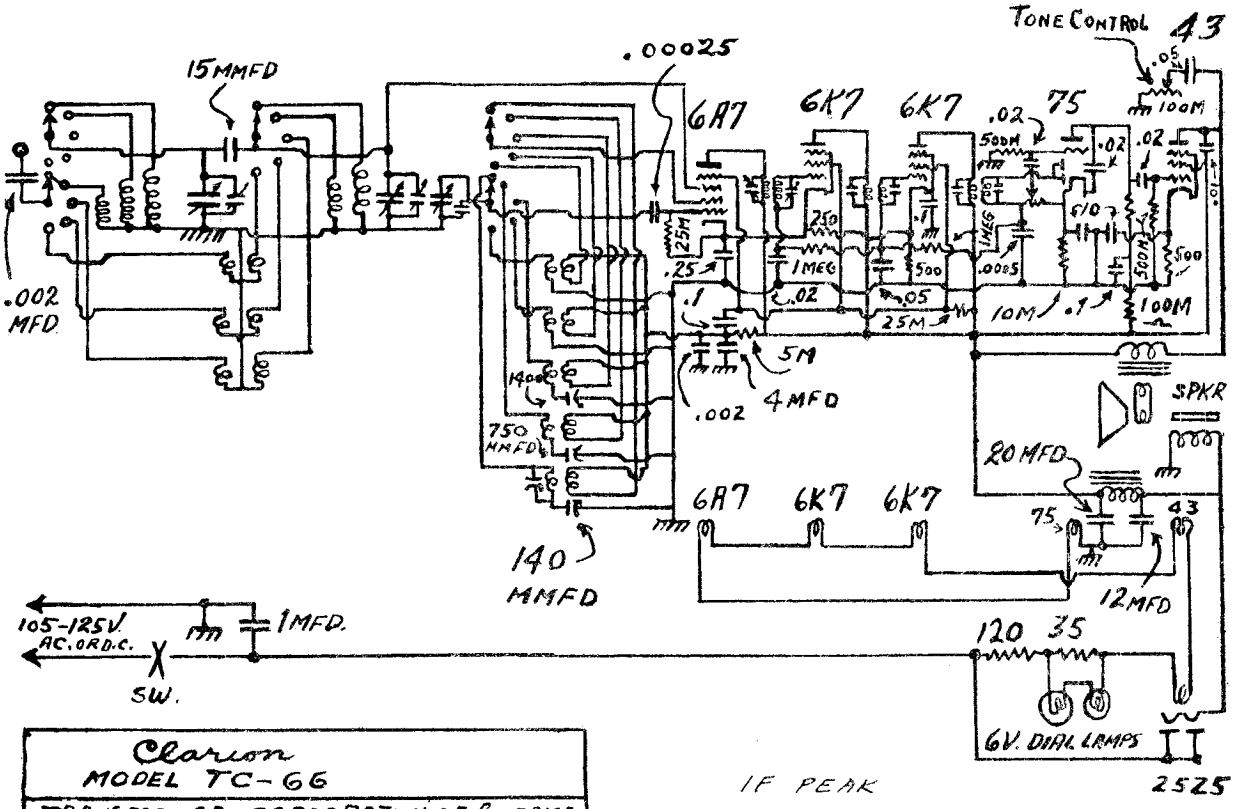
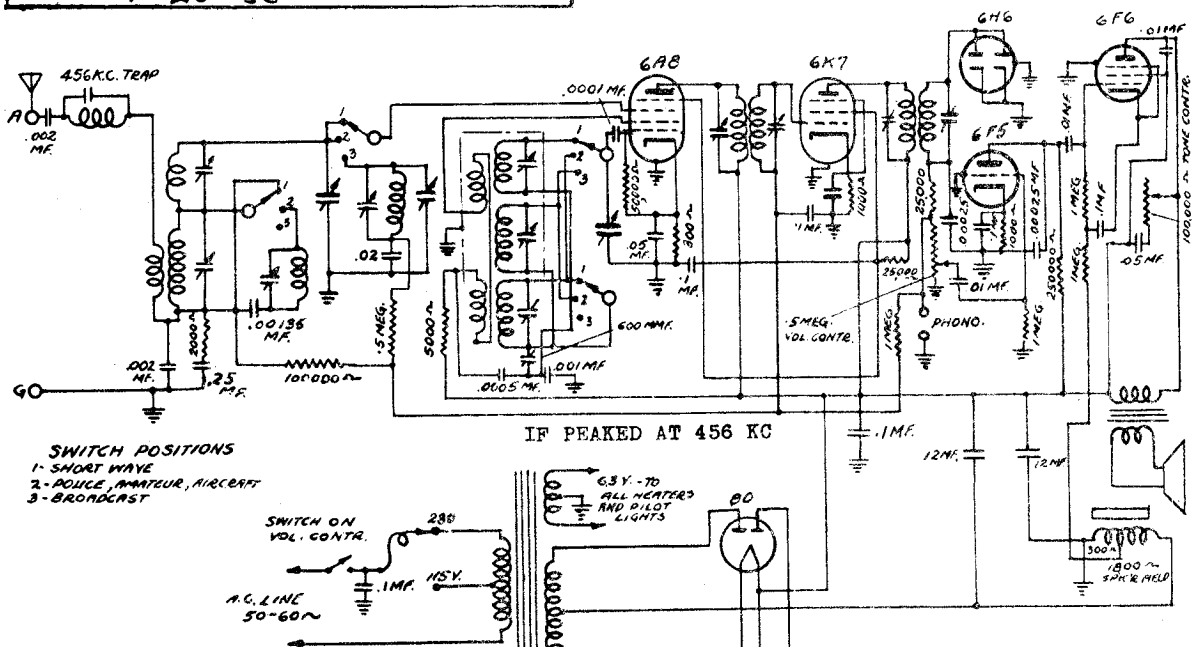
MODEL TC66
MODELS TC75, TC76
Schematics

# TRANSFORMER CORP. OF AMER.




Clarion
MODEL TC-66
TRANSFORMER CORPORATION OF AMERICA
100-6TH AVE NEW YORK, N Y.
1-20-36

IF PEAK
456 KC




Clarion
MODELS TC-75 & TC-76
6 TUBE 3 BAND A.C. SUPERHETERODYNE

TRANSFORMER CORP. OF AMERICA
100 SIXTH AVE. NEW YORK, N.Y.
DRAWN BY LS 12-14-35

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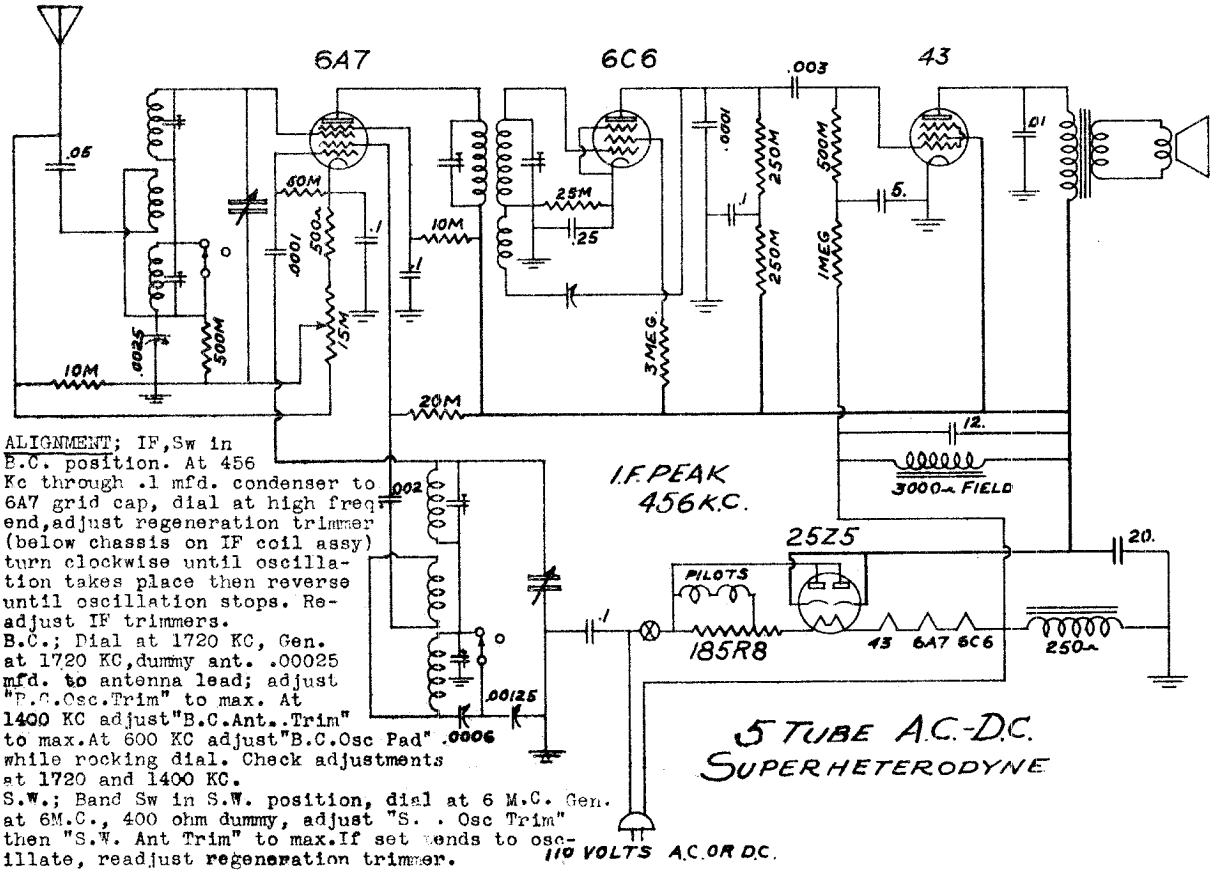
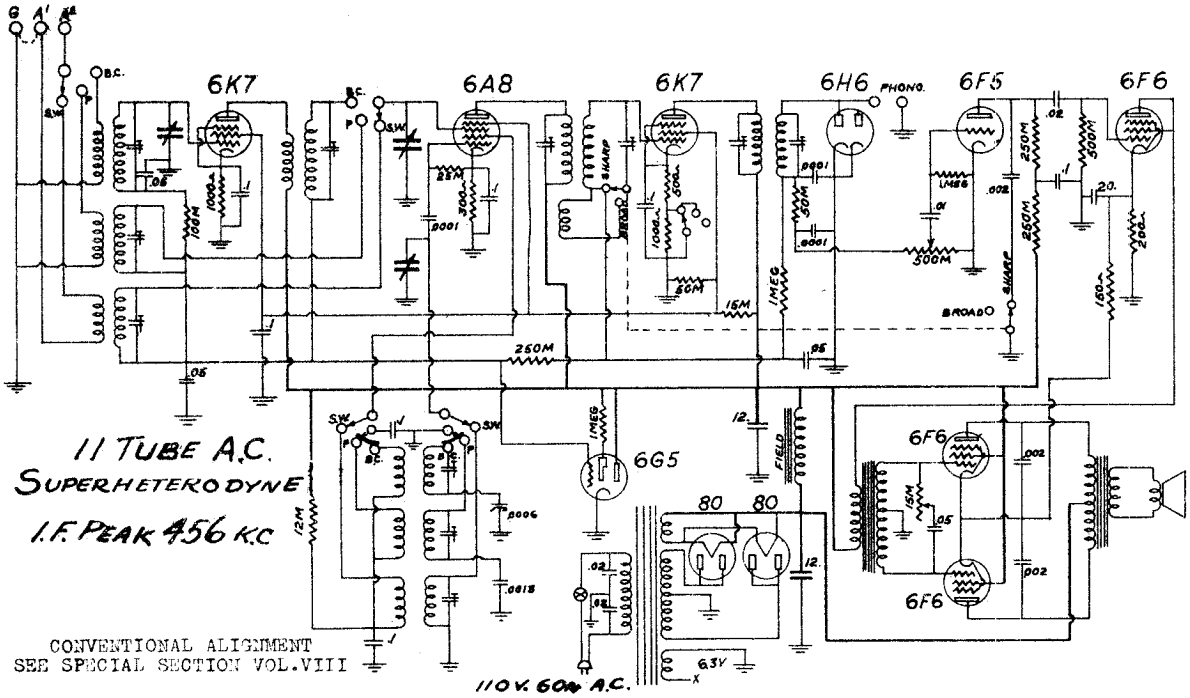
Schematic
Alignment

# TRAV-LER RADIO & TELEVISION CORP.

MODEL 5-Tube AC-DC
MODEL 11-Tube A-C
Superhets.




ALIGNMENT; IF,Sw in B.C. position. At 456 Kc through .1 mfd. condenser to 6A7 grid cap, dial at high freq end, adjust regeneration trimmer (below chassis on IF coil assy) turn clockwise until oscillation takes place then reverse until oscillation stops. Re-adjust IF trimmers.
B.C.; Dial at 1720 KC, Gen. at 1720 KC, dummy ant. .00025 mfd. to antenna lead; adjust "B.C.Osc.Trim" to max. At 1400 KC adjust "B.C.Ant..Trim" to max. At 600 KC adjust "B.C.Osc Pad" while rocking dial. Check adjustments at 1720 and 1400 KC.
S.W.; Band Sw in S.W. position, dial at 6 M.C. Gen. at 6M.C., 400 ohm dummy, adjust "S. . Osc Trim" then "S.W. Ant Trim" to max. If set tends to oscillate, readjust regeneration trimmer.

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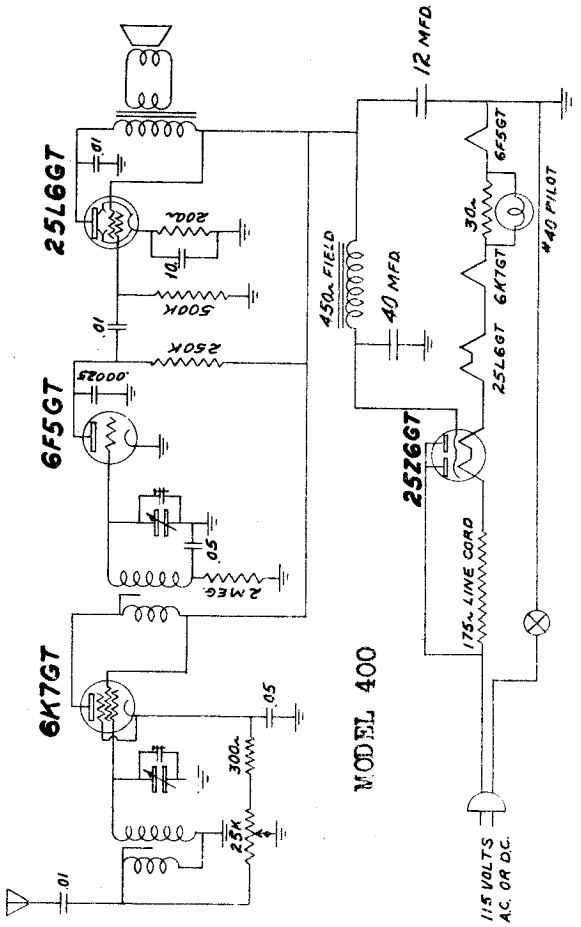
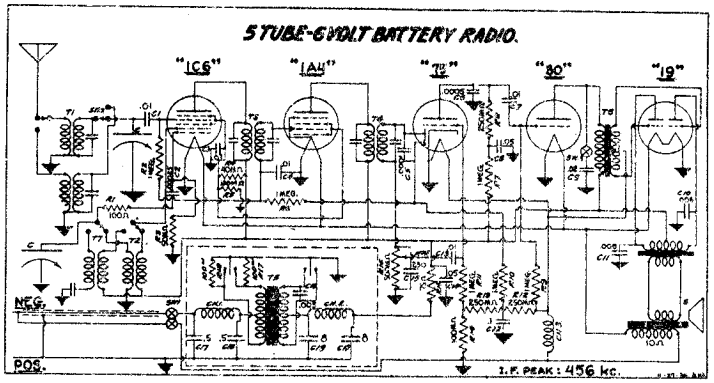
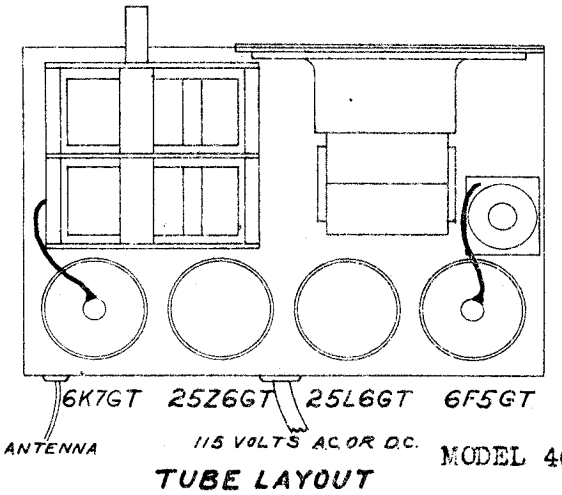
MODEL 5-Tube-6 Volt Batt.
MODEL 400
Schematics, Socket

# TRAV-LER RADIO & TELEVISION CORP.

MODEL 465M
Socket, Trimmers

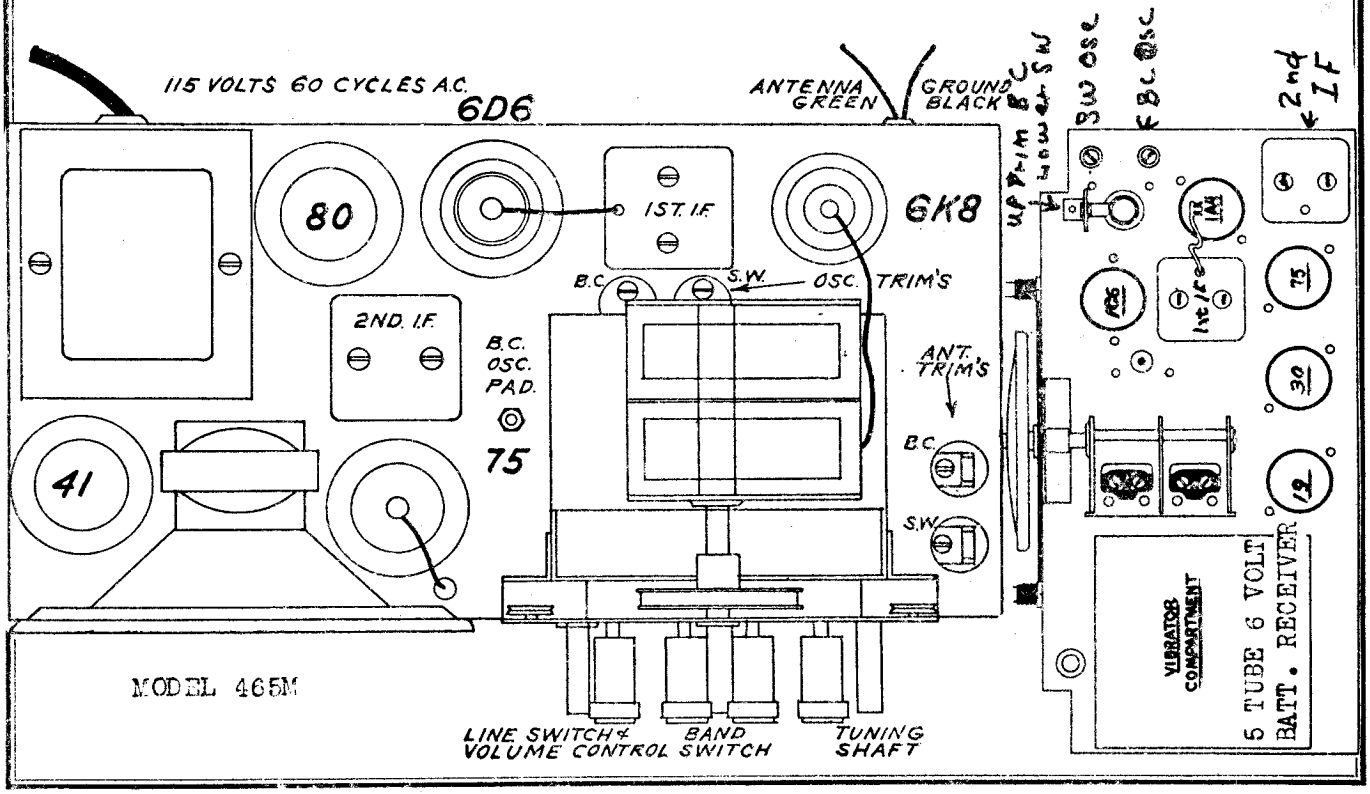



TUBE LAYOUT

MODEL 400

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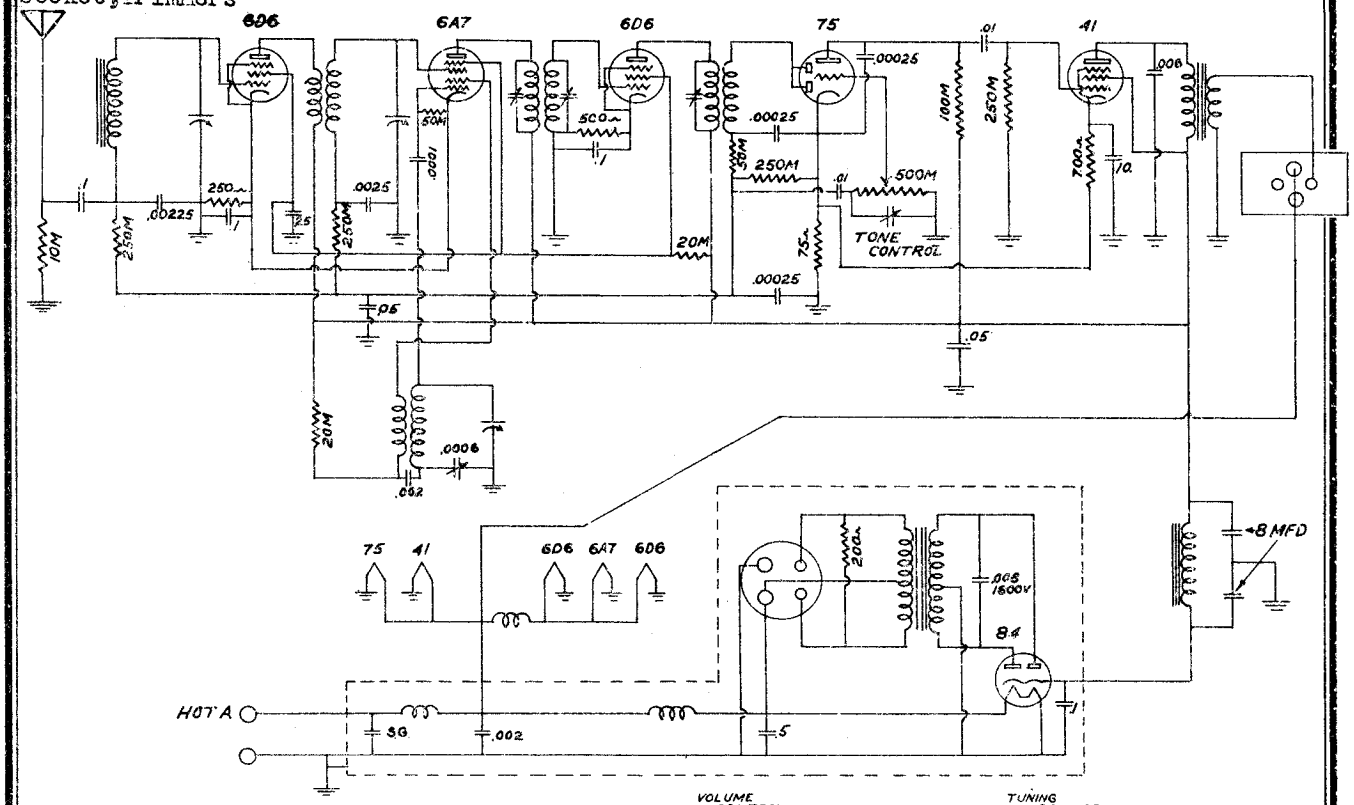
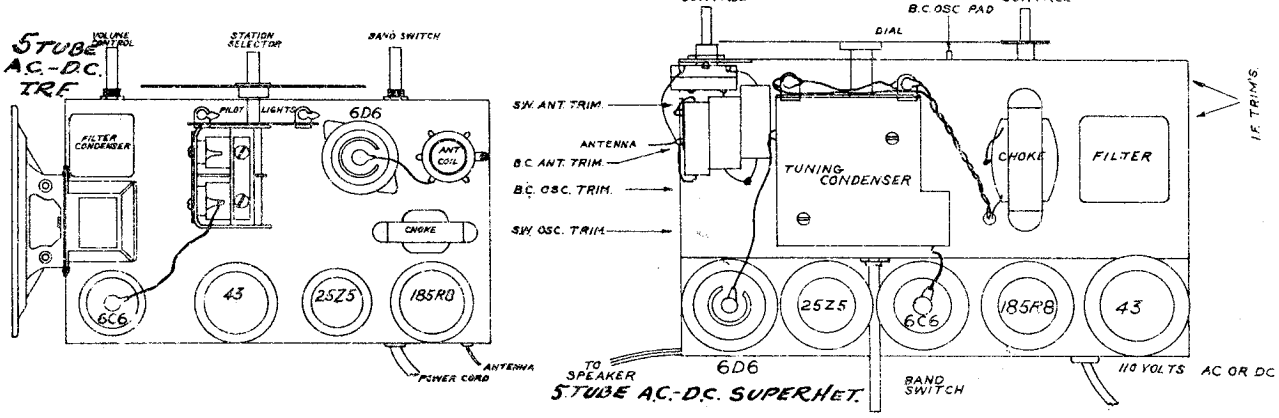
MODEL 5-Tube AC-DC TRF
MODEL 5-Tube AC-DC Superhet
MODEL 11-Tube A-C Superhet.
Socket, Trimmers

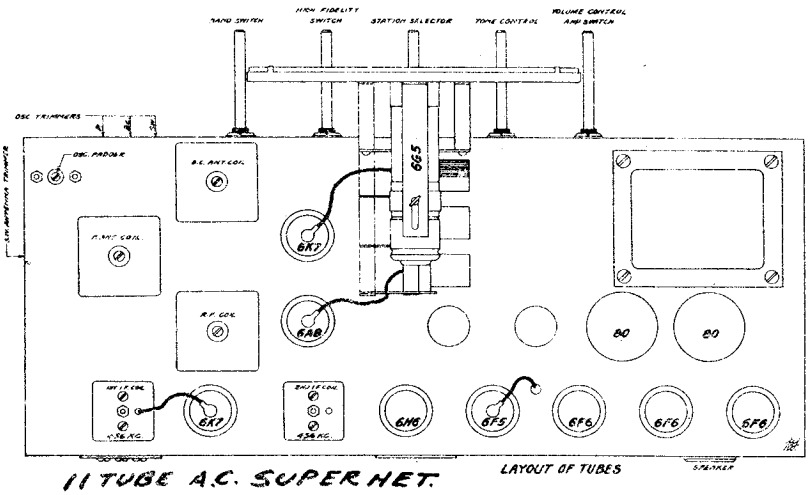
# TRAV-LER RADIO & TELEVISION CORP.

MODEL 6-Tube Auto
Schematic

6 TUBE AUTO SET I.F. = 262 K.C.

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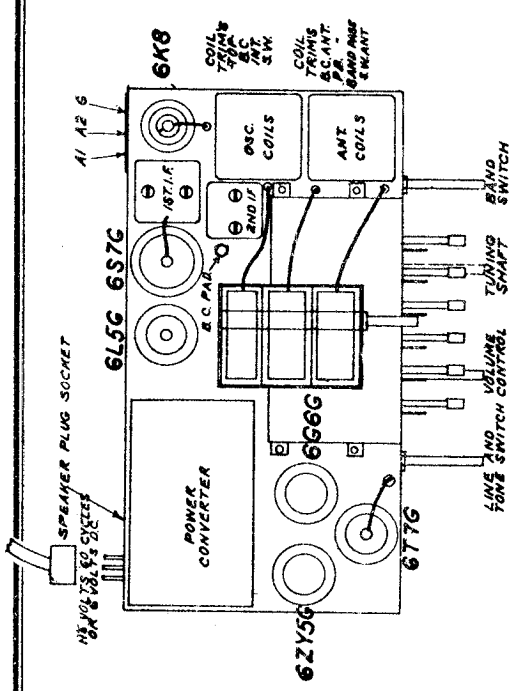
MODEL 6-Tube
Batt. or A-C
MODEL 8-Tube
Batt. or A-C

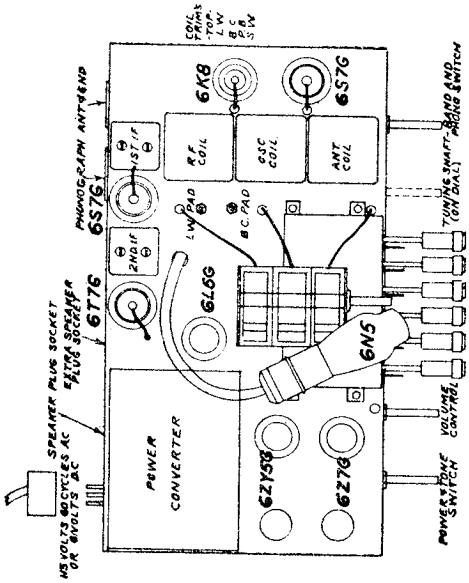
# TRAV-LER RADIO & TELEVISION CORP.

Schematics
Socket
Trimmers




**6 Tube Battery or A. C. Operated Receiver**

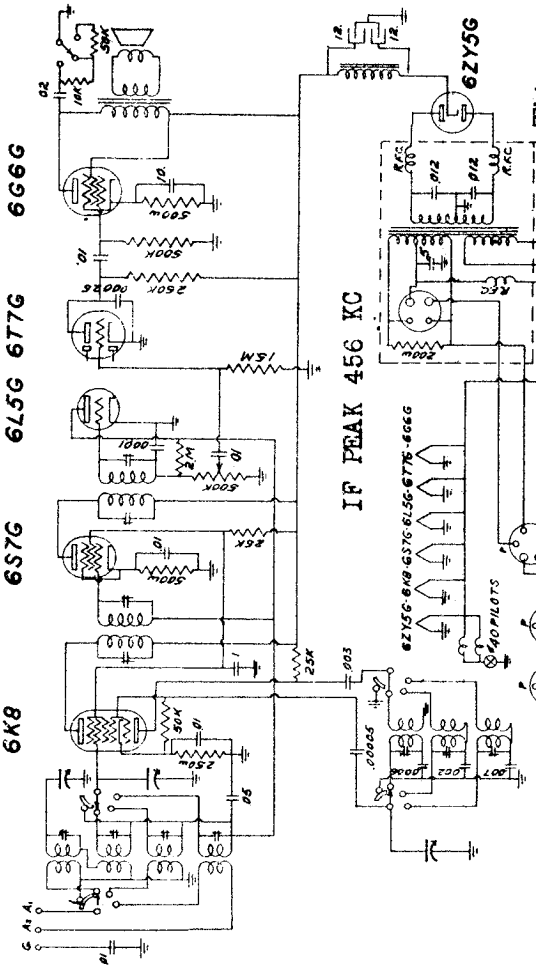
This receiver is designed to operate on a 6 volt storage battery, or 115 volts 60 cycles A. C. **only.** The special model will operate on a 6 volt storage battery, or 220 volts 60 cycle A. C. **only.**

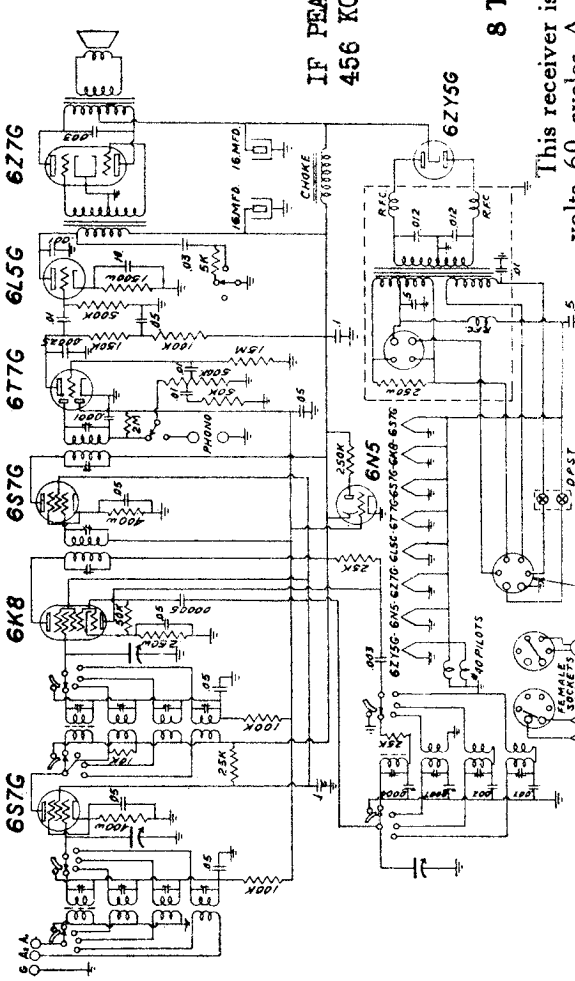



**8 Tube Battery or A. C. Operated Receiver**

This receiver is designed to operate on a 6 volt storage battery, or 115 volts 60 cycles A. C. **only.** The special model will operate on a 6 volt storage battery, or 220 volts 60 cycle A. C. **only.**

6 and 8 Tube Battery or A.C. Receivers----For Alignment and Tuner Data, See Index.

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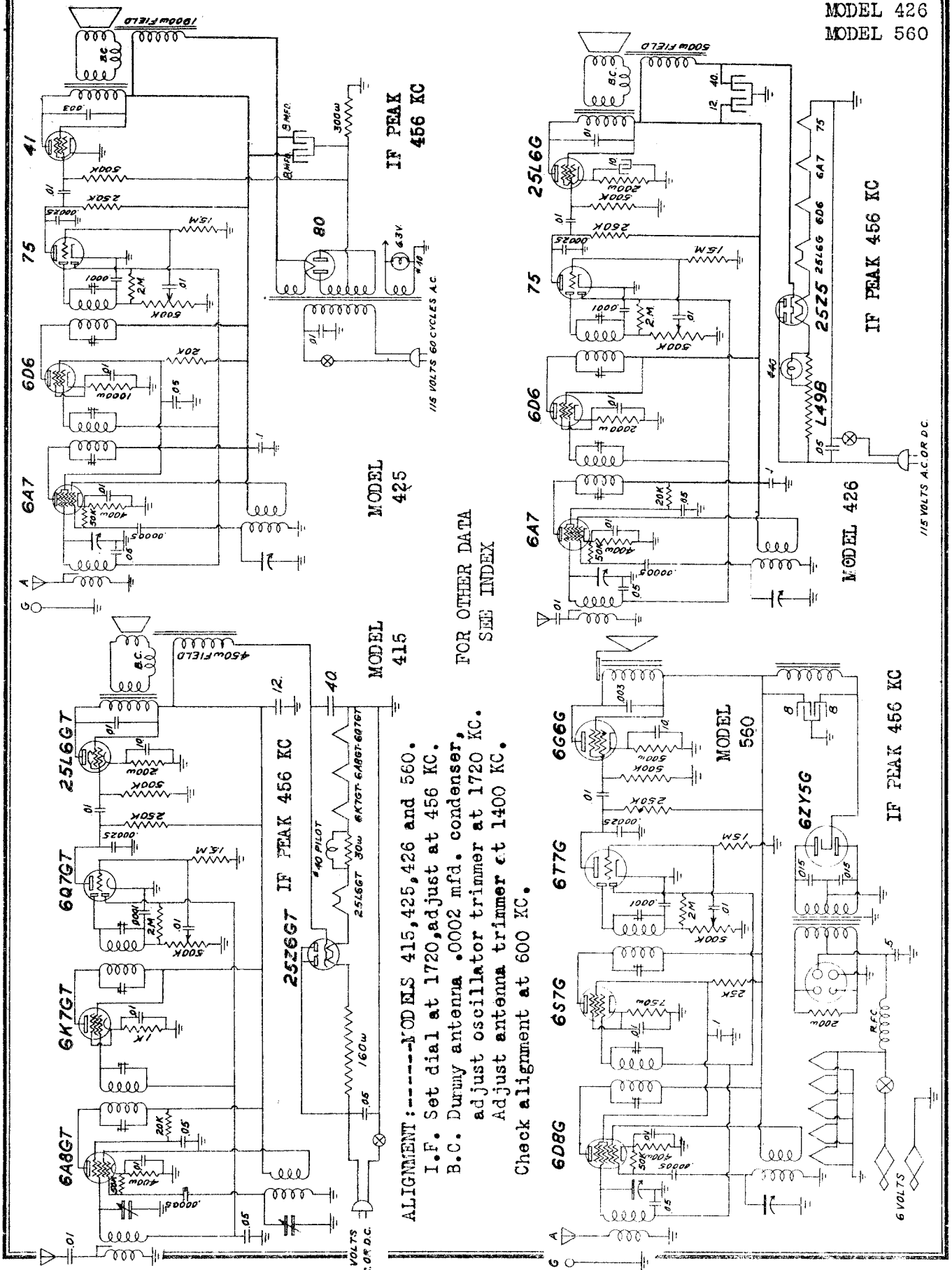
Schematics
Alignment

# TRAV-LER RADIO & TELEVISION CORP.

MODEL 415
MODEL 425
MODEL 426
MODEL 560




FOR OTHER DATA
SEE INDEX

ALIGNMENT:------MODELS 415,425,426 and 560.
I.F. Set dial at 1720, adjust at 456 KC.
B.C. Dummy antenna .0002 mfd. condenser, adjust oscillator trimmer at 1720 KC.
Adjust antenna trimmer at 1400 KC.
Check alignment at 600 KC.

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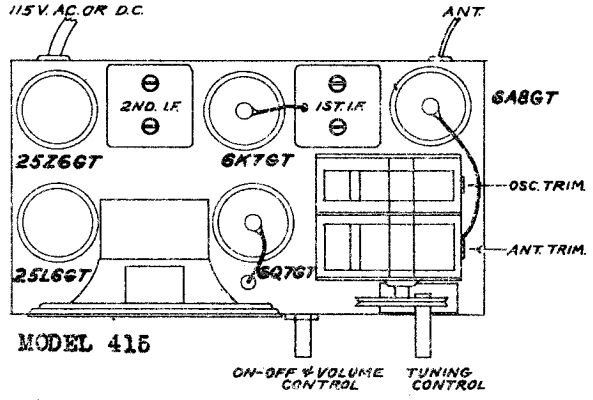
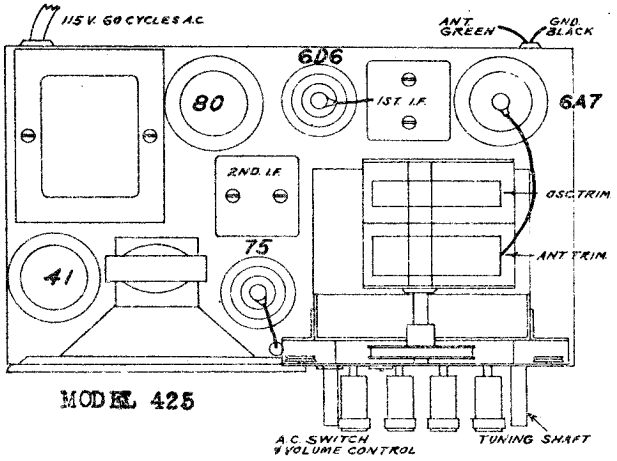
MODEL 415 MODEL 437M
MODEL 425 MODEL 536M
MODEL 426 MODEL 539M

# TRAV-LER RADIO & TELEVISION CORP.

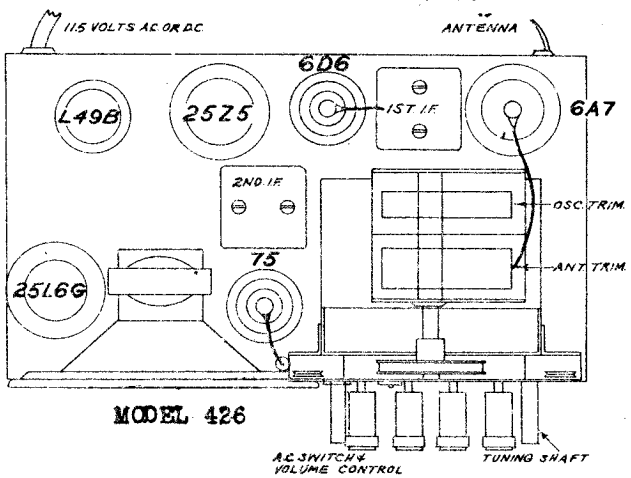
MODEL 552B
MODEL 560
Socket Trimmers



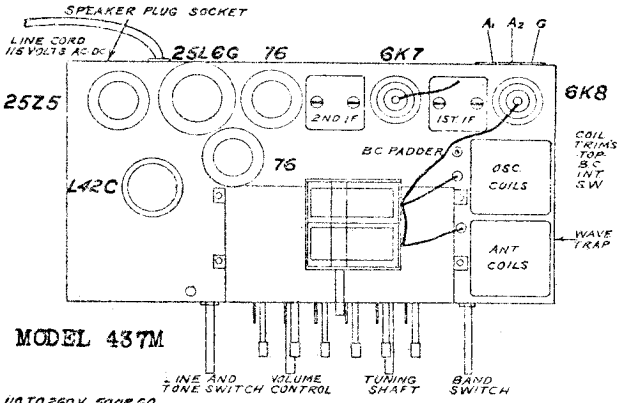

MODEL 415



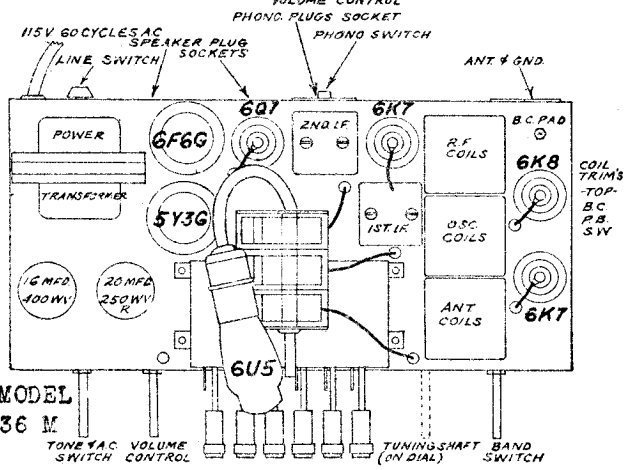

MODEL 425



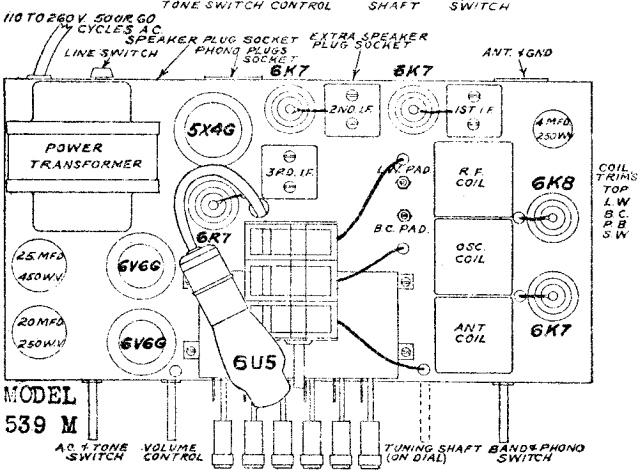

MODEL 426



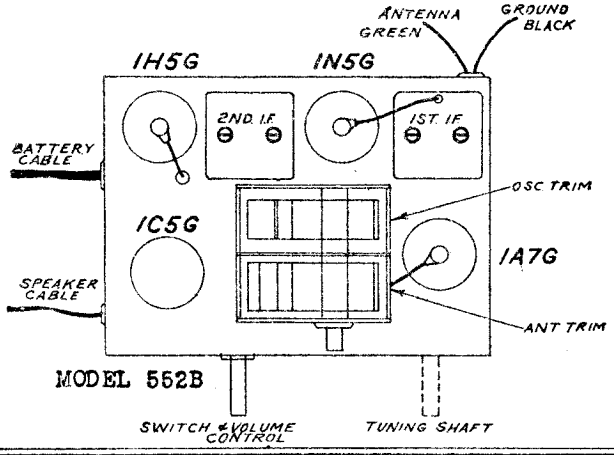

MODEL 437M



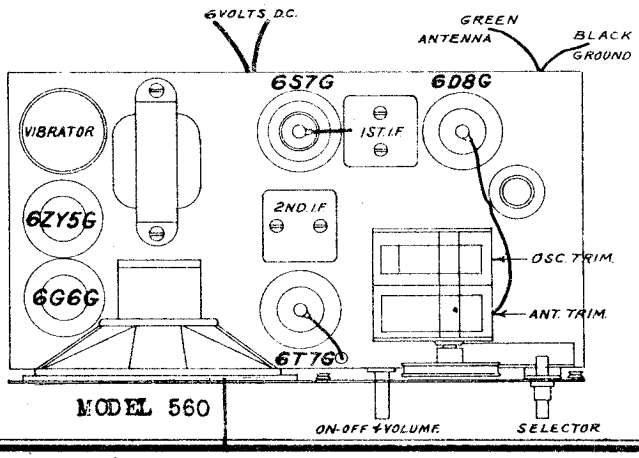

MODEL 536 M




MODEL 539 M




MODEL 552B




MODEL 560

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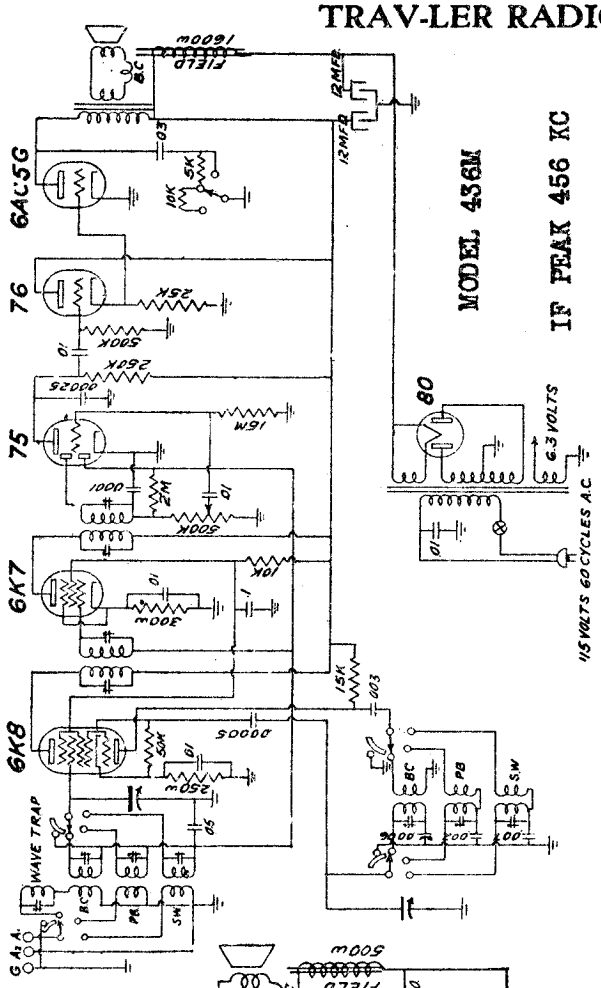
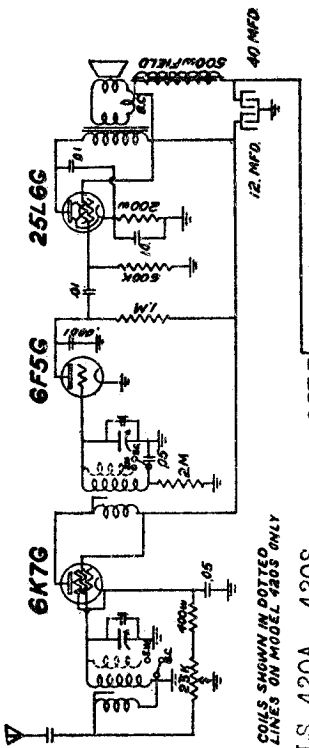
# TRAV-LER RADIO & TELEVISION CORP.

MODELS 420A, 420S
MODEL 436M
MODEL 437M
MODEL 455L
Schematics
Alignment



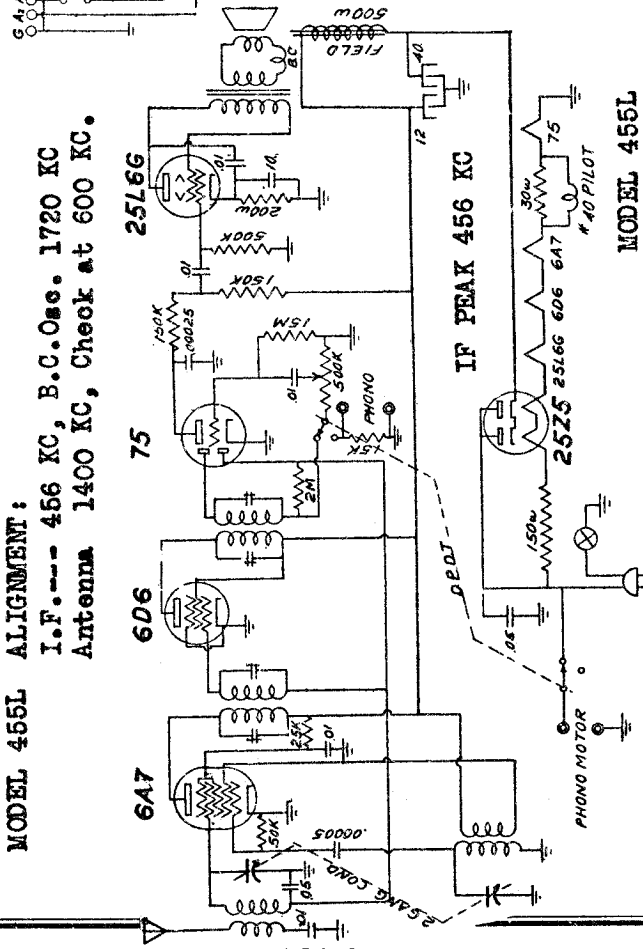




MODELS 420A, 420S

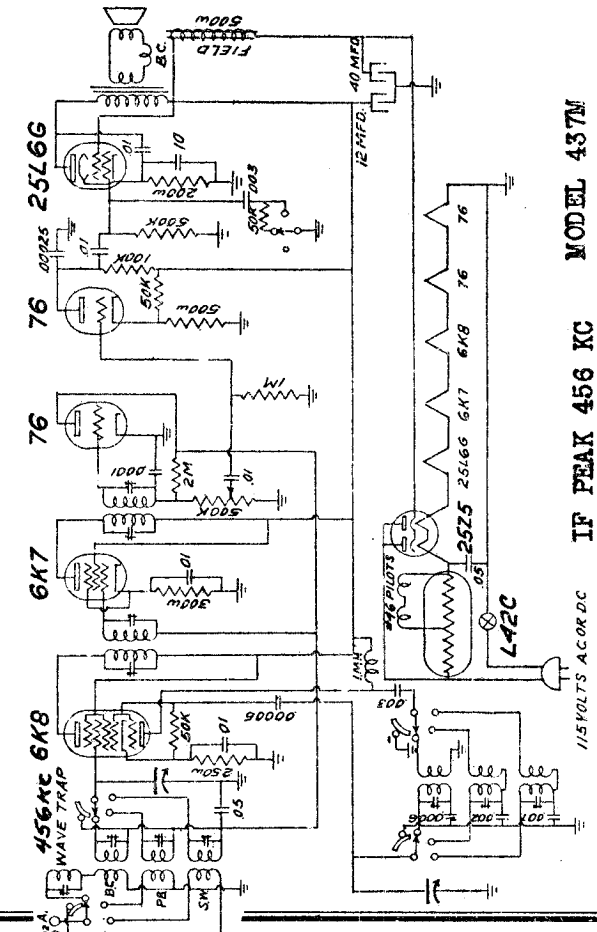
MODEL 420A (1 BAND)
ALIGNMENT:
R.F. Trimmer---1730 KC
Ant. Trimmer---1400 KC
Check at 600 KC.

MODEL 420S 2 BAND)
ALIGNMENT:
R.F. Trimmer--- 1560 KC
Ant. Trimmer--- 1400 KC
SW Band--No adjustment.

MODEL 455L ALIGNMENT:
I.F.--- 456 KC, B.C.Osc. 1720 KC
Antenna 1400 KC, Check at 600 KC.




FOR OTHER DATA, SEE INDEX.

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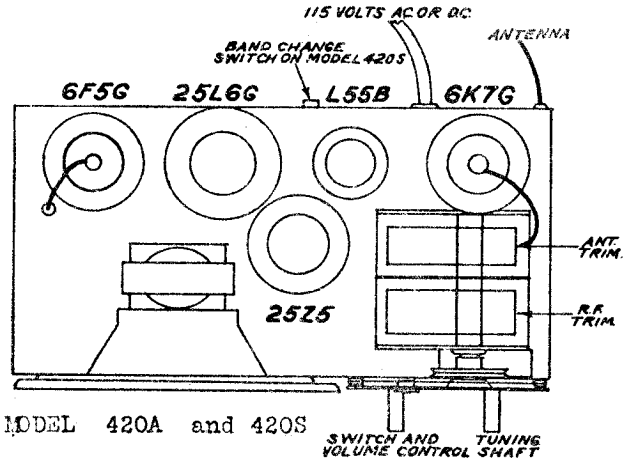
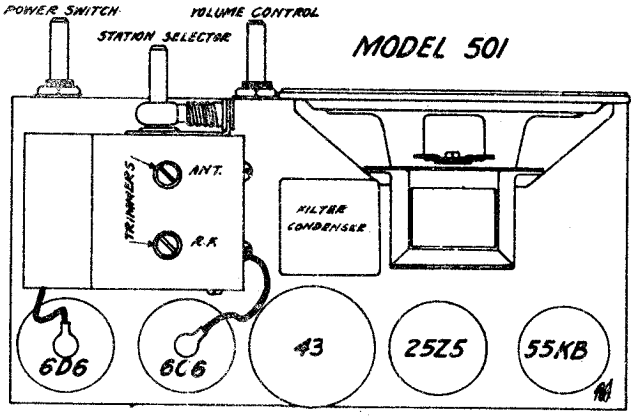
MODEL 501
MODEL A502
Socket, Trimmers

# TRAV-LER RADIO & TELEVISION CORP.

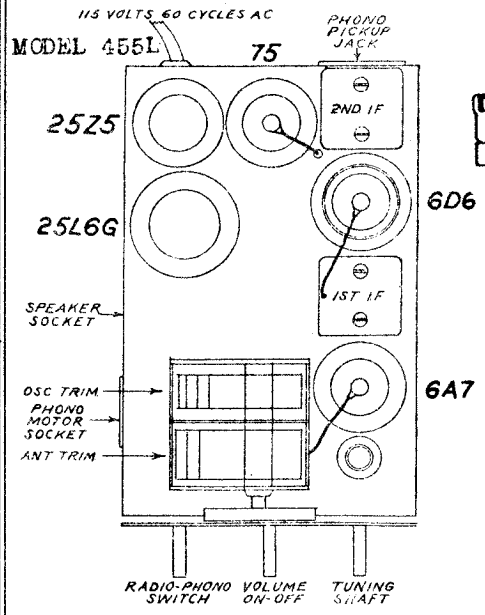
MODELS 420A, 420S
MODEL 436M
MODEL 455L
MODEL 466M

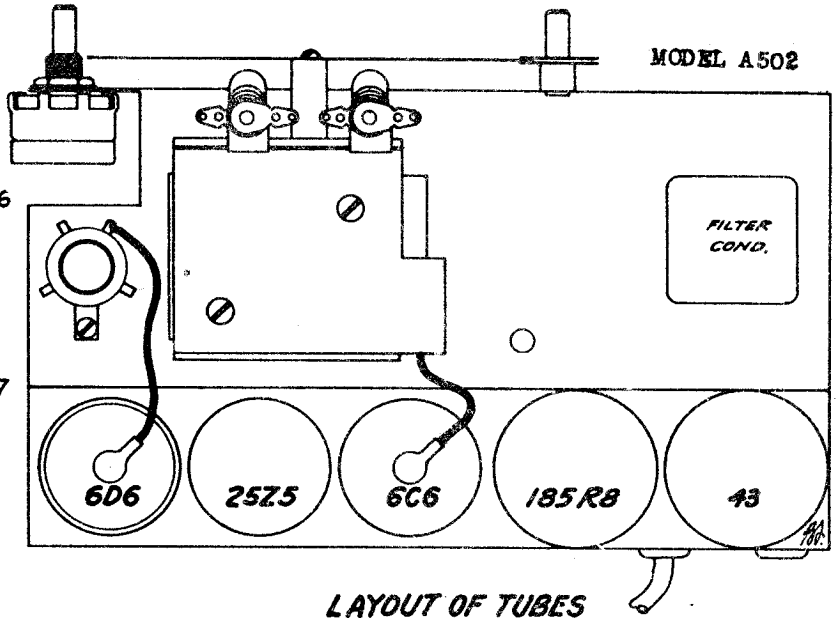



MODEL 420A and 420S

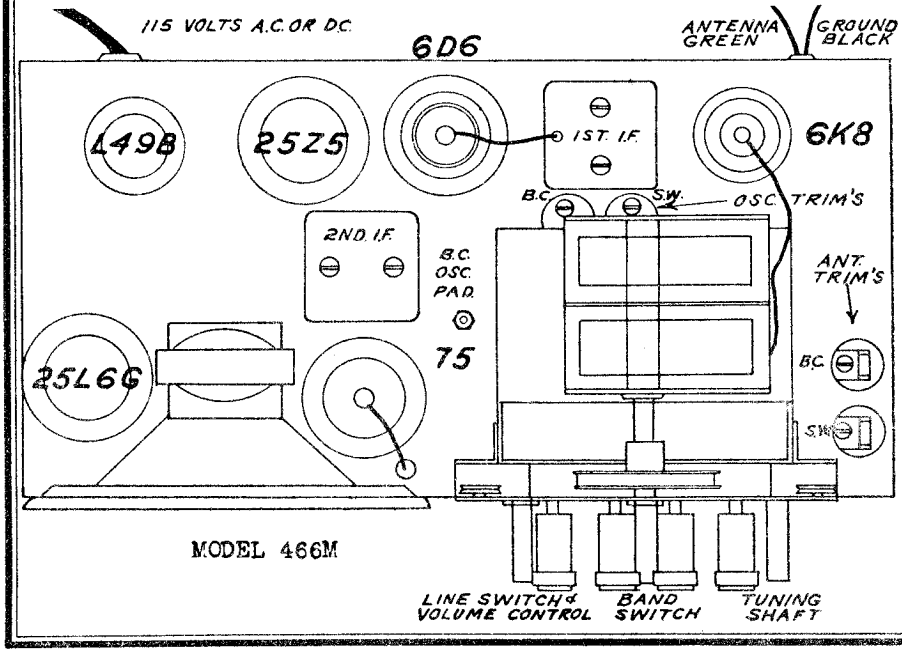



TUBE LAYOUT

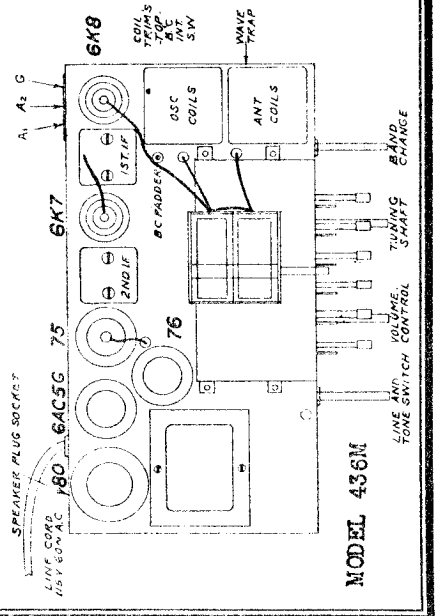



LAYOUT OF TUBES




MODEL 466M




MODEL 436M

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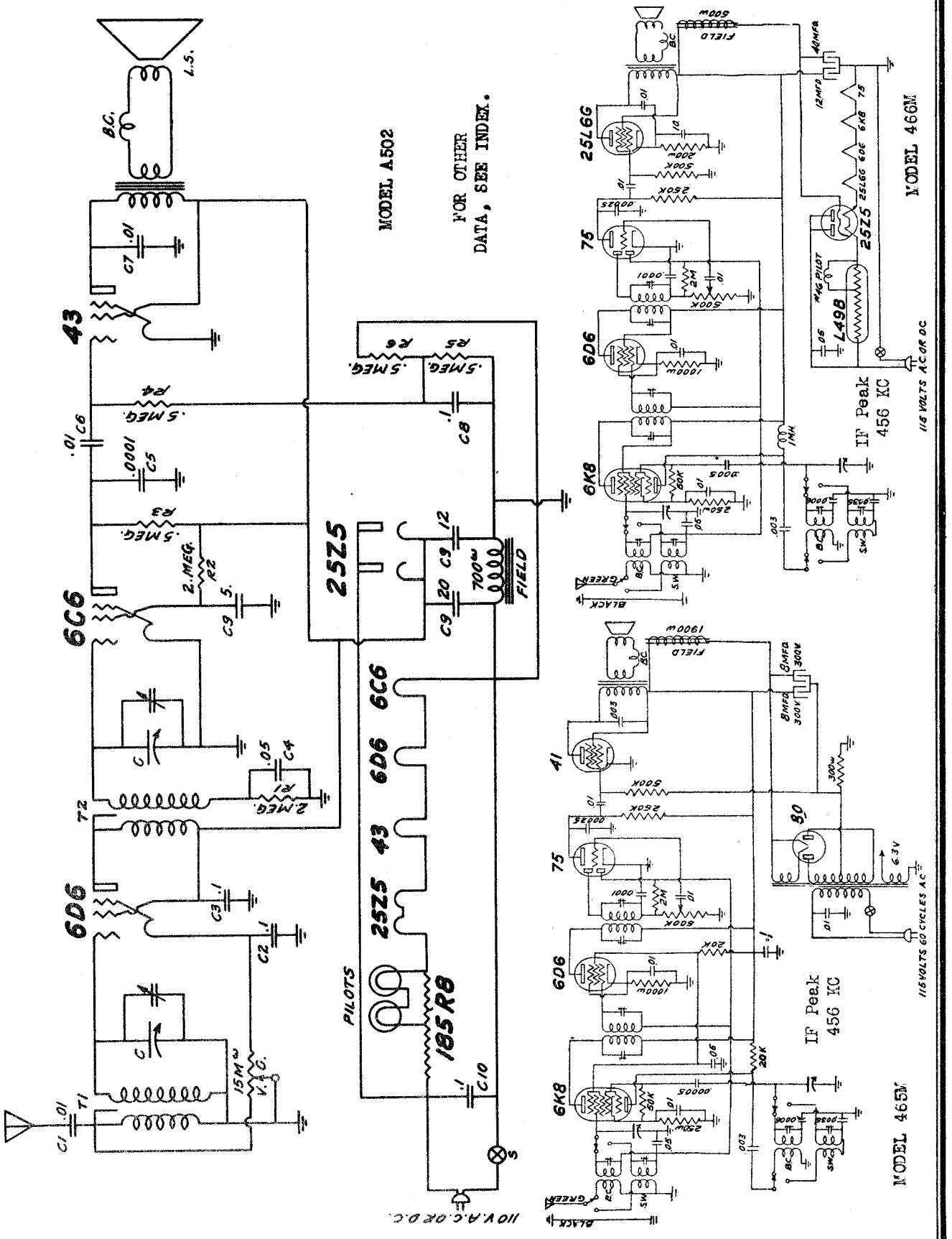
# TRAV-LER RADIO & TELEVISION CORP.

MODEL 465M
MODEL 466M
MODEL A502
Schematics

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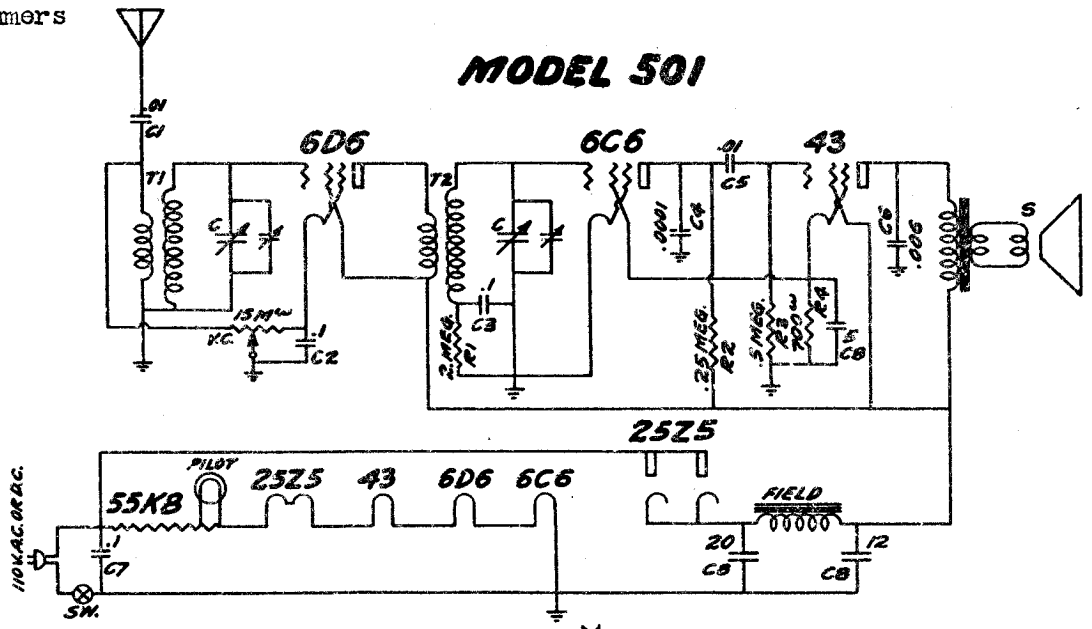
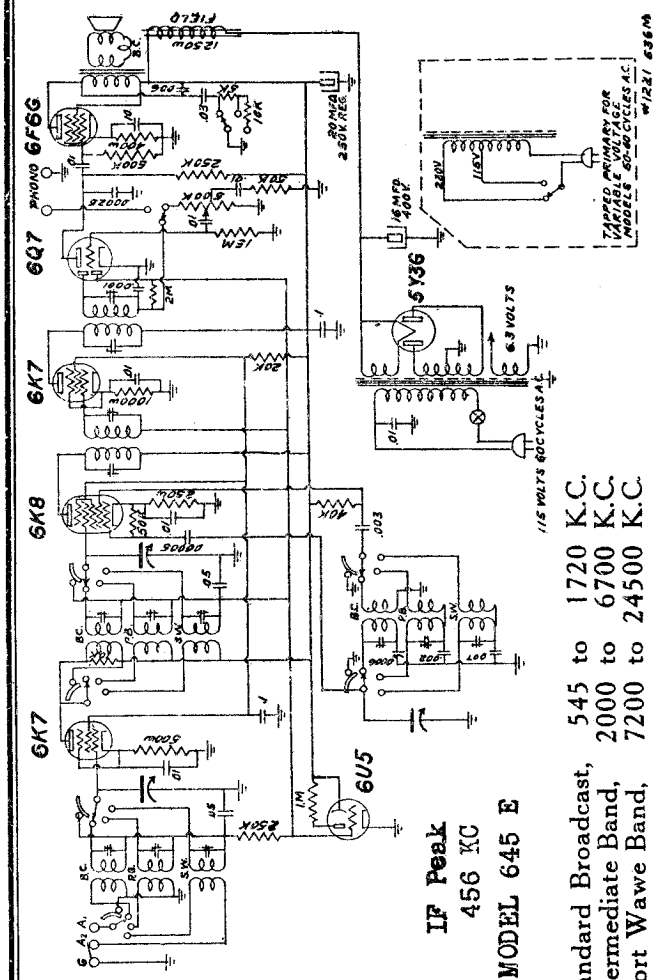
MODEL 501
Schematic
MODEL 645E
Schematic, Socket
Trimmers

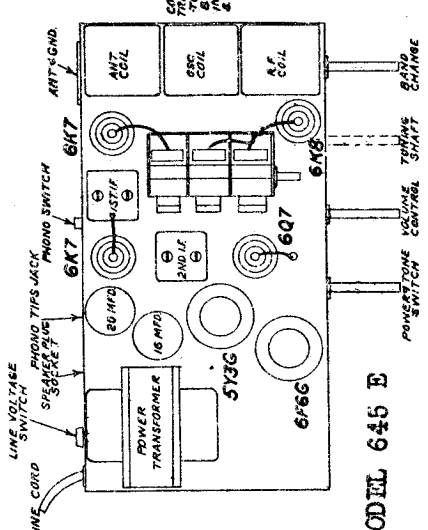
# TRAV-LER RADIO & TELEVISION CORP.



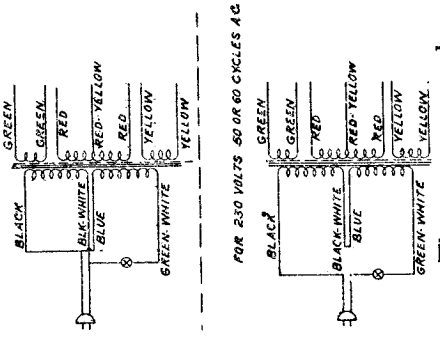

FOR OTHER DATA, SEE INDEX




Standard Broadcast, 545 to 1720 K.C.
Intermediate Band, 2000 to 6700 K.C.
Short Wave Band, 7200 to 24500 K.C.




WIRING DIAGRAM FOR MODEL 645E
UNIVERSAL POWER TRANSFORMER




## CURRENT SUPPLY

The current supply switch at the rear of the chassis must be set to 115 or 230 volts to correspond to the available current and **should never be changed while that current is being used!** Be absolutely sure this switch is set right before you plug in the radio. If it is set for 115 volts and 230 volts is used, **the transformer will burn out.**

## SUPPLY VOLTAGE

This receiver operates from any 110 volt light socket of any frequency AC or straight DC. When operating on a DC socket, the plug may have to be reversed in the socket to obtain the correct polarity, as it will work only in one position on DC current.

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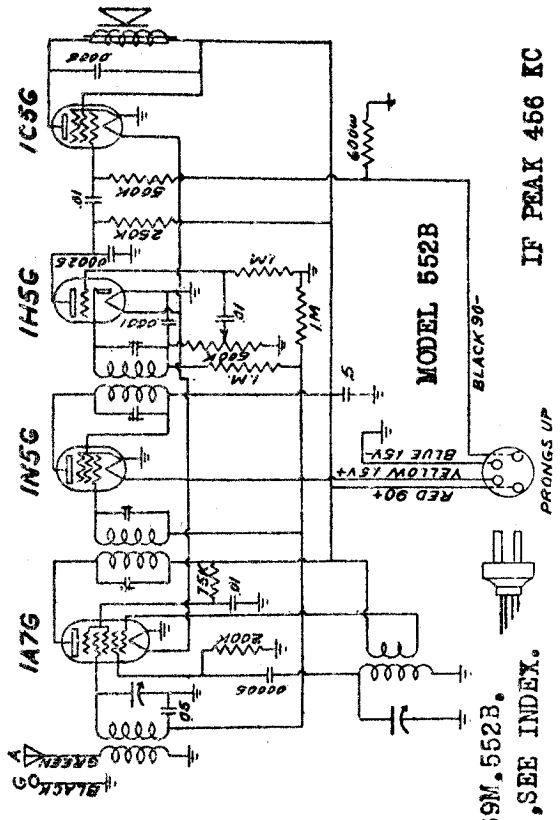
Schematics
Alignment

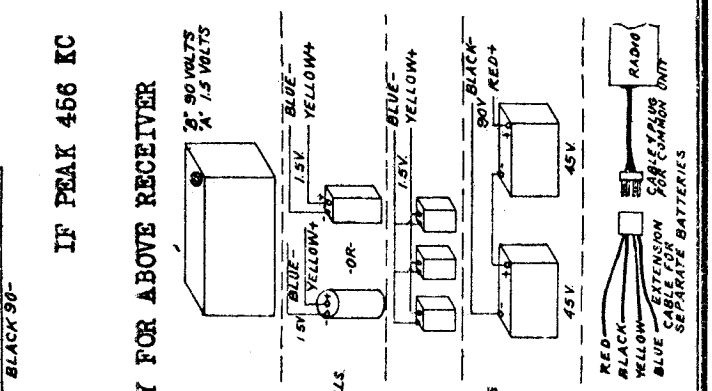
# TRAV-LER RADIO & TELEVISION CORP.

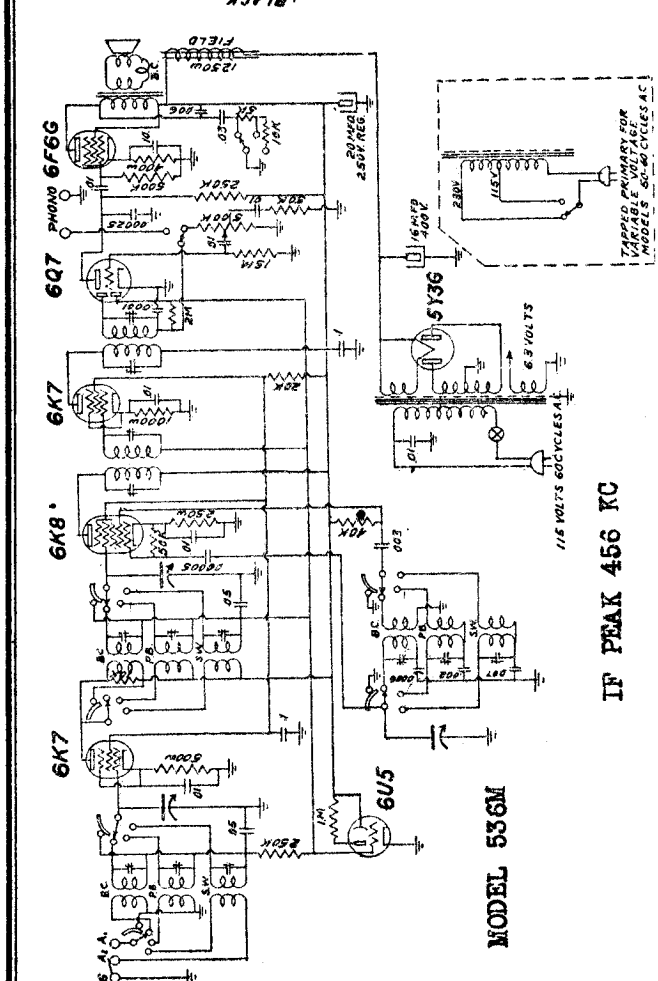
MODEL 536M
MODEL 539M
MODEL 552B

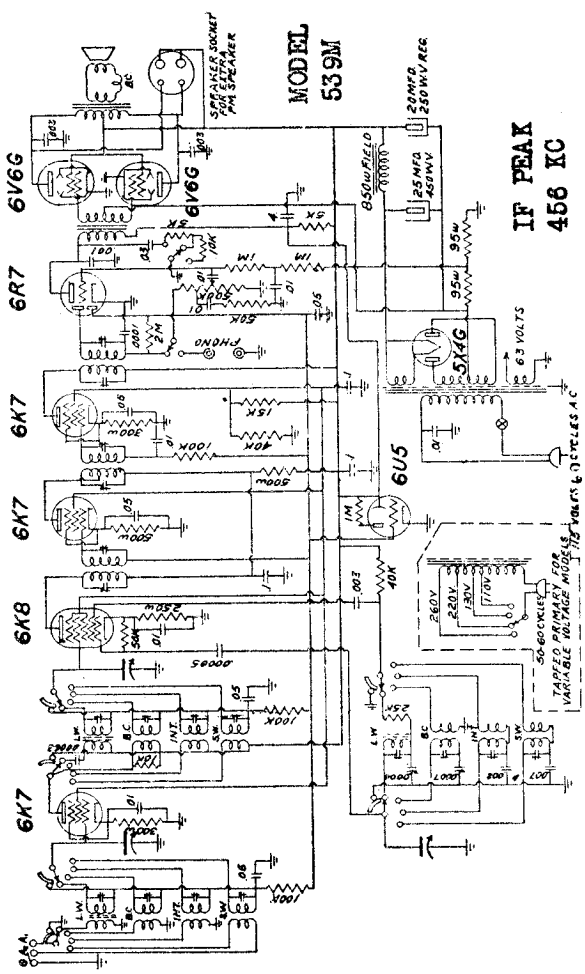
ALIGNMENT:-MODELS 536M,539M,552B.
I.F.TRIMMERS-------- 456 KC.
B.C.OSC. TRIMMERS--1720 KC.
ANT.TRIMMERS---1400 KC.
CHECK ALIGNMENT AT 600 KC.




MODELS 536M,539M,552B.
FOR OTHER DATA,SEE INDEX.


SUBSTITUTE POWER SUPPLY FOR ABOVE RECEIVER
THIS RADIO IS DESIGNED TO OPERATE FROM A SINGLE, COMMON, PLUG-IN UNIT
SUBSTITUTES MAY BE USED
FOR "A" BATTERIES, SINGLE 1.5 VOLT CELLS
OR SEVERAL 1.5 VOLT CELLS MAY BE USED IN PARALLEL CONNECTION.
FOR "B" BATTERIES, TWO 45 VOLT UNITS MAY BE USED, CONNECTED IN SERIES.
"B" 90 VOLTS "A" 1.5 VOLTS
MODEL 552B
RADIO
CABLE FOR USE WITH COMMON UNIT
EXTENSION CABLE FOR SEPARATE BATTERIES
RED
BLACK
YELLOW
BLUE

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MODEL 6-Tube Auto Voltage, Socket Trimmers, Alignment
MODELS 6-, 8-Tube Batt. or A-C Sets

# TRAV-LER RADIO & TELEVISION CORP.

MODELS 436M, 437M
MODELS 465M, 466M
Alignment, Tuner

MODEL 536M
MODEL 645E
MODEL 539M
Alignment
MODELS 425, 426
Tuner Data

ALIGNMENT: 8 TUBE BATTERY OR A.C. and MODEL 539M.

### I. F. ALIGNMENT

From a good signal generator, connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8 with the set's grid lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the radio speaker. Adjust the I.F. trimmers for maximum output, starting with the third I.F. and working back. Decrease the generator output as the speaker output increases.

### LONG WAVE ALIGNMENT

Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna, to terminal "A1," with the metal strip connected across A2 and G. Set the dial and generator to 362 K.C. and adjust the L.W. oscillator trimmer for maximum output. Align the L.W. RF and ANT trimmers at 320 K.C. Align the L.W. oscillator pad for maximum output at 200 K.C. by adjusting the dial and padder together. Check the alignment again at 320 K.C.

### BROADCAST BAND ALIGNMENT

Using the .0002 mfd. condenser as dummy antenna, adjust the B.C. oscillator trimmer at 1720 K.C. Align the RF and ANT trimmers at 1400 K.C. Align the B.C. oscillator padder at 600 K.C. by adjusting the dial and padder together. Check the alignment again at 1400 K.C.

### INTERMEDIATE BAND ALIGNMENT

Using a 400 ohm resistor as dummy antenna, adjust the Intermediate Band oscillator trimmer at 6.7 M.C. and the R.F. and Antenna trimmers at 6 M.C.

Check for alignment at 2.2 M.C.

### SHORT WAVE BAND ALIGNMENT

Using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C., and the R.F. and Antenna trimmers at 22 M.C.

Check for alignment at 8 M.C.

### NOTICE

If a Standard All Wave dummy Antenna is available, it should be used in place of the .0002 mfd. condenser, and the 400 ohm resistor.

On all bands the oscillator trimmers are adjusted with the variable condenser full open.

ALIGNMENT; MODELS 6Tube Battery or A.C., 437M, 436M 466M, 465M, 536M, and 645E.
NOTE, No intermediate band on Models 465M and 466M.

*I.F.* From a good signal generator, connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8 with the set's grid lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the radio speaker. Adjust the I.F. trimmers for maximum output, decreasing the generator output as the speaker ouput increases.

*B.C.* 1. Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna to the "A1" terminal, with the metal strip connected across A2 and G. Set the signal generator and radio dial to 1720 K.C. and adjust the B.C. oscillator trimmer for maximum output.

2. Set the signal generator and radio dial to 1400 K.C. and adjust the B.C. R.F. and ANT. trimmers for maximum output.

3. Set the signal generator to 600 K.C. and the radio dial to approximately 600 K.C., and adjust the B.C. oscillator padder for maximum output by adjusting dial and pad together.

Check the alignment again at 1400 K.C.

*INT.* Connect the signal generator lead thru a 400 ohm resistor as dummy antenna to A1. Set the dial and generator to 6700 K.C. and adjust the P.B. oscillator trimmer for maximum output. Adjust the R.F. and ANT. trimmers at 6000 K.C. and check for alignment at 2200 K.C.

*S.W.* Still using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C. on dial and generator. Adjust the R.F. and ANT. trimmers at 22 M.C. and check for alignment at 8. M.C.

ALIGNMENT: 6 TUBE AUTO RADIO

1. Set variable condenser with rotor plates in open position. Set signal generator to 262 ko., connect generator lead to grid cap of 6A7 using a .1 mfd., condenser as a dummy antenna. Adjust IF trimmers for maximum output, reducing signal generator output as signal increases.

2. Set signal generator to 1620 ko., connecting generator lead to antenna lead on set using a .00025 condenser as dummy antenna. Rotate oscillator trimmer until signal is picked up. Set generator ot 1400 ko., pick up signal by rotating variable condenser then adjust RF and antenna trimmers for maximum signal, reducing generator output as speaker signal increases. Set signal generator to 600 ko., rotate variable condenser to pick up signal then adjust for maximum sensitivity by rotating oscillator padder while rocking variable condenser.

3. Recheck alignment adjustments at 1620 and 1400 ko.

PUSH BUTTONS; MODELS 6 and 8 Tube Battery or A.C., 425, 426, 436M, 437M, 465M and 466M.

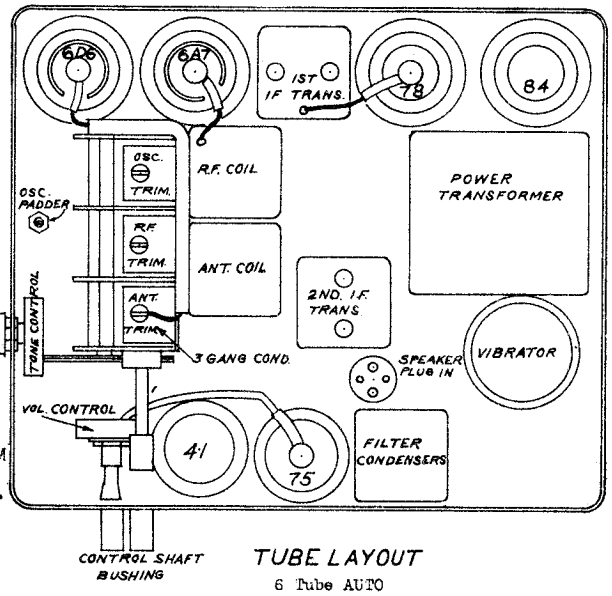
Six Push Button Station Selectors are incorporated in this receiver. Each button may be adjusted to select any station or frequency in the Broadcast Band. To adjust each button, perform the following operations:

1. Tune in a desired station with the Selector knob, watching the eye for the narrowest shadow.
2. Twist the Push button you want set up for this station, to the left about one full turn to loosen the mechanism.
3. Push this Push Button in as far as it will go, while holding the Selector knob firmly so the station will not be detuned.
4. With the Push Button pressed all the way in, twist it to the right until it is tight, and then release it.

Follow this procedure with the other five Push Buttons, setting each for a different station.

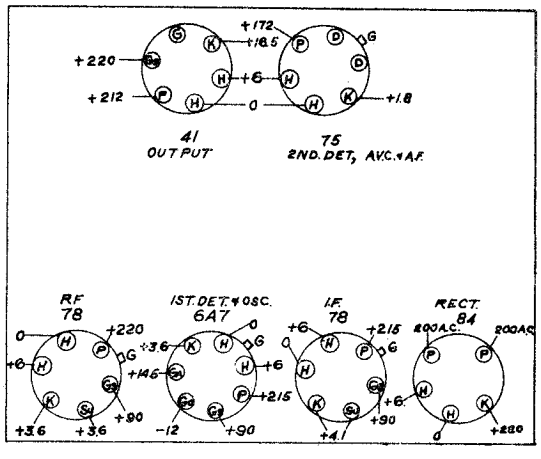
Now, when any button is pushed, the station for which that button is set should become perfectly tuned in. If it is not tuned in perfectly, repeat the above procedure until satisfactory results are obtained.

Select the Call Letter Tabs to correspond to the stations the Push Buttons are set up for, and insert them in the places provided above each button.




TUBE LAYOUT
6 Tube AUTO

VOLTAGE DATA 6 TUBE AUTO RADIO




Bottom view of 6-tube auto set showing socket positions and voltages from socket terminals to ground. All voltage measurements taken with volume control at maximum and with no signal applied. Use volt-meter of 1000 ohms per volt.

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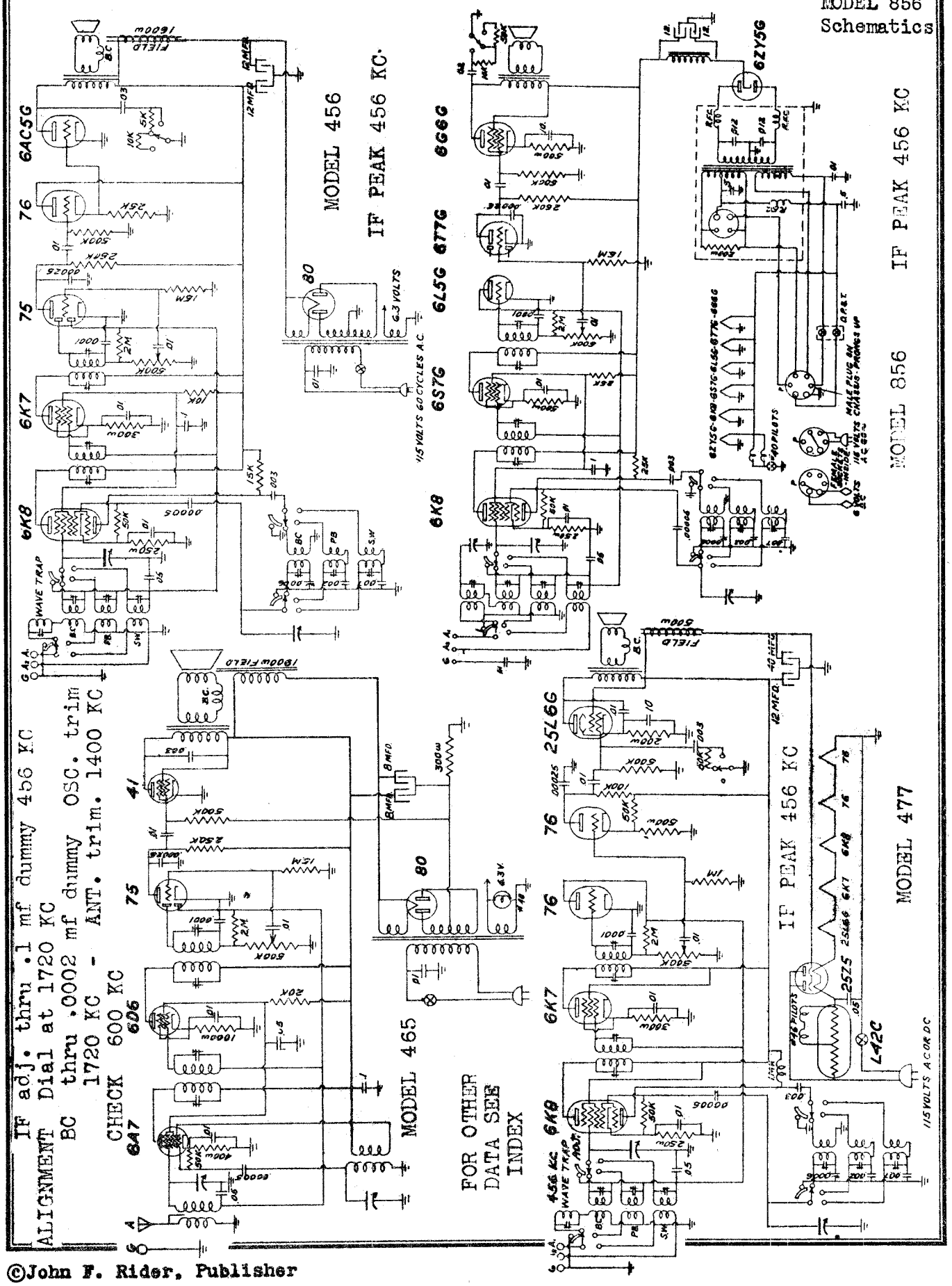
MODEL 465
Schematic, Alignment

# ULTRAMAR MFG. CORP.

MODEL 456
MODEL 477
MODEL 856
Schematics

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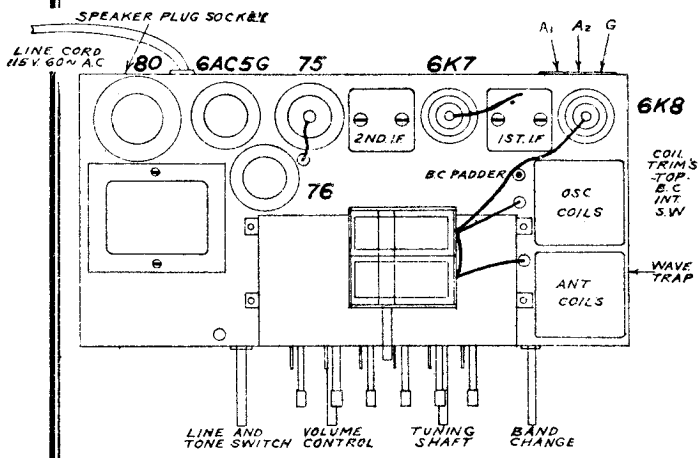
MODEL 456
MODEL 465
MODEL 477

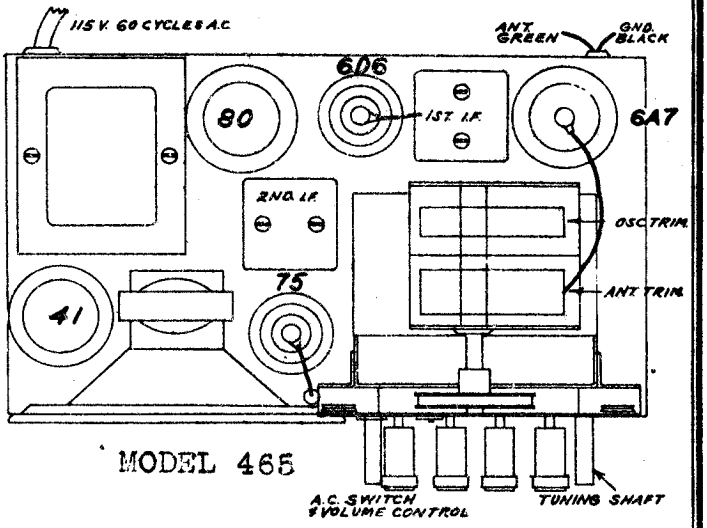
# ULTRAMAR MFG. CORP.

MODEL 856
MODEL 877
MODEL 889
Socket, Trimmers

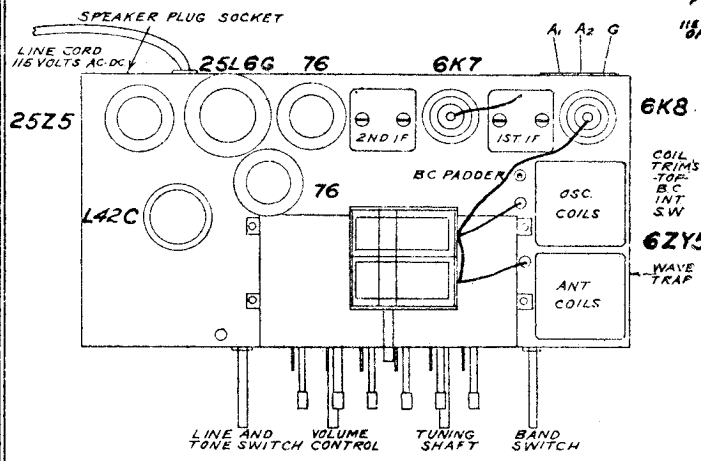
## MODEL 456



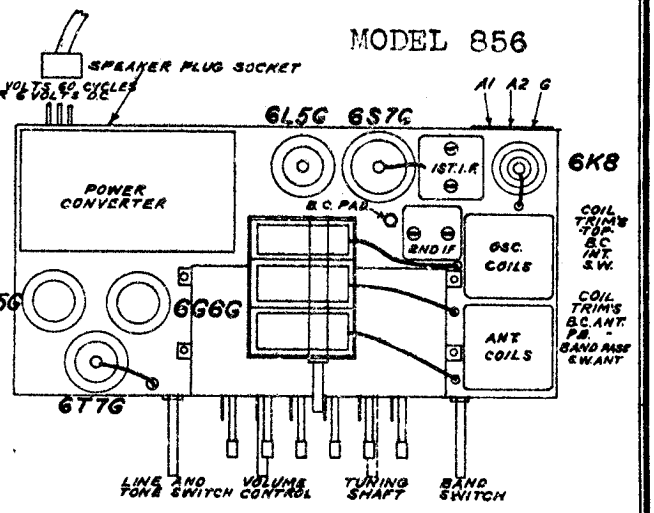

## MODEL 465



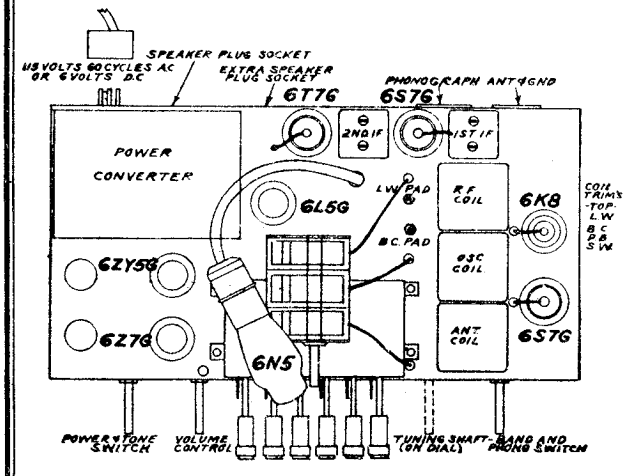

## MODEL 477



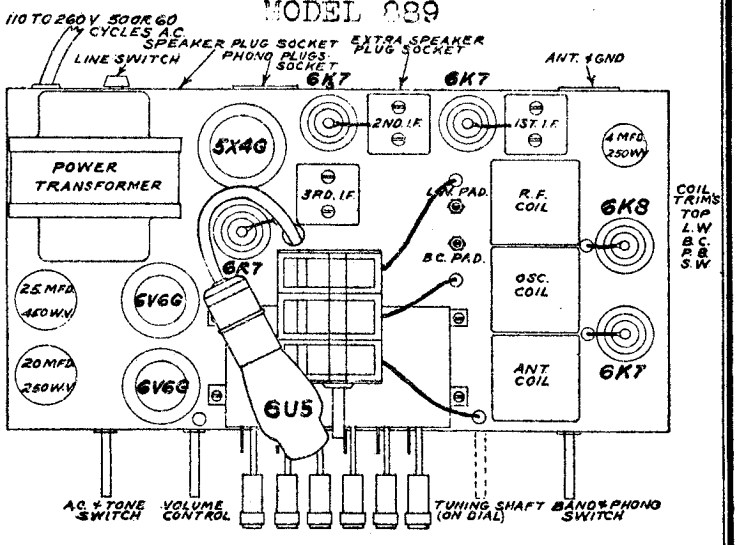

## MODEL 856




## MODEL 877




## MODEL 889

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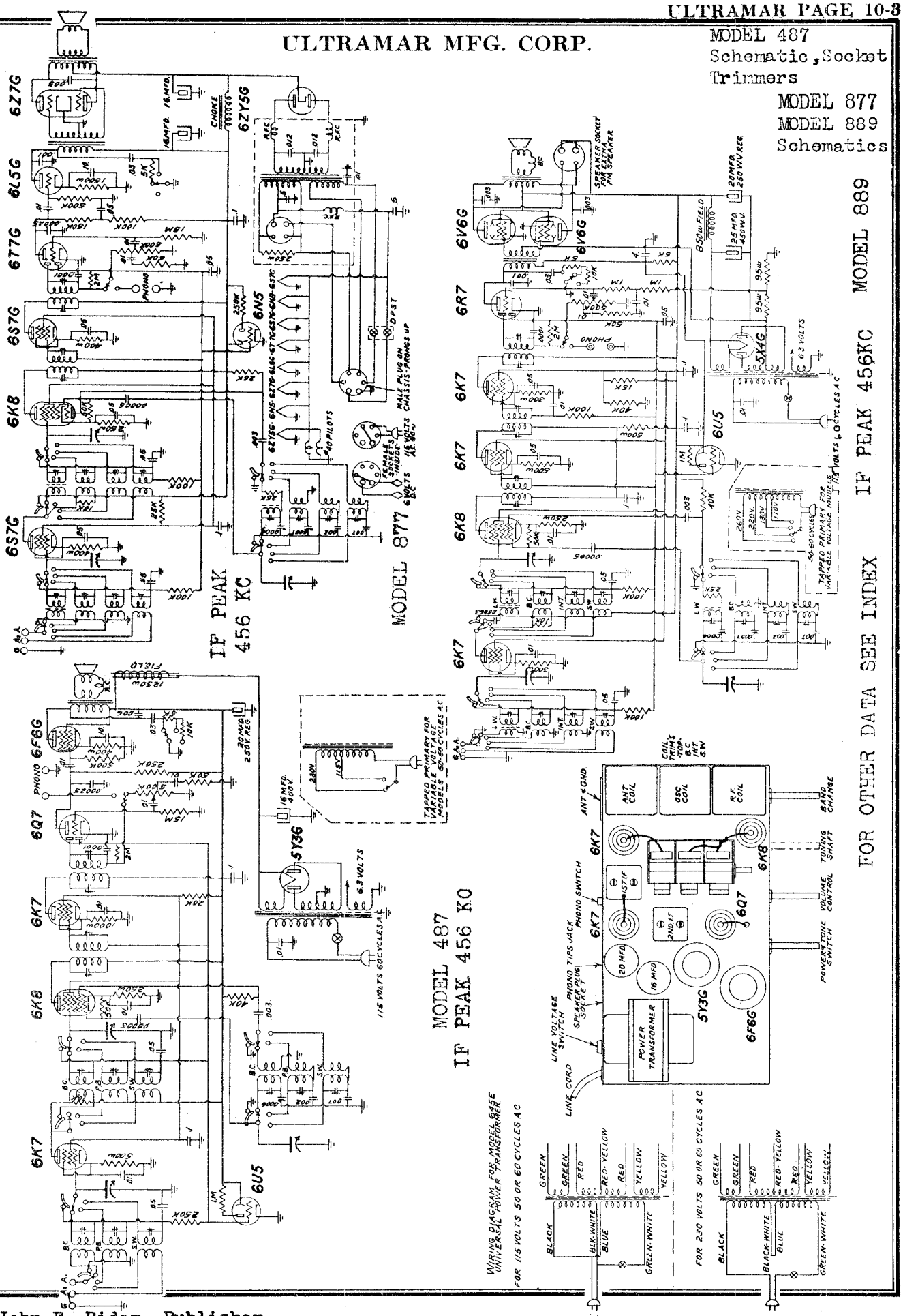
# ULTRAMAR MFG. CORP.

MODEL 487
Schematic, Socket
Trimmers

MODEL 877
MODEL 889
Schematics

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MODELS 306,316
Schematic,Socket
Trimmers,Alignment
MODEL 487 MODEL 465
Alignment Tuner Data

# ULTRAMAR MFG. CORP.

MODEL 456 MODEL 477
MODEL 856 MODEL 877
MODEL 889
Alignment,Tuner

## MODELS 877 & 889

### TECHNICAL INSTRUCTIONS

A good output meter should be used in all alignment adjustments.

### I. F. ALIGNMENT

From a good signal generator, connect the proper leads, one to the radio chassis, and the other thru a .1 mfd. condenser to the grid cap of the 6K8, with the tube's grid lead still in place. Set the radio dial to 1720 K.C. and the signal generator to 456 K.C. With the set's volume control full on, increase the generator output until the signal is heard in the radio speaker. Adjust the I. F. trimmers for maximum output, decreasing the generator output as the radio output increases.

### LONG WAVE ALIGNMENT

Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna, to the "A" terminal, with the metal strip connected across A2 and G. Set the dial and generator to 362 K. C. and adjust the oscillator trimmer for maximum output. Align the L.W., R.F. and antenna trimmers at 320 K.C.

Align the L.W. oscillator padder at 200 K.C. by adjusting the dial and padder together. Check the alignment again at 320 K.C.

### BROADCAST BAND ALIGNMENT

Using the .0002 mfd. condenser as dummy antenna, adjust the B.C. oscillator trimmer at 1720 K.C. for maximum output. Align the R.F. and antenna trimmers at 1400 K.C. Align the B.C. oscillator padder at 600 K.C. by adjusting the dial and padder together. Check the alignment again at 1400 K.C.

### INTERMEDIATE BAND ALIGNMENT

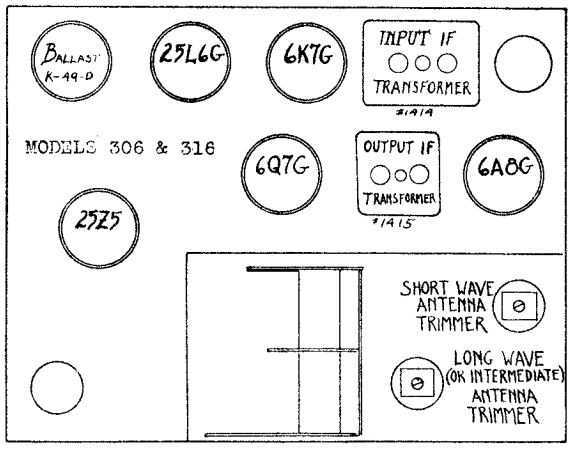
Using a 400 ohm resistor as dummy antenna, adjust the Intermediate Band oscillator trimmer at 6.7 M.C. and the R.F. and Antenna trimmers at 6 M.C.

Check for alignment at 2.2 M.C.

### SHORT WAVE BAND ALIGNMENT

Using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C., and the R.F. and Antenna trimmers at 22 M.C.

Check for alignment at 8 M.C.




## MODELS 487, 456, 477, & 856

### TECHNICAL INSTRUCTIONS

A good output meter should be used in all alignment adjustments

### I. F. ALIGNMENT

From a good signal generator connect the proper leads, one to the radio chassis, the other thru a .1 mfd. condenser to the grid cap of the 6K8, with the set's grid lead still in place. Set the radio dial to 1720 kilocycles and the signal generator to 456 K.C. With the set's volume control "full on," increase the generator output until the signal is heard in the radio speaker. Adjust I. F. trimmers for maximum output, decreasing the generator output as the speaker output increases.

### B. C. ALIGNMENT

1. Connect the signal generator lead thru a .0002 mfd. condenser as dummy antenna to the "A1" terminal, with the metal strip connected across A2 and G. Set the signal generator and radio dial to 1720 K.C. and adjust the B.C. oscillator trimmer for maximum output.
2. Set the signal generator and radio dial to 1400 K.C. and adjust the B.C. R.F. and ANT. trimmers for maximum output.
3. Set the signal generator to 600 K.C. and the radio dial to approximately 600 K.C., and adjust the B.C. oscillator padder for maximum output by adjusting dial and pad together.

Check the alignment again at 1400 K.C.

### INTERMEDIATE BAND ALIGNMENT

Connect the signal generator lead thru a 400 ohm resistor as dummy antenna to A1. Set the dial and generator to 6700 K.C. and adjust the P.B. oscillator trimmer for maximum output. Adjust the R.F. and ANT. trimmers at 6000 K.C. and check for alignment at 2200 K.C.

### SHORT WAVE ALIGNMENT

Still using the 400 ohm resistor as dummy antenna, adjust the S.W. oscillator trimmer at 24.5 M.C. on dial and generator. Adjust the R.F. and ANT. trimmers at 22 M.C. and check for alignment at 8. M.C.

## MODELS 456, 465, 477, 856, 877 & 889

### PUSH BUTTON OPERATION

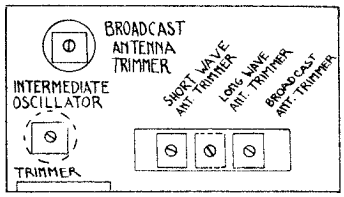
Six Push Button Station Selectors are incorporated in this receiver. Each button may be adjusted to select any station or frequency in the Broadcast Band. To adjust each button, perform the following operations:

1. Tune in a desired station with the Selector knob.
2. Twist the Push Button you want set up for this station, to the left about one full turn to loosen the mechanism.
3. Push this button in as far as it will go, while still holding the Selector knob firmly so the station will not be detuned.
4. With the button pressed all the way in, twist it to the right until it is tight and then release it.

Follow this procedure with the other five buttons, setting each for a different station.

Now, when any Push Button is pressed, the station for which that button is set, should appear perfectly tuned in. If it is not perfectly tuned, repeat the above procedure until satisfactory results are obtained.

Select the Call Letter Tabs to correspond to the stations the buttons are set for, and insert them in places provided above each button.




ALIGNMENT

ALIGN IF TRANSFORMERS AT 465 KILOCYCLES.

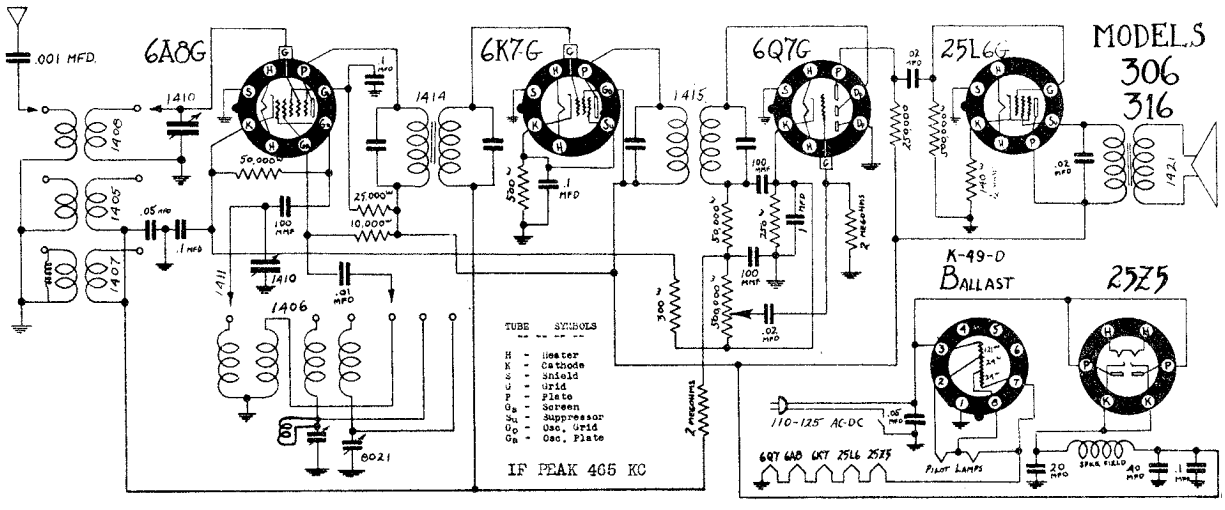
ALIGN BAND B AT 1400 KC - (214 METERS) - BY ADJUSTING BC ANTENNA AND BC OSCILLATOR TRIMMERS. ADJUST BC PADDER AT 600 METERS.

ALIGN BAND A AT 20 METERS BY ADJUSTING SW ANTENNA AND SW OSCILLATOR TRIMMERS.

ALIGN BAND C FOR MODEL 306 AT 5 MEGACYCLES BY ADJUSTING INTERMEDIATE ANTENNA AND OSCILLATOR TRIMMERS FOR MAXIMUM RESPONSE.

ALIGN BAND C FOR MODEL 316 AT 900 METERS BY ADJUSTING LW ANTENNA AND OSCILLATOR TRIMMERS. ADJUST LW PADDER AT 1800 METERS.

MAKE ALL ADJUSTMENTS FOR MAXIMUM RESPONSE ON OUTPUT METER---USING SIGNAL GENERATOR.

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# UNITED MOTORS SERVICE, INC.

MODEL R663 Delco
Schematic
Voltage

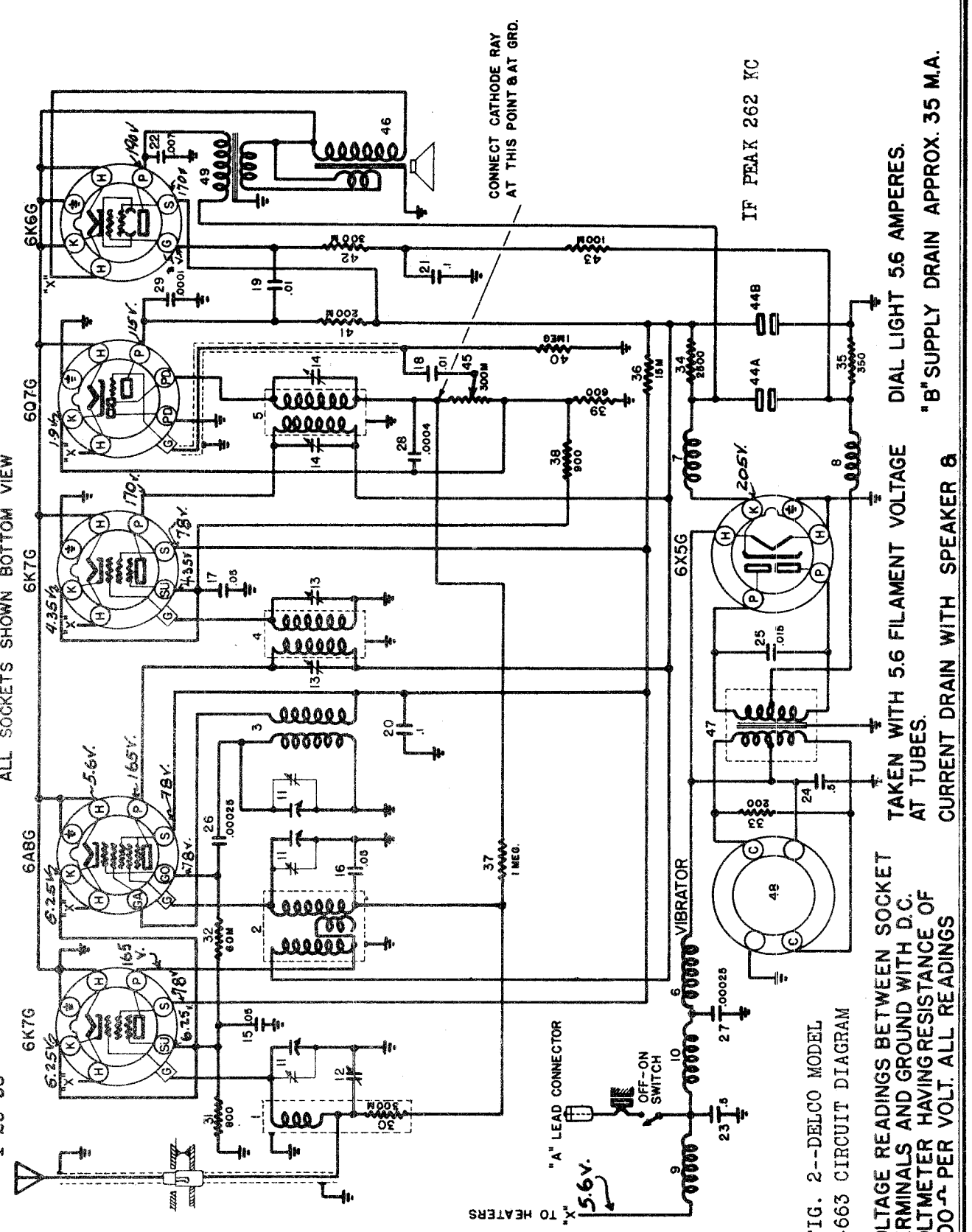


FIG. 2--DELCO MODEL
R-663 CIRCUIT DIAGRAM

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ALIGNMENT FOR MODELS R663, R664, R665, R666, R667, R668, and R669.

NOTE:- FIGURE REFERENCES IN THE TEXT REFER TO FIGURES SHOWN WITH EACH MODEL.

1. Aligning I-F Stages at 262 Kilocycles

(a) Connect the ground lead of the Signal Generator to the chassis case. Connect the signal lead of the Signal Generator to the grid cap of the 6A8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.

(b) Connect output meter from plate of { 6K6G (R663) / 6F6G (R664) / 6V6G (R665,6,7) / 6N7G (R668,9) } tube to ground.

(c) Set Signal Generator to exactly 262 kilocycles and turn volume control on full.

(d) Turn condenser gang to a position where no squeals or beat notes can be noticed, also so that when the tuning condenser is rotated within narrow limits there is no appreciable change in output.

(e) Adjust trimmers A-B-C-D through the cut outs on the side of the chassis (Illus. 13 & 14, Fig. 4) carefully for maximum output. *(Model R-664, Illus 12 & 13 Fig 4)*

(f) Repeat adjustments of I-F trimmers A-B-C-D with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Aligning at 1530 Kilocycles

(a) Leave Signal Generator leads connected the same as for I-F adjustments.

(b) Turn tuning condenser plates all the way out and against high frequency stop.

(c) Set Signal Generator to exactly 1530 kilocycles and adjust oscillator trimmer "G" (Fig. 3) on middle section of condenser gang carefully for maximum output.

3. Aligning at 1400 Kilocycles

(a) Remove signal lead of Signal Generator from grid cap of 6A8G tube and connect to antenna terminal of receiver through a .0002 mfd. mica condenser.

(b) Set the Signal Generator to 1400 kilocycles and tune the receiver to this signal.

(c) Adjust the parallel trimmers "F" and "H" (Fig. 3) of the condenser gang carefully for maximum output. Do not disturb the 1530 kilocycle adjustment of the middle section of the condenser gang.

4. Aligning at 600 Kilocycles

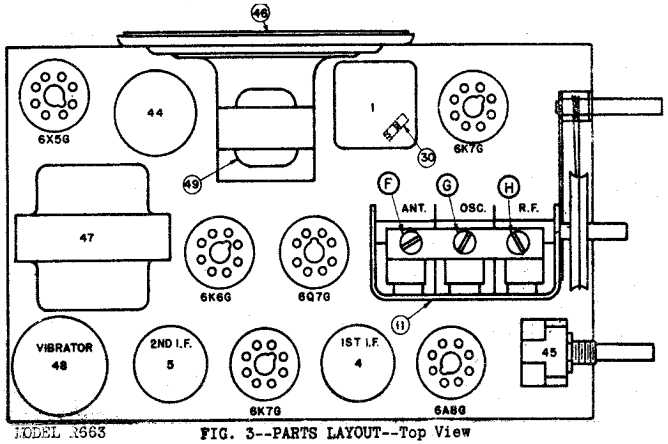
(a) Set Signal Generator to approximately 600 kilocycles and turn condenser gang plates until this signal is tuned in with maximum output.

(b) Adjust trimmer "E" on Delco Syncro-Tuning condenser (Illus. 12, Fig. 4) located next to antenna receptacle on bottom of chassis, rocking gang condenser plates back and forth through the signal until maximum output is obtained. (It will be necessary to readjust this condenser to the car antenna upon installation of the set.) *(Model R664, Illus. 11, Fig 4)*

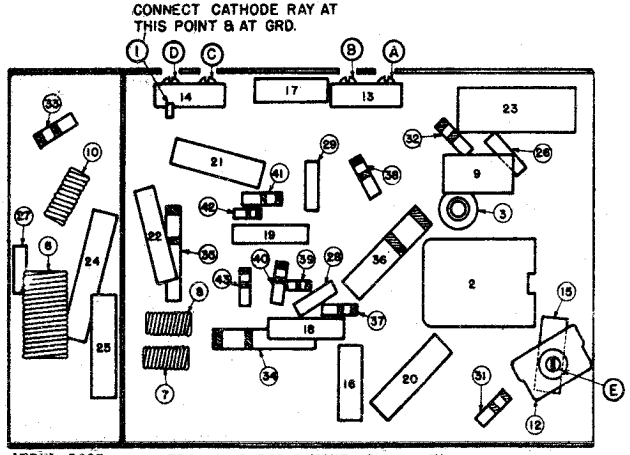
(c) Repeat adjustments made under--"Aligning at 1400 K.C."

5. Checking I-F Band Spread

The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustment of the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Connect Cathode Ray from connection "I" (Fig. 4) to ground.




MODEL R663 FIG. 3--PARTS LAYOUT--Top View




MODEL R663 FIG. 4--PARTS LAYOUT--Bottom View

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UNITED MOTORS SERVICE, INC.

MODEL R664 Delco
Schematic
Change

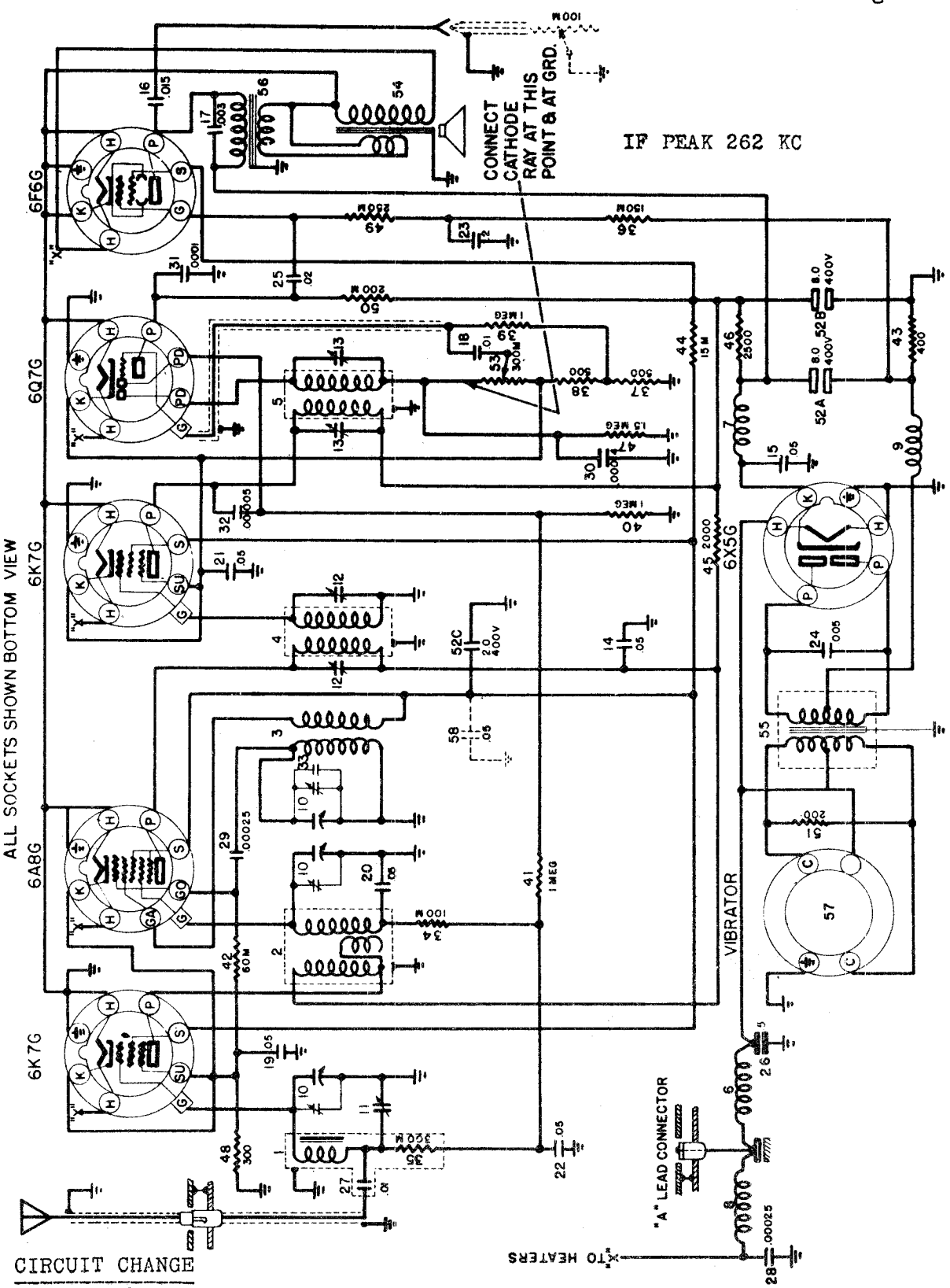


FIG. 2--DELCO MODEL R-664 CIRCUIT DIAGRAM

1-10-38

CIRCUIT CHANGE

Some sets were made with the 2 mfd. section of the electrolytic omitted (Illus. #52C) and Illus. #58 .05 mfd. 600 volt tubular condenser added. For replacement of electrolytic in these sets clip the green lead of replacement condenser.

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MODELS R664 to R669
Voltages

# UNITED MOTORS SERVICE INC.


6K7G
6F6G
6A8G
6K7G
6Q7G
6X5G
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.
CURRENT DRAIN WITHOUT SPEAKER 4.9 AMPERES
"B" SUPPLY DRAIN APPROX. 42 M.A.
DELCO R664
* THIS READING IS TAKEN BETWEEN NEGATIVE SIDE OF 400 OHM RESISTOR (ILLUS. NO. 43) AND GROUND.
6K7G
6V6G
6A8G
6K7G
6Q7G
OZ4G
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.
CURRENT DRAIN WITHOUT SPEAKER 4.9 AMPERES
"B" SUPPLY DRAIN APPROX. 42 M.A.
DELCO R665
* THIS READING IS TAKEN BETWEEN NEGATIVE SIDE OF 300 OHM RESISTOR (ILLUS. NO. 50) AND GROUND.
6K7G
6A8G
6K7G
6Q7G
OZ4G
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.
CURRENT DRAIN WITH SPEAKER 7 AMPERES
"B" SUPPLY DRAIN APPROX. 49 M.A.
DELCO R668, R669
6N7G
6K7G
6J5G
6A8G
6K7G
6R7G
OZ4G
VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.
CURRENT DRAIN WITHOUT SPEAKER 4.9 AMPERES.
"B" SUPPLY DRAIN APPROX. 42 M.A.
DELCO R666, R667
6V6G
6K7G
6A8G
6K7G
6Q7G
OZ4G
THIS READING IS TAKEN BETWEEN NEGATIVE SIDE OF 300 OHM RESISTOR (ILLUS. NO. 53) AND GROUND.

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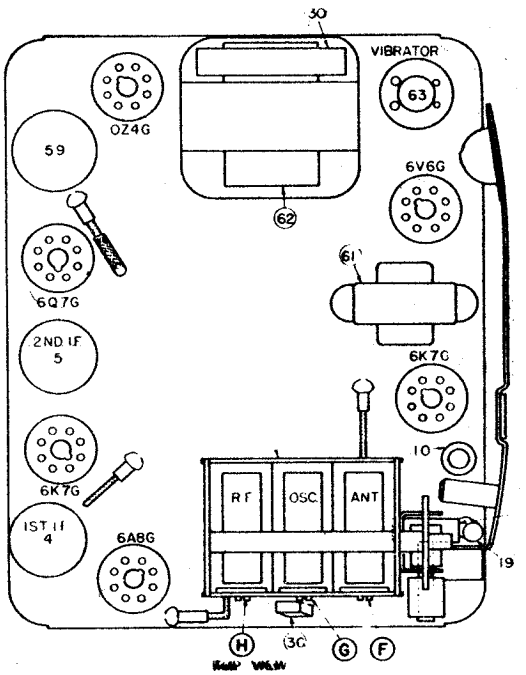
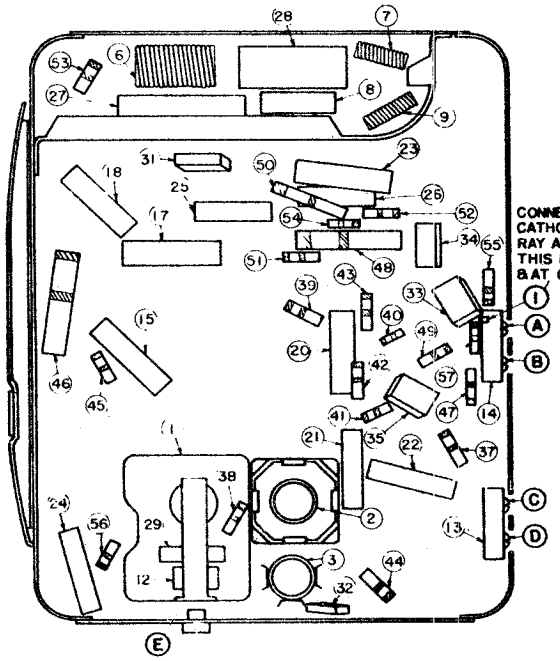
# UNITED MOTORS SERVICE, INC.

MODEL R664 Delco
MODEL R665 Delco
Socket, Trimmers
Chassis



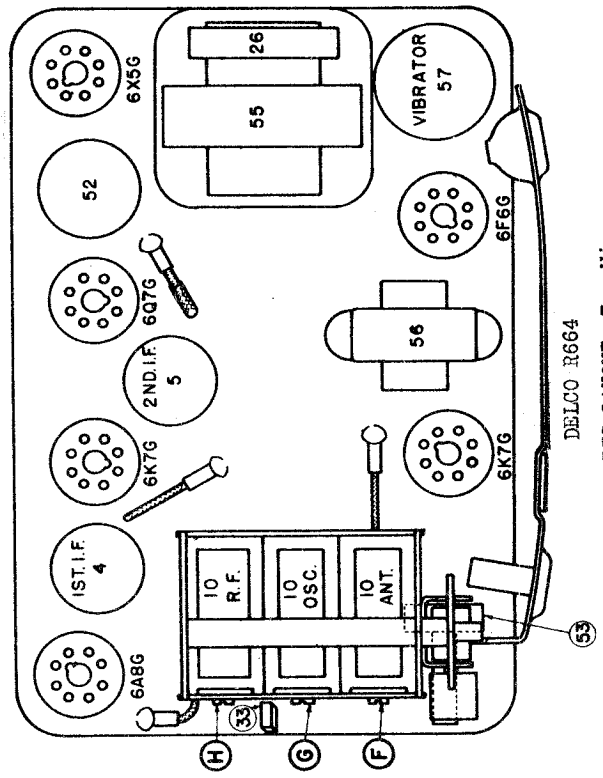

DELCO R665

FIG. 3--PARTS LAYOUT--Top View



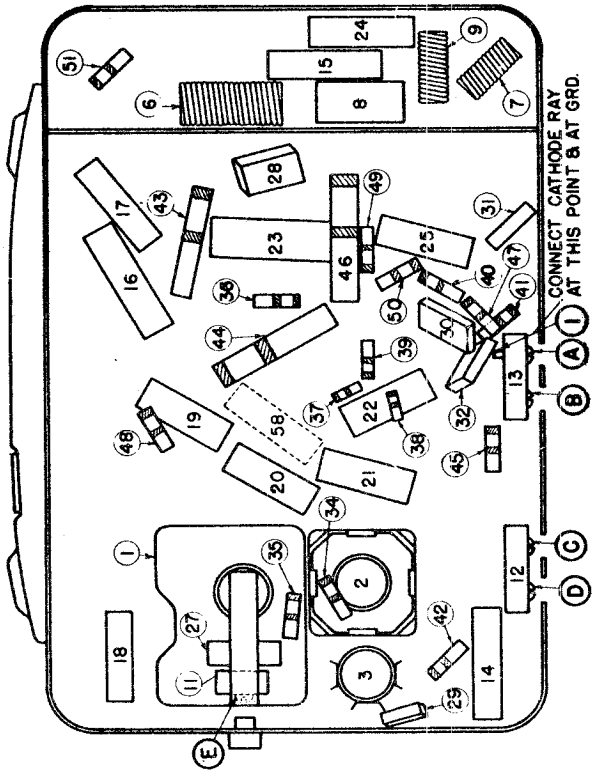

DELCO R665

FIG. 4--PARTS LAYOUT--Bottom View




DELCO R664

FIG. 3--PARTS LAYOUT--Top View




DELCO R664

FIG. 4--PARTS LAYOUT--Bottom View

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MODEL R665 Delco
Schematic

# UNITED MOTORS SERVICE, INC.

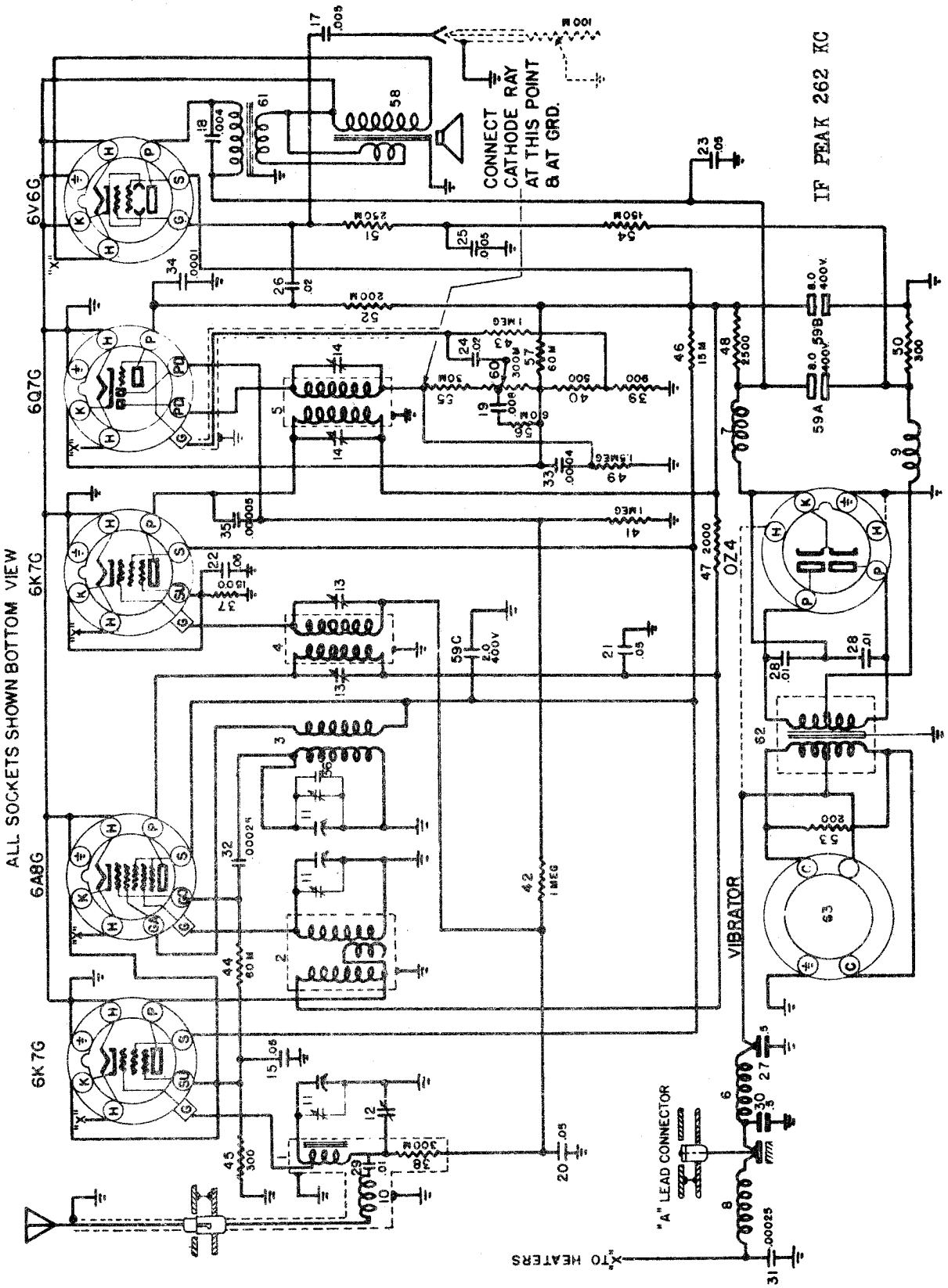


FIG. 2--DELCO MODEL R-665 CIRCUIT DIAGRAM

1-10-38

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# UNITED MOTORS SERVICE, INC.

MODELS R666,R667 Delco
Schematic,Socket,Change
Trimmers,Chassis

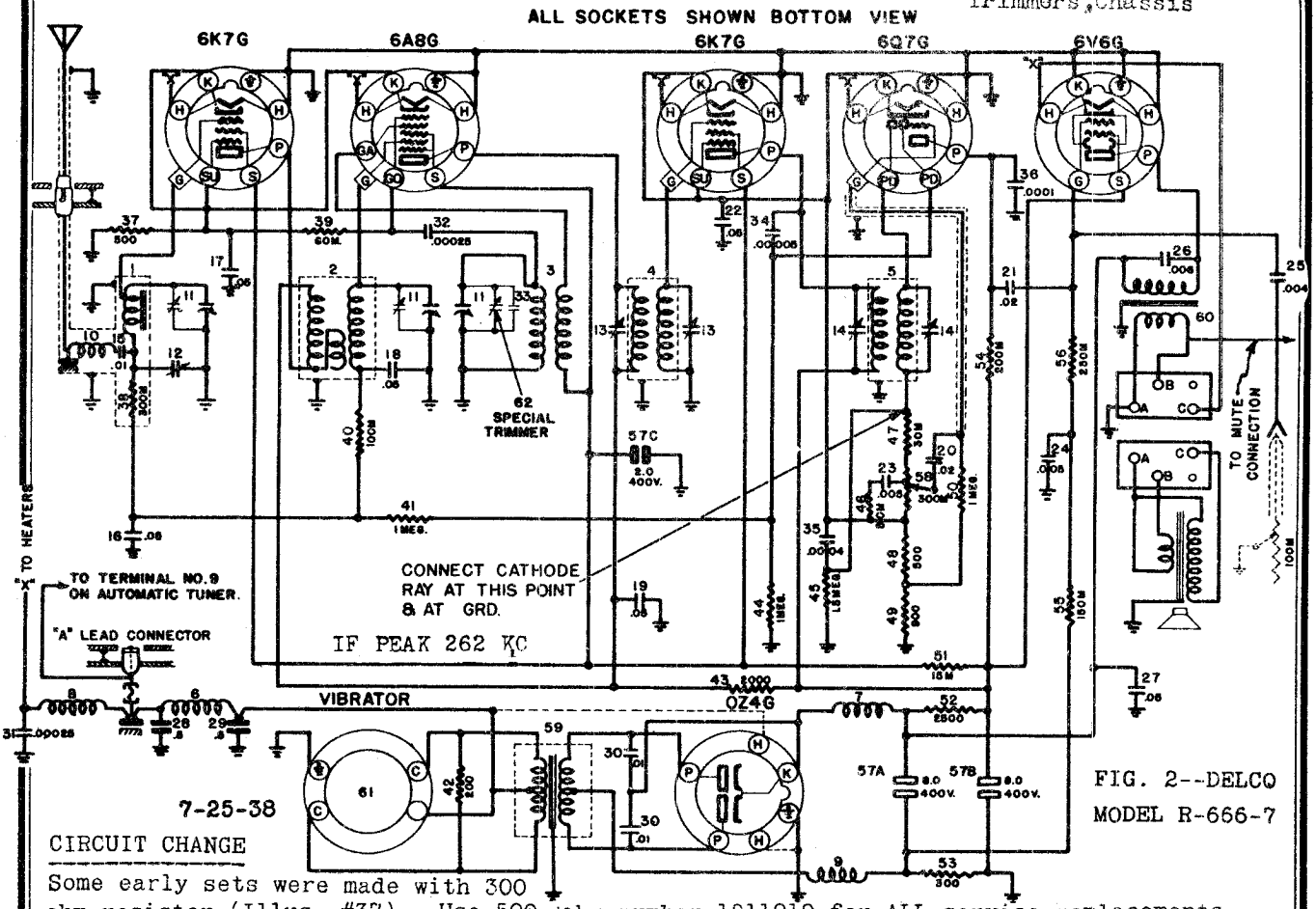


FIG. 2--DELCO
MODEL R-666-7

7-25-38

CIRCUIT CHANGE

Some early sets were made with 300 ohm resistor (Illus. #37). Use 500 ohm number 1211019 for ALL service replacements.

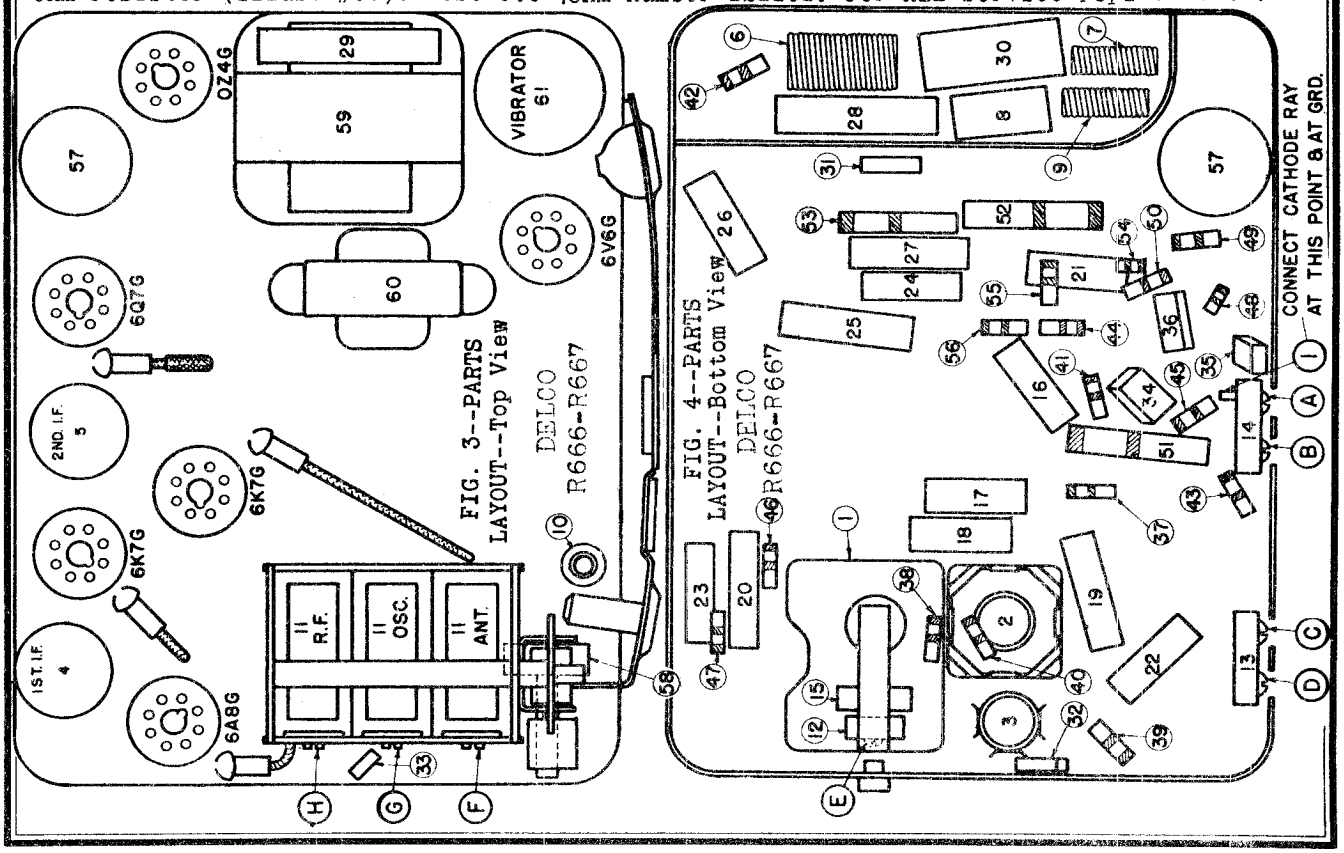


FIG. 3--PARTS LAYOUT--Top View DELCO R666-R667

FIG. 4--PARTS LAYOUT--Bottom View DELCO R666-R667

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MODELS R667,R669 Delco
Delco-Matic Tuner
Schematic,Parts

# UNITED MOTORS SERVICE, INC.

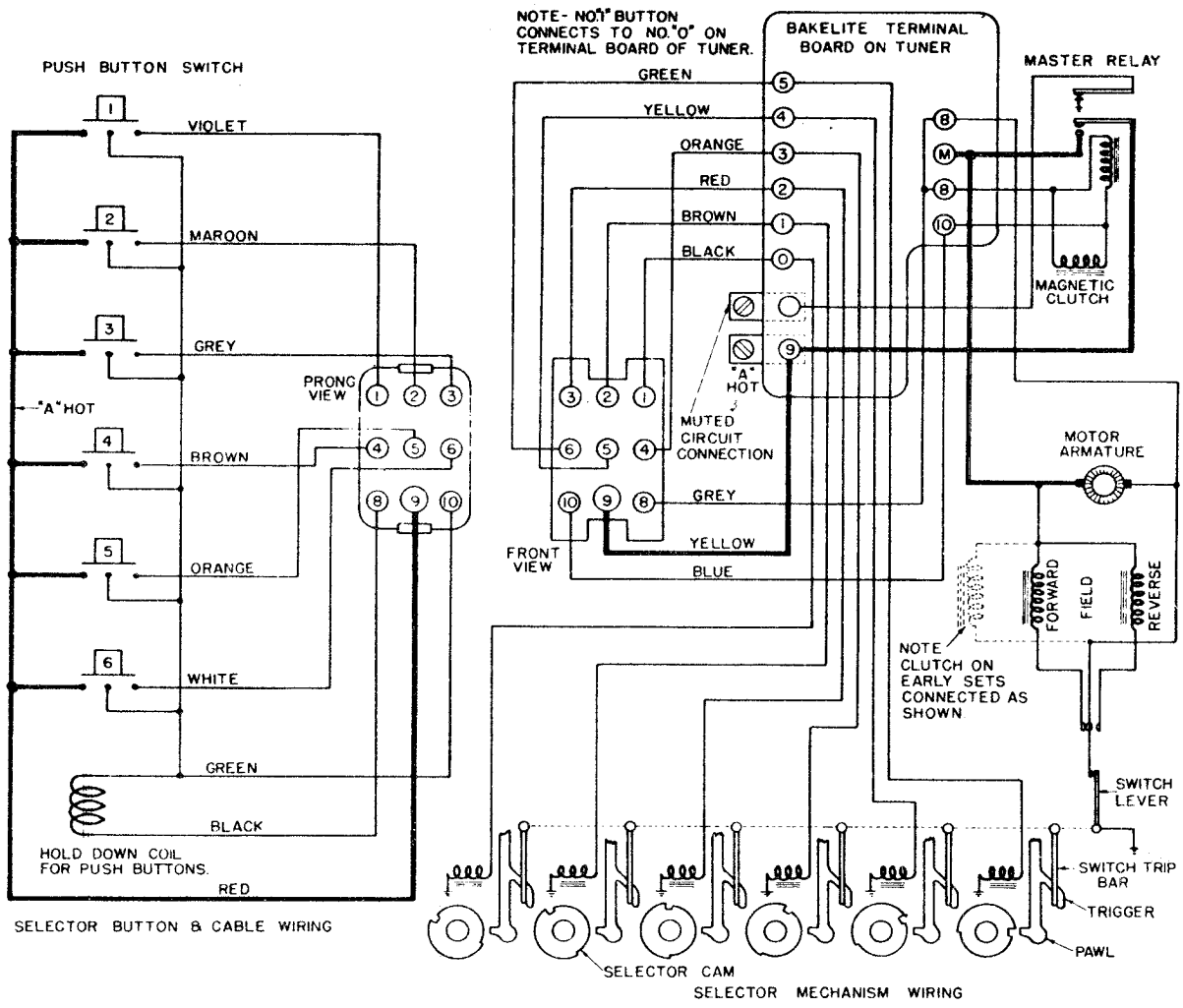


FIG. 1--CIRCUIT DIAGRAM--DELCO-MATIC TUNER

| Part No. | Part Name | Description | Part No. | Part Name | Description |
|---|---|---|---|---|---|
| *1880010 | Switch | Motor reversing | 134530 | Nut | Pivot screw locking |
| 122159 | Screw | Switch mounting | 7234957 | Gear | Large drive |
| 1880007 | Lever | Switch contact assy. | 7234768 | Washer | Mounting |
| 147460 | Screw | Switch lever set screw | 7234769 | Screw | Mounting |
| 7234714 | Bracket | Mounting | 7232713 | Spacer | Rubber mounting |
| 132892 | Screw | Mounting bracket | 138530 | Washer | #8 int. shakeproof |
| 1880065 | Spring | Trip bar | 7234745 | Shaft | Condenser drive--flex. |
| 7235711 | Spring | Pawl | 1880122 | Control | Push button--complete |
| 1880049 | Screw | Long pivot | | | |
| 1880066 | Screw | Short pivot | | | |

* For replacement only on late sets having metal stops between switch contact blades.

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MODELS R667,R669 Delco

# UNITED MOTORS SERVICE, INC.

Delco-Matic Tuner
Parts Layouts

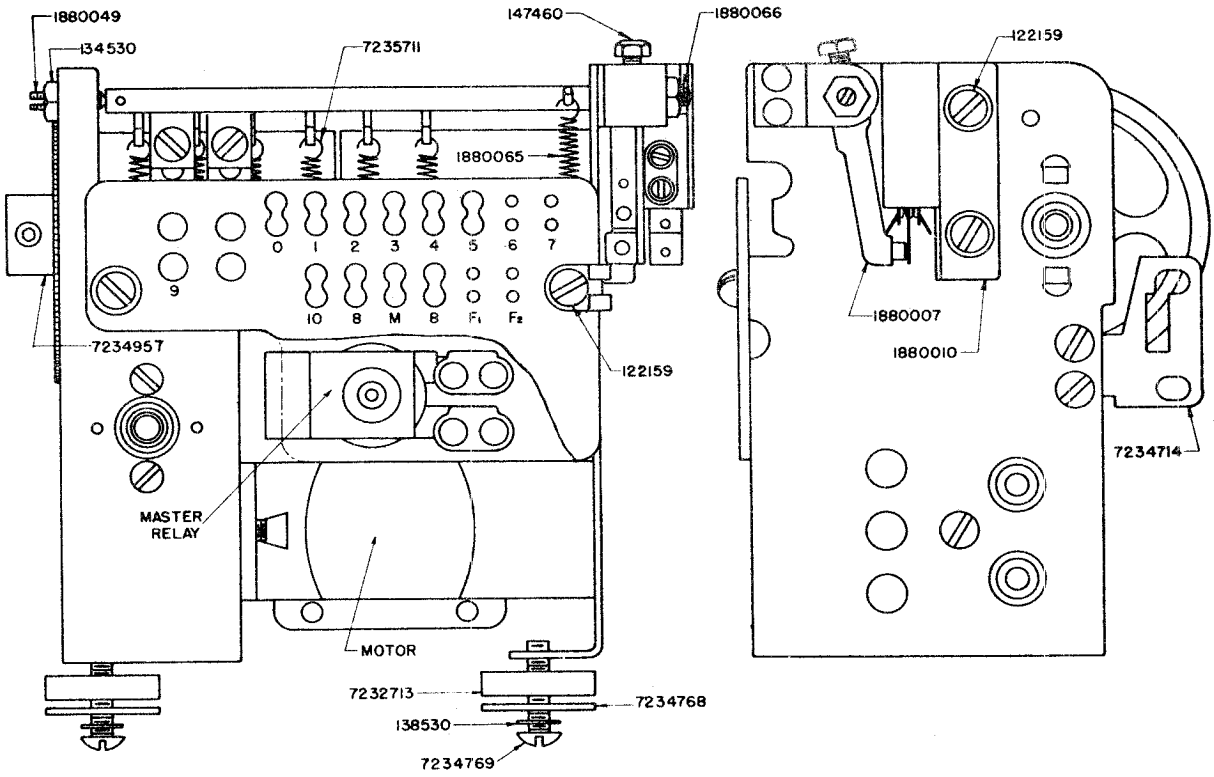


FIG. 2---PARTS LAYOUT--DELCO-MATIC TUNER

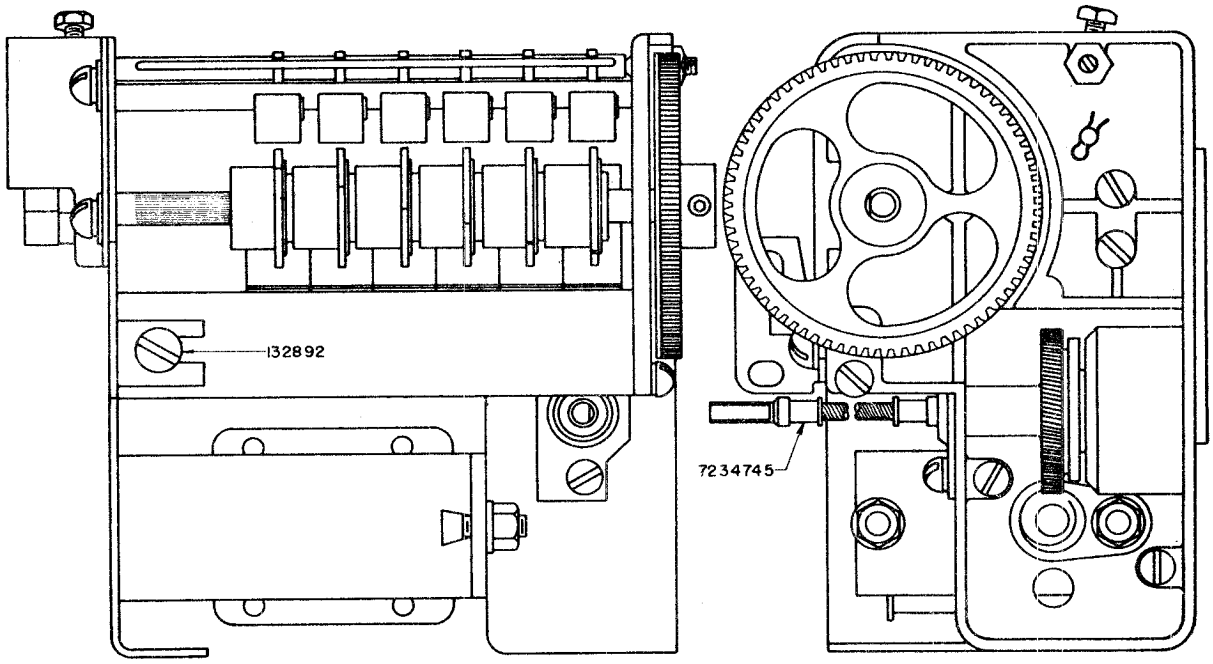


FIG. 3--PARTS LAYOUT--DELCO-MATIC TUNER

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# MODELS R667,R669 Delco-Matic Tuner Operating and Service Notes, Part 1

## UNITED MOTORS SERVICE INC.

GENERAL: The Delco Model R-667 is a six tube, two unit auto radio with "Delco-Matic" Flash tuning. The service parts and alignment procedure are identical to the Delco Model R-666,

The Delco Model R-669 is a seven tube, two unit auto radio with "Delco-Matic" Flash tuning. The service parts and alignment procedure are identical to the Delco Model R-668.

SETTING UP "DELCO-MATIC" TUNER

(a) Press a button and allow the selector mechanism to come to rest.

(b) Continue to hold the button down, and tune in the desired station by manual control.

(c) Release button, and set up remaining buttons in the same manner.

When the button is held down after the mechanism has come to rest, the pawl is held in the cam slot, locking the cam in position. The cam is allowed to slip on its shaft during the manual tuning process, by a clutch spring which is a part of the cam shaft assembly.

OPERATION OF "DELCO-MATIC" TUNER

The "Delco-Matic" Tuner is a motor driven mechanical device for tuning in stations quickly and silently by remote push button control. When a button is depressed, a relay coil pulls a corresponding pawl against a selector cam (Fig. 1). At the same time, a hold down coil in the control head holds the button down until the cycle of operation is complete. A trigger on the pawl presses against a switch operating trip rod, which in turn operates the power switch. The degree of movement of the trip rod, which is controlled by a high and low side on the selector cam, determines the direction of motor rotation. When the cam is rotated to a position where the pawl drops into the selector cam slot, the degree of movement of the trip rod opens the ground contact on the power switch which cuts the current to the motor and magnetic clutch and releases all relays.

1. PUSH BUTTON HEAD

The push buttons in the control head complete the circuit for the operation of the hold-down magnet, master relay and the corresponding station selector magnet. The buttons are held down magnetically until released by the "cut-off" switch on the tuner unit, actuated by the station selector pawl dropping into the slot in the selector cam.

2. STATION SELECTOR PAWLS

The station selector pawls are magnetically operated and controlled directly from the contacts in the push-button head. Upon pressing a button in the control head, a circuit is closed, energizing a station selector magnet coil which pulls a corresponding pawl down on a station selector cam. The pawl rides on the cam until it drops into the cam slot and cuts the motor off and releases all relays.

3. STATION SELECTOR CAMS

The station selector cams are circular discs with high and low sides for operation of the motor reversing switch and a stop slot for operation of the motor cut-off switch. Six of these cams are provided on a shaft, each with a friction clutch which allows the cam to be slipped on the shaft in setting the cam on the desired station.

4. REVERSING AND CUT-OFF SWITCH

The reversing and cut-off switch is a combination switch actuated by the trigger on the station selector pawl. The reversing switch causes the motor to run in the right direction for direct to the station tuning and the cut-off switch cuts the motor off when a station is tuned in, and also releases the push-button hold-down magnet and the megnetic clutch.

The forward and reverse positions of the reversing switch are dependent upon whether the station pawl is pulled against the high or low side of the station selector cam. The cut-off switch is actuated when the pawl drops into the cam slot as a station is tuned in.

5. MAGNETIC CLUTCH

The magnetic clutch consists of an electro megnet and two iron discs which are held together magnetically when the field is energized. One of the discs is coupled to the motor and the other to the condenser gang.

The clutch is designed to cut the motor driving power from the tuning condenser gang at the same instant the pawl drops into the cam slot and actuates the motor cut off switch.

6. MASTER RELAY

The master relay is controlled directly from the push-button head and the purpose is to allow the motor current to be fed directly to the motor rather than through the push-button circuits. A set of "mute" contacts are provided along with the "A" power contacts for muting the audio system of the set while the motor is driving the tuning mechanism.

SERVICE PROCEDURE

The logical procedure to employ in servicing the automatic tuner will depend to a large extent upon the nature of the trouble encountered and whether the tuner is partially or totally inoperative. However, in most cases the solution to the trouble will be found by checking the below points in the order named:

1. TUNING CONTROL and CABLE
2. BATTERY VOLTAGE AT TUNER
3. STATION SELECTOR PAWLS
4. PUSH BUTTON HEAD
5. REVERSING AND CUT-OFF SWITCH

The tuning control and tuning cable should be checked along with the battery voltage at the "A" terminal on tuner before removing chassis or push button head from car for servicing on the bench. Make all checks on bench with a tuning control connected to the tuner for proper loading. Detailed procedure for checking the above points is as follows:-

Checking Tuning Control and Cables

In order for the automatic tuner to operate properly it is necessary that the tuning control be free from kinks and binds, so as not to impose an excessive load on the tuner motor. Turn tuning control knob manually and note if drag is excessive or if any kinks or binds are apparent. If trouble is evident, disconnect flexible tuning cable from chassis case bushing and turn tuning knob to determine whether trouble is in set or tuning control. If trouble is in set, a careful check of the large die-cast gears should be made for proper meshing.

Checking Battery Voltage at "A" Terminal on Tuner

The magnets, relays and the motor in the automatic tuner have been designed to operate satisfactorily on voltages as low as 4.5 volts measured at the "A" terminal on the tuner unit with the motor running. Low battery voltages will cause erratic operation of the tuner.

BEFORE ATTEMPTING ANY TUNER REPAIRS, FIRST MEASURE THE "A" VOLTAGE AT THE LARGE "A" TERMINAL ON THE TUNER UNIT WITH THE TUNER MOTOR OPERATING. In order to allow the motor to run long enough to get an accurate reading before it cuts off, set two cams which appear to be working normally at opposite ends of the dial and press corresponding buttons, reading meter carefully while motor is running. If voltage is lower than 4.5 volts, check all connectors and terminals for poor contact. Measure voltage at car ammeter with set load only. This should be 5.5 volts or more.

NOTE: In testing these automatic tuners on UMS Radio Test Panels, it is very important that proper voltage be available for test, otherwise incorrect diagnosis of the trouble will be made. A heavy duty battery and a Power Unit should be used. Also, all connections should be clean and heavy "A" supply leads used for connecting sets to "A" supply terminals. On the #652 Test Panel it is recommended that all automatic tuner tests be made using the power supply terminals on the left side of the panel. This will give a slightly higher "A" voltage to test.

Checking Station Selector Pawls

In most instances a visual inspection will determine if the station selector pawls are operating satisfactorily. A check can be made by simply pressing the push buttons and noting if the corresponding pawls pull down against the selector cam. Failure of the pawl to operate may be caused by excessive spring tension on the pawl spring, open selector magnet circuit or low voltage.

To reduce spring tension on pawl spring, unhook top end of spring with a pair of long nose pliers and stretch spring slightly. Be careful not to stretch spring too far or pawl will have a tendency to stick in the cam slot when a station is tuned in.

Voltage measured at selector magnet coil terminals on bakelite terminal board should not be less than 4.5 volts.

Checking Push Button Head

The push button head is working normally when the following actions take place.

1. Buttons should stay down magnetically when pressed, until station is tuned in or pawl drops in cam slot.
2. Corresponding station pawl in tuner should pull down against cam.
3. Both the button pressed and its corresponding station pawl in the tuner should release when a station is tuned in or when the pawl drops into cam slot.

It should be noted that buttons will not release unless tuner motor is operating and station pawl trips the cut-off switch.

If push button head does not function as covered above and a duplicate head (Part #1880122) is not available for substitution, make complete check of head as follows with push button cable plug disconnected from receiver chassis.

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# UNITED MOTORS SERVICE, INC.

MODELS R667,R669 Delco
Delco-Matic Tuner
Service Notes,Part 2

## TESTING PUSH BUTTON HEAD

**A. MECHANICAL TEST OF PUSH BUTTON HEAD:**

**(a) Disconnect push button control plug from receiver chassis.**

**(b) Press buttons down and release slowly. Note if any button or buttons have a tendency to stick or do not extend out the full distance when released. Failure of a button to release to the full extent will cause the station selector pawl to stick in the cam slot when a station is tuned in (See Paragraph "C").**

**(c) If sticking buttons are encountered, remove the mechanism from the die-cast head, removing the back cover plate and taking out the four round head screws. A small burr on either the small bakelite insulators or the push-button shaft, or in the push** button holes in the die-casting or wires touching the button shafts will cause the buttons to stick. Removal of the burrs with fine sandpaper will eliminate this sticking.

NOTE: Do not hold the control head in an inverted position when removing mechanism from case.

**B. CHECKING MAGNET FOR HOLD-DOWN**

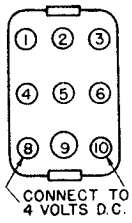


FIG. 5--CONTROL CABLE PLUG
Facing Plug

(a) Remove control cable plug from receiver chassis.

(b) Connect 4 volts D.C. across prongs #8 and #10 as shown.

(c) Press buttons one at a time, interrupting battery circuit to release button after each test.

(d) If none of the buttons will stay down when pressed, make continuity check across prongs #8 and #10 for open circuit in hold down magnet or cable wiring.

(e) If one or two buttons will not stay down when pressed, first check to see if any wires are caught behind button shafts. If not, then remove mechanism from die-cast head and check for excessive spring tension in switch contact springs or the button shaft kick-out spring.

**C. CHECKING PUSH BUTTON SWITCH CONTACTS:**

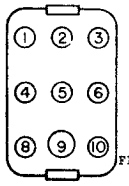


FIG. 6--CONTROL CABLE PLUG
Facing Plug

(a) The switches in the control head start to make contact during the first 1/8" of downward travel. It is, therefore; important that the buttons extend out the full distance when released by the hold down magnet, as covered in the "Mechanical Test of Push-Button Head".

(b) The switch contacts may be checked by applying 4 volts D.C. across the prongs 8 and 9, pressing each button under test, and interrupting the circuit after each test. Check remaining contacts similarly as follows:

| Press Button No. | Apply 4 volts D.C. across-- |
|---|---|
| 1 | Prong #8 and 1 |
| 2 | " 8 " 2 |
| 3 | " 8 " 3 |
| 4 | " 8 " 4 |
| 5 | " 8 " 5 |
| 6 | " 8 " 6 |

It will be noted that if the switch contacts are making proper contact and all preceding checks made, the hold down magnet in the head will be energized as each button is pressed.

### Checking the Reversing and Cut-Off Switch

Proper operation of the switch mechanism on the tuner is of vital importance. Erratic action of the tuner due to low battery voltage very often results in the trouble being erroneously diagnosed as switch trouble. It is therefore important that all other points be checked first for possible causes of the trouble before attempting any adjustments to the switching mechanism.

There are four positions of the switch mechanism, "normal", "pawl on high side of cam", "pawl on low side of cam" and "pawl in slot". Figures 7 to 10 illustrate the exact position of the switch contacts in each of the four switch positions. These contacts can be checked visually by observing their action under actual operating conditions or by disconnecting the "A" power and duplicating the position by pressing the pawls down against the cams manually. Before making any adjustments it should first be definitely known that an adjustment is necessary.

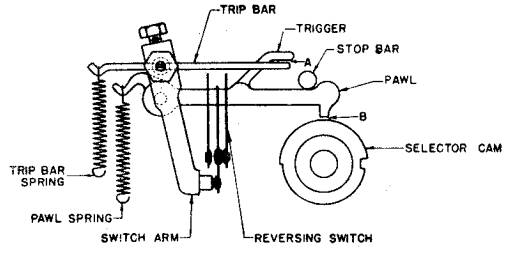


FIG. 7--NORMAL POSITION

In the normal position it will be noted that one set of reversing contacts are closed and that the ground contact on the switch arm is making contact. Also, there should be a slight gap ("A" on Fig. 7) between the trigger and the trip bar to prevent any movement of the switch arm when the pawl is pressed against the high side of the cam.

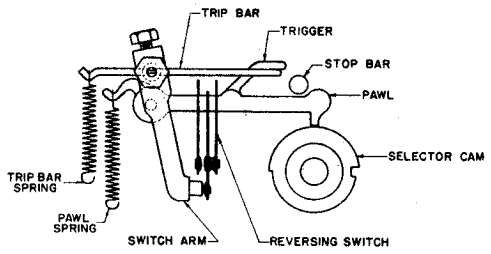


FIG. 8--PAWL ON HIGH SIDE OF CAM

In this position the contacts should be in exactly the same position as in the "normal position". The trigger rests against the trip bar but there should not be sufficient movement of the trip bar to open the normally closed reversing contacts at any point on the high side of the cam.

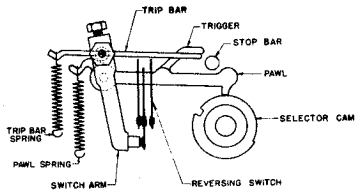


FIG. 9--PAWL ON LOW SIDE OF CAM

In this position the pawl is riding on the low side of the cam and a complete change has taken place in the reversing switch. The set of contacts which were normally closed when the pawl was riding on the high side of the cam have opened and the other set of contacts are now closed. The ground contact on the switch arm remains closed.

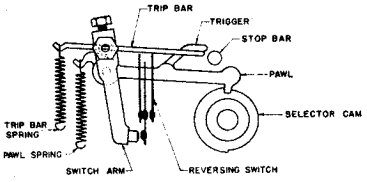


FIG. 10--PAWL IN SLOT

**It will be noted in this position that the set of contacts which are closed when the pawl is riding on the low side of the cam remain closed and the ground contact on the switch arm which has remained closed through each of the three previous positions is now open.**

### SWITCH ADJUSTMENTS

In the case where not more than two or three cams are not working satisfactorily, individual adjustments can be made to the station selector pawls by bending the small trigger arms up or down with a pair of pliers, to obtain proper action of the reversing and cut-off switches.

In making these adjustments it is very important that the triggers be adjusted so that they do not open the reversing contacts normally closed when the pawl is riding on the high side of the cam. Also, there should be a slight gap in the ground contact on the cut-off switch arm when the pawl drops to the bottom of the cam slot. This ground gap should be kept as small as possible, retaining sufficient clearance so that the contacts will remain open when the condenser gang is turned from one end of its travel to the other, with the station pawl holding the cam stationary.

In cases where the switching mechanism does not operate satisfactorily on any cam, a careful check should be made of the switch trip bar to see that it does not move the switch lever when the pawls are pressed against the high side of the cams.

DO NOT CHANGE POSITION OF EITHER THE REVERSING SWITCH OR SWITCH ARM AS SPECIAL EQUIPMENT IS REQUIRED TO OBTAIN ACCURATE ALIGNMENT OF THESE PARTS.

The normal position of the phosphor bronze switch springs with the switch arm pulled back should be as shown in Fig. 10 illustrating the switch position with the pawl in the cam slot.

If a complete test of the tuning mechanism indicates that it cannot be repaired or adjusted as outlined, a replacement of the complete chassis should be made in accordance with Mr. C. D. Wymer's letter of April 11, 1938, Subject--"Service Policy--Delco Auto Radio Models R-667 and R-669 Automatic Tuners".

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MODELS R668,R669 Delco
Schematic,Socket
Trimmers,Chassis

# UNITED MOTORS SERVICE, INC.

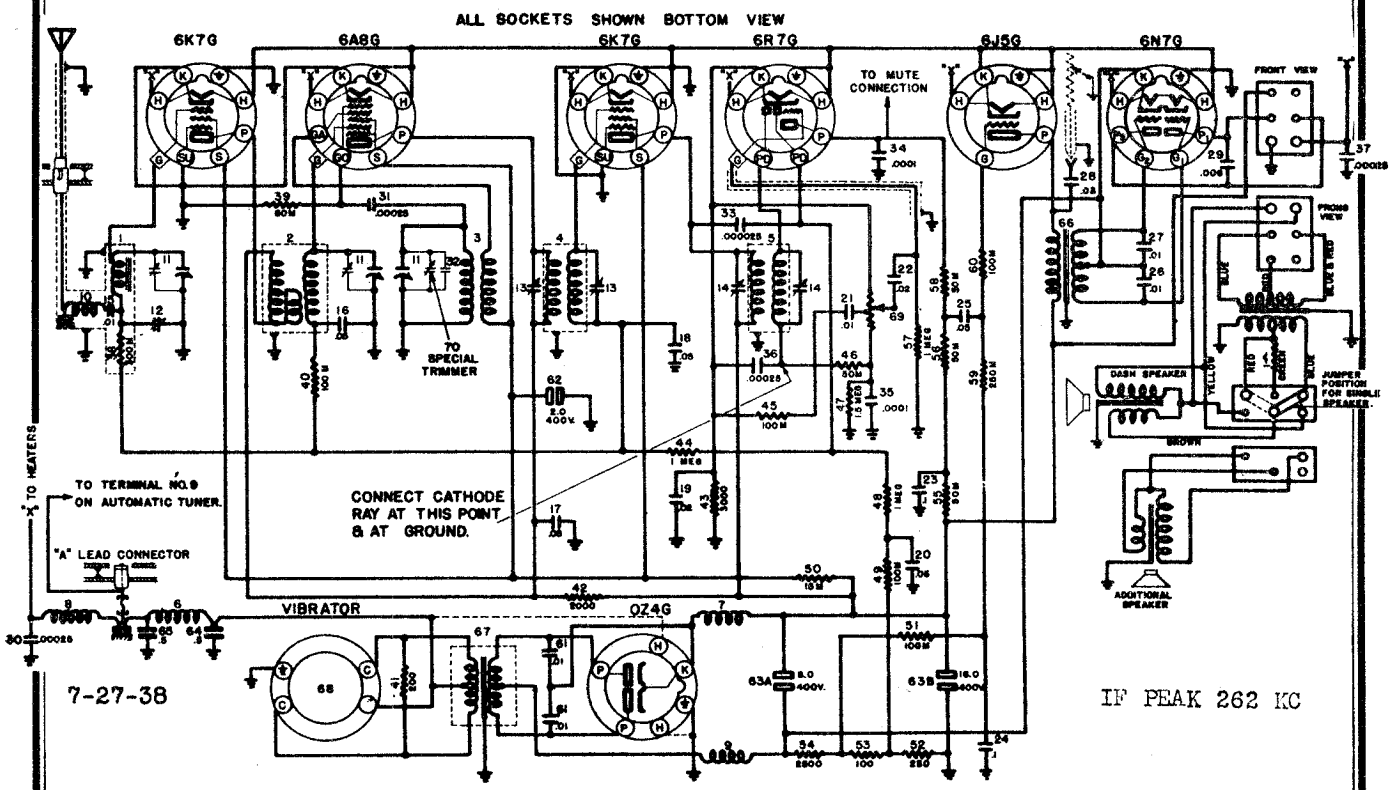


FIG. 2--DELCO MODEL R-668-9 CIRCUIT DIAGRAM

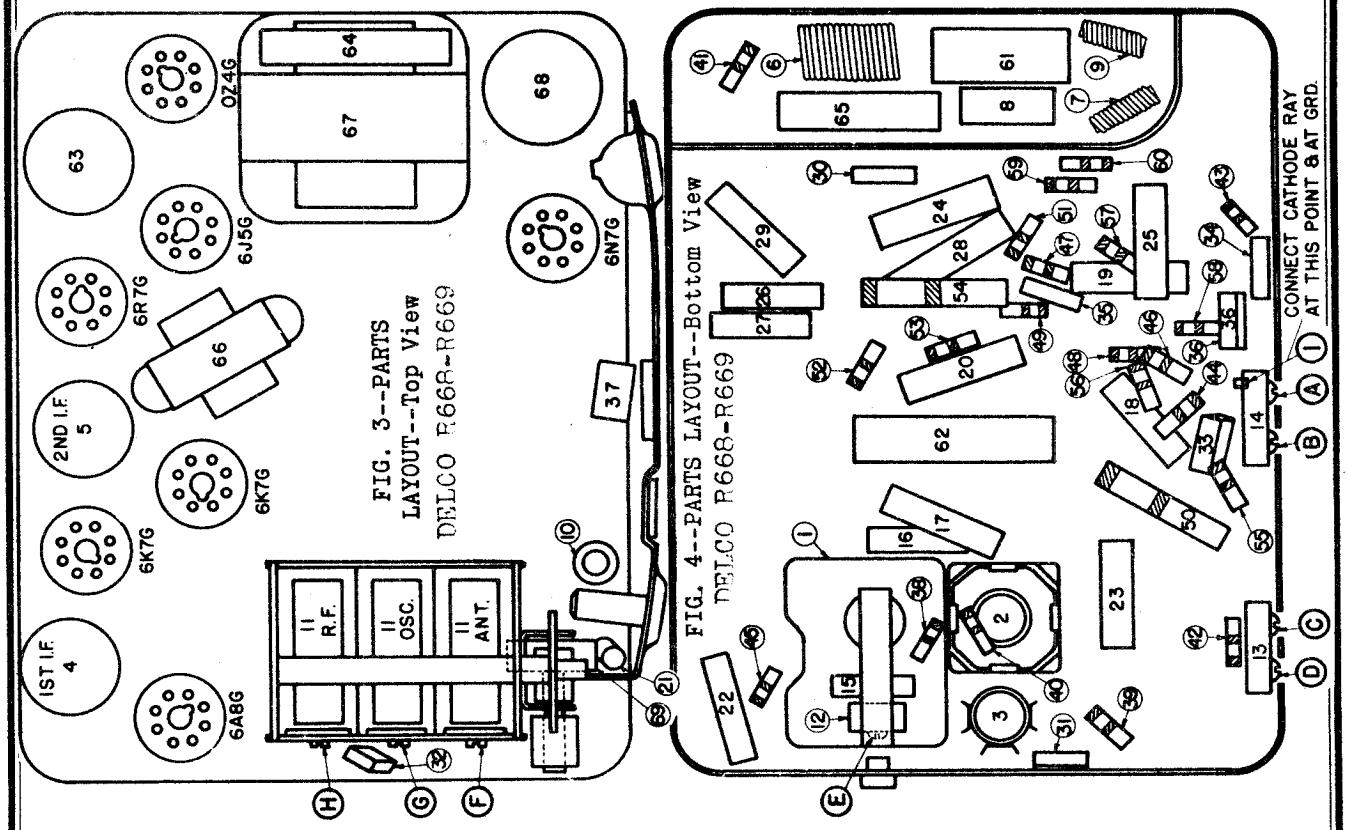


FIG. 3--PARTS LAYOUT--Top View DELCO R668-R669

FIG. 4--PARTS LAYOUT--Bottom View DELCO R668-R669

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MODEL R673 Delco
Schematic

# UNITED MOTORS SERVICE , INC.

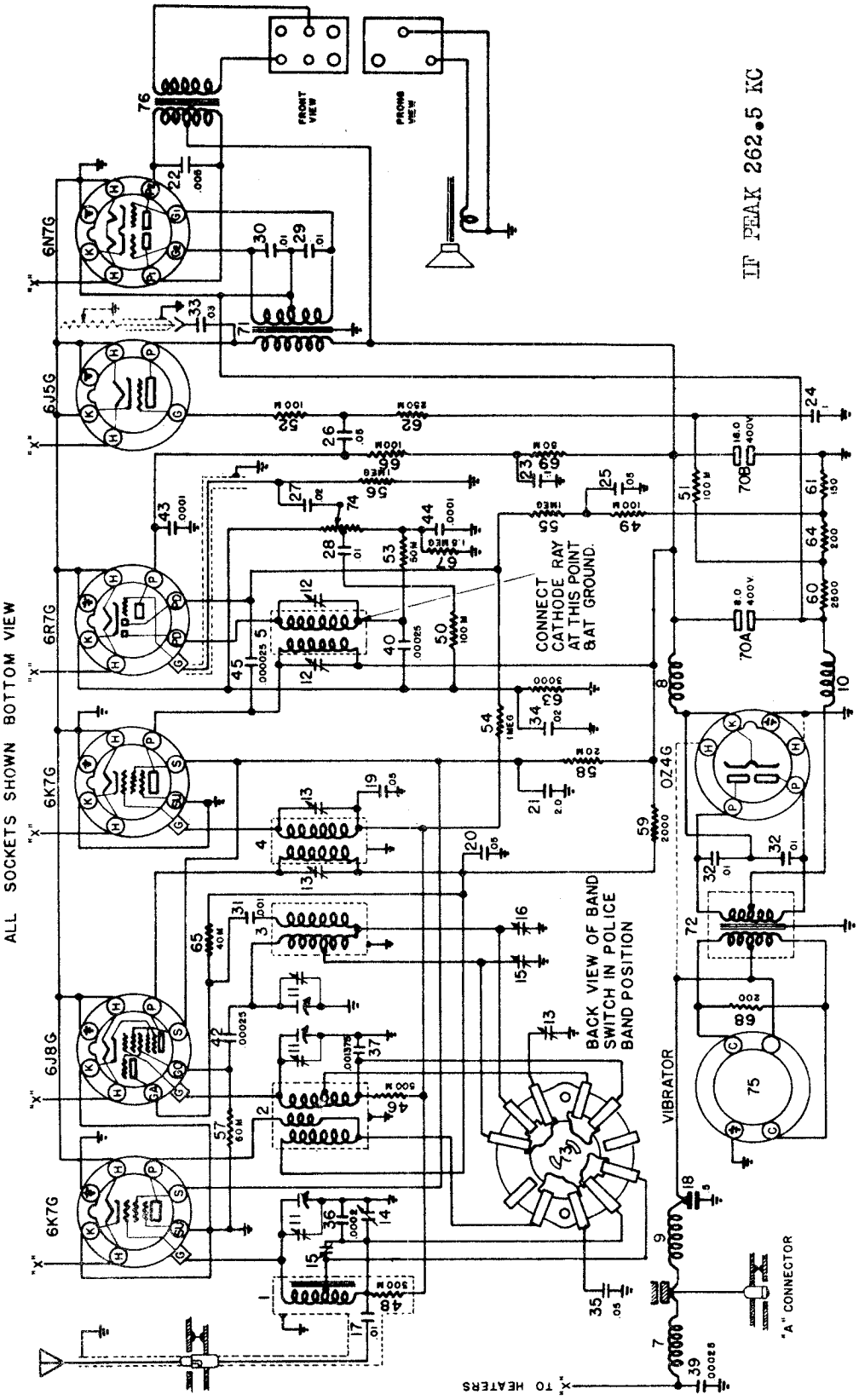


FIG. 3--DELCO MODEL R-673 CIRCUIT DIAGRAM

GENERAL: The Delco Model R-673 is a seven tube two unit receiver with short wave and broadcast band. Coverage of short wave band from 5000 kilocycles to 1600 kilocycles, broadcast 1530 kilocycles to 540 kilocycles. Special features such as base compensation, tone control and 6N7G push pull output.

5-20-38

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MODEL R673 Delco
Voltage, Socket
Trimmers, Chassis

# UNITED MOTORS SERVICE, INC.

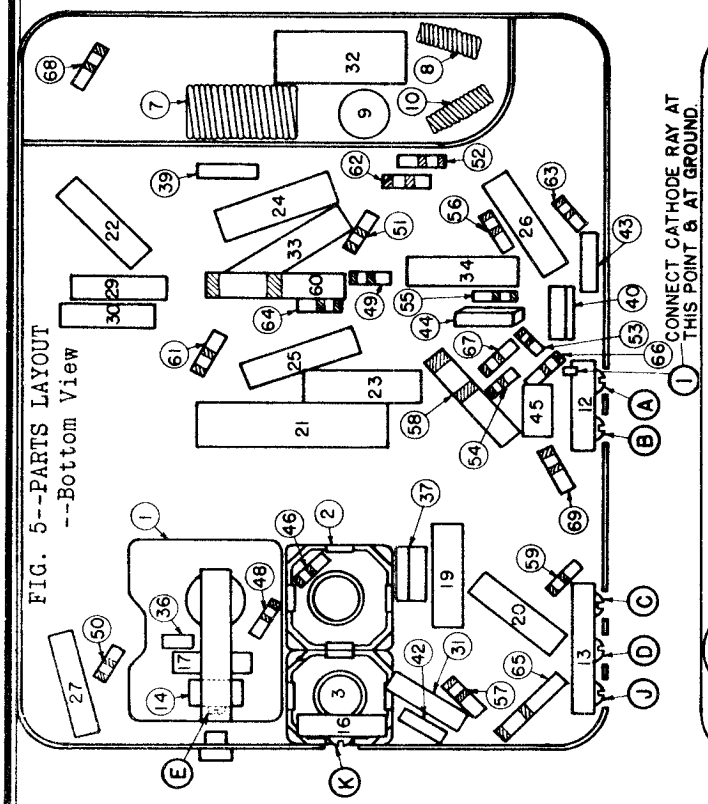



FIG. 5--PARTS LAYOUT
--Bottom View

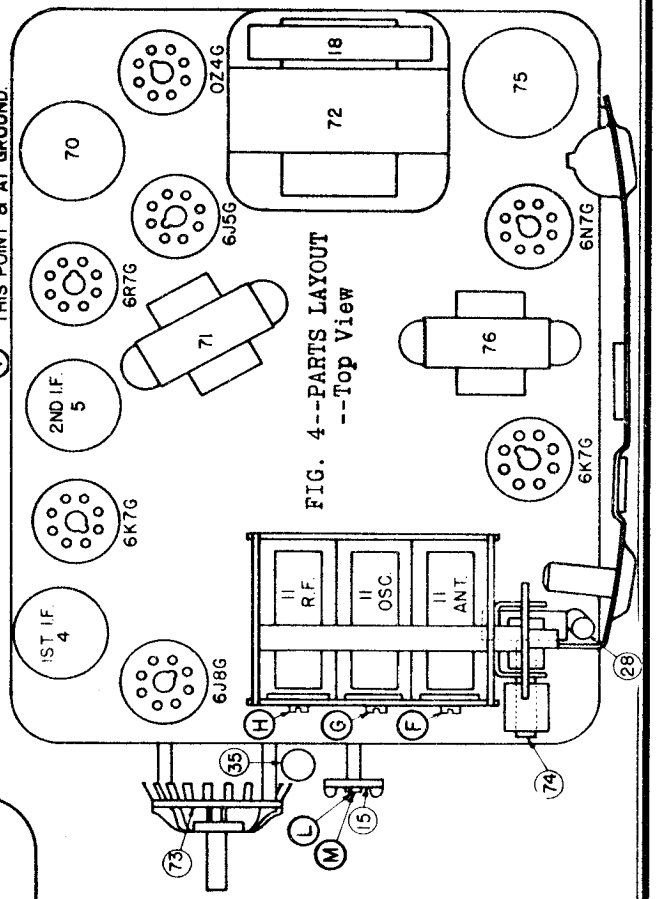
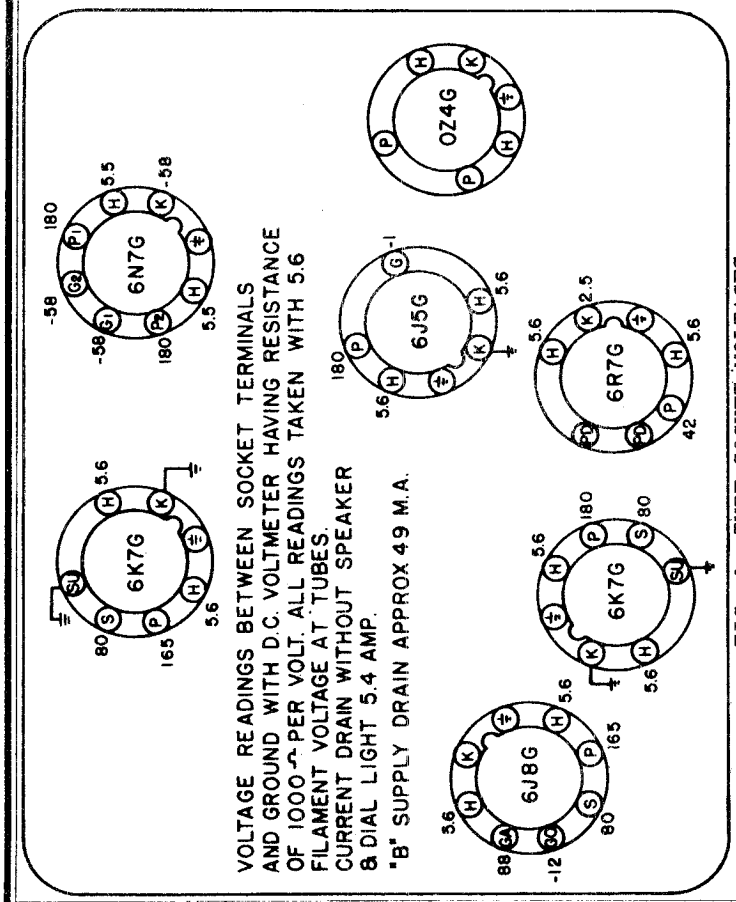



FIG. 4--PARTS LAYOUT
--Top View




VOLTAGE READINGS BETWEEN SOCKET TERMINALS AND GROUND WITH D.C. VOLTMETER HAVING RESISTANCE OF 1000 Ω PER VOLT. ALL READINGS TAKEN WITH 5.6 FILAMENT VOLTAGE AT TUBES.
CURRENT DRAIN WITHOUT SPEAKER & DIAL LIGHT 5.4 AMP.
"B" SUPPLY DRAIN APPROX 49 M.A.

FIG. 1--TUBE SOCKET VOLTAGES

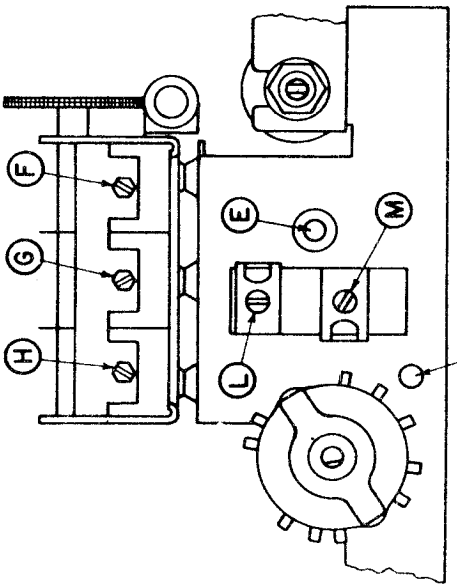


FIG. 2--TRIMMER LOCATIONS

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1. Aligning I-F Stages at 262.5 Kilocycles

(a) Connect the ground lead of the Signal Generator to the chassis case. Connect the signal lead of the Signal Generator to the grid cap of the 6J8G tube, through a .1 mfd. condenser, leaving the tube's grid clip in place.

(b) Connect output meter across plates of 6N7G tube.

(c) Set Signal Generator to exactly 262.5 kilocycles and turn volume control on full.

(d) Turn condenser gang to a position where no squeals or beat notes can be noticed, also so that when the tuning condenser is rotated within narrow limits there is no appreciable change in output.

(e) Adjust trimmers A, B, C & D through the cut-outs on the side of the chassis (Illus. 12 & 13, Fig. 5) carefully for maximum output.

(f) Repeat adjustments of I-F trimmers A, B, C & D with as low an output from the Signal Generator as possible, for more accurate alignment.

2. Aligning at 5000 Kilocycles

(a) Turn band switch to police band (clockwise).

(b) Leave Signal Generator leads connected the same as for I-F adjustments.

(c) Turn tuning condenser plates all the way out and against high frequency stop.

(d) Set Signal Generator to exactly 5000 kilocycles and adjust oscillator trimmer "G" (Fig. 4) carefully for maximum output, being careful to peak the signal received with trimmer screw out at minimum capacity.

3. Aligning at 1530 Kilocycles

(a) Turn band switch to broadcast band (counter clockwise).

(b) Set Signal Generator to 1530 kilocycles and leave the tuning condenser against high frequency stop.

(c) Adjust oscillator trimmer "L" (Fig. 4) for maximum output.

4. Aligning at 600 Kilocycles

(a) Connect Signal Generator leads to 6K7G, R-F grid, leaving the grid clip in place.

(b) Set Signal Generator to 600 kilocycles and tune the receiver to this signal.

(c) Adjust oscillator padder condenser "K" (Fig. 5) rocking gang condenser plates back and forth through the signal until maximum output is obtained.

(d) Remove signal generator lead from 6K7G tube clip and connect to the antenna terminal through a .0002 mfd. condenser.

(e) Adjust antenna series condenser "E" (Fig. 5) for maximum output.

5. Aligning at 1400 Kilocycles

(a) Set Signal Generator at 1400 kilocycles.

(b) Tune set to this signal and adjust R-F trimmer "H" (Fig. 4) and antenna trimmer "M" (Fig. 4) to maximum output.

6. Aligning at 4000 Kilocycles

(a) Turn band switch to police band.

(b) Set Signal Generator to 4000 kilocycles and tune receiver to this signal.

(c) Adjust police band antenna trimmer "F" (Fig. 4) for maximum output.

7. Aligning at 1800 Kilocycles

(a) Set Signal Generator at 1800 kilocycles and tune receiver to this signal.

(b) Adjust oscillator padder condenser "J" (Fig. 5) rocking gang condenser plates back and forth through the signal until maximum output is obtained.

(c) Close gang and check to see if tuning range extends to 1600 kilocycles.

8. Realigning at 1400 Kilocycles

(a) Turn band switch to broadcast band.

(b) Set Signal Generator to 1400 kilocycles.

(c) Tune set to this signal and adjust R-F trimmer "H" and antenna trimmer "M" to maximum output (Fig. 4).

9. Realigning at 600 Kilocycles

(a) Check alignment of antenna series condenser "E" (Fig. 5) for maximum output.

10. Checking I-F Band Spread

The Model 165 Cathode Ray Oscillograph should be used to check the I-F band spread after completing the "Alignment Procedure". Slight adjustment of the I-F stages may be found necessary in order to obtain a symmetrical selectivity curve. Connect Cathode Ray from connection "I" (Fig. 3) to ground.

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MODELS R1134,R1135
R1139 Delco
Schematic,Voltage

# UNITED MOTORS SERVICE, INC.

Socket,Trimmers
Chassis

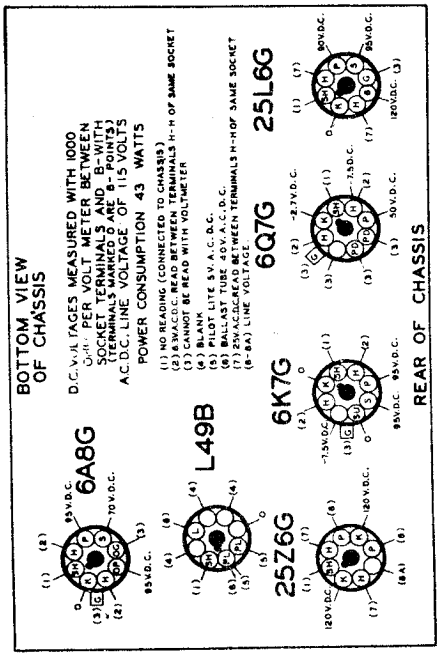
BOTTOM VIEW
OF CHASSIS
6A8G
L49B
25Z6G
6K7G
6Q7G
25L6G
REAR OF CHASSIS
D.C. VOLTAGES MEASURED WITH 1000 OHM PER VOLT METER BETWEEN SOCKET TERMINALS 5 AND 8-WITH SOCKET TERMINALS 8 ARE 8-POINTS
A.C.D.C. LINE VOLTAGE OF 115 VOLTS
POWER CONSUMPTION 43 WATTS
(1) NO READING (CONNECTED TO CHASSIS)
(2) 8.5 VA.C.D.C. READ BETWEEN TERMINALS H-H OF SAME SOCKET
(3) CANNOT BE READ WITH VOLTMETER
(4) BLANK
(5) PILOT LITE 5V. A.C. D.C.
(6) BALLAST TUBE 40 V. A.C. D.C.
(7) 25V. AC. D.C. READ BETWEEN TERMINALS H-H OF SAME SOCKET
(8-8A) LINE VOLTAGE.

FIG. 1--TUBE SOCKET VOLTAGES

3-6-39

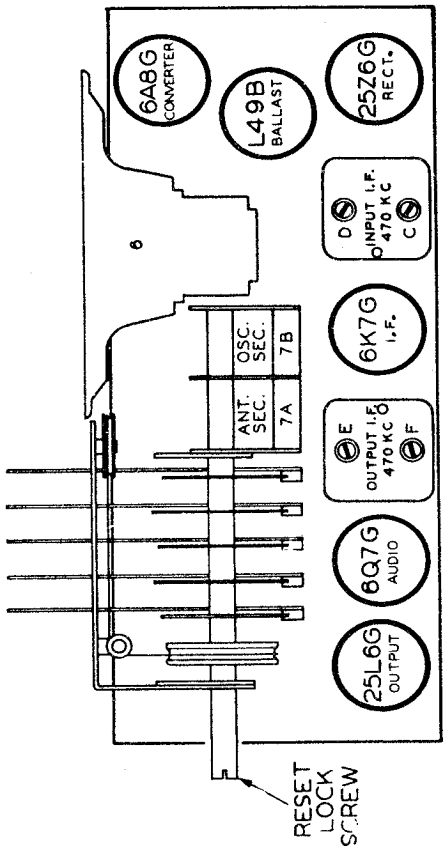


FIG. 3--PARTS LAYOUT--Top View

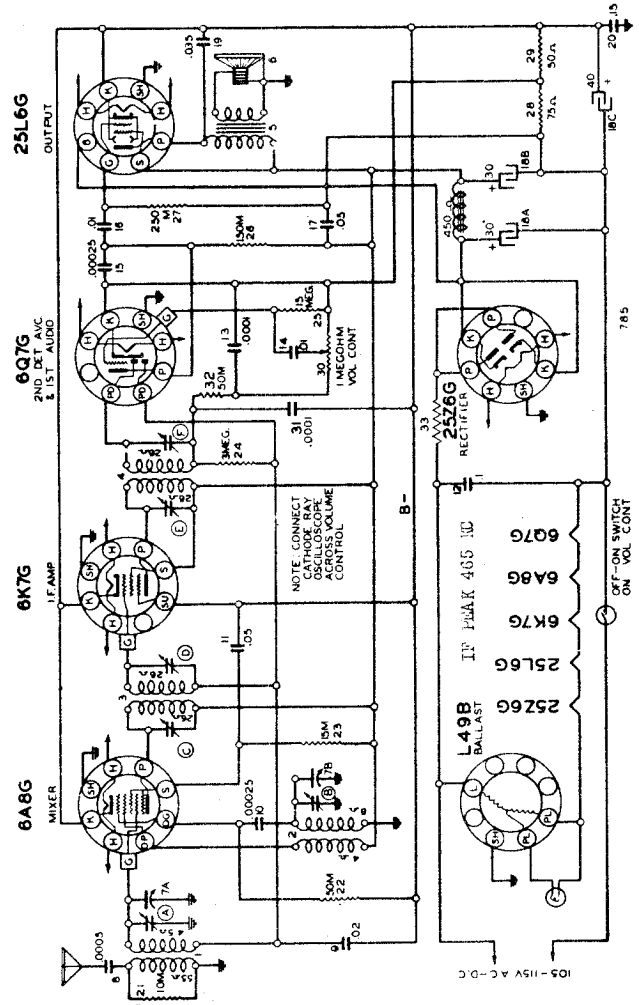


FIG. 2--DELCO MODELS R-1134-35-39 CIRCUIT DIAGRAM

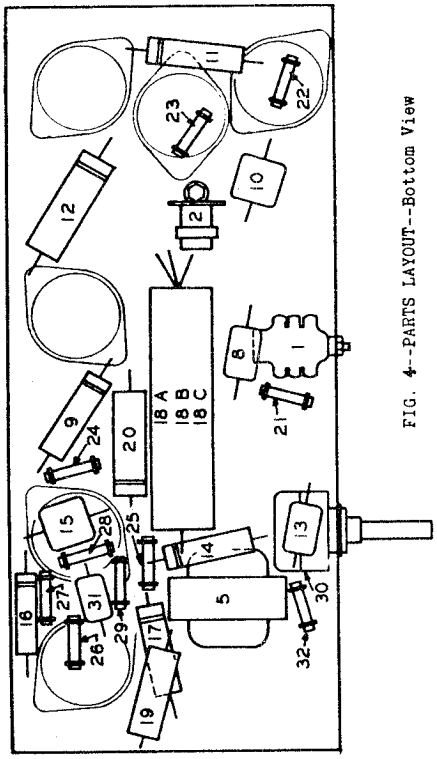

FIG. 4--PARTS LAYOUT--Bottom View

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SETTING UP AUTOMATIC TUNING DELCO MODELS R-1134-35-39 HOME RADIO

1. Loosen RESET LOCK SCREW in center of tuning knob.

2. Press any one of the automatic tuner levers all the way down. Stations may be set up in any sequence desired.

3. Hold the lever down firmly and tune set to station desired. When desired station is clearly tuned in, release the lever and follow same procedure until all levers have been set up.

4. Rotate the tuning knob to the right (clockwise) as far as it will turn and firmly tighten RESET LOCK SCREW.

DELCO MODELS R-1134-35-39 CIRCUIT ALIGNMENT

1. Aligning I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the signal generator in series with a .1 mfd. condenser to B- (pin #8 on 25L6G tube). Connect the signal lead of the signal generator to the grid cap of the 6A8G tube, leaving grid clip in place.

(b) Connect the output meter across the plate (pin 3) and screen (pin 4) of the 25L6G output tube.

(c) Set signal generator to exactly 465 kilocycles and turn volume control on full.

(d) Turn the rotor plates of the condenser gang all the way out of mesh and against the high frequency stop.

(e) Adjust the trimmers (E-F) on the second I-F coil and then the trimmers on the first I-F coil (C-D Fig. 3) carefully for maximum output.

(f) Repeat adjustments of the four I-F trimmers with as low an output from the signal generator as possible, for more accurate alignment.

2. Aligning at 1720 Kilocycles

(a) Leave ground lead of signal generator connected to B- through a .1 mfd. condenser as before. Connect the signal lead of signal generator through a .0001 mfd. condenser to the antenna terminal.

(b) Turn tuning condenser plates all the way out and against high frequency stop.

(c) Set signal generator to exactly 1720 kilocycles and adjust oscillator trimmer (7B Fig. 3) carefully for maximum output, being careful to peak the signal with trimmer screw out or at minimum capacity.

3. Aligning at 1400 Kilocycles

(a) Set signal generator to 1400 kilocycles and turn condenser gang plates until this signal is tuned in with maximum output.

(b) Adjust the antenna trimmer (7A Fig. 3) for maximum output. Do not disturb the 1720 kilocycle adjustment of the oscillator trimmer.

DELCO MODEL R-3215 CIRCUIT ALIGNMENT

1. Aligning I-F Stages at 455 Kilocycles

(a) Attach the ground lead of the signal generator to the chassis ground post. Connect the other lead to the grid cap of the 6K8 tube through a .02 mfd. series condenser. DO NOT REMOVE GRID CLIP.

(b) Set the signal generator to EXACTLY 455 kilocycles and turn receiver volume control on full.

(c) Peak each of the 2nd I-F coil trimmers, 2A & 2B, (Illus. 2, Fig. 3).

(d) Peak each of the 1st I-F coil trimmers, 1A & 1B, (Illus. 1, Fig. 3).

(e) To assure most accurate trimmer setting repeat above adjustments several times always using lowest possible signal generator output consistent with readable output meter scale deflection.

2. Aligning "American Broadcast" 1730-540 Kilocycle Band

(a) Connect signal generator antenna lead to receiver antenna terminal through a .00025 mfd. condenser, and the other signal generator lead to ground terminal.

(b) Adjust band selector switch for operation on 1730-540 kilocycle band.

(c) Check tuning dial adjustment by turning gang condenser until plates touch maximum capacity stop (completely in mesh), at which point the dial needle must be exactly even with the last line at the low frequency end of the dial calibration. If the needle does not point exactly to the last line move needle to correct position.

(d) Set signal generator frequency and receiver dial to EXACTLY 1730 kilocycles, and bring in 1730 kilocycle signal generator signal to maximum output by adjusting 1730 kilocycle oscillator trimmer, (Illus. 7C Fig. 4).

(e) Set signal generator frequency and receiver dial to approximately 600 kilocycles. Then while rocking gang condenser slightly to right and left, adjust 600 kilocycle oscillator padder (Illus. 6, Fig. 3) for maximum output.

(f) padder (Illus. 8, Fig. 3) for maximum signal response.

3. Aligning "Foreign Short Wave" 5.8-18.1 Megacycle Band

(a) Place band selector switch for operation on 5.8-18.1 megacycle band, tune receiver dial and set signal generator frequency to EXACTLY 18.1 megacycles.

(b) Adjust 18.1 megacycle oscillator trimmer (Illus. 7B, Fig 4) to bring in 18.1 megacycle test signal to maximum output. If more than one peak is noticed, back off trimmer to minimum capacity, then screw down the trimmer (add capacity) until the second peak is tuned in.

(c) Tune receiver dial and set signal generator frequency to EXACTLY 15 megacycles.

(d) While rocking gang condenser slightly to right and left, adjust 15 megacycle antenna trimmer (Illus. 7A, Fig. 4) for maximum 15 megacycle test signal response.

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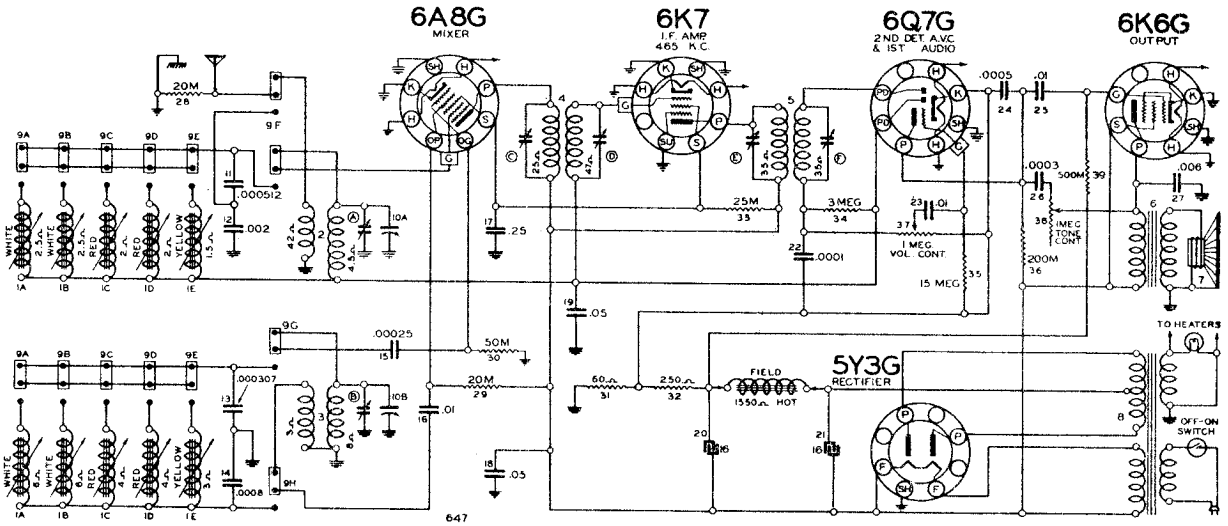
MODEL R1140 Delco
Schematic, Socket
Trimmers, Chassis

# UNITED MOTORS SERVICE, INC.




IF PEAK 465 KC 9-23-38

FIG. 2--DELCO MODEL R-1140 CIRCUIT DIAGRAM

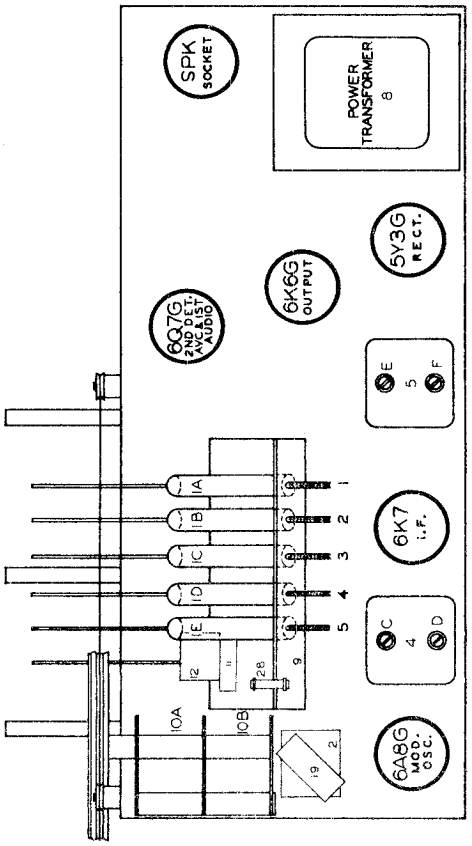



FIG. 3--PARTS LAYOUT--Top View

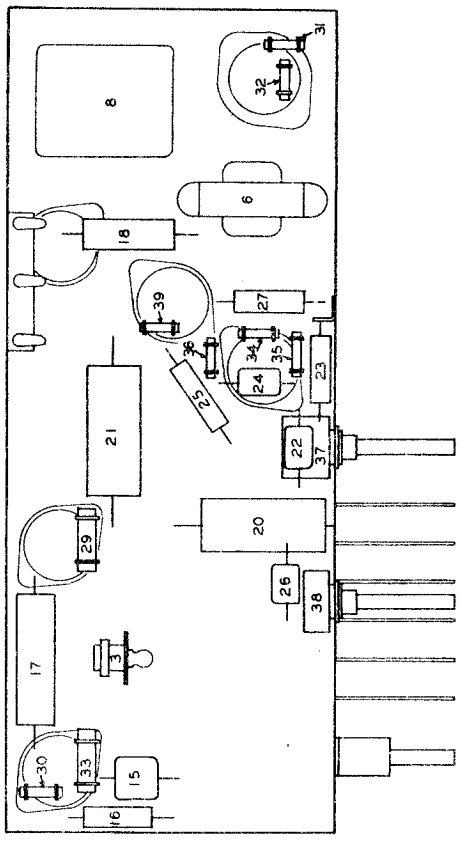


FIG. 4--PARTS LAYOUT--Bottom View

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**GENERAL:** The Delco Model R-1140 is a 5 tube, 110 volt A.C. superheterodyne automatic electric tuning receiver with a 6" dynamic speaker. Tuning is accomplished by means of the conventional manual control or by push button switches which control adjustable permeability tuned coils. Tuning range is from 530 to 1720 kilocycles. Five push buttons are used for automatic tuning, a sixth for switching from automatic to manual tuning.

The function of each button is, left to right:

1. Automatic tuning 530-800 K.C.
2. Automatic tuning 530-800 K.C.
3. Automatic tuning 660-1100 K.C.
4. Automatic tuning 660-1100 K.C.
5. Automatic tuning 975-1560 K.C.
6. Switch-Manual to automatic tuning

## SETTING UP AUTOMATIC ELECTRIC TUNING

Setting up the stations is accomplished by means of a single adjustment for each button, accessible from the rear of the chassis.

1. Turn on the set, and allow 15 minutes for the set to "warm up" before setting the station adjustment screws for the push buttons.
2. Press button #6 and tune in the desired station by means of the manual tuning control.
3. Press one of the buttons #1 to #5 which range corresponds to the station frequency and, with a small screw driver adjust screw on back of chassis corresponding to button pressed until the same station is accurately tuned in.
4. Press button #6, changing from "Push Button" to "Dial Tuning" to ascertain that the same program is heard for both.
5. Moisten and insert the call letters of the station on the front of the button.
6. Repeat the operation for the other buttons.

## CIRCUIT ALIGNMENT

For alignment purposes, a test scale is stamped on the inside of the dial drum on the condenser shaft. Before starting alignment procedure, turn the rotor plates of the condenser gang all the way out of mesh and against the high frequency stop and make an indicating mark on the front support bracket in line with the high frequency mark on test scale for future reference.

1. Aligning I-F Stages at 465 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis frame.

   (b) Connect the signal lead of the signal generator to the grid cap of the 6A8G tube through a .1 mfd. condenser, leaving grid clip in place.

   (c) Connect the output meter across the plate (pin 3) and screen (pin 4) of the 6K6G output tube.

   (d) Press #6 button (Dial Tuning), turn the volume control on full and the tone control to extreme clockwise (treble) position.

   (e) Set the signal generator to exactly 465 kilocycles and turn the rotor plates of the condenser gang all the way out of mesh and against the high frequency stop.

   (f) Adjust the trimmers on the second I-F coil (Illus. 5, Fig. 3) and then the trimmers on the first I-F coil (Illus. 4, Fig. 3) carefully for maximum output.

   (g) Repeat adjustments of the four I-F trimmers with as low an output from the signal generator as possible, for more accurate alignment.

2. Aligning at 1400 Kilocycles

   (a) Connect the signal lead of signal generator through a .0001 mfd. condenser to the antenna terminal. Connect ground lead of signal generator to chassis.

   (b) Set signal generator to 1400 kilocycles.

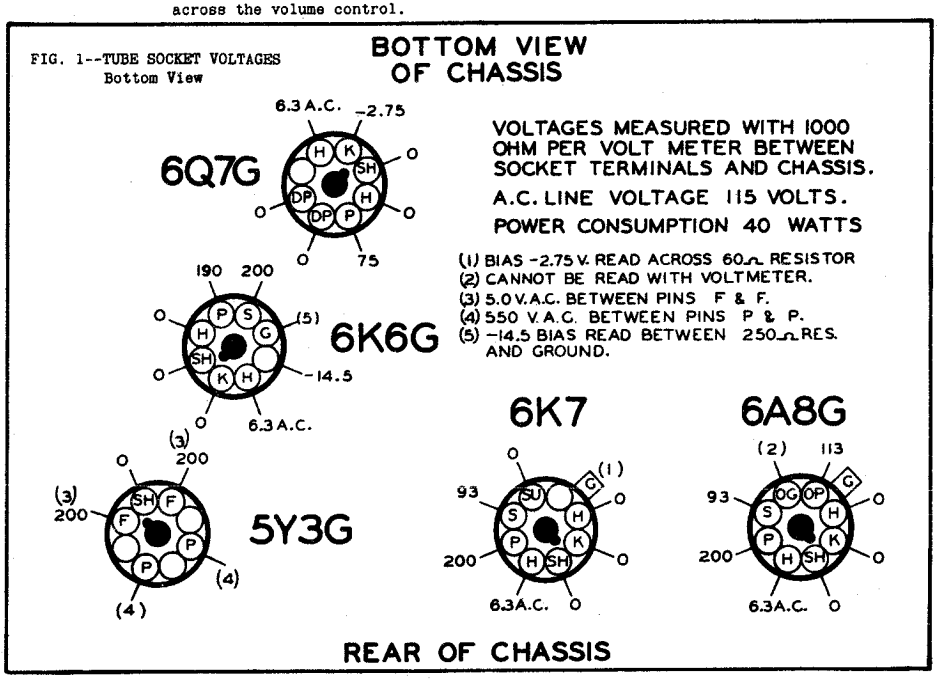
   (c) Turn tuning condenser plates until test scale dial is at the 1400 kilocycles position as noted from the reference mark you made on the front support bracket.

   (d) Adjust oscillator trimmer (Illus. 10B, Fig. 3) carefully for maximum output, being careful to peak the signal received with trimmer screw out at minimum capacity.

   (e) Adjust the antenna trimmer (Illus. 10A, Fig. 3) for maximum output with as low an output from the signal generator as possible, for more accurate alignment.

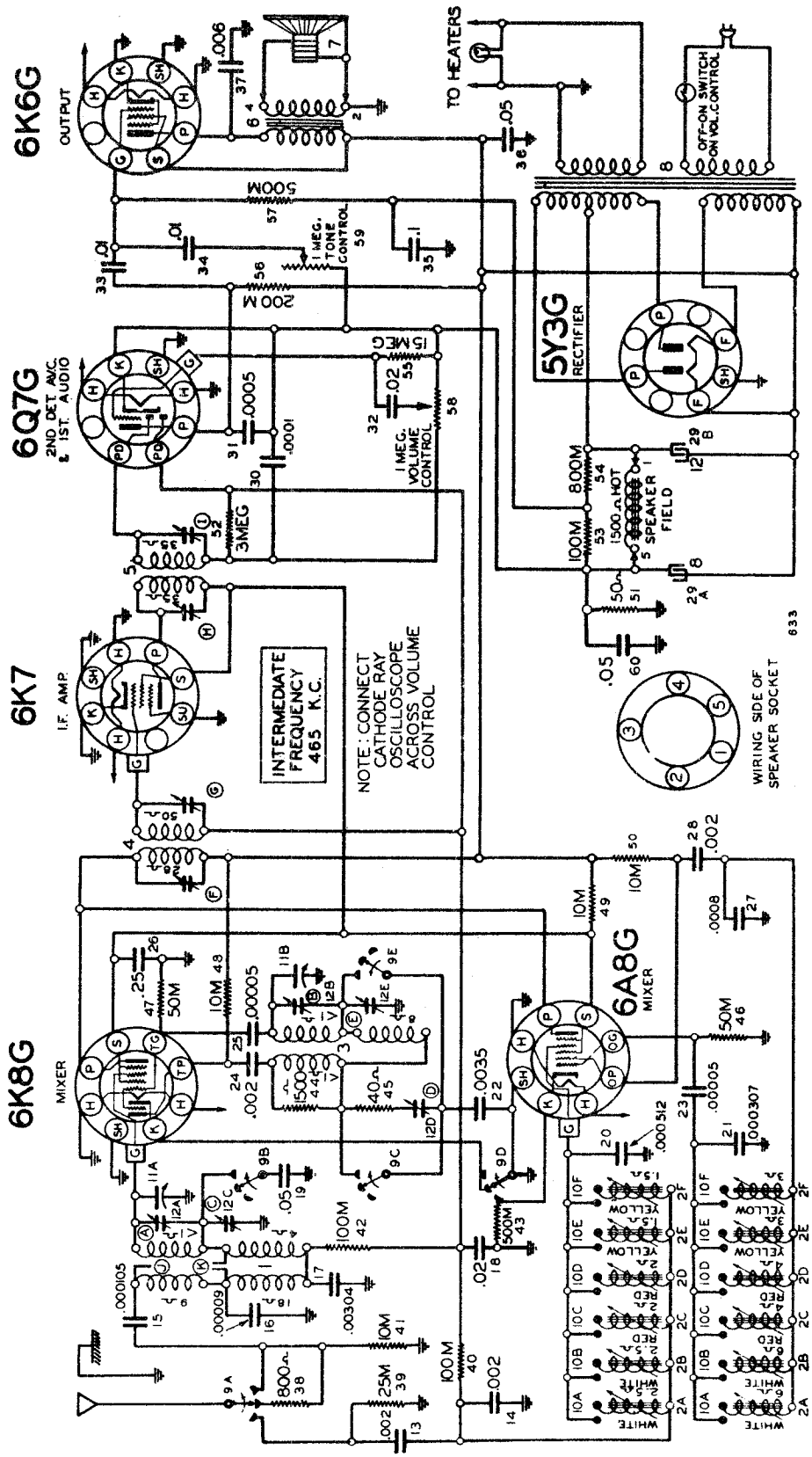
   (f) After completing the alignment procedure, the alignment should be checked with the cathode ray oscillograph. Connect the oscillograph across the volume control.

FIG. 1--TUBE SOCKET VOLTAGES
Bottom View



MODEL R1141 Delco
Schematic

# UNITED MOTORS SERVICE, INC.




Date: 9-13-38

GENERAL: The Delco Model R-1141 is a six tube, two band superheterodyne receiver with a 6" dynamic speaker. Tuning is accomplished by means of the conventional manual control, or by push button switches which control adjustable permeability tuned coils. The frequency ranges of the push buttons are, left to right:

1. 535 to 820 K.C.
2. 535 to 820 K.C.
3. 720 to 1120 K.C.
4. 720 to 1120 K.C.
5. 1000 to 1560 K.C.
6. 1000 to 1560 K.C.

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# UNITED MOTORS SERVICE, INC.

MODEL R1141 Delco
Voltage, Socket
Trimmers, Chassis

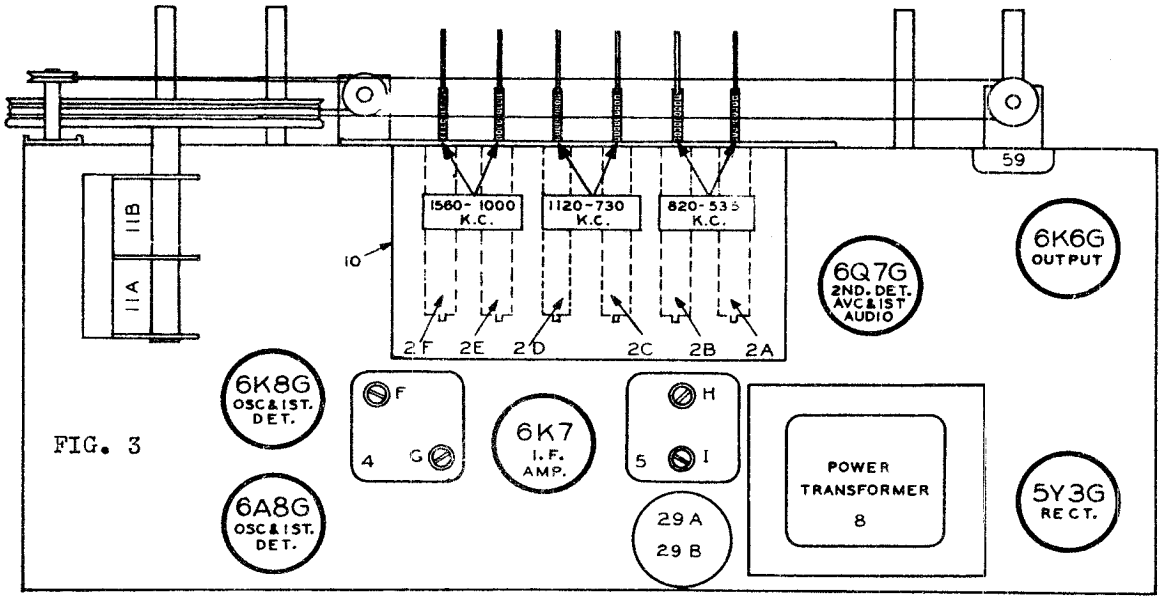
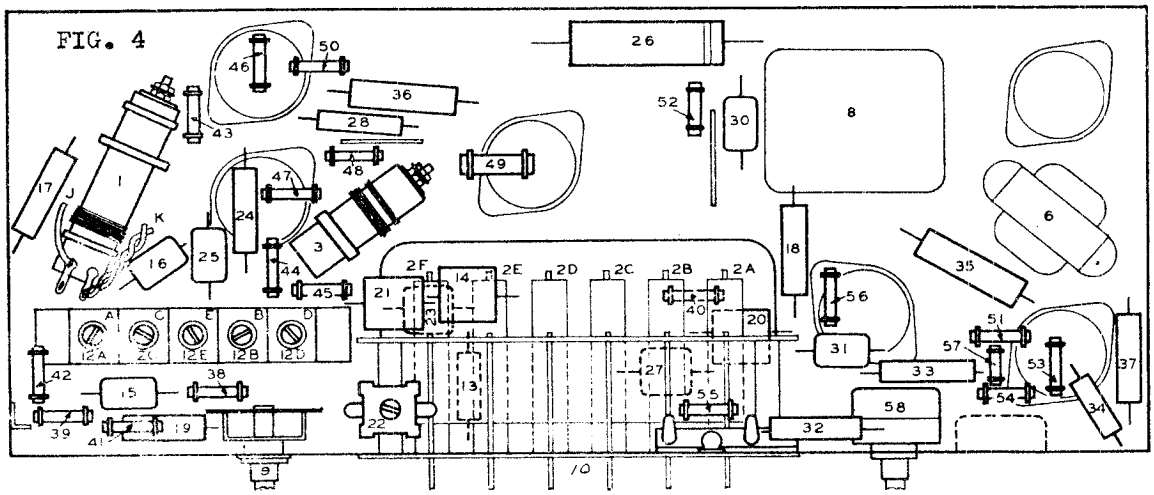
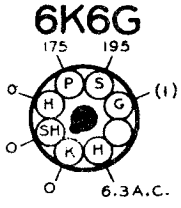
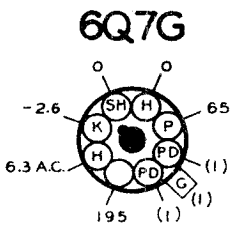



FIG. 3

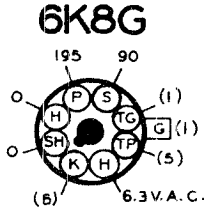


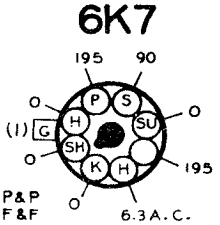

## BOTTOM VIEW OF CHASSIS

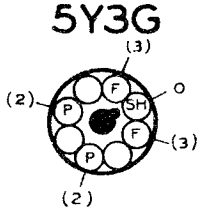


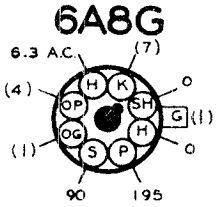

VOLTAGES MEASURED WITH 1000 OHM PER VOLT METER BETWEEN SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 50 WATTS




(1) CANNOT BE READ WITH VOLTMETER
(2) 650 V. A.C. READ ACROSS TERMINALS P & P
(3) 5 V. A.C. READ ACROSS TERMINALS F & F
(4) 155 V. IN PUSH BUTTON OPERATION
(5) 130 V. IN MANUAL OPERATION
(6) 0 IN MANUAL OPERATION
(7) 0 IN PUSH BUTTON OPERATION




REAR OF CHASSIS

621

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MODELS R1141,R1142,R1143
Alignment,Tuner
MODEL R1144 Delco
Tuner Data

UNITED MOTORS SERVICE , INC.

MODELS R1141,R1142,R1143 and R1144

SETTING UP AUTOMATIC ELECTRIC TUNING

Setting up the push buttons for pre-selected stations is accomplished by means of a single adjustment for each button, accessible from the front of the cabinet. These screw driver adjustments are made through the small openings in the escutcheon, in which the call letter tabs are placed.

1. Turn the set "on" and set the band change switch to the broadcast manual (center) position and allow about 15 minutes to warm up.
2. Tune in the desired station by means of the manual tuning control.
3. Press one of the buttons which most conveniently covers the frequency of the stations, turn the band change switch to the automatic (left hand) position and, with a small screw driver, adjust the screw directly above the button, until the station is tuned in accurately.
4. Turn the band change switch back to the center position to check the accuracy of the adjustment.
5. Insert the call letters of the station in the opening and cover with the celluloid tab provided.
6. Repeat the operation for the other buttons.

ALIGNMENT FOR MODELS R1141,R1142,and R1143.

NOTE FIGURE REFERENCES IN THE TEXT REFER TO FIGURES SHOWN WITH EACH MODEL.

1. Aligning I-F Stages at 465 Kilocycles

(a) Connect the ground lead of the signal generator to the chassis frame.

(b) Connect the signal lead of the signal generator to the grid cap of the *6A8G tube through a 1.0 mfd. condenser, leaving the grid clip in place. 4 6K8G (R1143)

(c) Connect the output meter across the plate and screen of the 6F6G tube.

(d) Press a button, turn the band change switch to the automatic (left hand) position, volume control on full, and the tone control in the treble position. 2 R1143 USE #10 BUTTON; VARIABLES FULLY OPEN

(e) Set the signal generator to exactly 465 kilocycles and adjust the trimmers on the second I-F coil (Illus. 5, Fig. 3) and the first I-F coil (Illus. 4, Fig. 3) for maximum output. Use as low a signal from the signal generator as will give a readable indication on the output meter. DO NOT REALIGN THE I-F COILS IN THE MANUAL (CENTER) POSITION (MODEL R1141 ONLY)

(f) After completing the Alignment Procedure, the alignment should be checked with the Model 165 Cathode Ray Oscillograph. Connect the oscillograph across the volume control. 3 FOR R1143 ACROSS #10 CONTROL RES.

2. Aligning at 17 Megacycles

(a) Remove the signal lead of the signal generator from the grid of the *6A8G and connect to the antenna terminal of the receiver through a 400 ohm resistor. 4 R1143 (6K8G)

(b) 5 Turn the band change switch to the short wave (right hand) position. 5 FOR R1143 - PRESS #8 BUTTON (S.W.-MANUAL TUNING)

(c) Set the signal generator to exactly 17 megacycles and rotate the variable section of the condenser gang to indicate 17 megacycles on the test scale.

(d) Adjust the oscillator trimmer condenser (Illus. B, Fig. 4) for maximum output. R1142 - (ILLUS 12D, FIG 4) R1141, R1143 (ILLUS. B, FIG 3) - R1143

(e) Adjust the antenna trimmer @ (Illus. A, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained. @ FOR MODEL 1142 SEE (ILLUS. 12A, FIG 4)

(f) Increase the signal from the signal generator and check for image frequency response. If the image does not fall at approximately 1630 megacycles, repeat section 2.

3. Aligning at 1735 Kilocycles (MODELS R1141, R1142 ONLY)

(a) Remove the 400 ohm resistor and connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0002 mfd. mica condenser.

3. Aligning at 5 Megacycles MODEL R1143 ONLY

(a) Press #9 button (Intermediate wave--manual tuning).

(b) Set the signal generator to exactly 5 megacycles and rotate the variable section of the condenser gang to indicate 5 megacycles on the test scale.

(c) Adjust the oscillator trimmer condenser (Illus. G, Fig. 3) for maximum output.

(d) Adjust the antenna trimmer condenser (Illus. C, Fig. 3) for maximum output.

4. Aligning at 1690 Kilocycles MODEL R1143 ONLY

(a) Remove the 400 ohm resistor and connect the signal lead of the signal generator to the antenna terminal of the receiver through a .0002 mfd. mica condenser.

(b) Press #10 button (Broadcast--manual tuning).

(c) Turn the variable plates of the condenser gang completely out of mesh and against the high frequency stop.

(d) Adjust image trimmer (Illus. E, Fig. 3) two turns up from tight.

(e) Set the signal generator to exactly 1690 kilocycles.

(f) Adjust the oscillator trimmer condenser (Illus. H, Fig. 3) for maximum output.

(b) Turn the band change switch to the broadcast Manual (center) position.

(c) Turn the variable plates of the condenser gang completely out of mesh and against the high frequency stop.

(d) Set the signal generator to exactly 1735 kilocycles.

(e) Adjust the oscillator trimmer condenser 4 (Illus. E, Fig. 4) for maximum output. 4 MODEL R1141 (ILLUS 12E, FIG 4) FOR MODEL R1142 (ILLUS 12A, FIG 4)

4. Aligning at 1400 Kilocycles

(a) Set the signal generator to approximately 1400 kilocycles.

(b) Rotate the variable plates of the condenser gang until the signal is tuned in with maximum output.

(c) Adjust the antenna trimmer X (Illus. C, Fig. 4) for maximum output.

5. Aligning at 600 Kilocycles

X MODEL R1141 ONLY FOR MODEL R1142 (ILLUS. 12B, FIG 4) " " R1143 (ILLUS D, FIG 3)

(a) Set the signal generator to approximately 600 kilocycles.

(b) Rotate the variable plates of the condenser gang until the signal is tuned in. FOR R1143 - SEE (ILLUS F, FIG 3) FOR R1143 - SEE (ILLUS. 12C, FIG 4) FOR R1142

(c) Adjust the oscillator series condenser (Illus. D, Fig. 4) while rocking the condenser gang back and forth through the signal until maximum output is obtained.

6. Aligning for Image Frequency Response

(a) Set the signal generator at 2100 kilocycles. (FOR R1143 AT 1930 KC.)

(b) Rotate the variable plates of the condenser gang until the image of this signal is tuned in at 1170 kilocycles. (FOR R1143 AT 1000 KC.)

(c) Adjust the two-wire capacitor (Illus. K, Fig. 4) by twisting, until a minimum output is obtained. (FOR R1143 - SEE (ILLUS. F, FIG 3)

NOTE: R1143 IS CHECKED ONLY AT 1930 KC. THEN READJUST AT 1690 KC.

(d) Set the signal generator at 2630 kilocycles.

(e) Rotate the variable plates of the condenser gang until the image of this signal is tuned in at 1700 kilocycles.

(f) Adjust the single wire capacitor (Illus. J, Fig. 4) by moving it either toward or away from the coil winding until a minimum output is obtained.

7. Repeat Sections 4 and 5 for Maximum Output

8. Repeat Section 6 for Minimum Output

9. Repeat Section 2 (e) for Maximum Output

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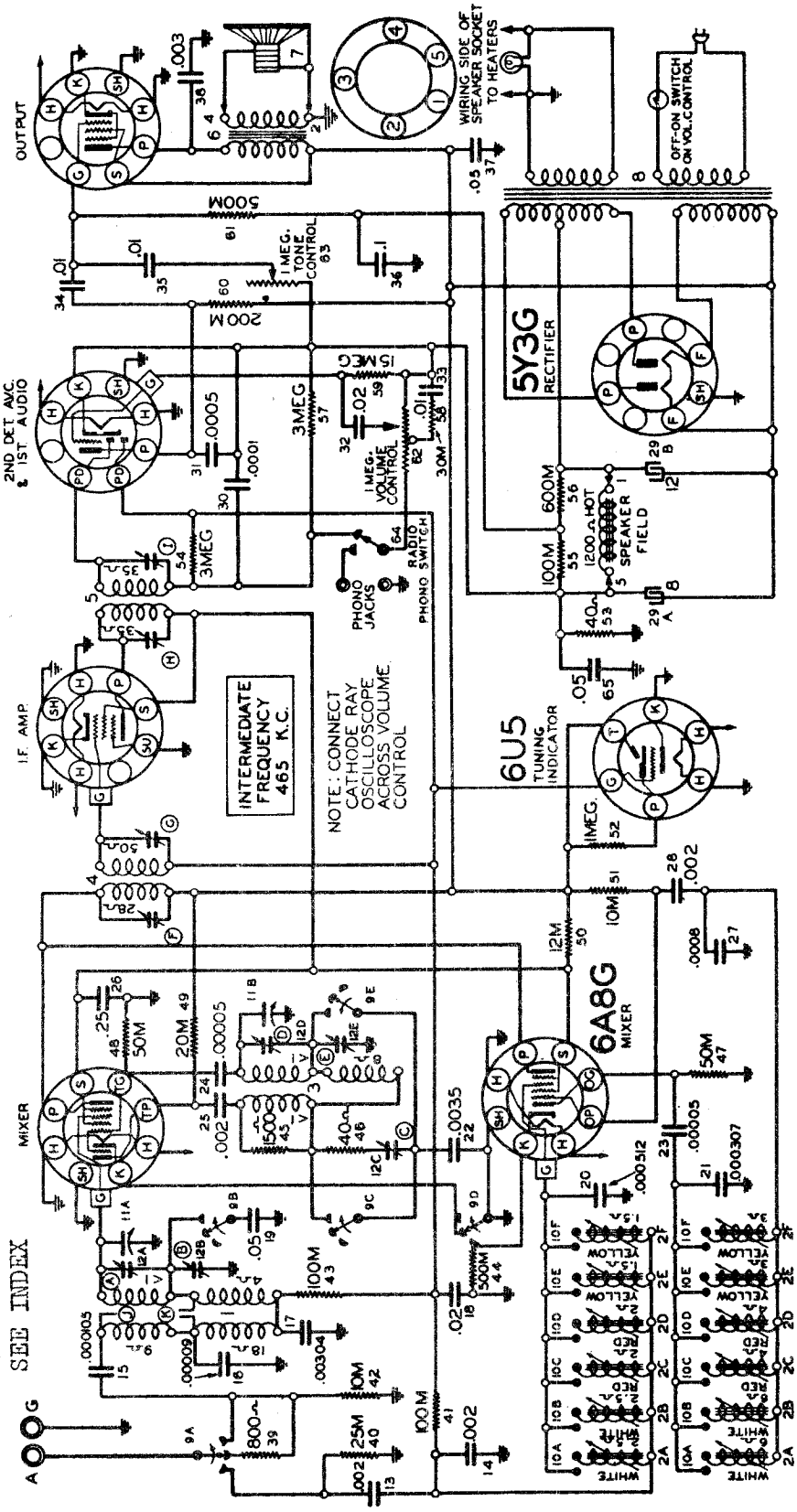
UNITED MOTORS SERVICE, INC.

MODEL R1142 Delco
Schematic, Notes




A phono switch and connector are mounted on the rear flange of the chassis and may be used in conjunction with a crystal pickup without a matching transformer.

The switch must be in the "radio" position during the alignment procedure

9-8-38

GENERAL: The Delco Model R-1142 is a seven tube, two band superheterodyne receiver with a 10" dynamic speaker. Tuning is accomplished by means of the conventional manual control, or by push button switches which control adjustable permeability tuned coils. The frequency ranges of the push buttons are, left to right:

1. 535 to 820 K.C.
2. 535 to 820 K.C.
3. 730 to 1120 K.C.
4. 730 to 1120 K.C.
5. 1000 to 1560 K.C.
6. 1000 to 1560 K.C.

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MODEL R1142 Delco
Socket,Trimmers
Chassis

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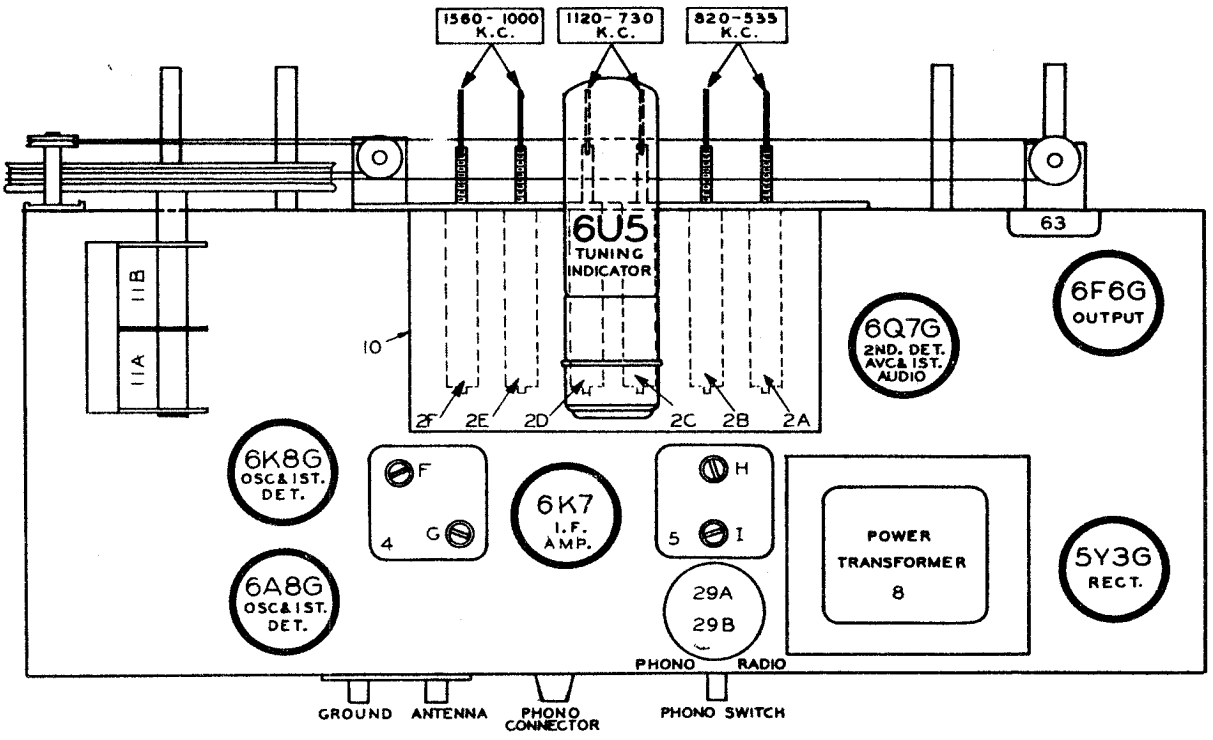


FIG. 3--PARTS LAYOUT--Top View

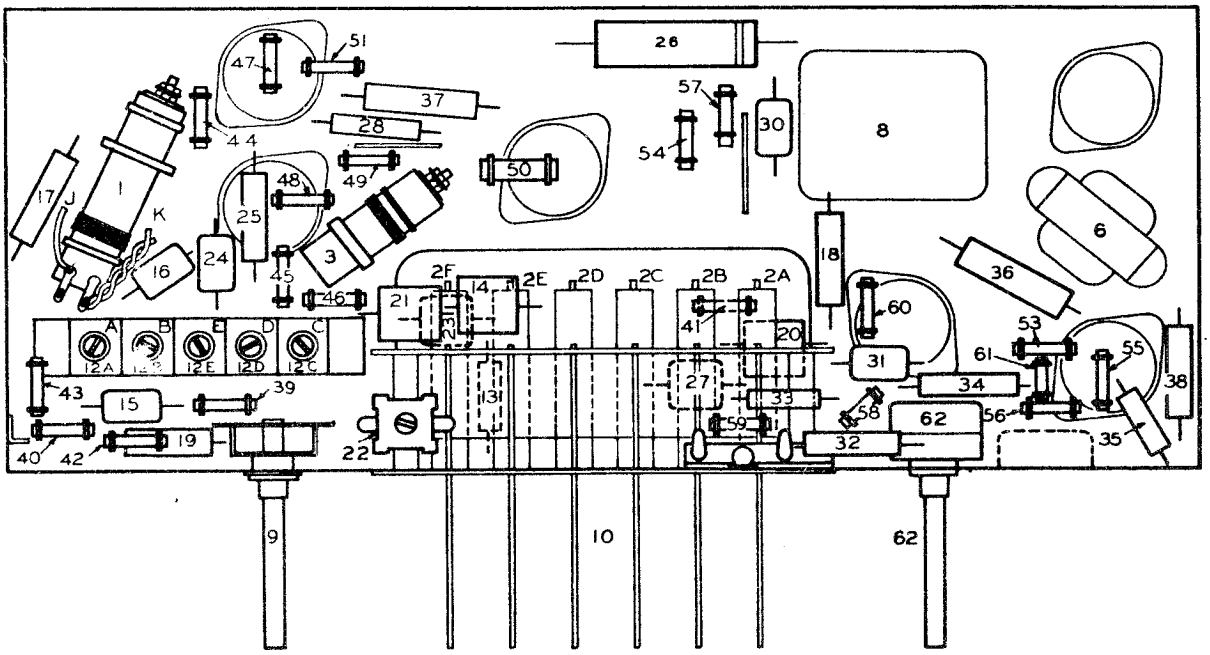


FIG. 4--PARTS LAYOUT--Bottom View

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UNITED MOTORS SERVICE , INC.

MODEL R1143 Delco
Schematic

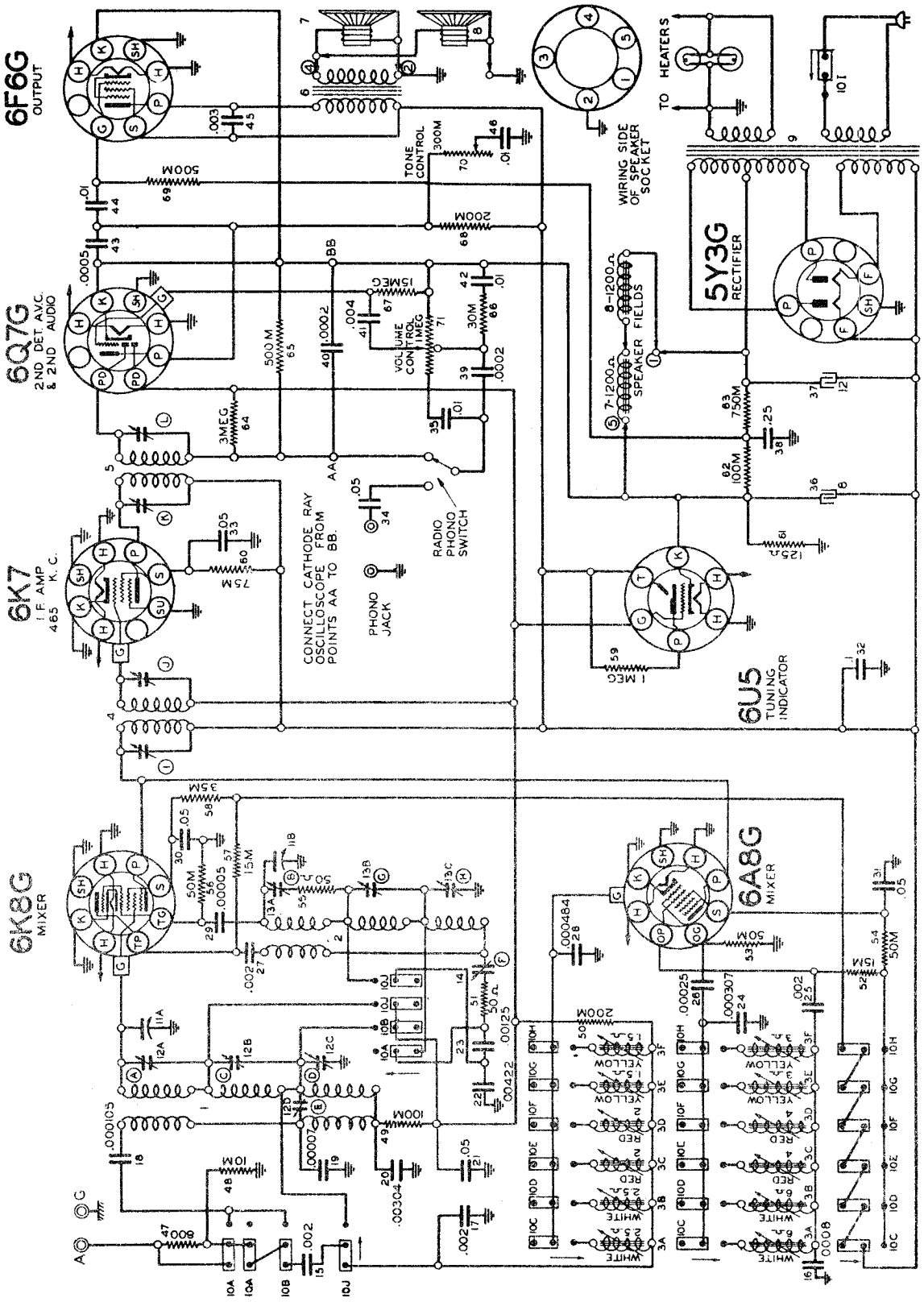


FIG. 2--DELCO MODEL R-1143 CIRCUIT DIAGRAM

IF PEAK 465 KC

FOR ALIGNMENT AND TUNER, SEE INDEX

9-28-38

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MODEL R1143 Delco
Socket, Trimmers
Voltage, Chassis

# UNITED MOTORS SERVICE, INC.

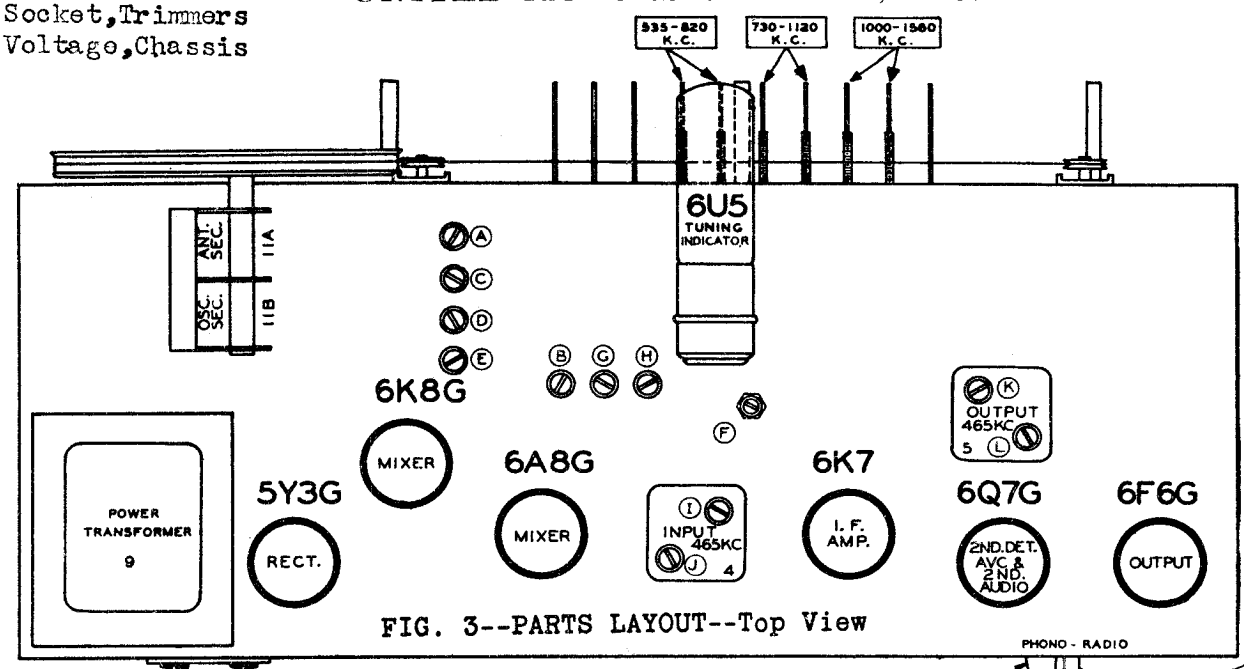



FIG. 3--PARTS LAYOUT--Top View

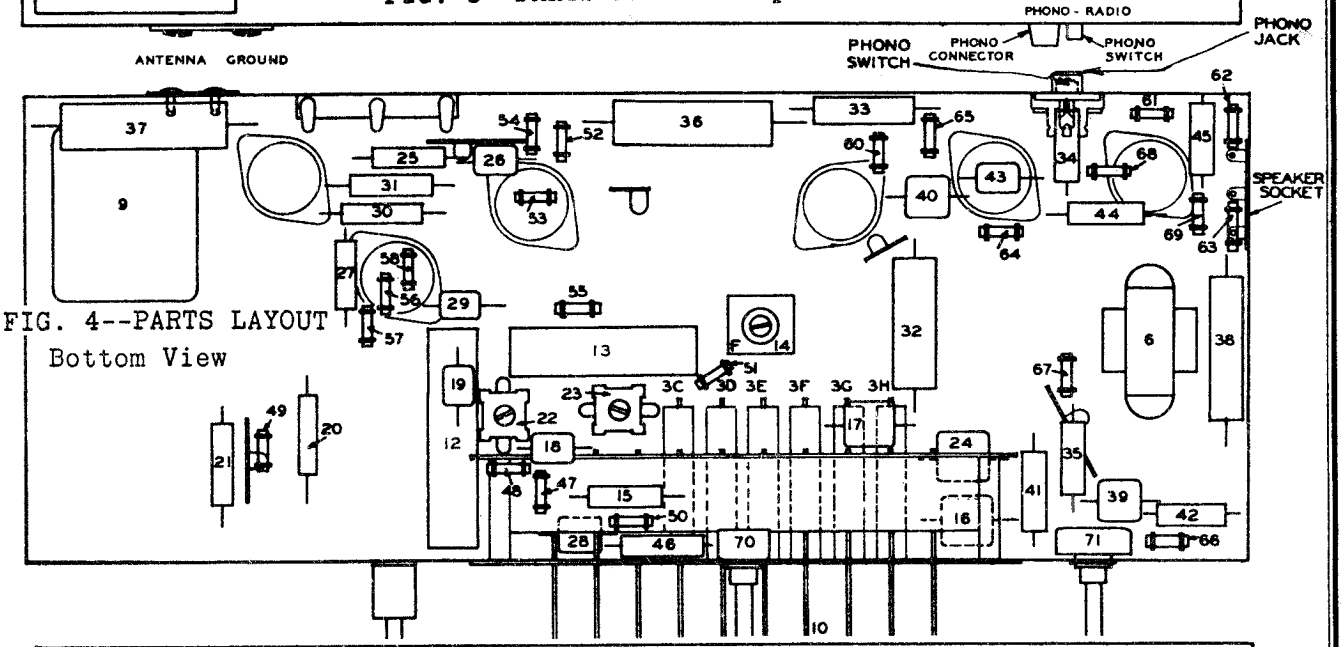



FIG. 4--PARTS LAYOUT
Bottom View

FIG. 1--TUBE SOCKET VOLTAGES

BOTTOM VIEW OF CHASSIS

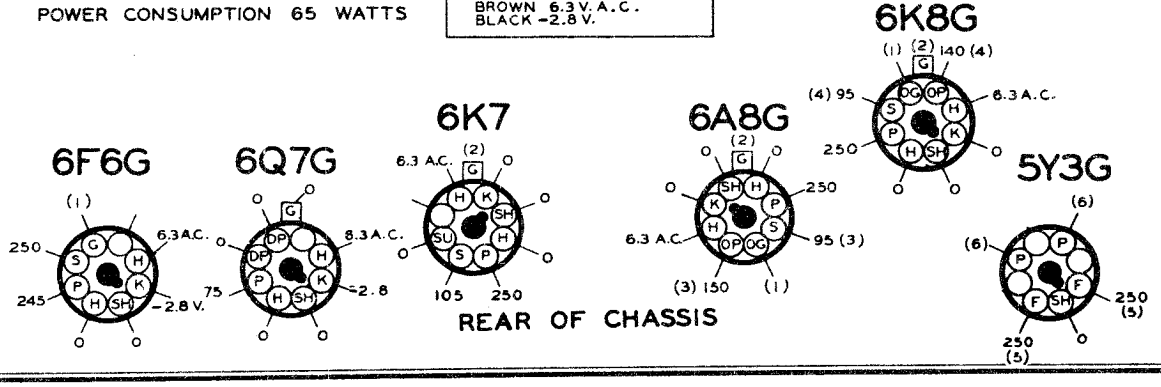
VOLTAGES MEASURED WITH 1000 OHM PER VOLT METER BETWEEN SOCKET TERMINALS AND CHASSIS.

A.C. LINE VOLTAGE 115 VOLTS.

POWER CONSUMPTION 65 WATTS

| TUNING EYE VOLTAGES AT CHASSIS END OF CABLE. | |
|---|---|
| RED | 250 V. |
| GREEN | 0 |
| BROWN | 0 |
| BROWN | 6.3 V. A.C. |
| BLACK | -2.8 V. |

(1) CANNOT BE READ WITH A VOLT METER
(2) BIAS 2.8V. AS READ ACROSS RESISTOR 61
(3) CAN BE READ ONLY WHEN PUSH BUTTONS 2 TO 7 ARE "IN"
(4) CAN BE READ ONLY WHEN PUSH BUTTONS 8, 9, & 10 ARE "IN"
(5) HEATER VOLTAGE 5.0V. A.C. ACROSS PINS F & F
(6) 750 V. A.C. AS READ ACROSS PINS P & P.

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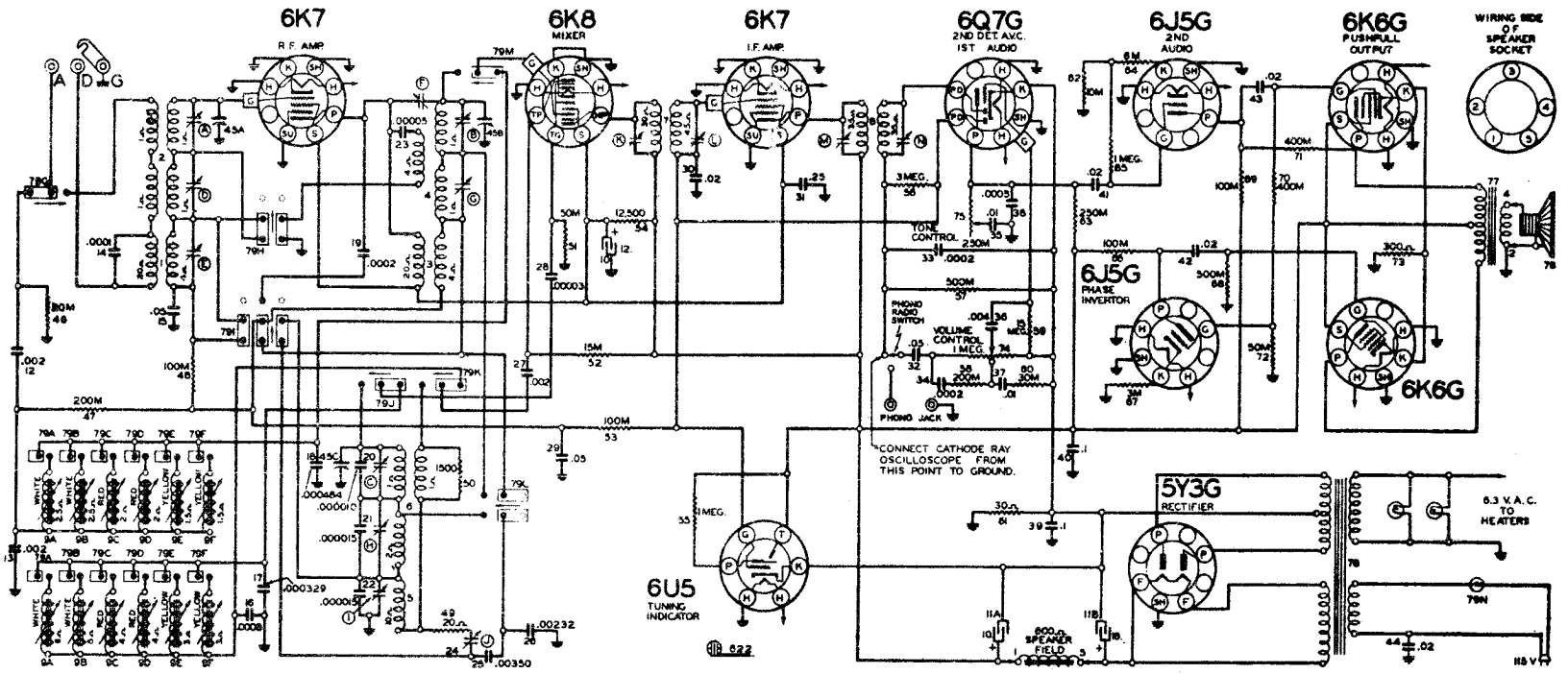



GENERAL: The Delco Model R-1144 is a ten tube, A.C., three band superheterodyne receiver with a 12" dynamic speaker. Tuning is accomplished by means of the conventional manual control or by push button switches which control adjustable permeability tuned coils. Band switching is accomplished by the same series of switches which are, left to right:

FOR TUNER SEE INDEX

9-2-38

1. Off Switch
2. Broadcast Band (Manual Tuning) 535-1690 K.C.
3. Intermediate Band (Manual Tuning) 1660-5500 K.C.
4. Short Wave Band (Manual Tuning) 5.3 - 18.0 M.C.
5. Broadcast Band (Automatic Tuning) 980 - 1560 K.C.
6. Broadcast Band (Automatic Tuning) 980 - 1560 K.C.
7. Broadcast Band (Automatic Tuning) 700 - 1100 K.C.
8. Broadcast Band (Automatic Tuning) 700 - 1100 K.C.
9. Broadcast Band (Automatic Tuning) 520 - 830 K.C.
10. Broadcast Band (Automatic Tuning) 520 - 830 K.C.

A phono switch and connector are mounted on the rear flange of the chassis and may be used in conjunction with a crystal pickup without a matching transformer. The switch must be in the "radio" position during the alignment procedure.

MODEL R1144 Delco
Socket,Trimmers
Voltage,Chassis

# UNITED MOTORS SERVICE INC.

## TUBE LAYOUT

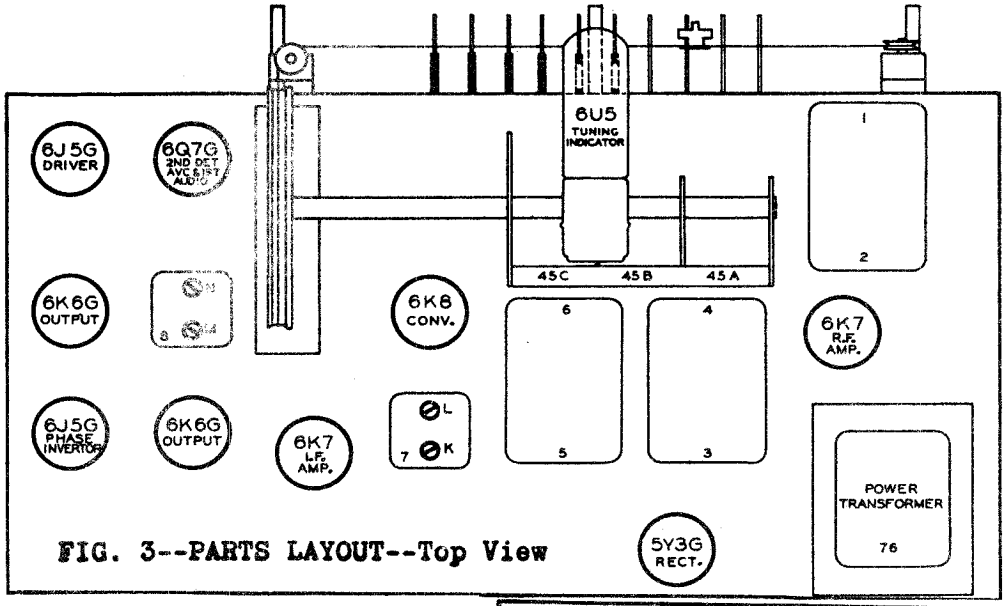
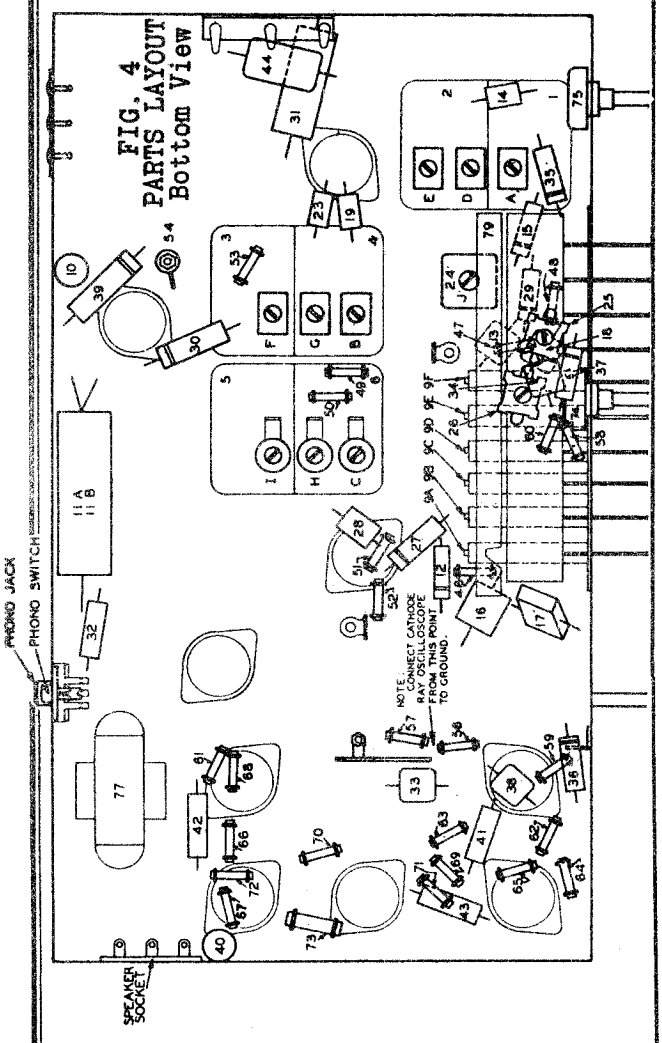



FIG. 3--PARTS LAYOUT--Top View

9-2-38



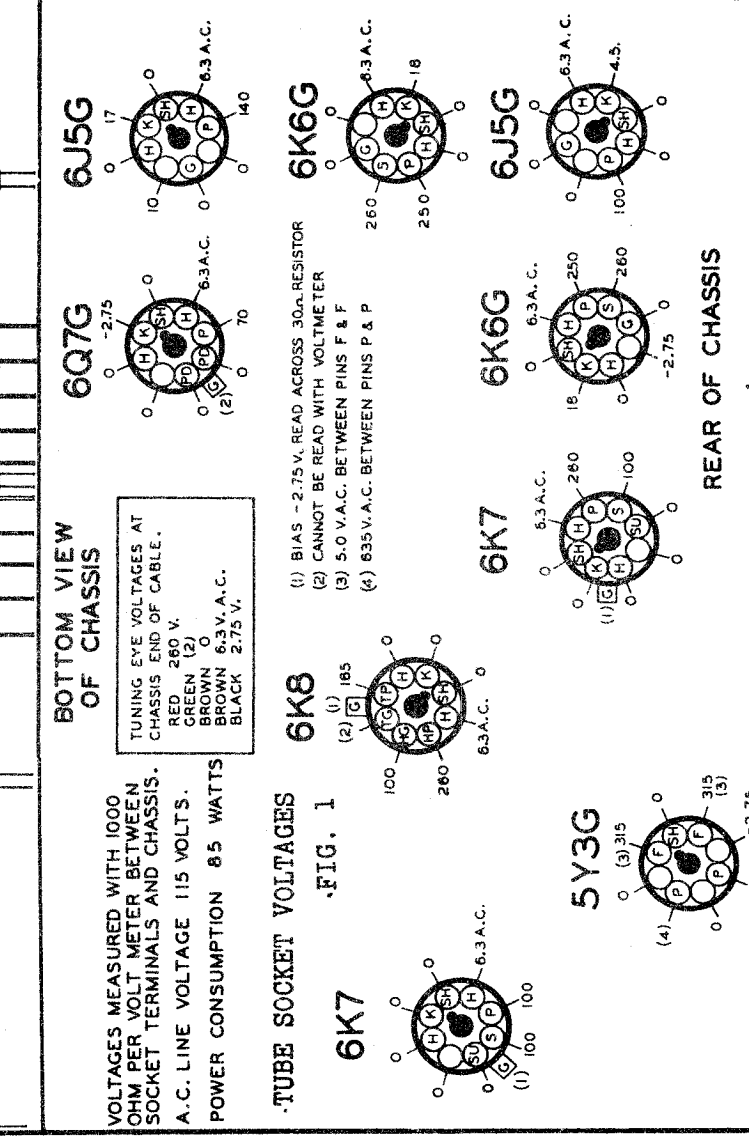

BOTTOM VIEW OF CHASSIS

TUNING EYE VOLTAGES AT CHASSIS END OF CABLE.
RED 260 V.
GREEN (2)
BROWN 0
BROWN 6.3 V. A.C.
BLACK 2.75 V.

(1) BIAS - 2.75 V. READ ACROSS 30Ω RESISTOR
(2) CANNOT BE READ WITH VOLTMETER
(3) 5.0 V.A.C. BETWEEN PINS F & F
(4) 635 V.A.C. BETWEEN PINS P & P

VOLTAGES MEASURED WITH 1000 OHM PER VOLT METER BETWEEN SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 85 WATTS

TUBE SOCKET VOLTAGES
FIG. 1

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# UNITED MOTORS SERVICE, INC.

MODEL R1144 Delco
MODEL R1145 Delco
Alignment

## ALIGNMENT MODEL R1144

1. Aligning I-F Stages at 465 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis frame.

   (b) Connect the signal lead of the signal generator to the grid cap of the 6K8 tube through a .1 mfd. condenser, leaving the grid clip in place.

   (c) Connect the output meter across the plates of the 6K6G tube.

   (d) Press #2 button (Broadcast:Manual), turn the volume control on full and the tone control on treble and turn the variable plates of the condenser gang completely out of mesh and against the high frequency stop.

   (e) Set the signal generator to exactly 465 kilocycles and adjust the trimmers on the second I-F coil (Illus. N&M, Fig. 3) and the first I-F coil (Illus. K&L, Fig. 3) for maximum output. Use as low a signal from the signal generator as will give a readable indication on the output meter.

   (f) After completing the Alignment Procedure, the alignment should be checked with the Model 165 Cathode Ray Oscillograph. Connect the oscillograph from point (Fig. 4) to ground.

2. Aligning at 1690 Kilocycles

   (a) Disconnect the signal lead of the signal generator from the grid of the 6K8 and connect to the antenna terminal of the receiver through a .002 mfd. mica condenser.

   (b) With the controls set as before, adjust the broadcast oscillator trimmer for maximum output (Illus. I, Fig. 4).

3. Aligning at 1400 Kilocycles

   (a) Set the signal generator to approximately 1400 kilocycles.

   (b) Rotate the variable section of the condenser gang until the signal is tuned in with maximum output.

   (c) Adjust the antenna trimmer (Illus. E, Fig. 4) and R-F trimmer (Illus. F, Fig. 4) for maximum output.

4. Aligning at 600 Kilocycles

   (a) Set the signal generator to approximately 600 kilocycles.

   (b) Rotate the variable section of the condenser gang until this signal is tuned in with maximum output.

   (c) Adjust the oscillator series condenser (Illus. J, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained.

5. Aligning at 17. Megacycles

   (a) Remove the .0002 mfd. condenser and connect the signal lead of the signal generator to the antenna trimmer of the receiver through a 400 ohm resistor.

   (b) Press #4 button (Short Wave Band:Manual).

   (c) Set the signal generator to exactly 17. megacycles and rotate the variable section of the condenser gang to indicate 17. megacycles on the test scale.

   (d) Adjust the oscillator trimmer condenser (Illus. C, Fig. 4) for maximum output.

   (e) Adjust the R-F trimmer condenser (Illus. B, Fig. 4) and antenna trimmer (Illus. A, Fig. 4) while rocking the condenser gang back and forth through the signal, until maximum output is obtained.

   (f) Increase the signal output from the signal generator and check for image frequency. If the image does not fall at approximately 1630 megacycles, repeat section 5.

6. Aligning at 5. Megacycles

   (a) Press #3 button (Medium Wave Band:Manual).

   (b) Set the signal generator to exactly 5. megacycles and rotate the variable section of the condenser gang to indicate 5. megacycles on the test scale.

   (c) Adjust the oscillator trimmer condenser (Illus. E, Fig. 4) R-F trimmer (Illus. G, Fig. 4) and antenna trimmer (Illus. D, Fig. 4) for maximum output.

7. Repeat Sections 2, 3 and 4.

## ALIGNMENT MODEL R1145

1. Aligning I-F Stages at 465 Kilocycles

   (a) Connect the ground lead of the signal generator to the chassis frame.

   (b) Connect the signal lead of the signal generator to the grid cap of the 6K8G tube through a .1 mfd. condenser, leaving the grid cap clip in place.

   (c) Connect the output meter from the plate of the 6AC5G tube to B plus.

   (d) Turn the rotor plates of the gang condenser to a point where no whistles or beat notes are heard.

   (e) Set the signal generator to exactly 465 kilocycles.

   (f) Adjust the trimmers on the first I-F coil (Illus. G & H, Fig. 3) and the second I-F coil (Illus. I & J, Fig. 3) for maximum output.

   (g) After completing the alignment procedure, the alignment should be checked with a cathode ray oscillograph. Connect the oscillograph from the high side of the volume control to ground.

2. Aligning at 1750 Kilocycles.

   (a) Remove the signal lead of the signal generator from the grid of the 6K8G and connect to the antenna terminal of the receiver through a .0002 mfd. mica condenser.

   (b) Set the signal generator to exactly 1750 kilocycles.

   (c) Turn the rotor plates of the gang condenser completely out of mesh and against the high frequency stop.

   (d) With the band change switch in the Broadcast position, adjust the oscillator trimmer condenser (Illus. F, Fig. 3) for maximum output.

3. Aligning at 1500 Kilocycles

   (a) Leave the signal generator leads connected as before.

   (b) Set the signal generator to 1500 kilocycles.

   (c) Rotate the variable plates of the gang condenser until this signal is tuned in with maximum output.

   (d) Adjust the antenna trimmer (Illus. A, Fig. 3) for maximum output.

4. Aligning at 600 Kilocycles

   (a) Set the signal generator to 600 kilocycles.

   (b) Rotate the variable plates of the gang condenser until this signal is tuned in with maximum output.

   (c) Adjust the oscillator padder condenser (Illus. C, Fig. 3) while rocking the rotor plates back and forth through the signal until maximum output is obtained.

5. Aligning at 17 Megacycles

   (a) Remove the .0002 mfd. mica condenser coupling the signal generator lead to the antenna terminal of the receiver and replace with a 400 ohm resistor.

   (b) Turn the band change switch to short wave position.

   (c) Set the signal generator to 17 megacycles.

   (d) Turn the rotor plates of the gang condenser until this signal is tuned in with maximum output.

   (e) Adjust the oscillator trimmer (Illus. E, Fig. 3) and the antenna trimmer (Illus. B, Fig. 3) for maximum output.

6. Aligning at 6 Megacycles

   (a) Set the signal generator to 6 megacycles.

   (b) Turn the rotor plates of the gang condenser until this signal is tuned in with maximum output.

   (c) Adjust the oscillator padding condenser (Illus. D, Fig. 3) while rocking the rotor plates back and forth through the signal until maximum output is obtained.

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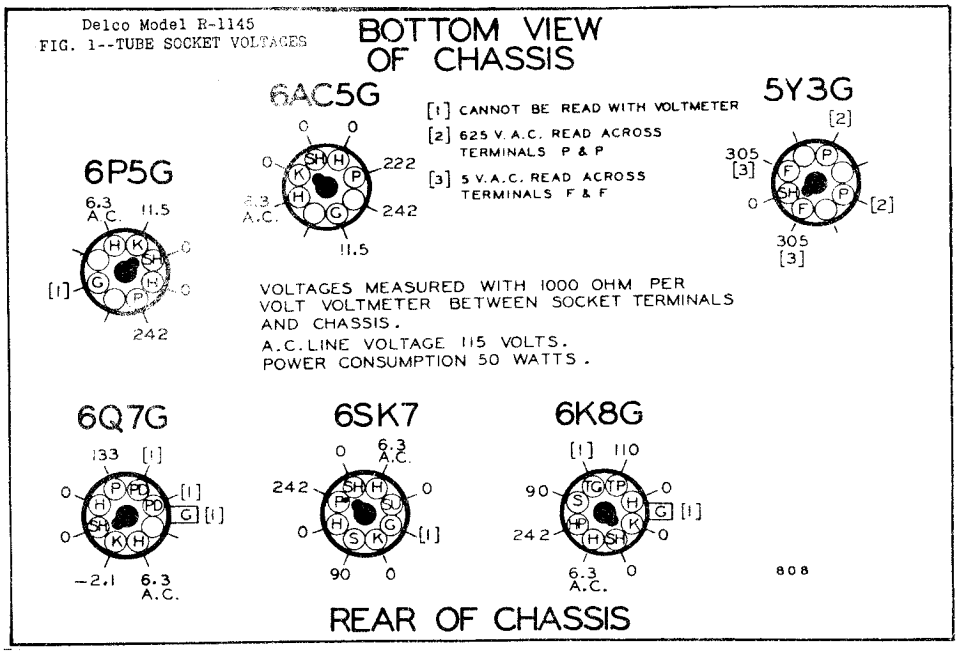
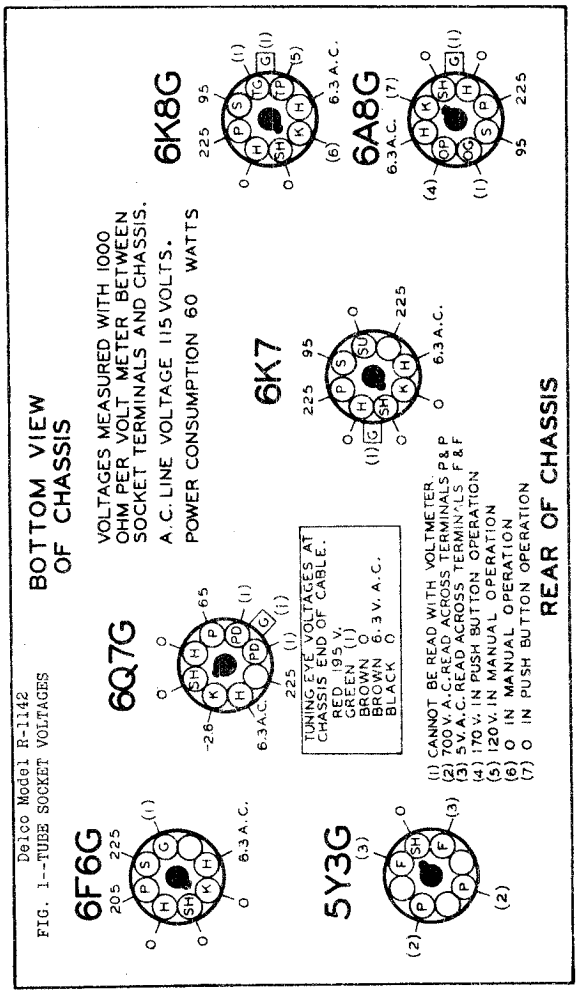
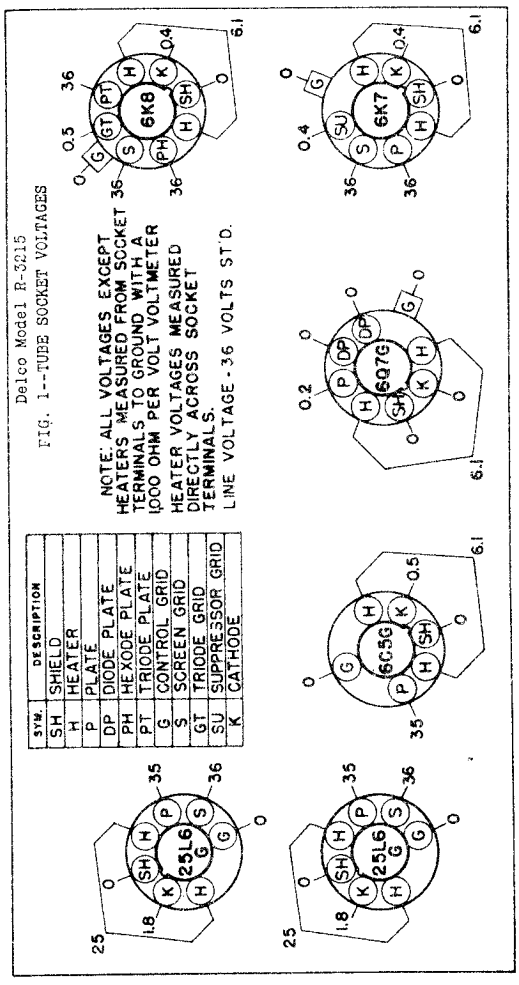
MODEL R1142 Delco
MODEL R1145 Delco
MODEL R3215 Delco
Voltage

# UNITED MOTORS SERVICE INC.


Delco Model R-1145
FIG. 1--TUBE SOCKET VOLTAGES
BOTTOM VIEW OF CHASSIS
6AC5G
6P5G
5Y3G
6Q7G
6SK7
6K8G
[1] CANNOT BE READ WITH VOLTMETER
[2] 625 V. A.C. READ ACROSS TERMINALS P & P
[3] 5 V.A.C. READ ACROSS TERMINALS F & F
VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER BETWEEN SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 50 WATTS.
808
REAR OF CHASSIS


Delco Model R-1142
FIG. 1--TUBE SOCKET VOLTAGES
BOTTOM VIEW OF CHASSIS
VOLTAGES MEASURED WITH 1000 OHM PER VOLT METER BETWEEN SOCKET TERMINALS AND CHASSIS.
A.C. LINE VOLTAGE 115 VOLTS.
POWER CONSUMPTION 60 WATTS
6K8G
6A8G
6K7
6Q7G
6F6G
5Y3G
TUNING EYE VOLTAGES AT CHASSIS END OF CABLE.
RED 195 V.
GREEN (1)
BROWN 0
BROWN 6.3 V. A.C.
BLACK 0
(1) CANNOT BE READ WITH VOLTMETER.
(2) 700 V.A.C. READ ACROSS TERMINALS P&P
(3) 5 V.A.C. READ ACROSS TERMINALS F&F
(4) 170 V. IN PUSH BUTTON OPERATION
(5) 120 V. IN MANUAL OPERATION
(6) 0 IN PUSH BUTTON OPERATION
(7) 0 IN PUSH BUTTON OPERATION
REAR OF CHASSIS

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UNITED MOTORS SERVICE ,INC.

MODEL R1145 Delco
Schematic

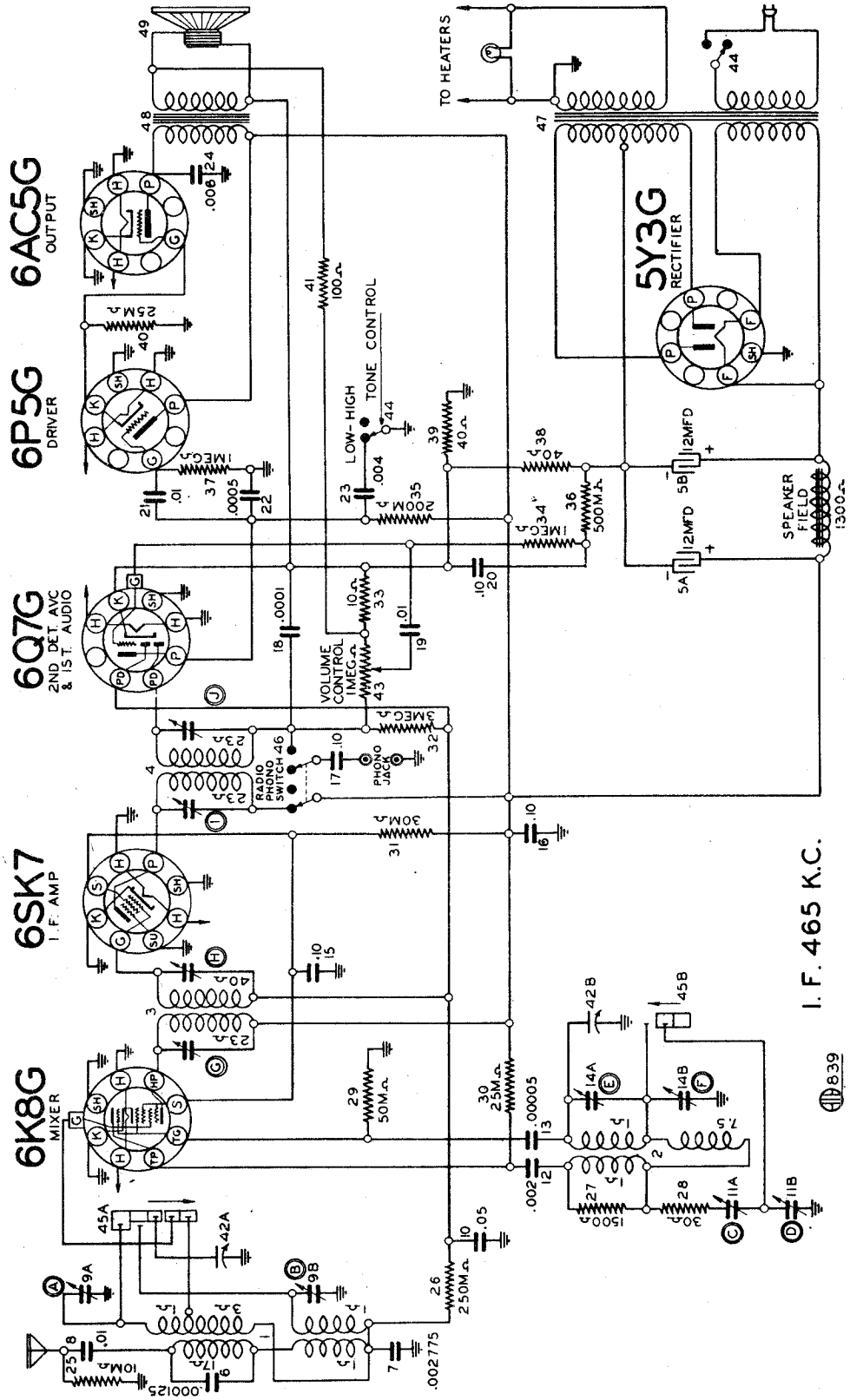


FIG. 2--DELCO MODEL R-1145 CIRCUIT DIAGRAM

Date: 3-24-39

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MODEL R1145 Delco
Socket, Trimmers
Chassis

UNITED MOTORS SERVICE, INC.

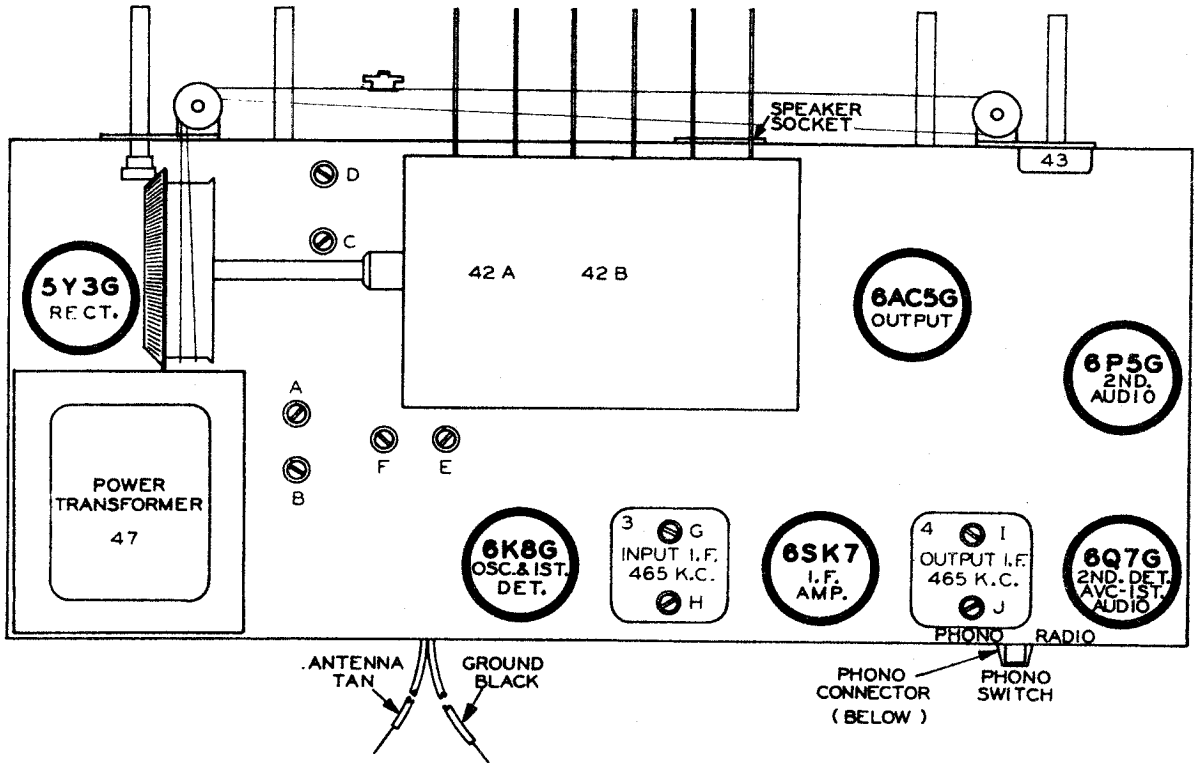


FIG. 3--PARTS LAYOUT--Top View

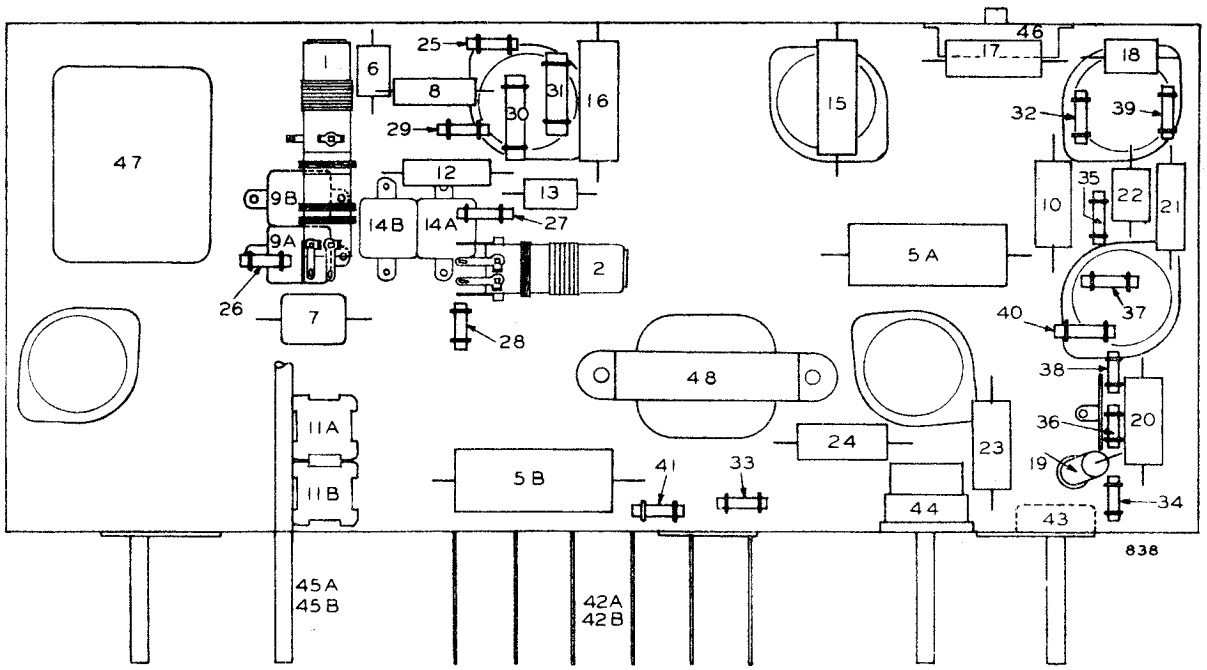


FIG. 4--PARTS LAYOUT--Bottom View

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UNITED MOTORS SERVICE, INC.

MODEL R3215 Delco
Schematic

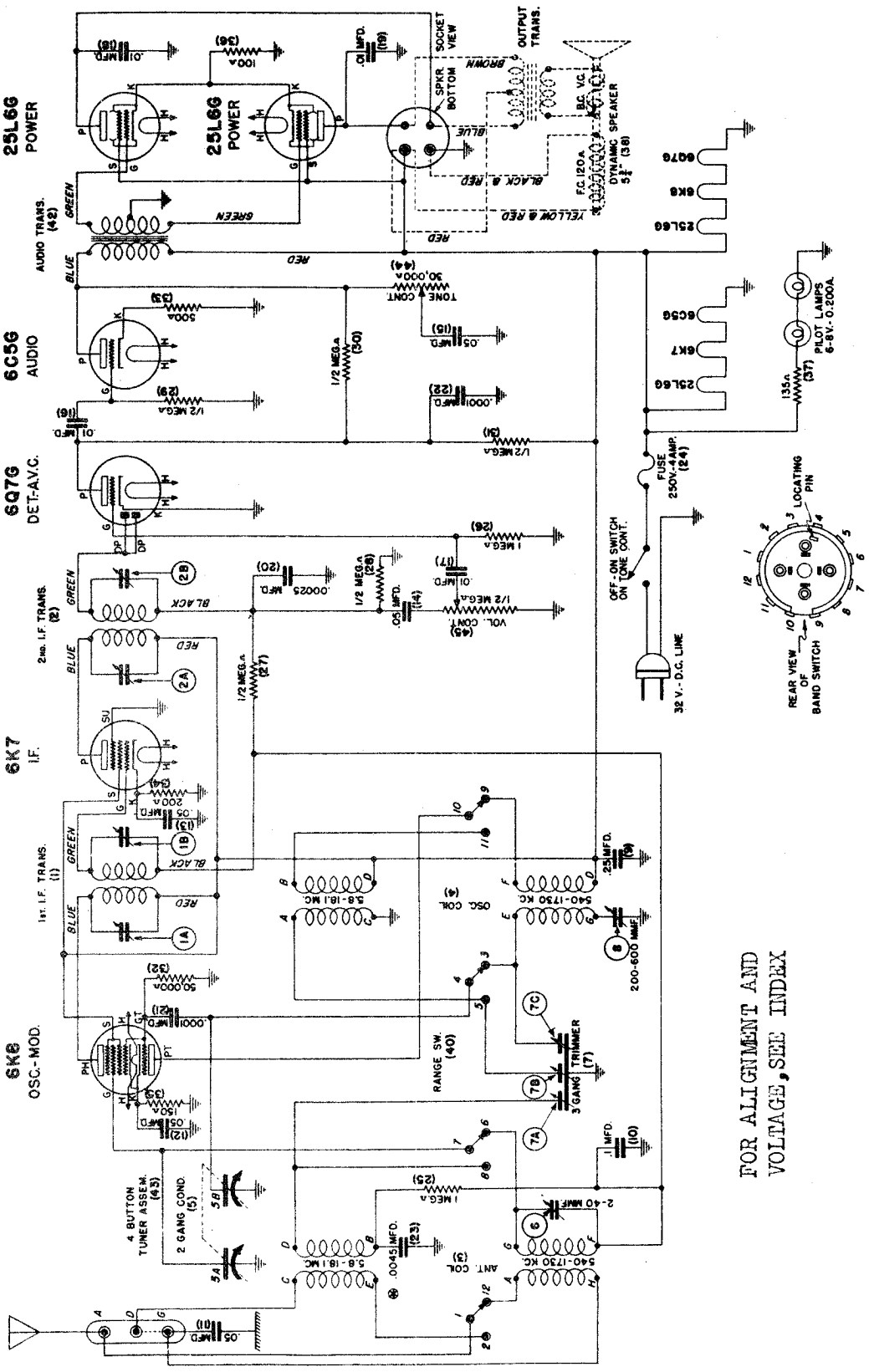


FIG. 2--DELCO MODEL R-3215 CIRCUIT DIAGRAM

FOR ALIGNMENT AND VOLTAGE, SEE INDEX

3-24-39

GENERAL: The Delco Model R-3215 is a six tube, two band, 32 volt radio with A.V.C. and tone control.

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MODEL R3215 Delco
Socket, Trimmers
Chassis

# UNITED MOTORS SERVICE ,INC.

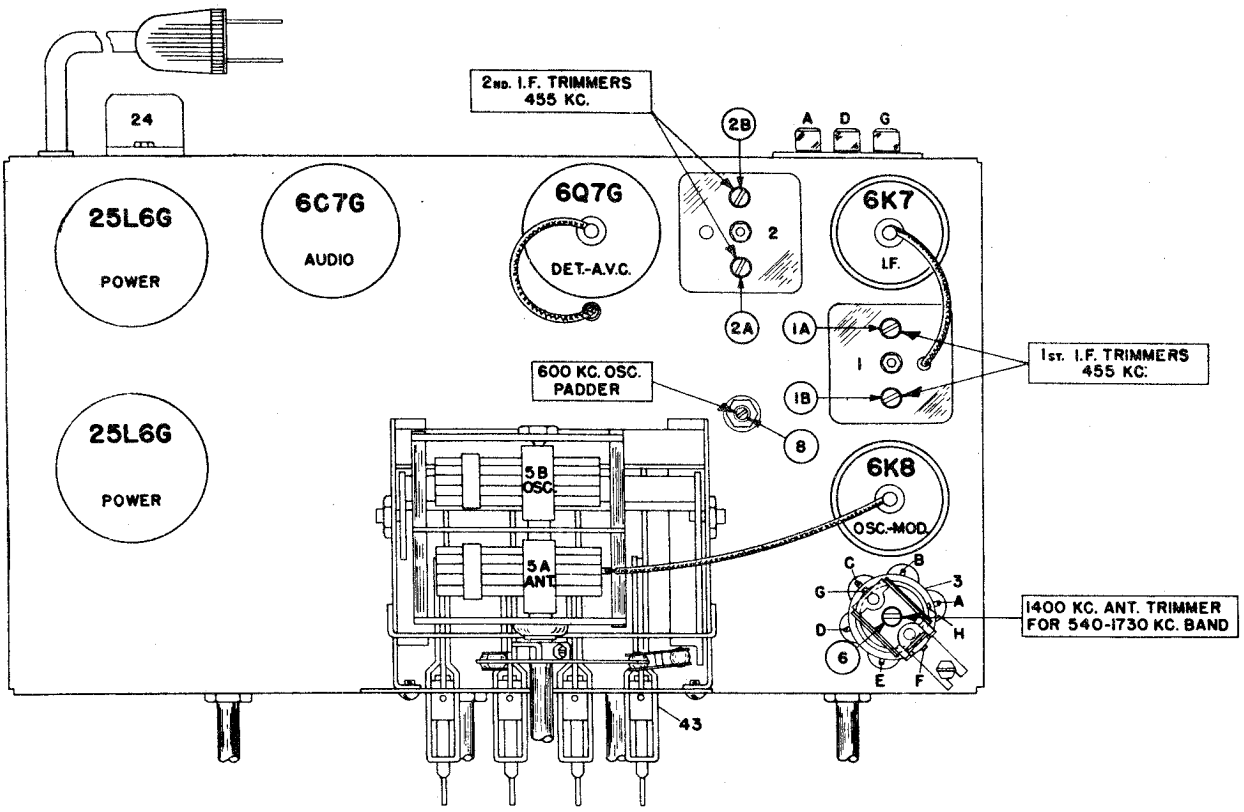
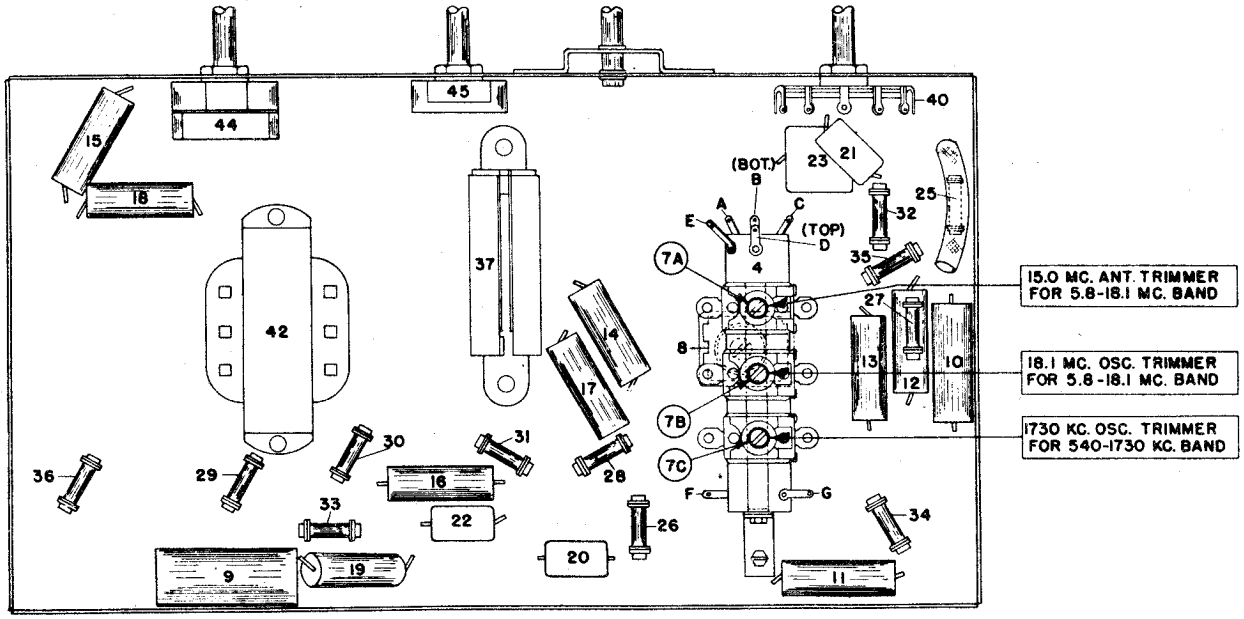



FIG. 3--PARTS LAYOUT--Top View




3-24-39

FIG. 4--PARTS LAYOUT--Bottom View

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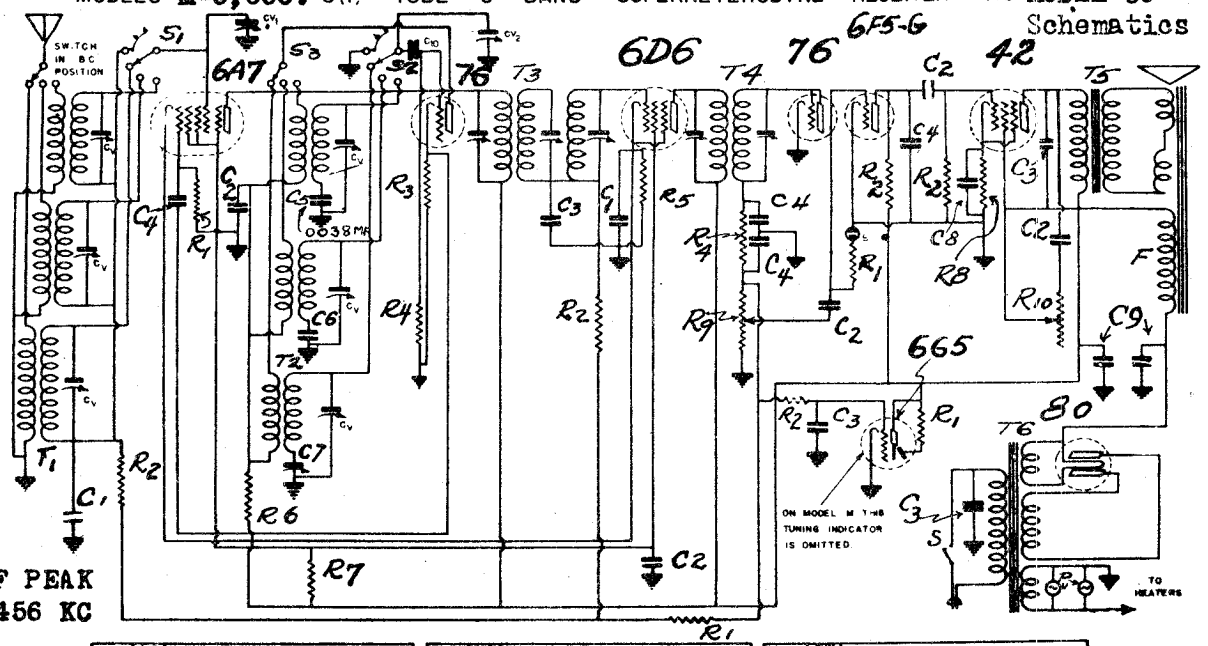
MODELS M-8,800
Chassis M,ME
MODEL 30
Schematics

# WALGREEN CO.

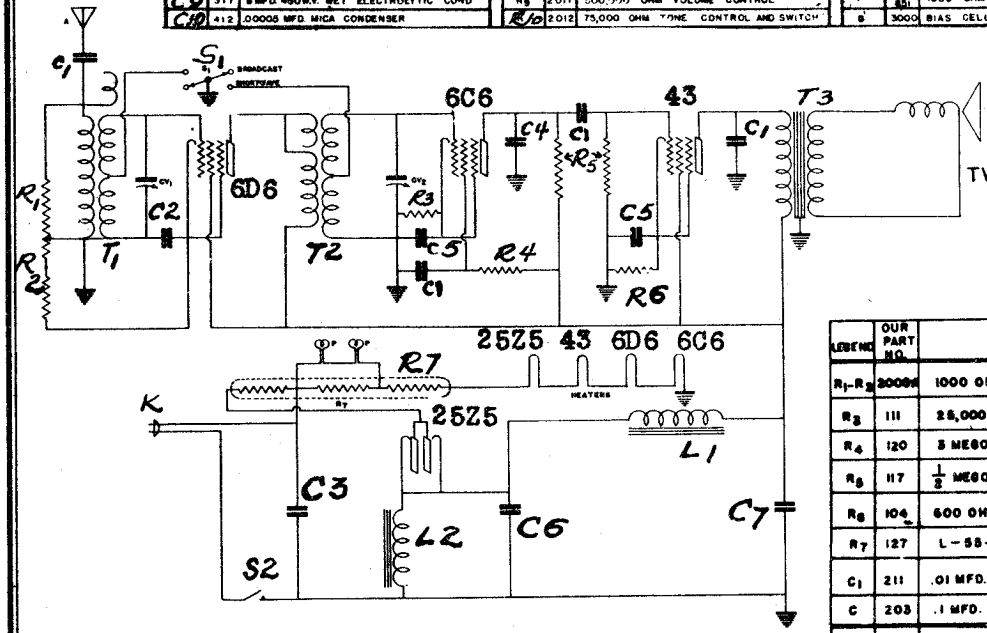
MODELS **M-8,800.** 8(7) TUBE 3 BAND SUPERHETERODYNE RECEIVER - AC




| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $C_1$ | 205 | 1 MFD - 200V TUBULAR CONDENSER |
| $C_2$ | 206 | .05 MFD - 400V TUBULAR CONDENSER |
| $C_3$ | 211 | .1 MFD - 400V TUBULAR CONDENSER |
| $C_4$ | 401 | .00025 MICA CONDENSER |
| $C_5$ | 418 | .0002 MICA CONDENSER |
| $C_6$ | 419 | .0018 MICA CONDENSER |
| $C_7$ | 508 | 5 PLATE PADDING CONDENSER |
| $C_8$ | 509 | 5-30 MFD. TRIMMER CONDENSERS |
| $C_9$ | 365 | .01 MFD. 25 W.V. TUBULAR ELECTROLYTIC COND. |
| $C_{10}$ | 317 | 8 MFD. 450 W.V. WET ELECTROLYTIC COND |
| $C_{11}$ | 412 | .00005 MFD. MICA CONDENSER |

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $C_{V1}$ $C_{V2}$ | 811 | 2 STAGE VARIABLE CONDENSER |
| $R_1$ | 119 | 1 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR |
| $R_2$ | 117 | $\frac{1}{2}$ MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR |
| $R_3$ | 105 | 1,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR |
| $R_4$ | 113 | 50,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR |
| $R_5$ | 103 | 250 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR |
| $R_6$ | 111 | 25,000 OHMS $\frac{1}{4}$ WATT CARBON RESISTOR |
| $R_7$ | 112 | 25,000 OHMS $\frac{1}{2}$ WATT CARBON RESISTOR |
| $R_8$ | 122 | 420 OHMS 2 WATT WIRE WOUND RESISTOR |
| $R_9$ | 2011 | 500,000 OHM VOLUME CONTROL |
| $R_{10}$ | 2012 | 75,000 OHM TONE CONTROL AND SWITCH |

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $T_1$ | 1215 | SHIELDED 3 BAND ANTENNA COIL |
| $T_2$ | 1406 | SHIELDED 3 BAND OSCILLATOR COIL |
| $T_3$ | 1508 | TRIPLE TUNED I.F. TRANSFORMER |
| $T_4$ | 1506 | DIODE I.F. TRANSFORMER |
| $T_5$ | 1510 SPKR | SPKR TRANSFORMER |
| $T_6$ | 1012 | POWER TRANSFORMER |
| $S_1 S_2 S_3$ | 1913 | 2 BAND BAND SWITCH |
| P | 2902 | MAZDA #46 PILOT LIGHT |
| S | — | SWITCH ON TONE CONTROL |
| F | 1511 | 1800 OHM SPEAKER FIELD |
| B | 3000 | BIAS CELL |




MODEL 30

TWO BAND RECEIVERS *AC-DC* TYPE.

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $R_1$-$R_2$ | 2009 | 1000 OHM VOLUME CONTROL (275 OHM MIN.) |
| $R_3$ | 111 | 25,000 OHM $\frac{1}{4}$ WATT CARBON RESISTOR |
| $R_4$ | 120 | 3 MEGOHM $\frac{1}{4}$ WATT CARBON RESISTOR |
| $R_5$ | 117 | $\frac{1}{2}$ MEGOHM $\frac{1}{2}$ WATT CARBON RESISTOR |
| $R_6$ | 104 | 600 OHM $\frac{1}{4}$ WATT CARBON RESISTOR |
| $R_7$ | 127 | L-55-$S_2$ BALLAST TUBE |
| $C_1$ | 211 | .01 MFD. 400 VOLT TUBULAR CONDENSER |
| C | 203 | .1 MFD. 200 VOLT TUBULAR CONDENSER |
| $T_3$ | 804-A | 5" DYNAMIC SPEAKER TRANSFORMER |
| $L_1$ | 1100 | IRON CORE FILTER CHOKE |
| A | 1805 | 20 FEET INDOOR AERIAL |
| P | 2902 | MAZDA #46 POLIT LIGHT |
| $S_1$ | 1902 | BAND SELECTOR SWITCH |
| S | — | LINE SWITCH ON VOLUME CONTROL |
| $CV_1$ $CV_2$ | 601 | TWO GANG VARIABLE CONDENSER |
| K | 1800 | RUBBER COVERED LINE CORD |

| | | |
|---|---|---|
| $C_3$ | 206 | .05 MFD. 400 VOLT TUBULAR CONDENSER |
| $C_4$ | 401 | .00025 MFD. MICA CONDENSER |
| $C_5$ | IN 308 | 10 MFD. 35 VOLT PEAK ELECTROLYTIC CONDENSER |
| $C_6$ | IN 308 | 20MFD. 220 VOLT PEAK ELECTROLYTIC CONDENSER |
| $C_7$ | IN 308 | 10 MFD. 220 VOLT PEAK ELECTROLYTIC CONDENSER |
| $T_1$ | 1205 | TWO BAND ANTENNA TRANSFORMER |
| $T_2$ | 1305 | TWO BAND INTERSTAGE TRANSFORMER |
| $L_2$ | 804 | SPEAKER FIELD (2500 OHM) |

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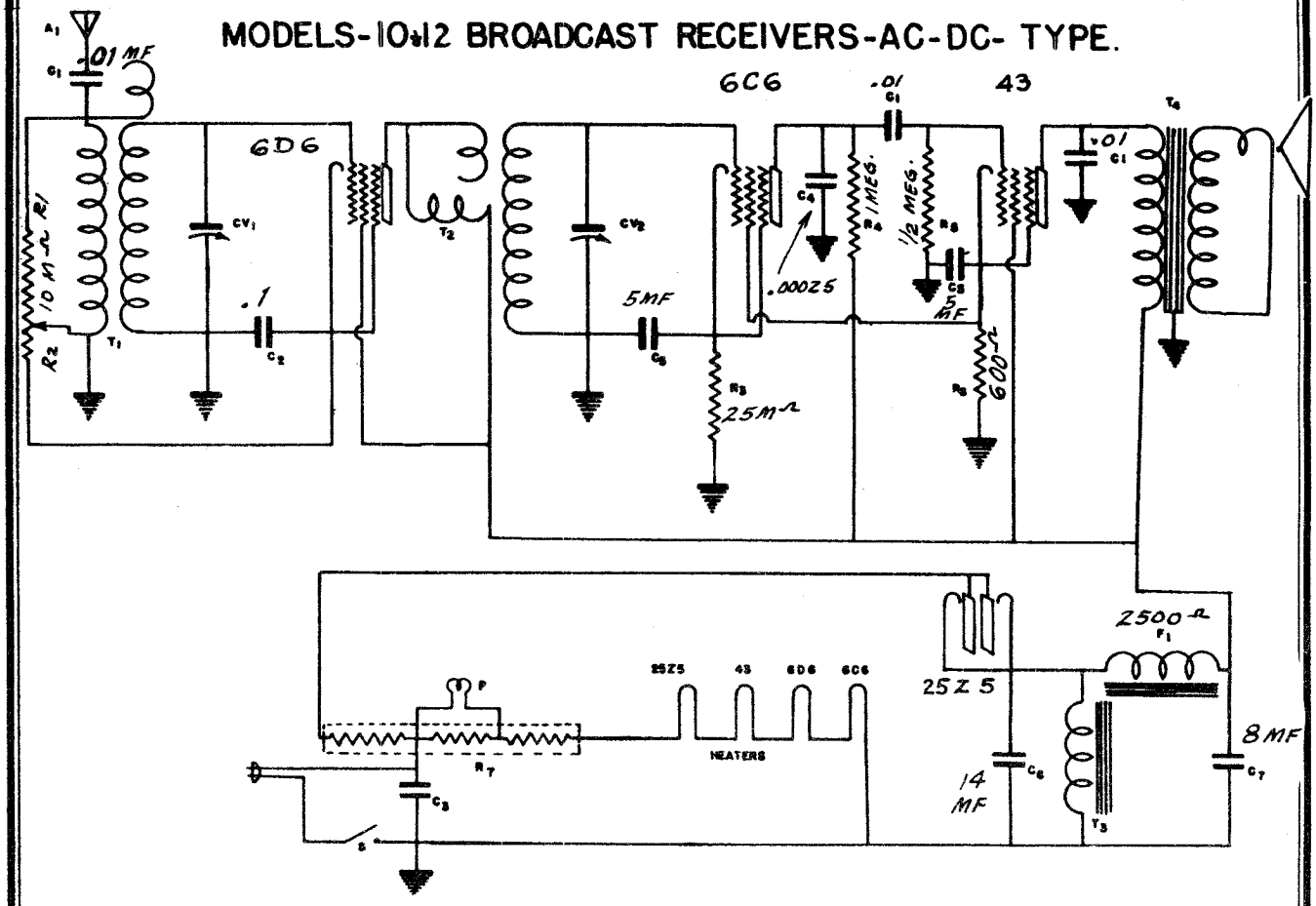
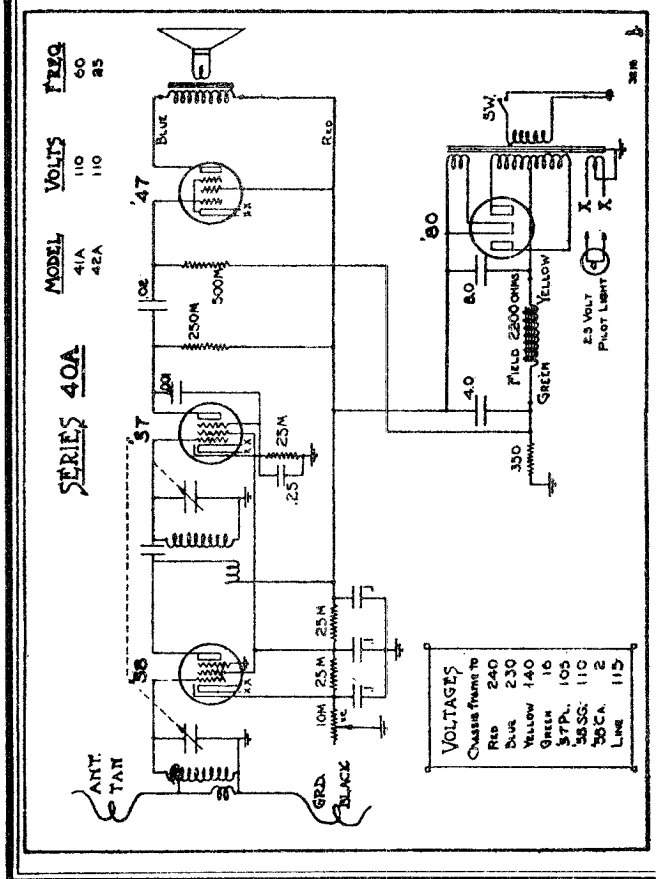
MODELS 10,12
MODELS 41,42

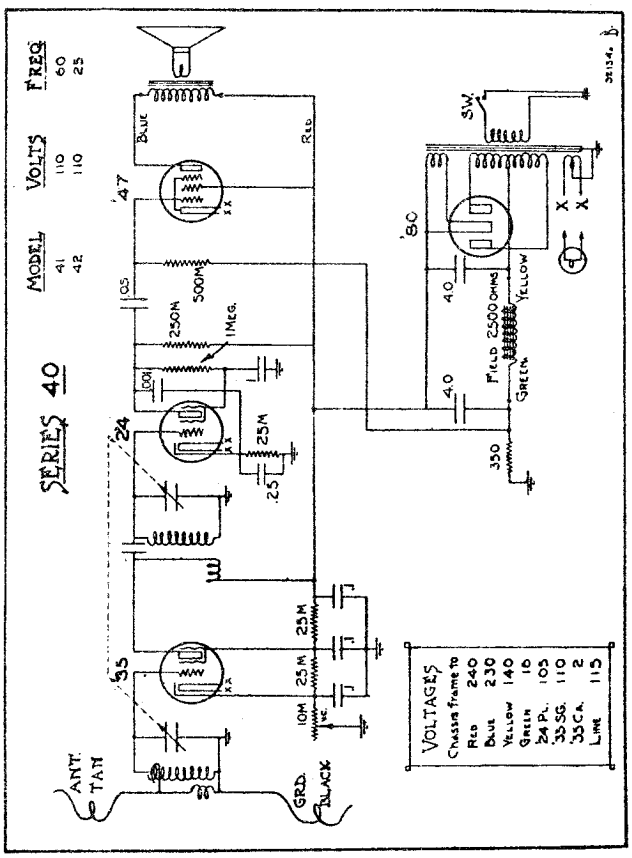
WALGREEN CO.

MODELS 41A,42A
Schematics

# MODELS-10&12 BROADCAST RECEIVERS-AC-DC- TYPE.




DECIMAL ARE MICROFARADS. WHOLE NUMBERS ARE OHMS.

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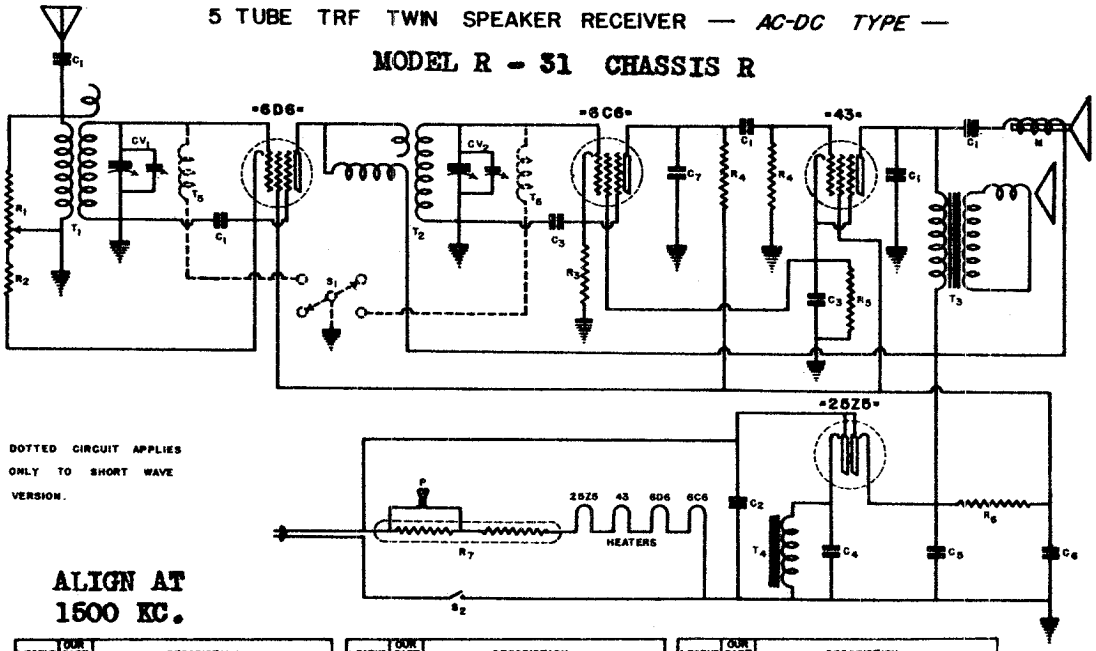
# WALGREEN CO.

MODEL R-31, Chassis R
MODEL 360, Chassis HE
Schematics

## 5 TUBE TRF TWIN SPEAKER RECEIVER — *AC-DC TYPE* —

## MODEL R - 31 CHASSIS R




**ALIGN AT 1500 KC.**

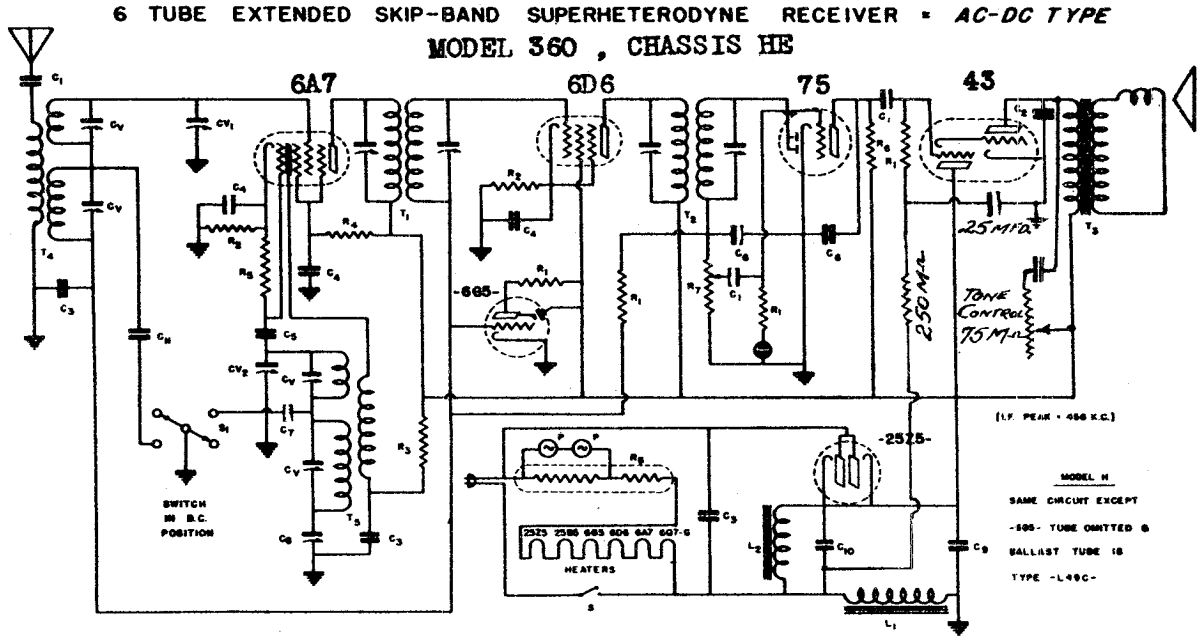
| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $R_1$ | 2008 | 10,000 OHM VOLUME CONTROL |
| $R_2$ | — | 275 OHM (Minimum on Volume Control) |
| $R_3$ | 111 | 25,000 OHM ½ WATT CARBON RESISTOR |
| $R_4$ | 117 | 500,000 OHM ½ WATT CARBON RESISTOR |
| $R_5$ | 104 | 600 OHM ½ WATT CARBON RESISTOR |
| $R_6$ | 108 | 5000 OHM ½ WATT CARBON RESISTOR |
| $R_7$ | 2903 | L-58-B BALLAST TUBE |
| P | 2902 | MAZDA # 46 PILOT LIGHT |

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $CV_1$ $CV_2$ | 610 | 2 GANG VARIABLE CONDENSER |
| $C_1$ | 211 | .01 MFD. 400V. TUBULAR CONDENSER |
| $C_2$ | 210 | .1 MFD. 400V. TUBULAR CONDENSER |
| $C_3$ | IN 316 | 5MFD. 25W.V. ELECTROLYTIC CONDENSER |
| $C_4$ | IN 316 | 44MFD. 150W.V. ELECTROLYTIC CONDENSER |
| $C_5$ | IN 316 | 14MFD. 150W.V. ELECTROLYTIC CONDENSER |
| $C_6$ | IN 316 | 8MFD. 150W.V. ELECTROLYTIC CONDENSER |
| $C_7$ | 401 | .00025 MFD. MICA CONDENSER |
| M | 900 | MAGNETIC SPEAKER |

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $S_1$ | 1914 | BAND SELECTOR SWITCH |
| $S_2$ | — | LINE SWITCH ON VOLUME CONTROL |
| $T_1$ | 1200 | ANTENNA COIL |
| $T_2$ | 1300 | RF COIL |
| $T_3$ | IN 810 | SPEAKER OUTPUT TRANSFORMER |
| $T_4$ | IN 810 | 2500 OHM SPEAKER FIELD |
| $T_5$ | 1612 | SHORT WAVE ANTENNA SHUNT |
| $T_6$ | 1612 | SHORT WAVE RF SHUNT |

## 6 TUBE EXTENDED SKIP-BAND SUPERHETERODYNE RECEIVER - *AC-DC TYPE*

## MODEL 360 , CHASSIS HE




| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $C_1$ | 211 | .01 MFD-400V TUBULAR CONDENSER |
| $C_2$ | 206 | .05 MFD-400V TUBULAR CONDENSER |
| $C_3$ | 210 | .1 MFD-400V TUBULAR CONDENSER |
| $C_4$ | 203 | .1 MFD-200V TUBULAR CONDENSER |
| $C_5$ | 400 | .0001 MICA CONDENSER |
| $C_6$ | 401 | .00025 MICA CONDENSER |
| $C_7$ | 411 | .00128 MICA CONDENSER |
| $C_8$ | 507 | 5 PLATE PADDING CONDENSER |
| $C_9$ | 314 | 10 MFD 150 W.V. ELECTROLYTIC COND. |
| $C_{10}$ | 311 | 20 MFD 150 W.V. ELECTROLYTIC COND. |

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $CV_1$ $CV_2$ | 612 | 2 GANG VARIABLE CONDENSER |
| $R_1$ | 119 | 1 MEGOHM ½ WATT CARBON RESISTOR |
| $R_2$ | 103 | 250 OHMS ½ WATT CARBON RESISTOR |
| $R_3$ | 109 | 10,000 OHMS ½ WATT CARBON RESISTOR |
| $R_4$ | 111 | 25,000 OHMS ½ WATT CARBON RESISTOR |
| $R_5$ | 113 | 50,000 OHMS ½ WATT CARBON RESISTOR |
| $R_6$ | 116 | 250,000 OHMS ½ WATT CARBON RESISTOR |
| $R_7$ | 2009 | 50,000 OHMS VOLUME CONTROL & SWITCH |
| $R_8$ | 2905 | L-49-C BALLAST TUBE (MODEL H) |
| $R_8$ | 2906 | L-42-C BALLAST TUBE (MODEL HE) |
| C | 212 | .05 MFD - 200 V TUBULAR CONDENSER |

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $T_1$ | 1503 | 1st I.F. TRANSFORMER |
| $T_2$ | 1506 | DIODE I.F. TRANSFORMER (2500 OHMS) |
| $T_3$ | IN 805 | SPEAKER OUTPUT TRANSFORMER |
| $T_4$ | 1210 | ANTENNA COIL |
| $T_5$ | 1404 | OSCILLATOR COIL |
| $L_1$ | 1101 | CHOKE |
| $L_2$ | IN 805 | SPEAKER FIELD (2500 OHMS) |
| $S_1$ | 1914 | BAND SELECTOR SWITCH |
| S | — | SWITCH ON TONE CONTROL |
| P | 2902 | MAZDA #46 PILOT LIGHT |

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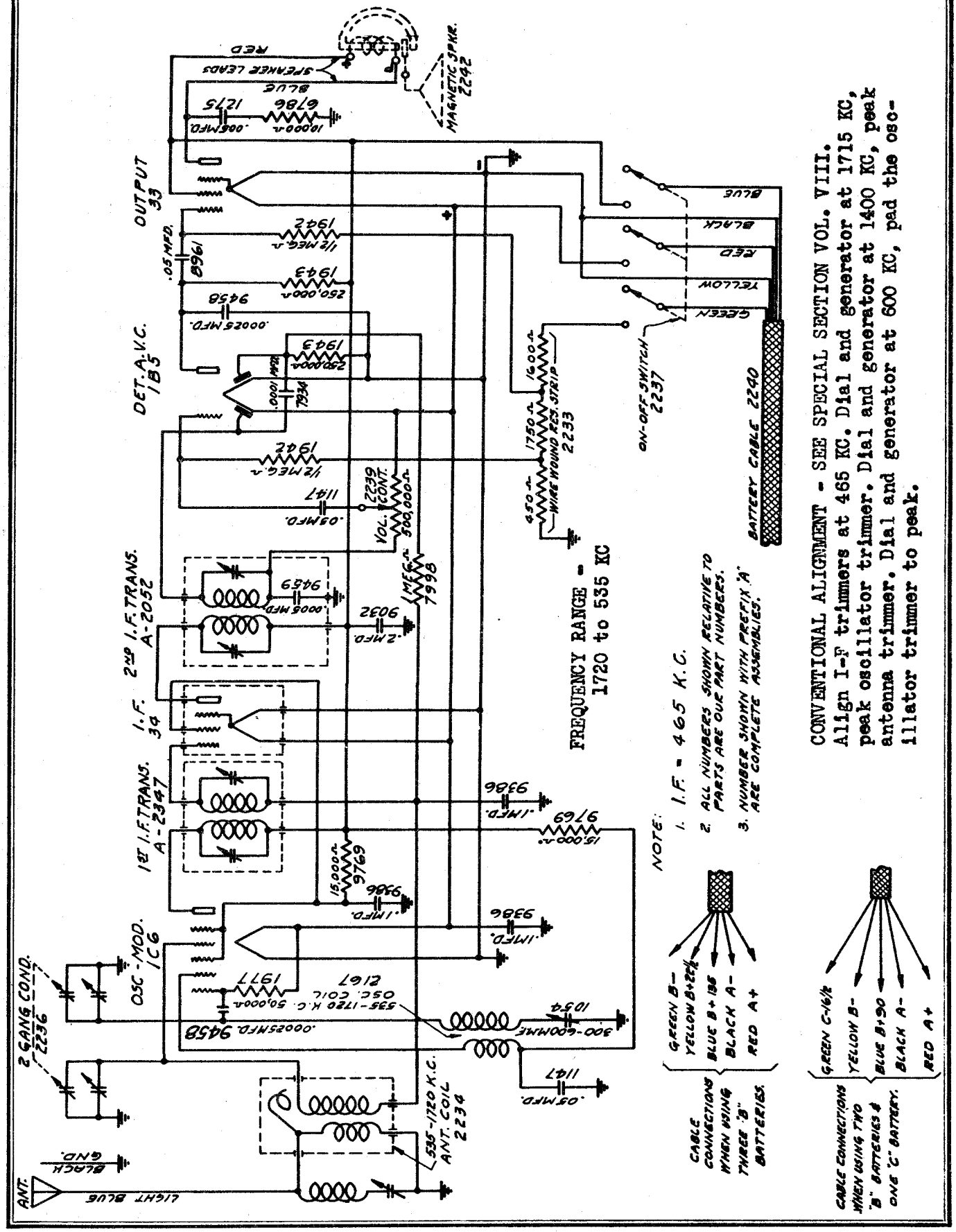
MODEL 32B
Schematic
Alignment

# WALGREEN CO.


CONVENTIONAL ALIGNMENT - SEE SPECIAL SECTION VOL. VIII.
Align I-F trimmers at 465 KC. Dial and generator at 1715 KC, peak osciliator trimmer. Dial and generator at 1400 KC, peak antenna trimmer. Dial and generator at 600 KC, pad the oscillator trimmer to peak.
FREQUENCY RANGE - 1720 to 535 KC
NOTE:
1. I.F. - 465 K.C.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBER SHOWN WITH PREFIX 'A' ARE COMPLETE ASSEMBLIES.
OUTPUT 33
DET. A.V.C. 185
2ND I.F. TRANS. A-2052
I.F. 34
1ST I.F. TRANS. A-2347
OSC.-MOD. 1C6
2 GANG COND. 2236
ANT.
GND.
LIGHT BLUE
BLACK
535-1720 K.C. ANT. COIL 2234
535-1720 K.C. OSC. COIL 2167
300-600 MMF. 1054
VOL. CONT. 2239
ON-OFF SWITCH 2237
BATTERY CABLE 2240
MAGNETIC SPKR. 2242
SPEAKER LEADS
RED
BLUE
BLACK
YELLOW
GREEN
CABLE CONNECTIONS WHEN USING THREE "B" BATTERIES
GREEN B-
YELLOW B+22½
BLUE B+135
BLACK A-
RED A+
CABLE CONNECTIONS WHEN USING TWO "B" BATTERIES & ONE "C" BATTERY.
GREEN C-4½
YELLOW B-
BLUE B+90
BLACK A-
RED A+

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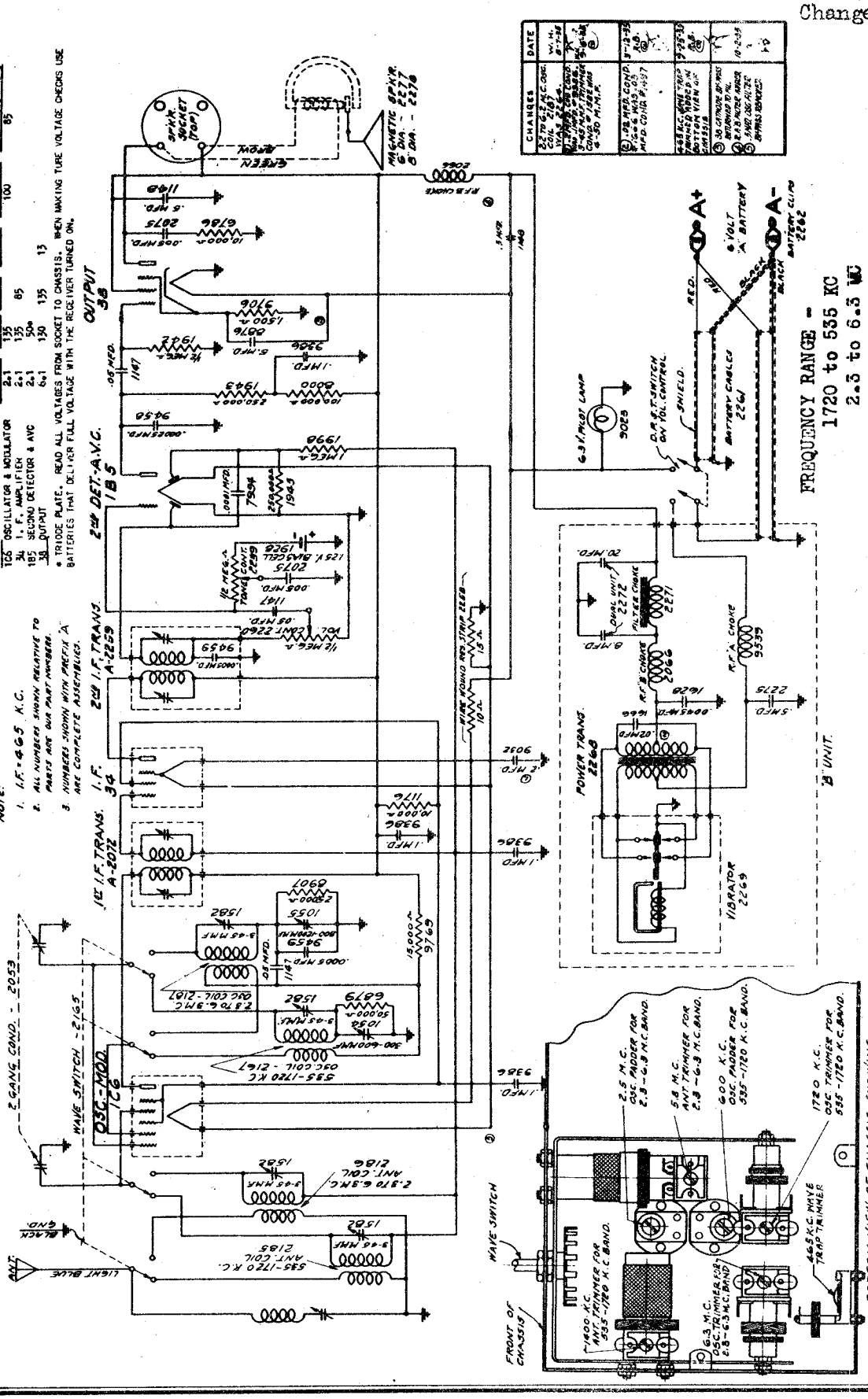
# WALGREEN CO.

## MODEL 34B
## Schematic, Voltage Alignment, Trimmers Changes


FREQUENCY RANGE -
1720 to 535 KC
2.3 to 6.3 MC
OSC.-MOD. 126
2 GANG COND. - 2053
WAVE SWITCH - 2165
OUTPUT 38
2nd DET.-A.V.C. 185
2nd I.F. TRANS. A-2229
1st I.F. TRANS. A-2232
I.F. 34
POWER TRANS. 2268
VIBRATOR 2269
FILTER CHOKE 2271
R.F. CHOKE 2266
R.F. CHOKE 2265
R.F. CHOKE 9539
BATTERY CABLE 2261
BATTERY CLIP 2262
6.3V PILOT LAMP 9025
D.P.S.T. SWITCH ON VOL. CONTROL
SHIELD
A+
A-
6 VOLT 'A' BATTERY
RED
BLACK
BLACK
2 UNIT
MAGNETIC SPKR. 6 DIA. - 2277 8 DIA. - 2278
SPKR. SOCKET (TOP)
GREEN
BROWN
ANT.
LIGHT BLUE
BLACK
GND.
WAVE SWITCH
FRONT OF CHASSIS
BOTTOM VIEW OF CHASSIS SHOWING LOCATION OF TRIMMERS & PADDERS.
1400 K.C. ANT. TRIMMER FOR 535-1720 K.C. BAND.
2.5 M.C. OSC. PADDER FOR 2.5-6.3 M.C. BAND.
5.8 M.C. ANT. TRIMMER FOR 2.3-6.3 M.C. BAND.
600 K.C. OSC. PADDER FOR 535-1720 K.C. BAND.
1720 K.C. OSC. TRIMMER FOR 535-1720 K.C. BAND.
6.3 M.C. OSC. TRIMMER FOR 2.8-6.3 M.C. BAND.
465 K.C. I.F. TRAP TRIMMER
2.370-6.3 M.C. OSC. COIL - 2167
535-1720 K.C. OSC. COIL - 2167
2.370-6.3 M.C. ANT. COIL 2186
535-1720 K.C. ANT. COIL 2185
3-465 MMF
300-600 MMF
3-105 MMF
NOTE:
1. I.F. = 465 K.C.
2. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
3. NUMBERS SHOWN WITH PREFIX 'A' ARE COMPLETE ASSEMBLIES.
TUBE
126 OSCILLATOR & MODULATOR
34 I. F. AMPLIFIER
185 SECOND DETECTOR & AVC
38 OUTPUT
FILAMENT 2.1 2.1 2.1 6.3
PLATE 155 155 50* 150
SCREEN 85 85 135
CATHODE 13
GRID NO. 2 100
GRID NO. 3 AND 5 85
* TRIODE PLATE. READ ALL VOLTAGES FROM SOCKET TO CHASSIS. WHEN MAKING TUBE VOLTAGE CHECKS USE BATTERIES THAT DELIVER FULL VOLTAGE WITH THE RECEIVER TURNED ON.
CHANGES
DATE
2.5 TO 6.3 M.C. OSC. COIL 2167 WAS 2166
1-13-38
3-25-38
3-29-38
10-2-38

ALIGNMENT - Peak IF trimmers at 465 KC. BROADCAST BAND - Dial and generator to 1720 KC, adjust oscillator trimmer to peak, dial and generator to 1400 KC, then adjust antenna trimmer to peak. Dial and generator to 600 KC, pad oscillator circuit to maximum peak. SHORTWAVE BAND - Dial and generator to 6.3 MC, peak oscillator trimmer. Dial and generator to 5.8 MC, adjust antenna trimmer to peak. Dial and generator to 2.5 MC, pad oscillator circuit to peak. Rock variable condenser during padding adjustments. Repeat adjustments for maximum response. Peak wave trap at 465 KC.

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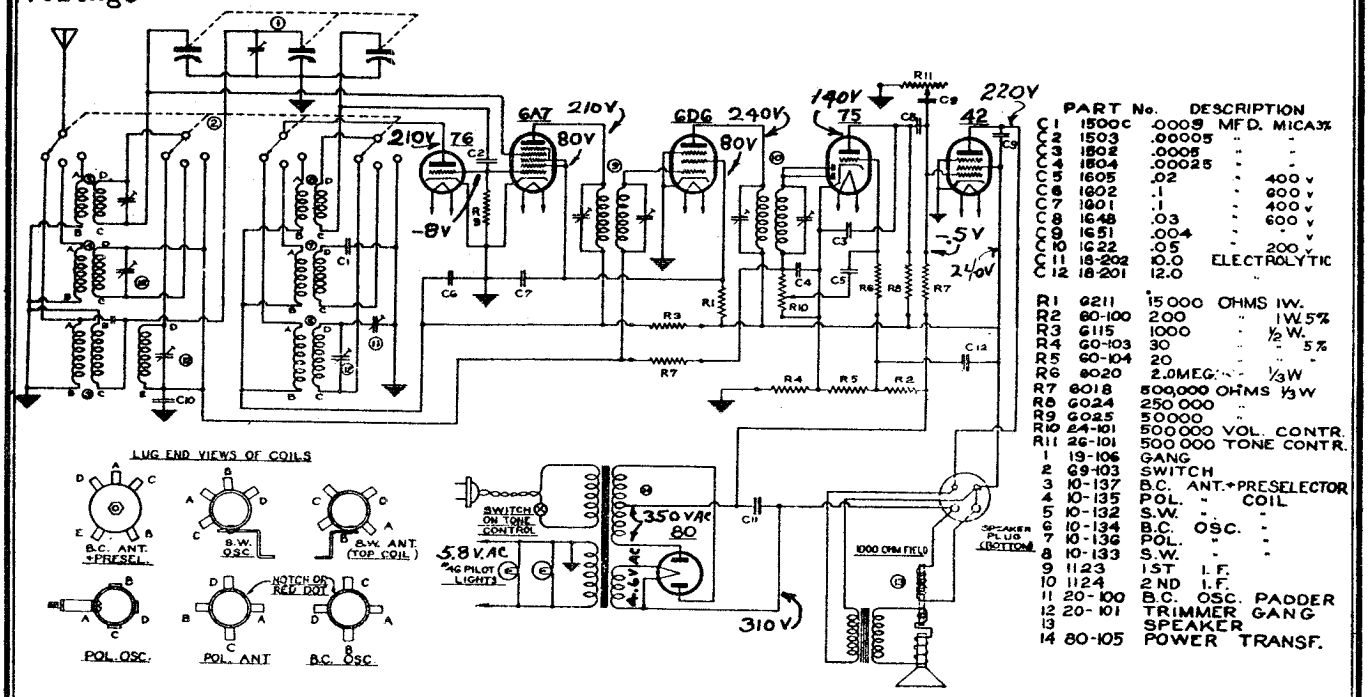
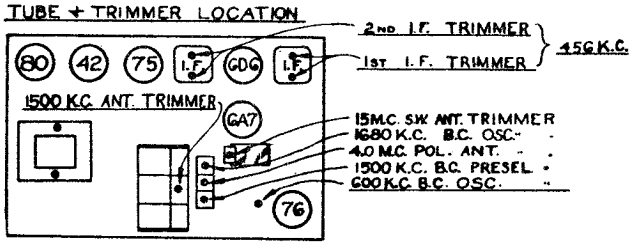
MODEL 166RIS
Schematic, Socket
Trimmers, Alignment
Voltage

# WALGREEN CO.




| | PART No. | DESCRIPTION |
|---|---|---|
| C1 | 1500c | .0009 MFD. MICA 3% |
| C2 | 1503 | .00005 " " " |
| C3 | 1502 | .0006 " " " |
| C4 | 1504 | .00025 " " " |
| C5 | 1605 | .02 " " 400 V |
| C6 | 1602 | " " 600 V |
| C7 | 1601 | " " 400 V |
| C8 | 1648 | .03 " " 600 V |
| C9 | 1651 | .0004 " " " |
| C10 | 1622 | .05 " " 200 V |
| C11 | 18-202 | 10.0 ELECTROLYTIC |
| C12 | 18-201 | 12.0 " |
| R1 | 6211 | 15 000 OHMS 1W. |
| R2 | 60-100 | 200 " 1W. 5% |
| R3 | 6115 | 1000 " ½W. |
| R4 | 60-103 | 30 " 5% |
| R5 | 60-104 | 20 " " |
| R6 | 6020 | 2.0 MEG. " ⅓W |
| R7 | 6018 | 500,000 OHMS ⅓W |
| R8 | 6024 | 250 000 " " |
| R9 | 6025 | 500000 " " |
| R10 | 24-101 | 500 000 VOL. CONTR. |
| R11 | 26-101 | 500 000 TONE CONTR. |
| - | 19-106 | GANG |
| 2 | 69-103 | SWITCH |
| 3 | 10-137 | B.C. ANT.+PRESELECTOR COIL |
| 4 | 10-135 | POL. " |
| 5 | 10-132 | S.W. " |
| 6 | 10-134 | B.C. OSC. " |
| 7 | 10-136 | POL. " |
| 8 | 10-133 | S.W. " |
| 9 | 1123 | 1ST I.F. " |
| 10 | 1124 | 2ND I.F. " |
| 11 | 20-100 | B.C. OSC. PADDER |
| 12 | 20-101 | TRIMMER GANG |
| 13 | | SPEAKER |
| 14 | 80-105 | POWER TRANSF. |




## IF PEAK 456 KC

## MODEL NO. 166 RIS

## DESCRIPTION

This receiver is a 7 tube alternating current operated superheterodyne. The tubes used are a 76 as oscillator, a 6A7 as modulator, a 6D6 as I.F. amplifier, a 75 as A.V.C. and audio rectifier and audio voltage amplifier, a 42 as power audio amplifier, an 80 as a power rectifier and a 6G5 as tuning indicator.

This receiver is made to cover 3 tuning bands, the broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and the high frequency or foreign band which is from 20 M.C. to 5.4 M.C.

## ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer and the 1500 K.C. broadcast preselector trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output *while tuning the receiver back and forth across the signal* from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding 4.0 M.C. signal to the receiver antenna lead through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

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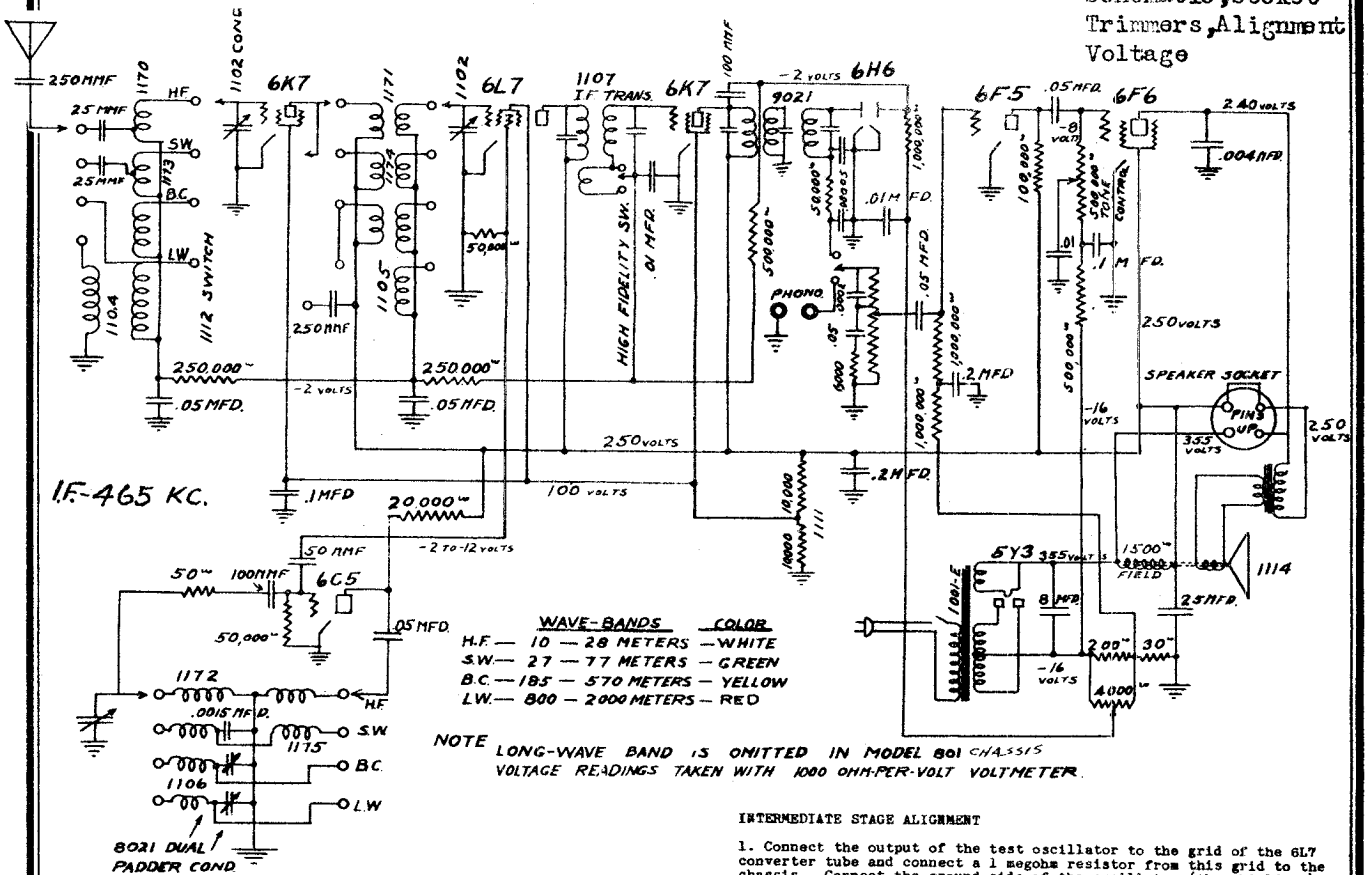
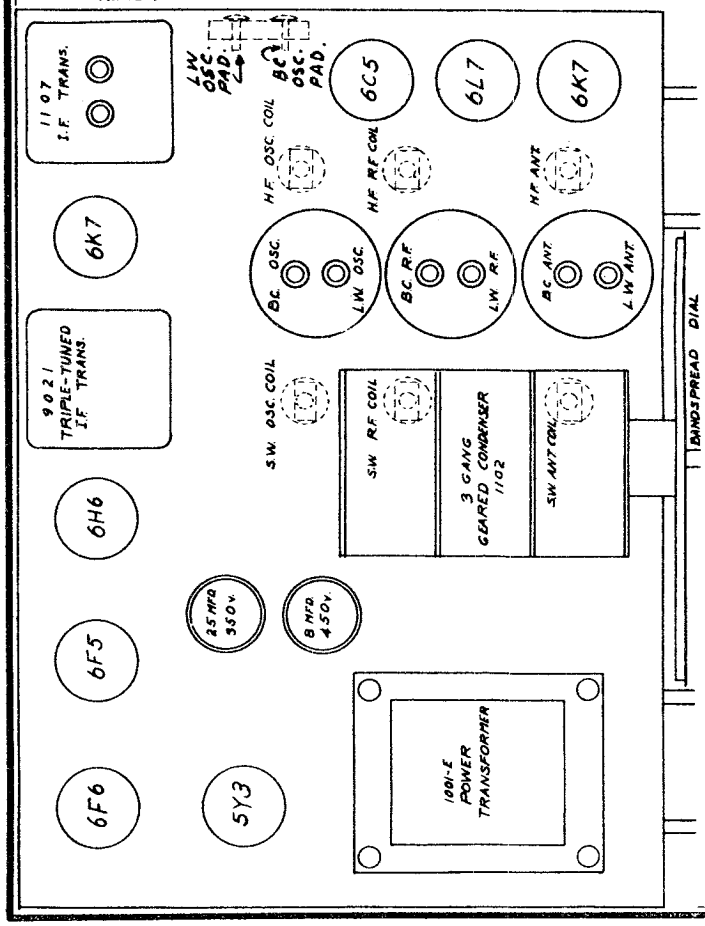
# WALGREEN CO.

MODEL 308
Chassis 801,802
Schematic, Socket
Trimmers, Alignment
Voltage




| WAVE-BANDS | | COLOR |
|---|---|---|
| H.F. — | 10 — 28 METERS | — WHITE |
| S.W. — | 27 — 77 METERS | — GREEN |
| B.C. — | 185 — 570 METERS | — YELLOW |
| L.W. — | 800 — 2000 METERS | — RED |

NOTE LONG-WAVE BAND IS OMITTED IN MODEL 801 CHASSIS
VOLTAGE READINGS TAKEN WITH 1000 OHM-PER-VOLT VOLTMETER.




INTERMEDIATE STAGE ALIGNMENT

1. Connect the output of the test oscillator to the grid of the 6L7 converter tube and connect a 1 megohm resistor from this grid to the chassis. Connect the ground side of the oscillator (the shielding) to the receiver chassis.

2. Set the test oscillator to 465 K.C. Refer to Curve B on the Calibration chart to obtain the proper setting of the test oscillator.

3. Set the tone control to the left. Align the output intermediate frequency transformer by turning the top screw at the rear of the output I.F. transformer until maximum response is obtained on the output meter. Adjust the other trimmer screws in the same manner.

4. Adjust the input intermediate frequecy transformer in the same manner.

ALIGNMENT OF TUNING CIRCUITS

5. Connect the output of the test oscillator to the antenna lead of the receiver through a .00025 M.F.D. condenser and connect the ground side (shielding) to the chassis.

6. Set the wave change switch to the long-wave position (Red). Set the dial and test oscillator to 900 meters. Adjust the long-wave oscillator trimmer until the signal is brought in. If no signal is heard, then adjust the long-wave padder. See diagram of chassis for location of trimmer and padder condensers.

7. Then adjust the long-wave antenna and R.F. trimmers for maximum response. Set the dial and test oscillator to 1800 meters and adjust the long-wave padder for maximum response while rocking the gang condenser. By rocking the gang is meant tuning to a point just above and just below the test oscillator frequency while making some other adjustment. Return to 900 meters and repeat the entire procedure.

8. Set the wave change switch to the broadcast position (Yellow). Set the dial and test oscillator to 214 meters (1400 K.C.) and adjust the B.C. oscillator, R.F. and antenna trimmers till maximum response is obtained. Set the dial and test oscillator to 600 K.C. and adjust the B.C. padder condenser while rocking the gang till maximum response is obtained.

9. Set the wave change switch to the high frequency band (Short-wave Green). Substitute a 400 ohm resistor for the .00025 M.F.D. condenser in the antenna circuit. Set the dial and test oscillator to 30 meters (10 megacycles). Stand the receiver on end and adjust the 30 meter oscillator coil (located to the right of switch when viewed from bottom) till the signal is brought in. Stop at the first peak. Screwing the trimmer down still more will give another peak which is the image and must not be used. To make certain the set is not tuned to the image, set the test oscillator to 11 megacycles and if another signal is received, then the set is correctly tuned. Reset the test oscillator to 30 meters and adjust the R.F. and antenna trimmers for maximum response, while rocking the gang. Set the dial and test oscillator to 75 meters and check for sensitivity.

10. Set the wave-change switch to the ultra-high frequency band (White). Set the test oscillator and dial to 11 meters (27.3 megacycles). Adjust the oscillator trimmer till the signal is brought in. Continue on through to the second peak. The image signal will now be found at 26.3 megacycles if the oscillator trimmer adjustment is correct. Reset the dial to 11 meters and adjust the R.F. and antenna trimmers for maximum response while rocking the gang.

Set the dial and test oscillator to 26 meters and check for sensitivity.

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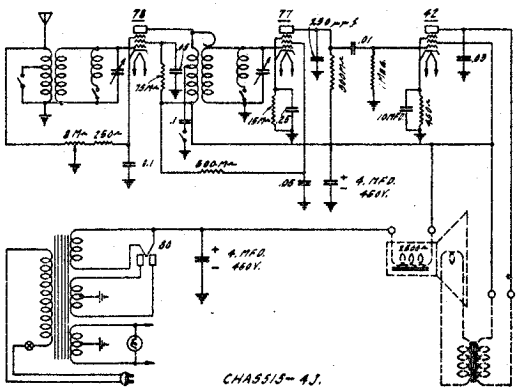
## MODEL 400



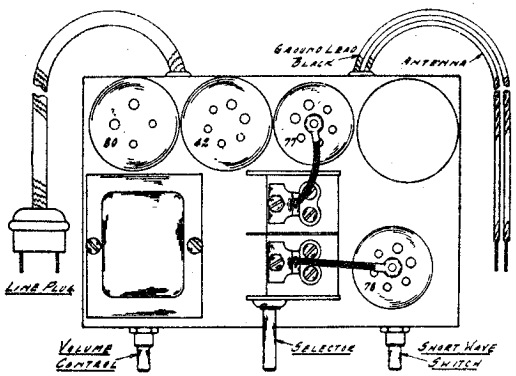

105 to 125 volts, 50-60 cycles, A.C. power supply.

The four tubes used in this set are as follows: 1—No. 280 Full Wave Rectifier; 1—No. 77 Radio Audio Amplifier; 1—No. 78 Detector; 1—No. 42 Audio Amplifier.

Set band switch

In the left-hand position, broadcast stations on frequencies between 550 and 1500 Kilocycles will be received. When the band switch is thrown to the right, stations operating on frequencies ranging from 1500 to 4800 Kilocycles will be heard.

CHASSIS 4J




### SERVICE SUGGESTIONS

In changing tubes always remove the plug from light socket. Make sure all tubes are pushed firmly into their proper sockets and that clips are always fastened to caps on tops of tubes.

Be sure that aerial and ground are properly connected. A thirty to fifty foot aerial is recommended for best operation.

To remove chassis from cabinet, first remove knobs. Then remove four screws from bottom of cabinet holding base. Remove screws holding speaker in cabinet and remove speaker and chassis as a unit.

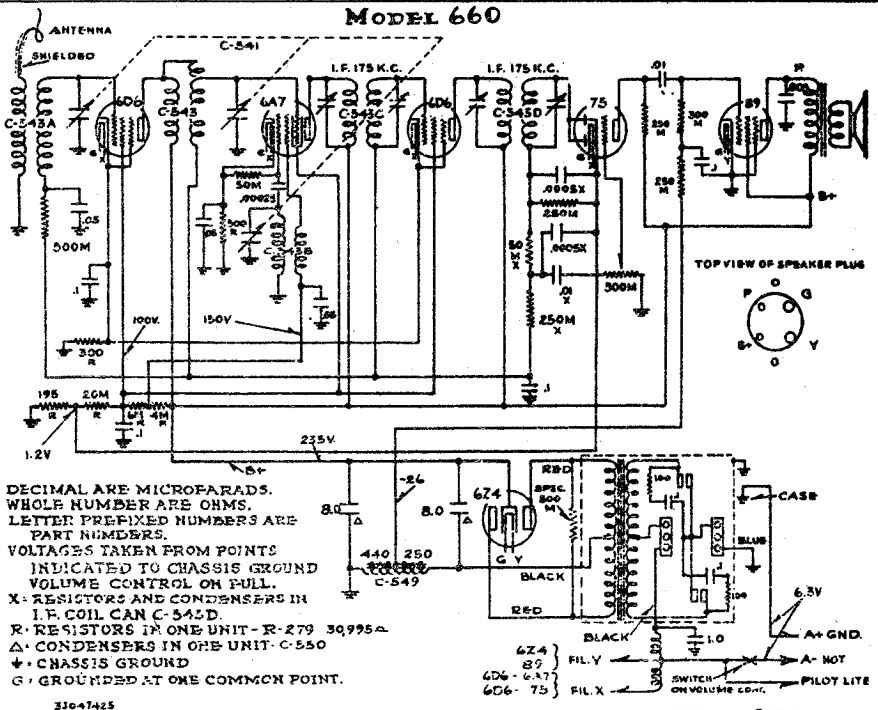
## SCHEMATIC CIRCUIT DIAGRAM

## MODEL 660 AUTORADIO

## PARTS LIST

| Part No. | Description | List Price Each |
|---|---|---|
| A 660 | Battery Cable—Plug Type. | 1.75 |
| B 104 | Cable Shaft Brackets..... | .35 |
| B 660 | Antenna Cable—Plug Type | .80 |
| C 106 | Shaft Couplings ..... | .35 |
| C 117 | "A" Choke—Small ..... | .25 |
| C 118 | "A" Choke—Large ..... | .35 |
| C 144 | Dual .1-200 Volt Condenser ..... | .35 |
| C 152 | .00025 Mica Condenser... | .20 |
| C 155 | .0005 Mica Condenser.... | .20 |
| C 522 | .01-400 Volt Condenser:.. | .25 |
| C 531A | Dual .05 Condenser..... | .30 |
| C 535 | Dual .1—200 Volt Condenser ..... | .35 |
| C 541B | 3 Gang Condenser ..... | 3.75 |
| C 543 | R.F. Coil ..... | .80 |
| C 543A | Antenna Coil ..... | .80 |
| C 543B | Oscillator Coil ..... | .70 |
| C 543C | Input I.F. Transformer... | 1.25 |
| C 543D | Output I.F. Transformer with Parts ..... | 2.50 |
| C 547 | .1-200 Volt Condenser.... | .30 |
| C 549 | 690 Ohm Choke ..... | 1.40 |
| C 550 | 8-8 Mfd. Electrolytic Condenser ..... | 2.25 |
| C 551 | 1 Mfd.—120 Volt Condenser ..... | .35 |
| C 553 | .05-200 Volt Condenser... | .25 |
| C 554 | .5 Mfd. Generator Condenser ..... | .50 |
| R 232A | Special 500M Ohm Resistor Identified with 2 Yellow Dots ..... | .35 |
| R 279 | 30,995 Ohm Resistor..... | .60 |
| R 281 | 100 Ohm Resistor..... | .20 |
| S 338 | 18" Volume Control Shaft. | 1.25 |
| S 339 | 18" Selector Control Shaft | 1.25 |
| S 338S | Special 24" Volume Control Shaft ..... | 1.50 |
| S 339S | Special 24" Selector Control Shaft ..... | 1.50 |
| V 660 | Complete "B" Unit—OAK | 8.00 |
| V 603 | Volume Control ..... | 1.50 |
| 660 | Remote Control Head Complete Less Shafts..... | 5.00 |
| | 20 Ampere Fuses..... | .10 |
| | Mounting Bolts ..... | .10 |
| | All carbon resistors..... | .20 |
| | All sockets ..... | .20 |
| | Dynamic speakers ..... | 5.00 |

## MODEL 660




3J047425

## IF PEAK 175 KC

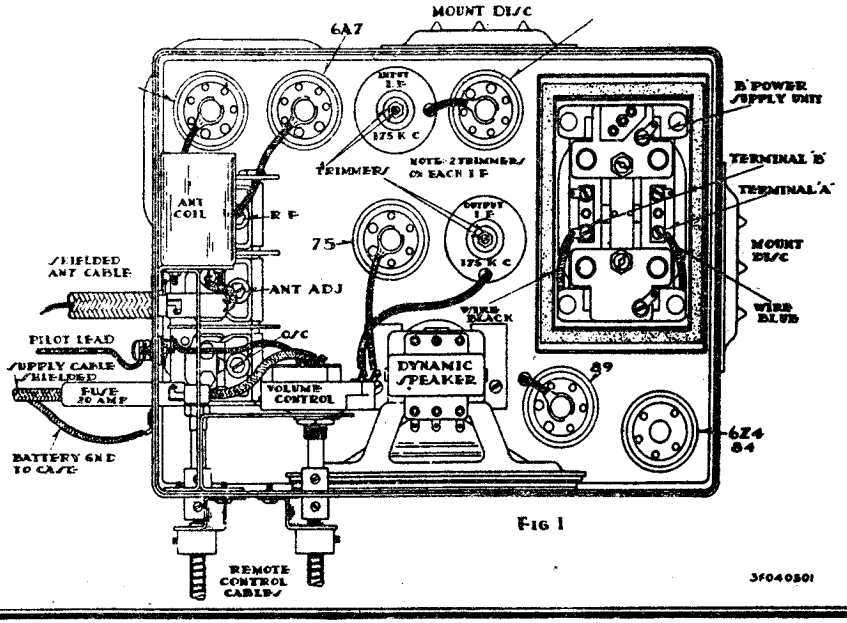



Fig 1

3F040801

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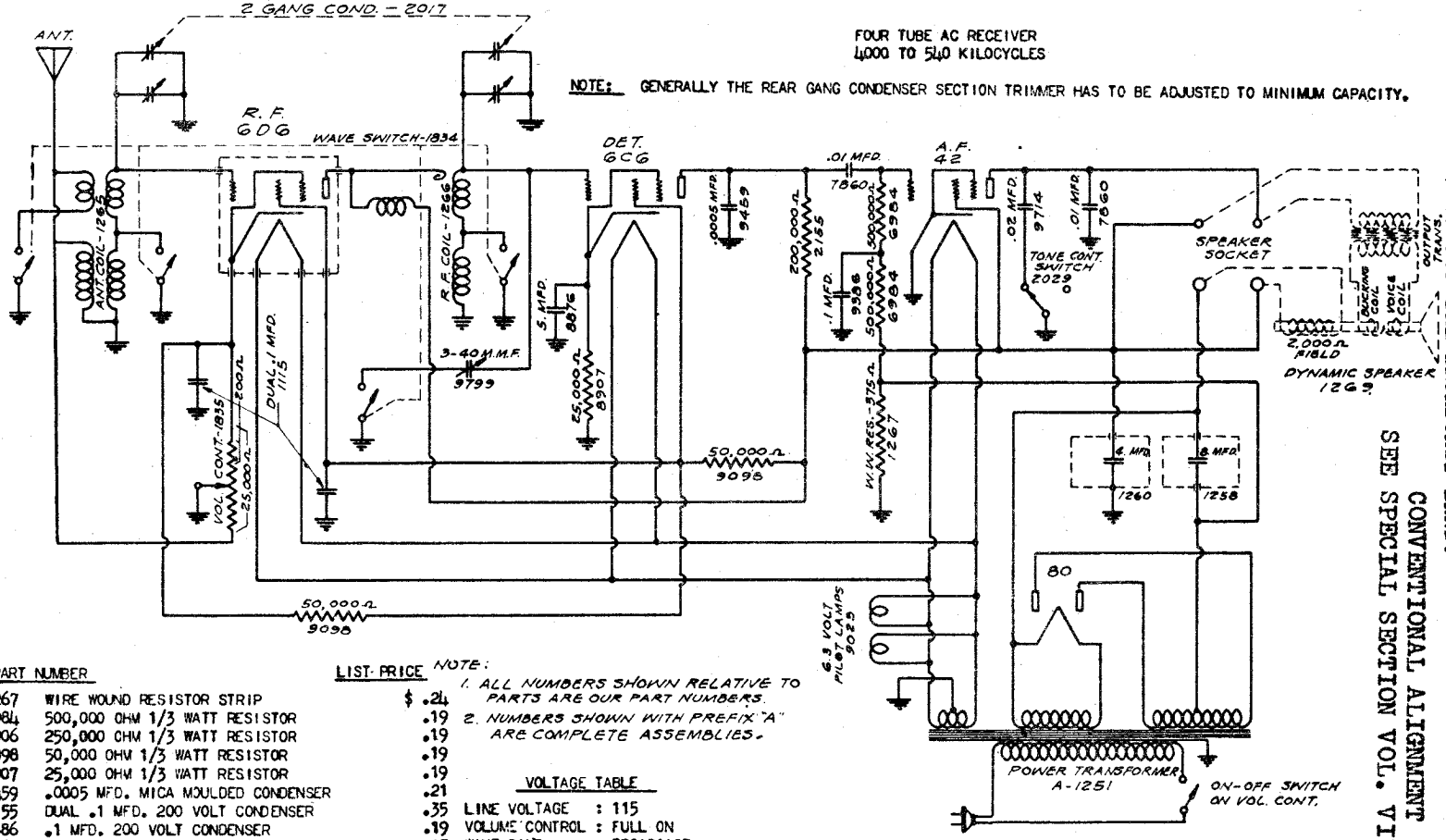
# WALGREEN CO.

## MODEL 401

Schematic, Voltage & Alignment

FOUR TUBE AC RECEIVER
4000 TO 540 KILOCYCLES

NOTE: GENERALLY THE REAR GANG CONDENSER SECTION TRIMMER HAS TO BE ADJUSTED TO MINIMUM CAPACITY.




### CONVENTIONAL ALIGNMENT

### BAND SELECTOR SWITCH

THIS RECEIVER IS DESIGNED FOR TWO FREQUENCY BANDS. BROADCAST BAND FROM 1720 to 540 KC. POLICE, AIRCRAFT AND AMATEUR BAND 1.5 MC. to 4 MC. SWITCH TO LEFT POSITION FOR SHORT WAVE AND TO THE RIGHT FOR THE BROADCAST BAND.

| PART NUMBER | | LIST PRICE |
|---|---|---|
| 1267 | WIRE WOUND RESISTOR STRIP | $ .24 |
| 6984 | 500,000 OHM 1/3 WATT RESISTOR | .19 |
| 8906 | 250,000 OHM 1/3 WATT RESISTOR | .19 |
| 9098 | 50,000 OHM 1/3 WATT RESISTOR | .19 |
| 8907 | 25,000 OHM 1/3 WATT RESISTOR | .19 |
| 9459 | .0005 MFD. MICA MOULDED CONDENSER | .21 |
| 1155 | DUAL .1 MFD. 200 VOLT CONDENSER | .35 |
| 9386 | .1 MFD. 200 VOLT CONDENSER | .19 |
| 7860 | .01 MFD. 400 VOLT CONDENSER | .17 |
| 9714 | .02 MFD. 400 VOLT CONDENSER | .18 |
| 1740 | 15/16" KNOB | .22 |
| 1739 | 13/16" KNOB | .22 |
| 1269 | DYNAMIC SPEAKER | 5.25 |
| 1265 | ANTENNA COIL | $1.27 |
| 1266 | R. F. COIL | 1.27 |
| 2017 | TWO GANG CONDENSER | 2.25 |
| 9799 | TRIMMER CONDENSER | .15 |
| 2105 | DIAL ASSEMBLY (SPECIFY REQUIRED NAME) | 2.00 |
| 1834 | WAVE SWITCH | .47 |
| 9023 | PILOT LIGHT LAMP BULB 6.3 VOLTS | .19 |
| 1251 | POWER TRANSFORMER | 3.20 |
| 1258 | 8 MFD. WET ELECTROLYTIC CONDENSER | 1.16 |
| 1260 | 4 MFD. WET ELECTROLYTIC CONDENSER | 1.02 |
| 8876 | 5 MFD. DRY ELECTROLYTIC CONDENSER | .85 |
| 1835 | VOLUME CONTROL | 1.15 |
| 2029 | TONE CONTROL | .36 |

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

NOTE:
1. ALL NUMBERS SHOWN RELATIVE TO PARTS ARE OUR PART NUMBERS.
2. NUMBERS SHOWN WITH PREFIX "A" ARE COMPLETE ASSEMBLIES.

VOLTAGE TABLE

LINE VOLTAGE : 115
VOLUME CONTROL : FULL ON
WAVE BAND : BROADCAST

| TUBE | | FILAMENT | PLATE | SCREEN | CATHODE |
|---|---|---|---|---|---|
| 606 | RADIO FREQUENCY | 6 | 225 | 85 | 2 |
| 606 | DETECTOR | 6 | 105* | 85 | 3.5 |
| 42 | OUTPUT | 6 | 200 | 225 | 15** |
| 80 | RECTIFIER | 4.9 | | | |

READ ALL VOLTAGES FROM SOCKET PRONG TO GROUND UNLESS OTHERWISE SPECIFIED. (EXCEPT FILAMENT)

** READ FROM 375 OHM RESISTOR #1267 TO GROUND.

* COMPARATIVE VOLTAGE IS NOT TRUE VOLTAGE APPLIED.

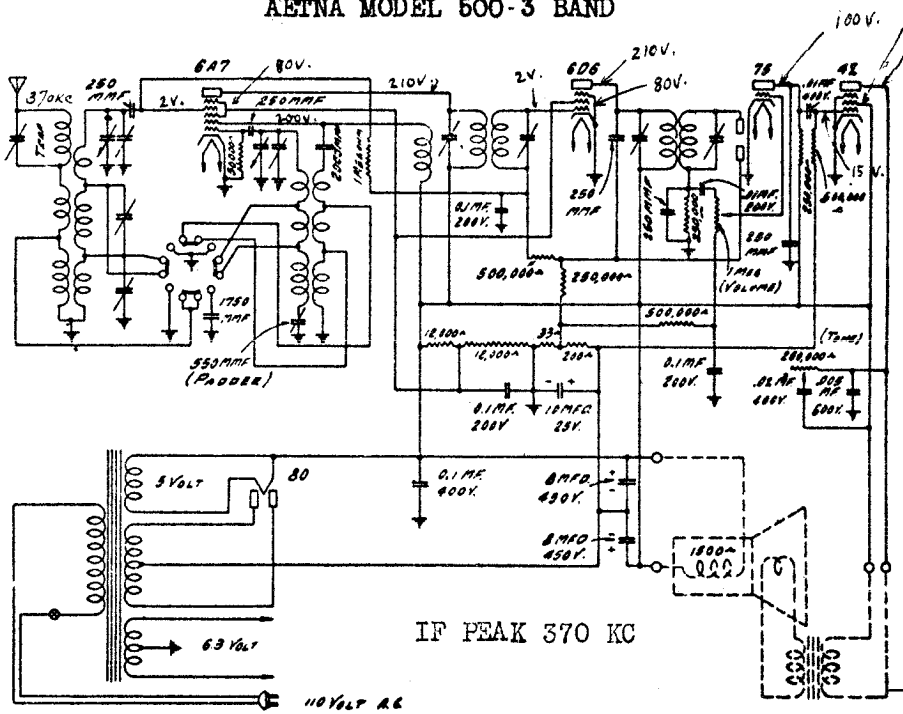
TO ALIGN THE VARIABLE CONDENSER: IT IS IMPORTANT WHEN ALIGNING TO FOLLOW THE PROCEDURE CAREFULLY, OTHERWISE THE RECEIVER WILL LACK SENSITIVITY AND THE DIAL CALIBRATION WILL BE INCORRECT.

1. CONNECT THE HIGH OUTPUT SIDE OF THE OSCILLATOR TO THE RECEIVER ANTENNA LEAD AND THE GROUND TO THE CHASSIS.
2. PLACE THE BAND SELECTOR SWITCH FOR OPERATION ON THE BROADCAST BAND, TUNE THE RECEIVER TO EXACTLY 1400 KILOCYCLES ON THE DIAL AND SET THE TEST OSCILLATOR FREQUENCY TO 1400 KILOCYCLES. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSERS LOCATED ON TOP OF THE GANG CONDENSER.
3. SET THE BAND SELECTOR SWITCH FOR OPERATION ON THE SHORT WAVE BAND, TUNE THE RECEIVER DIAL TO EXACTLY 4 MEGACYCLES AND SET THE TEST OSCILLATOR TO THIS FREQUENCY. THEN ADJUST THE TRIMMER CONDENSER MOUNTED ON THE COIL LOCATED UNDERNEATH THE CHASSIS FOR MAXIMUM SENSITIVITY. ROCK GANG CONDENSER WHEN MAKING THIS ADJUSTMENT.

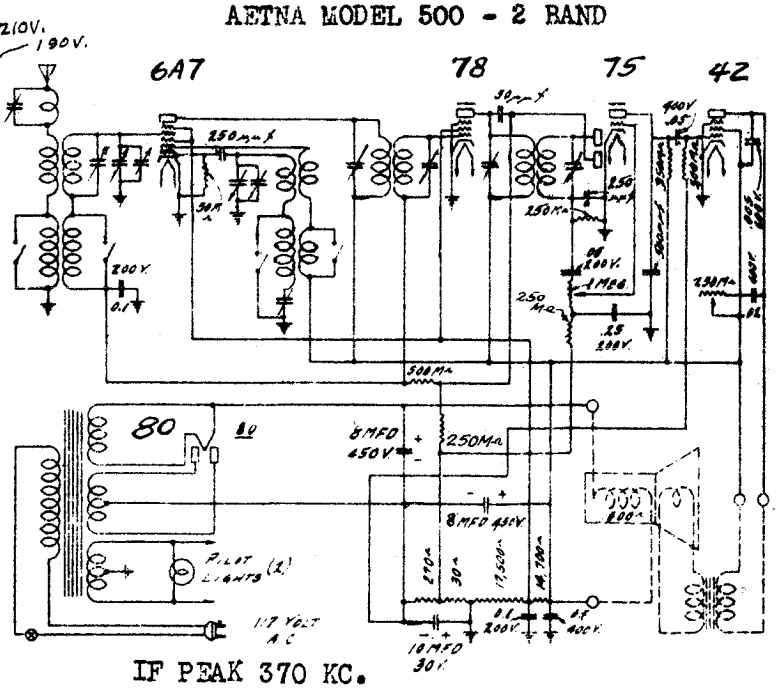
MODEL 500(2 Bands)
MODEL 500(3 Bands)
Schematic, Voltage
Alignment

WALGREEN CO.

AETNA MODEL 500-3 BAND




AETNA MODEL 500 - 2 BAND




To adjust the R. F. circuits: (1) Set pointer on tuning chart to 1400 K. C. with band switch in the broadcasting position. (2) Adjust test oscillator to 1400 K. C. and connect to antenna lead on chassis. (3) Adjust trimmer on the oscillator section of the tuning condenser for maximum reading. (4) Reset dial pointer on receiver and test oscillator to 600 K. C. (5) Adjust 600 K. C. padding condenser for maximum reading moving tuning condenser back and forth slowly while making adjustment (the 600 K. C. padding condenser is mounted on the base at the left of the tuning condenser). (6) Reset oscillator and tuning pointer on the receiver to 1400 K. C. and readjust trimmer on oscillator section of tuning condenser for maximum reading. (7) Reset dial pointer on receiver and test oscillator to 15 megacycles. (8) Set band change switch in the right hand position. (9) Adjust trimmer on first section of tuning condenser for maximum reading. (10) Reset dial pointer on receiver and test oscillator to 3.6 megacycles. (11) Set band change switch in left hand position. (12) Adjust 3.6 megacycle trimmer condenser for maximum reading (the 3.6 megacycle trimmer is mounted under the chassis and directly in front of the band change switch. (13) Reset dial pointer on receiver and test oscillator to 1400 K. C. (14) Set band change switch in broadcasting position and adjust 1400 K. C. trimmer for maximum reading (the 1400 K. C. trimmer is mounted under the chassis directly over the antenna coil).

| Tube Number | Control Grid to Cathode | Screen to Cathode | Plate to Cathode | M. A. Plate | Tube Socket Voltages Heater or Filament Voltage |
|---|---|---|---|---|---|
| 6A7 1st Det. | *1.75 | 92 | 225 | 4 | 6.3 |
| 6A7 OSC. | 0 | 0 | 225 | 4 | 6.3 |
| 78—I. F. | *1.75 | 92 | 225 | 7 | 6.3 |
| 75—2nd Det. | *1.75 | 0 | **110 | .8 | 6.3 |
| 42—2nd Audio | ***17 | 225 | 212 | 34 | 6.3 |
| 80—Rect. | | | | | |

***Voltage from No. 1 terminal on voltage divider to ground using 250 volt scale.

**Voltage from plate to ground using 250 volt scale.

*Voltage from ground to second terminal on voltage divider using 10 volt scale.

The above voltage readings were taken with 1,000 ohm per volt Volt Meter.

For conventional align. see spec. sect. Vol VIII

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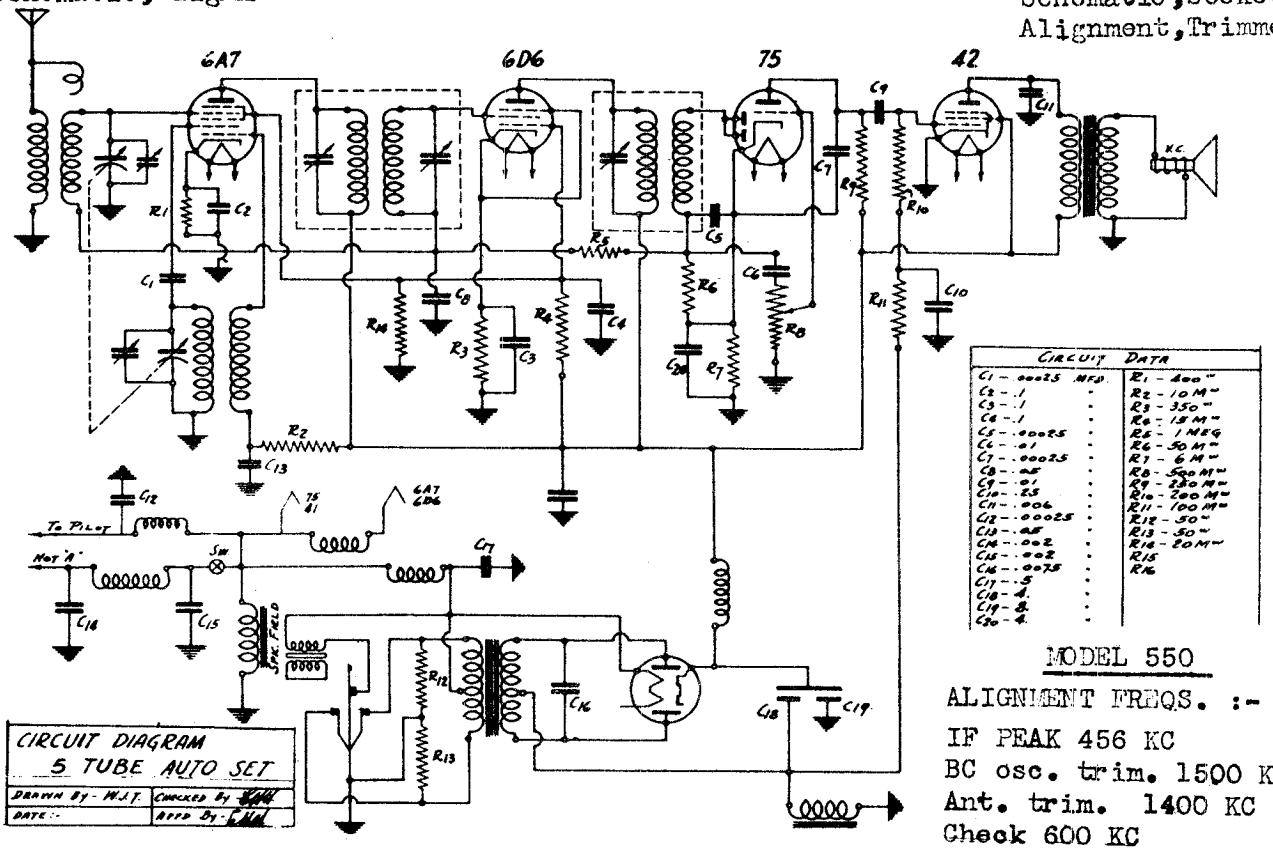
MODEL 550 Auto
Schematic, Alignment

# WALGREEN CO.

MODEL 540
Schematic, Socket
Alignment, Trimmers




CIRCUIT DIAGRAM
5 TUBE AUTO SET

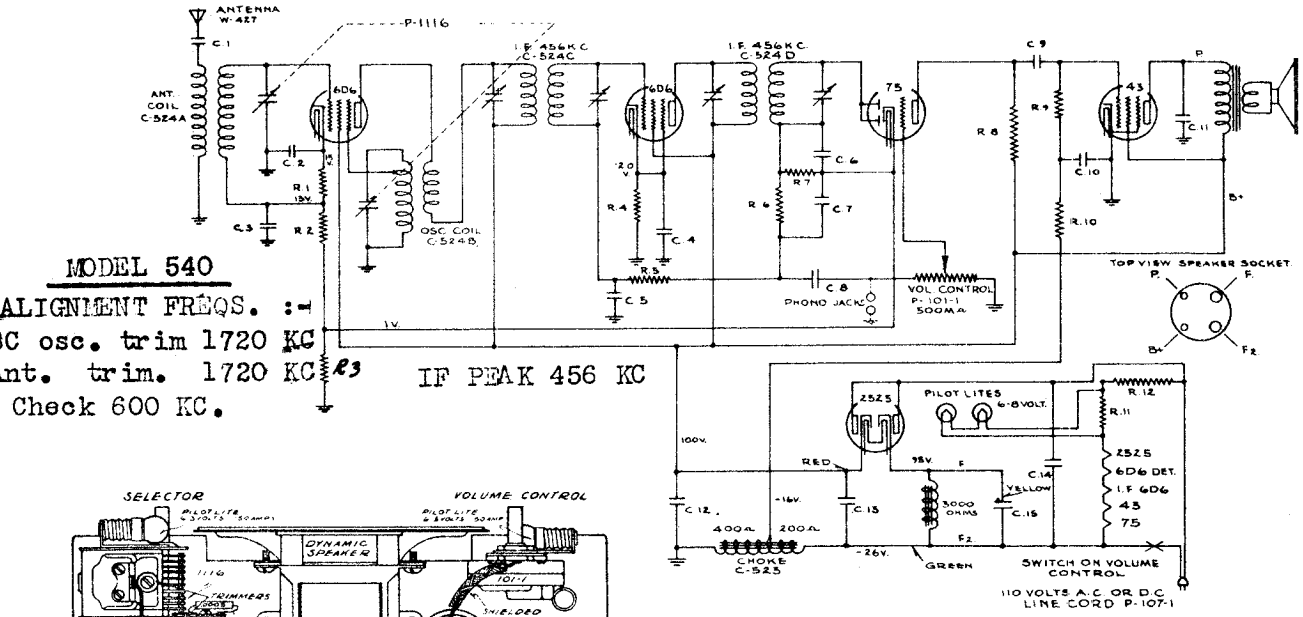
| | |
|---|---|
| DRAWN BY - W.J.F. | CHECKED BY |
| DATE :- | APPD BY - |

CIRCUIT DATA

| | |
|---|---|
| C1 - .00025 MFD. | R1 - 400 Ω |
| C2 - .1 | R2 - 10 MΩ |
| C3 - .1 | R3 - 350 Ω |
| C4 - .1 | R4 - 1.5 MΩ |
| C5 - .00025 | R5 - 1 MEG |
| C6 - .1 | R6 - 50 MΩ |
| C7 - .00025 | R7 - 6 MΩ |
| C8 - .05 | R8 - 500 MΩ |
| C9 - .01 | R9 - 250 MΩ |
| C10 - .25 | R10 - 200 MΩ |
| C11 - .006 | R11 - 100 MΩ |
| C12 - .00025 | R12 - 50 Ω |
| C13 - .05 | R13 - 50 Ω |
| C14 - .002 | R14 - 20 MΩ |
| C15 - .002 | R15 |
| C16 - .0075 | R16 |
| C17 - .5 | |
| C18 - 1. | |
| C19 - 2. | |
| C20 - 1. | |

## MODEL 550

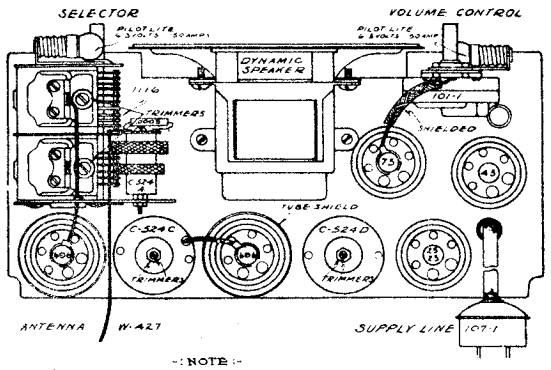
ALIGNMENT FREQS. :-
IF PEAK 456 KC
BC osc. trim. 1500 KC
Ant. trim. 1400 KC
Check 600 KC




## MODEL 540

ALIGNMENT FREQS. :-
BC osc. trim 1720 KC
Ant. trim. 1720 KC
Check 600 KC.

IF PEAK 456 KC







LEGEND

| RESISTORS | | |
|---|---|---|
| Nº | VALUE | |
| R.1 - | 300 | * |
| R.2 - | 2M | * |
| R.3 - | 180 | * |
| R.4 - | 250 R-270 | |
| R.5 - | 250M | |
| R.6 - | 50M | |
| R.7 - | 250M | |
| R.8 - | 100M | |
| R.9 - | 300M | |
| R.10 - | 250M | |
| R.11 - | 40Ω 300M.A. 0.36W P-106-1 | |
| R.12 - | 126 IN CORD P107-1 | |

| CONDENSERS | | |
|---|---|---|
| Nº | VALUE | |
| C.1 - | .0005 | MICA |
| C.2 - | .05 | 200V |
| C.3 - | .05 | 200V. |
| C.4 - | .05 | 200V. |
| C.5 - | .1 | 200V |
| C.6 - | .0005 | MICA |
| C.7 - | .0005 | MICA |
| C.8 - | .01 | 400V |
| C.9 - | .01 | 400V |
| C.10 - | .1 | 200V. |
| C.11 - | .025 | 300 |
| C.12 - | 5.0 MFD. | C-525D |
| C.13 - | 25.0 MFD. | * |
| C.14 - | .1 | 400V. |
| C.15 - | 5.0 MFD | * |

:-NOTE:-
* R.1, R.2 & R.3 IN ONE UNIT PART NUMBER R-268.
* C.13 AND C.15 IN ONE UNIT PART NUMBER C-525-C
NUMBERS PREFIXED BY LETTERS ARE PARTS.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL MEASURED ON A.C. CURRENT.

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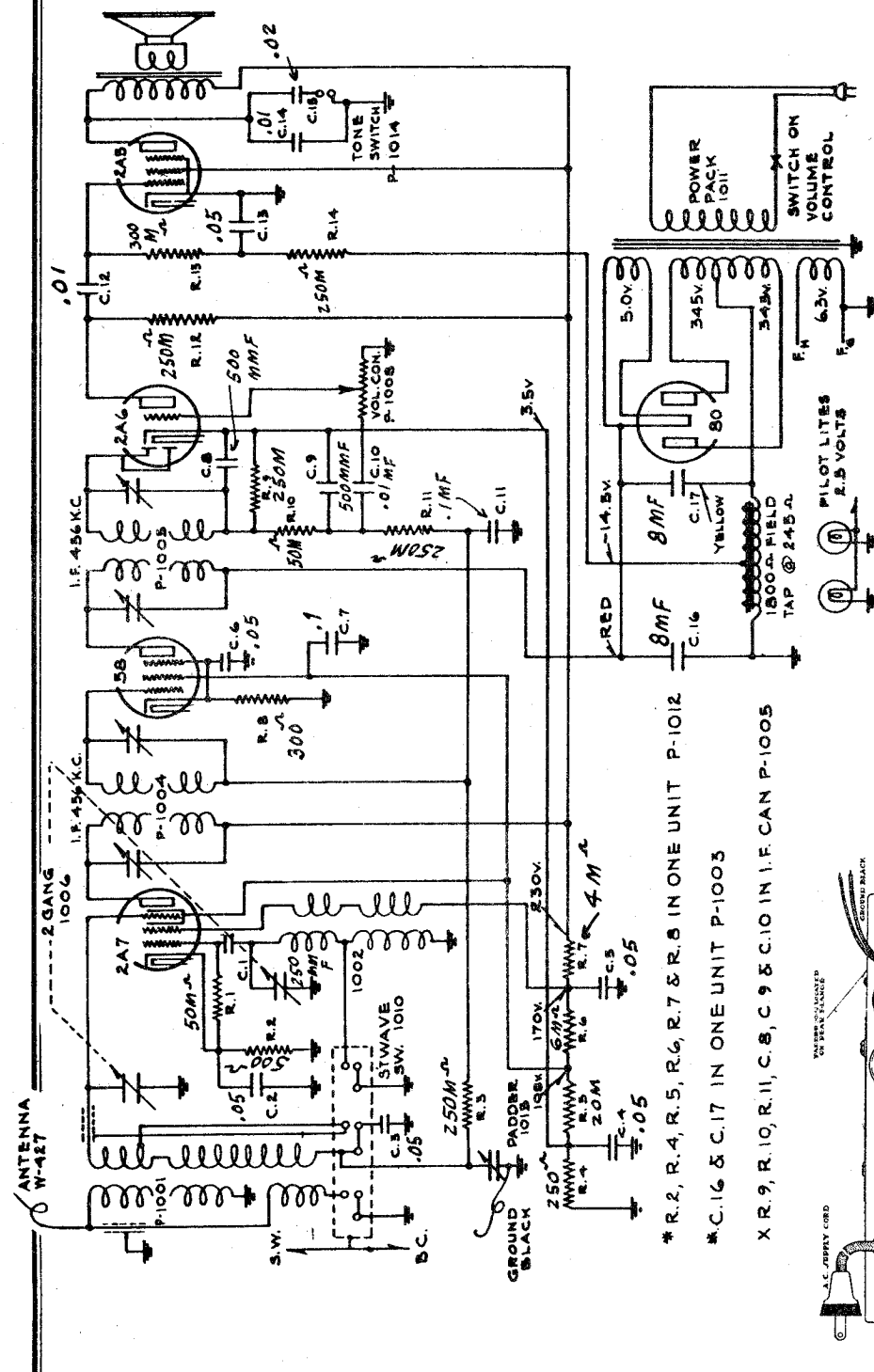
MODEL 550 A-C
Schematic, Socket
Trimmers, Alignment

# WALGREEN CO.

105-115 volts alternating current 50-60 cycles - 60 watts.
GREEN (Broadcast band) 530 - 1550 Kilocycles
RED (Short wave band) 1550 - 14,000 Kilocycles

## IF PEAK 456 KC

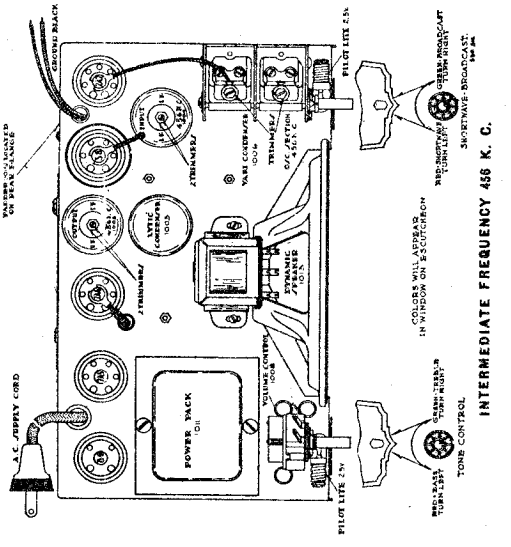



To peak I.F. transformers connect oscillator (set at 456 KC) to grid of 2A7 tube and (Black) ground wire. With variable condenser set at minimum capacity, (extreme left of its rotation) adjust four trimmers (one nut and one screw on each transformer trimmer) to resonance (maximum deflection on an output meter connected across the primary of the speaker input transformer).

To align Broadcast band, set wave changing switch to Green (right turn) and with variable condenser at minimum capacity disconnect antenna wire and connect 1550 KC oscillator to antenna coil in series with a 75 MMFD condenser. Adjust oscillator (front) section trimmer to resonance. Set oscillator to 1400 KC, rotate variable condenser until signal is tuned in, then adjust R.F. (rear) section trimmer to resonance. Check output at 1200, 1000, 800, and 600 Kilocycles if necessary bend plates (of rear R.F. section of variable only).

To align Short wave band, set wave changing switch to RED (left turn) and with input oscillator connected as above and set at 1720 KC, tune in signal, adjust padding condenser on rear of chassis to resonance. Check for output at 1550 KC and at harmonics of 1000 KC (2000 KC), of 1200 KC (2400 KC), of 1400 KC (2800 KC), and of 1720 KC (3440 KC). DO NOT BEND PLATES.

For failure to operate over both bands check 2A7 tube and connections to and contacts of wave changing switch.

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MODEL 575
Schematic, Socket
Alignment, Trimmers
Voltage

WALGREEN CO.

# Service Notes

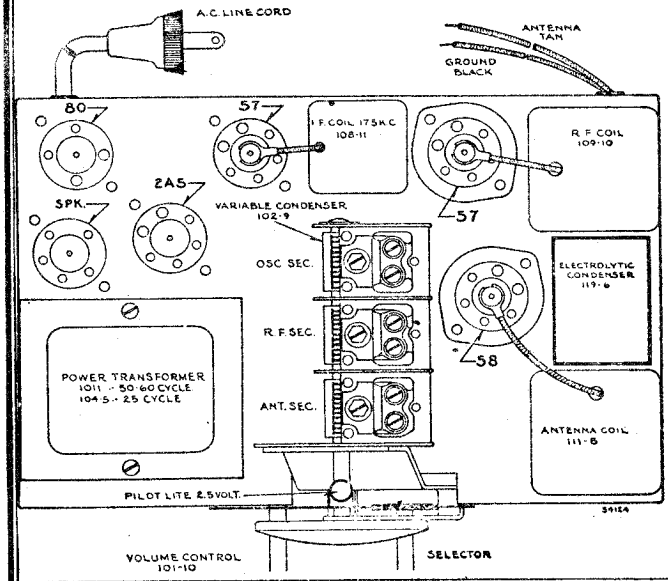
Voltages taken from different points of circuit to chassis are measured with volume control full on, using a voltmeter having a resistance of 1000 ohms per volt. These voltages are indicated on the schematic circuit diagram.

**Part No. 145-2**

| | | |
|---|---|---|
| Common Black to Brown | —.003 | x 600 Volts |
| Common Black to Green | —.1 | x 200 Volts |
| Common Black to Red | —.1 | x 200 Volts |
| Common Black to Orange | —.25 | x 200 Volts |
| Blue to Blue | —.05 | x 400 Volts |

**Part No. 145-3**

| | | |
|---|---|---|
| Common Black to Brown | —.1 | x 200 Volts |
| Common Black to Green | —.05 | x 200 Volts |
| Common Black to Orange | —.05 | x 200 Volts |
| Common Black to Yellow | —.05 | x 200 Volts |




## Aligning I. F. Transformer

1. With volume control full on, at extreme right of its rotation, and with variable condenser at its maximum capacity position (extreme right of its rotation) make the following adjustments:

(a) Connect an external oscillator adjusted to 175 kilocycles, in series with a .1 mfd. condenser, to the control grid cap of the type 57 tube located between the R. F. coil (part numbers 109-10) and the I. F. transformer (part number 108-11) and chassis.

(b) Adjust trimming condensers of I. F. transformer (part number 108-11) to resonance. See top view of chassis. Use as a resonance indicator an output meter connected across the primary of the speaker input transformer or between the plate and screen terminals of the type 2A5 tube, by means of an adapter. Maximum deflection of the meter indicates resonance. Care must be taken to use only enough signal to give a readily readable output, as excessive input will result in overload and a false resonance point.

NOTE: The two trimmer condensers which tune the primary and secondary of the I. F. transformer are adjusted by set screws accessible from the back of the chassis.

## Aligning R. F. and Oscillator Circuits

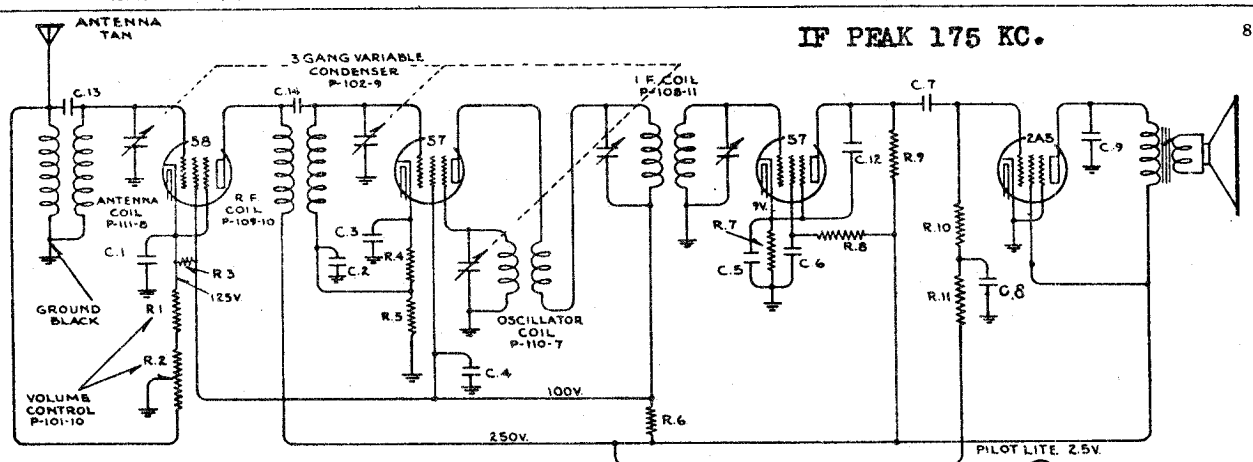
1. Connect the external oscillator set at 1720 kilocycles and in series with a 200 Mfd. condenser, between the antenna (tan) and ground (black) leads.

(a) With volume control full on and variable condenser plates in minimum capacity position, plates entirely out of mesh (extreme left of its rotation), adjust trimmer of rear oscillator section of variable condenser to resonance.

(b) Shift external oscillator frequency from 1720 to 1400 kilocycles, pick up signal by rotating variable condenser and peak R. F. (center) and antenna (front) section trimmers of variable condenser to resonance.

(c) Check tracking at 1500, 1200, 1000, 800, 600 and 530 kilocycles by changing external oscillator frequency and rotating variable condenser to pick up signal. Adjust slotted end plates of R. F. (center) and antenna (front) sections to increase output, if necessary. DO NOT BEND OSCILLATOR PLATES.

**IF PEAK 175 KC.** 8-1-34




**MODEL 575 SUPERHETERODYNE 530 to 1720 Kilocycles**
**FIVE TUBES: 1-58, 1-2A5, 1-80, 2-57**

LEGEND

CONDENSERS

| No | VALUE |
|---|---|
| C.1 | .05X200V. |
| C.2 | .05X200V. |
| C.3 | .05X200V. |
| C.4 | .1X200V. |
| C.5 | .25X200V. |
| C.6 | .1X200V. |
| C.7 | .05X200V. |
| C.8 | .1X200V. |
| C.9 | .003X600V. |
| C.10 | 8.0MFD.X400V. |
| C.11 | 8.0MFDX400V. |
| C.12 | .001 MICA. |
| C.13 | 10 μμf. GIMMICK |
| C.14 | 4 μμf. GIMMICK |

RESISTORS

| No | VALUE |
|---|---|
| R.1 | 100 |
| R.2 | 75M |
| R.3 | 50M 1/3W. |
| R.4 | 450 |
| R.5 | 5M |
| R.6 | 19M |
| R.7 | 50M 1/3W. |
| R.8 | 1MEG. 1/3W. |
| R.9 | 250M 1/3W. |
| R.10 | 200M 1/3W. |
| R.11 | 300M 1/3W. |

NOTE:
CONDENSERS C.10, C.11, IN ONE UNIT P-119-6.
CONDENSERS C.1, C.2, C.3, C.4 IN ONE UNIT P-145-3.
RESISTORS R.4, R.5, IN ONE UNIT P-106-10.
NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.
PHRASE 'GIMMICK' IS A WIRE WOUND AROUND ANOTHER WIRE.
VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND, VOLUME CONTROL ON FULL.
CONDENSERS C.5, C.6, C.7, C.8, C.9 IN ONE UNIT P-145-2.

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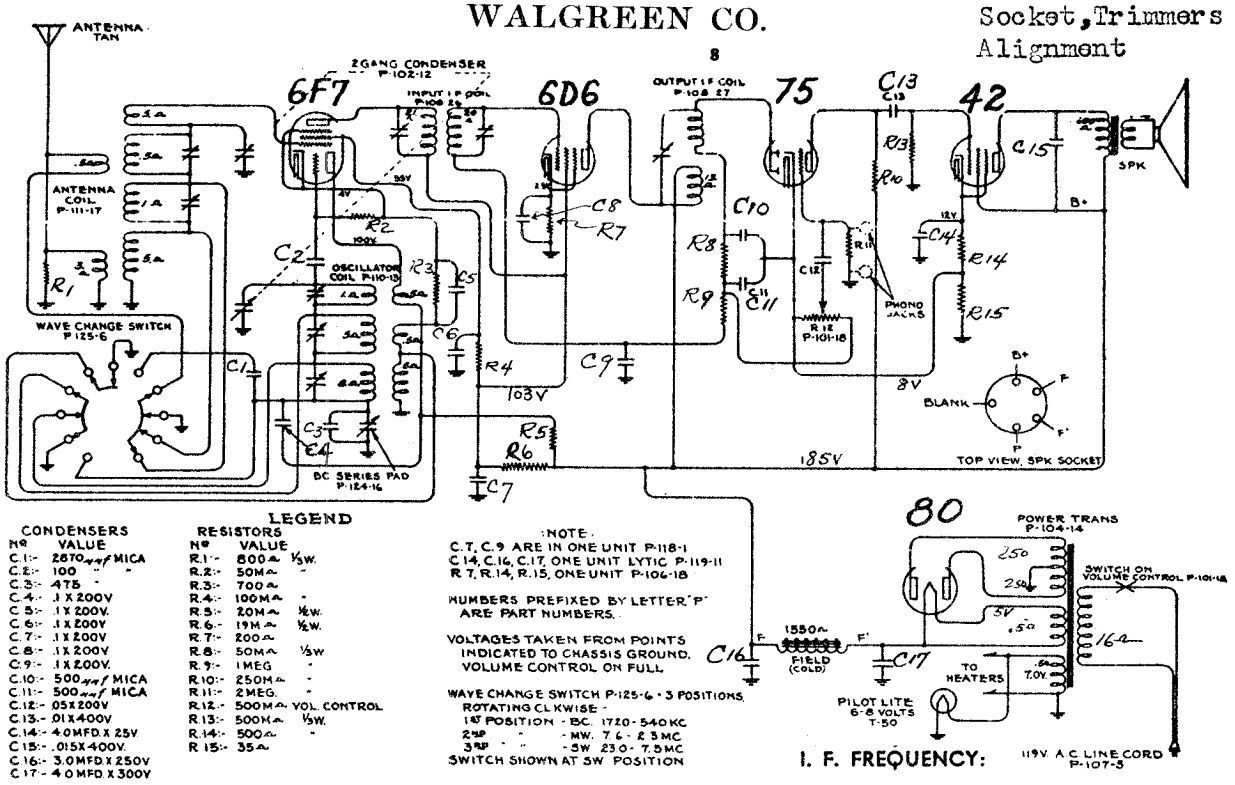
MODEL 585, Series A

# WALGREEN CO.

Schematic, Voltage
Socket, Trimmers
Alignment




**LEGEND**

| CONDENSERS | | RESISTORS | |
|---|---|---|---|
| No | VALUE | No | VALUE |
| C.1 | 270 mmf MICA | R.1 | 800Ω 1/3W. |
| C.2 | 100 " " | R.2 | 50MΩ " |
| C.3 | 475 " | R.3 | 700Ω " |
| C.4 | .1 X 200V | R.4 | 100MΩ " |
| C.5 | .1 X 200V. | R.5 | 20MΩ 1/2W. |
| C.6 | .1 X 200V | R.6 | 19MΩ 1/2W. |
| C.7 | .1 X 200V | R.7 | 200Ω " |
| C.8 | .1 X 200V | R.8 | 50MΩ 1/3W |
| C.9 | .1 X 200V. | R.9 | 1 MEG " |
| C.10 | 500 mmf MICA | R.10 | 250MΩ " |
| C.11 | 500 mmf MICA | R.11 | 2 MEG. " |
| C.12 | .05 X 200V | R.12 | 500MΩ VOL. CONTROL |
| C.13 | .01 X 400V | R.13 | 500MΩ 1/3W. |
| C.14 | 40 MFD. X 25V | R.14 | 500Ω " |
| C.15 | .015 X 400V. | R.15 | 35Ω " |
| C.16 | 30 MFD X 250V | | |
| C.17 | 40 MFD X 300V | | |

NOTE:
C.7, C.9 ARE IN ONE UNIT P-118-1
C.14, C.16, C.17, ONE UNIT LYTIC P-119-11
R.7, R.14, R.15, ONE UNIT P-106-18

NUMBERS PREFIXED BY LETTER "P" ARE PART NUMBERS.

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL.

WAVE CHANGE SWITCH P-125-6 - 3 POSITIONS, ROTATING CLKWISE -
1st POSITION - BC. 1720 - 540 KC.
2nd " - MW. 7.6 - 2.3 MC
3rd " - SW 23.0 - 7.5 MC
SWITCH SHOWN AT SW POSITION

I. F. FREQUENCY: 370 K.C.

119V A.C. LINE CORD P-107-3

## ALIGNING INSTRUCTIONS—

Description of various dummy antennas used and referred to in these instructions:

(1) I.F. Dummy—Consists of a .1 mfd. condenser connected in series with the external oscillator.

(2) Broadcast Dummy—Consists of a 200 mmfd. condenser and a 20 ohm resistor connected in series with each other and in series with the external oscillator.

(3) Intermediate and Short Wave Dummy—Consists of a .1 mfd. condenser and a 400 ohm resistor connected in series with each other and in series with the external oscillator.

Resonance Indicator:

Use as a resonance indicator an output meter connected across the primary of the speaker input transformer, or by means of an adapter between the plate and screen terminals of the type 42 output tube. Maximum deflection of the meter indicates resonance. Use only enough signal to get a readily readable output. A low range output meter or the low scale of a multi-range volt meter should be used.

## SERIES A

### Alignment

No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet. To remove the knobs, pull them off and to take the chassis out of the cabinet, remove the three bolts by which it is fastened and the speaker plug which you will find on the front flange of the chassis.

### Aligning I. F. Transformers

1. With volume control full on, the extreme right of its rotation, and with wave changing switch in the broadcast position, extreme left of its rotation, and with variable condenser at its minimum capacity position, plates, entirely out of mesh, adjust the I.F. transformers (adjustments at the top of parts number 108-26 and 108-27—see top view).
   (a) Connect external oscillator in series with I.F. dummy antenna. With external oscillator adjusted to 370 kilocycles, in series with I.F. dummy antenna to the control grid cap of the type 6D6 tube and chassis ground, adjust output I.F. transformer, part number 108-27, to resonance.
   Note: Output I.F. transformer, part number 108-27, has only one adjustment.
   (b) Move generator output clip from grid of 6D6 to grid cap of type 6F7 tube and align input I.F. transformer, part number 108-26, to resonance. NOTE: IT IS EXTREMELY NECESSARY TO ALIGN BOTH I.F. STAGES SEPARATELY.

### Broadcast Band Alignment—
(540 - 1720 Kilocycles)

1. With wave changing switch in the broadcast position, extreme left of its rotation, and with gang condenser in its minimum capacity position, plates entirely out of mesh, and with external oscillator connected in series with broadcast dummy antenna to tan antenna lead and black ground lead, make the following adjustments:
   (a) Set external oscillator to 1720 kilocycles and adjust oscillator trimmer to resonance. This adjustment is the rear adjustment of a group of three located next to the variable condenser.
   (b) Readjust external oscillator to 600 kilocycles and adjust broadcast series pad to resonance by rotating condenser to approximately 600 kilocycles, rocking it slowly to and fro until by adjusting pad maximum output is attained. This adjustment is located at the front of the chassis next to the variable condenser and wave changing switch.
   (c) Check for tracking and sensitivity at 1400 and 1000 kilocycles. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

### Short Wave Band Alignment—
(7.5 - 23.0 Megacycles)

1. This band is aligned after the I.F. adjustments have been completed. Set wave selector switch in the short wave position, extreme right of its rotation, set pointer of dial to 21 megacycles.
   (a) With external oscillator set at 21 megacycles, and connected to the tan antenna lead in series with the short wave dummy and to the black ground lead, adjust the oscillator short wave trimmer until generator signal is picked up. This trimmer is the one closest to the front of the chassis of the group of three trimmers located next to the gang condenser (see top view of chassis).
   (b) Adjust short wave antenna trimmer to resonance. This adjustment is to the right of the 6F7 tube and is the one closest to the front of the chassis (see top view).
   (c) Re-set external oscillator to 9 megacycles and pick up oscillator signal by rotating variable condenser, moving dial pointer. Check for tracking and sensitivity and do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

### Intermediate Band Alignment—
(2.3 - 7.6 Megacycles)

1. With wave selector switch in the center position and with dial pointer set to 7 megacycles, makes the following adjustments:
   (a) With external oscillator set at 7 magacycles and connected in series with the short wave dummy antenna to the tan antenna lead and black ground lead, same as for short wave adjustments, adjust center trimmer of oscillator coil, part number 110-13, until 7 magacycle signal is picked up. This is the center adjustment of a group of three located next to the gang condenser (see top view).
   (b) Adjust antenna trimmer to resonance, this adjustment is the rear of a group of two located at the right of the chassis next to the 6F7 tube (see top view).
   (c) Re-set external oscillator to 2.5 magacycles (2500 kilocycles), pick up signal by rotating condenser and moving dial pointer. Check for tracking and sensitivity. Do not bend plates. NOTE: It is extremely necessary in making all of the above adjustments that the fundamental signal of the oscillator be tuned in and not the image frequency, which will fall below the fundamental.

### Service Notes

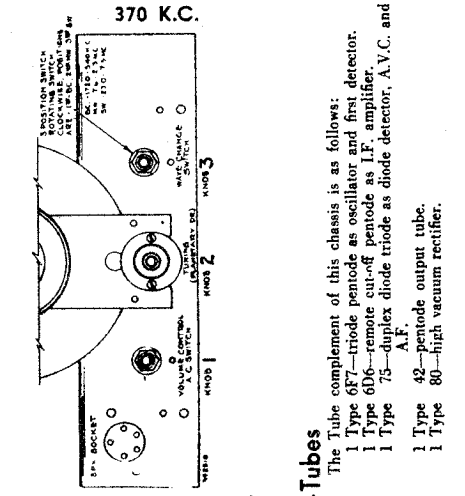
To check for open by-pass condensers, shunt each condenser with another of similar capacity and of the same voltage rating, which is known to be good, until the defective unit is located. Open by-pass condensers frequently cause oscillation and distorted tone. Defective and shorted electrolytic filter condensers cause excessive hum, motor-boating, low volume and a reduction in all D.C. voltages. Open or shorted electrolytic and by-pass condensers (across bias resistor of type 42 tube) will cause low volume and distorted tone.

Should the planetary vernier dial drive mechanism fail to function properly, it will probably be found to be due to a cracked or broken compression spring. The drive may be disassembled to replace the compression spring (part number 112-31) by removing the two screws which fasten it to the dial bracket. Before reassembling all parts should be carefully cleaned and a small amount of vaseline applied to the ball bearings. All other dial parts are hardened and should cause no trouble.

### Notes

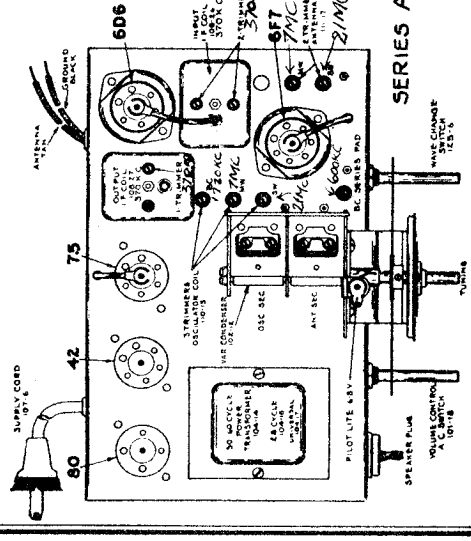
25 Cycle chassis differ from regular 60 cycle and 40 cycle chassis in that a larger electrolytic filter condenser is used. The regular condenser is part number 119-11 and the larger unit for the 25 cycle chassis is part number 119-12.

Part number 106-18, a metal clad resistor, consists of the following sections with resistances and wattages as noted: one, 500 ohms; one, 35 ohms, one, 200 ohms, all 1/3 watt, plus or minus 10%.




**Tubes**

The Tube complement of this chassis is as follows:
1 Type 6F7—triode pentode as oscillator and first detector.
1 Type 6D6—remote cut-off pentode as I.F. amplifier.
1 Type 75—duplex diode triode as diode detector, A.V.C. and A.F.
1 Type 42—pentode output tube.
1 Type 80—high vacuum rectifier.

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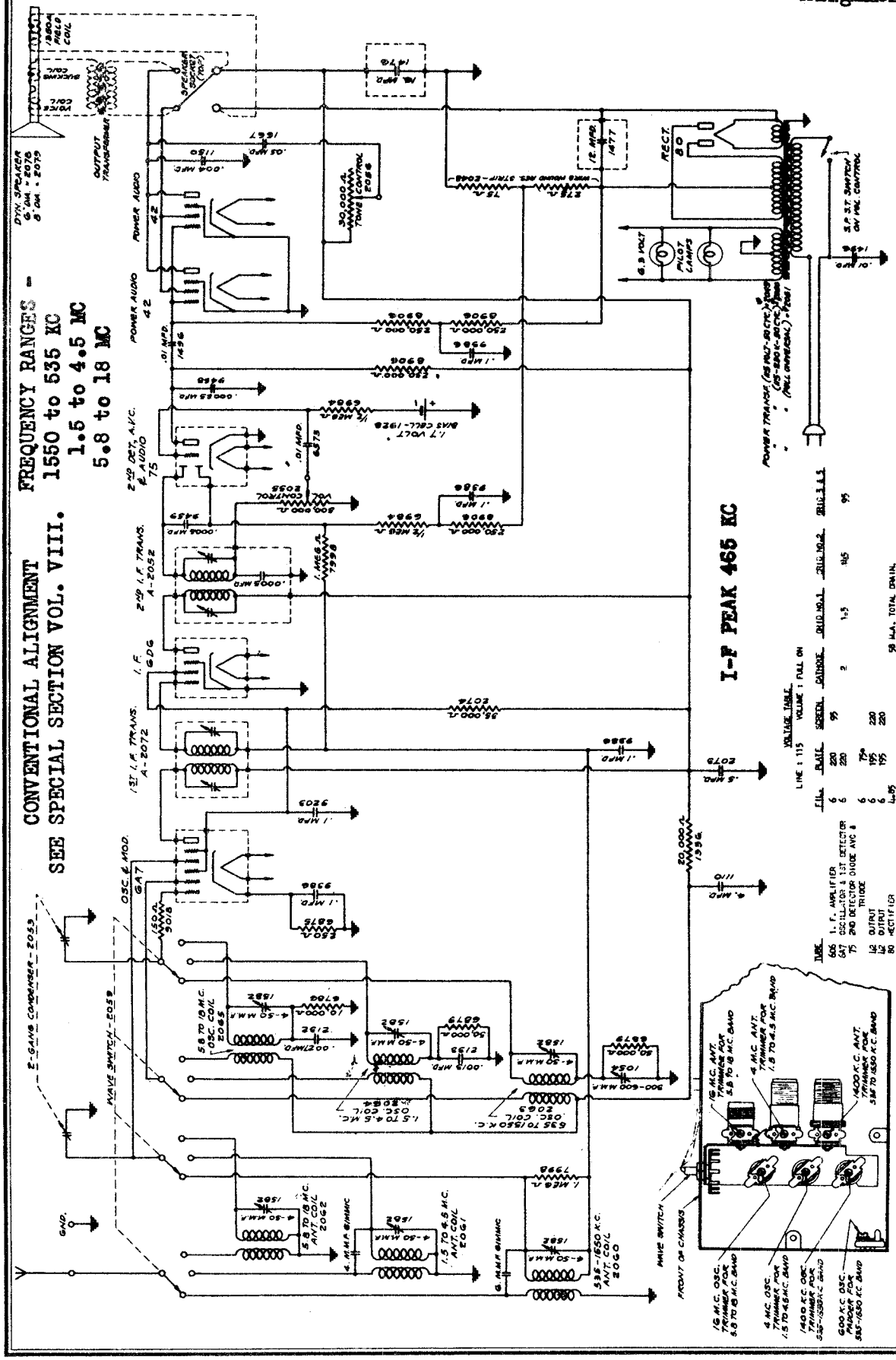
# WALGREEN CO.

MODEL 651
Schematic, Voltage
Alignment, Trimmers




Align I-F transformer trimmers to 465 KC. BROADCAST - Dial and generator to 1400 KC, peak the oscillator and antenna trimmers. Dial and generator to 600 KC, pad the oscillator circuit to maximum peak while rocking variable condenser. POLICE - Dial and generator to 4 MC, peak oscillator trimmer and antenna trimmer. SHORTWAVE - Dial and generator to 16 MC, peak oscillator and antenna trimmers.

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MODEL 675

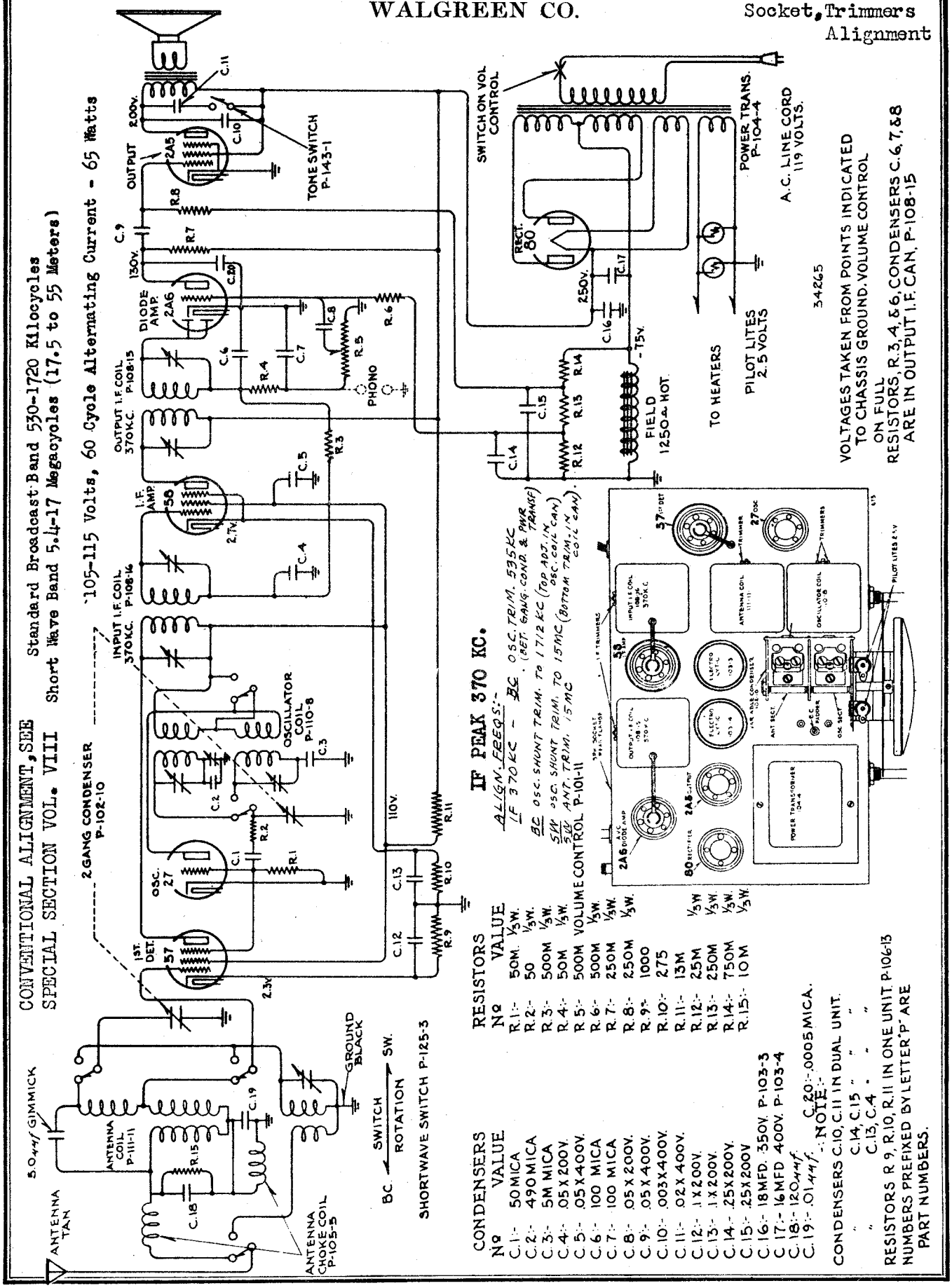
# WALGREEN CO.

Schematic, Voltage
Socket, Trimmers
Alignment

CONVENTIONAL ALIGNMENT, SEE
SPECIAL SECTION VOL. VIII

Standard Broadcast Band 530-1720 Kilocycles
Short Wave Band 5.4-17 Megacycles (17.5 to 55 Meters)

105-115 Volts, 60 Cycle Alternating Current - 65 Watts




## IF PEAK 370 KC.

ALIGN. FREQS:-
IF 370 KC - BC OSC. TRIM. 535 KC. (SET GANG COND. & PWR TRANSF)
BC OSC. SHUNT TRIM. TO 1712 KC (TOP ADJ. IN OSC. COIL CAN)
SW OSC. SHUNT TRIM. TO 15 MC (BOTTOM TRIM. IN COIL CAN).
SW ANT. TRIM. 15 MC




## RESISTORS

| No | VALUE | |
|---|---|---|
| R.1 | 50M. | ½W. |
| R.2 | 50 | ½W. |
| R.3 | 500M | ½W. |
| R.4 | 50M | ½W. |
| R.5 | 500M | VOLUME CONTROL P-101-11 |
| R.6 | 500M | ½W. |
| R.7 | 250M | ½W. |
| R.8 | 250M | ½W. |
| R.9 | 1000 | |
| R.10 | 275 | |
| R.11 | 13M | |
| R.12 | 25M | ½W |
| R.13 | 250M | ½W. |
| R.14 | 750M | ½W. |
| R.15 | 10M | ½W. |

## CONDENSERS

| No | VALUE |
|---|---|
| C.1 | 50 MICA |
| C.2 | 490 MICA |
| C.3 | 5M MICA |
| C.4 | .05 X 200V. |
| C.5 | .05 X 400V. |
| C.6 | 100 MICA |
| C.7 | 100 MICA |
| C.8 | .05 X 200V. |
| C.9 | .05 X 400V. |
| C.10 | .003 X 400V. |
| C.11 | .02 X 400V. |
| C.12 | .1 X 200V. |
| C.13 | 1 X 200V. |
| C.14 | .25 X 200V. |
| C.15 | .25 X 200V. |
| C.16 | 18 MFD. 350V. P-103-3 |
| C.17 | 16 MFD 400V. P-103-4 |
| C.18 | .120 mf. |
| C.19 | .01 mf. |
| C.20 | .0005 MICA. |

NOTE:-
CONDENSERS C.10, C.11 IN DUAL UNIT.
C.14, C.15 " " "
C.13, C.4 - " "

RESISTORS R.9, R.10, R.11 IN ONE UNIT P-106-13
NUMBERS PREFIXED BY LETTER 'P' ARE PART NUMBERS.

34265

VOLTAGES TAKEN FROM POINTS INDICATED TO CHASSIS GROUND. VOLUME CONTROL ON FULL RESISTORS, R.3, 4, & 6, CONDENSERS C.6, 7, & 8 ARE IN OUTPUT I.F. CAN, P-108-15

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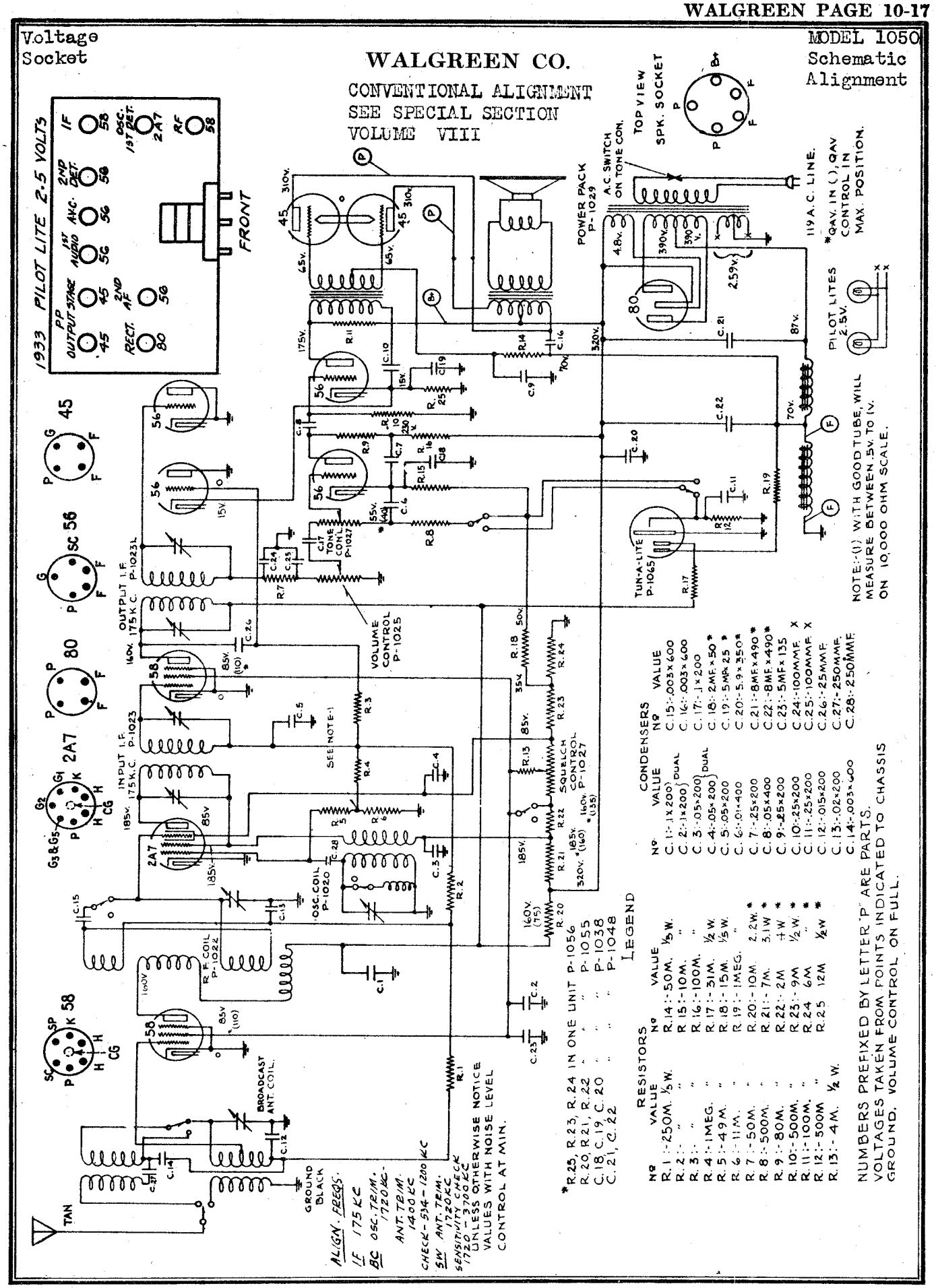


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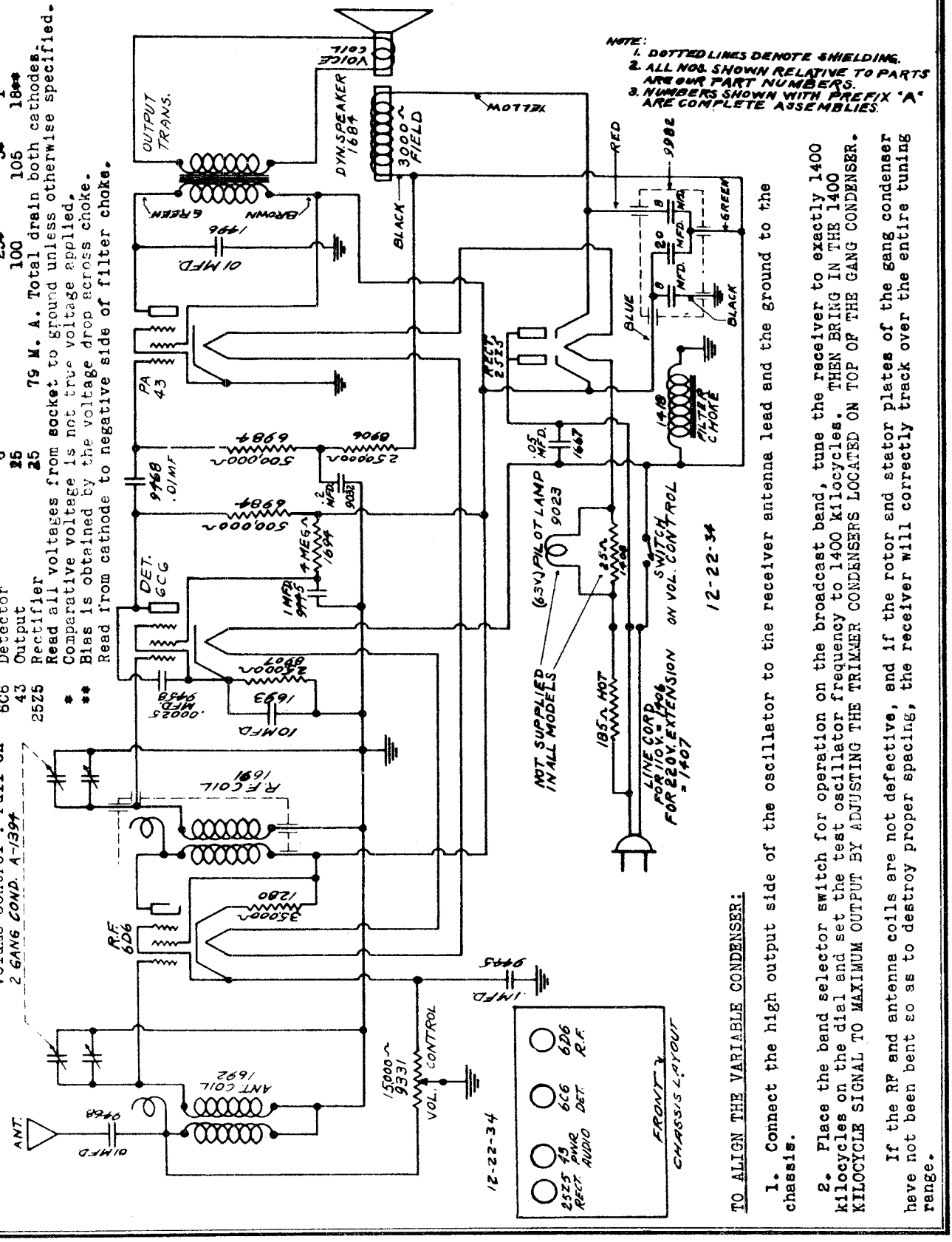
MODEL 4154
Schematic, Voltage
Socket, Alignment

# WALGREEN CO.




TO ALIGN THE VARIABLE CONDENSER:

1. Connect the high output side of the oscillator to the receiver antenna lead and the ground to the chassis.

2. Place the band selector switch for operation on the broadcast band, tune the receiver to exactly 1400 kilocycles on the dial and set the test oscillator frequency to 1400 kilocycles. THEN BRING IN THE 1400 KILOCYCLE SIGNAL TO MAXIMUM OUTPUT BY ADJUSTING THE TRIMMER CONDENSERS LOCATED ON TOP OF THE GANG CONDENSER.

If the RF and antenna coils are not defective, and if the rotor and stator plates of the gang condenser have not been bent so as to destroy proper spacing, the receiver will correctly track over the entire tuning range.

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## DESCRIPTION

This receiver is a portable, four (4) tube, battery operated superheterodyne with self-contained loop antenna and batteries.

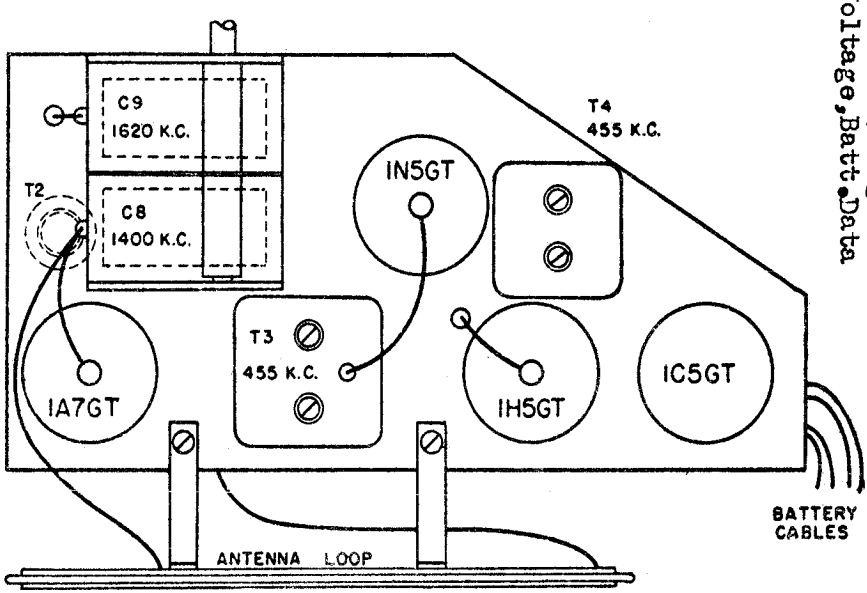
The tubes used are a 1A7GT as an oscillator convertor; a 1N5GT as an I. F. amplifier; a 1H5GT as an A.V.C. detector and audio amplifier; and a 1C5GT as a power output.

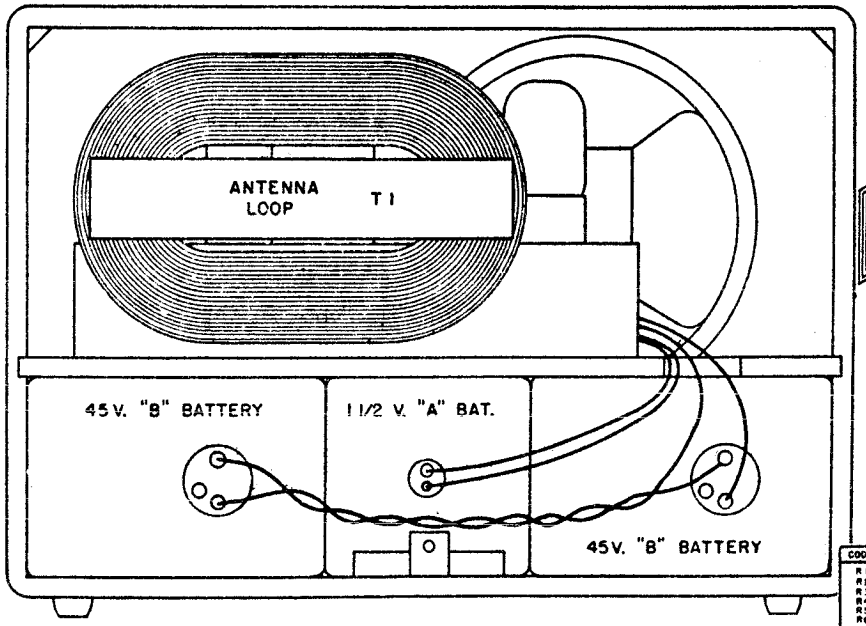
This receiver is made to cover the standard broadcast band from 1620 K.C. to 535 K.C.

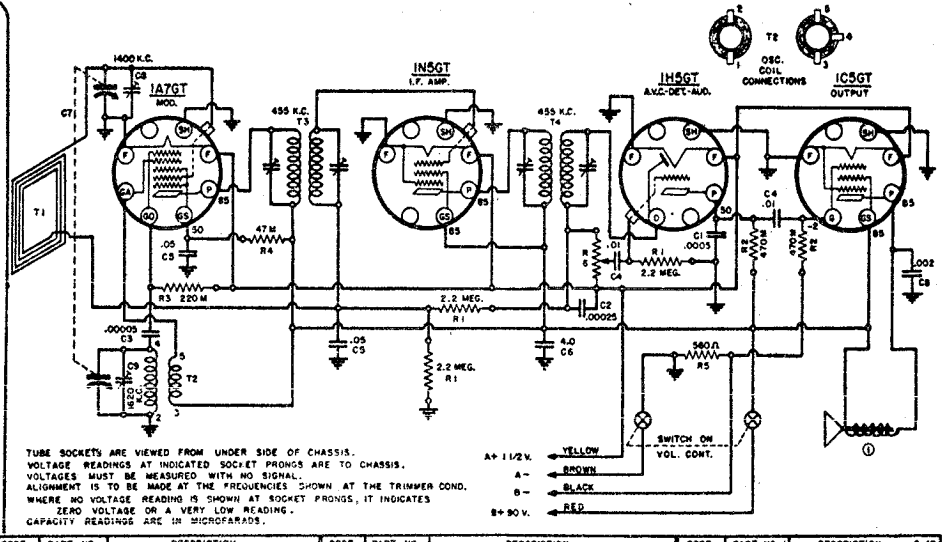
## BATTERIES

Listed below are various manufacturers of batteries and their part numbers that may be used to make up the combination of batteries to be used with this receiver.

| (Batteries) | | Their Part No. |
|---|---|---|
| Burgess: | B Battery | B30 |
| | A Battery | 4F |
| Ray-O-Vac: | B Battery | P-5303 |
| | A Battery | P-94A |
| Ever-Ready: | B Battery | 762 |
| | A Battery | 742 |
| General: | B Battery | V30B |
| | A Battery | 4F1 |




| CODE | PART NO. | DESCRIPTION | CODE | PART NO. | DESCRIPTION | CODE | PART NO. | DESCRIPTION 0-40 |
|---|---|---|---|---|---|---|---|---|
| R1 | 60-179 | 2.2 MEGOHM 1/3 WATT RESISTOR | C1 | 15-112 | .0005 MFD. MICA CONDENSER | T1 | 82-2 | ANTENNA LOOP |
| R2 | 60-178 | 470 M OHM " " " | C2 | 1504 | .00025 " " " | T2 | 10-294 | OSCILLATOR COIL |
| R3 | 60-180 | 220 M " " " | C3 | 1503 | .00005 " " " | T3 | 10-293 | 1 ST. I.F. TRANSFORMER |
| R4 | 60-177 | 47 M " " " | C4 | 16-121 | .01 MFD. 200 V. TUBULAR CONDENSER | T4 | 10-281 | 2 ND. " |
| R5 | 60-201 | 560 Ω " " " | C5 | 1622 | .05 " 200 V. " " | | | |
| R6 | 24-138 | 1 MEGOHM VOLUME CONTROL | C6 | 16-250 | 4.0 " 150 W.V. " " | 1 | 78-272 | 5" SPEAKER |
| | | | C7 | 19-149 | 2 GANG VARIABLE COND. ALSO C8 & C9 | | | |
| | | | C8 | 1908 | .002 MFD. 400 V. TUBULAR CONDENSER | | | |

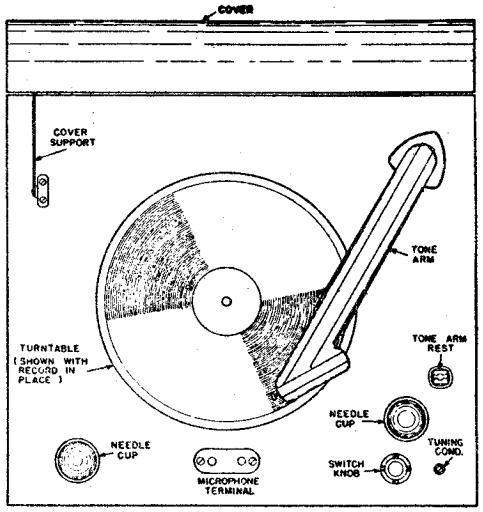
MODEL 9-23
Wireless Record Player
Schematic, Data

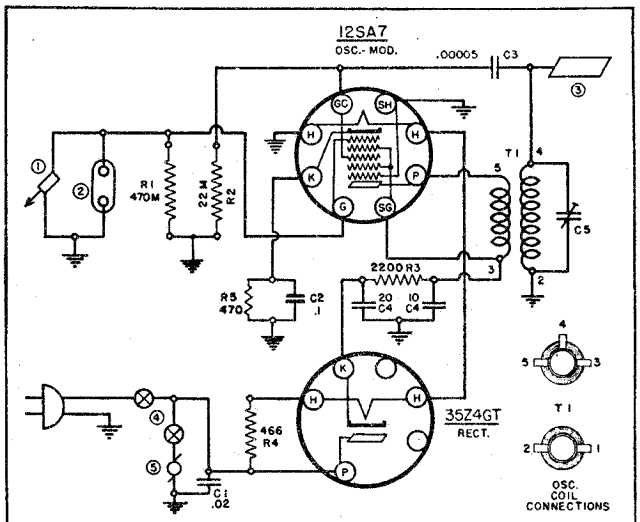
# WARWICK MFG. CORP.

## ATTACHMENT

There is incorporated in this Phono-Oscillator unit a tip jack terminal strip microphone connection. The microphone is supplied as an attachment and can be purchased under the part No. 79-263 from your dealer. In its attachment to the receiver, plug in the ends of the microphone cord into the tip jacks (see pictorial) and have switch in the first position. That is, in the positon to operate the oscillator but not the phono-motor.

**Note:**—Be sure to shut off the record player completely when it is not in use by turning the switch to the "off position".




| CODE | PART NO. | DESCRIPTION | CODE | PART NO. | DESCRIPTION 9-23 |
|---|---|---|---|---|---|
| R1 | 60-178 | 470M OHM 1/3 W. RES. | C1 | 1605 | .02 MFD. 400V. TUB. COND. |
| R2 | 60-185 | 22 M " " " | C2 | 16-115 | .1 " 200V. " |
| R3 | 60-234 | 2200 " " " | C3 | 1503 | .00005 MFD. MICA " |
| R4 | 60-231 | 466 " 10 1/2 W. | C4 | 18-241 | 20 X10 " 150V. ELECT. |
| R5 | 60-216 | 470 " 1/3 W " | C5 | 20-119 | 3 PLATE TRIMMER |
| 1 | 83-130 | PICKUP | T1 | 10-240 | OSCILLATOR COIL |
| 2 | 12-1 | MICROPHONE TERMINAL | | | |
| 3 | 82-1 | ANTENNA PLATE | 5 | 59-3 | PHONOGRAPH MOTOR |
| 4 | 69-129 | SWITCH (DUAL) | | | |

## PARTS PRICE LIST

| Part No. | DESCRIPTION | Price |
|---|---|---|
| 83-130 | Tone Arm Assem. | $ 8.25 |
| 59-3 | Motor Assem | 7.00 |
| 42-213 | Cabinet and Cover Assem. | 8.75 |
| 12-1 | Microphone Jack | .40 |
| 79-263 | Microphone Supplied as an Attachment. | 5.00 |
| 69-129 | Switch Dual | .75 |
| 10-240 | Oscillator Trans. | .75 |
| 20-119 | Trimmer | .25 |
| 18-241 | Electrolytic Cond. 20x10 mf. 150 V. | 1.00 |
| 60-231 | Res. 466 Ohms | .50 |

**Prices subject to change without notice.**

# PHONO-OSCILLATOR

## DESCRIPTION

This unit is a Two Tube Phono-Oscillator. The tubes used are a 12SA7 as an oscillator and a 35Z4GT as a power rectifier.

This unit should be operated between 1500 K.C. and 1700 K.C. and is so designed that the playing of a record on the unit makes it possible that you receive this same recording from any radio set within a nearby vicinity.

## INSTALLATION

This Phono-Oscillator is designed to operate from a 105-130 volt 60 cycle A.C. current supply only; do not connect this to any other source unless so specified. If in doubt about your power supply, your local power company will give you this information.

There are no connections needed between the Radio Receiver and the Phono-Oscillator. The only needed connection is the power supply line cord to an electric outlet.

For best results it would be advisable to use medium or soft needles. They will assure you longer record life and are not as severe on the tone arm as other types of needles.

The tone arm is a sensitive unit and precaution should be taken in handling. It would be injurious to drop or rest the tone arm on the point of the needle. Always use arm rest when the Phono-Oscillator is not in use.

## OPERATION

Place the Phono-Oscillator near an electric outlet and within a distance of about 30 feet of the Radio Receiver which you intend to use. Do not set this unit near a radiator or other heater since the cabinet may be damaged.

Attach line cord plug to the nearest outlet.

Adjust your radio receiver to maximum volume and set tuning dial to a point at the high frequency end between 1500 K.C. and 1700 K.C. where minimum interference from outside stations is noticed.

Allowing the Radio Receiver to remain at that adjustment, turn switch knob on the Phono-Oscillator (see pictorial diagram) in a clockwise direction until the first click is noticed. This will turn the oscillator section of the unit on, and about ½ minute should be allowed for tubes to heat up. With a record in the proper position on the turn table turn the same switch knob further toward the right (in a clockwise direction) until another click is heard. This will turn the Phono-Motor on and when the record has reached its proper speed of rotation, set the pick-up arm with its needle lightly upon the record.

The Phono-Oscillator is now operating and if it is not being heard over the radio it will indicate that it is oscillating at a different frequency than that set up on the Radio Receiver. In order to set the oscillator to the same position as the radio receiver there is incorporated a tuning condenser, (see pictorial layout). Turn this condenser with a screw driver in a clockwise rotation, slowly and carefully until the response of the record is picked up by the Radio Receiver. If when turning the tuning condenser as mentioned above you do not get a response after 3 or 4 turns it will indicate that you have gone past the point. It will be necessary to turn in the opposite direction (counter clockwise) until the response is obtained.

In order to get maximum volume and clarity it would be advisable to tune your radio a few degrees one way or the other until the best result is obtained.

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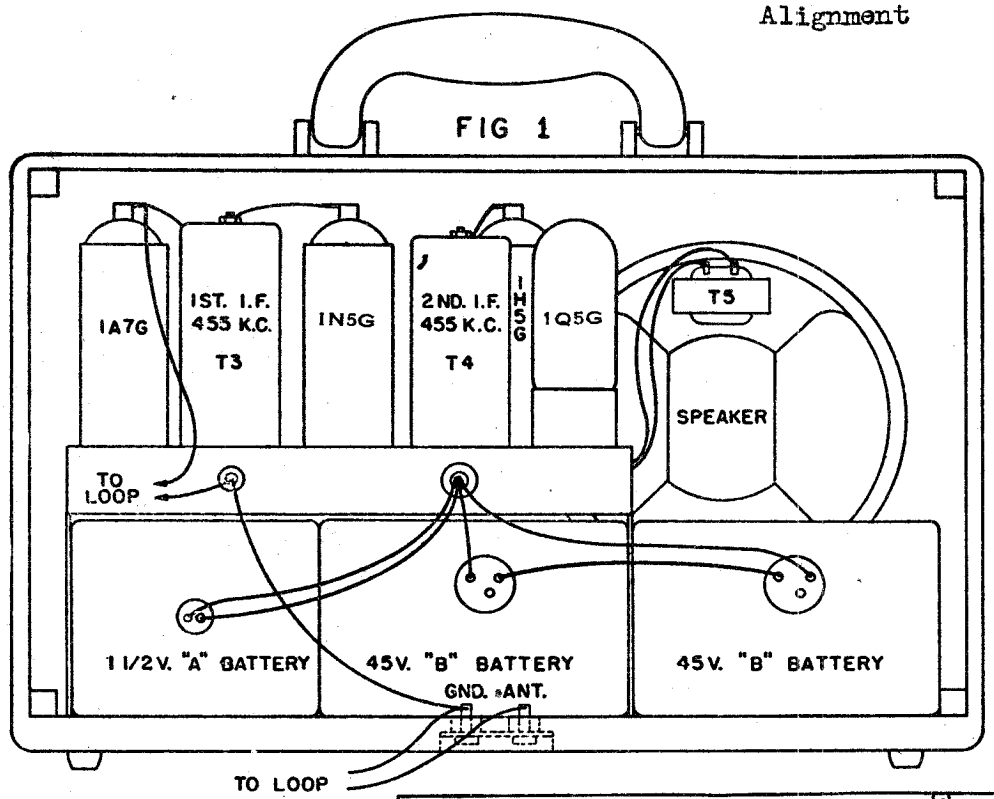
# WARWICK MFG. CORP.

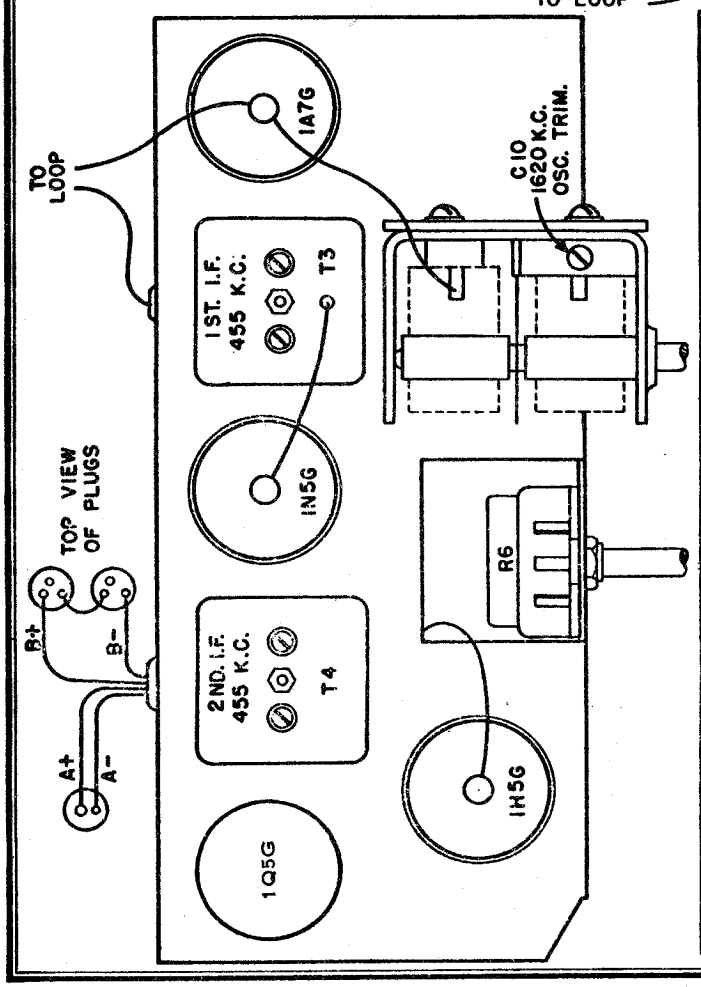
MODELS 9-43,9-45
Schematic, Voltage
Socket, Trimmers
Alignment

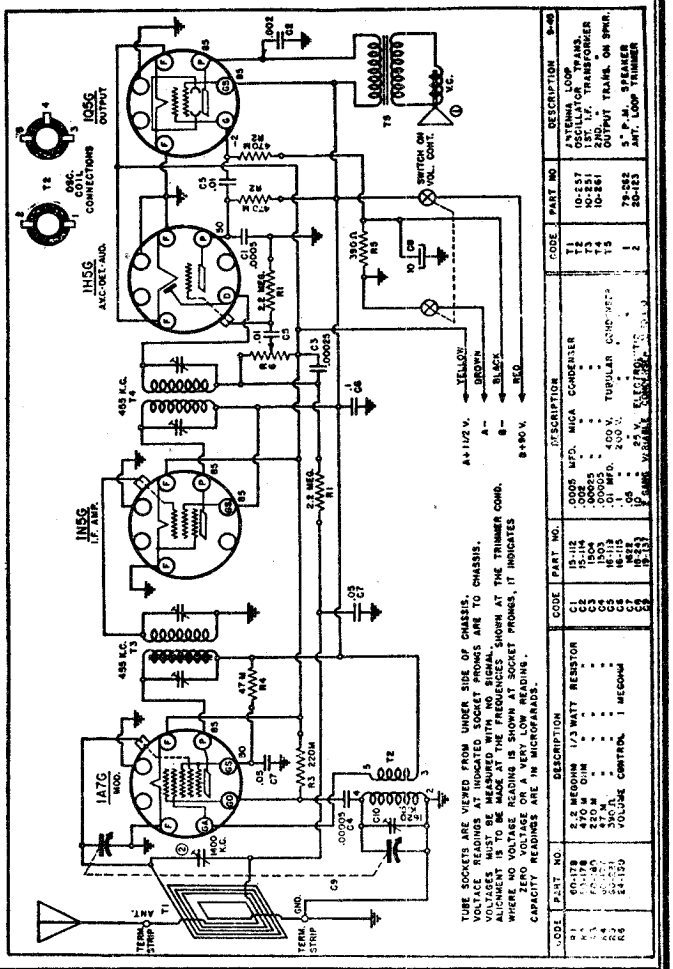
FOR CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL VIII

**This receiver is made to cover the standard broadcast band from 1620** K. C. to 535 K. C.

FIG 1





1Q5G OUTPUT
OSC. COIL CONNECTIONS
1H5G A.V.C.-DET.-AUD.
1N5G I.F. AMP.
1A7G MOD.
455 K.C. T4
455 K.C. T3
SWITCH ON VOL. CONT.
YELLOW
BROWN
BLACK
RED
A+ 1 1/2 V.
A-
B- 90 V.
B+ 90 V.
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MEASURED WITH 1000 OHMS PER VOLT METER.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER COND.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONGS, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY READINGS ARE IN MICROFARADS.
TERM. STRIP
ANT.
GND.

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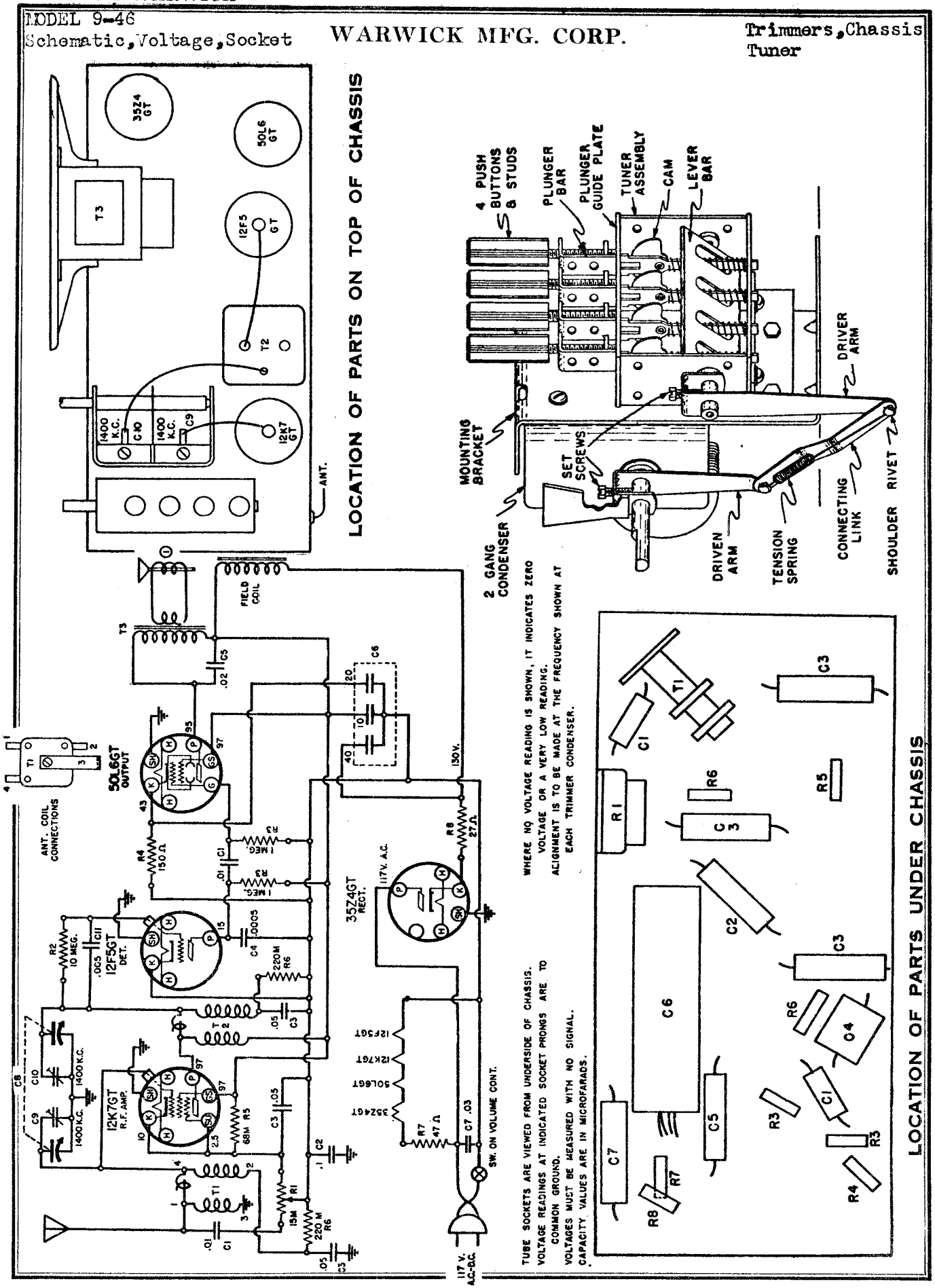
MODEL 9-46
Schematic, Voltage, Socket

# WARWICK MFG. CORP.

Trimmers, Chassis
Tuner


LOCATION OF PARTS ON TOP OF CHASSIS
ANT.
LOCATION OF PARTS UNDER CHASSIS
4 PUSH BUTTONS & STUDS
PLUNGER BAR
PLUNGER GUIDE PLATE
TUNER ASSEMBLY
CAM
LEVER BAR
DRIVER ARM
MOUNTING BRACKET
SET SCREWS
2 GANG CONDENSER
DRIVEN ARM
TENSION SPRING
CONNECTING LINK
SHOULDER RIVET
50L6GT OUTPUT
12F5GT DET.
12K7GT R.F. AMP.
35Z4GT RECT.
ANT. COIL CONNECTIONS
FIELD COIL
117 V. A.C.
SW. ON VOLUME CONT.
WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GROUND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
CAPACITY VALUES ARE IN MICROFARADS.

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# WARWICK MFG. CORP.





## ALIGNMENT PROCEDURE

Model 9-46

**PRELIMINARY**

| | |
|---|---|
| Output Meter Connections | Across Loud Speaker Voice Coil |
| Output Meter Reading to Indicate 1 Watt | 1.95 Volts |
| Generator Ground Lead Connection | Receiver Chassis |
| Dummy Antenna Value to Be in Series with Generator Output | See Chart Below |
| Connection of Generator Output Lead | See Chart Below |
| Generator Modulation | 30%, 400 Cycles |
| Position of Volume Control | Fully On |

| POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTIONS | TRIMMER ADJUSTMENT (In Order Shown) | TRIMMER FUNCTION |
|---|---|---|---|---|---|
| 1400 KC | 1400 Kc. | .0002 mfd. | Antenna Conn. | C10 | .F. Trimmer |
| 1400 KC | 1400 KC | .0002 mfd. | Antenna Conn. | C9 | Ant. Trimmer |

Model 9-58

| POSITION OF VARIABLE | GENERATOR FREQUENCY | DUMMY ANTENNA | GENERATOR CONNECTIONS | TRIMMER ADJUSTMENT (In Order Shown) | TRIMMER FUNCTION |
|---|---|---|---|---|---|
| Closed | 455 Kc. | .1 mfd. | 12A8GT | T4-T5 | I.F. |
| Closed | 455 Kc. | .0002 mfd. | Antenna Conn. | T1 (Min. Output) | Wave Trap |
| Fully Open | 1760 K.C. | .0002 mfd. | Antenna Conn. | C13 | Osc. Trimmer |
| Fully open | 1450 K.C. | .0002 mfd. | Antenna Conn. | C12 | Ant. Trimmer |

**INDEX TABS** Model 9-46

Cut the call letters of your four (4) selected stations from the list supplied with your receiver and slip them into the top of the Push-buttons. Arrange the call letters in the buttons with the call letter of the highest frequency station, the one that comes in closest to the number 160 on the tuning knob, toward the rear of the receiver and work progressively toward the front so that the lowest frequency station, the one that comes closest to the number 60 on the tuning knob, would be toward the front.

**SETTING PUSH-BUTTONS**

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the highest frequency—that is, your selected station which is tuned in nearest number 160 on the Station Selector Knob.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of highest frequency and the Call Letter Tab for this station should be in the Push-button nearest the rear of the receiver.

Follow through with this same procedure, setting up the other 3 stations in the order of their frequency—that is, the second station set up will be second highest in frequency and the third station set up will be third highest in frequency.

**INDEX TABS:** Model 9-58

Cut the call letters of your four (4) selected stations from the list supplied with your receiver and slip them into the Tab Holder from the front, with the clear celluloid in front of the call letters, to protect them. Arrange the call letters in the Buttons from right to left. Have the call letters of the lowest frequency station, that is, the station that comes in nearest to the top of the dial scale, at the extreme right-hand button and work progressively to the left so that the highest frequency call letters will be in the extreme left-hand button.

**SETTING PUSH-BUTTONS:**

1. By means of the Station Selector Knob, tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the top of the dial.
2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

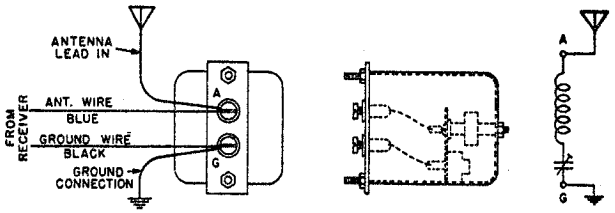
4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.
The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holder.

Follow through with this same procedure, setting up the other 3 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of its setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

To receive all other stations in the regular manner turn the tuning knob to the frequency of the station desired.




Model 9-46

**WAVE TRAP:**

In localities where particular interference is noticed from code transmitters it would be advisable to attach to the receiver an antenna wave trap. Connect the antenna wire from the receiver (blue lead) and the antenna lead-in from your antenna to the binding post marked "A" on the wave trap. Connect the ground wire of your receiver (black lead) and the ground lead coming from your ground connection to the binding post designated as "G" on the wave trap. This antenna wave trap can be obtained under the part No. 1016310255 as a service part.

This wave trap is supplied tuned to a frequency of 455 K.C. If there is only one interfering station it would be advisable to tune the wave trap to the frequency of the interference. Where there are more than one interference it would be advisable to have the wave trap tuned to a frequency of 455 K.C. to keep the interference at a minimum.

**HOW THE AUTOMATIC PUSH-BUTTON TUNER FUNCTIONS:**

Model 9-46

This unit is mechanically operated by means of a proven cam and lever action, designed to rotate a shaft 90 degrees. Since the variable gang condenser must rotate 180 degrees, a 2 to 1 step up mechanical lever action is incorporated to give full rotation to the gang condenser. Three links are used to transmit the operation of the push-button to the variable gang condenser, one a driver lever or link connected to the tuner shaft, second, a driven lever connected to the gang condenser shaft and third a connecting link, connecting the two levers together mechanically.

The plunger bar that retains the screw type push-buttons, also holds a cam to itself by a shoulder rivet. This cam floats on the rivet proper and is locked into position with a small square plate, floating in the plunger bar. To lock cam into position, screw the push-button knob toward the right (clock-wise). The end of the push-button screw will then force a small square plate known as a brake shoe against the periphery of the cam. The push-button must be tightened firmly after the position of the station selection is determined. To change the setting of the cam, the push-button knob must be loosened by rotating it toward the left (counter-clockwise). When this push-button screw is loosened, it will automatically release the brake shoe from the cam, leaving the cam free to rotate and set its new position to the setting of the lever bar.

If it becomes necessary to realign the tuner in relation to the gang condenser, the following procedure should be followed to assure perfect tuning operation:

1. Slip driver arm on to the tuner shaft and the driven arm on to the variable condenser shaft. Do not tighten set screws.

2. Connect these two lever arms by slipping the connecting link over the heads of the shoulder rivets. This link has a slight offset and precaution should be taken when assembling to see that it is installed in the proper manner as illustrated in the Pictorial. It will be necessary to tilt the link slightly in order to slip it over the head of the shoulder rivets. Then attach spring as shown.

3. In making the final adjustment, that of setting the condenser in relation to the tuner, set the condenser at minimum capacity (opened completely) and the front edge of the lever bar raised as high as possible (see Pictorial). With the lever arms in a vertical position as shown tighten set screws.

It is essential that all set screws be tightened securely so as to prevent a variation from original setting.

If, for some reason, a replacement is necessary for some particular item on the tuner proper, such as a lever bar, cam, plunger bar or brake shoe, it would be advisable to return the complete tuner proper for replacement.

**HOW THE AUTOMATIC PUSH-BUTTON TUNER FUNCTIONS:** Model 9-58

This unit is mechanically operated by means of a proven cam and lever action, designed to rotate a shaft 90 degrees. Since the variable gang condenser shaft must rotate 180 degrees, a 2 to 1 step up mechanical lever action is incorporated to give full rotation to the gang condenser. Three links are used to transmit the operation of the push-button to the variable gang condenser; first, a driver lever or link connected to the tuner lever bar, (see Pictorial); second, a driven lever arm connected to the gang condenser shaft; and third, a connecting link, connecting the two lever arms together mechanically.

If it becomes necessary to realign the tuner in relation to the gang condenser, the following procedure should be followed to assure perfect tuning operation:

1. Attach driver arm to the lever bar by means of two machine screws, making sure that they are assembled with lockwashers and tightened securely.

2. Slip the drum assembly, which consists of the drum, drum hub, and the driven arm, over the variable condenser shaft but do not tighten set screws.

3. Connect these two lever arms by slipping the connecting link over the heads of the shoulder rivets. This link has a slight bend (offset) about 1/3 of its length and is to be installed with the shorter end towards the top and the offset towards the rear when looking at it from the drum end. Attach the tension spring between the two shoulder rivets. This spring is incorporated to take up all the unnecessary slack in the drive.

4. In making the final adjustment, that of setting the condenser in relation to the tuner, close the condenser completely to maximum capacity and rotate drum with the left hand in a clock-wise rotation, until the driver arm comes gradually down to within 1/8 of an inch of the variable condenser shaft. When in this position, tighten set screws in the drum hub with the right hand.

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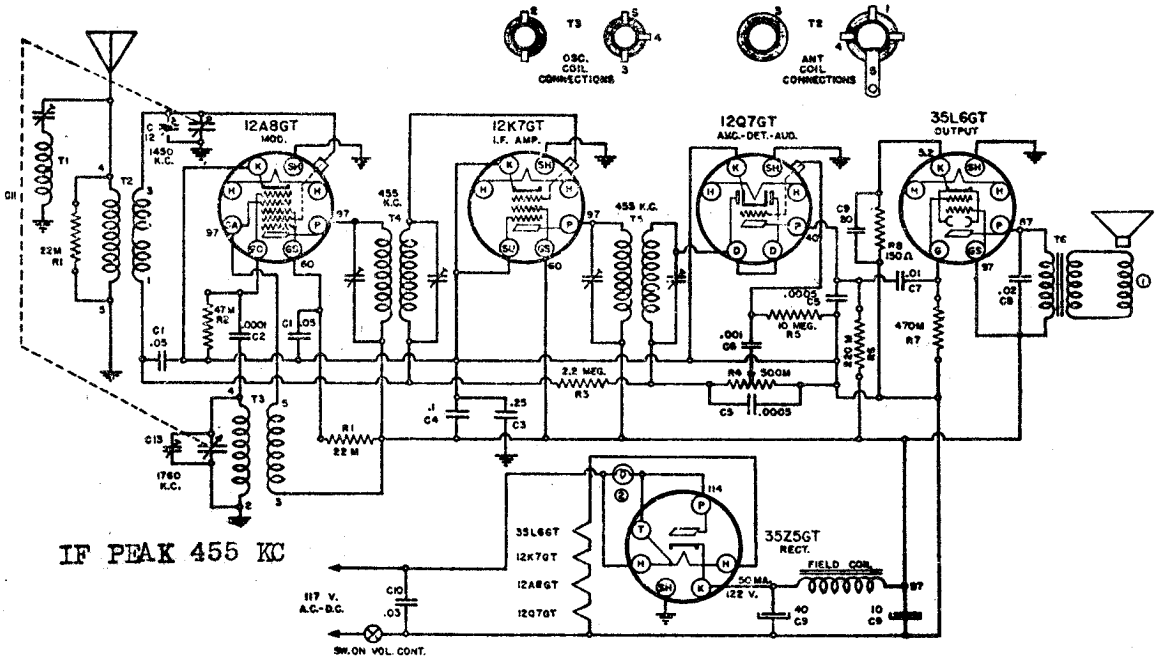
MODEL 9-58
Schematic, Voltage
Socket, Trimmers
Chassis

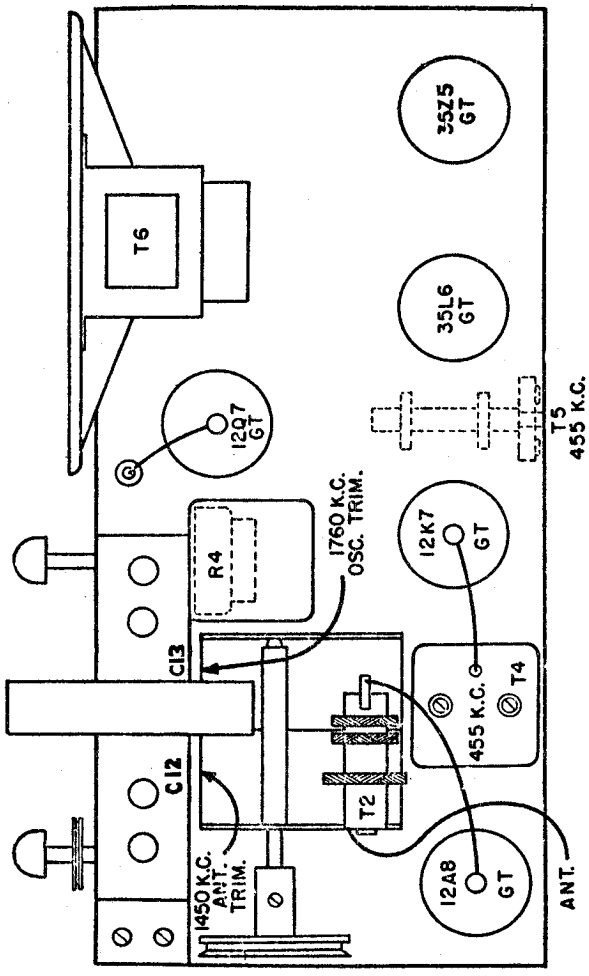
# WARWICK MFG. CORP.



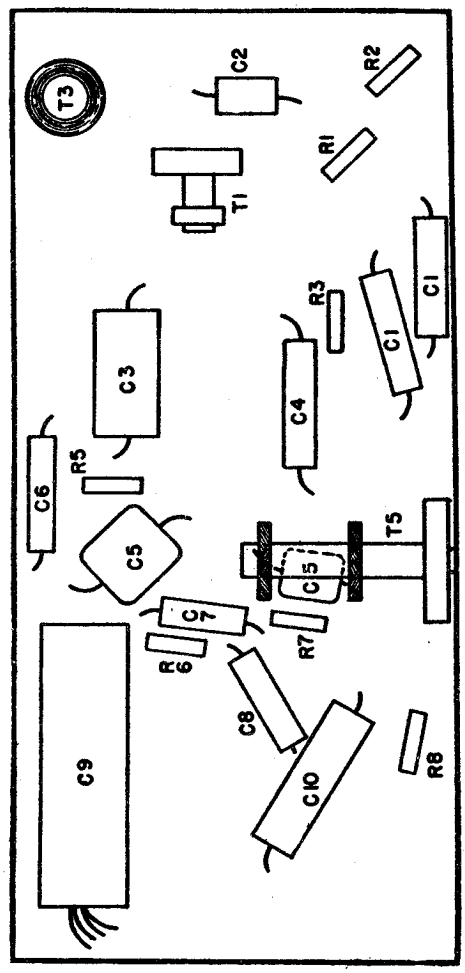

IF PEAK 455 KC

TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GROUND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
CAPACITY VALUES ARE IN MICROFARADS.

ALIGNMENT IS TO BE MADE AT THE FREQUENCY, SHOWN AT EACH TRIMMER CONDENSER.
WHERE NO VOLTAGE READING IS SHOWN, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.




LOCATION OF PARTS ON TOP OF CHASSIS




LOCATION OF PARTS UNDER CHASSIS

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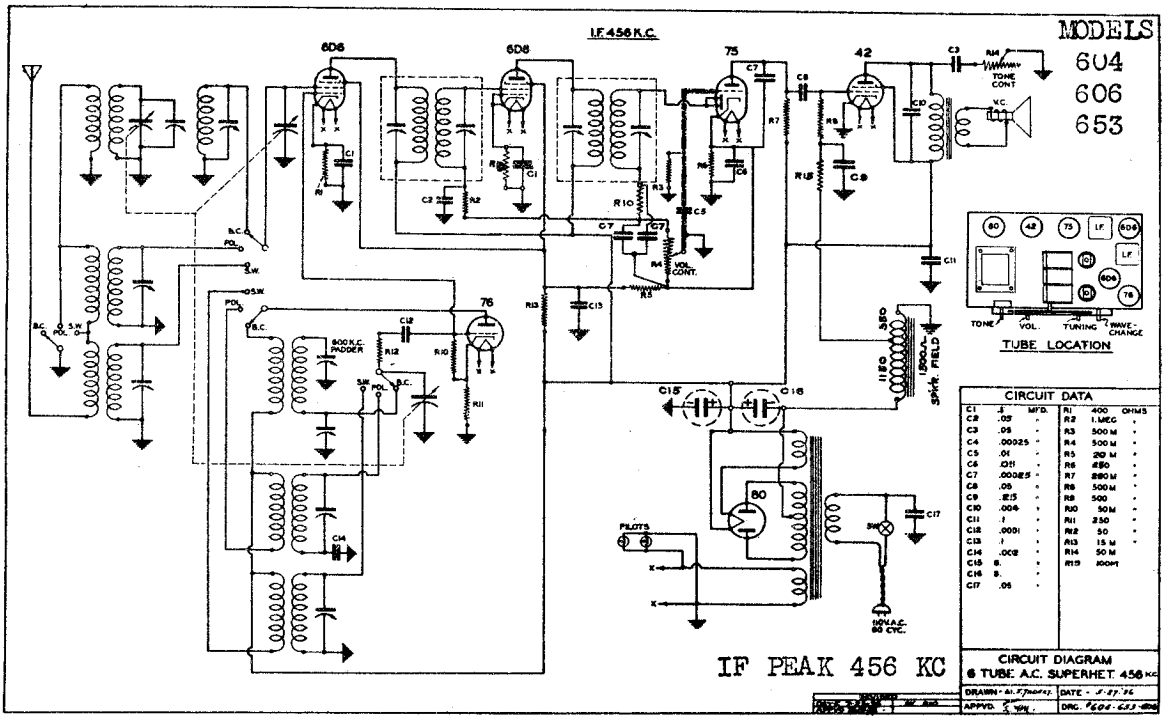
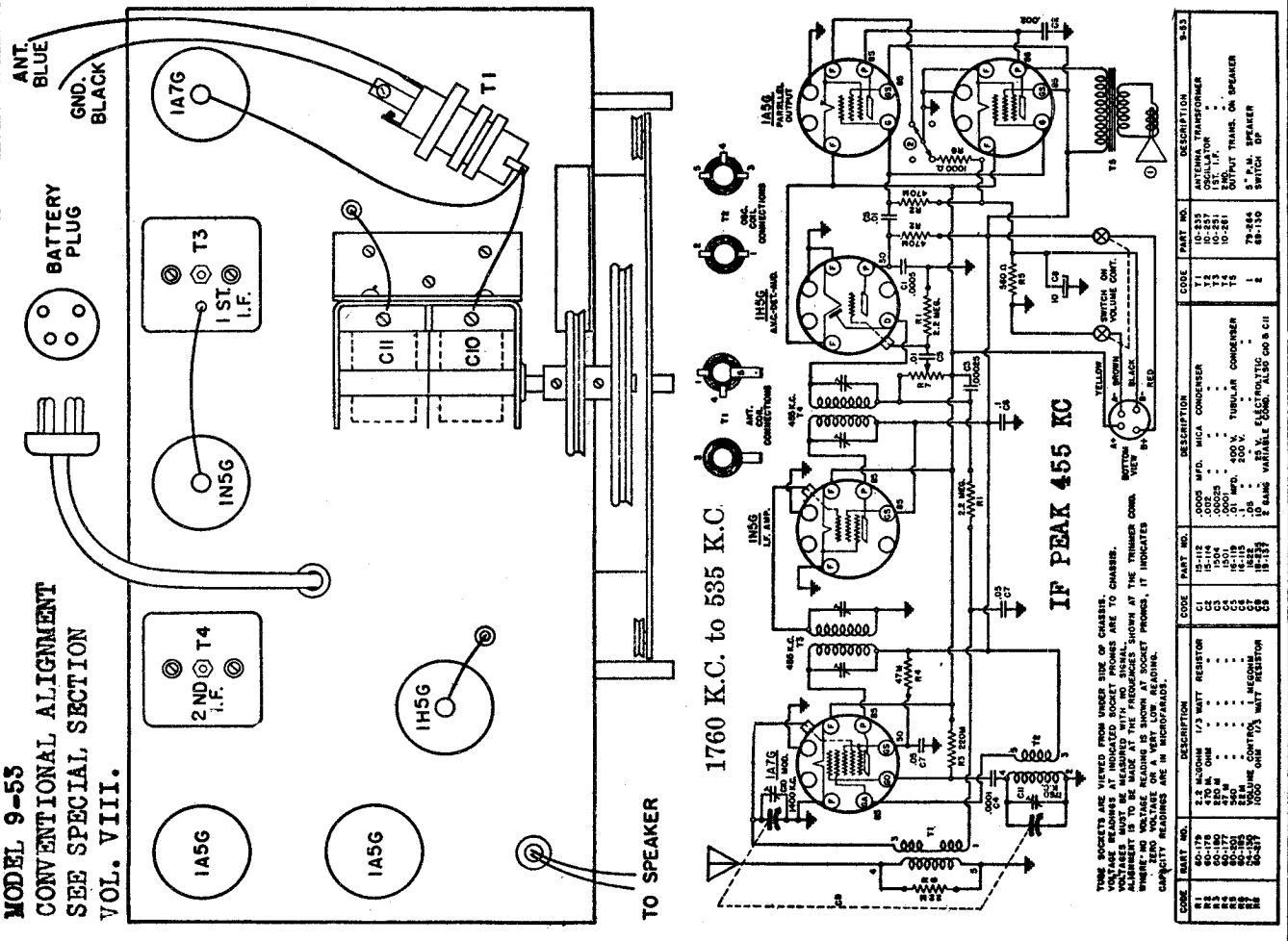
MODELS 604,606,653
Schematic,Socket

# WARWICK MFG. CORP.

MODEL 9-53
Schematic,Voltage,Socket
Trimmers,Alignment

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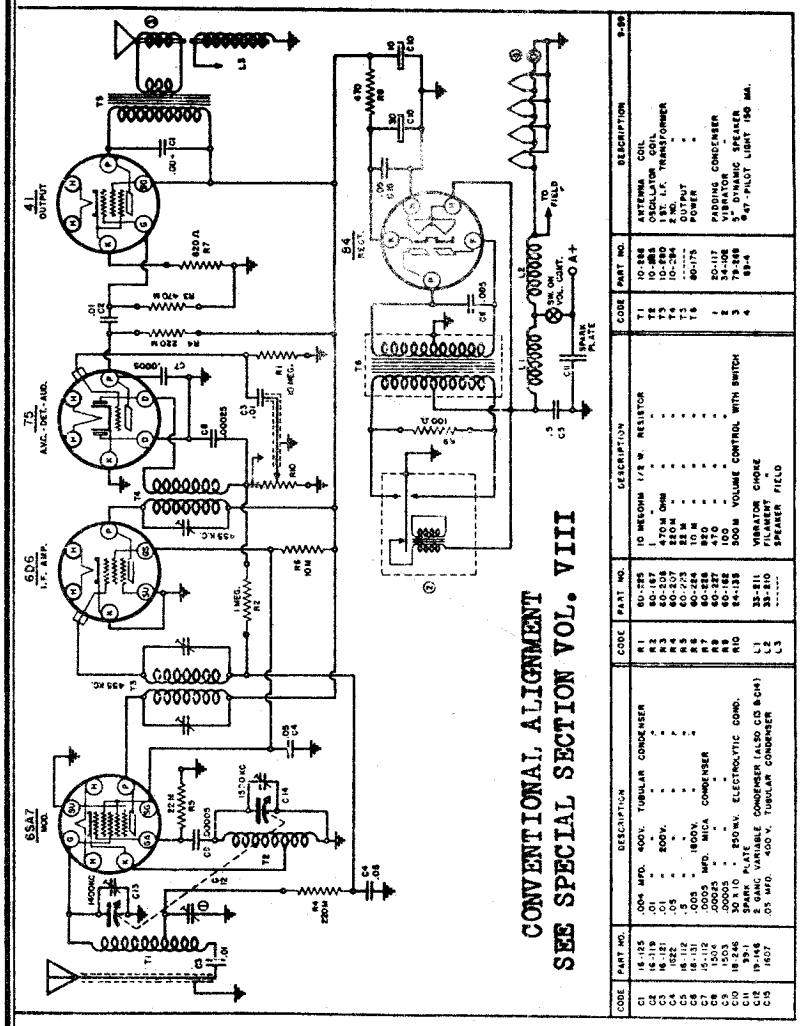
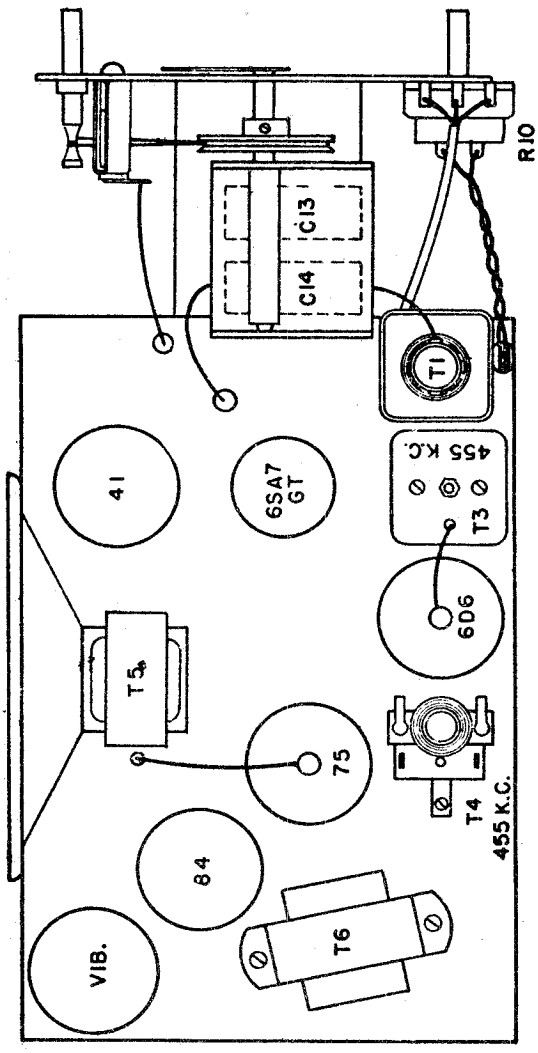
MODEL 9-59 Auto
Schematic, Socket
Trimmers, Alignment

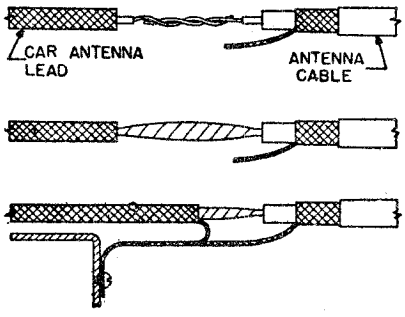
# WARWICK MFG. CORP.

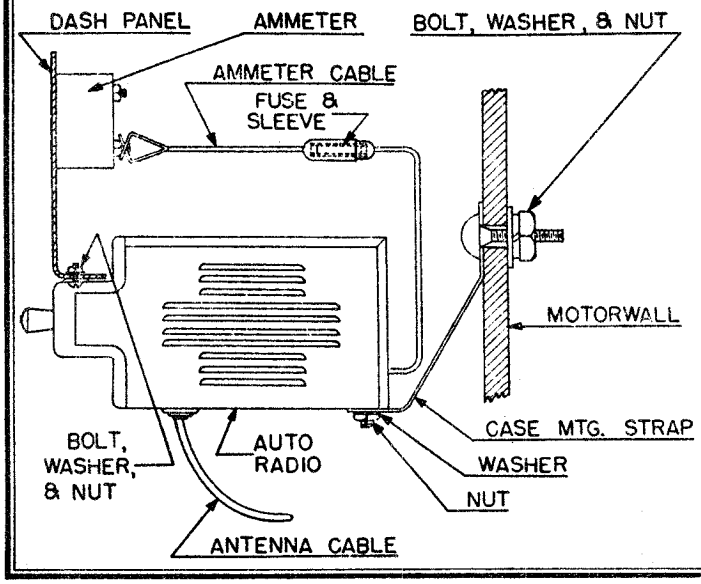


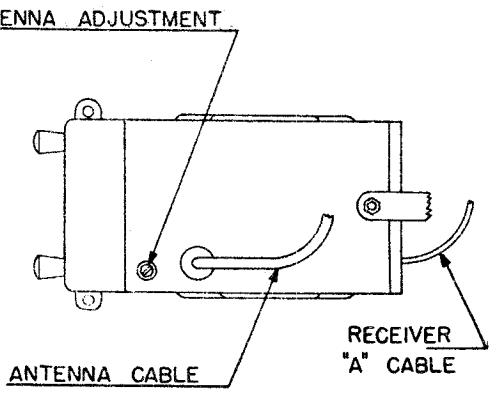




## Automobile Receiver

## Frequency Range 540-1520 Kilocycles

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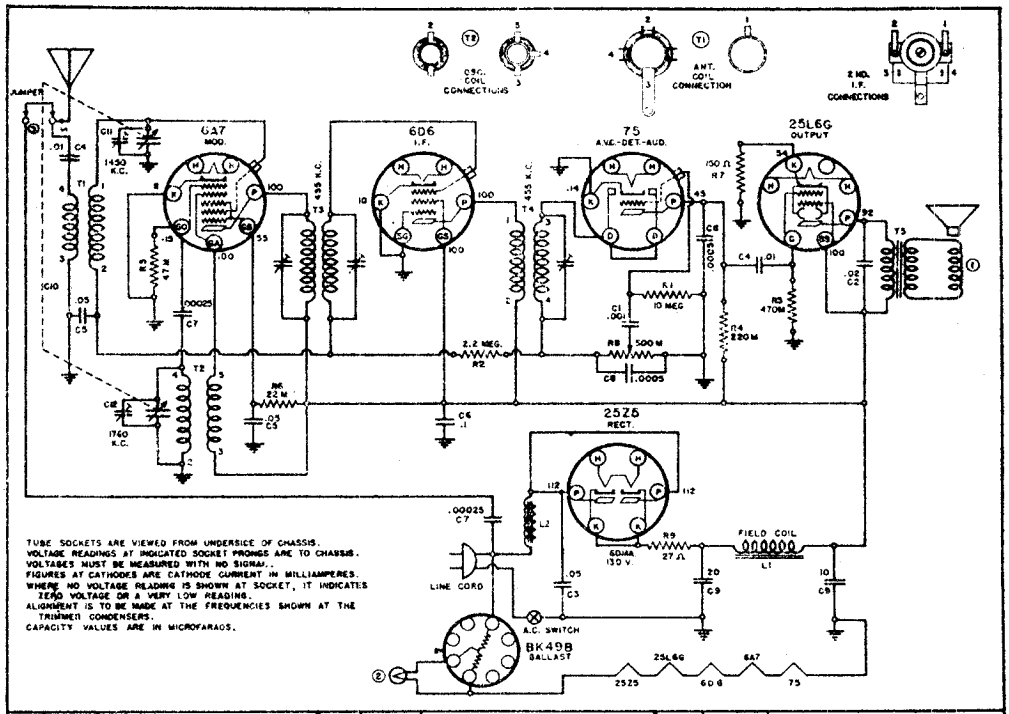
# WARWICK MFG. CORP.

MODEL 9-66
Schematic, Voltage
Socket, Trimmers
Alignment

This receiver is a 6-tube AC/DC current operated Superheterodyne.

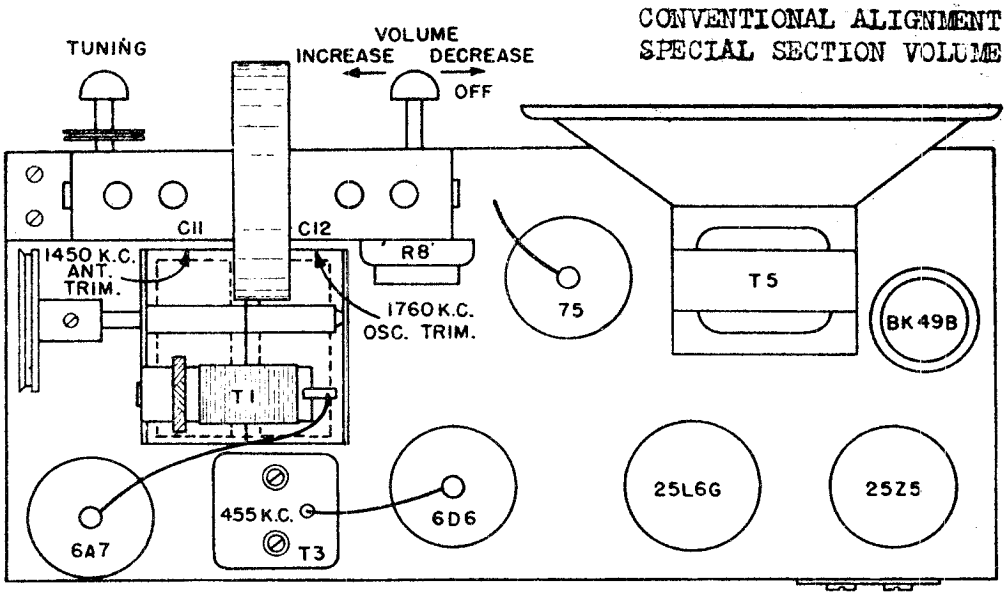
The tubes used are: a 6A7 as an oscillator-converter; a 6D6 as an I. F. amplifier; a 75 as an A.V.C. detector and audio amplifier; a 25L6G as a beam output; a 25Z5 as a power rectifier; and a BK49B as a voltage divider.

This receiver is made to cover from 1750 KC. to 535 KC., which covers the standard broadcast band and the first police band.


6A7
6D6
75
25L6G
25Z5
BK49B
TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
CAPACITY VALUES ARE IN MICROFARADS.
LINE CORD
A.C. SWITCH
FIELD COIL

| CODE | PART NO. | DESCRIPTION | CODE | PART NO. | DESCRIPTION | CODE | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|
| C1 | 16-124 | .001 MFD. 400V. TUBULAR COND. | R1 | 60-193 | 10 MEGOHM 1/3W. RESISTOR | T1 | 10-277 | ANTENNA COIL |
| C2 | 1605 | .02 - - - - | R2 | 60-179 | 2.2 - - - | T2 | 10-240 | OSCILLATOR COIL |
| C3 | 1607 | .05 - - - - | R3 | 60-178 | 470 M OHM - - - | T3 | 10-278 | 1ST. I.F. TRANSFORMER |
| C4 | 16-121 | .01 - 200V. - - | R4 | 60-180 | 220 - - - | T4 | 10-271 | 2ND. I.F. - |
| C5 | 1622 | .05 - - - - | R5 | 60-177 | 47 M - - - | T5 | ------ | OUTPUT - (ON SPEAKER) |
| C6 | 16-115 | .1 - - - - | R6 | 60-185 | 22 M - - - | | | |
| C7 | 1504 | .00025 MFD. MICA CONDENSER | R7 | 60-184 | 150 - - - | L1 | ------ | FIELD COIL (ON SPEAKER) |
| C8 | 15-112 | .0005 - - - | R8 | 24-124 | 500M - VOLUME CONTROL & SW. | L2 | 33-220 | R.F. CHOKE |
| C9 | 16-241 | 20 X 10 - 150 WV. ELECTROLYTIC | R9 | 60-220 | 27 - 1/3 W. RESISTOR | 1 | 79-268 | 9" DYNAMIC SPEAKER |
| C10 | 19-192 | 2 GANG VARIABLE COND. ALSO C11 & C12 | | | | 2 | 8901 | PILOT LIGHT #40 |
| | | | | | | 3 | 22-117 | ANT. TERM. |

CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

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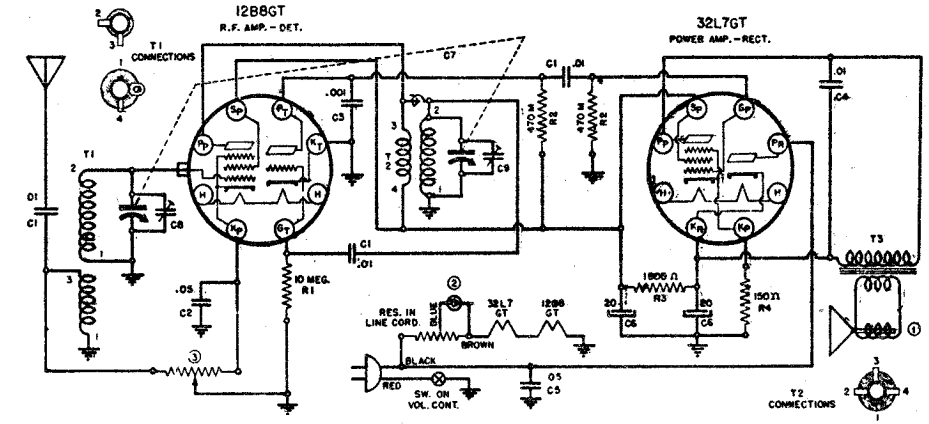
# STANDARD BROADCAST RECEIVER

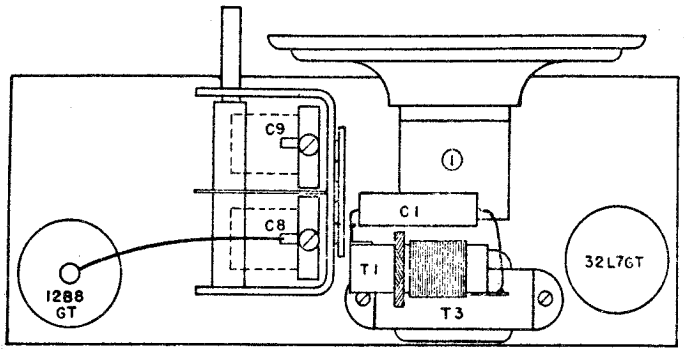
**Model No. 9-22** is a 2-tube T.R.F. radio receiver for operation on a 117 Volt A.C. 60 cycle or 117 Volt D.C. supply. The tubes used are a 12B8GT as an R.F. Amplifier and Detector and a 35L7GT as a Power Amplifier and Rectifier.

This receiver covers a frequency range from 540 Kilocycles to 1760 Kilocycles (K.C.).

The scale is calibrated in kilocycles (less the final zero). Standard broadcast stations are listed in kilocyclyes in most station lists.

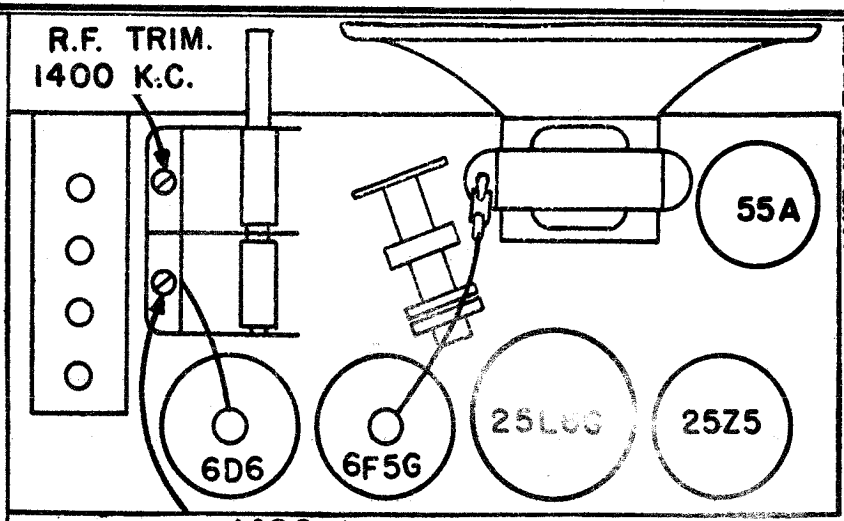



| CODE | PART NO. | DESCRIPTION | CODE | PART NO. | DESCRIPTION | CODE | PART NO. | DESCRIPTION 9-22 |
|---|---|---|---|---|---|---|---|---|
| C1 | 16-121 | .01 MFD. 200V. TUBULAR COND. | R1 | 60-193 | 10 MEGOHM 1/3W RESISTOR | T1 | 10-288 | ANTENNA COIL |
| C2 | 1622 | .05 " " " " | R2 | 60-178 | 470 M OHMS " " | T2 | 10-289 | R.F. COIL " |
| C3 | 16-124 | .001 " 400V. " " | R3 | 60-229 | 1800 " " " | T3 | 80-176 | OUTPUT TRANSFORMER |
| C4 | 16-119 | .01 " " " " | R4 | 60-184 | 150 " " " | | | |
| C5 | 1607 | .05 " " " " | | | | 1 | 79-270 | P.M. SPEAKER |
| C6 | 18-249 | 20 x 20 MFD. 150V. ELECTROLYTIC | | | | 2 | -99-4 | #47 PILOT LIGHT 150 MA. |
| C7 | 19-147 | 2 GANG VAR. COND. (ALSO C8 & C9) | | | | 3 | 24-136 | VOLUME CONTROL WITH SWITCH |




LOCATION OF PARTS ON TOP OF CHASSIS

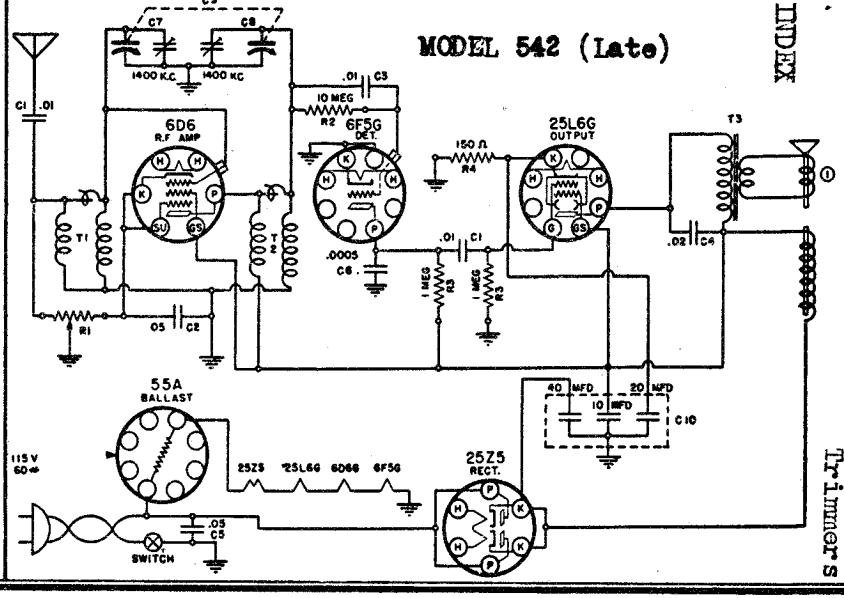
# MODEL No. 9-220 to 9-229, Inclusive




## ANT. TRIM. 1400 K.C.

| CODE | PART NO. | DESCRIPTION | CODE | PART NO. | DESCRIPTION 542 |
|---|---|---|---|---|---|
| C1 | 1604 | .01 MFD. 600V. TUBULAR CONDENSER | R1 | 24-127 | VOLUME CONTROL & SWITCH |
| C2 | 1622 | .05 MFD. 200 V. " " | R2 | 60-193 | 10 MEGOHM 1/3 W. RESISTOR |
| C3 | 16-119 | .01 MFD. 400 V. " " | R3 | 60-192 | 1 " " " |
| C4 | 16-108 | .02 MFD. 600 V. " " | R4 | 60-184 | 150 OHMS " " |
| C5 | 1607 | .05 MFD. 400 V. " " | | | |
| C6 | 15-112 | .0005 MFD. MICA CONDENSER | T1 | 10-249 | ANTENNA COIL |
| C7, C8, C9 | 19-135 | ANTENNA VARIABLE COND | T2 | 10-250 | R.F COIL |
| | | OSCILLATOR VARIABLE COND. | T3 | | OUTPUT TRANSFORMER |
| C10 | 18-234 | FILTER CONDENSER 40 X 10 MF-400WV 20 MF - 25 WV | 1 | 79-251 | SPEAKER |

This receiver is a 5 tube AC/DC current operated T.R.F. This receiver is made to cover from 1750K.C. to 535K.C.

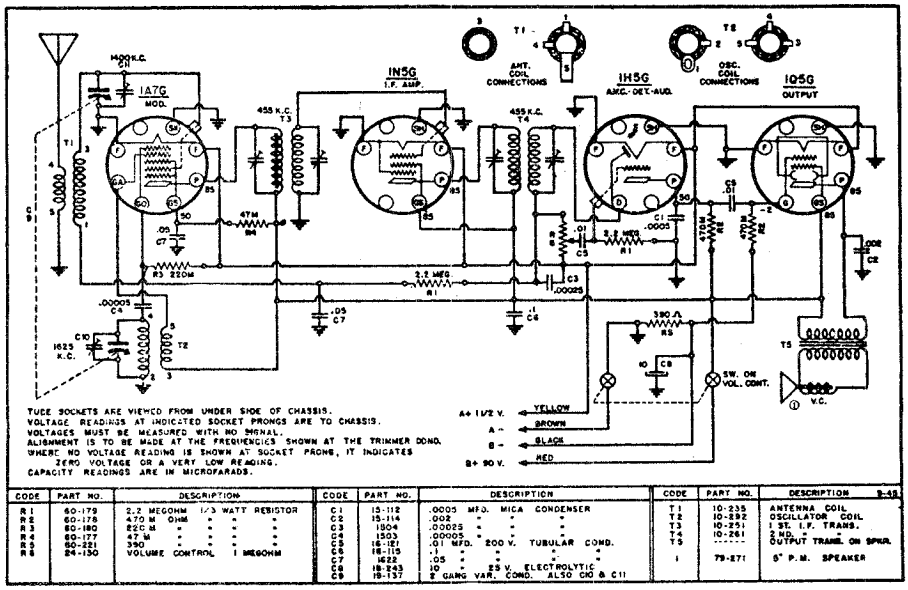



FOR TUNER SEE INDEX

# WARWICK MFG. CORP.

MODELS 9-480 to 9-489 inc.
MODELS 9-680 to 9-689 inc.
Schematics, Voltage, Socket
Trimmers, Alignment

CONVENTIONAL ALIGNMENT SEE
SPECIAL SECTION VOLUME VIII


1A7G MOD.
1N5G I.F. AMP.
1H5G AMC.-DET.-AUD.
1O5G OUTPUT
T1 ANT. COIL CONNECTIONS
T2 OSC. COIL CONNECTIONS
455 K.C.
1625 K.C.
SW. ON VOL. CONT.
V.C.
A+ 1½ V. YELLOW
A- BROWN
B- BLACK
B+ 90 V. RED
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER COND.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY READINGS ARE IN MICROFARADS.

| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| R1 | 60-179 | 2.2 MEGOHM 1/3 WATT RESISTOR |
| R2 | 60-178 | 470 M OHM " " " |
| R3 | 60-180 | 220 M " " " |
| R4 | 60-177 | 47 M " " " |
| R5 | 60-221 | 390 " " " |
| R6 | 24-130 | VOLUME CONTROL 1 MEGOHM |

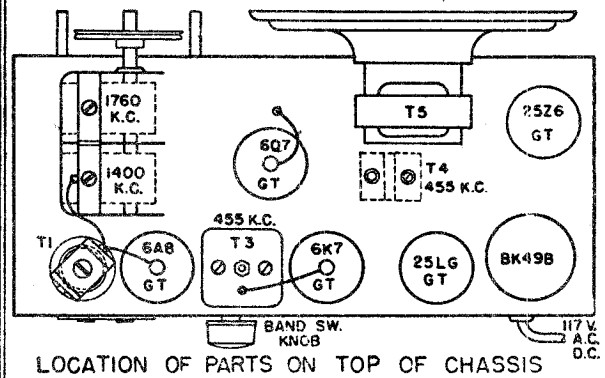
| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | 15-112 | .0005 MFD. MICA CONDENSER |
| C2 | 15-114 | .002 " " " |
| C3 | 1804 | .00025 " " " |
| C4 | 1503 | .00005 " " " |
| C5 | 16-121 | .01 MFD. 200 V. TUBULAR COND. |
| C6 | 16-115 | .1 " " " " |
| C7 | 1622 | .05 " " " " |
| C8 | 18-243 | 10 " 25 V. ELECTROLYTIC |
| C9 | 18-157 | 2 GANG VAR. COND. ALSO C10 & C11 |

| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| T1 | 10-255 | ANTENNA COIL |
| T2 | 10-252 | OSCILLATOR COIL |
| T3 | 10-251 | 1 ST. I.F. TRANS. |
| T4 | 10-261 | 2 ND. I.F. " |
| T5 | ------ | OUTPUT TRANS. ON SPKR. |
| 1 | 79-271 | 5" P.M. SPEAKER |

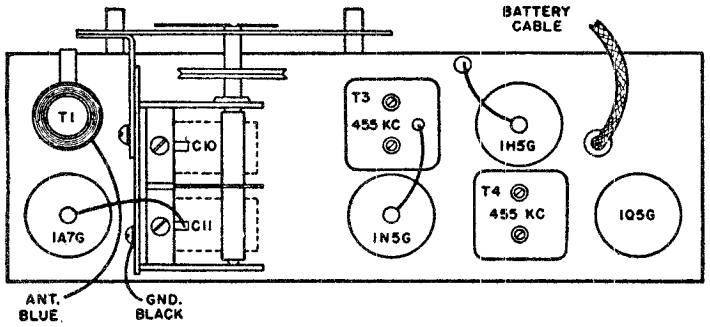
Models 9-480 to 9-489 inclusive

One of the following batteries may be used with this receiver and is to be put inside and towards the rear of the cabinet.

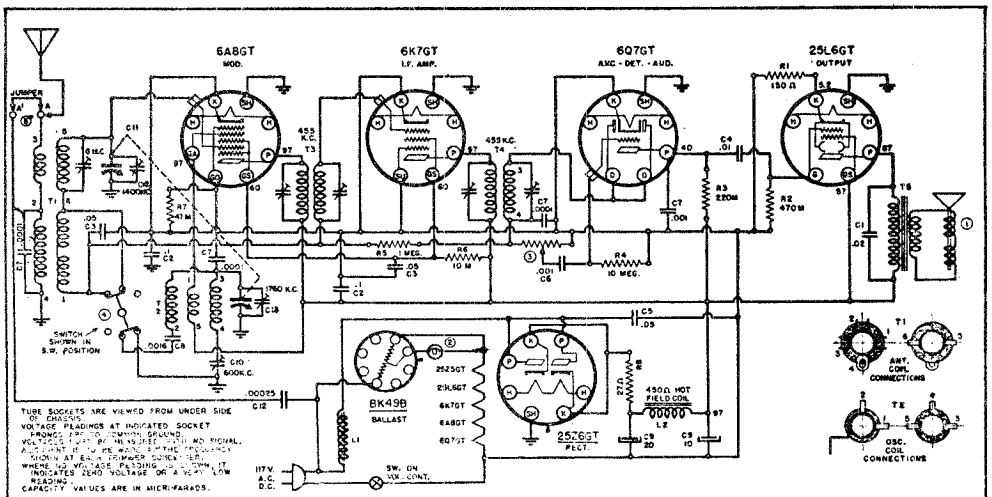
Ray-O-Vac..No."AB" 82
Burgess..No.17G-D60
General..No.60DL11L




LOCATION OF PARTS ON TOP OF CHASSIS
Models 9-680 to 9-689




LOCATION OF PARTS ON TOP OF CHASSIS
Models 9-480 to 9-489




| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | 16-123 | .02 MFD. 200 V. TUBULAR CONDENSER |
| C2 | 16-115 | .1 " " " " |
| C3 | 1622 | .05 " " " " |
| C4 | 16-121 | .01 " " " " |
| C5 | 16L7 | .05 " 400 V. " " |
| C6 | 16-124 | .001 " 200 V. " " |
| C7 | 1501 | .0001 " MICA CONDENSER |
| C8 | 15-116 | .001 " " " |
| C9 | 18-241 | 20-10-10 MFD. 150 V. ELECTROLYTIC CONDENSER |
| C10 | 20-117 | PADDING CONDENSER 300-600 MFD. |
| C11 | 19-165 | 2 GANG VARIABLE CONDENSER ALSO C12 & C13 |

| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| R1 | 60-184 | 150 OHM 1/3 W. RESISTOR |
| R2 | 60-178 | 470 M. " " " |
| R3 | 60-180 | 220 M. " " " |
| R4 | 50-193 | 10 MEG. " " " |
| R5 | 60-195 | 1 " " " |
| R6 | 60-215 | 10 M. " " " |
| R7 | 60-177 | 47 M. " " " |
| R8 | 60-220 | 27 " " " |
| L1 | 33-220 | R.F. CHOKE |
| L2 | ------ | FIELD COIL (ON SPKR.) |
| C12 | 1804 | .00025 MFD. MICA CONDENSER |

| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| T1 | 10-258 | ANTENNA TRANSFORMER |
| T2 | 10-257 | OSCILLATOR " |
| T3 | 10-259 | 1 ST. I.F. " |
| T4 | 10-261 | 2 ND. I.F. " |
| T5 | ------ | OUTPUT TRANS. (ON SPKR.) |
| 1 | 79-266 | 5" DYNAMIC SPEAKER |
| 2 | 89-4 | PILOT LIGHT #47 |
| 3 | 24-132 | VOLUME CONTROL & SWITCH |
| 4 | 69-133 | BAND SWITCH |
| 5 | 22-117 | ANT. TERM. |

Models
9-680 to 9-689
inclusive

Tuning Ranges:
Broadcast
536 - 1760 KC
Short-Wave
2.35 - 7.4 MC

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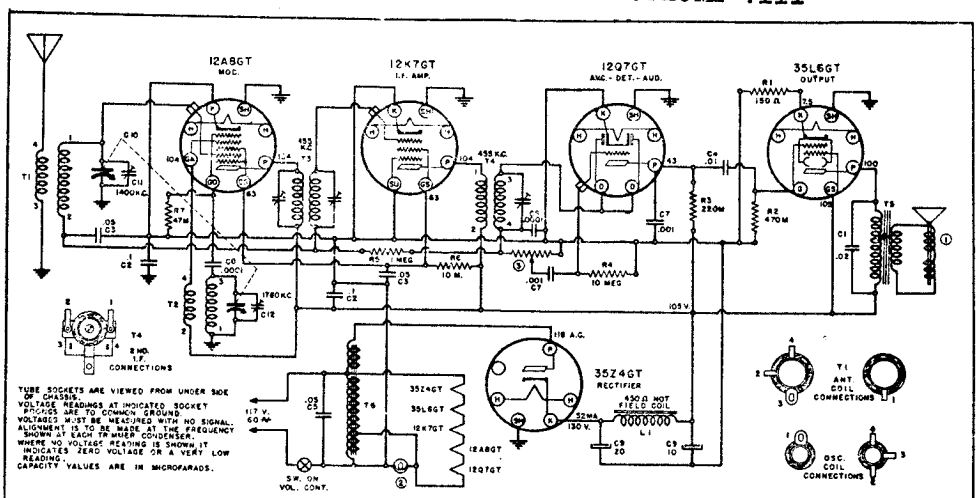
MODELS 9-550 to 9-559 inc
MODELS 9-670 to 9-679 inc. **WARWICK MFG. CORP.**
Schematics, Voltage, Socket Alignment, Trimmers

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII


12A8GT
MOD.
12K7GT
I.F. AMP.
12Q7GT
AVC - DET. - AUD.
35L6GT
OUTPUT
35Z4GT
RECTIFIER
450Ω HOT FIELD COIL
T1 ANT. COIL CONNECTIONS
OSC. COIL CONNECTIONS
T4 2ND. I.F. CONNECTIONS
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO COMMON GROUND.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCY SHOWN AT EACH TRIMMER CONDENSER.
WHERE NO VOLTAGE READING IS SHOWN IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY VALUES ARE IN MICROFARADS.
SW. ON VOL. CONT.

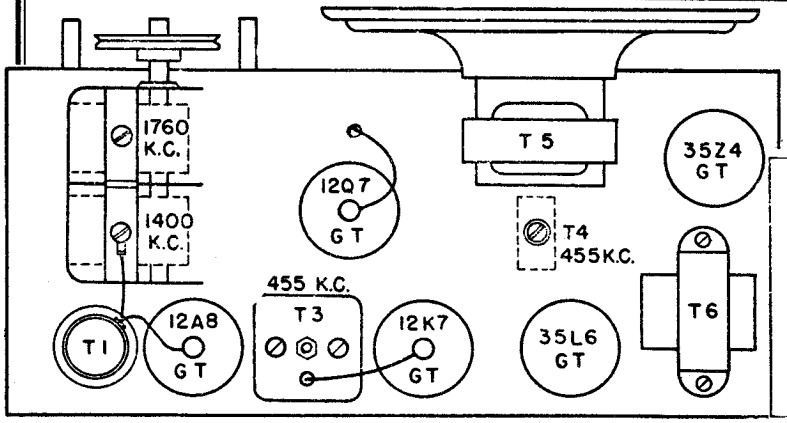
| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | 16-123 | .02 MFD. 200 V. TUBULAR CONDENSER |
| C2 | 16-115 | " " " " " |
| C3 | 1622 | .05 " " " " |
| C4 | 16-121 | .01 " " " " |
| C5 | 1607 | .05 " 400 V. " |
| C6 | 16-124 | .001 " 200 V. " |
| C7 | 1501 | .0001 " MICA CONDENSER |
| C8 | 16-241 | 20 X 10 MFD. ELECTROLYTIC COND. 150 V. |
| C9 | 19-144 | 2 GANG VARIABLE CONDENSER, ALSO C11 & C12 |

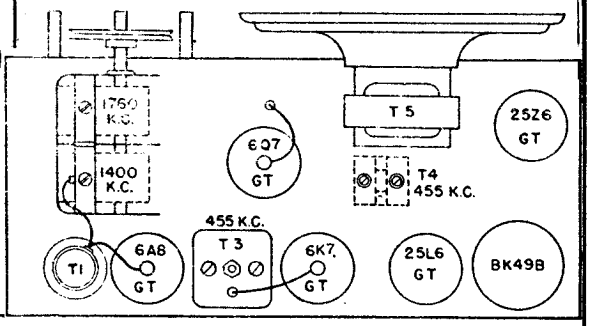
| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| R1 | 60-194 | 150 OHM 1/3 W. RESISTOR |
| R2 | 60-178 | 470 M. " " " |
| R3 | 60-180 | 220 M. " " " |
| R4 | 60-193 | 10 MEG " " " |
| R5 | 60-195 | 1 M. " " " |
| R6 | 60-215 | 10 M. " " " |
| R7 | 60-177 | 47 M. " " " |
| L1 | | FIELD COIL (ON SPEAKER) |

| CODE | PART NO. | DESCRIPTION 9-55 |
|---|---|---|
| T1 | 10-270 | ANTENNA TRANSFORMER |
| T2 | 10-272 | OSCILLATOR " |
| T3 | 10-268 | 1ST. I.F. " |
| T4 | 10-271 | 2ND. I.F. " |
| T5 | | OUTPUT TRANS. (ON SPKR.) |
| T6 | 80-172 | POWER TRANSFORMER |
| 1 | 79-266 | 5" DYNAMIC SPEAKER |
| 2 | 89-4 | PILOT LIGHT #47 |
| 3 | 24-132 | VOLUME CONTROL & SWITCH |

Models 9-550 to 9-559

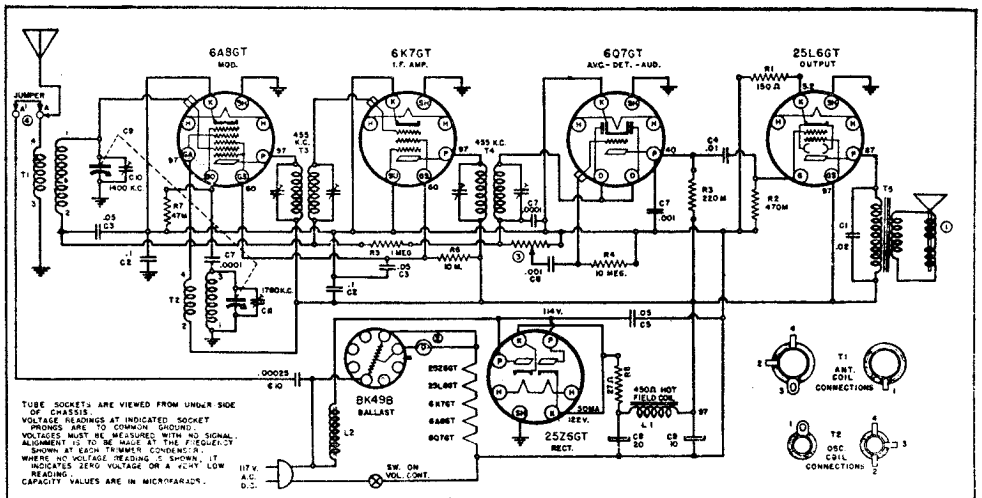
Left: Models 9-550 to 9-559
Below: Models 9-670 to 9-679




LOCATION OF PARTS ON TOP OF CHASSIS

LOCATION OF PARTS ON TOP OF CHASSIS




| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| C1 | 16-123 | .02 MFD. 200 V. TUBULAR CONDENSER |
| C2 | 16-115 | " " " " " |
| C3 | 1622 | .05 " " " " |
| C4 | 16-121 | .01 " " " " |
| C5 | 1607 | .03 " 400 V. " |
| C6 | 16-124 | .001 " 200 V. " |
| C7 | 1501 | .0001 " MICA CONDENSER |
| C8 | 16-241 | 20 X 10 MFD. 150 V. ELECTROLYTIC COND. |
| C9 | 19-144 | 2 GANG VARIABLE CONDENSER, ALSO C10 & C11 |
| C10 | 1504 | .00025 MFD. MICA CONDENSER |

| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| R1 | 60-184 | 150 OHM 1/3 W. RESISTOR |
| R2 | 60-178 | 470 M. " " " |
| R3 | 60-180 | 220 M. " " " |
| R4 | 60-193 | 10 MEG " " " |
| R5 | 60-195 | 1 " " " " |
| R6 | 60-215 | 10 M. " " " |
| R7 | 60-177 | 47 M. " " " |
| R8 | 60-220 | 27 " " " " |
| L1 | ------ | FIELD COIL (ON SPEAKER) |
| L2 | 33-220 | R.F. CHOKE |

| CODE | PART NO. | DESCRIPTION 9-67 |
|---|---|---|
| T1 | 10-270 | ANTENNA TRANSFORMER |
| T2 | 10-272 | OSCILLATOR " |
| T3 | 10-269 | 1ST. I.F. " |
| T4 | 10-281 | 2ND. I.F. " |
| T5 | ----- | OUTPUT TRANS. (ON SPKR.) |
| 1 | 79-266 | 5" DYNAMIC SPEAKER |
| 2 | 89-4 | PILOT LIGHT #47 |
| 3 | 24-132 | VOLUME CONTROL & SWITCH |
| 4 | 22-117 | ANT. TERMINAL |

Models 9-670 to 9-679

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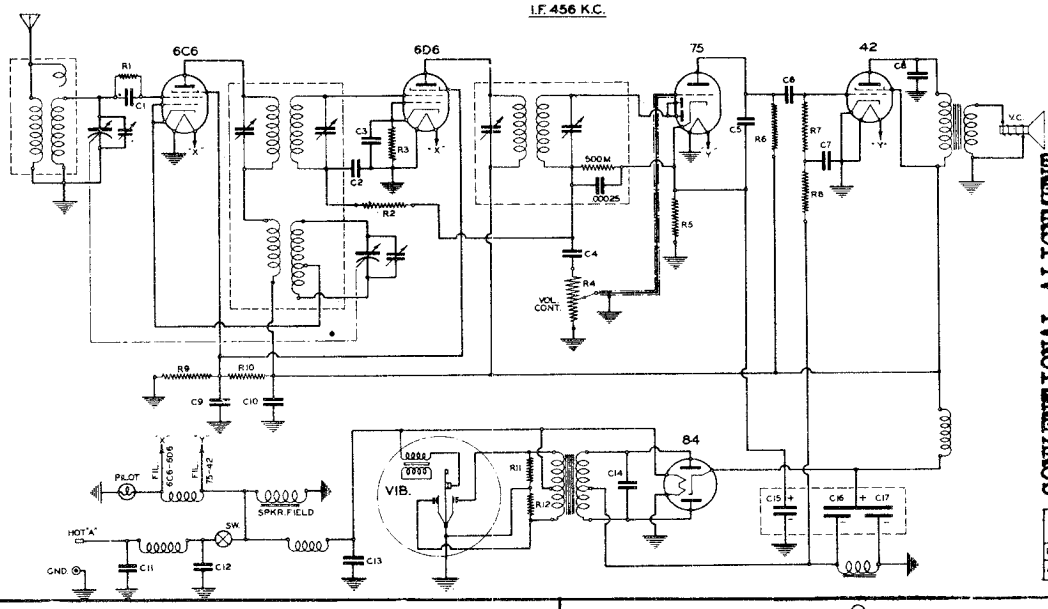
Schematics, Socket Alignment, Trimmers

# WARWICK MFG. CORP.

MODEL 401
MODEL 401LW
MODEL 550-C

I.F. 456 K.C.




CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL VIII.

CIRCUIT DATA

| | |
|---|---|
| C1 | .00025 MFD |
| C2 | .05 |
| C3 | .1 |
| C4 | .01 |
| C5 | .00025 |
| C6 | .01 |
| C7 | .25 |
| C8 | .004 |
| C9 | — |
| C10 | — |
| C11 | .002 |
| C12 | .002 |
| C13 | .5 |
| C14 | .0075 |
| C15 | 4 |
| C16 | 4 |
| C17 | 8 |
| R1 | 500 M OHMS |
| R2 | 1 MEG. |
| R3 | 300 |
| R4 | 1 MEG. |
| R5 | .5 M |
| R6 | 2.5 M |
| R7 | 2.5 M |
| R8 | 100 M |
| R9 | 2.5 M |
| R10 | 20 M |
| R11 | 50 |
| R12 | 50 |

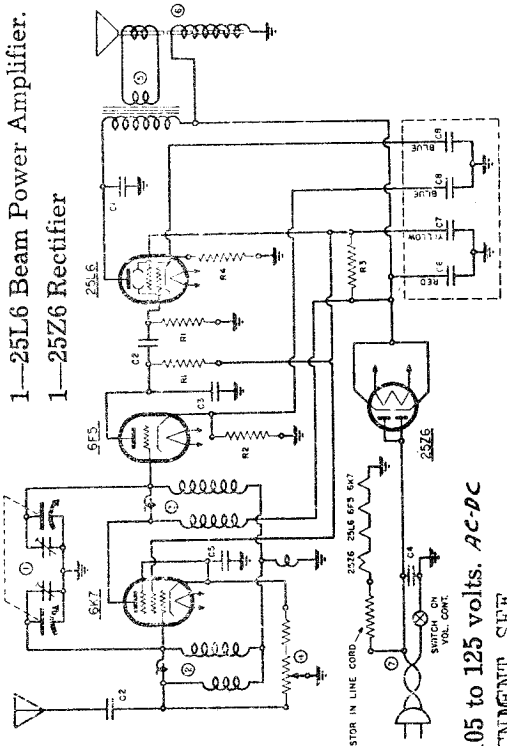
CIRCUIT DIAGRAM
5 TUBE SUPER AUTO SET.
DRAWN - W.J.T.MAKEY | DATE - 5-23-36
APPVD. [illegible] | DRG. NO. 550-C

## MODEL 401

1—6K7 R. F. Amplifier
1—6F5 Detector
1—25L6 Beam Power Amplifier.
1—25Z6 Rectifier

105 to 125 volts. AC-DC

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII



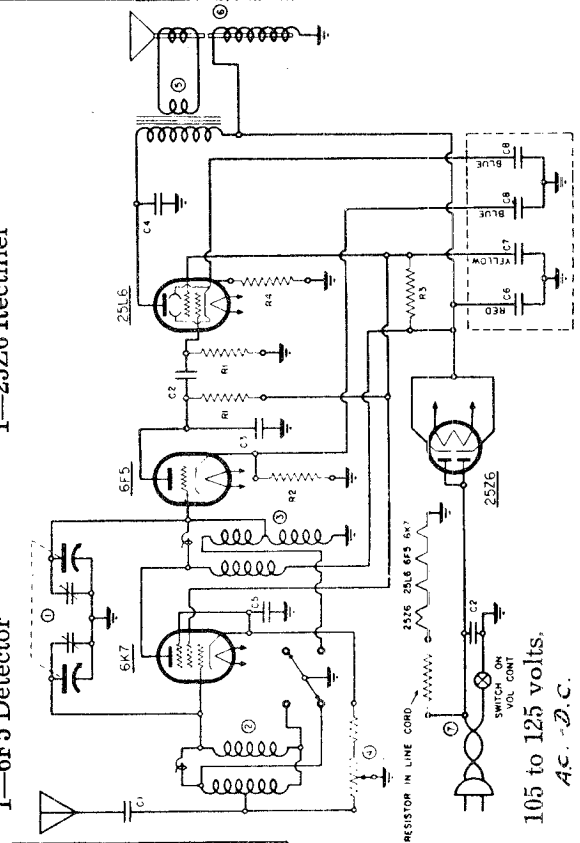

| PART NO | DESCRIPTION | 401 |
|---|---|---|
| R1 60-157 | 1 MEG OHM 1/2W CARBON RES. | |
| R2 60-155 | 13,000 " " " " | |
| R3 60-154 | 4700 " " " " | |
| R4 60-156 | 220 " " " " | |
| C1 16-108 | .02 MFD 600V TUBULAR COND. | |
| C2 16-110 | .01 " " " " | |
| C3 16-106 | .001 " 400V " " | |
| C4 16-107 | .05 " 400V " " | |
| C5 16-109 | .05 " 400V " " | |
| C6 18-213 | 40. " 150V FILTER | |
| C7 | 4.0 " 150V COND. | |
| C8 | 5.0 " 25V BLOCK | |
| 1 19-124 | 2 GANG CONDENSER | |
| 2 10-231 | ANT. COIL | |
| 3 10-232 | OSC. COIL | |
| 4 24-117 | VOLUME CONT. WITH SWITCH | |
| 5 80-149 | OUTPUT TRANSFORMER | |
| 6 79-238 | SPEAKER | |
| 7 23-117 | LINE CORD | |

## MODEL 401LW

1—6K7 R. F. Amplifier
1—6F5 Detector
1—25L6 Beam Power Amplifier.
1—25Z6 Rectifier

105 to 125 volts. A.C.-D.C.

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOL. VIII




| PART NO | DESCRIPTION | 401-LW |
|---|---|---|
| R1 60-157 | 1 MEG OHM 1/2W CARBON RES | |
| R2 60-155 | 13,000 " " " " | |
| R3 60-154 | 4700 " " " " | |
| R4 60-156 | 220 " " " " | |
| C1 1502 | .0005 MFD MICA CONDENSER | |
| C2 16-110 | .01 " 600 V TUBULAR COND | |
| C3 16-106 | .001 " 400 V " " | |
| C4 16-108 | .02 " 400 V " " | |
| C5 16-109 | .05 " 200 V " " | |
| C6 | 40. " 150 V FILTER | |
| C7 18-219 | 4.0 " 150 V COND | |
| C8 | 5.0 " 25 V BLOCK | |
| 1 19-124 | 2 GANG CONDENSER | |
| 2 10-231 | ANT COIL | |
| 3 10-232 | OSC COIL | |
| 4 24-117 | VOLUME CONT WITH SWITCH | |
| 5 80-149 | OUTPUT TRANSFORMER | |
| 6 79-238 | SPEAKER | |
| 7 23-117 | LINE CORD | |

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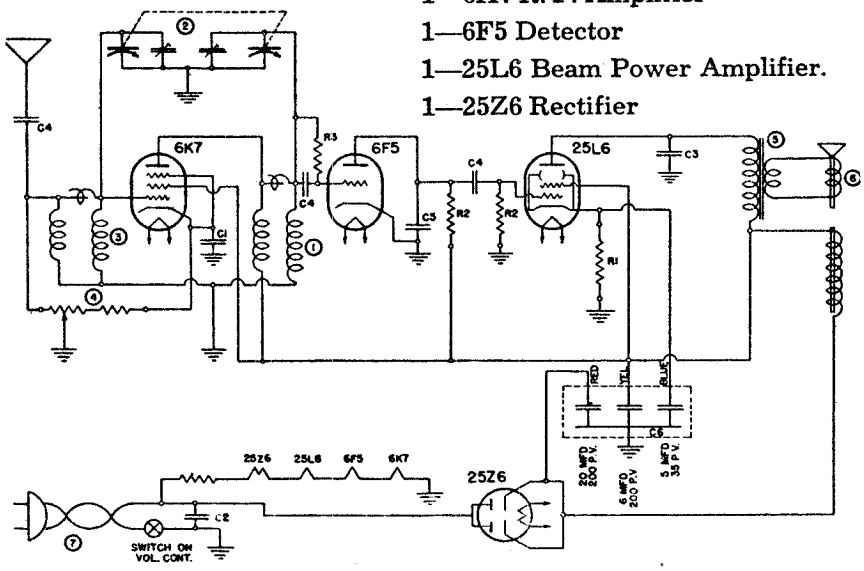
MODEL 404
MODEL 510-C
Schematics, Socket
Alignment, Trimmers

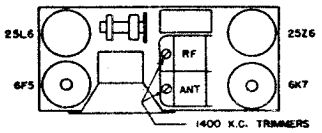
# WARWICK MFG. CORP.

## MODEL 404

This receiver will operate on either alternating or direct current, from a power supply of 105 to 125 volts. Do not connect it to any other source.

1—6K7 R. F. Amplifier
1—6F5 Detector
1—25L6 Beam Power Amplifier.
1—25Z6 Rectifier



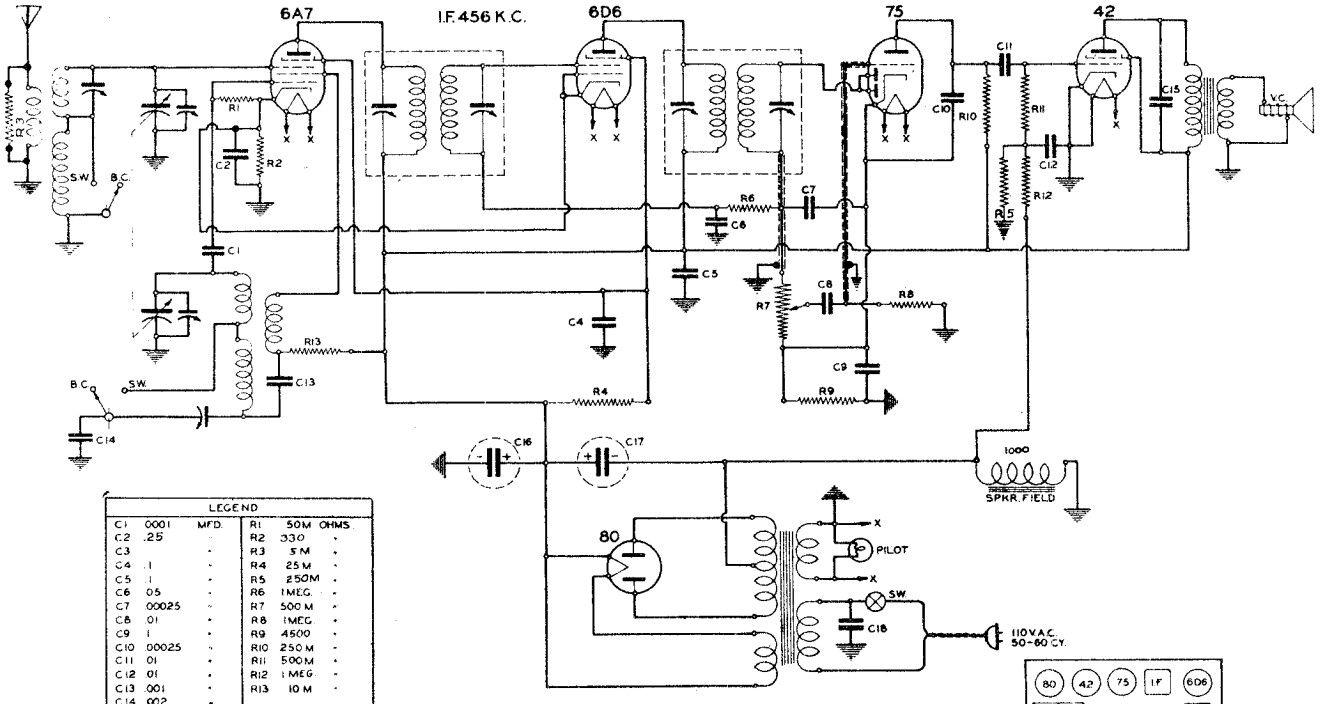




| CODE | PART NO | DESCRIPTION 404 |
|---|---|---|
| 1 | 10-234 | R.F. COIL |
| 2 | 19-124 | 2 GANG CONDENSER |
| 3 | 10-233 | ANTENNA COIL |
| 4 | 24-117 | VOLUME CONTROL & SWITCH |
| 5 | 80-148 | OUTPUT TRANSFORMER |
| 6 | 79-244 | SPEAKER |
| 7 | 23-117 | LINE CORD |

| CODE | PART NO. | DESCRIPTION |
|---|---|---|
| R1 | 60-184 | 150 OHM 1/2 WATT RESISTOR |
| R2 | 60-157 | 1 MEGOHM 1/2 WATT " |
| R3 | 60-183 | 6.8 MEGOHM 1/2 WATT " |
| C1 | 16-109 | .05 MFD 200 V TUBULAR CONDENSER |
| C2 | 16-107 | .05 MFD 400 V " " |
| C3 | 16-108 | .02 MFD 600 V " " |
| C4 | 16-110 | .01 " " " |
| C5 | 1504 | .00025 MFD MICA CONDENSER |
| C6 | 18-230 | FILTER CONDENSER |

CONVENTIONAL ALIGNMENT: SEE SPECIAL SECTION VOL. VIII.

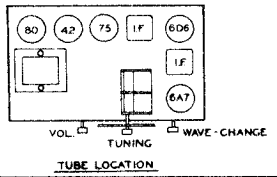
## MODEL 510C




| LEGEND | | | |
|---|---|---|---|
| C1 .0001 | MFD. | R1 50M | OHMS |
| C2 .25 | " | R2 330 | " |
| C3 .1 | " | R3 5 M | " |
| C4 .1 | " | R4 25 M | " |
| C5 .1 | " | R5 250M | " |
| C6 .05 | " | R6 1MEG. | " |
| C7 .00025 | " | R7 500 M | " |
| C8 .01 | " | R8 1MEG. | " |
| C9 .1 | " | R9 4500 | " |
| C10 .00025 | " | R10 250 M | " |
| C11 .01 | " | R11 500 M | " |
| C12 .01 | " | R12 1 MEG. | " |
| C13 .001 | " | R13 10 M | " |
| C14 .002 | " | | |
| C15 .004 | " | | |
| C16 8 | " | | |
| C17 8 | " | | |
| C18 .1 | " | | |

CIRCUIT DIAGRAM
5 TUBE A.C. SUPERHET.

| | |
|---|---|
| DRAWN - W.J. Tabor | DATE - 6-6-36 |
| APPD. | DRG. # 510-C |

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# WARWICK MFG. CORP.

## MODELS 453, 553

### Schematic Alignment

Voltage, Socket Trimmers

## DESCRIPTION

This receiver is a 4 tube, 6 volt storage battery operated superheterodyne.

The tubes used are 6D86 as oscillator modulator, 6S7G as I.F. amplifier, a 6T7G as A. V. C. and audio rectifier and audio voltage amplifier and a 1F5G as power audio amplifier.

This receiver is made to cover the standard broadcast band, from 1730 K.C. to 535 K.C.

## ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two plate and screen pins of the 1F5G tube.

Connect the signal generator to the grid cap of the 6D8G tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 456 K.C. signal Adjust the first and second I.F. trimmers until the maximum output is obtained. This aligns the I.F.

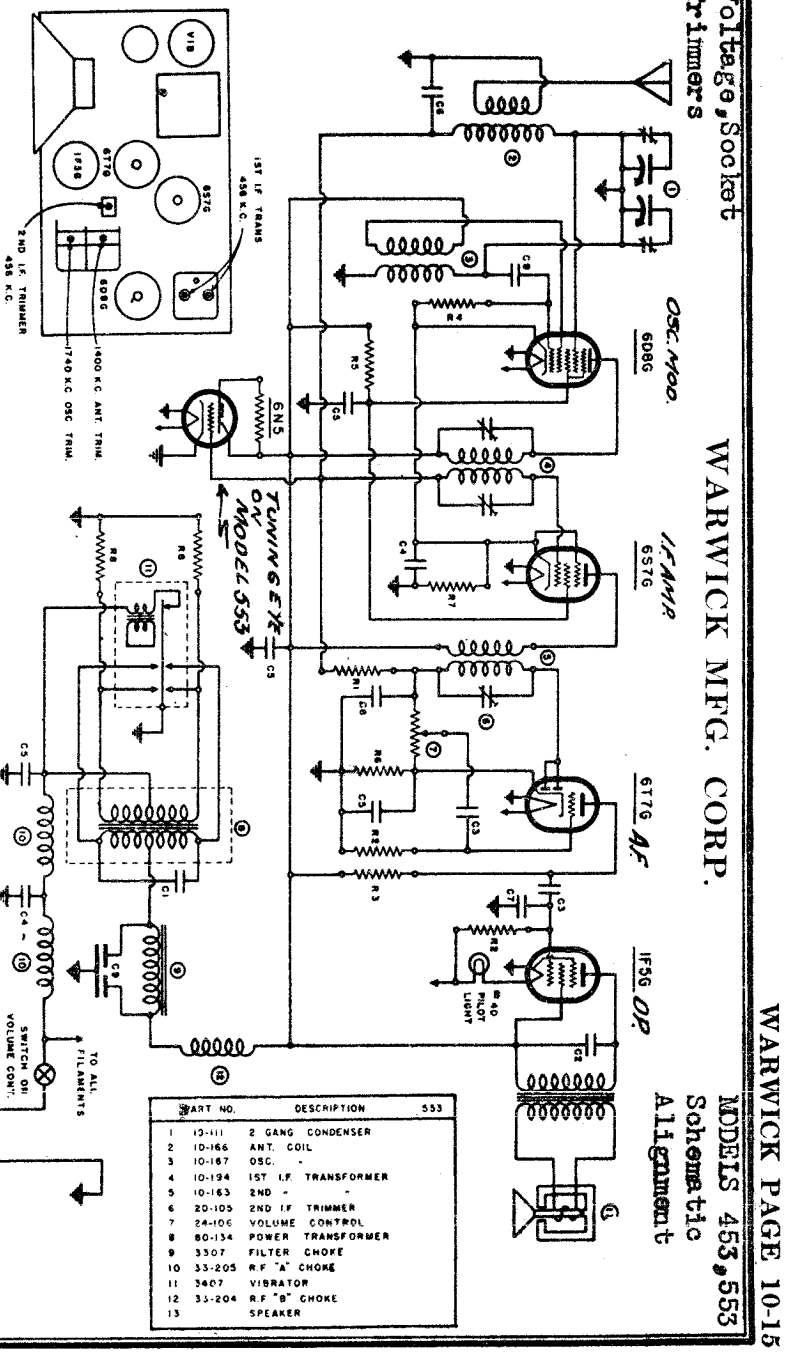
Turn the dial to the extreme high frequency end. Feed a 1740 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1740 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. antenna trimmer to maximum output. This completes the alignment.

| PART NO. | DESCRIPTION | |
|---|---|---|
| R1 | 6017 | 1 MEG |
| R2 | 6018 | 500,000 |
| R3 | 6024 | 250,000 |
| R4 | 6023 | 50,000 |
| R5 | 6022 | 15,000 |
| R6 | 6023 | 10,000 |
| R7 | 6013 | 300 |
| R8 | 6011 | 100 |

OHM 1/3 W CARBON RES.

| PART NO. | DESCRIPTION | |
|---|---|---|
| C1 | 1612 | .008 |
| C2 | 1631 | .004 |
| C3 | 1603 | .01 |
| C4 | 1614 | .25 |
| C5 | 1610 | 1 |
| C6 | 1622 | .05 |
| C7 | 1504 | .00025 |
| C8 | 1501 | .0001 |
| C9 | 1845 | DUAL 8 |

MFD. 1000V. TUB. COND.
600 V.
400 V.
200 V.
MICA CONDENSER
150 V. ELECTROLYTIC

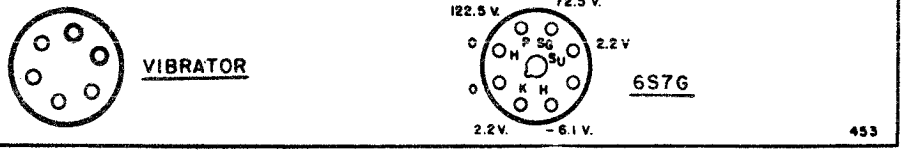



| PART NO. | DESCRIPTION | 553 |
|---|---|---|
| 1 | 10-111 | 2 GANG CONDENSER |
| 2 | 10-166 | ANT. COIL |
| 3 | 10-167 | OSC. - |
| 4 | 10-194 | 1ST I.F. TRANSFORMER |
| 5 | 10-163 | 2ND - - |
| 6 | 20-105 | 2ND I.F. TRIMMER |
| 7 | 24-106 | VOLUME CONTROL |
| 8 | 80-134 | POWER TRANSFORMER |
| 9 | 3307 | FILTER CHOKE |
| 10 | 33-205 | R.F. "A" CHOKE |
| 11 | 3407 | VIBRATOR |
| 12 | 33-204 | R.F. "B" CHOKE |
| 13 | | SPEAKER |

### VOLTAGE DIAGRAM

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER. ALL VOLTAGES MEASURED TO GROUND.

| | |
|---|---|
| F | FILAMENT |
| H | HEATER |
| P | PLATE |
| K | CATHODE |
| G | GRID |
| G1 | OSC. GRID |
| G2 | OSC. PLATE |
| SG | SCREEN GRID |
| SU | SUPPRESSOR |
| DP | DIODE PLATE |

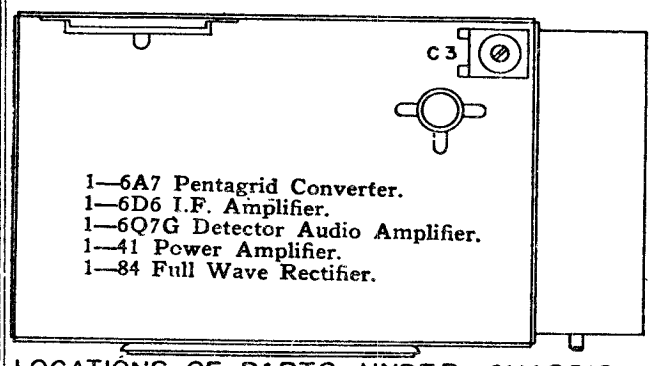



VIBRATOR

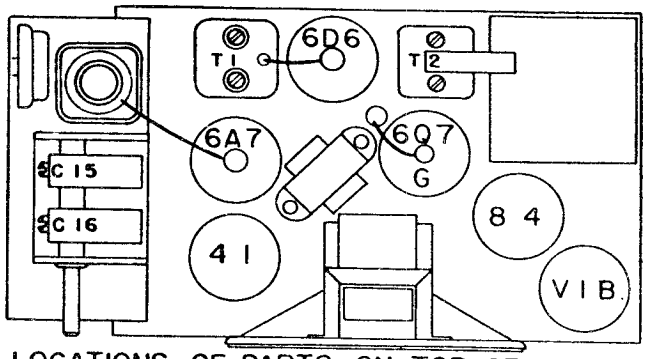
MODELS 559,579 with 150-Cycle Vibrator

# WARWICK MFG. CORP.

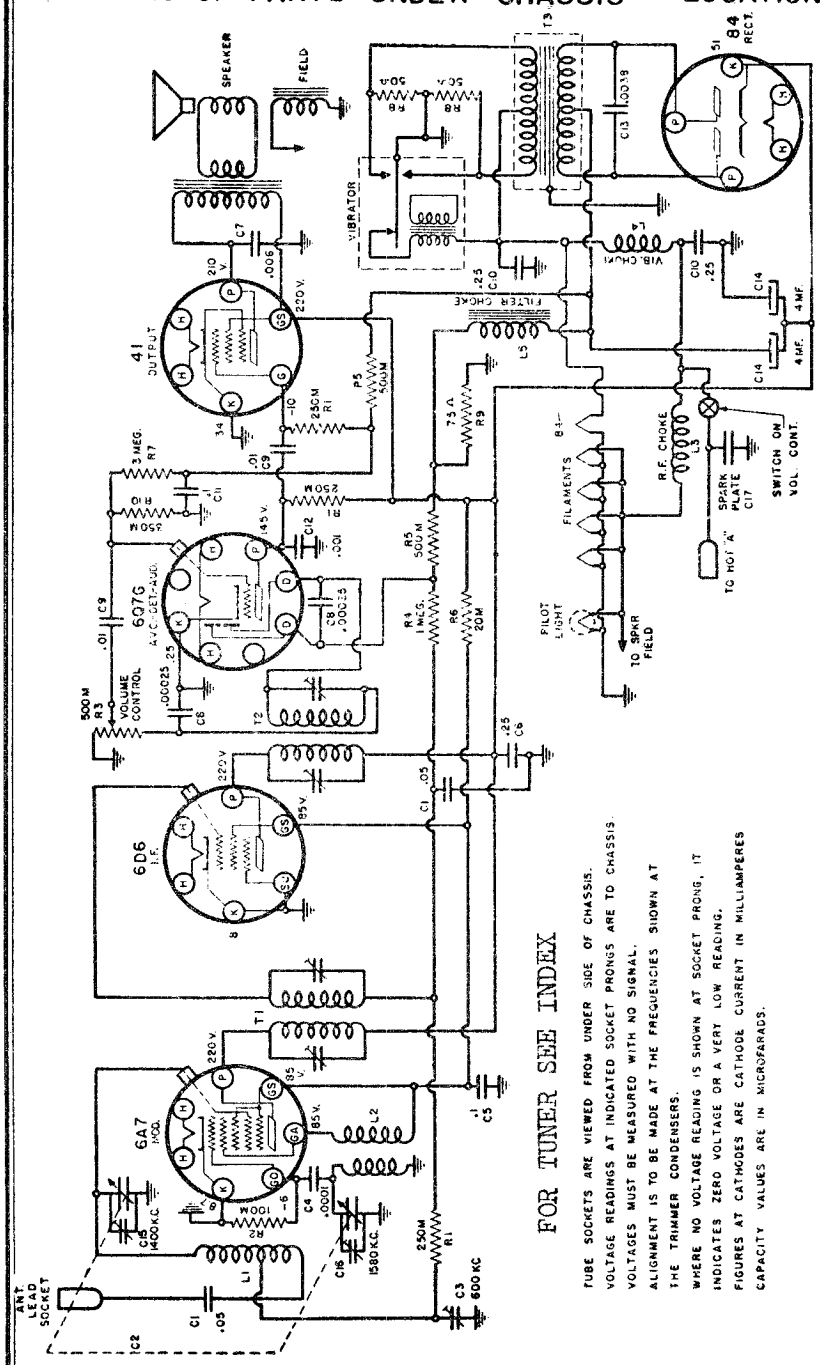
Schematic, Voltage, Socket Trimmers, Alignment




LOCATIONS OF PARTS UNDER CHASSIS




LOCATIONS OF PARTS ON TOP OF CHASSIS


SPEAKER
FIELD
VIBRATOR
84 RECT.
41 OUTPUT
6D6 I.F.
6A7 MOD.
6Q7G 2nd DET.-AVC-AUDIO
VOLUME CONTROL
FILTER CHOKE
FILAMENTS
PILOT LIGHT
R.F. CHOKE
SPARK PLATE
SWITCH ON VOL. CONT.
TO SPKR FIELD
TO HOT "A"
ANT. LEAD SOCKET
FOR TUNER SEE INDEX
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS.

## ALIGNMENT PROCEDURE

**PRELIMINARY**

Output Meter Connections ..... Across Loud Speaker Voice Coil
Output Meter Reading to Indicate 1 Watt ..... 1.85 Volts
Generator Ground Lead Connection ..... Receiver Chassis
Dummy Antenna Value to Be in Series with Generator Output ..... See Chart Below
Connection of Generator Output Lead ..... See Chart Below
Generator Modulation ..... 30%, 400 Cycles
Position of Volume Control ..... Fully On

| Position of Variable | Generator Frequency | Dummy Antenna | Generator Connection | Trimmer Adjustments (In Order Shown) | Trimmer Function |
|---|---|---|---|---|---|
| Closed | 456 KC | .1 mfd. | 6A7 Grid | T2, T1 | I. F. |
| Fully Open | 1580 KC | .0002 mfd. | Antenna Conn. | C16 | Oscillator Trimmer |
| 1400 KC | 1400 KC | .0002 mfd. | Antenna Conn. | C15 | Antenna Trimmer |
| 600 KC | 600 KC | .0002 mfd. | Antenna Conn. | C3 | Antenna Padder |

The variable condenser should be at 600 k.c. for antenna adjustment.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy. A final adjustment of antenna padder condenser C3 is always made after the receiver is installed in the car, in order to match the car antenna.

Always keep the output power from the generator at its lowest possible value to prevent the A.V.C. of the receiver from interfering with accurate alignment.

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## ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

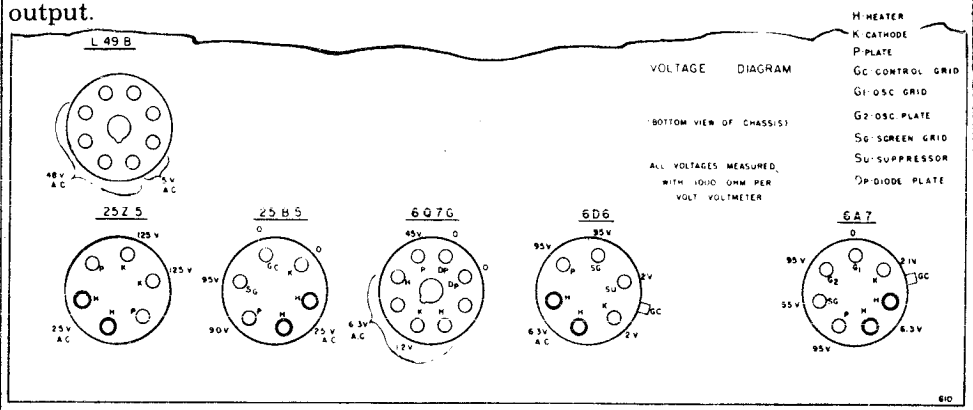
Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

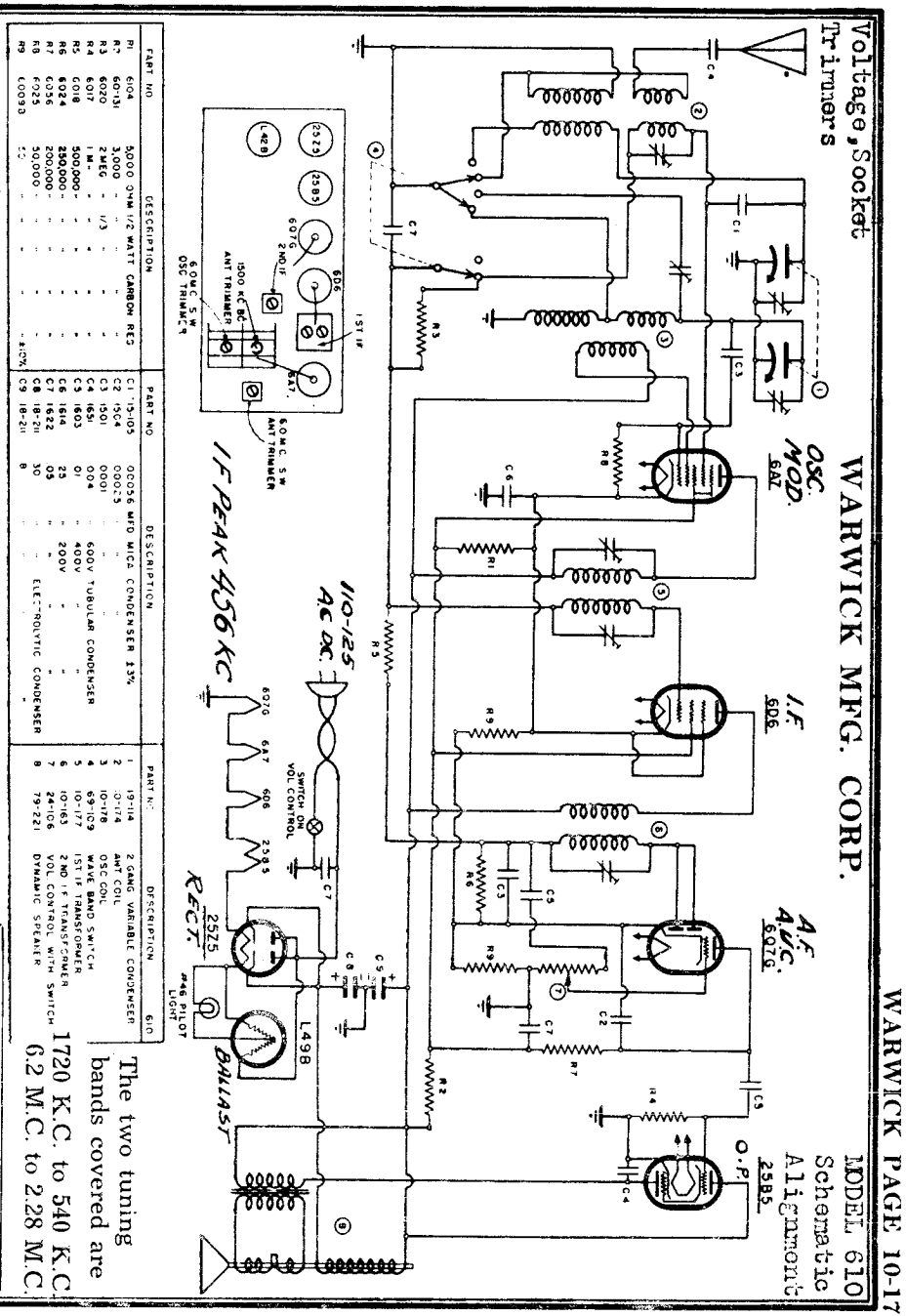
Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the receiver chassis through another .1 M.F. condenser. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Turn the wave switch to the short wave position and set the dial to 6.0 M.C. Feed a 6.0 M.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Tune the 6.0 M.C. Oscillator trimmer to give resonance. Two points may be found where this signal can be heard. The correct setting is the one where the trimmer is screwed the loosest. This may also be checked by turning the dial to about 5.0 M.C. where the signal should again be heard.

Then turn the wave switch to broadcast position and turn the dial to the extreme high frequency end. Feed in a 1720 K.C. signal and adjust the broadcast oscillator trimmer, which is located under the receiver at the wave switch, to resonance. Then set the signal generator to 1500 K.C. and tune in this signal on the receiver. Adjust the 1500 K.C. antenna trimmer for maximum output.

Again turn the wave switch to short wave position and tune in a 6.0 M.C. signal from the generator. Adjust the 6.0 M.C. antenna trimmer to maximum output.





Voltage, Socket Trimmers
WARWICK MFG. CORP.
MODEL 610
Schematic Alignment
25B5
OSC. MOD. 6A7
I.F. 6D6
A.F. 6Q7G
O.P.
RECT. 25Z5
BALLAST
L49B
1F PEAK 456 KC
110-125 AC DC
SWITCH ON VOL CONTROL
#46 PILOT LIGHT
6.0 MC. SW OSC TRIMMER
6.0 MC. SW ANT TRIMMER
1500 KC BC ANT TRIMMER
1ST I.F.
2ND I.F.
DET.
PART NO. DESCRIPTION
R1 6104 5000 OHM 1/2 WATT CARBON REG
R2 60131 3,000 " " " "
R3 6020 2 MEG " " " "
R4 6017 1 M. " " " "
R5 6018 500,000 " " " "
R6 6024 250,000 " " " "
R7 6036 200,000 " " " "
R8 F025 50,000 " " " "
R9 60093 " " " " ±10%
C1 15-105 .00056 MFD MICA CONDENSER ±3%
C2 15C4 .00025 " " " "
C3 1501 .0001 " " " "
C4 1651 .004 600V TUBULAR CONDENSER
C5 1603 .01 " " "
C6 1614 .25 400V " "
C7 1622 .05 200V " "
C8 18-211 30 " ELECTROLYTIC CONDENSER
C9 18-211 8 " " "
PART NO. DESCRIPTION
1 19-114 2 GANG VARIABLE CONDENSER
2 10-174 ANT COIL
3 10-178 OSC COIL
4 69-109 WAVE BAND SWITCH
5 10-177 1ST I.F. TRANSFORMER
6 10-183 2ND I.F. TRANSFORMER
7 24-106 VOL CONTROL WITH SWITCH
8 79-221 DYNAMIC SPEAKER
610
The two tuning bands covered are 1720 K.C. to 540 K.C. 6.2 M.C. to 2.28 M.C.

MODEL 629

# WARWICK MFG. CORP. Schematic, Voltage, Socket Alignment, Trimmers

## ALIGNMENT PROCEDURE

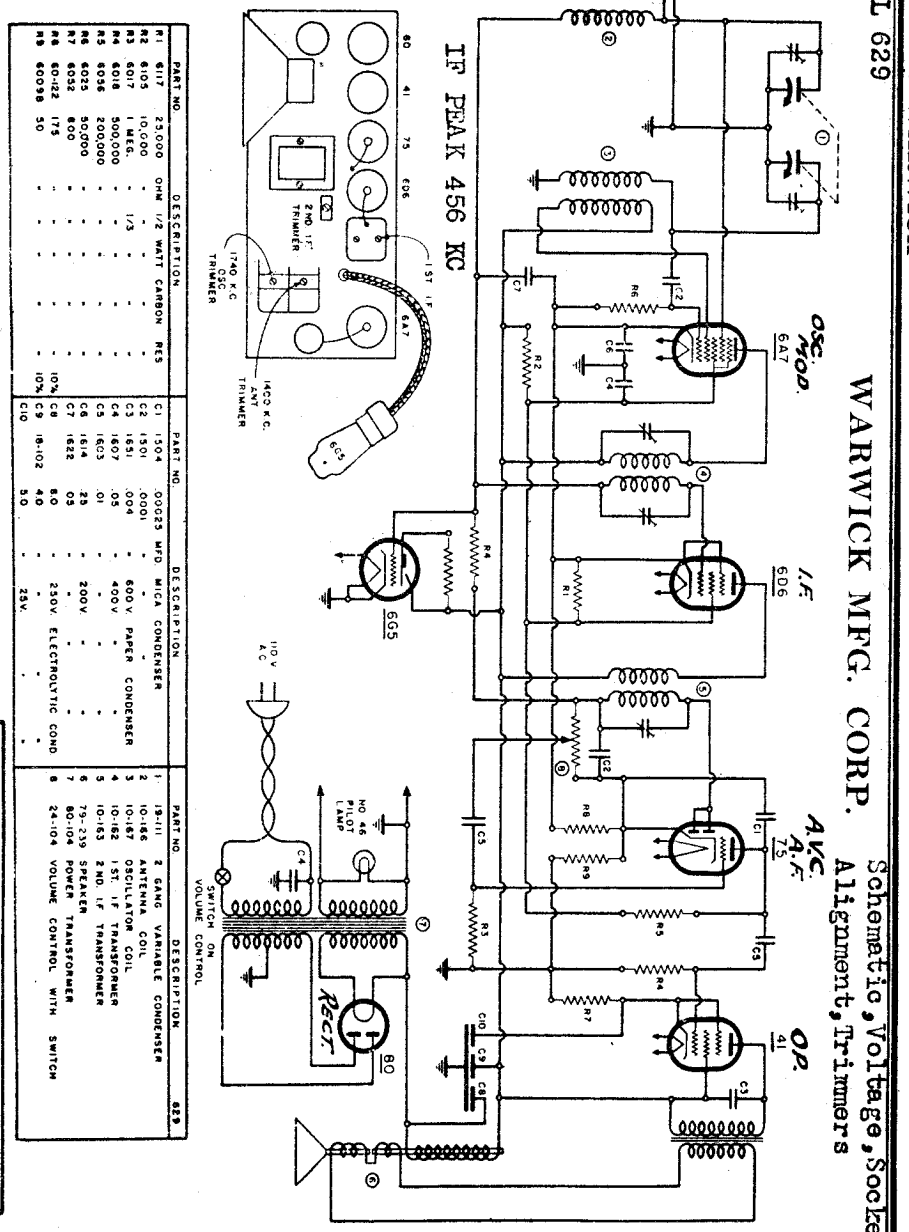
All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate and screen pins of output tube, or a low voltage A.C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 456 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1740 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1740 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1400 K.C. and tune in this signal on the receiver. Then adjust the 1400 K.C. antenna trimmer to maximum output. This completes the alignment.

This receiver is made to cover from 1740 K.C. to 535 K.C.

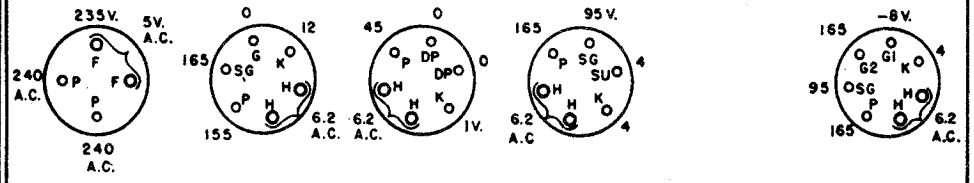



| PART NO. | DESCRIPTION | PART NO. | DESCRIPTION | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|
| R1 6117 | 25,000 OHM 1/2 WATT CARBON RES | C1 1504 | .00025 MFD MICA CONDENSER | 1 19-111 | 2 GANG VARIABLE CONDENSER |
| R2 6105 | 10,000 " " " | C2 1501 | .0001 " " " | 2 10-186 | ANTENNA COIL |
| R3 6017 | 1 MEG. " " " | C3 1651 | .004 " " " | 3 10-187 | OSCILLATOR COIL |
| R4 6018 | 500,000 " " " | C4 1607 | .05 600 V. PAPER CONDENSER | 4 10-182 | 1ST. I.F. TRANSFORMER |
| R5 6056 | 200,000 " " " | C5 1603 | .01 400 V. " " | 5 10-183 | 2ND I.F. TRANSFORMER |
| R6 6025 | 50,000 " " " | C6 1614 | .25 200 V. " " | 6 79-239 | SPEAKER |
| R7 6032 | 800 " " " | C7 1622 | .05 " " " | 7 80-104 | POWER TRANSFORMER |
| R8 60-122 | 175 " " " | C8 | 8.0 250 V. ELECTROLYTIC COND | 8 24-104 | VOLUME CONTROL WITH SWITCH |
| R9 60098 | 50 " " " | C9 19-102 | 4.0 " " " | | |
| | | C10 | 5.0 " " " | | |
| | | | 25 V. | | |

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER.
ALL VOLTAGES EXCEPT HEATERS MEASURED TO GROUND.

G - - - GRID
G1 - - OSCILLATOR GRID
G2 - - OSCILLATOR PLATE
SG - - SCREEN GRID
SU - - SUPPRESSOR GRID
P - - - PLATE
DP - - DIODE PLATE
K - - CATHODE
H HEATER

(BOTTOM VIEW OF CHASSIS)

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# WARWICK MFG. CORP.

## MODELS 648, 648B, 655B

Schematic, Voltage
Socket, Trimmers
Alignment

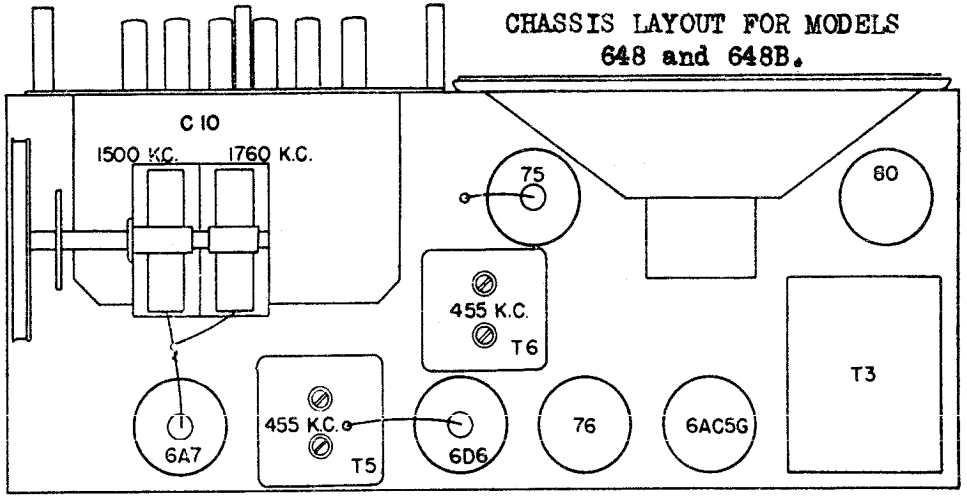
## ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate of output tube and B+, or a low voltage A. C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 455 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

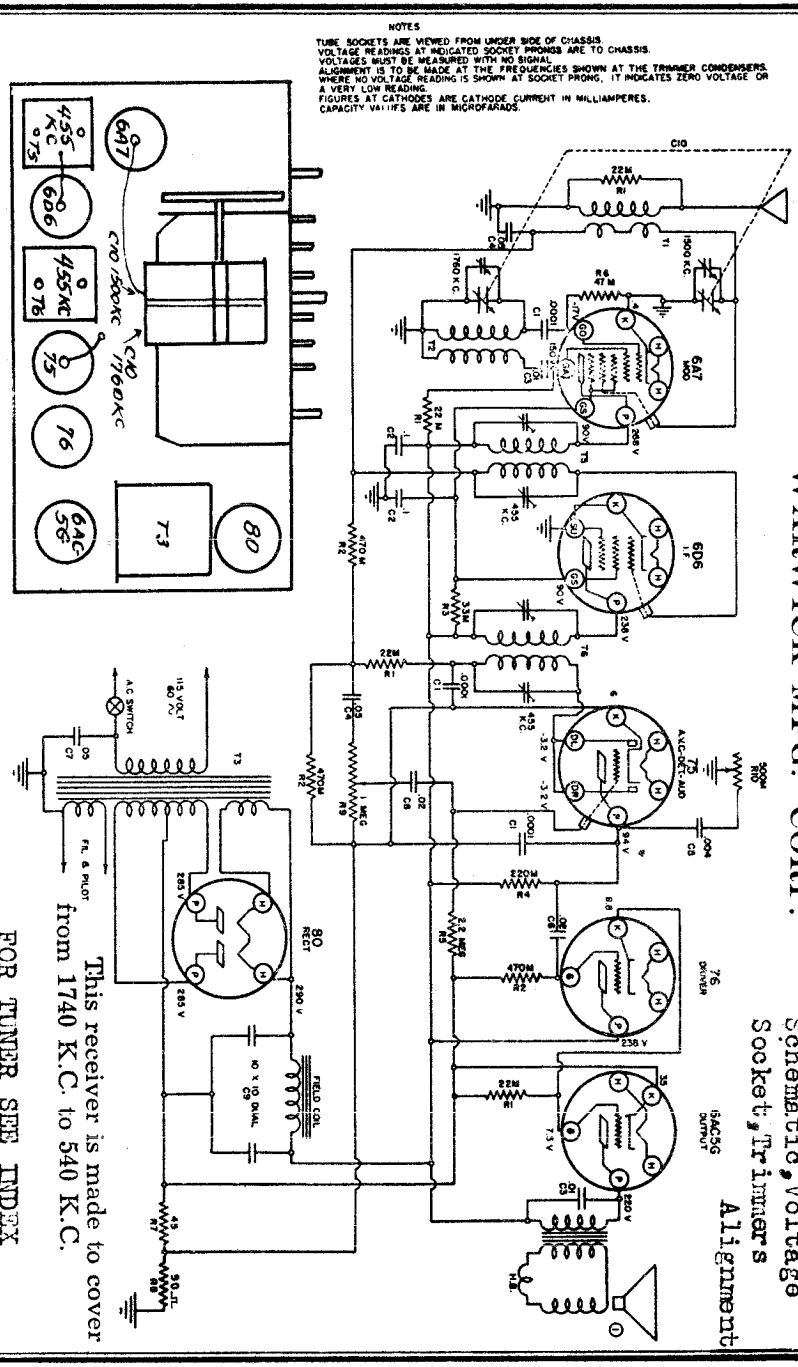
Turn the dial to the extreme high frequency end. Feed a 1760 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1760 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. antenna trimmer to the maximum output. This completes the alignment.




CHASSIS LAYOUT FOR MODELS 648 and 648B.




CHASSIS LAYOUT FOR MODEL 655B.




This receiver is made to cover from 1740 K.C. to 540 K.C.

FOR TUNER SEE INDEX

| CODE | PART NO | DESCRIPTION |
|---|---|---|
| R1 | 60-185 | 22 M. OHM 1/3 WATT RESISTOR |
| R2 | 60-178 | 470M " " " " |
| R3 | 60-186 | 33M " " " " |
| R4 | 60-180 | 220M " " " " |
| R5 | 60-179 | 2.2 MEGOHM 1/3 WATT RESISTOR |
| R6 | 60-177 | 47 M. OHM 1/3 WATT RESISTOR |
| R7 | 60-187 | 45 " 1/2 " " ± 10% |
| R8 | 60-191 | 90 " " " " ± 10% |
| R9 | 24-121 | 1 MEGOHM VOLUME CONTROL & SW. |
| R10 | 26-117 | 500M OHM TONE CONTROL |
| C1 | 1501 | 100 MMF MICA CONDENSER |
| C2 | 16-116 | 1 MFD 400 V TUBULAR CONDENSER |
| C3 | 1604 | .01 MFD 600V " " |
| C4 | 1622 | .05 " 200V " " |
| C5 | 1651 | .004 MFD 600V " " |
| C6 | 16-108 | .025 " 400V " " |
| C7 | 1607 | .05 " 400V " " |
| C8 | 16-123 | .02 " 200V " " |
| C9 | 18-226 | 10 X 10 MFD 400 WV. ELECTROLYTIC CONDENSER |
| C10 | 19-131 | 2 GANG VARIABLE CONDENSER |
| T1 | 10-235 | ANTENNA COIL |
| T2 | 10-236 | OSCILLATOR COIL |
| T3 | 60-159 | POWER TRANSFORMER |
| T4 | 10-227 | 1ST I.F. " |
| T5 | 10-228 | 2ND I.F. " |
| I | | SPEAKER |

MODEL 654 WARWICK MFG. CORP. Trimmers, Alignment

Schematic, Voltage, Socket

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.4 M.C. to 1.7 M.C. and high frequency or foreign band which is from 19 M. C. to 5.0 M.C.

This receiver is a 6 tube, 6 volt storage battery operated superheterodyne.

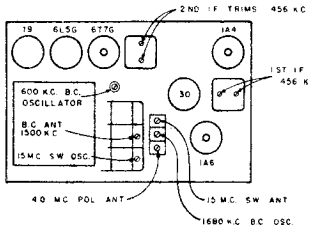
## ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 1A6 tube through a 1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

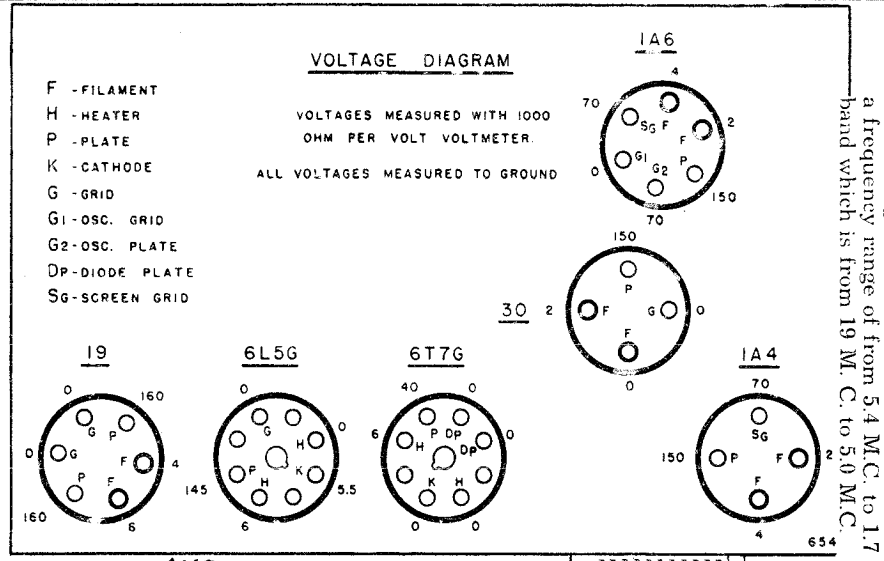
Leaving the signal generator connected to the grid cap of the 1A6, turn the wave switch to the right hand (short wave) position. Set the dial and the signal generator to 15.0 M.C. Tune in the signal by adjusting the 15.0 M.C. oscillator trimmer. The signal will be heard at two different settings of the trimmer. The proper setting is the one where the signal is heard when the trimmer is the loosest. Also when the dial of the receiver is turned the signal will be heard again at about 14.0 M.C. If the signal is heard at about 16.0 M.C. on the dial instead of 14.0 M.C. the wrong setting has been used and should be corrected.

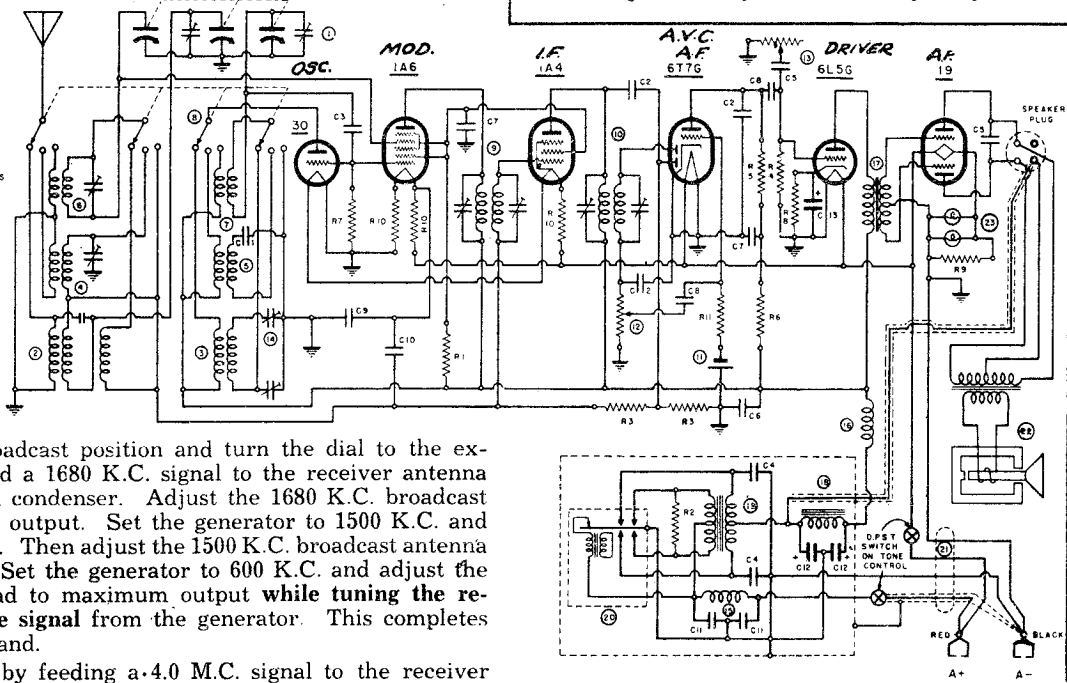



IF PEAK 456 KC

Set the wave switch on broadcast position and turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding a 4.0 M.C. signal to the receiver antenna lead through the 00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.




| PART NO | DESCRIPTION |
|---|---|
| R1 | 15000 OHM 1/2W CARBON RES |
| R2 | 6015 |
| R3 | 6017 1 MEG " " " |
| R4 | 6018 500,000 " " " |
| R5 | 6024 250,000 " " " |
| R6 | 6026 100,000 " " " |
| R7 | 6025 150,000 " " " |
| R8 | 6027 50,000 " " " |
| R9 | 6007 200 " " " |
| R10 | 66-102 33 1/3 1/2W WIRE WOUND RES |
| R11 | 6020 2 MEG " 1/2W CARBON RES |

| PART NO | DESCRIPTION |
|---|---|
| 1 | 19-121 3 GANG CONDENSER |
| 2 | 19-101 B.C. & POLICE COIL |
| 3 | 19-180 B.C. OSC. COIL |
| 4 | 19-182 POL. ANT. COIL |
| 5 | 19-181 POL OSC COIL |
| 6 | 19-183 S.W. ANT COIL |
| 7 | 19-184 S.W. OSC COIL |
| 8 | 19-140 1ST I.F. TRANSFORMER |
| 9 | 19-141 2ND I.F. TRANSFORMER |
| 10 | 19-146 BIAS CELL |
| 11 | 4600 VOLUME CONTROL |
| 12 | 24-103 TONE CONT WITH SWITCH |
| 13 | 26-107 |

| PART NO | DESCRIPTION |
|---|---|
| 14 | 29-100 B.C. OSC PAD |
| 15 | 33-104 R.F. & CHOKE |
| 17 | 8001 P.P. AUDIO TRANS |
| 18 | 3307 FILTER CHOKE |
| 19 | 8041 POWER TRANS |
| 20 | 3407 VIBRATOR |
| 22 | 23-104 SPEAKER |
| 23 | 23-103 SPEAKER CABLE |
| | NO 40 DIAL LIGHT |

| PART NO | DESCRIPTION |
|---|---|
| C1 | 15-106 .0011 MFD MICA CONS +5% |
| C2 | 1504 .00025 " " " |
| C3 | 1503 .00005 " " " |
| C4 | 1614 .006 MFD 600V TUBULAR COND |
| C5 | 1611 .25 " 400V " " |
| C6 | 1616 .25 " " " " |
| C7 | 1601 .1 " " " " |
| C8 | 1603 .01 " " " " |
| C9 | 1614 .25 " 200V " " |
| C10 | 1603 .01 " " " " |
| C11 | 1653 .5 " 150V ELECTROLYTIC |
| C12 | 1645 8 " 150V " |
| C13 | 16-100 10 " 25V TUB ELCET |

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

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# WARWICK MFG. CORP.

MODEL 659
Schematic, Voltage, Socket
Alignment, Trimmers




LOCATIONS OF PARTS ON TOP OF CHASSIS




LOCATIONS OF PARTS UNDER CHASSIS




## ALIGNMENT PROCEDURE

**PRELIMINARY**

Output Meter Connections ..... Across Loud Speaker Voice Coil
Output Meter Reading to Indicate 1 Watt ..... 1.85 Volts
Generator Ground Lead Connection ..... Receiver Chassis
Dummy Antenna Value to Be in Series with Generator Output ..... See Chart Below
Connection of Generator Output Lead ..... See Chart Below
Generator Modulation ..... 30%, 400 Cycles
Position of Volume Control ..... Fully On

| Position of Variable | Generator Frequency | Dummy Antenna | Generator Connections | Trimmer Adjustment (In Order Shown) | Trimmer Function |
|---|---|---|---|---|---|
| Closed | 262 KC | .1 mfd. | 6A8 Grid | T5, T4 | I.F. |
| Fully Open | 1580 KC | .0002 mfd. | Antenna Conn. | C3 | Oscillator Trimmer |
| 1400 KC | 1400 KC | .0002 mfd. | Antenna Conn. | C2, C6 | Ant. & R.F. Trimmer |
| 600 KC (Rock) | 600 KC | .1 mfd. | 6K7 R.F. Grid | C9 | Padder Oscillator |
| 600 KC | 600 KC | .0002 mfd. | Antenna Conn. | C5 | Padder Antenna |

The variable condenser should be rocked back and forth a degree or two while making the 600 K.C. adjustment on oscillator padder only.

The alignment procedure should be repeated in the original order, step by step, to insure greater accuracy.

A final adjustment of the antenna padder condenser C5 is always made after the receiver is installed in the car, in order to match the car antenna.

Always keep the output power from the generator at its lowest possible value to prevent the A.V.C. of the receiver from interfering with accurate alignment.

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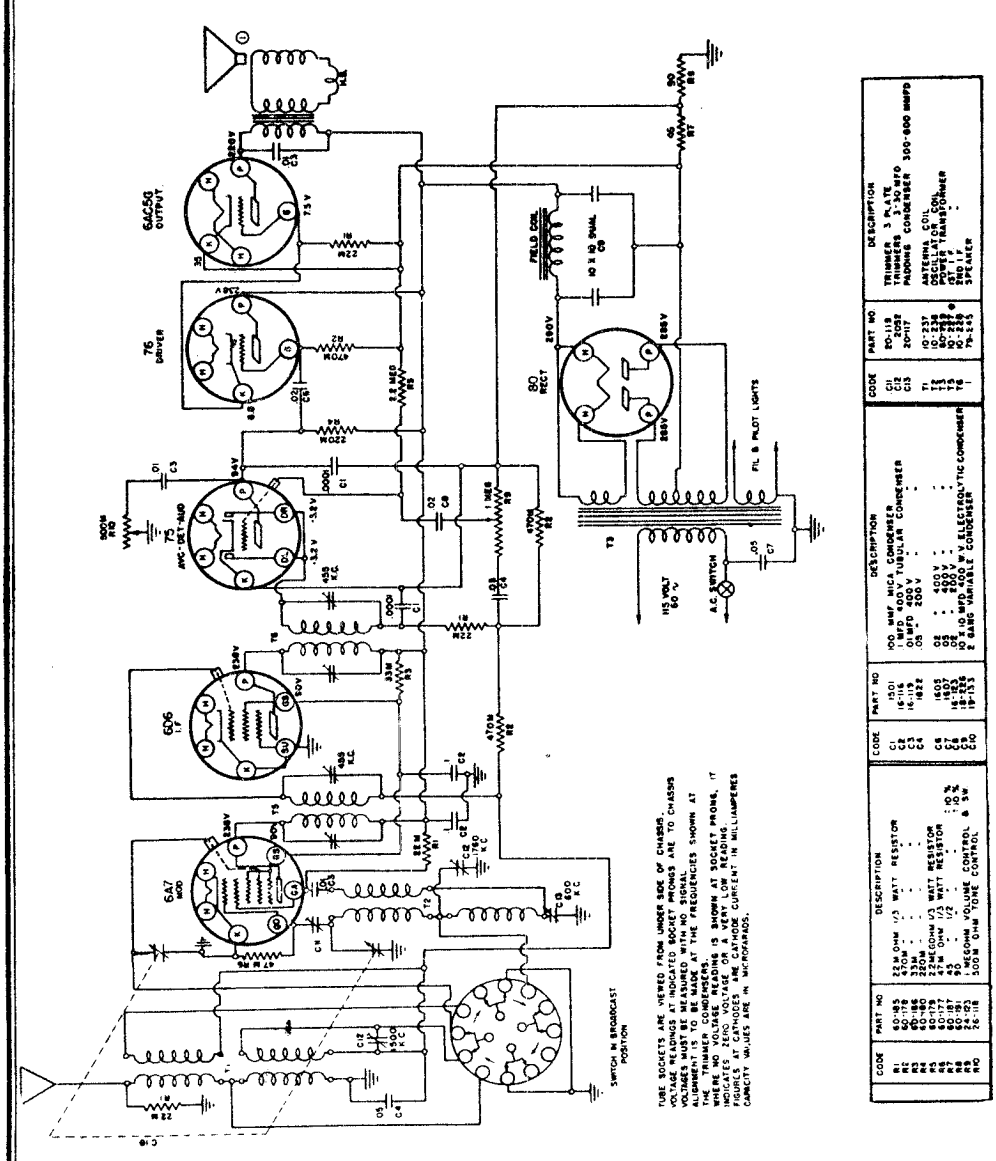
MODELS 668,668B
Schematic,Voltage,Socket Alignment,Trimmers

# WARWICK MFG. CORP.


6AC5G OUTPUT
75 DRIVER
80 RECT
6D6
6A7
FIL & PILOT LIGHTS
A.C. SWITCH
115 VOLT 60 ~
SWITCH IN BROADCAST POSITION
TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH A 1000 OHM PER VOLT METER.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES EXCESSIVE VOLTAGE OR NO CONNECTION.
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES
CAPACITY VALUES ARE IN MICROFARADS.

| CODE | PART NO | DESCRIPTION |
|---|---|---|
| R1 | 40-185 | 25M OHM 1/2 WATT RESISTOR |
| R2 | 40-186 | 100M " " " |
| R3 | 40-180 | 33M " " " |
| R4 | 40-179 | 22M OHM 1/2 WATT RESISTOR |
| R5 | 40-177 | 47M OHM 1/2 " " ±10% |
| R6 | 40-181 | 90 " " " ±10% |
| R7 | 40-181 | 90 " " " ±10% |
| R8 | 24-103 | 1 MEGOHM VOLUME CONTROL & SW |
| R9 | 28-118 | 5000 OHM TONE CONTROL |

| CODE | PART NO | DESCRIPTION |
|---|---|---|
| C1 | 1501 | 100 MMF MICA CONDENSER |
| C2 | 16-116 | 1 MFD 400 V TUBULAR CONDENSER |
| C3 | 16-119 | 05 MFD 200 V " " |
| C4 | 1822 | 00 " 400 V " " |
| C5 | | 01 " 400 V " " |
| C6 | 1805 | 05 " 400 V " " |
| C7 | 16-125 | 01 " 400 V " " |
| C8 | 18-153 | 20-10 MFD 450 V ELECTROLYTIC CONDENSER |
| C9 | | 2 GANG VARIABLE CONDENSER |

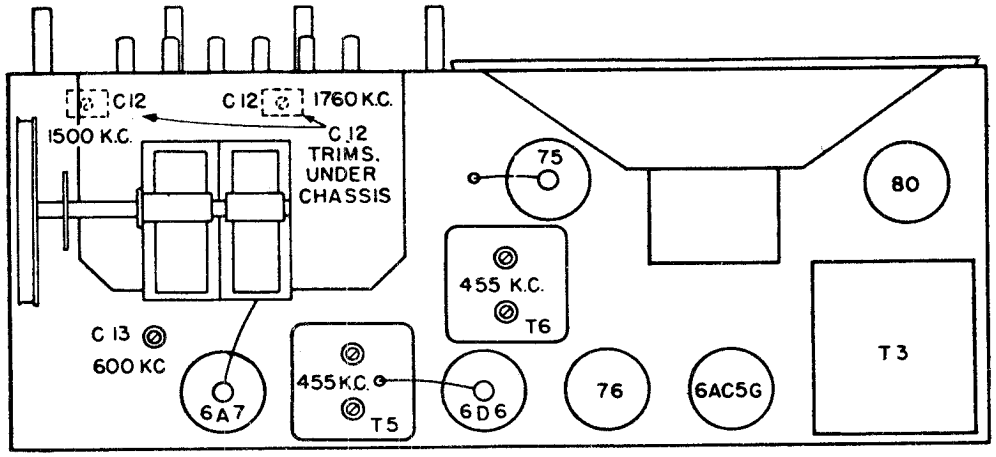
| CODE | PART NO | DESCRIPTION |
|---|---|---|
| C11 | RC-118 | TRIMMER 3 PLATE |
| C12 | 2052 | TRIMMERS 3-30 MFD |
| C13 | 20-17 | PADDING CONDENSER 300-600 MMFD |
| T1 | 10-237 | ANTENNA COIL |
| T2 | 10-238 | OSCILLATOR COIL |
| T3 | 60-238 | POWER TRANSFORMER |
| T4 | 60-239 | IFT |
| T5 | 60-238 | IFT |
| T6 | 60-238 | IFT |
| T7 | 75-245 | SPEAKER |

## DESCRIPTION

This receiver is a 6-tube alternating current operated superheterodyne.

The tubes used are—a 6A7 as oscillator modulator, a 6D6 as I. F. amplifier, a 75 as A. V. C. and audio rectifier and audio voltage amplifier, a 76 as a direct coupled driver, a 6AC5G as a power audio amplifier, and a 80 as a power rectifier.

This receiver is made to cover two tuning bands—the standard broadcast band which ranges from 1740 KC to 540 KC, and the short wave band which has a freuqency range of from 24 MC to 5.9 MC.




FOR TUNER SEE INDEX

## ALIGNMENT

FOLLOW PROCEDURE AS FOR MODEL 648 BUT ALIGN OSC-PAD,(C13 shown on chassis layout above) AT 600 KC as a final adjustment.

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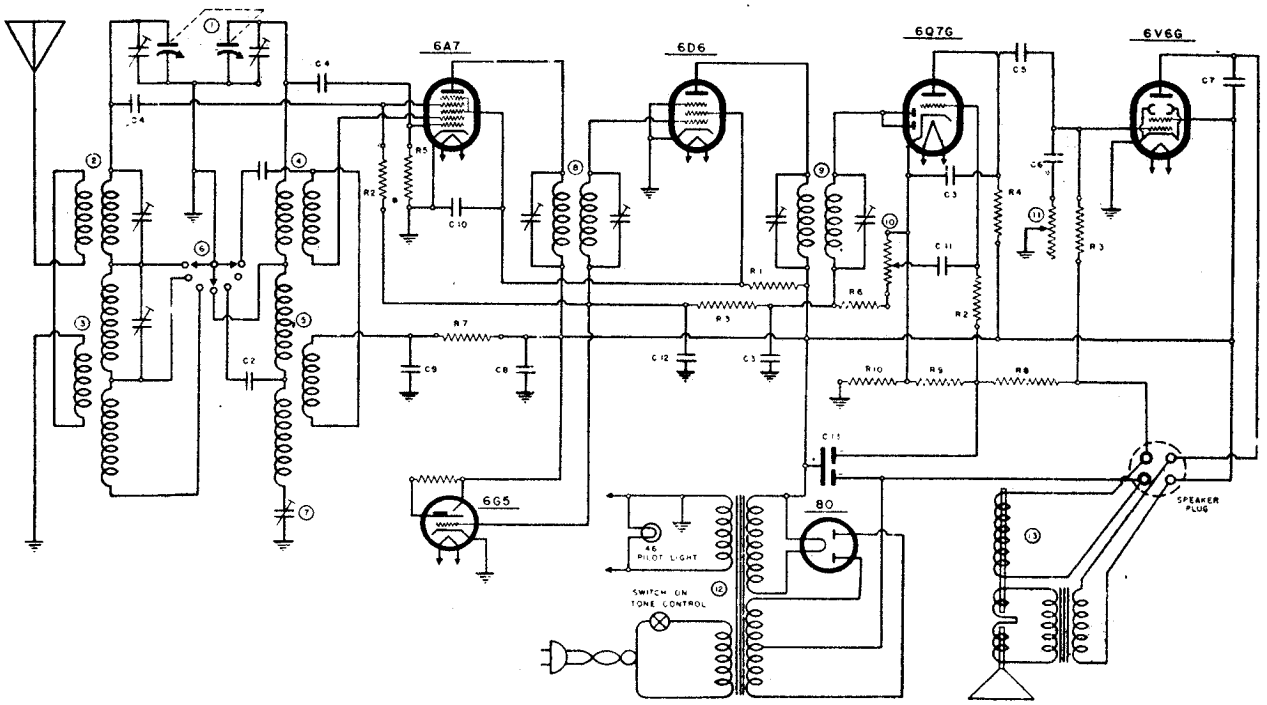
# WARWICK MFG. CORP.

MODEL 683
Schematic, Voltage, Socket
Trimmers, Alignment



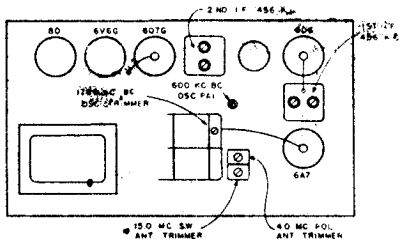

## ALIGNMENT

IF Through 0.1 mfd. dummy antenna, adjust trimmers at 456 KC.

BC Adjust osc. trimmer at 1760 KC through 0.0025 dummy. Adjust padders at 600 KC.

POLICE Through 0.00025 mfd. dummy, adjust antenna trimmer at 4 MC.

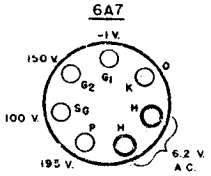
Short Wave Adjust antenna trimmer at 15 MC.

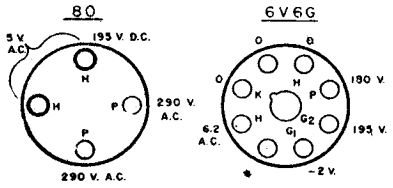



### VOLTAGE DIAGRAM

H HEATER
K CATHODE
P PLATE
Gc CONTROL GRID
G1 OSC. GRID
G2 OSC. PLATE
Sg SCREEN GRID
Su SUPPRESSOR
Dp DIODE PLATE

(BOTTOM VIEW OF CHASSIS)
ALL VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER




| | | | |
|---|---|---|---|
| 1 | 19-119 | 2 GANG CONDENSER | |
| 2 | 10-126 | SW ANT COIL | |
| 3 | 10-128 | BC & POL ANT COIL | |
| 4 | 10-127 | SW OSC COIL | |
| 5 | 10-129 | BC & POL OSC COIL | |
| 6 | 69-176 | WAVE BAND SWITCH | |
| 7 | 20-103 | BC OSC PADDING COND | |
| 8 | 10-175 | 1ST I.F. TRANSFORMER | |
| 9 | 10-176 | 2ND I.F. TRANSFORMER | |
| 10 | 24-109 | VOL CONTROL | |
| 11 | 26-108 | TONE CONTROL WITH SWITCH | |
| 12 | 80-137 | POWER TRANSFORMER | |
| 13 | | SPEAKER | |

| | | | |
|---|---|---|---|
| R1 | 6231 | 80,000 OHM | 1 W CARBON RES |
| R2 | 6020 | 2 MEG | |
| R3 | 6018 | 500,000 | |
| R4 | 6024 | 250,000 | |
| R5 | 6028 | 40,000 | |
| R6 | 6030 | 20,000 | |
| R7 | 6021 | 10,000 | |
| R8 | 60-140 | 130 | 1 W WIRE |
| R9 | 60-103 | 30 | 1/2 W |
| R10 | 60-126 | 16 | |

| | | | |
|---|---|---|---|
| C1 | 1509 | .002 MFD | MICA CONDENSER |
| C2 | 15-100 | 0082 | ±5% |
| C3 | 1504 | .00025 | |
| C4 | 1501 | .0001 | |
| C5 | 1604 | .01 | 600 V. PAPER COND |
| C6 | 1611 | .006 | |
| C7 | 1651 | .004 | |
| C8 | 1618 | .23 | 400 V |
| C9 | 1601-S | .1 | |
| C10 | 1607 | .05 | |
| C11 | 1603 | .01 | |
| C12 | 1652 | .05 | 200 V |
| C13 | 10-213 | 8 | 300 V. DUAL ELECTROLYTIC |

683

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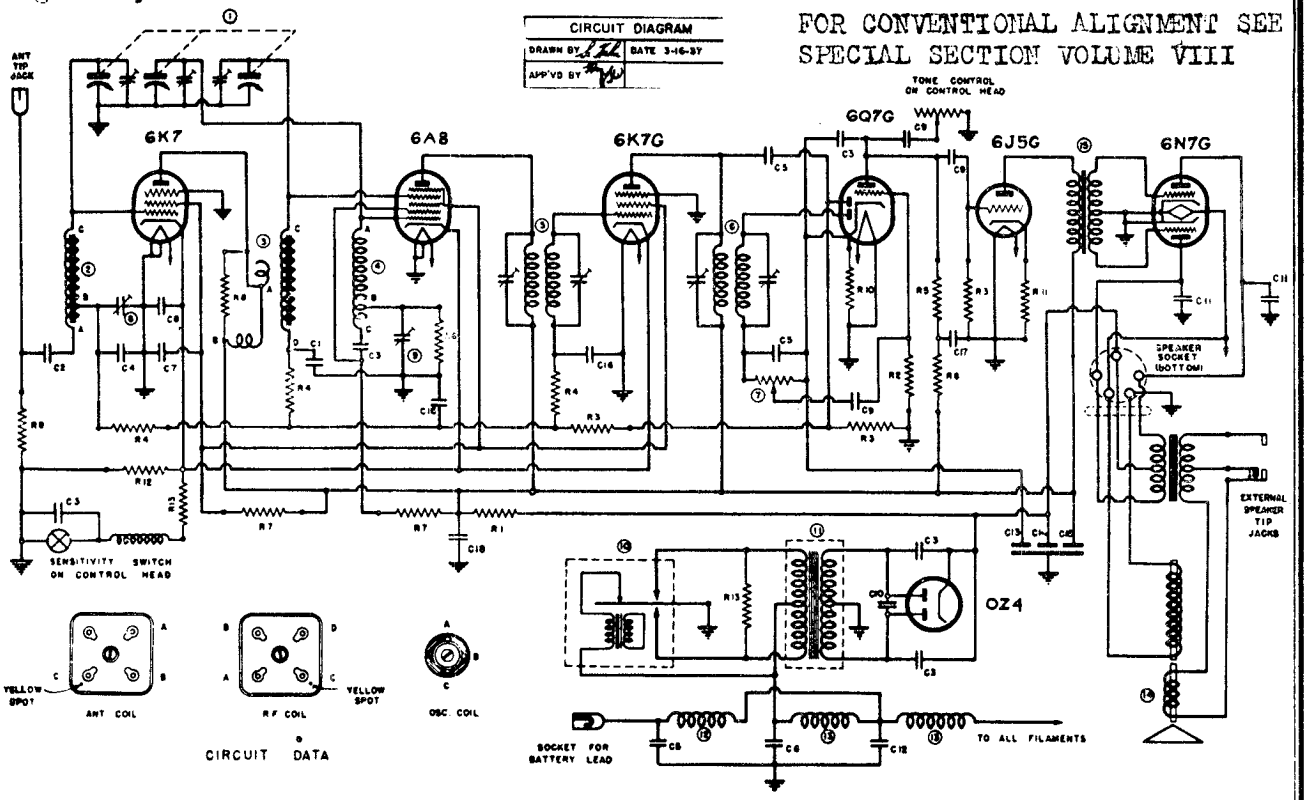
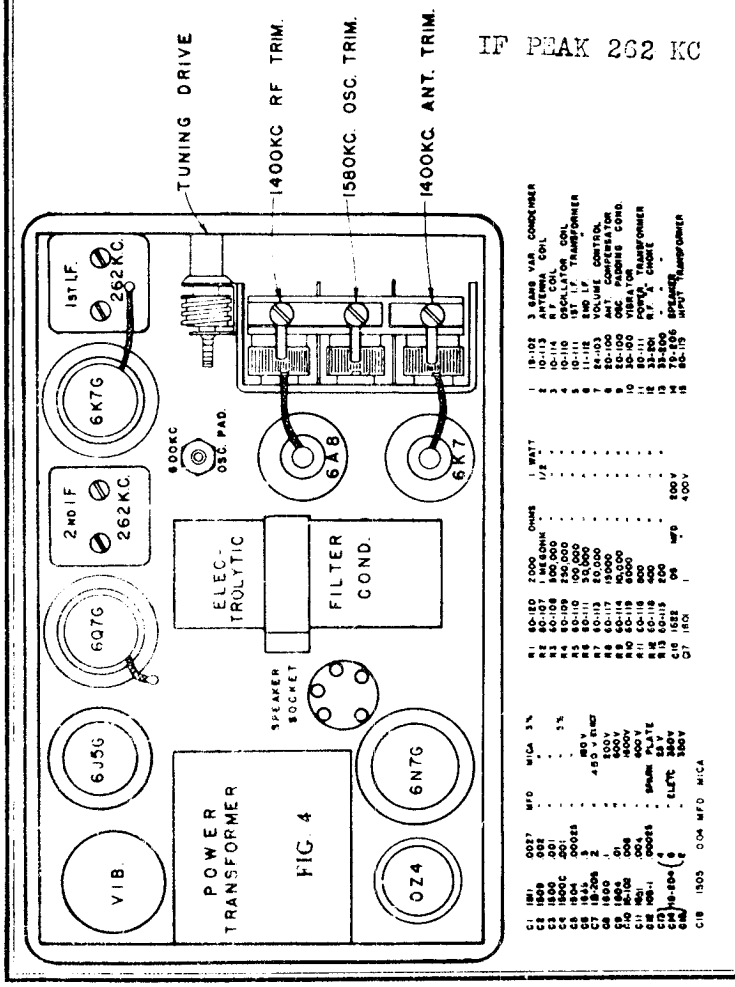
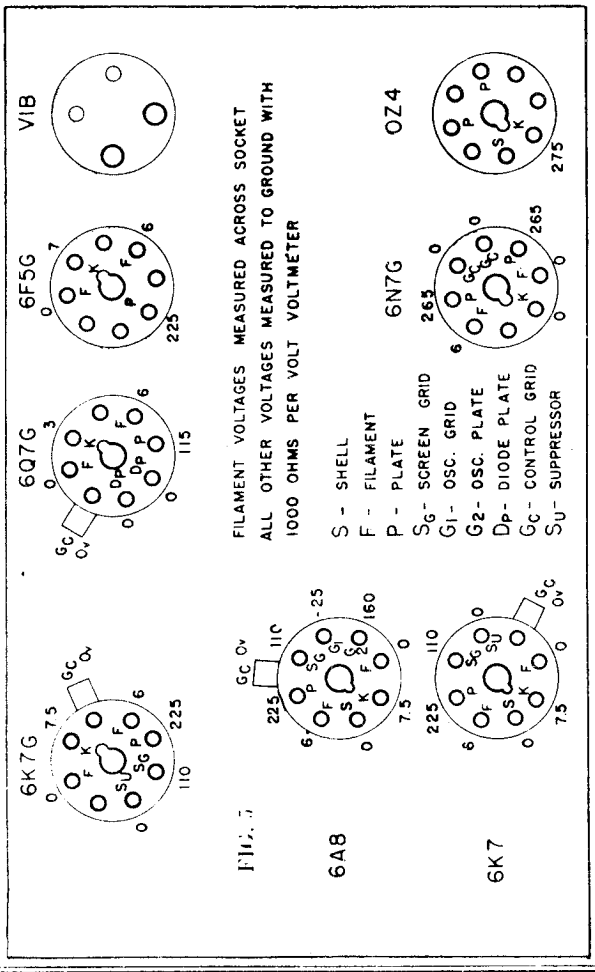
MODEL 746
Schematic, Voltage, Socket Alignment, Trimmers

# WARWICK MFG. CORP.

FOR CONVENTIONAL ALIGNMENT SEE SPECIAL SECTION VOLUME VIII

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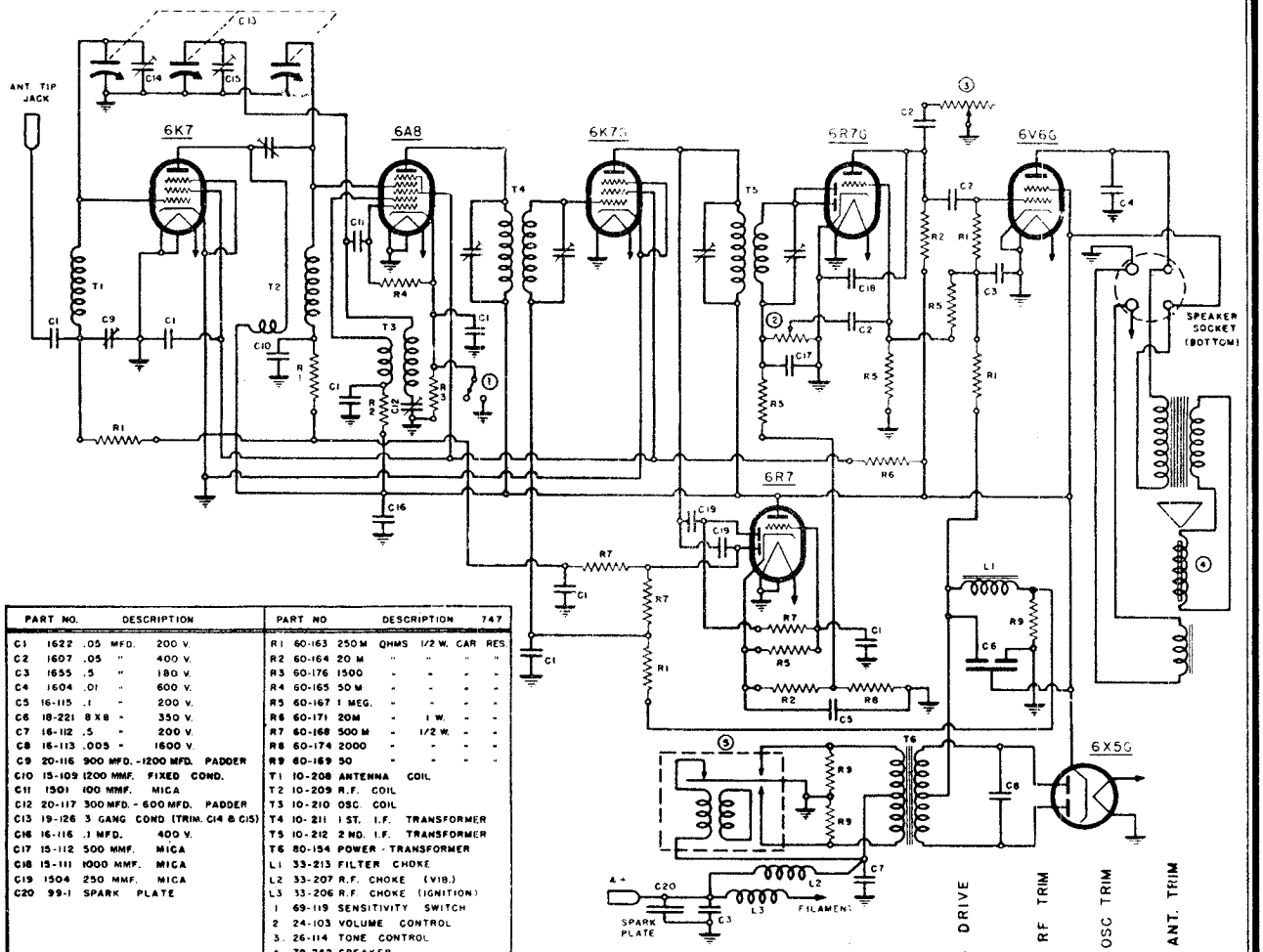
# WARWICK MFG. CORP.

MODEL 747
Schematic, Voltage, Socket
Alignment, Trimmers




| PART NO. | DESCRIPTION |
|---|---|
| C1 1622 .05 MFD. | 200 V. |
| C2 1607 .05 " | 400 V. |
| C3 1655 .5 " | 180 V. |
| C4 1604 .01 " | 600 V. |
| C5 16-115 .1 " | 200 V. |
| C6 18-221 8 X 8 " | 350 V. |
| C7 16-112 .5 " | 200 V. |
| C8 16-113 .005 " | 1600 V. |
| C9 20-116 900 MFD. - 1200 MFD. | PADDER |
| C10 15-109 1200 MMF. | FIXED COND. |
| C11 1501 100 MMF. | MICA |
| C12 20-117 300 MFD. - 600 MFD. | PADDER |
| C13 19-126 3 GANG COND (TRIM. C14 & C15) | |
| C16 16-116 .1 MFD. | 400 V. |
| C17 15-112 500 MMF. | MICA |
| C18 15-111 1000 MMF. | MICA |
| C19 1504 250 MMF. | MICA |
| C20 99-1 SPARK PLATE | |

| PART NO | DESCRIPTION 747 |
|---|---|
| R1 60-163 250 M OHMS | 1/2 W. CAR RES. |
| R2 60-164 20 M " | " " " |
| R3 60-176 1500 - | - - - |
| R4 60-165 50 M - | - - - |
| R5 60-167 1 MEG. - | - - - |
| R6 60-171 20M - | 1 W. - - |
| R7 60-168 500 M - | 1/2 W. - - |
| R8 60-174 2000 - | - - - |
| R9 60-169 50 - | - - - |
| T1 10-208 ANTENNA | COIL |
| T2 10-209 R.F. | COIL |
| T3 10-210 OSC. | COIL |
| T4 10-211 1 ST. I.F. | TRANSFORMER |
| T5 10-212 2 ND. I.F. | TRANSFORMER |
| T6 80-154 POWER - | TRANSFORMER |
| L1 33-213 FILTER | CHOKE |
| L2 33-207 R.F. CHOKE | (VIB.) |
| L3 33-206 R.F. CHOKE | (IGNITION) |
| 1 69-119 SENSITIVITY | SWITCH |
| 2 24-103 VOLUME | CONTROL |
| 3 26-114 TONE | CONTROL |
| 4 79-242 SPEAKER | |
| 5 34-101 VIBRATOR | |

## ALIGNMENT

IF Through 0.1 mfd. dummy antenna, adjust trimmers at 262 KC.

BC Trhough 0.00025 dummy, adjust osc. trimmer at 1580 KC. Adjust antenna trimmer at 1400 KC. Adjust padder at 600 KC. Adjust antenna compensator at 600 KC. for best sensitivity with signal.

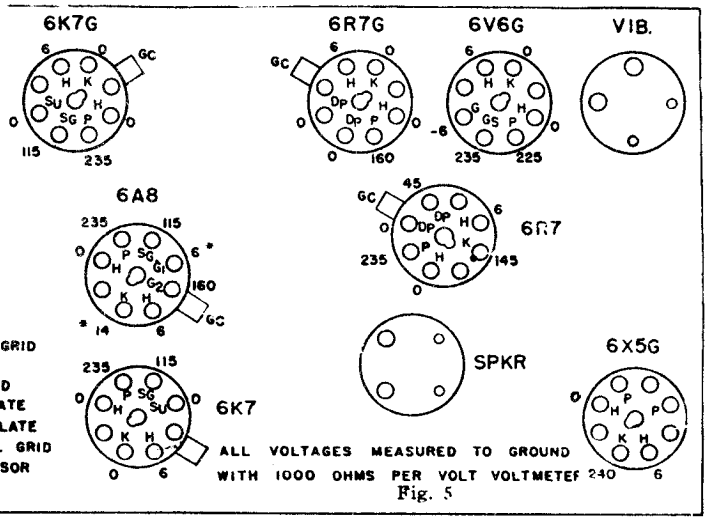



Fig. 5

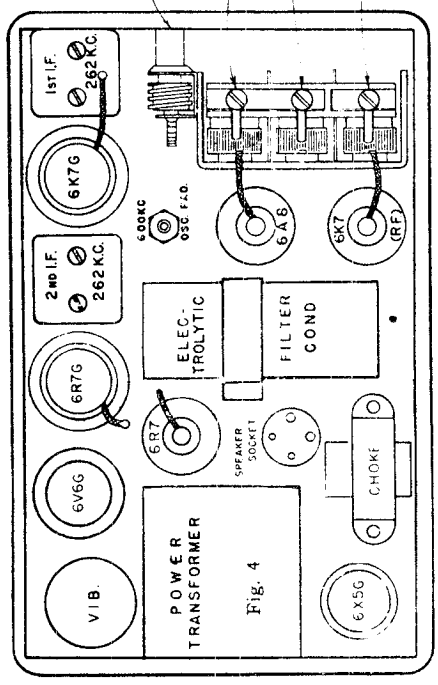



Fig. 4

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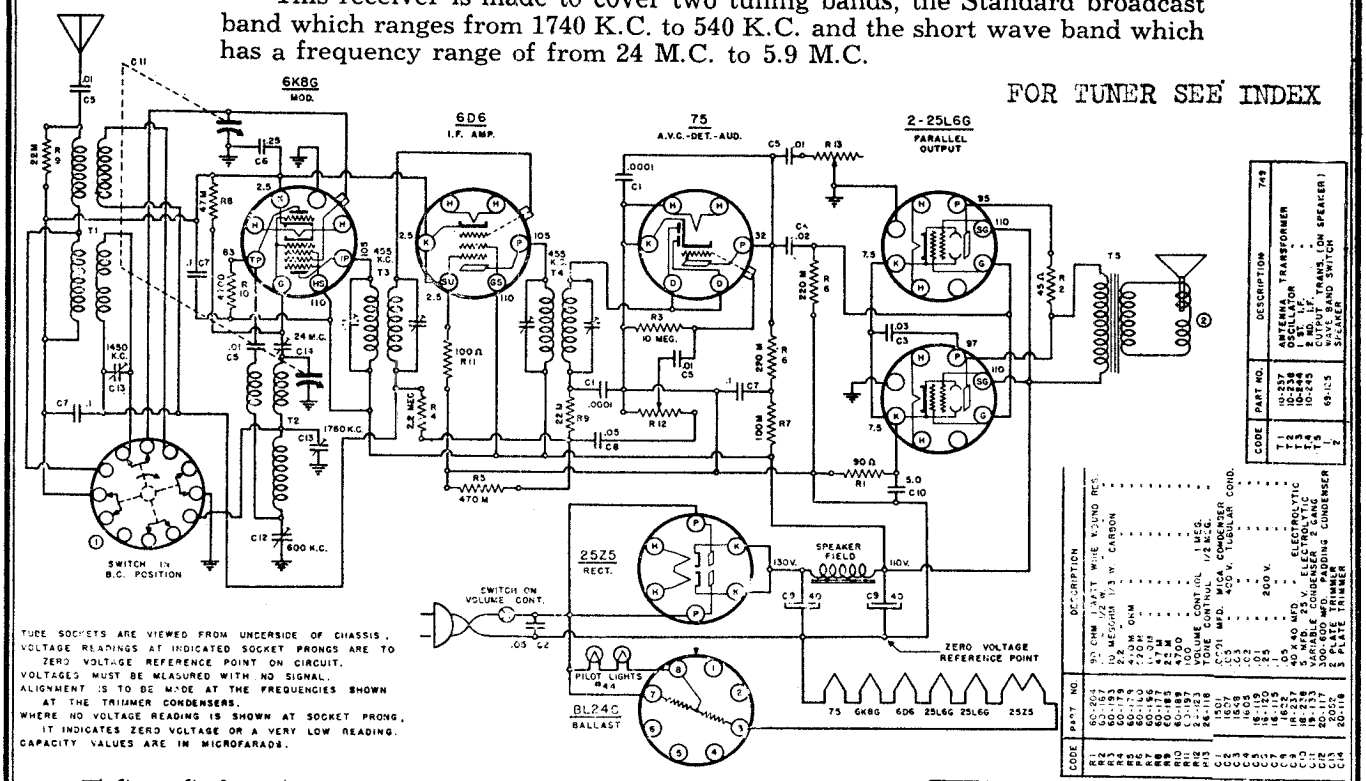
MODELS 749,749B Late
Schematic,Voltage,Socket
Alignment,Trimmers

# WARWICK MFG. CORP.

This receiver is made to cover two tuning bands, the Standard broadcast band which ranges from 1740 K.C. to 540 K.C. and the short wave band which has a frequency range of from 24 M.C. to 5.9 M.C.

FOR TUNER SEE INDEX




TUBE SOCKETS ARE VIEWED FROM UNDERSIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO ZERO VOLTAGE REFERENCE POINT ON CIRCUIT.
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS.
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING.
CAPACITY VALUES ARE IN MICROFARADS.

| CODE | PART NO | DESCRIPTION |
|---|---|---|
| R1 | 80-204 | 90 OHM 1 WATT WIRE WOUND RES. |
| R2 | 60-167 | 10 MEGOHM 1/2 W. CARBON |
| R3 | 60-179 | 10 MEGOHM 1/2 W. CARBON |
| R4 | 60-175 | 2.2 " " " " |
| R5 | 60-170 | 470M OHM " " " |
| R6 | 60-166 | 220M " " " |
| R7 | 60-166 | 100M " " " |
| R8 | 60-177 | 47M " " " |
| R9 | 60-185 | 22M " " " |
| R10 | 60-189 | 4700 " " " |
| R11 | 60-197 | 100 " " " |
| R12 | 60-193 | VOLUME CONT. - 1/2 MEG. |
| R13 | 24-118 | TONE CONTROL - 1/2 MEG. |
| C1 | 1501 | .0001 MFD. MICA CONDENSER |
| C2 | 1637 | .05 " " 400 V. TUBULAR COND. |
| C3 | 1638 | .02 " " " " " " |
| C4 | 1605 | .01 " " " " " " |
| C5 | 16-119 | .05 " " " " " " |
| C6 | 16-120 | .1 " " " " " " |
| C7 | 1627 | .05 " " 200 V. |
| C8 | 16-119 | .05 " " " " |
| C9 | 16-177 | 40-40 MFD. 25 V. ELECTROLYTIC |
| C10 | 16-133 | 5 MFD. 25 V. ELECTROLYTIC |
| C11 | 18-238 | VARIABLE CONDENSER 2 GANG |
| C12 | 1607 | 250 MMF. PADDING CONDENSER |
| C13 | 2052 | 2-PLATE MFR. TRIMMER |
| C14 | 20-116 | 5 PLATE TRIMMER |

| CODE | PART NO. | DESCRIPTION 749 |
|---|---|---|
| T1 | 10-237 | ANTENNA TRANSFORMER |
| T2 | 10-238 | OSCILLATOR " |
| T3 | 10-244 | 1 ST. I.F. " |
| T4 | 10-245 | 2 ND. I.F. " |
| T5 | | OUTPUT TRANS. (ON SPEAKER) |
| S | 69-105 | WAVE BAND SWITCH |
| | | SPEAKER |

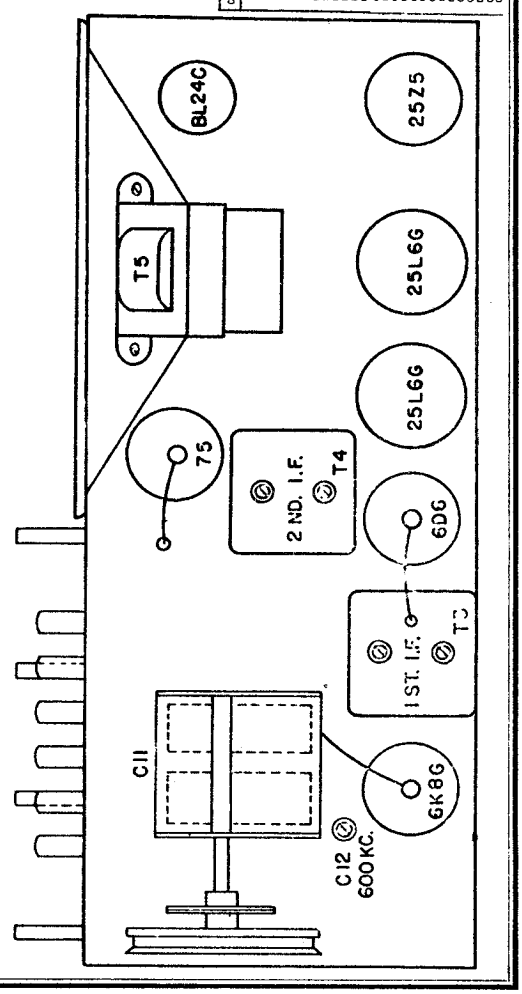
## ALIGNMENT PROCEDURE

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 10,000 ohms, to plate of output tube and B+, or a low voltage A. C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 455 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1760 K.C. signal to the receiver antenna lead through a .00025 MF mica condenser. Adjust the 1760 K.C. oscillator trimmer until maximum output is shown. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. antenna trimmer to the maximum output. Then impress a 600 K.C. signal into the receiver antenna lead and tune in this signal on the receiver. Adjust oscillator padding condenser to the maximum output. For the alignment of the short wave band open variable condenser to minimum capacity. With an impressed signal of 24 M.C. adjust trimmer designated as C14 in schematic diagram for maximum output. Follow through with this procedure several times in order to obtain the best alignment adjustment possible. This completes the alignment.

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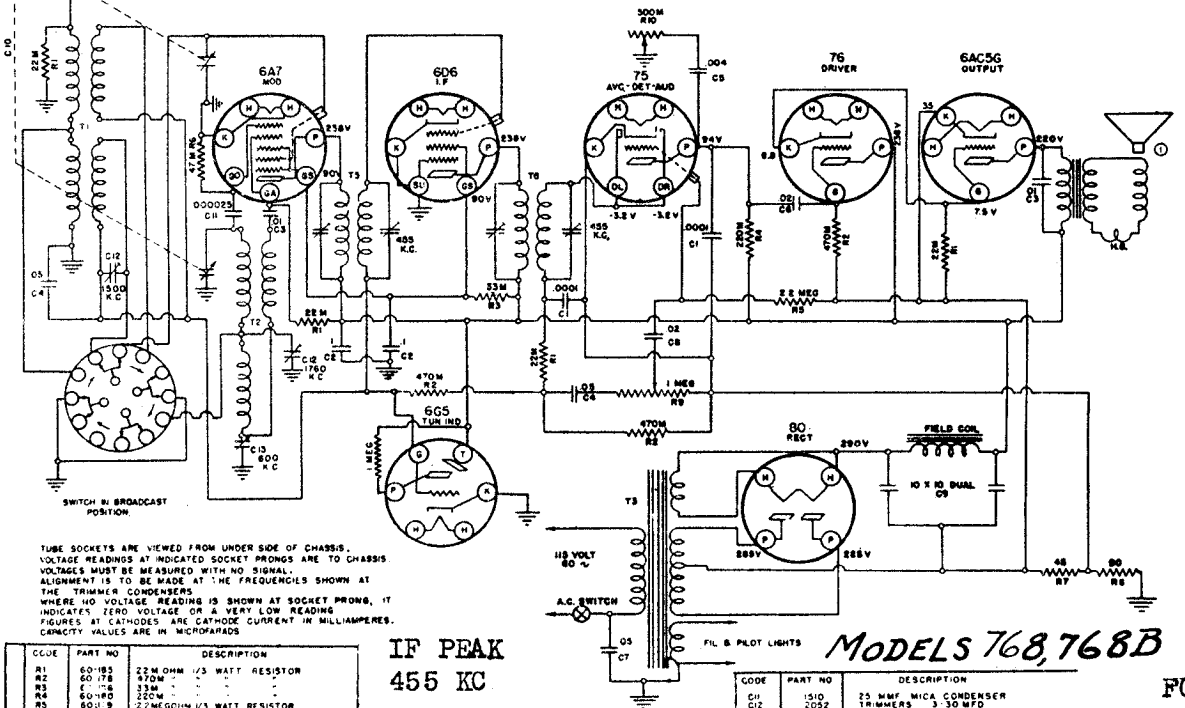
# WARWICK MFG. CORP.

MODEL 761
Schematic, Socket, Trimmers
MODELS 768, 768B
Schematic, Voltage




TUBE SOCKETS ARE VIEWED FROM UNDER SIDE OF CHASSIS.
VOLTAGE READINGS AT INDICATED SOCKET PRONGS ARE TO CHASSIS
VOLTAGES MUST BE MEASURED WITH NO SIGNAL.
ALIGNMENT IS TO BE MADE AT THE FREQUENCIES SHOWN AT THE TRIMMER CONDENSERS
WHERE NO VOLTAGE READING IS SHOWN AT SOCKET PRONG, IT INDICATES ZERO VOLTAGE OR A VERY LOW READING
FIGURES AT CATHODES ARE CATHODE CURRENT IN MILLIAMPERES.
CAPACITY VALUES ARE IN MICROFARADS

| CODE | PART NO | DESCRIPTION |
|---|---|---|
| R1 | 60-185 | 2.2 M OHM 1/3 WATT RESISTOR |
| R2 | 60-178 | 470M " " " |
| R3 | 60-196 | 33M " " " |
| R4 | 60-198 | 220M " " " |
| R5 | 60-199 | 2.2 MEGOHM 1/3 WATT RESISTOR |
| R6 | 60-177 | 47 M OHM 1/3 WATT RESISTOR |
| R7 | 60-187 | 68 " 1/2 " " ±10% |
| R8 | 60-191 | 90 " " " " ±10% |
| R9 | 64-173 | 1 MEGOHM VOLUME CONTROL & SW |
| R10 | 76-18 | 500M OHM TONE CONTROL |

IF PEAK
455 KC

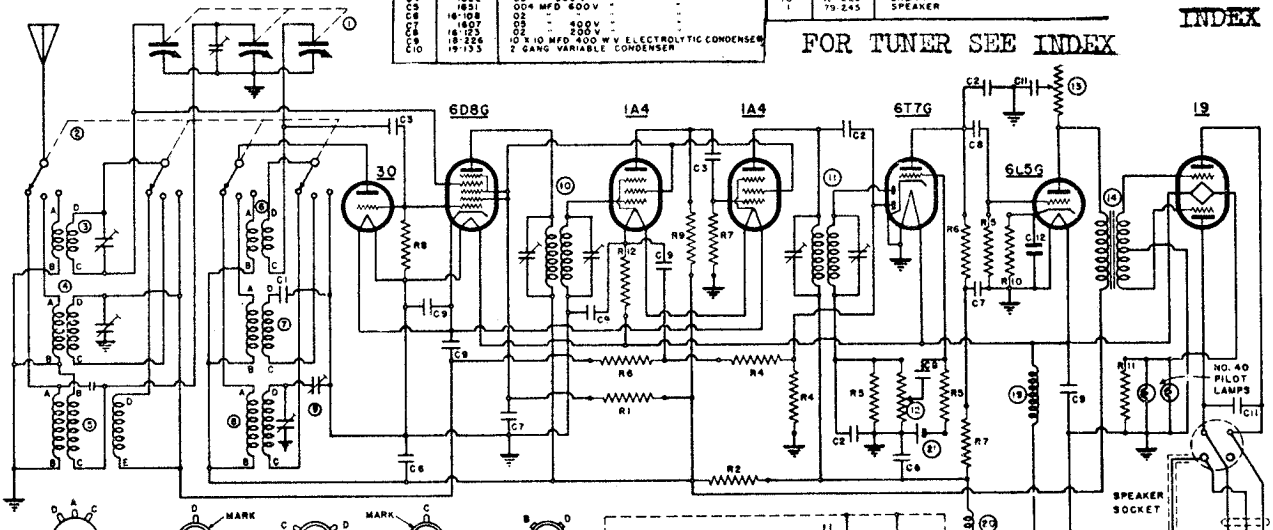
| CODE | PART NO | DESCRIPTION |
|---|---|---|
| C1 | 1501 | 100 MMF MICA CONDENSER |
| C2 | 16-116 | 1 MFD 400 V. TUBULAR CONDENSER |
| C3 | 1604 | .01 MFD 600 V. " " |
| C4 | 1622 | .05 " 200 V. " " |
| C5 | 1651 | .004 MFD 600 V. " " |
| C6 | 16-108 | .02 " " " " " |
| C7 | 1607 | .09 " 400 V. " " |
| C8 | 16-123 | .02 " 200 V. " " |
| C9 | 18-226 | 10 X 10 MFD 400 W V. ELECTROLYTIC CONDENSER |
| C10 | 19-133 | 2 GANG VARIABLE CONDENSER |

| CODE | PART NO | DESCRIPTION |
|---|---|---|
| C11 | 1510 | 25 MMF. MICA CONDENSER |
| C12 | 2052 | TRIMMERS 3-30 MFD |
| C13 | 20-117 | PADDING CONDENSER 300-600 MMFD |
| T1 | 10-237 | ANTENNA COIL |
| T2 | 10-236 | OSCILLATOR COIL |
| T3 | 10-159 | POWER TRANSFORMER |
| T4 | 10-227 | 1ST I.F. " |
| T5 | 10-228 | 2ND I.F. " |
| T6 | 79-245 | SPEAKER |

MODELS 768, 768B

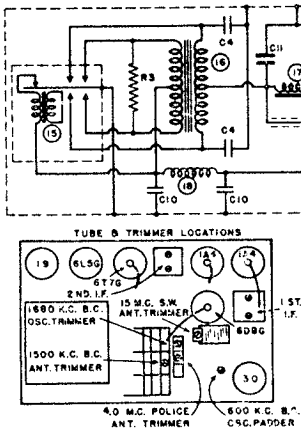
FOR ALIGNMENT SEE INDEX

FOR TUNER SEE INDEX




| | | | | | |
|---|---|---|---|---|---|
| R1 | 6103 | 10,000 | OHM | 1/2 W. | CARBON RES. |
| R2 | 6102 | 400 | " | " | " |
| R3 | 6101 | 100 | " | " | " |
| R4 | 6017 | 1 MEG | " | 1/3W. | " |
| R5 | 6018 | 2,000,000 | " | " | " |
| R6 | 6024 | 250,000 | " | " | " |
| R7 | 6026 | 100,000 | " | " | " |
| R8 | 6025 | 50,000 | " | " | " |
| R9 | 6022 | 15,000 | " | " | " |
| R10 | 6006 | 1500 | " | " | " |
| R11 | 6007 | 200 | " | " | " |
| R12 | 60-128 | 8 OHM | 1/2 W. | WIRE | RES. 5% |
| C1 | 1509G | .002 | MFD. | MICA | COND. 5% |
| C2 | 1504 | .000025 | " | " | " |
| C3 | 1510B | .000025 | " | " | 10% |
| C4 | 1604 | .01 | " | PAPER | 600 V. |
| C5 | 1611 | .006 | " | " | " |
| C6 | 1616 | .25 | " | " | 400 V. |
| C7 | 1601 | .1 | " | " | " |
| C8 | 1603 | .01 | " | " | " |
| C9 | 1600 | .1 | " | " | 200 V. |
| C10 | 1655 | .5 | " | " | 150 V. |
| C11 | 1845 | 8.0 | MFD. | ELECTROLYTIC | 150 V. |
| C12 | 16-100 | 10.0 | " | " | 25 V. |

| | | |
|---|---|---|
| 1 | 19-106 | 3 GANG VARIABLE CONDENSER |
| 2 | 69-103 | WAVE BAND SWITCH |
| 3 | 10-140 | S.W. ANTENNA COIL |
| 4 | 10-135 | POLICE BAND ANTENNA COIL |
| 5 | 10-137 | B.C. ANT. & PRESELECTOR COIL |
| 6 | 10-139 | S.W. OSCILLATOR COIL |
| 7 | 10-138 | POLICE BAND OSCILLATOR COIL |
| 8 | 10-134 | B.C. OSCILLATOR COIL |
| 9 | 20-100 | B.C. OSC. PADDING CONDENSER |
| 10 | 10-145 | 1 ST. I.F. TRANSFORMER |
| 11 | 10-144 | 2ND. I.F. TRANSFORMER |
| 12 | 24-101 | VOLUME CONTROL |
| 13 | 26-102 | TONE CONTROL WITH SWITCH |
| 14 | 8010 | P.P. INPUT TRANSFORMER |
| 15 | 3407 | VIBRATOR |
| 16 | 8041 | VIBRATOR POWER TRANSFORMER |
| 17 | 3307 | FILTER CHOKE |
| 18 | 3313 | R.F. "A" CHOKE |
| 19 | 33-204 | R.F. "A" CHOKE |
| 20 | 3303 | R.F. "B" CHOKE |
| 21 | 4900 | BIAS CELL |
| 22 | 25-103 | BATTERY CABLE |
| 23 | | SPEAKER |




MODEL 761

IF PEAK
456 KC

BATTERY CLIPS

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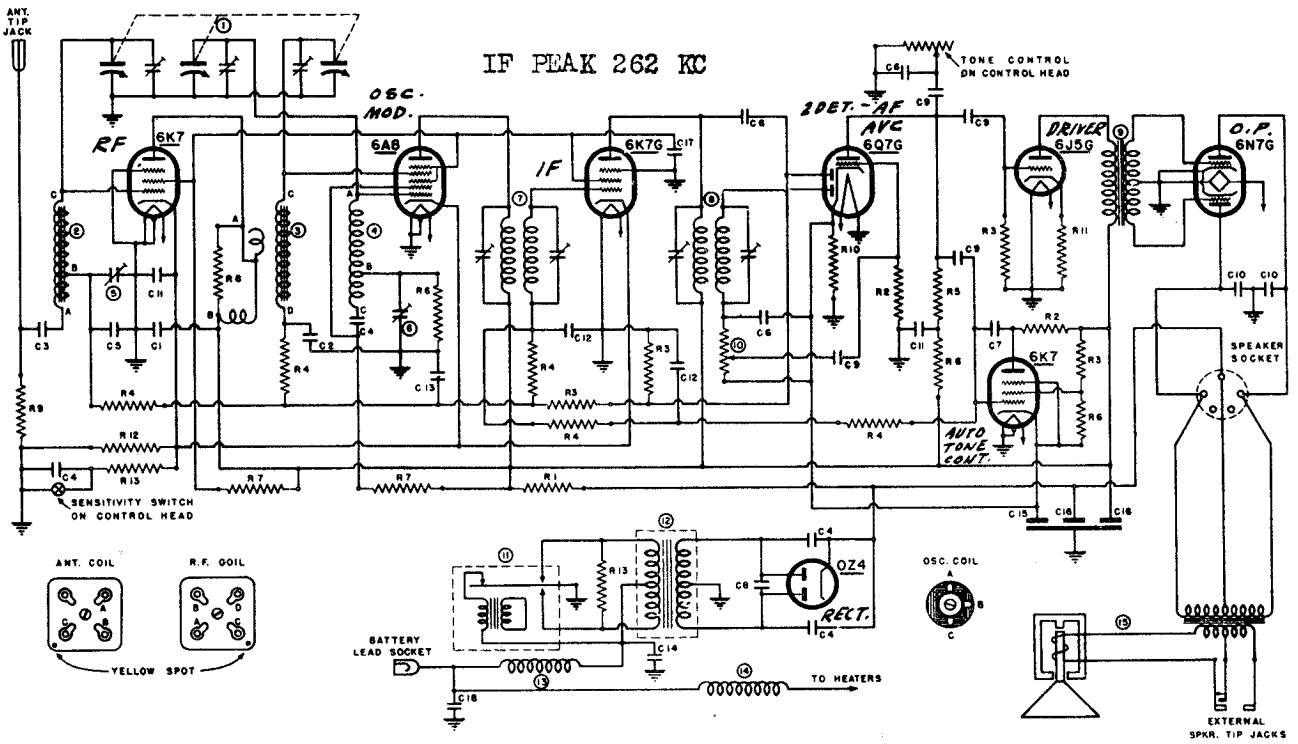
MODEL 846
Schematic, Socket
Alignment, Trimmers

# WARWICK MFG. CORP.




For Conventional Alignment See Special Section Vol. VIII

## FREQUENCY CALIBRATION ADJUSTMENT

While a station of known frequency is tuned in, remove the pilot light socket. In the tuning control head, immediately in front of position from which the dial light socket has been removed, will be seen a small screw head. This is the calibration adjustment screw. By turning this screw with a small screw driver, the frequency indicated by the dial may be made to correspond to the frequency of the station tuned in. After adjusting calibration by this means the dial light socket is replaced.

After the receiver is installed the 600 K.C. antenna compensator condenser is adjusted to give best sensitivity while the receiver is tuned to as weak a station as can be heard near 600 K.C. The volume control should be turned full on while making this adjustment.

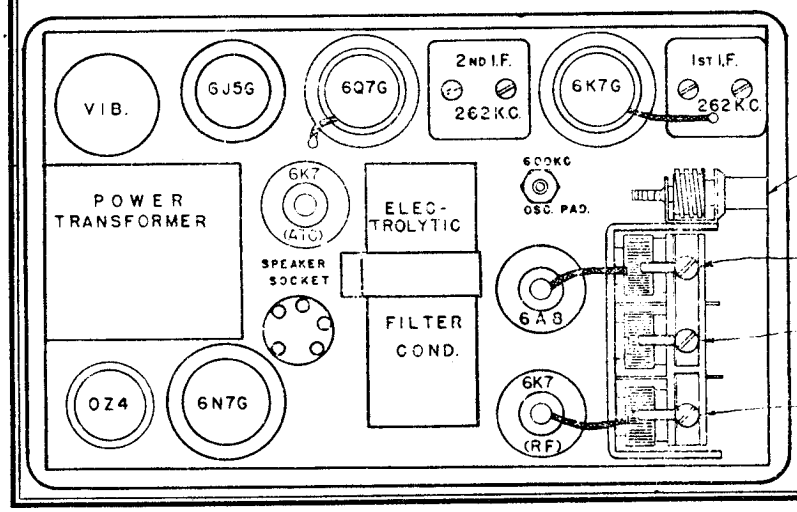



FIG. 4

| | | | | | |
|---|---|---|---|---|---|
| C1 | 1505 | .004 | MICA CONDENSER | | |
| C2 | 1511 | .0027 | " | " | 5% |
| C3 | 1509 | .002 | " | " | " |
| C4 | 1500 | .001 | " | " | " |
| C5 | 1500C | .001 | " | " | " |
| C6 | 1504 | .00025 | " | " | " |
| C7 | 1501 | .0001 | " | " | " |
| C8 | 16-102 | .008 MFD. | PAPER CONDENSER | | 1600V |
| C9 | 1604 | .01 | " | " | 600V |
| C10 | 1651 | .004 | " | " | " |
| C11 | 1601 | .1 | " | " | 400V |
| C12 | 1600 | .1 | " | " | 200V |
| C13 | 1622 | .05 | " | " | " |
| C14 | 1655 | .5 | " | " | 180V |
| C15 | | 4.0 | " | | |
| C16 | 18-204 | 8.0 | ELECTROLYTIC CONDENSER | | |
| C17 | 18-205 | 2.0 | " | " | |
| C18 | 105-1 | .00025 | SPARK PLATE | | |

| | | | | | |
|---|---|---|---|---|---|
| R1 | 60-120 | 2000 | OHM | 1 WATT | CARBON RES. |
| R2 | 60-107 | 1 | MEG | 1/2 | " |
| R3 | 60-108 | 500,000 | " | " | " |
| R4 | 60-109 | 250,000 | " | " | " |
| R5 | 60-110 | 100,000 | " | " | " |
| R6 | 60-111 | 50,000 | " | " | " |
| R7 | 60-113 | 20,000 | " | " | " |
| R8 | 60-117 | 15,000 | " | " | " |
| R9 | 60-114 | 10,000 | " | " | " |
| R10 | 60-129 | 1800 | " | " | " |
| R11 | 60-116 | 800 | " | " | " |
| R12 | 60-118 | 400 | " | " | " |
| R13 | 60-115 | 200 | " | " | " |

| | | |
|---|---|---|
| 1 | 19-102 | 3 GANG VARIABLE CONDENSER |
| 2 | 10-113 | ANTENNA COIL |
| 3 | 10-114 | R.F. COIL |
| 4 | 10-110 | OSCILLATOR COIL |
| 5 | 20-100 | ANTENNA COMPENSATOR CONDENSER |
| 6 | 20-100 | OSCILLATOR PADDING CONDENSER |
| 7 | 10-171 | 1ST. I.F. TRANSFORMER |
| 8 | 10-172 | 2ND. " " |
| 9 | 80-119 | P.P. AUDIO INPUT TRANSFORMER |
| 10 | 24-103 | VOLUME CONTROL |
| 11 | 30-100 | VIBRATOR |
| 12 | 80-111 | VIBRATOR POWER TRANSFORMER |
| 13 | 33-200 | R.F. "A" CHOKE |
| 14 | 33-203 | " " " |
| 15 | 79-217 | DYNAMIC SPEAKER |

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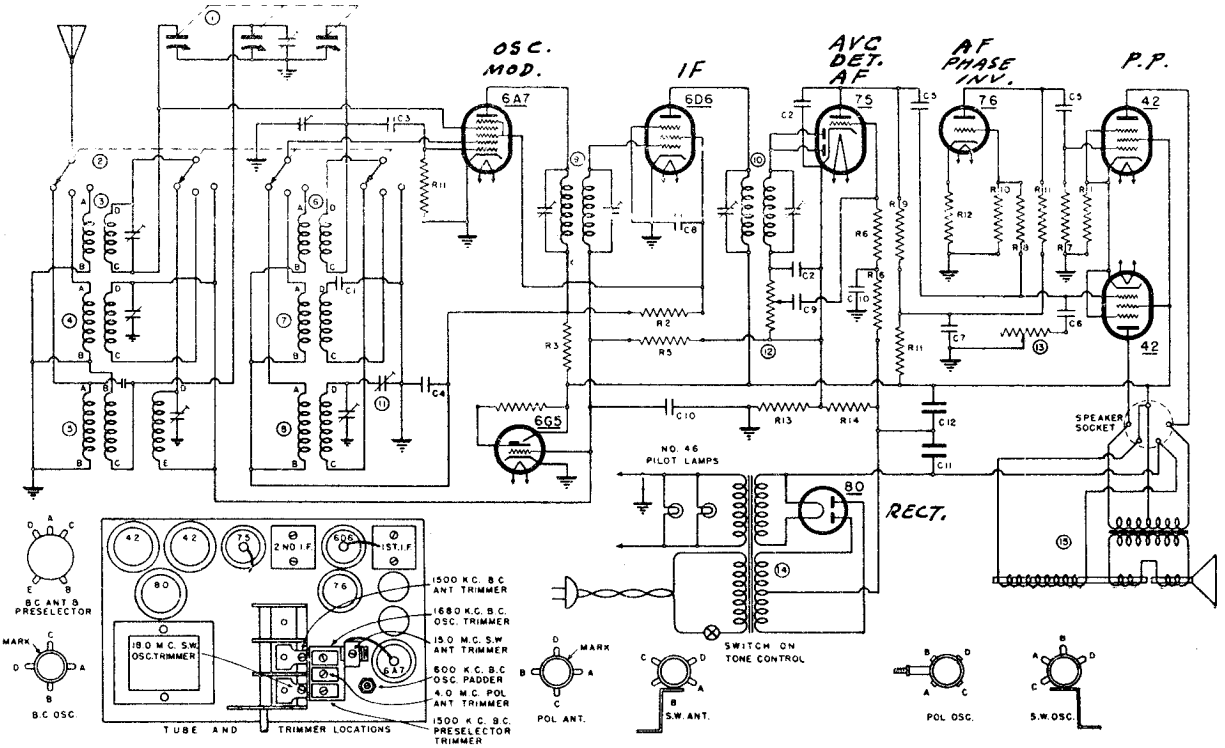
# WARWICK MFG. CORP.

MODEL 872
Schematic, Voltage, Socket
Alignment, Trimmers

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and high frequency or foreign band which is from 20 M.C. to 5.4 M.C.




## ALIGNMENT

IF Adjust at 456 KC through a 0.1 mfd. condenser.

SW Proper adjustment is loose trimmer setting at 15 MC, as signal is heard at 2 settings. Signal must be heard only at about 14 MC dial setting and not at 16 MC.

BC Adjust oscillator trimmer at 1680 KC through 0.00025 mfd. condenser. Adjust antenna trimmer at 1500 KC. Adjust padder at 600 KC.

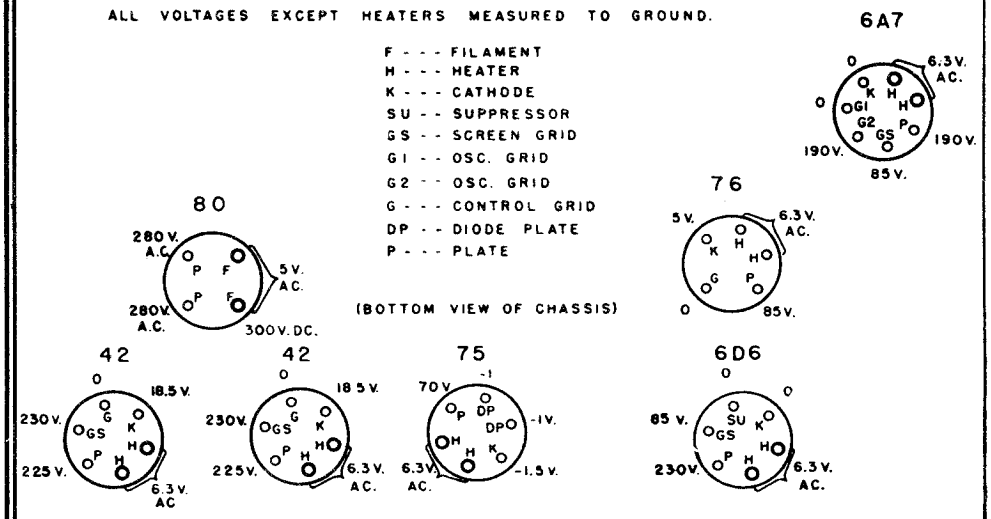
Police Adjust antenna trimmer at 4 MC., through 0.00025 condenser.

VOLTAGES MEASURED WITH 1000 OHM PER VOLT VOLTMETER.

ALL VOLTAGES EXCEPT HEATERS MEASURED TO GROUND.

F - - - FILAMENT
H - - - HEATER
K - - - CATHODE
SU - - SUPPRESSOR
GS - - SCREEN GRID
G1 - - OSC. GRID
G2 - - OSC. GRID
G - - - CONTROL GRID
DP - - DIODE PLATE
P - - - PLATE

(BOTTOM VIEW OF CHASSIS)




| | | | |
|---|---|---|---|
| 1 | 19-116 | 3 GANG VARIABLE CONDENSER | |
| 2 | 69-107 | BAND SWITCH | |
| 3 | 10-183 | SHORT WAVE ANTENNA COIL | |
| 4 | 10-182 | POLICE BAND ANTENNA COIL | |
| 5 | 10-179 | B.C. ANT & PRESELECTOR COIL | |
| 6 | 10-184 | SHORT WAVE OSCILLATOR COIL | |
| 7 | 10-181 | POLICE BAND OSCILLATOR COIL | |
| 8 | 10-180 | B.C. OSCILLATOR COIL | |
| 9 | 10-175 | 1 ST. I.F. TRANSFORMER | |
| 10 | 10-176 | 2 ND. I.F. TRANSFORMER | |
| 11 | 20-100 | B.C. OSC. PADDING CONDENSER | |
| 12 | 24-105 | VOLUME CONTROL | |
| 13 | 26-106 | TONE CONTROL WITH SWITCH | |
| 14 | 80-129 | POWER TRANSFORMER | |
| 15 | | SPEAKER | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| R1 | 60-123 | 350 | OHM | 2 | WATT | CARBON | RES | 10% |
| R2 | 6211 | 15,000 | " | 1 | " | " | " | " |
| R3 | 60-131 | 3000 | " | 1/2 | " | " | " | " |
| R5 | 6020 | 2 MEG | " | 1/3 | " | " | " | " |
| R6 | 601 | 1 | " | " | " | " | " | " |
| R7 | 6018 | 500,000 | " | " | " | " | " | " |
| R8 | 60-124 | 360,000 | " | " | " | " | " | 5% |
| R9 | 6024 | 250,000 | " | " | " | " | " | " |
| R10 | 60-125 | 110,000 | " | " | " | " | " | 5% |
| R11 | 6025 | 50,000 | " | " | " | " | " | " |
| R12 | 6016 | 5000 | " | " | " | " | " | " |
| R13 | 60-104 | 20 | " | 1/2 | " | WIRE | " | 5% |
| R14 | 60-126 | 16 | " | " | " | " | " | 5% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| C1 | 15-102 | 0009 | MFD | MICA | CONDENSER | | | 5% |
| C2 | 1504 | 00025 | " | " | " | | | " |
| C3 | 1503 | 00005 | " | " | " | | | " |
| C4 | 1602 | 1 | MFD | 600 | VOLT | PAPER | CONDENSER | |
| C5 | 1648 | 03 | " | " | " | " | " | " |
| C6 | 1651 | 004 | " | " | " | " | " | " |
| C7 | 1616 | 25 | " | 400 | " | " | " | " |
| C9 | 1605 | 02 | " | " | " | " | " | " |
| C10 | 1622 | 05 | " | 200 | " | " | " | " |
| C11 | 18-202 | 10.0 | " | 400 | " | ELECTROLYTIC | | COND |
| C12 | 18-201 | 12.0 | " | 300 | " | " | " | " |

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MODEL 761
Alignment
MODELS 768,768B
Alignment,Socket
Trimmers

# WARWICK MFG. CORP.

MODELS 542 Late,559,579
648,648B,655B,668,668B
659,749,749B,768,768B
Tuner Adjustments

## PUSH-BUTTON TUNING ADJUSTMENTS

MODELS 542 Late, 655B, 668, 668B, 648, 648B, 559, 579, 659, 768, 768B, 946, 749, 749B

After receiver is installed and antenna and ground properly connected, plug line cord into a convenient outlet. Then turn the volume control to about the center of rotation. This will turn the receiver on and put it in an operating condition. Time must be allowed for the tubes to heat up before stations can be tuned in. This time is approximately one-half minute.

The automatic tuning feature of your radio makes it possible to set up 6 favorite American broadcast stations and tune them in quickly with the automatic tuner. Choose stations for push-button operation heard with good volume at all times.

Cut the call letters of your 6 selected stations from the list supplied with your receiver and slip them into the Tab Holder from the top, with the clear celluloid in front of the call letters to protect them. Arrange the call letters in the Tab Holder from right to left. Have the call letters of the lowest frequency station at the extreme right and work progressively to the left so that the highest frequency call letters will be at the extreme left.

Follow the procedure outlined below, in order to adjust the push-buttons properly:

1. By means of the Station Selector Knob tune in WITH THE RIGHT HAND AS ACCURATELY AS POSSIBLE the station having the lowest frequency—that is, your selected station which is tuned in nearest the right-hand side of the dial.

2. After the station has been tuned in accurately with the right hand, continue to hold it in its exact position firmly, and with the left hand loosen the Push-Button to be set up for that station by unscrewing the Push-Button about one turn to the left (counter-clockwise).

3. Continuing to hold the Station Selector Knob in its exact position, PUSH THE PUSH-BUTTON IN ALL THE WAY with the left hand.

4. After the Push-Button has been depressed all the way, tighten it gently toward the right (clockwise). Release Push-Button slowly and when in normal position grip button and tighten firmly.

The Push-Button tuning system is now correctly set up for your first selected station of lowest frequency and the Call Letter Tab for this station should be at the extreme right of the Call Letter Holders.

Follow through with this same procedure, setting up the other 5 stations in the order of their frequency—that is, the second station set up will be second lowest in frequency and the third station set up will be third lowest in frequency.

Carefully check each Push-Button for the accuracy of the setting. If, when tuning in any station with its Automatic Push-Button it does not have equal volume or clarity to that obtained with manual tuning, this may indicate the automatic adjustment for that station was not made accurately. Should there be any inaccuracy in any one of the Push-Button adjustments, correction can be made by repeating the above procedure for that button only. Do not reset those Push-Buttons that are accurately adjusted.

No further adjustments are necessary to operate your radio automatically or manually. To receive any one of your four selected stations for automatic operation, merely push in ALL THE WAY the Button set up for that station.

## Models 768. 768B

### ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

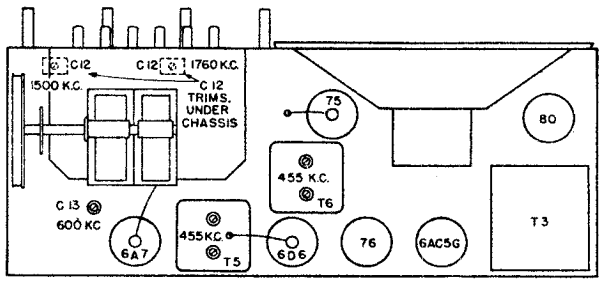
The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvoiter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total meter resistance approximately 7000 ohms, to plate of output tube and B+, or a low voltage A. C. meter may be used connected across speaker voice coil. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 6A7 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground lead of the receiver. Set the dial to about 1000 K.C., feed in a 455 K.C. signal. Adjust first and second I.F. trimmers for maximum output. Refer to chassis lay-out for location of trimmers.

Turn the dial to the extreme high frequency end. Feed a 1760 K.C. signal to the receiver antenna lead through a .00025 M.F. mica condenser. Adjust the 1760 KC oscillator trimmer until maximum output is shown. Set the generator to 1500 KC and tune in this signal on the receiver. Then adjust the 1500 KC antenna trimmer to the maximum output. Then impress a 600 KC signal into the receiver antenna lead and tune in this signal on the receiver. Adjust oscillator padding condenser to the maximum output. Follow through with this procedure several times in order to obtain the best alignment adjustment possible. This completes the alignment.




## MODEL 761

### ALIGNMENT PROCEDURE

The following alignment procedure is for use only by competent service men having the proper equipment. Re-alignment is very seldom needed and is usually only required after some major part has been replaced because of damage to the receiver.

The equipment required for re-aligning this receiver is an output meter and a modulated source of radio frequency (a signal generator or microvolter). This source of radio frequency must be accurately calibrated in frequency and must have a method of varying the output.

All alignments must be made with the volume control turned full on and with the signal input from the generator reduced to as low a value as possible while still giving a sufficient output to be easily read on the output meter.

Connect the output meter, through a .5 M.F. condenser and a resistance of such a value as to make the total resistance approximately 10,000 ohms, to the two small pins of the speaker plug. The output meter remains connected during the entire alignment procedure.

Connect the signal generator to the grid cap of the 1A6 tube through a .1 M.F. condenser. Connect the ground of the generator to the ground post of the receiver. With the wave switch on broadcast position and the dial set to about 1000 K.C., feed in a 456 K.C. signal. Adjust the trimmers on top of the first and second I.F. transformers until the maximum output is obtained. This aligns the I.F.

Leaving the wave switch on broadcast position turn the dial to the extreme high frequency end. Feed a 1680 K.C. signal to the receiver antenna post through a .00025 M.F. mica condenser. Adjust the 1680 K.C. broadcast oscillator trimmer for maximum output. Set the generator to 1500 K.C. and tune in this signal on the receiver. Then adjust the 1500 K.C. broadcast antenna trimmer for maximum output. Set the generator to 600 K.C. and adjust the 600 K.C. broadcast oscillator pad to maximum output **while tuning the receiver back and forth across the signal** from the generator. This completes the alignment of the broadcast band.

The police band is aligned by feeding 4.0 M.C. signal to the receiver antenna post through the .00025 condenser. Turn the wave switch to the center position and tune the receiver to this signal. Adjust the 4.0 M.C. police antenna trimmer for best output.

The short wave band is aligned in the same way using a 15 M.C. signal and adjusting the 15 M.C. short wave antenna trimmer after having turned the wave switch to the right hand position.

### DESCRIPTION

This receiver is a 7 tube, 6 volt storage battery operated superheterodyne.

The tubes used are a 30 as oscillator, a 6D8G as modulator, two 1A4 tubes as I.F. amplifiers, a 6T7G as A.V.C. and audio rectifier and audio voltage amplifier, a 6L5G as audio driver and a 19 as power audio amplifier.

This receiver is made to cover 3 tuning bands, the standard broadcast band which ranges from 1680 K.C. to 535 K.C., the middle or police band which has a frequency range of from 5.6 M.C. to 1.7 M.C. and high frequency or foreign band which is from 20 M.C. to 5.4 M.C.

While a ground is not always necessary with receivers which are made to use the lighting mains as a source of power, a battery operated receiver always requires a good ground if best performance and distance reception is expected. A ground may be made to a water supply system or to a galvanized pipe driven into ground that is moist most of the time. The use of a lightning arrestor is very good insurance against damage by lightning. Several types are on the market and may be obtained very easily. Soldering of all antenna and ground lead joints will eliminate any noise which may be caused by loose connections.

The antenna and ground leads connect to the marked binding posts located on the back of the chassis.

A 6 volt storage battery is the only power supply required for this receiver. The yellow battery lead connects to the positive (+) terminal of the battery and the black lead connects to the negative (—) terminal. If these connections are reversed the receiver will not operate and may be seriously damaged if left this way for more than a short time. **Never charge the battery while operating the receiver.** Attempting to use any other source of power supply will cause serious damage to the receiver.

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# Instructions for Mounting the New 7 Station Automa Tuning Panel on the 7, 9, 11 and 13 Tube Chass

(REPLACING MOTOR DRIVE PANEL)

## New 7 Station Automatic Tuning Panel

There are 8 push buttons. Buttons Nos. 1 to 3 and 5 to 8 are Automatic Tuning Station Buttons. Button No. 4 is the Manual Tuning Button - See Fig.1. When this button is depressed, the radio is in the manual tuning position.

The small buttons above the push buttons are still used for setting the stations. However, with the new panel, this is done by turning the button clockwise or counter-clockwise until the desired station is tuned in.

The aligning screw, shown in Fig. 1, when turned, moves the iron core of the antenna coil for aligning purposes.

## Old Parts Used

Use the following parts of the old assembly:

Escutcheon Plate,
Station Buttons and Hairpin Springs,
Setting Buttons,
Glass Screen and Rubber Bands.

## The Following New Parts are Supplied

7 Station Automatic Tuning Panel Assembly.

The parts shown in the list at the end of these instructions.

## Removing Old Motor Drive Panel from Chassis

Remove the knobs. Two are set screw knobs and three are the push-on type.

Remove the station buttons by pushing down the lower end of the small hairpin spring at the back of the button and, at the same time, pulling the button off the shaft. Remove the setting buttons by pulling them off.

The screws in the wooden support behind the electric drive panel must be unscrewed and the support removed from the cabinet.

Remove the speaker plug from the socket at the back of the chassis and also the tuning eye tube from its clamp bracket. Loosen the screw holding the bottom shield connection to the back of the chassis. Unscrew and remove the shipping bolts and the "L" bolts from beneath the chassis shelf.

The chassis may then be removed.

Remove the old tuning eye tube bracket from the cabinet.

Turn the electric-manual lever to the electric position.

Unsolder the wire to the silencer switch at the chassis end. Also, unsolder the two motor leads at the A. C. terminal strip under the chassis. Early models used a metal shell condenser which was connected at the same terminal strip. Remove this condenser if one is installed.

Take off the collars from the volume and tone control shafts.

Remove the glass screen by taking out the two screws and removing the two brackets.

Remove the four red mounting screws.

The panel can then be pulled straight out from the chassis.

## Mounting New Automatic Tuning Panel on the Chassis

Put a piece of insulating tape on the surface of the support casting at the point shown in Fig. 2. This will prevent possible short circuiting of the switch contacts.

Before mounting the new panel on the chassis, cut off any leads not required as shown in the table - Fig. 7. Bring the tuner panel near the chassis and pass the white-blue tracer and white-red tracer leads through the hole in the chassis under the front section of the gang condenser. Turn the gang condenser until the spring clip on the drive drum is at its lowest position - See Fig. 2 lower left. Line up the drive arm on the large panel drive pulley with the spring clip on the gang condenser drive drum. Since the drive arm will line up with the spring clip under two conditions, refer to Fig. 2 lower left for the correct relation of drive cord winding to drive arm.

Spread the spring clip SLIGHTLY with a small screw driver, bringing this screw driver up from beneath the chassis. Then push the panel toward the chassis, lowering it slightly so that the large drive pulley may be brought up in back of the bracket below the projector compartment. Insert the drive arm in the spring clip.

Mount the panel on the chassis using the four mounting screws at the four points shown in Fig.1.

Secure the two braces to the back of the panel as shown in Fig. 2.

Remove the two screws at the top of the lens housing support bracket. Using the two 8-32 X 3/8" screws supplied, secure the back end of the braces in place. When attaching the brace to the tuner switch side of the lens housing bracket, ground the lug of the braided wire under the screw head as illuatrated.

Replace the glass screen using clamps, nuts, and lock washers supplied.

Replace the collars on the volume control and tone control shafts.

Wire the panel in the circuit following Figs. 3,4, 9, 10, 15, and 16.

Replace chassis in cabinet reversing procedure followed when removing the chassis. The wooden shipping support is not used.

The electric-manual lever is not used. A cover plate is supplied which covers the opening left by the removal of this lever. This plate is so made that the back portion should fit snugly into the opening in the cabinet. If it does not, file the cabinet until it fits snugly in place.

Then put the tuning knob on the shaft.

## Knobs and Cover Plate

The 5 control knobs formerly used with the motor drive panel are also used with the new automatic tuning panel.

The cover plate used under the tuning knob is described in the previous article.

## Alignment

After the new panel is installed, realign the chasis using as a guide the alignment procedure given in the service manual for each chassis.

If a definite peak cannot be reache the 1830 KC adjustment on the 8 rang compensating condenser C16 in the models, C14 in the 13 tube model. 7 tube model.

If a definite peak cannot be reache the 22,000 KC adjustment on the D back off this trimmer as far as it w ceed with the 20,000 KC adjustment.

Next align the automatic tuner. The ing system is aligned by turning the which shifts the position of the ir antenna coil while the coil remains

Depress station button No. 1 - See F a signal of the frequency shown b ton No. 1. Turn setting button No. counter-clockwise until this signal tuned in. Then turn the aligning s No. 1 clockwise or counter-clockwise output is obtained.

Follow the same procedure with regar station tuning buttons using the fre below.

Button No. 1...Aligning Frequen
Button No. 2...Aligning Frequen
Button No. 3...Aligning Frequen
Button No. 5...Aligning Frequen
Button No. 6...Aligning Frequen
Button No. 7...Aligning Frequen
Button No. 8...Aligning Frequen

## Mounting New Panel or Chassis Equipped with Motor Drive Pane

Chassis equipped with the early type panel may be identified by the fact chassis is removed from the cab electric-manual lever is in the elec all four red mounting screws can be Fig. 23. On late models, the two are behind the glass screen and cann less this screen is removed - See Fi

To mount the new automatic tuning early chassis, first, using a hack the portion of the bracket assembly jector compartment as shown in Fig.

Mount the new panel on the chassis bottom mounting screws. Extend a pen instrument through the center of the el mounting holes and place a mark o extending down from the projector co

Remove the two lower mounting screws the new panel. Drill and tap two two upper 8-32 mounting screws in th new panel can then be mounted by mea mounting screws.

## Parts Shipped With 7 Station Automatic Tuning Panel

| QUANTITY | ITEM | APPLICATION |
|---|---|---|
| 1..... | 20,000 Ohm Resistor..... | To be used when installing panel on 9, and 13 tube chassis only. |
| 2..... | Braces..... | To secure the panel to top of projector assembly. |
| 4..... | 8-32 X 3/8" screws..... | 2 used for front end of above brace. 2 used for back end of above brace. |
| 2..... | #8 Shakeproof Lock Washers..... | To secure above brace to panel. |
| 2..... | 8-32 Hex Nuts..... | To secure above brace to panel. |
| 2..... | Glass Retainer Clamps..... | To hold the glass screen in place. |
| 2..... | 6-32 X 1/4" Round Head Screws... | For above. |
| 2..... | #6 Split Lock Washers..... | For above. |
| 1..... | Circular Cardboard Tab with Words "Manual Tuning" on it..... | To be put into manual switch button (4th button from left). |
| 1..... | Round Celluloid Tab..... | To be pushed into above mentioned butto over the cardboard tab. |
| 4..... | 8-32 X 1/4" Mounting Screws..... (Heads Red) | To mount panel to chassis. |
| 4..... | #8 Split Lock Washers..... | For above. |
| 1..... | Round Cover Plate..... | To cover opening in front panel of cabi left by removal of the electric-manual lever. |



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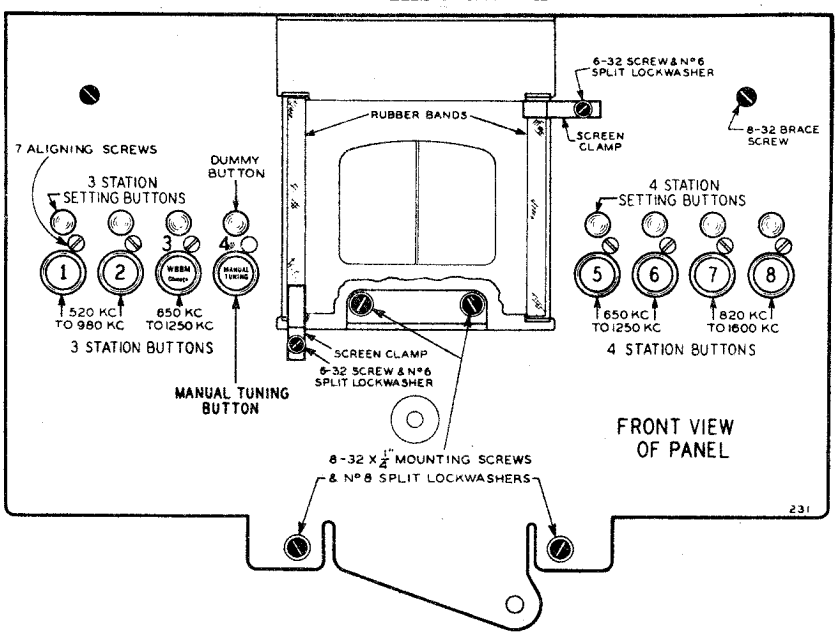
# MODEL 7-Station Automatic Tuning Panel For MODELS A2,A3,A4,A5 Series Installation Data.Panel View,Details



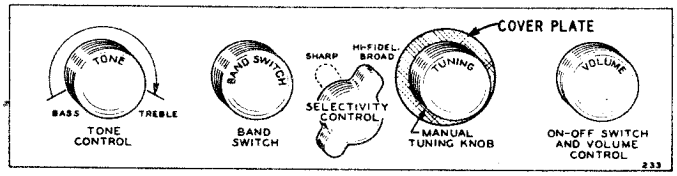




**Fig. 1—Automatic Tuning Panel—Front View**

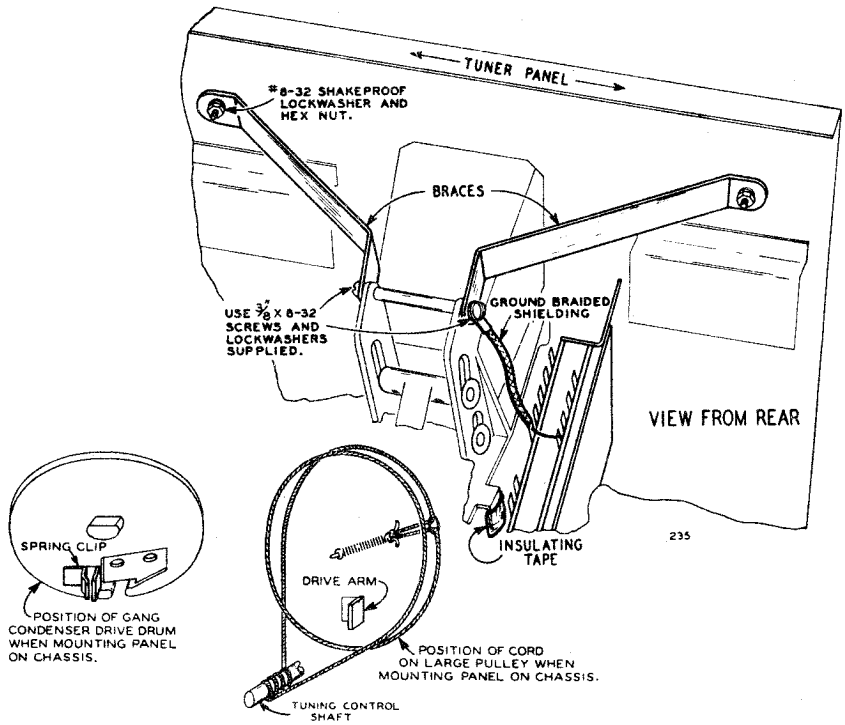

TUNER PANEL
#8-32 SHAKEPROOF LOCKWASHER AND HEX NUT.
BRACES
USE 3/8 X 8-32 SCREWS AND LOCKWASHERS SUPPLIED.
GROUND BRAIDED SHIELDING
VIEW FROM REAR
235
INSULATING TAPE
SPRING CLIP
POSITION OF GANG CONDENSER DRIVE DRUM WHEN MOUNTING PANEL ON CHASSIS.
DRIVE ARM
POSITION OF CORD ON LARGE PULLEY WHEN MOUNTING PANEL ON CHASSIS.
TUNING CONTROL SHAFT

**Fig. 2 Automatic Tuning Panel—Back View**

MODEL 7-Station Automatic Tuning Panel
Installation Data for MODEL A3 Series

WELLS-GA

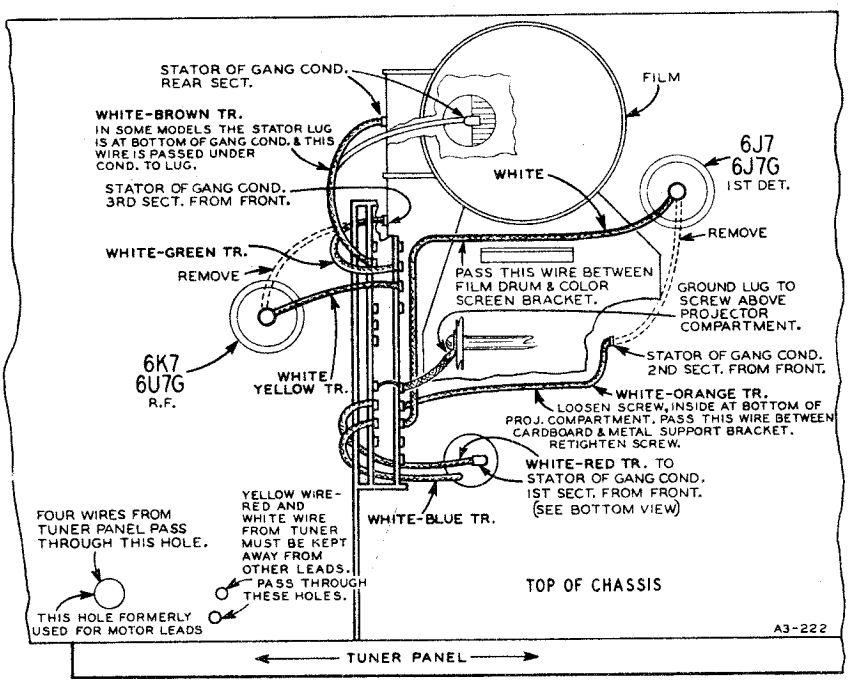

STATOR OF GANG COND. REAR SECT.
FILM
WHITE-BROWN TR.
IN SOME MODELS THE STATOR LUG IS AT BOTTOM OF GANG COND. & THIS WIRE IS PASSED UNDER COND. TO LUG.
6J7
6J7G
1ST DET.
WHITE
STATOR OF GANG COND. 3RD SECT. FROM FRONT.
REMOVE
WHITE-GREEN TR.
REMOVE
PASS THIS WIRE BETWEEN FILM DRUM & COLOR SCREEN BRACKET.
GROUND LUG TO SCREW ABOVE PROJECTOR COMPARTMENT.
6K7
6U7G
R.F.
WHITE
YELLOW TR.
STATOR OF GANG COND. 2ND SECT. FROM FRONT.
WHITE-ORANGE TR.
LOOSEN SCREW, INSIDE AT BOTTOM OF PROJ. COMPARTMENT. PASS THIS WIRE BETWEEN CARDBOARD & METAL SUPPORT BRACKET. RETIGHTEN SCREW.
WHITE-RED TR. TO STATOR OF GANG COND. 1ST SECT. FROM FRONT. (SEE BOTTOM VIEW)
WHITE-BLUE TR.
FOUR WIRES FROM TUNER PANEL PASS THROUGH THIS HOLE.
YELLOW WIRE-RED AND WHITE WIRE FROM TUNER MUST BE KEPT AWAY FROM OTHER LEADS.
PASS THROUGH THESE HOLES.
TOP OF CHASSIS
THIS HOLE FORMERLY USED FOR MOTOR LEADS
A3-222
TUNER PANEL

Fig. 3—13 Tube Chassis—Top View

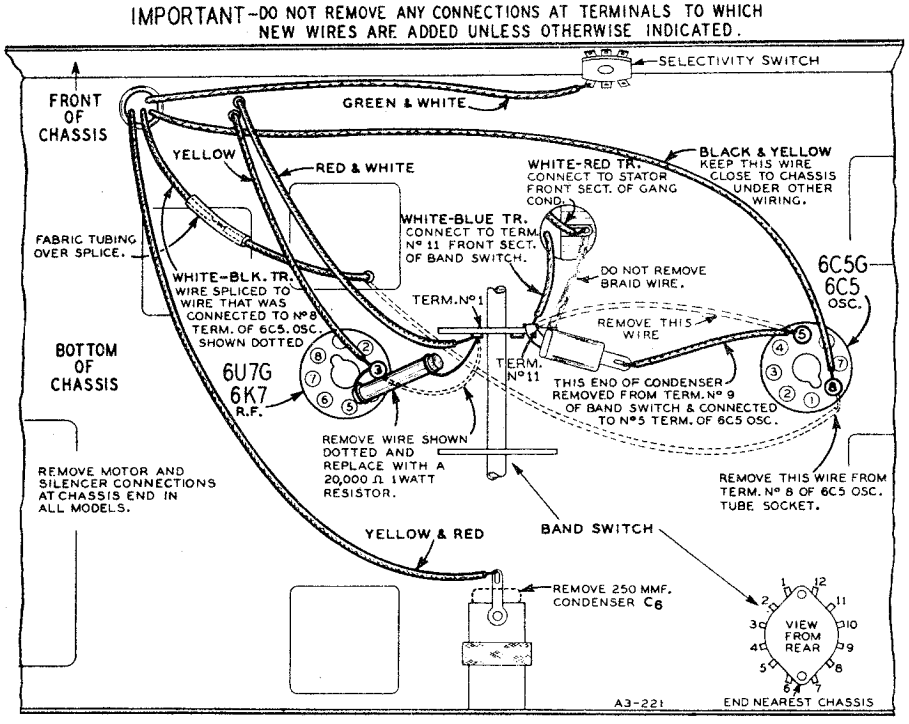

IMPORTANT—DO NOT REMOVE ANY CONNECTIONS AT TERMINALS TO WHICH NEW WIRES ARE ADDED UNLESS OTHERWISE INDICATED.
SELECTIVITY SWITCH
FRONT OF CHASSIS
GREEN & WHITE
YELLOW
RED & WHITE
WHITE-RED TR. CONNECT TO STATOR FRONT SECT. OF GANG COND.
BLACK & YELLOW KEEP THIS WIRE CLOSE TO CHASSIS UNDER OTHER WIRING.
FABRIC TUBING OVER SPLICE.
WHITE-BLUE TR. CONNECT TO TERM. Nº 11 FRONT SECT. OF BAND SWITCH.
DO NOT REMOVE BRAID WIRE.
6C5G
6C5
OSC.
WHITE-BLK. TR. WIRE SPLICED TO WIRE THAT WAS CONNECTED TO Nº8 TERM. OF 6C5 OSC. SHOWN DOTTED
TERM. Nº1
REMOVE THIS WIRE
BOTTOM OF CHASSIS
6U7G
6K7
R.F.
TERM. Nº11
THIS END OF CONDENSER REMOVED FROM TERM. Nº 9 OF BAND SWITCH & CONNECTED TO Nº5 TERM. OF 6C5 OSC.
REMOVE WIRE SHOWN DOTTED AND REPLACE WITH A 20,000 Ω 1WATT RESISTOR.
REMOVE MOTOR AND SILENCER CONNECTIONS AT CHASSIS END IN ALL MODELS.
REMOVE THIS WIRE FROM TERM. Nº 8 OF 6C5 OSC. TUBE SOCKET.
YELLOW & RED
BAND SWITCH
REMOVE 250 MMF. CONDENSER C6
VIEW FROM REAR
A3-221
END NEAREST CHASSIS

Fig. 4—13 Tube Chassis—Bottom View

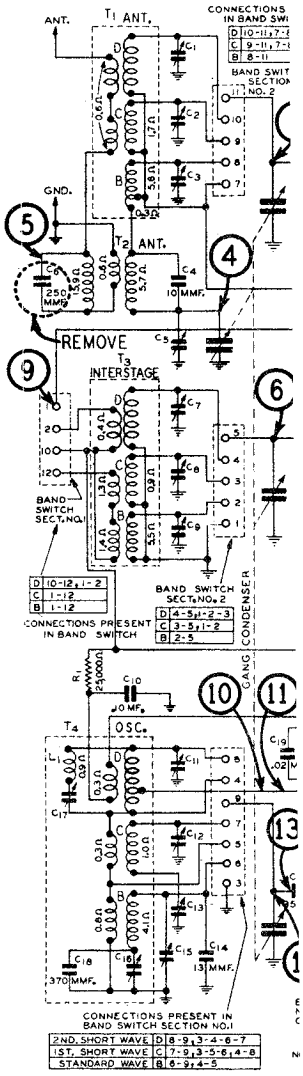



Fig. 5—13 Tube Sch

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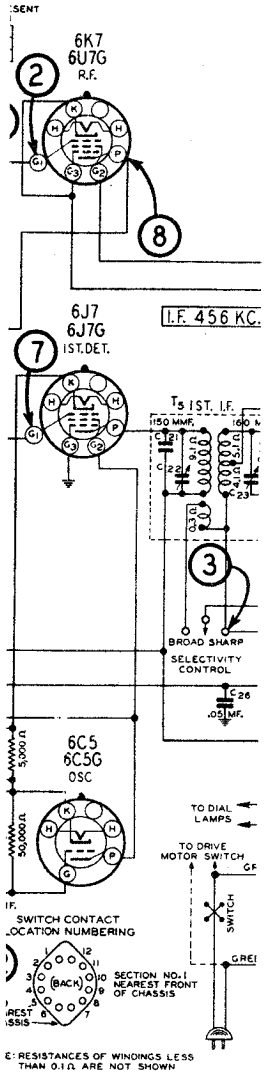


matic Diagram

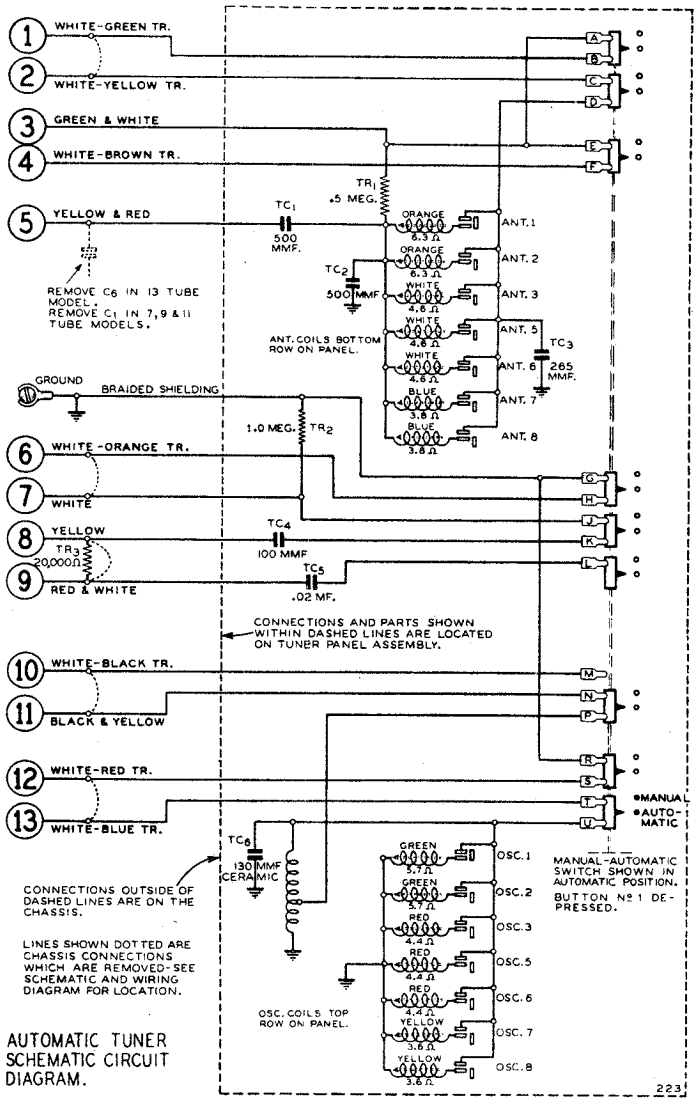


Fig. 6—Tuning Panel Schematic Diagram

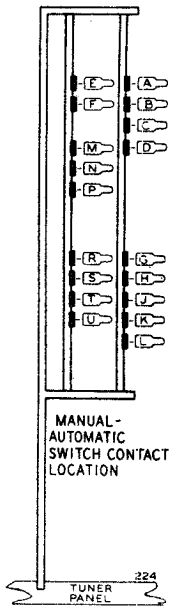


Fig. 8—Tuning Panel Switch Terminals

**13 TUBE MODEL**-USE ALL 13 WIRES & GROUND LEAD.

**9 & 11 TUBE MODELS**-CLIP OFF WHITE-BROWN TR. (4) AT SWITCH CONTACT (F)

**7 TUBE MODEL**-CLIP OFF THE FOLLOWING WIRES:
WHITE-ORANGE TR. (6) AT SWITCH CONTACT (H)
WHITE (7) AT SWITCH CONTACT (J)
YELLOW (8) & RED & WHITE (9) AT CONDENSER TERMINAL STRIP.
TR3 20000 OHM RESISTOR IS NOT USED.

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Fig. 7—Table of Tuning Panel Leads Used

# 13 TUBE RADIO

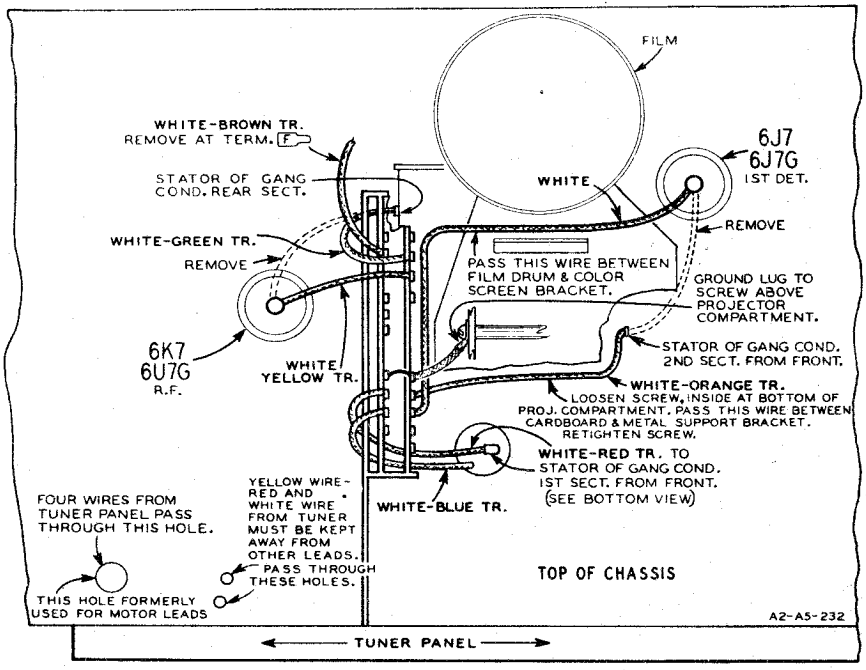
FILM
WHITE-BROWN TR.
REMOVE AT TERM. F
STATOR OF GANG COND. REAR SECT.
WHITE
6J7
6J7G
1ST DET.
REMOVE
WHITE-GREEN TR.
REMOVE
PASS THIS WIRE BETWEEN FILM DRUM & COLOR SCREEN BRACKET.
GROUND LUG TO SCREW ABOVE PROJECTOR COMPARTMENT.
6K7
6U7G
R.F.
WHITE YELLOW TR.
STATOR OF GANG COND. 2ND SECT. FROM FRONT.
WHITE-ORANGE TR.
LOOSEN SCREW, INSIDE AT BOTTOM OF PROJ. COMPARTMENT. PASS THIS WIRE BETWEEN CARDBOARD & METAL SUPPORT BRACKET. RETIGHTEN SCREW.
WHITE-RED TR. TO STATOR OF GANG COND. 1ST SECT. FROM FRONT. (SEE BOTTOM VIEW)
WHITE-BLUE TR.
FOUR WIRES FROM TUNER PANEL PASS THROUGH THIS HOLE.
YELLOW WIRE-RED AND WHITE WIRE FROM TUNER MUST BE KEPT AWAY FROM OTHER LEADS.
PASS THROUGH THESE HOLES.
THIS HOLE FORMERLY USED FOR MOTOR LEADS
TOP OF CHASSIS
A2-A5-232
TUNER PANEL

Fig. 9—9 and 11 Tube Chassis—Top View

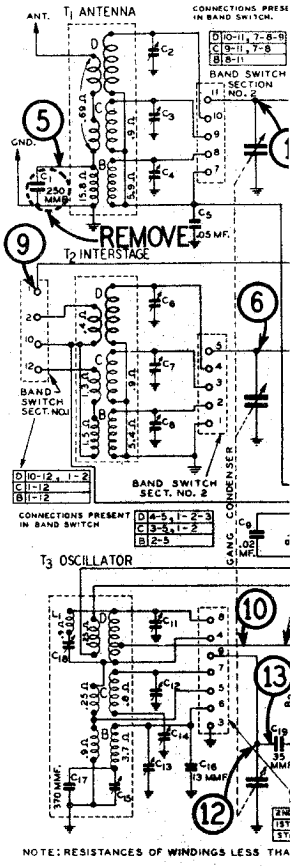


Fig. 11—9 and 11 Tube S

IMPORTANT—DO NOT REMOVE ANY CONNECTIONS AT TERMINALS TO WHICH NEW WIRES ARE ADDED UNLESS OTHERWISE INDICATED.

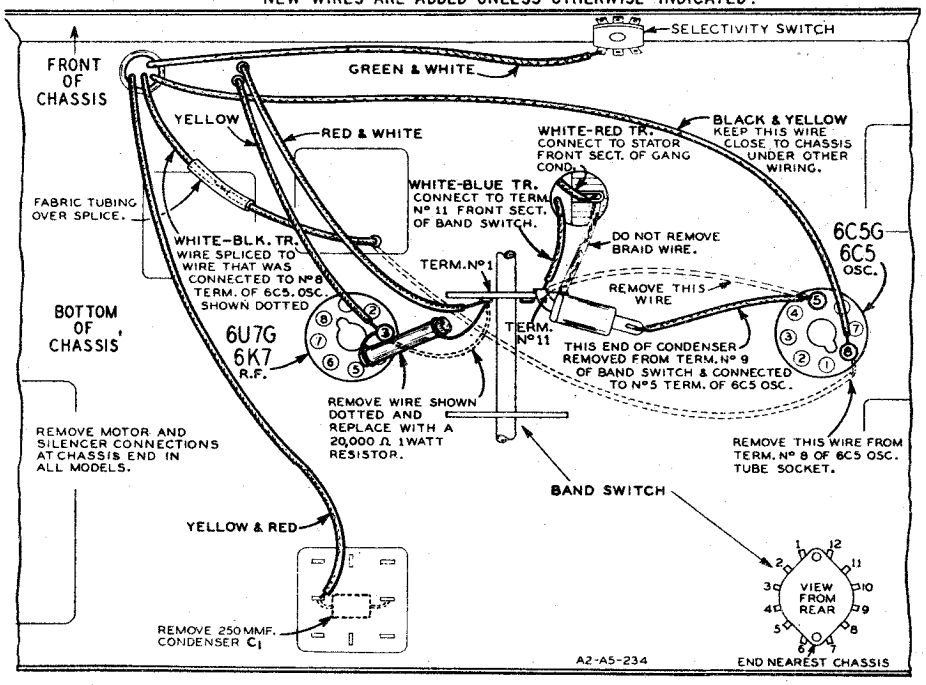
SELECTIVITY SWITCH
FRONT OF CHASSIS
GREEN & WHITE
YELLOW
RED & WHITE
WHITE-RED TR. CONNECT TO STATOR FRONT SECT. OF GANG COND.
BLACK & YELLOW KEEP THIS WIRE CLOSE TO CHASSIS UNDER OTHER WIRING.
FABRIC TUBING OVER SPLICE.
WHITE-BLUE TR. CONNECT TO TERM. N° 11 FRONT SECT. OF BAND SWITCH.
WHITE-BLK. TR. WIRE SPLICED TO WIRE THAT WAS CONNECTED TO N°8 TERM. OF 6C5. OSC. SHOWN DOTTED
DO NOT REMOVE BRAID WIRE.
6C5G
6C5
OSC.
TERM. N°1
REMOVE THIS WIRE
BOTTOM OF CHASSIS
6U7G
6K7
R.F.
TERM. N°11
THIS END OF CONDENSER REMOVED FROM TERM. N° 9 OF BAND SWITCH & CONNECTED TO N°5 TERM. OF 6C5 OSC.
REMOVE WIRE SHOWN DOTTED AND REPLACE WITH A 20,000 Ω 1WATT RESISTOR.
REMOVE MOTOR AND SILENCER CONNECTIONS AT CHASSIS END IN ALL MODELS.
REMOVE THIS WIRE FROM TERM. N° 8 OF 6C5 OSC. TUBE SOCKET.
BAND SWITCH
YELLOW & RED
VIEW FROM REAR
REMOVE 250 MMF. CONDENSER C1
A2-A5-234
END NEAREST CHASSIS

Fig. 10—9 and 11 Tube Chassis—Bottom View

13 TUBE MODEL-USE A GROUND LEAD.

9 & 11 TUBE MODELS- -BROWN TR. (4) CONTACT F

7 TUBE MODEL-CLIP C LOWING WIRES: WHITE-ORANGE SWITCH CONTAC WHITE (7) AT SW TACT J YELLOW (8) & RI AT CONDENSER TR3 20000 OHM NOT USED.

Fig. 12—Table c Panel L

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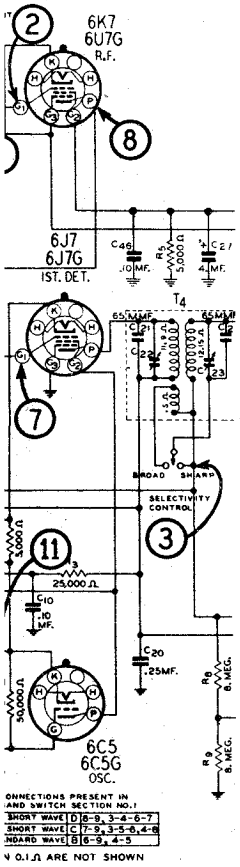
DNER & CO.

MODEL 7-Station Automatic Tuning Panel
Installation Data for MODELS A2 and A5 Series




chematic Diagram

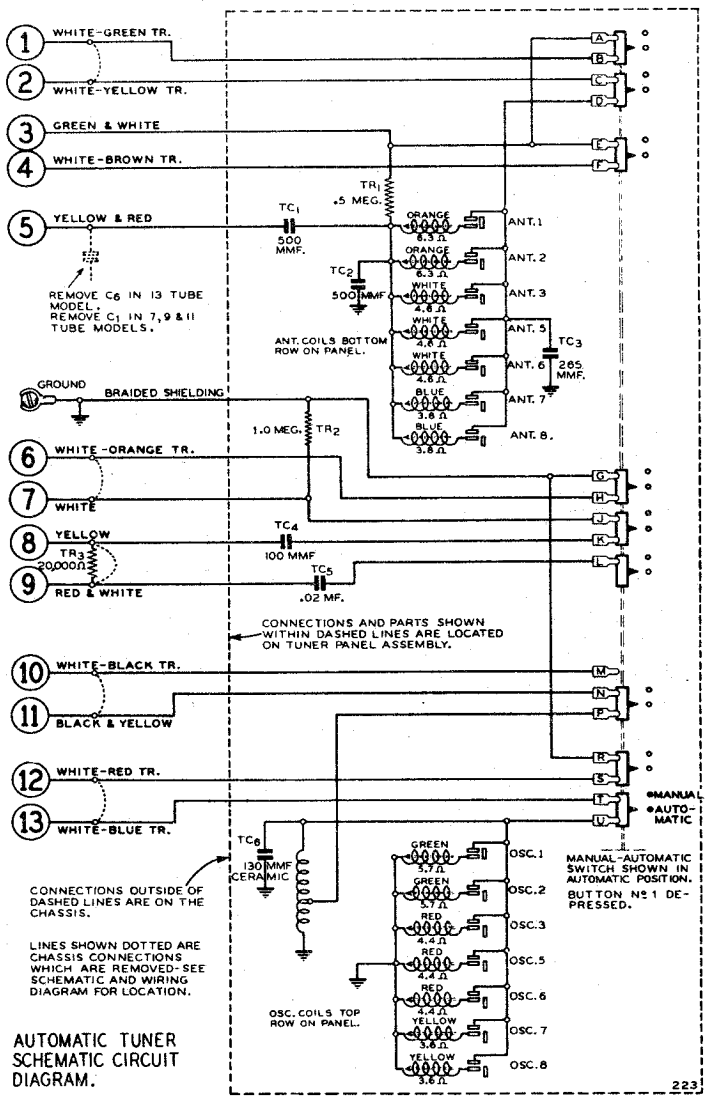



Fig. 13—Tuning Panel Schematic Diagram

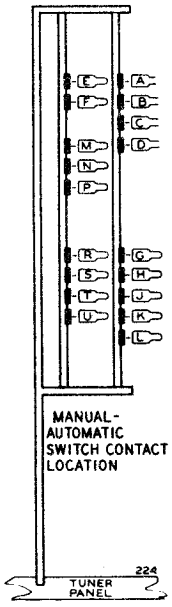



Fig. 14—Tuning Panel Switch Terminals

LL 13 WIRES &

CLIP OFF WHITE AT SWITCH

FF THE FOL-

TR. ⑥ AT

ITCH CON-

ED & WHITE ⑨

ERMINAL STRIP.

RESISTOR IS

236

f Tuning
eads Used

# 9 AND 11 TUBE RADIOS

MODEL 7-Station Automatic Tuning Panel
Installation Data for MODEL A4 Series



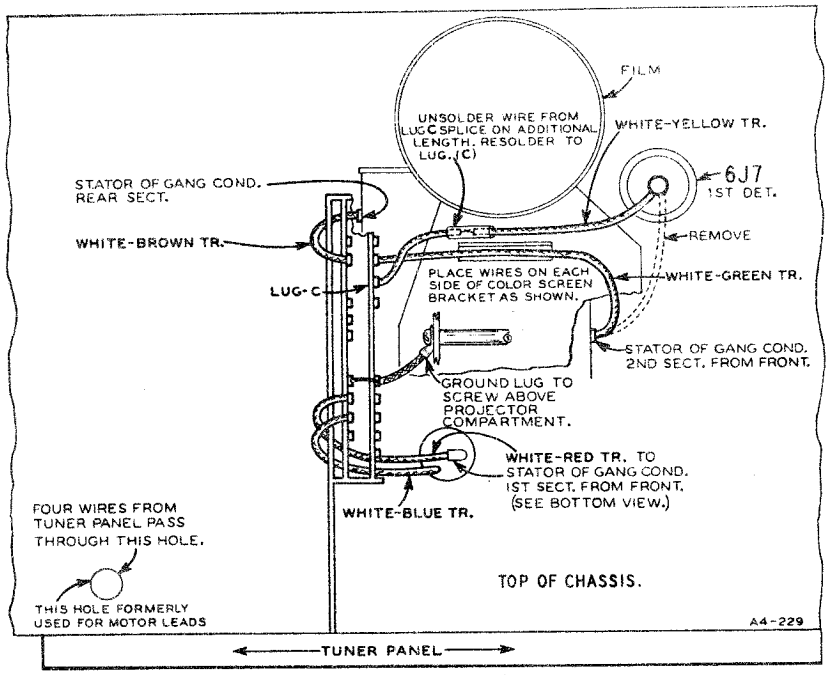

FILM
UNSOLDER WIRE FROM LUG C SPLICE ON ADDITIONAL LENGTH. RESOLDER TO LUG. (C)
WHITE-YELLOW TR.
6J7
1ST DET.
STATOR OF GANG COND. REAR SECT.
WHITE-BROWN TR.
REMOVE
PLACE WIRES ON EACH SIDE OF COLOR SCREEN BRACKET AS SHOWN.
WHITE-GREEN TR.
LUG-C
STATOR OF GANG COND. 2ND SECT. FROM FRONT.
GROUND LUG TO SCREW ABOVE PROJECTOR COMPARTMENT.
WHITE-RED TR. TO STATOR OF GANG COND. 1ST SECT. FROM FRONT. (SEE BOTTOM VIEW.)
WHITE-BLUE TR.
FOUR WIRES FROM TUNER PANEL PASS THROUGH THIS HOLE.
THIS HOLE FORMERLY USED FOR MOTOR LEADS
TOP OF CHASSIS.
A4-229
TUNER PANEL

Fig. 15—7 Tube Chassis—Top View

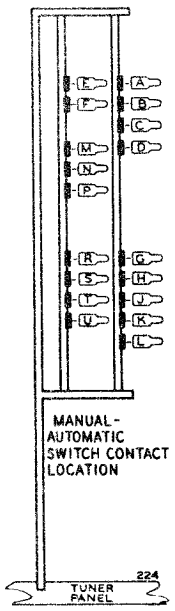



Fig. 17—Tuning Panel Switch Terminals

# 7 TUBE RADIC

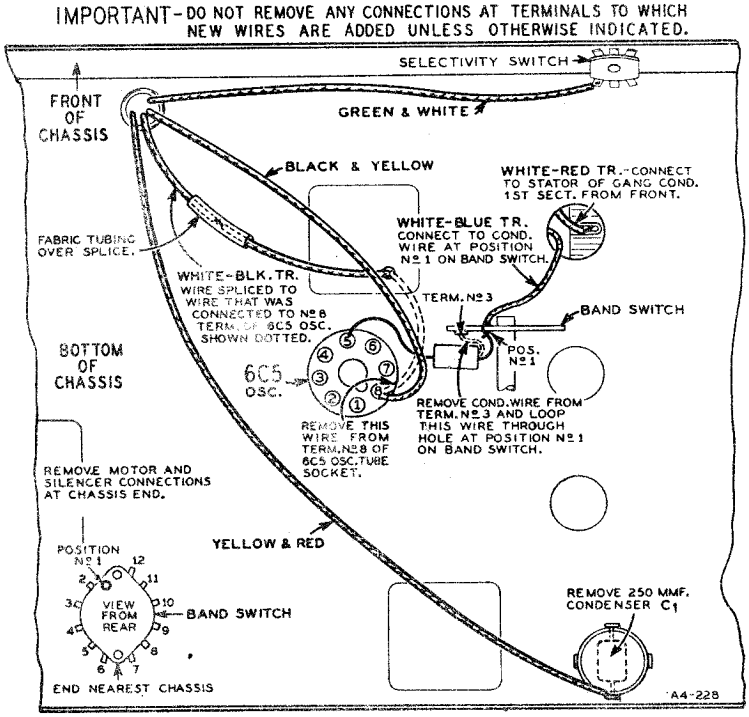

IMPORTANT-DO NOT REMOVE ANY CONNECTIONS AT TERMINALS TO WHICH NEW WIRES ARE ADDED UNLESS OTHERWISE INDICATED.
SELECTIVITY SWITCH
FRONT OF CHASSIS
GREEN & WHITE
BLACK & YELLOW
WHITE-RED TR.-CONNECT TO STATOR OF GANG COND. 1ST SECT. FROM FRONT.
WHITE-BLUE TR. CONNECT TO COND. WIRE AT POSITION No 1 ON BAND SWITCH.
FABRIC TUBING OVER SPLICE.
WHITE-BLK. TR. WIRE SPLICED TO WIRE THAT WAS CONNECTED TO No 8 TERM. OF 6C5 OSC. SHOWN DOTTED.
TERM. No 3
BAND SWITCH
BOTTOM OF CHASSIS
6C5 OSC.
POS. No 1
REMOVE COND. WIRE FROM TERM. No 3 AND LOOP THIS WIRE THROUGH HOLE AT POSITION No 1 ON BAND SWITCH.
REMOVE THIS WIRE FROM TERM. No 8 OF 6C5 OSC. TUBE SOCKET.
REMOVE MOTOR AND SILENCER CONNECTIONS AT CHASSIS END.
YELLOW & RED
POSITION No 1
VIEW FROM REAR
BAND SWITCH
REMOVE 250 MMF. CONDENSER C1
END NEAREST CHASSIS
A4-228

Fig. 16—7 Tube Chassis—Bottom View

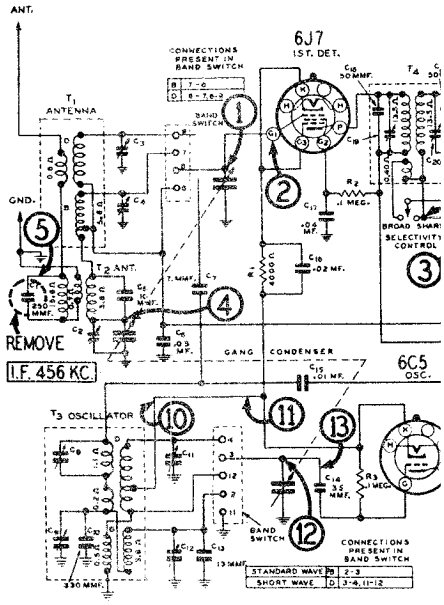



Fig. 18—7 Tube Schematic Diagram

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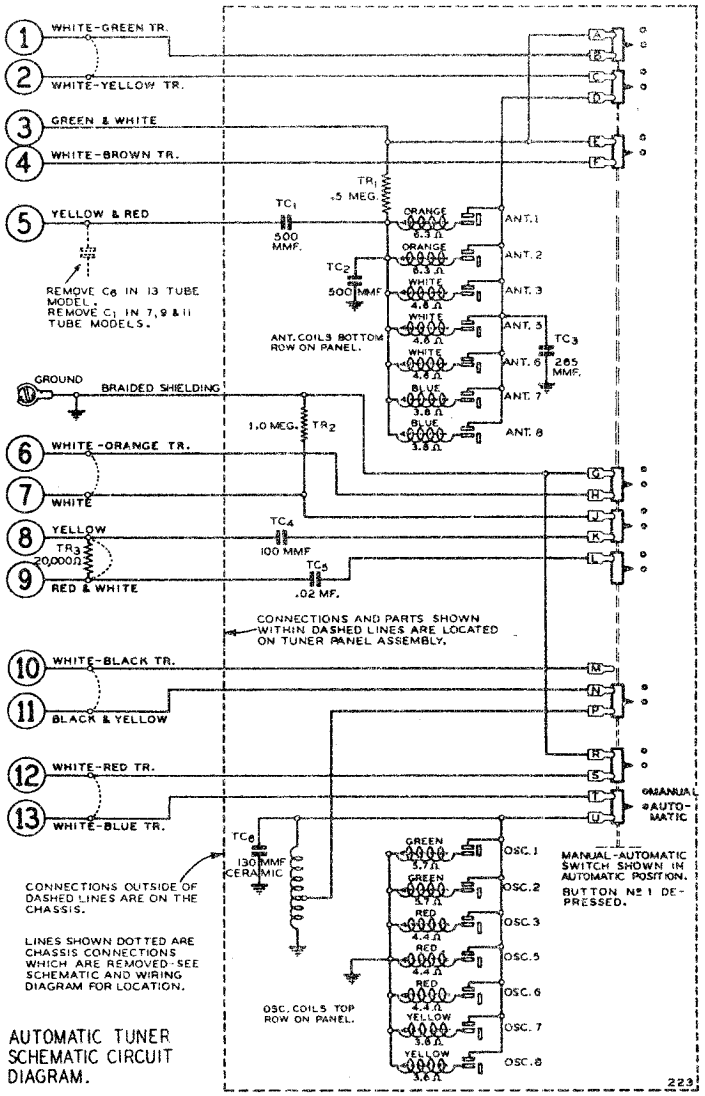
WHITE-GREEN TR.
WHITE-YELLOW TR.
GREEN & WHITE
WHITE-BROWN TR.
YELLOW & RED
REMOVE C6 IN 13 TUBE MODEL. REMOVE C1 IN 7, 9 & 11 TUBE MODELS.
GROUND
BRAIDED SHIELDING
WHITE-ORANGE TR.
WHITE
YELLOW
RED & WHITE
WHITE-BLACK TR.
BLACK & YELLOW
WHITE-RED TR.
WHITE-BLUE TR.
TR1 .5 MEG.
TC1 500 MMF.
TC2 500 MMF
TC3 265 MMF.
TR2 1.0 MEG.
TC4 100 MMF
TC5 .02 MF.
TR3 20,000Ω
TC6 130 MMF CERAMIC
ANT. COILS BOTTOM ROW ON PANEL.
OSC. COILS TOP ROW ON PANEL.
CONNECTIONS AND PARTS SHOWN WITHIN DASHED LINES ARE LOCATED ON TUNER PANEL ASSEMBLY.
CONNECTIONS OUTSIDE OF DASHED LINES ARE ON THE CHASSIS.
LINES SHOWN DOTTED ARE CHASSIS CONNECTIONS WHICH ARE REMOVED-SEE SCHEMATIC AND WIRING DIAGRAM FOR LOCATION.
MANUAL-AUTOMATIC SWITCH SHOWN IN AUTOMATIC POSITION. BUTTON Nº 1 DEPRESSED.
MANUAL
AUTOMATIC
223

AUTOMATIC TUNER SCHEMATIC CIRCUIT DIAGRAM.

Fig. 19—Tuning Panel Schematic Diagram

13 TUBE MODEL-USE ALL 13 WIRES & GROUND LEAD.

9 & 11 TUBE MODELS-CLIP OFF WHITE-BROWN TR. (4) AT SWITCH CONTACT F

7 TUBE MODEL-CLIP OFF THE FOLLOWING WIRES:
WHITE-ORANGE TR. (6) AT SWITCH CONTACT H
WHITE (7) AT SWITCH CONTACT J
YELLOW (8) & RED & WHITE (9) AT CONDENSER TERMINAL STRIP.
TR3 20000 OHM RESISTOR IS NOT USED.

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Fig. 20—Table of Tuning Panel Leads Used

## Early Models—Cutting off bracket

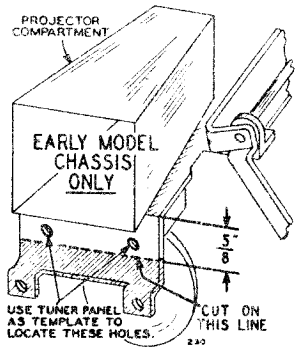


Fig. 21—Cutting Support Bracket—Early Models

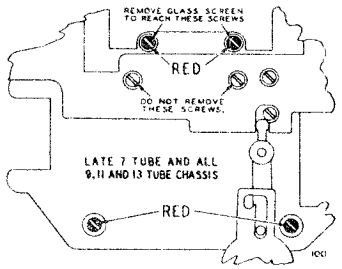
REMOVE GLASS SCREEN TO REACH THESE SCREWS
RED
DO NOT REMOVE THESE SCREWS.
LATE 7 TUBE AND ALL 9, 11 AND 13 TUBE CHASSIS
RED
100

Fig. 22—Location of 4 Red Mounting Screws in Late Models

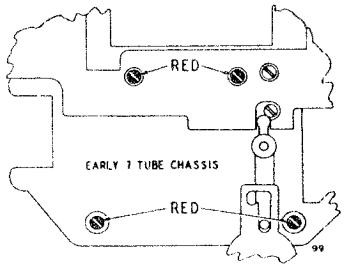


Fig. 23—Location of 4 Red Mounting Screws in Early Models

# WELLS-GARDNER & CO.

## MODEL B1 Series
## Schematic, Voltage
## Socket, Trimmers
## Alignment

**Input Voltages and Currents**
"A" Battery ..... 2 Volts—.3 Amperes
"B" Battery ..... 90 Volts—11.5 to 15 Ma.
Power Output - - - 135 Milliwatts Undistorted
Selectivity - - - 40 KC Broad at 1000 Times Signal

**Intermediate Frequency - - - - - - - - 456 KC.**
**Speaker - - - - - - - - - - - - 6" Dynamic**
**Tuning Frequency Range - - - - - 528 to 1730 KC.**
**Sensitivity - - - - - - - - - - 40 Microvolts**

**VOLTAGES AT SOCKETS**
Volume Control: Maximum — Antenna Shorted to Ground
"A" Battery — 2 Volts

| Tube | Function | Across Filament | Plate to Ground | Screen to Ground | Control Grid |
|---|---|---|---|---|---|
| 1D7G | 1st Det.-Osc. | 2.0 | 87 87(1) | 64 | 3.5(2) |
| 1D5G | I.F. | 2.0 | 87 | 64 | 3.5(2) |
| 1H6G | 2nd Det.-1st Audio | 2.0 | 32(3) | | 1.25(4) |
| 1F5G | Power | 2.0 | 82 | 87 | 3.5(2) |

(1) Anode Grid (G2) to ground
(2) As read across R6 and R7
(3) As read on 100 volt scale (1000 ohm per volt meter). Subject to variation.
(4) As read across R7

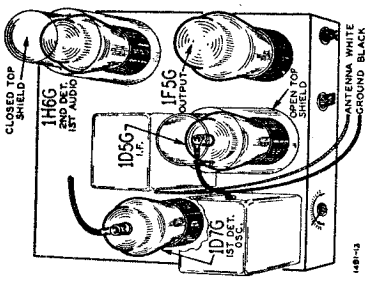


*Fig. 2—Tube Arrangement*

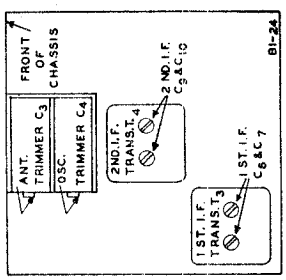


*Fig. 3—Trimmer Location*

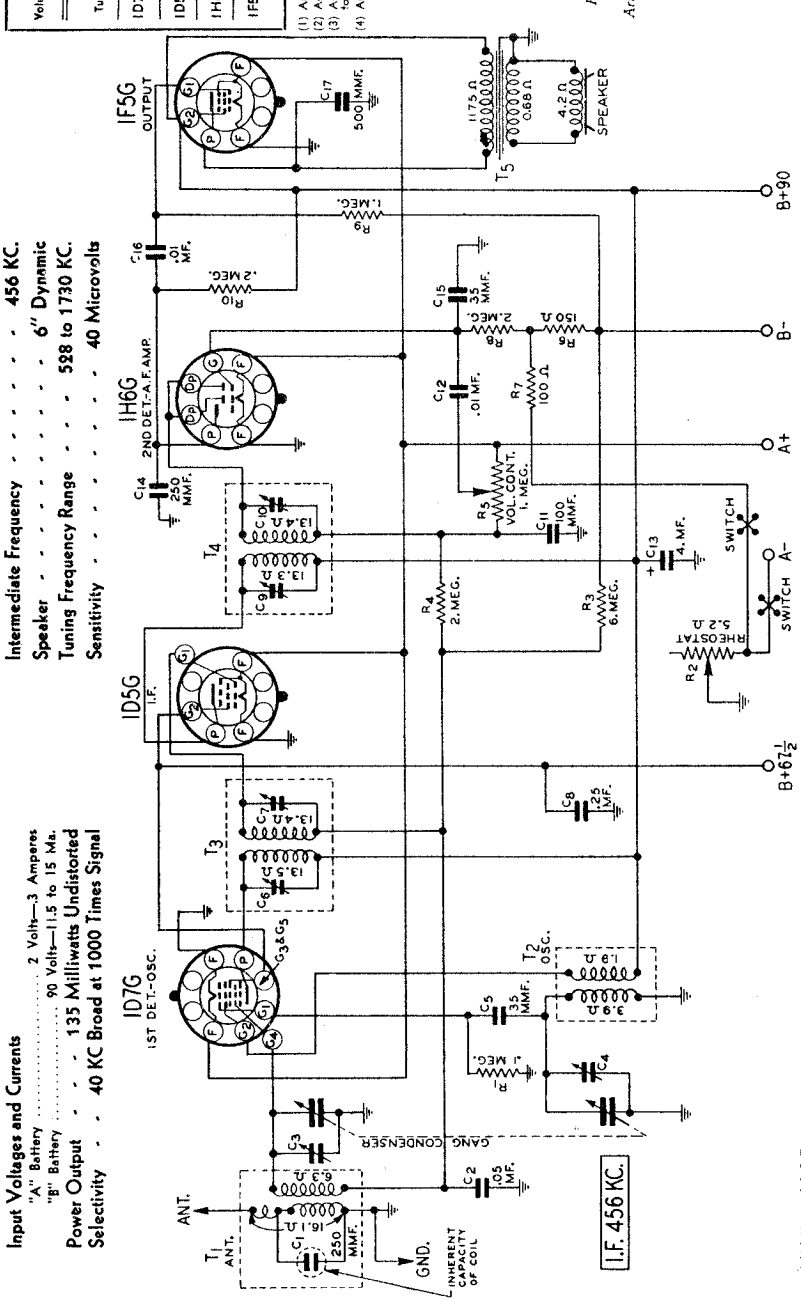


*Fig. 1—Schematic Circuit Diagram*

**JULY, 1937**

## ALIGNMENT PROCEDURE

| STEP (Follow Order as Given) | DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | TRIMMERS ADJUSTED See Illustration | PROCEDURE INITIAL STEPS | PROCEDURE ADJUSTMENT |
|---|---|---|---|---|---|---|
| I. F. | .1 mf. | 456 KC | Grid of 1st Det. | 2nd I. F. (C9) & (C10) 1st I. F. (C6) & (C 7) | Turn rotor to full open | Adjust to Maximum Output |
| 1730 KC Adj. | 200 mmf. | 1730 KC | Antenna Lead | Osc. (C4) | Turn rotor to full open | Adjust to Maximum Output |
| 1500 KC Adj. | 200 mmf. | 1500 KC | Antenna Lead | Ant. (C3) | Turn Rotor to Max. Output | Adjust to Maximum Output |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

NOTE—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, note the position of the pointer and remove the chassis from the cabinet. Loosen the pointer screw and set the pointer so that it will be at the 800 KC mark. Tighten the pointer screw and replace the chassis in the cabinet. If the pointer is not at the 800 KC mark another adjustment will be necessary.

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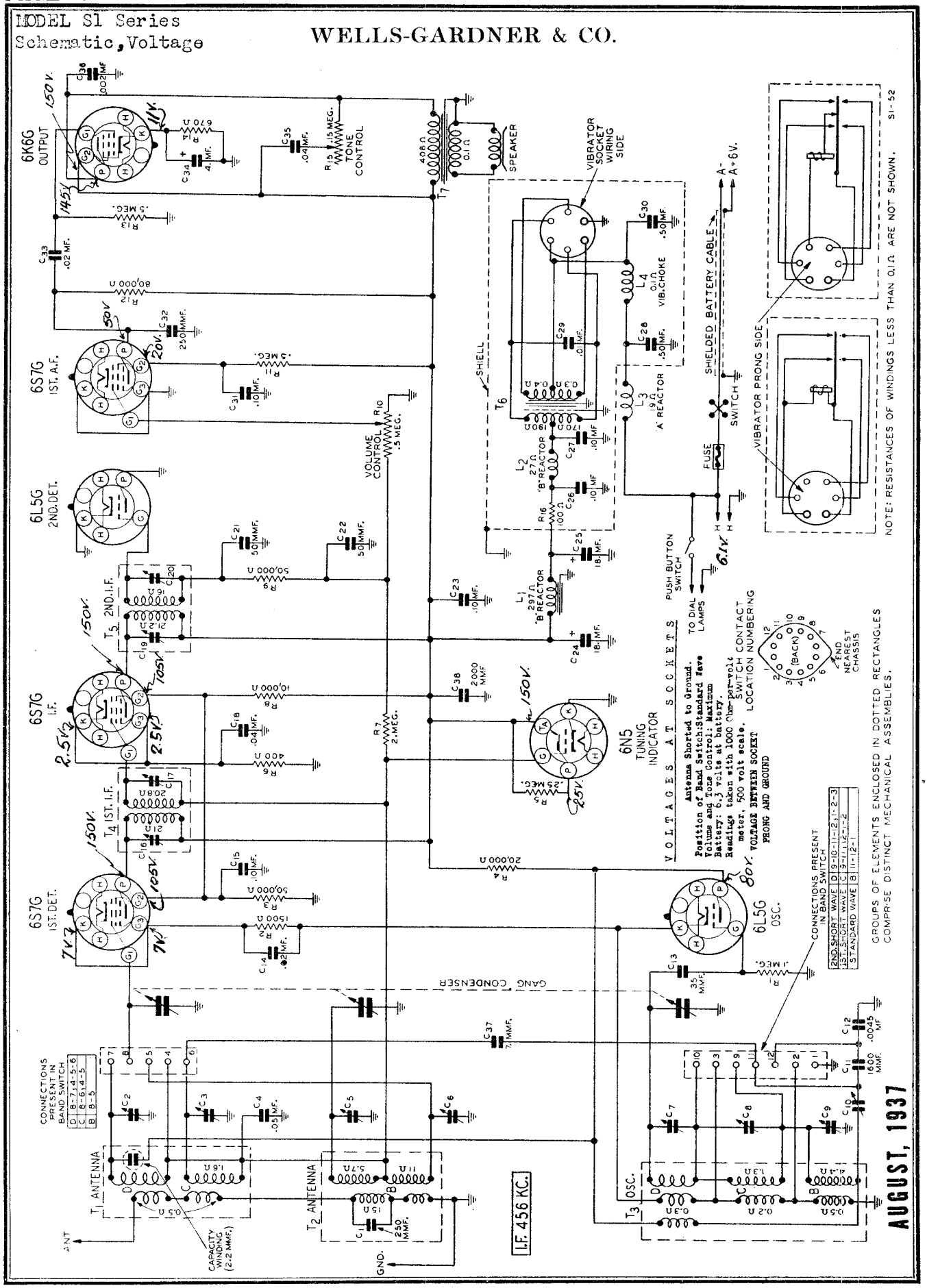
MODEL 51 Series
Schematic, Voltage

# WELLS-GARDNER & CO.

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# WELLS-GARDNER & CO.

MODEL S1 Series
Alignment, Trimmers
MODEL S2 Series
Alignment, Trimmers, Tuner

## ALIGNMENT PROCEDURE SERIES S1

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

| STEP (Follow Order as Given) | BAND SWITCH SETTING | DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | TRIMMERS ADJUSTED See Illustration | PROCEDURE INITIAL STEPS | PROCEDURE ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| I. F. | | | | | | | |
| 2nd I.F. Adj. | Range B | .1 mf. | 456 KC | Grid of I.F. Tube | 2nd I.F. (C19) & (C20) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1st I.F. Adj. | Range B | .1 mf. | 456 KC | Grid of 1st Det. | 1st I.F. (C16) & (C17) | Turn Rotor to Full Open | Adjust to Maximum Output |
| RANGE D | | | | | | | |
| 22,000 KC | Range D | 400 Ohm | 22,000 KC | Antenna Lead | Oscillator Range D (C7) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 20,000 KC | Range D | 400 Ohm | 20,000 KC | Antenna Lead | Antenna Range D (C2) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |
| RANGE C | | | | | | | |
| 6350 KC | Range C | 400 Ohm | 6350 KC | Antenna Lead | Oscillator Range C (C8) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 6000 KC | Range C | 400 Ohm | 6000 KC | Antenna Lead | Antenna Range C (C3) | Turn Rotor to Max. Output | Adjust to Maximum Output |
| RANGE B | | | | | | | |
| 1830 KC | Range B | 200 mmf. | 1830 KC | Antenna Lead | Oscillator Range B (C9) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1500 KC | Range B | 200 mmf. | 1500 KC | Antenna Lead | 1st Ant. Range B (C5) 2nd Ant. Range B (C6) | Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A | Adjust to Maximum Output |
| 600 KC | Range B | 200 mmf. | 600 KC | Antenna Lead | 600 KC (C10) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |

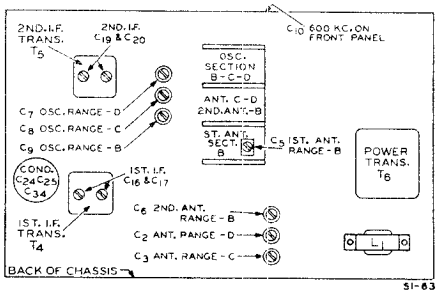
**Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.**

After each range is completed, repeat the procedure as a final check.

NOTE A—Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the **peak** of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image




## ALIGNMENT PROCEDURE Series S2

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
|---|---|---|---|---|---|
| I. F. | | | | | |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 1st I.F. (C15) & (C16) 2nd I.F. (C21) & (C22) |
| RANGE B | | | | | |
| 1730 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C7) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A | Ant. Range B (C5) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C8) Rock Rotor—See Note B |
| RANGE D | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C6) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C3) Rock Rotor—See Note B |

| PERMEABILITY TUNING UNIT | | | BUTTON DEPRESSED (Band Switch in Push Button Position) | TURN SETTING SCREW TO MAXIMUM OUTPUT | ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note C |
|---|---|---|---|---|---|
| 1100 KC | Antenna Lead | 200 mmf. | No. 1 | Setting Screw No. 1 | Antenna Coil No. 1 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 2 | Setting Screw No. 2 | Antenna Coil No. 2 |
| 850 KC | Antenna Lead | 200 mmf. | No. 3 | Setting Screw No. 3 | Antenna Coil No. 3 |
| 850 KC | Antenna Lead | 200 mmf. | No. 4 | Setting Screw No. 4 | Antenna Coil No. 4 |
| 700 KC | Antenna Lead | 200 mmf. | No. 5 | Setting Screw No. 5 | Antenna Coil No. 5 |
| 700 KC | Antenna Lead | 200 mmf. | No. 6 | Setting Screw No. 6 | Antenna Coil No. 6 |

**CAUTION**—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

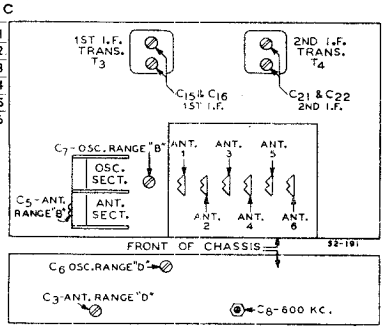



*Fig. 2—Trimmer Location*

**Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.**

**After each range is completed, repeat the procedure as a final check.**

**NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.**

**NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.**

**NOTE C—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained**

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MODEL S2 Series
Schematic, Voltage
Socket, Coils, Notes

# WELLS-GARDNER & CO.

Power Consumption - 2.45 Amperes at 6.3 Volts

Power Output - - - - - - - .8 Watt Undistorted
1.4 Watts Maximum

Selectivity - 41 KC Broad at 1000 times Signal

Sensitivity

B Range (Manual Tuning).....6 Microvolts Average
B Range (Automatic Tuning).....8 Microvolts Average
D Range .....8 Microvolts Average

Intermediate Frequency - - - - - - - 456 KC.

Speaker - - - - - - - 6" or 8" P. M. Dynamic

Tuning Frequency Range

B Range (Manual Tuning)..... 528 to 1730 KC
D Range (Manual Tuning).....5750 to 18300 KC
Buttons 1 and 2 (Automatic Tuning).....820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning).....650 to 1250 KC
Buttons 5 and 6 (Automatic Tuning).....520 to 980 KC

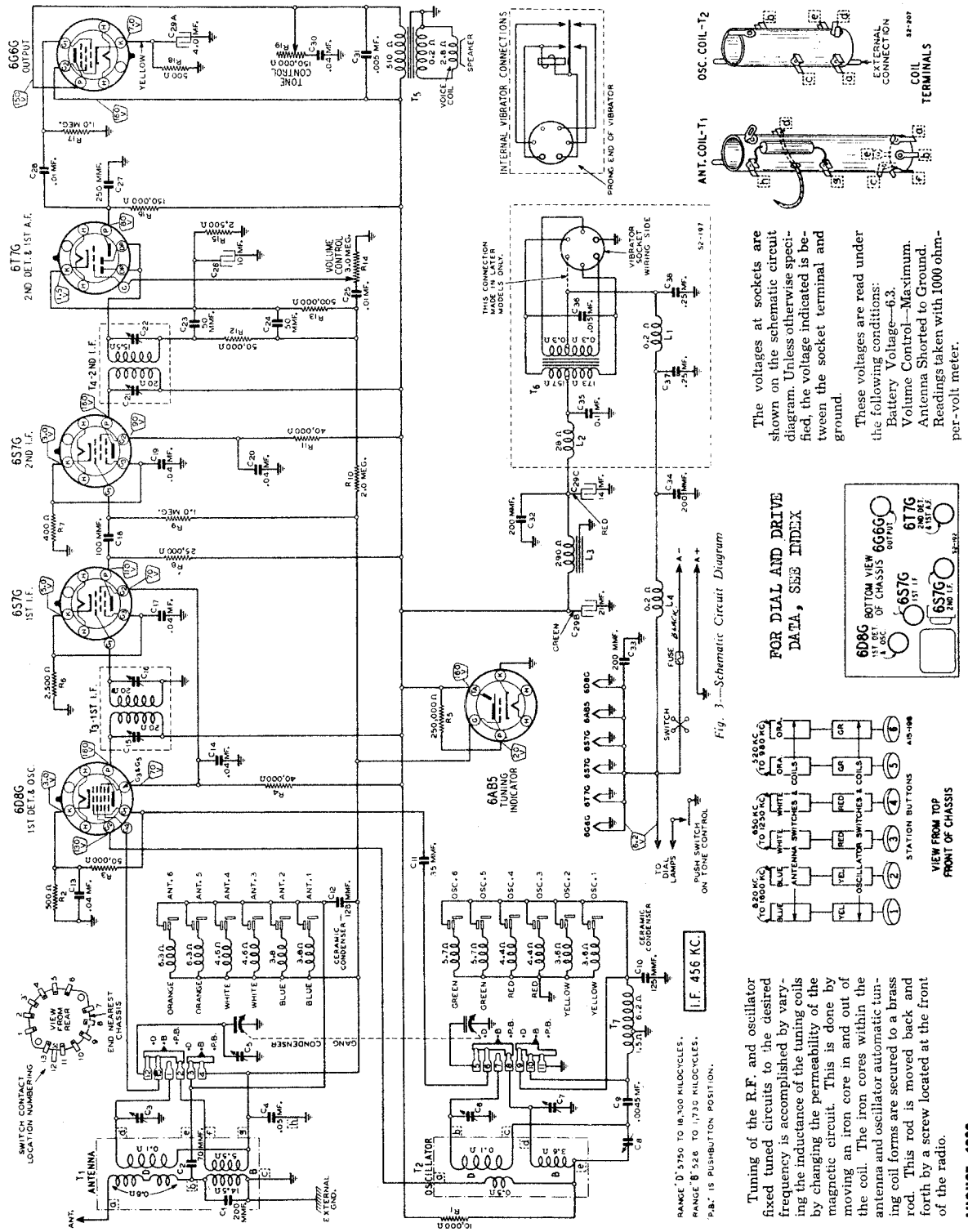


Fig. 3—Schematic Circuit Diagram

FOR DIAL AND DRIVE DATA, SEE INDEX

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:
Battery Voltage—6.3.
Volume Control—Maximum.
Antenna Shorted to Ground.
Readings taken with 1000 ohm-per-volt meter.

Tuning of the R.F. and oscillator fixed tuned circuits to the desired frequency is accomplished by varying the inductance of the tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core in and out of the coil. The iron cores within the antenna and oscillator automatic tuning coil forms are secured to a brass rod. This rod is moved back and forth by a screw located at the front of the radio.

AUGUST, 1938

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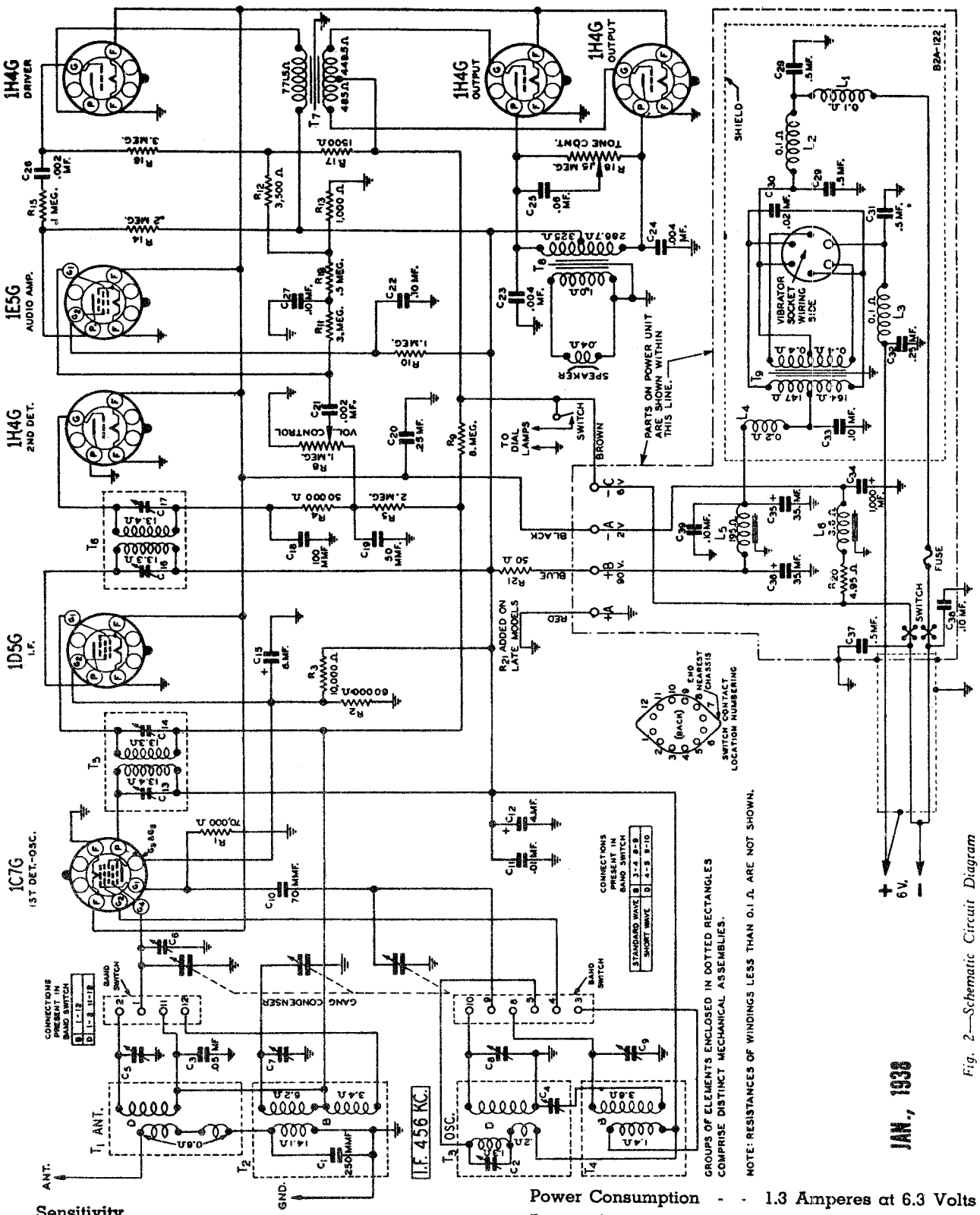
WELLS-GARDNER & CO.

MODEL B2A Series
Schematic, Specifications




JAN., 1938

*Fig. 2—Schematic Circuit Diagram*

**Sensitivity**

B Range.....13.5 Microvolts Average
D Range.....21.0 Microvolts Average

**Tuning Frequency Range**

B Range.....528 to 1730 KC
D Range.....5750 to 18300 KC

Power Consumption - - 1.3 Amperes at 6.3 Volts
Power Output - - - - - 360 Milliwatts Undistorted
725 Milliwatts Maximum
Selectivity - - 35 KC Broad at 1000 times Signal
Intermediate Frequency - - - - - - - - 456 KC
Speaker - - - - 6" P.M. Dynamic—Mantel Models
8" P.M. Dynamic—Console Models

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## ALIGNMENT PROCEDURE

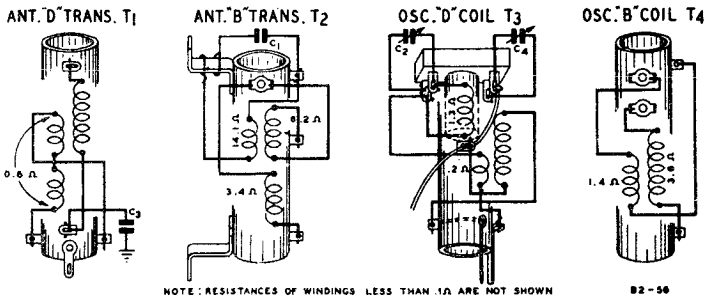
Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

| STEP (Follow Order as Given) | BAND SWITCH SETTING | DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | TRIMMERS ADJUSTED See Illustration | PROCEDURE INITIAL STEPS | PROCEDURE ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| I.F. | Range B | .1 mf. | 456 KC | Grid of 1st Det. | 1st I.F. (C13) & (C14) 2nd I.F. (C16) & (C17) | Turn Rotor to Full Open | Adjust to Maximum Output |
| RANGE B | | | | | | | |
| 1730 KC | Range B | 200 mmf. | 1730 KC | Antenna Lead | Oscillator Range B (C9) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1500 KC | Range B | 200 mmf. | 1500 KC | Antenna Lead | 1st Ant. Range B (C7) 2nd Ant. Range B (C6) | Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A | Adjust to Maximum Output |
| 600 KC | Range B | 200 mmf. | 600 KC | Antenna Lead | 600 KC (C4) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor—See Note B |
| RANGE D | | | | | | | |
| 18300 KC | Range D | 400 Ohm | 18300 KC | Antenna Lead | Oscillator Range D (C8) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 15000 KC | Range D | 400 Ohm | 15000 KC | Antenna Lead | Ant. Range D (C5) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor—See Note B |
| 6000 KC | Range D | 400 Ohm | 6000 KC | Antenna Lead | 6000 KC (C2) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor—See Note B |




NOTE: RESISTANCES OF WINDINGS LESS THAN .1Ω ARE NOT SHOWN

*Fig. 6—Coil Terminal Arrangement and D.C. Resistance of Windings*

NOTE A—In sets using the finger tip tuning dial, remove the retaining ring which holds the dial scale in position. Readjust rotor to maximum output. Hold the station selector ring and turn the dial scale until the pointer is at the 1500 KC mark. Replace the retaining ring.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

After alignment of Range D has been completed, do not make any adjustments of the Range B trimmers. If this is done, it will be necessary to realign Range D.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

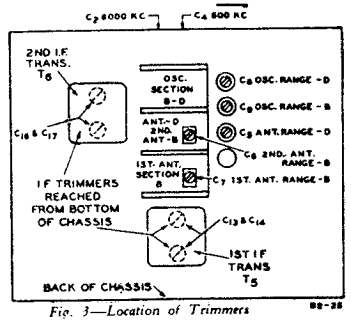

C2 6000 KC
C4 600 KC
2ND I.F. TRANS. T6
OSC. SECTION B-D
ANT-D 2ND. ANT-B
1ST. ANT. SECTION B
C16 & C17
C8 OSC. RANGE - D
C9 OSC. RANGE - B
C5 ANT. RANGE - D
C6 2ND. ANT. RANGE - B
C7 1ST. ANT. RANGE - B
I.F. TRIMMERS REACHED FROM BOTTOM OF CHASSIS
C13 & C14
1ST I.F. TRANS T5
BACK OF CHASSIS
B2-26

*Fig. 3—Location of Trimmers*

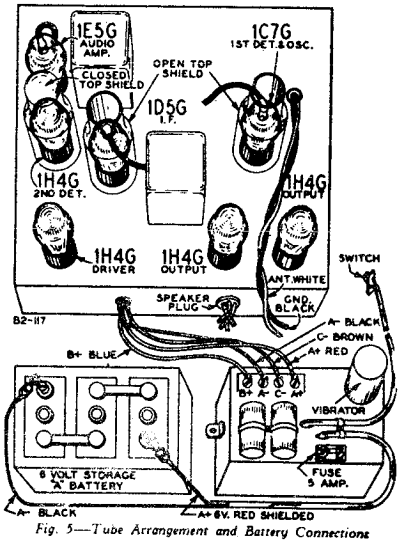



*Fig. 5—Tube Arrangement and Battery Connections*

## VOLTAGES AT SOCKETS

**Volume Control: Maximum** **Antenna Shorted to Ground**
**Readings taken with 1000 Ohm-per-volt meter.** **Band Switch in Standard Wave Position**

| TUBE | FUNCTION | VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated) Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Control Grid Bias |
|---|---|---|---|---|---|---|---|---|
| 1C7G | 1st Det.—Osc. | 0 | 103 | 66 | | 103 | 2 | |
| 1D5G | I.F. | 0 | 103 | 66 | | | 2 | |
| 1H4G | 2nd Det. | 0 | 0 | | | | 2 | |
| 1E5G | Audio Amp. | 0 | 40(1) | 19(1) | | | 2 | 1.0 Across R13 |
| 1H4G | Driver | 0 | 100 | | | | 2 | 4.5 Across R12 & 13 |
| 1H4G | Output | 0 | 102 | | 6 | | 2 | 6 —C to Ground |

(1) As read on 1000 volt scale.

A synchronous type vibrator is used in the power unit. This vibrator interrupts the current through the primary of the power transformer and also rectifies the current in the secondary circuit.

If, after a new 2 section dry electrolytic condenser has been installed, vibrator hash is encountered, reverse the connections of the 2 sections.

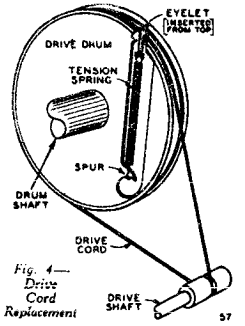



*Fig. 4—Drive Cord Replacement*

# WELLS-GARDNER & CO.

MODEL T2 Series
Schematic, Voltage
Socket, Coils, Notes

Power Consumption - 1.45 Amperes at 32 Volts DC

Power Output - - - - - - - .17 Watts Undistorted
.40 Watts Maximum

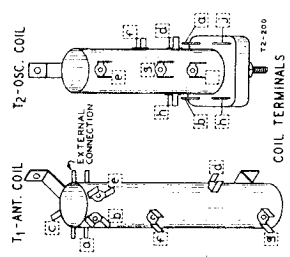
Selectivity - - 30 KC Broad at 1000 times Signal

Sensitivity

B Range (Manual Tuning).....6.0 Microvolts Average
B Range (Automatic Tuning).....6.0 Microvolts Average
D Range .....6.0 Microvolts Average

Intermediate Frequency - - - - - - - - 456 KC
Speaker - - - - - - - - - - - - 8" Dynamic
Tuning Frequency Range

B Range (Manual Tuning)... 528 to 1730 KC (Kilccycles)
D Range (Manual Tuning)...5750 to 18300 KC (Kilocycles)
Buttons 1 and 2 (Automatic Tuning).....820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning).....650 to 1250 KC
Buttons 5 and 6 (Automatic Tuning).....520 to 980 KC




## Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

## Starting Current

When first turned on, the drain for a few seconds is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant.

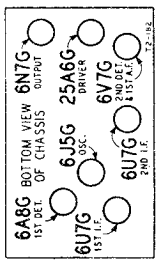
## Polarity of Power Supply

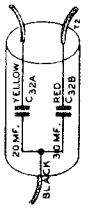
There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

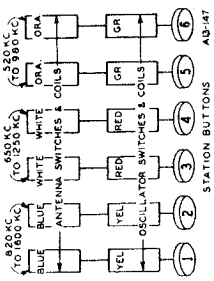
## Caution

**If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.**

**Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 dial lamps.**




FOR OTHER DATA
SEE INDEX

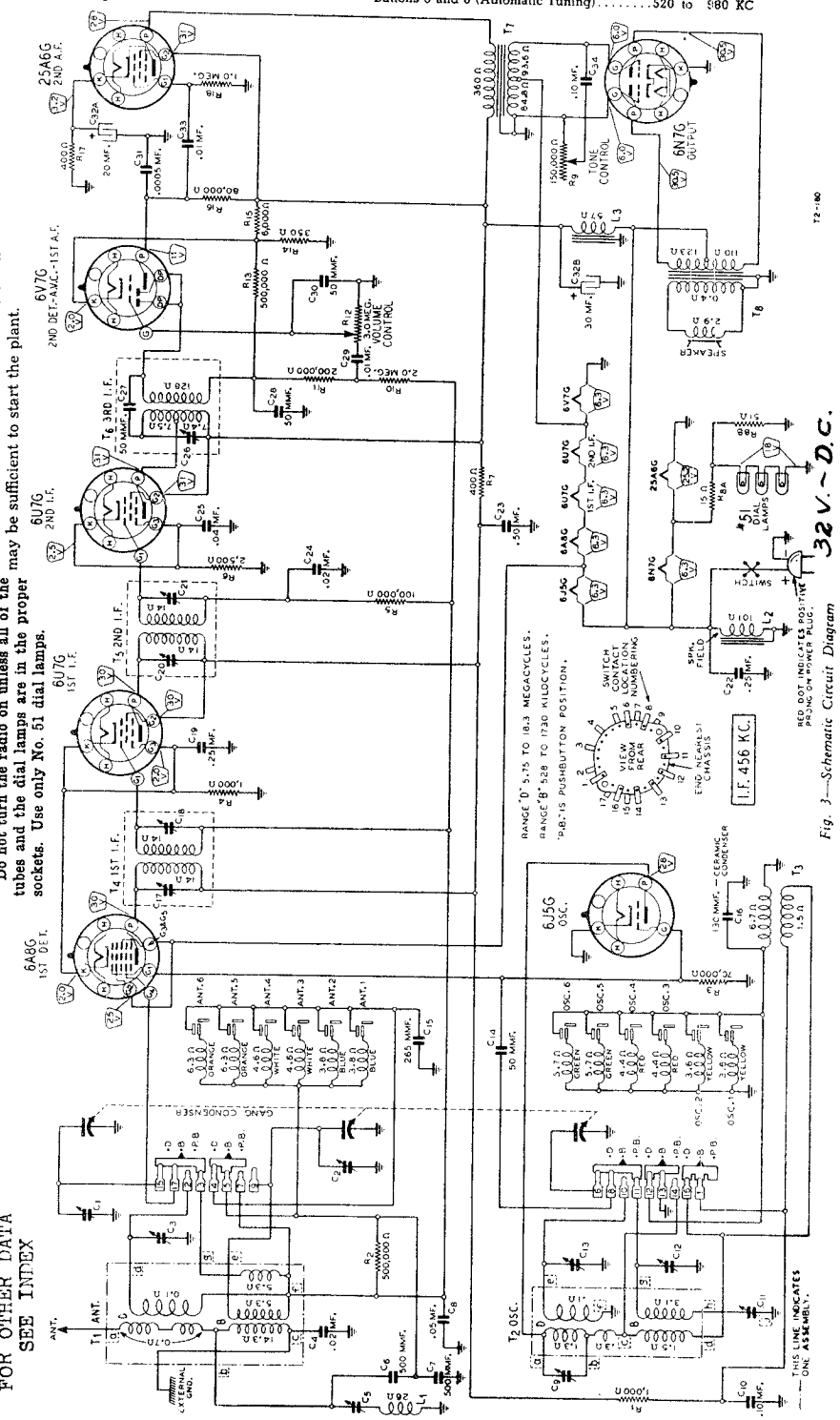



*Fig. 3—Schematic Circuit Diagram*

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# MODEL A17

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
|---|---|---|---|---|---|
| I. F. | | | | | 2nd I.F. (C23) & (C24) |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 1st I.F. (C20) & (C21) |
| RANGE D | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C10) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C2) Int. Range D (C6) Rock Rotor—See Note A |
| RANGE C | | | | | |
| 5400 KC | Antenna Lead | 400 Ohm | C Range | Turn Rotor to Full Open | Oscillator Range C (C11) |
| 5000 KC | Antenna Lead | 400 Ohm | C Range | Turn Rotor to Max. Output | Antenna Range C (C3) Int. Range C (C7) |
| RANGE B | | | | | |
| 1600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C12) |
| 1400 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Set Indicator to 1400 KC—See Note B | Ant. Range B (C4) Int. Range B (C8) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C13) Rock Rotor—See Note A |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE B—If the pointer is not at 1400 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1400 KC mark, and tighten the clamps.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

### Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram—Fig. 3. On the top of the chassis base and between two of the 76 tube sockets is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

### Tone Control

There are 3 wiring lugs on the tone control. One of the end lugs connects to one end of the tone control resistor. The center lug connects to the slider. The other end lug on the tone control is used for external wiring purposes only and is not connected to the tone control resistor in any way. One side of the tone control condenser and a wire from the B+ line are connected at this lug.

### Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

### Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

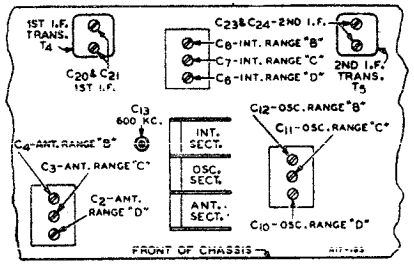
These voltages are read under the following conditions:

Line Voltage—117.

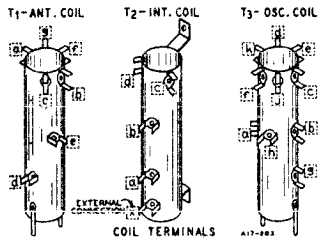
Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter.




*Location of Trimmers*




# MODEL T2

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| I. F. | | | | | 1st I.F. (C17) & (C18) |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (C20) & (C21) 3rd I.F. (C26) |
| RANGE B | | | | | |
| 1730 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C12) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | 1st Ant. Range B (C2) 2nd Ant. Range B (C1) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C11) Rock Rotor—See Note B |
| WAVE TRAP | | | | | |
| 456 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to 600 KC Adjust Sig. Gen.—See Note C | Wave Trap (C5) Adjust for MINIMUM Output |
| RANGE D | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C13) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C3) Rock Rotor—See Note B |
| 6000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | 6000 KC (C9) Rock Rotor—See Note B |
| PERMEABILITY TUNING UNIT | | | BUTTON DEPRESSED (Band Switch in Push Button Position) | TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book | ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D |
| 1100 KC | Antenna Lead | 200 mmf. | No. 1 | Setting Screw No. 1 | Antenna Coil No. 1 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 2 | Setting Screw No. 2 | Antenna Coil No. 2 |
| 950 KC | Antenna Lead | 200 mmf. | No. 3 | Setting Screw No. 3 | Antenna Coil No. 3 |
| 850 KC | Antenna Lead | 200 mmf. | No. 4 | Setting Screw No. 4 | Antenna Coil No. 4 |
| 700 KC | Antenna Lead | 200 mmf. | No. 5 | Setting Screw No. 5 | Antenna Coil No. 5 |
| 700 KC | Antenna Lead | 200 mmf. | No. 6 | Setting Screw No. 6 | Antenna Coil No. 6 |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

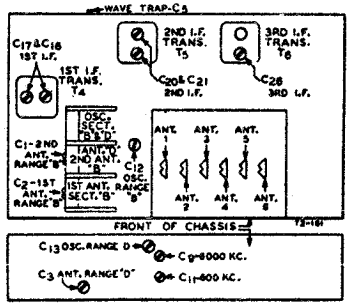
NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.



MODEL T3 Series
Schematic, Voltage
Socket, Trimmers
Coils, Notes

# WELLS-GARDNER & CO.

**Power Consumption** - 1.45 Amperes at 32 Volts DC **Intermediate Frequency** - - - - - - - - 456 KC

**Power Output** - - - - - - - .17 Watts Undistorted .40 Watts Maximum **Speaker** - - - - - 6" or 8" Electro-Dynamic

**Selectivity** - - 30 KC Broad at 1000 times Signal **Tuning Frequency Range**

**Sensitivity** (For .05 watt output)

| | | | |
|---|---|---|---|
| B Range | .....6.0 Microvolts Average | B Range | ..... 528 to 1730 KC (Kilocycles) |
| D Range | .....6.0 Microvolts Average | D Range | ..... 5750 to 18300 KC (Kilocycles) |

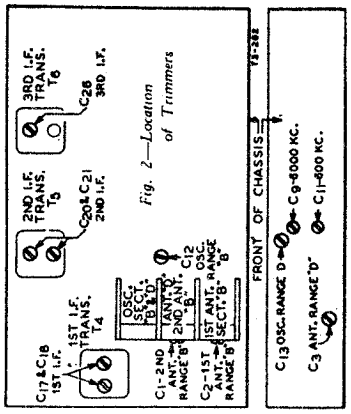



*Fig. 2—Location of Trimmers*




## Line Voltage Range

The radio will operate satisfactorily within a line voltage range of 25 to 42 volts. If the line voltage is higher than 42, it will be necessary to use a series resistor to cut it down. If the voltage varies, a variable resistor may be required.

## Starting Current

When first turned on for a few seconds the drain is slightly higher than normal until the tubes heat up. Some automatic plants are adjusted to start under a load of 200 to 300 watts. If a number of devices such as lights or motors are being used and the radio set is turned on the total drain may be sufficient to start the plant.

This radio is designed for use on farms and in those places where the power supply consists of a 32 volt direct current generating plant.

## Polarity of Power Supply

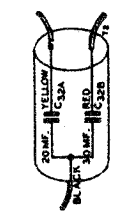
There is a red mark on the plug at the end of the power supply cord of the radio. The prong of the plug at which the red mark is placed must be plugged into the positive side of the line.

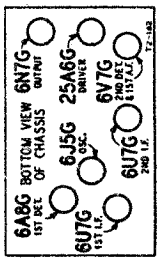
## Caution

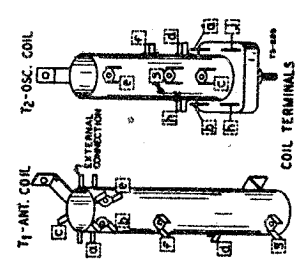
**If used on any other type of power supply than 32 volt DC, severe damage may be done to the receiver.**

**Do not turn the radio on unless all of the tubes and the dial lamps are in the proper sockets. Use only No. 51 dial lamps.**

## 32 Volt Power Supply



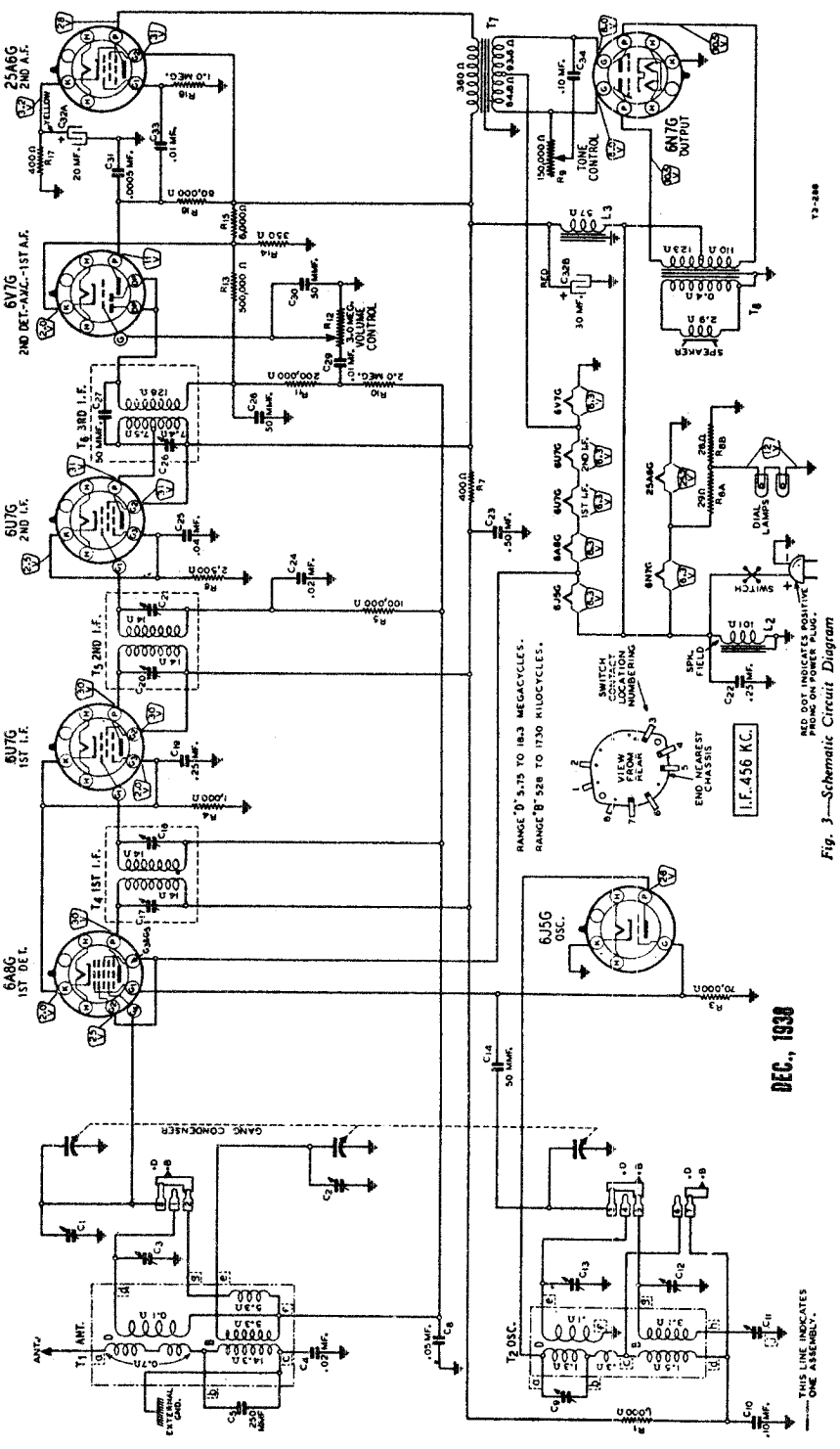




*Fig. 3—Schematic Circuit Diagram*

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## WG Series T3

### ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
|---|---|---|---|---|---|
| I. F. | | | | | 1st I.F. (C17) & (C18) 2nd I.F. (C20) & (C21) 3rd I.F. (C26) |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | |
| RANGE B | | | | | |
| 1730 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C12) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | 1st Ant. Range B (C2) 2nd Ant. Range B (C1) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C11) Rock Rotor—See Note B |
| RANGE D | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C13) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C3) Rock Rotor—See Note B |
| 6000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | 6000 KC (C9) Rock Rotor—See Note B |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

CAUTION—When aligning the short wave band, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTE A—If the pointer is not at 1500 KC on the dial, hold the drive cord and move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

**Dial Pointer Attachment**—Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale.

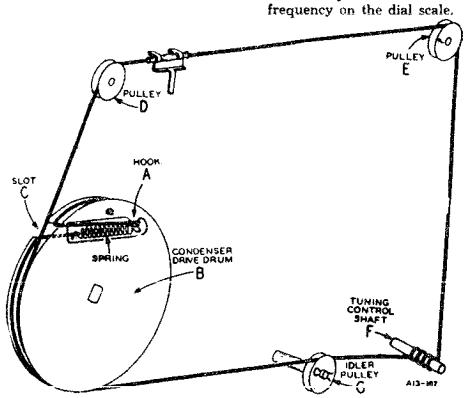



*Fig. 4—Drive Cord Replacement*

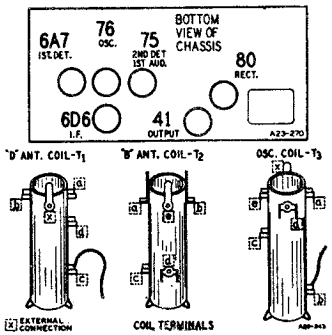
### Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 49¾ inches.

Arrange to keep the gang condenser in the completely closed position.

Place the looped end of the drive cord over hook A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E as shown. Continue cord down to shaft F and wind 4 turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.

## WG Series A23




### ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER OR DIAL SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| I. F. | | | | | 2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15) |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | |
| WAVE TRAP | | | | | Wave Trap (C5) |
| 456 KC | Antenna Lead | 200 mmf. | B Range | 600 KC | Adjust for MINIMUM Output |
| RANGE B | | | | Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A. | |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor until dial pointer is at 1500 KC | Oscillator Range B (C11) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Leave Rotor at above setting | Ant. Range B (C3) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C9) Rock Rotor—See Note B |
| RANGE D | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C8) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C1) Rock Rotor—See Note B |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

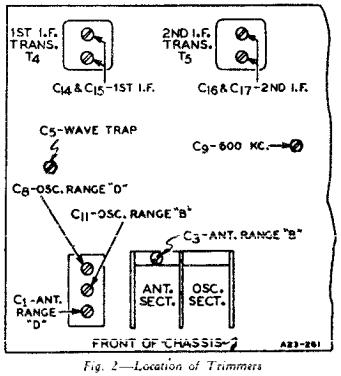



*Fig. 2—Location of Trimmers*

**Tuning Frequency Range**

B Range..... 528 to 1730 KC (Kilocycles)
D Range.....5750 to 18300 KC (Kilocycles)

**Sensitivity** (For 0.5 watt output)

B Range.....30 Microvolts Average
D Range.....50 Microvolts Average

**Power Consumption -- 60 Watts** (At 117 volts 60 cycles)

**Power Output** - - - - - - 1.5 Watts Undistorted 3.0 Watts Maximum

**Selectivity** - - 45 KC Broad at 1000 times Signal

**Intermediate Frequency** - - - - - - - 456 KC

**Speaker** - - - - - - - 6", 8" or 10" Dynamic

For drive cord data, rack and panel assembly, see index.

Schematic, Voltage, Socket Trimmers, Alignment, Coils

# WELLS-GARDNER & CO.

MODELS B3 Series (Portable)
B4 Series (Table Models)

**Input Voltages and Currents**

"A" Battery.....1.5 Volts—.30 Amperes
"B" Battery.....90 Volts—12 to 15 Ma.

Power Output - - - 140 Milliwatts Undistorted
Selectivity - - 41 KC Broad at 1000 Times Signal

Intermediate Frequency - - - - - - - 456 KC.
Speaker - - - - - - - - - 6" P.M. Dynamic
Tuning Frequency Range - - - 540 to 1600 KC.
Sensitivity (For .05 Watt Output)
Table Model.....10.5 Microvolts Average
Portable Model.....20 Microvolts Per Meter Average

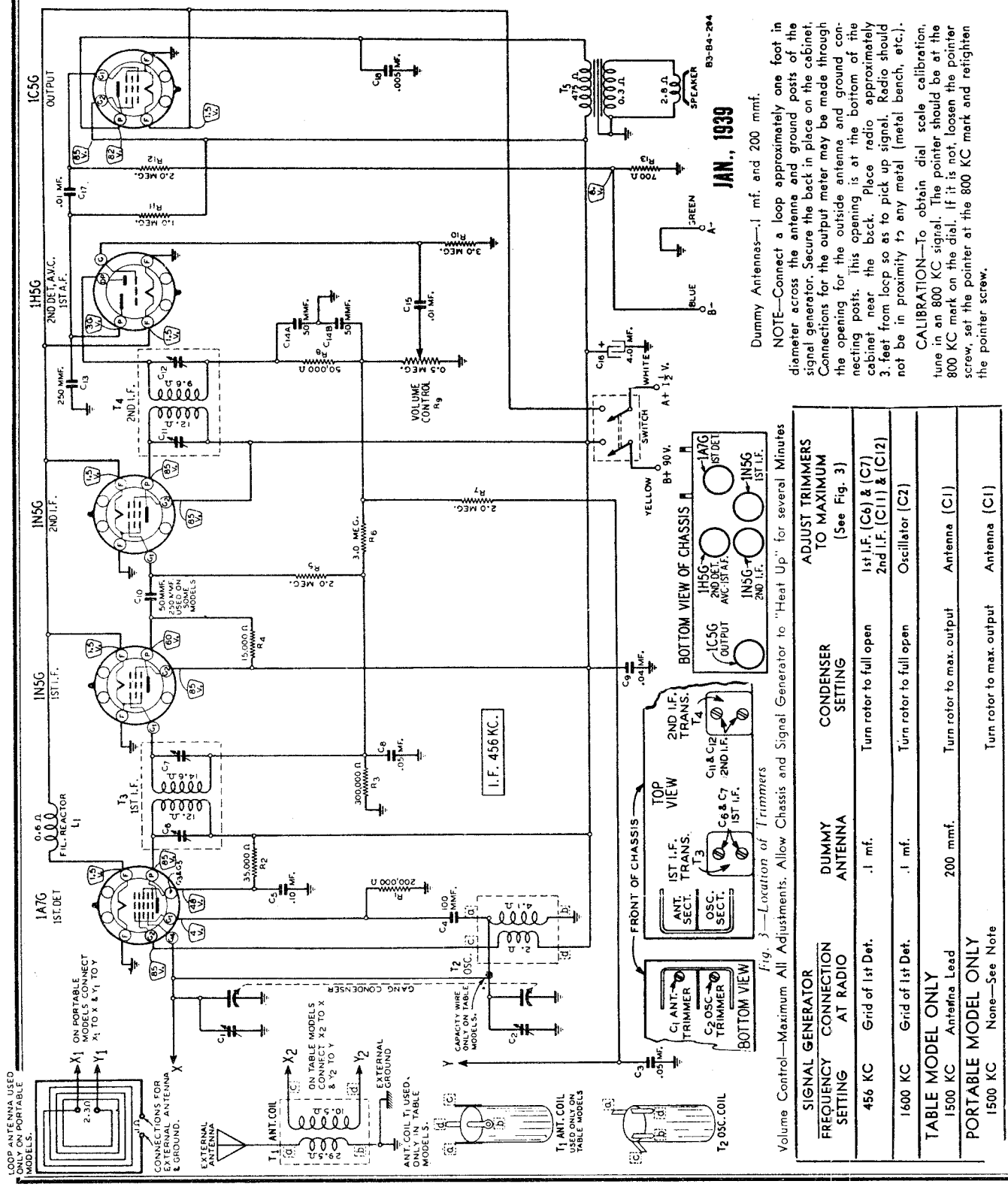



Fig. 3—Location of Trimmers

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several Minutes

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (See Fig. 3) | |
|---|---|---|---|---|---|
| 456 KC | Grid of 1st Det. | .1 mf. | Turn rotor to full open | 1st I.F. (C6) & (C7)<br>2nd I.F. (C11) & (C12) | |
| 1600 KC | Grid of 1st Det. | .1 mf. | Turn rotor to full open | Oscillator (C2) | |
| **TABLE MODEL ONLY** | | | | | |
| 1500 KC | Antenna Lead | 200 mmf. | Turn rotor to max. output | Antenna (C1) | |
| **PORTABLE MODEL ONLY** | | | | | |
| 1500 KC | None—See Note | | Turn rotor to max. output | Antenna (C1) | |

Dummy Antennas—.1 mf. and 200 mmf.

NOTE—Connect a loop approximately one foot in diameter across the antenna and ground posts of the signal generator. Secure the back in place on the cabinet. Connections for the output meter may be made through the opening for the outside antenna and ground connecting posts. This opening is at the bottom of the cabinet near the back. Place radio approximately 3 feet from loop so as to pick up signal. Radio should not be in proximity to any metal (metal bench, etc.).

CALIBRATION—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

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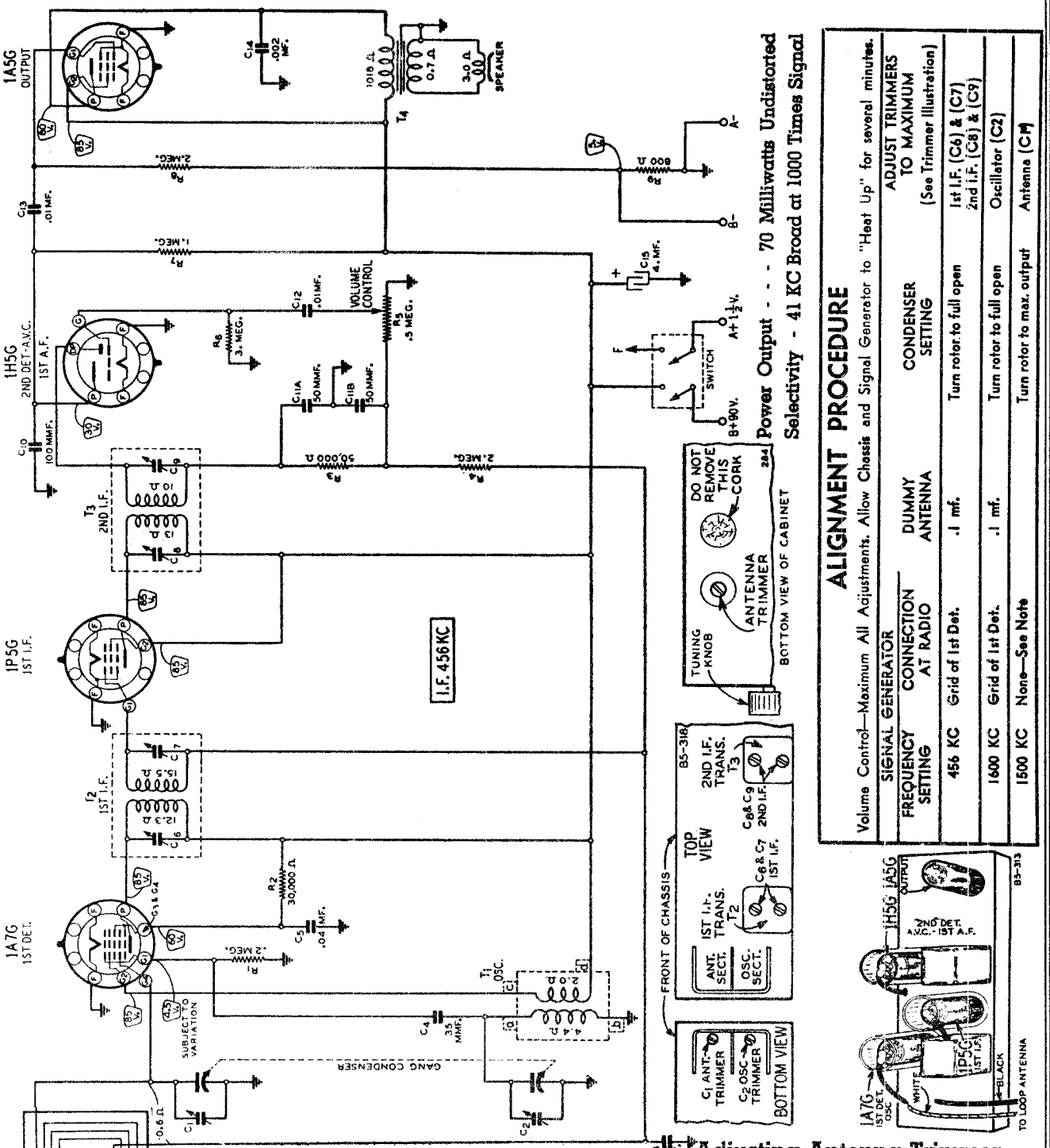
MODEL 4B5 Series
Schematic, Voltage

# WELLS-GARDNER & CO.

Socket, Trimmers
Alignment




## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments. Allow Chassis and Signal Generator to "Heat Up" for several minutes.

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (See Trimmer Illustration) |
|---|---|---|---|---|
| 456 KC | Grid of 1st Det. | .1 mf. | Turn rotor to full open | 1st I.F. (C6) & (C7) 2nd I.F. (C8) & (C9) |
| 1600 KC | Grid of 1st Det. | .1 mf. | Turn rotor to full open | Oscillator (C2) |
| 1500 KC | None—See Note | | Turn rotor to max. output | Antenna (C1) |

CALIBRATION (For models with pointer in front of dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

CALIBRATION (For model with pointer in back of celluloid dial scale)—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. **IF THE POINTER IS AT A HIGHER KC MARK THAN 800 KC,** grasp the drive cord below the tension spring. Hold the tuning control shaft motionless and slowly pull the drive cord down until the pointer is at the 800 KC mark. **IF THE POINTER IS AT A LOWER KC MARK THAN 800 KC,** grasp the drive cord above the tension spring. Hold the tuning control shaft motionless and slowly pull the drive cord up until the pointer is at the 800 KC mark.

## Adjusting Antenna Trimmer

After the batteries are installed and the back of the cabinet is in place, adjust the antenna trimmer.

Accurately tune in a weak station signal between 1400 and 1500 KC on the dial. With a screwdriver turn the adjusting screw of the antenna trimmer up or down until maximum output is obtained. This trimmer is reached through an opening in the bottom of the cabinet—see illustration. CAUTION: Do not remove the cork from the other opening at the bottom of the cabinet.

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Socket, Trimmers
Alignment

# WELLS-GARDNER & CO.

MODEL 5C10 Series
Schematic, Voltage

**Power Consumption - 6.25 Amperes at 6.3 Volts**

**Power Output - - - - - 1.5 Watts Undistorted**

**Sensitivity - - 1.5 Microvolts at .5 Watt Output**

**Selectivity - 42 KC Broad at 1000 Times Signal**
**Tuning Frequency Range - - - 540 to 1560 KC**
**Intermediate Frequency - - - - - - - 456 KC**
**Speaker - - - - - - - - 6" Electro-Dynamic**

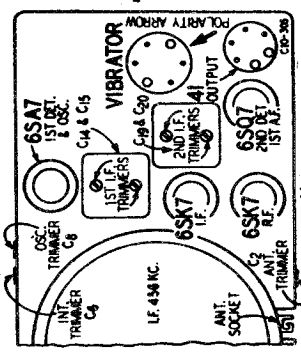


*Fig. 2—Tube and Vibrator Location*

**FOR SETTING PUSH BUTTONS, SEE INDEX.**

IF ALIGNMENT
Adjust at 456 KC through 0.05 mfd. condenser.

BC ALIGNMENT
Adjust oscillator trimmer C8 at 1560 KC.
Adjust C6 and C2 trimmers at 1000 KC.

FOR CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION OF VOLUME VIII

*Schematic Circuit Diagram*

## Battery Cable and Fuse

The battery connection is made at the ammeter. The end of the battery cable with the connecting lug is secured to one of the posts at the back of the ammeter in the instrument panel. The other end of the cable with the fuse receptacle connects to the battery cable from the radio after the fuse has been inserted.

A 9 ampere automobile fuse is used.

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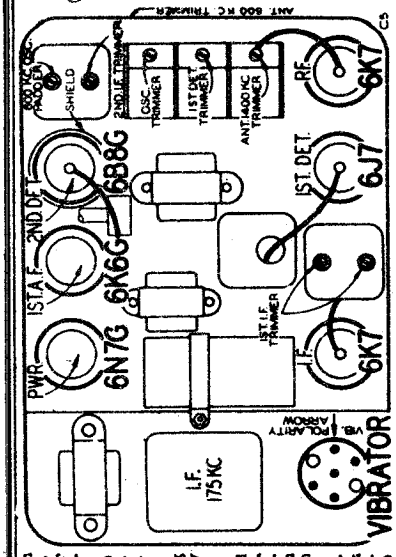
MODELS C5,6CH5 Series
Schematic,Socket,Trimmers
Alignment

# WELLS-GARDNER & CO.

Power Consumption - - - 8.25 Amperes at 5.3 Volts
Power Output - - - - - - - - - 6 Watts Undistorted
Sensitivity - - - 0.8 Microvolt at 1 Watt Output
Selectivity - - - 45 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - - - - 528 to 1581 KC
Speaker - - - 6" Dynamic

C5-12B

JULY, 1938




## Alignment and Calibration

Set the signal generator for 175 KC and connect the output of the signal generator through a .05 mf. condenser to the stator of the 1st detector section of the tuning condenser. Connect the ground lead of the signal generator to the chassis. The chassis should be in the case. Set the volume control at maximum and the L-D switch in the distance position. Attenuate the signal from the signal generator to prevent the leveling off action of the AVC. Then adjust the three I.F. trimmers until maximum output is obtained - See Fig. 2.

Set the signal generator for 1581 KC. Turn the rotor of the tuning condenser to the full open position. Insert the antenna plug with the mark on the high capacity (HC) side. Connect the shielded antenna lead from the chassis through a 120 mmf. condenser to the antenna post of the signal generator. Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained.

Set the signal generator for 1400 KC. Carefully turn the rotor of the tuning condenser until maximum output is obtained. Adjust the 1st detector and antenna 1400 KC trimmers for maximum output. Do not change the setting of the oscillator trimmer.

Set the signal generator for 600 KC. Connect the output through a .05 mf. condenser to the control grid of the 6K7 R. F. tube. Rock the tuning condenser rotor and adjust the 600 KC oscillator padder (See Fig. 2) until the peak of greatest intensity is obtained.

Leave the signal generator set for 600 KC and re-connect the output to the shielded antenna lead through a 120 mmf. condenser. Adjust the 600 KC antenna trimmer to maximum. (This trimmer is reached from outside of the case - See Fig. 1.)

After the alignment procedure is completed, the antenna plug may be withdrawn and reinserted on the LC side if a low capacity (70 mmf.) car antenna is used.

**Adjusting Antenna 600 KC Trimmer** - After the radio is installed and the car antenna is connected, it will be necessary to readjust the antenna trimmer. Tune in a weak signal at approximately 600 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna 600 KC trimmer up or down until maximum output is obtained.

**Calibrating the Radio** - To calibrate the radio, tune in a station of known frequency. Remove the dial lamp assembly from the back of the dial unit. The calibration screw is at the bottom of the dial lamp tube. Hold the tuning knob. Insert a fine blade screwdriver and turn this screw so that the POINTER travels in a clockwise direction until it is at the frequency of the station being received.

Location of Tubes and Vibrator.

Schematic Circuit Diagram.

NOTE "A"-WHEN C36 IS USED IT IS IN THE 2ND I.F. CAN.
WHEN GANG CONDENSER No 14A6.15 IS USED 600 KC PADDER C36 IS NOT USED.

NOTE:-RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN.

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WELLS-GARDNER & CO.

MODEL 6C9 Series
Schematic, Voltage
Socket, Trimmers

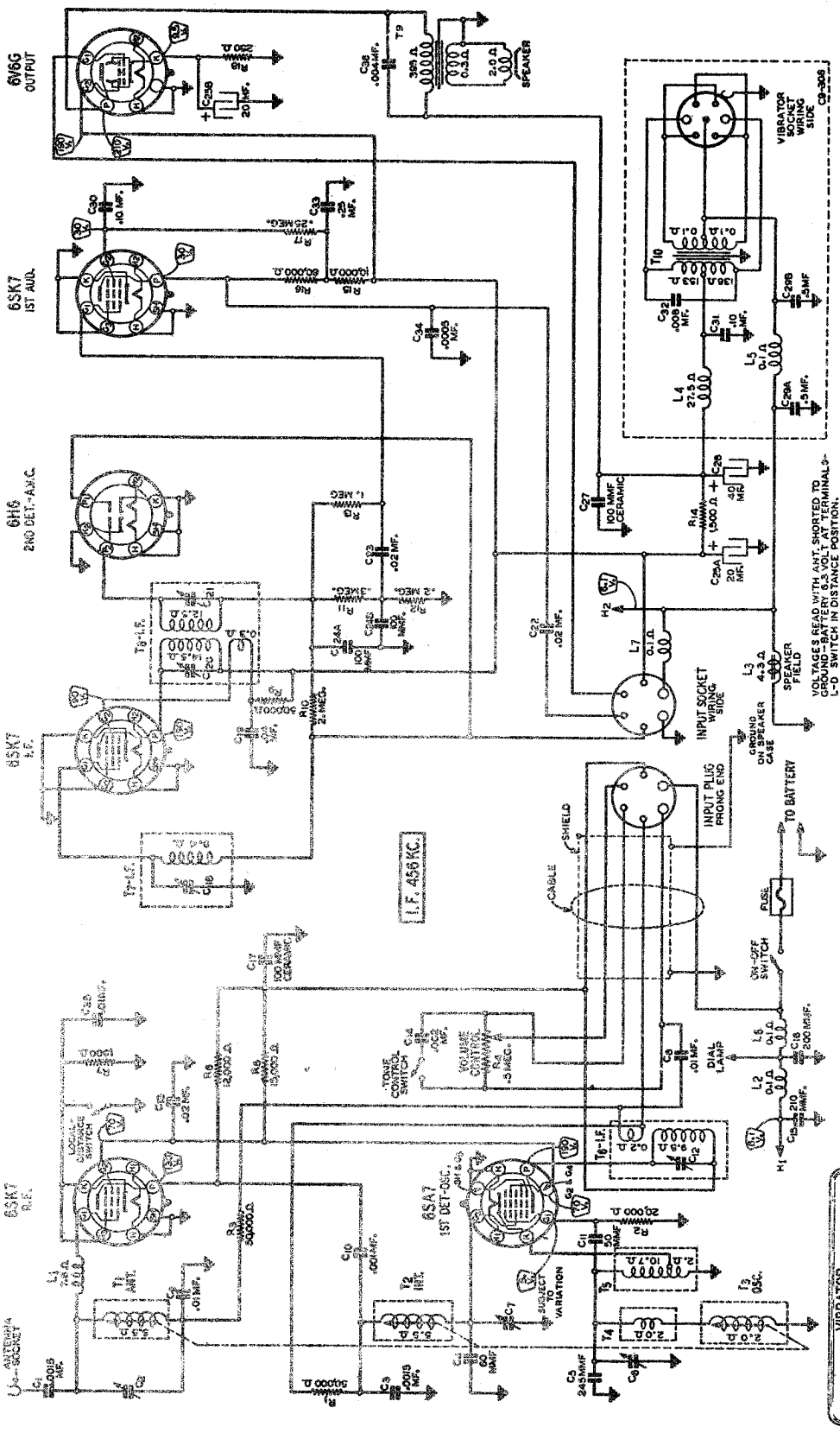


Fig. 5—Schematic Circuit Diagram

Power Consumption - 6.8 Amperes at 6.3 Volts
Power Output - - - - - 3 Watts Undistorted
Sensitivity - - 1.5 Microvolts at .5 Watt Output
(L-D Switch in Distance Position)
Selectivity - 39 KC Broad at 1000 Times Signal
Tuning Frequency Range - - - 540 to 1560 KC
Intermediate Frequency - - - - - - 456 KC
Speaker - - - - - - - - 6" Electro-Dynamic

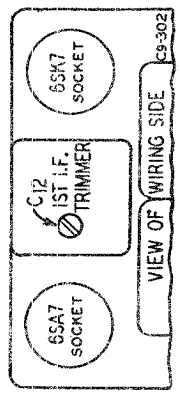


Fig. 6—Location of 1st I.F. Trimmer in Tuning Unit

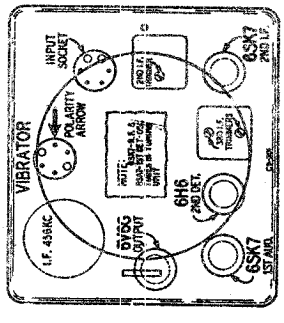


Fig. 2—Tube and Vibrator Location

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# Procedure for Setting the Station Buttons

There are 5 buttons on the automatic tuning dial by means of which 5 stations may be set.

Any button may be used for any station you can receive.

Make a list of your favorite stations, those which you tune in regularly.

It is better to list the station with the lowest kilocycle number first, the station with the next higher kilocycle number next, and so on.

Depress the manual tuning button AND KEEP IT DEPRESSED DURING THE ENTIRE SETTING OPERATION AS DESCRIBED BELOW. See Fig. 1 for location of buttons. Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial until the stop is reached.

**UNLOCK THE TUNING MECHANISM** by inserting a screwdriver, as shown in Fig. 1, in the locking screw opening at the bottom of the tuning unit. Loosen the locking screw by turning it counter-clockwise as far as it will go.

TO SET STATIONS ACCURATELY, DO NOT JAR THE RADIO OR BUTTONS WHILE THE MECHANISM IS UNLOCKED.

KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the first (left hand) station button. Both will remain depressed.

Select the first station from the list you have made and tune in this station by means of the manual tuning knob.

TURN THE MANUAL TUNING KNOB CAREFULLY BACK AND FORTH UNTIL THE ABOVE MENTIONED STATION IS ACCURATELY TUNED IN TO THE LOUDEST POINT. This station is now set on button No. 1.

**CAUTION**—Do not touch this button again while the mechanism is unlocked as the setting may be altered.

Next KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, depress the second station button FIRMLY AND GENTLY. Then proceed to set the second station on your list in the same manner as described above.

Then continue to set any additional stations on your list on the remaining buttons.

After all desired stations have been set, release any station button which is depressed as follows: KEEP THE MANUAL TUNING BUTTON DEPRESSED WITH ONE HAND and, with the other hand, push in the OFF button a slight amount—only enough to release any station button which is depressed. Should the OFF button be pushed all the way in to the depressed position, no harm will be done except that the dial will not be illuminated.

Turn the manual tuning knob so that the indicator moves toward the 1500 KC end of the dial, until the stop is reached.

**NOW LOCK THE TUNING MECHANISM** by inserting a screwdriver, as shown in Fig. 1, in the locking screw opening and turning the locking screw in a clockwise direction until it is tight.

Insert a celluloid reinforcement tab half-way in the slot at the front of station button No. 1—See Fig. 3.

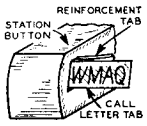



*Fig. 3—Inserting Station Tab*

Remove the correct station call letter tab for button No. 1 from the sheet supplied by bending the sheet back and forth at the score marks. Place the call letter tab in front of the celluloid reinforcement tab and insert it in slot. Push both tabs all the way in the button slot. Follow the same procedure for inserting the station call letter tabs in any other buttons.

After the stations are set and the mechanism is locked, tune in each of them by depressing the proper button. If any of them does not appear to be properly tuned in after the button has been depressed, reset the station for that button following the procedure outlined above. Changing the setting of one button will not affect the setting of the others.

# Alignment Procedure

Remove grille and speaker from speaker unit.

Remove the chassis from tuning unit case in accordance with the article under "General Installation Items" in this manual.

Set the signal generator for 456 KC and connect the output of the signal generator through a .05 mf. condenser to the control grid of the 6SA7 1st detector tube (prong No. 8). Connect the ground lead of the signal generator to the tuning unit chassis. Set the volume control at maximum and the Local-Distance switch to the distance position. Attenuate the signal from the signal generator to prevent the levelling off action of the AVC.

Then adjust the 4 I.F. trimmers until maximum output is obtained. Three of the trimmers are in the speaker unit—See Fig. 2. One trimmer is at the top of the tuning unit—See Fig. 6.

Insert the antenna cable plug in the antenna socket on the tuning unit. The total capacity of the antenna cable and dummy antenna should be 60 mmf. If the cable, for example, has a capacity of 25 mmf., use a 35 mmf. condenser for a dummy antenna. Connect the other end of the antenna cable through the dummy antenna capacity to the output of the signal generator.

Set the signal generator for 1560 KC. Turn the tuning knob until the iron cores are as far out of the tuning coils as they will go. Then adjust the oscillator trimmer C6 (Fig. 1) until maximum output is obtained.

Set the signal generator for 1000 KC. Turn the tuning knob until maximum output is obtained. Adjust interstage trimmer C7 and antenna trimmer C2 for maximum output—See Fig. 1.

Reassemble the radio and install it in the automobile. Insert the car antenna cable. Tune in a weak signal near 1000 KC and readjust the antenna trimmer C2 for maximum output.

**Calibration**—If it is necessary to calibrate the radio, remove the chassis from the tuning unit case—See article on that subject in this manual. Accurately tune in a signal of known frequency near 1000 KC. Loosen the set screw of the large gear that drives the dial drum. Turn the dial drum until the indicator line is at the frequency of the station tuned in. Tighten the set screw and reassemble.

## Adjusting Antenna Trimmer

After the antenna is connected, tune in a weak signal at approximately 1000 KC with the volume control about three-fourths on. Turn the adjusting screw of the antenna trimmer (C2) up or down until maximum output is obtained. See Fig. 1 for location of this trimmer.

# Antenna

A shielded antenna cable with bayonet connector plug is required.

The plug on the antenna cable is inserted in the socket at the bottom of the tuning unit case as shown in Fig. 1. The wire at the other end of the cable is connected to the antenna.

## LOW CAPACITY ANTENNA

This radio is designed for a low capacity car antenna. The total capacity of antenna and shielded cable should be 35 to 60 mmf.

Types of Low Capacity Antennas —Door hinge; fishpole; over-the-roof types which are mounted quite a distance from the metal roof of the car.

The antenna should be mounted on the same side of the car as the tuning unit.

## HIGH CAPACITY ANTENNA

If this radio is to be installed with a high capacity car antenna (200 mmf. total capacity of antenna and shielded cable) an adapter must be used. The adapter is inserted in the socket at the bottom of the tuning unit case. Then the antenna plug is inserted in the adapter.

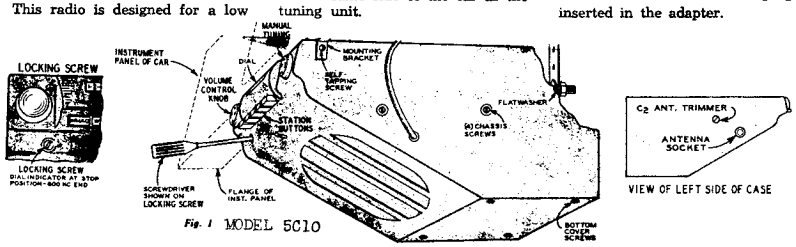



*Fig. 1* MODEL 5C10

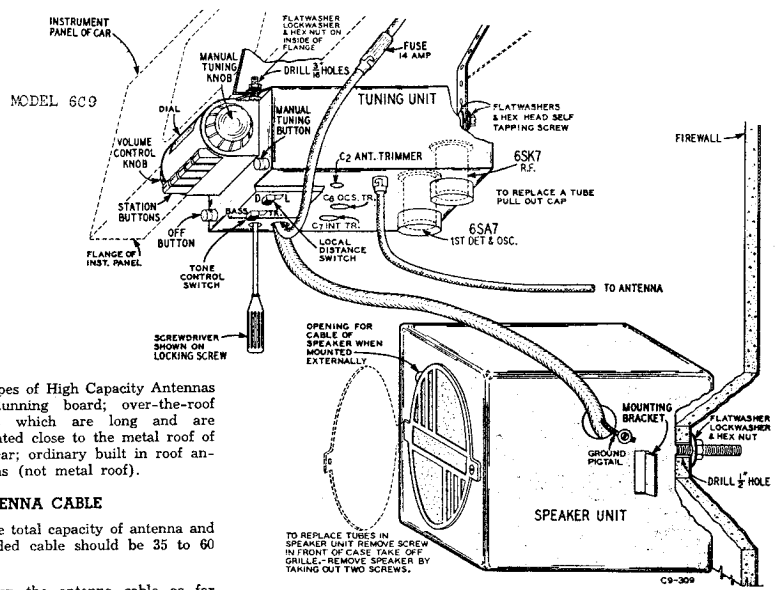



*Fig. 1—Details of Mounting Tuning and Speaker Units*

Types of High Capacity Antennas — Running board; over-the-roof types which are long and are mounted close to the metal roof of the car; ordinary built in roof antennas (not metal roof).

## ANTENNA CABLE

The total capacity of antenna and shielded cable should be 35 to 60 mmf.

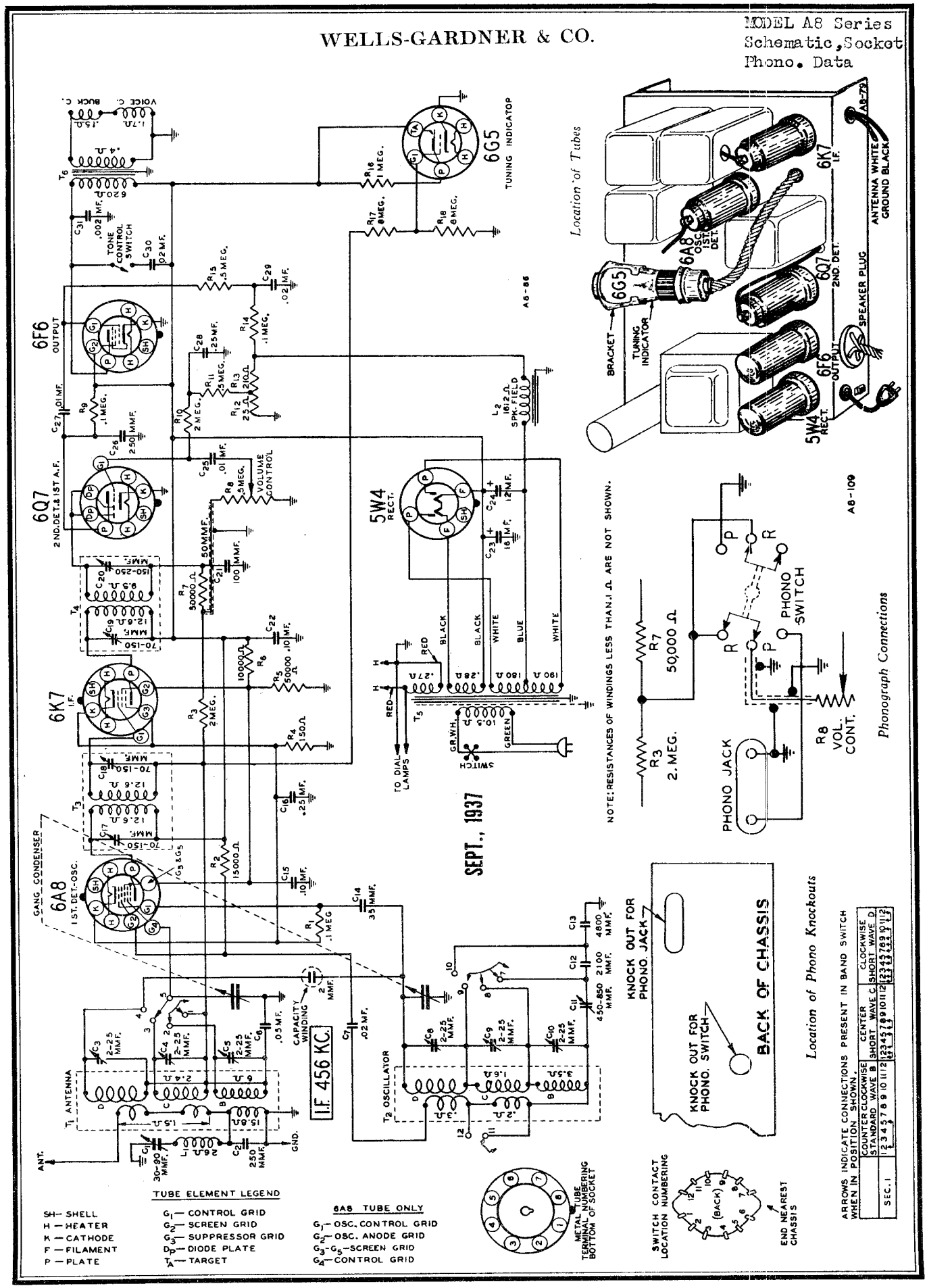
Keep the antenna cable as far away from car wiring as possible and ground the pigtail of the antenna cable shield at the antenna end, otherwise ignition noise may be picked up. The length of the pigtail from the grounding point to the end of the antenna cable should be kept as short as possible, preferably not over one inch.

For the door hinge and over-the-roof type antennas, the antenna lead must be shielded the entire distance from the radio to the point where the lead goes through the car body to the outside. In the case of a running board antenna, the antenna lead shielding must extend all the way to the antenna.

When the antenna cable is connected to an antenna lead coming down the pillar post, the shielded cable should be pushed several inches up into the pillar post.

WELLS-GARDNER & CO.

MODEL A8 Series
Schematic, Socket
Phono. Data

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MODEL A8 Series
Alignment, Trimmers
Voltage, Parts

# WELLS-GARDNER & CO.

## VOLTAGES AT SOCKETS

Line Voltage: 115 — Volume Control: Maximum — Antenna Shorted to Ground

| TUBE | FUNCTION | VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 |
| 6A8 | 1st Det.-Osc. | 0 | 6.3(1) | 200 | 110 | | 160 | 6.3(1) | 3 |
| 6K7 | I.F. | 0 | 6.3(1) | 200 | 110 | 3 | | 6.3(1) | 3 |
| 6Q7 | 2nd Det. | 0 | 6.3(1) | 110 | 0 | 0 | | 6.3(1) | 0(2) |
| 6F6 | Output | 0 | 6.3(1) | 185 | 200 | 12.5(3) | | 6.3(1) | 0 |
| 5W4 | Rectifier | 0 | 5.1(4) | | 620(5) | | 620(5) | | 5.1(4) |
| 6G5 | Tuning Indicator | Plate to Ground 18 | | Target to Ground 200 | | Cathode to Ground 0 | | Across Heater 6.3 A.C. | |

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R12.
(3) Read across resistor R12 and R13.
(4) A.C. voltage as read across heater terminals 2 and 8.
(5) A.C. voltage read across terminals 4 and 6.

## ALIGNMENT PROCEDURE

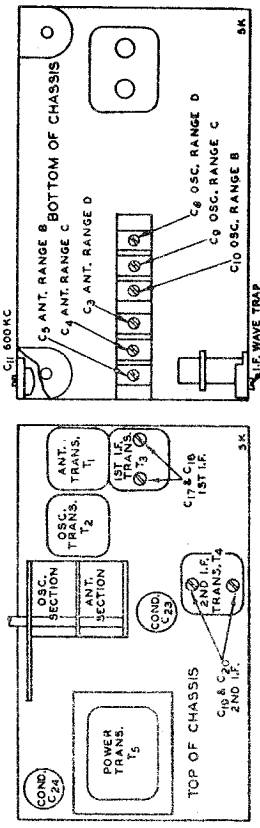
6 Tube - 3 Band - All-Wave Radio

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

Volume Control—Maximum All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

| STEP (Follow in Order as Given) | BAND SWITCH SETTING | SIGNAL GENERATOR: DUMMY ANTENNA | SIGNAL GENERATOR: FREQUENCY SETTING | SIGNAL GENERATOR: CONNECTION AT RADIO | TRIMMERS ADJUSTED See Illustration | PROCEDURE: INITIAL STEPS | PROCEDURE: ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| I.F. | | | | | | | |
| 2nd I.F. Adj. | Range B | .1 mf. | 456 KC | Grid of I.F. Tube | 2nd I.F. (C19) & (C20) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1st I.F. Adj. | Range B | .1 mf. | 456 KC | Grid of 1st Det. | 1st I.F. (C17) & (C18) | Turn Rotor to Full Open | Adjust to Maximum Output |
| I.F. Wave Trap | Range B | 200 mmf. | 456 KC | Antenna Lead | I.F. Wave Trap (C1) | Turn Rotor to Full Open | Adjust to Minimum Output |
| RANGE D | | | | | | | |
| 18,300 KC | Range D | 400 Ohm | 18,300 KC | Antenna Lead | Oscillator Range D (C8) | Turn Rotor to Full Open | Adjust to Maximum Output<br>Adjust to Maximum Output<br>Rock Rotor — See Note B |
| 15,000 KC | Range D | 400 Ohm | 15,000 KC | Antenna Lead | Antenna Range D (C3) | Turn Rotor to Max. Output | |
| RANGE C | | | | | | | |
| 5800 KC | Range C | 400 Ohm | 5800 KC | Antenna Lead | Oscillator Range C (C9) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 5060 KC | Range C | 400 Ohm | 5000 KC | Antenna Lead | Antenna Range C (C4) | Turn Rotor to Max. Output | Adjust to Maximum Output |
| RANGE B | | | | | | | |
| 1730 KC | Range B | 200 mmf. | 1730 KC | Antenna Lead | Oscillator Range B (C10) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1500 KC | Range B | 200 mmf. | 1500 KC | Antenna Lead | Ant. Range B (C5) | Turn Rotor to Max. Output<br>Set Indicator to 1500 KC—See Note A | Adjust to Maximum Output |
| 600 KC | Range B | 200 mmf. | 600 KC | Antenna Lead | 600 KC (C11) | Turn Rotor to Max. Output | Adjust to Maximum Output<br>Rock Rotor — See Note B |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.
After each range is completed, repeat the procedure as a final check.
NOTE A—Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.
NOTE B—Turn the rotor back and forth and adjust the trimmer until the point of greatest intensity is obtained.
CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.




## CONDENSERS

### TUBULAR

| Part No. | Code | Capacitance | Voltage | | List Price |
|---|---|---|---|---|---|
| 46X30 | C7 | .05 mf. | 180 | | $0.15 |
| 46X282 | C6 | .02 mf. | 360 | | .15 |
| 46X98 | C15 | .10 mf. | 180 | | .20 |
| 46X117 | C16 | .25 mf. | 180 | | .25 |
| 46X108 | C22 | .10 mf. | 360 | | .20 |
| 46X120 | C25 | .01 mf. | 360 | | .15 |
| 46X120 | C27 | .01 mf. | 360 | | .15 |
| 46X117 | C28 | .25 mf. | 180 | | .25 |
| 46X172 | C29 | .02 mf. | 180 | | .15 |
| 46X205 | C30 | .02 mf. | 400 | | .15 |
| 46X180 | C31 | .002 mf. | 600 | | .15 |

### MOLDED

| | | | | | |
|---|---|---|---|---|---|
| 47X69 | C2 | 250 mmf. | | | .15 |
| 47X76 | C12 | 2100 mmf. | | | .25 |
| 47X76 | C13 | 4800 mmf. | | | .35 |
| 47X53 | C14 | 35 mmf. | | | .10 |
| 47X52 | C21 | 100 mmf. | | | .10 |
| 47X68 | C26 | 250 mmf. | | | .15 |

### ELECTROLYTIC

| | | | | | |
|---|---|---|---|---|---|
| 40X32 | C23 | 16 mf. | 250 | Wet | .75 |
| 40X31 | C24 | 12 mf. | 350 | Wet | .80 |

### TRIMMERS

| | | | | | |
|---|---|---|---|---|---|
| 17A64 | C1 | 30-90 | mmf. | Wave Trap Trimmer | .25 |
| 17A59 | C3 | 2-25 | mmf. | Range "D" Antenna Trimmer | .60 |
| | C5 | 2-25 | mmf. | Range "C" Antenna Trimmer | |
| | C8 | 2-25 | mmf. | Range "B" Antenna Trimmer | |
| | C6 | 2-25 | mmf. | Range "D" Oscillator Trimmer | |
| | C9 | 2-25 | mmf. | Range "C" Oscillator Trimmer | |
| | C10 | 2-25 | mmf. | Range "B" Oscillator Trimmer | |
| 17A68 | C11 | 450-850 | mmf. | 600 KC Trimmer | .45 |
| 17A33 | C17 | 70-150 | mmf. | 1st I.F. Trimmers | .40 |
| | C18 | 70-150 | mmf. | | |
| 17A34 | C19 | 70-150 | mmf. | 2nd I.F. Trimmers | .40 |
| | C20 | 150-250 | mmf. | | |

### MISCELLANEOUS

| | | | |
|---|---|---|---|
| 14A61 | 2 Gang Condenser less Dial and Drive Assembly | | 2.90 |

## RESISTORS

### CARBON

| Part No. | Code | Resistance | Wattage | List Price |
|---|---|---|---|---|
| A94104 | R1 | 100,000 Ohm | 0.2 | $0.15 |
| A95153 | R2 | 15,000 Ohm | 0.2 | .10 |
| A95205 | R3 | 2 Megohm | 0.2 | .10 |
| A94151 | R4 | 150 Ohm | 0.2 | .15 |
| B94503 | R5 | 50,000 Ohm | 0.5 | .15 |
| C94103 | R6 | 10,000 Ohm | 1.0 | .15 |
| A95503 | R7 | 50,000 Ohm | 0.2 | .10 |
| A95104 | R9 | 100,000 Ohm | 0.2 | .10 |
| A95205 | R10 | 2 Megohm | 0.2 | .10 |
| A94504 | R11 | 500,000 Ohm | 0.2 | .15 |
| A94104 | R14 | 100,000 Ohm | 0.2 | .15 |
| A94504 | R15 | 500,000 Ohm | 0.2 | .15 |
| A95105 | R16 | 1 Megohm | 0.2 | .10 |
| A95805 | R17 | 8 Megohm | 0.2 | .15 |
| A95805 | R18 | 8 Megohm | 0.2 | .10 |

### WIRE WOUND

| | | | | |
|---|---|---|---|---|
| 43X69 | R12 | 25 Ohm | .25 | .35 |
| | R13 | 210 Ohm | 2.0 | |

### VARIABLE

| | | | |
|---|---|---|---|
| 16X227 | R8 | 0.5 Megohm | Volume Control and On-Off Switch 1.00 |

## PHONO ATTACHMENT PARTS

| Part No. | Description | List Price |
|---|---|---|
| P-2A31 | Phono Switch (Double Pole Double Throw Switch) | .60 |
| P-3A12 | Phono Jack | .10 |
| P-10A36 | Switch Knob | .20 |

### SPEAKERS

| | | |
|---|---|---|
| 12A257 | 6" Dynamic Speaker Compl. with Output Transformer (T6) | 5.50 |
| 12A268 | 8" Dynamic Speaker Compl. with Output Transformer (T6) | 6.35 |
| 12A258 | 10" Dynamic Speaker Compl. with Output Transformer (T6) | 6.65 |

### KNOBS

Specify Name of Knob and Name and Model of Radio

| | | |
|---|---|---|
| | Tuning Control — Set Screw Type | .15 |
| | Volume Control — Push-On Type | .20 |
| | Band Switch — Push-On Type | .20 |

### GENERAL

| | | | |
|---|---|---|---|
| 2X38 | Felt Washer (Used behind knobs) | doz. | .10 |
| 8X23 | Rubber Chassis Mounting Cushion | ea. | .10 |
| 7A67 | Band Change Switch | | .85 |
| 2A61 | Tone Control Switch | | .20 |
| 30X44 | Grid Clip Only | doz. | .10 |
| 4A50 | Terminal Strip (2 lugs insulated with mounting hole in center) | | .10 |
| 4A49 | Terminal Strip—Single Lug Insulated (With Mounting Hole at One End) | | .10 |
| 25X376 | Clamp Bracket for Tuning Eye Tube | | .10 |
| 13X80 | Line Cord and Plug | | .50 |
| 13X214 | Antenna and Ground Lead Assembly | | .30 |
| 25X122 | Chassis Mounting Feet | ea. | .10 |
| 23A61 | Gang Condenser Mounting Cushion Assembly includes 3—Rubber Cushions 3—Hex Shoulder Nuts 3—No. 6 Flat Washers | | .15 |

## DIAL AND DRIVE ASSEMBLY

| Part No. | Description | List Price |
|---|---|---|
| 11A132 | Dial Assembly complete with Gang Condenser, less Dial Lamps and Dial Lamp Sockets | 4.60 |
| 15A120 | Dial Scale and Bracket Assembly | .85 |
| 25X422 | Bracket only for Dial Scale | .30 |
| 58X263 | Celluloid Dial Scale only | .50 |
| 15X117 | Pointer | .15 |
| | Dial Lamp—No. 51 Mazda | .20 |
| 7A60 | Dial Lamp Socket | .10 |
| 4X219 | Dial Crystal and Escutcheon Assembly | 1.50 |
| 25X428 | Dial Support Bracket ("L" Shaped) | .10 |
| 25X427 | Bracket and Bushing for Drive Shaft | .30 |
| 26X266 | Drive Shaft only | .15 |
| 19X21 | Horseshoe Washers for above Shaft | Doz. .10 |
| 24X317 | Drive Drum and Pointer Shaft | .50 |
| | 20" Drive Cord for Tuning Condenser | Doz. .45 |
| 28X27 | Tension Spring for Drive Cord | Doz. .20 |

## TRANSFORMERS AND COILS

| Part No. | Code | Description | List Price |
|---|---|---|---|
| 9A692 | T1 | Antenna Transformer and Can Assembly | $2.20 |
| 9A693 | T2 | Oscillator Coil and Can Assembly | 1.90 |
| 9A694 | T3 | 1st I.F. Transformer and Can Assembly | 1.50 |
| 9A695 | T4 | 2nd I.F. Transformer and Can Assembly | 1.45 |
| 52X134 | T5 | 115 Volt, 60 Cycle Power Transformer | 3.70 |
| 53X136 | T5 | 115-230 Volt, 50-60 Cycle Power Transformer | 4.70 |
| 51X31 | T6 | Output Transformer (Part of Speaker Assembly) | 2.45 |
| 9A714 | L1 | Wave Trap (456 KC) | .65 |

Prices Subject to Change Without Notice

## Series A8 — Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

### MISCELLANEOUS

SOCKETS

| Part No. | Description | List Price |
|---|---|---|
| 3A258 | Tube Socket—Octal (7 prong) | .15 |
| 3A259 | Tube Socket—Octal (6 prong) | .10 |
| 3A2AC | Tube Socket—Octal (8 prong) | .15 |
| 3A58 | Speaker Socket, 5 Prong | .10 |
| 13X255 | 6G5 Tube Socket and Cable Assembly | .65 |

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MODEL A10 Series
Schematic

# WELLS-GARDNER & CO.

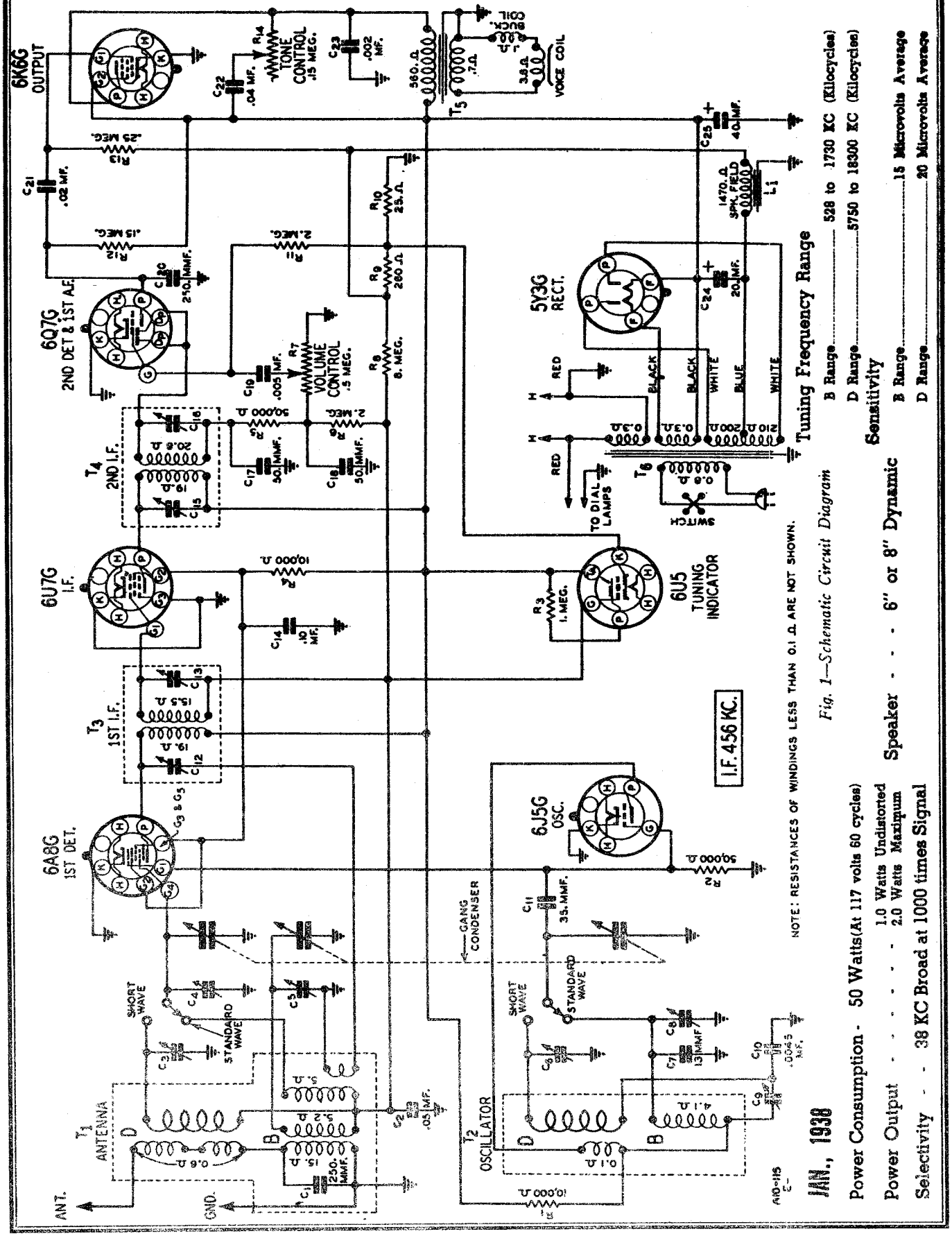


*Fig. 1—Schematic Circuit Diagram*

**Tuning Frequency Range**

B Range..... 528 to 1730 KC (Kilocycles)
D Range..... 5750 to 18300 KC (Kilocycles)

**Sensitivity**

B Range..... 15 Microvolts Average
D Range..... 20 Microvolts Average

**JAN., 1938**

Power Consumption - 50 Watts(At 117 volts 60 cycles)

Power Output - - - - - - 1.0 Watts Undistorted
2.0 Watts Maximum

Speaker - - - 6" or 8" Dynamic

Selectivity - - 38 KC Broad at 1000 times Signal

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MODEL A10 Series
Alignment, Trimmers
Voltage, Socket
Tuner, Drive Cord Data

# WELLS-GARDNER & CO.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator With a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An all Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| STEP (Follow Order as Given) | BAND SWITCH SETTING | DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | TRIMMERS ADJUSTED See Illustration | PROCEDURE INITIAL STEPS | PROCEDURE ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| I.F. | | | | | | | |
| 456 KC | Range B | .1 mf. | 456 KC | Grid of 1st Det. | 1st I.F. (C12) & (C13) 2nd I.F. (C15) & (C16) | Turn Rotor to Full Open | Adjust to Maximum Output |
| RANGE B | | | | | | | |
| 1730 KC | Range B | 200 mmf. | 1730 KC | Antenna Lead | Oscillator Range B (C8) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1500 KC | Range B | 200 mmf. | 1500 KC | Antenna Lead | 1st Ant. Range B (C5) 2nd Ant. Range B (C4) | Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | Adjust to Maximum Output |
| 600 KC | Range B | 200 mmf. | 600 KC | Antenna Lead | 600 KC (C9) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor—See Note B |
| RANGE D | | | | | | | |
| 18300 KC | Range D | 400 Ohm | 18300 KC | Antenna Lead | Oscillator Range D (C6) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 15000 KC | Range D | 400 Ohm | 15000 KC | Antenna Lead | Ant. Range D (C3) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor—See Note B |

**Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.**

After each range is completed, repeat the procedure as a final check.

After alignment of Range D has been completed, do not make any adjustments of the Range B trimmers. If this is done, it will be necessary to realign Range D.

NOTE A—After the 1500 KC adjustment is made, the dial indicator should be at the 1500 KC mark on the dial scale. If it is not, the position of the indicator on the drive cord must be changed. This procedure, however, should not be followed unless it is absolutely necessary as there is danger of breaking the clamp which holds the indicator in place.

If the indicator must be moved, loosen the clamp at the back which holds it in place, move the indicator to the correct position, and bend the clamp back into place again.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 9/2 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

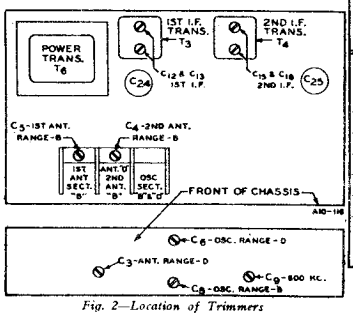


*Fig. 2—Location of Trimmers*

## VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum.
Readings taken with a 1000 Ohm-per-volt meter.
Antenna Shorted to Ground.
Position of Band Switch: Standard Wave.

| TUBE | FUNCTION | VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated) Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 |
|---|---|---|---|---|---|---|---|---|---|
| 6A8G | 1st Det. | 0 | 6.1(1) | 165 | 90 | 6.5 | 90 | 6.1(1) | 0 |
| 6J5G | Osc. | 0 | 6.1(1) | 125 | | 6.5 | | 6.1(1) | 0 |
| 6U7G | I.F. | 0 | 6.1(1) | 165 | 90 | 0 | | 6.1(1) | 0 |
| 6Q7G | 2nd Det. & 1st. Audio | 0 | 6.1(1) | 80 | | | | 6.1(1) | 0(2) |
| 6K6G | Output | 0 | 6.1(1) | 155 | 165 | 12.5(3) | | 6.1(1) | 0 |
| 5Y3G | Rectifier | 0 | 4.7(4) | | 480(5) | | 480(5) | | 4.7(4) |
| 6U5 | Tuning Indicator | Plate to Ground 95 | | Target to Ground 165 | | Cathode to Ground 1 | | Across Heater 6.1 A.C. | |

(1) A.C. voltage read across heater terminals 2 and 7.
(2) Bias (1.2 volts) as read across R10.
(3) Bias voltage as read across R9 and R10.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

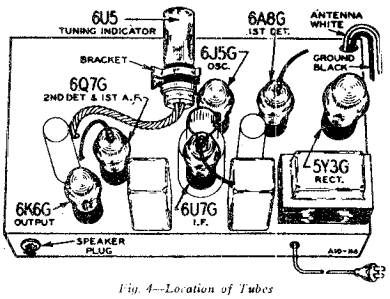


*Fig. 4—Location of Tubes*

### Replacing Drive Cords

**Three** drive cords, Nos. 1, 2, and 3, as shown in **Fig. 5**, are used. To replace any of these cords, proceed as follows:

**Cord No. 1**

Turn the gang condenser to full open position.

Turn the drive shaft so that the holes for the cord are vertical. The positions of the drive shaft and drive drum are shown in Fig. 5.

Tie a double knot in one end of the cord. From the bottom of hole (A) in the drive shaft, thread the other end of the cord through the hole.

Slide a ½ inch length of fabric tubing on the cord, placing it near the free end. Fasten the shorter of the two springs used to the free end of the cord, making the distance between the two knots 22⅞ inches.

Starting at the point where the cord leaves hole (A), wind it around the shaft ¾ of a turn as shown in Fig. 5. Bring the end up to the wide groove (B) in the drive drum and wind on 2¼ turns, progressing toward the edge of the groove. Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut, and hook the spring to the pin at (D).

**Cord No. 2**

The gang condenser and tuning shaft should be in the same position as explained for Cord No. 1.

Tie a double knot in one end of the cord. From the top of hole (E) in the drive shaft, thread the other end of the cord through the hole.

Slide a ½ inch length of fabric tubing on the cord, placing it near the free end. Tie a slip knot with a small loop in the free end of the cord so that the length of the cord is 12 inches between the knots.

Starting at the point where the cord leaves hole (E), wind it around the shaft 3¼ turns as shown in Fig. 5. Do not attempt to wind the cord on the drive drum, but put the loop in the slip knot over pin (G). Rotate the drive drum clockwise about ½ a turn. This will unwind the cord on the drive shaft at (E).

Pass the cord through the slot at (C), placing the fabric tube (F) in position to protect the cord from being cut. While holding the cord on the wide flange, rotate the drive drum counterclockwise. The cord will be pulled into position in the groove.

**Cord No. 3**

The gang condenser and drive drum should be in the same position as explained for Cord No. 1.

Tie one end of the cord on hook (H).

Slide a ½ inch length of fabric tubing over the cord. Place this tubing approximately 13½ inches from the end of the cord to be attached to the spring.

Tie the other end of the cord to the longer of the two springs used. The length of the cord between the knots should be 34⅜ inches.

Pass the cord through slot (J) in groove (P) of the drive drum. Bring the cord up to pulley (K), around the other pulleys as shown in Fig. 5, and down to groove (P). After passing the cord around the drive drum ½ turn in groove (P), fasten the spring to hook (Q).

**Attaching Dial Pointer**—Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. After the pointer has been moved to the correct position, clamp it tightly over the fabric tubing on the cord—See Fig. 5.

### Lever Tuning Assembly Adjustments

**Pressure of Spacers on Heart Cams** — The heart cams must rotate freely relative to the shaft spacers when the tightening lever is in the "loose" position and must not rotate relative to the shaft spacers when this lever is in the "tight" position.

Pressure of the spacers against the heart cams is determined by the position of nut (R) on the threaded shaft—See Fig. 5. If, after the tightening lever is turned to the "tight" position, the cams can turn relative to the shaft, this nut must be tightened

Bend back the ears of washer (S)—See Fig. 5, and tighten nut (R) about ½ turn. Bend the ears of the washer down again on nut (R). Tighten the tightening lever and see if the cams are sufficiently tight.

In general, nut (R) should be at such a position on the threaded shaft that the stop on the tightening lever moves to about ⅛ inch from the end of the slot in the tightening washers when a reasonable amount of pressure is exerted on this lever.

**Connection between Gang Condenser and Cam Shaft**—One screw only should be used in the universal joint connection between the condenser shaft and the cam shaft. If 2 screws are used, considerably more pressure must be exerted on the station levers to rotate the cam shaft.

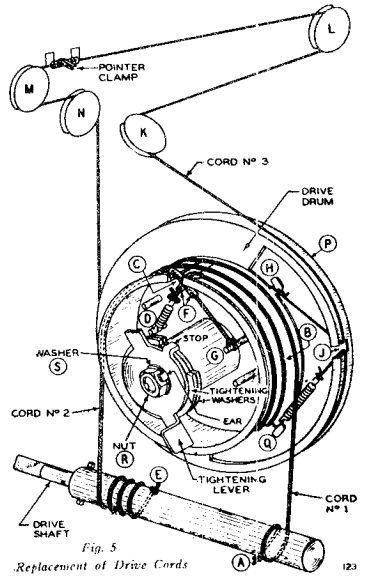


*Fig. 5*
*Replacement of Drive Cords*

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# WELLS-GARDNER & CO.

MODELS C7, C11 Series
Schematic, Voltage, Socket
Alignment, Trimmers

**ALIGNMENT** Adjust IF trimmers at 175 KC thru .05 mf dummy. Adjust Osc. trimmer at 1581 KC thru 120 mmf dummy if 60 inch cable 70 mmf is used - or thru 25 mmf dummy if 30 inch cable 35 mmf dummy is used.
Adjust Interstage and Antenna trimmers at 1400 KC.
Readjust Antenna trimmer C2 at 1400 KC.

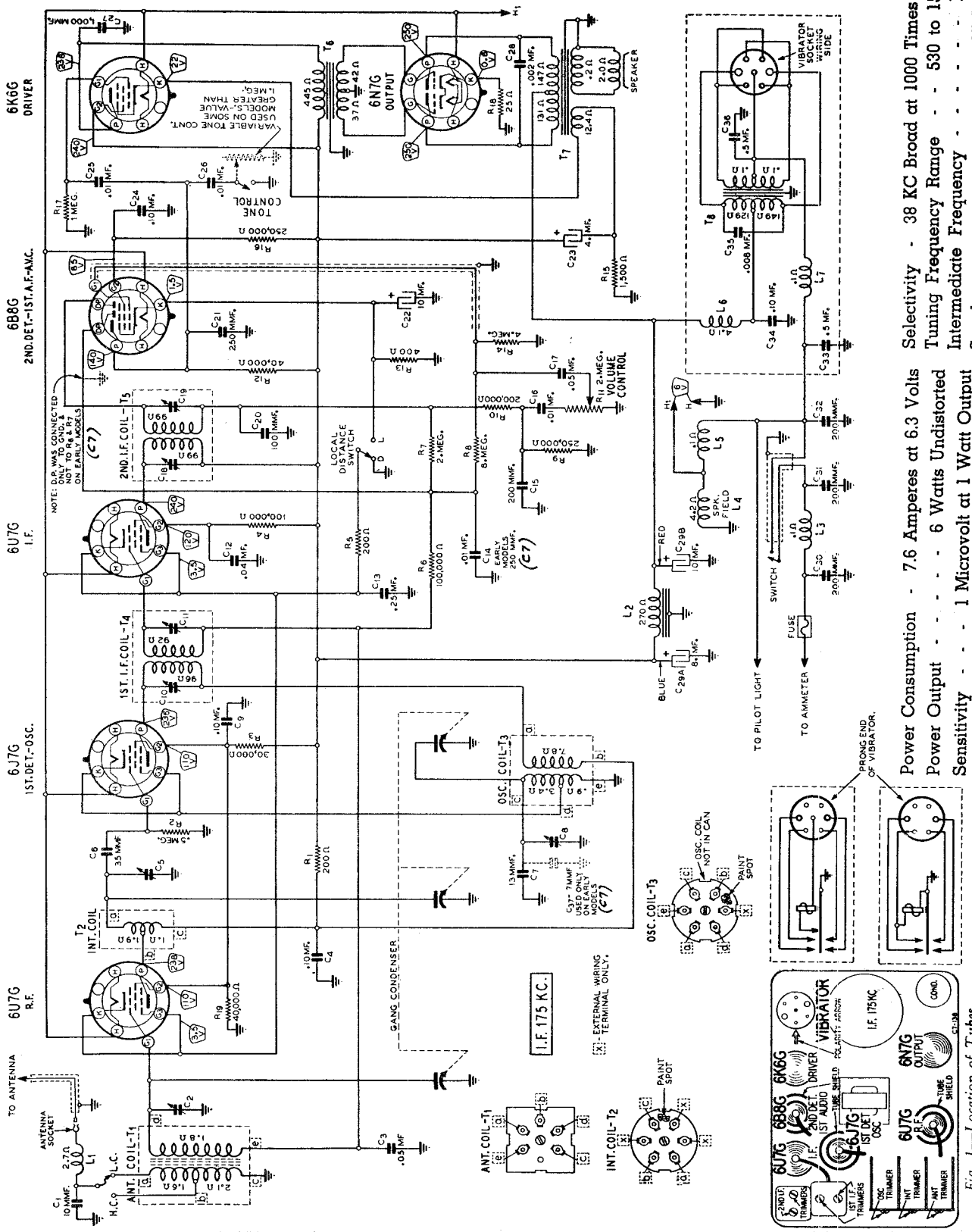


*Fig. 1—Location of Tubes and Vibrator*

Power Consumption - 7.6 Amperes at 6.3 Volts
Power Output - - - - - 6 Watts Undistorted
Sensitivity - - - 1 Microvolt at 1 Watt Output
(L-D Switch in Distance Position)

Selectivity - 38 KC Broad at 1000 Times Signal
Tuning Frequency Range - - 530 to 1581 KC
Intermediate Frequency - - - - - - 175 KC
Speaker - - - - - - - - - - 6" Dynamic

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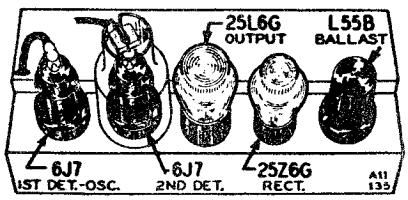
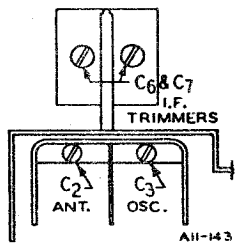
MODEL All Series
Schematic, Voltage
Alignment, Socket

# WELLS-GARDNER & CO.

**DC OPERATION**—Filament and ballast tube voltages will be the same as AC (for 117 volt line). The plate, screen and bias voltages will be slightly lower than those shown above. When operated on DC, the rectifier tube acts as a low resistance series resistor with a drop of approximately 6 volts between plate and cathode.




**CAUTION**—In any service work on the AC-DC chassis, keep it on a wood or other insulated surface to avoid contacts with ground.




**MAY, 1938**

## VOLTAGES AT SOCKETS FOR 117 VOLT AC LINE

See Note Below Regarding Voltages when Operated on DC
Volume Control Maximum—Antenna Lead Grounded—Readings taken with 1000 Ohm-per-volt Meter.

| TUBE | FUNCTION | Voltage Between Socket Prong and Ground (Unless Otherwise Indicated) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 |
| 6J7 | 1st Det. & Osc. | | 6.3(1) | 98 | 98 | | | 6.3(1) | 6.0 |
| 6J7 | 2nd Det. | | 6.3(1) | 10 | 13 | | | 6.3(1) | |
| 25L6G | Output | | 24(1) | 92 | 98 | | | 24(1) | 5 |
| 25Z6G | Rectifier | | 24(1) | 117(2) | 125 | 117(2) | | 24(1) | 125 |
| L55B | Ballast | | | 56.6(3) | | | | 56.6(3) | 4.5(4) |

(1) AC voltage across terminals 2 and 7.
(2) AC voltage to ground.
(3) AC voltage across terminals 3 and 7.
(4) AC voltage across terminals 7 and 8.

Power Consumption - 48 Watts (At 117 volts AC Supply)
Power Output - - - - - - - .8 Watts Undistorted
Selectivity - - 30 KC Broad at 100 times Signal
Tuning Frequency Range - - - - - 530 to 1730 KC
Sensitivity - - - - - - 180 Microvolts Average

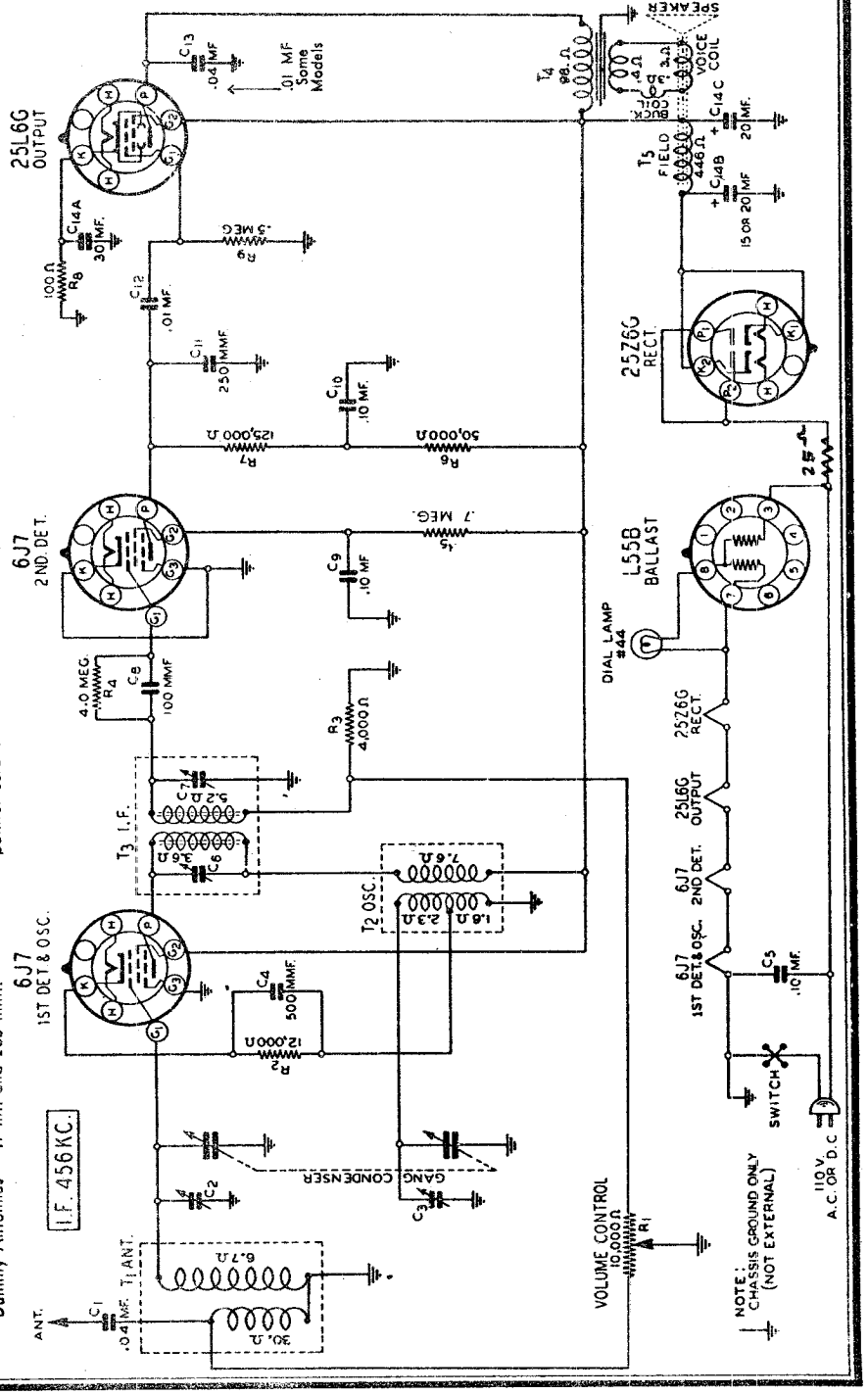
## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments, Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (See Illustration) |
|---|---|---|---|---|
| 456 KC | Grid of 1st Det. | .1 mf. | Turn rotor to full open | I.F. (C6) & (C7) |
| 1730 KC | Antenna Lead | 200 mmf. | Turn rotor to full open | Oscillator (C3) |
| 1500 KC | Antenna Lead | 200 mmf. | Turn rotor to max. output | Antenna (C2) |

The following equipment is required for aligning:
Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter; Non-Metallic Screwdriver.
Dummy Antennas — .1 mf. and 200 mmf.

NOTE—To obtain dial scale calibration, tune in an 800 KC signal. The pointer should be at the 800 KC mark on the dial. If it is not, loosen the pointer screw, set the pointer at the 800 KC mark and retighten the pointer screw.

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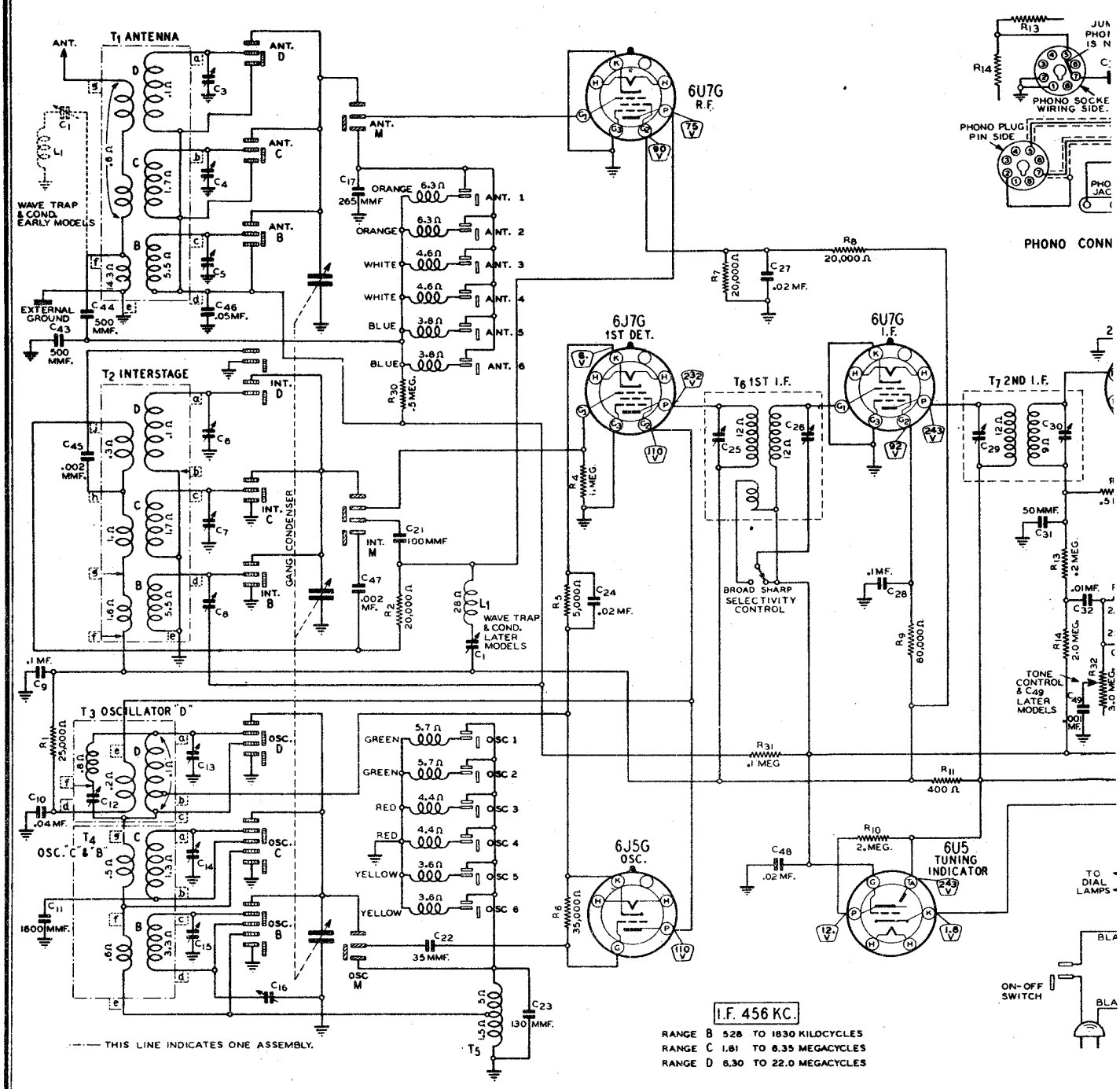


# ISSUE NUMBER CHANGES

The last digit of the number on the chassis number label identifies the radio as to the issue number.

ISSUE NO. 1

The information contained in the Series A12 Service Manual, with the exception of the Replacement Parts List and Schematic Circuit Diagram, applies with minor changes to all chassis issues, 1 through 6. The Replacement Parts List and Schematic Circuit Diagram, however, apply only to No. 1 issue chassis.

ISSUE NOS. 2 and 3

MECHANICAL CHANGES -- The station button plunger has a length of 7-3/16 inches.

The locking plate for the station button plungers has been redesigned and now employs two side arms mounted in rubber cushioned hinge brackets which are attached to the rear bracket of the tuner assembly by two screws.

ELECTRICAL CHANGES -- The Schematic Circuit Diagram (Fig.3) is that of Issue Nos. 2 through 6. The AVC voltage is fed to the grid of the R.F. tube through the manual and automatic tuning coils. Formerly, it was applied difectly to the grid of the R.F. tube through a 1 Megohm resistor.

The operating voltages of several of the tubes have been changed. Correct values are shown on the schematic in this supplement.

ISSUE NOS. 4 and 5

MECHANICAL CHANGES -- The antenna coil (T1) and Wave Trap Coil (L1) have been moved from the top of the chassis base to a position just in back of the band switch underneath the chassis base.

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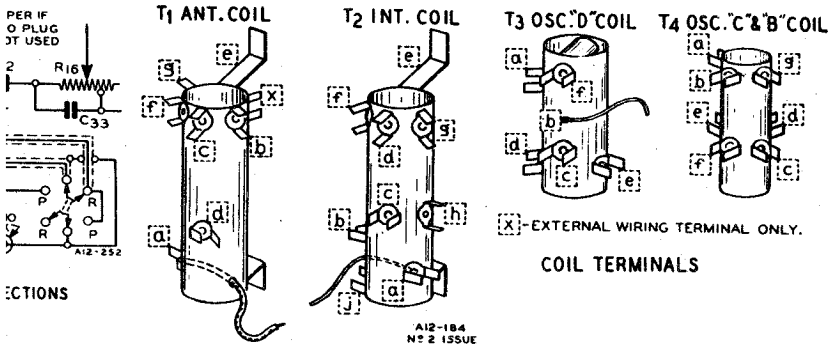
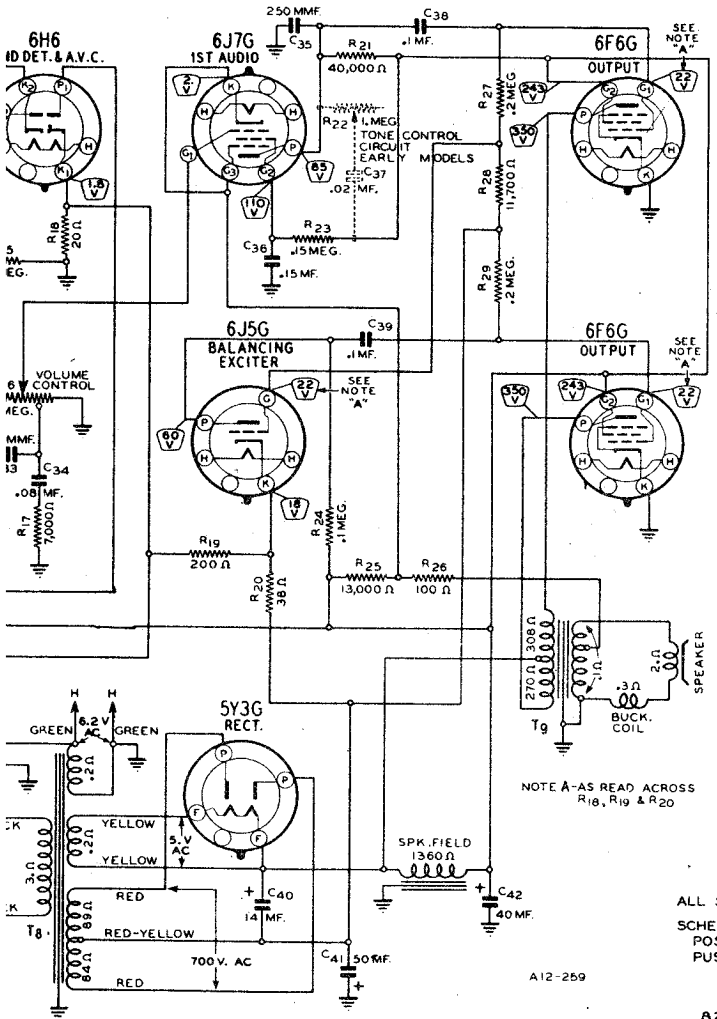
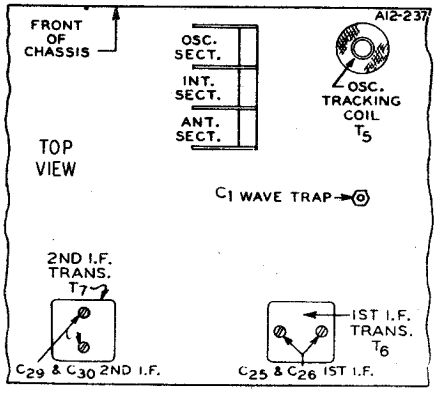
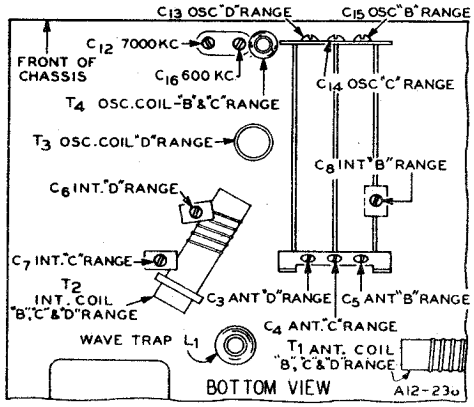
DNER & CO.

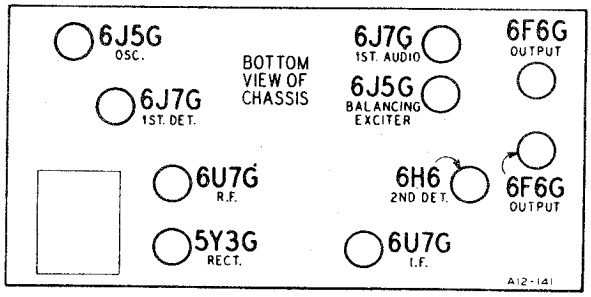
MODEL A12 Series Late
Schematic, Voltage, Socket
Trimmers, Changes
Tuner Switches

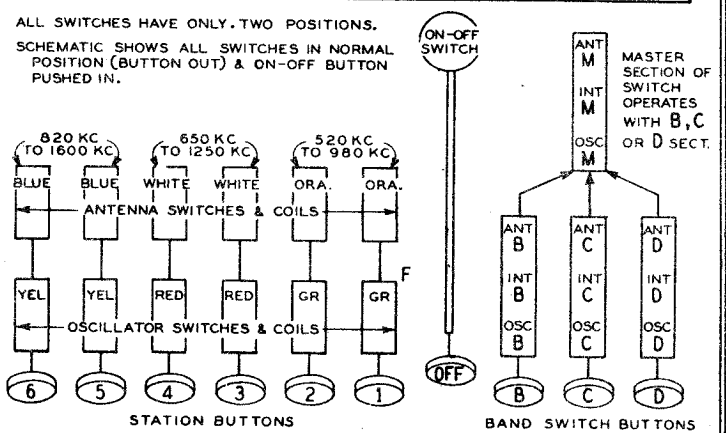


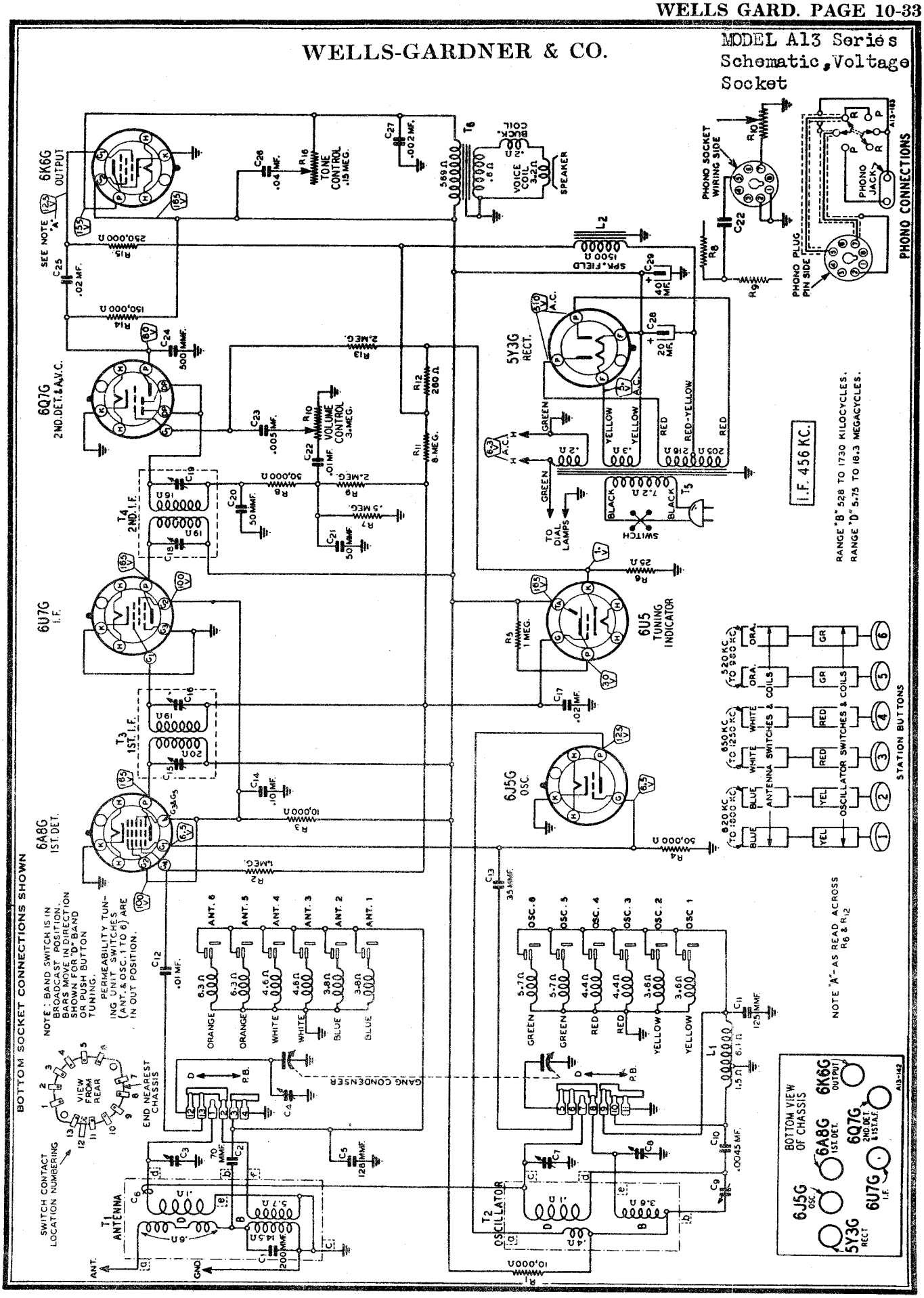




Wave Trap Trimmer (C1) has been moved from its former position the 1st I.F. Transformer (T6) to a position near the 6U7G R.F.

TRICAL CHANGES -- The Wave Trap Coil (L1) and Trimmer Condenser have been removed from the antenna circuit and are now connected ie interstage circuit - See Fig. 3.

: NO. 6

TRICAL CHANGES -- The Tone Control, formerly in the 1st audio plate been put in the diode circuit - See Fig. 3. A 1 Megohm Tone Con- (R22) and a .02 mf. (C37) condenser were used in the audio plate. Megohm Tone Control (R32) and a .001 mf. (C49) condenser are used ie diode circuit.

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MODEL A13 Series
Alignment, Trimmers
Coils, Specifications

# WELLS-GARDNER & CO.

**Power Consumption** - 50 Watts (At 117 volts 60 cycles)

**Power Output** - - - - - - - 1.0 Watts Undistorted, 2.0 Watts Maximum

**Selectivity** - - 38 KC Broad at 1000 times Signal

**Sensitivity**

B Range (Manual Tuning).....15 Microvolts Average
B Range (Automatic Tuning).....15 Microvolts Average
D Range .....25 Microvolts Average

**Intermediate Frequency** - - - - - - - 456 KC

**Speaker** - - - - - - - - - 6" or 8" Dynamic

**Tuning Frequency Range**

B Range (Manual Tuning).... 528 to 1730 KC (Kilocycles)
D Range (Manual Tuning)....5750 to 18300 KC (Kilocycles)
Buttons 1 and 2 (Automatic Tuning).....820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning).....650 to 1250 KC
Buttons 5 and 6 (Automatic Tuning)..... 520 to 980 KC

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM |
|---|---|---|---|---|---|
| **I. F.** | | | | | |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 1st I.F. (C15) & (C16)<br>2nd I.F. (C18) & (C19) |
| **RANGE B** | | | | | |
| 1730 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C8) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output<br>Set Indicator to 1500 KC—See Note A | Ant. Range B (C4) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C9)<br>Rock Rotor—See Note B |
| **RANGE D** | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C7) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C3)<br>Rock Rotor—See Note B |
| **PERMEABILITY TUNING UNIT** | | | **BUTTON DEPRESSED** (Band Switch in Push Button Position) | **TURN SETTING SCREW TO MAXIMUM OUTPUT** —See Instruction Book | **ADJUST COIL POSITION TO MAXIMUM OUTPUT** —See Note C |
| 1100 KC | Antenna Lead | 200 mmf. | No. 1 | Setting Screw No. 1 | Antenna Coil No. 1 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 2 | Setting Screw No. 2 | Antenna Coil No. 2 |
| 850 KC | Antenna Lead | 200 mmf. | No. 3 | Setting Screw No. 3 | Antenna Coil No. 3 |
| 850 KC | Antenna Lead | 200 mmf. | No. 4 | Setting Screw No. 4 | Antenna Coil No. 4 |
| 700 KC | Antenna Lead | 200 mmf. | No. 5 | Setting Screw No. 5 | Antenna Coil No. 5 |
| 700 KC | Antenna Lead | 200 mmf. | No. 6 | Setting Screw No. 6 | Antenna Coil No. 6 |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

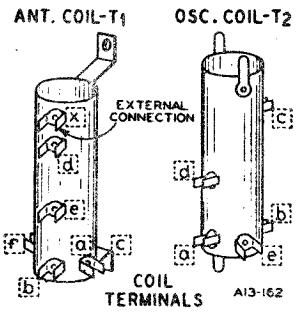
After each range is completed, repeat the procedure as a final check.

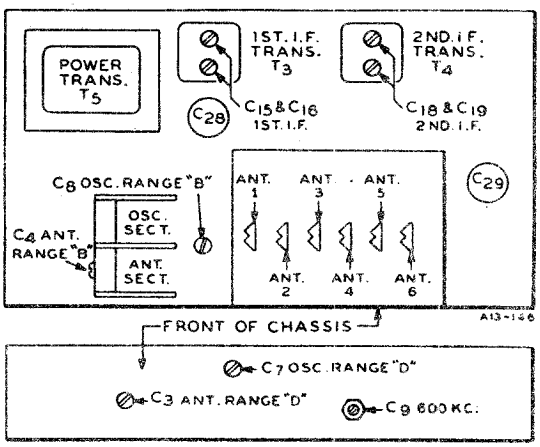
NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave band be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

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Socket, Coils, Phono.

# WELLS-GARDNER & CO.

MODEL A15 Series
Schematic, Voltage

AUGUST, 1938

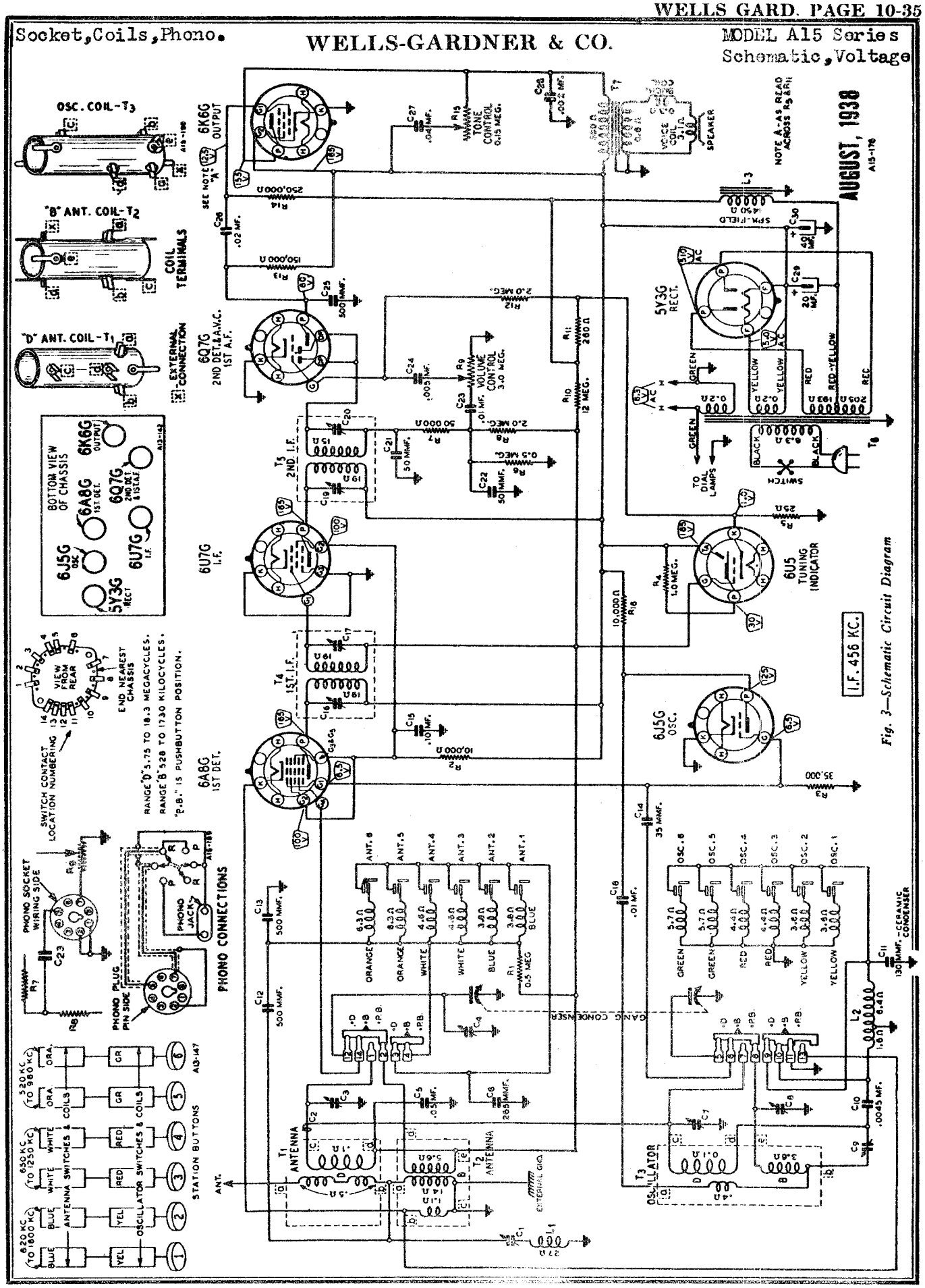


Fig. 3—Schematic Circuit Diagram

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MODEL A15 Series
Alignment, Trimmers

# WELLS-GARDNER & CO.

Specifications

**Power Consumption - 50 Watts** (At 117 volts 60 cycles)
**Power Output** - - - - - - - 1.0 Watts Undistorted, 2.0 Watts Maximum
**Selectivity** - - 38 KC Broad at 1000 times Signal
**Sensitivity**
B Range (Manual Tuning).....15 Microvolts Average
B Range (Automatic Tuning).....15 Microvolts Average
D Range .....25 Microvolts Average

**Intermediate Frequency** - - - - - - - 456 KC
**Speaker** - - - - - - - - - 6" or 8" Dynamic
**Tuning Frequency Range**
B Range (Manual Tuning).... 528 to 1730 KC (Kilocycles)
D Range (Manual Tuning)....5750 to 18300 KC (Kilocycles)
Buttons 1 and 2 (Automatic Tuning).....820 to 1600 KC
Buttons 3 and 4 (Automatic Tuning).....650 to 1250 KC
Buttons 5 and 6 (Automatic Tuning).....520 to 980 KC

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| **I. F.** | | | | | |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 1st I.F. (C16) & (C17)<br>2nd I.F. (C19) & (C20) |
| **RANGE B** | | | | | |
| 1730 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C8) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output<br>Set Indicator to 1500 KC—<br>See Note A | Ant. Range B (C4) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C9)<br>Rock Rotor—See Note B |
| **WAVE TRAP** | | | | | |
| 456 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to 600 KC<br>Adjust Sig. Gen.—See Note C | Wave Trap (C1)<br>Adjust for MINIMUM Output |
| **RANGE D** | | | | | |
| 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C7) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C3)<br>Rock Rotor—See Note B |
| **PERMEABILITY TUNING UNIT** | | BUTTON DEPRESSED (Band Switch in Push Button Position) | | TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book | ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D |
| 1100 KC | Antenna Lead | 200 mmf. | No. 1 | Setting Screw No. 1 | Antenna Coil No. 1 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 2 | Setting Screw No. 2 | Antenna Coil No. 2 |
| 850 KC | Antenna Lead | 200 mmf. | No. 3 | Setting Screw No. 3 | Antenna Coil No. 3 |
| 850 KC | Antenna Lead | 200 mmf. | No. 4 | Setting Screw No. 4 | Antenna Coil No. 4 |
| 700 KC | Antenna Lead | 200 mmf. | No. 5 | Setting Screw No. 5 | Antenna Coil No. 5 |
| 700 KC | Antenna Lead | 200 mmf. | No. 6 | Setting Screw No. 6 | Antenna Coil No. 6 |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the top of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

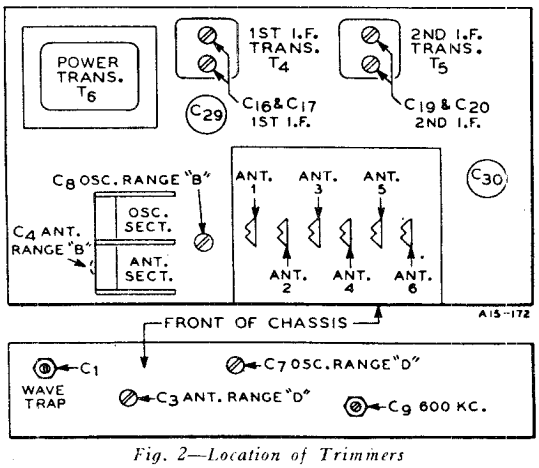


*Fig. 2—Location of Trimmers*

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## ALIGNMENT

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—Hold the tuning knob and turn the film drum until it is at the 1500 KC mark on the dial.

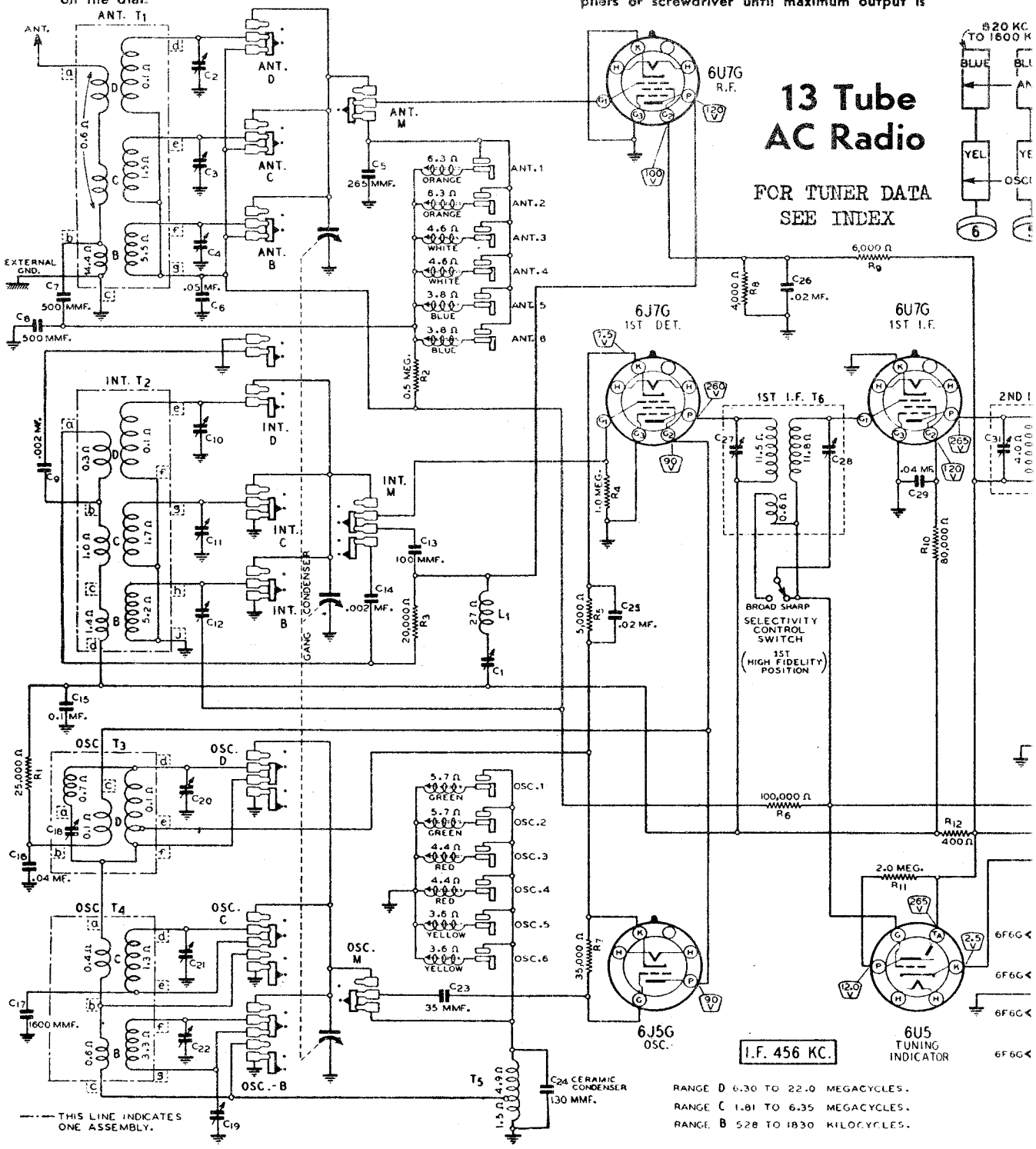
NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is

ALL SWITC
SCHEMATIC
POSITION
PUSHED I

# 13 Tube AC Radio

FOR TUNER DATA SEE INDEX

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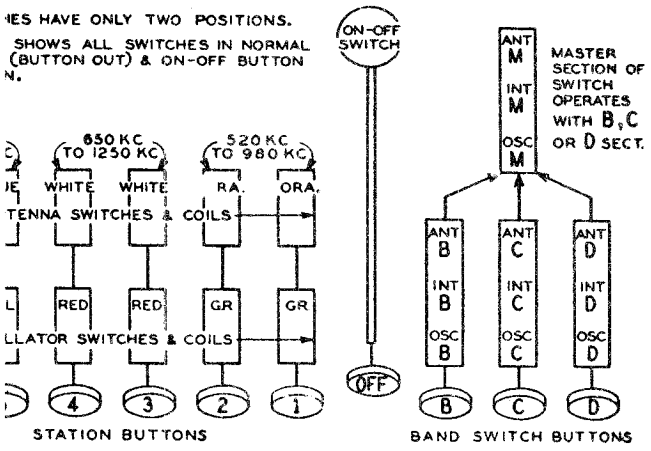
RDNER & CO.

MODEL A16 Series
Schematic, Voltage
Socket, Alignment Notes

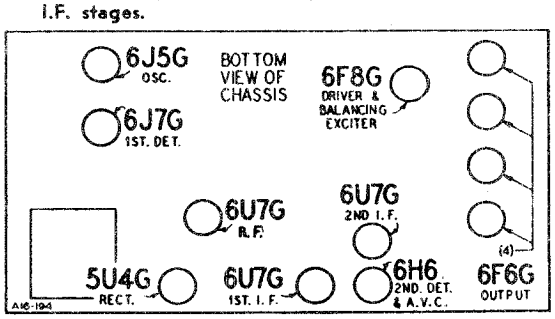
**CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows:**

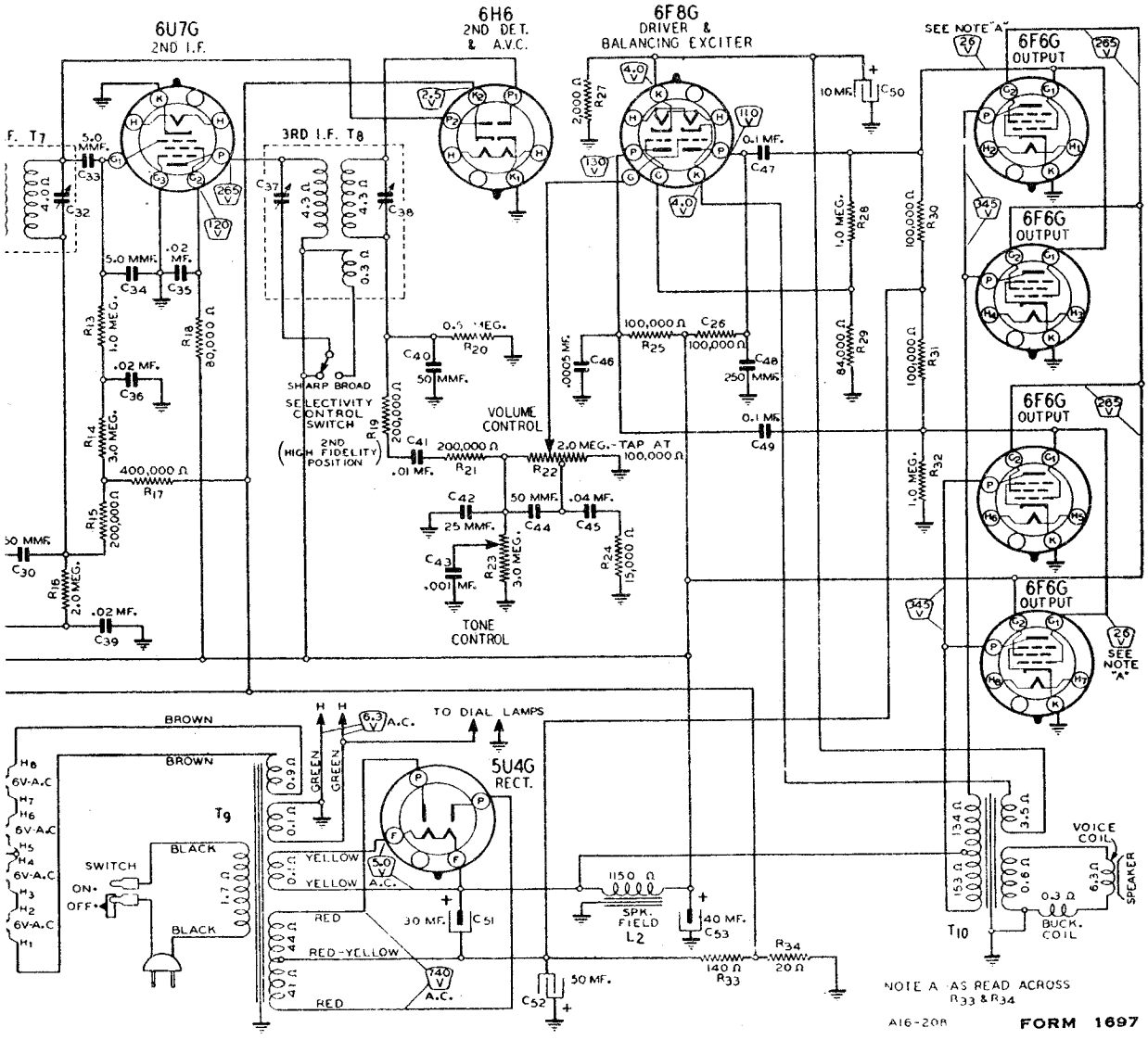
Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.




VIEW FROM BOTTOM FRONT OF CHASSIS



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## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Selectivity Control—Sharp Position All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | CONNECTION AT RADIO | DUMMY ANTENNA | BUTTON DEPRESSED | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| I. F. | | | | | |
| 456 KC | Grid of 2nd I.F. Tube | .1 mf. | B Range | Turn Rotor to Full Open | 3rd I.F. (C37) & (C38) |
| 456 KC | Grid of 1st I.F. Tube | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (C31) & (C32) |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 1st I.F. (C27) & (C28) |
| WAVE TRAP | | | | | |
| 456 KC | Antenna Lead | 200 mmf. | No. 1 | | Wave Trap (C1) Adjust for MINIMUM Output |
| RANGE B | | | | | |
| 1830 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C22) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | Ant. Range B (C4) Int. Range B (C12) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C19) Rock Rotor—See Note B |
| RANGE C | | | | | |
| 6350 KC | Antenna Lead | 400 Ohm | C Range | Turn Rotor to Full Open | Oscillator Range C (C21) |
| 6000 KC | Antenna Lead | 400 Ohm | C Range | Turn Rotor to Max. Output | Antenna Range C (C3) Int. Range C (C11) |
| RANGE D | | | | | |
| 22,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C20) |
| 20,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C2) Int. Range D (C10) Rock Rotor—See Note B |
| 7000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | 7000 KC (C18) Rock Rotor—See Note B |
| PERMEABILITY TUNING UNIT | | | | TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book | ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note C |
| 700 KC | Antenna Lead | 200 mmf. | No. 1 | Setting Screw No. 1 | Antenna Coil No. 1 |
| 700 KC | Antenna Lead | 200 mmf. | No. 2 | Setting Screw No. 2 | Antenna Coil No. 2 |
| 850 KC | Antenna Lead | 200 mmf. | No. 3 | Setting Screw No. 3 | Antenna Coil No. 3 |
| 850 KC | Antenna Lead | 200 mmf. | No. 4 | Setting Screw No. 4 | Antenna Coil No. 4 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 5 | Setting Screw No. 5 | Antenna Coil No. 5 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 6 | Setting Screw No. 6 | Antenna Coil No. 6 |

**Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.**

**After each range is completed, repeat the procedure as a final check.**

NOTE A—Hold the tuning knob and turn the film drum until it is at the 1500 KC mark on the dial. There is a slot at the bottom of the film drum which will permit the drum to be rotated a small distance. If the drum must be rotated an additional amount in order to calibrate, loosen the film drum pulley set screw and turn the film drum until it is at the correct position. Then tighten the set screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

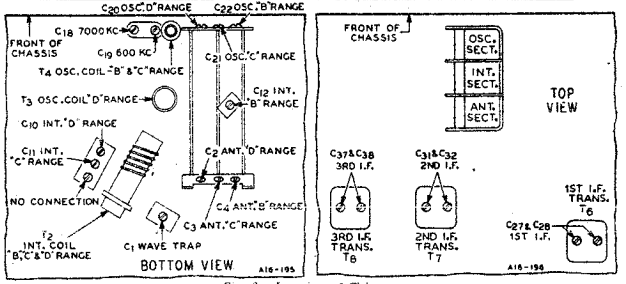






*Fig. 2—Location of Trimmers*

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

# Movie Dial Adjustments and General Service Data

## Adjusting Height of Image on Screen

The image height should be so adjusted that the complete image for each band will be centered on the screen.

Depress the B band (Broadcast) button. If the image is not centered on the screen, loosen the nut of the B band image height adjusting screw —See Fig. 3. Turn the screw until the image is centered and tighten the nut.

Next depress the D band (2nd Short Wave) button. If the image is not centered on the screen, turn the knurled head of the D band image height adjusting screw until the image is centered on the screen.

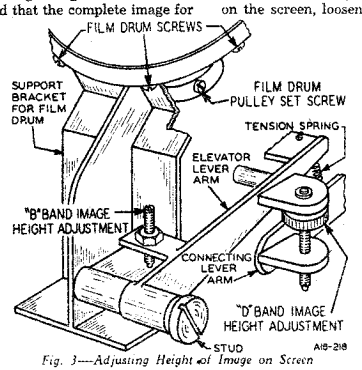



*Fig. 3—Adjusting Height of Image on Screen*

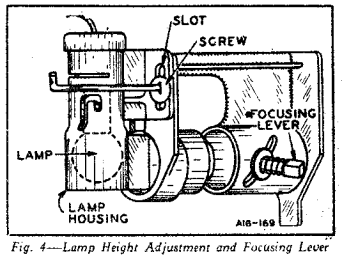



*Fig. 4—Lamp Height Adjustment and Focusing Lever*

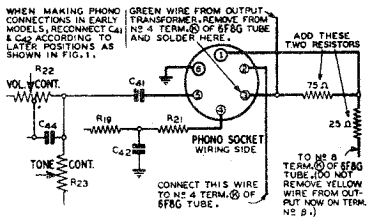
## Calibrating the Radio

To calibrate the radio, tune in a station of known frequency between 800 and 1,000 KC on the Broadcast band.

Hold the tuning knob in position and turn the film drum until it is at the correct kilocycle mark on the dial scale. Care should be taken not to touch the film. There is a slot at the bottom of the film drum which will permit the drum to be rotated a small distance.

If the drum must be rotated an additional amount in order to calibrate, loosen the film drum pulley set screw (Fig. 6) and turn the film drum until it is at the correct position. Then tighten this set screw.

**EARLY MODELS**—Some of the first production models employed a film drum pulley bushing with a small set screw hole—See Fig. 6. Two types of film drum pulleys were used with this bushing; one employed a 3/16 inch brass set screw, the other a 5/8 inch steel set screw. In calibrating, the latter screw should not be passed through the set screw hole in the bushing, but should be tightened against the outer wall of the bushing. If calibration cannot be made without passing the set screw through the hole, loosen the 6 screws around the edge of the film drum and carefully rotate the film a slight amount


WHEN MAKING PHONO CONNECTIONS IN EARLY MODELS, RECONNECT C41 & C42 ACCORDING TO LATER POSITIONS AS SHOWN IN FIG. 1.
GREEN WIRE FROM OUTPUT TRANSFORMER. REMOVE FROM No. 4 TERM. OF 6F8G TUBE AND SOLDER HERE.
ADD THESE TWO RESISTORS
R22 VOL. CONT.
C41
75 Ω
C44
R19
R21
25 Ω
PHONO SOCKET WIRING SIDE
C42
TONE CONT.
R23
TO No. 8 TERM. OF 6F8G TUBE. DO NOT REMOVE YELLOW WIRE FROM OUTPUT NOW ON TERM. No. 8.
CONNECT THIS WIRE TO No. 4 TERM. OF 6F8G TUBE.

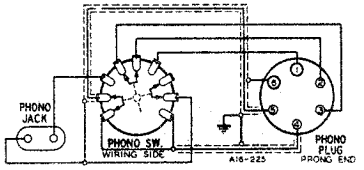



*Fig. 7—Phonograph Connections*

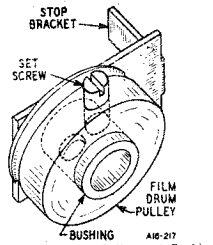
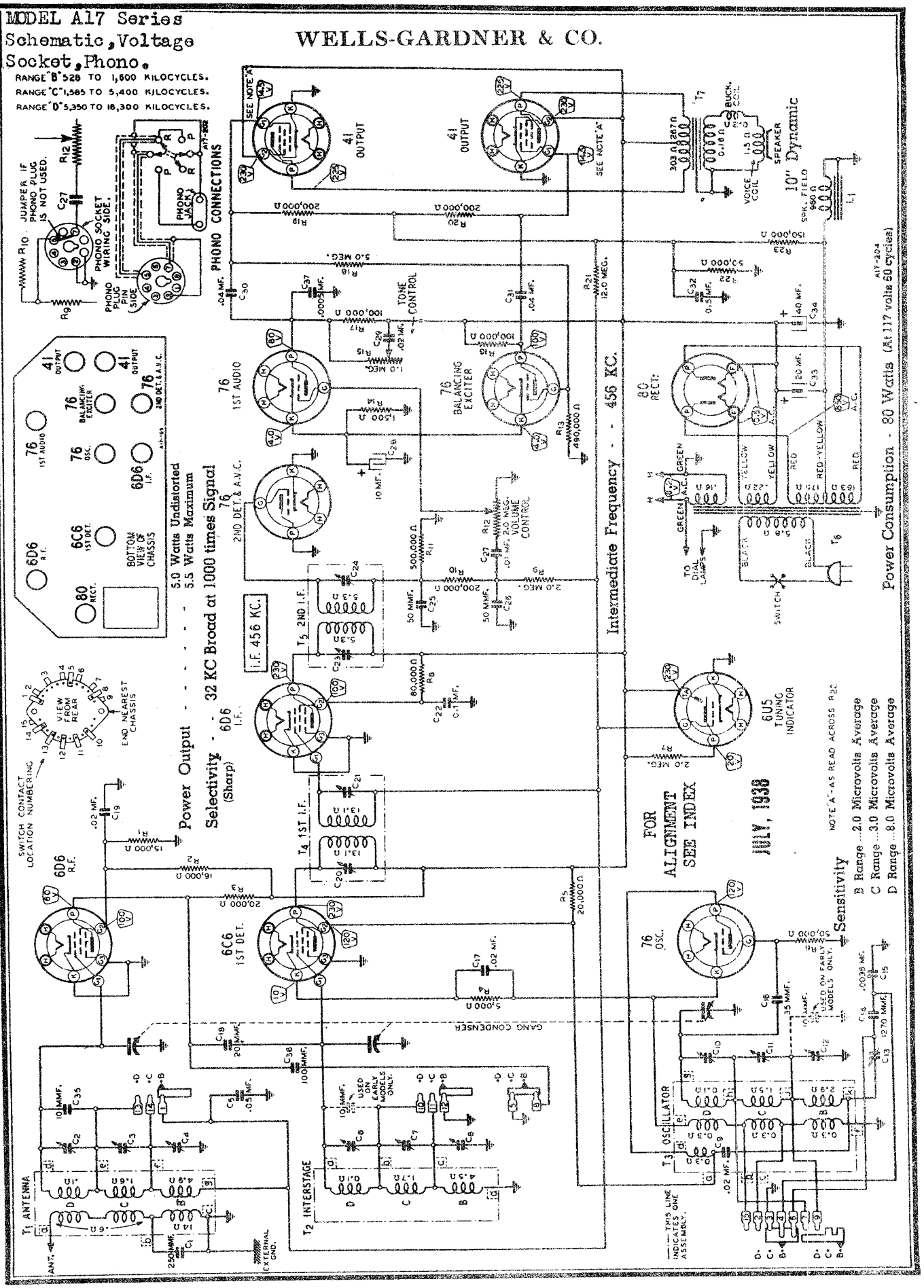



*Fig. 6—Film Drum Pulley and Bushing*

MODEL A17 Series
Schematic, Voltage
Socket, Phono.

WELLS-GARDNER & CO.

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# WELLS-GARDNER & CO.

MODEL A20 Series
Schematic, Voltage
Socket, Coils
Specifications

## SPECIFICATIONS

Power Consumption -- 65 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 3.0 Watts Undistorted, 4.0 Watts Maximum

Selectivity - - 40 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - - 8" or 10" Dynamic

Tuning Frequency Range

B Range..... 528 to 1730 KC (Kilocycles)

D Range.....5750 to 18300 KC (Kilocycles)

Sensitivity (For 0.5 watt output)

B Range.....25 Microvolts Average

D Range.....40 Microvolts Average

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:

Line Voltage—117.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter.

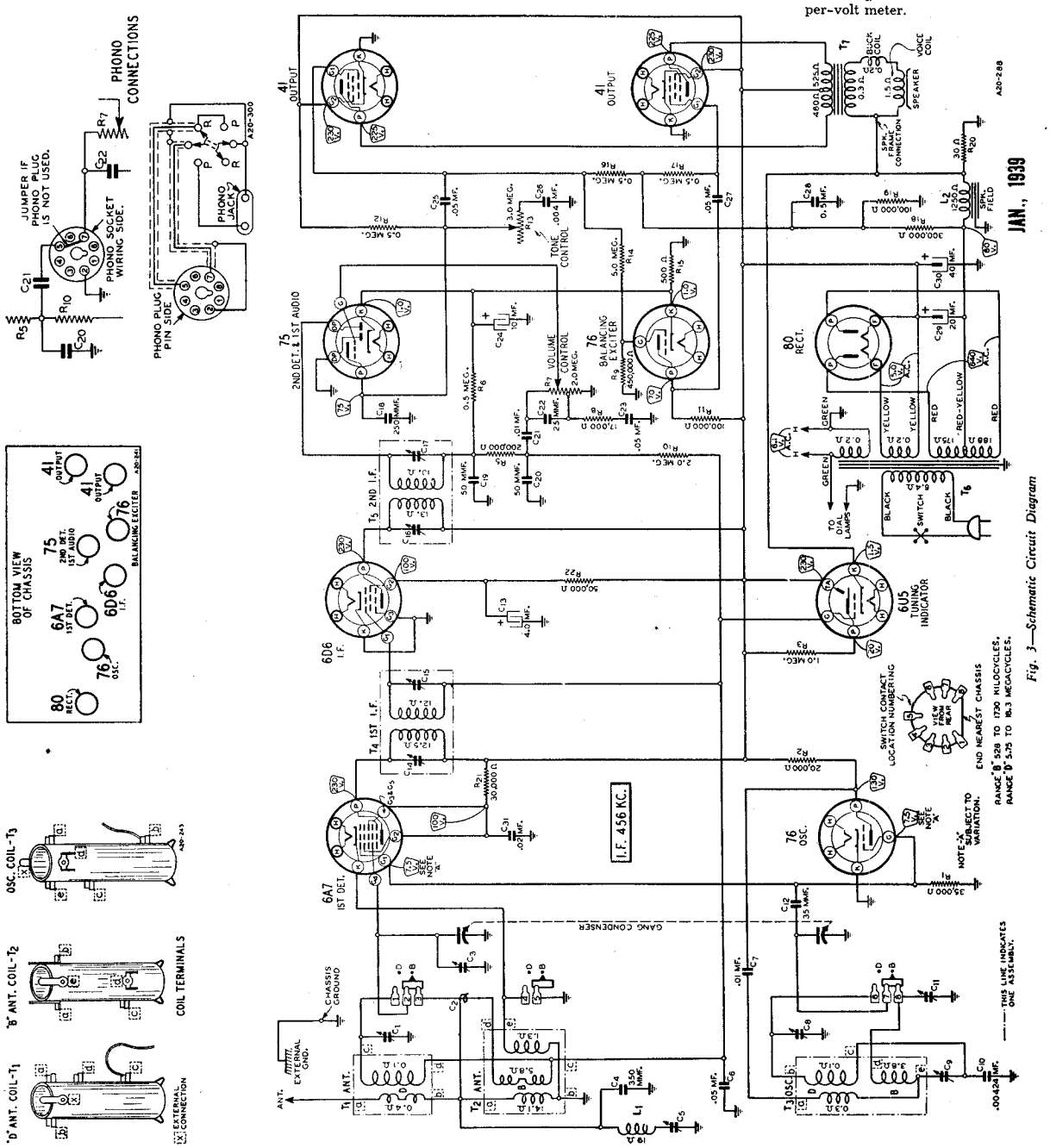


*Fig. 3—Schematic Circuit Diagram*

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MODEL A20 Series
Alignment, Phono. Data
Drive Cord Data, Trimmers

# WELLS-GARDNER & CO.

MODELS T2, A12, A13, A15
A22, A23, A24 Series
Tuner Data

## SETTING PUSH BUTTONS WG SERIES A15, A22, A23, A24.

### Selecting the Stations to be Set

There are 6 buttons on the push button tuning dial by means of which 6 stations may be set for quick tuning. They are numbered 1 to 6 in Fig. 2.

Make a list of your favorite stations, those which you tune in regularly. There may be any number up to and including 6 in this list.

It is better to list the station with the highest kilocycle number first, the station with the next lower kilocycle number next, and so on.

### Frequencies Covered by Each Button

The frequency range of each station button is shown in Fig. 2. Any station within the range of a button may be set. Although, in some cases, it may be possible to set a certain station on several buttons, it is better to set the stations so that the kilocycle numbers decrease from buttons 1 to 6.

### Setting a Station Button

Select a station from the list you have prepared, preferably the station with the highest kilocycle number, and tune in this station with the tuning knob in the usual way. Determine what program is being broadcast.

At each side of the escutcheon plate is an escutcheon screw—See Fig. 2. Remove the escutcheon plate by unscrewing these two screws. Be careful to avoid scratching the plate.

When this is done, the setting screws above the six buttons will be exposed.

Turn the band switch knob to the PUSH BUTTON TUNING position —See Fig. 2. The station tuned in previously will probably disappear.

If the kilocycle number of the station tuned in is within the range of button No. 1, push this button in. The same station or a different station may be heard.

With a small screw driver, slowly turn the setting screw above button No. 1 in or out until the desired station (the one previously tuned in) is heard. Turning the screw in (clockwise) will tune in stations with higher kilocycle numbers while turning the screw out (counter-clockwise) will tune in stations with lower kilocycle numbers. Be sure not to tune in some other station broadcasting the same program. Using the tuning eye as a guide, *accurately* tune in this station. The station is now set on this button.

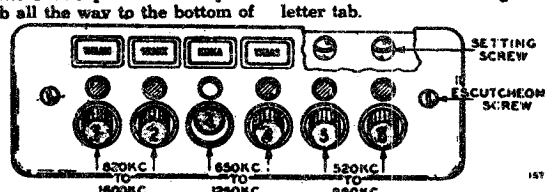
To determine whether the correct station has been set, turn the band switch knob back to the BROADCAST position. The same station should be heard (provided the tuning knob has not been turned). If it is not, turn the band switch knob to the PUSH BUTTON TUNING position again and retune with the setting screw.

Remove the station call letter tab from the sheets provided and push the tab all the way to the bottom of the rectangular space above the correct station button opening in the escutcheon plate. Then cover the call letter tab with one of the clear celluloid tabs.

Proceed in the same manner to set stations on any of the remaining buttons. Use blank tabs above buttons on which stations are not set.

After all of the stations have been set, carefully replace the escutcheon plate.

If at any time you wish to change the setting of a button from one station to another, repeat the above procedure. Changing the setting of one button will not affect the setting of any of the other buttons. The old call letter tab may be removed by sticking a pin through the notch in the celluloid tab and through the call letter tab.




## WG SERIES A20 ALIGNMENT, DRIVE CORD DATA, PHONOGRAPH NOTES.

### ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| I. F. 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15) |
| WAVE TRAP 456 KC | Antenna Lead | 200 mmf. | B Range | 600 KC | Wave Trap (C5) Adjust for MINIMUM Output |
| RANGE B 1730 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C11) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | Ant. Range B (C3) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C9) Rock Rotor—See Note B |
| RANGE D 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C8) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C1) Rock Rotor—See Note B |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

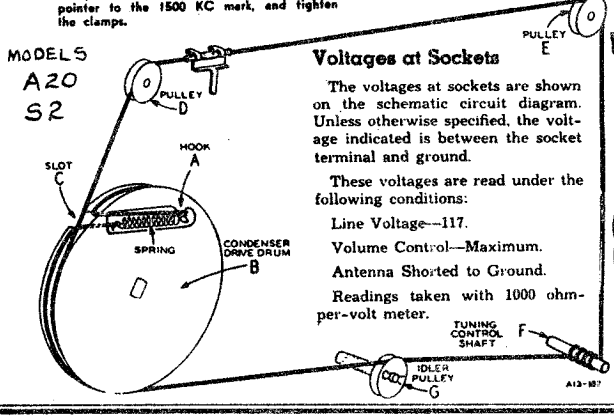
After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

*Fig. 4—Drive Cord*




### Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:

Line Voltage—117.

Volume Control—Maximum.

Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter.

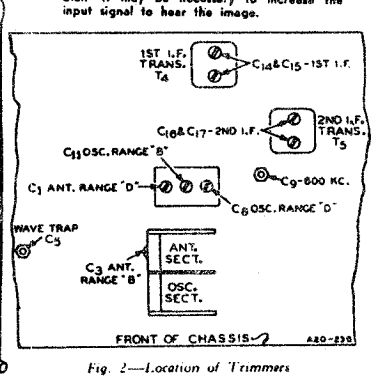



*Fig. 2—Location of Trimmers*

### Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Slide a 1¾ inch length of fabric tubing on the cord. Tie the free end of the drive cord to the tension spring. The distance between knots should be 48½ inches.

Arrange to keep the gang condenser in the completely closed position.

Place the looped end of the drive cord over hook A on condenser drive drum B (See Fig. 4). Pass the cord through slot C in the drum rim and wind one turn in a clockwise direction (from front of chassis) on condenser drive drum. Pass drive cord over pulleys D and E as shown. See that the fabric tubing is now between pulleys D and E. Continue cord down to shaft F and wind 2¼ turns clockwise, progressing towards the chassis. Bring cord over pulley G to bottom of condenser drive drum B as shown. Wind drive cord clockwise (from front of chassis) around condenser drive drum B to slot C. See that the drive cord does not cross in groove of condenser drive drum. Pass the remaining drive cord and tension spring through slot C and secure the free end of the spring on hook A.

DIAL POINTER ATTACHMENT —Tune in a station of known frequency. Move the pointer to this frequency on the dial scale. Clamp pointer tightly over the fabric tubing on the cord—See Fig. 4.

### Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram—Fig. 3. On the back panel of the chassis base is a round knockout 1-9/64 inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (See parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

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MODEL A22 Series
Schematic,Voltage
Socket,Phono.,Coils
MODEL A24 Series
Socket,Phono.,Coils

# WELLS-GARDNER & CO.

## SPECIFICATIONS

Power Consumption - - 65 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 3.0 Watts Undistorted
4.0 Watts Maximum

Selectivity - - 40 KC Broad at 1000 times Signal

Intermediate Frequency - - - - - - - 456 KC

Speaker - - - - - - - - - - - 10" Dynamic

**Tuning Frequency Range**

B Range..... 528 to 1730 KC (Kilocycles)

D Range.....5750 to 18300 KC (Kilocycles)

**Sensitivity** (For 0.5 watt output)

B Range.....25 Microvolts Average

D Range.....40 Microvolts Average

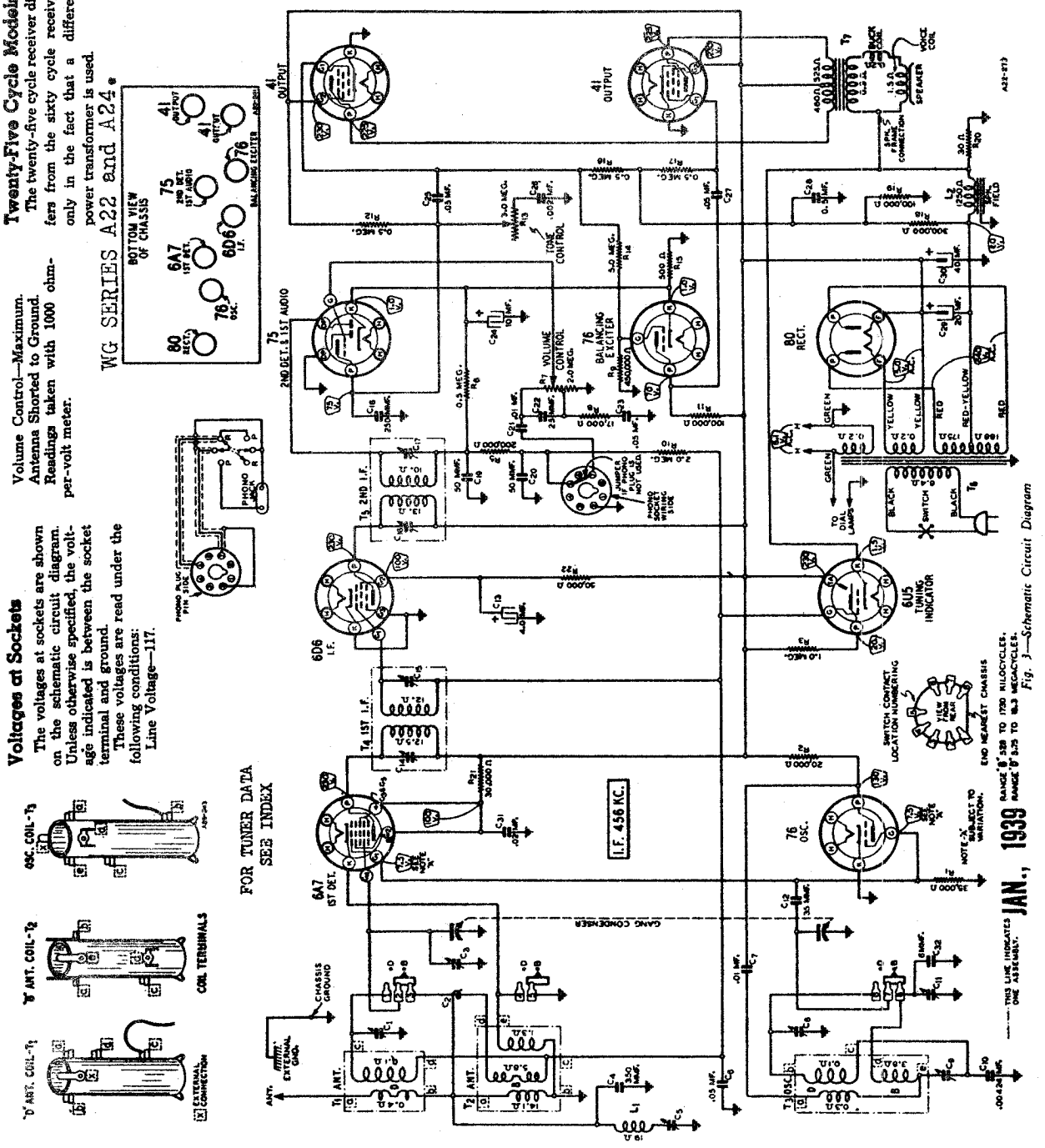
**Twenty-Five Cycle Models**
The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

WG SERIES A22 and A24

BOTTOM VIEW OF CHASSIS

Volume Control—Maximum.
Antenna Shorted to Ground.
Readings taken with 1000 ohm-per-volt meter.

**Voltages at Sockets**
The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.
These voltages are read under the following conditions:
Line Voltage—117.







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MODEL A22 Series
MODEL A24 Series
Alignment, Trimmers
Drive Data
MODEL A23 Series
Drive Data

# WELLS-GARDNER & CO.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

IMPORTANT—Follow procedure in the order shown.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | CONDENSER OR DIAL SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| I. F. 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (C16) & (C17) 1st I.F. (C14) & (C15) |
| WAVE TRAP 456 KC | Antenna Lead | 200 mmf. | B Range | 600 KC | Wave Trap (C5) Adjust for MINIMUM Output |
| RANGE B | | | | Turn Rotor to Full Closed Position. Pointer should be at low frequency end mark on scale—See Note A. | |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor until dial pointer is at 1500 KC | Oscillator Range B (C11) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Leave Rotor at above setting | Ant. Range B (C3) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C9) Rock Rotor—See Note B |
| RANGE D 18,300 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C8) |
| 15,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C1) Rock Rotor—See Note B |

NOTE A—The low frequency end mark is a small dot at the left side of the short wave scale under the "5." of the number 5.8 and to the right of the "C" of the letters MC. If the pointer is not at this mark on the dial, move the pointer to this mark.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 15,000 KC. The signal will then be heard at 15,000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 15,000 less 912 KC, or 14,088 KC on the dial. It may be necessary to increase the input signal to hear the image.

# General Service Data

### Drive Cord Replacement

Tie a knot with a small loop at one end of the new drive cord. Tie the other end to the tension spring, leaving a distance of 64⅛ inches between the knots.

Turn the gang condenser to the full open position. Secure the free end of the spring over hook A—See Fig. 4. Turn the gang condenser to the completely closed position.

Pass the cord through slot B and, guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. Hook the cord in slot B and turn the gang condenser to the completely closed position. Unhook the cord from slot B and pass over pulleys C, D, and E as shown. Pass the cord in front of idler pulley F. Wind 2½ turns counter-clockwise (from front of chassis) around the drive shaft spool, progressing away from the chassis. Pass cord up and over the drive drum. Guiding the cord in the groove of the drive drum, turn the gang condenser to the full open position. If necessary, stretch the tension spring and pull the drive cord taut. Pass drive cord through slot B and secure the loop to the tension spring at point G.

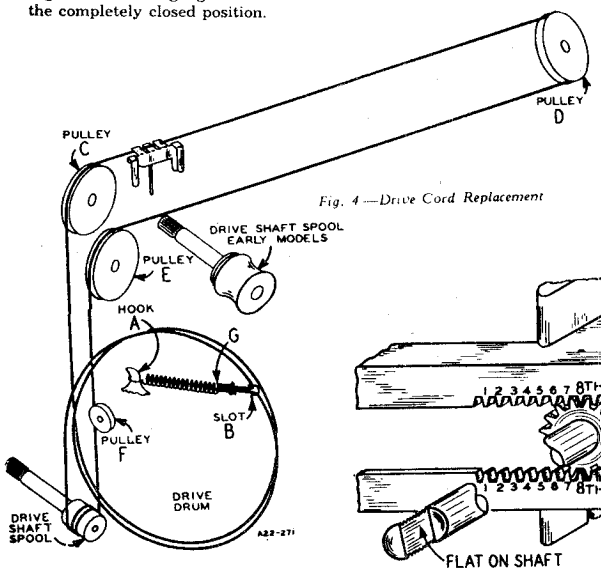


*Fig. 4—Drive Cord Replacement*

EARLY MODELS—In the early models using a larger drive shaft spool (See Fig. 4), there should be a distance of 65½ inches between the knots.

DIAL POINTER ATTACHMENT—Tune in a station of known frequency. Move the pointer to the approximate frequency on the dial scale. Pass the cord through the slotted head—See Fig. 4. Hold the drive cord and slide the pointer to the exact frequency on the dial scale

### Rack and Pinion Assembly

If it is ever necessary to re-assemble the automatic tuning unit, proceed as follows: The pinion gear shaft should be held in such a position that the flat portion is vertical or turned slightly counter-clockwise from the vertical as shown in Fig. 5.

The lower rack should be meshed with the pinion gear so that the 8th tooth from the front on each side of the rack is in line with the axis of the pinion gear shaft—See Fig. 5. The upper rack should then be lined up with the lower rack and meshed with the pinion gear. The 8th tooth from the front on each side of the upper rack will then line up with the axis of the pinion gear shaft.

The rear and side brackets can then be mounted on the rack and pinion assembly.

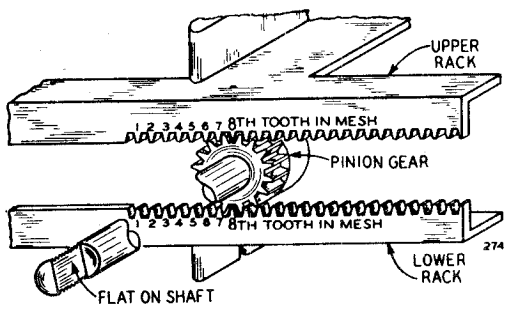


*Fig. 5—Rack and Pinion Assembly*

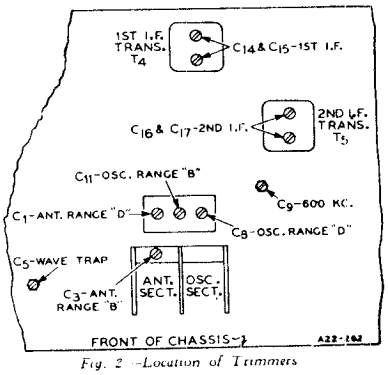


*Fig. 2—Location of Trimmers*

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# WELLS-GARDNER & CO.

MODEL A23 Series
Schematic, Voltage
Phono. Data

DEC., 1938

A23-280

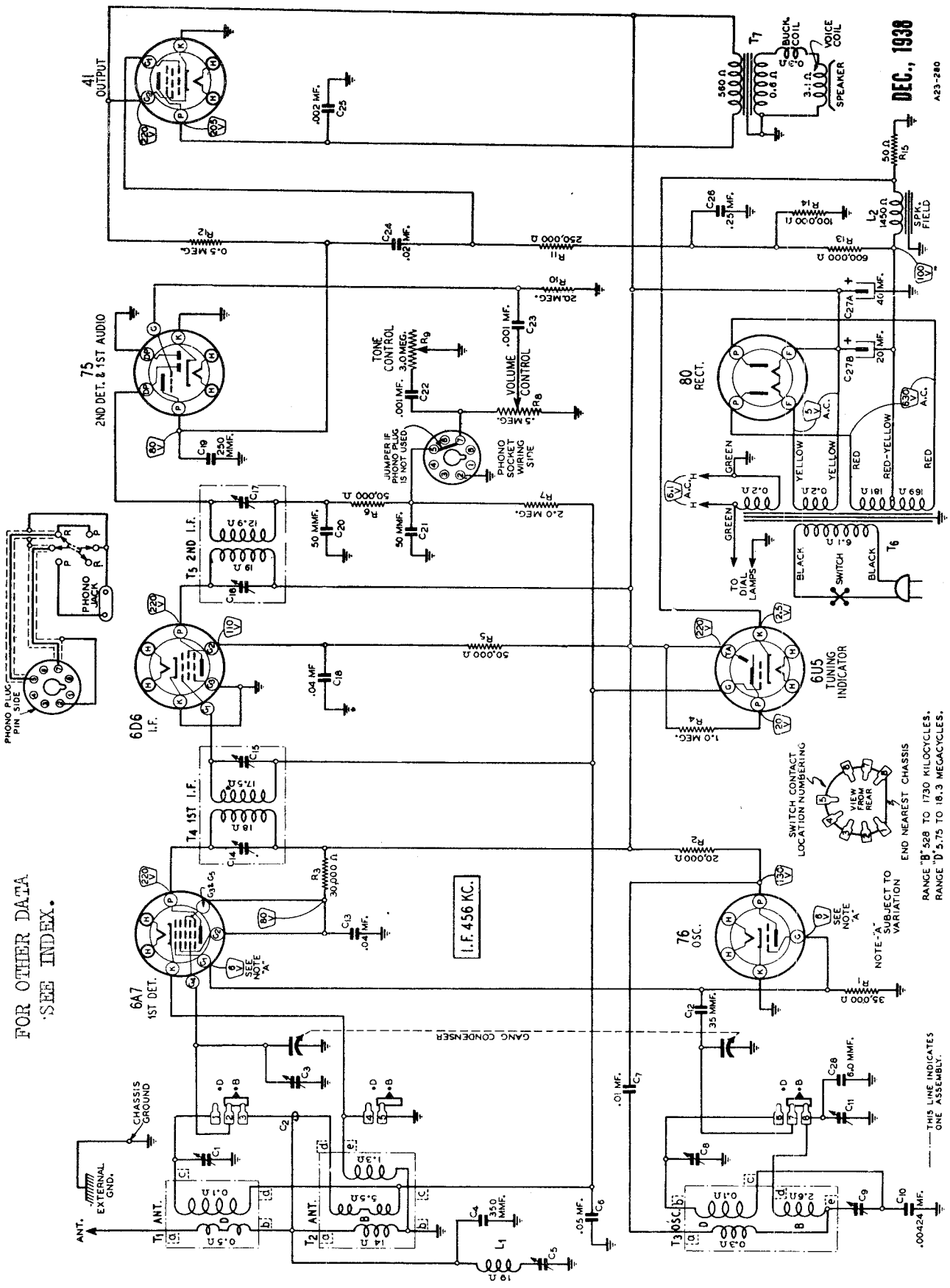


*Fig. 3—Schematic Circuit Diagram*

FOR OTHER DATA
SEE INDEX.

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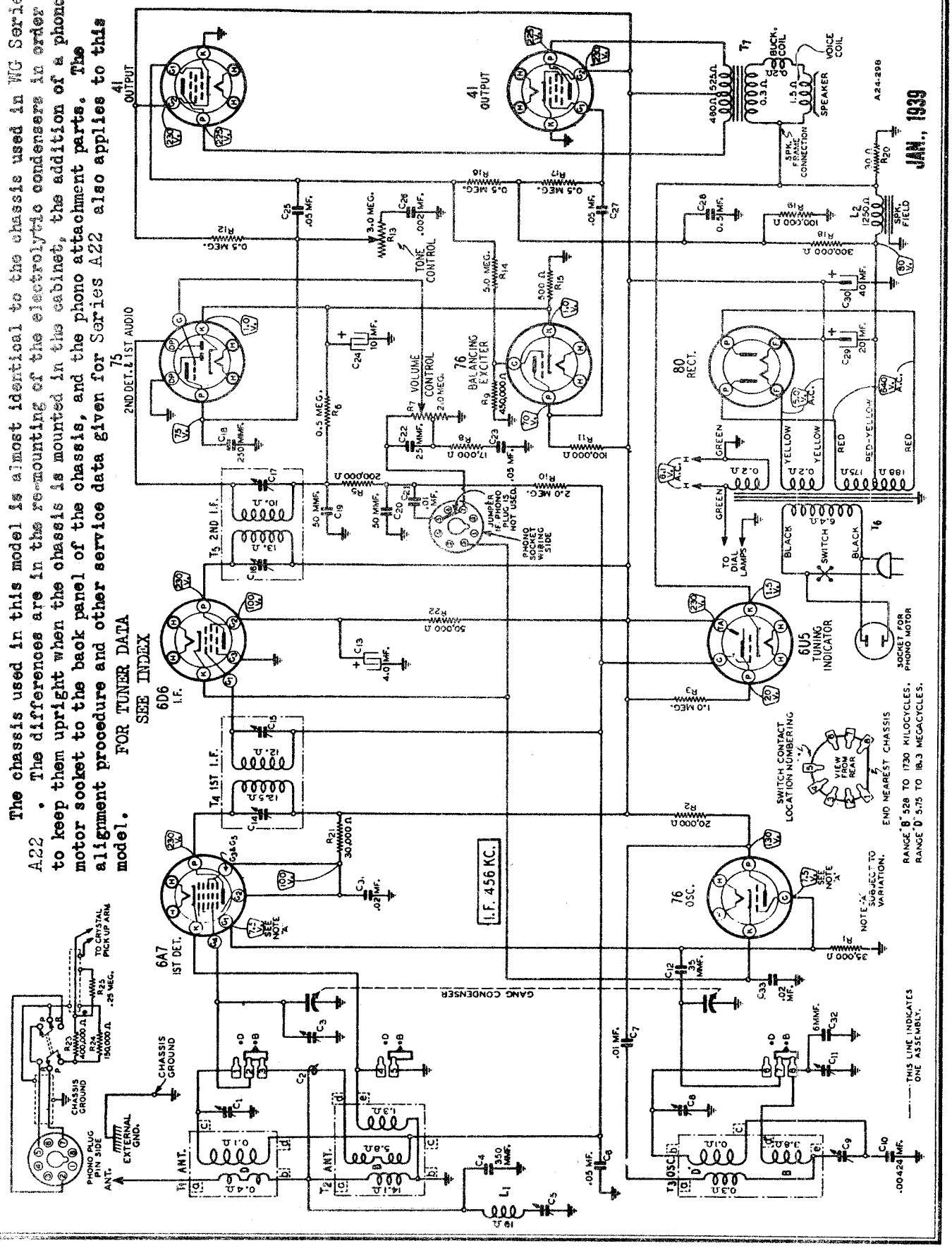
MODEL A24 Series
Schematic, Voltage
Phono. Data

# WELLS-GARDNER & CO.

**The chassis used in this model is almost identical to the chassis used in WG Series A22 . The differences are in the re-mounting of the electrolytic condensers in order to keep them upright when the chassis is mounted in the cabinet, the addition of a phono motor socket to the back panel of the chassis, and the phono attachment parts. The alignment procedure and other service data given for Series A22 also applies to this model.**

FOR TUNER DATA
SEE INDEX

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# SPECIFICATIONS

Power Consumption - 70 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 3.0 Watts Undistorted
4.0 Watts Maximum

Selectivity - 31.5 KC Broad at 1000 times Signal
(Sharp)

Sensitivity

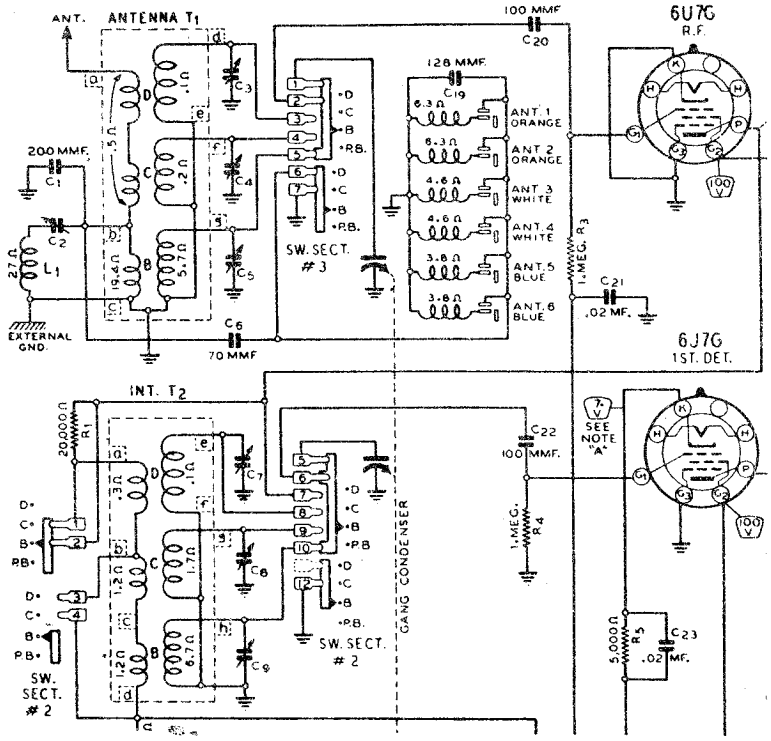
| | |
|---|---|
| B Range (Manual Tuning) | 1.0 Microvolt Average |
| B Range (Automatic Tuning) | 1.0 Microvolt Average |
| C Range | 3.0 Microvolts Average |
| D Range | 5.0 Microvolts Average |

Intermediate Frequency - - - - - - - 456 KC.

Speaker - - - - - - - - 10" or 12" Dynamic

Tuning Frequency Range

| | | | |
|---|---|---|---|
| B Range (Manual Tuning) | 528 | to | 1830 KC |
| C Range (Manual Tuning) | 1810 | to | 6350 KC |
| D Range (Manual Tuning) | 6300 | to | 22000 KC |
| Buttons 1 & 2 (Automatic Tuning) | 520 | to | 980 KC |
| Buttons 3 & 4 (Automatic Tuning) | 650 | to | 1250 KC |
| Buttons 5 & 6 (Automatic Tuning) | 820 | to | 1600 KC |



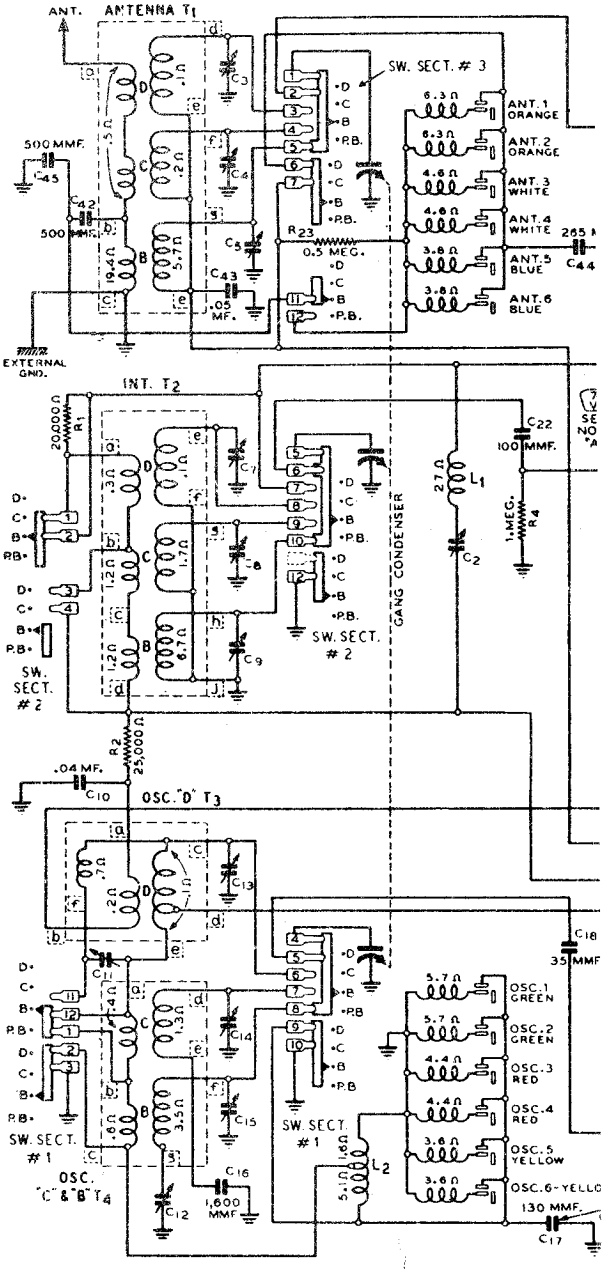
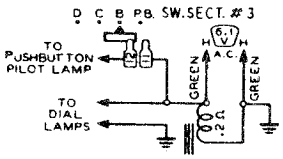




*Fig. 4—Partial Schematic Circuit Diagram—Issue No. 1*




FOR TUNER DATA
SEE INDEX

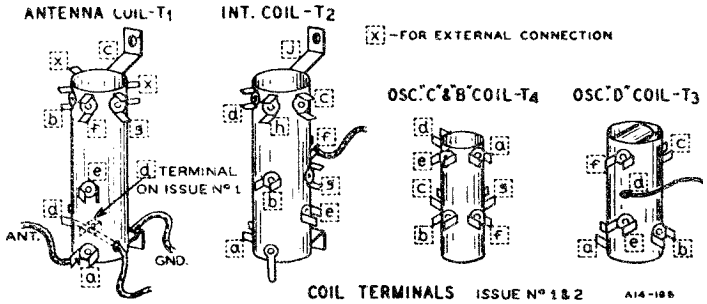



*Fig. 3—Schema*

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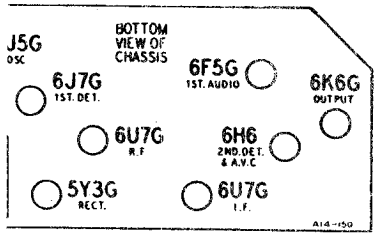
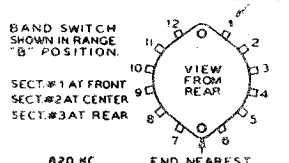
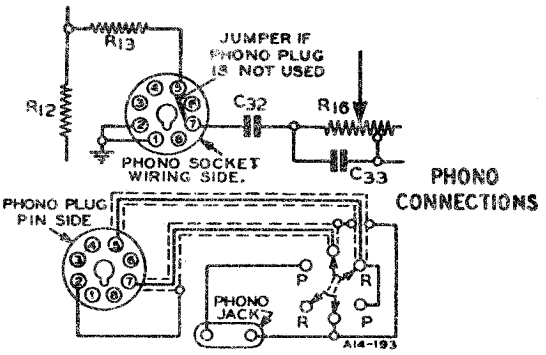
UTO SUPPLY CO.

MODEL D689
Schematic, Voltage, Coils
Socket, Sensitivity

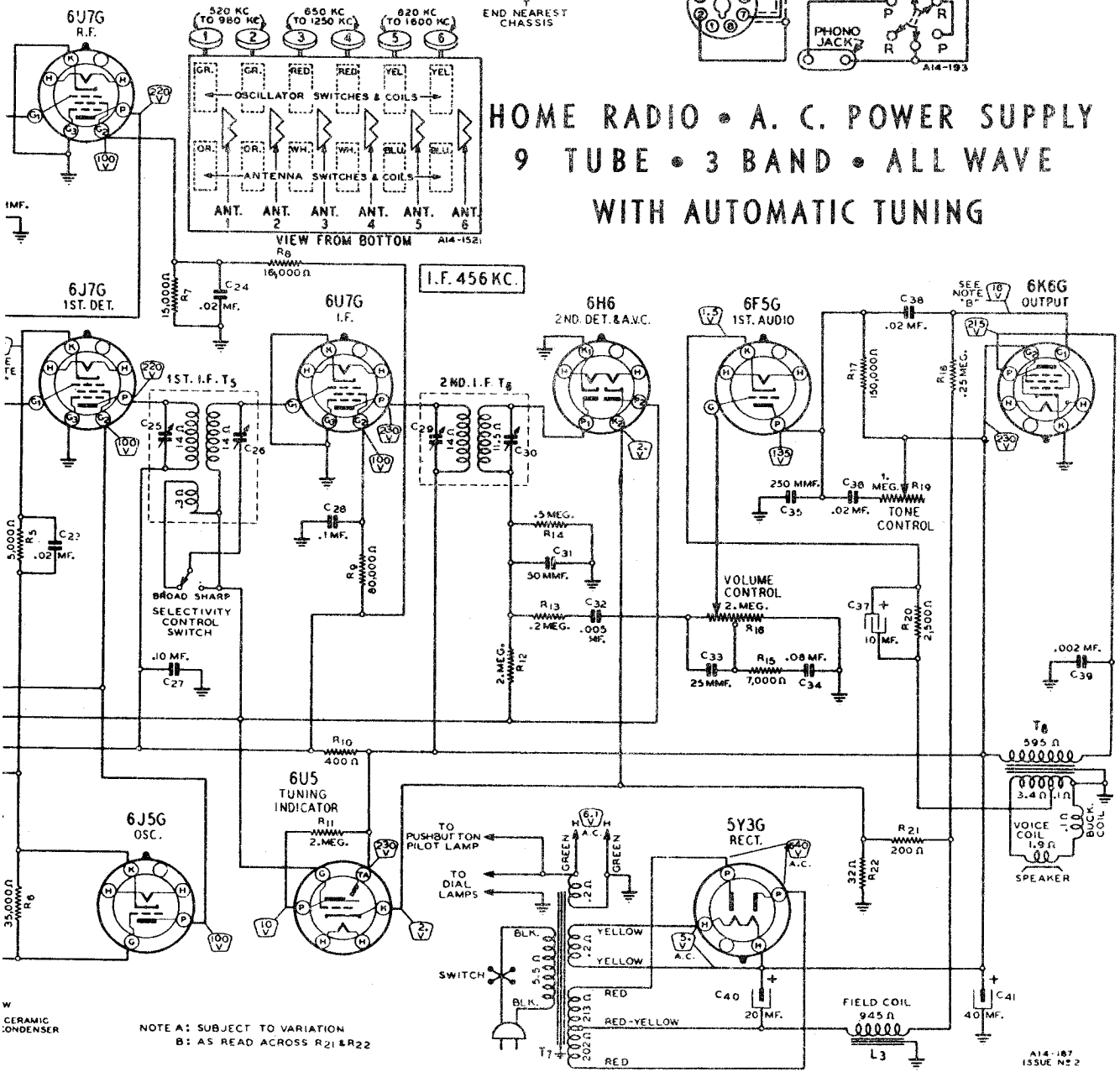



RANGE "D" 6.30 TO 22.0 MEGACYCLES
RANGE "C" 1.81 TO 6.35 MEGACYCLES
RANGE "B" 528 TO 1830 KILOCYCLES
"P.B." IS PUSHBUTTON POSITION


SWITCH CONTACT LOCATION NUMBERING
BAND SWITCH SHOWN IN RANGE "B" POSITION.
SECT. #1 AT FRONT
SECT. #2 AT CENTER
SECT. #3 AT REAR
VIEW FROM REAR
END NEAREST CHASSIS




# HOME RADIO • A. C. POWER SUPPLY
## 9 TUBE • 3 BAND • ALL WAVE
## WITH AUTOMATIC TUNING




*ic Circuit Diagram—Issue No. 2*

**MAY, 1938**

# WESTERN AUTO SUPPLY CO.

MODEL D689
Alignment, Trimmers
Parts
MODEL D705, Issue 1
Parts List

## Replacement Parts

NOTICE: There is a chassis number label on the chassis base. The chassis number identifies the radio as to chassis, dial, and issue number. When ordering parts or writing, be sure to mention the chassis number.

### SPEAKERS

When ordering parts for speakers, specify part number of speaker and letters preceding part number stamped on the speaker.

| | | |
|---|---|---|
| 12A310 | 10" Dynamic Speaker | 4.75 |
| | Cone and Voice Coil Assembly for above Speaker | 2.00 |
| 12A311 | 12" Dynamic Speaker | 6.80 |
| | Cone and Voice Coil Assembly for above Speaker | 2.80 |
| 12A316 | 10" Dynamic Speaker | 5.40 |
| | Cone and Voice Coil Assembly for above Speaker | 2.00 |

### TRANSFORMERS AND COILS

| Part No. | Code | Description | List Price |
|---|---|---|---|
| 9A953 | T1 | Antenna Transformer Assembly (Issue No. 1 only) | $1.45 |
| 9A994 | T1 | Antenna Transformer Assembly (Issue No. 2) | 1.65 |
| 9A954 | T2 | R.F. Interstage Transformer Assembly | 1.40 |
| 9A956 | T3 | Oscillator Coil Assembly "D" Range | .75 |
| 9A955 | T4 | Oscillator Coil Assembly "B" and "C" Range | 1.00 |
| 9A957 | T5 | 1st I.F. Transformer and Can Assembly | 1.40 |
| 9A958 | T6 | 2nd I.F. Transformer and Can Assembly | $1.30 |
| 53X182 | T7 | 117 Volt, 60 Cycle, Standard Power Transformer | 4.80 |
| 53X183 | T7 | 117 Volt, 25 Cycle, Standard Power Transformer | 4.75 |
| 53X184 | T7 | 117 Volt, 40-60 Cycle, Universal Power Transformer | 4.15 |
| 51X62 | T8 | Output Transformer | 1.35 |
| 9A939 | L1 | Wave Trap Coil | .30 |
| 9A929 | L2 | Oscillator Tracking Coil | .45 |

### RESISTORS

#### CARBON

| Part No. | Code | Resistance | Wattage | List Price |
|---|---|---|---|---|
| C94203 | R1 | 20,000 Ohm | 1.0 | $0.15 |
| C94253 | R2 | 25,000 Ohm | 1.0 | .15 |
| A95105 | R3 | 1 Megohm | 0.2 (Issue No. 1 only) | .10 |
| A95105 | R4 | 1 Megohm | 0.2 | .10 |
| A94502 | R5 | 5,000 Ohm | 0.2 | .15 |
| A94353 | R6 | 35,000 Ohm | 0.2 | .15 |
| C94153 | R7 | 15,000 Ohm | 1.0 | .15 |
| D94163 | R8 | 16,000 Ohm | 2.0 | .30 |
| B94283 | R9 | 80,000 Ohm | 0.5 | .15 |
| A95401 | R10 | 400 Ohm | 0.2 | .10 |
| A95205 | R11, R12 | 2 Megohm | 0.2 | .10 |
| A95204 | R13 | 200,000 Ohm | 0.2 | .10 |
| A95504 | R14 | 500,000 Ohm | 0.2 | .10 |
| A95702 | R15 | 7,000 Ohm | 0.2 | .10 |
| A95154 | R17 | 150,000 Ohm | 0.2 | .10 |
| A95254 | R18 | 250,000 Ohm | 0.2 | .15 |
| A94252 | R20 | 2,500 Ohm | 0.2 | .15 |
| C93201 | R21 | 200 Ohm | 1.0 | .20 |
| A94320 | R22 | 2 Ohm | 0.2 | .15 |
| A95504 | R23 | 500,000 Ohm | 0.2 (Issue No. 2) | .10 |

#### VARIABLE

| | | | | |
|---|---|---|---|---|
| 34X250 | R16 | 2 Megohm | Volume Control and On-Off Switch | .80 |
| 40X228 | R19 | 1 Megohm | Tone and Selectivity Control | .90 |

### CONDENSERS

#### MISCELLANEOUS

| | | | |
|---|---|---|---|
| 47X107 | C17 | 130 mmf. Ceramic | .35 |
| 47X103 | C19 | 128 mmf. Ceramic (Issue No. 1 only) | .35 |
| 47X105 | C44 | 265 mmf. Silvered Mica (Issue No. 2) | .50 |
| 14A88 | | 3 Gang Condenser less Dial and Drive Assembly (Issue No. 1 only) | 3.45 |
| | | 3 Gang Condenser less Dial and Drive Assembly (Issue No. 2) | 3.45 |

### DIAL AND DRIVE ASSEMBLY

#### No. 9 DIAL

Models using this dial may be identified by the round push buttons used on the tuning unit. The station call letters are mounted in the escutcheon above the buttons.

SEE PARTS Model D705 Issue 1

#### No. 10 DIAL

Models using this dial may be identified by the rectangular push buttons used on the tuning unit. The station call letter tabs are mounted in the push button.

| | |
|---|---|
| Dial Mounting Plate only—Complete with 3 Idler Pulleys less Tuning Knob Shaft and Tone Control (See Fig. 5 for method of replacing drive cord) | $1.40 |
| Brace for above Mounting Plate (Top of Dial Mounting Plate to back of Chassis) | .10 |
| Brace for Gang Condenser (Gang Mounting Bracket to side of Dial Mounting Plate) | .10 |
| Tuning Eye Tube Clamp Assembly | .10 |
| Tuning Knob Shaft only | .15 |
| Horse Shoe Washers for above Shaft | Doz. .10 |
| Drive Drum for Condenser | .10 |
| Spring Clamp to hold Drive Drum to Shaft | Doz. .20 |
| 66" Drive Cord (See Fig. 5) | Ea. .20 |
| Tensior Spring for Drive Cord | Doz. .20 |
| Dial Glass (Specify Name and Chassis Number of Radio) | .85 |
| Dial Background | .10 |
| Pointer for Dial | .10 |
| Clamp for Glass Crystal | .10 |
| Plain Glass Crystal | .10 |
| Dial Lamp Socket Assembly with Wire | .10 |
| Dial Lamp—No. 51 | .20 |

### PHONO ATTACHMENT PARTS

| Part No. | Description | List Price |
|---|---|---|
| | 20" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob) | $2.70 |
| | Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket | .15 |
| | Plug (8 Prong) Only of Phono Cable | .15 |
| | Phono Jack Only of Phono Cable | .10 |
| | Phono Switch Only of Phono Cable | .20 |
| | Knob Only of Phono Cable | .20 |

### AUTOMATIC TUNING ASSEMBLY

| Part No. | Description | List Price |
|---|---|---|
| 25A302 | Automatic Tuning Push Button Assembly Complete with 12 Coils less Push Buttons | $5.55 |
| 26A89 | Front Bracket for Tuning Assembly—Includes 6 Setting Screws and Front Switch Contact Spring Strip | .75 |
| 20X249 | Setting Screw Only—Part of above Bracket | Doz. .20 |
| 26A90 | Rear Bracket for Tuning Assembly—Includes Rear Switch Contact Spring Strip—Issue No. 1 Only | .60 |
| 26A115 | Rear Bracket for Tuning Assembly—Includes Rear Switch Contact Spring Strip—Issue No. 2 | .60 |
| 26A92 | Station Button Plunger with 2 Switch Contacts mounted on Fiber Strips and 1 Rubber Bumper—Issue No. 1 Only | .10 |
| 26A111 | Station Button Plunger with 2 Switch Contacts mounted on Fiber Strips and 1 Rubber Bumper—Issue No. 2 | .10 |
| 8X64 | Rubber Bumper only for above Station Button Plunger | Doz. .10 |
| 28X198 | Compression Spring for Station Button Plunger | Doz. .10 |
| 37X119 | Locking Plate for Button Plungers (At Rear of Assembly—Length 4⅝")—Issue No. 1 Only | .10 |
| 28X183 | Flat Pressure Spring for Locking Plate | Doz. .25 |
| 25X522 | "L" Shaped Stop Bracket used behind above Spring (At back of Tuning Push Button Assembly)—Issue No. 1 Only | Doz. .10 |
| 37X130 | Locking Plate for Button Plungers (At rear of Assembly)—Issue No. 2 | .10 |
| 30X113 | Hinge Bracket for Locking Plate—Issue No. 2 | Doz. .10 |
| 8X71 | Rubber Bushing for Hinge Bracket—Issue No. 2 | Doz. .15 |
| 26A88 | Fiber Blinder and Felt Pad (Used on Button Plungers and Escutcheon)—No. 9 Dial only | Doz. .10 |
| 25X504 | Adjustable Coil Support Bracket for Rear (Antenna) Coils | .10 |
| 28X184 | Spring Clamps for holding front and rear coils in place | Doz. .10 |
| 26A93 | Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16" Washer, and 1 Compression Spring (for Buttons Nos. 1 and 2—520-980 KC) | .30 |
| 26A94 | Tuning Rod Assembly—Includes 2 Iron Cores, one 3/16" Washer, and 1 Compression Spring (for Buttons Nos. 3 and 4—650-1250 KC) | .30 |
| 26A95 | Tuning Rod Assembly—Includes 2 Iron Cores, One 3/16" Washer, and 1 Compression Spring (for Buttons Nos. 5 and 6—820-1600 KC) | .30 |
| 28X181 | Compression Spring for Tuning Rod | Doz. .25 |
| 9A925 | Antenna Coil Assembly (Color—Orange; Range 520-980 KC; Buttons 1 and 2) | .15 |
| 9A936 | Antenna Coil Assembly (Color—White; Range 650-1250 KC; Buttons 3 and 4) | .15 |
| 9A926 | Antenna Coil Assembly (Color—Blue; Range 820-1600 KC; Buttons 5 and 6) | .15 |
| 9A927 | Oscillator Coil Assembly (Color—Green; Range 520-980 KC; Buttons 1 and 2) | .15 |
| 9A937 | Oscillator Coil Assembly (Color—Red; Range 650-1250 KC; Buttons 3 and 4) | .15 |
| 9A928 | Oscillator Coil Assembly (Color—Yellow; Range 820-1600 KC; Buttons 5 and 6) | .15 |
| 9X48 | Fiber Strip to Cover Setting Screws—No. 9 Dial | Doz. .15 |
| 9X60 | Fiber Strip to Cover Setting Screws—No. 10 Dial | Doz. .15 |
| 26A97 | 2 Call Letter Sheets (U. S. Stations) and Celluloid Tabs—For Mounting in Escutcheon—No. 9 Dial | .40 |
| 26A113 | 1 Call Letter Sheet (U. S. Stations) and Celluloid Tabs for Mounting on Push Button—No. 10 Dial | .15 |

Prices Subject to Change Without Notice.

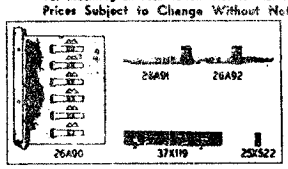



*Fig. 8—Issue No. 1 Automatic Tuning Unit Parts Which Differ From Issue No. 2.*

## ALIGNMENT PROCEDURE

The following equipment is required for aligning:

An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.

Output Indicating Meter—Non-Metallic Screwdriver.

Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

Volume Control—Maximum All Adjustments.

Selectivity Control—Sharp Position All Adjustments.

Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.

Allow Chassis and Signal Generator to "Heat Up" for several minutes.

| | SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BAND SWITCH SETTING | ADJUST TRIMMERS TO MAXIMUM CONDENSER SETTING (Unless otherwise specified) | |
|---|---|---|---|---|---|---|
| I. F. | 456 KC | Grid of I.F. Tube | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (C29) & (C30) |
| | 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 1st I.F. (C25) & (C26) |
| WAVE TRAP | 456 KC | Antenna Lead | 200 mmf. | Push Button Position Button No. 1 Depressed | | Wave Trap (C2) Adjust for MINIMUM Output |
| RANGE B | 1830 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C15) |
| | 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | Ant. Range B (C5) Int. Range B (C9) |
| | 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C12) Rock Rotor—See Note B |
| RANGE C | 8350 KC | Antenna Lead | 400 Ohm | C Range | Turn Rotor to Full Open | Oscillator Range C (C14) |
| | 6000 KC | Antenna Lead | 400 Ohm | C Range | Turn Rotor to Max. Output | Antenna Range C (C4) Int. Range C (C8) |
| RANGE D | 22,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C13) |
| | 20,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C3) Int. Range D (C7) Rock Rotor—See Note B |
| | 7000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | 7000 KC (C11) Rock Rotor—See Note B |

| PERMEABILITY TUNING UNIT | BUTTON DEPRESSED (Band Switch in Push Button Position) | TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book | ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note C | |
|---|---|---|---|---|
| 700 KC | Antenna Lead | 200 mmf. | No. 1 | Setting Screw No. 1 | Antenna Coil No. 1 |
| 700 KC | Antenna Lead | 200 mmf. | No. 2 | Setting Screw No. 2 | Antenna Coil No. 2 |
| 850 KC | Antenna Lead | 200 mmf. | No. 3 | Setting Screw No. 3 | Antenna Coil No. 3 |
| 850 KC | Antenna Lead | 200 mmf. | No. 4 | Setting Screw No. 4 | Antenna Coil No. 4 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 5 | Setting Screw No. 5 | Antenna Coil No. 5 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 6 | Setting Screw No. 6 | Antenna Coil No. 6 |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial.

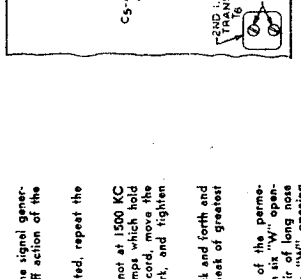



*Fig. 2—Location of Trimmers*

It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

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MODEL D689
Circuit, Tuner Data
Changes, Phono. Data

# WESTERN AUTO SUPPLY CO.

## Circuit

This model is a 3 band A.C. operated radio with a 6 button inductive type automatic tuning system.

A 4 position rotary switch is used to switch the tuning circuits from automatic (push button) tuning to any of the 3 manual tuning ranges (one broadcast and 2 short wave ranges).

In MANUAL TUNING, an R. F. antenna transformer with tuned secondary is used before the 6U7G R. F. tube. The output of this tube is fed through another R. F. transformer with tuned secondary into the 6J7G 1st detector tube. A 6J5G tube functions as a separate oscillator. The antenna transformer B band secondary is connected to the R. F. tube grid circuit. The antenna transformer C and D band secondaries are open circuited.

In issue No. 1 sets, if any automatic tuning button is depressed, the automatic tuning antenna coil corresponding to that button is short circuited. In issue No. 2 sets, the connection between the antenna circuit and the automatic tuning antenna coils is open circuited by the band switch.

The interstage transformer B band secondary is connected to the 1st detector tube grid circuit. The interstage transformer C and D band secondaries are open circuited.




*Fig. 1—Location of Controls and Push Buttons—No. 9 Dial Escutcheon*

The oscillator B band grid coil is connected to the grid circuit of the oscillator tube. The oscillator B band cathode coil is connected to ground. The oscillator C and D band grid coils are open circuited. If any automatic tuning button is depressed, the automatic tuning oscillator coil corresponding to that button is short circuited.

In like manner, to describe the connections for one AUTOMATIC TUNING circuit, assume that the band switch is in the push button position and button number 1 is depressed.

In issue No. 1 sets, the antenna circuit is connected to the R. F. tube grid circuit through the band switch. The antenna circuit is also connected to the antenna No. 1 automatic tuning coil through Ant. 1 switch. The antenna No. 1 coil is tuned by fixed condenser C19.

In issue No. 2 sets, the antenna circuit is connected to the automatic tuning antenna coils through the band switch. The antenna No. 1 automatic tuning coil is connected to the R. F. tube grid circuit through coil is tuned by condensers C44 and C45.

In both issues, the connections from the antenna and interstage transformer secondaries are open circuited.

The plate of the R. F. tube is connected in series with resistor R1 to the B+ circuit. It is also connected through coupling condenser C22 to the grid of the 1st detector. The latter is connected through grid leak R4 to ground.

**Electrical Assembly**—The schematic circuit diagram (Fig. 3) is that of issue No. 2 sets. The partial schematic illustration (Fig. 4) shows the sections of the issue No. 1 circuit which differ from the issue No. 2 circuit.

The A. V. C. voltage is applied directly to the R. F. tube grid circuit through a resistor.

Wave trap (L1 and C2) is in the antenna circuit.

Lugs 11 and 12 of band switch section No. 3 are used to connect a pilot lamp when the rotary band switch is in the automatic tuning (push button) position.

### Issue No. 2

**Mechanical Changes**—The station button plunger has a length of 7⅞ inches.

The locking plate for the station button plungers has been re-designed and now employs 2 side arms mounted in rubber cushioned hinge brackets which are attached to the rear bracket of the tuner assembly by 2 screws—See Fig. 7.

**Electrical Changes**—The schematic circuit diagram (Fig. 3) is that of issue No. 2 sets.

The A. V. C. is fed into the R. F. tube grid circuit through the manual and the automatic tuning antenna coils.

The wave trap is in the R. F. tube plate circuit.

Lugs 11 and 12 of band switch section No. 3 are used to open the connection between the antenna circuit and the automatic tuning antenna coils.

The following changes are made to bring about the change mentioned above in the A. V. C. circuit:

C43 is inserted between the secondary of the antenna transformer and ground to isolate the A. V. C. from ground. C21 is replaced by C42. R22 is added to isolate the automatic tuning coils from the manual tuning coils. C1 is replaced by C42 and C45 in the automatic tuning coil circuit. R3 and C20 are removed from the R. F. tube grid circuit. C19 is replaced by C44 in the automatic tuning coil circuit.

**ATTACHING DIAL POINTER**—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.

## Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 3. On the top of the chassis base and between the 6H6 and 6F5G tube sockets is a round knockout opening 1⅝ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (See parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made —See Fig. 3.

## Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:
Line Voltage—117.
Volume Control—Maximum.
Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter.

## Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

## General Service Data

### Issue Number

The last digit of the number on the chassis number label identifies the radio as to the issue number.

**PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE**

**CONDENSERS**

**TUBULAR**

| Part No. | Code | Capacitance | Voltage | | List Price |
|---|---|---|---|---|---|
| 44512 | C16 | .05 mf. | 400 | (Issue No. 1 only) | $0.15 |
| 44513 | C26 | .1 mf. | 400 | | .15 |
| 44514 | C36 | .25 mf. | 400 | | .15 |
| 44515 | | .5 mf. | 400 | | .20 |
| 44516 | | 1 mf. | 400 | | .25 |
| 44517 | | 2 mf. | 400 | | .35 |
| 44518 | | 3 mf. | 400 | | .45 |
| 44519 | | 4 mf. | 400 | | .55 |
| 44520 | | 5 mf. | 400 | | .65 |
| 44521 | | 6 mf. | 400 | | .75 |
| 44522 | | 7 mf. | 400 | | .85 |
| 44523 | | 8 mf. | 400 | | .95 |
| 44524 | | 9 mf. | 400 | | 1.05 |
| 44525 | | 10 mf. | 400 | | 1.15 |
| 44526 | | .05 mf. | 600 | (Issue No. 2) | .20 |
| 44527 | | .1 mf. | 600 | | .20 |
| 44528 | | .25 mf. | 600 | | .20 |
| 44529 | | .5 mf. | 600 | | .25 |
| 44530 | | 1 mf. | 600 | | .30 |
| 44531 | | 2 mf. | 600 | | .40 |
| 44532 | | 3 mf. | 600 | | .50 |
| 44533 | | 4 mf. | 600 | | .60 |
| 44534 | | 5 mf. | 600 | | .70 |
| 44535 | | 6 mf. | 600 | | .80 |
| 44536 | | 7 mf. | 600 | | .90 |
| 44537 | | 8 mf. | 600 | | 1.00 |
| 44538 | | 9 mf. | 600 | | 1.10 |
| 44539 | | 10 mf. | 600 | | 1.20 |

**ELECTROLYTIC**

| Part No. | Code | Capacitance | Voltage | | List Price |
|---|---|---|---|---|---|
| 44544 | C37 | 8 mf. | 25 | | $0.25 |
| 44545 | C38 | 8 mf. | 350 | Wkg. | .25 |
| 44546 | | 8 mf. | 450 | Wkg. | .30 |

**MOLDED**

| Part No. | Code | Capacitance | Voltage | | List Price |
|---|---|---|---|---|---|
| 44547 | C28 | .01 mf. | 400 | (Issue No. 1 only) | $0.15 |
| 44548 | C48 | .02 mf. | 400 | | .15 |
| 44549 | | .05 mf. | 400 | | .15 |
| 44550 | | .1 mf. | 400 | | .15 |
| 44551 | | .25 mf. | 400 | | .15 |
| 44552 | | .5 mf. | 400 | | .20 |
| 44553 | | 1 mf. | 400 | | .25 |
| 44554 | | 2 mf. | 400 | | .35 |
| 44555 | | .01 mf. | 600 | (Issue No. 1 only) | .15 |
| 44556 | | .02 mf. | 600 | | .15 |
| 44557 | | .05 mf. | 600 | | .15 |
| 44558 | | .1 mf. | 600 | | .15 |
| 44559 | | .25 mf. | 600 | | .15 |
| 44560 | | .5 mf. | 600 | | .20 |
| 44561 | | 1 mf. | 600 | | .25 |
| 44562 | | 2 mf. | 600 | | .35 |
| 44563 | | .01 mf. | 600 | (Issue No. 2) | .20 |
| 44564 | | .02 mf. | 600 | | .20 |
| 44565 | | .05 mf. | 600 | | .20 |
| 44566 | | .1 mf. | 600 | | .20 |
| 44567 | | .25 mf. | 600 | | .20 |
| 44568 | | .5 mf. | 600 | | .25 |
| 44569 | | 1 mf. | 600 | | .30 |
| 44570 | | 2 mf. | 600 | | .40 |

**TRIMMER**

| Part No. | Code | Capacitance | | | List Price |
|---|---|---|---|---|---|
| 44571 | C2 | 25 mmf. | Wave Trap | | $0.25 |
| 44572 | C3 | 50 mmf. | Antenna Range | | .25 |
| 44573 | C4 | 100 mmf. | Antenna Range | | .25 |
| 44574 | C5 | 250 mmf. | Antenna Range | | .25 |
| 44575 | C6 | 500 mmf. | Antenna Range | | .25 |
| 44576 | C7 | 1000 mmf. | Antenna Range | | .25 |
| 44577 | C8 | 2500 mmf. | Antenna Range | | .25 |
| 44578 | C9 | 5000 mmf. | Antenna Range | | .25 |
| 44579 | C10 | 10000 mmf. | Antenna Range | | .25 |
| 44580 | C11 | 25 mmf. | Oscillator Range | | .25 |
| 44581 | C12 | 50 mmf. | Oscillator Range | | .25 |
| 44582 | C13 | 100 mmf. | Oscillator Range | | .25 |
| 44583 | C14 | 250 mmf. | Oscillator Range | | .25 |
| 44584 | C15 | 500 mmf. | Oscillator Range | | .25 |
| 44585 | C17 | 1000 mmf. | Oscillator Range | | .25 |
| 44586 | C18 | 2500 mmf. | Oscillator Range | | .25 |
| 44587 | C19 | 5000 mmf. | Oscillator Range | | .25 |
| 44588 | C20 | 10000 mmf. | Oscillator Range | | .25 |
| 44589 | C21 | 25 mmf. | 1st I.F. | | .25 |
| 44590 | C22 | 50 mmf. | 1st I.F. | | .25 |
| 44591 | C23 | 100 mmf. | 1st I.F. | | .25 |
| 44592 | C24 | 250 mmf. | 1st I.F. | | .25 |
| 44593 | C25 | 500 mmf. | 1st I.F. | | .25 |
| 44594 | C27 | 1000 mmf. | 1st I.F. | | .25 |
| 44595 | C29 | 2500 mmf. | 1st I.F. | | .25 |
| 44596 | C30 | 5000 mmf. | 1st I.F. | | .25 |
| 44597 | C31 | 10000 mmf. | 1st I.F. | | .25 |
| 44598 | C32 | 25 mmf. | 2nd I.F. | | .25 |
| 44599 | C33 | 50 mmf. | 2nd I.F. | | .25 |
| 44600 | C34 | 100 mmf. | 2nd I.F. | | .25 |
| 44601 | C35 | 250 mmf. | 2nd I.F. | | .25 |
| 44602 | C40 | 500 mmf. | 2nd I.F. | | .25 |
| 44603 | C41 | 1000 mmf. | 2nd I.F. | | .25 |
| 44604 | C42 | 2500 mmf. | 2nd I.F. | | .25 |
| 44605 | C43 | 5000 mmf. | 2nd I.F. | | .25 |
| 44606 | C44 | 10000 mmf. | 2nd I.F. | | .25 |

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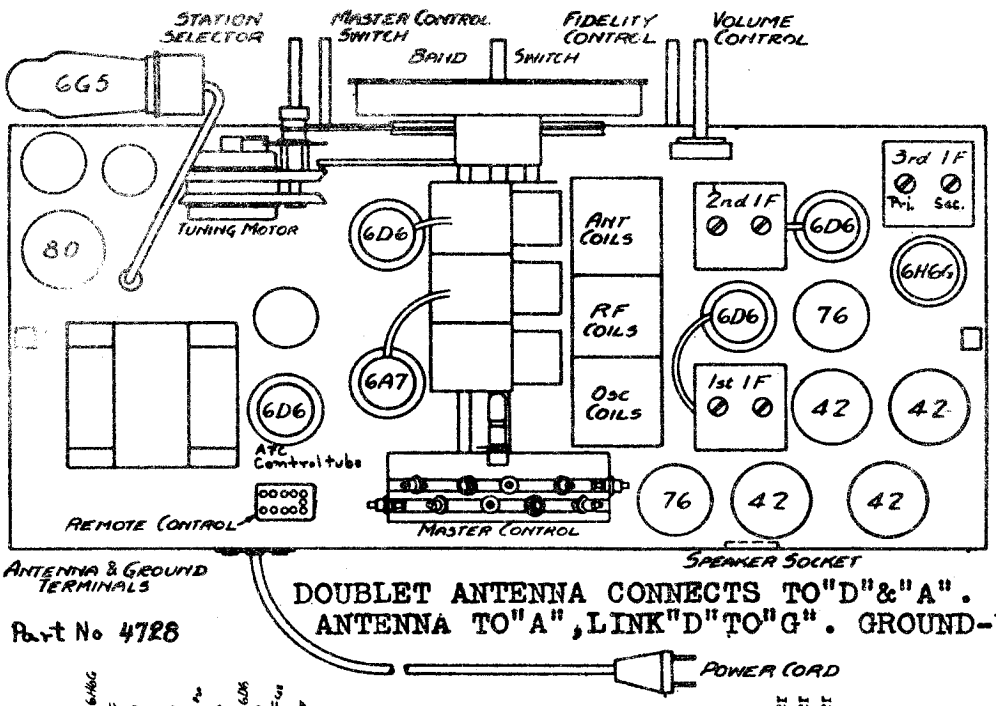
# WESTERN AUTO SUPPLY CO.

MODEL D690
Schematic, Socket
Trimmers

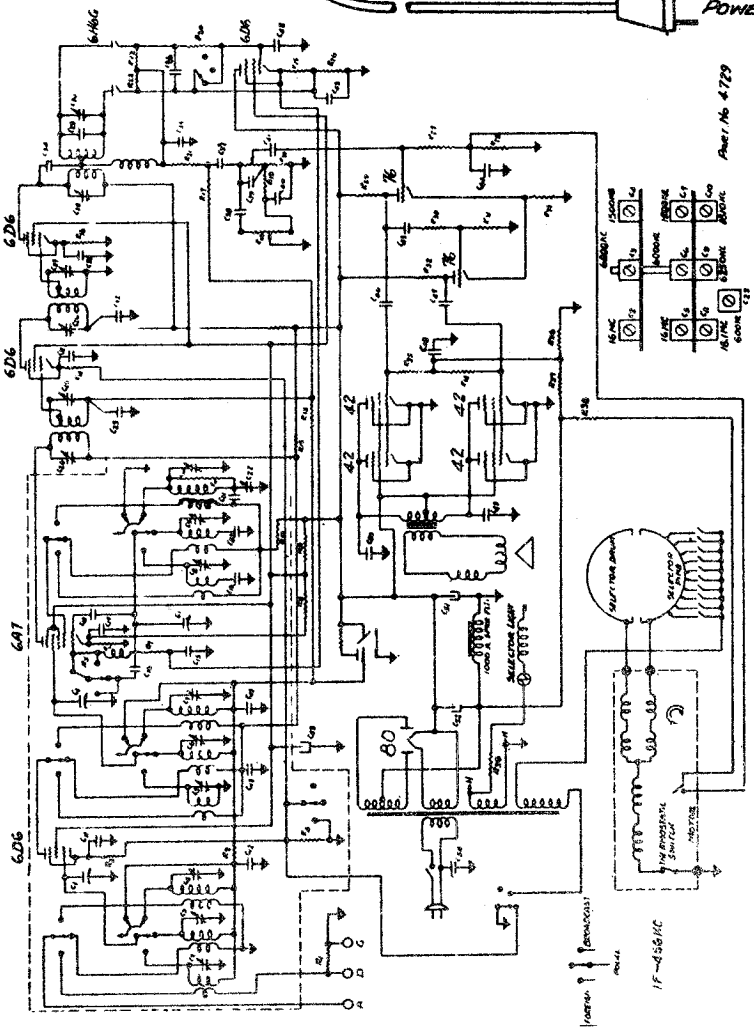



Part No 4728

DOUBLET ANTENNA CONNECTS TO "D" & "A". SINGLE-WIRE ANTENNA TO "A", LINK "D" TO "G". GROUND-WIRE TO "G".

**Frequency Ranges**
B----540-1800KC
P----1800-6250KC
F---6250-18100KC

**Power Supply:** Unless specifically stated otherwise, these receivers are designed to operate on 115 VOLTS 60 CYCLES ALTERNATING CURRENT ONLY.




| Symbol | Part No. | Description | | | |
|---|---|---|---|---|---|
| R1,13,29,32 | 2880 | 100 M 1/3W 10% | C2,3,4 | 3822 | 2-35 mmf triple trimmer |
| R2,7,21 | 631 | 50 M 1/3W | C5,6,7 | 3822 | 2-35 mmf triple trimmer |
| R3,12,14,15,16 | 2421 | 1000 ohm 1/3W | C8,9,10 | 3822 | 2-35 mmf triple trimmer |
| R4 | 2421 | 1000 ohm 1/3W | C11,12,14,17, 31,33 | 580 | .05—200 V |
| R5 | 2783 | 2500 ohm 1/3W 10% | C13,32 | 575 | .1—400 V |
| R6 | 3937 | 500 ohm ½ W Wire-wound ±10% | C15,23,42,43,44 | 572 | .1—200 V |
| R8 | 3805 | 7000 ohm 3½ W Wirewound | C16 | 2925 | 25 mmf mica |
| | | | C18 | 4676 | 8 mmf |
| R9 | 3805 | 8000 ohm 1½ W Wirewound | C19 | 2694 | .005—600 5% |
| | | | C20 | 2741 | 1330 mmf 5% |
| R10 | 600 | 10M 1/3W | C21 | | .01—400 V |
| R11 | 3581 | 3M 1/3W ±10% | C22 | 2560 | 350 mmf variable padder |
| R17,22,23,24, 28,27,30 | 2599 | 1 meg 1/3W 10% | C34,35 | 1285 | 100 mmf mica |
| R18 | 2737 | 2 meg tone control | C36,48 | 2792 | .2—200 V |
| R20 | 3800 | 3 meg volume control | C37,41 | 576 | .02—400 V |
| R25 | 2572 | 400 ohm 1/3W 10% | C38,40 | 824 | .002—600 V |
| R26 | 2691 | 500 ohm 1/3W 10% | C39 | 2780 | 50 mmf mica |
| R33,34,19 | 2730 | 200 M 1/3W 10% | C45,46,47 | 2600 | .02—600 V |
| R36 | | 150 M 1/3W 10% | C49,50 | 2601 | .01—600 V |
| R38,37 | 2731 | 500 M 1/3W 10% | C51 | 4062 | 30 MF 275 V |
| R39 | | 20 ohm 1 W | C52 | 4649 | 24 MF 450 V |
| Ci | | 400 mmf variable | C53 | 3079 | 8 MF 150 V |
| | | | C54 | 3135 | .003—800 V |

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MODEL D690
Alignment
Tuner Data

# WESTERN AUTO SUPPLY CO.

## INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE ELECTRIC AUTOMATIC TUNING SYSTEM

Before attempting to adjust the automatic tuner, read the following instructions carefully and proceed exactly as directed. Setting up the ***Master Selector*** requires no tools, and is very easily accomplished when the proper procedure is followed.

The tuning unit consists essentially of three parts, which may be described briefly as follows:

**Master Selector:** This includes the ***Selector Drum,*** the ***Selector Pins,*** and the ***Selector Light.*** These parts are mounted on the rear of the variable condenser, together with their associated brackets and wiring.

**Motor and Drive:** This assembly consists of an induction motor having a mechanical drive clutch with magnetic throw-out, and a train of gears operating directly onto the ***Manual Station Selector*** drive shaft. No oiling is necessary.

**Push Button Assembly:** These buttons are located on the front of the chassis, and extend through the escutcheon above the dial. Stations are tuned in automatically when the button with the call letters of the desired station is depressed and held down until the motor stops and the station is heard. When the button is pushed down, an automatic silencer mutes the receiver until the desired station is exactly on tune.

## SETTING UP THE MASTER SELECTOR

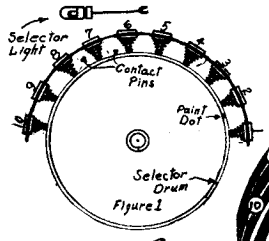


Figure 1

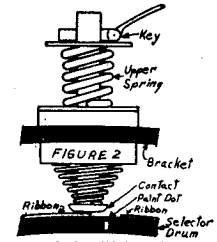


FIGURE 2

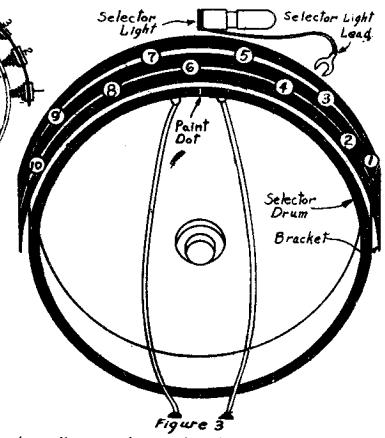


Figure 3

As a means of simplifying these operations, list ten of your favorite local or strong near-by stations according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left-hand end of the dial (nearest 600 kc) the No. 1 station, and number the other stations similarly going from left to right across the dial. For example, assume that your favorite stations operate on frequencies of 600 kc, 700 kc, 800 kc, 900 kc, 1000 kc, 1100 kc, 1200 kc, 1300 kc, 1400 kc, and 1500 kc. Then the 600 kc station would be No. 1, the 700 kc station would be No. 2, and so on down the list with the 1500 kc station being designated No. 10. Reference to the push buttons is not necessary since they are not used until After the Master Selector has been set up.

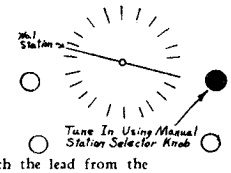
On the back of the receiver will be found the ***Selector Drum*** and the ten ***Contact Pins*** which determine the points at which the tuner will stop when the buttons are pressed. Referring to the diagrams, ***Fig. 1*** shows the general layout and relation of the drum and contacts. ***Fig. 2*** shows one of the contact pins in detail: note that while the position of the contact may be varied at will by sliding it along the slot in the bracket, it is held securely by a strong spring which will not allow it to move when the selector drum turns under it. ***Fig. 3*** shows the arrangement of the ***Contact Pins,*** each pin being numbered according to the system suggested for numbering the station, thus ***pin No. 1*** will be used for ***Station No. 1, pin No. 2*** will be used for ***Station No. 2,*** and so on down the list.

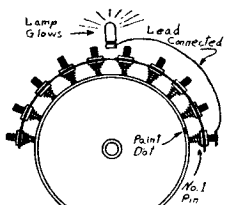
On the ***Selector Drum*** are two pairs of ***Contact Ribbons.*** Note that there is a ***Paint Dot*** on the edge of the drum directly opposite the break in the ribbons on the upper half of the drum. This ***Paint Dot*** is for the purpose of locating the approximate position at which a given ***Contact Pin*** should be set in order to have the ***Drum*** stop for a particular station.

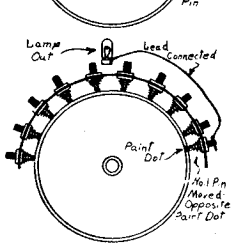
It is very important that the following steps be followed exactly as outlined; any deviation may necessitate re-setting some of the stations:

1. Set the receiver for reception of Standard Broadcast Stations as outlined previously under "Operation." Turn the Master Control Switch to the extreme right-hand position and wait about ten minutes to allow the tubes to reach their final operating temperature.

2. Using the Manual Station Selector (upper right) knob, tune in the No. 1 station, that is, the one nearest the 600 kc end of the dial. Watch the tuning eye closely, making certain that the station is tuned in perfectly.




3. Face the rear of the chassis. Attach the lead from the ***Selector Light*** to the ***No. 1 Contact Pin;*** unless the pin happens to be set exactly, the lamp will glow when the lead is touched to the pin.

4. Observe the position of the ***Paint Dot*** on the edge of the ***Drum.*** Grasp the No. 1 pin firmly and slide it toward the ***Paint Dot,*** being careful not to break the connection between the ***Selector Light*** lead and the pin. When the pin is directly opposite the ***Paint Dot,*** the light will go out, indicating that the contact is properly set. To insure greatest accuracy in making the setting, slide the pin back and forth across the break between the ribbons, leaving it set half way between the points where the lamp lights. ***Be very careful not to move the Selector Drum while the pin is being set.*** When the pin is definitely in its proper position, ***Disconnect the Selector Light Lead from the Pin.***

5. Repeat the above procedure for the ***No. 2*** station; tune in the station, connect the ***Selector Light*** lead to the ***No. 2*** contact pin, move this pin opposite the ***Paint Dot*** so that the light goes out, then ***Disconnect the Selector Light Lead.***

6. Using similar procedure, set up the other eight stations, in each case using the ***Contact Pin*** bearing the ***same number as that assigned to the station being set up.*** Always ***Disconnect the Selector Light Lead*** as soon as a station has been set up; failure to do so will cause the receiver to hum, and may result in the lamp being burned out.

7. After all the stations have been set up, located the Call Letters of your stations on the printed sheets supplied with the receiver. Remove the desired call letter discs from the sheets. Remove the metal ferrules from the buttons, place the call letter discs behind the celluloid and press the ferrules back on the proper buttons.

8. The only operations necessary to receive any of the ten stations set up as outlined above are: Turn the Master Control Switch to the Center position, allow about one minute for the tubes to heat, press the button with the call letters of the desired station Holding the Button Down Until the Pointer Stops Moving and the Station is Heard, then adjust the tone and volume. Be sure that the Band Selector switch is in the proper position for reception of Standard Broadcast stations.

## ALINEMENT PROCEDURE

The Master Control Switch must be turned to the extreme right hand position for all alinement.

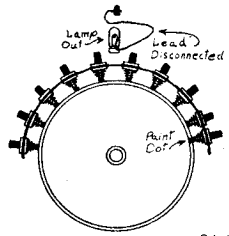
IF. Connect generator ground to receiver chassis. Using .1 mfd. condenser in series with the high side of the generator, apply 456 kc. signal to the grid of the 6D6 second IF amplifier tube and aline the PRIMARY only of the third IF transformer. (See above diagram.) Connect generator to grid of 6D6 first IF tube and aline the second IF transformer. Repeat for transformer No. 1 applying signal to grid of 6A7 translator.

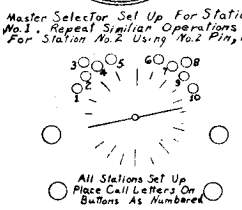
RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

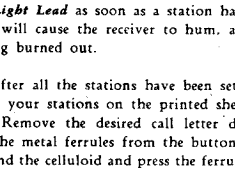
A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc, then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

AFC. Connect a high resistance DC voltmeter between the cathode of the 6D6 AFC control tube and ground. Turn the Master Control Switch to the CENTER position and the Band Selector Switch to the extreme left hand position. Apply a strong 456 kc. signal to the grid of the 6A7 translator and adjust the secondary of the third IF transformer until the voltage is the same as with no signal.

FOR OPERATING SUGGESTIONS SEE MODEL D691.




**Tubes required are:**

1—6D6 Radio Frequency Amplifier
1—6A7 Oscillator—translator
2—6D6 Intermediate Frequency Amplifiers
1—6H6G Detector AVC—Discriminator
1—6G5 Cathode Ray Tuning Tube
1—6D6 AFC Control
1—76 Driver
1—76 Phase Inverter
4—42 Power Output
1—80 Rectifier

**Master Control Switch:** The extreme left position turns the power off. The center position connects the motor and the automatic frequency control for automatic tuning. The right hand position disconnects the motor and automatic frequency control, and increases sensitivity for manual tuning of weak stations. (The right hand position is also used for setting up stations for automatic tuning.)

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# WESTERN AUTO SUPPLY CO.

MODEL D691
Schematic, Socket
Trimmers, Alignment

## ALIGNMENT OF SHORT-WAVE BANDS ON NEXT PAGE




| Symbol | Part No. | Description | | Part No. | Description |
|---|---|---|---|---|---|
| C1.2.3 | 4354 | Variable Condenser | R4 | 617 | 20 M 1/3 W |
| C4.9 | 1611 | 3-35 MMF trimmer | R5 | 4530 | 30 M 1 W |
| C5.6.7.8 | 2597 | 1-10 MMF trimmer | R7.11.13 | 624 | 1 Meg 1/3 W |
| C10 | 2780 | 50 MMF mica | R9 | | 500 M volume control |
| C11 | 2793 | .006-600 V 5% | R10 | | 2 Meg tone control |
| C12 | 2741 | 1330 MMF mica 5% | R12.22 | 2731 | 500 M 1/3 W 10% |
| C13 | 2560 | 200-400 MMF padder | R14.18.19.20.21 | 2730 | 200 M 1/3 W 10% |
| C14 | 576 | .02-400 V | R15 | 2599 | 1 Meg 1/3 W 10% |
| C15 | | IF trimmers | R16 | 2568 | 300 M 1/3 W 10% |
| C16.25 | 2792 | .2-200 V | R17 | 4529 | 10 M 1/3 W 10% |
| C17 | 4528 | 4 MF—150 V | R23 | 3580 | 10 ohm 1/2 W 10% |
| C18.32 | 1286 | 250 MMF mica | R24 | 4535 | 20 ohm 1 W 10% |
| C19 | 576 | .02-400 V | Do not use tubes of types different from those shown above. | | |
| C20 | 572 | .1-200 V | | | |
| C21 | 581 | .005-600 V | | | |
| C22.24 | 2600 | .02-600 V | | | |
| C23 | 563 | .05-400 V | | | |
| C26.27 | 2601 | .01-600 V | | | |
| C28 | 3135 | .003-800 V | | | |
| C29 | 3375 | 16 MF—450 V | | | |
| C30 | 4062 | 30 MF—275 V | | | |
| C31 | 580 | .05-200 V | | | |
| R1.6.8 | 631 | 50 M 1/3 W | | | |
| R2.3 | 2689 | 100 ohm 1/3 W 10% | | | |

## ALINEMENT PROCEDURE

**IF.** Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6D6 IF amplifier tube and aline second IF transformer trimmers. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

**RF.** (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1680 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1400-1500 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

Unless specifically stated otherwise, these receivers are designed to operate on *115 volts 60 cycles alternating current only.*

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MODEL D691
Tuner Data
Alignment

# WESTERN AUTO SUPPLY CO.

## ALIGNMENT OF SHORT-WAVE BANDS

**Tubes required are:** 1—6A7 Oscillator-translator
1—6D6 Intermediate Frequency Amplifier
1—6Q7G Detector AVC—First Audio Amplifier
1—76 Driver—Phase Inverter
1—76 Silencer
4—42 Power Output
1—80 Rectifier
1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 5400 kc., then aline the antenna trimmer at about 5000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency band to 16,000 kc., and aline the antenna trimmer at about 15,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmed down tight, then unscrew to the second peak. The antenna trimmer should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

## INSTRUCTIONS FOR ADJUSTMENT AND OPERATION OF THE D691 ELECTRIC AUTOMATIC TUNING SYSTEM

Before attempting to adjust the automatic tuner, read the following instructions carefully and proceed exactly as directed. Setting up the *Master Selector* requires no tools, and is very easily accomplished when the proper procedure is followed.

The tuning unit consists essentially of three parts, which may be described briefly as follows:

**Master Selector.** This includes the *Selector Drum*, the *Selector Pins*, and the *Selector Light*. These parts are mounted on the rear of the variable condenser, together with their associated brackets and wiring.

**Motor and Drive.** This assembly consists of an induction motor having a mechanical drive clutch with magnetic throw-out, and a train of gears operating directly onto the *Manual Station Selector* drive shaft. No oiling is necessary.

**Push Button Assembly.** These buttons are located on the front of the chassis, and extend through the escutcheon below the dial. Stations are tuned in automatically when the button under the call letters of the desired station is depressed and held down until the motor stops and the station is heard. When the button is pushed down, an automatic silencer mutes the receiver until the desired station is exactly on tune.

### SETTING UP THE MASTER SELECTOR

As a means of simplifying these operations, list eight of your favorite *local* or strong near-by stations according to frequency or position on the dial. Setting up weak or distant stations is not recommended. Call the station nearest the left-hand end of the dial (nearest 1600 kc) the *No. 1* station, and number the other stations similarly going from left to right across the dial. For example, assume that you favorite stations operate on frequencies of 1500 kc, 1400 kc, 1300 kc, 1200 kc, 1000 kc, 900 kc, 700 kc, and 600 kc. Then the 1500 kc station would be *No. 1*, the 1400 kc station would be *No. 2*, and so on down the list with the 600 kc station being designated *No. 8*. Reference to the push buttons is not necessary since they are not used until *After* the *Master Selector* has been set up.

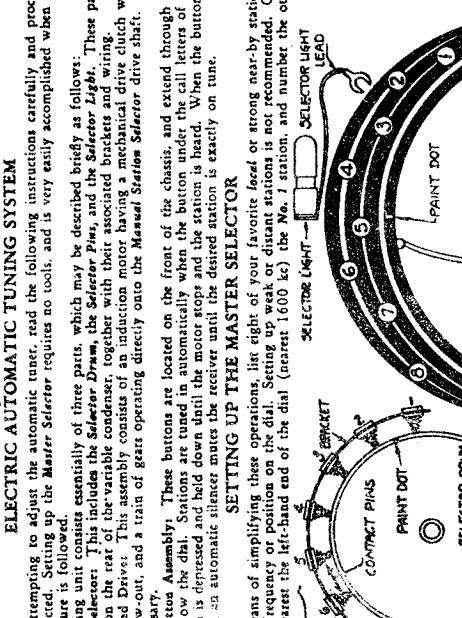


FIGURE 1 FIGURE 2 FIGURE 3

On the back of the receiver will be found the *Selector Drum* and the eight *Contact Pins* which determine the points at which the tuner will stop when the buttons are pressed. Referring to the diagrams, *Fig. 1* shows the general layout and relation of the drum and contacts. *Fig. 2* shows one of the contact pins in detail: note that while the position of the contact may be varied at will by sliding it along the slot in the bracket, it is held securely by a strong spring which will not allow it to move when the selector drum turns under it. *Fig. 3* shows the arrangement of the *Contact Pins*, each pin being numbered according to the system suggested for numbering the stations, thus *pin No. 1* will be used for *Station No. 1*, *pin No. 2* will be used for *Station No. 2*, and so on down the list.

On the *Selector Drum* are two pairs of *Contact Ribbons*. Note that there is a *Paint Dot* on the edge of the drum directly opposite the break in the ribbons on the upper half of the drum. This *Paint Dot* is for the purpose of locating the approximate position at which a given *Contact Pin* should be set in order to have the *Drum* stop for a particular station.

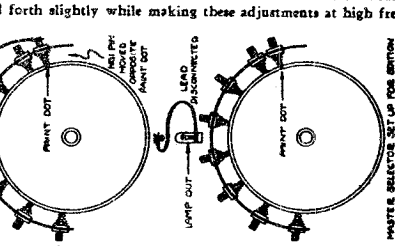
It is very important that the following steps be followed exactly as outlined: any deviation may necessitate re-setting some of the stations:

1. Set the receiver for reception of *Standard Broadcast Stations*, as outlined previously under *"Operation."* Turn the receiver *"On,"* let it run for *at Least Ten Minutes* to allow the tubes to reach their final operating temperature.

2. Using the *Manual Station Selector* (upper right) knob, tune in the No. 1 station, that is, the one nearest the 1600 kc end of the dial. Watch the tuning eye closely, making certain that the station is tuned in perfectly.

3. Face the rear of the chassis. Attach the lead from the *Selector Light* to the *No. 1 Contact Pin*; unless the pin happens to be set exactly, the lamp will glow when the lead is touched to the pin.

4. Observe the position of the *Paint Dot* on the edge of the *Drum*. Grasp the No. 1 pin firmly and slide it toward the *Paint Dot*, being careful not to break the connection between the *Selector Light* lead and the pin. When the pin is directly opposite the *Paint Dot*, the light will go out, indicating that the contact is properly set. To insure greatest accuracy in making this setting, slide the pin back and forth across the break between the ribbons, leaving it set half way between the points where the lamp lights. *Be very careful not to move the Selector Drum while the pin is being set.* When the pin is definitely in its proper position, *Disconnect the Selector Light Lead from the Pin.*

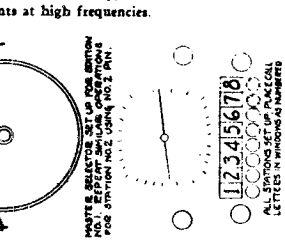



5. Repeat the above procedure for the *No. 2* station: tune in the station, connect the *Selector Light* lead to the *No. 2* contact pin, move this pin opposite the *Paint Dot* so that the light goes out, then *Disconnect the Selector Light Lead.*

6. Using similar procedure, set up the other six stations, in each case using the *Contact Pin* bearing the *same number as that assigned to the station being set up.* Always *Disconnect the Selector Light Lead* as soon as a station has been set up; failure to do so will cause the receiver to hum, and may result in the lamp being burned out.

7. After all the stations have been set up, locate the *Call Letters* of your stations on the printed sheets supplied with the receiver. Remove the desired call letter blocks from the sheets, and insert them in the proper pockets above the push buttons.

8. The only operations necessary to receive any of the eight stations set up as outlined above are: Turn the power switch on by rotating the lower left knob to the right—*turn the control a few degrees beyond the point at which the switch snaps on* — allow about one minute for the tubes to heat, press the button under the call letters of the desired station *Holding the Button Down Until the Pointer Stops Moving and the Station is Heard*, then adjust the tone and volume. Be sure that the *Band Selector* switch is in the proper position for reception of *Standard Broadcast Stations.*


MASTER SELECTOR SET UP FOR STATION NO.1. REPEAT SIMILAR OPERATIONS FOR STATION NO.2 USING NO.2 PIN.
1 2 3 4 5 6 7 8
ALL STATIONS SET UP PLACE CALL LETTERS IN WINDOWS AS NUMBERED

### OPERATING SUGGESTIONS

Be sure that your stations are listed in the proper order according to frequency or position on the dial. Do not confuse frequency (kilocycles) with wave length (meters).

Be sure that your stations are tuned in exactly before setting the contact pins.

Do not set up weak stations, or distant stations too weak to afford clear reception at all times.

Do not press more than one button at a time. Holdi down more than one button will cause inaccurate tuning, or the motor may not turn at all.

*Do not leave the Selector Light Lead connected after pins are set up.*

*Do not run the motor for excessively long periods of time.* While no damage will result, a protective cut-out will shut off the power to the motor after four to five minutes of *continuous* operation, and the automatic tuner will not function again until the motor has been allowed to cool for several minutes.

When tuning stations, *do not release the button until the pointer stops moving.*

Do not attempt to set adjacent pins in the same slot too close together.

Do not expect good results unless a good outdoor antenna is used.

Do not change the relative positions of the contact pins; keep them in the same order as shown on the diagram (Figure 3).

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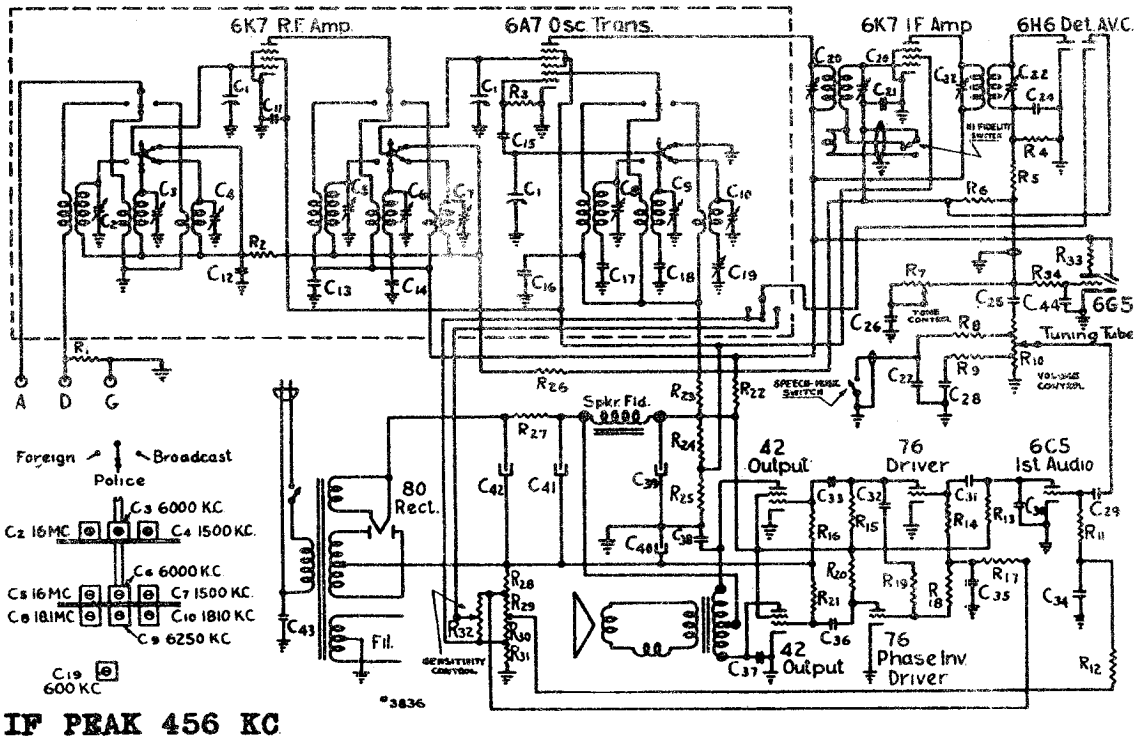
# WESTERN AUTO SUPPLY CO.

MODEL D692, Early
Schematic

## Tubes

Tubes required are:

1—6K7 Radio frequency amplifier
1—6A7 Oscillator—translator
1—6K7 Intermediate frequency amplifier
1—6H6 Detector—automatic volume control
1—6C5 First audio amplifier
1—6G5 Cathode ray tuning tube (on models equipped with "eye" tuning indicator)
1—76 Driver
1—76 Driver-phase inverter
2—42 Power output
1—80 Rectifier




## IF PEAK 456 KC

| Symbol | Part No. | Description |
|---|---|---|
| C1 | 3814 | 9-400 mmf Variable |
| C2,3,4 | 3822 | 2-35 triple trimmer |
| C5,6,7 | 3822 | 2-35 triple trimmer |
| C8,9,10 | 3822 | 2-35 triple trimmer |
| C11,21,34 | 572 | .1—200 V. |
| C12,14 | 580 | .05 200 V. |
| C13 | 575 | .1 400 V. |
| C15,24 | 2780 | 50 mmf mica |
| C16 | 568 | .01 400 V. |
| C17 | 2694 | .005 5% tolerance |
| C18 | 2741 | 1330 mmf 5% tolerance |
| C19 | 2560 | 350 mmf variable padder |
| C20,22 | | IF Trimmers |
| C25,28 | 2385 | .02 200 V. |
| C26 | 2695 | .003 600 V. |
| C27 | 824 | .002 600 V. |
| C29 | 576 | .02 400 V. |
| C30 | 1286 | 250 mmf mica |
| C31,33,36 | 2600 | .02 600 V. |
| C32 | 563 | .05 400 V. |
| C35 | 579 | .25 200 V. |
| C37,38 | 3138 | .001 800 V. |
| C39 | 3113 | 16 MF regulating |
| C40 | 3136 | 20 MF 25 V. |
| C41 | 3112 | 16 MF 450 V. |
| C42 | 3111 | 16 MF 500 V. |
| C43 | 3135 | .003 800 V. |
| R1,5,15,20,26 | 603 | 100 M 1/3 W. |
| R2,3,13 | 631 | 50 M 1/3 W. |
| R4,14,16,21 | 615 | 500 M 1/3 W. |
| R6 | 2693 | 2 meg 1/3 W. |
| R7 | 3799 | 2 meg tone control |
| R8,17 | 2568 | 300 M 1/3 W. |
| R9,23 | 617 | 20 M 1/3 W. |
| R10 | 3800 | 3 meg volume control |
| R11,12 | 624 | 1 meg 1/3 W. |
| R18 | 2688 | 60 M 1/3 W. 10% |
| R19 | 2731 | 500 M 1/3 W. 10% |
| R22 | 2421 | 1 M 1/3 W. |
| R24 | 3805 | 7 M 3.5 W. |
| R25 | 3805 | 8 M 1.5 W. |
| R27 | 3809 | 100 ohms 2 W. 10% |
| R28 | 3806 | 120 ohms 1.5 W. 10% |
| R29 | 3808 | 50 ohms .75 W. 10% |
| R30 | 3807 | 35 ohms .5 W. 10% |
| R31 | 3870 | 15 ohms .5 W. 10% |
| R32 | 3801 | 2 M Variable |
| | 3796 | Power transformer |
| | 3797 | No. 1 IF transformer |
| | 3798 | No. 2 IF transformer |
| | 2981 | Tuning tube cable |
| | 3838 | 12" Speaker |
| | 2898 | Tuning tube clamp |
| | 3815 | RF coil |
| | 3943 | Oscillator coil |
| | 3817 | Antenna coil |
| | 3825 | Planetary drive |
| | 3826 | Drive belt |
| | 3198 | Idler pulley |
| | 3199 | Idler spring |
| | 3831 | Minute pointer |
| | 3832 | Tuning pointer |
| | 3802 | On-off switch |
| | 3818 | RF and Antenna switch |
| | 3819 | Oscillator switch |

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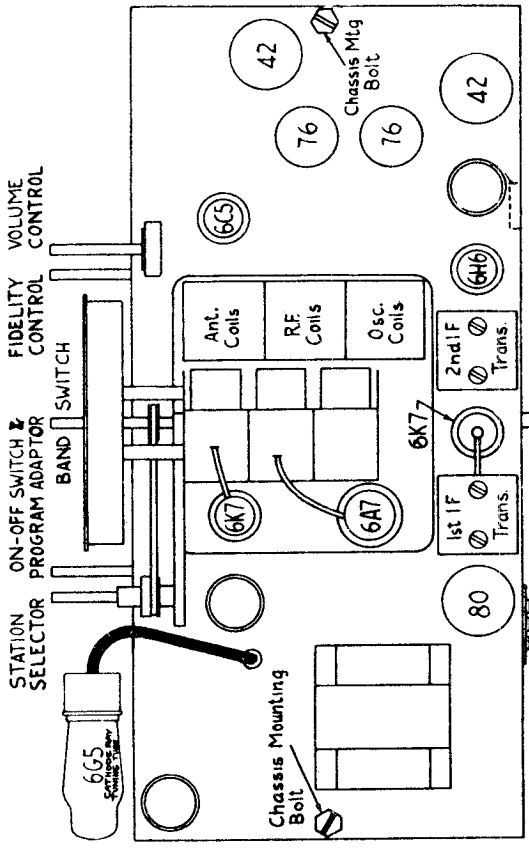
MODEL D692,Early
MODEL D694
Alignment,Socket
Trimmers

# WESTERN AUTO SUPPLY CO.

## MODEL D-692 (EARLY)

TUBE LAYOUT *and* CONNECTION DIAGRAM




Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

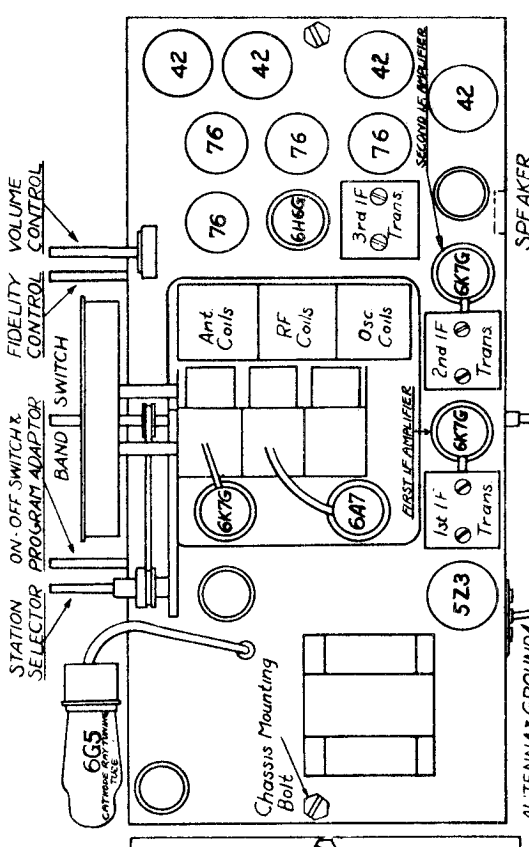
Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position."

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of the generator, apply 456 kc. signal to the grid of the 6K7 IF amplifier tube and aline second IF transformer trimmes. Repeat for first IF transformer, applying signal to grid of the 6A7 tube. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position. adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position. adjust the top frequency of the high frequency to 18.100 kc., and aline the antenna and RF trimmers at about 16.000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight. then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight. then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

## MODEL D-694




Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position.

IF. Connect the generator ground to receiver chassis. Using .1 mfd. condenser in series with high side of generator, apply 456 kc. signal to grid of 6K7G second IF amplifier and aline transformer No. 3. Repeat for transformer No. 2. applying signal to grid of 6K7G first IF amplifier. Repeat for transformer No. 1. applying signal to grid of 6A7 translator. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator. turn band selector switch all the way to the left. tuning condenser to minimum capacity. feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position. adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position. adjust the top frequency of the high frequency to 18.100 kc., and aline the antenna and RF trimmers at about 16.000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight. then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight. then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

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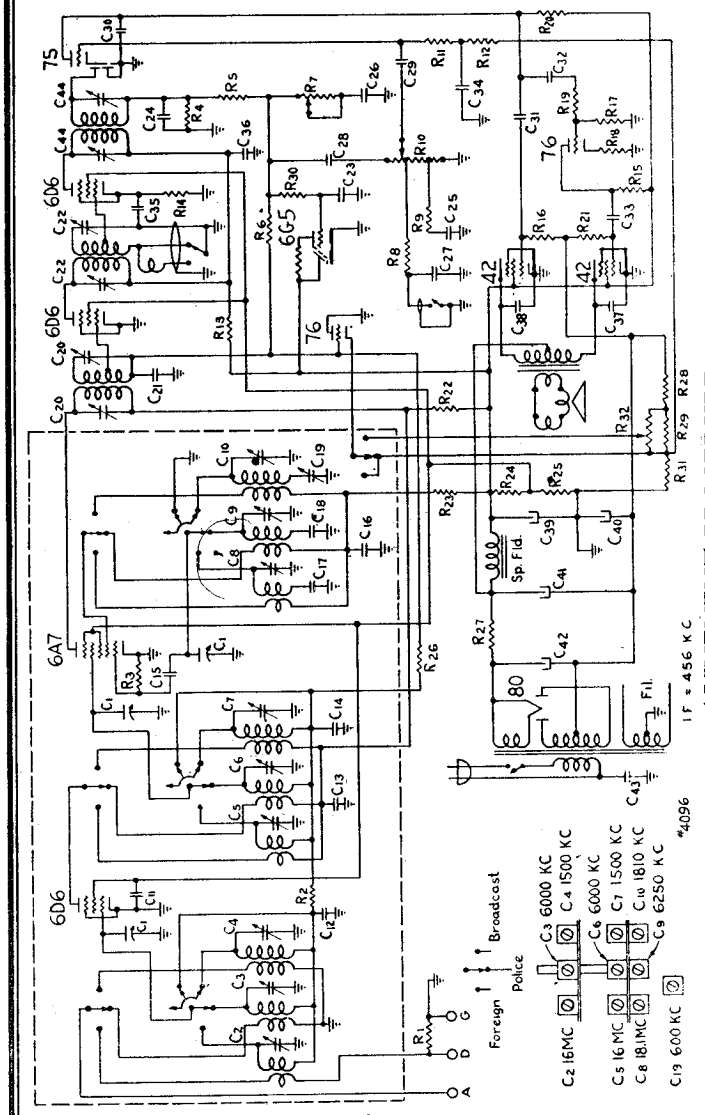
# WESTERN AUTO SUPPLY CO.

MODEL D692, Late
Schematic
Alignment




## ALINEMENT PROCEDURE

Connect a high impedance AC voltmeter across the loudspeaker terminals. Volume control should be set a few degrees back of maximum volume position. Use a weak signal from the generator, strong signals tend to cause improper adjustments.

Be sure that the fidelity control is NOT in the HIGH FIDELITY position. It will not be possible to properly aline the receiver unless this control is turned part way toward its "bass" position.

IF. Connect the generator ground to receiver chassis. Using .1 mfd condenser in series with high side of generator, apply 456 kc signal to grid of 6D6 second IF amplifier and aline transformer No. 3. Repeat for transformer No. 2, applying signal to grid of 6D6 first IF amplifier. Repeat for transformer No. 1, applying signal to grid of 6A7 translator. (See above diagram for location of tubes and transformers.)

RF. (See circuit diagram for location of trimmers.) Using a 200 mmf. condenser in series with the high side of the generator, turn band selector switch all the way to the left, tuning condenser to minimum capacity, feed 1810 kc. signal to antenna terminal and adjust broadcast oscillator trimmer for top frequency. Set generator frequency at some point around 1500-1600 kc., and adjust broadcast antenna and RF trimmers. Set generator for 600 kc., tune receiver to signal and adjust the padder. The tuning condenser should be rocked back and forth through the signal while varying the padder in order to assure perfect alinement.

A 400 ohm resistor must be used in series with the generator as a "dummy" antenna for proper alinement of the two short wave bands. Set the band selector switch in the center position, adjust the oscillator top frequency for 6250 kc., then aline the antenna and RF trimmers at about 6000 kc. With the band selector in the extreme right position, adjust the top frequency of the high frequency to 18,100 kc., and aline the antenna and RF trimmers at about 16,000 kc. In order to make sure that the top end of the last band is set properly, it is best to screw the oscillator trimmer down tight, then unscrew to the second peak. The antenna and RF trimmers should be screwed down tight, then unscrewed to the first peak. This procedure must be followed in order that the oscillator and RF circuits will be set in the correct relation to each other, otherwise a "dead" spot at a lower frequency will result, and the dial calibration will not be correct. Usually, it is best to rock the tuning condenser back and forth slightly while making these adjustments at high frequencies.

| Symbol | Part No. | Description |
|---|---|---|
| C1 | 3814 | 9-400 mmf Variable |
| C2,3,4 | 3822 | 2-35 triple trimmer |
| C5,6,7 | 3822 | 2-35 triple trimmer |
| C8,9,10 | 3822 | 2-35 triple trimmer |
| C11,21,34 | 572 | .1-200 V. |
| C12,14,23 | 580 | .05-200 V. |
| C13 | 575 | .1-400 V. |
| C15,24 | 2780 | 50 mmf mica |
| C16,35 | 568 | .01-400 V. |
| C17 | 2694 | .005 5% tolerance |
| C18 | 2741 | 1330 mmf 5% tolerance |
| C19 | 2560 | 350 mmf variable padder |
| C20,22,44 | | IF Trimmer |
| C25 | 4072 | .03-200 V. |
| C26 | 2695 | .003-600 V. |
| C27 | 824 | .002-600 V. |
| C28,29 | 576 | .02-400 V. |
| C30 | 1286 | 250 mmf mica |
| C31,33 | 2600 | .02-600 V. |
| C32,36 | 563 | .05-400 V. |
| C37,38 | 3138 | .001-800 V. |
| C39 | 3113 | 16 MF regulating |
| C40 | 3136 | 20 MF 25 V. |
| C41 | 3112 | 16 MF 450 V. |
| C42 | 3111 | 16 MF 500 V. |
| C43 | 3135 | .003-800 V. |
| R1,5,15,26 | 603 | 100 M 1/3 W. |

| Symbol | Part No. | Description |
|---|---|---|
| R10 | 3800 | 3 meg volume control |
| R11,12 | 624 | 1 meg 1/3 W. |
| R13,14,22 | 2421 | 1 M 1/3 W. |
| R17 | 2880 | 100 M 1/3 W. 10 % |
| R18 | 614 | 5 M 1/3 W. |
| R19 | 2731 | 500 M 1/3 W. 10% |
| R20 | 598 | 200 M 1/3 W. |
| R24 | 3805 | 7 M 3.5 W. |
| R25 | 3805 | 8 M 1.5 W. |
| R27 | 3809 | 100 ohms 2 W. 10% |
| R28 | 3806 | 120 ohms 1.5 W. 10% |
| R29 | 4111 | 85 ohms 1.0 W. 10% |
| R30 | 2106 | 3 meg 1/3 W. |
| R31 | 3870 | 15 ohms .5 W. 10% |
| R32 | 3801 | 2 M variable |
| R2,3 | 631 | 50 M 1/3 W. |
| R4,16,21 | 615 | 500 M 1/3 W. |
| R6 | 2693 | 2 meg 1/3 W. |
| R7 | 3799 | 2 meg tone control |
| R8 | 2568 | 300 M 1/3 W. |
| R9,23 | 617 | 20 M 1/3 W. |

| | |
|---|---|
| 3796 | Power transformer |
| 4061 | No. 1 IF transformer |
| 4060 | No. 2 IF transformer |
| 3968 | No. 3 IF transformer |
| 2981 | Tuning tube cable |
| 3838 | 12" Speaker |
| 2898 | Tuning tube clamp |
| 3815 | RF coil |
| 3943 | Oscillator coil |
| 3817 | Antenna coil |
| 4105 | Drive belt |
| 3198 | Idler pulley |
| 3199 | Idler spring |
| 3831 | Minute pointer |
| 3832 | Tuning pointer |
| 3802 | On-off switch |
| 3818 | RF and Antenna switch |
| 3819 | Oscillator switch |

# MODEL D-692 (LATE)

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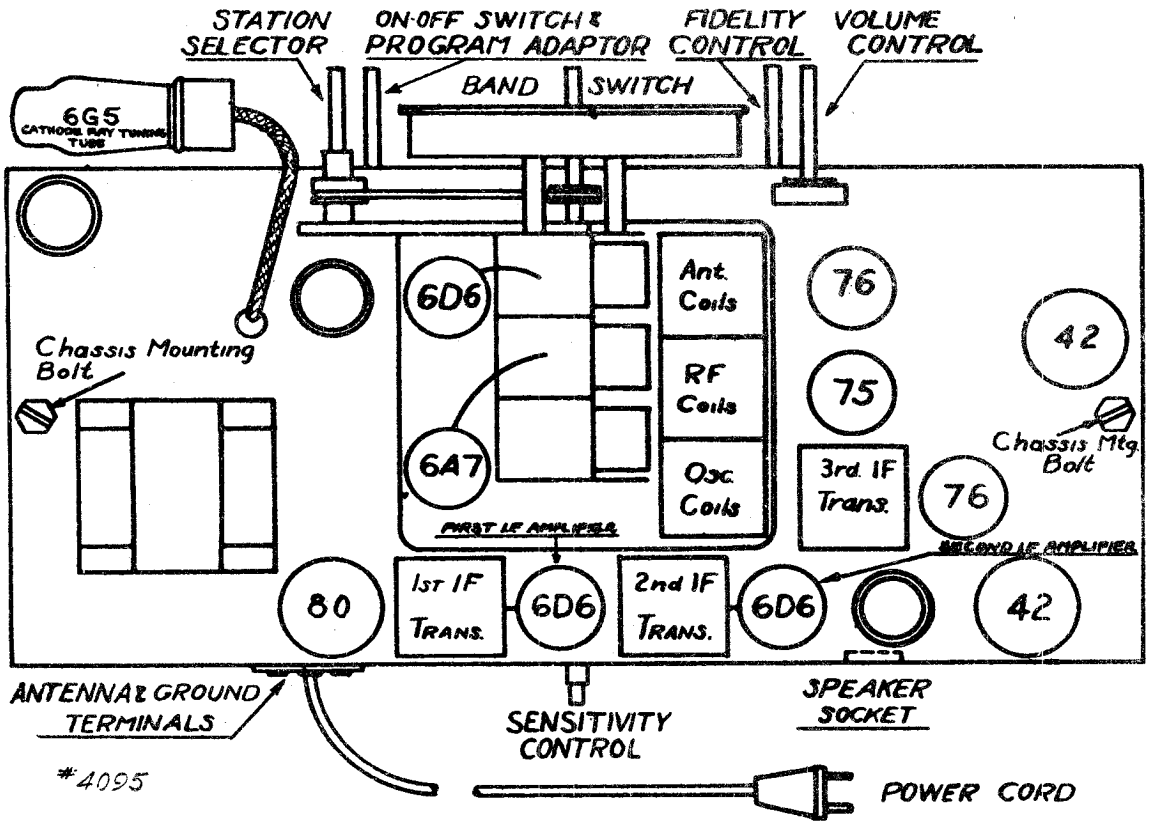
MODEL D692, Late
Socket, Trimmers
Antenna Data

# WESTERN AUTO SUPPLY CO.




**Tubes must be in proper position and connected as shown.**

Tubes required are:
1—6D6 Radio Frequency Amplifier
1—6A7 Oscillator-translator
2—6D6 Intermediate Frequency Amplifiers
1—76 Automatic Bias Control
1—75 Detector AVC—First Audio Amplifier
1—76 Driver—Phase Inverter
2—42 Power Output
1—80 Rectifier
1—6G5 Cathode Ray Tuning Tube (on models equipped with "eye" tuning indicator)

Do not use tubes of types different from those shown above. When replacing tubes or checking connections, refer to the TUBE LAYOUT CHART.

**Connections**

Turn the lower right knob to the left as far as it will go. This turns the power switch "off."

Connect the antenna and ground leads to the receiver as shown on the diagrams below. For use with a single wire antenna, connect as shown on Figure 1. If used with a doublet antenna, connect according to Figure 2.

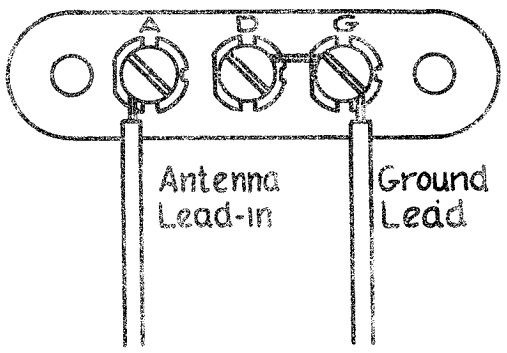



Fig. 1

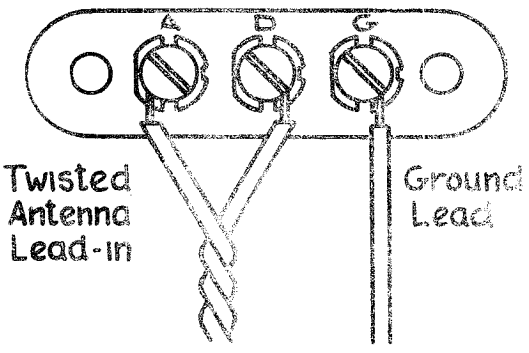



Fig. 2

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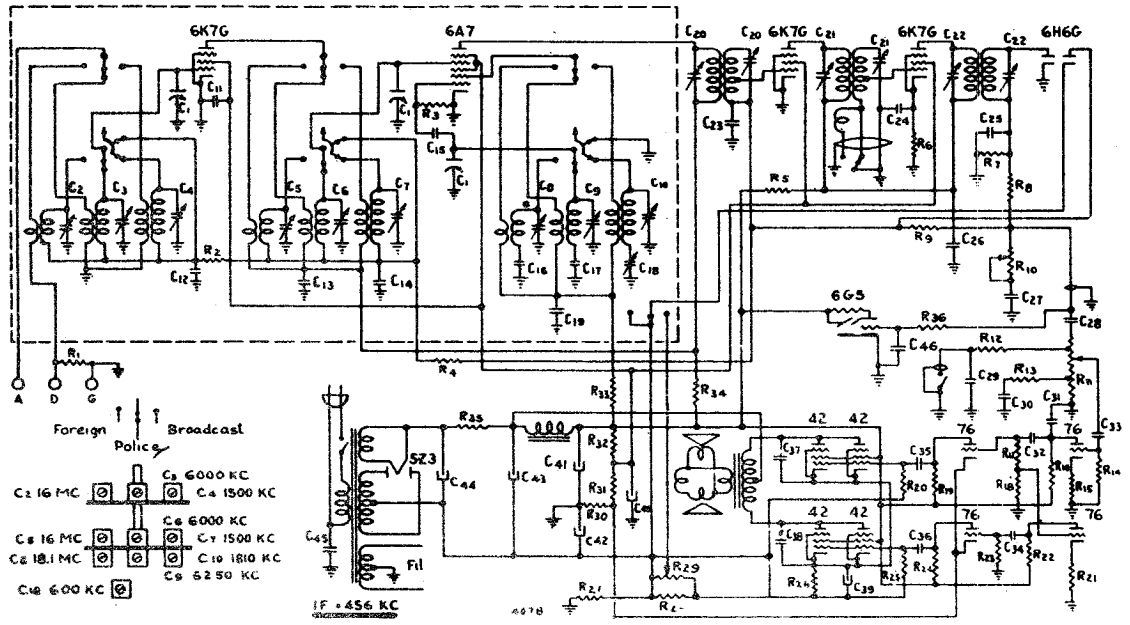
MODEL D694
Schematic

# WESTERN AUTO SUPPLY CO.

## Tubes

Tubes required are:
1—6K7G Radio frequency Amplifier
1—6A7 Oscillator—Translator
2—6K7G Intermediate frequency Amplifiers
1—6H6G Detector—AVC—Bias control
1—6G5 Cathode ray tuning tube (on models equipped with "eye" tuning indicator)
1—76 First Audio Amplifier
1—76 Phase Inverter
2—76 Drivers
4—42 Power Output
1—5Z3 Rectifier




FOR ALIGNMENT, SEE INDEX

| Symbol | Part No. | Description |
|---|---|---|
| C1 | 3814 | 9-400 mmf variable |
| C2,3,4 | 3822 | 2-35 triple trimmer |
| C5,6,7 | 3822 | 2-35 triple trimmer |
| C8,9,10 | 3822 | 2-35 triple trimmer |
| C11,23 | 572 | .1 200V. |
| C12,14,46 | 580 | .05 200V. |
| C13 | 575 | .1 400V. |
| C15,25 | 2780 | 50 mmf mica |
| C16 | 2694 | .005 5% tolerance |
| C17 | 2741 | 1330 mmf 5% tolerance |
| C18 | 2560 | 350 mmf variable padder |
| C19,24 | 568 | .01 400V. |
| C20,21,22 | | IF trimmers |
| C26 | 563 | .05 400V. |
| C27 | 2695 | .003 600V. |
| C28,33 | 576 | .02-200V. |
| C29 | 824 | .002 600V. |
| C30 | 4072 | .03 200V. |
| C31 | 1286 | 250 mmf mica |
| C32,34,35,36 | 2600 | .02 600V. |
| C37,38 | 3138 | .001 800V. |
| C39,42 | 4071 | 20 MF 35 WV. |
| C40 | 3079 | 8 MF 150V. |
| C41 | 4062 | 30 MF 275V. Reg. |
| C43 | 3112 | 16 MF 450V. |
| C44 | 3111 | 16 MF 500V. |
| C45 | 3135 | .003 800V. |
| R1,4,8,16,19,22,24 | 603 | 100 M 1/3 W. |
| R2,3 | 631 | 50 M 1/3 W. |
| R5,6,34 | 2421 | 1 M 1/3 W. |
| R7,23 | 615 | 500 M 1/3 W. |
| R9 | 2693 | 2 meg 1/3 W. |
| R10 | 3799 | 2 meg tone control |
| R11 | 3800 | 3 meg volume control |
| R12,20,25 | 2568 | 300 M 1/3 W. |
| R13,33 | 617 | 20 M 1/3 W. |
| R14 | 624 | 1 meg 1/3 W. |
| R15,21 | 614 | 5 M 1/3 W. |
| R17 | 2731 | 500 M 10% 1/3 W. |
| R18 | 2880 | 100 M 10% 1/3 W. |
| R26 | 4068 | 300 ohm 10% 3 W. flex. |
| R27 | 3808 | 50 ohm 10% ¾ W. flex. |
| R28 | 4069 | 200 ohm 10% 2 W. flex. |
| R29 | 3801 | 2 M variable |
| R30 | 639 | 750 ohm 1/3 W. |
| R31 | 3805 | 8 M 1.5 W. |
| R32 | 3805 | 7 M 3.5 W. |
| R35 | 4070 | 100 ohm 10% 3 W. flex |
| | 4058 | Power transformer |
| | 4061 | No. 1 IF transformer |
| | 4060 | No. 2 IF transformer |
| | 3968 | No. 3 IF transformer |
| | 2981 | Tuning tube cable |
| | 4082 | 12" Dynamic speaker |
| | 4079 | 12" P.M. speaker |
| | 2898 | Tuning tube clamp |
| | 3815 | RF coil |
| | 3943 | Oscillator coil |
| | 3817 | Antenna coil |
| | 3825 | Planetary drive |
| | 3826 | Drive belt |
| | 3198 | Idler pulley |
| | 3199 | Idler spring |
| | 3831 | Minute pointer |
| | 3832 | Tuning pointer |
| | 3802 | On-off switch |
| | 3818 | RF and antenna switch |
| | 3819 | Oscillator switch |

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MODEL D695(1936)
Socket,Trimmers
Phono.Data,Coils

# WESTERN AUTO SUPPLY CO.

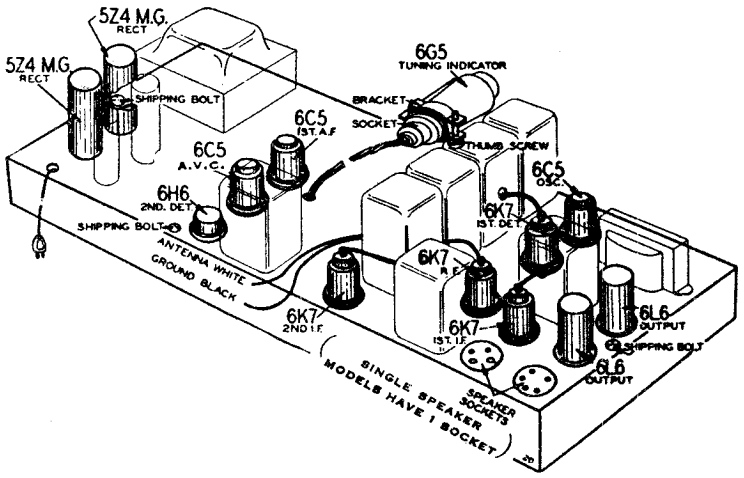



*Fig. 5—Location of Tubes*

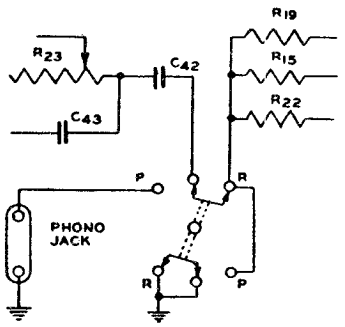



*Fig. 7—Phonograph Connections*

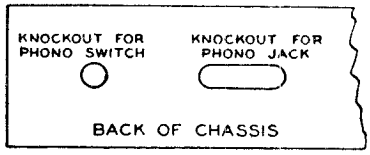



*Fig. 8—Location of Phono Knockouts*

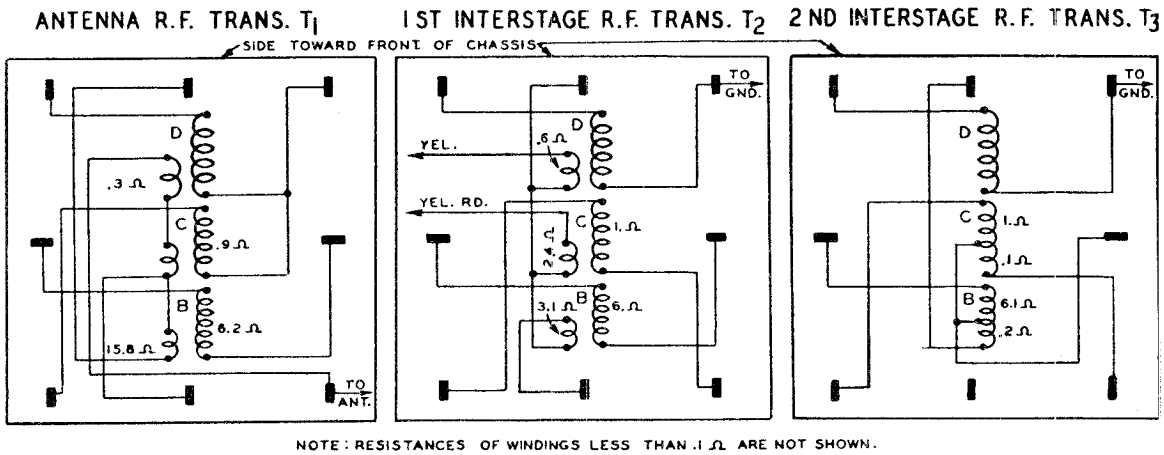
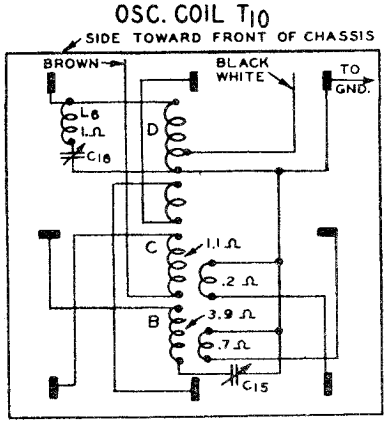



*Fig. 6—R.F. and Oscillator Coil Base Terminal Arrangement and D.C. Resistance of Windings*



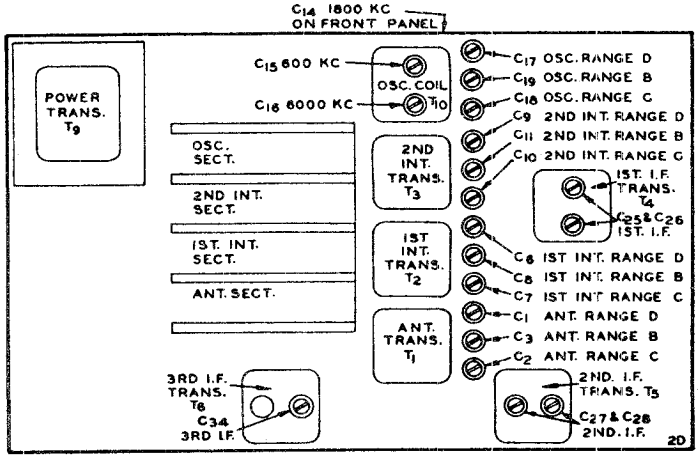




*Fig. 3—Location of Trimmers*

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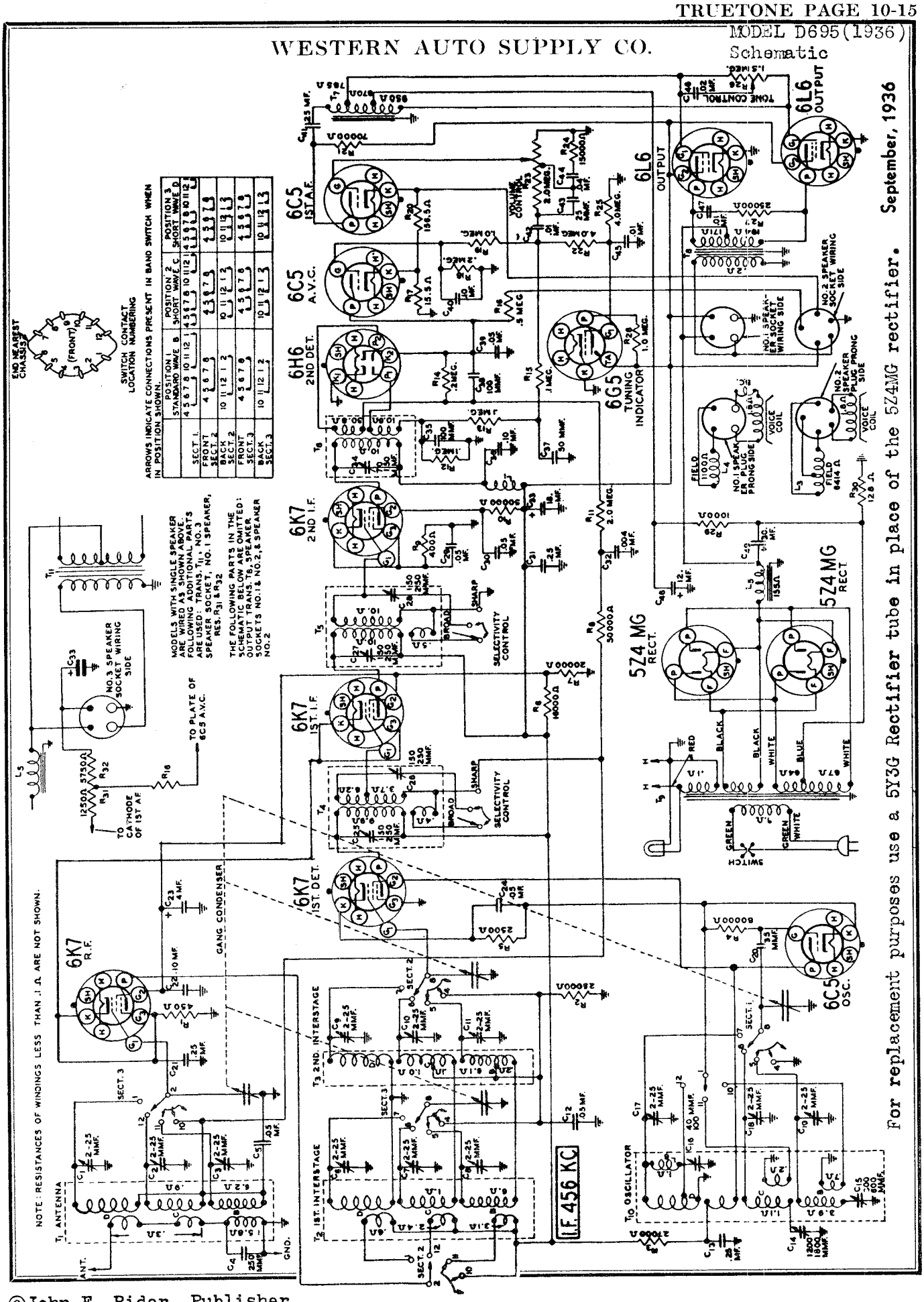
# WESTERN AUTO SUPPLY CO.

MODEL D695 (1936)
Schematic




For replacement purposes use a 5Y3G Rectifier tube in place of the 5Z4MG rectifier. September, 1936

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I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band switch to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis and the location is shown in Fig. 3.

## Range B Alignment

**After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.**

### 1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

In sets using pointers, loosen the screw of the large pointer and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the screw.

In sets using the moving beam of light, there is moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until it is at the 1500 KC mark on the dial. Retighten the screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C11) and antenna Range B trimmer (C3) to maximum.

Do not change the setting of the oscillator Range B trimmer.

### 600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

## Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

### 5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range C position (first short wave band).

Adjust the oscillator Range C trimmer (C18) until maximum output is obtained. See Fig. 3 for location of this trimmer.

### 5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C7 and C10) and antenna Range C trimmer (C2) to maximum.

Do not change the setting of the oscillator Range C trimmer.

### 1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 1800 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

## Range D Alignment

### 18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the Range D position (second short wave band).

Adjust the oscillator Range D trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

### 15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C6 and C9) and antenna Range D trimmer (C1) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

### 6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

## Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

## Planetary Drive Assembly

The planetary assembly is the unit that is integral with the tuning shaft.

If the nut on the back end of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect.

If this nut is too loose, the drive will slip in slow speed. The remedy in this case, of course, is to tighten the nut.

Should the condenser drive cord slip when the planetary pulley is turning, inspect the tuning condenser, drive drum and gears to see if they are turning properly or if they are being obstructed in some way.

If the drive turns unevenly (rough in spots), this may mean that the planetary assembly is defective or damaged internally and a new unit will be required.

## Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required as shown in the parts list. Knockouts are provided in the back of the chassis for mounting the phono jack and phono switch—See Fig. 8.

The phono switch should be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. This is done by removing the wire connecting condenser C42 to resistors R15, R19 and R22, at the terminal strip located near the back of the planetary drive. Cut this wire to correct length and solder it to the proper terminal on the phono switch—See Fig. 7, keeping the wire close to the back of the chassis base.

A wire is then connected from the lug on the above mentioned terminal strip to which the wire was connected, to the correct terminal on the phono switch—See Fig. 7. This wire should be brought directly to the back of the chassis at a point close to the phono jack pin tip nearest the channel provided for a chassis mounting bolt, and then routed over to the switch.

Complete the other connections as illustrated in Fig. 7.

It will be necessary to re-route the AC line cord away from the 6C5 1st audio grid lead by running it between the volume control and the filter choke and then straight back to the hole provided for it in the chassis base.

If a hum is heard when the phono pickup is touched, reverse the two pickup leads.

## Twenty-five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

| TUBE | FUNCTION | VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (unless otherwise indicated) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 |
| 6K7 | R.F. | 0 | 6.2(1) | 250 | 110 | 7.5(2) | | 6.2(1) | 7.5(2) |
| 6K7 | 1st Det. | 0 | 6.2(1) | 250 | 110 | | | 6.2(1) | 9.0 |
| 6C8 | Osc. | 0 | 6.2(1) | 110 | | | | 6.2(1) | |
| 6K7 | 1st I.F. | 0 | 6.2(1) | 250 | 110 | 7.5 | | 6.2(1) | 7.5(2) |
| 6K7 | 2nd I.F. | 0 | 6.2(1) | 250 | 148 | 5(2) | | 6.2(1) | 8.0 |
| 6H6 | 2nd Det. | 0 | 6.2(1) | | | | | 6.2(1) | |
| 6C8 | A.V.C. | 0 | 6.2(1) | 5(3) | | | | 6.2(1) | 8.8 |
| 6C8 | 1st A.F. | 0 | 6.2(1) | 130 | | | | 6.2(1) | 6.0 |
| 6L6 | Power | 0 | 6.2(1) | 360 | 260 | 20(4) | | 6.2(1) | |
| 5Z4MG | Rectifier | 0 | 5.0(5) | | 1024(6) | | 1024(6) | | 5.0(5) |
| 6G5 | Tuning Indicator | Plate to Ground 25(2) | | Target to Ground 250 | | Cathode to Ground 0 | | Across Heater 6.2 A.C. | |

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) As read with 500,000 ohm meter.
(4) As read across R-30.
(5) A.C. voltage as read across heater terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

# WESTERN AUTO SUPPLY CO.

MODEL D697
Schemato, Phono. Data
Transformer Data

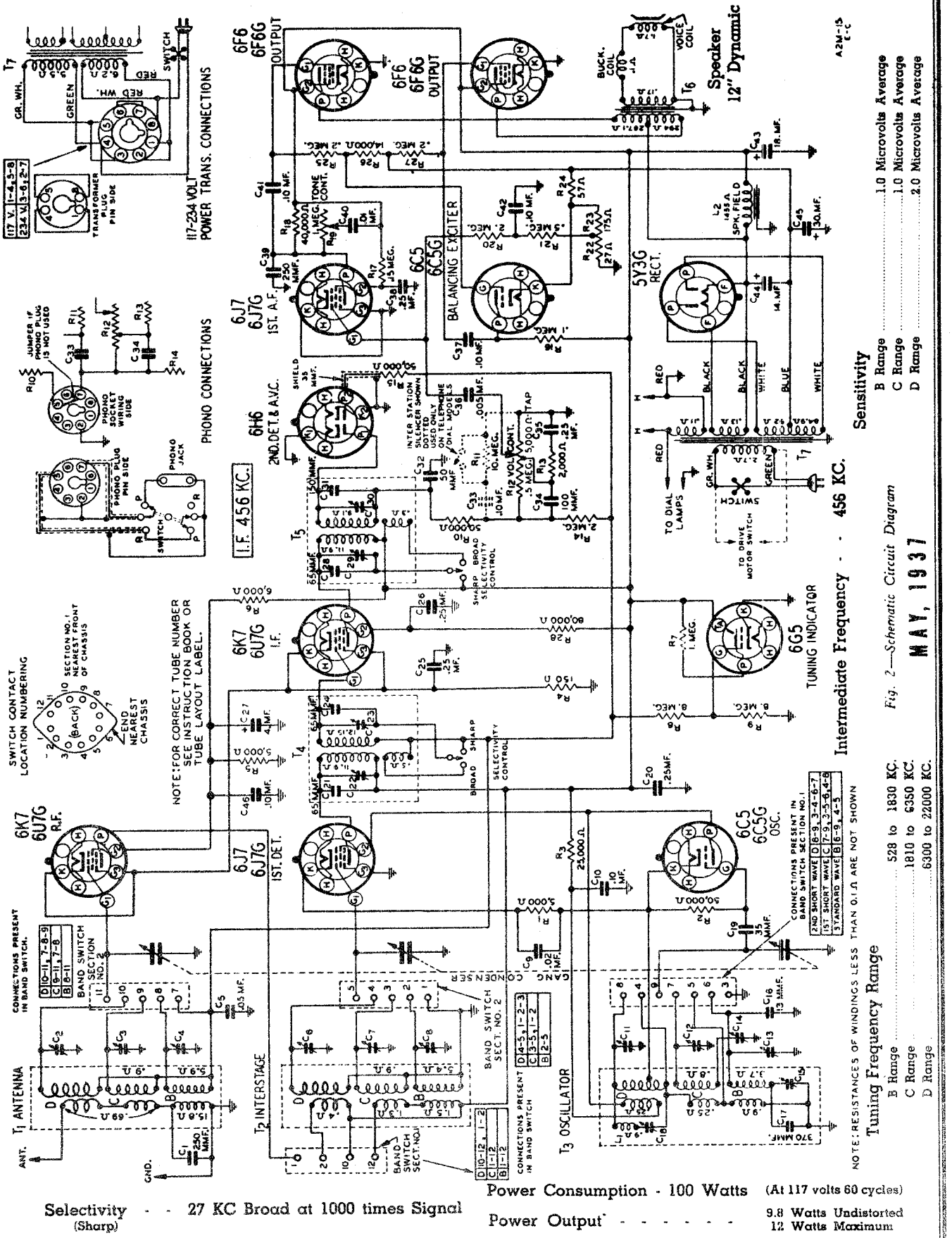


Fig. 2—Schematic Circuit Diagram

MAY, 1937

Intermediate Frequency - - 456 KC.

Tuning Frequency Range

| | |
|---|---|
| B Range | 528 to 1830 KC. |
| C Range | 1810 to 6350 KC. |
| D Range | 6300 to 22000 KC. |

Sensitivity

| | |
|---|---|
| B Range | 1.0 Microvolts Average |
| C Range | 1.0 Microvolts Average |
| D Range | 2.0 Microvolts Average |

NOTE: RESISTANCES OF WINDINGS LESS THAN 0.1 Ω ARE NOT SHOWN

Power Consumption - 100 Watts (At 117 volts 60 cycles)

Power Output - - - - - - - 9.8 Watts Undistorted
12 Watts Maximum

Selectivity - - 27 KC Broad at 1000 times Signal
(Sharp)

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MODEL D697
Alignment, Circuit Data
Trimmers, Coils

# WESTERN AUTO SUPPLY CO.

11 TUBE • 3 BAND • ALL WAVE

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

| STEP (Follow Order as Given) | BAND SWITCH SETTING | DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | TRIMMERS ADJUSTED (See Illustration | PROCEDURE INITIAL STEPS | PROCEDURE ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| I. F. | | | | | | | |
| 2nd I.F. Adj. | Range B | .1 mf. | 456 KC | Grid of I.F. Tube | 2nd I.F. (C29) & (C30) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1st I.F. Adj. | Range B | .1 mf. | 456 KC | Grid of 1st Det. | 1st I.F. (C22) & (C23) | Turn Rotor to Full Open | Adjust to Maximum Output |
| RANGE B | | | | | | | |
| 1830 KC | Range B | 200 mmf. | 1830 KC | Antenna Lead | Oscillator Range B (C13) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1500 KC | Range B | 200 mmf. | 1500 KC | Antenna Lead | Ant. Range B (C4) Int. Range B (C8) | Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A | Adjust to Maximum Output |
| 600 KC | Range B | 200 mmf. | 600 KC | Antenna Lead | 600 KC (C15) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |
| RANGE C | | | | | | | |
| 6350 KC | Range C | 400 Ohm | 6350 KC | Antenna Lead | Oscillator Range C (C12) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 6000 KC | Range C | 400 Ohm | 6000 KC | Antenna Lead | Antenna Range C (C3) Int. Range C (C7) | Turn Rotor to Max. Output | Adjust to Maximum Output |
| 2000 KC | Range C | 400 Ohm | 2000 KC | Antenna Lead | 2000 KC (C14) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |
| RANGE D | | | | | | | |
| 22,000 KC | Range D | 400 Ohm | 22,000 KC | Antenna Lead | Oscillator Range D (C11) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 20,000 KC | Range D | 400 Ohm | 20,000 KC | Antenna Lead | Ant. Range D (C2) Int. Range D (C6) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |
| 7000 KC | Range D | 400 Ohm | 7000 KC | Antenna Lead | 7000 KC (C18) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |

**Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.**

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

**NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.**

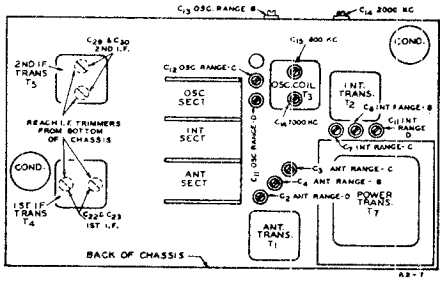


*Fig. 3—Location of Trimmers*

## Circuit

This model is a three band AC operated radio with a tuning range as shown in the specifications above.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R.F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively.

The band switch completes connections to the coils in use. The band switch sections are designated in the schematic as section 1 and section 2.

The antenna transformer with tuned secondary feeds into a type 6K7 R.F. amplifier tube. The output of this tube is fed through the interstage R.F. transformer with tuned secondary into a 6J7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

One stage of I.F. amplification is employed using a 6K7 tube. The primaries and secondaries of the 1st and 2nd I.F. transformers are tuned by small trimmer condensers.

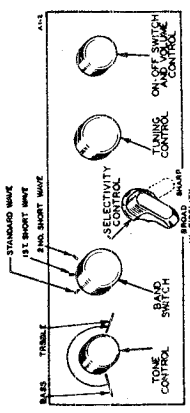


*Fig. 1—Arrangement of Controls*

Referring to the 1st and 2nd I.F. transformers T4 and T5 in Fig. 2, it will be noted that there is a coupling winding shown below the primary of T4 and below the secondary of T5.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T4 is connected in series with the secondary. In the case of T5, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R.F. and I.F. tubes.

Across the volume control resistor R12 is a filter composed of condensers C34 and C35 and resistor R13. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6J7 1st A. F. tube. The output of this tube is fed thru resistance coupling into the 6F6 output tube shown nearest to it in the schematic.

A portion of the voltage developed across the output tube grid resistor is applied to the control grid of the 6C5 balancing exciter tube. This tube functions as a phase inverter and applies the audio voltage of proper phase and amplitude to the other 6F6 output tube. The two output tubes operate as a stage of Class A push-pull amplification. The balancing exciter tube thus replaces a push-pull input transformer. A dynamic reproducer is employed.

The power unit uses a 5Y3G full wave rectifier. A 6G5 tuning indicator tube is employed.

### Glass and Metal Tubes

All sets of this series use a 6H6 metal tube and 5Y3G and 6G5 glass tubes.

It will be noted in the schematic that there are two tube type numbers shown at the other sockets. The "metal" tube sets use the upper tube type numbers which are for metal tubes while the "glass" tube sets use the lower tube type numbers which are for glass tubes.

**Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.**

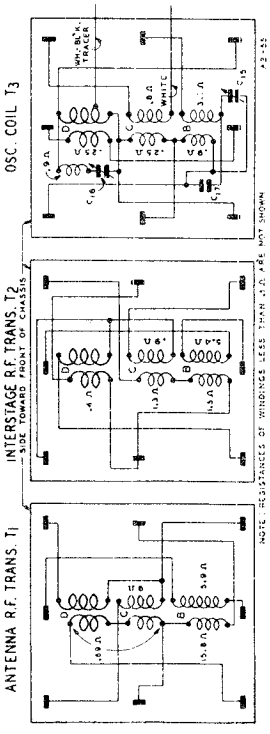
OSC. COIL T3
INTERSTAGE R.F. TRANS. T2
SIDE TOWARD FRONT OF CHASSIS
ANTENNA R.F. TRANS. T1
NOTE: RESISTANCES OF WINDINGS LESS THAN 1.0 Ω ARE NOT SHOWN

*Fig. 6—Coil Terminal Arrangement and DC Resistance of Windings*

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# WESTERN AUTO SUPPLY CO.

MODEL D697
Voltage, Socket Changes, Phono. Data
Parts List

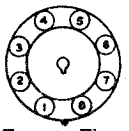

*Fig. 7—Octal Tube Terminal Numbering (bottom of socket).*

## Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true—the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

## Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the front panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic. METAL TUBES ARE IN SAME POS. AS GLASS EQUIVALENTS SHOWN IN LAYOUT

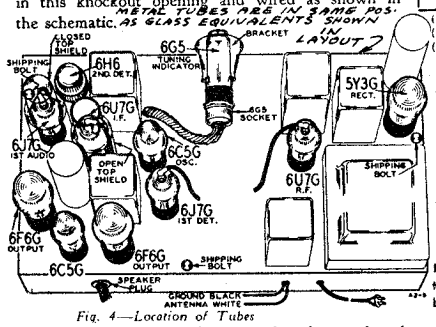


*Fig. 4—Location of Tubes*

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph-radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—see Fig. 2.

## 117-234 Volt Power Transformers

Some models are equipped with a 117-234 volt 40 to 60 cycle power transformer. Connections as shown in Fig. 2 are completed to a special octal socket mounted on the back panel of the chassis. A plug which goes with this socket may then be inserted for either the 117 volt or 234 volt connection.

If one of these transformers is to be installed in a chassis equipped with a regular transformer, there is a 1⅛ inch round knockout on the back panel which may be removed to permit installation of the octal socket mentioned above.

## Dial and Drive Assembly

Complete information regarding the dial and drive assemblies will be found in the Dial and Drive Service Notes issued for this chassis. (see index)

## Changes in Later Models

Later models of this series have the following changes incorporated in them.

On the first models, the 2nd I.F. Coil was not expanded. In other words, the extra selectivity coupling winding was not incorporated in the early type coil. Models with the letter "C" or any later issue stamped on the chassis use the new type coil with the selectivity coupling winding. Because of the change in coil connections, the selectivity switch used on the late model is not interchangeable with that on the early model.

**When ordering parts, therefore, it is important that the issue letter on the chassis be noted and the correct part number as shown in the parts list be specified.**

## VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.
Antenna Shorted to Ground
Position of Band Switch: Standard Wave

| TUBE | FUNCTION | VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 |
| 6K7 6U7G | R.F. | 0 | 6.1(1) | 250 | 105 | 2.5 | | 6.1(1) | 2.5 |
| 6J7 6J7G | 1st Det. | 0 | 6.1(1) | 250 | 125 | 0 | | 6.1(1) | 5.8 |
| 6C5 6C5G | Osc. | 0 | 6.1(1) | 125(2) | | | | 6.1(1) | 0 |
| 6K7 6U7G | I.F. | 0 | 6.1(1) | 250 | 100 | 2.5 | | 6.1(1) | 2.5 |
| 6H6 | 2nd Det.—A.V.C. | 0 | 6.1(1) | | | | | 6.1(1) | 0 |
| 6J7 6J7G | 1st A.F. | 0 | 6.1(1) | 110 | 120 | 0(3) | | 6.1(1) | 0(3) |
| 6C5 6C5G | Balancing Exciter | 0 | 6.1(1) | 100 | | | | 6.1(1) | 18.5 |
| 6F6 6F6G | Output | 0 | 6.1(1) | 330 | 250 | | | 6.1(1) | 0(4) |
| 5Y3G | Rectifier | 0 | 4.8(5) | | 730(6) | | 730(6) | | 4.8(5) |
| 6G5 | Tuning Indicator | Plate to Ground 20 | | Target to Ground 250 | | Cathode to Ground 0 | | Across Heater 6.1 A.C. | |

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Subject to variation.
(3) Bias (2.5 volts) as read across resistor R22.
(4) Bias (24 volts) as read across resistors R22, R23, & R24.
(5) A.C. voltage as read across filament terminals 2 and 8.
(6) A.C. voltage as read across terminals 4 and 6.

The R.F. circuit of early models was slightly different from that used in later models. The screen grids of the R.F. and I.F. tubes now supplied by separate voltage sources were formerly connected together and supplied from a single source. On the latter models, resistor R 28 and condenser C 46 were not used.

# Replacement Parts

NOTICE—There is a large letter on the chassis which identifies the set as to major part changes. When ordering parts, please be sure to mention the series number and this large letter.

## MISCELLANEOUS

### SOCKETS

| Part No. | Description | List Price |
|---|---|---|
| 3A256 | Tube Socket—Octal (7 Prong) | $0.15 |
| 3A263 | Tube Socket—Octal (8 Prong) | .15 |
| 3A261 | Tube Socket—Octal (5 Prong) | .10 |
| 3A262 | Speaker Socket (6 Prong) | .15 |
| 13X295 | Tuning Eye Tube Socket and Cable Assembly | .55 |
| 3A266 | Phono Socket—Octal (4 Prong) | .10 |
| 3A282 | Dual Keyway Socket—Octal (8 Prong)—Universal Power Transformer Connections | .15 |
| 6A214 | Plug (4 Prong)—Used with above Socket | .25 |

### SPEAKERS

When ordering parts for speakers, specify part number of speaker and letter preceding part number stamped on the speaker.

| | | |
|---|---|---|
| 12A269 | 12" Dynamic Speaker, complete with Output Trans. (T6) | 7.70 |
| | Cone and Voice Coil Assembly for above speaker | 4.60 |
| | Output Transformer only (T6) | 2.45 |

### KNOBS

| | | |
|---|---|---|
| Specify Name of Knob & Name & Model of Radio | Volume Control Knob | .15 |
| | Tone Control Knob | .15 |
| | Tuning Control Knob | .15 |
| | Band Switch Knob | .20 |
| | Selectivity Control Knob | .25 |

### GENERAL

| | | |
|---|---|---|
| 25X379 | Clamp Bracket for Tuning Eye Tube | .10 |
| 32X50 | Tube Shield—Closed Top (Used on glass and metal tube chassis) | .15 |
| 32X32 | Tube Shield—Open Top (Used only on models having glass tubes) | .15 |
| 32X51 | Tube Shield Base | .10 |
| 2X38 | Felt Washers (Used Behind Knobs) doz. | .10 |
| 8X23 | Rubber Cushions (Chassis Mounting) doz. | .10 |
| 30X44 | Grid Clip only | .10 |
| 2A78 | Selectivity Switch (Early Type—Used when 2nd I.F. is not expanded) | .40 |
| 2A83 | Selectivity Switch (Late Type—Used when 2nd I.F. is expanded) | .45 |
| 4A38 | Terminal Strip (1 lug insulated, one lug used for mtg.) | .10 |
| 4A53 | Terminal Strip (3 lugs insulated, mounting hole used) | .10 |
| 4A68 | Terminal Strip (3 lugs insulated) | .10 |
| 13X214 | Antenna and Ground Lead Assembly | .30 |
| 13X80 | Line Cord and Plug | .50 |
| 2A79 | Band Switch (2 section, 3 position) | 1.65 |

## TRANSFORMERS AND COILS

| Part No. | Code | Description | List Price |
|---|---|---|---|
| 9A779 | T1 | Antenna Transformer and Can Assembly | $2.15 |
| 9A780 | T2 | R.F. Interstage Transformer and Can Assembly | 2.30 |
| 9A781 | T3 | Oscillator Coil and Can Assembly | 3.60 |
| 9A782 | T4 | 1st I.F. Transformer and Can Assembly | 2.40 |
| 9A783 | T5 | 2nd I.F. Transformer and Can Assembly (Early Type—Without selectivity coupling winding) | 2.25 |
| 9A857 | T5 | 2nd I.F. Transformer and Can Assembly (Late Type—With selectivity coupling winding) | 2.25 |
| | T6 | Output Transformer (See "Speakers") | |
| 53X148 | T7 | 117 Volt, 60 Cycle, Standard Power Transformer | 4.45 |
| 53X149 | T7 | 117 Volt, 25 Cycle, Standard Power Transformer | 7.15 |
| 53X150 | T7 | 117-234 Volt, 40-60 Cycle, Universal Power Transformer | 5.75 |

## CONDENSERS

### TUBULAR

| Part No. | Code | Capacitance | Voltage | List Price |
|---|---|---|---|---|
| 46X80 | C5 | .05 mf. | 180 | $0.15 |
| 46X187 | C9 | .02 mf. | 180 | .15 |
| 46X105 | C10 | .10 mf. | 360 | .20 |
| 46X121 | C20 | .25 mf. | 360 | .30 |
| 46X117 | C25 | .25 mf. | 180 | .25 |
| 46X121 | C26 | .25 mf. | 360 | .30 |
| 46X98 | C33 | .10 mf. | 180 | .20 |
| 46X197 | C35 | .25 mf. | 180 | .25 |
| 46X147 | C36 | .005 mf. | 360 | .15 |
| 46X105 | C37 | .10 mf. | 360 | .20 |
| 46X121 | C38 | .25 mf. | 360 | .30 |
| 46X161 | C40 | .01 mf. | 600 | .15 |
| 46X105 | C41 | .10 mf. | 360 | .20 |
| 46X98 | C42 | .10 mf. | 180 | .20 |
| 46X181 | C44 | .10 mf. | 240 | .15 |

## CONDENSERS (Cont.)

### ELECTROLYTIC

| Part No. | Code | Capacitance | Voltage | List Price |
|---|---|---|---|---|
| 45X223 | C27 | 4 mf. | 150 Dry | $0.75 |
| 44X11 | C43 | 18 mf. | 290 Wet | 1.10 |
| 44X30 | C44 | 14 mf. | 450 Wet | 1.00 |
| 45X222 | C45 | 30 mf. | 25 Dry | .95 |

### MOLDED

| | | | |
|---|---|---|---|
| 47X69 | C1 | 250 mmf. | .15 |
| 47X81 | C19 | 35 mmf. | .25 |
| 47X56 | C32 | 50 mmf. | .10 |
| 47X57 | C34 | 100 mmf. | .10 |
| 47X65 | C39 | 250 mmf. | .15 |

### TRIMMER

| | | | | |
|---|---|---|---|---|
| 17A73 | C2, C3, C4 | 2-25 mmf. | Range "D" Antenna Trimmer, Range "C" Antenna Trimmer, Range "B" Antenna Trimmer | .36 |
| 17A73 | C6, C7, C8 | 2-25 mmf. | Range "D" Interstage Trimmer, Range "C" Interstage Trimmer, Range "B" Interstage Trimmer | .35 |
| 17A76 | C11, C12 | 2-25 mmf. | Range "D" Oscillator Trimmer, Range "C" Oscillator Trimmer | .25 |
| 17A68 | C13 | 1-12 mmf. | Range "B" Oscillator Trimmer | .20 |
| 17A75 | C14 | 1300-1700 mmf. | 2000 KC Adjustment | .50 |
| 17A69 | C15, C16 | 40-120 mmf. | Oscillator 600 KC Adjustment, Oscillator 1400 KC Adjustment | .40 |
| 17A70 | C22, C23 | 15-55 mmf. | 1st I.F. Trimmer | .40 |
| 17A70 | C29, C30 | 15-55 mmf. | 2nd. I.F. Trimmer | .40 |

### MISCELLANEOUS

| | | | | |
|---|---|---|---|---|
| 47X80 | C16 | 13 mmf. | Compensating Capacitor | .50 |
| 47X89 | C17 | 370 mmf. | Iron Clad | .30 |
| 47X91 | C21 | 65 mmf. | Iron Clad | .25 |
| 47X91 | C24 | 65 mmf. | Iron Clad | .25 |
| 47X91 | C28 | 65 mmf. | Iron Clad | .25 |
| 47X83 | C31 | 150 mmf. | Iron Clad | .35 |
| 14A70 | 3 Section Gang Condenser (less dial and drive assembly) | | | 4.20 |

* Used on late models only.

## RESISTORS

### CARBON

| Part No. | Code | Resistance | Wattage | List Price |
|---|---|---|---|---|
| A94502 | R1 | 5,000 Ohm | 0.2 | $0.15 |
| A94503 | R2 | 50,000 Ohm | 0.2 | .15 |
| C94253 | R3 | 25,000 Ohm | 1.0 | .15 |
| A94151 | R4 | 150 Ohm | 0.2 | .15 |
| E94502 | R5 | 5,000 Ohm | 1.0 | .30 |
| G94602 | R6 | 6,000 Ohm | 5.0 | .40 |
| A95105 | R7 | 1 Megohm | 0.2 | .10 |
| A94805 | R8 | 8 Megohm | 0.2 | .15 |
| A94805 | R9 | 8 Megohm | 0.2 | .15 |
| A95503 | R10 | 50,000 Ohm | 0.2 | .10 |
| A95106 | R11 | 10 Megohm | 0.2 | .10 |
| A94202 | R13 | 2,000 Ohm | 0.2 | .15 |
| A95205 | R14 | 2 Megohm | 0.2 | .10 |
| A95503 | R15 | 50,000 Ohm | 0.2 | .10 |
| A94104 | R16 | 100,000 Ohm | 0.2 | .15 |
| A94154 | R17 | 150,000 Ohm | 0.2 | .15 |
| B94403 | R18 | 40,000 Ohm | 0.5 | .15 |
| A95205 | R20 | 2 Megohm | 0.2 | .10 |
| A95504 | R21 | 500,000 Ohm | 0.2 | .10 |
| B93570 | R24 | 57 Ohm | 0.5 | .20 |
| A93204 | R25 | 200,000 Ohm | 0.2 | .20 |
| A93143 | R26 | 14,000 Ohm | 0.2 | .20 |
| A95204 | R27 | 200,000 Ohm | 0.2 | .10 |
| *B94803 | R28 | 80,000 Ohm | 0.5 | .15 |

### WIRE WOUND

| | | | | |
|---|---|---|---|---|
| 43X77 | R22, R23 | 27 Ohm, 175 Ohm | 0.25, 2.0 | .35 |

### VARIABLE

| | | | | |
|---|---|---|---|---|
| 36X236 | R12 | 500,000 Ohm | Volume Control and On-Off Switch | 1.00 |
| 40X224 | R19 | 1 Megohm | Tone Control | .65 |

* Used on late models only.

## PHONO ATTACHMENT PARTS

| Part No. | Description | List Price |
|---|---|---|
| 13X298 | 36" Phono Cable Assembly Complete (Includes Plug, Double-tip Phono Jack, Switch, and Knob) | $2.65 |
| 3A266 | Phono Socket—Octal (4 Prong)—Must be ordered for Chassis not equipped with this socket | .10 |
| 6A218 | Plug (8 Prong) Only of Phono Cable | .15 |
| 3A12 | Phono Jack Only of Phono Cable | .10 |
| 2A80 | Phono Switch Only of Phono Cable | .70 |
| 10A90 | Knob Only of Phono Cable | .20 |

DIAL AND DRIVE PARTS WILL BE FOUND IN SPECIAL DIAL AND DRIVE NOTES. (see index)

Prices Subject to Change Without Notice.

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MODEL D697
MODEL D698
Telephone Dial Data

# WESTERN AUTO SUPPLY CO.

## NOS. 9, 10, & 11 — 17 BUTTON TELEPHONE DIAL

## NOS. 3 & 7 — PHANTOM LIGHT DIAL

APRIL, 1937

### Identification of Dial and Chassis

**The following description will identify the different dials:**

**No. 9 Dial—17 Button Telephone Dial—Station call letters in black push buttons.**

**No. 11 Dial—Same as No. 9 Dial except push buttons are brown.**

**No. 10 Dial—17 Button Telephone Dial—Station call letters are rectangular in shape and are mounted in rectangular openings in escutcheon ring. Equipped with visible tone and volume indicators.**

**No. 3 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by series of circles.**

**No. 7 Dial—Glass dial—Moving beam of light indicators—Tone and volume indicated by slanting lines.**

**The following description will identify the chassis used with the above dials:**

8 Tube---D698

11 Tube---D697

### Telephone Dial Assembly

The telephone dial assembly provides a means of pre-setting a number of broadcasting stations and tuning in these stations at any time by depressing a button and rotating the dial to a stop position.

The apparatus is mounted on an assembly attached at the front of the chassis. An examination of this assembly will clearly show the method of operation.

**Silencer Circuit**—A silencer circuit is provided which results in silent tuning between stations when using the telephone dial buttons.

When a telephone dial button is depressed, a circuit is established between the ungrounded end of the volume control and the chassis ground. Referring to Fig. 1 it will be noted that contact is made between the line from the volume control, contact ring, contact washer arm (when button is depressed), spring and pulley ring stud. Since the pulley ring is at ground potential, this grounds the audio voltage and no signal will be heard until the button is released to break the contact.

It should be noted that the contact ring is part of the pulley ring assembly, but is insulated from it.

In the case of powerful local stations a slight amount of signal may be heard when the button is depressed.

# Telephone Dial Adjustments

### Noise When Tuning in a Signal with a Telephone Dial Button

As explained in the article on "Silencer Circuit" in this manual, no noise or signal should be heard when tuning in a signal with a telephone dial button until the button is released. If noise is heard while tuning in a signal with one of these buttons, it can be corrected as follows:

**If Noise Occurs on All Buttons**—This is probably due to a poor contact between the flat contact spring and the contact ring—See Fig. 1. Clean the flat contact spring and contact ring to insure a good electrical connection. Ordinary cleaning fluid may be used and will be effective in most cases in cleaning the surface without affecting the plating. If the contact is still not satisfactory, a piece of fine emery cloth may be used.

**If Noise Occurs on One Button Only**—This is due to a poor contact between the pulley ring stud, spring, contact washer, and contact ring—See Fig. 1. Clean all of these items of the particular button, in the same manner as mentioned previously, so as to provide a good electrical connection.

### Telephone Dial Drive Cord Slipping

If the telephone dial drive cord slips on the tuning shaft pulley, this may be remedied by adjusting the drive cord tension pulley. Loosen the tension pulley bracket screw and adjust pulley assembly until the desired tension is obtained.

### Position of Stop Pin

When the telephone dial assembly is on the chassis, the gang condenser rotor should not completely open or close. The travel of the rotor in this respect is controlled by the gang stop pin on the pulley ring—See Fig. 4. This is necessary to protect the gang condenser in case the telephone dial is swung rapidly to either of the extreme positions. When the gang stop pin is properly set, it will serve as the stop at both extreme positions. If the rotor is seen to open completely or close completely, the stop pin should be pulled back and re-set to overcome this condition.

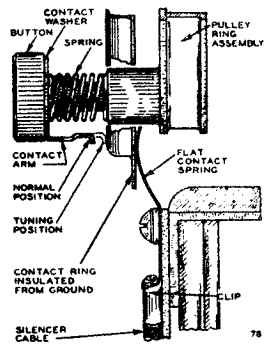


*Fig. 1—Silencer Assembly*

### Greasing and Oiling

After a period of time, put some light grease on the pulley ring shaft and on the teeth of the pulley ring. Use light oil on the drive shaft assembly bearing, care being taken not to get any on the drive cord.

# Telephone Dial Replacements

### Replacing Complete Dial and Condenser Assembly

Remove the grid lead clip from tube grid cap.

Remove silencer cable from the contact spring assembly. Unsolder dial lamp lead from terminal of tube socket.

Unsolder the three stator section connections of the gang condenser. Unsolder the three braided shield leads which ground the gang condenser frame to the chassis, taking care not to loosen the connections of any other units which are grounded at these common points.

At the back of the gang condenser is a stud which secures the assembly to an "L" bracket which is secured to the chassis.

Through this stud is a cotter pin. Remove only the cotter pin, metal washer, and rubber washer.

Viewing the assembly from the back, on the left is a brass bolt which holds the dial support bracket to the chassis—remove this bolt from underneath the chassis.

Grasp the dial support brace and move entire assembly toward the front of the chassis. When the support casting rubber cushions slip clear of the slot in front of chassis, lift entire assembly clear of chassis.

To replace this assembly, reverse the procedure as given above.

### Replacing Pulley and Button Ring Assembly Only

Remove drive cord.

From underneath the chassis, unsolder the dial lamp lead from prong of the tube socket. Pull this lead through and out to the front of the assembly.

Remove the four escutcheon screws which hold the escutcheon ring and glass crystal in place. The dial scale pointer is removed by unhooking it from the center stud. Unscrew and remove center stud, washers, and dial scale. Slide pulley ring assembly off the center shaft.

On the No. 10 dial, two strips of celluloid between the escutcheon ring and the glass crystal will have to be removed.

To replace the pulley ring assembly, proceed as follows: Lay the assembly face down and adjust the stop pin. The stop pin (Fig. 2) is directly in back of the wide spacer on the dial button ring. Pull this pin back and adjust it to the center position —See Fig. 2.

Rotate tuning condenser rotor counter-clockwise (from front) as far as possible—See. Fig. 2.

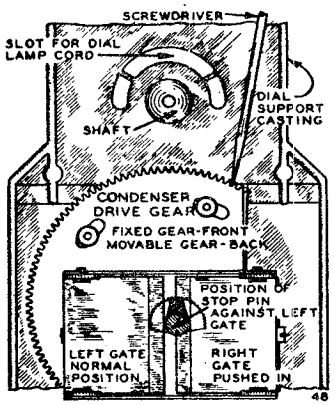


*Fig. 2—Replacing Pulley Ring Assembly*

Place the pulley ring assembly on the shaft with the knot of the dial lamp lead at the top—do not engage the gears.

Pull the dial lamp lead through the slot in the pulley ring gear and through the long slot in the dial support casting. Then place this lead through the clip under the dial support brace and out through the opening in the back of this brace.

With the gears still disengaged, rotate the pulley ring clockwise (from front) ½ revolution until the stop pin passes over the right gate and comes to rest against the left gate—See Fig. 2.

With the condenser rotor fully closed, push the pulley ring on the shaft until the pulley ring gear engages the *fixed gear only* (front) of the condenser drive gear assembly. Hold the pulley ring assembly and with a fine blade screw driver, move the movable (back) gear clockwise one tooth relative to the fixed gear—See Fig. 2. Then push the pulley ring all of the way on, engaging the movable gear.

Now lay the chassis on its back. Replace in the order given the large washer with rectangular hole, dial scale, washers, center stud, dial pointer, glass crystal, and escutcheon. Resolder the lamp lead.

For the No. 10 dial, before putting the escutcheon on, lay the two celluloid strips on the glass crystal with the inside flange facing away from the glass. Then lay the escutcheon on top of the celluloid strips. The section not cut out for station call letters should be at the wide spacer in the button spacer ring. Center the small holes in the celluloid discs in the station call letter openings and then tighten the escutcheon screws.

The stop pin must now be adjusted, as explained in article "Position of Stop Pin," until the condenser does not open or close fully. Injury to the condenser will result if allowed to open or close fully.

Replace the drive cord as explained in the article "Replacing Drive Cord."

### Replacing Gates

After a great amount of use, one or both of the stop gates may wear, making it necessary to replace the stop gate assembly. This is done by first removing the pulley ring assembly as explained in the article "Replacing Pulley and Button Ring Assembly."

The stop gate assembly is then removed by taking out the two screws at the bottom of the assembly.

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# WESTERN AUTO SUPPLY CO.

MODEL D698
Schematic, Phono.
Transformer Data

Power Consumption - 67 Watts (At 117 volts 60 cycles)
Power Output - - - - - 2.5 Watts Undistorted, 4.5 Watts Maximum
Selectivity - 30 KC Broad at 1000 times Signal (Sharp)
Intermediate Frequency - - - - - 456 KC.
Speakers - - - - - 8", 10" or 12" Dynamic

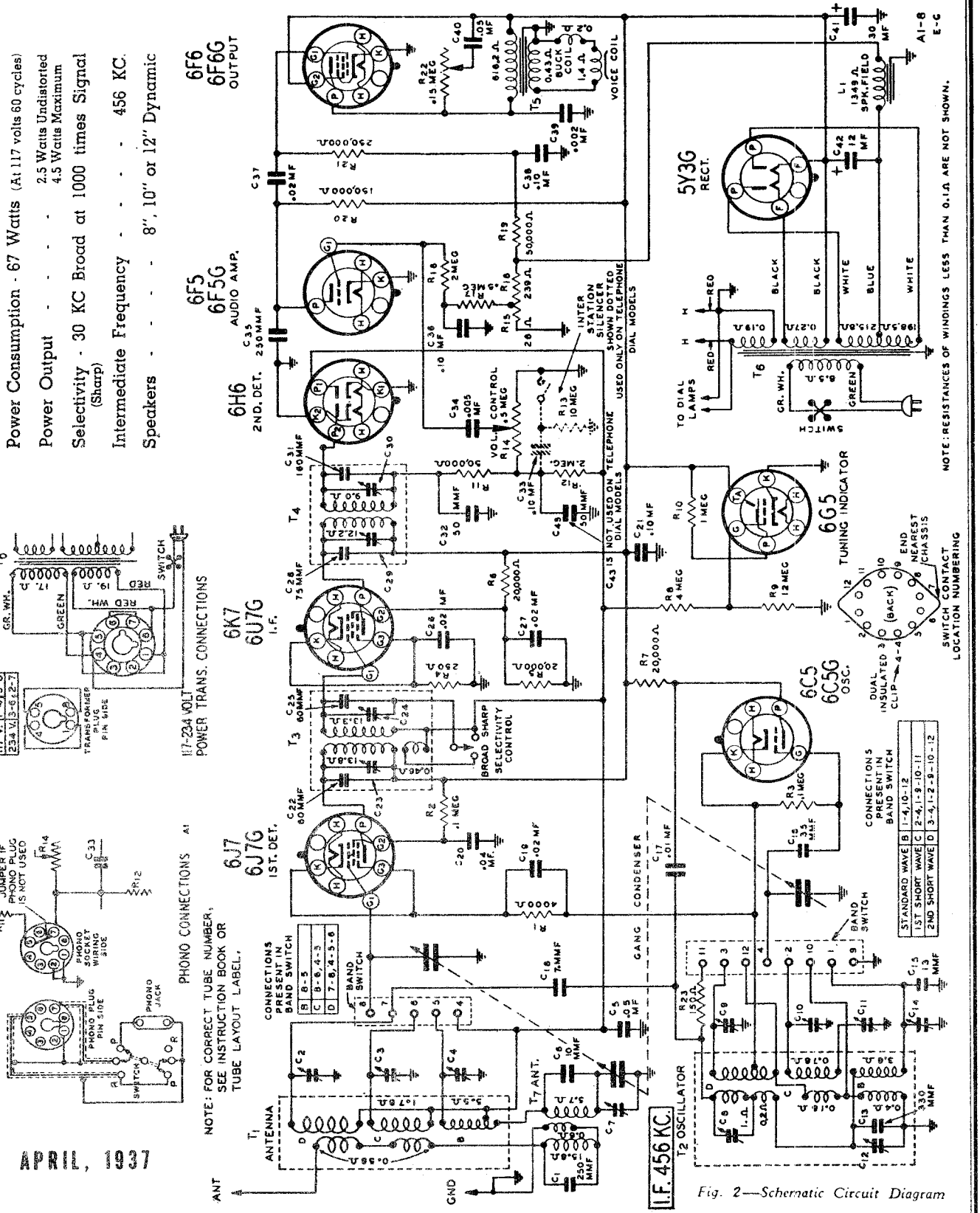


*Fig. 2—Schematic Circuit Diagram*

**Tuning Frequency Range**

| | |
|---|---|
| B Range | 528 to 1830 KC. |
| C Range | 1810 to 6350 KC. |
| D Range | 6300 to 22000 KC. |

**Sensitivity**

| | |
|---|---|
| B Range | 8 Microvolts Average |
| C Range | 13 Microvolts Average |
| D Range | 9 Microvolts Average |

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MODEL D698
Alignment, Voltage
Socket, Trimmers, Coils

# WESTERN AUTO SUPPLY CO.

8 TUBE • 3 BAND • ALL WAVE

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for Several Minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter — Non-Metallic Screwdriver.
Dummy Antennas — .1 mf., 200 mmf., and 400 ohms.

| STEP (Follow Order as Given) | BAND SWITCH SETTING | DUMMY ANTENNA | SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | TRIMMERS ADJUSTED See Illustration | PROCEDURE INITIAL STEPS | PROCEDURE ADJUSTMENT |
|---|---|---|---|---|---|---|---|
| I. F. | | | | | | | |
| 2nd I.F. Adj. | Range B | .1 mf. | 456 KC | Grid of I.F. Tube | 2nd I.F. (C29) & (C30) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1st I.F. Adj. | Range B | .1 mf. | 456 KC | Grid of 1st Det. | 1st I.F. (C23) & (C24) | Turn Rotor to Full Open | Adjust to Maximum Output |
| RANGE B | | | | | | | |
| 1830 KC | Range B | 200 mmf. | 1830 KC | Antenna Lead | Oscillator Range B (C14) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 1500 KC | Range B | 200 mmf. | 1500 KC | Antenna Lead | 1st Ant. Range B (C7) 2nd Ant. Range B (C4) | Turn Rotor to Max. Output Set Indicator to 1500 KC— See Note A | Adjust to Maximum Output |
| 600 KC | Range B | 200 mmf. | 600 KC | Antenna Lead | 600 KC (C12) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |
| RANGE C | | | | | | | |
| 6350 KC | Range C | 400 Ohm | 6350 KC | Antenna Lead | Oscillator Range C (C10) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 6000 KC | Range C | 400 Ohm | 6000 KC | Antenna Lead | Antenna Range C (C3) | Turn Rotor to Max. Output | Adjust to Maximum Output |
| 2000 KC | Range C | 400 Ohm | 2000 KC | Antenna Lead | 2000 KC (C11) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |
| RANGE D | | | | | | | |
| 22,000 KC | Range D | 400 Ohm | 22,000 KC | Antenna Lead | Oscillator Range D (C9) | Turn Rotor to Full Open | Adjust to Maximum Output |
| 20,000 KC | Range D | 400 Ohm | 20,000 KC | Antenna Lead | Antenna Range D (C2) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |
| 7000 KC | Range D | 400 Ohm | 7000 KC | Antenna Lead | 7000 KC (C8) | Turn Rotor to Max. Output | Adjust to Maximum Output Rock Rotor — See Note B |

**Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.**

After each range is completed, repeat the procedure as a final check.

NOTE A—In sets using the telephone dial tuning, there will be seen inside the telephone dial button ring an escutcheon plate held in place by four screws. Loosen the 2 screws nearest the pointer. An extension of the pointer will be seen protruding over the edge of this escutcheon plate. Move the pointer to the 1500 KC mark on the dial and then tighten the 2 escutcheon screws. (Do not tighten these screws too much.)

In sets using the moving beam of light indicator, there is a moving light assembly held to the front of the drive drum by means of a screw. Loosen this screw and move the light assembly until the beam is at the 1500 KC mark on the dial. Retighten the screw.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

CAUTION—When aligning the short wave bands, be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

**NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.**

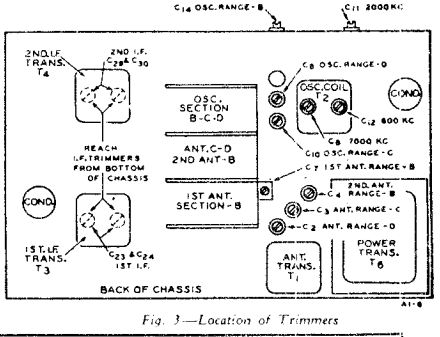


*Fig. 3—Location of Trimmers*

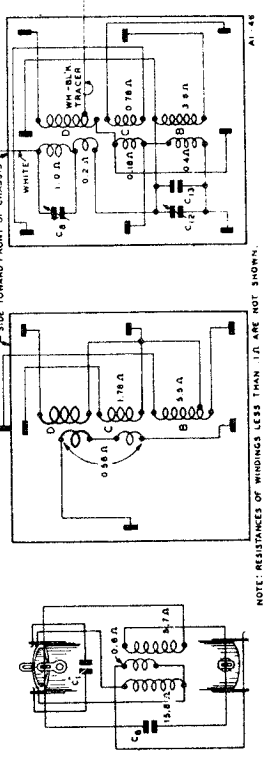
OSC. COIL T2
SIDE TOWARD FRONT OF CHASSIS
WHT-BLK TRACER
WHITE
ANT. R.F. TRANS. "C" & "D" 2ND ANT. "B" T1
1ST ANT. "B" TRANS. T7
NOTE: RESISTANCES OF WINDINGS LESS THAN 1 Ω ARE NOT SHOWN.

*Fig. 7—Coil Terminal Arrangement and D.C. Resistance of Windings*

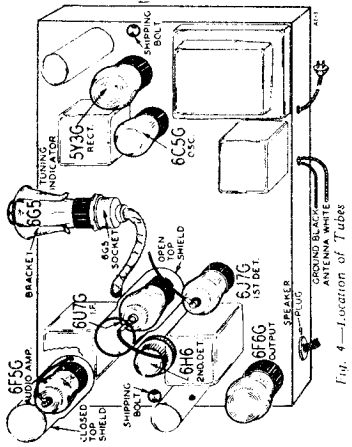


*Fig. 4—Location of Tubes*

early models, write the factory for detailed instructions.

### Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram Fig. 2. On the side panel of the chassis base is a round knockout 1⅛ inches in diameter. An octal base socket is mounted in this knockout opening and wired as shown in the schematic.

A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug and on the other end is a phonograph radio switch and double tip jack.

Some models are shipped from the factory equipped with the phono socket. A jumper is inserted in this socket which must be removed if the phonograph installation is made—See Fig. 2.

**Early Models**—A few of the early models did not have the circular knockout for the phonograph socket as mentioned above. If a phonograph installation is to be made in connection with one of these

## VOLTAGES AT SOCKETS

Line Voltage: 117—Volume Control: Maximum
Readings taken with 1000 Ohm-per-volt meter.
Antenna Shorted to Ground
Position of Band Switch: Standard Wave

| TUBE | FUNCTION | VOLTAGE BETWEEN SOCKET PRONG AND GROUND (Unless otherwise indicated) Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 |
|---|---|---|---|---|---|---|---|---|---|
| 6J7 6J7G | 1st Det. | 0 | 6.1(1) | 220 | 100 | 7.9 | | 6.1(1) | 7.9 |
| 6C5 6C5G | Osc. | 0 | 6.1(1) | 140 | | | | 6.1(1) | 0 |
| 6K7 6U7G | I.F. | 0 | 6.1(1) | 220 | 100 | 2 | | 6.1(1) | 2 |
| 6H6 | 2nd Det. | 0 | 6.1(1) | | 0 | | | 6.1(1) | 0 |
| 6F5 6F5G | Audio Amp. | 0 | 6.1(1) | | 75 | | | 6.1(1) | 0(2) |
| 6F6 6F6G | Power | 0 | 6.1(1) | 215 | 220 | | | 6.1(1) | 0(3) |
| 5Y3G | Rectifier | 0 | 4.9(4) | Plate to Ground 220 | 610(5) | Cathode to Ground 0 | 610(5) | | 4.9(4) |
| 6G5 | Tuning Indicator | Plate to Ground 20 | | Target to Ground 220 | | Cathode to Ground 0 | | Across Heater 6.1 A. C. | |

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) Bias (1.5 volts) as read across resistor R15.
(3) Bias (14 volts) as read across resistors R13 and R16.
(4) A.C. voltage as read across filament terminals 2 and 8.
(5) A.C. voltage as read across terminals 4 and 6.

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| | |
|---|---|
| Power Consumption | 85 Watts (At 115 volts 60 cycles) |
| Power Output | 3 Watts Undistorted |
| Selectivity | 28 KC Broad at 1000 times Signal (Sharp) |
| Intermediate Frequency | 456 KC. |
| Speaker | 8" and 10" Dynamic |

**Tuning Frequency Range**

| | | | |
|---|---|---|---|
| B Range | 528 | to | 1730 KC. |
| C Range | 1710 | to | 5800 KC. |
| D Range | 5750 | to | 18300 KC. |

**Sensitivity**

| | | | |
|---|---|---|---|
| B Range | 0.5 | to 2 | Microvolts Absolute |
| C Range | 0.5 | to 2 | Microvolts Absolute |
| D Range | 1.0 | to 4 | Microvolts Absolute |

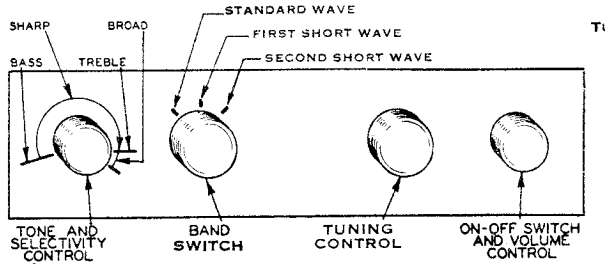
ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

| | POSITION 1 STANDARD WAVE B | POSITION 2 SHORT WAVE C | POSITION 3 SHORT WAVE D |
|---|---|---|---|
| BACK SECT. 1 | 11 1 2 3 | 11 1 2 3 | 11 1 2 3 |
| FRONT SECT. 1 | 9 10 11 12 4 5 6 7 8 | 9 10 11 12 4 5 6 7 8 | 9 10 11 12 4 5 6 7 8 |
| FRONT SECT. 2 | 4 5 6 7 8 | 4 5 6 7 8 | 4 5 6 7 8 |
| BACK SECT. 2 | 10 11 12 1 2 | 10 11 12 1 2 | 10 11 12 1 2 |

END NEAREST CHASSIS

SWITCH CONTACT LOCATION NUMBERING

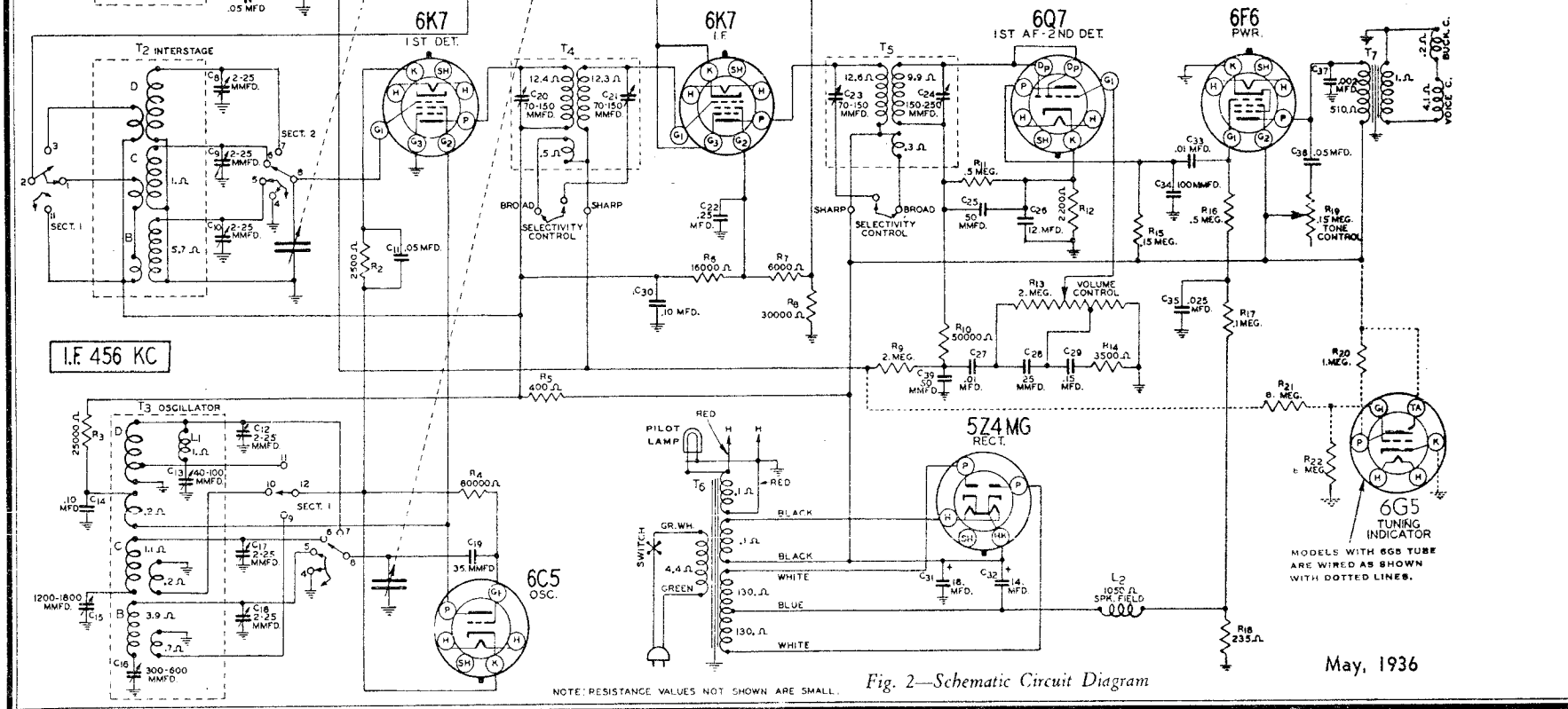
METAL TUBE TERMINAL NUMBERING BOTTOM OF SOCKET




**TUBE ELEMENT LEGEND**

SH - Shell
H - Heater
K - Cathode
P - Plate
$G_1$ - Control Grid
$G_2$ - Screen Grid
$G_3$ - Suppressor Grid
$D_P$ - Diode Plate
$T_A$ - Target
HK - Heater and Cathode

*Fig. 1—Arrangement of Controls*




NOTE: RESISTANCE VALUES NOT SHOWN ARE SMALL.

*Fig. 2—Schematic Circuit Diagram*

May, 1936

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## Circuit

This model is a three band radio with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a two-section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T3 is the oscillator coil assembly. The standard wave, 1st, and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The band switch sections are designated as section one and section two.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 6C5 tube is employed in the oscillator circuit. The oscillating circuit is always resonant at 456 KC above the frequency to which the R.F. amplifier is tuned.

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

Two stages of I. F. amplification are employed using 6K7 tubes. The primaries and secondaries of the first and second I. F. transformers and the primary of the 3rd I. F. transformer are tuned by small trimmer condensers.

Referring to the 1st and 2nd I. F. transformers T4 and T5 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary of T4 and below the secondary of T5.

When the selectivity control is in the sharp position, the coupling windings are open circuited and the loose coupling which exists between the primary and secondary of these transformers results in high selectivity.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary in the case of T4 is connected in series with the secondary. In the case of T5, the coupling winding which is wound under the secondary is in series with the primary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

A type 6Q7 duo-diode triode tube functions as the second detector and a one stage amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R13 is applied through the movable arm to the control grid of the 6Q7 tube.

Across the volume control resistor R13 is a filter composed of condensers C28 and C29 and resistor R14. A tap connection near the low potential end of the volume control is connected between the two condensers. At high volume settings, the filter is not effective. At the low volume settings, as the pointer approaches the tap, the higher frequencies are bypassed through condenser C29. Very high frequencies are transmitted through condenser C28 to compensate for the reduction of these frequencies. At low volume settings the low frequency amplitudes are increased as a result.

Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 5Z4MG (metal glass tube) full wave rectifier is used in the power unit.

The models with the tuning indicator tube are wired as shown in the schematic. This tube contains a triode and cathode ray section in one envelope.

The cathode ray is produced by the attraction of electrons from the upper end of the cathode to the coated target or anode, which is operated at a high positive potential. When this electron stream strikes the target the coating glows. The electron stream is controlled by an additional element, or control electrode, in the tube.

As a signal is tuned in, the control grid of the triode section of the 6E5 cathode ray tube becomes increasingly negative, the negative bias voltage being taken from the AVC line. The AVC voltage is reduced to a suitable value by the potentiometer arrangement of the 10 and 1.5 megohm resistors. The increased bias voltage reduces the triode plate current. This reduces the voltage drop across the 1 megohm plate resistor and raises the triode plate voltage. The triode plate is connected to the control electrode of the cathode ray section of the tube.

The shape and size of the area on the target struck by the cathode ray is governed by the voltage of the control electrode. When the signal is tuned to resonance, practically no plate current flows and the voltage of the control electrode is the same as that of the target. There is no opposition to the flow of electrons to the target. Tuning off resonance decreases the control electrode voltage and causes the darkened sector of the target to widen, because of the opposition to the flow of electrons in the direction of the control electrode.

## Alignment and Calibration

Correct alignment is extremely important in connection with all wave radios. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 1800, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

### I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the AVC.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 3.

### Range B Alignment

**After the procedure for the alignment of each range, as explained below, is completed, it is advisable to repeat the procedure as a final check.**

#### 1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and *all* subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent AVC action.

Adjust the oscillator Range B trimmer (C18) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

#### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C10) and antenna Range B trimmer (C4) to maximum.

Do not change the setting of the oscillator Range B trimmer.

#### 600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 600 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

### Range C Alignment

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC. It may be necessary to increase the input signal to hear the image.

#### 5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band).

Adjust the oscillator Range C trimmer (C17) until maximum output is obtained. See Fig. 3 for location of this trimmer.

#### 5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C9) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

#### 1800 KC Adjustment

Set the signal generator for 1800 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth, at the same time adjusting the 1800 KC trimmer, until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

### Range D Alignment

#### 18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band).

Adjust the oscillator Range D trimmer (C12) until maximum output is obtained. See Fig. 3 for location of this trimmer.

#### 15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C8) and antenna Range D trimmer (C2) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Do not change the setting of the oscillator Range D trimmer.

#### 6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

### Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

### Trimmer Replacement

If one trimmer of the gang trimmer strip should become defective, it is not necessary to replace the entire strip. A single trimmer P-17A36, as shown in the replacement parts list, may be used. Disconnect the lead from the coil side (side not grounded) of the defective trimmer in the strip. This connection is then made to the single trimmer. Connect it to the side of the trimmer not in contact with the adjusting screw. The other side of the single trimmer is then connected to a good ground, using a piece of heavy wire in order to support the trimmer adequately. In replacing a trimmer, be sure to keep both leads as short as possible and keep the ungrounded lead as far from ground as possible.

### Voltage Chart

The voltage readings are taken with a voltmeter having a resistance of 1000 ohms per volt.

The standard metal tube socket terminal numbering system (bottom of socket) is shown in Fig. 5. On the schematic circuit diagram, Fig. 2 is a list giving the complete names of the tube elements and the corresponding symbols as used on the sockets on the schematic.

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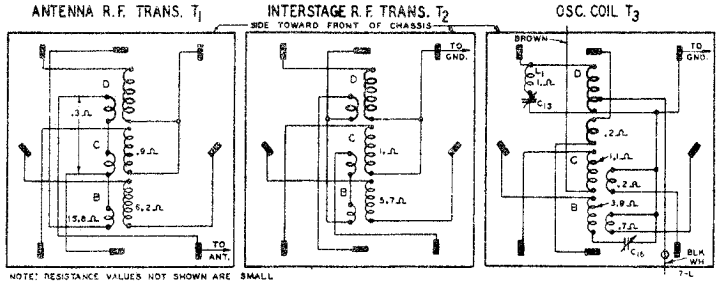


*Fig. 4—R. F. and Oscillator Coil Base Terminal Arrangement and D. C. Resistance of Windings*

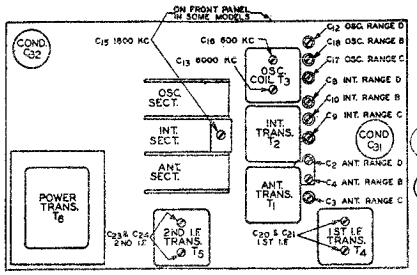


*Fig. 3—Location of Trimmers*

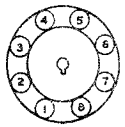

*Fig. 5—Metal tube terminal numbering (bottom of socket)*

## Drive Assembly

This model uses a two-speed planetary drive.

All of the early sets are equipped with a flat belt and may be identified by the ¼ inch wide belt. The later sets use the same type of drive, but have a black cord belt. This is a bronze cable with a black fabric covering. It is about 1/16 inch in diameter.

The belt type also has an idler pulley which the cord type does not have.

The planetary assembly is the unit that is integral with the tuning shaft. It is at the bottom of the belt. If the nut of this assembly is too tight, the drive will be jerky and will turn hard in high speed. If this condition exists, back off this nut one or two turns and note the effect. If the nut is too loose, the drive will slip in slow speed. The remedy in this case is, of course, to tighten up the nut.

Should the drive belt slip when the planetary pulley is turning, first inspect the drive drum assembly. This is the assembly which is mounted on the tuning condenser shaft. If this assembly and the tuning condenser rotor turn satisfactorily, the belt is probably too loose and a new one will be required. In the sets with the flat belt type of drive, there is an idler pulley which can be positioned, and by means of which the belt tension can be increased. In this type, therefore, the belt tension should be increased before attempting to put on a new one.

The replacement parts list shows the parts used in each type of drive and the parts common to both types.

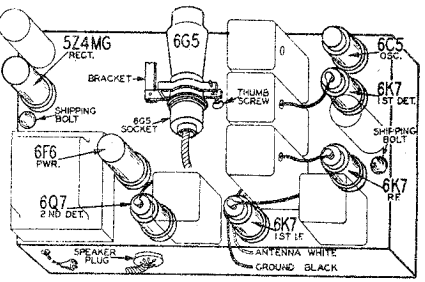


*Fig. 6—Location of Tubes*

Line Voltage: 115
Volume Control: Maximum

Antenna Shorted to Ground
Position of Band Switch: Standard Wave

| TUBE | FUNCTION | VOLTAGE BETWEEN SOCKET PRONGS AND GROUND (Unless otherwise indicated) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Prong No. 1 | Prong No. 2 | Prong No. 3 | Prong No. 4 | Prong No. 5 | Prong No. 6 | Prong No. 7 | Prong No. 8 |
| 6K7 | R.F. | 0 | 6.1(1) | 260 | 100 | 4.0 | ..... | 6.1(1) | 4.0 |
| 6K7 | 1st Det. | 0 | 6.1(1) | 260 | 118 | 0 | ..... | 6.1(1) | 9.0 |
| 6C5 | Osc. | 0 | 6.1(1) | 120 | ..... | 0 | ..... | 6.1(1) | 0 |
| 6K7 | I.F. | 0 | 6.1(1) | 260 | 138 | 4.0 | ..... | 6.1(1) | 4.0 |
| 6Q7 | 1st A.F.—2nd Det. | 0 | 6.1(1) | 105 | 0 | 0 | ..... | 6.1(1) | 1.4 |
| 6F6 | Power Amp. | 0 | 6.1(1) | 238 | 260 | 18 | ..... | 6.1(1) | 0 |
| 5Z4MG | Rect. | 0 | 4.9(2) | | 680(3) | ..... | 680(3) | ..... | 4.9(2) |
| 6E5 | Tuning Indicator | Plate to Ground 30(4) | | Target to Ground 270 | | Cathode to Ground 0 | | Across Heater 6.1 A.C. | |

(1) A.C. voltage as read across heater terminals 2 and 7.
(2) A.C. voltage as read across heater terminals 2 and 8.
(3) A.C. voltage as read across terminals 4 and 6.
(4) As read with 500,000 ohm meter.

## Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch —See Fig 8.

The phono switch must be mounted with one set of terminals nearest the bottom of the chassis base.

The connections are made by opening the diode return circuit at the volume control. Unsolder the .01 mf. condenser C27 from the volume control.

Strip about 2¾ inches of the shielding from each end of the cable furnished with the phono attachment parts. Connect one lead of the cable to the terminal on the volume control from which condenser C27 was removed. The other end of this lead is connected to the phono switch as shown in Fig. 7. The second cable lead is connected to the open end of condenser C27. Then connect the other end of this lead to the phono switch as shown in Fig. 7. Both of the shielded cable leads connected to the phono switch are connected to the switch terminals nearest the chassis base. Before connecting the cable leads to the phono switch, it will be necessary to slip a piece of varnished tubing over the portion of the cable that passes near the 6K7 1st I.F. tube socket.

Now ground the shielding by soldering it to the lugs on the chassis base. One of these lugs is located just below the planetary drive; the other is near the rear mounting foot of the gang condenser.

Complete the other connections as illustrated in Fig. 7. The lead between the tone control and the .05 mf. tubular condenser C36 mounted on the back of the chassis base, should be covered with a piece of varnished tubing.

The tin plate shield is soldered to the tone control mounting bracket in such a way that when it is bent down toward the bottom and back of the chassis it will shield the lower leads of the phono switch and the lead between the tone control and tubular condenser C36.

After making the phono connections, the I.F. stages should be realigned.

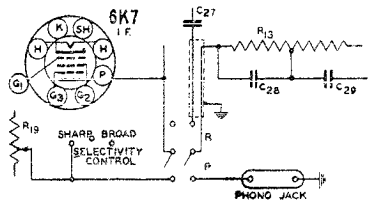


*Fig. 7—Phonograph Connections*

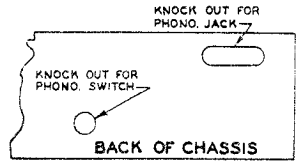


*Fig. 8—Location of Phono Knockouts*

## Switch Contact Location Numbering

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 2. In contact locations not used, the number applying to that particular location is not employed.

MODEL D705
Issues 1 to 6

# WESTERN AUTO SUPPLY CO.

Drive Cord Data
Switch Data, Phono.

## Drive Cord Replacement

**LATE MODELS**—Tie a knot with a small loop at one end of the new drive cord. Slide a 1¾ inch length of fabric tubing on the cord. The free end of the drive cord should be tied to the tension spring in such a manner that there is a distance of 56⅜ inches between the knots.

Turn the gang condenser to full open position.

Place the looped end of the drive cord over the hook on condenser drive drum A—See Fig. 2. Bring the cord up through the slot in the drum rim and pass to the right (from back of chassis) and around pulley B. Then bring the cord to the left and over pulley C. See that the fabric tubing is now between pulleys B and C. Continue cord down to control shaft D and wind 3½ turns counter-clockwise (from back of chassis) on shaft D. Bring cord up to and over pulley E. Bring cord down to top of drive drum A and wind one turn clockwise around the drum rim.

Pass the remaining drive cord and tension spring through the slot in the drum. Place free end of spring over the hook on the condenser drive drum.

**EARLY MODELS**—The procedure is the same as for the late models with the following exceptions:

The distance between the knots on the drive cord should be 49¼ inches.

Leaving shaft D (Fig. 3), the drive cord is brought directly to the top of drive drum A and then continued as in late models.

## Permeability Tuning and Band Switch Assemblies—Differences in Early Models

A few of the first models used a station button plunger $6^{13}/_{32}$ inches long. These models may be identified by a red paint mark on the front bracket of the tuning unit at the upper right corner. On later models, this length was changed to $6^{9}/_{16}$ inches. These models have an orange paint mark in place of the red mark. It is important, therefore, that the length be noted when ordering this part and the correct part number, as shown in the parts list, be specified.

The plungers are replaceable only on the permeability (6 button) tuning unit. In the case of the band switch unit, if any parts require replacing, the entire assembly must be ordered. Two of these assemblies are listed, one using the early short shaft and the other using the later long shaft. The short shaft (early unit) has no paint mark on it. The long shaft (late unit) has an orange paint mark on it.

A change was also made on the tuning rod assembly (Rod on which 2 iron cores are mounted). The rod used on early models was 3¾ inches long and the back end of the rod rested in a small cup in the end of the compression spring. The rod used on late models is 4¾ inches long, extends through the compression spring and projects beyond the rear bracket of the tuning assembly. Only the later type rod complete with the compression spring and a small washer is being furnished for replacement. This complete assembly is interchangeable with the early type.

**ATTACHING DIAL POINTER**—Tune in a 1500 KC signal. Move the pointer to the 1500 KC mark on the dial and clamp it tightly over the fabric tubing on the cord.

## Phonograph Connections

Phonograph connections are made as shown in the schematic circuit diagram. On the back panel of the chassis base is a round knockout opening. In the case of the jack. early models a $1^{9}/_{64}$ inch hole must be drilled in the back panel. A phono cable assembly may then be purchased (see parts list). On one end of this cable is an octal plug $1^{9}/_{64}$ inches in diameter. An octal and on the other end is a phonograph-radio switch and double tip base socket is then mounted in this knockout.

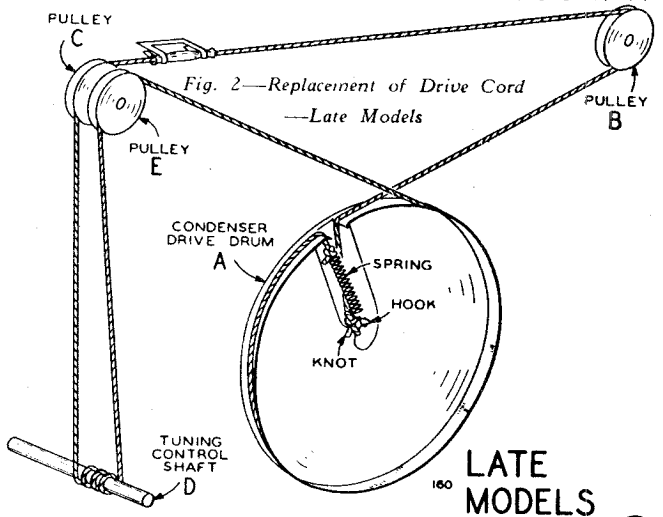


*Fig. 2—Replacement of Drive Cord —Late Models*

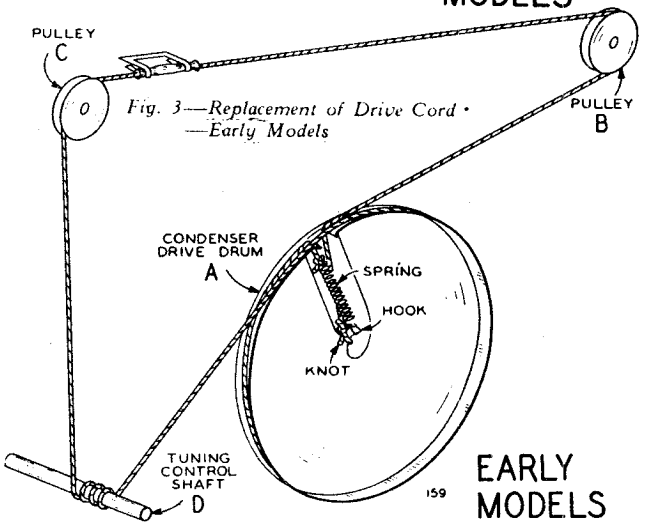


*Fig. 3—Replacement of Drive Cord • —Early Models*

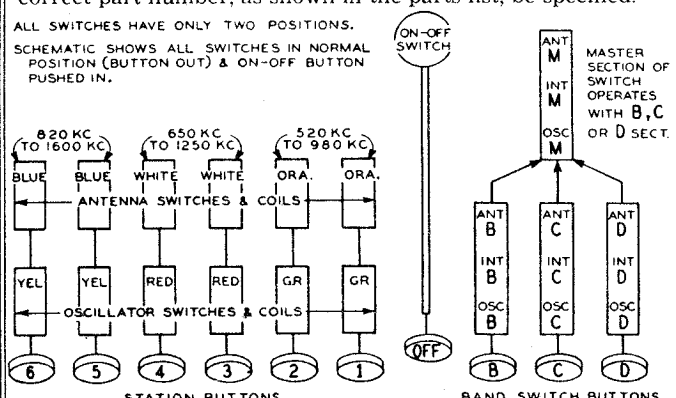


*Fig. 5—Permeability Tuning Unit and Band Switch Arrangement.*

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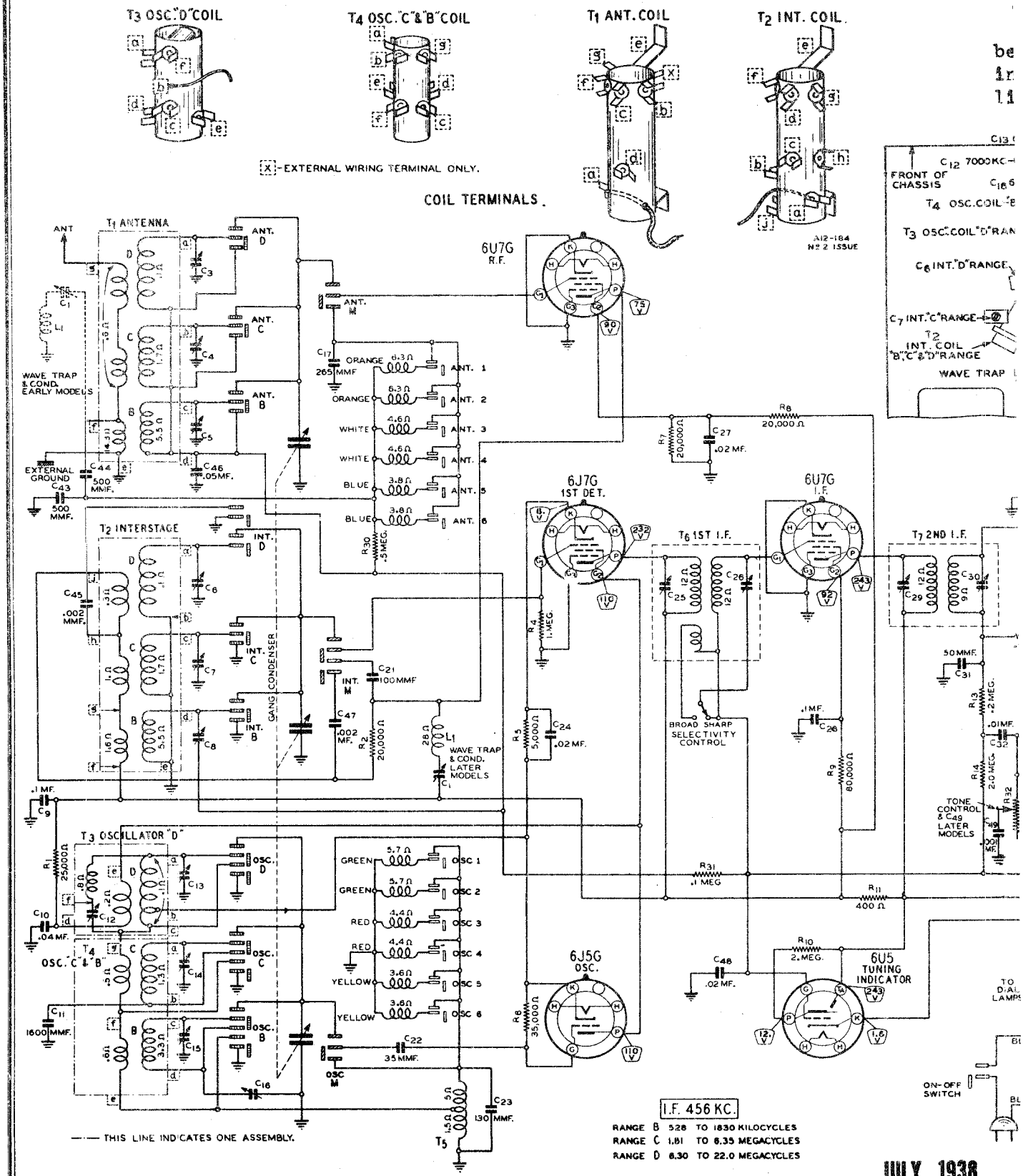
MODEL D705
Issues 1 to 6 incl.
Distortion Notes






SCHEMATIC CIRCUIT DIAGRAM FOR ISSUE NOS. 2 THROUGH 6 .

JULY, 1938

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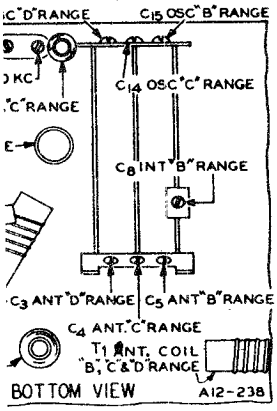
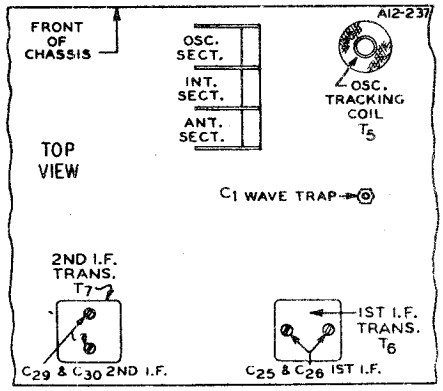
O SUPPLY CO.

MODEL D705
Issues 2 to 6 incl.
Schematic, Voltage, Coils
Trimmers, Changes

## CHANGES IN LATER PRODUCTION

Mechanical and electrical changes have
on made in the later productions, includ-
; several new dials. Changes and parts
its of Issues 2 to 6 are given herewith.




## ISSUE NUMBER CHANGES

The last digit of the number on the chassis number label identifies the radio as to the issue number.

ISSUE NO. 1 (see notes for issue 1) with the exception of the Replacement Parts List and Schematic Circuit Diagram, applies with minor changes to all chassis issues, 1 through 6. The Replacement Parts List and Schematic Circuit Diagram, however, apply only to No. 1 issue chassis.

ISSUE NOS. 2 and 3

MECHANICAL CHANGES -- The station button plunger has a length of 7-5/16 inches.

The locking plate for the station button plungers has been redesigned and now employs two side arms mounted in rubber cushioned hinge brackets which are attached to the rear bracket of the tuner assembly by two screws.

FOR THE FOLLOWING ELECTRICAL CHANGES REFER TO SCHEMATIC ON THIS PAGE.

ELECTRICAL CHANGES -- The AVC voltage is fed to the grid of the R.F. tube through the manual and automatic tuning coils. Formerly, it was applied directly to the grid of the R.F. tube through a 1 Megohm resistor.

The operating voltages of several of the tubes have been changed. Correct values are shown on the schematic in this supplement.

ISSUE NOS. 4 and 5

MECHANICAL CHANGES -- The antenna coil (r1) and Wave Trap Coil (L1) have been moved from the top of the chassis base to a position just in back of the band switch underneath the chassis base.

The Wave Trap Trimmer (C1) has been moved from its former position near the 1st I.F. Transformer (T6) to a position near the 6U7G R.F. tube.

ELECTRICAL CHANGES -- The Wave Trap Coil (L1) and Trimmer Condenser (C1) have been removed from the antenna circuit and are now connected in the interstage circuit.

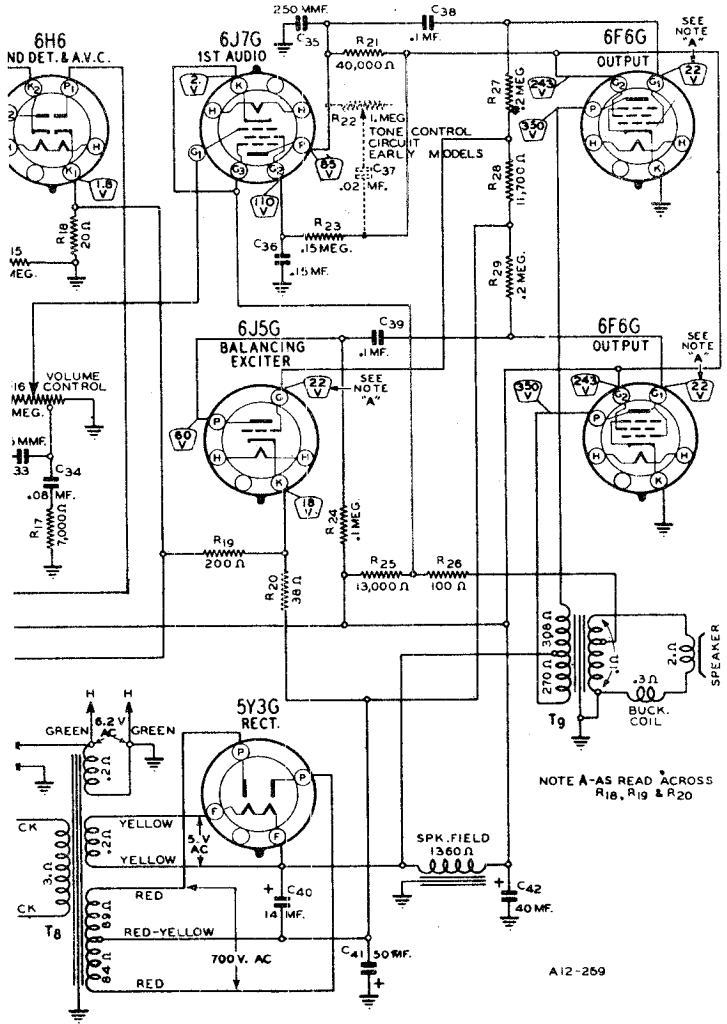
ISSUE NO. 6

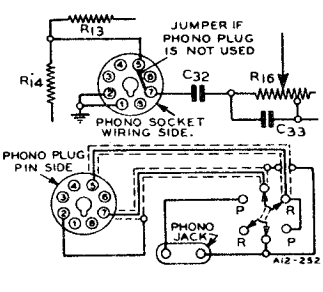
ELECTRICAL CHANGES -- The Tone Control, formerly in the 1st audio plate has been put in the diode circuit. A 1 Megohm Tone Control (R22) and a .02 mf. (C37) condenser were used in the audio plate. A 3 Megohm Tone Control (R32) and a .001 mf. (C49) condenser are used in the diode circuit.

DISTORTION (ALL ISSUES NOS. 1 THROUGH 6)

If mushy reproduction is encountered on a medium or strong signal after the radio has been turned on for about ten minutes, it probably is due to grid current in the 6U7G R.F. and I.F. tubes.

Change the 4 megohm resistor R14 to a 2 megohm resistor and if this does not clear up the reproduction replace either the 6U7G R.F. or I.F. tubes or both of them.



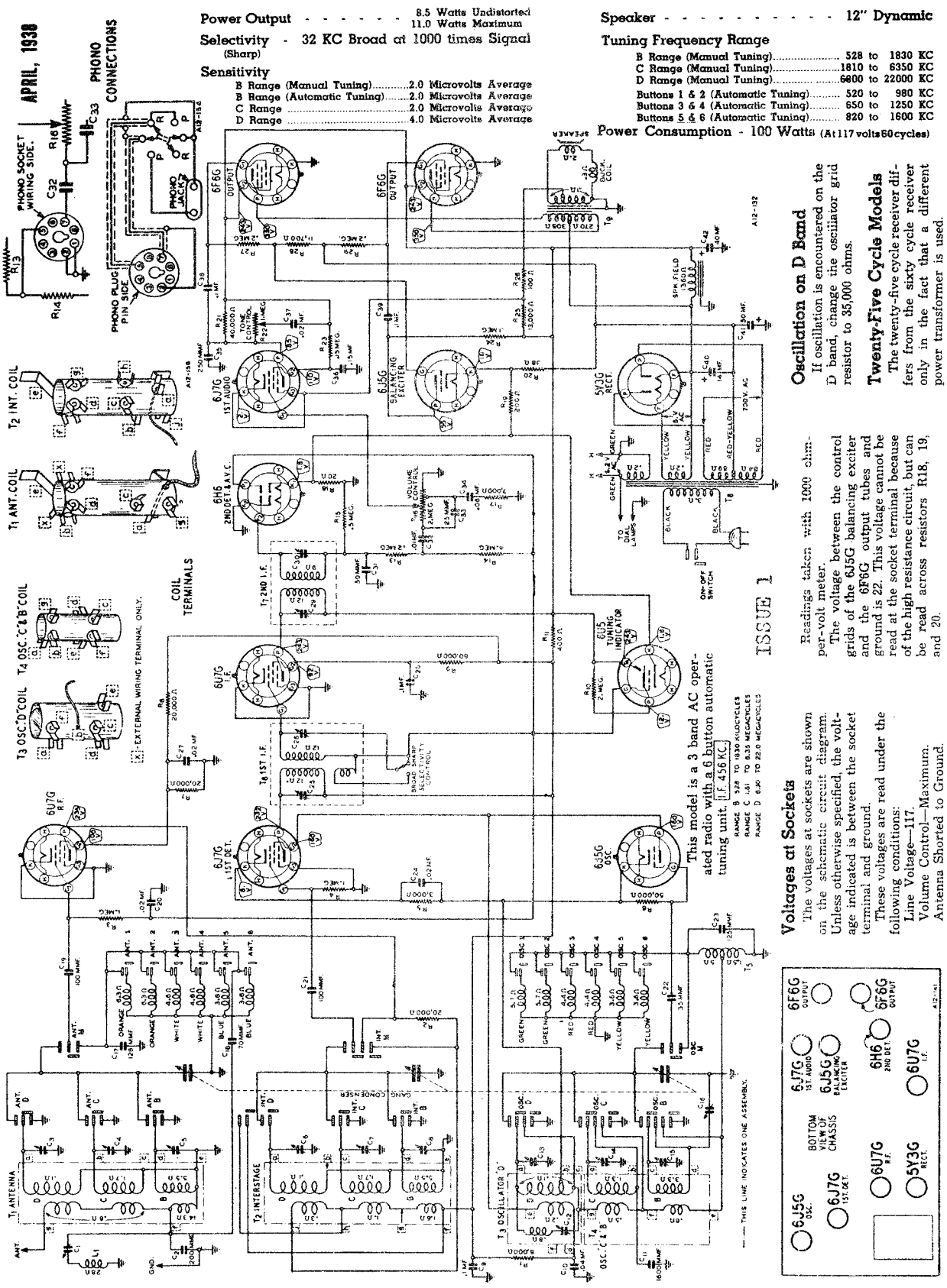

PHONO CONNECTIONS

SOCKET LAYOUT: SEE ISSUE NO.1 SOCKET LAYOUT.

MODEL D705, Issues 1 to 6
Socket, Specifications
Notes

# WESTERN AUTO SUPPLY CO.

MODEL D705, Issue 1
Schematic, Voltage


APRIL, 1938
PHONO CONNECTIONS
PHONO SOCKET WIRING SIDE.
PHONO PLUG PIN SIDE
PHONO JACKS
Power Output - - - - - - - 8.5 Watts Undistorted
11.0 Watts Maximum
Selectivity - 32 KC Broad at 1000 times Signal
(Sharp)
Sensitivity
B Range (Manual Tuning).....2.0 Microvolts Average
B Range (Automatic Tuning).....2.0 Microvolts Average
C Range .....2.0 Microvolts Average
D Range .....4.0 Microvolts Average
Speaker - - - - - - - - - - - 12" Dynamic
Tuning Frequency Range
B Range (Manual Tuning)..... 528 to 1830 KC
C Range (Manual Tuning).....1810 to 6350 KC
D Range (Manual Tuning)..... .....6600 to 22000 KC
Buttons 1 & 2 (Automatic Tuning)..... 520 to 980 KC
Buttons 3 & 4 (Automatic Tuning)..... 650 to 1250 KC
Buttons 5 & 6 (Automatic Tuning)..... 820 to 1600 KC
Power Consumption - 100 Watts (At 117 volts 60 cycles)
T2 INT. COIL
T1 ANT. COIL
T4 OSC. 'C' & 'B' COIL
T3 OSC. 'D' COIL
COIL TERMINALS
[X] - EXTERNAL WIRING TERMINAL ONLY.
6F6G OUTPUT
6J7G 1ST AUDIO
6J5G BALANCING EXCITER
6H6 2ND DET. & A.V.C.
5Y3G RECT.
6U5 TUNING INDICATOR
6U7G R.F.
6U7G 1ST DET.
6J5G OSC.
SPEAKER
SPK. FIELD 1360Ω
VOLUME CONTROL
TONE CONTROL
ON-OFF SWITCH
TO DIAL LAMPS
T6 1ST I.F.
T7 2ND I.F.
BROAD SHARP SELECTIVITY CONTROL
This model is a 3 band AC operated radio with a 6 button automatic tuning unit. I.F. 456 KC.
RANGE B 528 TO 1830 KILOCYCLES
RANGE C 1.81 TO 6.35 MEGACYCLES
RANGE D 6.60 TO 22.0 MEGACYCLES
T1 ANTENNA
T2 INTERSTAGE
T3 OSCILLATOR 'D'
OSC. C & B
GANG CONDENSER
THIS LINE INDICATES ONE ASSEMBLY.
BOTTOM VIEW OF CHASSIS
6J5G OSC.
6J7G 1ST DET.
6J7G 1ST AUDIO
6J5G BALANCING EXCITER
6F6G OUTPUT
6H6 2ND DET
6U7G R.F.
5Y3G RECT.
6U7G I.F.

ISSUE 1

## Voltages at Sockets

The voltages at sockets are shown on the schematic circuit diagram. Unless otherwise specified, the voltage indicated is between the socket terminal and ground.

These voltages are read under the following conditions:
Line Voltage—117.
Volume Control—Maximum.
Antenna Shorted to Ground.

Readings taken with 1000 ohm-per-volt meter.

The voltage between the control grids of the 6J5G balancing exciter and the 6F6G output tubes and ground is 22. This voltage cannot be read at the socket terminal because of the high resistance circuit, but can be read across resistors R18, 19, and 20.

## Oscillation on D Band

If oscillation is encountered on the D band, change the oscillator grid resistor to 35,000 ohms.

## Twenty-Five Cycle Models

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used.

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MODEL D705, Issues 1 to 6
Alignment, Trimmers

# WESTERN AUTO SUPPLY CO.

## Circuit

Ten buttons are provided on the front panel. Three buttons actuate linear band switches for a broadcast and 2 short wave manual tuning ranges. Six buttons actuate switches which connect fixed tuned circuits for automatic tuning. Depressing any of the 9 band and automatic tuning buttons also turns on the radio. Depressing the 10th button will turn the radio to the off position.

The band switch has 4 arms as shown in Fig. 5, one each for the B, C, and D bands (broadcast, 1st and 2nd short wave, respectively) and one called the "Master" arm. The master arm switches from manual to automatic tuning and vice versa. This arm is actually over the other 3 arms rather than in back of them, as shown in the illustration. Depressing any of the B, C, or D band buttons actuates the arm for that band and also the master arm. The latter is in only when one of the 3 band switch buttons is depressed.

In manual tuning, an R. F. antenna transformer with tuned secondary is used before the 6U7G R.F. tube. The output of this tube is fed through another R. F. transformer with tuned secondary into the 6J7G 1st detector tube. A 6J5G tube functions as a separate oscillator. The antenna, interstage, and oscillator circuits are tuned by sections of the gang condenser.

In automatic tuning, the gang condenser is not used. A single tuned circuit is used before the R. F. tube while a stage of resistance coupling is employed between this tube and the 1st detector. The other automatic tuned circuit is the oscillator grid circuit. Tuning of the R. F. and oscillator fixed tuned circuits to the desired frequency is accomplished by varying the inductance of tuning coils by changing the permeability of the magnetic circuit. This is done by moving an iron core in and out of the coil.

The iron cores within the automatic tuning antenna and oscillator coil forms are secured to a brass rod. This rod is moved back and forth by a screw at the front of the radio.

Alignment between the oscillator and antenna automatic tuning coils is obtained by changing the antenna (rear) coil position while the iron core is held in place on the shaft.

In the schematic, the band switch and the automatic tuning switch are broken into sections each of which is given a name that is, to some extent, descriptive of its location in the circuit. Ant. D, for example, completes the antenna coil D band connections when the D range button is depressed. The location of the Ant. D connections on the band switch is shown in Fig. 5. All of the switches have only 2 positions. In the schematic, they are in the normal or button out position.

Now, to describe the connections for one manual tuning range: Let us assume that the B band button is depressed. The antenna transformer B band secondary is connected to the R. F. tube grid circuit through the Ant. B and Ant. M sections of the B band and master switch arms. The antenna transformer C and D band secondaries are short circuited.

The interstage transformer B band secondary is connected to the 1st detector tube grid circuit through the Int. B and Int. M sections of the switch arms mentioned above. The interstage transformer C band secondary is short circuited and the D band secondary is open circuited.

The oscillator B band grid coil is connected to the grid circuit of the oscillator tube through the Osc. B and Osc. M sections of the same switch arms as mentioned above. The oscillator B band cathode coil is connected to ground through the Osc. B section. The oscillator C and D band grid coils are short circuited.

The permeability tuning coils are open circuited.

In like manner, to describe the connections for one automatic tuning circuit, assume that button number 1 is depressed.

The antenna circuit is connected to the R. F. tube grid circuit through the Ant. M section of the master switch arm. The antenna circuit is also connected to the antenna No. 1 permeability coil through Ant. 1 switch. The antenna No. 1 coil is shunted by fixed condenser C17. The connections from the antenna and interstage transformer secondaries are open circuited.

The plate of the R. F. tube is connected in series with resistor R2 to the B+ line. It is also connected through coupling condenser C21 to the grid of the 1st detector. The latter is connected through grid leak R4 to ground.

The oscillator cathode circuit is connected through the tap on tracking coil T5 to ground. This tracking coil is connected through the Osc. M switch section to the control grid circuit of the oscillator tube. It is also connected to oscillator No. 1 coil through the Osc. 1 switch section. The tracking or oscillator grid coil is tuned by fixed condenser C23 and the inductance of oscillator coil No. 1.

One stage of I. F. amplification is employed using a 6U7G tube. An expander is used in the 1st I. F. transformer for high fidelity reception.

A 6H6 tube functions as a diode 2nd detector. AVC voltage is applied to the control grid circuits of the R. F. and I. F. tubes.

Across the volume control resistor R16 is a filter composed of condensers C33 and C34 and resistor R17. At high volume settings, the filter is not effective. At low volume settings, the action of this filter results in an increase of high and low frequency amplitudes relative to the other frequency amplitudes.

The output of the 2nd detector is applied to the 6J7G 1st A. F. tube. The output of this tube is fed through resistance coupling into the 6F6G output tube immediately to the right of it in the schematic.

A portion of the voltage developed across the output tube grid resistor is applied to the control grid of the 6J5G balancing exciter tube. This tube functions as a phase inverter and applies the audio voltage of proper phase and amplitude to the other 6F6G output tube. The two output tubes operate as a stage of Class A push-pull amplification. The balancing exciter tube thus replaces a push-pull input transformer. A dynamic reproducer is employed.

Degeneration or negative feedback is used in the audio amplifier. A portion of the voltage developed across the secondary of the output transformer is fed back into the cathode circuit of the 1st audio tube. The voltage fed back is of the proper phase to reduce the amplitude of certain frequencies. This results in a reduction in distortion.

The power unit uses a 5Y3G full wave rectifier. A 6U5 tuning indicator tube is employed.

## ALIGNMENT PROCEDURE

Volume Control—Maximum All Adjustments.
Selectivity Control—Sharp Position All Adjustments.
Connect Radio Chassis to Ground Post of Signal Generator with a Short Heavy Lead.
Allow Chassis and Signal Generator to "Heat Up" for several minutes.

The following equipment is required for aligning:
An All Wave Signal Generator which will provide an accurately calibrated signal at the test frequencies as listed.
Output Indicating Meter—Non-Metallic Screwdriver.
Dummy Antennas—.1 mf., 200 mmf., and 400 ohms.

| SIGNAL GENERATOR FREQUENCY SETTING | SIGNAL GENERATOR CONNECTION AT RADIO | DUMMY ANTENNA | BUTTON DEPRESSED | CONDENSER SETTING | ADJUST TRIMMERS TO MAXIMUM (Unless otherwise specified) |
|---|---|---|---|---|---|
| I. F. | | | | | |
| 456 KC | Grid of I.F. Tube | .1 mf. | B Range | Turn Rotor to Full Open | 2nd I.F. (C29) & (C30) |
| 456 KC | Grid of 1st Det. | .1 mf. | B Range | Turn Rotor to Full Open | 1st I.F. (C25) & (C26) |
| RANGE B | | | | | |
| 1830 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Full Open | Oscillator Range B (C15) |
| 1500 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output Set Indicator to 1500 KC—See Note A | Ant. Range B (C5) Int. Range B (C8) |
| 600 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to Max. Output | 600 KC (C16) Rock Rotor—See Note B |
| WAVE TRAP | | | | | |
| 456 KC | Antenna Lead | 200 mmf. | B Range | Turn Rotor to 600 KC Adjust Sig. Gen.—See Note C | Wave Trap (C1) Adjust for MINIMUM Output |
| RANGE C | | | | | |
| 6350 KC | Antenna Lead | 400 Ohm | C Range | Turn Rotor to Full Open | Oscillator Range C (C14) |
| 6000 KC | Antenna Lead | 400 Ohm | C Range | Turn Rotor to Max. Output | Antenna Range C (C4) Int. Range C (C7) |
| RANGE D | | | | | |
| 22,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Full Open | Oscillator Range D (C13) |
| 20,000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | Ant. Range D (C3) Int. Range D (C6) Rock Rotor—See Note B |
| 7000 KC | Antenna Lead | 400 Ohm | D Range | Turn Rotor to Max. Output | 7000 KC (C12) Rock Rotor—See Note B |
| PERMEABILITY TUNING UNIT | | | | TURN SETTING SCREW TO MAXIMUM OUTPUT —See Instruction Book | ADJUST COIL POSITION TO MAXIMUM OUTPUT —See Note D |
| 700 KC | Antenna Lead | 200 mmf. | No. 1 | Setting Screw No. 1 | Antenna Coil No. 1 |
| 700 KC | Antenna Lead | 200 mmf. | No. 2 | Setting Screw No. 2 | Antenna Coil No. 2 |
| 850 KC | Antenna Lead | 200 mmf. | No. 3 | Setting Screw No. 3 | Antenna Coil No. 3 |
| 850 KC | Antenna Lead | 200 mmf. | No. 4 | Setting Screw No. 4 | Antenna Coil No. 4 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 5 | Setting Screw No. 5 | Antenna Coil No. 5 |
| 1100 KC | Antenna Lead | 200 mmf. | No. 6 | Setting Screw No. 6 | Antenna Coil No. 6 |

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each range is completed, repeat the procedure as a final check.

NOTE A—If the pointer is not at 1500 KC on the dial, loosen the 2 clamps which hold the pointer assembly on the cord, move the pointer to the 1500 KC mark, and tighten the clamps.

NOTE B—Turn the rotor back and forth and adjust the trimmer until the peak of greatest intensity is obtained.

NOTE C—Leave condenser rotor at the 600 KC setting and adjust the signal generator until maximum output is obtained at or near 456 KC.

NOTE D—At the bottom of the permeability tuning unit can be seen six "W" openings. Insert the end of a pair of long nose pliers or a screwdriver in the "W" opening of the proper button and adjust the position of the antenna (rear) coil by twisting the pliers or screwdriver until maximum output is obtained.

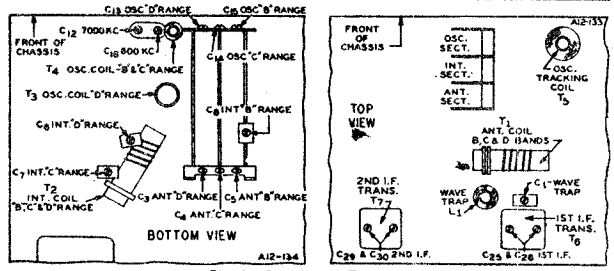


*Fig. 1—Location of Trimmers*

CAUTION—When aligning the short wave bands be sure NOT to adjust at the image frequency. This can be checked as follows: Let us say the signal generator is set for 5000 KC. The signal will then be heard at 5000 KC on the dial of the radio. The image signal, which is much weaker, will be heard at 5000 less 912 KC, or 4088 KC on the dial. It may be necessary to increase the input signal to hear the image.

NOTICE—Re-alignment is necessary if glass tubes are replaced by their equivalent in metal tubes, or vice versa, in the R.F. and I.F. stages.

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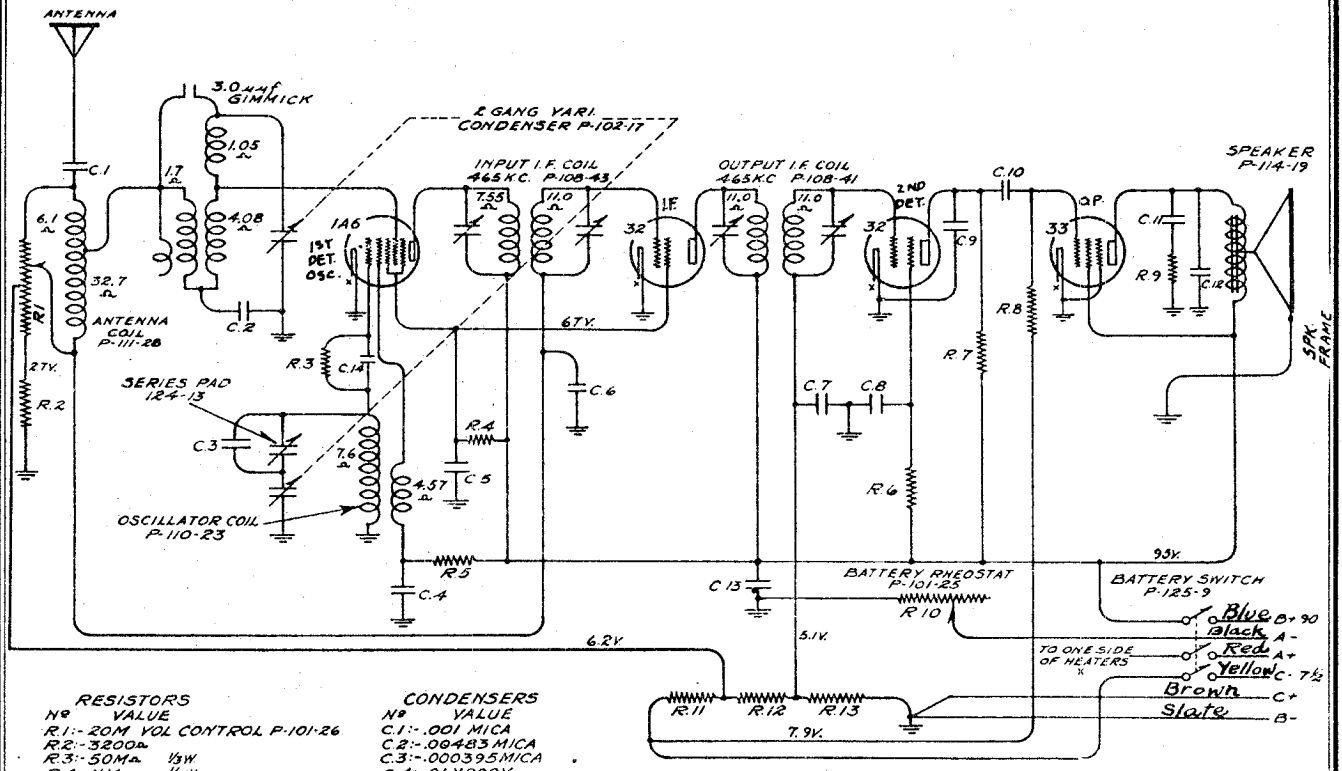
# WESTERN AUTO SUPPLY CO.

MODEL D709 (1933)
Schematic, Socket Trimmers




### RESISTORS

| Nº | VALUE |
|---|---|
| R.1 | 20M VOL CONTROL P-101-26 |
| R.2 | 3200Ω |
| R.3 | 50MΩ ⅓W |
| R.4 | 11MΩ ⅓W |
| R.5 | 10MΩ ⅓W |
| R.6 | 3 MEG.Ω ⅓W. |
| R.7 | 750MΩ ⅓W. |
| R.8 | 500MΩ ⅓W. |
| R.9 | 35MΩ ⅓W. |
| R.10 | 4Ω BAT. RHEOSTAT P-101-25 |
| R.11 | 1300Ω |
| R.12 | 1920Ω |
| R.13 | 9800Ω ⅓W |

### CONDENSERS

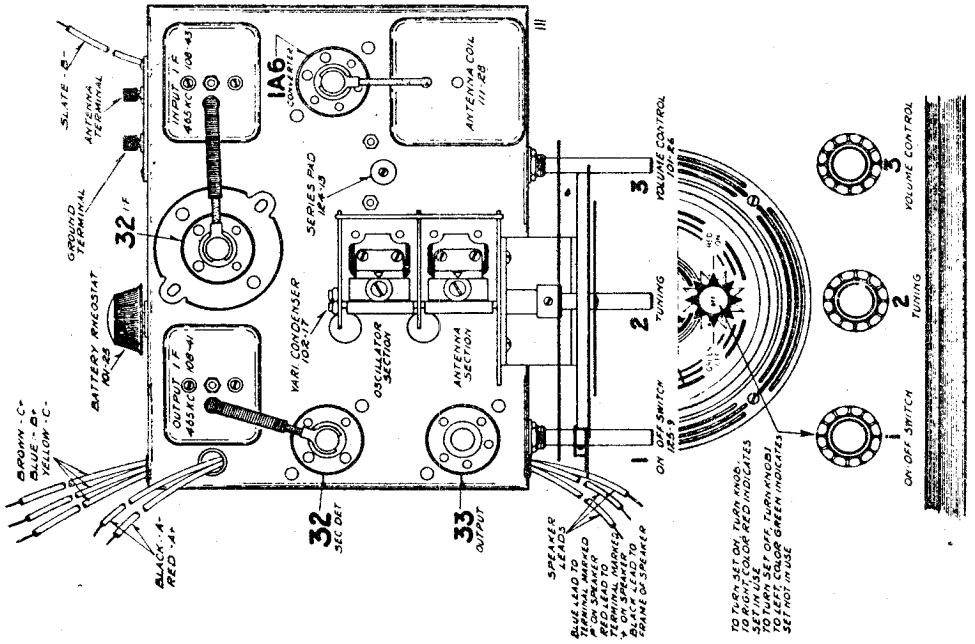
| Nº | VALUE |
|---|---|
| C.1 | .001 MICA |
| C.2 | .00483 MICA |
| C.3 | .000395 MICA |
| C.4 | .01 X 200V. |
| C.5 | .05 X 200V. |
| C.6 | .25 X 200V. |
| C.7 | .05 X 200V |
| C.8 | .01 X 200V. |
| C.9 | .00025 MICA |
| C.10 | .01 X 400V |
| C.11 | .01 X 400V |
| C.12 | .0005 MICA |
| C.13 | .25 X 200V |
| C.14 | .00025 MICA |

- NOTE -

R. 2, R.11, R.12 ARE IN ONE UNIT. P-106-21
C.4, C.5 ARE IN ONE UNIT P-118-11
C.6, C.13 " " " " P-118-5
C.7, C.8 " " " " P-118-11
NUMBERS PREFIXED BY LETTER 'P ARE PART Nos
ALL VOLTAGES INDICATED ARE WITH NEW BATTERIES, VOLUME CONTROL ON FULL

IF PEAK 465 KC

Serial No. 5D115200A and up




## BATTERIES NEEDED

The following batteries are needed.

2.....45 volt "B" Batteries.

1.....7½ Volt "C" Battery.

1.....3 Volt Dry "A" Battery or 2 Volt Storage Battery.

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### "A" Battery and Regulator

This receiver is designed to operate with a 2 volt storage cell, but may be operated with a 3 volt dry "A" battery if used with a voltage regulator. The receiver may also be used with an air cell "A" battery provided a series resistor is used.

**3 Volt "A" Battery**—The voltage regulator required with this type of battery as illustrated in Fig. 4 is not supplied with the receiver unless specified. This device consists of a rheostat which controls the voltage, a voltmeter for measuring its value as supplied to the receiver and a small push button switch for cutting the voltmeter in and out of the circuit. It has two prongs at the bottom which plug into the socket in the platform at the rear left corner of the chassis. The circuit diagram of the regulator is shown in Fig. 5.

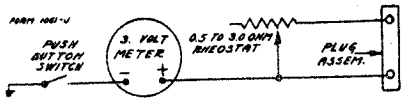


*Fig. 5—Schematic Diagram of Voltage Regulator*

The receiver is shipped from the factory with a jumper between the two socket connections and a fibre strip over the socket. This strip must be removed and the jumper taken out as illustrated in Figs. 6 and 7 before the regulator can be inserted as shown in Fig. 4. The jumper is in the "A+" line.

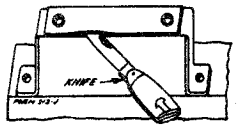


*Fig. 6—Prying off Fiber Cover*

When a new 3 volt "A" battery is inserted, the adjusting knob must be turned to the left hand position and then turned up until the voltmeter indicates 1.9 to 2 volts. The push button must be held in until the adjustment is completed. **Caution the user never to operate the receiver with the adjustment beyond 2 volts.**

**Air Cell "A" Battery**—If an air cell "A" battery is used, a series resistor will be required to reduce the voltage to the proper level of 2 volts for the tube filaments. Although the voltage regulator mentioned above can be used, the series resistor is cheaper and is satisfactory as the voltage of one of these batteries drops very little during the useful life of the battery

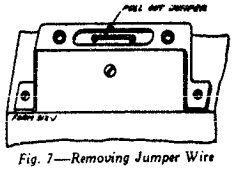

*Fig. 7—Removing Jumper Wire*

## Replacing Drive Cord

Remove chassis from cabinet.

Take off the pointer by removing the screw at the center of the dial.

Remove the dial by taking out the six rivets from the dial assembly.

Remove the on-off indicator dial by pulling it forward.

With the condenser plates in a completely open position, slip the new drive cord thru hole "A" (from the front) in the drive drum. See Fig. 9.

Pull the cord thru this hole far enough to tie a knot near the end. Make this knot large enough so that it will not pull back thru the hole.

Slip the opposite end of the drive cord thru hole "B" of the drive drum.

Now slip the piece of fine tubing (about ¼" long) over the drive cord and insert about half of this tubing into hole "B" as shown in the illustration. This is important to prevent the cord from being cut.

Bring the drive cord down to the drive shaft and wrap the cord in a clockwise direction about two and one-half times around this shaft, progressing toward the front.

Bring the cord up from the drive shaft and wrap it around the drive drum approximately one and one-half times in a clockwise direction, progressing toward the front until the cord is up to the turned-in portion of the flange "C". See Fig. 9.

Pull the cord tight and tie the end of the cord to the tension spring as shown in the illustration. The knot should be at the bend in the flange so that the spring will be under sufficient tension to prevent the drive cord from slipping.

Now, by applying a little tension on the spring, hook the other end of the spring into hole "D" on the opposite side of the drum. Hook the spring from the inside (in later models hole "D" is replaced by a hook on the inside of the drive drum).

Turn the drive shaft back and forth several times to take out the slack and see if the drive is operating properly. *If the cord slips on the drive shaft, remove the spring from the drive drum and add an additional knot in the cord at the spring in order to put greater tension on the spring.*

Replace the on-off indicator dial, care being taken that the indicator is so placed that it will properly show the on and off positions.

Re-assemble the pointer and dial to the drive assembly. If the rivets are broken use No. 2 by ¼" long round head machine screws and nuts.

### Testing Batteries

If the receiver does not operate satisfactorily test the batteries under load. A high resistance meter is required for the "B" and "C" voltages. If any of the batteries are considerably below their rated voltage, new ones should be used. When the "B" batteries are replaced the "C" batteries should also be replaced. The reason for this is that the "C" drain is such that the "C" batteries are run down in about the same time as the "B" batteries.

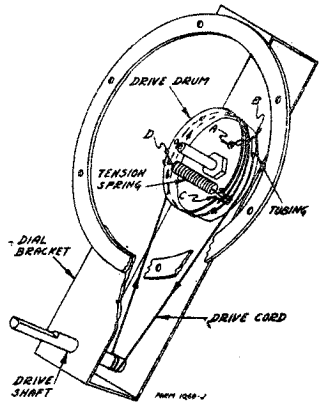


*Fig. 9—Replacing Drive Cord*

VOLTAGES AT SOCKETS
**Volume Control at Maximum—Antenna Shorted to Ground. B+135 Volts Voltages to Chassis**

| Type of Tube | Function | Across Filament | Plate to Gnd. | Screen to Gnd. | Grid to Gnd. | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 32 | 1st Det. & Osc. | 2.0 | 135 | 67.5 | 7.5 (1) (2) | 2.5 |
| 34 | 1. F. | 2.0 | 135 | 67.5 | 2.5 (3) | 2.8 |
| 34 | 2nd Det. | 2.0 | 50 | 40 (1) | 0 | 1.8 |
| 30 | 1st Audio | 2.0 | 135 | | 9 (4) | 3.0 |
| 19 | Output | 2.0 | 135 | | 4.5 | 3.2 Total |

(1) With 250,000 ohm meter.
(2) Subject to variation.
(3) With 25,000 ohm meter.
(4) Read at "C" battery.

## Alignment Procedure and Dial Calibration

Misalignment or mistracking of condensers generally manifests itself as broad tuning and lack of volume at portions or all of the standard wave band. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide accurately calibrated signals over the standard wave band and at the intermediate frequency and an output meter are required for indicating the effect of adjustments.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

### I. F. Adjustment

Set the signal generator for a signal of 175 KC.

Connect the antenna lead of the signal generator thru a .1 MF condenser to the coil end of the grid leak resistor R1. There is a lead which runs from the center tuning condenser stator to a lug at the bottom of the R. F. coil assembly. This connection can be made at the lug on the coil to which this lead is connected.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the volume control to the maximum position.

Then adjust the three I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 8.

As stated above, use a non-metallic screwdriver to make the adjustment.

### 1750 KC Adjustment

Set the signal generator for 1750 KC.

Turn the rotor of the tuning condenser to the full open position.

Connect the antenna lead of the receiver thru a 250 mmf. condenser to the output of the signal generator.

Keep the volume control at the maximum position.

Adjust the trimmer of the oscillator section of the three gang condenser until maximum output is obtained. The location of this trimmer is shown in Fig. 8.

### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st detector and antenna trimmers for maximum output.

Do not change the setting of the oscillator trimmer.

### Dial Calibration

To obtain dial scale calibration tune in an 800 KC signal and set the dial pointer at that mark on the dial scale. When calibrated in this manner, the setting will be approximately correct at both ends of the scale.

## SPECIFICATIONS

**Input Voltages**
"A" Battery . . . . . 2 Volts (.5 Amperes)
"B" Batteries . . . . . 67½ and 135 Volts
"C" Batteries . . . . . 4½, 9 and 22½ Volts
**Power Output** . . . . 1 Watt (Undistorted)

**Sensitivity** . . . . 15 Microvolts Absolute
**Tuning Range** . . . . . 530 to 1750 KC
**Intermediate Frequency** . . . . . 175 KC
**Speaker** . . . . . 6" Magnetic

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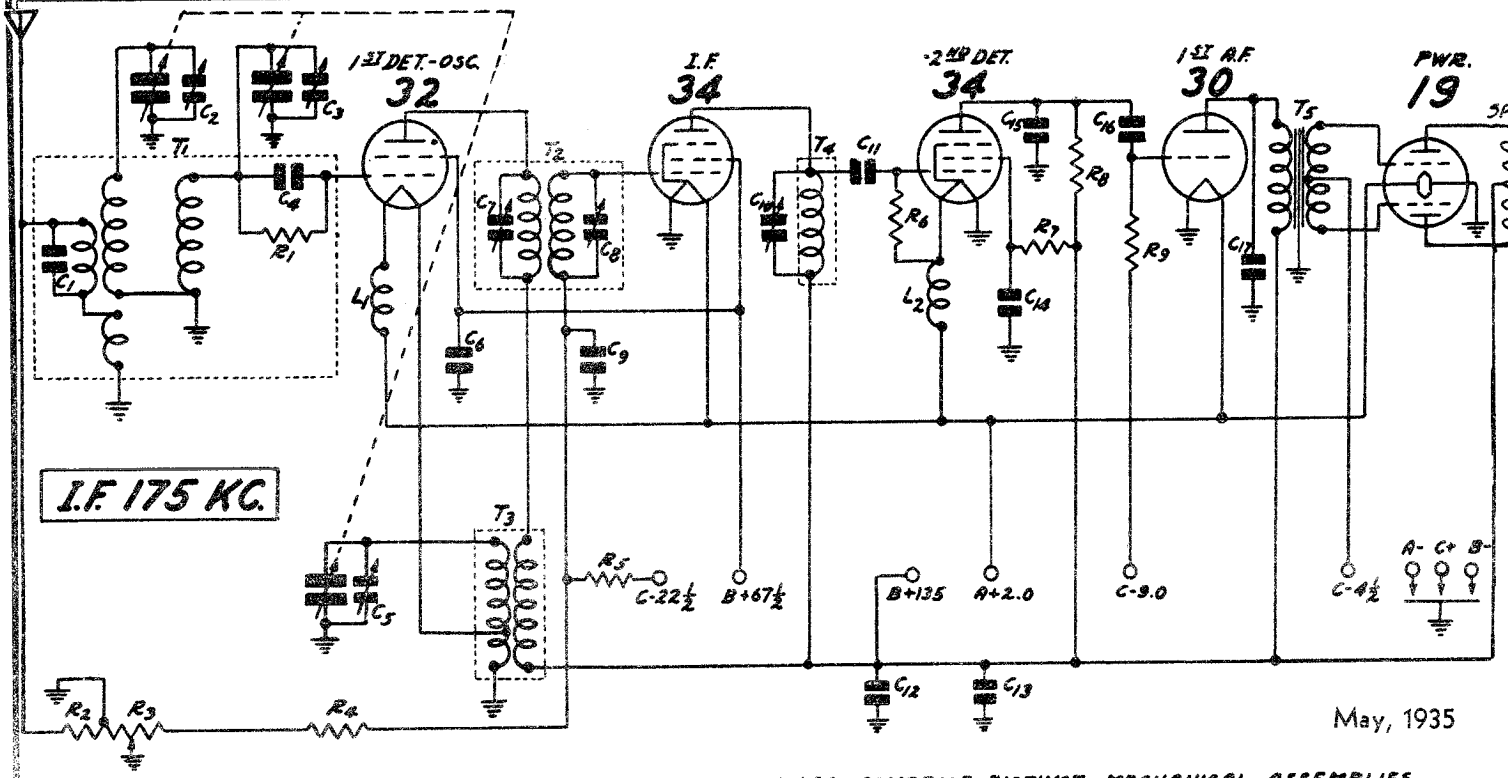
WESTERN AUTO SUPPLY CO

MODEL D709 (1935) S709
Schematic, Socket
Trimmers




C1 150 MMF MOULDED
C2 GANG TRIMMER
C3 GANG TRIMMER
C4 35 MMF MOULDED
C5 GANG TRIMMER
C6 .25 MF 180 V.
C7 40-100 MMF } DUAL
C8 20-70 MMF } (P-17A37)
C9 .05 MF 180 V.
C10 40-100 MMF (P-17A38)
C11 50 MMF MOULDED
C12 .10 MF 180 V.
C13 4.0 MF 150 V. ELECTROLYTIC
C14 .10 MF 180 V.
C15 .002 MF 300 V.
C16 .006 MF 300 V.
C17 .002 MF 300 V.

May, 1935

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

R1 1.0 MEGOHM .2 W.
R2 10000 OHM } VOLUME CONTROL
R3 60000 OHM }
R4 900 OHM .2 W.
R5 6500 OHM .2 W.
R6 2.0 MEGOHM .2 W.
R7 100000 OHM .5 W.
R8 40000 OHM .5 W.
R9 1.0 MEGOHM .2 W.

L1 SINGLE FILAMENT REACTOR (P-9A281)
L2 SINGLE FILAMENT REACTOR (P-9A281)

T1 DOUBLE TUNED ANTENNA COIL (P-9A381)
T2 1ST I.F. COIL (P-9A383)
T3 OSC. COIL (P-9A382)
T4 2ND I.F. COIL (P-9A384)
T5 AUDIO INPUT TRANS. (P-50XH)

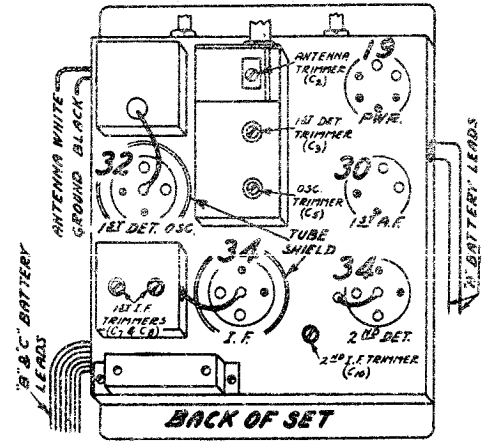



*Fig. 8—Tube Arrangement*

**Following are the D. C. resistances of the various windings in the chassis.**

| Part No. | | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| 9A381 | Double Tuned Ant. Trans. Pri. (in series) | T1 | 17. |
| | Double Tuned Ant. Trans. Sec. (Antenna) | T1 | 3.5 |
| | Double Tuned Ant. Trans. Sec. (1st Det.) | T1 | 3.5 |
| 9A383 | 1st I.F. Trans. Primary | T2 | 80. |
| | 1st I.F. Trans. Secondary | T2 | 105. |
| 9A382 | Oscillator Coil Cathode Winding | T3 | 2. |
| | Oscillator Coil Plate Winding | T3 | 7. |
| 9A384 | 2nd I.F. Reactor Coil | T4 | 50. |
| 9A281 | Filament Reactor (In 1st Det. Ckt.) | L1 | Small |
| 9A281 | Filament Reactor (In 2nd Det. Ckt.) | L2 | Small |
| 50X11 | Audio Transformer Primary | T5 | 950. |
| | Audio Transformer Secondary (Center Tap to outside) | T5 | 600. |
| | Audio Transformer Secondary (Center Tap to inside) | T5 | 550. |
| 12A217 | Magnetic Speaker (Center Tap to outside) | | 290. |
| | Magnetic Speaker (Center Tap to inside) | | 250. |

MODEL D709 (1938)

# WESTERN AUTO SUPPLY CO.

Schematic, Socket Trimmers, Alignment

## Six Tube 6 Volt Battery Dual Wave Superheterodyne

This receiver is designed to operate over two tuning ranges: from 535 to 1730 Kilocycles (KC) (173.4 to 561 meters), and from 5650 to 18,100 Kilocycles (KC) (16.5 to 53 Meters).




**RESISTORS**

| No. | OHMS | WATTS | SPL. TOL. |
|---|---|---|---|
| 1 | 250 | | |
| 2 | 15,000 | | |
| 3 | 1 MEG | | |
| 4 | 500,000 | | (VOL. CON) |
| 5 | 150,000 | | ± 10% |
| 6 | 150,000 | | |
| 7 | 500,000 | | ± 10% |
| 8 | 600,000 | | |
| 9 | 400,000 | | |
| 10 | 100,000 | | |
| 11 | 40,000 | | |
| 12 | 150 | | |
| 13 | 150 | | |

**CONDENSERS**

| No. | CAP-MFD | TYPE | No. | CAP-MFD | TYPE |
|---|---|---|---|---|---|
| 1 | .05 | 200 V. | 11 | .1 | 200 V. |
| 2 | .25 | 200 V. | 12 | .00005 | MICA |
| 3 | .1 | 200 V. | 13 | .004 (± 5%) | MICA |
| 4 | .00025 | MICA | 14 | | |
| 5 | .01 | 400 V. | 15 | .5 | 50 V. |
| 6 | .00025 | MICA | 16 | .5 | 50 V. |
| 7 | .01 | 400 V. | 17 | .015 | 1000 V. |
| 8 | .05 | 200 V. | 18 | .01 | 400 V. |
| 9 | .005 | 600 V. | 19 | 8-8 CCCW | 200 W.V. |
| 10 | .02 | 400 V. | | | |




### CORRECT ALIGNMENT PROCEDURE

The intermediate frequency I.F. stage should be aligned properly as the first step. After the I.F. transformers have been properly adjusted and peaked, the Broadcast Band should always be the next procedure; after which, the Short Wave Band may be aligned.

### I.F. ALIGNMENT

Note: Approximately the same sensitivity should be noted at this point as was at 1400 KC. The signal strength may sometimes be improved by padding the circuits. This is done by slowly increasing or decreasing the oscillator padding condenser and, at the same time, continuously tuning back and forth across the signal with the receiver until the maximum reading is obtained on the output meter. This adjustment may seem a little complicated but is the easiest way to adjust the oscillator to the antenna. Return oscillator or signal generator to the grid of the first detector tube (6A8G) through a .05 or .1 mfd. condenser. The ground on the test oscillator can be connected to the chassis ground. Align all four I.F. trimmers to peak or maximum reading on the output meter.

With the wave switch in the broadcast band and the gang condenser set at minimum, adjust the test oscillator to 456 KC and connect the output of test to the grid of the first detector tube to 1400 KC and again go over the adjustments of this frequency oscillator or signal generator. The ground on the test oscillator can be connected to the chassis ground. Align all four adjustment was made at 600 KC.

### BROADCAST BAND ALIGNMENT

Connect the output of the signal generator to the antenna lead (blue) through a .0002 mfd. mica condenser. Set the gang condenser to minimum and the oscillator to 1730 KC and adjust the Broadcast "oscillator trimmer" to receive this signal. Make no other adjustments at this frequency. Then set the generator to 1400 KC and tune in this signal by rotating the gang to 1400 on the dial. Adjust the Broadcast "antenna" trimmer to a maximum signal. Set the signal generator to 600 KC and tune in the signal on the receiver.

### SHORT WAVE BAND ALIGNMENT

The short wave band is adjusted by setting the generator to 16,000 KC and tuning in the signal. Adjust the "short wave antenna" to give maximum output. As there is no variable low frequency padding condenser on this band, the sensitivity of the receiver should be checked at 6000 KC to determine whether the circuits are in line at this frequency. Should the receiver lack sensitivity at 6000 KC, the antenna and oscillator coils, as well as the .004 mica padding condenser, should be tested for defects as sometimes these components become subject to mechanical or electrical injuries, despite their rugged construction and liberal ratings.

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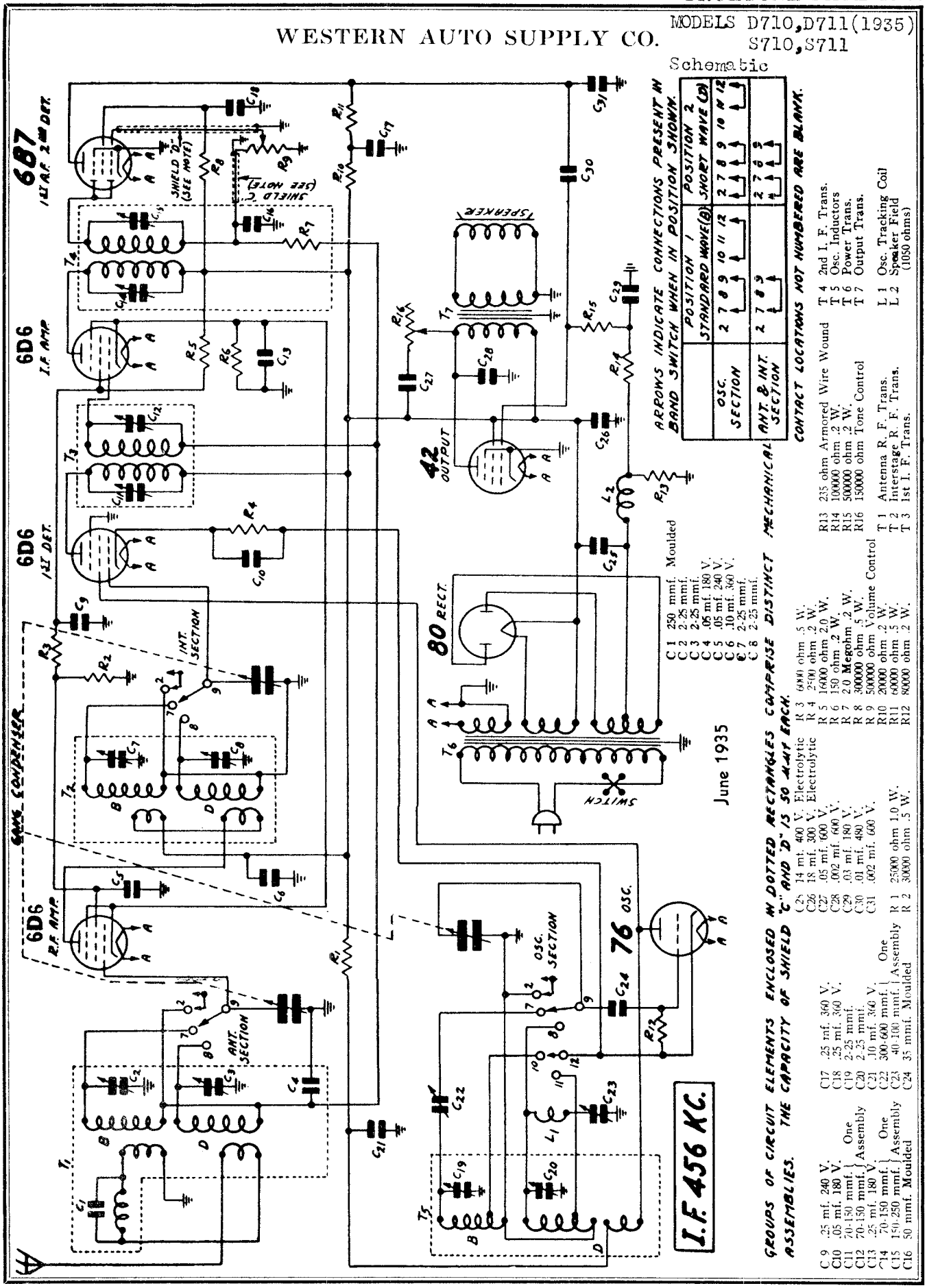
# WESTERN AUTO SUPPLY CO.

MODELS D710, D711 (1935)
S710, S711

Schematic




ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

| | POSITION 1 STANDARD WAVE (B) | POSITION 2 SHORT WAVE (A) |
|---|---|---|
| OSC. SECTION | 2 7 8 9 10 11 12 | 2 7 8 9 10 11 12 |
| ANT. & INT. SECTION | 2 7 8 9 | 2 7 8 9 |

MECHANICAL CONTACT LOCATIONS NOT NUMBERED ARE BLANK.

C1 250 mmf. Moulded
C2 2.25 mmf.
C3 2.25 mmf.
C4 .05 mf. 180 V.
C5 .05 mf. 240 V.
C6 .10 mf. 360 V.
C7 2.25 mmf.
C8 2.25 mmf.

C9 .25 mf. 240 V.
C10 .05 mf. 180 V.
C11 70-150 mmf. } One
C12 70-150 mmf. } Assembly
C13 .25 mf. 180 V.
C14 70-150 mmf. } One
C15 150-250 mmf. } Assembly
C16 50 mmf. Moulded
C17 .25 mf. 360 V.
C18 .25 mf. 360 V.
C19 2.25 mmf.
C20 2.25 mmf.
C21 .10 mf. 360 V.
C22 300-600 mmf. } One
C23 40-100 mmf. } Assembly
C24 35 mmf. Moulded
C25 14 mf. 400 V. Electrolytic
C26 18 mf. 300 V. Electrolytic
C27 .05 mf. 600 V.
C28 .002 mf. 600 V.
C29 .03 mf. 180 V.
C30 .01 mf. 480 V.
C31 .002 mf. 600 V.

R 1 25000 ohm 1.0 W.
R 2 30000 ohm .5 W.
R 3 6000 ohm .5 W.
R 4 250 ohm .2 W.
R 5 16000 ohm 2.0 W.
R 6 150 ohm .2 W.
R 7 2.0 Megohm .2 W.
R 8 300000 ohm .5 W.
R 9 500000 ohm Volume Control
R10 20000 ohm .2 W.
R11 60000 ohm .5 W.
R12 80000 ohm .2 W.
R13 235 ohm Armored Wire Wound
R14 100000 ohm .2 W.
R15 500000 ohm .2 W.
R16 150000 ohm Tone Control

T 1 Antenna R. F. Trans.
T 2 Interstage R. F. Trans.
T 3 1st I. F. Trans.
T 4 2nd I. F. Trans.
T 5 Osc. Inductors
T 6 Power Trans.
T 7 Output Trans.

L 1 Osc. Tracking Coil
L 2 Speaker Field (1050 ohms)

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT ASSEMBLIES. THE CAPACITY OF SHIELD "C" AND "D" IS 50 MMF EACH.

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Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and re-alignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screw driver for the adjustments. The complete procedure is as follows:

### I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the antenna lead of the signal generator thru a .1 MF condenser to the grid of the 1st detector.

Connect the ground lead of the signal generator to the chassis ground.

Turn the band switch to the standard wave position.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I. F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

### 1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band switch in the standard wave position.

Connect the antenna lead of the receiver through a 250 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator standard wave trimmer (C19) until maximum output is obtained. The location of this trimmer is shown in Fig. 4.

### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

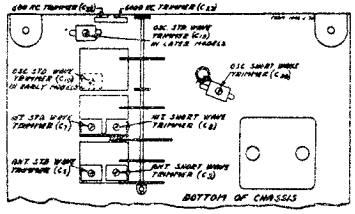


Fig 4—Location of Trimmers

Loosen the pointer set screw and set the pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage standard wave trimmer (C7) and antenna standard wave trimmer (C2) until maximum output is obtained.

Do not change the setting of the oscillator standard wave trimmer.

### 600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.

Be sure to use a non-metallic screw driver for this adjustment.

### 18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Turn the rotor of the tuning condenser to the full open position.

Turn the band switch to the short wave position.

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator short wave trimmer (C20) until maximum output is obtained. See Fig. 4 for location of this trimmer.

If a maximum output peak cannot be reached, it may be due to the fact that the antenna and interstage short wave trimmers are screwed down too far. Back off these two trimmer screws two or three turns and then adjust the oscillator short wave trimmer for maximum ouptut.

### 15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage short wave trimmer (C8) and antenna short wave trimmer (C3) until maximum output is obtained.

When adjusting the interstage short wave trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator short wave trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator short wave trimmer.

### 6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 4 for location of this trimmer.

Use a non-metallic screw driver for this adjustment.

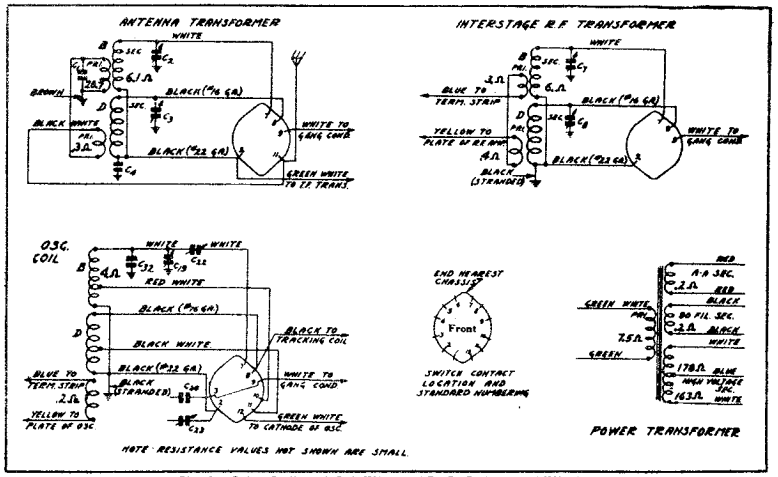


Fig. 3—Color Coding of Coil Wires and D. C. Resistance of Windings

## D. C. Resistance of Windings

**Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets. Refer to Fig. 3.**

| New Part No. | Item | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| 9A368 | Antenna Transformer | | |
| | Range B Primary Winding | T1 | 20.7 |
| | Range D Primary Winding | T1 | 0.3 |
| | Range B Secondary Winding | T1 | 6.1 |
| | Range D Secondary Winding | T1 | Small |
| 9A387 | R. F. Interstage Transformer | | |
| | Range B Primary Winding | T2 | 3.0 |
| | Range D Primary Winding | T2 | 0.4 |
| | Range B Secondary Winding | T2 | 6.0 |
| | Range D Secondary Winding | T2 | Small |
| 9A388 | Oscillator Coils | | |
| | Range B Grid Coil | T5 | |
| | Red White to White | | 4.0 |
| | Red White to ground | | Small |
| | Range D Grid Coil | T5 | |
| | Black White to Black | | Small |
| | Black White to ground | | Small |
| | Oscillator Plate Coil | T5 | 0.2 |
| 9A389 | 1st I. F. Transformer | | |
| | Primary Winding | T3 | 12.0 |
| | Secondary Winding | T3 | 11.1 |
| 9A390 | 2nd I. F. Transformer | | |
| | Primary Winding | T4 | 12.0 |
| | Secondary Winding | T4 | 4.5 |
| | Output Transformer (Part of Speaker Assembly) | | |
| | Primary Winding | T7 | 510. |
| | Secondary Winding | T7 | 1.0 |
| | Dynamic Speaker | | |
| | Speaker Field | L2 | 1025. |
| | Speaker Voice Coil | | 4.1 |
| | Speaker Bucking Coil | | 0.2 |

### VOLTAGES AT SOCKETS
**Line Voltage - 112**
**Antenna Shorted to Ground**

| Type of Tube | Function | Heater Volts | Plate to Ground | Screen to Ground | Cathode to Ground | Plate M. A. |
|---|---|---|---|---|---|---|
| 6D6 | R. F. | 6.1 | 240 | 95 | 3 | 7. |
| 6D6 | 1st Det. | 6.1 | 240 | 100 | 9 | 3.5 |
| 76 | Osc. | 6.1 | 100 | | | 5. |
| 6D6 | I. F. | 6.1 | 240 | 120 | 3 | 7.5 |
| 6B7 | 2nd Det. | 6.1 | 55 | 40 | 0 | 2.3 |
| 42 | Power | 6.1 | 225 | 240 | 17 (1) | 38.0 |
| 80 | Rectifier | 4.6 | | | | 32.0 per plate |

| New Part No. | Item | Code | D. C. Resistance In Ohms |
|---|---|---|---|
| 53X91 | 115 volt 60 cycle Power Transformer | | |
| | Primary Winding | T6 | 7.5 |
| | Tube Filament Secondary (A-A) | T6 | 0.2 |
| | 80 Filament Secondary | T6 | 0.2 |
| | High Voltage Secondary Winding | T6 | |
| | Center tap to inside | | 133. |
| | Center tap to outside | | 178. |
| 9A391 | High Frequency Oscillator Tracking Coil | L1 | 1.1 |

## Changes in Early Models

In the early models of this receiver the oscillator standard wave trimmer C19 was in the oscillator coil can—see Fig. 4.

In the early models the antenna transformer had two B primary windings as shown in Fig. 5. In later models only one winding was used as shown in Fig. 3.

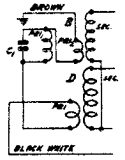


Fig. 5—Antenna Transformer on Early Models

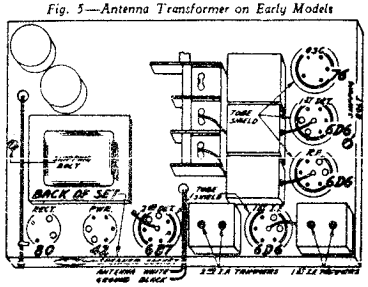


Fig. 6—Location of Tubes

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# MODELS D-710, D-711, S-710, S-711 (1935)

## Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch —see Fig. 8.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis base directly below the wet electrolytic condensers. These holes are 1¼" from the bottom, ⅞" and 3¾" from the front of the chassis.

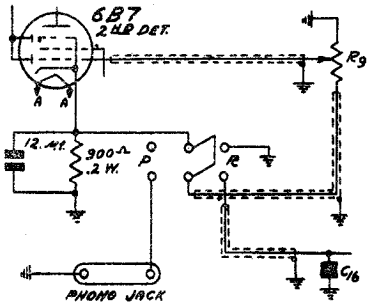


*Fig. 7—Phonograph Connections*

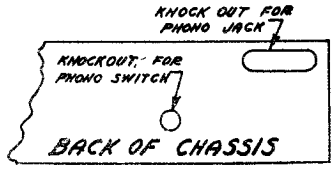


*Fig. 8—Location of Phono Knockouts*

The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

The connections are made by opening the diode return circuit at the volume control. Unsolder the shielded lead which runs from the I. F. transformer to the volume control at the lug on the volume control. Cut this lead to length and connect it to the switch as shown in Fig. 7. The extra length of shielded lead which is provided, is connected from the volume control R9 to the phono switch as illustrated.

Remove the ground from the cathode terminal of the 6B7 2nd detector tube by bending the chassis ground lug away from this terminal. Be sure to solder back to this ground lug any leads that were connected to it (not including cathode connection of socket).

Connect one side of the 12 mfd. 25 volt electrolytic condenser to ground and the other side of the condenser to the cathode terminal of the 6B7 2nd detector and the phono switch as shown in Fig. 7. To this same terminal on the phono switch connect the 900 ohm .2 watt resistor. The other side of this resistor goes to ground. Complete the other connections as illustrated.

A high impedance pick-up should be used. If a low impedance pick-up is used a step-up transformer will be required for sufficient volume. The volume control and tone control of the set will regulate the phono volume and tone.

### Servicing R. F. Coil Assemblies

The R. F. coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 3.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

### Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle chassis can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

# MODELS D-714-M, S-712 (1935)

**PHONO ATTACHMENT PARTS**

| Part No. | New Part No. | Description | List Price |
|---|---|---|---|
| P-9A386 | | Phono Switch (Double Pole Double Throw Switch) | $ .60 |
| P-9A387 | 2A31 | Phono Jack | .10 |
| P-9A389 | 3A12 | Switch Knob | .20 |
| P-9A390 | 10A36 | 12.0 mf. - 25 Volt - Dry Electrolytic Condenser | .75 |
| P-9A388 | 45X37 | 900 Ohm 0.2 Watt Resistor | .15 |
| | A94901 | 12 Inches of No. 722G Shielded Hookup Wire | .10 |
| | 4A39 | Terminal Strip | .10 |

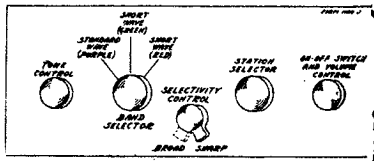


*Fig. 1—Arrangement of Controls*

## General Service Data

### D. C. Resistance of Windings

**Refer to Fig. 5.**

**Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.**

| Part No. | Item | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| 9A376 | Antenna Transformer | T1 | |
| | Range B Primary Winding | | 21.2 |
| | Range C Primary Winding | | 0.3 |
| | Range D Primary Winding | | 0.2 |
| | Range B Secondary Winding | | 6.1 |
| | Range C Secondary Winding | | 1.8 |
| | Range D Secondary Winding | | Small |
| 9A377 | R. F. Interstage Transformer | T2 | |
| | Range B Primary Winding | | 2.4 |
| | Range C Primary Winding | | 1.4 |
| | Range D Primary Winding | | 0.4 |
| | Range B Secondary Winding | | 6.0 |
| | Range C Secondary Winding | | 1.9 |
| | Range D Secondary Winding | | Small |
| 9A378 | Oscillator Coils | T5 | |
| | Range B Grid Coil | | |
| | Red White Tap to White | | 3.8 |
| | Red White Tap to Ground | | 0.9 |
| | Range C Grid Coil | | |
| | Green White Tap to Green | | 1.3 |
| | Green White Tap to Ground | | 0.6 |
| | Range D Grid Coil | | |
| | Black White Tap to Black | | Small |
| | Black White Tap to Ground | | Small |
| | Oscillator Plate Coil | | 0.2 |
| 9A379 | 1st I. F. Transformer | T3 | |
| | Primary Winding | | 11.6 |
| | Secondary Winding | | |
| | Long Portion | | 11.4 |
| | Short Portion | | 0.8 |
| 9A380 | 2nd I. F. Transformer | T4 | |
| | Primary Winding | | 14.3 |
| | Secondary Winding | | 4.4 |
| *12A223 | Dynamic Speaker (8") | L1 | |
| | Output Transformer Primary Winding | T7 | 510. |
| | Output Transformer Sec. Winding | T7 | 1.0 |
| | Speaker Field | | 1025. |
| | Speaker Voice Coil | | 4.1 |
| | Speaker Bucking Coil | | 0.2 |
| 53X91 | 115 Volt 60 Cycle Power Transformer | T6 | |
| | Primary Winding | | 7.5 |
| | Tube Filament Winding (A-A) | | 6.2 |
| | 80 Filament Secondary | | 0.2 |
| | High Voltage Secondary Winding | | |
| | Center Tap to Inside | | 163. |
| | Center Tap to Outside | | 178. |
| 9A391 | High Frequency Oscillator Tracking Coil | L2 | 1.1 |

*Speakers with other part numbers may have slightly different values of D. C. resistance.

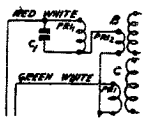


*Fig. 8—Antenna Transformer in Early Models*

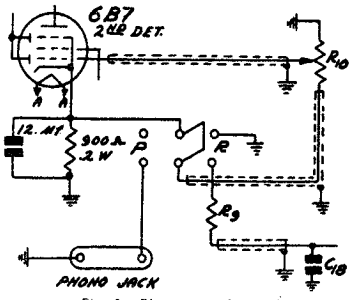


*Fig. 9—Phonograph Connections*

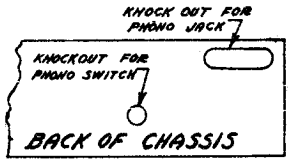


*Fig. 10—Location of Phono Knockouts*

MODEL D712M (1935)
Voltage, Socket, Trimmers
Coils, Phono, Connections

# WESTERN AUTO SUPPLY CO.

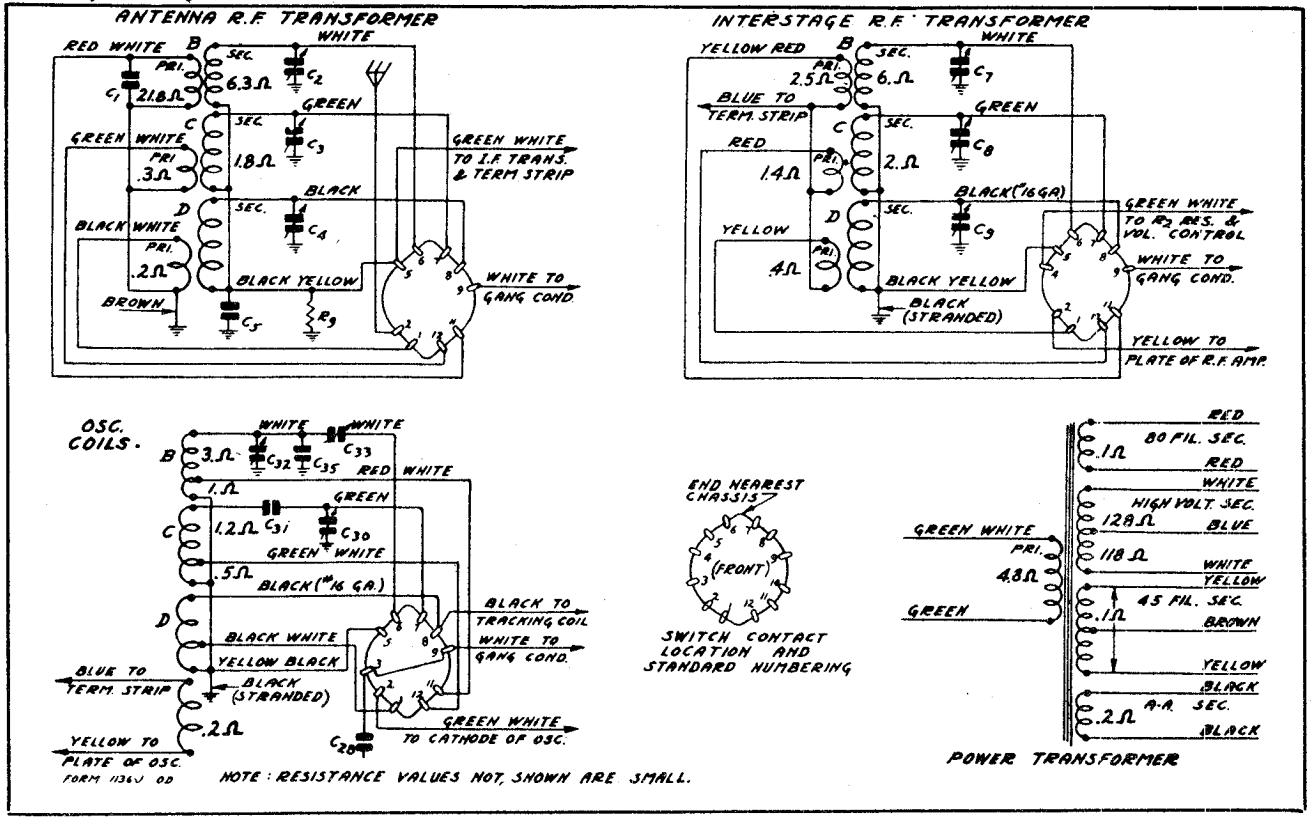


*Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings (Also see complete D. C. Resistance List in this Manual)*

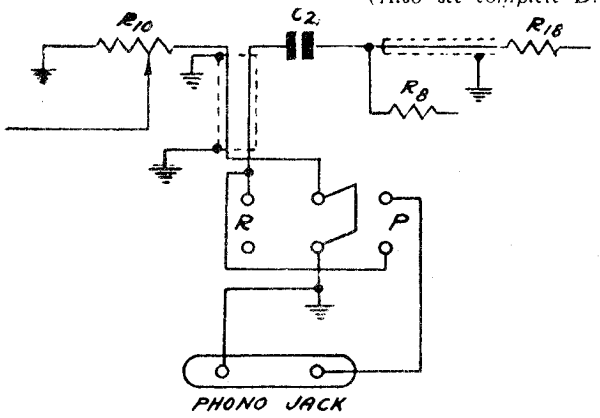


*Fig. 7—Phonograph Connections*

## VOLTAGES AT SOCKETS

**Line Voltage, 115 - Volume Control at Maximum Antenna Shorted to Ground**

| Type of Tube | Function | Heater or Filam't | Plate to Ground | Screen to Ground | Cathode to Ground | Ca'hode M. A. |
|---|---|---|---|---|---|---|
| 6K7 (6D6) | R. F. | 6.1 | 265 | 120 | 3.7 | 9.0 |
| 6K7 (6D6) | 1st Det. | 6.1 | 265 | 110 | 9.5 | 3.8 |
| 76 | Osc. | 6.1 | 110 | | | 5.8 |
| 6K7 (6D6) | 1st. I. F. | 6.1 | 265 | 120 | 3.7 | 9.0 |
| 6K7 (6D6) | 2nd I. F. | 6.1 | 265 | 120 | 3.7 | 9.0 |
| 76 | 2nd Det. | 6.1 | | | | |
| 76 | 1st A. F. | 6.1 | 265 | | 14. | 5.0 |
| 45 | Power | 2.5 | 265 | | 50.(1) | 22. |
| 80 | Rectifier | 4.9 | | | | 90. (total) |

(1) As read with 500 Volt Scale. Grid to Ground.

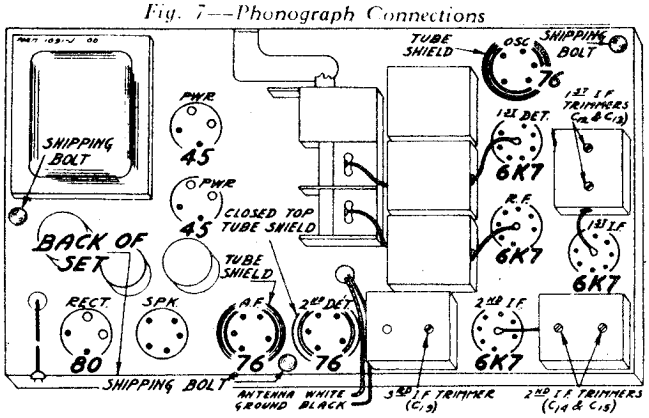


*Fig. 5—Location of Tubes*

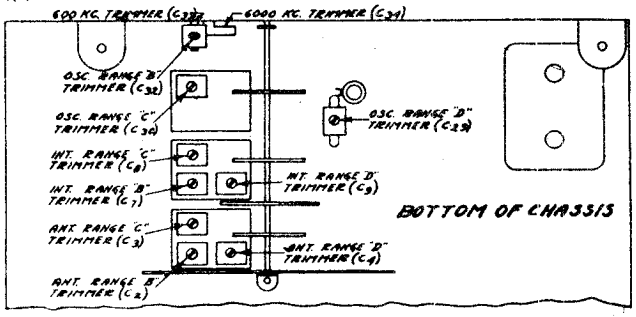


*Fig. 3—Location of Trimmers*

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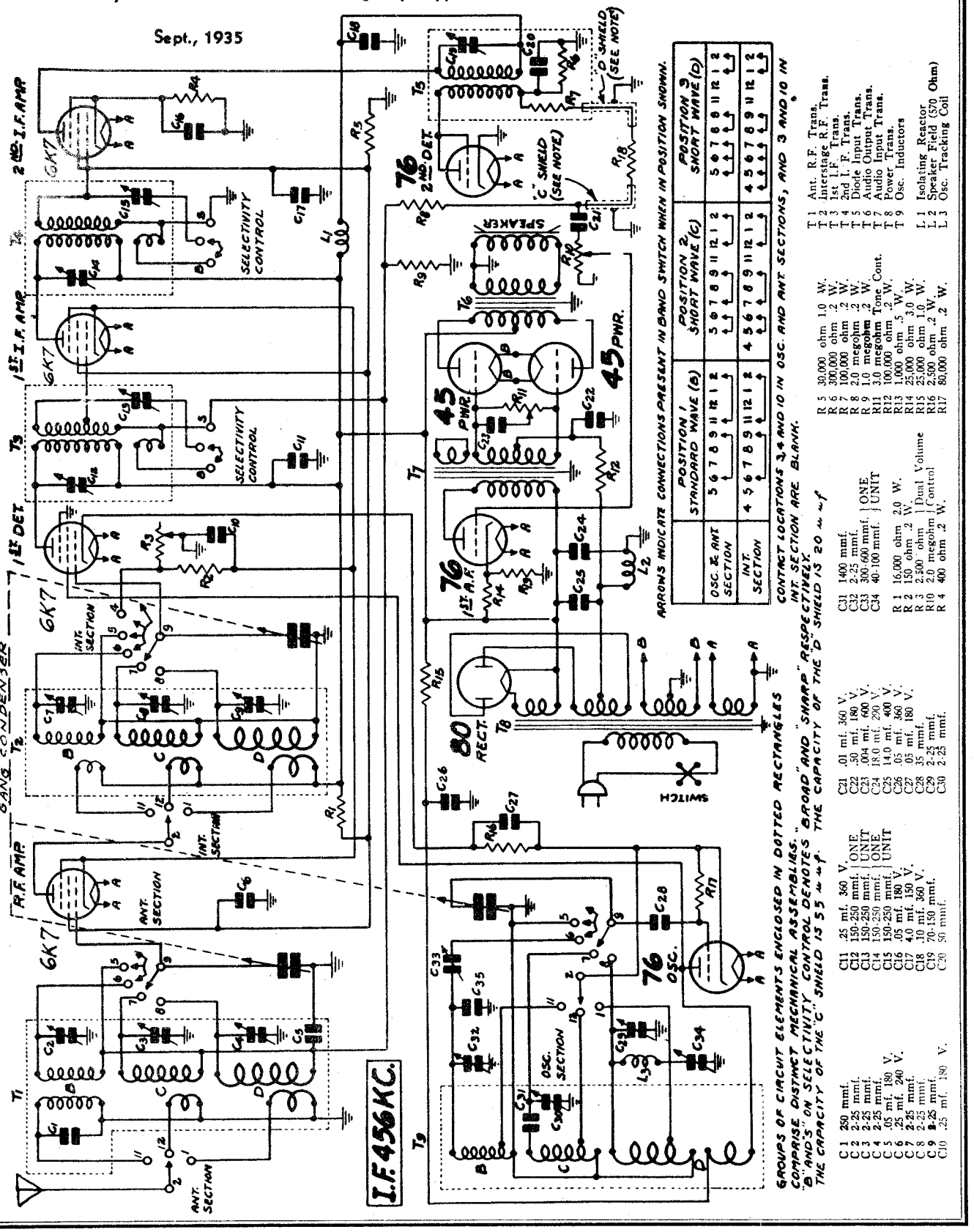
# WESTERN AUTO SUPPLY CO.

MODEL D712M (1935)
Schematic

Power Consumption - 90 Watts (At 115 volts 60 cycles)
Power Output - - - - - - 5 Watts Undistorted
Selectivity - 22 KC Broad at 1000 times Signal (Sharp)

Tuning Frequency Range
B Range - - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - - 1715 to 5800 KC.
D Range - - - - - - - - - - 5750 to 18300 KC.

Sept., 1935




ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

| | POSITION 1 STANDARD WAVE (A) | POSITION 2 SHORT WAVE (C) | POSITION 3 SHORT WAVE (D) |
|---|---|---|---|
| OSC. & ANT SECTION | 5 6 7 8 9 10 11 12 1 2 | 5 6 7 8 9 10 11 12 1 2 | 5 6 7 8 9 10 11 12 1 2 |
| INT. SECTION | 4 5 6 7 8 9 10 11 12 1 2 | 4 5 6 7 8 9 10 11 12 1 2 | 4 5 6 7 8 9 10 11 12 1 2 |

CONTACT LOCATIONS 3, 4 AND 10 IN OSC. AND ANT. SECTIONS, AND 3 AND 10 IN INT. SECTION ARE BLANK.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. "BROAD" AND "SHARP" RESPECTIVELY. "B" AND "C" ON SELECTIVITY CONTROL DENOTES THE CAPACITY OF THE "C" SHIELD IS 55 mmf. THE CAPACITY OF THE "D" SHIELD IS 20 mmf.

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 .25 mf. 240 V.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 2-25 mmf.
C10 .25 mf. 180 V.
C11 .25 mf. 360 V.
C12 150-250 mmf. } ONE
C13 150-250 mmf. } UNIT
C14 150-250 mmf. } ONE
C15 150-250 mmf. } UNIT
C16 .05 mf. 180 V.
C17 4.0 mf. 150 V.
C18 .10 mf. 360 V.
C19 70-150 mmf.
C20 50 mmf.
C21 .01 mf. 360 V.
C22 .50 mf. 180 V.
C23 .004 mf. 600 V.
C24 18.0 mf. 250 V.
C25 14.0 mf. 400 V.
C26 .05 mf. 360 V.
C27 .05 mf. 180 V.
C28 35 mmf.
C29 2-25 mmf.
C30 2-25 mmf.
C31 1400 mmf.
C32 2-25 mmf.
C33 300-600 mmf. } ONE
C34 40-100 mmf. } UNIT
R 1 16,000 ohm 2.0 W.
R 2 150 ohm .2 W.
R 3 2,500 ohm } Dual Volume
R10 2.0 megohm } Control
R 4 400 ohm .2 W.
R 5 30,000 ohm 1.0 W.
R 6 300,000 ohm .2 W.
R 7 100,000 ohm .2 W.
R 8 2.0 megohm .2 W.
R 9 1.0 megohm .2 W.
R11 3.0 megohm Tone Cont.
R12 100,000 ohm .2 W.
R13 1,000 ohm .5 W.
R14 25,000 ohm 3.0 W.
R15 25,000 ohm 1.0 W.
R16 2,500 ohm .2 W.
R17 80,000 ohm .2 W.
T 1 Ant. R.F. Trans.
T 2 Interstage R.F. Trans.
T 3 1st I.F. Trans.
T 4 2nd I. F. Trans.
T 5 Diode Input Trans.
T 6 Audio Output Trans.
T 7 Audio Input Trans.
T 8 Power Trans.
T 9 Osc. Inductors
L 1 Isolating Reactor
L 2 Speaker Field (570 Ohm)
L 3 Osc. Tracking Coil

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# Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

### I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 5.

## Range B Alignment

### 1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C32) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

### 600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

## Range C Alignment

### 5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C30) until maximum output is obtained. See Fig. 3 for location of this trimmer.

### 5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C8) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

## Range D Alignment

### 18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C29) until maximum output is obtained. See Fig. 3 for location of this trimmer.

### 15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

### 6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

## D. C. Resistance of Windings

Refer to Fig. 4.

**Following are the D. C. resistances of the various windings in the chassis. The values given below will vary slightly in different sets.**

| Part No. | Winding | Coils | D. C. Resistance in Ohms |
|---|---|---|---|
| P-9A405 | Antenna R. F. Transformer | T1 | |
| | Range B Primary Winding | | 21.8 |
| | Range C Primary Winding | | 0.3 |
| | Range D Primary Winding | | 0.2 |
| | Range B Secondary Winding | | 0.3 |
| | Range C Secondary Winding | | 1.8 |
| | Range D Secondary Winding | | Small |
| P-9A425 | Interstage R. F. Transformer | T2 | |
| | Range B Primary Winding | | 2.5 |
| | Range C Primary Winding | | 1.4 |
| | Range D Primary Winding | | 0.4 |
| | Range B Secondary Winding | | 6.0 |
| | Range C Secondary Winding | | 2.0 |
| | Range D Secondary Winding | | Small |
| P-9A426 | Oscillator Coils | T9 | |
| | Range B Grid Coil | | |
| | Red White Tap to White | | 3.0 |
| | Red White Tap to Ground | | 1.0 |
| | Range C Grid Coil | | |
| | Green White Tap to Green | | 1.2 |
| | Green White Tap to Ground | | 0.5 |
| | Range D Grid Coil | | |
| | Black White Tap to Black | | Small |
| | Black White Tap to Ground | | Small |
| | Oscillator Plate Coil | | 0.2 |
| P-9A397 | 1st I. F. Transformer | T3 | |
| | Primary Winding | | 4.6 |
| | Secondary Winding | | |
| | Long Portion | | 3.4 |
| | Short Portion | | 1.7 |
| | Coupling Winding | | 0.2 |
| P-9A398 | 2nd I. F. Transformer | T4 | |
| | Primary Winding | | 9.4 |
| | Secondary Winding | | 9.0 |
| | Coupling Winding | | 0.5 |
| P-9A399 | 3rd I. F. Transformer | T5 | |
| | Primary Winding | | 10.2 |
| | Secondary Winding | | 28.4 |
| P-50X16 | Audio Input Transformer | T7 | |
| | Primary Winding | | 2350. |
| | Secondary Winding | | |
| | Center Tap to Inside | | 2000. |
| | Center Tap to Outside | | 2690. |
| P-51X32 | Audio Output Transformer | T6 | |
| | Primary Winding | | |
| | Center Tap to Inside | | 198. |
| | Center Tap to Outside | | 222. |
| | Secondary Winding | | 0.4 |
| P-12A208 | Dynamic Speaker (10") | | |
| | Speaker Voice Coil | | 1.6 |
| | Speaker Field | L2 | 570. |
| P-53X94 | 115 Volt 60 Cycle Power Trans. | T8 | |
| | Primary Winding | | 4.8 |
| | Tube Filament Secondary (A-A) | | 0.2 |
| | Tube Filament Secondary (B-B) (45) | | 0.1 |
| | Rectifier Filament Secondary | | 0.1 |
| | High Voltage Secondary Winding | | |
| | Center Tap to Inside | | 118. |
| | Center Tap to Outside | | 128. |
| P-9A400 | 2nd I. F. Plate Isolating Reactor | L1 | 36. |
| P-9A391 | High Frequency Oscillator Tracking Coil | L3 | 1.2 |

## Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

## Changes in Early Models

In the early models of this receiver the tone control resistor (R11) was connected as a series variable resistor connecting in series through the condenser C23 between the grids of the 45 tubes in the audio output stage. In the later models it is employed as a potentiometer in the manner shown in Fig. 2.

The 100,000 ohm resistor (R18) was not used in the early models. Condenser C21 was connected directly to resistor R7.

The type 6K7 metal tubes replace the type 6D6 glass tubes which were used in the early models.

Condenser C35 was added to the oscillator coil standard wave section in later models. It is not, however, used in all cases but only when this capacity is required in this circuit.

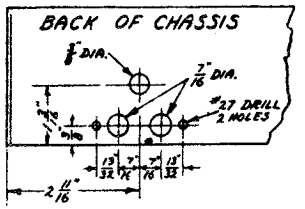


*Fig. 8—Details of Panel Drilling for Phono Assembly*

# Phonograph Connections

Phonograph connections can be made as shown in Fig. 7. The parts required to make this installation are shown in the parts list.

To mount the phono switch and phono jack, drill holes of a size and in the position shown in Fig. 8 at the left hand side (from back) of the rear panel of the chassis.

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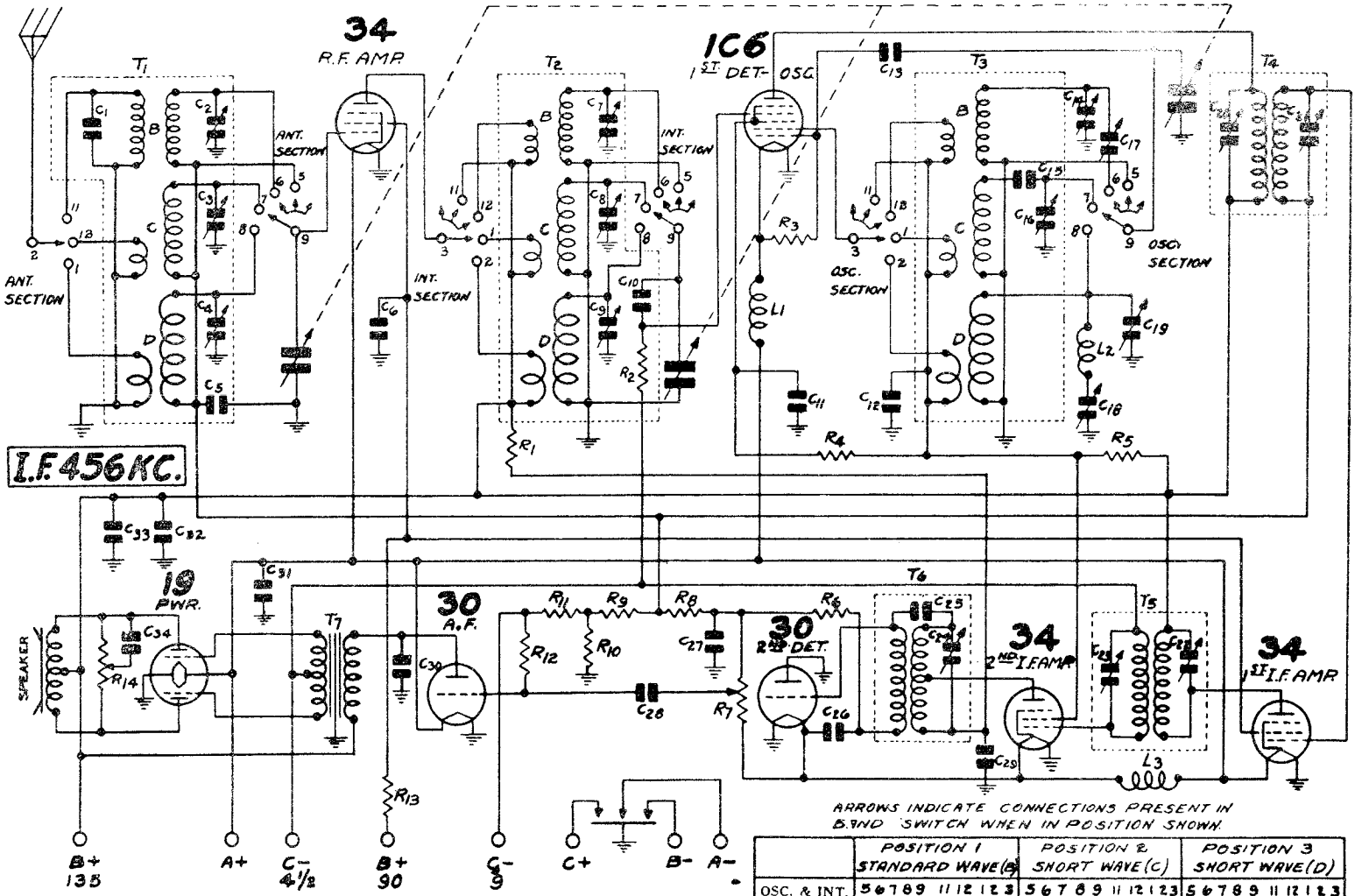


ARROWS INDICATE CONNECTIONS PRESENT IN B'ND SWITCH WHEN IN POSITION SHOWN.

| | POSITION 1 STANDARD WAVE (B) | POSITION 2 SHORT WAVE (C) | POSITION 3 SHORT WAVE (D) |
|---|---|---|---|
| OSC. & INT. SECTION | 5 6 7 8 9 11 12 1 2 3 | 5 6 7 8 9 11 12 1 2 3 | 5 6 7 8 9 11 12 1 2 3 |
| ANT. SECTION | 5 6 7 8 9 11 12 1 2 | 5 6 7 8 9 11 12 1 2 | 5 6 7 8 9 11 12 1 2 |

Contact Locations 4 and 10 in Osc. & Int. Sections and 3, 4 and 10 in Ant. Section are Blank.

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.

Sept., 1935

*Fig. 2—Schematic Circuit Diagram*

C 1 250 mmf.
C 2 2-25 mmf.
C 3 2-25 mmf.
C 4 2-25 mmf.
C 5 .05 mf. 180 V.
C 6 .25 mf. 180 V.
C 7 2-25 mmf.
C 8 2-25 mmf.
C 9 2-25 mmf.
C10 35 mmf.
C11 .05 mf. 180 V.
C12 .25 mf. 180 V.
C13 35 mmf.
C14 2-25 mmf.
C15 1400 mmf.
C16 2-25 mmf.
C17 300-600 mmf. } ONE
C18 40-100 mmf. } ASSEMBLY
C19 2-25 mmf.
C20 70-150 mmf. } ONE
C21 70-150 mmf. } ASSEMBLY
C22 70-150 mmf. } ONE
C23 70-150 mmf. } ASSEMBLY
C24 40-100 mmf.
C25 50 mmf.
C26 100 mmf.
C27 50 mmf.
C28 .002 mf. 600 V.
C29 .05 mf. 180 V.
C30 250 mmf.
C31 .50 mf. 180 V.
C32 .25 mf. 180 V.
C33 20.0 mf. 150 V. Electrolytic
C34 .05 mf. 240 V.

R 1 1,000 Ohm .2 W.
R 2 1.0 Megohm .2 W.
R 3 100,000 Ohm .2 W.
R 4 5,000 Ohm .2 W.
R 5 10,000 Ohm .5 W.
R 6 60,000 Ohm .2 W.
R 7 1.0 Megohm Vol. Cont.
R 8 3.0 Megohm .2 W.
R 9 1.0 Megohm .2 W.
R10 2,000 Ohm .2 W.
R11 7,000 Ohm .2 W.
R12 3.0 Megohm .2 W.
R13 30,000 Ohm .2 W.
R14 150,000 Ohm Tone Control

T 1 Antenna R.F. Trans.
T 2 Interstage R.F. Trans.
T 3 Osc. Inductors
T 4 1st. I.F. Trans.
T 5 2nd. I.F. Trans.
T 6 3rd. I.F. Trans.
T 7 Push-Pull Input Trans.

L 1 Single Filament Reactor
L 2 Osc. Tracking Coil
L 3 Single Filament Reactor

MODEL D713 (1935)
Voltage, Socket, Coils
Trimmers

# WESTERN AUTO SUPPLY CO.

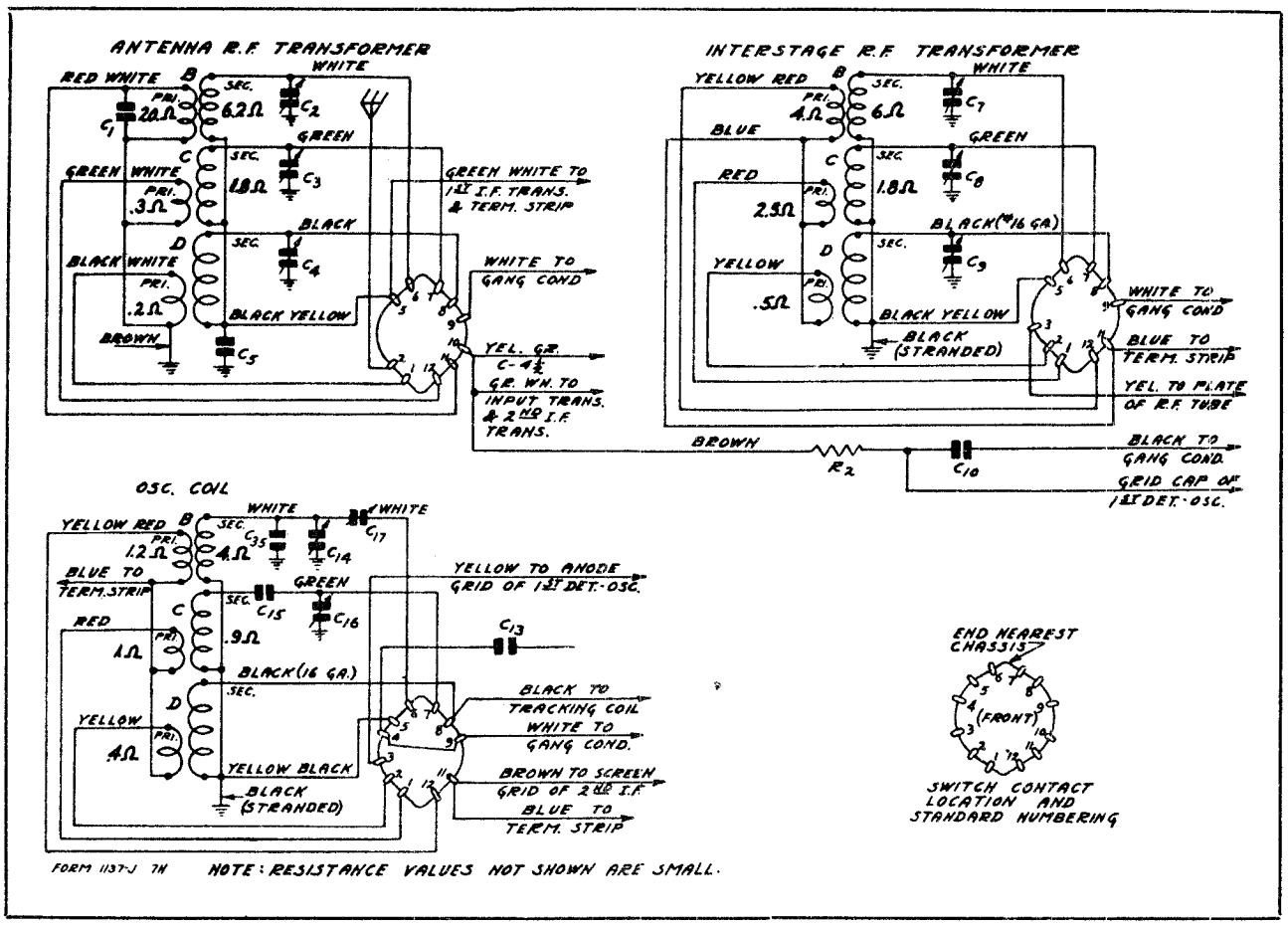


*Fig. 11—Color Coding of Coil Wires and D. C. Resistance of Windings (Also See Complete D. C. Resistance List Below)*

**VOLTAGES AT SOCKETS**
**Batteries up to Rated Voltages Ant. Shorted to Ground**
**Voltages Read from Negative Fil. Terminal**
**Volume Control at Maximum**

| Type of Tube | Function | Across Filam't | Plate to Ground | Screen to Ground | Control Grid to Ground | Normal Plate M. A. |
|---|---|---|---|---|---|---|
| 34 | R. F. Amp. | 2.0 | 135 | 45 | | 1.8 |
| 1C6 | 1st Detector Oscillator | 2.0 | 135<br>75(1) | 65 | | 2.6<br>1.8(1) |
| 34 | 1st I. F. Amp. | 2.0 | 135 | 45 | | 1.8 |
| 34 | 2nd I. F. Amp. | 2.0 | 133 | 75 | 4.5 | 2.25 |
| 30 | 2nd Detector | 2.0 | | | | |
| 30 | A. F. Amp. | 2.0 | 135 | | | 3.0 |
| 19 | Power Amp. | 2.0 | 135 | | 4.5 | 1.0 (Per Plate) |

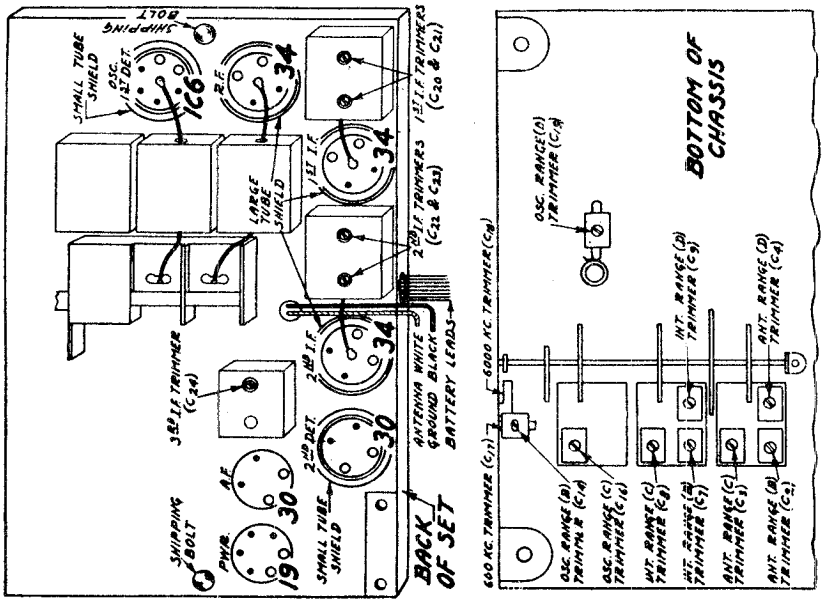


*Fig. 9—Arrangement of Trimmers*

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# WESTERN AUTO SUPPLY CO.

## SPECIFICATIONS

| | |
|---|---|
| **Input Voltages** | |
| "A" Battery | 2 Volts (0.68 Amperes) |
| "B" Batteries | 90 and 135 Volts |
| "C" Batteries | 4½ and 9 Volts |
| Power Output | 1 Watt Undistorted |
| Selectivity | 24 KC Broad at 1000 times Signal |
| Intermediate Frequency | 456 KC. |
| Speaker | 8" Magnetic |
| **Tuning Frequency Range** | |
| B Range | 535 to 1730 KC. |
| C Range | 1680 to 4800 KC. |
| D Range | 5650 to 16000 KC. |
| **Sensitivity** | |
| B Range Average | 2.0 Microvolts Absolute |
| C Range Average | 4.0 Microvolts Absolute |
| D Range Average | 6.0 Microvolts Absolute |

# Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 4800, 4200, 16,000, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

### I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a 0.1 mf. condenser to the switch end of condenser C-10—see Fig. 2. There is a lead which goes to the lug on the top of the center stator section of the tuning condenser—see Fig. 10. The connection can be made at this lug.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 10.

## Range B Alignment

### 1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C14) until maximum output is obtained. The location of this trimmer is shown in Fig. 9.

### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the interstage Range B trimmer (C7) and antenna Range B trimmer (C2) to maximum.

### 600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

## Range C Alignment

### 4800 KC Adjustment

Set the signal generator for 4800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C16) until maximum output is obtained. See Fig. 9 for location of this trimmer.

### 4200 KC Adjustment

Set the signal generator for 4200 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C8) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

## Range D Alignment

### 16,000 KC Adjustment

Set the signal generator for 16,000 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C19) until maximum output is obtained. See Fig. 9 for location of this trimmer.

### 15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C9) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 16,000 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

### 6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer (C18) until the peak of greatest intensity is obtained. See Fig. 9 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment.

## Voltages

Check the voltages at the sockets to see if correct values are being delivered to the tubes. The antenna and ground should be disconnected and the antenna and ground leads from the set connected together. The volume control should be turned to the right or maximum position.

The voltage chart gives the voltages with all tubes in, the speaker connected and the set in operating condition. These voltages are typical of the sets but will vary slightly with variations in individual receivers, tubes, test equipment used and battery voltages.

## Changes in Early Models

Condenser C35 7 mmf. (not shown in Fig. 2, was added to the oscillator coil assembly in parallel with oscillator Range B trimmer condenser C14. It is not, however, used in all cases but only when this capacity is required in this circuit.

MODEL D713 (1935)
Drive Cord Data
Resistances

WESTERN AUTO SUPPLY CO.

# Replacing Drive Cord

Take off the station pointer by removing the screw at the center of the dial.

Loosen the two set screws in the collar on the band selector shaft.

Loosen the dial assembly by taking out the two screws which secure the bottom of this assembly to the chassis and one screw at the top which secures this assembly to the bracket.

Pull the dial assembly forward until the collar is free of the band selector shaft; and lay the assembly face downward in front of the chassis.

Turn the drive drum until the opening in this drum is approximately vertical and with the hole at the top as shown in Fig. 12.

Remove the tension spring and the old drive cord.

See that the eyelet is in the hole in the drive drum as shown in Fig. 12. Insert one end of the new drive cord from the outside through the hole in the eyelet in the drive drum.

Tie the end of the cord, which has been inserted through the hole, to one end of the tension spring.

Wrap the cord in a counter clockwise direction (facing front of chassis) around the drive drum approximately one and one half turns, progressing toward the front.

Then tilt the chassis up on its back panel and bring the cord mentioned in the previous paragraph down to the drive shaft. Wrap it two and one half times around this shaft as shown in Fig. 12, progressing toward the back of chassis.

Wrap the cord on directly under the drive drum above.

Then bring this cord up to the drive drum until it is up to the hole in the drive drum as shown in the illustration.

Now insert the free end of the cord through the hole in the eyelet and tie it to the end of the tension spring. The end of the spring when hanging free should be approximately 3/8" from the flange of the drum as shown in Fig. 12. Cut off the surplus length of cord after it is knotted.

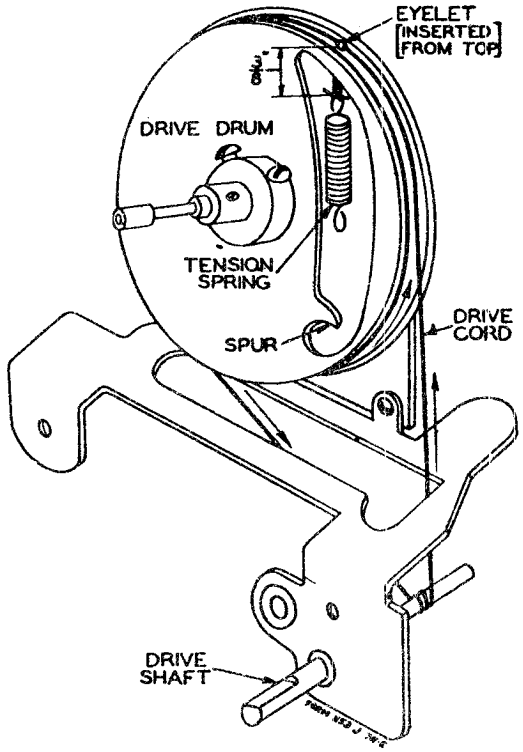


*Fig. 12—Drive Cord Replacement*

Then secure the other end of the tension spring over the spur on the drive drum.

Turn the drive shaft back and forth several times.

Replace the drive assembly and pointer.

Replace the chassis in the cabinet.

**Following are the D. C. resistances of the various coil windings in the chassis. The values given below will vary slightly in different sets.**

| Part No. | Winding | Code | D. C. Resistance in Ohms |
|---|---|---|---|
| P-9A416 | Antenna R. F. Transformer | T1 | |
| | Range B Primary Winding | | 20.0 |
| | Range C Primary Winding | | 0.3 |
| | Range D Primary Winding | | 0.2 |
| | Range B Secondary Winding | | 6.2 |
| | Range C Secondary Winding | | 1.8 |
| | Range D Secondary Winding | | Small |
| P-9A392 | Interstage R. F. Transformer | T2 | |
| | Range B Primary Winding | | 4.0 |
| | Range C Primary Winding | | 2.5 |
| | Range D Primary Winding | | 0.5 |
| | Range B Secondary Winding | | 6.0 |
| | Range C Secondary Winding | | 1.8 |
| | Range D Secondary Winding | | Small |
| P-9A393 | Oscillator Coils | T3 | |
| | Range B Plate Coil | | 1.2 |
| | Range C Plate Coil | | 1.0 |
| | Range D Plate Coil | | 0.4 |
| | Range B Grid Coil | | 4.0 |
| | Range C Grid Coil | | 0.9 |
| | Range D Grid Coil | | Small |
| P-9A394 | 1st I. F. Transformer | T4 | |
| | Primary Winding | | 11.4 |
| | Secondary Winding | | 11.4 |
| P-9A395 | 2nd I. F. Transformer | T5 | |
| | Primary Winding | | 11.4 |
| | Secondary Winding | | 11.4 |
| P-9A396 | 3rd I. F. Transformer | T6 | |
| | Primary Winding | | |
| | Tap to B+ | | 8.0 |
| | Tap to Variable Trimmer | | 8.2 |
| | Secondary Winding | | 126.0 |
| P-50X11 | Audio Input Transformer | T7 | |
| | Primary Winding | | 1005.0 |
| | Secondary Winding | | |
| | Center Tap to Inside | | 580.0 |
| | Center Tap to Outside | | 630.0 |
| *P-12A218 | Magnetic Speaker | | |
| | Speaker Coil | | |
| | Center Tap to Inside | | 275.0 |
| | Center Tap to Outside | | 300.0 |
| P-9A281 | Single Filament Reactor | L1 | 1.2 |
| P-9A391 | High Frequency Oscillator Tracking Coil | L2 | 0.7 |
| P-9A281 | Single Filament Reactor | L3 | 1.2 |

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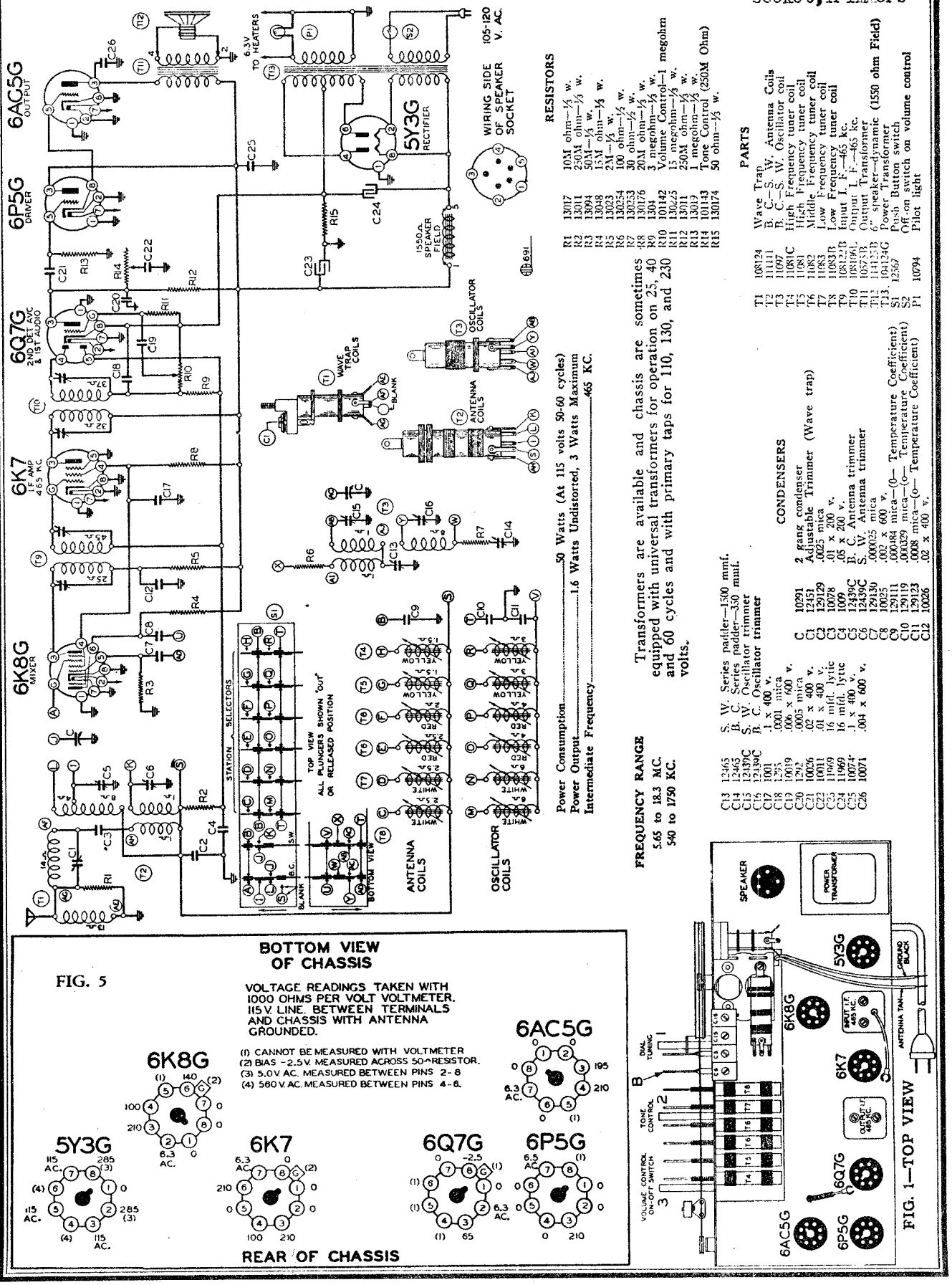
# WESTERN AUTO SUPPLY CO.

MODEL D714 (1939)
Schematic, Voltage
Socket, Trimmers




**RESISTORS**

| | | |
|---|---|---|
| R1 | 13017 | 10M ohm—½ w. |
| R2 | 13011 | 250M ohm—½ w. |
| R3 | 13094 | 50M—½ w. |
| R4 | 13048 | 15M ohm—½ w. |
| R5 | 13023 | 2M—½ w. |
| R6 | 130254 | 100 ohm—½ w. |
| R7 | 130253 | 30 ohm—½ w. |
| R8 | 130176 | 20M ohm—½ w. |
| R9 | 1304 | 3 megohm—½ w. |
| R10 | 10142 | Volume Control—1 megohm |
| R11 | 130225 | 15 megohm—½ w. |
| R12 | 13011 | 250M ohm—½ w. |
| R13 | 13013 | 1 megohm—½ w. |
| R14 | 10143 | Tone Control (250M Ohm) |
| R15 | 130174 | 50 ohm—½ w. |

**PARTS**

| | | |
|---|---|---|
| T1 | 108124 | Wave Trap |
| T2 | 111111 | B. C.—S. W. Antenna Coils |
| T3 | 11097 | B. C.—S. W. Oscillator coil |
| T4 | 110810 | High Frequency tuner coil |
| T5 | 11081 | High Frequency tuner coil |
| T6 | 11082 | Middle Frequency tuner coil |
| T7 | 11083 | Low Frequency tuner coil |
| T8 | 110831B | Low Frequency tuner coil |
| T9 | 108122B | Input I. F.—465 kc. |
| T10 | 108119L | Output I. F.—465 kc. |
| T11 | 105758 | Output Transformer |
| T12 | 114125B | 6" speaker—dynamic (1550 ohm Field) |
| T13 | 104124G | Power Transformer |
| S1 | 12567 | Push Button switch |
| S2 | 10794 | Off-on switch on volume control |
| P1 | | Pilot light |

**CONDENSERS**

| | | | |
|---|---|---|---|
| C | 10291 | 2 gang condenser | |
| C1 | 129129 | Adjustable Trimmer (Wave trap) | |
| C2 | 10078 | .0025 mica | |
| C3 | 10078 | .01 x 200 v. | |
| C4 | 10097 | .05 x 200 v. | |
| C5 | 12439C | B. C. Antenna trimmer | |
| C6 | 12439C | S. W. Antenna trimmer | |
| C7 | 129130 | .000025 mica | |
| C8 | 10025 | .002 x 600 v. | |
| C9 | 129111 | .000484 mica—(0— Temperature Coefficient) | |
| C10 | 129119 | .000329 mica—(o— Temperature Coefficient) | |
| C11 | 129123 | .0008 mica—(o— Temperature Coefficient) | |
| C12 | 10026 | .02 x 400 v. | |
| C13 | 12465 | S. W. Series padder—1500 mmf. | |
| C14 | 12465 | B. C. Series padder—330 mmf. | |
| C15 | 12439C | S. W. Oscillator trimmer | |
| C16 | 12439C | B. C. Oscillator trimmer | |
| C17 | 1001 | .1 x 400 v. | |
| C18 | 1255 | .0001 mica | |
| C19 | 10019 | .006 x 600 v. | |
| C20 | 1252 | .0005 mica | |
| C21 | 10026 | .02 x 400 v. | |
| C22 | 10011 | .01 x 400 v. | |
| C23 | 11969 | 16 mfd. lytic | |
| C24 | 11969 | 16 mfd. lytic | |
| C25 | 10074* | .1 x 400 v. | |
| C26 | 10071 | .004 x 600 v. | |

Power Consumption ..... 50 Watts (At 115 volts 50-60 cycles)
Power Output ..... 1.6 Watts Undistorted, 3 Watts Maximum
Intermediate Frequency ..... 465 KC.

**FREQUENCY RANGE**
5.65 to 18.3 MC.
540 to 1750 KC.

Transformers are available and chassis are sometimes equipped with universal transformers for operation on 25, 40 and 60 cycles and with primary taps for 110, 130, and 230 volts.

## BOTTOM VIEW OF CHASSIS

FIG. 5

VOLTAGE READINGS TAKEN WITH 1000 OHMS PER VOLT VOLTMETER. 115 V. LINE. BETWEEN TERMINALS AND CHASSIS WITH ANTENNA GROUNDED.

(1) CANNOT BE MEASURED WITH VOLTMETER
(2) BIAS -2.5 V. MEASURED ACROSS 50 OHM RESISTOR.
(3) 5.0 V. AC. MEASURED BETWEEN PINS 2-8
(4) 580 V. AC. MEASURED BETWEEN PINS 4-6.







FIG. 1—TOP VIEW

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## ALIGNING INSTRUCTIONS:

CAUTION:—No aligning adjustments should be attempted without first thoroughly checking over all other possible causes of trouble, such as poor installations, open or grounded antenna systems, low line voltages, defective tubes, condensers and resistors. In order to properly align this chassis, an oscillator (generator) is absolutely necessary. No aligning adjustments should be attempted with the chassis in the cabinet.

To remove the chassis from the cabinet, remove the four bolts which are used to fasten the chassis to the cabinet bottom; pull the knobs off their shafts and detach the pointer from the drive string (see Fig. 1, top view).

NOTE:—On the front of the string dial drum a calibrated scale is provided for aligning this chassis to the frequencies listed in the alignment procedure. Attach a pointer so that it will indicate proper dial setting in respect to the position of the variable condenser.

## DIAL CALIBRATION:

To correct dial calibration rotate the tuning knob to the right until the dial pointer reaches the extreme end of the dial scale; then rotate the tuning knob to the left until the pointer reaches the other extreme end of the dial scale.

Stop clamps on the pointer slider bar make the pointer self aligning thereby correcting dial calibration.

## ALIGNMENT PROCEDURE

- Volume control—Maximum all adjustments.
- Connect radio chassis to ground post of signal generator with a short heavy lead.
- Connect dummy antenna value in series with generator output lead.
- Connect output meter across primary of output transformer.
- Allow chassis and signal generator to "heat up" for several minutes.

The following equipment is required for aligning:

- An all wave signal generator which will provide an accurately calibrated signal at the test frequencies as listed.
- Output indicating meter.
- Non-metallic screwdriver.
- Dummy antennas—.1 mf., 200 mmf. and 400 ohms.

| BAND | SIGNAL GENERATOR Frequency Setting | Dummy Antenna | Connection to Radio | Pushbutton Indicated Below Pushed "In" | Variable Condenser Setting | Trimmers Adjusted (in Order Shown) | Trimmer Function | Adjustment |
|---|---|---|---|---|---|---|---|---|
| I. F. | 465 Kc. | .1 MFD. | Grid of 6K7 | Broadcast | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Output I. F. | Adjust to maximum output |
| | 465 Kc. | .1 MFD. | Grid of 6K8G | Broadcast | Rotor full open (Plates out of mesh) | Two trimmers on top (See Fig. 1) | Input I. F. | Adjust to maximum output |
| BROADCAST BAND | 1750 Kc. | 200 mmf. | Antenna lead | Broadcast | Rotor full open (Plates out of mesh) | Trimmer (C16) (See Fig. 1) | Broadcast oscillator | Adjust to maximum output |
| | 1400 Kc. | 200 mmf. | Antenna lead | Broadcast | Set Dial at 1400 Kc. | Trimmer (C5) (See Fig. 1) | Broadcast antenna | Adjust to maximum output |
| | 600 Kc. | 200 mmf. | Antenna lead | Broadcast | Set Dial at 600 Kc. | Trimmer (C14) (See Fig. 4) | Broadcast oscillator series pad | Adjust to maximum rock dial. (See note "A") |
| | 465 Kc. | 200 mmf. | Antenna lead | Broadcast | Set Dial at 600 Kc. | Trimmer (C1) (See Fig. 4) | I. F. Wave Trap | Adjust for minimum output |
| SHORT WAVE BAND | 17 Mc. | 400 ohms | Antenna lead | Short Wave | Set Dial at 17 MC | Trimmer (C15) (See Fig. 1) | Short Wave oscillator | Adjust to maximum output |
| | 17 Mc. | 400 ohms | Antenna lead | Short Wave | Dial Set at 17 MC | Trimmer (C6) (See Fig. 1) | Short Wave antenna | Adjust to maximum output |
| | 6 Mc. | 400 ohms | Antenna lead | Short Wave | Set Dial at 6 MC | Trimmer (C13) (See Fig. 4) | Short Wave oscillator series pad | Adjust to maximum rock dial. (See note "A") |

NOTE "A" Turn the dial back and forth slightly (rock) and adjust trimmer until the peak of greatest intensity is obtained.

Attenuate the signal from the signal generator to prevent the leveling-off action of the AVC.

After each band is completed, repeat the procedure as a final check.

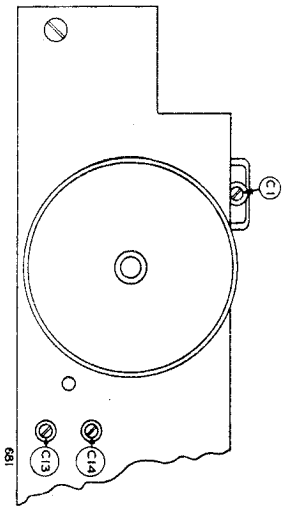



FIG. 4

## SERVICE NOTES:

Voltages taken from different points of circuit to chassis are measured with volume control full on, all tubes in their sockets and speaker connected, with a volt meter having a resistance of 1000 ohms per volt.

All voltages as indicated on the voltage chart are measured with 115 volts A. C. on the primary of the power transformer.

Resistances of coil windings are indicated in ohms on the schematic circuit diagram.

To check for open by-pass condensers, shunt each condenser with another condenser of the same capacity and voltage rating, which is known to be good, until the defective unit is located.

Excessive hum, stuttering, low volume and a reduction in all D. C. voltages is usually caused by a shorted electrolytic condenser; open by-pass condensers frequently cause oscillation and distorted tone.

## PROCEDURE FOR SETTING THE AUTOMATIC STATION PUSHBUTTONS:

**Important: Allow the radio to "warm up" for about 15 minutes before setting the station adjustment screws for the pushbuttons.**

**After you have made up your list of stations, press button marked "Broadcast" and tune set manually until station selected having the highest frequency is tuned in and the program noted. Press button covering frequency range in which station is located (See Fig. 3). Adjust screw through station** tab opening above button pressed until the same station is heard clearly and is correctly tuned.

Press pushbutton marked "Broadcast" and tune in next station selected. Press button covering frequency range in which station is located. Adjust screw through station tab opening above button pressed until the same station is heard clearly and with maximum volume.

Follow this procedure for each button until you have selected all of your stations. The automatic buttons are now set up for quick tuning and no further adjustment is necessary.

**NOTE: In setting up the pushbuttons, station identification may require switching back and forth to button marked "Broadcast" until the same program is heard for both. If the same program is heard on more than one station, find the station on dial tuning and select the proper one on the pushbutton by comparing the order or sequence of programs with that on dial tuning.**

Punch out the station call letter tabs of the stations you have set up for the automatic buttons from the set of sheets supplied and insert them into the rectangular openings in the escutcheon. One of the small, clear celluloid tabs supplied should be snapped into place over each of the station call letter tabs.

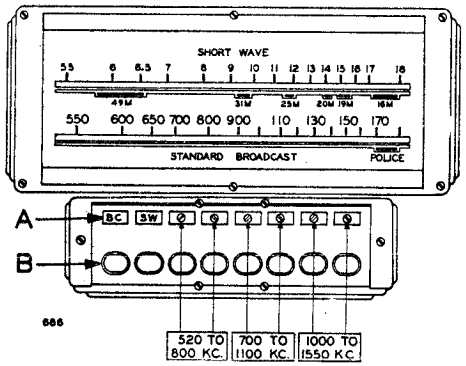


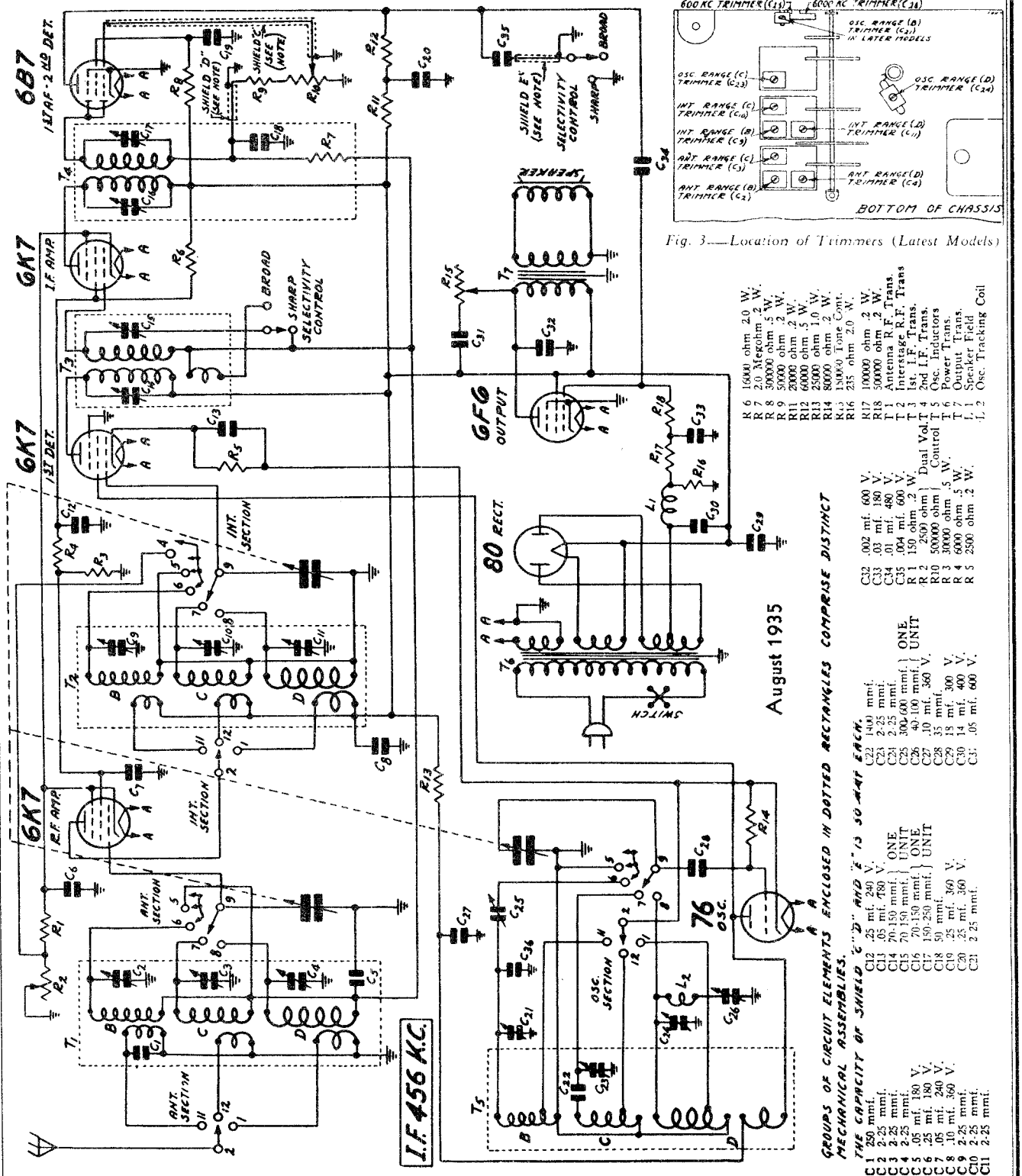

FIG. 3—Showing Station Adjustment Screws.

MODEL 3712, D7141 (1935)

# WESTERN AUTO SUPPLY CO. Schematic, Trimmers


600 KC TRIMMER (C13)
6000 KC TRIMMER (C34)
OSC. RANGE (B) TRIMMER (C21) IN LATER MODELS
OSC. RANGE (C) TRIMMER (C23)
OSC. RANGE (D) TRIMMER (C24)
INT. RANGE (C) TRIMMER (C10)
INT. RANGE (B) TRIMMER (C9)
INT. RANGE (D) TRIMMER (C11)
ANT. RANGE (C) TRIMMER (C3)
ANT. RANGE (D) TRIMMER (C4)
ANT. RANGE (B) TRIMMER (C2)
BOTTOM OF CHASSIS

Fig. 3—Location of Trimmers (Latest Models)


687 1ST A.F. 2ND DET.
6K7 I.F. AMP.
6K7 1ST DET.
6K7 R.F. AMP.
6F6 OUTPUT
80 RECT.
76 OSC.
SHIELD "D" (SEE NOTE)
SHIELD "E" (SEE NOTE)
SHIELD "C" (SEE NOTE)
SELECTIVITY CONTROL
BROAD
SHARP
SPEAKER
SWITCH
INT. SECTION
ANT. SECTION
OSC. SECTION
I.F. 456 K.C.
August 1935
GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES.
THE CAPACITY OF SHIELD "C", "D" AND "E" IS 50 MMF. EACH.
C1 250 mmf.
C2 2-25 mmf.
C3 2-25 mmf.
C4 2-25 mmf.
C5 .05 mf. 180 V.
C6 .25 mf. 180 V.
C7 .05 mf. 240 V.
C8 .10 mf. 360 V.
C9 2-25 mmf.
C10 2-25 mmf.
C11 2-25 mmf.
C12 .25 mf. 240 V.
C13 .05 mf. 180 V.
C14 70-150 mmf. } ONE UNIT
C15 70-150 mmf. }
C16 70-150 mmf. } ONE UNIT
C17 150-250 mmf. }
C18 50 mmf.
C19 .25 mf. 360 V.
C20 .25 mf. 360 V.
C21 2-25 mmf.
C22 1400 mmf.
C23 2-25 mmf.
C24 2-25 mmf.
C25 300-600 mmf. } ONE UNIT
C26 40-100 mmf. }
C27 .10 mf. 360 V.
C28 35 mmf.
C29 .18 mf. 300 V.
C30 .14 mf. 400 V.
C31 .05 mf. 600 V.
C32 .002 mf. 600 V.
C33 .03 mf. 180 V.
C34 .01 mf. 480 V.
C35 .004 mf. 600 V.
R 1 150 ohm .2 W.
R 2 250 ohm } Dual Vol. Control
R10 500000 ohm }
R 3 30000 ohm .5 W.
R 4 6000 ohm .5 W.
R 5 2500 ohm .2 W.
R 6 1600 ohm .2 W.
R 7 2.0 Megohm .2 W.
R 8 300000 ohm .5 W.
R 9 50000 ohm .2 W.
R11 20000 ohm .2 W.
R12 60000 ohm .5 W.
R13 25000 ohm 1.0 W.
R14 80000 ohm .2 W.
R15 150000 Tone Cont.
R16 235 ohm 2.0 W.
R17 100000 ohm .2 W.
R18 500000 ohm .2 W.
T 1 Antenna R.F. Trans.
T 2 Interstage R.F. Trans
T 3 1st. I.F. Trans.
T 4 2nd I.F. Trans.
T 5 Osc. Inductors
T 6 Power Trans.
T 7 Output Trans.
L 1 Speaker Field
L 2 Osc. Tracking Coil

ARROWS INDICATE CONNECTIONS PRESENT IN BAND SWITCH WHEN IN POSITION SHOWN.

| | POSITION 1 STANDARD WAVE (B) | POSITION 2 SHORT WAVE (C) | POSITION 3 SHORT WAVE (D) |
|---|---|---|---|
| ANT. & OSC. SECTION | 5 6 7 8 9 11 12 1 2 | 5 6 7 8 9 11 12 1 2 | 5 6 7 8 9 11 12 1 2 |
| INT. SECTION | 4 5 6 7 8 9 11 12 1 2 | 4 5 6 7 8 9 11 12 1 2 | 4 5 6 7 8 9 11 12 1 2 |

CONTACT LOCATIONS 3, 4 AND 10 IN ANT. AND OSC. SECTIONS AND 3 AND 10 IN INT. SECTION ARE BLANK.

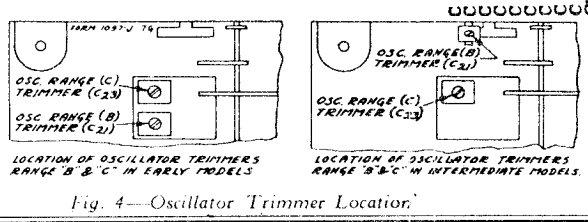

OSC. RANGE (C) TRIMMER (C23)
OSC. RANGE (B) TRIMMER (C21)
LOCATION OF OSCILLATOR TRIMMERS RANGE "B" & "C" IN EARLY MODELS
OSC. RANGE (B) TRIMMER (C21)
OSC. RANGE (C) TRIMMER (C23)
LOCATION OF OSCILLATOR TRIMMERS RANGE "B" & "C" IN INTERMEDIATE MODELS.

Fig. 4—Oscillator Trimmer Location

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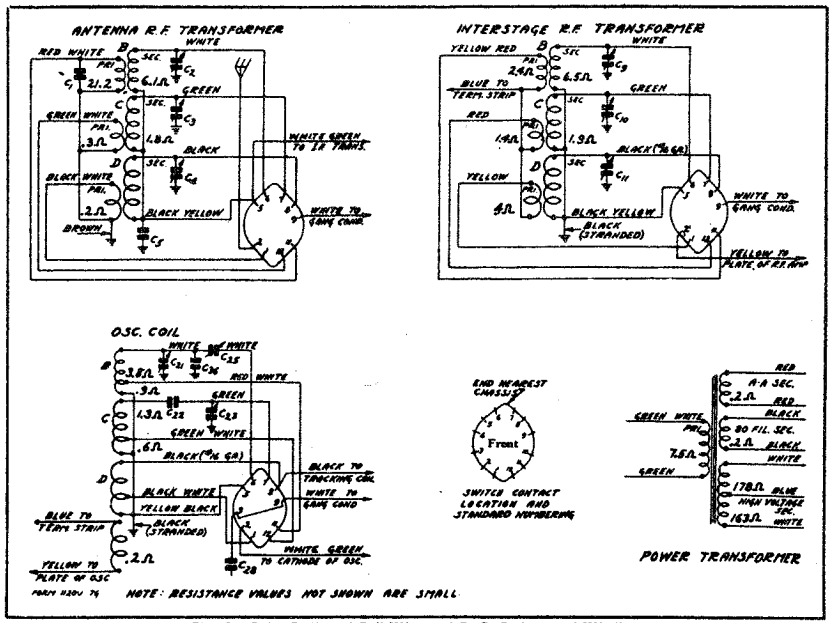


*Fig. 5—Color Coding of Coil Wires and D. C. Resistance of Windings (Also see complete D. C. Resistance List in this Manual)*

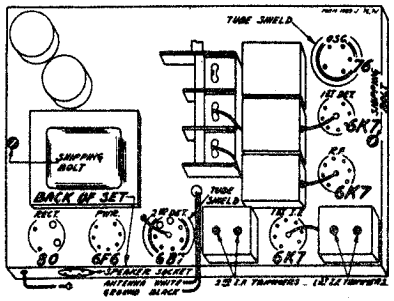


*Fig. 6—Location of Tubes*

**VOLTAGES AT SOCKETS**
**Line Voltage, 115 - Volume Control at Maximum Antenna Shorted to Ground**

| Type of Tube | Function | Heater or Filam't | Plate to Ground | Screen to Ground | Cathode to Ground | Plate M. A. |
|---|---|---|---|---|---|---|
| 6K7 (6D6) | R. F. | 6.1 | 230 | 95 | 3.0 | 6.4 |
| 6K7 (6D6) | 1st Det. | 6.1 | 230 | 100 | 9.0 | 3.2 |
| 76 | Osc. | 6.1 | 100 | | | 5.2 |
| 6K7 (6D6) | I. F. | 6.1 | 230 | 120 | 3.0 | 9. |
| 6B7 | 2nd Det. | 6.1 | 55(1) | 40 | | 2.3 |
| 6F6 (42) | Power | 6.1 | 215 | 230 | 17(2) | 30.0 |
| 80 | Rectifier | 4.7 | | | | 34. per plate |

(1) As read with 500,000 ohm meter.
(2) As read across R16

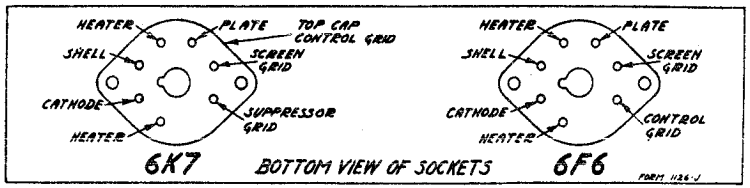


*Fig. 7—Metal Tubes—Bottom View of Sockets*

## Servicing R. F. Coil Assemblies

The R. F. transformers and oscillator coil assemblies in this receiver are sold complete with can. This is due to the fact that the trimmers are soldered to the can, and cannot be easily disassembled.

The lead colors and resistances of the various windings in each assembly are shown in Fig. 5.

If it is ever necessary to remove one of coil assemblies from the can, proceed as follows: First remove the nuts from the screws at the top of the can. The outside lug on the trimmer condenser is inserted in a slot in the coil can, and this lug is soldered into position.

Apply a soldering iron to the can at the point of the soldered connection. Then with a screw driver lift up on the outside edge of the trimmer (edge soldered to can) until the trimmer is clear of the can. After the trimmers are all unsoldered, the coil can be taken out.

## Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

A standard arrangement for switch contact location numbering has been adopted. This numbering is illustrated in Fig. 5. In contact locations not used, the number applying to that particular location is not employed.

## Changes in Early Models

In the early models of this receiver, the antenna transformer (T1) had two Range B Primary windings as shown in Fig. 8.

The oscillator Range B and C trimmer locations varied in the early and intermediate models of this receiver as shown in Figs. 3 and 4.

Referring to Fig. 2, in the early models of this receiver, contact No. 4 in the interstage section of the band selector was not used. The purpose of this contact arrangement is to short out variable resistor R2 in the second short wave position. In these models the relative positions of resistors R1 and R2 were reversed. The common connection from the suppressor grid and cathodes of the R. F. and I. F. amplifier tubes was connected to the control arm of variable resistor R2. The latter was connected to resistor R1 which was grounded at the other end. The by-pass condenser C6 remains connected as before, to the cathode and suppressor grid connection.

The type 6K7 and 6F6 metal tubes replace the types 6D6 and 42 glass tubes respectively which were used in the early models.

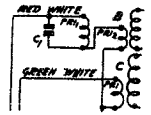


*Fig. 8—Antenna Transformer in Early Models*

# Phonograph Connections

Phonograph connections can be made as shown in Fig. 9. The parts required are shown in the parts list. Knockouts are provided in the back panel of the chassis for mounting the phono jack and phono switch—See Fig. 10.

For mounting the 12 mfd. 25 volt dry electrolytic condenser, two No. 27 drill holes should be drilled in the side of the chassis directly below the wet electrolytic condensers. These holes are 1¼" from the bottom, ⅞" and 3¾" from the front of chassis. The ground lug which extends out from the side of the chassis should be bent back into the chassis wall.

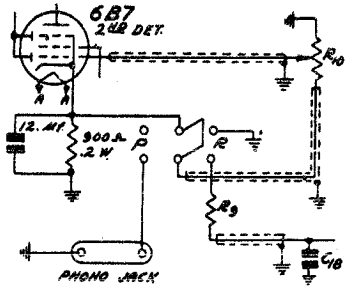


*Fig. 9—Phonograph Connections*

Replace the single lug insulated terminal strip (located on the rear panel, directly in back of the band selector switch) with (P-4A39) double lug insulated terminal strip with ground lug. Be sure to solder back to this new terminal strip any leads that were connected to the other terminal strip.

The connections are made by opening the diode return circuit at the volume control. Unsolder the 50,000 ohm resistor R9 (covered with saturated sleeving in early models) from the lug at the volume control and from the shielded lead which runs from the I. F. transformer. Cut this shielded lead to length and connect to the open lug on the new terminal strip. Connect one side of the 50,000 ohm resistor R9 to the same lug and the other side to the phono switch—see Fig. 9. Ground the shield to the ground lug of the terminal strip.

The extra shielded lead which is provided should be inserted into a piece of saturated sleeving.

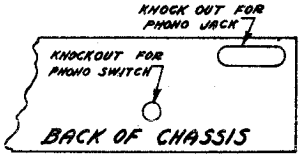


*Fig. 10—Location of Phono Knockouts*

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## Circuit

This model is a three band receiver with a tuning range in each band as shown in the specifications above. Three band coverage is accomplished by means of three sets of R. F. and oscillator coils and a three section triple throw switch.

Referring to the schematic circuit diagram, Fig. 2, T1 and T2 are the antenna and interstage R. F. transformer assemblies and T5 is the oscillator coil assembly. The standard wave, 1st and 2nd short wave coils in each assembly are indicated by the letters B, C and D respectively. The three sections of the band switch are designated in the schematic as the antenna, interstage and oscillator sections.

The band switch completes connections to the coils in use. It also short circuits the R. F. transformer secondary and oscillator coil of lower frequency not in use.

The antenna transformer with tuned secondary feeds into a type 6K7 R. F. amplifier tube. The output of this tube is fed through the interstage R. F. transformer with tuned secondary into another 6K7 tube which functions as the 1st detector.

A separate type 76 tube is employed in the oscillator circuit. Referring to the oscillator assembly T5, Fig. 2, B, C and D refer to the standard wave, 1st short wave and 2nd short wave oscillator coils respectively. The oscillating circuit is always resonant at 456 KC above the frequency to which the R. F. amplifier is tuned.

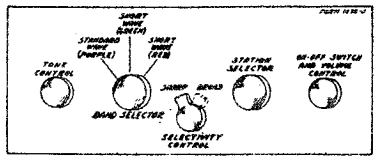


*Fig. 1—Arrangement of Controls*

The oscillator potential is fed into the cathode circuit of the 6K7 first detector tube. This results in the intermediate or beat frequency of 456 KC being present in the plate circuit of this tube.

One stage of I. F. amplification is employed using a 6K7 tube. The primaries and secondaries of the first and second I. F. transformers are tuned by small trimmer condensers.

**Selectivity Control**—Referring to the 1st I. F. transformer T3 in Fig. 2, it will be noted that there is a coupling winding shown in the illustration below the primary. Refer also to the by-pass arrangement in the pentode plate circuit of the 6B7.

When the selectivity control is in the sharp position, the coupling winding is open circuited and the loose coupling which exists between the primary and secondary of this transformer results in high selectivity. High audio frequencies are by-passed to ground through condenser C35.

When the selectivity control is in the broad position, the coupling winding which is wound under the primary is connected in series with the secondary. This provides overcoupling which results in a greatly widened resonance curve. Passage of a wide range of audio frequencies is thus obtained.

In order to allow passage of the higher audio frequencies in the broad position, the capacity of the by-pass condenser to ground is greatly reduced (C35 and the capacity of shield E in series).

**Dual Volume Control**—A dual manual volume control is employed. In one section the audio voltage applied to the 1st audio section of the 6B7 tube is varied (R10). In the other section the R. F. and I. F. bias is varied (R2). The purpose of the latter section is to reduce the sensitivity of the receiver at low volume settings in order to cut down noise pick-up between stations. The variable section R2 is shorted out through contact No. 4 of the interstage section of the band selector when in the 2nd short wave position.

A type 6B7 duo diode pentode tube functions as the second detector and a one stage audio amplifier. The two diode plates are connected together. AVC voltage is applied through isolating resistors to the control grid circuits of the R. F. and I. F. tubes. The audio voltage developed across volume control resistor R10 is applied through the movable arm to the control grid of the 6B7 tube. Resistance coupling is used between the first audio stage and the output stage which employs a type 6F6 output pentode tube. A type 80 full wave rectifier tube is used in the power unit.

## Alignment and Calibration

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

### I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator through a .1 mf. condenser to the grid of the 1st detector.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity switch to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the four I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 6.

### Range B Alignment

#### 1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C21) until maximum output is obtained. The location of this trimmer is shown in Figs. 3 and 4.

#### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

There is a lever arm in front of the large gear on the tuning condenser shaft by means of which the position of the station pointer may be adjusted. Set the station pointer at the 1500 KC mark on the dial scale by adjusting this lever arm.

Adjust the interstage Range B trimmer (C9) and antenna Range B trimmer (C2) to maximum.

#### 600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

### Range C Alignment

#### 5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

Adjust the oscillator Range C trimmer (C23) until maximum output is obtained. See Figs. 3 and 4 for location of this trimmer.

#### 5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range C trimmer (C10) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

### Range D Alignment

#### 18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

Adjust the oscillator Range D trimmer (C24) until maximum output is obtained. See Fig. 3 for location of this trimmer.

#### 15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the interstage Range D trimmer (C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

#### 6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

**Tuning Frequency Range**

| | |
|---|---|
| B Range | 535 to 1730 KC. |
| C Range | 1715 to 5800 KC. |
| D Range | 5750 to 18300 KC. |

**Sensitivity**

| | |
|---|---|
| B Range Average | 0.5 Microvolts Absolute |
| C Range Average | 1.0 Microvolts Absolute |
| D Range Average | 2.0 Microvolts Absolute |

**Power Consumption - 68 Watts (At 115 volts 60 cycles)**

**Power Output - - - - - - 3 Watts Undistorted**

**Selectivity - 28 KC Broad at 1000 times Signal (Sharp)**

**Intermediate Frequency - - - - - - 456 KC.**

**Speaker - - - - - - - - - 6" and 8" Dynamic**

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# Alignment and Calibration

Correct alignment is extremely important in connection with all wave receivers. The receivers are all properly aligned at the factory with precision instruments and realignment should not be attempted unless all other possible causes of the faulty operation have first been investigated and unless the service technician has the proper equipment.

A signal generator that will provide an accurately calibrated signal at 456, 1730, 1500, 600, 5800, 5000, 18,300, 15,000 and 6000 KC and an output indicating meter are required. It will be practically impossible to align the receiver if unsatisfactory apparatus is used. If a station is tuned in with the selectivity control in the broad position and this control is then turned to the sharp position, the station may disappear. This is not an indication that the receiver is out of alignment.

Use a non-metallic screwdriver for the adjustments. The complete procedure is as follows:

### I. F. Adjustment

Set the signal generator for a signal of 456 KC.

Connect the output of the signal generator to the grid of the 1st detector through a 0.1 MF condenser.

Connect the ground lead of the receiver to the ground post of the signal generator.

Turn the band selector to the Range B position (standard wave band—purple dial color).

Turn the selectivity control to the sharp position and keep it in this position for all adjustments.

Turn the volume control to the maximum position.

Attenuate the signal from the signal generator to prevent the levelling-off action of the A.V.C.

Then adjust the five I.F. trimmers until maximum output is obtained. The adjusting screws for these condensers are reached from the top of the chassis, and the location is shown in Fig. 5.

## Range B Alignment

### 1730 KC Adjustment

Set the signal generator for 1730 KC.

Turn the rotor of the tuning condenser to the full open position.

Keep the band selector in the standard wave position.

Connect the antenna lead of the receiver through a 200 mmf. condenser to the output of the signal generator.

For this and all subsequent adjustments keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range B trimmer (C38) until maximum output is obtained. The location of this trimmer is shown in Fig. 3.

### 1500 KC Adjustment

Set the signal generator for 1500 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Loosen the pointer set screw and set the large pointer at the 1500 KC mark on the standard wave band scale. Retighten the set screw.

Adjust the 1st and 2nd interstage Range B trimmers (C8 and C13) and antenna Range B trimmer (C2) to maximum.

Do not change the setting of the oscillator Range B trimmer.

### 600 KC Adjustment

Set the signal generator for 600 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 600 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Be sure to use a non-metallic screwdriver for this adjustment.

## Range C Alignment

### 5800 KC Adjustment

Set the signal generator for 5800 KC.

Connect the antenna lead of the receiver through a 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range C position (1st short wave band—green dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range C trimmer (C40) until maximum output is obtained. See Fig. 3 for location of this trimmer.

### 5000 KC Adjustment

Set the signal generator for 5000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range C trimmers (C9 and C12) and antenna Range C trimmer (C3) to maximum.

Do not change the setting of the oscillator Range C trimmer.

## Range D Alignment

### 18,300 KC Adjustment

Set the signal generator for 18,300 KC.

Keep the antenna lead of the receiver connected through the 400 ohm resistor to the output of the signal generator.

Turn the rotor of the tuning condenser to the full open position.

Turn the band selector to the Range D position (2nd short wave band—red dial color).

As mentioned above, keep the volume control at the maximum position and attenuate the signal from the signal generator to prevent A.V.C. action.

Adjust the oscillator Range D trimmer (C41) until maximum output is obtained. See Fig. 3 for location of this trimmer.

### 15,000 KC Adjustment

Set the signal generator for 15,000 KC.

Turn the rotor of the tuning condenser carefully until maximum output is obtained.

Adjust the 1st and 2nd interstage Range D trimmers (C10 and C11) and antenna Range D trimmer (C4) to maximum.

When adjusting the 2nd interstage Range D trimmer, it will be necessary at the same time to turn the tuning condenser rotor slowly back and forth until the peak of greatest intensity is obtained.

Then go back and repeat the procedure as given for the 18,300 KC adjustment. If it is found necessary to make any appreciable change in the setting of the oscillator Range D trimmer, the 15,000 KC adjustment must be repeated.

Do not make any further change in the setting of the oscillator Range D trimmer.

### 6000 KC Adjustment

Set the signal generator for 6000 KC.

Turn the tuning condenser rotor until maximum output is obtained.

Turn the rotor slowly back and forth at the same time adjusting the 6000 KC trimmer until the peak of greatest intensity is obtained. See Fig. 3 for location of this trimmer.

Use a non-metallic screwdriver for this adjustment

## Twenty-five Cycle Receivers

The twenty-five cycle receiver differs from the sixty cycle receiver only in the fact that a different power transformer is used. The correct power transformer is shown in the parts list.

The twenty-five cycle receiver can be operated satisfactorily from a sixty cycle power supply. However, the reverse is not true, the sixty cycle receiver cannot be operated from a twenty-five cycle power supply.

A 115-230 Volt, 40 to 60 cycle as well as other power transformers with special power ratings are also available for this model.

## D. C. Resistance of Windings

| Part No. | Winding | Code | in Ohms |
|---|---|---|---|
| P-9A418 | Antenna R. F. Transformer | T1 | |
| | Range B Primary Winding | | 21.4 |
| | Range C Primary Winding | | 0.3 |
| | Range D Primary Winding | | 0.2 |
| | Range B Secondary Winding | | 6.1 |
| | Range C Secondary Winding | | 2.1 |
| | Range D Secondary Winding | | Small |
| P-9A411 | 1st Interstage R. F. Transformer | T2 | |
| | Range B Primary Winding | | 3.6 |
| | Range C Primary Winding | | 2.4 |
| | Range D Primary Winding | | 0.5 |
| | Range B Secondary Winding | | 5.8 |
| | Range C Secondary Winding | | 2.1 |
| | Range D Secondary Winding | | Small |
| P-50X24 | Audio Input Transformer | T7 | |
| | Primary Winding | | 415.0 |
| | Secondary Winding | | |
| | Center Tap to Inside | | 211.7 |
| | Center Tap to Outside | | 288.5 |
| P-51X26 | Audio Output Transformer | T8 | |
| | Primary Winding | | |
| | Center Tap to Inside | | 135.5 |
| | Center Tap to Outside | | 155.3 |
| | Secondary Winding | | |
| | Tap to Upper Side | | 0.16 |
| | Tap to Ground Side | | 0.12 |
| P-53X82 | Power Transformer (115 Volt-60 Cycle) | T9 | |
| | Primary Winding | | 1.7 |
| | Tube Filament Secondary (A-A) | | Small |
| | Tube Filament Secondary (B-B) (80) | | Small |
| | High Voltage Secondary Winding | | |
| | Center Tap to Inside | | 97.9 |
| | Center Tap to Outside | | 106.4 |
| P-9A427 | Oscillator Coils | T10 | |
| | Range B Grid Coil | | |
| | Red White Tap to White | | 3.1 |
| | Red White Tap to Ground | | 0.7 |
| | Range C Grid Coil | | |
| | Green White Tap to Green | | 1.7 |
| | Green White Tap to Ground | | 0.5 |
| | Range D Grid Coil | | |
| | Black White Tap to Black | | Small |
| | Black White Tap to Ground | | Small |
| | Oscillator Plate Coil | | 0.2 |
| P-9A400 | 2nd I. F. Plate Isolating Reactor | L1 | 34.7 |
| P-12A204 | 12" Dynamic Speaker (No. 1—See Fig. 2) | | |
| | Speaker Field | L4 | 6400. |
| | Voice Coil | | Small |
| P-12A205 | 12" Dynamic Speaker (No. 2—See Fig. 2) | | |
| | Speaker Field | L3 | 1000. |
| | Voice Coil | | Small |
| P-12A226 | 12" Dynamic Speaker (No. 3—See Fig. 2) | | |
| | Speaker Field | L2 | 1000. |
| | Voice Coil | | Small |
| P-52X39 | Reactor Assembly | L5 | 143.6 |
| P-9A391 | High Frequency Oscillator Tracking Coil | L6 | 1.0 |
| P-9A412 | 2nd Interstage R. F. Coils | T3 | |
| | Range B Section | | |
| | Long Portion | | 5.9 |
| | Short Portion | | 0.2 |
| | Range C Section | | |
| | Long Portion | | 1.8 |
| | Short Portion | | 0.2 |
| | Range D Section | | Small |
| P-9A413 | 1st I. F. Transformer | T4 | |
| | Primary Winding | | 4.4 |
| | Coupling Winding | | 0.3 |
| | Secondary Winding | | |
| | Tap to Condenser Side | | 2.3 |
| | Tap to Switch Side | | 2.3 |
| P-9A414 | 2nd I. F. Transformer | T5 | |
| | Primary Winding | | 4.3 |
| | Coupling Winding | | 0.3 |
| | Secondary Winding | | |
| | Tap to Condenser Side | | 2.3 |
| | Tap to Switch Side | | 2.3 |
| P-9A415 | 3rd I. F. Transformer | T6 | |
| | Primary Winding | | 9.8 |
| | Secondary Winding | | 30.0 |

# WESTERN AUTO SUPPLY CO.

MODEL D716 (1935)
Schematic

Power Consumption - 140 Watts (At 115 volts 60 cycles)

Power Output - - - - - - 15 Watts Undistorted

Tuning Frequency Range

B Range - - - - - - - - - 535 to 1730 KC.
C Range - - - - - - - - - 1715 to 5800 KC.
D Range - - - - - - - - - 5750 to 18300 KC.




ARROWS INDICATE CONNECTIONS PRESENT IN BAND SELECTOR WHEN IN POSITION SHOWN.

| | POSITION 1 STANDARD WAVE(B) | POSITION 2 SHORT WAVE (C) | POSITION 3 SHORT WAVE (D) |
|---|---|---|---|
| OSC. AND ANT. SECTION | 1 1 2 1 2 5 6 7 8 9 | 1 1 2 1 2 5 6 7 8 9 | 1 1 2 1 2 5 6 7 3 9 |
| 2ND. INT. SECTION | 1 2 5 6 7 8 9 | 1 2 5 6 7 8 9 | 1 2 5 6 7 8 9 |
| 1ST. INT. SECTION | 1 1 2 1 2 3 5 6 7 8 9 | 1 1 2 1 2 3 5 6 7 8 9 | 1 1 2 1 2 3 5 6 7 8 9 |

CONTACT LOCATIONS 3, 4 AND 10 IN OSC. AND ANT. SECTIONS, 3, 4, 10, 11 AND 12 IN 2ND. INT. SECTION AND 4 AND 10 IN 1ST. INT. SECTION ARE BLANK.

October, 1935

GROUPS OF CIRCUIT ELEMENTS ENCLOSED IN DOTTED RECTANGLES COMPRISE DISTINCT MECHANICAL ASSEMBLIES. 'B' AND 'S' ON SELECTIVITY CONTROL DENOTES BROAD AND 'SHARP' RESPECTIVELY.

THE CAPACITY OF THE 'C' SHIELD IS 80 mmf. THE CAPACITY OF THE 'D' SHIELD IS 70 mmf. THE CAPACITY OF THE 'E' SHIELD IS 10 mmf.

ON SETS USING ONE SPEAKER THE #3 SPEAKER IS FURNISHED. ON SETS USING TWO SPEAKERS THE #1 AND #2 SPEAKERS ARE FURNISHED.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C1 | 250 mmf. | C13 | 2-25 mmf. | C25 | .05 mf. 360 V. | C37 | .25 mf. 360 V. | R 5 | 40,000 ohm 0.5 watt | R18 | 128 ohm 2.5 watt } Armored |
| C2 | 2-25 mmf. | C14 | .05 mf. 180 V. | C26 | .25 mf. 180 V. | C38 | 2-25 mmf. | R 6 | 100,000 ohm 0.5 watt | R19 | 145 ohm 3.0 watt } Wire-Wound |
| C3 | 2-25 mmf. | C15 | 150-250 mmf. } One | C27 | .004 mf. 600 V. | C39 | 1400 mmf. | R 7 | 500 ohm 0.2 watt | R20 | 7800 ohm 12.0 watt |
| C4 | 2-25 mmf. | C16 | 150-250 mmf. } One | C28 | 125.0 mf. 45 V. Electrolytic | C40 | 2-25 mmf. | R 8 | 200,000 ohm 0.2 watt | R21 | 80,000 ohm 0.2 watt |
| C5 | .05 mf. 180 V. | C17 | 150-250 mmf. } One | C29 | 18.0 mf. 290 V. Electrolytic | C41 | 2-25 mmf. | R 9 | 100,000 ohm 0.5 watt | R22 | 2,500 ohm 0.2 watt |
| C6 | .70 mf. 360 V. | C18 | 150-250 mmf. } Unit | C30 | .25 mf. 360 V. | C42 | 10 mmf. | R10 | 100,000 ohm 0.2 watt | R23 | 27,000 ohm 1.0 watt |
| C7 | .25 mf. 180 V. | C19 | 70-150 mmf. | C31 | 30.0 mf. 450 V. Electrolytic | | | R11 | 2.0 megohm 0.2 watt | | |
| C8 | 2-25 mmf. | C20 | 50 mmf. | C32 | .15 mf. 280 V. A. C. | R 1 | 25,000 ohm 0.2 watt | R13 | 200 ohm 0.5 watt | T 1 | Ant. R.F. Trans. |
| C9 | 2-25 mmf. | C21 | .05 mf. 180 V. | C33 | .05 mf. 180 V. | R 2 | 150 ohm 0.2 watt | R14 | 250,000 ohm 0.2 watt | T 2 | 1st Interstage R.F. Trans. |
| C10 | 2-25 mmf. | C22 | .05 mf. 360 V. | C34 | 35 mmf. | R 3 | 2500 ohm } Dual Volume | R15 | 250,000 ohm 0.2 watt | T 3 | 2nd Interstage R.F. Trans. |
| C11 | 2-25 mmf. | C23 | .10 mf. 360 V. | C35 | 40-100 mmf. } One | R12 | 2.0 megohm } Control | R16 | 3.0 megohm Tone Control | T 4 | 1st I.F. Trans. |
| C12 | 2-25 mmf. | C24 | .01 mf. 480 V. | C36 | 300-600 mmf. } Unit | R 4 | 50,000 ohm 1.0 watt | R17 | 100,000 ohm 0.2 watt | T 5 | 2nd I.F. Trans. |

T 6 3rd I.F. Trans.
T 7 Push-Pull Input Trans.
T 8 Push-Pull Output Trans.
T 9 Power Trans.
T10 Osc. Inductors

L 1 2nd I.F. Plate Isolating Reactor
L 2 No. 3 Speaker Field (1000 ohm)
L 3 No. 2 Speaker Field (1000 ohm)
L 4 No. 1 Speaker Field (6400 ohm)
L 5 Choke Coil
L 6 Osc. Tracking Coil

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MODEL D716 (1935)
Voltage, Socket, Coils
Trimmers

# WESTERN AUTO SUPPLY CO.

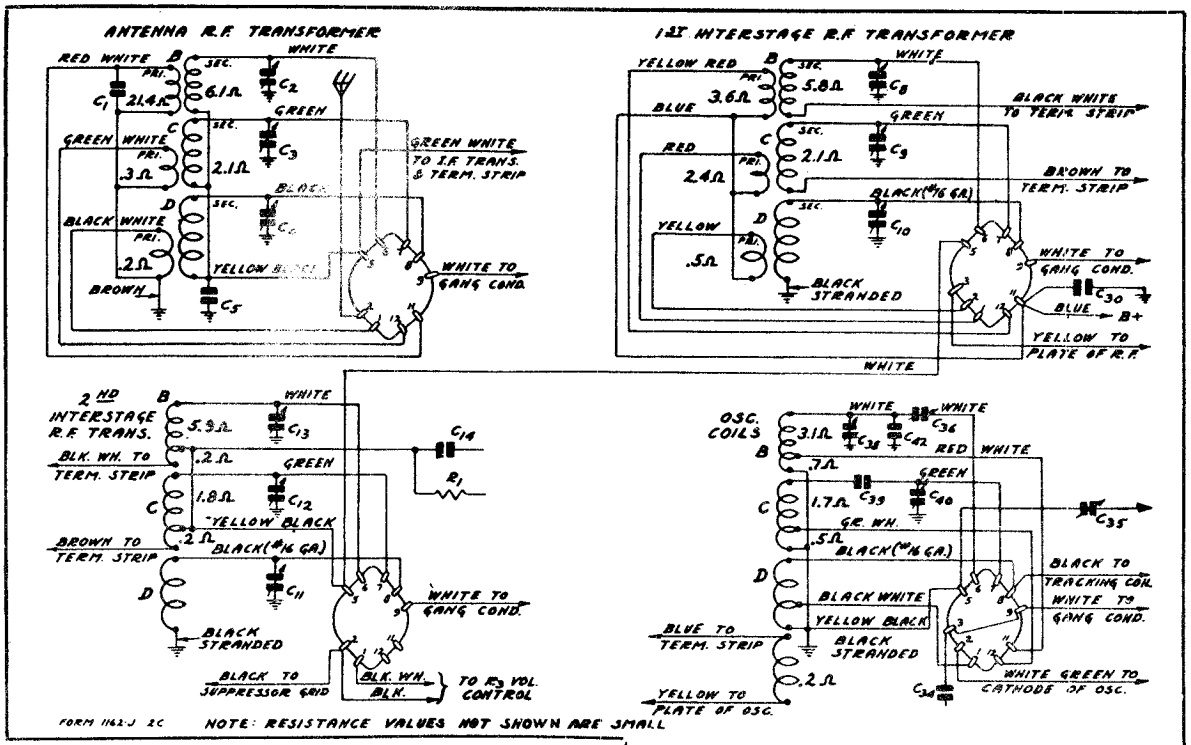
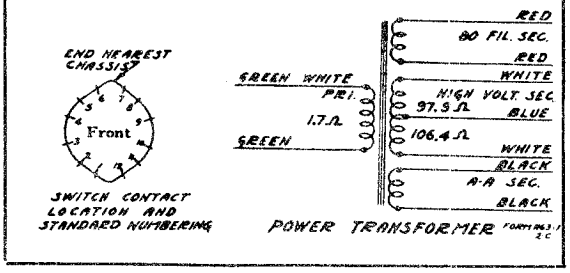

ANTENNA R.F. TRANSFORMER
1ST INTERSTAGE R.F. TRANSFORMER
2ND INTERSTAGE R.F. TRANS.
OSC. COILS
NOTE: RESISTANCE VALUES NOT SHOWN ARE SMALL

*Fig. 4—Color Coding of Coil Wires and D. C. Resistance of Windings. (Also see complete D. C. Resistance List)*



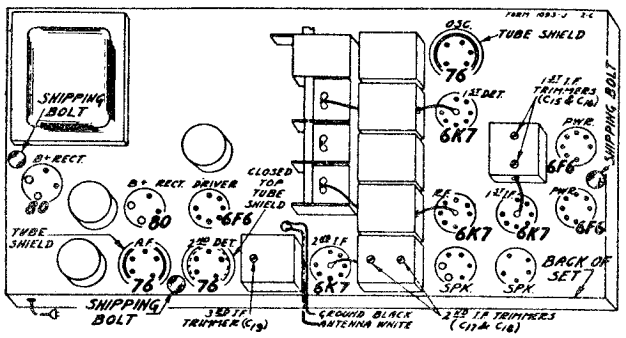




*Fig. 5—Location of Tubes*

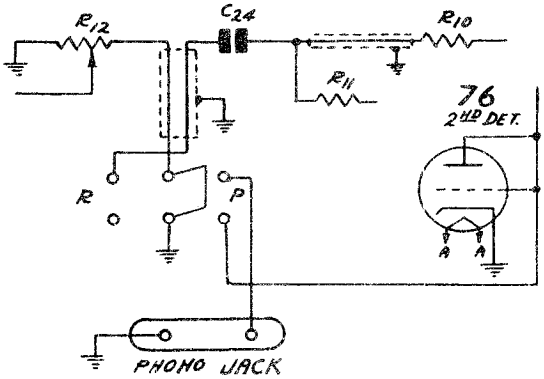



*Fig. 7—Phonograph Connections*

**VOLTAGES AT SOCKETS**
**Line Voltage 115 - Antenna Shorted to Ground**
**Volume Control at Maximum**

| Tube | Function | Across Heater | Plate to Ground | Screen to Ground | Cath. to Ground | Cath. M A |
|---|---|---|---|---|---|---|
| 6K7 | R. F. | 6.2 | 245 | 80 | 2.8 | 7.6 |
| 6K7 | 1st Det. | 6.2 | 245 | 90 | 6.5 | 2.6 |
| 76 | Osc. | 6.2 | 90 | | | 5.3 |
| 6K7 | 1st I. F. | 6.2 | 245 | 80 | 2.8 | 7.6 |
| 6K7 | 2nd I. F. | 6.2 | 245 | 74 | 3.9 | 7.0 |
| 76 | 2nd Det. | 6.2 | | | | |
| 76 | 1st A. F. | 6.2 | 110 | | 5.6 | 2.1 |
| 6F6 | Driver | 6.2 | 235 | 230 | 20.0(1) | 27.0 |
| 6F6 | Power | 6.2 | 345 | 345 | 38.0(2) | 22.5 |
| 80 | Rectifier | 5.1 | 500(3) | | | 140.0(4) |

(1) As read across R19
(2) Grid to Ground
(3) Plate to Center Tap
(4) Two tubes in parallel

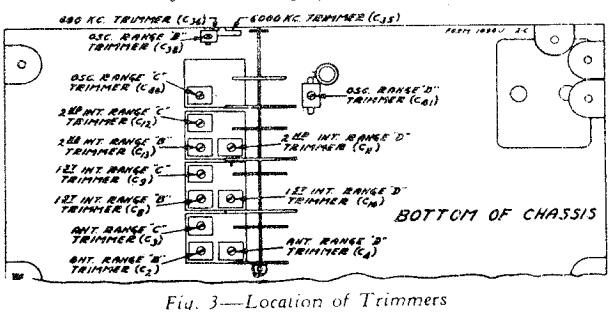



*Fig. 3—Location of Trimmers*

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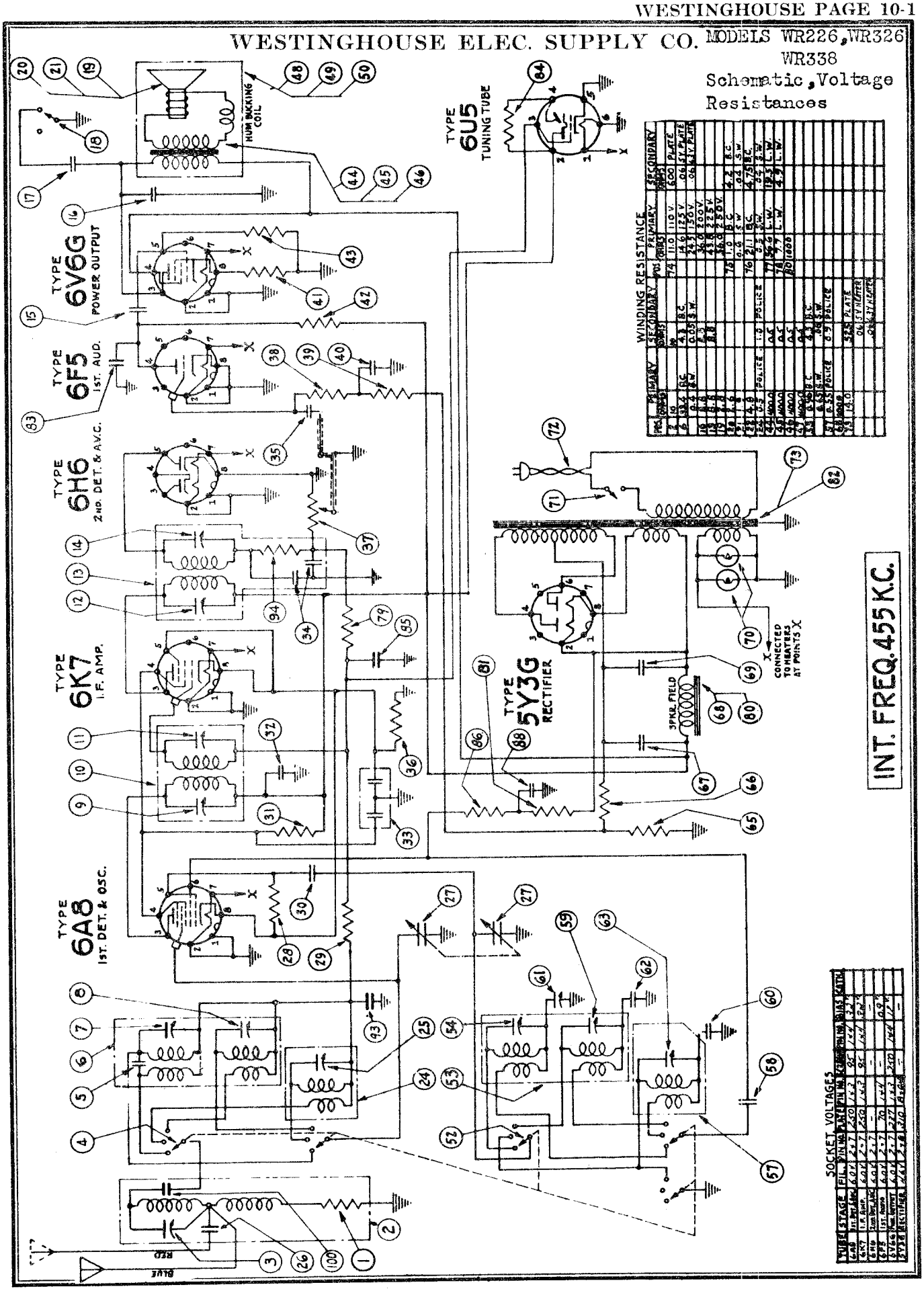
# WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR226, WR326
WR338
Schematic, Voltage
Resistances

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MODELS WR226,WR326
WR338

# WESTINGHOUSE ELEC. SUPPLY CO.

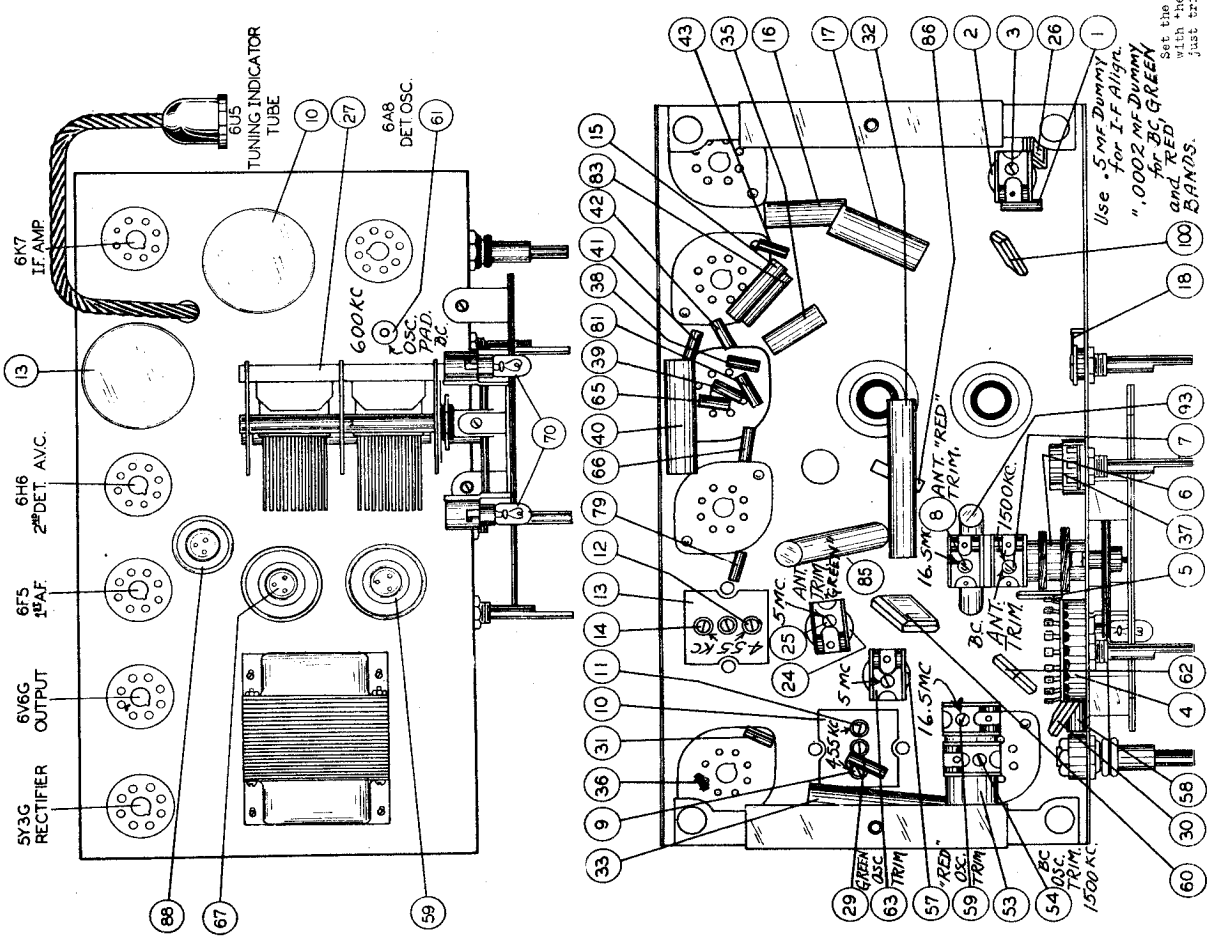
Socket,Trimmers,Parts
Alignment

SERVICE PARTS LIST

| Dia. # | Part # | Description of Parts |
|---|---|---|
| 1 | RE 3333 | 33,000 ohm, 1/2 W. resistor - part of RC 95326 |
| 2 | RC 95326 | Tap coil - part of RC 95326 |
| 3 | | Trimmer condenser 100-200 mmf. - part of RC 95326 |
| 4 | SW 9579 | Switch assembly |
| 5 | | .000005 mfd. mica condenser - part of RC 95302 |
| 6 | RC 95302 | Preselector coil |
| 7 | | Trimmer condenser 1.6-12 mmf. - part of RC 95302 |
| 8 | | Trimmer condenser 4-35 mmf. - part of RC 95302 |
| 9 | | Trimmer condenser - part of IC 95113 |
| 10 | IC 95113 | 1st I.F. coil (455 K.C.) |
| 11 | | Trimmer condenser - part of IC 95113 |
| 12 | | Trimmer condenser - part of IC 95114 |
| 13 | IC 95114 | 2nd I.F. coil (455 K.C.) |
| 14 | | Trimmer condenser - part of IC 95114 |
| 15 | CW 4-02 | .02 mfd., 400 V. condenser |
| 16 | CW 6-005 | .005 mfd., 600 V. condenser |
| 17 | CW 6-05 | .05 mfd., 600 V. condenser |
| 18 | SW 9573 | Tone control switch |
| 19 | DW 9529 | Speaker diaphragm (SK 9578) |
| 20 | DW 9527 | Speaker diaphragm (SK 9575) |
| 21 | DW 9534 | Speaker diaphragm (SK 9583) |
| 22 | RC 95304 | Preselector coil (police band) |
| 23 | | Trimmer condenser 1.6-12 mmf. - part of RC 95304 |
| 25 | | .000005 mfd. mica condenser - part of RC 95303 |
| 26 | | Gang condenser, 3 sections |
| 27 | CG 9567 | 47,000 ohm, 1/2 W. resistor |
| 28 | RE 4753 | 47,000 ohm, 1/2 W. resistor |
| 29 | RE 2243 | 22,000 ohm, 1/2 W. resistor |
| 30 | CW 4-005 | .005 mfd., 400 V. condenser |
| 31 | RW 4710 | 47,000 ohm, 1/2 W. resistor |
| 32 | CW 9535 | .1 mfd., 400 V. dual condenser |
| 33 | | .0001-.0001 mfd. condenser - part of IC 95114 |
| 34 | CW 2-02 | .02 mfd., 200 V. condenser |
| 35 | RE 2213 | 220 ohm, 1/2 W. resistor |
| 36 | VR 9548 | Volume control - .5 meg. |
| 37 | RE 1053 | 1 meg., 1/2 W. resistor |
| 38 | RE 4743 | 470,000 ohms, 1/2 W. resistor |
| 39 | CW 4-05 | .05 mfd., 400 V. condenser |
| 40 | RE 2713 | 270 ohm, 1/2 W. resistor |
| 41 | RE 2243 | 220,000 ohm, 1/2 W. resistor |
| 42 | RE 4743 | 470,000 ohm, 1/2 W. resistor |
| 43 | TR 95145 | Output transformer (6-1/2" speaker SK 9578) |
| 44 | TR 95143 | Output transformer (12" speaker SK 9575) |
| 45 | TR 95154 | Output transformer (10" speaker SK 9583) |
| 46 | SK 9578 | Speaker 6-1/2" |
| 48 | SK 9575 | Speaker 12" |
| 49 | SK 9583 | Speaker 10" |
| 50 | | Broadcast oscillator coil - part of RC 95303 |
| 53 | | Trimmer condenser 4-35 mmf. - part of RC 95303 |
| 54 | RC 95305 | Police oscillator coil |
| 57 | CW 4-02 | .02 mfd., 400 V. condenser |
| 58 | | Trimmer condenser 1.6-12 mmf. - part of RC 95303 |
| 59 | CM 9547 | .0016 mfd. mica condenser |
| 60 | CS 9565 | Oscillator series (lag) condenser 225-700 mmf. |
| 61 | CM 969 | .002 mfd. mica condenser |
| 62 | | Trimmer condenser 4-35 mmf. - part of RC 95305 |
| 65 | RE 1503 | 15 ohm, 1/2 W. resistor |
| 66 | RE 2703 | 27 ohm, 1/2 W. resistor |
| 67 | CE 9662 | 16 mfd., 300 V. electrolytic condenser |
| 68 | CL 9669 | Field coil (6-1/2" speaker SK 9578) |
| 69 | CS 9564 | 18 mfd., 450 V. electrolytic condenser |
| 70 | LP 9610 | Dial lamp - 6.3 V., .25 amp. |
| 71 | | Line switch - part of VR 9548 |
| 72 | CB 9512 | Power cable assembly |
| 73 | TR 95132 | Power transformer 105-125 V., 50-60 cycle |
| 75 | RE 4743 | 470,000 ohm, 1/2 W. resistor |
| 78 | CL 9567 | Field coil (12" speaker SK 9575 & 10" speaker SK9583) |
| 80 | RE 3353 | 33,000 ohm, 1/2 W. resistor |
| 81 | TR 95135 | Power transformer 105-125 V., 25 cycle |
| 82 | CW 6-001 | .001 mfd., 600 V. condenser |
| 83 | | 1 meg., 1/4 W. resistor - part of CB 95152 |
| 84 | CW 4-05 | .05 mfd., 400 V. condenser |
| 85 | RE 1033 | 10,000 ohm, 1/2 W. resistor |
| 86 | CE 9668 | 8 mfd., 450 V. electrolytic condenser |
| 88 | CW 4-05 | .05 mfd., 400 V. condenser |
| 93 | | 47,000 ohm, 1/2 W. resistor - part of IC 95114 |
| 94 | | .002 mfd. mica condenser |
| 100 | CM 959 | |

WAVE TRAP ADJUSTMENT

Set the test oscillator to 455 K.C. and with the signal applied to the antenna adjust trimmer condenser #3 to minimize the signal. Under actual operating conditions this trimmer may be adjusted slightly to minimize an interfering signal known to be on or near the 455 K.C. channel.

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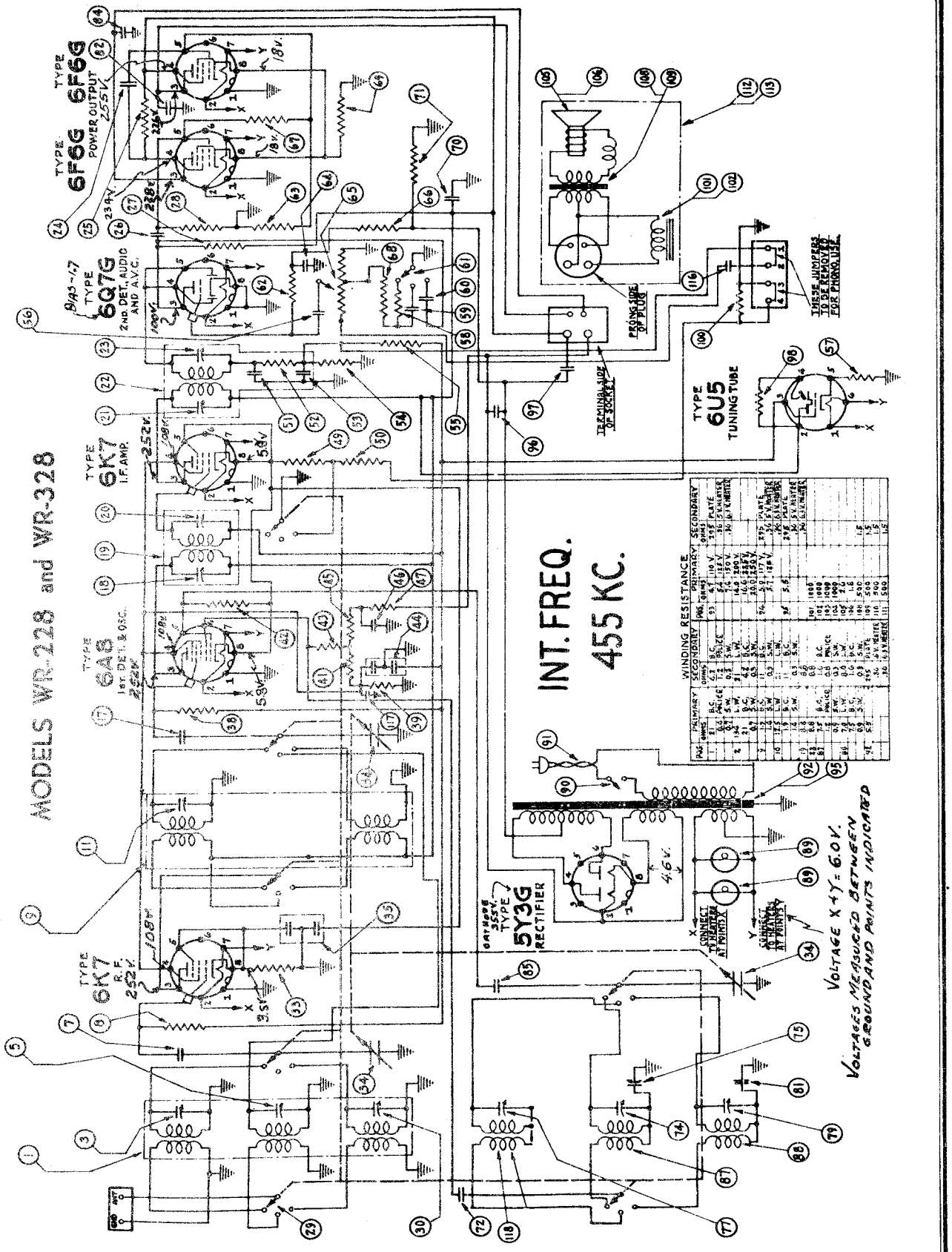
# WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR228, WR328
Schematic, Voltage
Resistances


MODELS WR-228 and WR-328
INT. FREQ. 455 KC.
TYPE 6F6G POWER OUTPUT 255V.
TYPE 6Q7G 2ND. DET., AUDIO AND A.V.C.
TYPE 6K7 I.F. AMP.
TYPE 6A8 1st. DET. & OSC.
TYPE 6K7 R.F.
TYPE 5Y3G RECTIFIER
TYPE 6U5 TUNING TUBE
TECHNICAL TYPE OF SOCKET
PHONO PLUG
THESE JUMPERS TO BE REMOVED FOR PHONO USE
WINDING RESISTANCE
PRIMARY
SECONDARY
VOLTAGES MEASURED BETWEEN GROUND AND POINTS INDICATED
VOLTAGE X + Y = 6.0 V.

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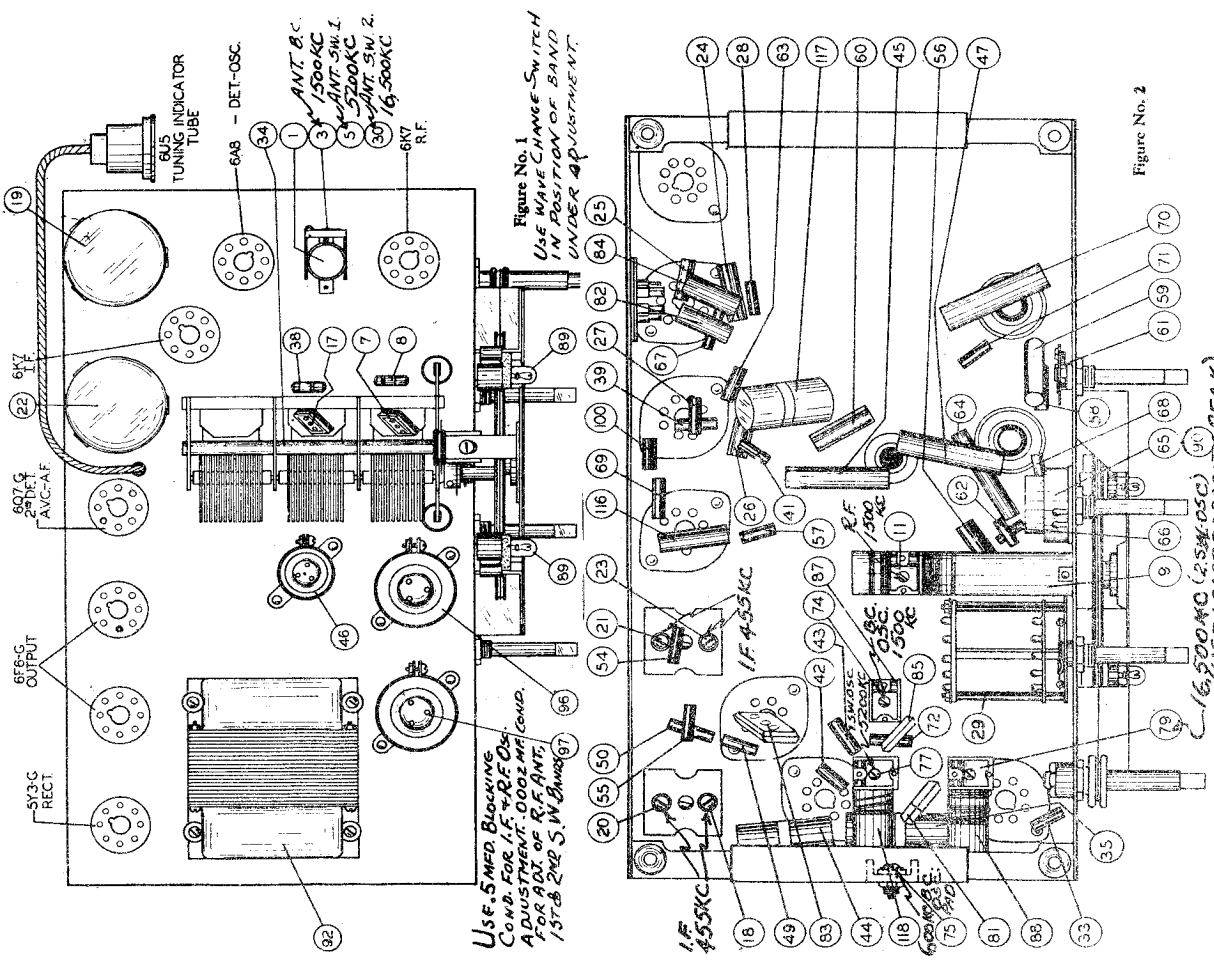
MODELS WR228, WR328
Socket, Trimmers
Aligument, Parts

# WESTINGHOUSE ELEC. SUPPLY CO.

| Dia. # | Part # | Description of Parts |
|---|---|---|
| 1 | RC 95306 | Antenna composite coil assembly |
| 3 | | Broadcast antenna trimmer - part of RC 95306 |
| 5 | | Police antenna trimmer - part of RC 95306 |
| 7 | CM 9519 | .0005 mfd. mica condenser |
| 8 | RE 2743 | 270,000 ohm, 1/2 W. resistor |
| 9 | RC 95307 | R.F. composite coil assembly |
| 11 | | Broadcast R.F. trimmer - part of RC 95307 |
| 17 | CM 9519 | .0005 mfd. trimmer condenser - part of IC 95119 |
| 18, 20 | | 1st I.F. trimmers - part of IC 95119 |
| 19 | | 1st I.F. transformer (less housing) |
| 21, 23 | | 2nd I.F. trimmers - part of IC 95120 |
| 22 | IC 95120 | 2nd I.F. transformer (less housing) |
| 24 | CW 4-01 | .01 mfd., 400 V. condenser |
| 25 | RE 1023 | 1000 ohm, 1/2 W. resistor |
| 26 | CW 4-02 | .02 mfd., 400 V. condenser |
| 27 | RE 1043 | 100,000 ohm, 1/2 W. resistor |
| 28 | RE 1843 | 180,000 ohm, 1/2 W. resistor |
| 29 | SW 9560 | Wave-change switch assembly |
| 30 | | Short-wave antenna trimmer - part of RC 95306 |
| 33 | RE 3913 | 390 ohm, 1/2 W. resistor |
| 34 | CG 9569 | Variable gang condenser |
| 35 | CW 9535 | .1 mfd.-.1 mfd., 400 V. dual condenser |
| 38 | RE 2743 | 270,000 ohm, 1/2 W. resistor |
| 39 | RE 6835 | 680,000 ohm, 1/2 W. resistor |
| 41 | RE 1033 | 150,000 ohm, 1/2 W. resistor |
| 42 | RE 4733 | 47,000 ohm, 1/2 W. resistor |
| 43 | RE 4723 | 4700 ohm, 1/2 W. resistor |
| 44 | CW 9535 | .1 mfd.-.1 mfd., 400 V. dual condenser |
| 45 | RE 103522 | 10,000 ohm, 2 W. resistor |
| 46 | CE 9568 | 8 mfd., 450 V. electrolytic condenser |
| 47 | RE 682522 | 6800 ohm, 2 W. resistor |
| 49 | RE 1513 | 150 ohm, 1/2 W. resistor |
| 50 | RE 1513 | 150 ohm, 1/2 W. resistor |
| 51 | CM 9513 | .0001 mfd. mica condenser |
| 52 | RE 4733 | 47,000 ohm, 1/2 W. resistor |
| 53 | CM 9513 | .0001 mfd. mica condenser |
| 54 | RE 4743 | 470,000 ohm, 1/2 W. resistor |
| 55 | RE 4743 | 470,000 ohm, 1/2 W. resistor |
| 56 | CW 4-02 | .02 mfd., 400 V. condenser |
| 57 | RE 2743 | 270 ohm, 1/2 W. resistor |
| 58 | RE 1043 | 100,000 ohm, 1/2 W. resistor |
| 59 | CW 4-002 | .002 mfd., 600 V. condenser |
| 60 | CW 4-02 | .02 mfd., 400 V. condenser |
| 61 | SW 9561 | Tone control switch |
| 62 | RE 2253 | 2.2 meg., 1/2 W. resistor |
| 63 | RR 4743 | 470,000 ohm, 1/2 W. resistor |
| 64 | CW 2-10 | .1 mfd., 200 V. condenser |
| 65 | VR 9566 | 2 meg., mid-tapped volume control |
| 66 | RE 4743 | 470,000 ohm, 1/2 W. resistor |
| 67 | RE 3343 | 330,000 ohm, 1/2 W. resistor |
| 68 | RE 1043 | 100,000 ohm, 1/2 W. resistor |
| 69 | RE 271522 | 270 ohm, 2 W. resistor |
| 70 | CW 4-10 | .1 mfd., 400 V. condenser |
| 71 | RR 1803 | 18 ohm, 1/2 W. resistor |
| 72 | CW 6-005 | .005 mfd., 600 V. condenser |
| 74 | | B.C. oscillator trimmer - part of RC 95308 |
| 75 | CS 9585 | B.C. oscillator lag condenser - part of RC 95309 |
| 77 | | Police oscillator trimmer - part of RC 95309 |
| 79 | CM 9545 | S.W. oscillator trimmer - part of RC 95310 |
| 81 | CW 6-002 | 4000 mmfd. mica condenser |
| 82 | CW 6-002 | .002 mfd., 600 V. condenser |
| 84 | CW 6-002 | .002 mfd., 600 V. condenser |
| 85 | CM 9513 | .0001 mfd. mica condenser |
| 87 | RG 95308 | Broadcast oscillator coil |
| 88 | RG 95310 | S.W. oscillator coil |
| 89 | CE 9510 | Line cord and plug assembly |
| 91 | CS 9612 | Line cord and plug, assembly |
| 92 | TR 95117 | Power transformer 105-125 V. 50-60 cycle |
| 93 | TR 95120 | Power transformer 105-125 V. 25 cycle |
| 96 | CE 9554 | 18 mfd., 450 V. electrolytic condenser |
| 97 | CE 9562 | 18 mfd., 300 V. electrolytic condenser |
| 98 | RM 1053 | 1 meg., 1/2 W. resistor |
| 100 | RB 1033 | 10,000 ohm, 1/2 W. resistor |
| 101 | CL 9574 | Field coil (8" speaker) |
| 102 | CL 9572 | Field coil (12" speaker) |
| 105 | DK 9632 | 8" speaker diaphragm |
| 106 | DN 9628 | 12" speaker diaphragm |
| 107 | TR 95153 | Output transformer (8" speaker) |
| 108 | TR 95160 | Output transformer (12" speaker) |
| 112 | SK 9581 | 8" speaker complete |
| 113 | SK 9585 | 12" speaker complete |
| 116 | CW 4-02 | .02 mfd., 400 V. condenser |
| 117 | CW 9535 | 1 mfd., 200 V. condenser |
| 118 | RG 95309 | Police oscillator coil |


6U5 TUNING INDICATOR TUBE
6A8 - DET-OSC.
6K7 R.F.
6K7 I.F.
6Q7-G 2nd DET. AVC-A.F.
6F6-G OUTPUT
5Y3-G RECT
ANT. B.C. 1500KC
ANT. SW 1. 5200KC
ANT. SW 2. 16,500KC
Figure No. 1
USE WAVE CHANGE SWITCH IN POSITION OF BAND UNDER ADJUSTMENT.
USE .5 MFD. BLOCKING COND. FOR I.F. & R.F. OSC. ADJUSTMENT. .0002 MF. COND. FOR ADJ. OF R.F. ANT. 1ST & 2ND S.W. BANDS
I.F. 455KC
R.F. 1500 KC
OSC. 1500 KC
OSC. 5200KC
OSC. 16,500KC (25 MC OSC.) (USE LEAST CAPACITY PEAK)
Figure No. 2

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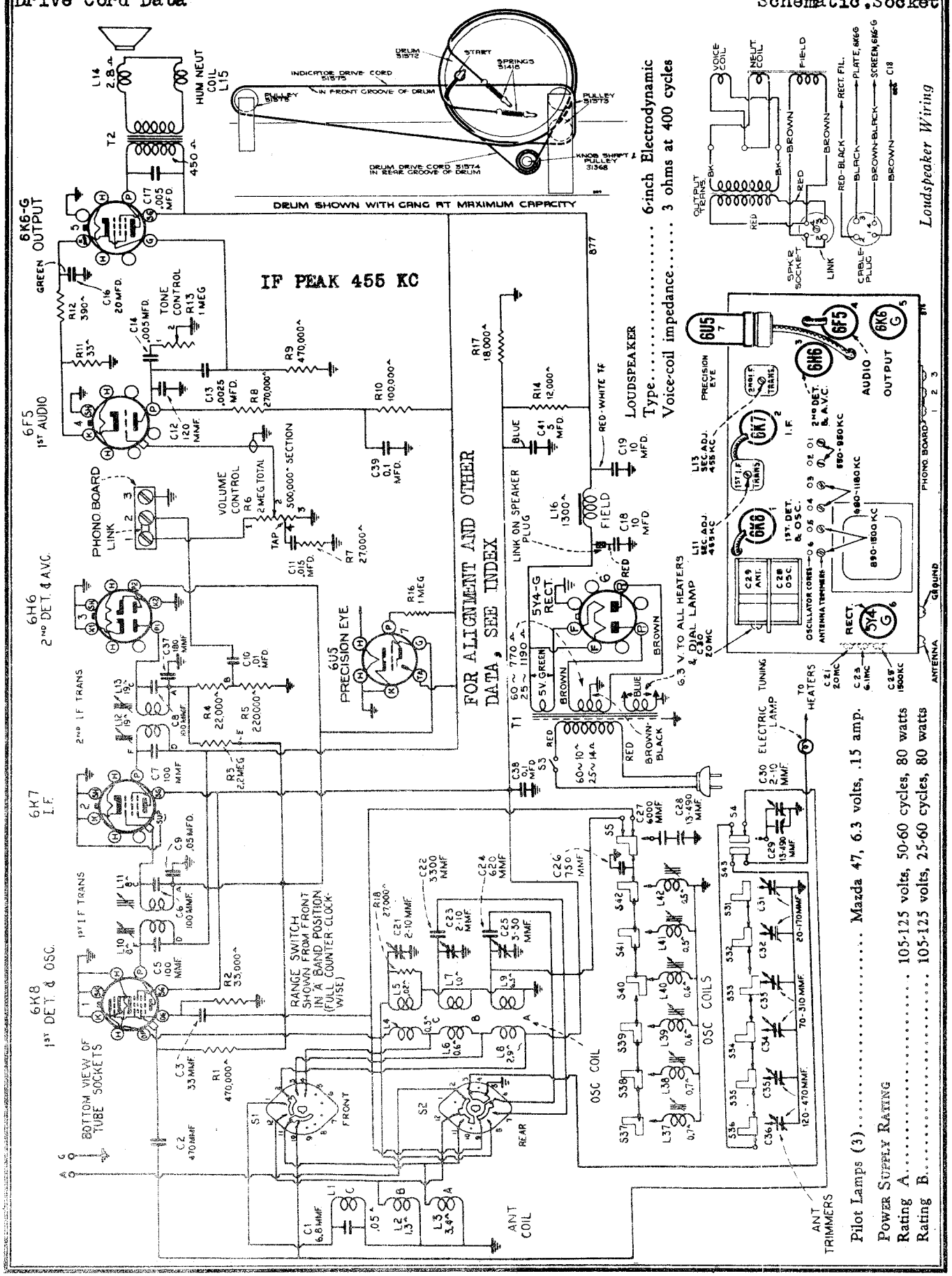
Trimmers, Speaker Drive Cord Data

# WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR264
Schematic, Socket




Pilot Lamps (3)..... Mazda 47, 6.3 volts, .15 amp.

Power Supply Rating
Rating A..... 105-125 volts, 50-60 cycles, 80 watts
Rating B..... 105-125 volts, 25-60 cycles, 80 watts

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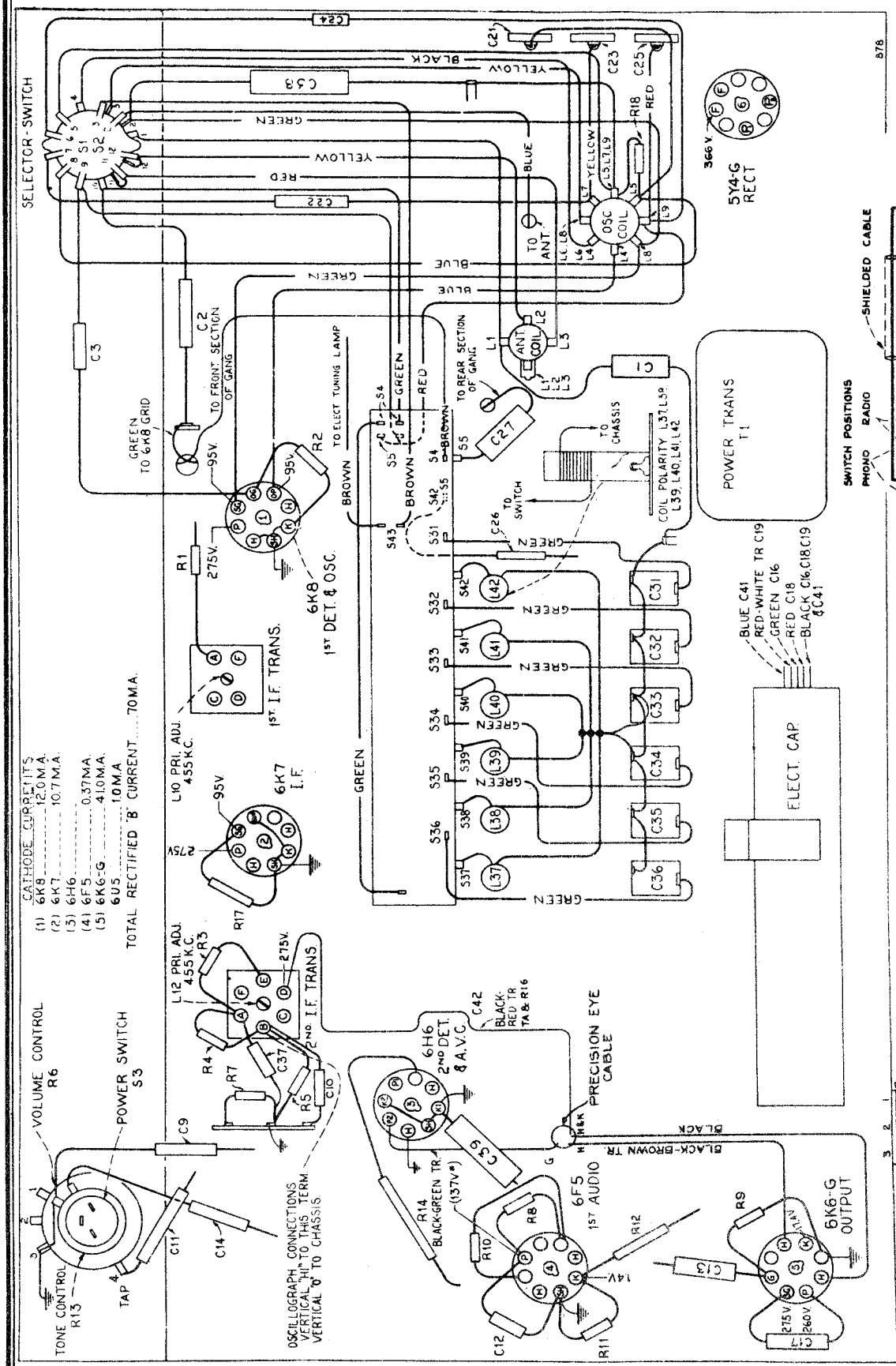
MODEL WR264
Chassis Wiring
Voltage

# WESTINGHOUSE ELEC. SUPPLY CO.




*Schematic of Phono Connections*

***NOTE:** Values with star (*) are operating voltages in circuits with high series resistance. The actual measured voltages will be lower, depending on the voltmeter loading.

**R-F Alignment Frequencies**

Measurements made to chassis unless otherwise indicated, with set tuned to quiet point and volume control at minimum. Values should hold within ±20% with 117-volt a-c supply.

"Short Wave" (C).. 20 mc (osc., ant.)
"Medium Wave" (B)..... 6.1 mc (osc.)
"Standard Broadcast" (A 1,500 kc (osc.)

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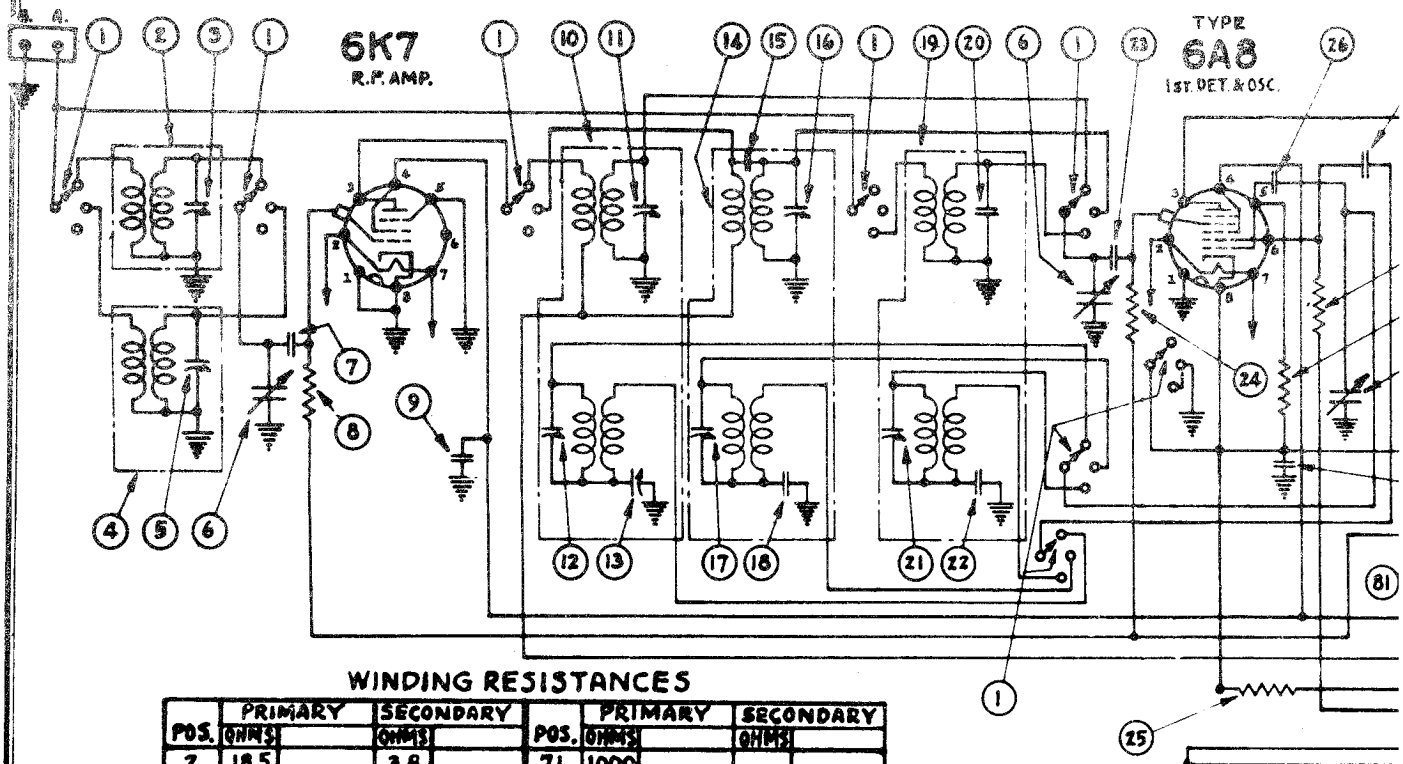


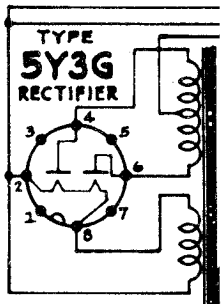


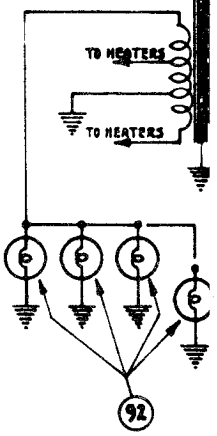


## WINDING RESISTANCES

| POS. | PRIMARY OHMS | | SECONDARY OHMS | | POS. | PRIMARY OHMS | | SECONDARY OHMS | |
|---|---|---|---|---|---|---|---|---|---|
| 2 | 18.5 | | 3.8 | | 71 | 1000 | | | |
| 4 | .73 | | .03 | | 72 | 560 | | .2 | |
| 10 | 1.7 | R.F. | 1.0 | R.F. | 73 | | | 1.7 | VOICE COIL |
| | 1.5 | OSC. | 3.1 | OSC. | 77 | 5.5 | | 295 | PLATE |
| 14 | 2.3 | R.F. | .03 | R.F. | | | | .11 | 5 V. HEATER |
| | .7 | OSC. | .03 | OSC. | | | | .06 | 6.3 V. HEATER |
| 19 | 2.9 | ANT. | .9 | ANT. | | | | | |
| | .5 | OSC. | .9 | OSC. | | | | | |
| 32 | 8.8 | | 8.8 | | | | | | |
| 39 | 8.8 | | 8.8 | | | | | | |

## TUBE VOLTAGES

| TUBE | STAGE | FIL. | PIN NO. | PLATE | PIN NO. | SCREEN | PIN NO. | CATH. | OSC. PLATE |
|---|---|---|---|---|---|---|---|---|---|
| 6K7 | R.F. AMP. | 6.0 | 2 TO 7 | 269 | 1 TO 3 | 100 | 1 TO 4 | | |
| 6A8 | 1ST. DET. | 6.0 | 2 TO 7 | 269 | 1 TO 3 | 100 | 1 TO 4 | 1.90 | 175 |
| 6K7 | I. F. AMP. | 6.0 | 2 TO 7 | 269 | 1 TO 3 | 100 | 1 TO 4 | 1.90 | |
| 6H6 | 2ND. DET. | 6.0 | 2 TO 7 | | | | | -3.5 | |
| 6F5 | 1ST. AUDIO | 6.0 | 2 TO 7 | 138 | 1 TO 4 | | | | |
| 6C5 | INVERTER | 6.0 | 2 TO 7 | 184 | 1 TO 3 | | | 4.5 | |
| 6F6 | POWER OUTPUT | 6.0 | 2 TO 7 | 261 | 1 TO 3 | 269 | 1 TO 4 | 17.2 | |
| 6F6 | POWER OUTPUT | 6.0 | 2 TO 7 | 261 | 1 TO 3 | 269 | 1 TO 4 | 17.2 | |
| 6U5 | TUNING | 6.0 | 1 TO 6 | 261 | G TO 2 | | | | |
| 5Y3 | RECTIFIER | 4.6 | 2 TO 8 | | | | | 379 | |
| 5Y4 | RECTIFIER | 4.6 | 7 TO 8 | | | | | 379 | |

VOLTAGES TAKEN WITH BROADCAST BAND IN OPERATION.
TAKEN WITH 1,000 OHMS PER VOLT VOLTMETER.

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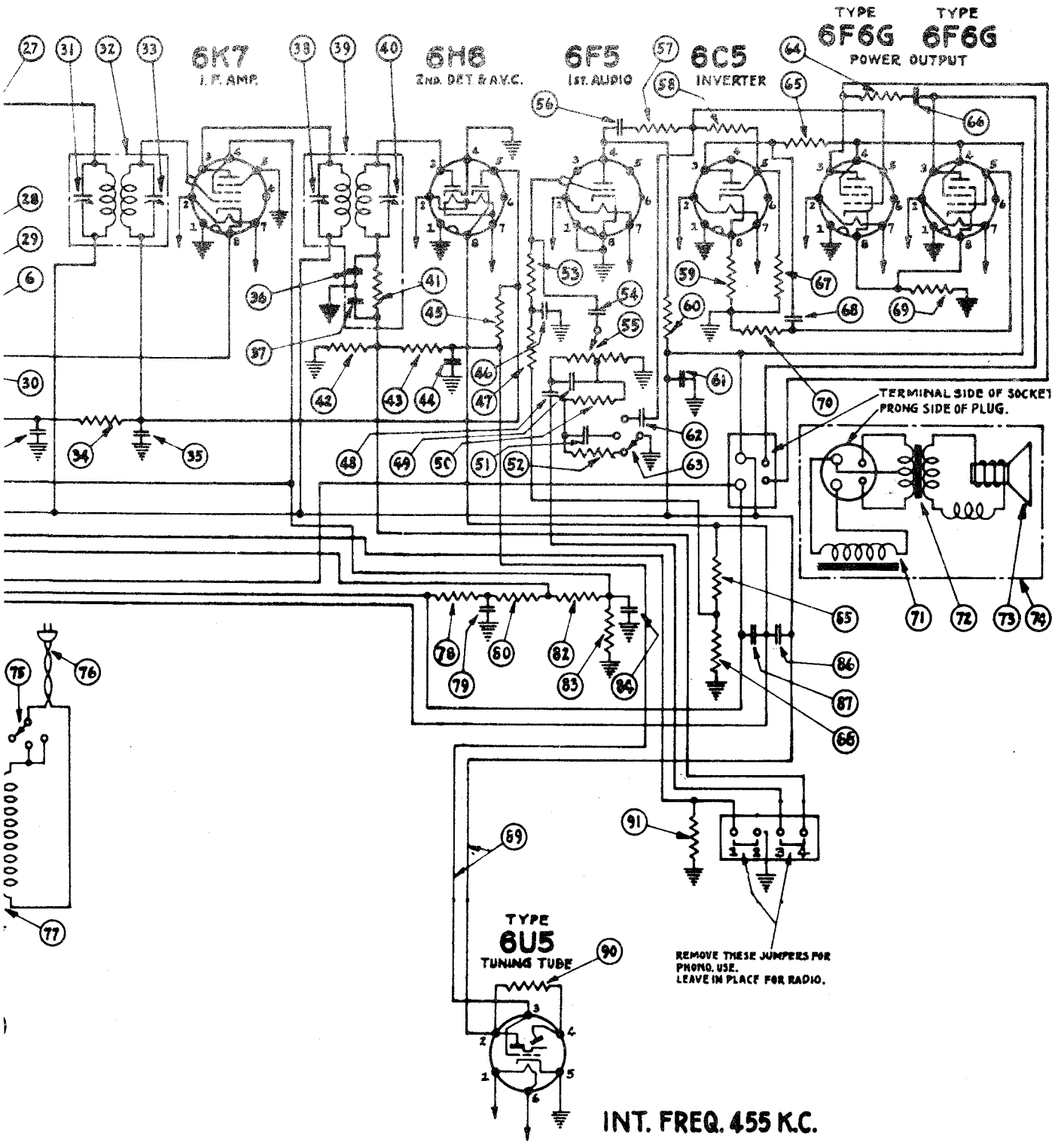
ELEC. SUPPLY CO.

MODEL WR330
Schematic, Voltage
Resistances



# WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR330
Socket, Trimmers
Alignment, Parts

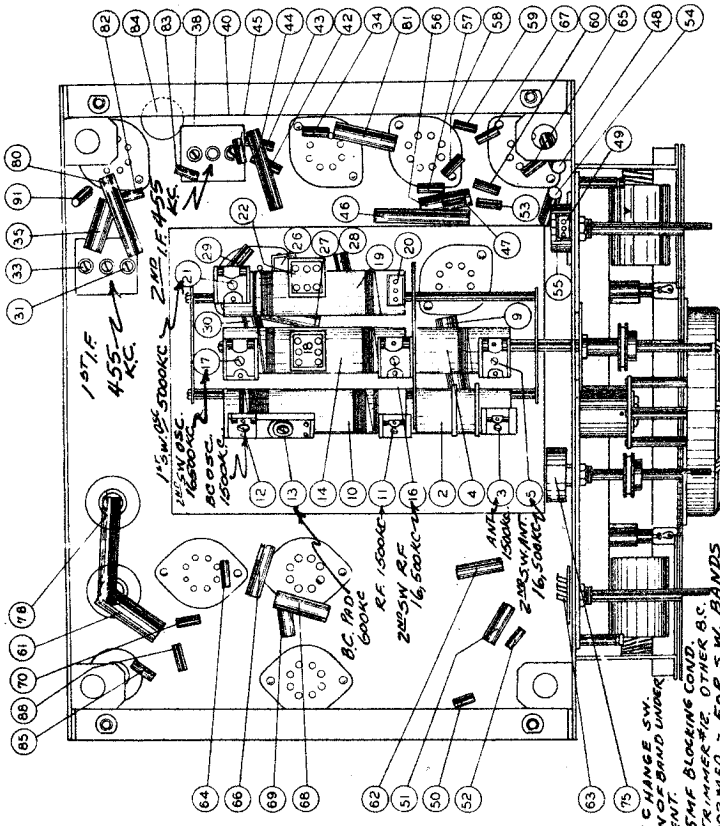

1st I.F. 455 K.C.
2nd I.F. 455 K.C.
1st SW OSC. 1500KC
2nd SW OSC. 1500KC
BC OSC. 1500KC
BC PROS 600KC
R.F. 1500KC
2nd SW R.F. 16,500KC
ANT. 1500KC
2nd SW ANT. 16,500KC
USE WAVE CHANGE SW. IN POSITION FOR BAND UNDER ADJUSTMENT. OTHER B.C. AND S.W. BANDS ADJ. ~.0002MFD. CONDS. IN SERIES WITH 400 OHM RES. (EQUIV. OF SW ANT.)
IF-USE SW. BLOCKING COND. B.C. TRIMMER. FOR S.W. BANDS USE ~.0002MFD CONDS. IN SERIES WITH ANT.

Figure No. 2

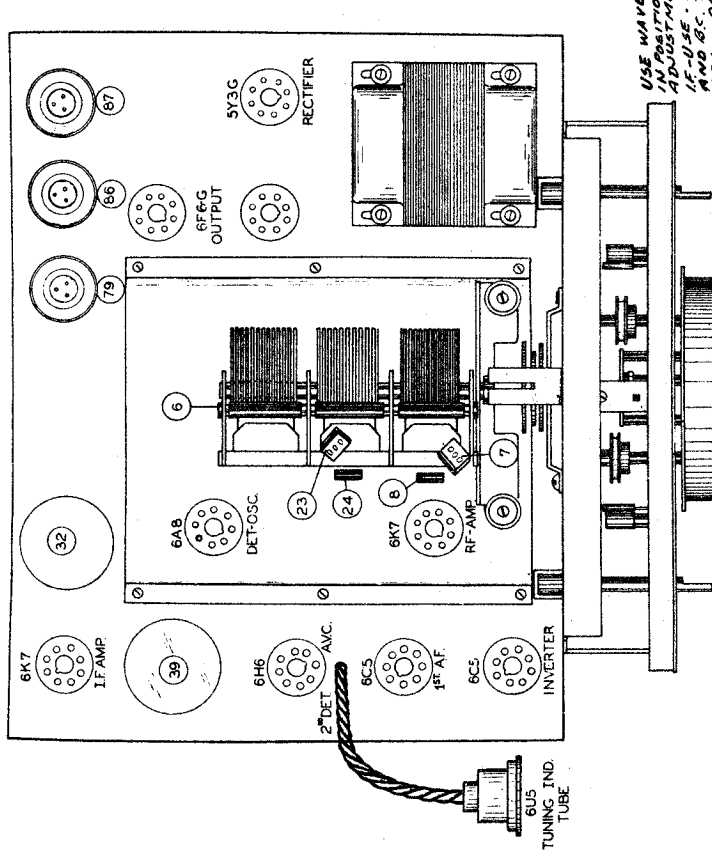



Figure No. 1

| Dia. # | Part # | | | | | |
|---|---|---|---|---|---|---|
| 1 | SW 9586 | Wave change switch assembly | 32 | IC 95119 | 1st I.F. transformer | 65 |
| 2 | RC 95311 | B.C. antenna coil assembly | 34 | RE 4743 | 470,000 ohm, 1/2 W. resistor | 66 |
| 3 | | 4-35 mmf. trimmer - part of RC 95311 | 35 | CW 4-05 | .05 mfd., 400 V. condenser | 66 |
| 4 | RC 95312 | S.W. antenna coil assembly | 36-37 | | 100 mmf. mica condenser - part of IC 95121 | 57 |
| 5 | | 4-35 mmf. trimmer - part of RC 95312 | 38-40 | | 80-200 mmf. trimmers - part of IC 95121 | 68 |
| 6 | CG 9566 | Variable condenser gang | 39 | IC 95121 | 2nd I.F. transformer | 69 |
| 7 | CM 9519 | .0005 mfd. mica condenser | 41 | RE 4733 | 47,000 ohm, 1/2 W. resistor | 70 |
| 8 | RE 1045 | 100,000 ohm, 1/2 W. resistor | 42 | RE 4745 | 470,000 ohm, 1/2 W. resistor | 71 |
| 9 | CW 4-10 | .1 mfd., 400 V. condenser | 43 | RE 1033 | 1 meg., 1/2 W. resistor | 72 |
| 10 | RC 95317 | B.C. composite coil assembly | 44 | CW 4-10 | .1 mfd., 400 V. condenser | 73 |
| 11 | | 4-35 mmf. trimmer - part of RC 95317 | 45 | RE 1033 | 1 meg., 1/2 W. resistor | 74 |
| 12 | | 4-25 mmf. trimmer - part of RC 95317 | 46 | CW 4-10 | .1 mfd., 400 V. condenser | 75 |
| 13 | | 300-800 mmf. trimmer - part of RC 95317 | 47 | RE 4743 | 470,000 ohm, 1/2 W. resistor | 76 |
| 14 | RC 95315 | S.W. composite coil assembly | 48 | CW 4-02 | .02 mfd., 400 V. condenser | 77 |
| 15 | | 10 mmf. mica condenser - part of RC 95315 | 49 | CM 9518 | 75 mmf. mica condenser | 78 |
| 16-17 | | 4-35 mmf. trimmers - part of RC 95315 | 50 | RE 1043 | 100,000 ohm, 1/2 W. resistor | 79 |
| 18 | | 5400 mmf. mica condenser - part of RC 95315 | 51 | CW 6-002 | .002 mfd., 600 V. condenser | 80 |
| 19 | RC 95314 | Police composite coil assembly | 52 | RE 1043 | 100,000 ohm, 1/2 W. resistor | 81 |
| 20 | | 10 mmf. mica condenser - part of RC 95314 | 53 | RE 2253 | 2.2 megs., 1/2 W. resistor | 82 |
| 21 | | 4-35 mmf. trimmer - part of RC 95314 | 54 | CW 4-02 | .02 mfd., 400 V. condenser | 83 |
| 22 | | 1100 mmf. mica condenser - part of RC 95314 | 55 | VR 9555 | 2 meg. - mid tapped volume control | 84 |
| 23 | CM 9519 | .0005 mfd. mica condenser | 56 | CW 4-02 | .02 mfd., 400 V. condenser | 85 |
| 24 | RE 1045 | 100,000 ohm, 1/2 W. resistor | 57 | RE 4733 | 47,000 ohm, 1/2 W. resistor | 86 |
| 25 | RE 1513 | 150 ohm, 1/2 W. resistor | 58 | RE 3943 | 390,000 ohm, 1/2 W. resistor | 87 |
| 26 | CM 9518 | .0001 mfd. mica condenser | 59 | RE 5613 | 560 ohm, 1/2 W. resistor | 88 |
| 27 | CW 4-01 | .01 mfd., 400 V. condenser | 60 | RE 2243 | 220,000 ohm, 1/2 W. resistor | 89 |
| 28 | RE 562412 | 5,600 ohm, 1 W. resistor | 61 | CW 4-10 | .1 mfd., 400 V. condenser | 90 |
| 29 | RE 4733 | 47,000 ohm, 1/2 W. resistor | 62 | CW 4-01 | .01 mfd., 400 V. condenser | 91 |
| 30 | CW 2-05 | .05 mfd., 200 V. condenser | 63 | SW 9578 | Tone control switch | 92 |
| 31-33 | | 80-200 mmf. trimmers - part of IC 95119 | 64 | RE 223522 | 22,000 ohm, 2 W. resistor | |
| | | | | RE 1033 | 10,000 ohm, 1/2 W. resistor | |
| | | | | CW 6-001 | .001 mfd., 600 V. condenser | |
| | | | | RE 6833 | 68,000 ohm, 1/2 W. resistor | |
| | | | | CW 4-02 | .02 mfd., 400 V. condenser | |
| | | | | RE 271522 | 270 ohm, 2 W. resistor | |
| | | | | RE 4743 | 470,000 ohm, 1/2 W. resistor | |
| | | | | CL 9572 | Speaker field coil | |
| | | | | TR 95150 | Speaker output transformer | |
| | | | | DM 9528 | Speaker diaphragm assembly (12") | |
| | | | | SK 9585 | Speaker complete (12") | |
| | | | | SW 9577 | Line switch | |
| | | | | CB 9512 | Line cable and plug assembly | |
| | | | | TR 95121 | Power transformer - 105-125 volts, 50-60 cycles | |
| | | | | RE 682522 | 6800 ohm, 2 W. resistor | |
| | | | | CE 9528 | 8 mfd., 450 V. electrolytic condenser | |
| | | | | RE 103522 | 10,000 ohms, 2 W. resistor | |
| | | | | CW 4-05 | .05 mfd., 400 V. condenser | |
| | | | | RE 1033 | 10,000 ohm, 1/2 W. resistor | |
| | | | | RE 6833 | 68000 ohm, 1/2 W. resistor | |
| | | | | CW 4-50 | .5 mfd., 400 V. condenser | |
| | | | | RE 1803 | 18 ohm, 1/2 W. resistor | |
| | | | | CE 9562 | 18 mfd., 300 V. electrolytic condenser | |
| | | | | CE 9554 | 18 mfd., 450 V. electrolytic condenser | |
| | | | | RE 1803 | 18 ohm, 1/2 W. resistor | |
| | | | | CB 95151 | Cable and socket for tuning tube | |
| | | | | | 1 meg. resistor - part of CB 95151 | |
| | | | | RE 223522 | 22,000 ohm, 2 W. resistor . | |
| | | | | LP 9510 | Dial light - 6.3 V., .25 amp. | |

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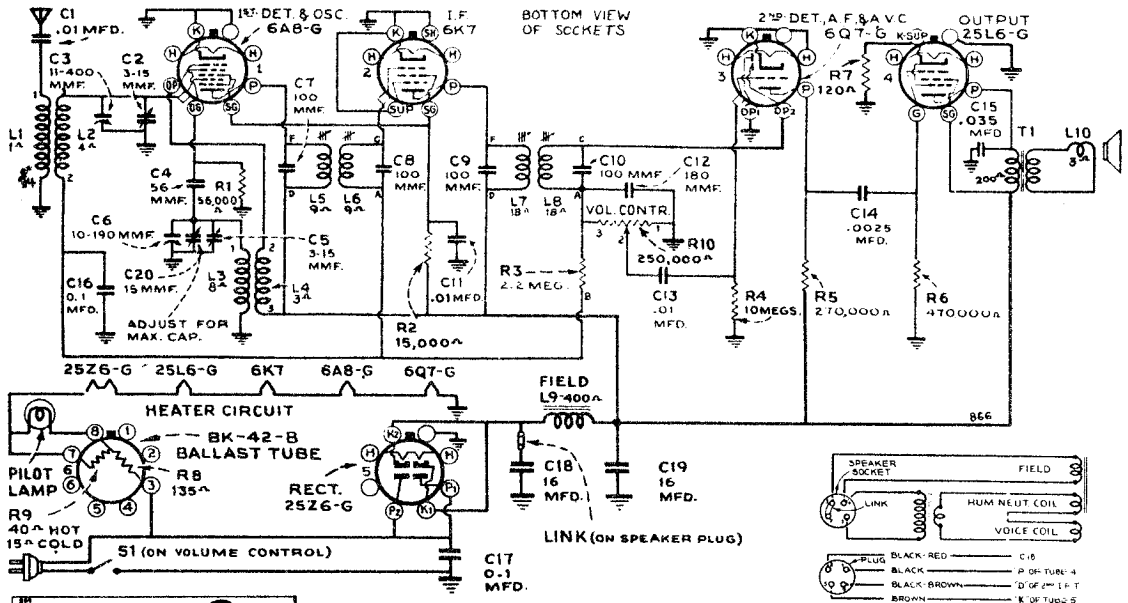
MODEL WR154
Schematic, Voltage
Alignment, Trimmers
Socket, Data

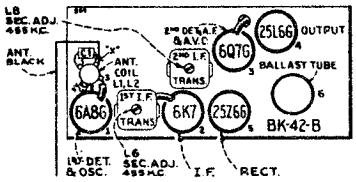
# WESTINGHOUSE ELEC. SUPPLY CO.

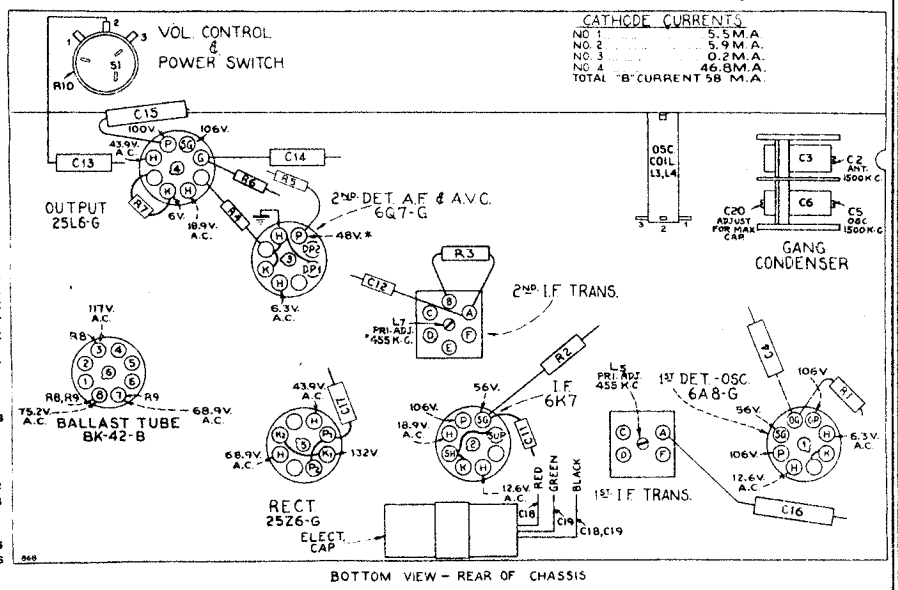






SPEAKER PLUG CONNECTIONS




BOTTOM VIEW – REAR OF CHASSIS

Frequency Range..... 540 to 1,720 kc
R-F Alignment Frequency.. 1,500 kc (osc., ant.)
Intermediate Frequency..... 455 kc

TUBE COMPLEMENT

(1) RCA-6A8-G..... First-Det., Osc.
(2) RCA-6K7..... Intermediate Amp.
(3) RCA-6Q7-G..... Second-Det., A-F, A.V.C.
(4) RCA-25L6-G..... Power Output
(5) RCA-25Z6-G..... Rectifier
(6) BK-42-B..... Ballast

Dial lamp.... Mazda No. 47, 6.3 volts, 0.15 amp.

POWER OUTPUT (125-volt, 60-cycle supply)

Undistorted..... 1.0 watt
Maximum..... 1.5 watts

LOUDSPEAKER

Type..... 5-inch Electrodynamic
Voice-coil Impedance..... 3.4 ohms at 400 cycles

POWER SUPPLY RATINGS

A-C Rating. 105-125 volts, 50-60 cycles, 50 watts
D-C Rating..... 105-125 volts, 50 watts

### Precautionary Lead Dress

1. Keep power cord close to chassis base and away from volume control.
2. Keep speaker leads close to chassis and away from volume control and 25L6-G socket.
3. Keep black wire from 2nd i-f transformer to volume control close to front apron and away from other parts.
4. Keep pilot lamp leads close to chassis base.
5. Keep 6Q7-G grid lead away from dial lamp.

*Figure 2—Tube Socket Voltages and Location of Parts*

* Note: Values with star (*) are operating voltages.
Values not starred are actual measured voltages.

Measurements made to chassis unless otherwise indicated.
Measurements made with set tuned to quiet point, volume control at minimum, using 1,000-ohm-per-volt meter, having ranges of 10, 50, 250, and 500 volts. (Use nearest range above the specified measured voltage).
Values should hold within approximately ± 20% for 117-volt 60-cycle supply. On d-c, voltages are approximately 10% lower except heaters which remain the same.

## Alignment Procedure

CAUTION: The chassis is connected to one side of the power supply. Avoid contact of chassis or parts to external ground when servicing.

Output meter alignment.—Connect the meter across the speaker voice-coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis through a 0.1 mfd. capacitor.

Pre-setting dial.—With gang condenser in full mesh, move dial pointer to coincide with horizontal lines. This is a friction adjustment.

Re-sealing i-f adjusting screws.—After completion of alignment, seal the i-f adjusting screws with a few drops of household cement.

Note 1.—Reel up the antenna wire and connect the high side of test oscillator through an 80-mmfd. capacitor to terminal "X" on antenna coil (see top view).

25-cycle operation.—For operation with 25-cycle power supply, connect a 16-mfd., 150-volt dry electrolytic capacitor (Part No. 31323) in parallel with C18.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| No. 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | Quiet point between 550-750 kc | L7 and L8 (2nd I-F Transformer) |
| No. 2 | 6A8-G 1st-det. grid cap, in series with .01 mfd. | 455 kc | | L5 and L6 (1st I-F Transformer) |
| No. 3 | See Note 1 | 1,500 kc | 1,500 kc | C5* (oscillator) C2 (antenna) |

* Trimmer C20 on gang condenser should be screwed clockwise for maximum capacity before adjusting C5.

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Transformer Data
Pick-up, Motor Coils

# WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR472
Schematic, Voltage
Socket, Trimmers

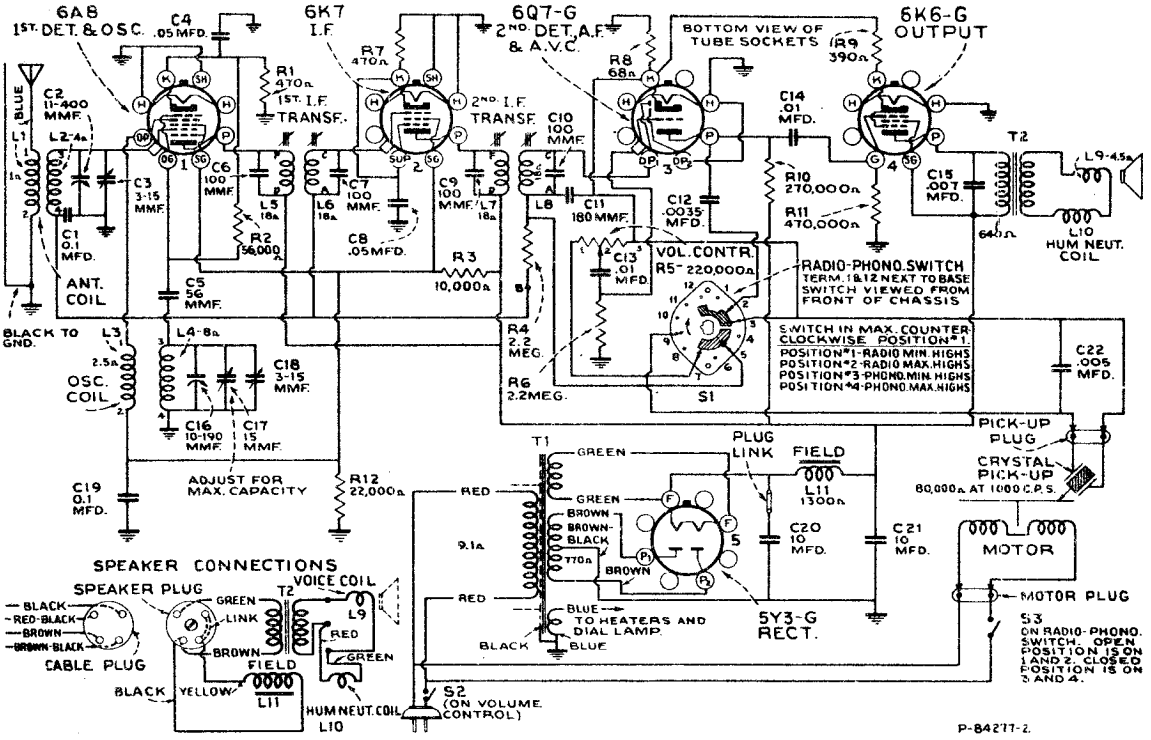


*Figure 4—Schematic Circuit Diagram*

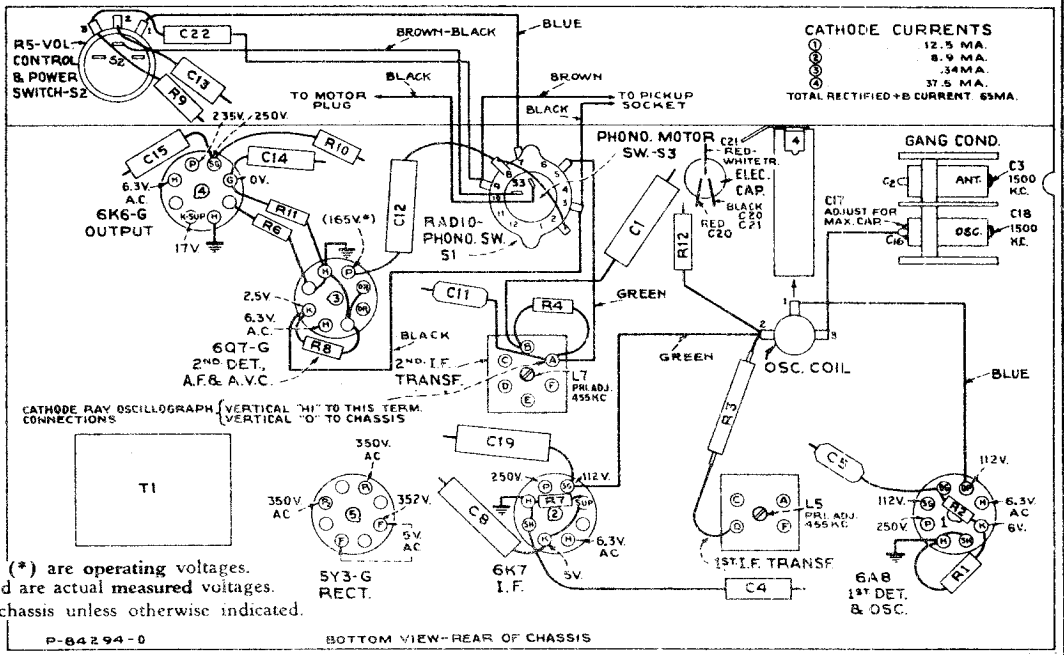


*Figure 3—Tube Socket Voltages*

* **Note:** Values with star (*) are **operating** voltages.
Values not starred are actual **measured** voltages.
Measurements made to chassis unless otherwise indicated.

*Figure 1—Connections for No. 30888 Replacement Transformer*

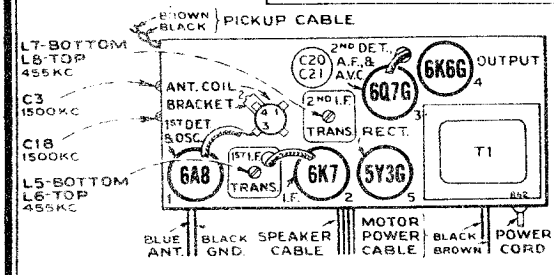


*Figure 2—Tube and Trimmer Locations*

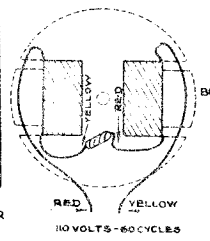


*Figure 5—Motor Coil Connections*

D-C resistance of each coil (for 110 volts, 50 and 60 cycles) is approximately 82 ohms.

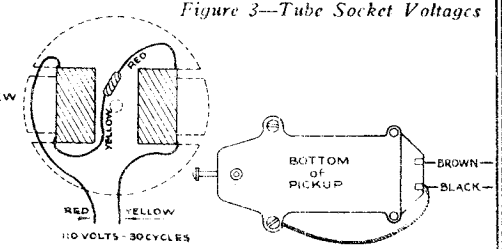


*Figure 6—Pickup Connections*

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## MODEL WR-472 PHONOGRAPH MOTOR SERVICE DATA

**The synchronous motor used in this instrument is designed to be simple and foolproof. Among its many features are constancy of speed, low power consumption, single moving part, ease of starting, rubber damper, ease of repair, and long life. The parts that may require attention are plainly shown in figure 1. The motor is started by turning "on" the power switch and giving the turntable a clockwise spin with the hand. Smooth starting and running will be insured by keeping the bearings well cleaned and oiled.**

**Hum and Vibration.**—A small amount of hum when starting, decreasing to a negligible amount when running, is normal. If excessive vibration occurs it may be due to:

1. Insufficient lubrication, or any failure that will cause binding.
2. Leather washer not oiled. (Check to make certain that the leather washer is above the steel washer.)
3. Motor not properly supported from motor board.
4. Burrs on poles of rotor or stator. Remove with fine emery cloth.

**Removing Rotor.**—The rotor and turntable assembly simply rests on the ball bearing at bottom of vertical bearing. Remove by lifting up.

**Rotor Adjustment.**—Loosen the three screws that hold the rotor to the turntable, insert three 16-mil shims at equal distances around the gap between the rotor and stator, and then carefully tighten the three screws. The top of rotor must be flush with top of stator; add additional steel washers beneath the stator if necessary.

**Lubrication.**—Oiling points are indicated in figure 1.

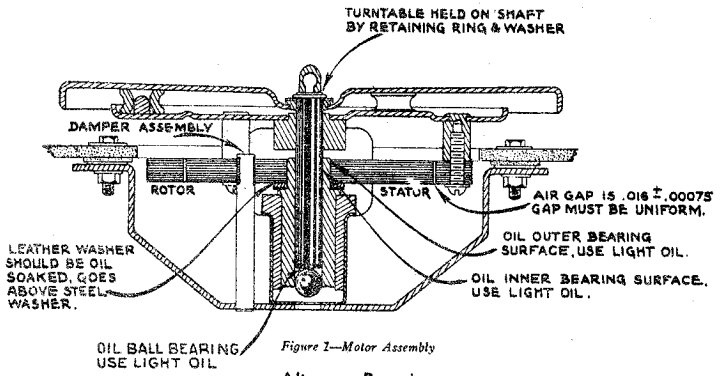

TURNTABLE HELD ON SHAFT BY RETAINING RING & WASHER
DAMPER ASSEMBLY
ROTOR
STATOR
AIR GAP IS .016 ± .0007 5 GAP MUST BE UNIFORM.
OIL OUTER BEARING SURFACE, USE LIGHT OIL.
OIL INNER BEARING SURFACE, USE LIGHT OIL.
LEATHER WASHER SHOULD BE OIL SOAKED, GOES ABOVE STEEL WASHER.
OIL BALL BEARING USE LIGHT OIL

*Figure 1—Motor Assembly*

## Alignment Procedure

**Cathode-ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing.

**Output meter alignment.**—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-oscillator.**—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

### Precautionary Lead Dress

1. Dress power leads to phono motor switch away from the audio wiring.
2. Dress power cord and motor cable to end of chassis (free from volume control wiring).
3. Dress pilot lamp lead away from 6Q7G grid.
4. Capacitors C13 and C15 (located at volume control) must be dressed at right angles to each other and as far apart as possible.

**Pre-setting dial.**—With gang condenser in full mesh, move dial pointer to coincide with horizontal lines. This is a friction adjustment.

**Re-sealing I.F. Adjustment Screws.**—After completion of alignment, seal the I.F. core adjustment screws with a few drops of household cement.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| No. 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | Quiet point between 550-750 kc | L7 and L8 (2nd I-F Transformer) |
| No. 2 | 6A8 1st-det. grid cap, in series with .01 mfd. | 455 kc | | L5 and L6 (1st I-F Transformer) |
| No. 3 | Antenna lead, in series with 200 mmfd. | 1,500 kc | 1,500 kc | C18* (osc.) C3 (antenna) |

* Trimmer C17 on gang condenser should be screwed clockwise for maximum capacity before adjusting C18

Frequency Range..... 540-1,720 kc
R-F Alignment Frequency..... 1,500 kc (osc., ant.)
Intermediate Frequency..... 455 kc

TUBE COMPLEMENT

(1) RCA-6A8..... First Det., and Osc.
(2) RCA-6K7..... Intermediate Amp.
(3) RCA-6Q7-G..... Second Det., A-F, and A.V.C.
(4) RCA-6K6-G..... Power Output
(5) RCA-5Y3-G..... Rectifier
Dial Lamp..... Mazda No. 44, 6.3 volts, 0.25 amp.

POWER OUTPUT (125-volt, a-c supply)

Undistorted..... 2.0 watts
Maximum..... 3.5 watts

LOUDSPEAKER

Type..... 5 inch electrodynamic
V-C impedance..... 5 ohms at 400 cycles

POWER SUPPLY RATINGS

Rating A-6..... 105-125 volts, 60 cycles, 80 watts
Rating A-5..... 105-125 volts, 50 cycles, 80 watts

PHONOGRAPH..... Synchronous (manual starting)
Records..... 10-inch and 12-inch, 78 r.p.m.
Pickup..... Crystal, 80,000 ohms at 1,000 c.p.s.
Average Output of Pickup..... 1½-volts, at 1,000 c.p.s. across ¼ meg. load

## MODEL WR-264

**Phonograph Terminal Board.**—A 3-terminal board is located on the rear of the chassis for connecting a phonograph pickup, or Record Player, into the audio amplifier of the receiver. The above schematic shows connections for a high-impedance pickup with a switch for changing from radio to records. For low-impedance pickups, a suitable step-up transformer should be used to provide proper impedance matching, and should be connected between the pickup and radio-phono switch. The volume control is optional.

**Loudspeaker.**—The loudspeaker voice-coil may be centered in the normal manner by using three narrow feelers to obtain equal spacing of the air-gap. The dust cover must be removed before centering, and may be done by gently cutting it free from the cone, being careful not to cut or damage the cone while doing so.

### Precautionary Lead Dress.—

1. Dress power-switch leads against left apron to prevent hum pickup.
2. Dress R1 away from front of chassis.
3. Electric-tuning lamp leads must be dressed in front of range switch.
4. Dress lead from L5 to range switch away from other leads.
5. Dress leads away from antenna coil.
6. Dress other parts and leads away from R14, as it becomes heated.
7. Leads across back of chassis should be dressed under electrolytic to prevent approaching phono board.
8. Keep leads of C27 as short as possible.

FREQUENCY RANGES

"Standard Broadcast" (A)..... 540-1,720 kc
"Medium Wave" (B)..... 2.3-7 mc
"Short Wave" (C)..... 7-22 mc

**Calibration Scale on Indicator - Drive - Cord Drum.**—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore, a calibration scale is attached to the rear of the drum which is mounted on the front shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The 180° mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The distance from the front of the chassis to the drum must not exceed ⅜-inch. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

**Pointer for Calibration Scale.**—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

**Dial-Indicator Adjustment.**—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 530 kc mark, and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

After completion of alignment, seal the i-f core-adjusting screws with household cement.

**The dial tuning (right hand) push button must be pushed in for steps 1 to 5 inclusive.**

| Steps | Connect the high side of test-osc. to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | "A" band, Quiet Point between 550-750 kc | L12 and L13 (2nd I-F Trans.) |
| 2 | 6K8 det. grid cap, in series with .01 mfd. | 455 kc | | L10 and L11 (1st I-F Trans.) |
| 3 | Antenna Terminal, in series with 400 ohms | 20 mc | 20 mc (23°) "C" band | C21 (osc.)* C30 (ant.)** |
| 4 | Antenna Terminal, in series with 400 ohms | 6.1 mc | 6.1 mc (31°) "B" band | C23 (osc.)† |
| 5 | Antenna Terminal, in series with 200 mmf. | 1,500 kc | 1,500 kc (28½°) "A" band | C25 (osc.) |
| 6 | Follow "Adjustments for Electric Tuning" | | | |

* Use minimum capacity peak if two peaks can be obtained.

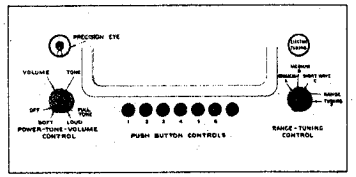
** Rock gang slightly and use maximum capacity peak if two peaks can be obtained with C30. Check to determine that C21 has been adjusted to the correct peak by tuning to approximately 28° (19.09 mc), where a weaker signal should be received.

† Use minimum capacity peak if two peaks can be obtained. Check to determine that C23 has been adjusted to the correct peak by turning to approximately 49° (5.19 mc), at which point a weaker signal should be received.

**NOTE:** Oscillator tracks 455 kc above signal on all bands.

## ADJUSTMENTS FOR ELECTRIC TUNING

This receiver has seven push buttons. The right-hand button connects the gang condenser for manual tuning. The other six buttons are for electric tuning of six different stations in the standard-broadcast range. The station buttons connect to separate permeability tuned oscillator coils and separate antenna trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool for making adjustments. Allow at least five minutes warm-up period before making adjustments.




*Location of Controls*

The right-hand push-button is for dial tuning

The procedure is as follows:

1. Make a list of the desired six stations, arranged in order from low to high frequencies. See "Tube and Trimmer Locations" view for frequency coverage of each button.
2. Push in the dial-tuning button, and manually tune in the first station on the list.
3. Push in station button No. 1 (left) and adjust No. 1 oscillator core (L37) to receive this station. Screw the core all the way in, to lowest frequency, and then unscrew slowly until station is received.
4. Adjust No. 1 antenna trimmer (C36) for maximum output on this station.

**Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.**

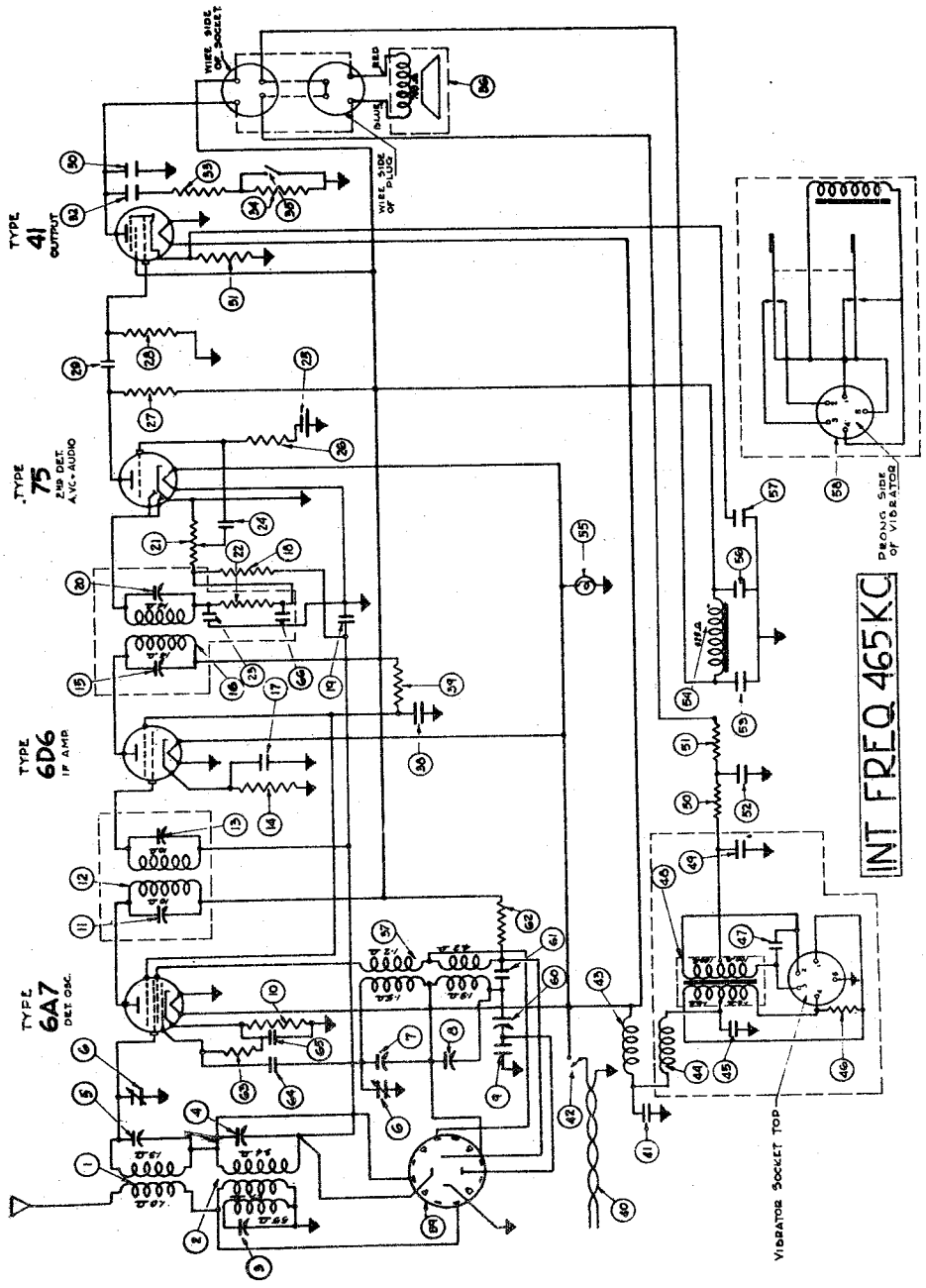
5. Adjust for each of the remaining five stations in the same manner.
6. Make a final careful adjustment of the oscillator cores and antenna trimmers. Use the Precision Eye to ensure sharp peaking.



WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR603, WR606

# WESTINGHOUSE ELEC. SUPPLY CO. Schematic


TYPE 41 OUTPUT
TYPE 75 2ND DET. A.V.C. + AUDIO
TYPE 6D6 I.F. AMP
TYPE 6A7 DET. OSC.
WIRE SIDE OF SOCKET
WIRE SIDE OF PLUG
PRONG SIDE OF VIBRATOR
VIBRATOR SOCKET TOP
INT FREQ 465 KC

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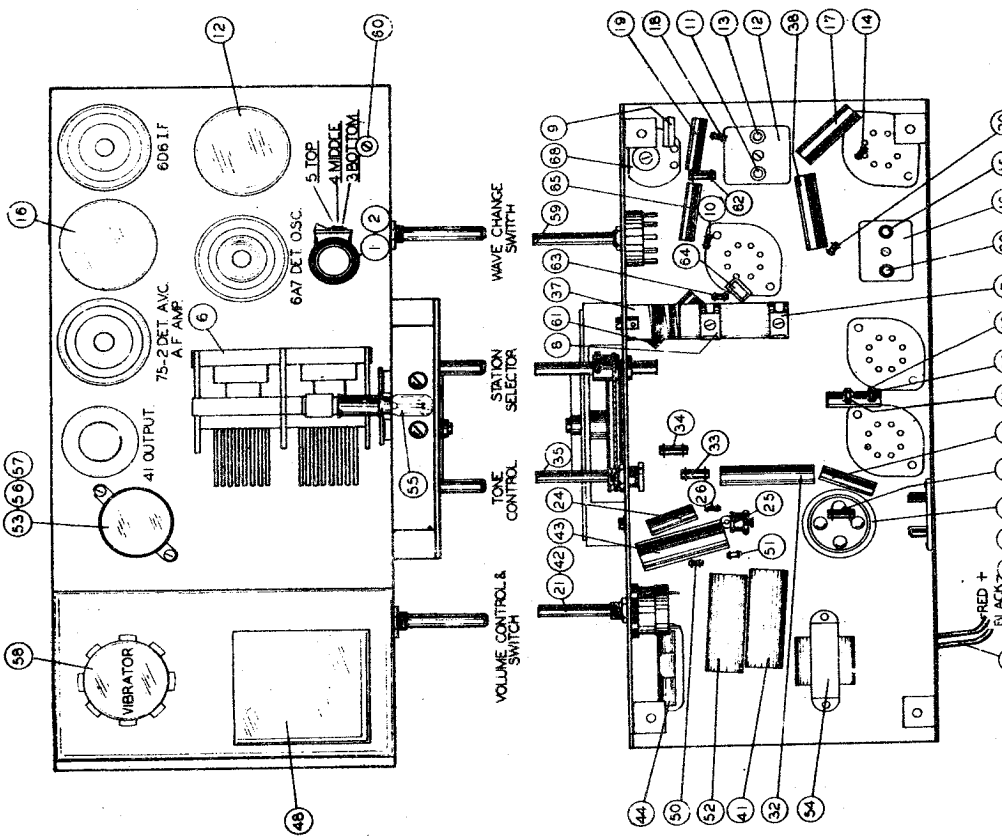
MODELS WR603,WR606
Chassis,Socket,
Trimmers,Alignment
Parts

# WESTINGHOUSE ELEC. SUPPLY CO.

| Dia. # | Part # | Description of Parts |
|---|---|---|
| 1 | RC 95237 | Antenna coil assembly |
| 2 | | Trap coil - part of RC 95237 |
| 3 | | Trimmer condenser, 30-60 mmf. - part of RC 95237 |
| 4 | | Trimmer condenser, 1.5-10 mmf. - part of RC 95237 |
| 5 | | Trimmer condenser, 4-25 mmf. - part of RC 95237 |
| 6 | CG 9552 | Variable condenser - 2 gang |
| 7 | | Trimmer condenser, 6-30 mmf. - part of RC 95238 |
| 8 | | Trimmer condenser, 4-25 mmf. - part of RC 95238 |
| 9 | CM 9526 | .0012 mfd. oscillator series condenser |
| 10 | SA 105264 | 500 ohm, 1/4 W. resistor |
| 11 | | Trimmer condenser, 45-135 mmf. - part of IC 9569 |
| 12 | IC 9569 | 1st I.F. coil (465 KC.) |
| 13 | | Trimmer condenser, 45-135 mmf. - part of IC 9569 |
| 14 | RE 95117 | 500 ohm, 1/4 W. resistor |
| 15 | | Trimmer condenser, 30-100 mmf. - part of IC 9574 |
| 16 | IC 9574 | 2nd I.F. coil (465 KC.) |
| 17 | CW 2-05 | .05 mfd., 200 V. condenser |
| 18 | RE 9574 | 1 meg., 1/4 W. resistor |
| 19 | CW 4-02 | .02 mfd., 400 V. condenser |
| 20 | | Trimmer condenser, 30-100 mmf. - part of IC 9574 |
| 21 | VR 9523 | .5 meg. volume control |
| 22 | RE 9524 | 50,000 ohm, 1/8 W. resistor |
| 23 | | .0001 mfd. mica condenser - part of IC 9574 |
| 24 | CW 4-02 | Grid bias cell |
| 25 | BY 962 | 1 meg., 1/4 W. resistor |
| 26 | RE 9574 | 1/4 meg., 1/4 W. resistor |
| 27 | RE 9585 | 1/2 meg., 1/4 W. resistor |
| 28 | RE 9572 | .02 mfd., 400 V. condenser |
| 29 | CW 4-02 | .005 mfd., 400 V. condenser |
| 30 | CW 4-005 | 750 ohm, 1/4 W. resistor |
| 31 | SA 105265 | .05 mfd., 400 V. condenser |
| 32 | CW 4-05 | 5000 ohm, 1/4 W. resistor |
| 33 | SA 105249 | 20,000 ohm, 1/4 W. resistor |
| 34 | SA 105274 | Tone control switch |
| 35 | SW 9558 | Speaker |
| 36 | SK 9539 | Oscillator coil |
| 37 | RC 95238 | .05 mfd., 200 V. condenser |
| 38 | CW 2-05 | 15,000 ohm, 1/4 W. resistor |
| 39 | SA 105254 | Power supply cable |
| 40 | CB 9556 | .5 mfd., 200 V. condenser |
| 41 | CW 2-50 | On-Off switch - part of VR 9523 |
| 42 | | "A" choke |
| 43 | SA 105452 | "A" choke |
| 44 | SA 105452 | .5 mfd., 120 V. condenser |
| 45 | CW 957 | 200 ohm, 1/4 W. resistor |
| 46 | SA 105268 | .008 mfd., 1600 V. condenser |
| 47 | CW 9521 | Power transformer |
| 48 | TR 9569 | .05 mfd. 200 V. condenser |
| 49 | CW 9513 | 50 ohm, 1/4 W. resistor |
| 50 | RE 9537 | 50 ohm, 1/4 W. resistor |
| 51 | RE 9516 | .5 mfd., 200 V. condenser |
| 52 | CW 2-50 | 8 mfd., 200 V. electrolytic cond. - part of CE 9541 |
| 53 | | "B" choke |
| 54 | TR 9534 | Dial lamp (6. volt) |
| 55 | LP 9516 | 8 mfd., 250 V. electrolytic condenser - part of CE 9541 |
| 56 | | 10 mfd., 25 V. electrolytic condenser - part of CE 9541 |
| 57 | | Vibrator |
| 58 | VI 957 | Wave change switch |
| 59 | SW 9559 | Broadcast oscillator series condenser |
| 60 | CS 9560 | .02 mfd., 400 V. condenser |
| 61 | CW 4-02 | 25,000 ohm, 1/4 W. resistor |
| 62 | SA 105275 | 50,000 ohm, 1/4 W. resistor |
| 63 | RE 9575 | .0001 mfd., mica condenser |
| 64 | CM 9513 | .05 mfd., 200 V. condenser |
| 65 | CW 2-05 | .0001 mfd. mica condenser - part of IC 9574 |
| 66 | | Speaker diaphragm |
| 67 | DM 9519 | Check the receiver over the shortwave |




Set the volume control to the maximum position, the tone control to the treble position, the wave change switch to the broadcast band position and the dial indicator to approximately 600 KC. Set the test oscillator to 465 KC. and apply the test signal to the grid of the type #6D6 I.F. amplifier tube thru a .5 mfd. condenser. Adjust trimmer condenser #15 and #20 to maximum output.

Apply the test signal to the grid of the type #6A7 first detector-oscillator tube and adjust trimmer condensers #12 and #13 to maximum output.

Apply the test signal to the antenna lead of the receiver and adjust the trap coil trimmer #3 to minimum output.

SHORT-WAVE BAND ADJUSTMENTS

Set the test oscillator and dial indicator to 6000 KC. and adjust the short-wave oscillator trimmer condenser, #7, to maximum output.

Adjust the short wave antenna trimmer band for sensitivity and calibration. #5 to maximum output.

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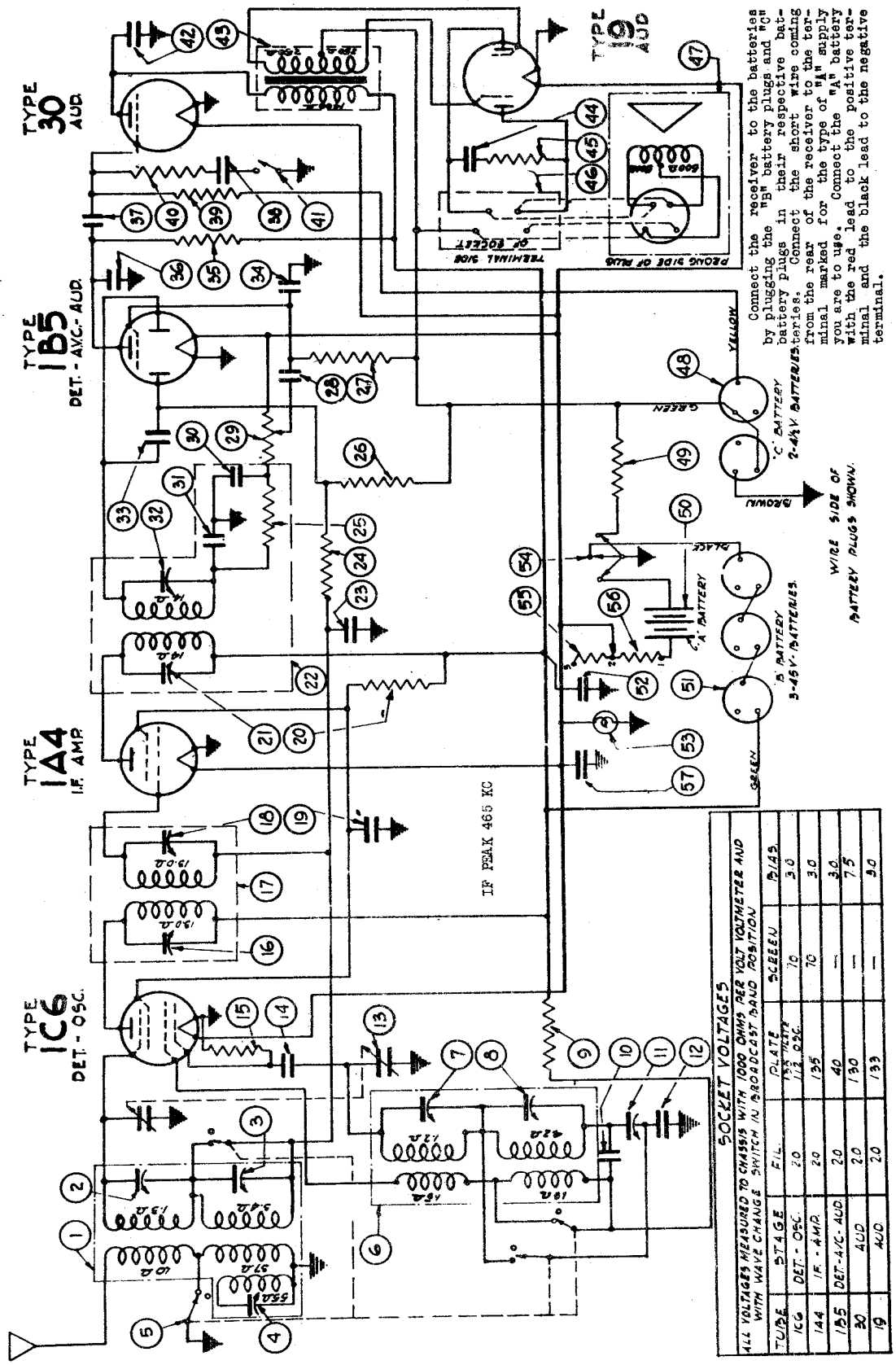
# WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR604, WR607
Schematic, Voltage


TYPE 30 AUD.
TYPE 19 AUD.
TYPE 1B5 DET. - AVC. - AUD.
TYPE 1A4 I.F. AMP.
TYPE 1C6 DET. - OSC.
IF PEAK 465 KC
TERMINAL SIDE OF SOCKET
PRONG SIDE OF PLUG
Connect the receiver to the batteries by plugging the "B" battery plugs and "C" battery plugs in their respective batteries. Connect the short wire coming from the rear of the receiver to the terminal marked for the type of "A" supply you are to use. Connect the "A" battery with the red lead to the positive terminal and the black lead to the negative terminal.
YELLOW
GREEN
BROWN
C BATTERY 2-4½ V. BATTERIES
B BATTERY 3-45 V. BATTERIES
A BATTERY
BLACK
GREEN
WIRE SIDE OF BATTERY PLUGS SHOWN.

SOCKET VOLTAGES

ALL VOLTAGES MEASURED TO CHASSIS WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

| TUBE | STAGE | FIL. | PLATE | SCREEN | B/45 |
|---|---|---|---|---|---|
| 1C6 | DET. - OSC. | 2.0 | 135 METER 112 OSC. | 70 | 3.0 |
| 1A4 | I.F. - AMP. | 2.0 | 135 | 70 | 3.0 |
| 1B5 | DET. - AVC. - AUD. | 2.0 | 40 | — | 3.0 |
| 30 | AUD. | 2.0 | 130 | — | 7.5 |
| 19 | AUD. | 2.0 | 133 | — | 3.0 |

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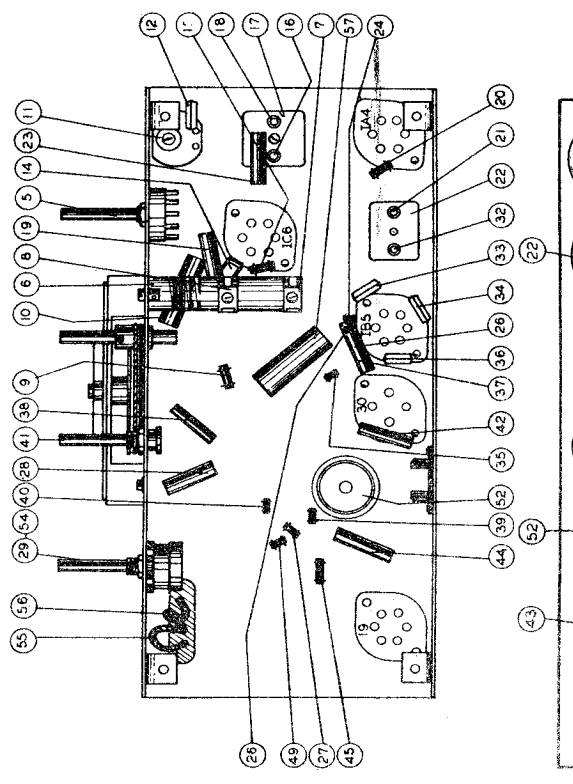
MODELS WR604,WR607
Alignment,Trimmers
Socket,Chassis,Parts

# WESTINGHOUSE ELEC. SUPPLY CO.

| Dia. # | Part # | Description of Parts | List Price |
|---|---|---|---|
| 1 | RC 95237 | Antenna coil assembly ..... | $ 2.25 |
| 2 | | 4-26 mmf. trimmer condenser - part of RC 95237 | |
| 3 | | 1.5-10 mmf. trimmer condenser - part of RC 95237 | |
| 4 | | 30-60 mmf. trimmer condenser - part of RC 95237 | |
| 5 | SW 9559 | Wave change switch ..... | .65 |
| 6 | RC 95238 | Oscillator coil assembly ..... | 1.60 |
| 7 | | 10-85 mmf. trimmer condenser - part of RC 95238 | |
| 8 | | 4-25 mmf. trimmer condenser - part of RC 95238 | |
| 9 | SA 105249 | 5,000 ohm, 1/4 W. resistor ..... | .15 |
| 10 | CW 4-02 | .02 mfd., 400 V. condenser ..... | .15 |
| 11 | CS 9560 | 350-700 mmf. oscillator series condenser ..... | .35 |
| 12 | CM 9526 | .0012 mfd. mica condenser ..... | .20 |
| 13 | CG 9552 | Variable condenser (2 gang) ..... | 2.75 |
| 14 | CM 9513 | .100 mmf. mica condenser ..... | .10 |
| 15 | RE 9575 | 50,000 ohm, 1/4 W. resistor ..... | .15 |
| 16 | | 30-100 mmf. trimmer condenser - part of IC 9579 | |
| 17 | IC 9579 | First I.F. coil (465 KC.) ..... | 2.00 |
| 18 | | 30-100 mmf. trimmer condenser - part of IC 9579 | |
| 19 | CW 2-05 | .05 mfd., 200 V. condenser ..... | .15 |
| 20 | SA 105254 | 15,000 ohm, 1/4 W. resistor ..... | .15 |
| 21 | | 30-100 mmf. trimmer condenser - part of IC 9574 | |
| 22 | IC 9574 | Second I.F. coil (465 KC.) ..... | 1.75 |
| 23 | CW 2-05 | .05 mfd., 200 V. condenser ..... | .15 |
| 24 | RE 9530 | 1 meg., 1/8 W. resistor ..... | .10 |
| 25 | RE 9524 | 50,000 ohm, 1/4 W. resistor ..... | .10 |
| 26 | RE 9530 | 1 meg., 1/8 W. resistor ..... | .10 |
| 27 | RE 9574 | 1 meg., 1/4 W. resistor ..... | .15 |
| 28 | CW 4-02 | .02 mfd., 400 V. condenser ..... | .15 |
| 29 | VR 9538 | .5 meg. volume control ..... | .95 |
| 30 | | 100 mmf. mica condenser - part of IC 9574 | |
| 31 | | 100 mmf. mica condenser - part of IC 9574 | |
| 32 | | 30-100 mmf. trimmer condenser - part of IC 9574 | |
| 33 | CM 9513 | 100 mmf. mica condenser ..... | .10 |
| 34 | CM 9513 | 100 mmf. mica condenser ..... | .10 |
| 35 | RE 9585 | 250,000 ohm, 1/4 W. resistor ..... | .15 |
| 36 | CM 9513 | 100 mmf. mica condenser ..... | .10 |
| 37 | CW 4-02 | .02 mfd., 400 V. condenser ..... | .15 |
| 38 | RE 9572 | 500,000 ohm, 1/4 W. resistor ..... | .15 |
| 39 | SA 105272 | 10,000 ohm, 1/4 W. resistor ..... | .15 |
| 40 | SW 9558 | Tone control switch ..... | .40 |
| 41 | CW 6-006 | .006 mfd., 600 V. condenser ..... | .15 |
| 42 | TR 9570 | Audio transformer ..... | 2.00 |
| 43 | CW 4-01 | .01 mfd., 400 V. condenser ..... | .15 |
| 44 | SA 105274 | 20,000 ohm, 1/4 W. resistor ..... | .15 |
| 45 | SA 107267 | Speaker socket ..... | .10 |
| 46 | SK 9540 | Speaker ..... | 6.00 |
| 47 | PG 9514 | "B" battery plug ..... | .10 |
| 48 | SA 105267 | 1000 ohm, 1/4 W. resistor ..... | .15 |
| 49 | DM 9519 | Speaker diaphragm ..... | 1.25 |
| 50 | PG 958 | "B" battery plug ..... | .10 |
| 51 | CE 9542 | 8 mfd., 200 V. electrolytic condenser ..... | 1.25 |
| 52 | LP 9518 | Dial lamp, 2 V., .06 amp. ..... | .30 |
| 53 | | On-off switch - part of VR 9538 | |
| 54 | | | |
| 55 | RE 9591 | 0.94 ohm resistor ..... | .15 |
| 56 | RE 9592 | 0.42 ohm resistor ..... | .15 |
| 57 | CW 2-50 | .5 mfd., 200 V. condenser ..... | .25 |




Set the volume control to the maximum position, the tone control to the treble position, the wave change switch on the broadcast band and the dial indicator to approximately 600 KC.

Set the test oscillator to 465 KC. and apply the test signal to the grid of the type 1A4 tube, through a 0.1 mfd. blocking condenser, and adjust the I.F. trimmer condensers #21 and #22 to maximum output.

Apply the test signal to the grid of the type 1C6 first detector-oscillator tube and adjust the I.F. trimmer condensers #16 and #18 to maximum output.

Apply the test signal to the antenna lead of the receiver and adjust the wave trap trimmer condenser #4 to minimum output.

BROADCAST BAND ADJUSTMENTS

1. Set the test oscillator and dial indicator to 1600 KC. and apply the test signal to the antenna of the receiver through a .0002 mfd. condenser.

2. Adjust the broadcast oscillator trimmer condenser #18 to maximum output.

3. Adjust the Broadcast preselector trimmer #3 to maximum output.

4. Set the test oscillator and dial indicator to 600 KC. and adjust the oscillator series condenser #11 to maximum output at the same time rocking the variable condenser.

5. Return the test oscillator and dial indicator to 1600 KC. and check the adjustment of trimmer condensers #8 and #5 for accuracy.

SHORT WAVE BAND ADJUSTMENTS

1. Set the wave change switch to the short-wave band position.

2. Set the test oscillator and dial indicator to 6000 KC. and adjust the short-wave trimmer condenser #7 to maximum output.

3. Adjust the short-wave preselector trimmer condenser #2 to maximum output.

4. Check the receiver over the short-wave band for sensitivity and calibration.

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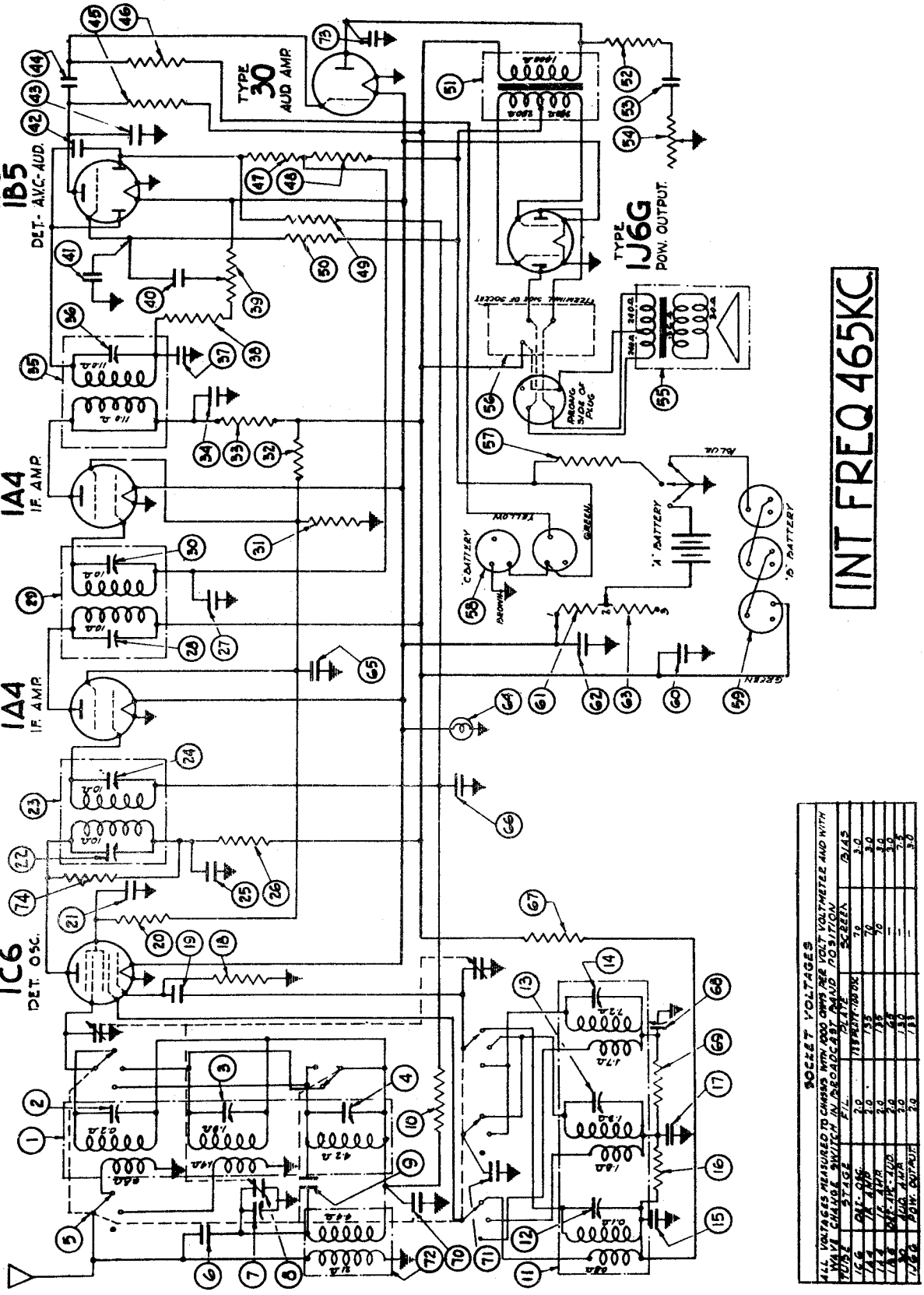
# WESTINGHOUSE ELEC. SUPPLY CO.

MODELS WR605, WR608
Schematic, Voltage




SOCKET VOLTAGES

ALL VOLTAGES MEASURED TO CHASS WITH 1000 OHMS PER VOLT VOLTMETER AND WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

| TUBE | STAGE | F/L | PLATE | SCREEN | D/45 |
|---|---|---|---|---|---|
| 1C6 | ON-OSC. | 3.0 | 115VOLT-180VDC | 70 | 3.0 |
| 1A4 | 1ST I.F. | 3.0 | 155 | 70 | 3.0 |
| 1A4 | 2ND I.F. | 3.0 | 155 | 70 | 3.0 |
| 1B5 | DET.-AVC.-AUD. | 3.0 | 65 | — | 7.5 |
| 30 | AUD. AMP. | 3.0 | 130 | — | 3.0 |
| 1J6G | POW. OUTPUT | 2.9 | 115 | — | 3.0 |

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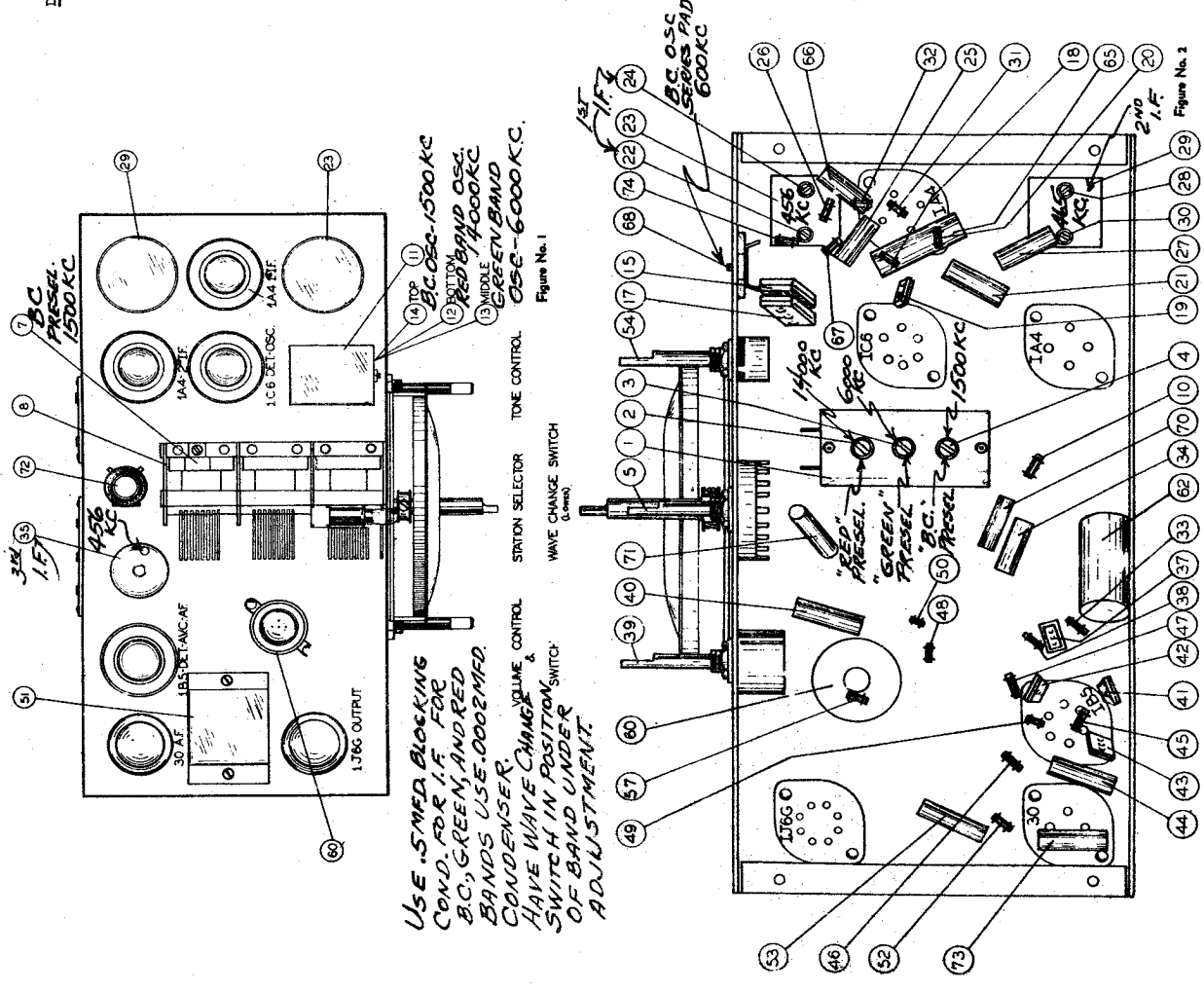
MODELS WR605,WR608
Alignment,Socket
Trimmers,Chassis,Parts

# WESTINGHOUSE ELEC. SUPPLY CO.

| Dia. # | Part # | Description of Parts |
|---|---|---|
| 1 | RC 96257 | Preselector coil ..... part of RC 96257 |
| 2 | | 30-60 mmf. trimmer condenser - part of RC 96257 |
| 3 | | 4-30 mmf. trimmer condenser - part of RC 96257 |
| 4 | | 4-30 mmf. trimmer condenser - part of RC 96257 |
| 5 | SW 9548 | Wave change switch ..... |
| 6 | | 10 mmf. mica condenser - part of RC 96258 |
| 7 | | 15-25 mmf. trimmer condenser - part of CG 9554 |
| 8 | CG 9554 | Variable condenser - 3 gang ..... |
| 9 | | Twisted wires |
| 10 | RE 9594 | 100,000 ohm, 1/4 W. resistor ..... |
| 11 | RC 96259 | Oscillator coil ..... part of RC 96259 |
| 12 | | 1.5 to 10 mmf. trimmer condenser - part of RC 96259 |
| 13 | | 1.5 to 10 mmf. trimmer condenser - part of RC 96259 |
| 14 | | 4-30 mmf. trimmer condenser - part of RC 96259 |
| 15 | CM 9510 | .0032 mfd. mica condenser ..... |
| 16 | RE 96188 | 2500 ohm, 1/8 W. resistor ..... |
| 17 | CM 959 | .002 mfd. mica condenser ..... |
| 18 | SA 105276 | 50,000 ohm, 1/4 W. resistor ..... |
| 19 | CM 9513 | .0001 mfd. mica condenser ..... |
| 20 | SA 105267 | 1000 ohm, 1/4 W. resistor ..... |
| 21 | CW 2-05 | .05 mfd., 200 V. condenser ..... part of IC 9572 |
| 22 | | 45 to 135 mmf. trimmer condenser - part of IC 9572 |
| 23 | IC 9572 | 1st I.F. coil (465 KC.) ..... |
| 24 | | 45 to 135 mmf. trimmer condenser - part of IC 9572 |
| 25 | CW 2-05 | .05 mfd., 200 V. condenser ..... |
| 26 | SA 105270 | 2500 ohm, 1/4 W. resistor ..... |
| 27 | CW 2-05 | .05 mfd., 200 V. condenser ..... part of IC 9569 |
| 28 | | 45 to 135 mmf. trimmer condenser - part of IC 9569 |
| 29 | IC 9569 | 2nd I.F. coil ..... |
| 30 | | 45 to 135 mmf. trimmer condenser - part of IC 9569 |
| 31 | SA 105276 | 50,000 ohm, 1/4 W. resistor ..... |
| 32 | SA 105272 | 10,000 ohm, 1/4 W. resistor ..... |
| 33 | SA 105267 | 1000 ohm, 1/4 W. resistor ..... |
| 34 | CW 2-05 | .05 mfd., 200 V. condenser ..... |
| 35 | IC 9568 | 3rd I.F. coil (465 KC.) ..... |
| 36 | | 30-60 mmf. trimmer condenser - part of IC 9568 |
| 37 | CM 9513 | .0001 mfd. mica condenser ..... |
| 38 | SA 105276 | 50,000 ohm, 1/4 W. resistor ..... |
| 39 | VR 9540 | 1/2 meg. volume control ..... |
| 40 | CW 4-02 | .02 mfd., 400 V. condenser ..... |
| 41 | CM 9513 | .0001 mfd. mica condenser ..... |
| 42 | CM 9513 | .0001 mfd. mica condenser ..... |
| 43 | CM 956 | .00025 mfd. mica condenser ..... |
| 44 | CW 4-02 | .02 mfd., 400 V. condenser ..... |
| 45 | RE 9585 | .25 meg., 1/4 W. resistor ..... |
| 46 | RE 9572 | .5 meg., 1/4 W. resistor ..... |
| 47 | RE 9574 | 1 meg., 1/4 W. resistor ..... |
| 48 | RE 9574 | 1 meg., 1/4 W. resistor ..... |
| 49 | RE 9574 | 1 meg., 1/4 W. resistor ..... |
| 50 | TR 9570 | Audio transformer ..... |
| 51 | SA 105267 | 1000 ohm, 1/4 W. resistor ..... |
| 52 | CW 2-05 | .05 mfd., 200 V. condenser ..... |
| 53 | VR 9539 | 10,000 ohm tone control ..... |
| 54 | SK 9541 | Speaker ..... |
| 55 | SA 107257 | Speaker socket ..... |
| 56 | SA 105267 | 1000 ohm, 1/4 W. resistor ..... |
| 57 | PG 9514 | "C" battery plug ..... |
| 58 | PG 958 | "B" battery plug ..... |
| 59 | CE 9543 | 30 mfd 200 V. electrolytic condenser ..... |
| 60 | RE 9594 | 0.31 ohm resistor ..... |
| 61 | CW 2-50 | .5 mfd., 200 V. condenser ..... |
| 62 | RE 9591 | 0.94 ohm resistor ..... |
| 63 | LP 9518 | Dial lamp ..... |
| 64 | CW 2-25 | .25 mfd., 200 V. condenser ..... |
| 65 | CW 2-05 | .05 mfd., 200 V. condenser ..... |
| 66 | SA 105270 | 2500 ohm, 1/4 W. resistor ..... |
| 67 | CS 9560 | 350-700 mmf. oscillator series condenser ..... |
| 68 | RE 9527 | 5000 ohm, 1/8 W. resistor ..... |
| 69 | CW 2-25 | .05 mfd., 200 V. condenser ..... |
| 70 | CW 4-005 | .005 mfd., 400 V. condenser ..... |
| 71 | RC 96258 | Antenna coil ..... |
| 72 | CW 4-005 | .005 mfd., 400 V. condenser ..... |
| 73 | RE 9584 | .1 meg., 1/4 W. resistor ..... |
| 74 | TR 9596 | Output transformer ..... |
| 75 | DM 9520 | Speaker diaphragm ..... |
| 76 | | |

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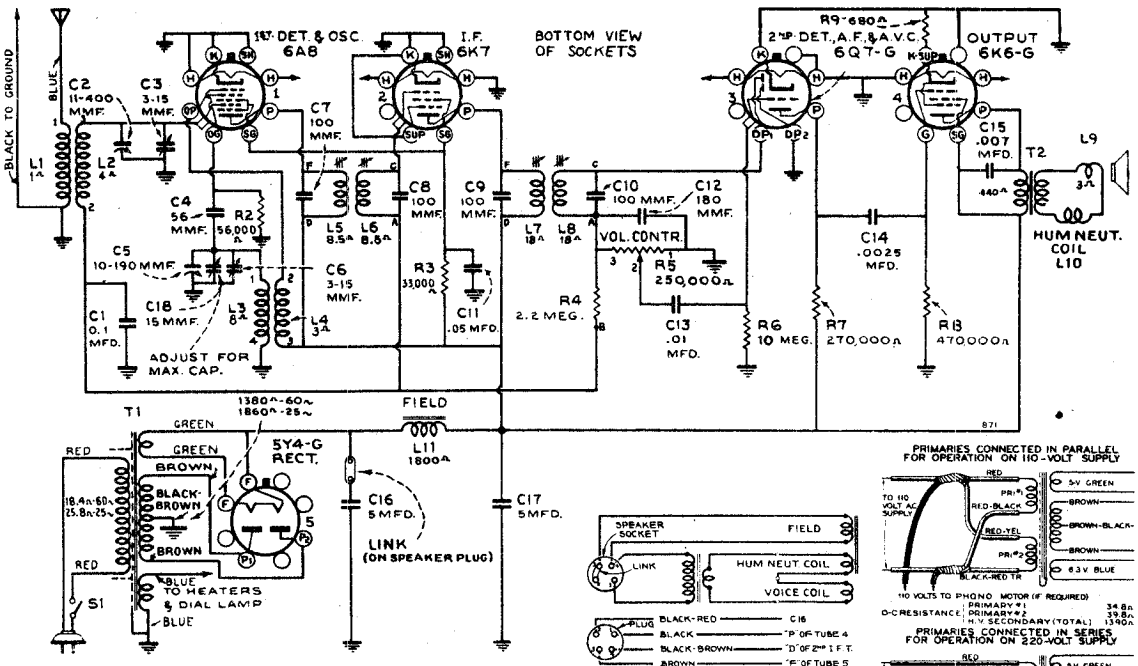
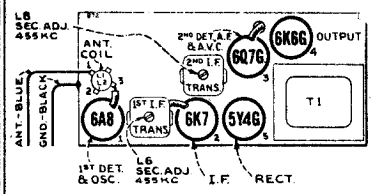
Alignment, Socket Trimmers, Data

# WESTINGHOUSE ELEC. SUPPLY CO.

MODEL WR256 Schematic, Voltage




## Precautionary Lead Dress

1. Power transformer leads and power cord must be dressed toward rear apron away from volume control.
2. Blue lead from "A" terminal of 2nd I-F transformer to volume control must be dressed toward front apron away from other parts.
3. Speaker cable leads must be dressed close to chassis base, away from 6K6-G socket and volume control.

*Connections for No. 30888 Transformer*

Frequency Range..... 540 to 1,720 kc
R-F Alignment Frequency.... 1,500 kc (osc., ant.)
Intermediate Frequency..... 455 kc

TUBE COMPLEMENT

(1) RCA-6A8..... First-Det., Osc.
(2) RCA-6K7..... Intermediate Amp.
(3) RCA-6Q7-G..... Second-Det., A-F, A.V.C.
(4) RCA-6K6-G..... Power Output
(5) RCA-5Y4-G..... Rectifier
Dial lamp.....Mazda No. 44, 6.3 volts, 0.25 amps.

POWER OUTPUT (125-volt, a-c supply)

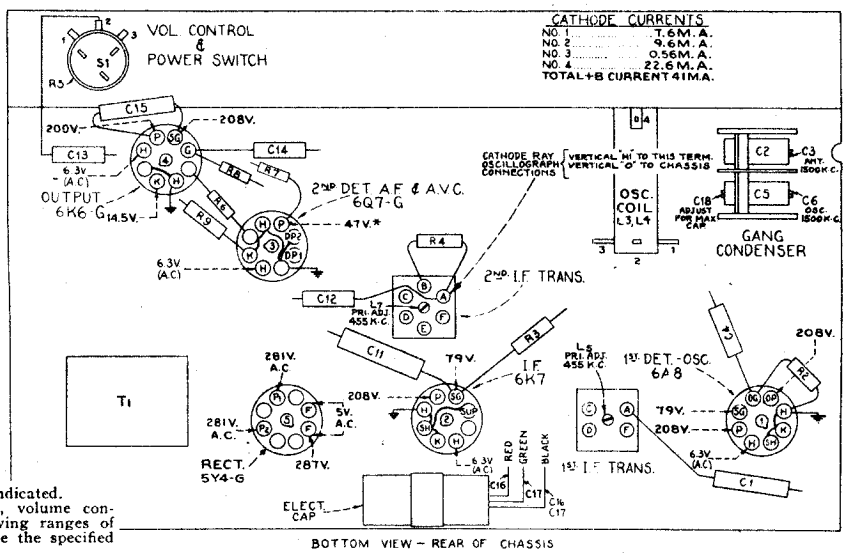
Undistorted..... 1.0 watt
Maximum ..... 2.0 watts

LOUDSPEAKER

Type..... 5-inch Electrodynamic
Voice-coil Impedance..... 3.4 ohms at 400 cycles

POWER SUPPLY RATINGS

Rating A..... 105-125 volts, 50-60 cycles, 50 watts
Rating B..... 105-125 volts, 25-60 cycles, 50 watts




BOTTOM VIEW – REAR OF CHASSIS

*Tube Socket Voltages and Location of Parts*

Values with star (*) are operating voltages.
Values not starred are actual measured voltages.

Measurements made to chassis unless otherwise indicated.
Measurements made with set tuned to quiet point, volume control at minimum, using 1,000-ohm-per-volt meter, having ranges of 10, 50, 250, and 500 volts. (Use nearest range above the specified measured voltage.)
Values should hold within approximately ± 20% for 117-volt 60-cycle supply.

## Alignment Procedure

**Cathode-ray Alignment** is the preferable method. Connections for the oscillograph are shown in the chassis drawing..

**Output meter alignment.** If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

**Test-oscillator.** For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the output as low as possible to avoid a-v-c action.

**Pre-setting dial.** With gang condenser in full mesh, move dial pointer to coincide with horizontal lines. This is a friction adjustment.

| Steps | Connect the high side of test-oscillator to— | Tune test-osc. to— | Turn radio dial to— | Adjust the following for max. peak output |
|---|---|---|---|---|
| No. 1 | 6K7 I-F grid cap, in series with .01 mfd. | 455 kc | Quiet point between 550-750 kc | L7 and L8 (2nd I-F Transformer) |
| No. 2 | 6A8 1st-det. grid cap, in series with .01 mfd. | 455 kc | | L5 and L6 (1st I-F Transformer) |
| No. 3 | Antenna lead, in series with 200 mmfd. | 1,500 kc | 1,500 kc | C6* (oscillator) C3 (antenna) |

*Trimmer C18 on gang condenser should be screwed clockwise for maximum capacity before adjusting C6.

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MODELS WRT700
WRT701
MODELS WRT702
WRT703

# WESTINGHOUSE ELEC. SUPPLY CO.

Data, Parts

EXCEPT for the following data:-
Model WRT-700 is the same as RCA Model TT-5
Model WRT-701 is the same as RCA Model TRK-5

SUPPLEMENTARY
REPLACEMENT PARTS LIST FOR
WESTINGHOUSE TELEVISION RECEIVERS

Model WRT-700 (5" Television Attachment)
Model WRT-701 (5" Console)

When ordering replacement parts refer to this supplementary sheet first and if the part appears here it should be ordered by the stock number and receiver model indicated. For parts not listed in this sheet, refer to the main parts list.

Parts should be ordered from your Westinghouse Parts Distributor giving the stock number of part and model number of receiver.

TELEVISION CHASSIS ASSEMBLIES

| Stock Number | | | Unit List Price |
|---|---|---|---|
| 33835 | Adjuster | - Magnetite core and stud in tube for high frequency oscillator circuit adjustment (used with L13)..... | $ .60 |
| 33120 | Choke | - Filter choke (L39)..... | 3.25 |

3-BAND RADIO RECEIVER
RC-429-A Used with Model WRT-701

| | | | |
|---|---|---|---|
| 30752 | Bracket | - "Precision Eye" bracket..... | .25 |
| 30766 | Cap | - Rubber cap for "Precision Eye"..... | .15 |
| 13871 | Socket | - "Precision Eye" socket..... | .45 |

MISCELLANEOUS ASSEMBLIES
Model WRT-700
Model WRT-701

| | | | |
|---|---|---|---|
| 33827 | Cap | - Pilot lamp "bulls eye" (Model WRT-701 only)..... | .65 |
| 33716 | Escutcheon | - Dial escutcheon less scale and buttons (Model WRT-701 only)..... | 14.00 |
| 31210 | Button | - Station selector push button (Model WRT-701 only). | .10 |
| 33715 | Dial | - 3 Band glass dial scale (Model WRT-701 only)..... | 1.70 |
| 31095 | Disc | - Package of 8 protective cover discs for push buttons (Model WRT-701 only)..... | .10 |
| 33754 | Glass | - Safety protective glass for Kinescope..... | 2.90 |
| 31355 | Knob | - Band switch knob (Model WRT-701 only)..... | .12 |
| 33181 | Knob | - Television "Brightness", "Vert. Hold", or Radio "Volume" knob..... | .25 |
| 31391 | Knob | - Television "Contrast", "Hor. Hold", "Fine Tuning" or Radio "Tone Control" knob..... | .15 |
| 33178 | Knob | - Television "Off-on" control knob (Model WRT-700 only) | .20 |
| 33179 | Knob | - Radio tuning knob (Model WRT-701 only)..... | .25 |
| 33176 | Knob | - Television "Station Selector" control knob (white dot) | .30 |
| 31355 | Knob | - Television "Volume Control" knob (Model WRT-700 only) | .12 |
| 30991 | Markers | - Complete set of call letter markers (Model WRT-701") | .40 |
| 14270 | Spring | - Knob spring for Stock No. 31355, 33176, 33178 and 33181 knobs..... | .05 |
| 30330 | Spring | - Knob spring for Stock No. 31391 knob..... | .03 |
| 4982 | Spring | - Knob spring for Stock No. 33179 knob..... | .05 |

Prices subject to change without notice.

EXCEPT for the following data:-
Model WRT-702 is the same as RCA Model TRK-9
Model WRT-703 is the same as RCA Model TRK-12

SUPPLEMENTARY
REPLACEMENT PARTS LIST FOR
WESTINGHOUSE TELEVISION RECEIVERS

Model WRT-702 ( 9" Console)
Model WRT-703 (12" Console)

When ordering replacement parts refer to this supplementary sheet first and if the part appears here it should be ordered by the stock number (and receiver model) indicated. For parts not listed in this sheet, refer to the main parts list.

Parts should be ordered from your Westinghouse Parts Distributor giving the stock number of the part and the model number of the receiver.

3-BAND RADIO RECEIVER CHASSIS
RC-427-B in WRT-703
RC-427-C in WRT-702

| Stock Number | | | Unit List Price |
|---|---|---|---|
| 30716 | Clip | - Precision eye mounting clip with wing screw..... | $ .25 |
| 32634 | Cord | - Variable condenser drive cord..... | .10 |
| 33712 | Plate | - Finished drive plate with drive pully and bracket... | 1.95 |
| 33713 | Pointer | - Dial pointer and carriage..... | .40 |
| 13871 | Socket | - "Precision Eye" socket..... | .45 |

MISCELLANEOUS ASSEMBLIES
WRT-702 and WRT-703

| | | | |
|---|---|---|---|
| 32425 | Button | - Station selector push button..... | .20 |
| 33827 | Cap | - Orange pilot lamp "Bulls Eye"..... | .65 |
| 33752 | Cushion | - Kinescope masking cushion (Model WRT-703 only)... | 2.30 |
| 33753 | Cushion | - Kinescope masking cushion (Model WRT-702 only)... | 2.00 |
| 33710 | Dial | - Three band glass dial scale..... | 2.30 |
| 33711 | Escutcheon | - Dial escutcheon less buttons, button shaft, and dial scale..... | 4.75 |
| 31355 | Knob | - Radio tuning, volume, or range selector knob..... | .12 |
| 31391 | Knob | - Television "Contrast", "Hor. Hold", or "Fine Tuning" knob..... | .15 |
| 33181 | Knob | - Television "Brightness" or "Vert. Hold" knob..... | .25 |
| 33176 | Knob | - Television "Station selector" knob..... | .30 |
| 33178 | Knob | - "Victrola, Radio, Television - Fidelity selection knob"..... | .20 |
| 32067 | Marker | - Complete set of call letter markers..... | .35 |
| 31460 | Marker | - "Dial Tuning" push button marker..... | .04 |
| 30330 | Spring | - Knob spring for stock No. 31391 knob..... | .03 |
| 14270 | Spring | - Knob spring for stock No. 31355, 33181, 33176, and 33178 knobs..... | .05 |

Prices subject to change without notice.

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Trimmers
Chassis

# WESTINGHOUSE ELEC. INTERNATIONAL CO.

MODEL WR102
Alignment
Socket

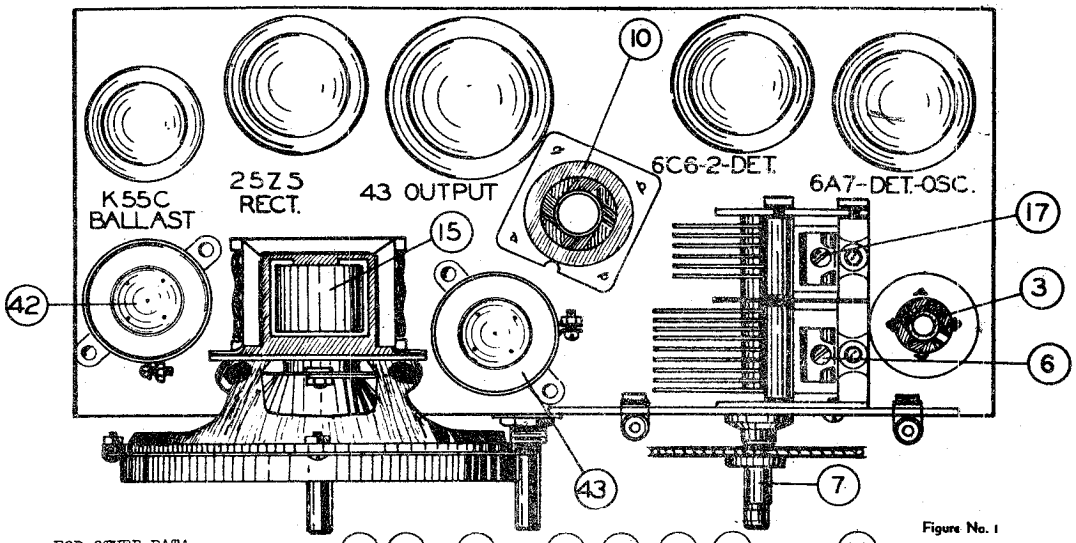


Figure No. 1

FOR OTHER DATA
SEE INDEX

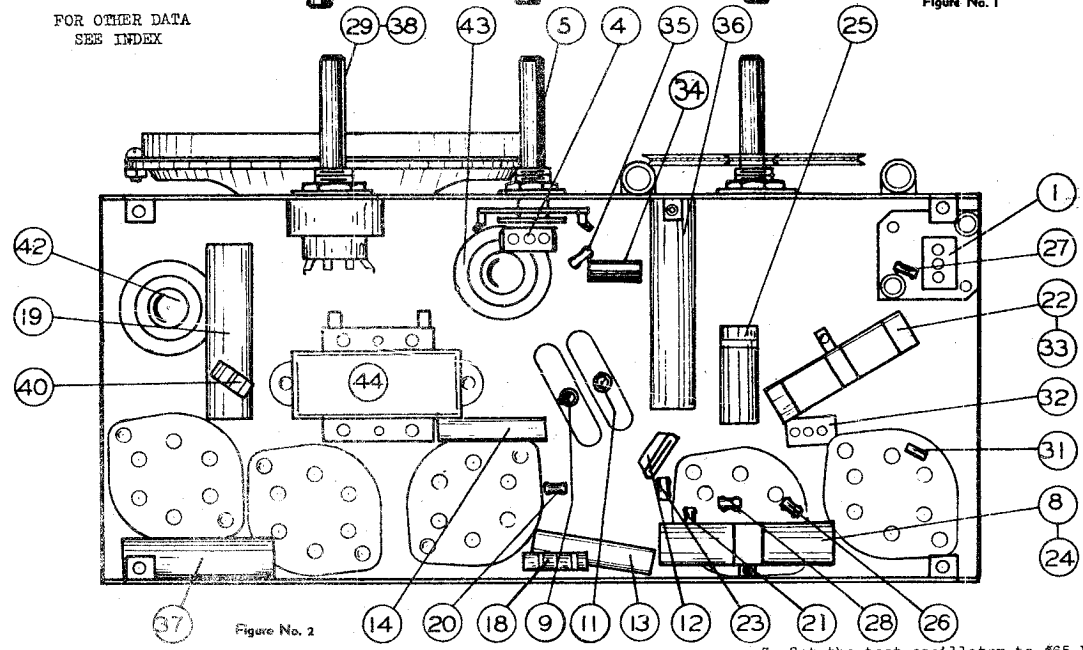


Figure No. 2

Type and Number of Tubes 1 #6A7, 1 #6C6, 1 #43, 1 #25Z5, 1 #K55C (Ballast) - Total 5
Power Supply Characteristics ..... 105-125 volts D.C. or 105-125 volts, 50-60 cycle A.C.
Power Consumption ..... 44 Watts
Total Power Output ..... 1.10 Watts
Undistorted Power Output ..... 0.75 Watts
Tuning Ranges ..... (Broadcast Band 535 to 1525 K.C.
(Shortwave Band 1500 to 3000 K.C.
Line-Up Frequencies ..... I.F. 465 K.C., 1400 K.C.

## LINE-UP CAPACITOR ADJUSTMENTS

To properly align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied and reduced sufficiently to prevent overload as the individual circuits of the receiver are brought into alignment. A conventional output meter should be connected across the terminals of the speaker voice coil to indicate when the individual circuits are correctly aligned. The sensitivity of this meter must be sufficient to give satisfactory readings with low input signals.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the various tubes and alignment condensers. Top and bottom views of the chassis are shown in Figures #1 and #2 and should be carefully studied before actual work is started.

### ALIGNMENT OF I.F. (465 K.C.)

1. Set the volume control to maximum position and wave change switch to standard broadcast band.
2. Connect the output meter across the voice coil terminals of the speaker.
3. Set the test oscillator to 465 K.C. and adjust its output to produce a measureable reading on the output meter when the test signal is applied to the grid of the type 6A7 first detector-oscillator tube through a 0.5 mfd. blocking condenser.
4. Adjust trimmers #9 and #11 to maximum output.

### ALIGNMENT OF OSCILLATOR AND R. F.

1. Check the pointer setting to be sure that is is exactly horizontal when the tuning condenser is completely closed.
2. Set the test oscillator and dial indicator to 1400 K.C. and adjust the oscillator trimmer condenser #17 to maximum output.
3. Apply the test signal to the antenna of the receiver through a .0001 mfd. blocking condenser and adjust trimmer condenser #6 to maximum output.
4. Check sensitivity over the band.
5. Turn wave change switch to the shortwave band and check the sensitivity over scale.

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MODEL WR209 **WESTINGHOUSE ELEC. INTERNATIONAL CO.**

Alignment, Socket Trimmers, Chassis

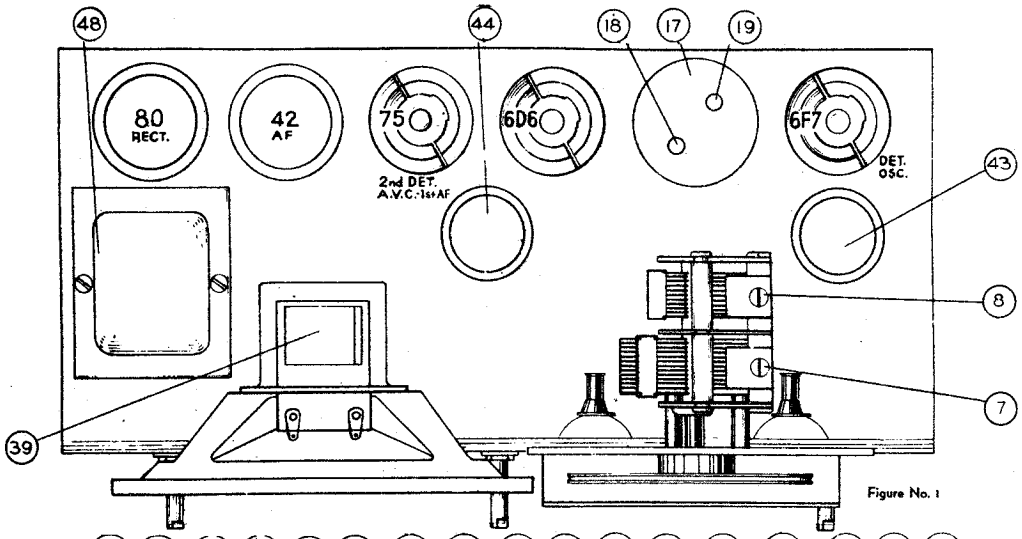


Figure No. 1

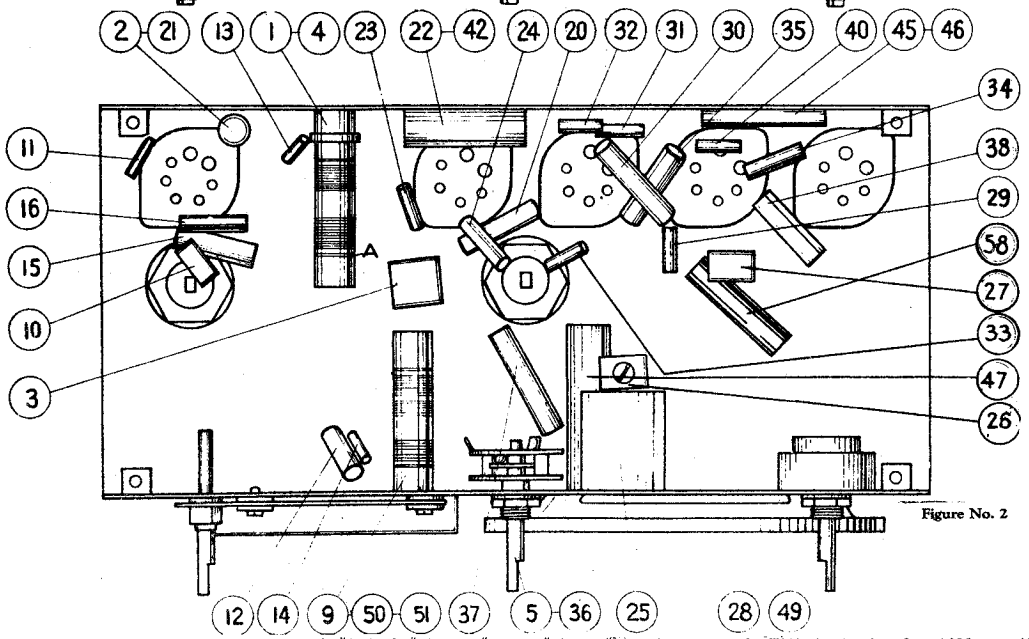


Figure No. 2




Type and Number of Tubes ---------- 1 #6F7, 1 #6D6, 1 #75, 1 #42, 1 #80 - Total 5
Power Supply ---------- 105 to 125 volts, 50 to 60 cycles A.C.
Power Consumption ---------- 46 Watts
Tuning Ranges ---------- 540 to 1500 K.C. and 1500 to 3200 K.C.
Maximum Undistorted Output ---------- 1.5 Watts
Maximum Output ---------- 2.8 Watts
Line-Up Frequencies ---------- I.F. 465 K.C., 1400 K.C.

This model is a five-tube, A.C., two-band superheterodyne receiver whose circuit comprises a combined first detector-oscillator an intermediate frequency amplifier, a combined second detector, A.V.C. and first audio amplifier, a power pentode output stage and a rectifier with its associated filter circuit and power transformer.

This model is designed to work over two bands, the broadcast band extending from 540 to 1500 K.C. and a police band which extends from 1400 to 3200 K.C.

## LINE-UP CAPACITOR ADJUSTMENTS

To align the circuits of this receiver it is essential to use a high grade modulated test oscillator, the output of which can be continuously varied with absence from overload when the individual circuits of the receiver are brought into alignment.

A conventional output meter can be connected across the terminals of the speaker voice coil to indicate when the circuits are aligned. The sensitivity of the output meter must be sufficient to give satisfactory reading with a low input signal.

Before attempting to align the receiver, the service man should familiarize himself with the general layout of the chassis, location of the tubes and various alignment condensers. Top and bottom views of the chassis are shown in Fig. #1 and #2 and should be carefully studied before the actual work is started

ADJUSTMENT OF I.F. (465 K.C.)

1. Set volume control on full, turn tone control knob to the right hand position. Set wave-change switch on the broadcast position and the dial indicator at approximately 600 K.C.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 K.C. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of the 6D6 I.F. tube thru a .5 mfd. blocking condenser.
4. Adjust #26 (see Fig. #2) to maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6F7 first detector-oscillator tube and adjust #18 and #19 (Fig. #1) to maximum output.
6. With test signal still on the grid of 6F7 tube, repeat the above adjustments for greatest sensitivity.

ADJUSTMENT OF BROADCAST BAND

1. Leave test signal on grid of 6F7 tube and set the test oscillator to 1400 K.C.
2. Turn the gang condenser to its maximum position. Adjust dial indicator until either end is directly over the long horizontal lines on the dial scale. Then set dial indicator to 1400 K.C.
3. Adjust trimmer #8 to maximum output.
4. Apply test signal to antenna of set thru a .0002 mfd. condenser and adjust trimmer #7 to maximum output.

ADJUSTMENT OF POLICE BAND

When adjustments as outlined under the broadcast band are completed, the police band requires no adjustment unless the coil had been changed. In this event, set test oscillator and station indicator to 1700 K.C. and apply test signal to antenna lead. The police band winding is indicated by "A" in Fig. #2. Adjust the position of this winding by sliding it back and forth on the core until maximum output is indicated on the output meter. This winding should then be secured in place by applying a thin coat of coil cement.

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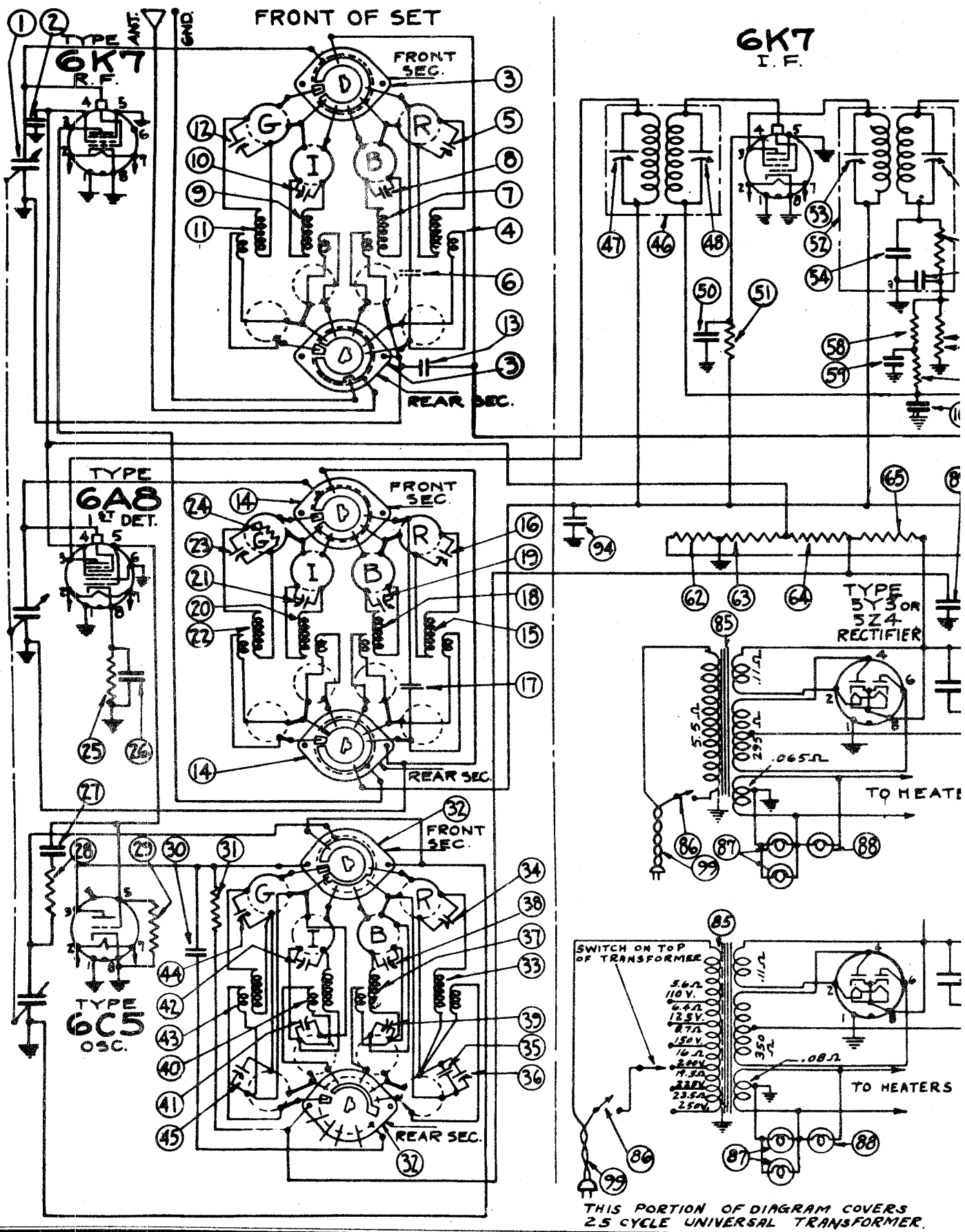


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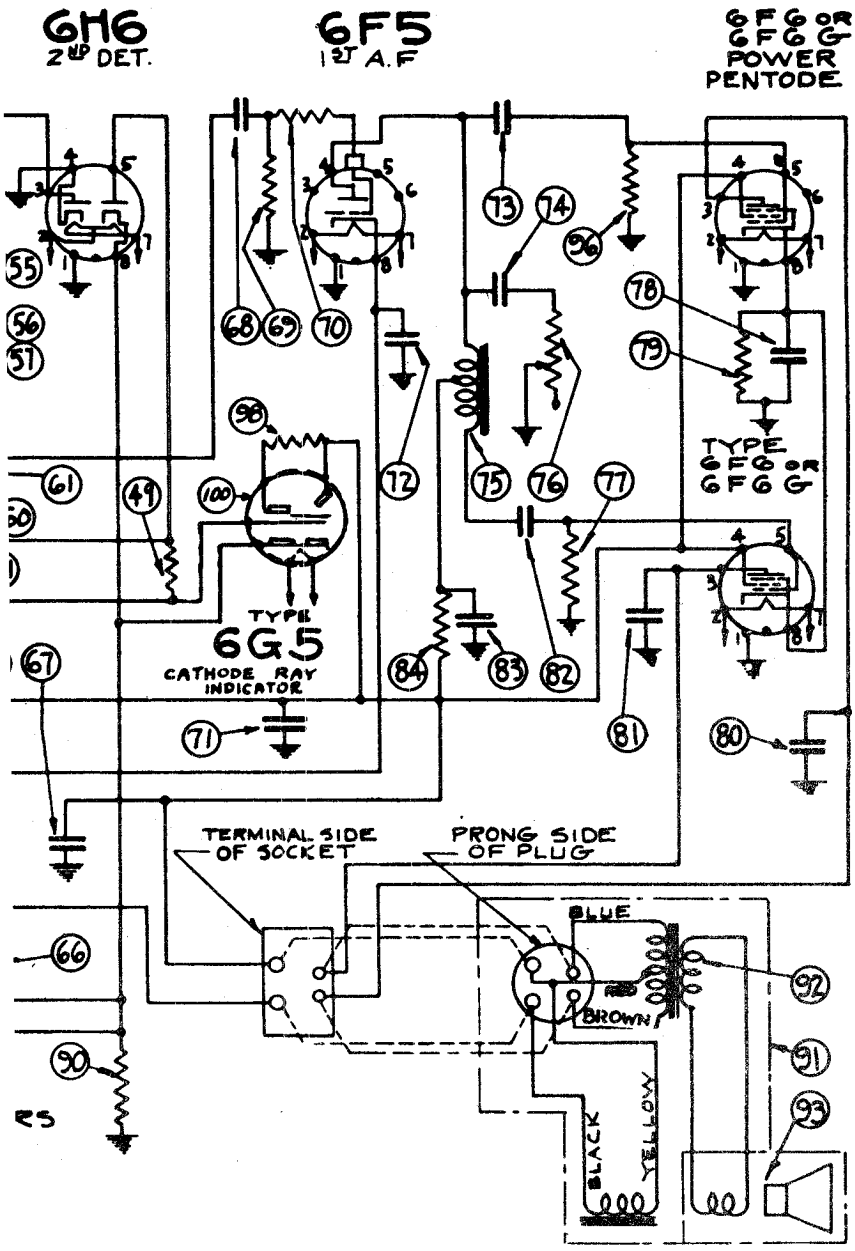
INTERNATIONAL CO.

MODELS WR214X, WR314X
Schematic, Voltage
Resistances




| D.C. RESISTANCE MEASURED WITH WAVE CHANGE SWITCH IN CORRESPONDING BAND POSITION | | | |
|---|---|---|---|
| COIL | DIA. NO | PRIM. | SEC |
| G-ANT | 11 | 120 | 20 |
| G-R.F. | 22 | 11 | 20 |
| G-OSC. | 43 | 6 | 8 |
| I-ANT. | 9 | 18.5 | 3.8 |
| I-R.F. | 20 | 0.8 | 10.7 |
| I-OSC. | 40 | 1.4 | 3.3 |
| B-ANT. | 7 | 2.1 | 1.0 |
| B-R.F. | 18 | 1.8 | 1.0 |
| B-OSC. | 37 | 0.5 | 0.9 |
| R-ANT | 4 | 0.7 | .003 |
| R-R.F. | 15 | 2.0 | .003 |
| R-OSC | 33 | 0.5 | .003 |
| | | | |
| 1ST I.F. | 46 | 8.6 | 8.6 |
| 2ND I.F. | 52 | 8.6 | 8.6 |
| | | | |
| | | | |
| INTERSTAGE TRANS | 75 | 4200 | 9000 |
| | | | |
| OUTPUT TRANS. | 92 | 392 | .03 |
| | | | |
| SPKR FIELD | | 1800 | |
| | | | |
| | | | |
| | | | |
| VOICE COIL | 93 | 3.2 | |

# INT. FREQ. 465KC.

SOCKET VOLTAGES - LINE = 115 VOLTS TAKEN FROM BOTTOM OF SOCKETS

MEASUREMENTS MADE WITH A 1000 OHMS PER VOLT VOLTMETER & WITH WAVE CHANGE SWITCH IN BROADCAST BAND POSITION

| TUBE | STAGE | FIL. | PIN NOS | PLATE | PIN NOS | SCREEN | PIN NOS | BIAS | PIN NOS |
|---|---|---|---|---|---|---|---|---|---|
| 6K7 | R.F. | 6.25 | 2-7 | 245 | 3-1 | 100 | 4-1 | *SEE NOTE | |
| 6A8 | 1ST DET. | 6.25 | 2-7 | 250 | 3-1 | 100 | 4-1 | 2.4 | 8-1 |
| 6C5 | OSC. | 6.25 | 2-7 | 180 | 3-1 | | | | |
| 6K7 | I.F. | 6.25 | 2-7 | 250 | 3-1 | 105 | 4-1 | * SEE NOTE | |
| 6H6 | 2ND DET. | 6.25 | 2-7 | | | | | 5.1 | 8-1 |
| 6F5 | AUDIO | 6.25 | 2-7 | 230 | 4-1 | | | 1.5 | 8-1 |
| 6F6 | OUTPUT | 6.25 | 2-7 | 235 | 3-1 | 250 | 4-1 | 21.5 | 8-1 |
| 5Y3 | RECTIFIER | 5. | 2-8 | 395 | 8-1 | | | | |
| 6F6 | OUTPUT | 6.25 | 2-7 | 235. | 3-1 | 250 | 4-1 | 21.5 | 8-1 |
| 6G5 | TUNING INDICATOR | 6.25 | 1-6 | 263 | 2-5 | | | XSEE NOTE | |

* CONTROL GRID BIAS ON 6K7 & 6G5 TUBES IS EQUAL TO APPROX. SIX-TENTHS THE VOLTAGE FROM PINS 5-1 ON THE 6H6 TUBE SOCKET.

Socket, Trimmers
Chassis

# WESTINGHOUSE ELEC. INTERNATIONAL CO.

MODELS WR214X
WR314X

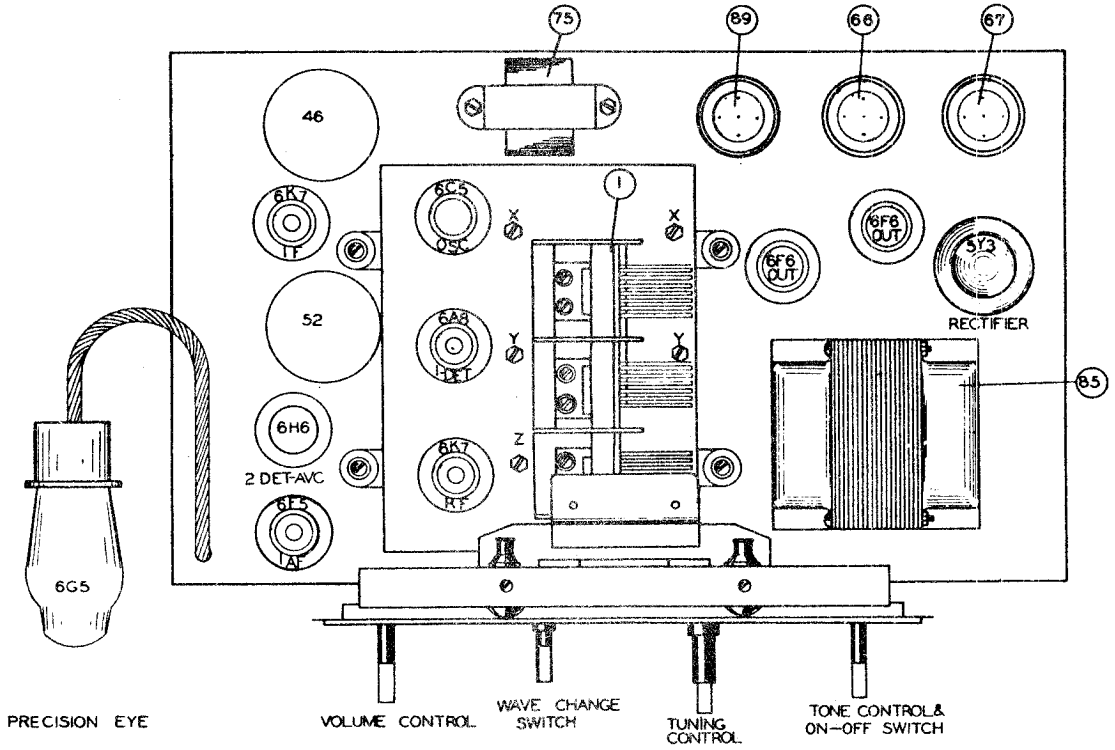



Figure No. 1

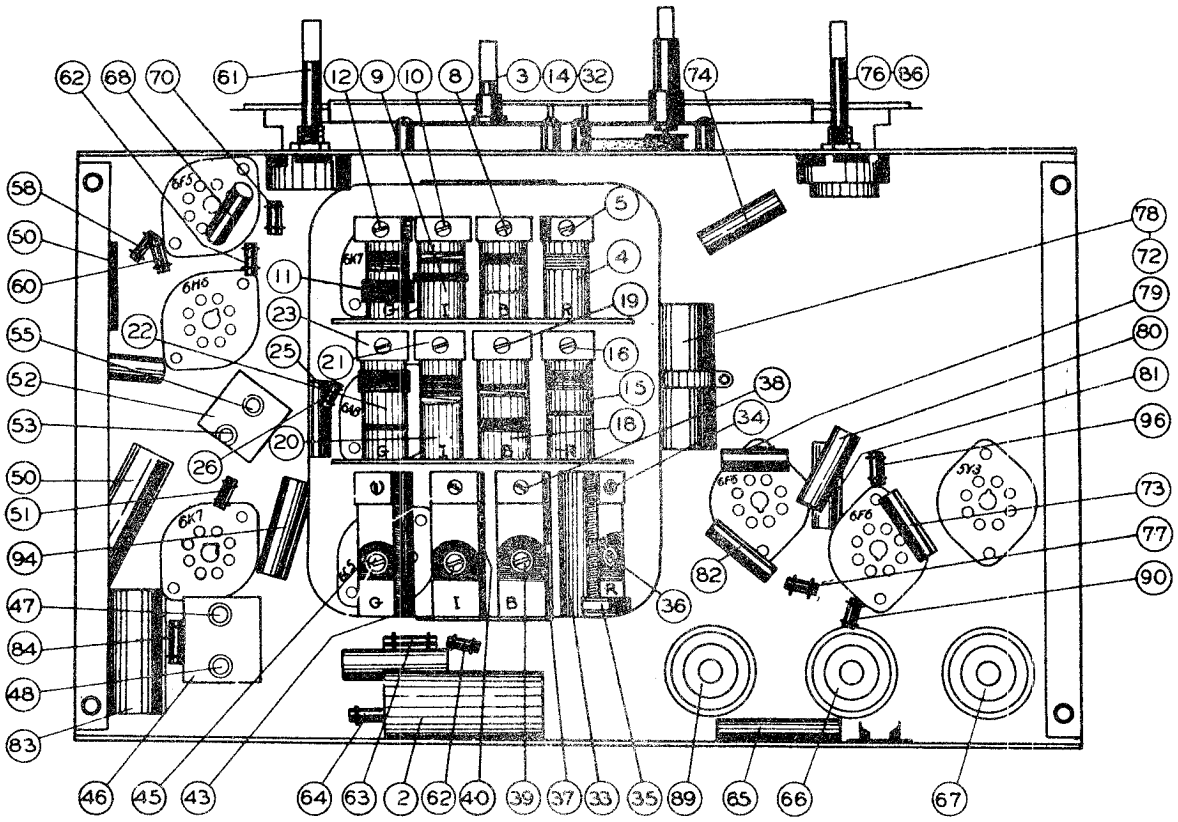



Figure No. 2

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## ELECTRICAL SPECIFICATIONS

Type and Number of Tubes ..... 2 #6K7, 1 #6A8, 1 #6C5, 1 #6H6, 1 #6P5, 2 #6P6, 1 #6G5, 1 #5Y3 - Total 10
Power Supply ..... 105 to 125 volts, 50 to 60 cycles
Power Consumption ..... 80 Watts
Maximum Undistorted Output ..... 4.5 Watts
Maximum Output ..... 6.5 Watts
Tuning Ranges ..... (Green Band - 150 to 390 KC. (White Band - 525 to 1800 KC. (Blue Band - 1750 to 6000 KC. (Red Band - - 5800 to 18500 KC.
Line-Up Frequencies .. I.F. 465 KC.,350 KC.,165 KC.,1600 KC.,570 KC.,5500 KC.,1900 KC., 17000 KC., and 6000 KC.

## LINE-UP CAPACITOR ADJUSTMENTS

ADJUSTMENT OF I.F. (465 KC.)

1. Set volume control on full and turn tone control to bass position.
2. Connect output meter across voice coil of speaker.
3. Set test oscillator to 465 KC. and adjust its output to produce a measurable reading on output meter when test signal is applied to the grid of 6K7 I.F. tube through a .5 mfd. blocking condenser.
4. Adjust trimmers #53 and #55 for maximum output reducing output of test oscillator as required.
5. Apply test signal to grid of 6A8 first detector and adjust #47 and #48 for maximum output.

ADJUSTMENT OF GREEN BAND

1. Set wave change switch to Green Band position.
2. Set test oscillator and dial indicator to 350 KC.
3. Apply test signal to antenna terminal of the chassis through a .0002 mfd. series condenser an adjust #44, #23, and #12 for maximum output.
4. Set test oscillator and dial indicator to 165 KC. and adjust #45 for maximum output, at the same time rocking the variable tuning condenser.
5. Return to 350 KC. setting with both test oscillator and dial indicator and repeat adjustment of #44, #23 and #12 for accuracy.

ADJUSTMENT OF BROADCAST BAND

1. Set wave change switch to the White or Broadcast Band position.
2. Set test oscillator and dial indicator to 1600 KC. and adjust #42, #21 and #10 for maximum output.
3. Set test oscillator and dial indicator to 570 KC., and adjust #41 for maximum output, at the same time rocking the variable tuning condenser.
4. Return to 1600 KC. setting and make readjustment of #42, #21 and #10.

ADJUSTMENT OF BLUE BAND

NOTE: In adjusting the Blue and Red Bands, a .0002 mfd. condenser and a 400 ohm resistor connected in series should be inserted in the high side of the test oscillator leads. This condenser-resistor combination is the approximate equivalent of a short-wave antenna.

1. Set wave change switch to Blue Band position.
2. Set test oscillator and dial indicator to 5500 KC. and adjust #38, #19 and #8 for maximum output.
3. Set test oscillator and dial indicator to 1900 KC. and adjust #39 for maximum output, at the same time rocking the variable tuning condenser.

ADJUSTMENT OF RED BAND

1. Set wave change switch to Red Band position.
2. Set test oscillator and dial indicator to 17000 KC. and adjust #34, #16 and #5 for maximum output.
3. Set test oscillator and dial indicator to 6000 KC. and adjust #36 for maximum output, at the same time rocking the variable tuning condenser.
4. Return to 17000 KC. setting and make readjustment of #34, #16 and #5.

IMPORTANT: While testing or making repairs on this receiver, the chassis should not be turned upside down or on its side for any long period of time while the set is turned on as the chemicals in the electrolytic filter condenser will come out through the air vents making the condenser appear to be defective. If left in this position too long the condenser may be injured.

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE

| Dia. # | Part # | Description of Parts | List Price |
|---|---|---|---|
| 1 | CG 9551 | Variable condenser - 3 gang | $ 4.50 |
| 2 | CW 2-100 | 1 mfd., 200 V. condenser | .40 |
| 3 | SW 9555 | Switch and bracket assembly - antenna section | 1.40 |
| 4 | RC 95220 | Antenna coil (Red) | .95 |
| 5 | CS 9554 | 4-30 mmf. trimmer condenser | .15 |
| 6 | | Twisted wire - part of RC 95220 | |
| 7 | RC 95212 | Antenna coil (Blue) | .80 |
| 8 | CS 9554 | 4-30 mmf. trimmer condenser | .15 |
| 9 | RC 95218 | Antenna coil (White) | 1.00 |
| 10 | CS 9554 | 4-30 mmf. trimmer condenser | .15 |
| 11 | RC 95219 | Antenna coil (Green) | 1.25 |
| 12 | CS 9554 | 4-30 mmf., trimmer condenser | .15 |
| 13 | CW 9513 | .05 mfd., 200 V. condenser | .25 |
| 14 | SW 9556 | Switch and bracket assembly - R.F. section | 1.40 |
| 15 | RC 95217 | R.F. coil (Red) | 1.35 |
| 16 | CS 9554 | 4-30 mmf. trimmer condenser | .15 |
| 17 | CM 9512 | 6 mmf. mica condenser | .15 |
| 18 | RC 95214 | R.F. coil (Blue) | 1.00 |
| 19 | CS 9553 | 1.5-10 mmf. trimmer condenser | .15 |
| 20 | RC 95215 | R.F. coil (White) | 1.00 |
| 21 | CS 9554 | 4-30 mmf. trimmer condenser | .15 |
| 22 | RC 95216 | R.F. coil (Green) | 1.30 |
| 23 | CS 9553 | 1.5-10 mmf. trimmer condenser | .15 |
| 24 | | .1 meg., 1/4 W. resistor - part of RC 95216 | |
| 25 | RE 9529 | 300 ohm, 1/4 W. resistor | .10 |
| 26 | CW 2-05 | .05 mfd., 200 V. condenser | .15 |
| 27 | CM 9511 | .000065 mfd. mica condenser | .15 |
| 28 | RE 9537 | 50 ohm, 1/4 W. resistor | .10 |
| 29 | RE 9524 | 50,000 ohm, 1/4 W. resistor | .10 |
| 30 | CW 9515 | .05 mfd., 200 V. condenser | .25 |
| 31 | RE 9526 | 5,000 ohm, 1 W. resistor | .20 |
| 32 | SW 9557 | Switch and bracket assembly - oscillator section | 1.50 |
| 33 | RC 95223 | Oscillator coil (Red) | 2.50 |
| 34 | | 3-15 mmf., trimmer condenser - part of CS 9557 | .80 |
| 35 | CM 959 | .002 mfd., mica condenser | .25 |
| 36 | | 800-1600 mmf. oscillator series cond. - part of CS 9557 | |
| 37 | RC 95213 | Oscillator coil (Blue) | 1.75 |
| 38 | | 3-15 mmf. trimmer condenser - part of CS 9520 | .75 |
| 39 | | 800-1600 mmf. osc. series condenser - part of CS 9520 | |
| 40 | RC 95221 | Oscillator coil (White) | 1.80 |
| 41 | | 300-600 mmf. osc. series condenser - part of CS 9517 | .55 |
| 42 | | 5-25 mmf. trimmer condenser - part of CS 9517 | |
| 43 | RC 95222 | Oscillator coil (Green) | 1.85 |
| 44 | | 50-100 mmf. trimmer condenser - part of CS 9558 | .50 |
| 45 | | 60-150 mmf. osc. series condenser - part of CS 9558 | |
| 46 | IC 9576 | First I.F. coil assembly - 465 K.C. | 1.50 |
| 47 | | 80-200 mmf. trimmer condenser - part of IC 9576 | |
| 48 | | 80-200 mmf. trimmer condenser - part of IC 9576 | |
| 49 | RE 9585 | .25 meg., 1/4 W. resistor | .15 |
| 50 | CW 2-25 | .25 mfd., 200 V. condenser | .15 |
| 51 | SA 105277 | 75,000 ohm, 1/4 W. resistor | .15 |
| 52 | IC 9577 | Second I.F. coil assembly - 465 KC. | 1.85 |
| 53 | | 80-200 mmf. trimmer condenser - part of IC 9577 | |
| 54 | | 100 mmf. mica condenser - part of IC 9577 | |
| 55 | | 80-200 mmf. trimmer condenser - part of IC 9577 | |
| 56 | | 50,000 ohm, 1/4 W. resistor - part of IC 9577 | |
| 57 | | 100 mmf. mica condenser - part of IC 9577 | |
| 58 | SA 105281 | 1 meg., 1/4 W. resistor | .15 |
| 59 | CW 2-05 | .05 mfd., 200 V. condenser | .15 |
| 60 | SA 105281 | 1 meg., 1/4 W. resistor | .15 |
| 61 | VR 959 | .5 meg. volume control | 1.00 |
| 62 | SA 105268 | 1500 ohm, 1/4 W. resistor | .15 |
| 63 | SA 104966 | 30,000 ohm, 1/2 W. resistor | .15 |
| 64 | SA 101404 | 15,000 ohm, 1 W. resistor | .20 |
| 65 | SA 103835 | 10,000 ohm, 2 W. resistor | .25 |
| 66 | CE 9536 | 12 mfd., 450 V. electrolytic condenser | .80 |
| 67 | CE 9535 | 16 mfd., 300 V. electrolytic condenser | .75 |
| 68 | CW 4-02 | .02 mfd., 400 V. condenser | .15 |
| 69 | SA 105281 | 1 meg., 1/4 W. resistor | .15 |
| 70 | RE 9584 | .1 meg., 1/4 W. resistor | .15 |
| 71 | CW 4-10 | .1 mfd., 400 V. condenser | .15 |
| 72 | CE 9526 | 12 mfd., 25 V. electrolytic condenser | .90 |
| 73 | CW 4-02 | .02 mfd., 400 V. condenser | .15 |
| 74 | CW 4-02 | .02 mfd., 400 V. condenser | .15 |
| 75 | TR 9563 | Interstage transformer | 2.50 |
| 76 | VR 9537 | .1 meg., tone control - 5,000 ohm min. | 1.00 |
| 77 | RE 9585 | .25 meg., 1/4 W. resistor | .15 |
| 78 | | 12 mfd. electrolytic condenser - part of CE 9526 | |
| 79 | RE 9587 | 500 ohm resistor | .35 |
| 80 | CW 4-005 | .005 mfd., 400 V. condenser | .15 |
| 81 | CW 4-005 | .005 mfd., 400 V. condenser | .15 |
| 82 | CW 4-02 | .02 mfd., 400 V. condenser | .15 |
| 83 | CW 9526 | 1 mfd., 400 V. condenser | .40 |
| 84 | SA 105272 | 10,000 ohm, 1/4 W. resistor | .15 |
| 85 | TR 9562 | Power transformer - 105-125 V., 50-60 cycle | 5.00 |
| 86 | | On & Off switch - part of VR 9537 | |
| 87 | LP 9515 | Dial lamp - 3.5 V., .35 amp. | .20 |
| 88 | LP 9510 | Tuning indicator lamp - 6.3 V., .25 amp. | .15 |
| 89 | CE 9528 | 8 mfd., 450 V. electrolytic condenser | .80 |
| 90 | RE 95101 | 37 ohm, 1/4 W. resistor | .15 |
| 91 | SK 9537 | Speaker | 7.50 |
| 92 | TR 9577 | Output transformer | 1.75 |
| 93 | SA 107282 | Diaphragm and voice coil assembly | 1.15 |
| 94 | CW 4-05 | .05 mfd., 400 V. condenser | .15 |
| 96 | RE 9585 | .25 meg., 1/4 W. resistor | .15 |
| 98 | | 1 meg., 1/4 W. resistor - part of CB 9598 | |
| 99 | CB 9512 | Line cable and plug | .60 |
| 100 | CB 9598 | "Precision eye" cable assembly | .70 |
| 101 | CW 2-05 | .05 mfd., 200 V. condenser | .15 |

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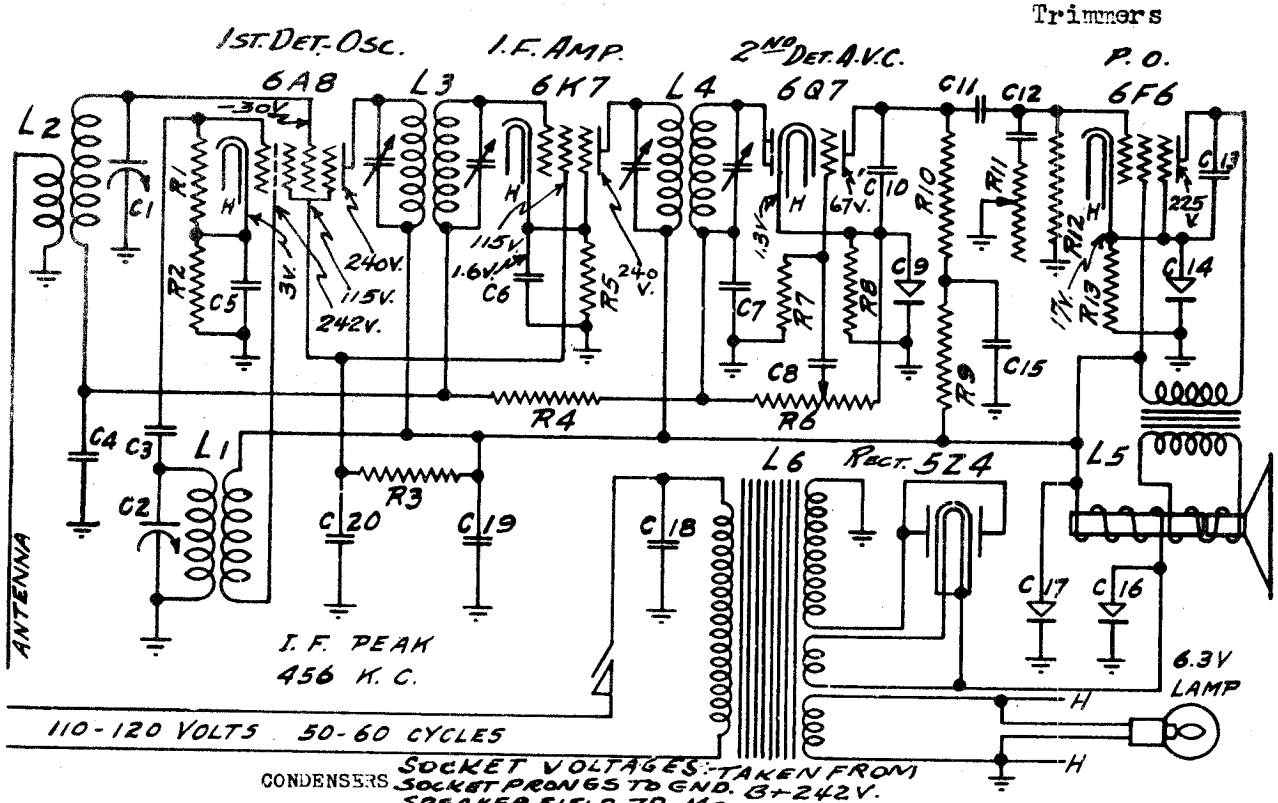
# WILCOX-GAY CORP.

MODEL 7E5
Schematic, Voltage
Alignment, Socket
Trimmers




SOCKET VOLTAGES:-TAKEN FROM SOCKET PRONGS TO GND. B+242V. SPEAKER FIELD 7B. METER 1000 OHMS/VOLT.

CONDENSERS

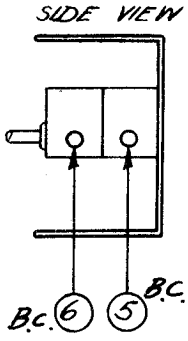
| | | |
|---|---|---|
| C1 | 77-2007 | Preselector Section of Variable Condenser |
| C2 | 77-2007 | Oscillator Section of Variable Condenser |
| C3 | 76-2002 | .00005 Mfd. Mica Condenser |
| C4 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C5 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C6 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C7 | 76-268 | .00025 Mfd. Mica Condenser |
| C8 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C9 | 18-928 | 25 Mfd. 25 V. Dry Electrolytic Cond. |
| C10 | 76-662 | .002 Mfd. Mica Condenser |
| C11 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C12 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C13 | 75-2002 | .004 Mfd. 600 V. Paper Condenser |
| C14 | 18-928 | 25 Mfd. 25 V. Dry Electrolytic Cond. |
| C15 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C16 | 18-2008 | 6 Mfd. 350 W.V. Dry Electrolytic |
| C17 | 18-2008 | 6 Mfd. 250 W.V. Dry Electrolytic |
| C18 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C19 | 75-2011 | .5 Mfd. 200 V. Paper Condenser |
| C20 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |

INDUCTANCES

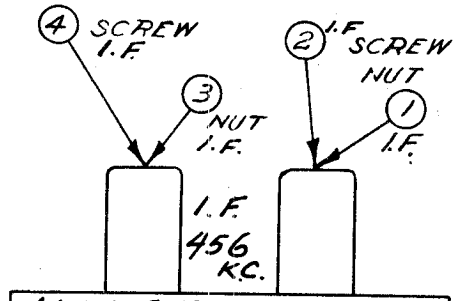
| | | |
|---|---|---|
| L1 | 17-2135 | Oscillator Coil Assembly |
| L2 | 17-2138 | Preselector Coil Assembly |
| L3 | 68-2040 | First I.F. Transformer Assembly |
| L4 | 68-2041 | Second I.F. Transformer Assembly |
| L5 | 64-2045 | 5" Speaker, 1500 Ohm Field, 6F6 Output Trans. |
| L6 | 80-2009 | Power Transformer for 110-120 V. 60 Cycle |

RESISTORS

| CODE | PART NO. | |
|---|---|---|
| R1 | 53-898 | 50,000 Ohm Type M Resistor |
| R2 | 53-1062 | 250 Ohm Wirewound Resistor |
| R3 | 53-1042 | 25,000 Ohm Type M Resistor |
| R4 | 53-926 | 1 Meg Ohm Type M Resistor |
| R5 | 53-1062 | 250 Ohm Wirewound Resistor |
| R6 | 19-1291 | 500,000 Ohm Volume Control & Line Switch |
| R7 | 53-925 | 500,000 Ohm Type M Resistor |
| R8 | 53-919 | 5,000 Ohm Type M Resistor |
| R9 | 53-923 | 100,000 Ohm Type M Resistor |
| R10 | 53-924 | 250,000 Ohm Type M Resistor |
| R11 | 19-1317 | 250,000 Ohm Tone Control |
| R12 | 53-925 | 500,000 Ohm Type M Resistor |
| R13 | 53-1063 | 500 Ohm Wirewound Resistor |

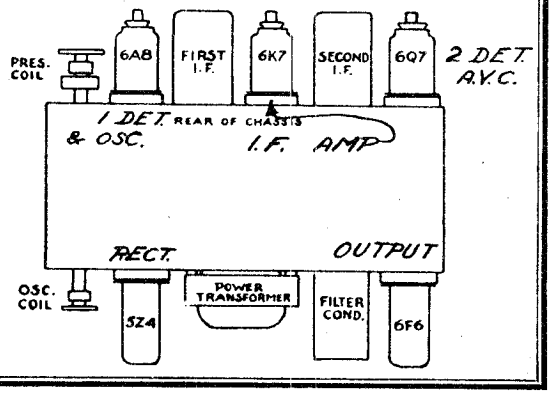



25-2120




ALIGN I.F. TRIMMERS, ABOVE, IN NUMERICAL ORDER DIAL SET AT 1400 KC. (REMOVE GRID CAP OF 6A8) ALIGN 5, 6, AT 1400 KC. THEN 600 KC. (6A8 GRID CAP CONNECTED) USE A STANDARD DUMMY ANT. - VOL. CONTR ON FULL AT ALL TIMES. REAR VIEW

ALIGNMENT:- CONNECT OUTPUT METER BETWEEN PLATE 6F6 AND GROUND.

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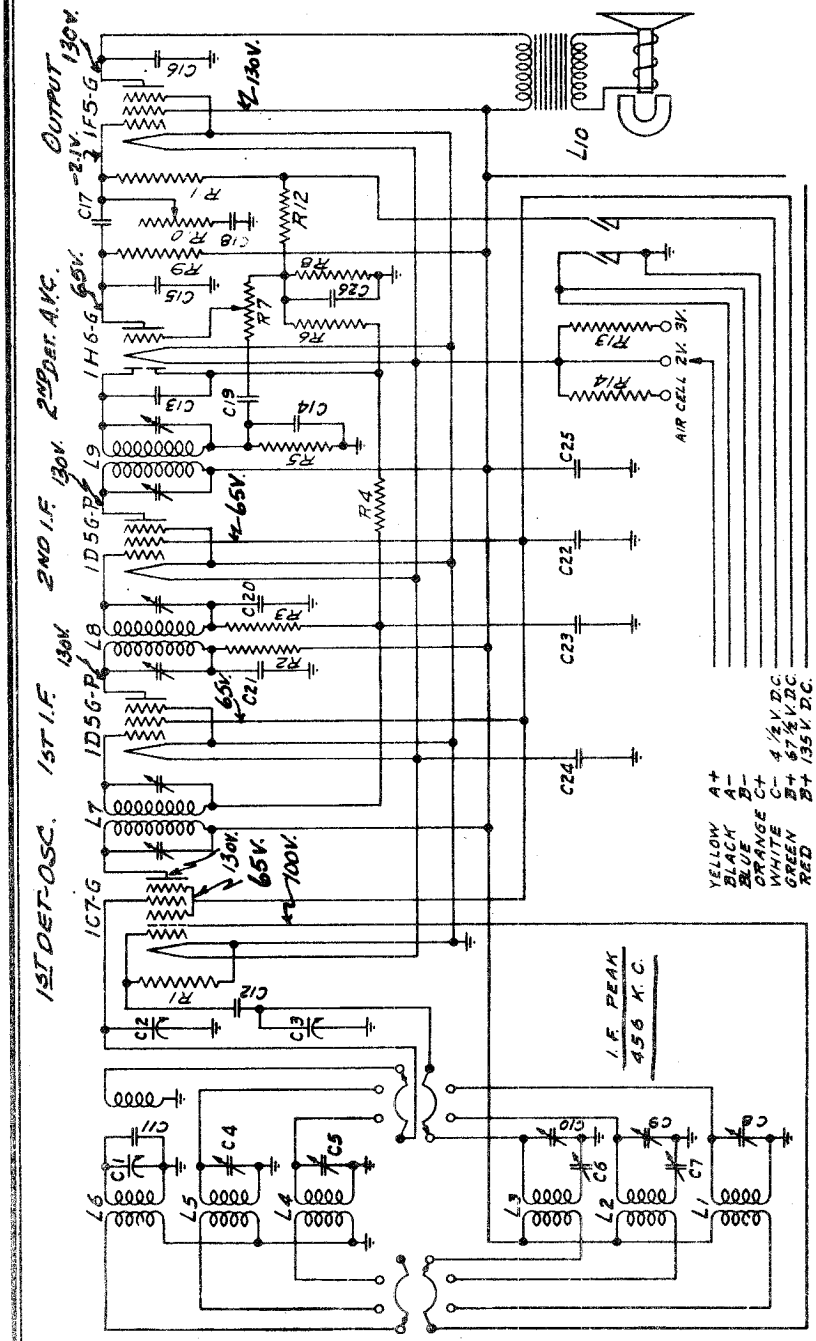
MODELS A41,A42
Chassis 7R5
Schematic,Voltage
Socket,Alignment

# WILCOX-GAY CORP.



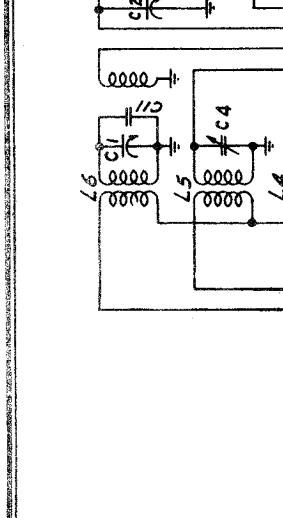

VOLTAGES MEASURED FROM SOCKET PRONGS TO GROUND, WITH A 1000 OHM PER VOLT METER. FILAMENT VOLTAGE 1.5.

25-2133

CONVENTIONAL ALIGNMENT

SEE SPECIAL SECTION VOL. VIII

LOCATION OF TUBES




| CODE | PART NO. | RESISTORS |
|---|---|---|
| R1 | 53-898 | 50,000 Ohm 1/4 Watt Resistor |
| R2 | 53-919 | 5,000 Ohm 1/4 Watt Resistor |
| R3 | 53-925 | 100,000 Ohm 1/4 Watt Resistor |
| R4 | 53-926 | 1 Meg Ohm 1/4 Watt Resistor |
| R5 | 53-928 | 500,000 Ohm 1/4 Watt Resistor |
| R6 | 53-928 | 500,000 Ohm Volume Control |
| R7 | 19-8008 | 500,000 Ohm 1/4 Watt Resistor |
| R8 | 53-923 | 100,000 Ohm 1/4 Watt Resistor |
| R9 | 53-924 | 250,000 Ohm Tone Control & D.P.S.T. Switch |
| R10 | 19-8010 | 250,000 Ohm 1/4 Watt Resistor |
| R11 | 53-925 | 500,000 Ohm 1/4 Watt Resistor |
| R12 | 53-898 | 50,000 Ohm 1/4 Watt Resistor |
| R13 | 53-2016 | 2.1Ω Ohm Wirewound Resistor |
| R14 | 53-2015 | .7Ω Ohm Wirewound Resistor |

| CODE | PART NO. | CONDENSERS |
|---|---|---|
| C1,C2,C3 | 77-2011 | 3 Gang Tuning Condenser |
| C4, C5 | 78-1887 | 3-30 Mmfd. 2 Gang Trimmer Cond. |
| C6, C7 | 78-2088 | 600 & 1600 Mmfd. 2 Gang Trimmer Cond. |
| C8,C9,C10 | 78-2030 | 3-60 Mmfd. 3 Gang Trimmer Condenser |
| C11 | 76-2003 | .00001 Mfd. Mica Condenser |
| C12 | 76-2002 | .00005 Mfd. Mica Condenser |
| C13 | 76-2002 | .00005 Mfd. Mica Condenser |
| C14 | 76-2002 | .00005 Mfd. Mica Condenser |
| C15 | 76-307 | .0008 Mfd. Mica Condenser |

| CODE | PART NO. | CONDENSERS (Cont'd.) |
|---|---|---|
| C15 | 76-265 | .001 Mfd. Mica Condenser |
| C16 | 75-2002 | .004 Mfd. 600 V. Paper Condenser |
| C17 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C18 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C19 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C20 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C21 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C22 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C23 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C24 | 75-2011 | .5 Mfd. 200 V. Paper Condenser |
| C25 | 75-2011 | .5 Mfd. 200 V. Paper Condenser |
| C26 | 75-2011 | .5 Mfd. 200 V. Paper Condenser |

| CODE | PART NO. | INDUCTANCES |
|---|---|---|
| L1 | 17-2165 | Foreign Band Oscillator Coil Assembly |
| L2 | 17-2170 | Police Band Oscillator Coil Assembly |
| L3 | 17-2150 | Broadcast Band Oscillator Coil Assembly |
| L4 | 17-2182 | Foreign Band Preselector Coil Assembly |
| L5 | 17-2168 | Police Band Preselector Coil Assembly |
| L6 | 17-2151 | Broadcast Band Preselector Coil Assembly |
| L7 | 68-2047 | First I. F. Transformer Assembly |
| L8 | 68-2047 | Second I. F. Transformer Assembly |
| L9 | 68-2048 | Third I. F. Transformer Assembly |
| L10 | 64-2052 | 5" Speaker-Permanent Magnet Field for Model A-41<br>6½" Speaker Permanent Magnet Field, for Model A-42<br>Output Trans. for single 1F5-G |
| L10 | 64-2053 | Output Trans. for single 1F5-G |

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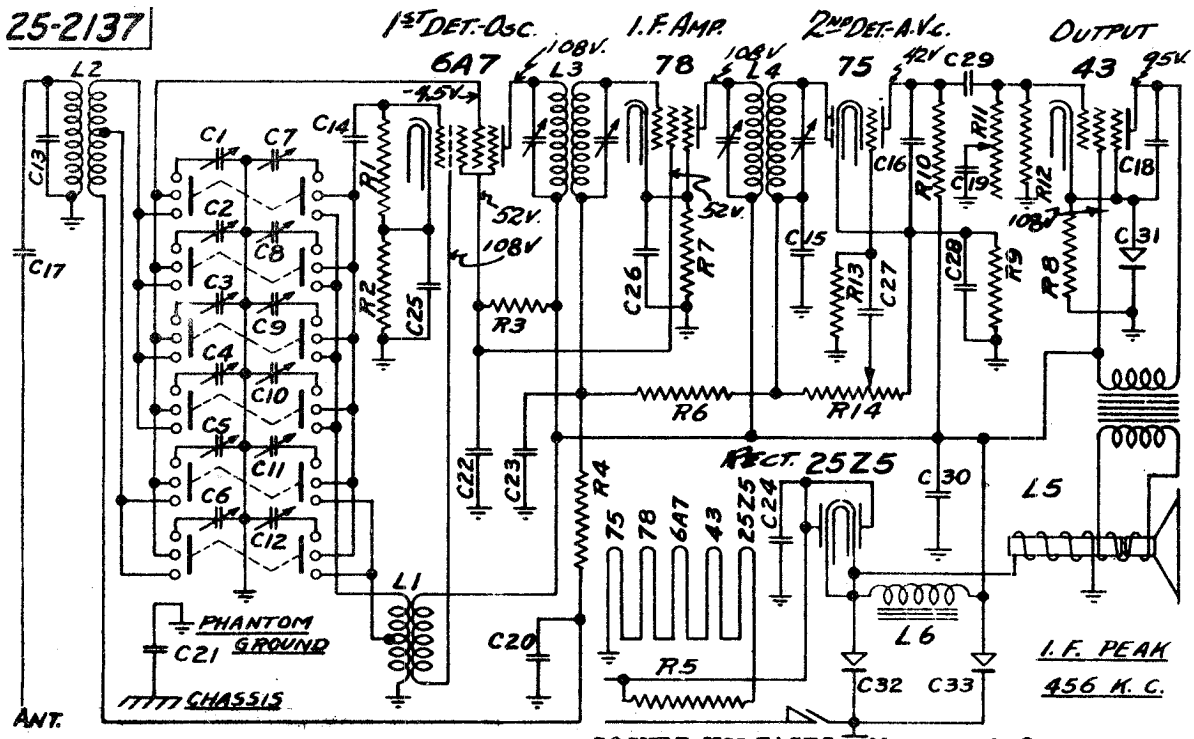
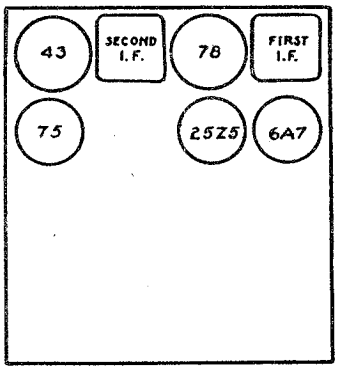
# WILCOX-GAY CORP.

MODEL A48
Chassis 7S5
Schematic, Voltage
Socket, Alignment




## CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

LOCATION OF TUBES




**SOCKET VOLTAGES,** Measured from socket prongs to ground with a 1000 ohm per volt meter. B+ 180V., Speaker field 125 V., Line voltage was 120 at 60 cycles.

| | | |
|---|---|---|
| C1, C2 | 78-2033 | 40-240 Mmfd. Two Gang Trimmer Condenser |
| C3, C4 | 78-2033 | 40-240 Mmfd. Two Gang Trimmer Condenser |
| C5, C6 | 78-2033 | 40-240 Mmfd. Two Gang Trimmer Condenser |
| C7, C8 | 78-2033 | 40-240 Mmfd. Two Gang Trimmer Condenser |
| C9, C10 | 78-2033 | 40-240 Mmfd. Two Gang Trimmer Condenser |
| C11, C12 | 78-2033 | 40-240 Mmfd. Two Gang Trimmer Condenser |
| C13 | 76-2002 | .00005 Mfd. Mica Condenser |
| C14 | 76-2002 | .00005 Mfd. Mica Condenser |
| C15 | 76-307 | .0005 Mfd. Mica Condenser |
| C16 | 76-265 | .001 Mfd. Mica Condenser |
| C17 | 76-265 | .001 Mfd. Mica Condenser |
| C18 | 75-2002 | .004 Mfd. 600 V. Paper Condenser |
| C19 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C20 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C21 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C22 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C23 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C24 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C25 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C26 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C27 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C28 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C29 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C30 | 75-2011 | .5 Mfd. 200 V. Paper Condenser |
| C31 | 18-928 | 25 Mfd. 25 V. Dry Electrolytic Cond. |
| C32, C33 | 18-2009 | 20 Mfd. & 10 Mfd. 150 W.V. Dry Elect. Cond. |

| CODE | PART NO. | RESISTORS |
|---|---|---|
| R1 | 53-898 | 50,000 Ohm 1/4 Watt Resistor |
| R2 | 53-1062 | 250 Ohm Wirewound Resistor |
| R3 | 53-1042 | 25,000 Ohm 1/4 Watt Resistor |
| R4 | 53-923 | 100,000 Ohm 1/4 Watt Resistor |
| R5 | 20-2009 | 173 Ohm Resistor in Power Line Cord |
| R6 | 53-926 | 1 Megohm 1/4 Watt Resistor |
| R7 | 53-1063 | 500 Ohm Wirewound Resistor |
| R8 | 53-1063 | 500 Ohm Wirewound Resistor |
| R9 | 53-919 | 5,000 Ohm 1/4 Watt Resistor |
| R10 | 53-924 | 250,000 Ohm 1/4 Watt Resistor |
| R11 | 19-2009 | 250,000 Ohm Tone Control |
| R12 | 53-925 | 500,000 Ohm 1/4 Watt Resistor |
| R13 | 53-925 | 500,000 Ohm 1/4 Watt Resistor |
| R14 | 19-2007 | 500,000 Ohm Volume Control & Off-On Switch |

INDUCTANCES

| | | |
|---|---|---|
| L1 | 17-2198 | Oscillator Coil Assembly |
| L2 | 17-2200 | Preselector Coil Assembly |
| L3 | 68-2051 | First I. F. Transformer Assembly |
| L4 | 68-2052 | Second I. F. Transformer Assembly |
| L5 | 64-2055 | 4" Speaker, 2100 Ohm, 43 Tube Output Trans. |
| L6 | 14-2002 | 20 Henry Filter Choke |

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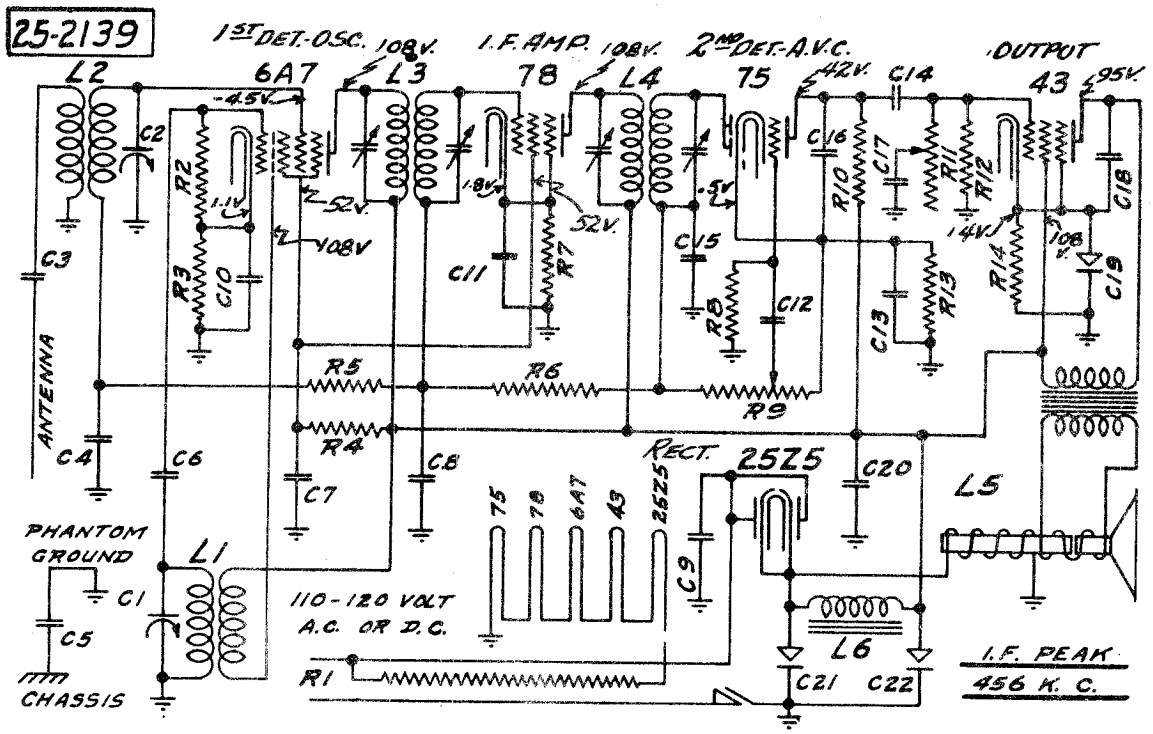
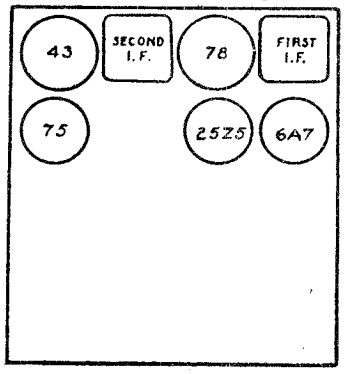
MODEL A49
Chassis 7T5
Schematic, Voltage
Alignment, Socket

# WILCOX-GAY CORP.




SOCKET VOLTAGES, Measured from socket prongs to ground with a 1000 ohm per volt meter. B+ 180V., Speaker field 125 V., Line voltage was 120 at 60 cycles.

LOCATION OF TUBES




CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

RESISTORS

| CODE | PART NO. | |
|---|---|---|
| R1 | 20-2009 | 173 Ohm Resistor in Power Line Cord |
| R2 | 53-898 | 50,000 Ohm 1/4 Watt Resistor |
| R3 | 53-1062 | 250 Ohm Wirecohm Resistor |
| R4 | 53-1042 | 25,000 Ohm 1/4 Watt Resistor |
| R5 | 53-923 | 100,000 Ohm 1/4 Watt Resistor |
| R6 | 53-926 | 1 Megohm 1/4 Watt Resistor |
| R7 | 53-1063 | 500 Ohm Wirewound Resistor |
| R8 | 53-1063 | 500 Ohm Wirewound Resistor |
| R9 | 19-2007 | 500,000 Ohm Volume Control & Off-On Switch |
| R10 | 53-924 | 250,000 Ohm 1/4 Watt Resistor |
| R11 | 19-2009 | 250,000 Ohm Tone Control |
| R12 | 53-925 | 500,000 Ohm 1/4 Watt Resistor |
| R13 | 53-919 | 5,000 Ohm 1/4 Watt Resistor |
| R14 | 53-1063 | 500 Ohm Wirecohm Resistor |

CONDENSERS

| | | |
|---|---|---|
| C1, C2 | 77-2007 | 2 Gang Variable Condenser |
| C3 | 76-265 | .001 Mfd. Mica Condenser |
| C4 | 76-2003 | .01 Mfd. 200 V. Paper Condenser |
| C5 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C6 | 76-2002 | .00005 Mfd. Mica Condenser |
| C7 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C8 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C9 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C10 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C11 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C12 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C13 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C14 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C15 | 76-307 | .0005 Mfd. Mica Condenser |
| C16 | 76-265 | .001 Mfd. Mica Condenser |
| C17 | 75-2002 | .004 Mfd. 600 V. Paper Condenser |
| C18 | 75-2002 | .004 Mfd. 600 V. Paper Condenser |
| C19 | 18-928 | 25 Mfd. 25 V. Dry Electrolytic Cond. |
| C20 | 75-2011 | .5 Mfd. 200 V. Paper Condenser |
| C21, C22 | 18-2009 | 25 Mfd. & 10 Mfd. W.V. Dry Elect. Cond. |

INDUCTANCES

| | | |
|---|---|---|
| L1 | 17-2204 | Oscillator Coil Assembly |
| L2 | 17-2202 | Preselector Coil Assembly |
| L3 | 68-2051 | First I.F. Transformer Assembly |
| L4 | 68-2052 | Second I.F. Transformer Assembly |
| L5 | 64-2055 | 4" Speaker, 2100 Ohm, 43 Tube Output Trans |
| L6 | 14-2002 | 20 Henry Filter Choke |

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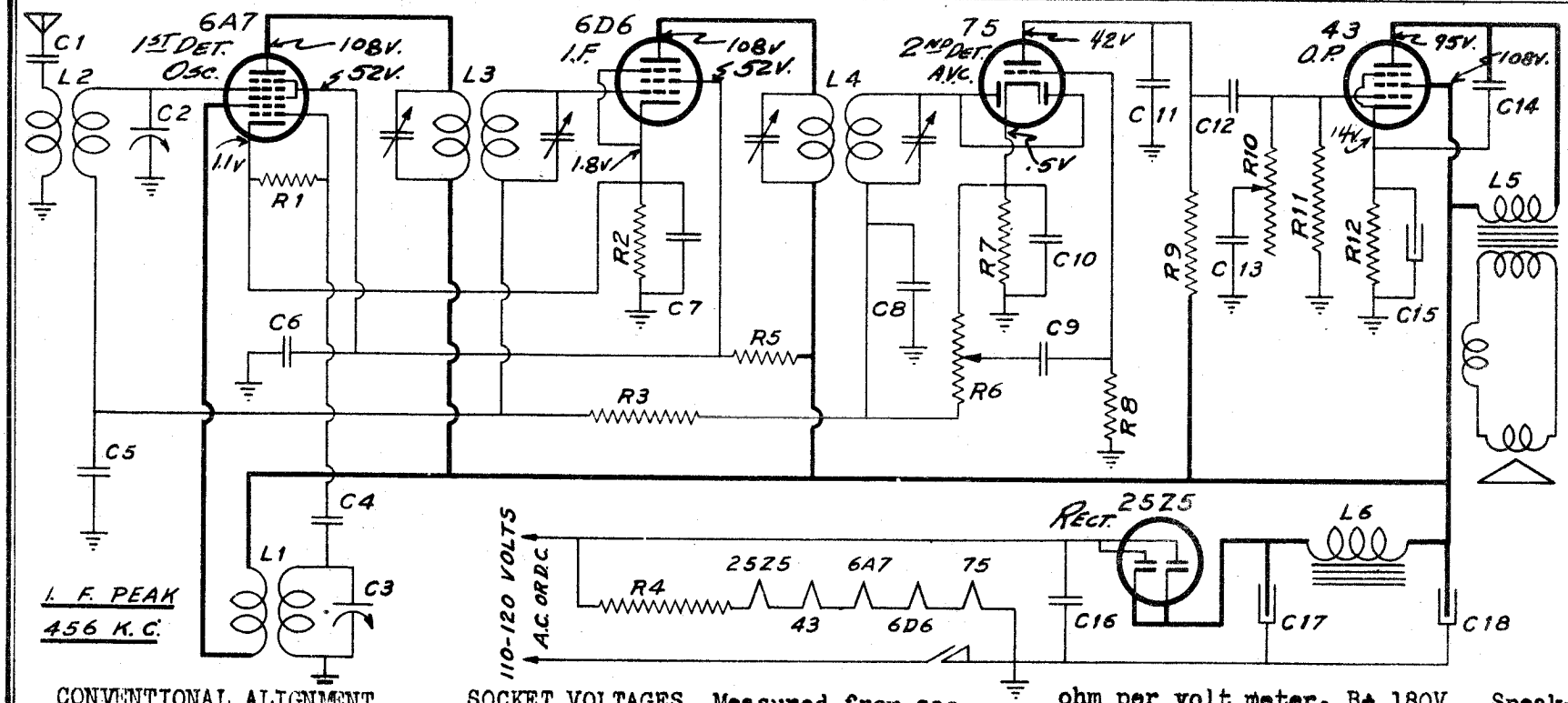
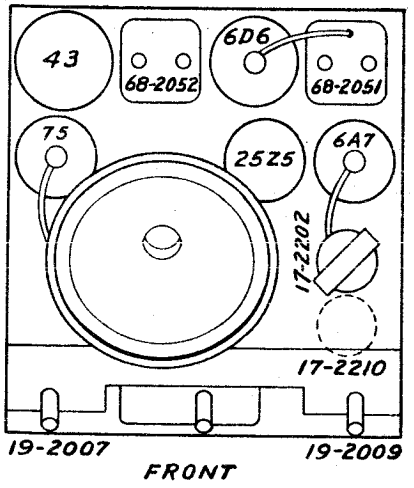



CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII




SOCKET VOLTAGES, Measured from socket prongs to ground with a 1000 ohm per volt meter. B+ 180V., Speaker field 125V., Line voltage was 120 at 60 cycles.

RESISTORS

| | | |
|---|---|---|
| R1 | 53-398 | 50,000 Ohm 1/4 Watt Resistor |
| R2 | 53-1062 | 250 Ohm 1/2 Watt Resistor |
| R3 | 53-926 | 1 Meg Ohm 1/4 Watt Resistor |
| R4 | 20-2009 | 173 Ohm Rest. in Power Cord |
| R5 | 53-1042 | 25,000 Ohm 1/4 Watt Resistor |
| R6 | 19-2007 | 500,000 Ohm Volume Cont. & Switch |
| R7 | 53-919 | 5,000 Ohm 1/4 Watt Resistor |
| R8 | 53-925 | 500,000 Ohm 1/4 Watt Resistor |
| R9 | 53-924 | 250,000 Ohm 1/4 Watt Resistor |
| R10 | 19-2009 | 250,000 Ohm Tone Control |
| R11 | 53-925 | 500,000 Ohm 1/4 Watt Resistor |
| R12 | 53-1063 | 500 Ohm 1/2 Watt Resistor |

CONDENSERS

| | | |
|---|---|---|
| C1 | 75-2001 | .002 Mfd. 600 V. Paper Cond. |
| C2, C3, | 77-2007 | Two Gang Variable Condenser |
| C4 | 76-2002 | .00005 Mfd. Mica Condenser |
| C5 | 75-2005 | .1 Mfd. 200 V. Paper Cond. |
| C6 | 75-2005 | .1 Mfd. 200 V. Paper Cond. |
| C7 | 75-2005 | .1 Mfd. 200 V. Paper Cond. |
| C8 | 76-307 | .0005 Mfd. Mica Condenser |
| C9 | 75-2005 | .1 Mfd. 200 V. Paper Cond. |
| C10 | 75-2005 | .1 Mfd. 200 V. Paper Cond. |
| C11 | 75-2014 | .001 Mfd. 600 V. Paper Cond. |
| C12 | 75-2005 | .1 Mfd. 200 V. Paper Cond. |
| C13 | 75-2003 | .01 Mfd. 400 V. Paper Cond. |
| C14 | 75-2002 | .004 Mfd. 600 V. Paper Cond. |
| C15 | 18-928 | 25 Mfd. 25 W.V. Dry Elect. Cond. |
| C16 | 75-2005 | .1 Mfd. 200 V. Paper Cond. |
| C17 | 18-2010 | 16 Mfd. 150 W.V. Dry Elect. Cond. |
| C18 | 18-2011 | 8 Mfd. 150 W.V. Dry Elect. Cond. |

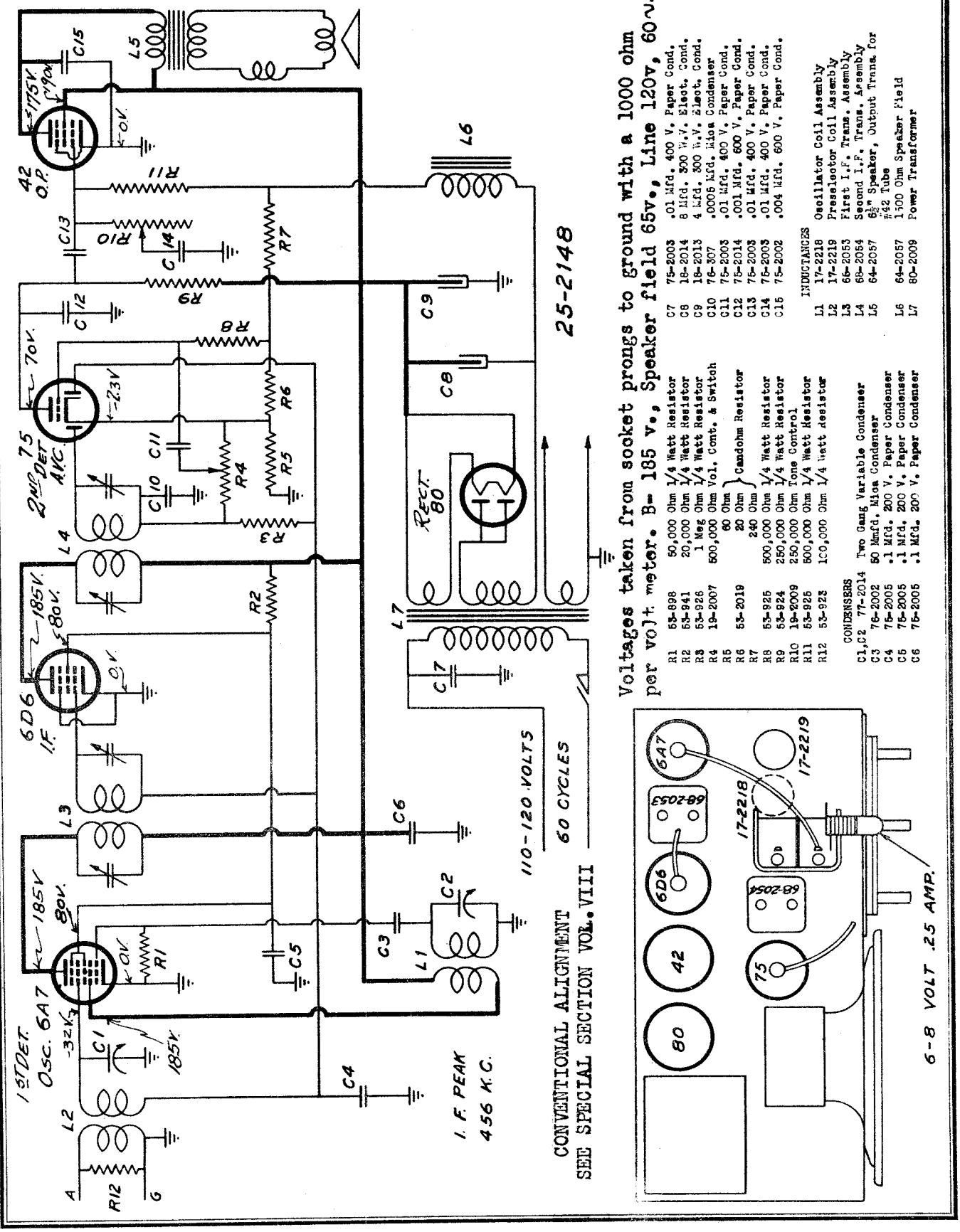
INDUCTANCES

| | | |
|---|---|---|
| L1 | 17-2210 | Oscillator Coil Assembly |
| L2 | 17-2202 | Preselector Coil Assembly |
| L3 | 68-2051 | First I.F. Trans. Assembly |
| L4 | 68-2052 | Second I.F. Trans. Assembly |
| L5 | 81-2003 | Output Transformer for # 43 Tube |
| L6 | 64-2056 | 4" Speaker, 450 Ohm Field |

25-2144

MODEL A52
Chassis 8E5
Schematic, Voltage
Socket, Alignment

# WILCOX-GAY CORP.




Voltages taken from socket prongs to ground with a 1000 ohm per volt meter. B- 185 v., Speaker field 65v., Line 120v., 60v.

| | | | | | | |
|---|---|---|---|---|---|---|
| R1 | 53-898 | 50,000 Ohm 1/4 Watt Resistor | C7 | 75-2003 | .01 Mfd. 400 V. Paper Cond. |
| R2 | 53-941 | 20,000 Ohm 1/4 Watt Resistor | C8 | 18-2014 | 8 Mfd. 300 W.V. Elect. Cond. |
| R3 | 53-926 | 1 Meg Ohm 1/4 Watt Resistor | C9 | 18-2013 | 4 Mfd. 300 W.V. Elect. Cond. |
| R4 | 19-2007 | 500,000 Ohm Vol. Cont. & Switch | C10 | 76-307 | .0005 Mfd. Mica Condenser |
| R5 | | 60 Ohm } Candohm Resistor | C11 | 75-2003 | .01 Mfd. 400 V. Paper Cond. |
| R6 | 53-2019 | 20 Ohm } | C12 | 75-2014 | .001 Mfd. 600 V. Paper Cond. |
| R7 | | 240 Ohm } | C13 | 75-2003 | .01 Mfd. 400 V. Paper Cond. |
| R8 | 53-925 | 500,000 Ohm 1/4 Watt Resistor | C14 | 75-2003 | .01 Mfd. 400 V. Paper Cond. |
| R9 | 53-924 | 250,000 Ohm 1/4 Watt Resistor | C15 | 75-2002 | .004 Mfd. 600 V. Paper Cond. |
| R10 | 19-2009 | 250,000 Ohm Tone Control | | | |
| R11 | 53-926 | 500,000 Ohm 1/4 Watt Resistor | | INDUCTANCES | |
| R12 | 53-923 | 100,000 Ohm 1/4 Watt Resistor | L1 | 17-2218 | Oscillator Coil Assembly |
| | | | L2 | 17-2219 | Preselector Coil Assembly |
| | CONDENSERS | | L3 | 68-2053 | First I.F. Trans. Assembly |
| C1,C2 | 77-2014 | Two Gang Variable Condenser | L4 | 68-2054 | Second I.F. Trans. Assembly |
| C3 | 76-2002 | 50 Mmfd. Mica Condenser | L5 | 64-2057 | 6½" Speaker, Output Trans. for #42 Tube |
| C4 | 75-2005 | .1 Mfd. 200 V. Paper Condenser | | | |
| C5 | 75-2005 | .1 Mfd. 200 V. Paper Condenser | L6 | 64-2057 | 1500 Ohm Speaker Field |
| C6 | 75-2005 | .1 Mfd. 200 V. Paper Condenser | L7 | 80-2009 | Power Transformer |

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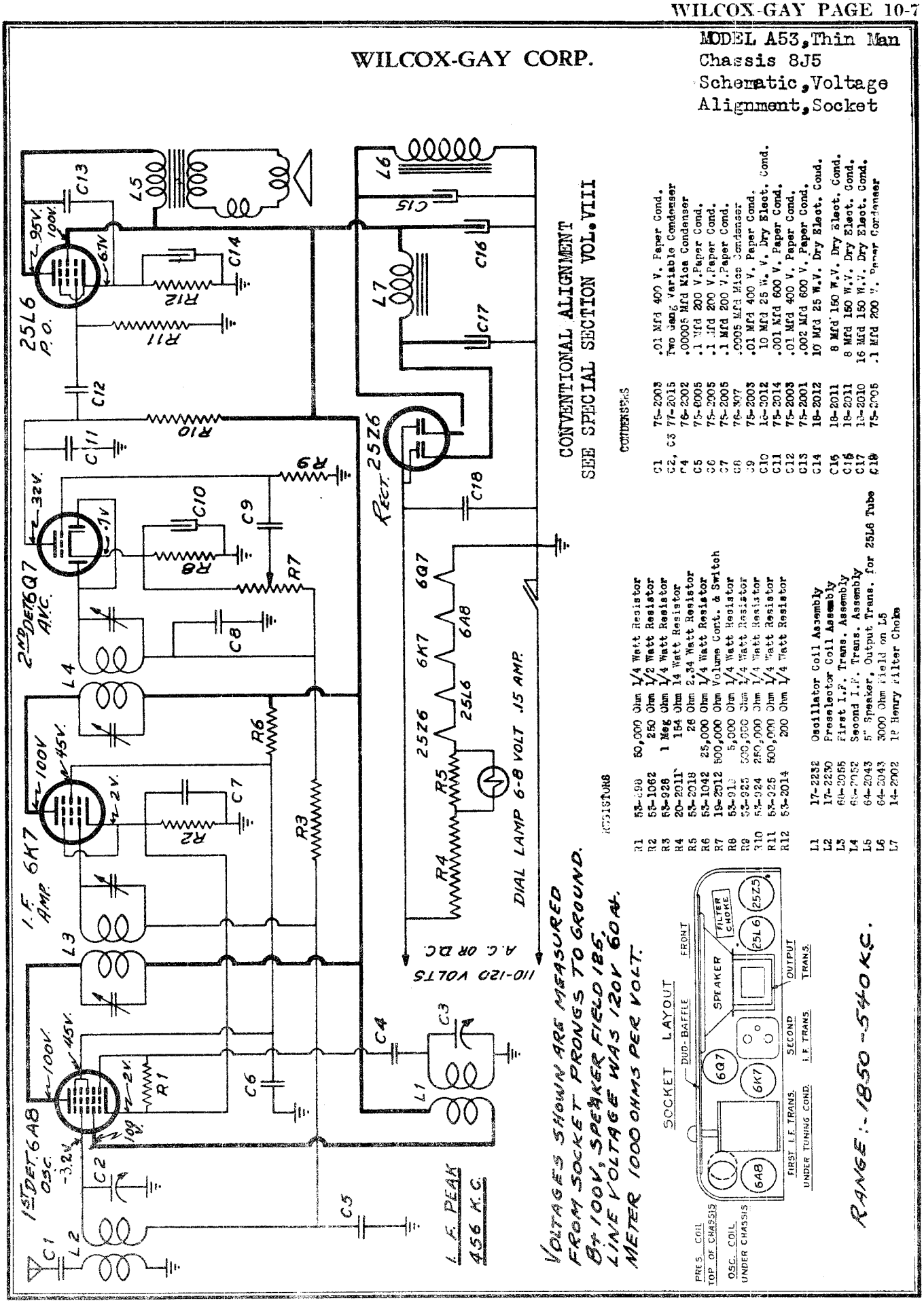
# WILCOX-GAY CORP.

MODEL A53, Thin Man
Chassis 8J5
Schematic, Voltage
Alignment, Socket


CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII
VOLTAGES SHOWN ARE MEASURED FROM SOCKET PRONGS TO GROUND. B+ 100V, SPEAKER FIELD 185, LINE VOLTAGE WAS 120V 60 ~. METER 1000 OHMS PER VOLT.
RANGE: - 1850 - 540 K.C.
I.F. PEAK 456 K.C.
1ST DET. 6A8 OSC.
I.F. AMP. 6K7
2ND DET. 6Q7 A.V.C.
2526 P.O.
Rect. 2526
DIAL LAMP 6-8 VOLT .15 AMP.
110-120 VOLTS A.C. OR D.C.
SOCKET LAYOUT
DUO-BAFFLE
FRONT
SPEAKER
FILTER CHOKE
OUTPUT TRANS.
SECOND I.F. TRANS.
FIRST I.F. TRANS.
UNDER TUNING COND.
PRES. COIL TOP OF CHASSIS
OSC. COIL UNDER CHASSIS

RESISTORS

| | | |
|---|---|---|
| R1 | 53-[illegible] | 50,000 Ohm 1/4 Watt Resistor |
| R2 | 53-1062 | 250 Ohm 1/2 Watt Resistor |
| R3 | 53-928 | 1 Meg Ohm 1/4 Watt Resistor |
| R4 | 20-2011 | 154 Ohm 14 Watt Resistor |
| R5 | 53-2018 | 26 Ohm 2.34 Watt Resistor |
| R6 | 53-1042 | 25,000 Ohm 1/4 Watt Resistor |
| R7 | 19-2012 | 500,000 Ohm Volume Cont. & Switch |
| R8 | 53-913 | 5,000 Ohm 1/4 Watt Resistor |
| R9 | 53-925 | 500,000 Ohm 1/4 Watt Resistor |
| R10 | 53-924 | 250,000 Ohm 1/4 Watt Resistor |
| R11 | 53-925 | 500,000 Ohm 1/4 Watt Resistor |
| R12 | 53-2014 | 200 Ohm 1/4 Watt Resistor |

| | | |
|---|---|---|
| L1 | 17-2232 | Oscillator Coil Assembly |
| L2 | 17-2230 | Preselector Coil Assembly |
| L3 | 68-2055 | First I.F. Trans. Assembly |
| L4 | 68-2052 | Second I.F. Trans. Assembly |
| L5 | 64-2043 | 5" Speaker, Output Trans. for 2516 Tube |
| L6 | 64-2043 | 3000 Ohm Field on L5 |
| L7 | 14-2002 | 12 Henry Filter Choke |

CONDENSERS

| | | |
|---|---|---|
| C1 | 75-2003 | .01 Mfd 400 V. Paper Cond. |
| C2, C3 | 77-2015 | Two Gang Variable Condenser |
| C4 | 76-2002 | .00005 Mfd Mica Condenser |
| C5 | 75-2005 | .1 Mfd 200 V.Paper Cond. |
| C6 | 75-2005 | .1 Mfd 200 V.Paper Cond. |
| C7 | 75-2005 | .1 Mfd 200 V.Paper Cond. |
| C8 | 76-307 | .0005 Mfd Mica Condenser |
| C9 | 75-2003 | .01 Mfd 400 V. Paper Cond. |
| C10 | 16-2012 | 10 Mfd 25 W.V. Dry Elect. Cond. |
| C11 | 75-2014 | .001 Mfd 600 V. Paper Cond. |
| C12 | 75-2003 | .01 Mfd 400 V. Paper Cond. |
| C13 | 75-2001 | .002 Mfd 600 V. Paper Cond. |
| C14 | 16-2012 | 10 Mfd 25 W.V. Dry Elect. Cond. |
| C15 | 16-2011 | 8 Mfd 150 W.V. Dry Elect. Cond. |
| C16 | 16-2011 | 8 Mfd 150 W.V. Dry Elect. Cond. |
| C17 | 16-2010 | 16 Mfd 150 W.V. Dry Elect. Cond. |
| C18 | 75-2005 | .1 Mfd 200 V. Paper Condenser |

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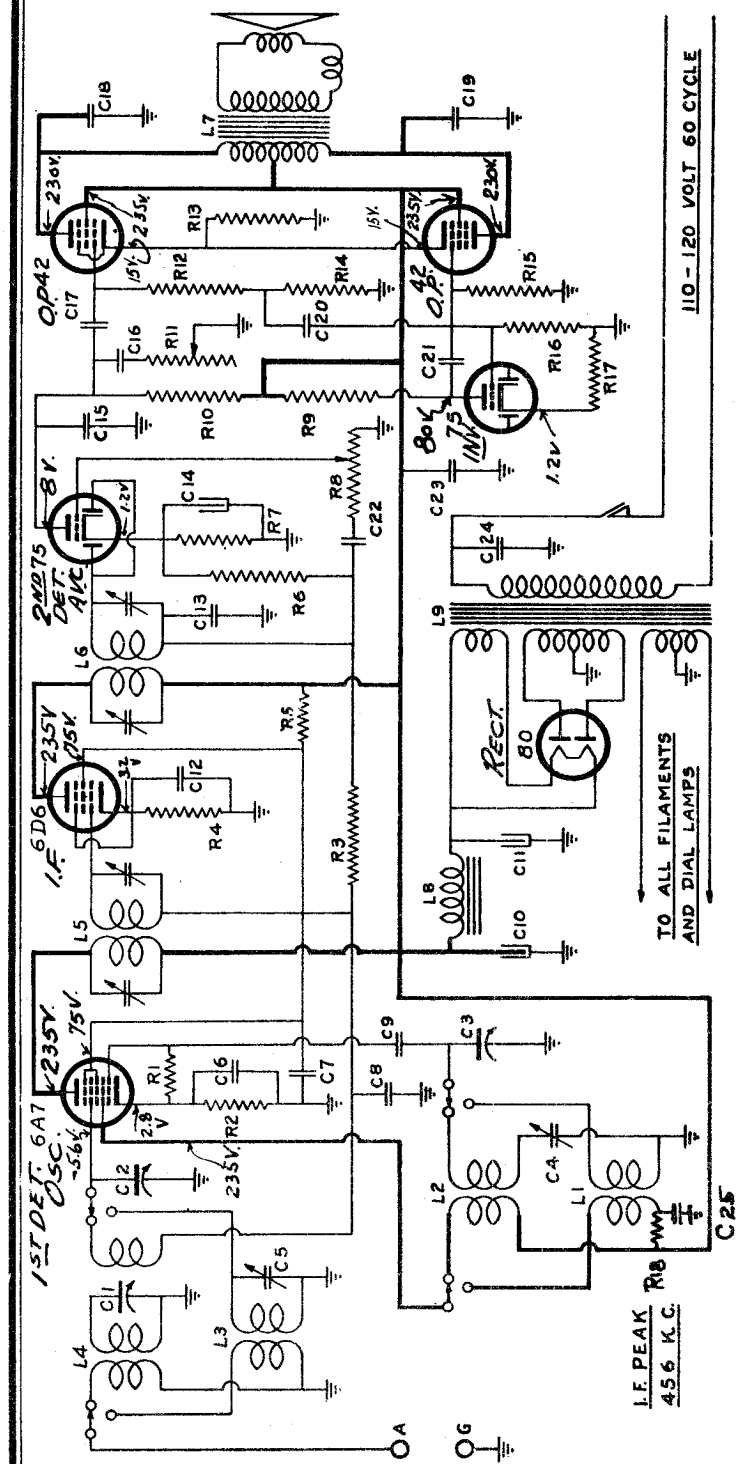
MODELS A54, Chassis 8L7
A55, Chassis 8N7
Schematic, Voltage
Socket, Alignment

# WILCOX-GAY CORP.

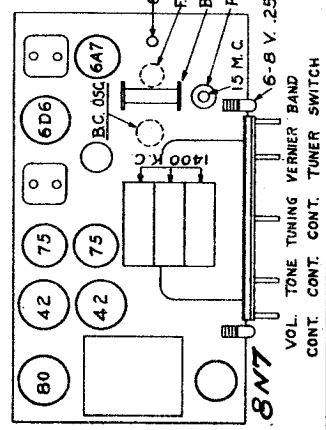


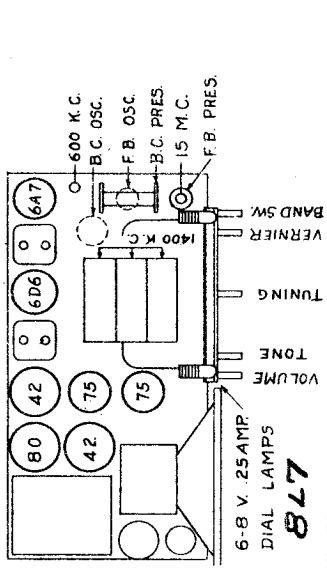

Voltages taken from socket prongs to ground. B+ 235V. Speaker field 87. Line 120 volts 60 cycles. Meter 1000 ohms per volt.

| | | | |
|---|---|---|---|
| L5 | 68-2061 | First I.F. Transformer Assembly |
| L6 | 68-2061 | Second I.F. Transformer Assembly |
| L9 | 80-2022 | Power Transformer |

MODEL A55

| | | |
|---|---|---|
| I7 | 64-2089 | 12" Speaker - #42 Push Pull Output Trans. |
| I8 | 64-2089 | 12" Speaker - 1000 Ohm Field |




| | | | |
|---|---|---|---|
| R11 | 19-2009 | 250,000 Ohm Tone Control |
| R12 | 53-928 | 500,000 Ohm 1/4 Watt Resistor |
| R13 | 53-2011 | 250 Ohm 1/2 Watt Resistor |
| R14 | 53-921 | 20,000 Ohm 1/4 Watt Resistor |
| R15 | 53-926 | 500,000 Ohm 1/4 Watt Resistor |
| R16 | 53-926 | 500,000 Ohm 1/4 Watt Resistor |
| R17 | 53-919 | 5,000 Ohm 1/4 Watt Resistor |
| R18 | 53-898 | 50,000 ohm 1/4 WATTRESISTOR |
| I1 | 17-2149 | Foreign Band Osc. Coil Assembly |
| I2 | 17-2227 | Broadcast Oscillator Coil Assembly |
| I3 | 17-2228 | Foreign Band Pres. Coil Assembly |
| I4 | 17-2226 | Broadcast Preselector Coil Assembly. |

MODEL A54

| | | |
|---|---|---|
| I7 | 64-2058 | 6½" Speaker - #42 Push Pull Output Trans. |
| I8 | 64-2058 | 6½" Speaker - 1000 Ohm Field |

## CONVENTIONAL ALIGNMENT
## SEE SPECIAL SECTION VOL. VIII

| | | | |
|---|---|---|---|
| C1, C2, C3 | 77-2016 | 3 Gang Variable Condenser |
| C4 | 78-2031 | Broadcast Series Osc. Trimmer |
| C5 | 78-2010 | 3-30 MMFD. Foreign Band |
| C6 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C7 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C8 | 75-2005 | .1 Mfd. 200 V. Paper Condenser. |
| C9 | 76-2002 | .00005 Mfd. Mica Condenser |
| C10 | 18-2006 | 16 Mfd. 250 W.V. Elect. Condenser |
| C11 | 18-721 | 8 Mfd. 450 W.V. Elect. Condenser |
| C12 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C13 | 76-307 | .0005 Mfd. Mica Condenser |
| C14 | 18-2012 | 10 Mfd. 25 W.V. Dry Elect. Cond. |
| C15 | 75-2014 | .001 Mfd. 600 V. Paper Condenser |
| C16 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C17 | 75-2006 | .1 Mfd. 200 V. Paper Condenser |
| C18 | 75-2001 | .002 Mfd. 600 V. Paper Condenser |
| C19 | 75-2001 | .002 Mfd. 600 V. Paper Condenser |
| C20 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C21 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C22 | 75-2005 | .1 Mfd. 200 V. Paper Condenser |
| C23 | 75-2012 | .25 Mfd. 400 V. Paper Condenser |
| C24 | 75-2003 | .01 Mfd. 400 V. Paper Condenser |
| C25 | 75-2005 | .1 MFD. 200 V. PAPER COMPENSER |
| R1 | 53-898 | 50,000 Ohm 1/4 Watt Resistor |
| R2 | 53-1002 | 250 Ohm 1/2 Watt Resistor |
| R3 | 53-926 | 1 Megohm 1/4 Watt Resistor |
| R4 | 53-1003 | 500 Ohm 1/2 Watt Resistor |
| R5 | 53-921 | 40,000 Ohm 1/4 Watt Resistor |
| R6 | 53-926 | 500,000 Ohm 1/4 Watt Resistor |
| R7 | 53-919 | 5,000 Ohm 1/4 Watt Resistor |
| R8 | 19-2007 | 500,000 Ohm Vol. Cont. & Switch |
| R9 | 53-924 | 250,000 Ohm 1/4 Watt Resistor |
| R10 | 53-924 | 250,000 Ohm 1/4 Watt Resistor |

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For MODELS 6S306, 9S307
15S308
Installation, Operation

ZENITH RADIO CORP.

MODEL 169-31 Automatic
Record Changer

# INSTALLATION, OPERATION AND SERVICE

# AUTOMATIC RECORD CHANGER

used in

Models 6-S-306; 9-S-307; 15-S-308

This Record Changer will automatically play a series of eight 10- or seven 12-inch records of the 78 revolutions-per-minute type or, if you so desire, you may change records, of any size up to 12 inches, manually. Records of the last few years with the standard eccentric or spiral stopping groove will operate the automatic mechanism and change your records for you.

## INSTALLATION

The Automatic Record Changer as supplied consists of two units.

1. **The Motorboard Unit** which includes the automatic record changer mechanism, the turntable, and the pickup.
2. **The Motor Unit** which includes the support plate assembly.

The units are supplied ready for mounting on a cabinet rail. This rail must be drilled in accordance with the information and dimensions shown on page 4. Wooden support blocks as shown, must be provided by the customer. All other necessary parts are included in your purchase. It is essential for proper operation that the rail and support blocks provide for the mounting of the motor support plate exactly 2¾ inches below the top surface of the motorboard. The support blocks should be attached to the rail with heavy wood screws. Details of this mounting, with all necessary dimensions, are given on page 4.

1. Install the Motor Unit with support plate loosely in position as shown on page 4. Do not tighten the mounting screws.
2. Loosen the two set screws in the collar of the flexible coupling on the Motorboard Unit, a detail of which is shown on page 3.
3. Place the Motorboard Unit in position on the cabinet rail with the upper mounting springs in place as shown on page 4. Make sure that the guide pins extending from the motor support plate enter the rubber grommets in the Motorboard Unit without binding.
4. Secure Motorboard in position using the screws and lower mounting springs as shown on page 4. Tighten up the four motorboard mounting screws to compress all eight mounting springs to the dimensions shown. *Make sure that the Motorboard Assembly is level in the cabinet.*
5. Tighten up the mounting screws on the Motor Unit support plate assembly so that they are firmly down against the spacers.
6. Check the installation to be sure that there is no binding between the collar of the flexible coupling and the collar of the motor spindle. See page 3.
7. **Tighten the two set screws of the flexible coupling down on the spindle of the Motor Unit.**

### Needle Box

The needle box is in a separate package. Place the box in the hole in the motorboard with the needle ejector tab toward the front. To do this tilt the box upwards at front and lower into hole with the lug on back of box in the slot in the motorboard. Slide the lug under the motorboard and the box drops in place.

### Speed Regulation and Lubrication

There are three holes in the top of the turntable which give access to oil holes and a speed regulating screw in the motor mechanism beneath. Revolve the turntable slowly until you can see the holes and screw through the turntable. A few drops of good quality light machine oil should be applied in the oil holes at regular intervals, about once every six months.

**Speed Regulation.**—After the phonograph is in operation the speed should be checked while playing a record.

1. Place a piece of white paper under edge of record so that it is plainly visible.
2. Count the number of revolutions per minute with the aid of a watch.
3. If not 78, stop the turntable, lift off the record and set the turntable to give access to the speed regulator screw through one of the holes.
4. Insert a screwdriver through the hole in the turntable into the groove in the speed regulator screw and turn to right (clockwise) to decrease speed, or to the left (counter-clockwise) to increase speed.
5. Replace and replay record, recount and adjust until speed is checked at 78 r. p. m.

### Shipping

Shipping blocks as shown on page 4 should be used in all cases of reshipment.

## OPERATION

Before operating the phonograph, either automatically or manually, be sure that the pickup is down and can be moved by hand. If not, a "cycle" must be completed to bring it down. To do this, throw Turntable Switch "on." The turntable will start to revolve and the cycle of motion on the pickup arm will be resumed. When the pickup arm comes down, turn off the Turntable Switch.

### Cautions

**1. Never use force to start or stop the motor or any part of the record-changing mechanism or pickup arm.**

**2. The use of records which have become warped or damaged through improper care may cause the mechanism to jam and damage the instrument. In addition, records which have become warped will slide on one another when playing, resulting in unsatisfactory reproduction.**

**3. This instrument is not recommended for playing 10-inch and 12-inch records in mixed sequence. If the user desires this service he must be positive that all records are perfectly flat and free from warp. The Index and Record Reject Lever must be set at "10" and after playing the last selection the pickup will come down in position for a 10-inch record and repeat the playing of the record on a 10-inch diameter unless the Turntable Switch is turned off. Any jamming of the mechanism under these conditions indicates that the records used are not perfectly flat or that their edges are not sufficiently smooth to permit normal operation of the separators in dropping each record in sequence onto the turntable.**

**4. Do not leave records on the record holder posts, as they are liable to warp, particularly so in warmer climates. Keep your records in a record file (album or cabinet) when not in use. If any records should become warped, place them on a flat surface with a flat heavy article, such as a large book, on top and leave them in this position for a few days.**

### Controls and Moving Mechanism

**Index and Record Reject Lever.**—This lever is located near the right front corner of the motorboard with its index plate marked for four positions—"MANUAL," "12," "10," and "REJECT." When you desire to change record selections manually, this lever should be set in the "MANUAL" position. With the lever in the "12" position, the mechanism is set to play a series of 12-inch records automatically. To play either a series of 10-inch records, or 10- and 12-inch records mixed, the lever should be set at the "10" position.

To reject a record being played, or to start the record-changing cycle in case the record just played does not have the standard eccentric or spiral stopping groove, simply push the lever to the "REJECT" position and let go. The pickup will raise up and swing outwards and the next record will drop down. Upon releasing the lever, it will automatically return to the "10" position. If you are playing a series of 12-inch records, the lever should be returned to the "12" position after rejecting a record. Keep the lever in its "MANUAL" position when not actually playing records automatically.

1.

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MODEL 169-31 Automatic Record Changer

# ZENITH RADIO CORP.

## Automatic Record Changer

Adjustments, Notes

### GENERAL INFORMATION

Before servicing the automatic record changer, inspect the assembly to see that all levers, parts, gears, springs, etc. are in good order and are correctly assembled.

A bind or jam in the mechanism can usually be relieved by rotating the turntable in the reverse direction.

The changer can be conveniently rotated through its change cycle by pushing the index lever to "Reject" and revolving the turntable by hand. Six turntable revolutions are required for one change cycle.

The turntable, spindle, and pinion gear are assembled by means of a 3/32 inch straight pin. This pin may be removed by gently driving with a standard pin punch.

If the record changer or cabinet is not perfectly level, normal operation is likely to be affected.

The 10 and 12 inch records must be absolutely flat for smooth operation when using a mixture of the two sizes.

A shorting switch, located in the pickup head, operates due to pressure when the pickup is placed on the pickup rest.

### ADJUSTMENTS

**A. Main Lever.**—This lever is basically important in that it interlinks the various individual mechanisms which control needle landing, tripping, record separation, etc. One adjustment is provided for the main lever. Rotate the turntable until the changer is out-of-cycle; and adjust rubber bumper bracket (A) so that the roller clears the nose of the cam plate by 1/16 inch.

**B. Friction Clutch.**—The motion of the tone arm toward the center of the record is transmitted to the trip pawl "22" by the trip lever "7" through a friction clutch "5." If the motion of the pickup is abruptly accelerated or becomes irregular due to swinging in the eccentric groove, the trip finger "7" moves the trip pawl "22" into engagement with the pawl on the main gear, and the change cycle is started. Proper adjustment of the friction clutch "5" occurs when movement of the tone arm causes positive movement of the trip pawl "22" without tendency of the clutch to slip. The friction should be just enough to prevent slippage, and is adjustable by means of screw "B." If adjustment is too tight, the needle will repeat grooves; if too loose, tripping will not occur at the end of the record.

**C. Pickup Lift Cable Screw.**—During the record change cycle, lever "16" is actuated by the main lever "15" so as to raise the tone arm clear of the record by means of the pickup lift cable. To adjust pickup for proper elevation, stop the changer "in-cycle" at the point where pickup is raised to the maximum height above turntable plate, and has not moved outward; at this point adjust locknuts "C" to obtain 1 inch spacing between needle point and turntable top surface.

**D. & E. Needle Landing on Record.** — The relation of coupling between the tone arm vertical shaft and lever "20" determines the landing position of the needle on a 10 inch record. Position of eccentric stud "E" governs the landing of the needle on a 12 inch record; this, however, is dependent on the proper 10 inch adjustment.

To adjust for needle landing, place 10 inch record on turntable; push index lever to reject position and return to the 10 inch position; see that pickup locating lever "17" is tilted fully toward turntable; rotate mechanism through cycle until needle is just ready to land on the record; then see that pin "V" on lever "14" is in contact with "Step T" on lever "17." The correct point of landing is 4-11/16 inches from the nearest side of the turntable spindle; loosen the two screws "D" and adjust horizontal position of tone arm to proper dimension, being careful not to disturb levers "14" and "17". Leave approximately 1/32 inch end play between hub of lever "20" and pickup base bearing, and tighten the blunt nose screw "D"; run mechanism through several cycles as a check, then tighten cone pointed screw "D".

After adjusting for needle landing on a 10 inch record, place 12 inch record on turntable; push index lever to reject and return to 12 inch position; rotate mechanism through cycle until needle is just ready to land on the record; the correct point of landing is 5-11/16 inches from nearest side of spindle. If the landing is incorrect, turn stud "E" until the eccentric end adjusts lever "14" to give correct needle landing. The eccentric end of the stud must always be toward the rear of the motor board, otherwise incorrect landing may occur with 10 inch records.

**F. & G. Record Separating Knife.** — The upper plate (knife) "25" on each of the record posts serves to separate the lower record from the stack and to support the remaining records during the change cycle. It is essential that the spacing between the knife and the rotating record shelf "27" be accurately maintained. The spacing for the 10 inch record is nominally .055 inch, and for the 12 inch record is .075 inch.

To adjust, rotate the knife to the point of minimum vertical separation from the record shelf and turn screw and locknut "F" to give .052—.058 inch separation. Screw "G" must not be depressed during this adjustment. After setting screw "F", adjust screw "G" so that when its tip is depressed flush with top of record shelf, the vertical spacing between the knife, in its lowest rotational position, and the shelf, is .072—.078 inch.

**H. Record Support Shelf.**—The record shelf revolves during the change cycle to allow the lower record to drop onto the turntable. Both posts are rotated simultaneously by a gear and rack coupled to the main lever "15," and it is necessary that adjustments be such that the record is released from both shelves at the same instant. To adjust, place a 12 inch record on the turntable, rotate mechanism into cycle to the point where tone arm is at maximum distance outward from turntable; lift record upward until it is in contact with both separating knives, then loosen screws "H" and shift record shelves so that the curved inner edges of the shelves are uniformly spaced at least 1/16 inch from record edge. Tighten the blunt nose screw "H," run mechanism through cycle several times to check action, then tighten cone pointed screw "H".

*If record shelves or knives are bent, or not perfectly horizontal, improper operation and jamming of mechanism will occur.*

**J. Tone Arm Rest Support (not shown).**—When the changer is out-of-cycle, the front lower edge of the pickup head should be 5/16 inch above surface of motor board. This may be adjusted by bending the tone arm support bracket, which is associated with the tone arm mounting base, in the required direction.

**K. Trip Pawl Stop Pin.**—The position of the trip pawl stop pin "K" in relation to the main lever "15" governs the point at which the roller enters the cam. By bending the pin support either toward or away from trip pawl bearing stud, the roller can be made to enter the cam later or earlier, respectively. This adjustment should be made so that the roller definitely clears the cam outer guide as well as the nose of the cam plate.

**Lubrication.**—Petrolatum or petroleum jelly should be applied to cam, main gear, spindle pinion gear, and gears of record posts.

Light machine oil should be used in the tone arm vertical bearing, record post bearings, and all other bearings of various levers on underside of motor board.

The felt washer between the turntable and spindle bearing should be soaked in light engine oil whenever the turntable is removed, or as required for proper operation.

Do not allow oil or grease to come in contact with, rubber mounting of tone arm base, rubber bumper, or flexible coupling of drive motor.

### MISCELLANEOUS SERVICE HINTS

Incorrect adjustment of a particular mechanism of the changer is generally exhibited in a specific mode of improper operation. The following relations between effects on operation and the usual mis-adjustments will enable ready adjustment in most cases.

1. For any irregularity of operation, the adjustment of the main lever "15" should be checked first as in "A".
2. Needle does not land properly on both 10 and 12 inch records—Make complete adjustments "D" and "E".
3. Needle does not land properly on 12 inch record but correct on 10 inch—Effect adjustment "E".
4. Failure to trip at end of record—Increase clutch "5" friction by means of screw "B". Also, see that levers "7" and "12" are free to move without touching each other.
5. Pickup strikes lower record of stack or drags across top record on turntable—Adjust lift cable per adjustment "C".
6. Needle does not track after landing—Friction clutch "5" adjustment "B" may be too tight; bind in tone arm vertical bearing; levers "7" and "12" fouled; or pickup output cable twisted.
7. Cycle commences before record is complete—Record is defective, or adjustment "B" of friction clutch "5" is too tight.
8. Wow in record reproduction—Record is defective; flexible coupling between motor and changer mechanism not correctly assembled; or instrument is not being operated at normal room temperature (65° F).
9. Record knives strike edge of records—Records warped; record edges are rough; or knife adjustments "F" and "G" are incorrect.
10. Record not released properly—Adjust record shelf assemblies in respect to shaft by means of adjustment "H".
11. Needle lands in 10 inch position on 12 inch record or misses record when playing both types mixed—Increase tension of pickup locating lever spring "30".

2.

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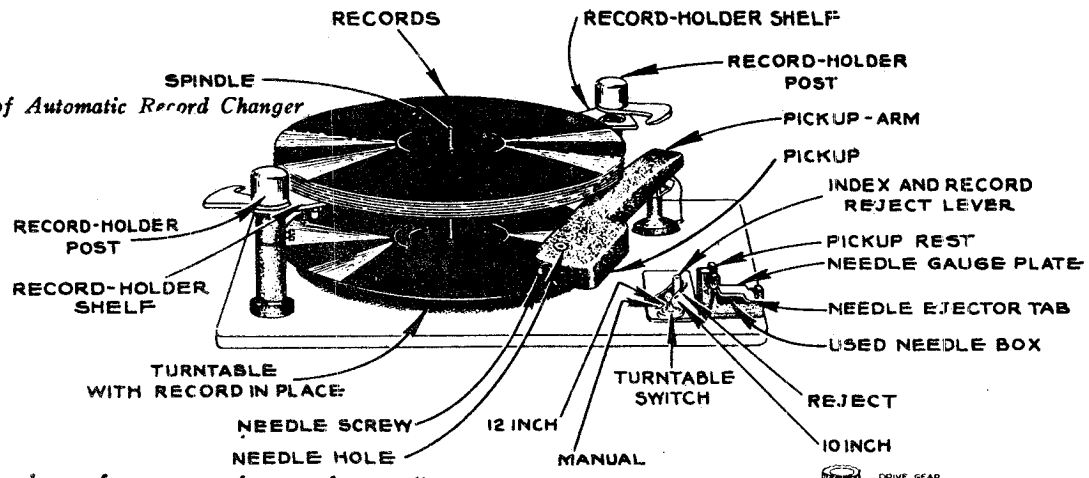
Chassis, Details

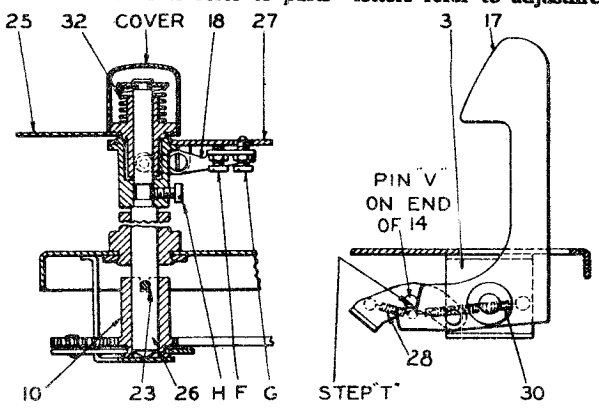
# ZENITH RADIO CORP.

MODEL 169-31 Automatic Record Changer

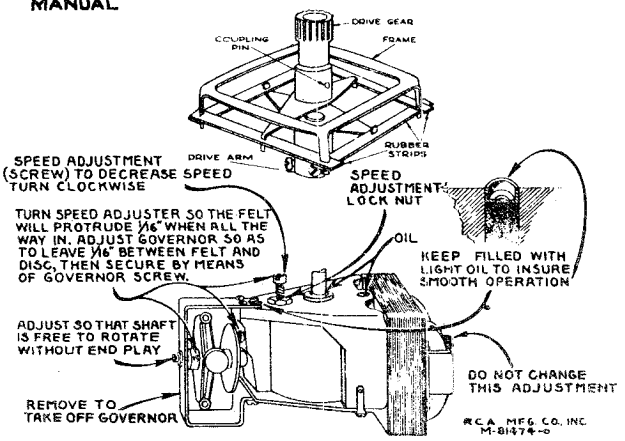
*Top View of Automatic Record Changer*




**NOTE: Numbers refer to parts—letters refer to adjustments.**

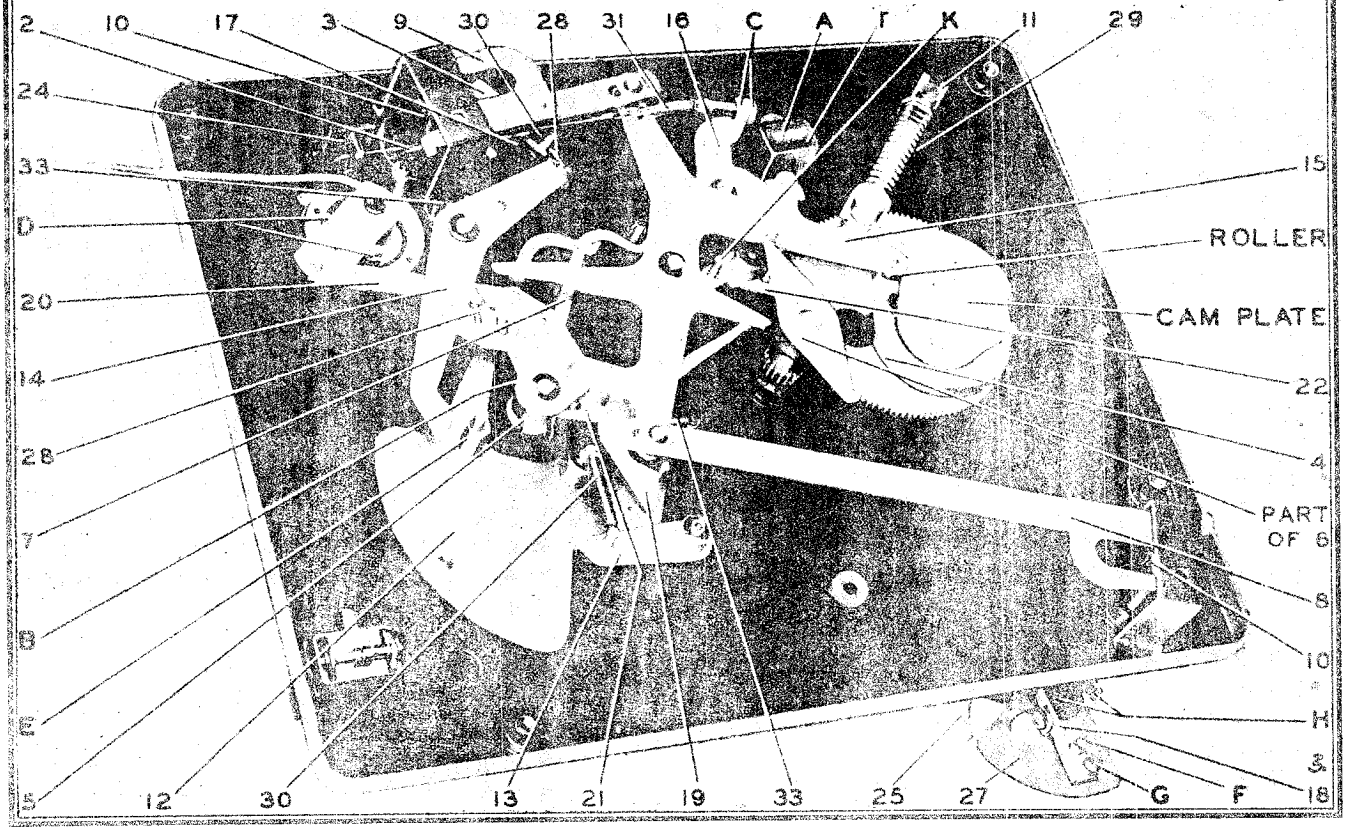



*Details of Record Shelf Posts, and Locating Lever Assemblies*


COUPLING PIN
DRIVE GEAR
FRAME
RUBBER STRIPS
DRIVE ARM
SPEED ADJUSTMENT (SCREW) TO DECREASE SPEED TURN CLOCKWISE
SPEED ADJUSTMENT LOCK NUT
TURN SPEED ADJUSTER SO THE FELT WILL PROTRUDE 1/16" WHEN ALL THE WAY IN. ADJUST GOVERNOR SO AS TO LEAVE 1/16" BETWEEN FELT AND DISC, THEN SECURE BY MEANS OF GOVERNOR SCREW.
OIL
KEEP FILLED WITH LIGHT OIL TO INSURE SMOOTH OPERATION
ADJUST SO THAT SHAFT IS FREE TO ROTATE WITHOUT END PLAY
DO NOT CHANGE THIS ADJUSTMENT
REMOVE TO TAKE OFF GOVERNOR
RCA MFG CO. INC. M-81474-0

*Motor Data and Coupling*

*Bottom View of Automatic Record Changer*

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MODEL 169-31 Automatic Record Changer

# ZENITH RADIO CORP.

Details, Notes

**Turntable Switch.**—The toggle switch located just in front of the Index and Record Reject Lever controls the current to the turntable motor. To start the turntable, throw the switch to the "ON" position. To stop the turntable throw the switch to the "OFF" position.

**Pickup and Top-Loading Needle Socket.**—The pickup is the new crystal type, with a hole in the top for insertion of needles. When not playing records, the pickup arm should be moved out to the right beyond the turntable and placed at rest on the support with the edge of the pickup arm in the groove and the pickup over the needle gauge plate. The pickup must be in this position to change needles.

To insert a needle initially, loosen the needle screw on the front of the pickup, place needle in hole at top so that it drops down against the needle gauge plate and then tighten up the needle screw.

**Needle Ejector.**—The extending tab on the needle gauge plate of the needle box operates the needle ejector. To change a needle, place pickup in rest position, loosen needle screw and press the extending tab on the needle gauge plate to drop the used needle into the box below. Release tab, allowing the needle gauge plate to swing back, and then insert a new needle in the pickup as described above.

**Record Holder Shelves.**—To place a record on the turntable or to remove records, raise the record holder shelves, by lifting with the fingers under the shelf, and swing clear of outer edge of record. Also push back vertical lever adjacent to the rear record holder post. You now have clear access to the turntable. Before loading the magazine for Automatic Operation swing the record holder shelves back into position.

## Automatic Operation

1. See that pickup is over needle gauge plate with needle properly in place. If not, complete a "cycle" as explained in the first paragraph under "OPERATION."
2. With Index and Record Reject Lever at "MANUAL," place the first of the series of records on the turntable and the remainder of the series (up to seven 10-inch or six 12-inch records) on the record holder posts (as shown in Figure 1). The records should be arranged in the desired order with the desired selection face up and the last selection on top.
3. Set the Index and Record Reject Lever to the proper position. (See CONTROLS:—INDEX AND RECORD REJECT LEVER.)
4. Throw Turntable Switch to the left—"ON"—turntable should commence to revolve.
5. When turntable has attained speed, lift pickup and lower gently on to the record so that the needle point enters the outside groove.
6. Close the lid of the cabinet to eliminate mechanical reproduction of sound by the needle.

The whole series of records will now play without further attention, and the last record will repeat until the Turntable Switch is turned off. Allow the record-changing mechanism to complete its cycle before the turntable is stopped. Then lift the pickup, swing the arm to the right beyond the edge of the record and lower it onto the pickup rest with pickup over needle gauge plate. The record player is then ready for reloading, or for manual operation.

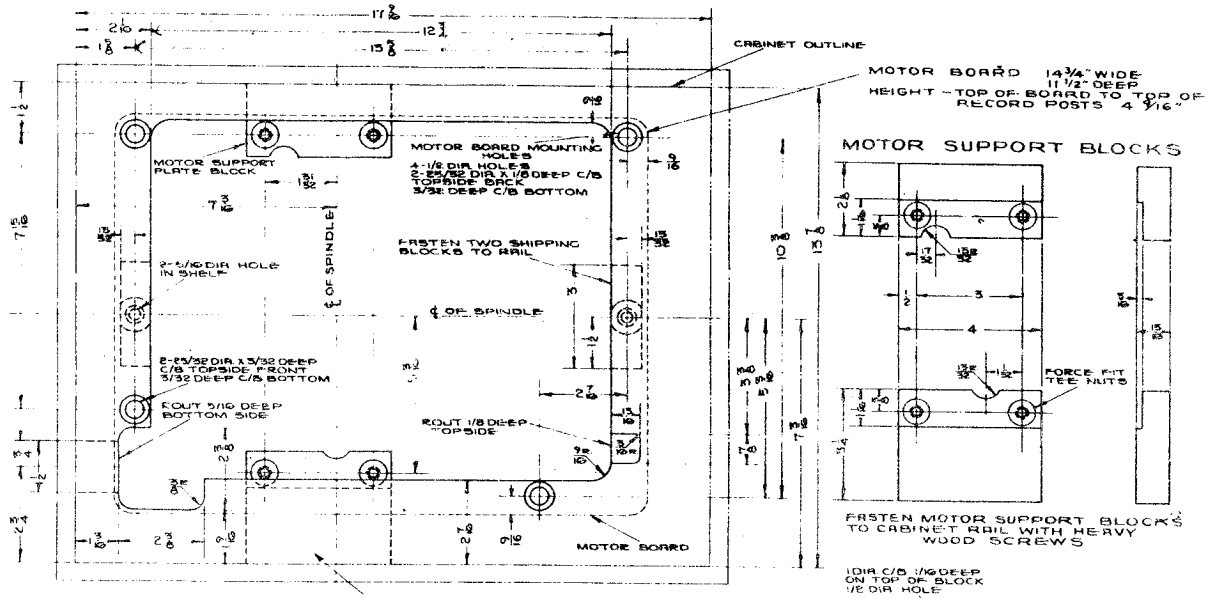
## Manual Operation

To play records manually:

1. Proceed as in step 1, under "AUTOMATIC OPERATION."
2. Place record on turntable with desired selection upwards.
3. Set Index and Record Reject Lever to "MANUAL" position.
4. Proceed as in steps 4, 5 and 6 under "AUTOMATIC OPERATION."

When you have finished playing, be sure that the turntable has stopped and the pickup is in the rest position over needle gauge plate. Never leave pickup with needle resting on a record or on the turntable.

Good reproduction can only be obtained with the turntable revolving at 78 revolutions per minute. For speed check and regulation see INSTALLATION.



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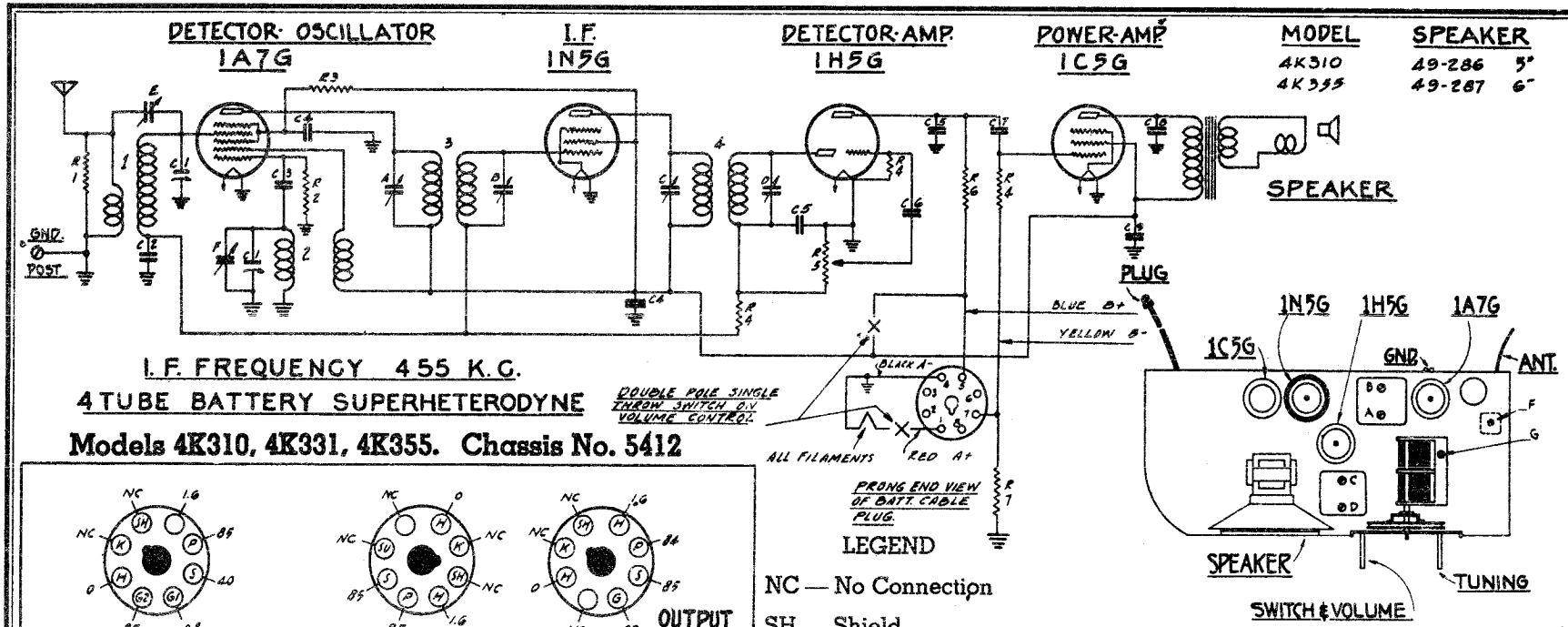
# ZENITH RADIO CORP.



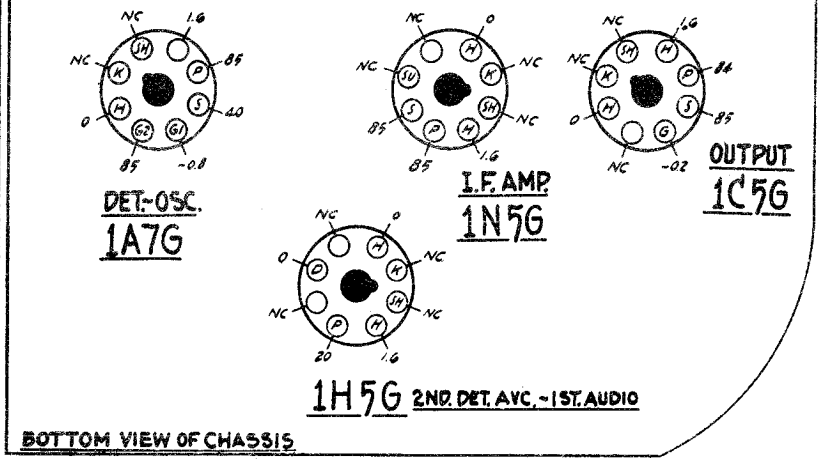





## I. F. FREQUENCY 455 K.C.

## 4 TUBE BATTERY SUPERHETERODYNE

## Models 4K310, 4K331, 4K355. Chassis No. 5412




LEGEND

NC — No Connection
SH — Shield
H — Heater
P — Plate
S — Screen
G — Grid
SU — Suppressor
D — Diode
K — Cathode
F — Filament

Location of tubes and trimmers

| DIAG NO | PART NO | DESCRIPTION |
|---|---|---|
| 1 | 5-6704 | ANTENNA COIL ASSEMBLY |
| 2 | 5-6381 | OSCILLATOR COIL ASSEMBLY |
| 3 | 95-513 | 1ST. I.F. TRANSFORMER |
| 4 | 95-520 | 2ND I.F. TRANSFORMER |
| 5 | | SPEAKER TRANS. (ON SPEAKER) |
| A | | 1ST I.F. TRANS. PRIMARY |
| B | | 1ST. I.F. TRANS. SECONDARY |
| C | | 2ND. I.F. TRANS. PRIMARY |
| D | | 2ND. I.F. TRANS. SECONDARY |
| E | 22-305 | ANTENNA TRIMMER |
| F | | BROADCAST OSC. (ON GANG) |

| DIAG. NO | PART NO. | DESCRIPTION | |
|---|---|---|---|
| C-1 | 22-778 | 2 GANG VARIABLE | |
| C-2 | 22-250 | .05 MFD. | 200V |
| C-3 | 22-182 | .00025 MFD | 600V |
| C-4 | 22-212 | .05 MFD | 600V |
| C-5 | 22-162 | .0001 MFD | 600V |
| C-6 | 22-185 | .01 MFD | 200V |
| C-7 | 22-263 | .01 MFD | 600V |
| C-8 | 22-448 | .006 MFD | 600V |
| C-9 | 22-684 | 8 MFD DRY ELEC. | 150 |
| R-1 | 63-587 | 4700 OHM | ½ W |
| R-2 | 63-656 | 180 M OHM | ½ W |
| R-3 | 63-594 | 68 M OHM | ½ W |
| R-4 | 63-680 | 2.2 MEGOHM | ½ W |
| R-5 | 63-997 | 600 M OHM VOL. CONT. & SW. ASS'Y | |
| R-6 | 63-271 | 1 MEGOHM | ½ W |
| R-7 | 63-238 | 1000 OHM | ½ W |

## NOTE

All voltages measured from point indicated to chassis using a 1000 ohm per volt meter.

Antenna disconnected — volume control at minimum and condenser plates in full mesh.

All voltages measured using Zenith No. Z28 battery pack.

## ALIGNMENT PROCEDURE

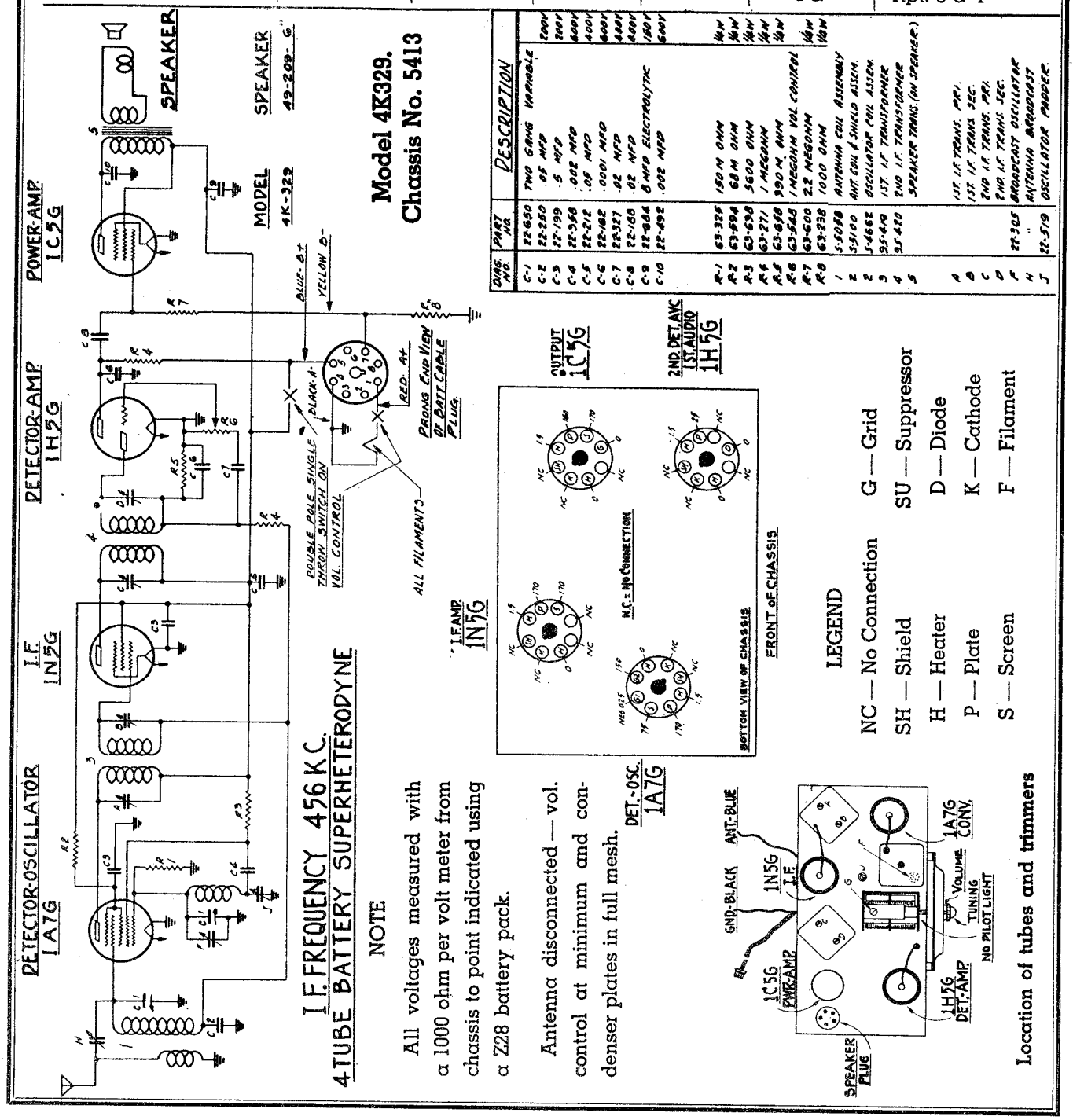
| Operation | Connect Test Oscillator to | Dummy Antenna | Set Test Osc. to | Band | Set Dial At | Adjust Trimmers | Purpose |
|---|---|---|---|---|---|---|---|
| 1 | 1st Det. Grid | 1/2 Mfd. | 455 | Br'dc't | 600 | ABCD | I. F. Aligment |
| 2 | Rec. Ant. Lead | 200 Mmfd. | 1500 | " | 1500 | F | Set Osc. to Scale |
| 3 | " " " | 200 Mmfd. | 1500 | " | 1500 | G | Al'gment of Ant. |

MODEL 4K329, Chas. 5413
Schematic, Voltage
Alignment, Socket
Trimmers

ZENITH RADIO CORP.

# ALIGNMENT PROCEDURE

| Operation | Connect Test Oscillator to— | Dummy Antenna | Set Test Osc. to | Band | Set Dial At | Adjust Trimmers | Purpose |
|---|---|---|---|---|---|---|---|
| 1 | 1st Det. Grid | ½ Mfd. | 456 | Br'dc't | 600 | ABCD | I. F. Algm't. |
| 2 | Rec. Ant. Lead | 200 Mmfd. | 1500 | " | 1500 | F | Set Osc. to Scale |
| 3 | " " " | 200 Mmfd. | 1500 | " | 1500 | G | Algm't of Ant. |
| 4 | " " " | 200 Mmfd. | 600 | " | 600 | J | Rock gang & adj. for max. output |
| 5 | " " " | 200 Mmfd. | 1500 | " | 1500 | FG | Rpt. 3 & 4 |




| DWG. NO. | PART NO. | DESCRIPTION | | |
|---|---|---|---|---|
| C-1 | 22-650 | TWO GANG VARIABLE | 200V | |
| C-2 | 22-250 | .05 MFD | 200V | |
| C-3 | 22-199 | .5 MFD | 200V | |
| C-4 | 22-368 | .002 MFD | 400V | |
| C-5 | 22-212 | .05 MFD | 400V | |
| C-6 | 22-162 | .0001 MFD | 400V | |
| C-7 | 22-321 | .02 MFD | 400V | |
| C-8 | 22-166 | .02 MFD | 400V | |
| C-9 | 22-384 | 8 MFD ELECTROLYTIC | 150V | |
| C-10 | 22-492 | .002 MFD | 600V | |
| R-1 | 63-325 | 150 M OHM | | ½W |
| R-2 | 63-394 | 68 M OHM | | ½W |
| R-3 | 63-638 | 3600 OHM | | ½W |
| R-4 | 63-271 | 1 MEGOHM | | ½W |
| R-5 | 63-658 | 390 M. OHM | | ½W |
| R-6 | 63-548 | 1 MEGOHM VOL CONTROL | | ½W |
| R-7 | 63-600 | 2.2 MEGOHM | | ½W |
| R-8 | 63-238 | 1000 OHM | | ½W |
| 1 | 5-5058 | ANTENNA COIL ASSEMBLY | | |
| 2 | 5-9100 | ANT. COIL & SHIELD ASSEM. | | |
| 3 | 5-4662 | OSCILLATOR COIL ASSEM. | | |
| 4 | 95-419 | 1ST. I.F. TRANSFORMER | | |
| 5 | 95-420 | 2ND I.F. TRANSFORMER | | |
| | | SPEAKER TRANS. (W/ SPEAKER) | | |
| A | | 1ST. I.F. TRANS. PRI. | | |
| B | | 1ST. I.F. TRANS. SEC. | | |
| C | | 2ND I.F. TRANS. PRI. | | |
| D | | 2ND I.F. TRANS. SEC. | | |
| E | 22-305 | BROADCAST OSCILLATOR | | |
| M | " | ANTENNA BROADCAST | | |
| J | 22-519 | OSCILLATOR PADDER | | |

NOTE

All voltages measured with a 1000 ohm per volt meter from chassis to point indicated using a Z28 battery pack.

Antenna disconnected — vol. control at minimum and condenser plates in full mesh.

Location of tubes and trimmers

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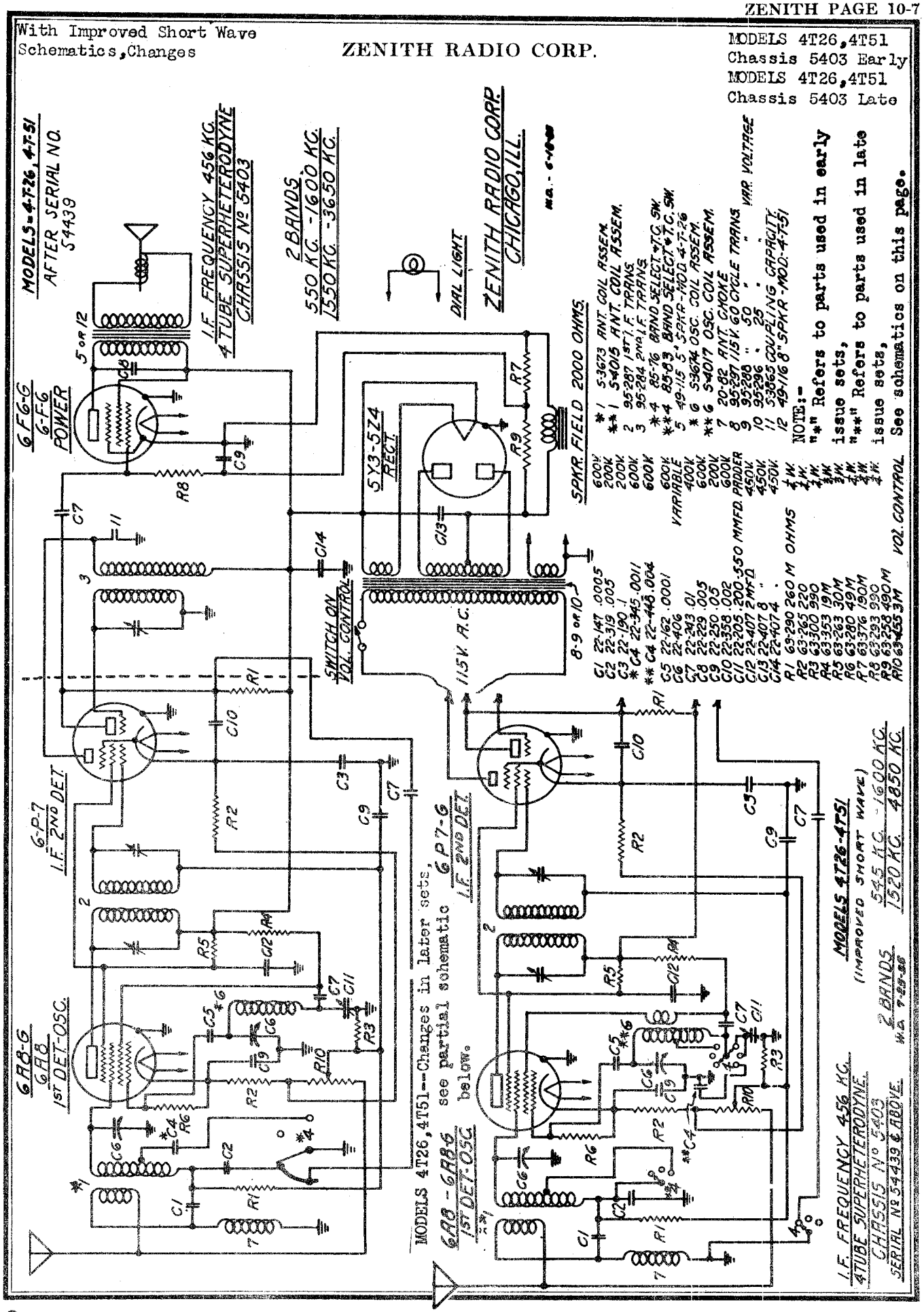
With Improved Short Wave
Schematics, Changes

# ZENITH RADIO CORP.

MODELS 4T26, 4T51
Chassis 5403 Early
MODELS 4T26, 4T51
Chassis 5403 Late

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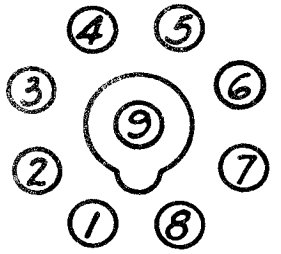
MODELS 4T26,4T51
Chassis 5403
Early,Late
Alignment,Voltage
Socket,Trimmers

ZENITH RADIO CORP.

# Socket Voltages

| TUBE | POSITION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6A8 | 1st Det. Osc. | 0 | 6 AC | 220 | 90 | 6 | 125 | 6 AC | 14 | 0 |
| 6P7 | I.F. 2nd Det. | 0 | 6 AC | 0 | 220 | 100 | 100 | 0 | 13 | 0 |
| 6F6 | PWR | 0 | 0 | 200 | 220 | -1 | - | 6 AC | 0 | - |
| 5Y3 | Rect. | 0 | 220 | - | 230 AC | - | 230 AC | - | 220 | - |

Line Voltage 110 Antenna and Ground Disconnected.

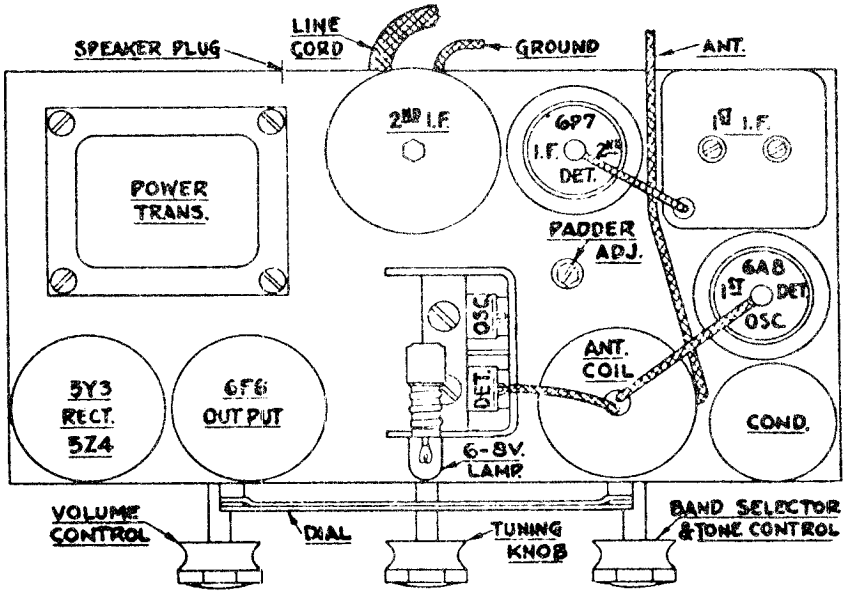



BOTTOM VIEW OF SOCKET

All voltages measured from point indicated to ground, using a 1000 ohm per volt D.C. meter (unless marked otherwise.)

## Alignment

(1) Balance I.F. transformer at 456 K.C.
(2) Place switch in left or broadcast position. Set dial pointer at 1500 K.C., and align trimmers on gang to resonance. Align broadcast padder at 540 K.C. slowly rocking pointer past 540 on dial to position giving strongest signal.
There are no adjustments for the short wave band.

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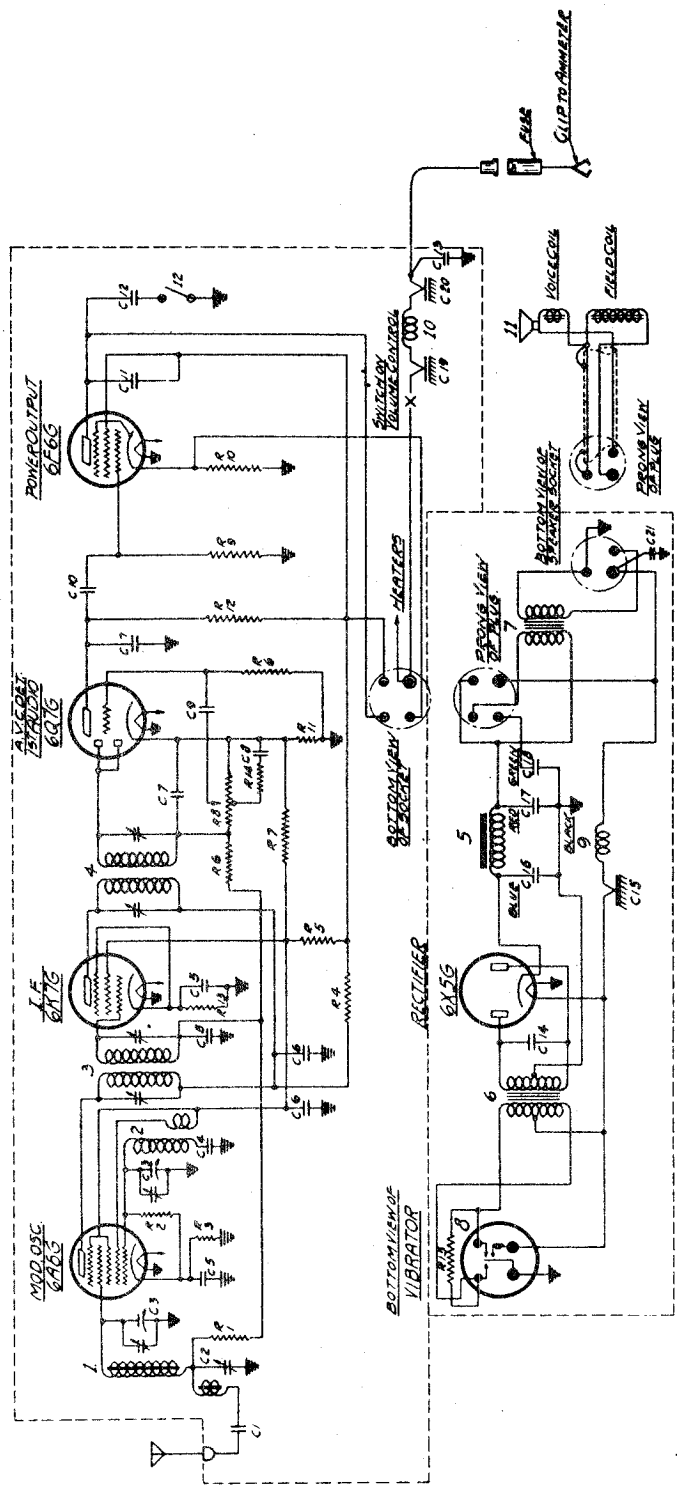
# ZENITH RADIO CORP.

MODEL 5M291, Chas. 5527
Schematic

I.F. FREQUENCY-455—K.C.

MODEL-5-M-291 CHASSIS-5527

ZENITH RADIO CORPORATION
CHICAGO, ILL.




| DIAG № | PART № | DESCRIPTION |
|---|---|---|
| C 1 | 23-219 | .03 MFD |
| C 2 | 23-447 | 600 KC ANTENNA TRIMMER |
| C 3 | 23-447 | TWO GANG VARIABLE |
| C 4 | 23-441 | OSCILLATOR PADDER |
| C 5 | 23-250 | .05 MFD |
| C 6 | 23-170 | .1 MFD |
| C 7 | 23-182 | .0025 MFD |
| C 8 | 23-318 | .005 MFD |
| C 9 | 23-317 | .02 MFD |
| C 10 | 23-435 | .005 MFD |
| C 11 | 23-428 | .03 MFD |
| C 12 | 23-420 | .25 MFD |
| C 13 | 23-440 | .1 MFD |
| C 14 | 23-441 | .5 MFD |
| C 15 | | 7 MFD DRY ELECTROLYTIC |
| C 16 | 23-439 | " " " |
| C 17 | | " " " |
| C 18 | | 400 MFD DRY ELECTROLYTIC |
| C 19 | 5-9317 | 400 " " " |
| C 20 | 23-441 | .0005 MFD |
| C 21 | | |
| R 1 | 63-717 | 220 M OHM |
| R 2 | 63-713 | 1/2 M OHM |
| R 3 | 63-704 | 500 OHM |
| R 4 | 63-847 | 1/2 MEGOHM |
| R 5 | 63-844 | 1 M OHM |
| R 6 | 63-704 | 50 M OHM |
| R 7 | 63-845 | 2 MEGOHM |
| R 8 | 63-719 | 470 M OHM |
| R 9 | 63-842 | 250 OHM |
| R 10 | 63-848 | 450 OHM |
| R 11 | 63-705 | 1/10 M OHM |
| R 12 | 63-725 | 170 M OHM |
| R 13 | 63-730 | 820 OHM |
| R 14 | 63-713 | 47 M OHM |
| R 15 | 63-840 | 220 OHM |
| L 1 | | ANTENNA COIL |
| L 2 | | OSCILLATOR COIL |
| L 3 | 20-179 | 1ST I.F. TRANS |
| L 4 | 20-169 | 2ND I.F. TRANS |
| L 5 | 95-346 | POWER CHOKE |
| L 6 | 95-345 | POWER TRANS |
| L 7 | 95-347 | AUDIO TRANS |
| L 8 | 95-349 | VIBRATOR |
| L 9 | 80-133 | MAIN CHOKE COIL |
| L 10 | 80-178 | ANT. NOISE CHOKE COIL |
| L 11 | 80-176 | 8" DYNAMIC SPEAKER |
| | 49-232 | (8 Ω 2ST. FINE WIRE) |
| | | (WITH T.C.) |
| | 85-134 | TONE CONTROL SWITCH |

NOTE:
"A" BATTERY ANT. TRIMMER
SEE C 1

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MODEL 5M291, Chas. 5527
Socket, Trimmers, Voltage
Alignment
MODEL 5M294, Chas. 5530
Alignment, Tuner Data

# ZENITH RADIO CORP.

MODELS 5X230, 5X248
5X274, Chas. 5523
Voltage

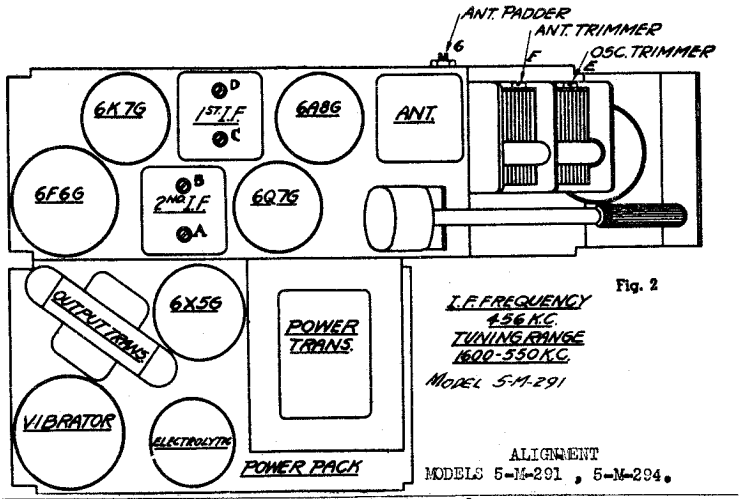


Fig. 2

ALIGNMENT
MODELS 5-M-291 , 5-M-294.

| Operation | Connect Test Oscillator To | Dummy Antenna | Set Test Osc. To | Manual or Automatic Position | Set Gang Cond. | Adjust Trimmers | Purpose |
|---|---|---|---|---|---|---|---|
| 1 | 1st Det. Grid | ½ Mfd. | 456 | Manual | Max. Cap. | A.B.C.D. | I. F. Alignment |
| 2 | Rec. Ant. Lead | 50 Mmfd. | 1530 | Manual | Min. Cap. | E | Trim Oscillator |
| 3 | Rec. Ant. Lead | 50 Mmfd. | 1400 | Manual | 1400 | F | Trim Ant. Stage |
| 4 | Rec. Ant. Lead | 50 Mmfd. | 600 | Manual | 600 | G | Adjust Ant. Padder For Max. Output |
| 5 | Connect Car Antenna to Set — Tune to Weak Station Around 1400 K. C. — Trim Antenna Trimmer "F" for Maximum Peak Output. | | | | | | |
| 6 | With Set Connected to Car Antenna—Tune To Weak Station Around 600 K. C. —Trim Antenna Padder "G" for Mamimum Peak Output. | | | | | | |

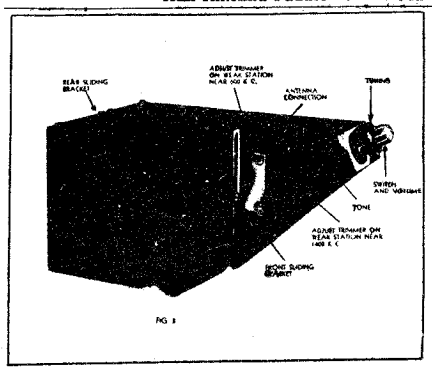

FIG. 3

## ANTENNA ALIGNMENT
**(Models 5-M-291 and 5-M-294)**

There is such a great variation in the capacity of different antennas that it is impossible to meet every condition without some means of variable antenna alignment. To accomplish this, 2 screw adjustments are provided on the receiver case as shown in Figure 3. After the set has been completely installed, the proper method of antenna alignment is as follows: Tune in a weak signal at or near 1400 K.C., and carefully adjust the lower screw as indicated in Figure 3 to loudest signal strength. Turn the tuning dial to a station at or near 600 K.C., and carefully adjust the upper left screw, also shown in Figure 3. Do not use a loud local signal for either of the adjstments. The adjustments at both 600 and 1400 K.C. should be repeated not only as a recheck but for more perfect alignment.

## IMPORTANT — ANTENNA ALIGNMENT
5-M-294 — CHASSIS 5530

Due to the large variation in electrical capacity of different automobile antennas it is necessary to adjust the receiver to the particular antenna used after installation has been made for maximum performance. Model 5-M-294 is equipped with two adjusting screws to accomplish this alignment. The green tag on the side of the receiver case shows the location of the two adjusting screws.

To align, first turn the receiver on with the center knob shown in Fig. 3. Press the tuning knob IN. This places the tuning mechanism in the **manual** operating position. Tune to a weak station near 1400 K.C. and adjust the trimmer directly below the antenna connector to maximum volume. Next tune the receiver to a weak station near 600 K.C. and adjust the trimmer nearest the power pack case for maximum volume. Repeat the adjustments for greatest accuracy.

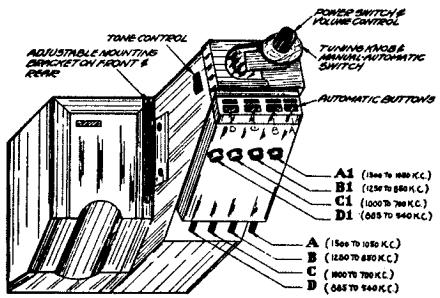
TONE CONTROL
ADJUSTABLE MOUNTING BRACKET ON FRONT & REAR
POWER SWITCH & VOLUME CONTROL
TUNING KNOB & MANUAL-AUTOMATIC SWITCH
AUTOMATIC BUTTONS
A1 (1500 TO 1050 K.C.)
B1 (1250 TO 850 K.C.)
C1 (1000 TO 700 K.C.)
D1 (685 TO 540 K.C.)
A (1500 TO 1050 K.C.)
B (1250 TO 850 K.C.)
C (1000 TO 700 K.C.)
D (685 TO 540 K.C.)

Fig. 5

## AUTOMATIC

To set the automatic buttons, first pull the tuning knob OUT. This shifts the tuning mechanism to the **Automatic** position. Press Automatic button A and turn the volume up and with a small screw driver carefully adjust screw A at bottom of the Automatic unit shown in Fig. 3 to a local station between 1500 to 1050 K.C. Set to exact position of maximum volume and clearest tone. Next adjust trimmer A1 for maximum volume and clearest tone **on the same station.** It should be noted that there are two trimmer adjustments to each station button. To set the second button press B and tune trimmer B to a local station between 1250 to 850 K.C. Trim with adjustment B1 to best volume and tone on the same station. To set the third button press C and tune trimmer screw C to a station between 1000 to 700 K.C. and corresponding adjustment C1 again for maximum volume of the selected station. Follow the same procedure for the fourth button by pressing button D and using trimmers D and D1 on a local station between 685 to 540 K.C. After all four button have been set, cut the call letters of stations selected from the gummed call letter sheet supplied with the receiver. Remove the escutcheon over the automatic buttons by taking out the three screws which hold it in position. Remove the celluloid strip and paste the station call letters in their proper positions by wetting the back of the call letter sticker. The four outlines on the celluloid strip provide the exact points at which the gummed labels are placed. After the call letter stickers are attached replace the celluloid and the escutcheon plate.

## SOCKET VOLTAGES

5X-230, 5-X-248, 5X-274 — CHASSIS 5523

| TUBE | POSITION | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6A8 | 1st Det. Osc. | 0 | 10 | 146 | 50 | 0 | 132 | 5.5 | 2.5 | 0 |
| 6K7 | I.F. | 0 | 16.5 | 154 | 50 | 2 | - | 10.5 | 2. | 0 |
| 6Q7 | 2nd Det.A.V.C. | 0 | 0 | 25 | 0 | 0 | - | 5. | 1. | 0 |
| 6V6 | Power | 0 | 22 | 134 | 154 | 0 | - | 16 | 6 | - |
| 6X5 | Rect. | 0 | 28 | A.C. | - | AC | - | 22 | 166 | - |

**All voltages measured from point indicated to ground using a 1000 Ohm per Volt meter, antenna and ground disconnected.**
**Line voltage 31.5 volts.**
**Consumption 3.9 amp.**

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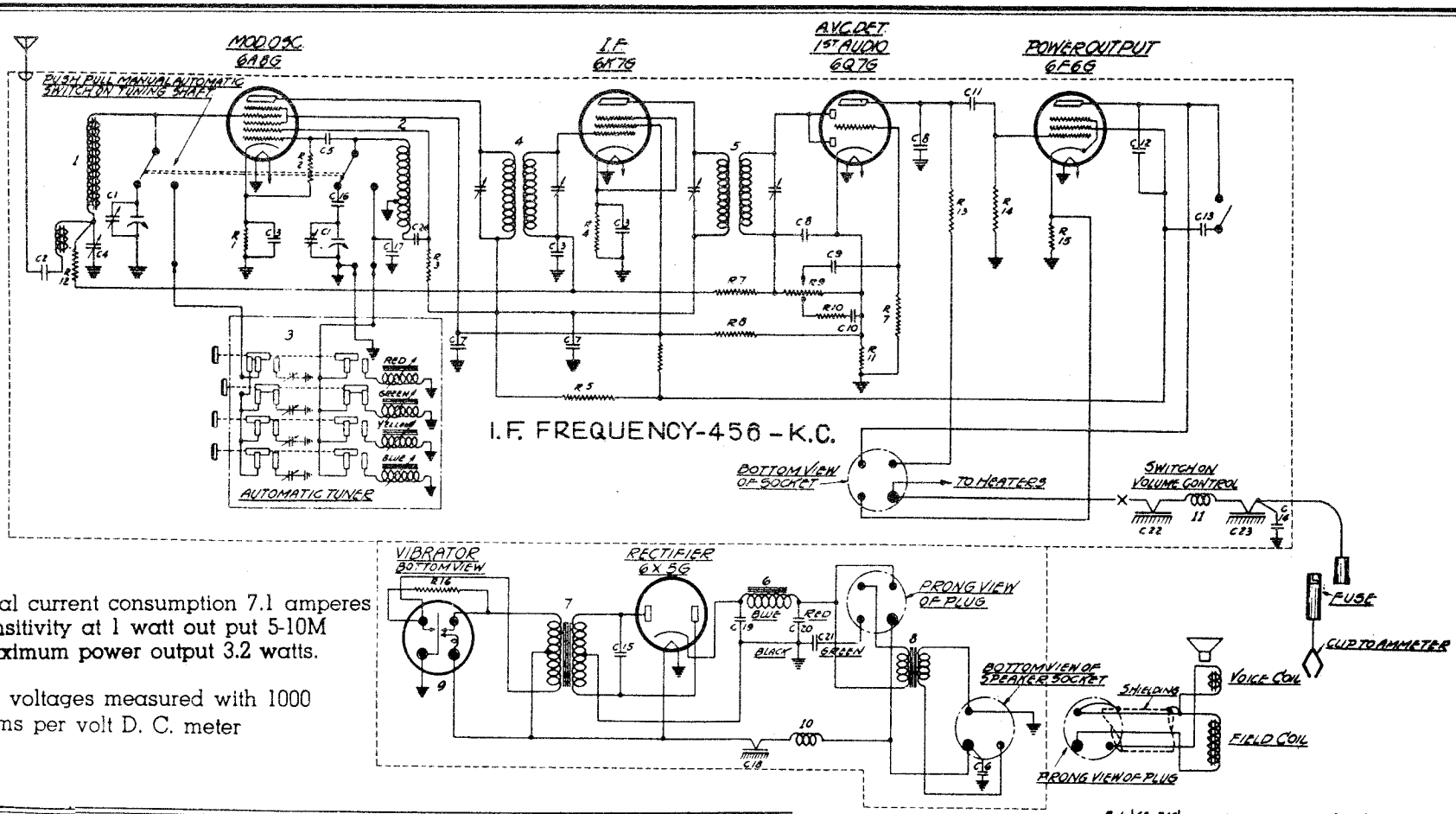
# ZENITH RADIO CORP.

MODEL 5E294, Chas. 5530
Schematic, Voltage




Total current consumption 7.1 amperes
Sensitivity at 1 watt out put 5-10M
Maximum power output 3.2 watts.

All voltages measured with 1000 ohms per volt D. C. meter

| Tube | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 6A8G | 0 | 0 | 240 | 93.0 | * | 147 | 6.0 | ** | — |
| 6K7G | 0 | 0 | 240 | 93.0 | *** | — | 6.0 | *** | — |
| 6Q7G | 0 | 0 | 112 | — | — | — | 6.0 | — | 1.9 |
| 6F6G | 0 | 0 | 235 | 250 | — | — | 6.0 | — | 16.0 |
| 6X5G | — | 0 | — | — | — | — | 6.0 | 250 | — |

* { —5.8 manual / +4.2 automatic } ** { +4.4 manual / +5.0 automatic } *** { +5.2 manual / +4.9 automatic }

| | | | |
|---|---|---|---|
| C 1 | 22-661 | TWO GANG VARIABLE | |
| C 2 | 22-219 | .03 MFD | 200 V |
| C 3 | 22-250 | .05 MFD | 200 V |
| C 4 | 22-662 | ANTENNA TRIMMER | |
| C 5 | 22-162 | .0001 MFD | 600 V |
| C 6 | 22-147 | .0005 MFD | 600 V |
| C 7 | 22-170 | .1 MFD | 400 V |
| C 8 | 22-182 | .00025 MFD | 600 V |
| C 9 | 22-327 | .02 MFD | 200 V |
| C 10 | 22-319 | .005 MFD | 200 V |
| C 11 | 22-455 | .02 MFD | 600 V |
| C 12 | 22-229 | .005 MFD | 600 V |
| C 13 | 22-287 | .03 MFD | 600 V |
| C 14 | 22-678 | .25 MFD | 200 V |
| C 15 | 22-660 | .006 MFD | 1400 V |
| C 16 | 22-682 | OSCILLATOR PADDER | |
| C 17 | 22-687 | COMPENSATING CONDENSER | |
| C 18 | 22-684 | .5 MFD | 120 V |
| C 19 | | 7 MFD DRY ELECTROLYTIC | 440 V |
| C 20 | 22-659 | 8 MFD DRY ELECTROLYTIC | 350 V |
| C 21 | | 10 MFD DRY ELECTROLYTIC | 25 V |
| C 22 | | 400 MMFD LOW REACTOR | |
| C 23 | | 400 MMFD LOW REACTOR | |
| C 24 | 22-716 | .0005 MFD | 600 V |

| | | | |
|---|---|---|---|
| R 1 | 63-768 | 560 OHM | ½ W |
| R 2 | 63-718 | 100 M OHM | ½ W |
| R 3 | 63-946 | .33 M OHM | 1 W |
| R 4 | 63-750 | 820 OHM | ½ W |
| R 5 | 63-734 | 1500 OHM | ½ W |
| R 6 | 63-967 | .27 M OHM | 1 W |
| R 7 | 63-444 | 1 MEGOHM | ½ W |
| R 8 | 63-766 | .39 M OHM | ½ W |
| R 9 | 63-982 | 400 M OHM VOL. CONTROL | |
| R 10 | 63-718 | .47 M OHM | ½ W |
| R 11 | 63-769 | 680 OHM | ½ W |
| R 12 | 63-717 | .220 M OHM | ½ W |
| R 13 | 63-775 | 270 M OHM | ½ W |
| R 14 | 63-778 | 470 M OHM | ½ W |
| R 15 | 63-941 | 390 M OHM | 1 W |
| R 16 | 63-948 | 220 OHM | ½ W |

| | | |
|---|---|---|
| 1 | 5-6028 | ANTENNA COIL & SHIELD ASSEM |
| 2 | 20-185 | OSCILLATOR COIL |
| 3 | 85-142 | SELECTOR SWITCH ASSEM |
| 4 | 95-506 | 1ST I.F. TRANSFORMER |
| 5 | 95-508 | 2ND I.F. TRANSFORMER |
| 6 | 95-506 | POWER CHOKE |
| 7 | 95-508 | POWER TRANSFORMER |
| 8 | 95-507 | AUDIO TRANSFORMER |
| 9 | 190-13 | VIBRATOR |
| 10 | 20-175 | HASH CHOKE COIL |
| 11 | 20-176 | MOTOR NOISE CHOKE COIL |

MODELS 5A318, 5A325
Chassis 5532A
Voltage, Tuner Data
Socket

# ZENITH RADIO CORP.

MODEL 5S313B
Chassis 5535BT
Socket, Voltage




Fig. 1

CHASSIS 5532A **AUTOMATIC**

To set the buttons for automatic operation proceed as follows:

1. Select a station in the tuning range of the No. 1 button.
2. Place the band switch on BROADCAST and tune this station manually in the conventional manner.
3. Set the band switch to the AUTOMATIC position and press No. 1 button.
4. Remove the cap above the button by inserting a pin or your finger nail under the edge and pulling out.
5. Turn the exposed screw in either direction until the previously selected station is heard. (Recheck by switching back to BROADCAST.) Adjust the screw very carefully for best tone, greatest freedom from noise, and maximum volume.
6. Replace cap and cut the call letters of the station from the call sheet furnished with the receiver. Wet the rear surface of the tab, and place it in the space provided on the cap.
7. Follow the above operations in setting the remaining four buttons.
8. The call letter sheets should be preserved for use in the event it is desired to change any of the buttons to some other station.

CHASSIS 5535BT **SOCKET VOLTAGES**




(A) Bias for 6J8G—6U7G and diodes of 6Q7 measured across resistor R14.

(B) Bias for triode section of 6Q7G and 6K6G measured across R13 and R14.

Fig. 3

Voltages measured with a 1000 ohm per volt meter from chassis to socket contacts. Antenna disconnected — volume control on full.

Line voltage 115 v.

All Voltage is taken with a 1000 ohm per volt meter from point indicated to ground. Line Volts 115 A.C. Vol. at minimum, no ant. Band sw on manual Broadcast position. NOTE "A" Grid Bias for 6U7G and 6V8G is—2 V. measured at "K" of 6Q7G.

LEGEND: N.C.—*No Connections*; S.H.—*Shield*; H.—*Heater*; P.—*Plate*; S.—*Screen*; S.U.—*Suppressor Grid*; G.—*Grid*; D.I. *Diode*; K.—*Cathode*.

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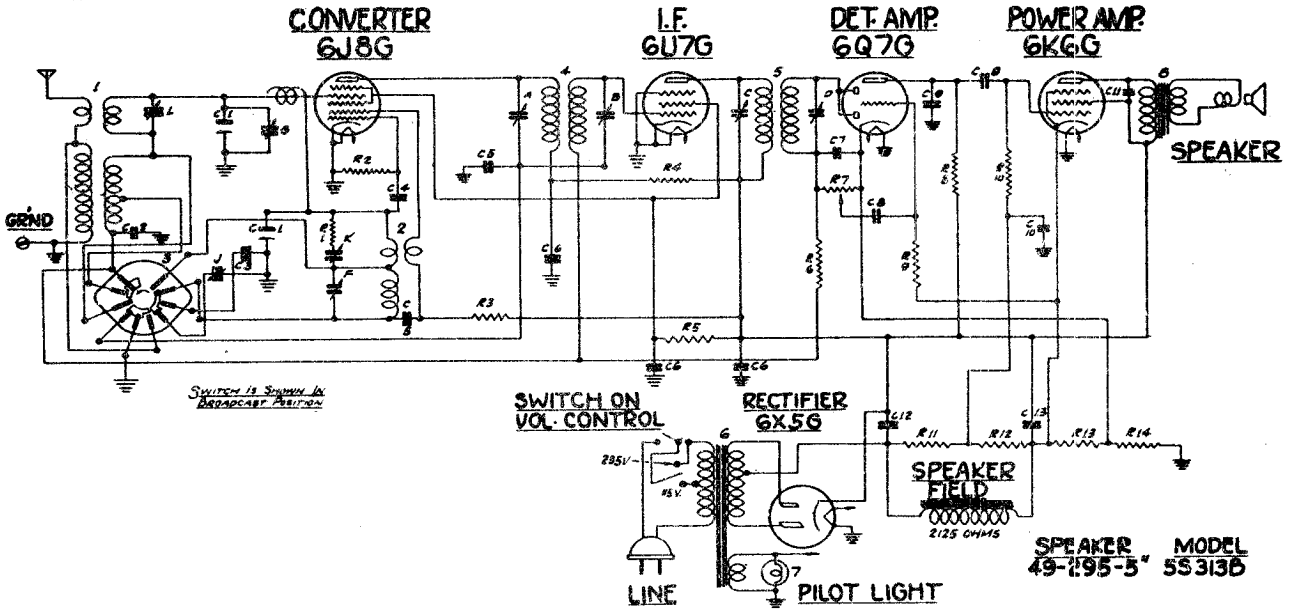
MODEL 5S313B
Chassis 5535BT
Schematic

# ZENITH RADIO CORP.

MODELS 5A318, 5A325
Chassis 5532A
Schematic



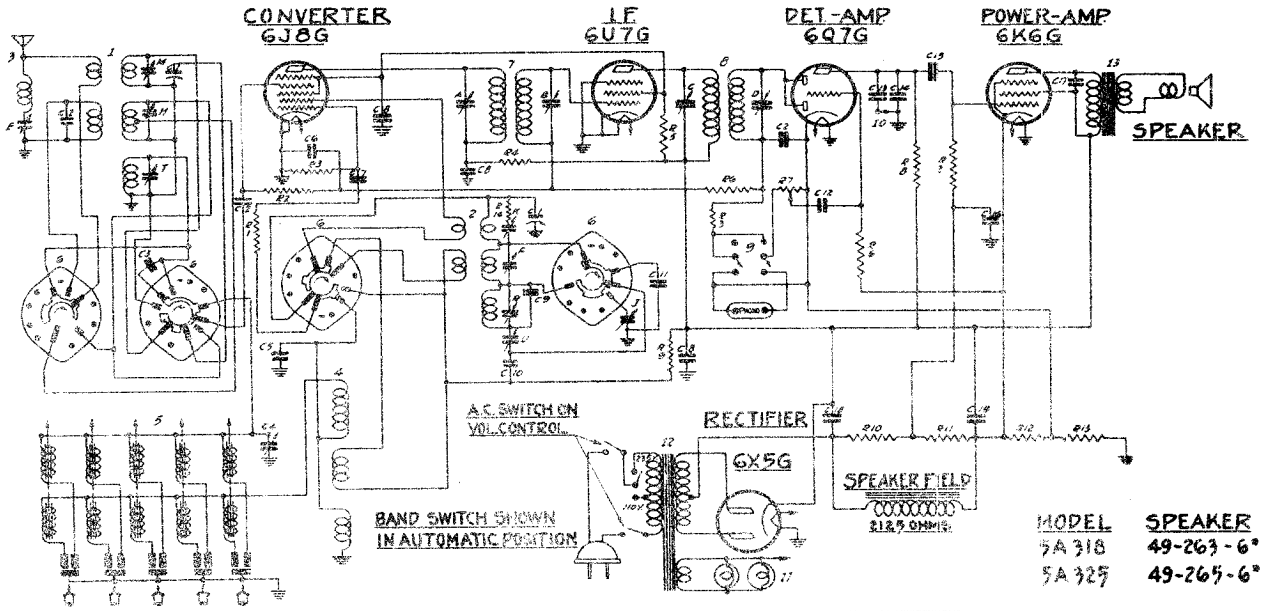

| DIAG NO. | PART NO. | DESCRIPTION | | DIAG NO. | PART NO. | DESCRIPTION | | DIAG NO. | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| C-1 | 22-832 | TWO GANG VAR. | | R-2 | 63-333 | 47M OHMS | 1/4 W | S | 95-182 | BAND SWITCH |
| C-2 | 22-818 | .03MFD | 400V. | R-3 | 63-1014 | 15M OHMS | 2 W | 4 | 95-593 | 1ST I.F. TRANSFORMER |
| C-3 | 22-569 | FIXED PADDER COND. | | R-4 | 63-605 | 1000 OHMS | 1/2 W | 5 | 96-594 | 2ND I.F. TRANSFORMER |
| C-4 | 22-819 | .02 MMFD | 600V. | R-5 | 63-208 | 12M OHMS | 1 W | 6 | 95-570 | POWER TRANSFORMER 25Z6 |
| C-5 | 22-358 | .008MFD | 600V. | R-6 | 63-600 | 2.2 MEGOHMS | 1/2W. | 7 | 100-34 | PILOT LIGHT. 25A-6.3V |
| C-6 | 22-819 | .05 MFD | 600V. | R-7 | 63-1027 | VOLUME CONTROL | | 8 | | SPEAKER TRANS. |
| C-7 | 22-162 | .0001MFD | 600V. | R-8 | 63-296 | 220M OHMS | 1/2W | | | |
| C-8 | 22-811 | .01 MFD | 600V. | R-9 | 63-271 | 1 MEGOHM | 1/2W | A | | 1ST I.F. TRNS PRI |
| C-9 | 22-147 | .0005MFD | 600V. | R-10 | 63-597 | 470M OHMS | 1/2 W | B | | 1ST I.F. TRNS SEC |
| C-10 | 22-826 | .5MFD | 200V. | R-11 | 63-658 | 990M OHMS | 1/2W | C | | 2ND I.F. TRANS PRI |
| C-11 | 22-812 | .01MFD | 1200V. | R-12 | 63-260 | 100 M OHMS | 1/2 W | D | | 2ND I.F. TRANS SEC. |
| C-12 | 22-775 | 8MFD ELECTROLYTIC | 450V. | R-13 | 63-563 | 80 OHMS WIREWOUND | 1/2 W | F | | BROADCAST OSC. (SEE NOTE) |
| C-13 | 22-776 | 8MFD ELECTROLYTIC | 350V. | R-14 | 63-686 | 150 OHMS WIRE WOUND | 1/2 W | G | | ANTENNA BROAD. (ON GANG) |
| | | | | | | | | J | 22-463 | BROADCAST PADDER |
| | | | | 1 | 5-6874 | ANTENNA COIL ASSM. | | K | | SHORT WAVE OSC (SEE NOTE) |
| R-1 | 63-626 | 82 OHMS | 1/2W | 2 | 5-6875 | OSCILLATOR COIL ASSM | | L | 23-788 | SHORT WAVE DETECTOR |

NOTE: TRIMMERS F & K MOUNTED ON BAKELITE STRIP # 22-754

I.F. FREQUENCY 455 KC.
5 TUBE SUPERHETERODYNE
CHASSIS No. 5535 BT
ZENITH RADIO CORPORATION
CHICAGO, ILL.

Total power consumption 45 watts.

Power output 3.5 watts.




| MODEL | SPEAKER |
|---|---|
| 5A318 | 49-263-6" |
| 5A325 | 49-265-6" |

| DIAG NO. | PART NO. | DESCRIPTION | | DIAG NO. | PART NO. | DESCRIPTION | | DIAG NO. | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|---|---|---|---|---|
| C-1 | 22-794 | TWO GANG ADJUSTABLE | | | | | | A | 20-196 | COMPENSATING COIL |
| C-2 | 22-162 | .0001 MFD | 600 V | | | | | 6 | 1-6174 | AUTOMATIC BAND SWITCH ASSEM. |
| C-3 | 22-889 | .02 MMFD | 600 V | R-1 | 63-625 | 82 OHM | 1/4 W | G | 85-172 | BAND SELECTOR SWITCH |
| C-4 | 22-819 | TRIMMER CONDENSER | | R-2 | 63-587 | 470 MOHM | 1/4 W | 7 | 95-573 | 1ST I.F. TRANS |
| C-5 | 22-761 | COMPENSATING COND. | | R-3 | 63-593 | 47 MOHM | 1/4 W | 8 | 95-574 | 2ND I.F. TRANS |
| C-6 | 22-812 | .05 MFD | 400 V | R-4 | 63-583 | 1000 OHM | 1/4 W | 9 | 85-171 | RADIO SWITCH |
| C-7 | 22-127 | 23 MMFD | 500 V | R-5 | 63-958 | 22 M OHM | 1 W | 10 | 83-145 | TONE CONTROL SWITCH |
| C-8 | 22-171 | .05 MFD | 600 V | R-6 | 63-271 | 1 MEGOHM | 1/2W | 11 | 100-35 | PILOT LIGHT 25A-6.3V |
| C-9 | 22-758 | 60 MMFD CERAMIC | | R-7 | 63-998 | 220 MOHM VOL CONTROL | | 12 | 95-521 | POWER TRANSFORMER |
| C-10 | 22-358 | .008 MFD | 600 V | R-8 | 63-296 | 220 MOHM | 1/2W | 13 | | SPEAKER TRANSFORMER |
| C-11 | 22-563 | FIXED PADDER COND. | | R-9 | 63-151 | 1.2 MOHM | 1 W | | | |
| C-12 | 22-196 | .01 MFD | 600 V | R-10 | 63-655 | 330 MOHM | 1/4 W | | | |
| C-13 | 22-448 | .002 MFD | 600 V | R-11 | 63-760 | 100 MOHM | 1/2 W | A | | 1ST I.F. TRANS PRI. |
| C-14 | 22-1371 | .0025 MFD | 600 V | R-12 | 63-563 | 80 OHM WIREWOUND | 1/4 W | B | | 1ST SEC. |
| C-15 | 22-439 | .02 MFD | 600 V | R-13 | 63-686 | 150 OHM WIREWOUND | 1/2 W | C | | 2ND PRI. |
| C-16 | 22-190 | 1 MFD | 200 V | R-14 | 63-621 | 39 OHM | 1/4 W | D | | 2ND SEC. |
| C-17 | 22-756 | .002 MFD | 1200 V | 1 | 5-6711 | ANT. COIL ASSEMBLY | | E | | WAVE TRAP SEE NOTE |
| C-18 | 22-772 | 8 MFD ELECTROLYTIC | 450 V | 1 | 5-6710 | ANT. COIL & FIELD ASSEM. | | F | | BROADCAST OSC - SEE NOTE |
| C-19 | 22-776 | 8 MFD " | 350 V | 2 | 5-6647 | OSC. COIL ASSEMBLY | | H | | ANT. BROADCAST - SEE NOTE |
| | | | | 3 | 20-199 | WAVE TRAP COIL | | J | 23-519 | BROADCAST PADDER - SEE NOTE |

| DIAG NO. | DESCRIPTION |
|---|---|
| K | SHORT WAVE OSC. - SEE NOTE |
| M | SHORT WAVE ANT. - SEE NOTE |
| P | LONG WAVE OSC. - SEE NOTE |
| T | LONG WAVE ANT. - SEE NOTE |
| U | LONG WAVE PADDER - SEE NOTE |

NOTE - TRIMMERS M-N-T & U ARE MOUNTED ON BAKELITE STRIP # 22-795 -

TRIMMERS E-H-K & L ARE MOUNTED ON BAKELITE STRIP # 22-754 -

Total power consumption 45 watts.

Power output 3.0 watts

I.F. FREQUENCY 455 KC
5 TUBE SUPERHETERODYNE
CHASSIS No. 5532-A
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

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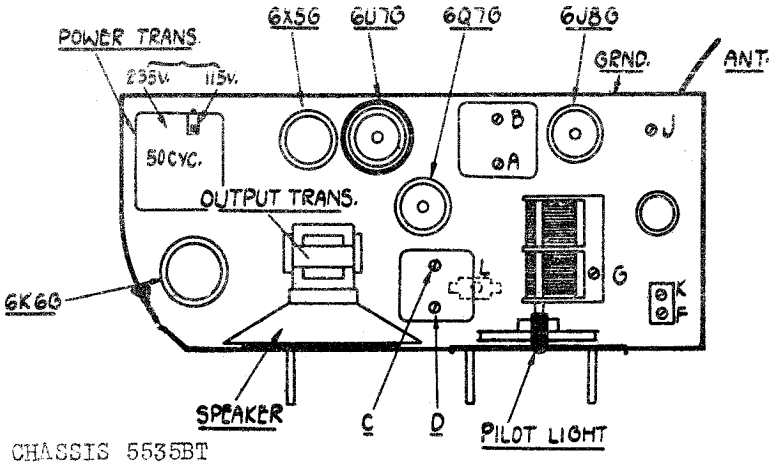
5 Tube A.C. receiver—Chassis No. 5535BT

## GENERAL

This receiver is a modern five tube superheterodyne with a dual tuning range covering frequencies between 18.2 to 5.4 megacycles and 540 to 1750 kilocycles. The tuning is explained under "Operation."

UNDER NO CIRCUMSTANCES SHOULD THIS RECEIVER BE CONNECTED TO DIRECT CURRENT (D. C.).

This receiver is designed to operate on 50 to 100 cycle alternating current (A.C.) and may be adjusted for use on either 110 or 235 Volt power lines by means of the switch on top of the power transformer. The proper position of the switch for either voltage is marked on the transformer case.



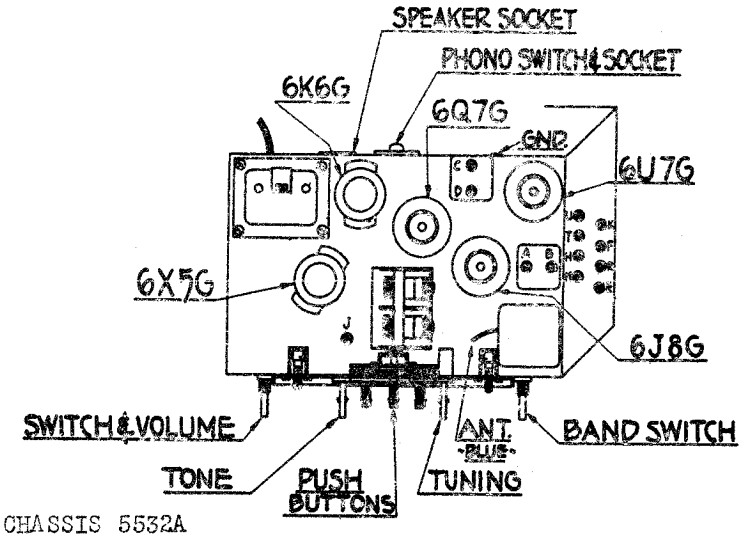

CHASSIS 5535BT

## ALIGNMENT PROCEDURE

| Operation | Connect Test Oscillator to | Dummy Antenna | Set Test Osc. to | Band | Set Dial At | Adjust Trimmers | Purpose |
|---|---|---|---|---|---|---|---|
| 1 | 1st Det. Grid | ½ Mfd. | 455 | Br'dc't | 600 | ABCD | I. F. Alignment |
| 2 | Rec. Ant. Lead | 200 Mmfd. | 1500 | Br'dc't | 1500 | F | Set Osc. to Scale |
| 3 | Rec. Ant. Lead | 200 Mmfd. | 1500 | Br'dc't | 1500 | G | Al'gment of Ant. |
| 4 | Rec. Ant. Lead | 200 Mmfd. | 600 | Br'dc't | 600 | J | Rock gang & adj. for max. output |
| 5 | Rec. Ant. Lead | 200 Mmfd. | 1500 | Br'dc't | 1500 | F • G | Repeat 2 & 3 |
| 6 | Rec. Ant. Lead | 400 ohms | 18000 | S. W. | 18000 | K | Set Osc. to Scale |
| 7 | Rec. Ant. Lead | 400 ohms | 18000 | S. W. | 18000 | L | Rock gang & adj. for max. output |

UNDER NO CIRCUMSTANCES SHOULD THIS RECEIVER BE CONNECTED TO DIRECT CURRENT (D. C.).

Chassis 5532A **only** is designed to operate on 25 to 100 cycle alternating current (A.C.) and may be adjusted for use on either 110 or 235 Volt power lines by means of the switch on top of the power transformer. The proper position of the switch for either voltage is marked on the transformer case.




CHASSIS 5532A

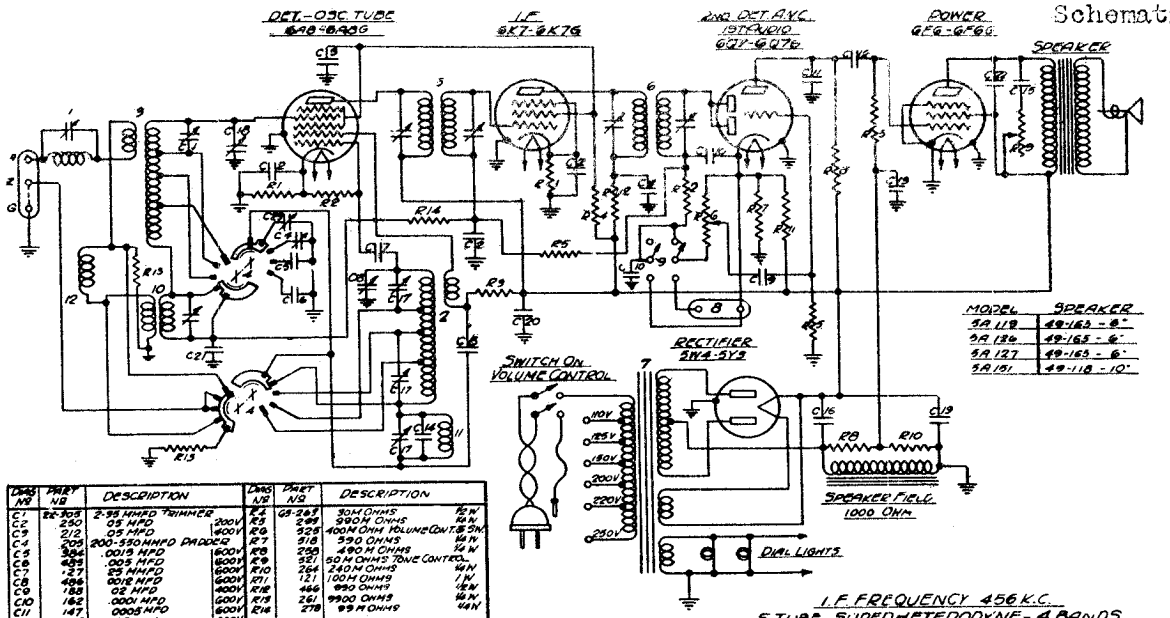
## ALIGNMENT PROCEDURE

| Operation | Connect Test Oscillator to— | Dummy Antenna | Set Test Osc. to— (Meters) | Wave Band | Set Dial to— (Meters) | Adjust Trimmers | Purpose |
|---|---|---|---|---|---|---|---|
| 1 | 1st Det. Grid | ½ Mfd. | 660 | Med. | 500 | ABCD | I.F. Alignment |
| 2 | Rec. Ant. Lead | 200 Mmfd. | 660 | Med. | 500 | E | See Note |
| 3 | Rec. Ant. Lead | 200 Mmfd. | 200 | Med. | 200 | F | Set Osc. to Scale |
| 4 | Rec. Ant. Lead | 200 Mmfd. | 200 | Med. | 200 | H | Algmt. of Antenna |
| 5 | Rec. Ant. Lead | 200 Mmfd. | 500 | Med. | 500 | J | Rock gang & adj. for max. output |
| 6 | Rec. Ant. Lead | 200 Mmfd. | | Med. | | FH | Repeat 3 & 4 |
| 7 | Rec. Ant. Lead | 200 Mmfd. | 800 | Long | 800 | R | Set Osc. to Scale |
| 8 | Rec. Ant. Lead | 200 Mmfd. | 800 | Long | 800 | T | Algmt. of Antenna |
| 9 | Rec. Ant. Lead | 200 Mmfd. | 1900 | Long | 1900 | U | Rock gang & adj. for max. output |
| 10 | Rec. Ant. Lead | 200 Mmfd. | | Long | | RT | Repeat 7 & 8 |
| 11 | Rec. Ant. Lead | 400 Ohms | 17 | Short | 17 | K | Set Osc. to Scale |
| 12 | Rec. Ant. Lead | 400 Ohms | 17 | Short | 17 | M | Algmt. of Antenna |

NOTE: If receiver is used in location subject to code interference adjust wave trap (E) for minimum interference with antenna, connected and receiver operating in Medium Wave position.

# ZENITH RADIO CORP.

MODELS 5A119, 5A126
5A127, 5A151, Ch. 5517A
MODELS 5L228, 5L237
Chassis 5525A
Schematics




| MODEL | SPEAKER |
|---|---|
| 5A 119 | 49-163 - 8" |
| 5A 126 | 49-165 - 6" |
| 5A 127 | 49-165 - 6" |
| 5A 151 | 49-118 - 10" |

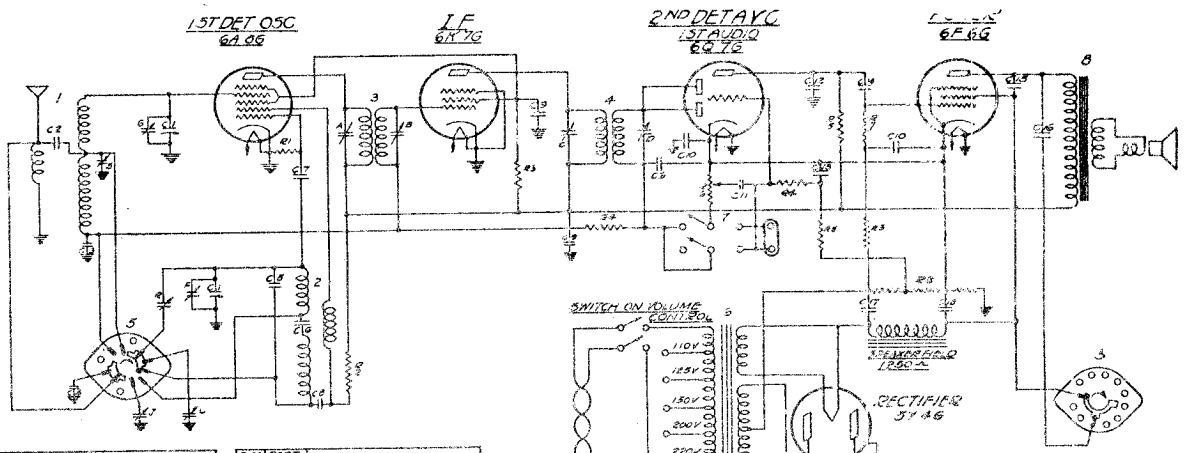
| Ckt. No. | Part No. | Description | Ckt. No. | Part No. | Description |
|---|---|---|---|---|---|
| C1 | 26-308 | 2-95 MMFD Trimmer | R1 | 68-267 | 30M Ohms 1/2 W |
| C2 | 280 | .05 MFD 200V | R2 | 249 | 990M Ohms 1/2 W |
| C3 | 212 | .05 MFD 400V | R6 | 328 | 400M Ohm Volume Cont. & SW. |
| C4 | 203 | 200-550 MMFD Padder | R7 | 318 | 390 Ohms 1/2 W |
| C5 | 306 | .0019 MFD 600V | R8 | 259 | 490 M Ohms 1/2 W |
| C6 | 495 | .005 MFD 600V | R9 | 321 | 50 M Ohms Tone Control |
| C7 | 127 | .25 MMFD 600V | R10 | 264 | 240 M Ohms 1/2 W |
| C8 | 486 | .0018 MFD 600V | R11 | 131 | 100 M Ohms 1 W |
| C9 | 182 | .02 MFD 400V | R12 | 466 | 990 Ohms 1/2 W |
| C10 | 162 | .0001 MFD 600V | R13 | 261 | 9900 Ohms 1/2 W |
| C11 | 147 | .0005 MFD 600V | R14 | 278 | 99 M Ohms 1/4 W |
| C12 | 494 | .02 MFD 600V | | | |
| C13 | 185 | .8 MFD 200V | | | |
| C14 | 321 | 60 MMFD 600V | | | |
| C15 | 529 | .04 MFD 600V | | | |
| C16 | 294 | 16 MFD Wet Elect. 450V | 1 | 20-193 | Wave Trap Assembly |
| C17 | 324 | 8-95 MMFD Trimmer | 2 | 5-4618 | Oscillator Coil Assembly |
| C18 | 482 | 2 Gang Variable Cond. | 3 | 5-4615 | Antenna Coil Assembly |
| C19 | 309 | 12 MFD Wet Elec. Cond. 25V | 4 | 86-100 | Band Selector Switch |
| C20 | 170 | .1 MFD 400V | 5 | 96-349 | 1st I.F. Transformer |
| C21 | 487 | .05 MFD 400V | 6 | 96-350 | 2nd I.F. Transformer |
| C22 | 529 | .004 MFD 600V | 7 | 96-386 | Power Transformer 25 Cycle All Volt |
| C23 | 518 | 100-280 MMFD Padder | 8 | 447 | Phonograph Jack |
| | | | 9 | 86-98 | Phonograph Switch |
| | | | 10 | 70-140 | L.W. Antenna Coil |
| | | | 11 | 20-198 | L.W. Oscillator Coil |
| R1 | 68-362 | 400 Ohms 1/4 W | 12 | 20-147 | L.W. Antenna Primary Coil |
| R5 | 350 | 49 M Ohms 1/2 W | | | |
| R9 | 377 | 11 M Ohms 1/2 W | | | |

I.F. FREQUENCY 456 K.C.
5 TUBE SUPERHETERODYNE - 4 BANDS
CHASSIS NO 5517A

| BAND | COLOR | KILOCYCLES |
|---|---|---|
| A | Green | 492-1640 |
| B | Yellow | 1750-6040 |
| C | Red | 5520-19000 |
| D | Blue | 148-400 |

The total consumption is 55 watts. Power output 3 watts.

FOR OTHER DATA, SEE INDEX




| Ckt. No. | Part No. | Description |
|---|---|---|
| C1 | 22-540 | 70 G.M.D. Variable |
| C2 | 22-508 | 8 MMFD Cera-Mic |
| C3 | 22-477 | .05 MFD 400V |
| C4 | 22-178 | .002 MFD 600V |
| C5 | 22-507 | 10 MMFD Ceramic |
| C6 | 22-102 | .00025 MFD 600V |
| C7 | 22-209 | 50 MMFD 600V |
| C8 | 22-182 | .02 MFD 400V |
| C9 | 22-170 | .1 MFD 400V |
| C10 | 22-183 | .1 MFD 200V |
| C11 | 22-327 | .02 MFD 1,500V |
| C12 | 22-467 | .0025 MFD 600V |
| C13 | 22-180 | .1 MFD 200V |
| C14 | 22-435 | .02 MFD 600V |
| C15 | 22-209 | .005 MFD 600V |
| C16 | 22-171 | .03 MFD 400V |
| C17 | 22-696 | 8 MFD Dry Electrolytic 450V |
| C18 | | 16 MFD Dry Electrolytic 450V |

VARIABLE TRIMMERS

| | |
|---|---|
| A | 1st I.F. Trans. Primary |
| B | 1st I.F. Trans. Secondary |
| C | 2nd I.F. Trans. Primary |
| D | 2nd I.F. Trans. Secondary |
| E | Broadcast Oscillator 182-385 |
| F | Osc. Trk. Broadcast (Low Band) |
| G | Broadcast Padder 182-518 |
| R | (Long Wave Osc. (Not Voted) |
| S | (Long Wave Osc. Factory Adjusted) |
| U | Long Wave Padder 148-518 |

NOTE - Trimmers are all mounted on Bakelite Strip Part 326-608

| Ckt. No. | Part No. | Description |
|---|---|---|
| R1 | 63-393 | 47 M Ohms 1/4 W 5% |
| R2 | 63-910 | 33 M Ohms 1 W 5 10 |
| R3 | 63-67 | 33 M Ohms 1 W 5 10 |
| R4 | 63-22 | 1 M Ohms 1/4 W 5 20 |
| R5 | 63-234 | 220 M Ohms 1/4 W 5 20 |
| R6 | 63-511 | 2 M Ohms Volume Control |
| R7 | 63-937 | 470 M Ohms 1/4 W 5 20 |
| R8 | 63-308 | 3 Section Candohm |
| 1 | 5 538 | Ant. Coil Assembly |
| | 5 5525 | Ant. Coil & Shield Assembly |
| 2 | 5 5536 | Osc. Coil Assembly |
| 3 | 96-437 | 1st I.F. Transformer |
| 4 | 96-438 | 2nd I.F. Transformer |
| 5 | 86-81 | Band Switch |
| 6 | 96-433 | Power Transformer 25 Cycle All Voltage |
| 7 | 86-39 | Phono Switch |
| 8 | | Speaker Transformer |

| MODEL | SPEAKER |
|---|---|
| 5L 228 | 49-180 6" |
| 5L 237 | 49-180 6" |

I. FREQUENCY 456 KC
5 TUBE SUPERHETERODYNE
2-BAND LONG WAVE
CHASSIS NO-5525A
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

The total consumption is 65 watts.
Power output 4.5 watts.

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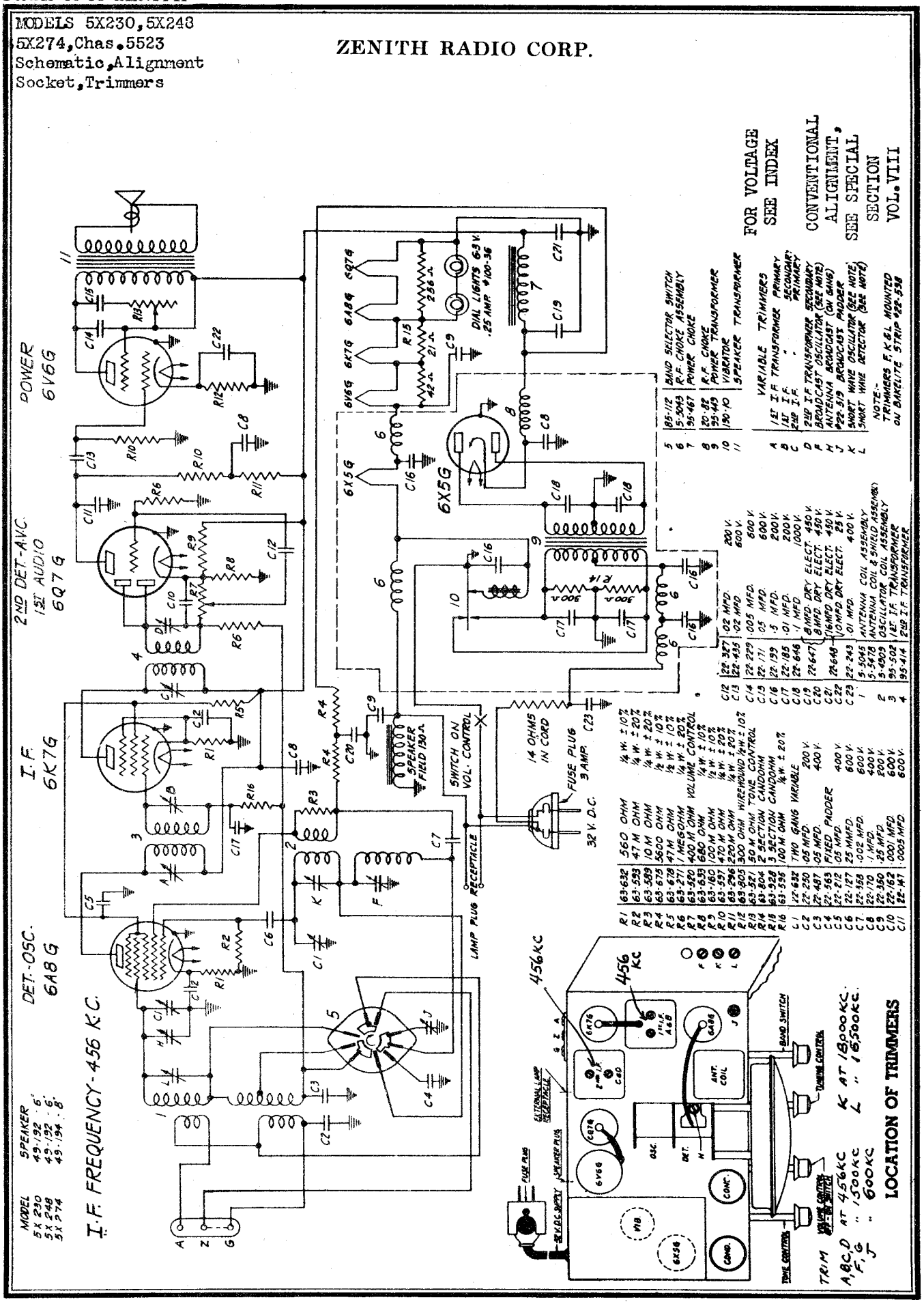
MODELS 5X230, 5X248
5X274, Chas. 5523
Schematic, Alignment
Socket, Trimmers

# ZENITH RADIO CORP.




| MODEL | SPEAKER |
|---|---|
| 5X230 | 49-192 : 6" |
| 5X248 | 49-192 : 6" |
| 5X274 | 49-194 : 8" |

| | | | |
|---|---|---|---|
| R1 | 63-632 | 560 OHM | ½ W. ± 10% |
| R2 | 63-553 | 47 M OHM | ½ W. ± 20% |
| R3 | 63-389 | 10 M OHM | ½ W. ± 20% |
| R4 | 63-675 | 3600 OHM | ½ W. ± 10% |
| R5 | 63-678 | 47 M OHM | ½ W. ± 10% |
| R6 | 63-271 | 1 MEGOHM | ½ W. ± 20% |
| R7 | 63-520 | 400 M OHM | VOLUME CONTROL |
| R8 | 63-635 | 680 OHM | ½ W ± 10% |
| R9 | 63-660 | 100 M OHM | ½ W ± 10% |
| R10 | 63-551 | 470 M OHM | ½ W ± 20% |
| R11 | 63-296 | 220 M OHM | ½ W ± 20% |
| R12 | 63-805 | 300 OHM WIREWOUND | ½ W ± 10% |
| R13 | 63-521 | 50 M OHM | TONE CONTROL |
| R14 | 63-804 | 2 SECTION CANDOHM | |
| R15 | 63-528 | 3 SECTION CANDOHM | |
| R16 | 63-595 | 100 M OHM | ½ W ± 20% |
| L1 | 22-632 | TWO GANG | VARIABLE |
| C2 | 22-250 | .05 MFD. | 200 V. |
| C3 | 22-487 | .05 MFD. | 400 V. |
| C4 | 22-565 | FIXED PADDER | 400 V. |
| C5 | 22-212 | .05 MFD. | 600 V. |
| C6 | 22-127 | 25 MMFD. | 600 V. |
| C7 | 22-158 | .002 MFD. | 600 V. |
| C8 | 22-170 | .1 MFD. | 400 V. |
| C9 | 22-350 | .25 MFD. | 200 V. |
| C10 | 22-162 | .001 MFD. | 600 V. |
| C11 | 22-147 | .0005 MFD. | 600 V. |
| C12 | 22-327 | .02 MFD. | 200 V. |
| C13 | 22-435 | .02 MFD. | 600 V. |
| C14 | 22-229 | .005 MFD. | 600 V. |
| C15 | 22-171 | .05 MFD. | 600 V. |
| C16 | 22-139 | .5 MFD. | 200 V. |
| C17 | 22-185 | .01 MFD. | 200 V. |
| C18 | 22-646 | .1 MFD. | 1000 V. |
| C19 | 22-647 | 8 MFD. DRY ELECT. | 450 V. |
| C20 | | 8 MFD. DRY ELECT. | 450 V. |
| C21 | 22-648 | 16 MFD. DRY ELECT. | 450 V. |
| C22 | | 16 MFD. DRY ELECT. | 25 V. |
| C23 | 22-243 | .01 MFD. | 400 V. |
| 1 | 5-5045 | ANTENNA COIL ASSEMBLY | |
| | 5-5478 | ANTENNA COIL & SHIELD ASSEMBLY | |
| 2 | 5-4929 | OSCILLATOR COIL & SHIELD ASSEMBLY | |
| 3 | 95-502 | 1ST I.F. TRANSFORMER | |
| 4 | 95-414 | 2ND I.F. TRANSFORMER | |
| 5 | 85-112 | BAND SELECTOR SWITCH | |
| 6 | 5-3043 | R.F. CHOKE ASSEMBLY | |
| 7 | 95-467 | POWER CHOKE | |
| 8 | 20-82 | R.F. CHOKE | |
| 9 | 95-445 | POWER TRANSFORMER | |
| 10 | 130-10 | VIBRATOR | |
| 11 | | SPEAKER TRANSFORMER | |

FOR VOLTAGE SEE INDEX

| | |
|---|---|
| | VARIABLE TRIMMERS |
| A | 1ST I.F. TRANSFORMER PRIMARY |
| B | 1ST I.F. " SECONDARY |
| C | 2ND I.F. " PRIMARY |
| D | 2ND I.F. TRANSFORMER SECONDARY |
| E | BROADCAST OSCILLATOR (SEE NOTE) |
| F | ANTENNA BROADCAST (ON GANG) |
| H | #22-319 BROADCAST PADDER |
| J | SHORT WAVE OSCILLATOR (SEE NOTE) |
| K | SHORT WAVE DETECTOR (SEE NOTE) |
| L | |

NOTE:- TRIMMERS F, K & L MOUNTED ON BAKELITE STRIP #22-538

CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII

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ZENITH RADIO CORP.

MODEL 6D315, Chas. 5657
Schematic, Voltage, Socket
Trimmers, Alignment

# ALIGNMENT PROCEDURE

| Operation | Connect Test Oscillator to | Dummy Antenna | Set Test Osc. to | Band | Set Dial At | Adjust Trimmers | Purpose |
|---|---|---|---|---|---|---|---|
| 1 | 1st Det. Grid | 1/2 Mfd. | 455 | Br'dc't | 600 | ABCD | I. F. Alignment |
| 2 | Rec. Ant. Lead | 200 Mmfd. | 1500 | " | 1500 | F | Set Osc. to Scale |
| 3 | " " " | 200 Mmfd. | 1500 | " | 1500 | G | Al'gment of Ant. |

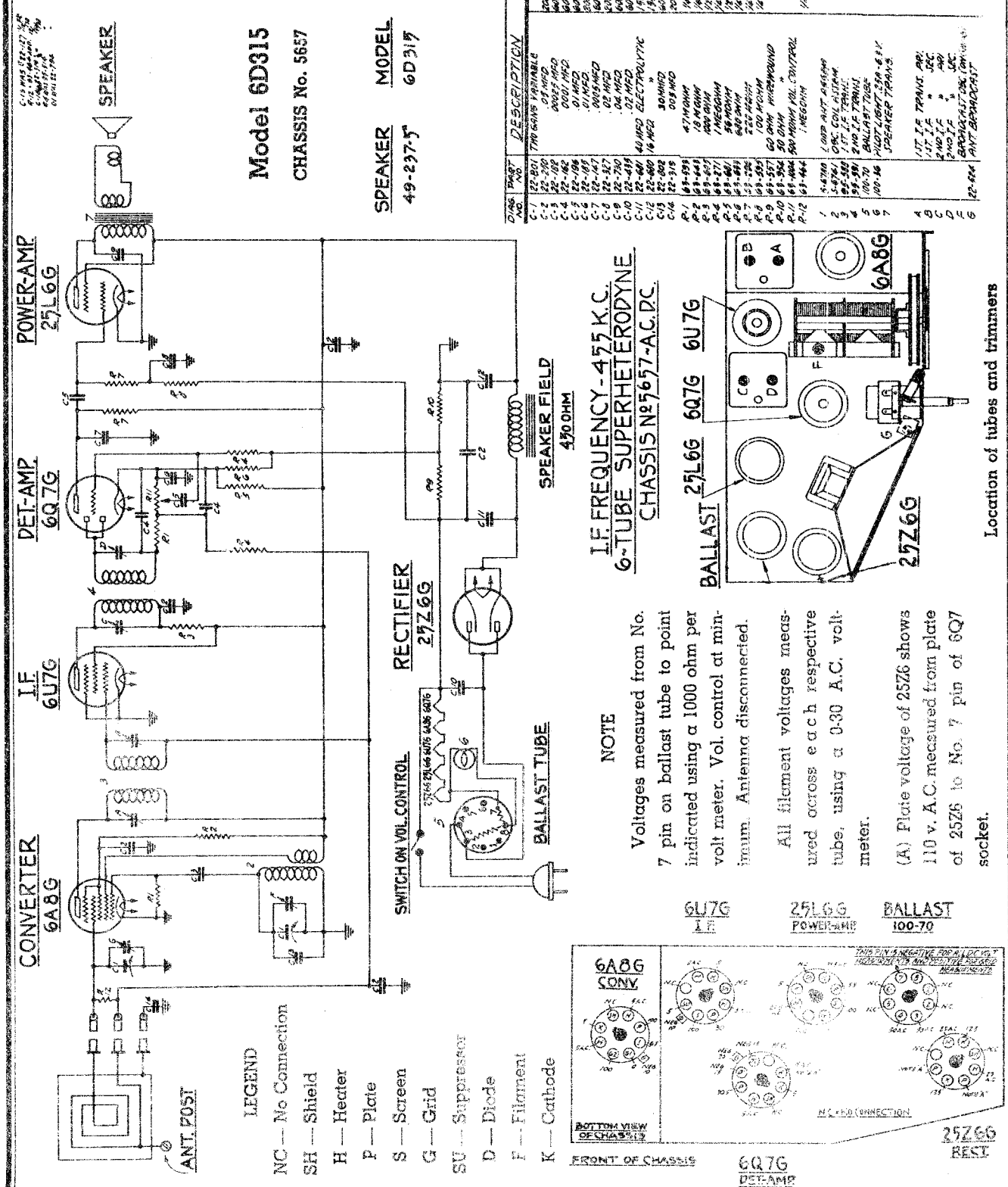
Model 6D315

CHASSIS No. 5657

SPEAKER MODEL 6D315

SPEAKER 49-237-5

| D'AGR. NO. | PART NO. | DESCRIPTION | | | |
|---|---|---|---|---|---|
| C-1 | 22-801 | TWO GANG VARIABLE | | | |
| C-2 | 22-230 | .05 MFD. | 400V | 1/4 W | |
| C-3 | 22-109 | .0025 MFD. | 600V | 1/4 W | |
| C-4 | 22-102 | .001 MFD. | 600V | 1/4 W | |
| C-5 | 22-106 | .01 MFD. | 600V | 1/4 W | |
| C-6 | 22-105 | .005 MFD. | 600V | 1/4 W | |
| C-7 | 22-107 | .02 MFD. | 600V | 1/4 W | |
| C-8 | 22-727 | .02 MFD. | 600V | 1/4 W | |
| C-9 | 22-730 | .04 MFD. | 600V | 1/4 W | |
| C-10 | 22-455 | .02 MFD. | 600V | 1/4 W | |
| C-11 | 22-460 | 40 MFD. ELECTROLYTIC | 150V | | |
| C-12 | 22-800 | 16 MFD. " | 150V | | |
| C-13 | 22-802 | 30 MFD. " | 450V | | |
| C-14 | 22-315 | 0015 MFD. | 2000V | 1/4 W | |
| R-1 | 61-431 | 47 M OHM | | 1/4 W | |
| R-2 | 61-441 | 15 M OHM | | 1/2 W | |
| R-3 | 61-451 | 1000 OHM | | 1/2 W | |
| R-4 | 61-471 | 1 MEGOHM | | 1/2 W | |
| R-5 | 61-461 | 250 OHM | | 1/2 W | |
| R-6 | 61-481 | 50 M OHM | | 1/2 W | |
| R-7 | 61-126 | 250 MEGOHM | | 1/2 W | |
| R-8 | 61-551 | 100 M OHM | | 1/2 W | |
| R-9 | 61-557 | 60 OHM WIREWOUND | | 10 W | |
| R-10 | 61-562 | 50 OHM " | | 10 W | |
| R-11 | 61-4004 | 500 M OHM VOL. CONTROL | | | |
| R-12 | 61-444 | 1 MEGOHM | | 1/4 W | |
| 1 | 1-8780 | LOOP ANT. ASSEMB. | | | |
| 2 | 1-8764 | OSC. COIL ASSEMB. | | | |
| 3 | 25-580 | 1ST I.F. TRANS. | | | |
| 4 | 25-581 | 2ND I.F. " | | | |
| 5 | 25-582 | BALLAST TUBE | | | |
| 6 | 100-70 | PILOT LIGHT 3.5A-6.4 V. | | | |
| 7 | 100-46 | SPEAKER TRANS. | | | |
| A | | 1ST I.F. TRANS. PRI. | | | |
| B | | 1ST I.F. " SEC. | | | |
| C | | 2ND I.F. " PRI. | | | |
| D | | 2ND I.F. " SEC. | | | |
| E | | BROADCAST OSC. TRIM. | | | |
| F | 22-604 | ANT. BROADCAST | | | |

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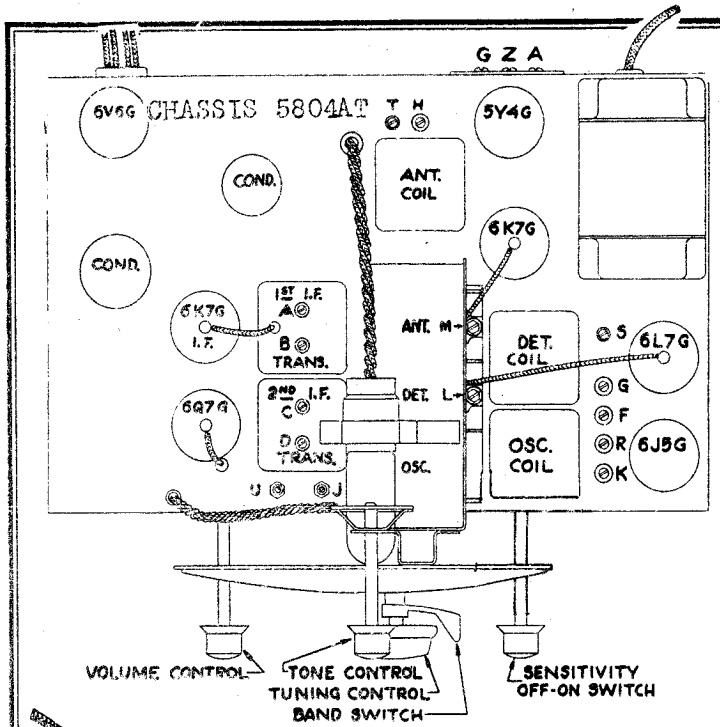
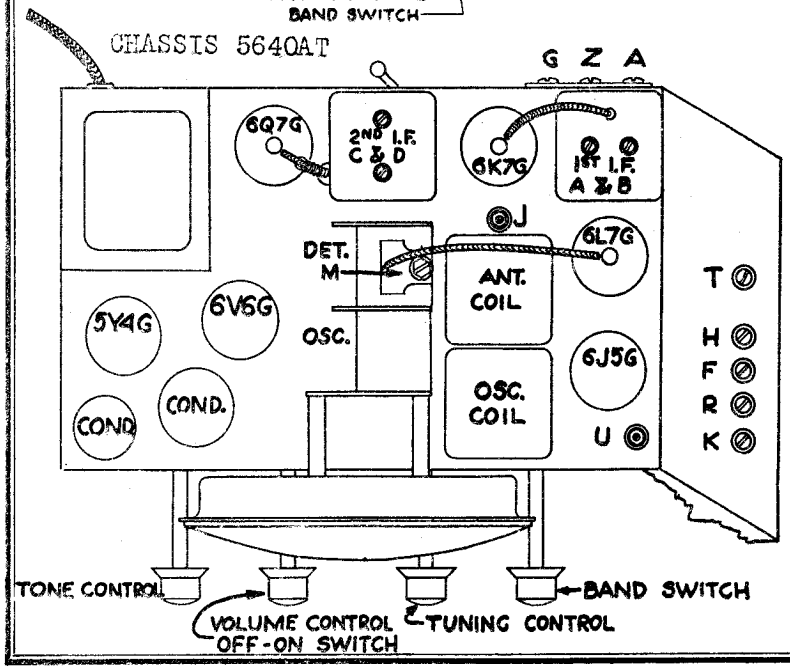



# CHASSIS 5640, 5804A Secret Volume Governor

Where it is desired to limit the maximum volume of the receiver to a predetermined level such as for hospital use, use in public places, etc., this may be done as follows:

1. Tune the receiver carefully to a local station, and adjust the volume to the loudest desired setting.

2. Remove the knob by pulling directly away from the panel, and insert the short headless screw into the hole provided in the rear of the knob closest to the right side of the elongated cut-out around the volume control shaft.

3. It may be necessary to move the screw to the next hole in either direction before it is definitely determined what volume level is desired.

# Alignment Procedure

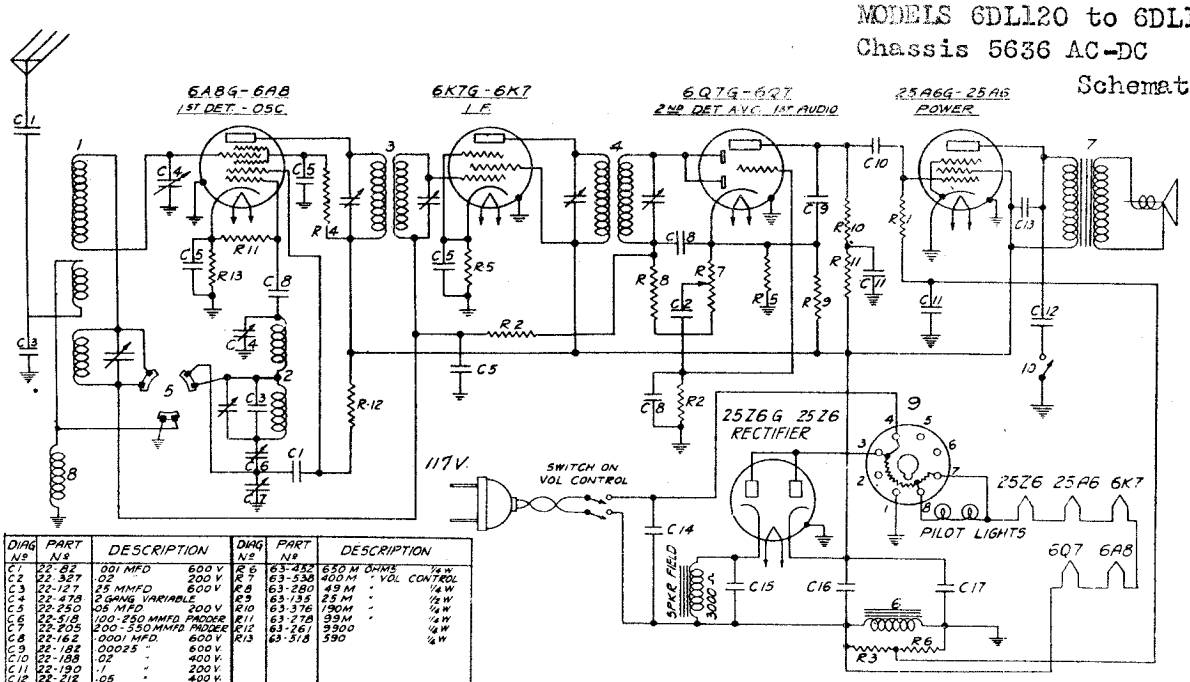
## CHASSIS 5640AT AND 5804AT

| Operation | Sig. Gen. Connected to | Dummy | Gen. Freq. | Band Switch | Receiver Dial | Trimmer | Remarks: |
|---|---|---|---|---|---|---|---|
| 1 | 1st Det. Grid | ½ mfd | 456 | Med. Wave | 550KC | ABCD | I F Alignment |
| 2 | Rec. Ant. Post | 400 Ohms | 18000 | S. W. | 18000 | K | Set. Osc. To Scale |
| 3 | Rec. Ant. Post | 400 Ohms | 18000 | S. W. | 18000 | L—M | Rock Gang While Adj. for Max. Output |
| 4 | Rec. Ant. Post | 200 mfd. | 1500 | Med. Wave | 1500 | F | Set. Osc. to Scale |
| 5 | " " " | 200 " | 1500 | " " | 1500 | G—H | Adjust for Max. Output |
| 6 | " " " | 200 " | 550 | " " | 550 | J | Rock Gang while Adjusting for Maximum Output |
| 7 | " " " | 200 " | 1500 | " " | 1500 | F-G-H | Repeat 4 & 5 |
| 8 | " " " | 200 " | 400 | L. W. | 400 | R | Set. Osc. to Scale |
| 9 | " " " | 200 " | 400 | L. W. | 400 | S—T | Adjust for Max. Output |
| 10 | " " " | 200 " | 166.7 | L. W. | 166.7 | U | Rock Gang While Adjusting for max. Output |
| 11 | " " " | 200 " | 400 | L. W. | 400 | R-S-T | Repeat 8 & 9 |

*MODEL CHASSIS 5804A ONLY

# ZENITH RADIO CORP.

MODELS 6A203, 6A223, 6A229
6A239, 6A241, Ch. 5640AT
MODELS 6DL120 to 6DL122
Chassis 5636 AC-DC
Schematics




| DIAG Nº | PART Nº | DESCRIPTION | | DIAG Nº | PART Nº | DESCRIPTION | |
|---|---|---|---|---|---|---|---|
| C1 | 23-682 | .001 MFD | 600 V | R6 | 63-432 | 650 M OHMS | 1/4 W |
| C2 | 22-387 | .02 " | 200 V | R7 | 63-538 | 400 M " | VOL. CONTROL |
| C3 | 22-127 | 25 MMFD | 600 V | R8 | 63-280 | 49 M " | 1/4 W |
| C4 | 22-478 | 2 GANG VARIABLE | | R9 | 63-136 | 25 M " | 1/2 W |
| C5 | 22-250 | .05 MFD | 200 V | R10 | 63-376 | 190 M " | 1/4 W |
| C6 | 22-518 | 100-250 MMFD PADDER | | R11 | 63-278 | 99 M " | 1/4 W |
| C7 | 23-205 | 200-550 MMFD PADDER | | R12 | 63-261 | 9300 " | 1/4 W |
| C8 | 22-162 | .0001 MFD. | 600 V | R13 | 63-518 | 590 " | 1/2 W |
| C9 | 22-182 | .00025 " | 600 V | | | | |
| C10 | 22-188 | .02 " | 400 V | | | | |
| C11 | 22-190 | .1 " | 200 V | | | | |
| C12 | 22-218 | .05 " | 400 V | | | | |
| C13 | 22-229 | .005 " | 600 V | | | | |
| C14 | 22-455 | .01 " | 1200 V | | | | |
| C15 | 22-517 | .4 " | 250 V | 1 | 20-144 | ANT COIL ASSEMBLY | |
| C16 | | .16 " | 250 V | 2 | 20-145 | OSC COIL ASSEMBLY | |
| C17 | 22-516 | .8 " | 250 V | 3 | 95-378 | 1ST I.F. TRANS | |
| | | | | 4 | 95-347 | 2ND I.F. TRANS | |
| | | | | 5 | 85-101 | BAND SELECT SWITCH | |
| | | | | 6 | 95-345 | POWER CHOKE | |
| | | | | 7 | 45-141 | SPEAKER | |
| | | | | 8 | 20-88 | ANTENNA CHOKE | |
| | | | | 9 | 100-37 | BALLAST TUBE (117 V.) | |
| R1 | 63-290 | 260 M OHMS | 1/4 W | 10 | 85-102 | TONE CONTROL SWITCH | |
| R2 | 63-293 | 990 M " | " | | | | |
| R3 | 63-481 | 400 M " | " | | | | |
| R4 | 63-288 | 19 M " | " | | | | |
| R5 | 63-362 | 400 " | " | | | | |

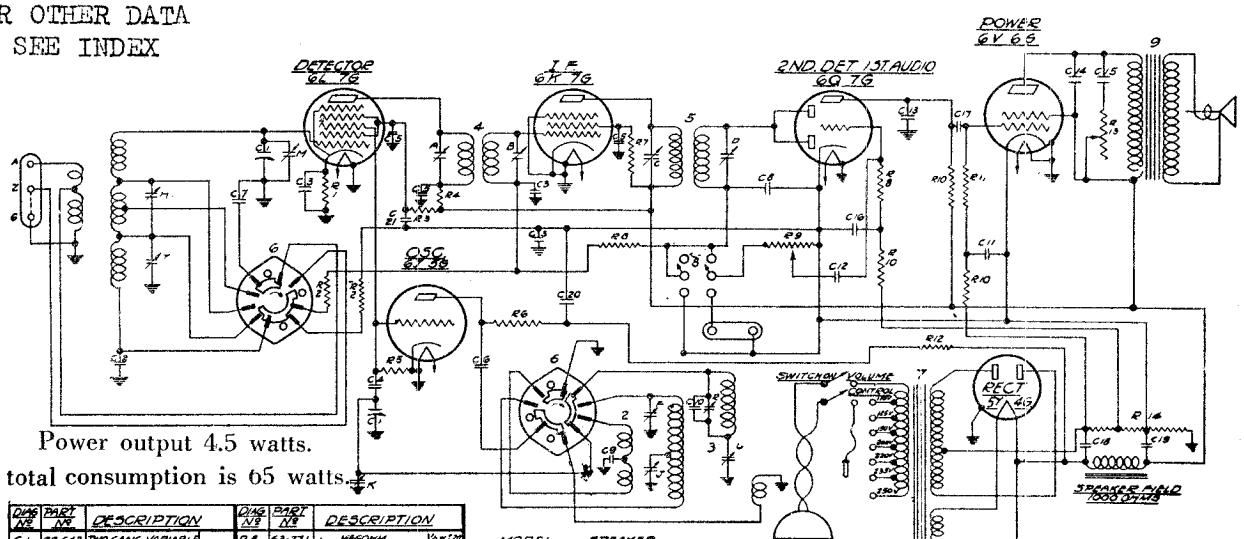
| MODEL | SPEAKER |
|---|---|
| 6DL 120 | 45-141 |
| 6DL 121 | 45-141 |
| 6DL 122 | 45-141 |

I.F. FREQUENCY 456 K.C.
6 TUBE SUPERHETERODYNE
CHASSIS Nº 5636 AC-DC

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

Power Output 1.5 watts.
Current Consumption 44 watts

FOR OTHER DATA
SEE INDEX




Power output 4.5 watts.
The total consumption is 65 watts.

| DIAG Nº | PART Nº | DESCRIPTION | | DIAG Nº | PART Nº | DESCRIPTION | |
|---|---|---|---|---|---|---|---|
| C1 | 22-643 | TWO GANG VARIABLE | | C8 | 63-271 | 1 MEGOHM | 1/4 W |
| C2 | 22-487 | .05 MFD | 400 V | C9 | 63-525 | 400 M OHMS VOLUME CONTR | |
| C3 | 22-256 | .05 MFD | 200 V | C10 | 63-288 | 280 M OHMS 1/4 W | |
| C4 | 22-127 | 25 MMFD | 600 V | C11 | 63-287 | 470 M OHMS 1/4 W | |
| C5 | 22-212 | .05 MFD | 400 V | C12 | 63-603 | 15 M OHMS 1/4 W | |
| C6 | 22-82 | .001 MFD | 600 V | C13 | 63-314 | 50 M OHMS TONE CONTROL | |
| C7 | 22-376 | .002 MFD | 600 V | C14 | 63-795 | 3 SECTION CANDOHM | |
| C8 | 22-182 | .00025 MFD | 600 V | | | | |
| C9 | 22-680 | FIXED PADDER COND | | 1 | S 5436 | ANTENNA COIL ASSEM | |
| C10 | 22-629 | .25 MMFD CERAMIC | | 2 | S 5440 | ANT COIL & SHIELD ASSEM | |
| C11 | 22-795 | .01 MFD | 200 V | 3 | S 5445 | SHORT WAVE OSC COIL | |
| C12 | 22-327 | .02 MFD | 200 V | 4 | S 5436 | OSC COIL ASSEM | |
| C13 | 22-147 | .0005 MFD | 600 V | 5 | S 5441 | OSC COIL & SHIELD ASSEM | |
| C14 | 22-196 | .01 MFD | 600 V | A | 92-461 | 1ST I.F. TRANSFORMER | |
| C15 | 22-171 | .05 MFD | 400 V | B | 92-462 | 2ND I.F. TRANSFORMER | |
| C16 | 22-190 | .1 MFD | 200 V | C | 85-122 | BAND SWITCH | |
| C17 | 22-435 | .02 MFD | 600 V | 7 | 95-450 | POWER TRANSF. ALL VOLTAGE 25 CYCLE | |
| C18 | 22-833 | .1 MFD ELECTROLYTIC | 475 V | | | | |
| C19 | | .1 MFD ELECTROLYTIC | 450 V | 8 | 85-39 | PHONO SWITCH | |
| C20 | 22-637 | 4 MFD ELECTROLYTIC | 450 V | 9 | | SPEAKER TRANSFORMER | |
| C21 | | 4 MFD ELECTROLYTIC | 350 V | | | | |
| R1 | 63-629 | 330 OHMS | 1/4 W | | | | |
| R2 | 63-595 | 100 M OHMS | 1/2 W | | | | |
| R3 | 63-208 | 1.2 M OHMS | 1 W | | | | |
| R4 | 63-605 | 2000 OHMS | 1/4 W | | | | |
| R5 | 63-593 | .47 M OHMS | 1/2 W | | | | |
| R6 | 63-680 | .10 M OHMS | 1 W | | | | |
| R7 | 63-381 | .22 M OHMS | 1/4 W | | | | |

| MODEL | SPEAKER |
|---|---|
| 6-A-203 | 49-226-8 W |
| 6-A-223 | 49-229-6 " |
| 6-A-229 | 49-229-6 " |
| 6-A-239 | 49-229-6 " |
| 6-A-241 | 49-229-8 " |

| VARIABLE TRIMMERS | |
|---|---|
| A | 1ST I.F. TRANS. PRIMARY |
| B | 1ST I.F. TRANS. SECONDARY |
| C | 2ND I.F. TRANS. PRIMARY |
| D | 2ND I.F. TRANS. SECONDARY |
| E | BROADCAST OSC. (SEE NOTE) |
| F | ANT BROADCAST (SEE NOTE) |
| H | 22-518 BROADCAST PADDER |
| J | 22-523 SHORT WAVE OSC. |
| K | SHORT WAVE ANT. (GANG) |
| M | LONG WAVE OSC. (SEE NOTE) |
| R | 22-524 LONG WAVE ANT. |
| T | 22-529 LONG WAVE PADDER |
| U | |

NOTE - TRIMMERS A-B-E-F ARE MOUNTED ON BAKELITE STRIP Nº 23-641

I.F. FREQUENCY 456 KC
6 TUBE SUPERHETERODYNE
CHASSIS Nº 5640 AT
3 BAND LONG WAVE

ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS.

| BAND | KILOCYCLES |
|---|---|
| A | 411 — 150 |
| B | 1538 — 432 |
| C | 23077 — 5660 |

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MODELS 6DL120 to 6DL122
Chassis 5636
MODELS 7DA119,7DA126,
7DA127,7DA138,7DA148,
7DA162,7DA168,Ch.5708E
Alignment,Socket
Trimmers

ZENITH RADIO CORP.

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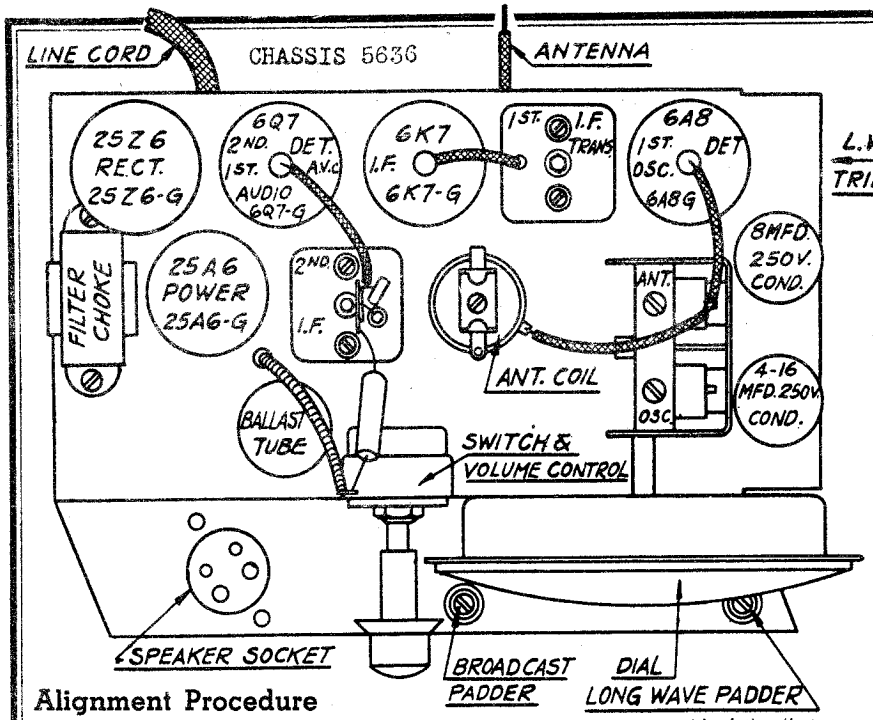
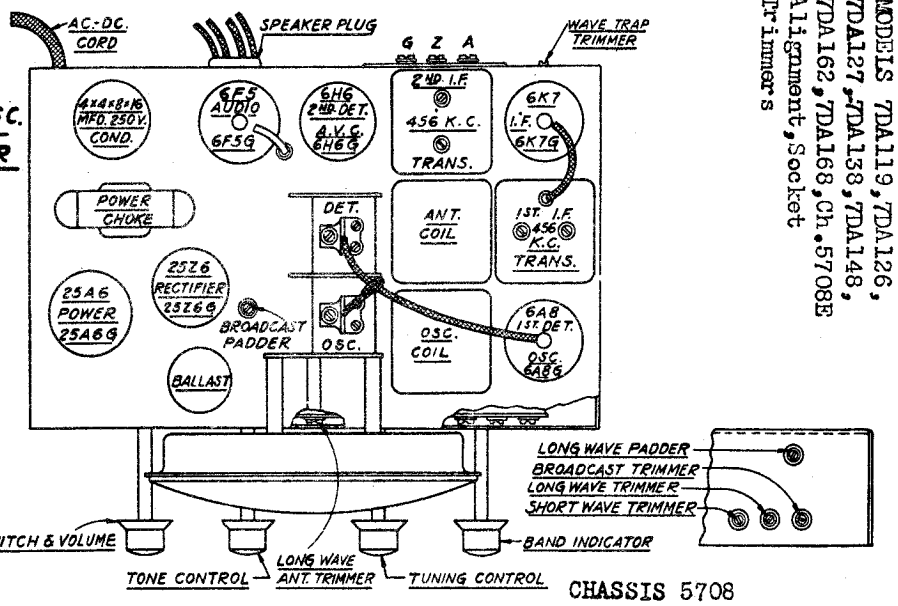



L.W. OSC. TRIMMER




CHASSIS 5708

## Alignment Procedure

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver ground. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K. C. and carefully adjust the four I. F. trimmers to the point giving the highest reading of the output meter. These adjustments should be repeated several times to secure the greatest accuracy.

All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Set signal generator at 1500 K. C., switch receiver to broadcast band and adjust oscillator trimmer on gang for correct dial reading at 200 meters. Also adjust antenna trimmer on gang to resonance.

(5) Set signal generator to 600 K. C. and rock pointer past 500 meters on dial while adjusting the broadcast padder (adjacent to gang) to combination giving the greatest output reading.

(6) Repeat operation No. 4.

(7) Set signal generator at 375 K. C. Switch receiver to long wave band and adjust long wave oscillator trimmer (located on oscillator coil underneath chassis) for correct dial reading at 800 meters. Also adjust trimmer on top of coil adjacent to gang for greatest output reading.

(8) Set the signal generator at 167 K. C. Rock the pointer past 1800 meters on dial and adjust the long wave padder to point giving the highest output.

(9) Repeat operation No. 7.

## ALIGNMENT PROCEDURE

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading of the output meter. These adjustments should be repeated several times to secure the greatest accuracy.

All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and chassis of the receiver.

(4) Adjust the wave trap (located on rear of chassis) for minimum output reading.

(5) Set signal generator at 6 M.C. Switch receiver to band B and adjust osc. trimmer on gang for correct dial readjng at 50 meters.

(6) Set signal generator at 1400 K.C. Switch receiver to band A and adjust broadcast trimmer (see diagram) for correct dial reading at 215 meters. Also adjust det. trimmer on gang for greatest output reading.

(7) Set signal generator to 600 K.C. and rock pointer past 500 meters on dial while adjusting the broadcast padder (adjacent to gang) to combination giving the greatest output reading.

(8) Repeat operation No. 6.

(9) Set the signal generator at 17 M.C. Switch the receiver to band C and adjust short wave trimmer while rocking pointer past 17.5 meters on dial to combination giving the greatest output.

(10) Set the signal generator at 375 K.C. Switch receiver to Band D and adjust the long wave trimmer for correct dial reading at 800 meters. Also adjust the long wave ant. trimmer to resonance.

(11) Set the signal generator at 167 K.C. Rock the pointer past 1800 meters on dial and adjust the long wave padder to point giving the highest output.

(12) Repeat operation No. 10.

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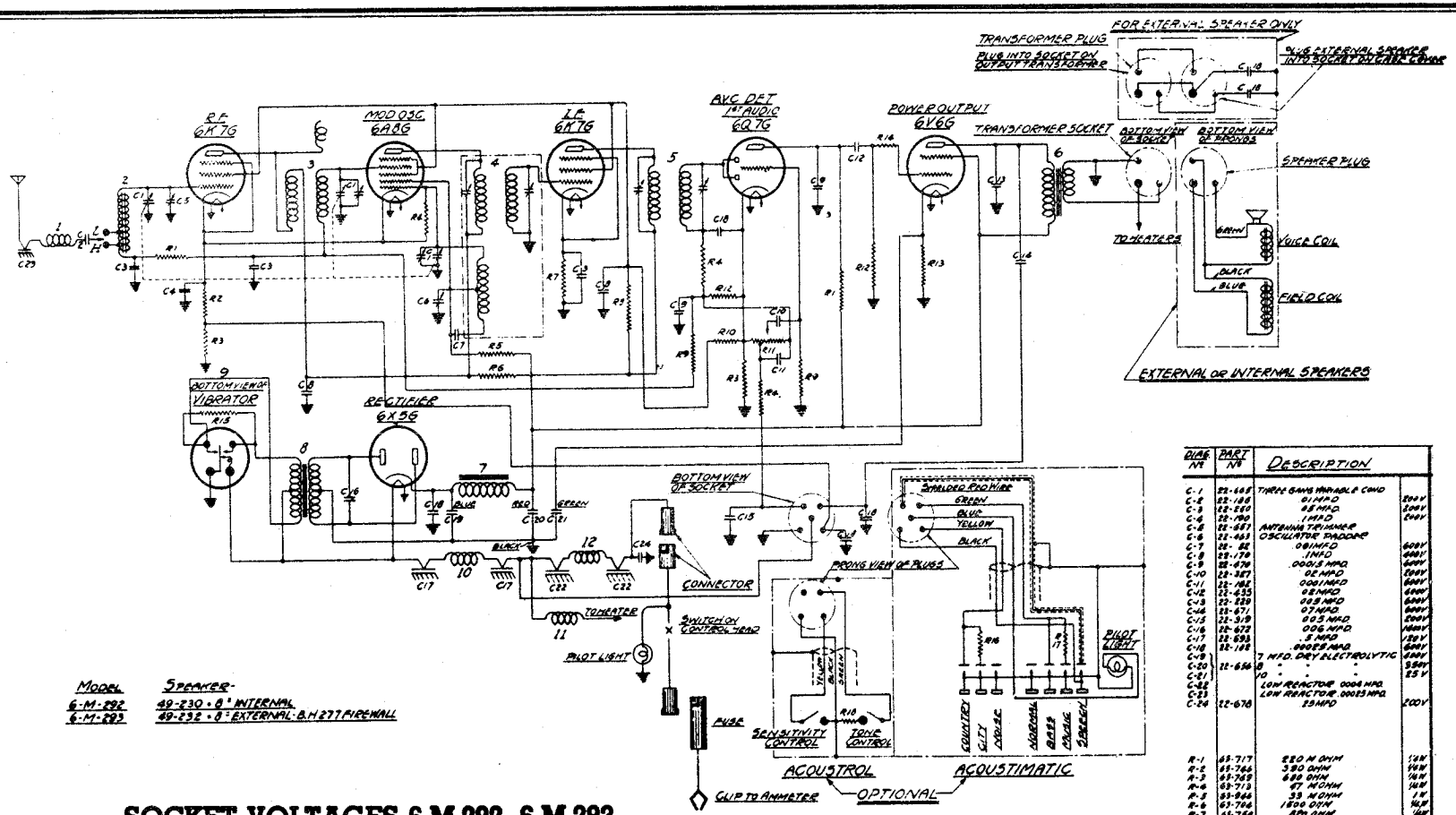
# ZENITH RADIO CORP.

MODELS 6M292, 6M293
Chassis 5645
Schematic, Voltage




Model
6-M-292
6-M-293

Speaker-
49-230 - 8" INTERNAL
49-232 - 8" EXTERNAL-B.H.277 FIREWALL

| DIAG. NO. | PART NO. | DESCRIPTION | |
|---|---|---|---|
| C-1 | 22-668 | THREE GANG VARIABLE COND | |
| C-2 | 22-188 | .01 MFD | 200 V |
| C-3 | 22-510 | .05 MFD. | 200 V |
| C-4 | 22-190 | .1 MFD. | 200 V |
| C-5 | 22-681 | ANTENNA TRIMMER | |
| C-6 | 22-683 | OSCILLATOR PADDER | |
| C-7 | 22-82 | .00 MFD | 600 V |
| C-8 | 22-170 | .1 MFD | 400 V |
| C-9 | 22-676 | .0005 MFD. | 600 V |
| C-10 | 22-187 | .02 MFD | 200 V |
| C-11 | 22-182 | .001 MFD | 600 V |
| C-12 | 22-635 | .05 MFD | 400 V |
| C-13 | 22-239 | .005 MFD | 600 V |
| C-14 | 22-671 | .07 MFD. | 200 V |
| C-15 | 22-519 | .015 MFD. | 200 V |
| C-16 | 22-672 | .006 MFD. | 400 V |
| C-17 | 22-693 | .5 MFD. | 250 V |
| C-18 | 22-188 | .0002 MFD. | 600 V |
| C-19 | | 7 MFD. DRY ELECTROLYTIC | 450 V |
| C-20 | 22-656 | 10 " " " | 350 V |
| C-21 | | 10 " " " | 25 V |
| C-22 | | LOW REACTOR .0004 MFD. | |
| C-23 | | LOW REACTOR .00025 MFD. | |
| C-24 | 22-678 | .25 MFD | 200 V |
| R-1 | 63-717 | 220 M OHM | 1/2 W |
| R-2 | 63-766 | 330 OHM | 1/4 W |
| R-3 | 63-749 | 680 OHM | 1/4 W |
| R-4 | 63-713 | .47 M OHM | 1/2 W |
| R-5 | 63-844 | .33 M OHM | 1 W |
| R-6 | 63-706 | 1800 OHM | 1/4 W |
| R-7 | 63-746 | 820 OHM | 1/4 W |
| R-8 | 63-947 | .27 M OHM | 2 W |
| R-9 | 63-664 | 1.25 MEGOHM | 1/4 W |
| R-10 | 63-766 | .33 MOHM | 1/4 W |
| R-11 | 63-980 | 1 MEGOHM VOLUME CONTROL | |
| R-12 | 63-719 | .470 M OHM | 1/4 W |
| R-13 | 63-848 | 330 OHM | 1 W |
| R-14 | 63-687 | 100 OHM | 1/2 W |
| R-15 | 63-840 | 220 OHM | 1 W |
| R-16 | 63-721 | 1000 OHM | 1/4 W |
| R-17 | 63-747 | 4700 OHM | 1/4 W |
| R-18 | 63-709 | 2200 OHM | 1/4 W |

| | | | |
|---|---|---|---|
| 1 | 20-178 | ANTENNA COIL | |
| 2 | 20-170 | ANTENNA COIL | |
| 3 | 20-171 | DETECTOR COIL | |
| 4 | 3-8228 | I.F. & OSCILLATOR | |
| 5 | 20-501 | 2ND I.F. | |
| 6 | 20-499 | OUTPUT TRANSFORMER | |
| 7 | 20-497 | POWER CHOKE | |
| 8 | 20-498 | POWER TRANSFORMER | |
| 9 | 20-13 | VIBRATOR | |
| 10 | 20-173 | VIBRATOR CHOKE COIL | |
| 11 | 20-166 | FILAMENT CHOKE COIL | |
| 12 | 3-8844 | ANTENNA COND COIL | |

## SOCKET VOLTAGES 6-M-292, 6-M-293

| Tube | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 6K7G | 0 | 6.0 | 250 | 78 | * | — | 0 | * | |
| 6A8G | 0 | 6.0 | 250 | 78 | ** | 132 | 0 | * | |
| 6K7G | 0 | 0 | 250 | 78 | -3.8 | — | 6.0 | 3.5 | |
| 6Q7G | 0 | 0 | 95 | 0 | — | — | 6.0 | 1.6 | |
| 6V6G | 0 | 6.0 | 240 | 250 | — | — | 0 | 11.5 | |
| 6X5G | — | 0 | — | — | — | — | 6.0 | 255 | |

*Sensitivity position { —4.96 country; —8.0 city; —9.5 noise

**Sensitivity position { —18.5 country; —17.5 city; —15.0 noise

I.F. FREQUENCY

252½ —K.C.

Voltage at Battery 6.3
Voltage of Receiver 6.0
Antenna disconnected
All Voltages measured with 1000 ohm per volt meter
Total current consumption 7.4 amperes
Sensitivity at 1 watt output - 1 microvolt
Maximum power output 6 watts.

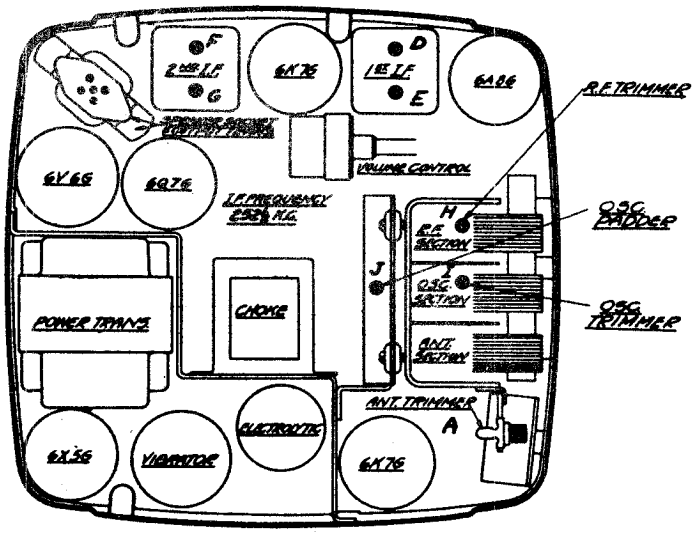
MODELS 6M292,6M293
Chassis 5645
Alignment,Socket
Trimmers
MODEL 6M295,Ch.5650
Alignment

# ZENITH RADIO CORP.

## MODELS 6-M-292, 6-M-293, 6-M-295

| Operation | Connect Test Oscillator To | Dummy Antenna | Set Test Osc. To | Manual or Automatic Position | Set Gang Cond. | Adjust Trimmers | Purpose |
|---|---|---|---|---|---|---|---|
| 1 | 1st Det. Grid | ½ Mfd. | 252.5 | Manual | Max. Cap. | DEFG | I. F. Alignment |
| 2 | Rec. Ant. Lead | 50 Mmfd. | 1600 | Manual | Min. Cap. | I | Trim Oscillator |
| 3 | Rec. Ant. Lead | 50 Mmfd. | 1400 | Manual | 1400 | AH | Trim Ant. & R. F. Stage |
| 4 | Rec. Ant. Lead | 50 Mmfd. | 600 | Manual | 600 | J | Rock Gang & Adjust Osc. Padder for Max. Output |
| 5 | Rec. Ant. Lead | 50 Mmfd. | —— | Manual | Tune To A Station Around 900 K. C. and Set Dial for Calibration | | |
| 6 | Rec. Ant. Lead | 50 Mmfd. | 1000 | Automatic | Range #2 | Trim Ant. & R.F. of Automatic Unit — Trimmers "B" - "C" | |
| 7 | Connect Car Antenna to Set — Tune to Weak Station Around 1400 K. C. — Trim Antenna Trimmer "A" for Maximum Peak Output. | | | | | | |
| 8 | Trim Automatic Antenna Trimmer "B" to Car Antenna on a Weak Station around 1000 K. C. on Range #2. | | | | | | |

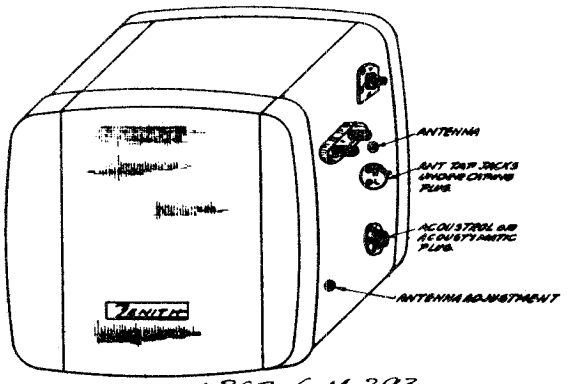
See tube layouts for location of aligning trimmers




6-M-292, 6-M-293

**Fig. 7**

**Tube Position**




6M-292, 6-M-293

**Fig. 8**

6M-292, 6-M-293

### ANTENNA ALIGNMENT

Fig. 8 shows the location of the antenna tap jacks on the side of the receiver case. Remove the capping plug from over this jack assembly, and insert the antenna pin lead in the "H" or "L" position, depending on the capacity of the antenna being used The "H" position must be used for antennas with a capacity in the range of from 100 to 500 mmfd. The "L" connection must be used for low capacity antennas of from 0 to 125 mmfd. Compare this listing with that given under the various antennas, and the proper position will easily be recognized. After selecting the position desired, place the capping plug back over the hole to prevent motor noise from entering into the antenna circuit of the receiver. Connect the antenna proper by means of the Delco-Remy connector shown in Fig. 8.

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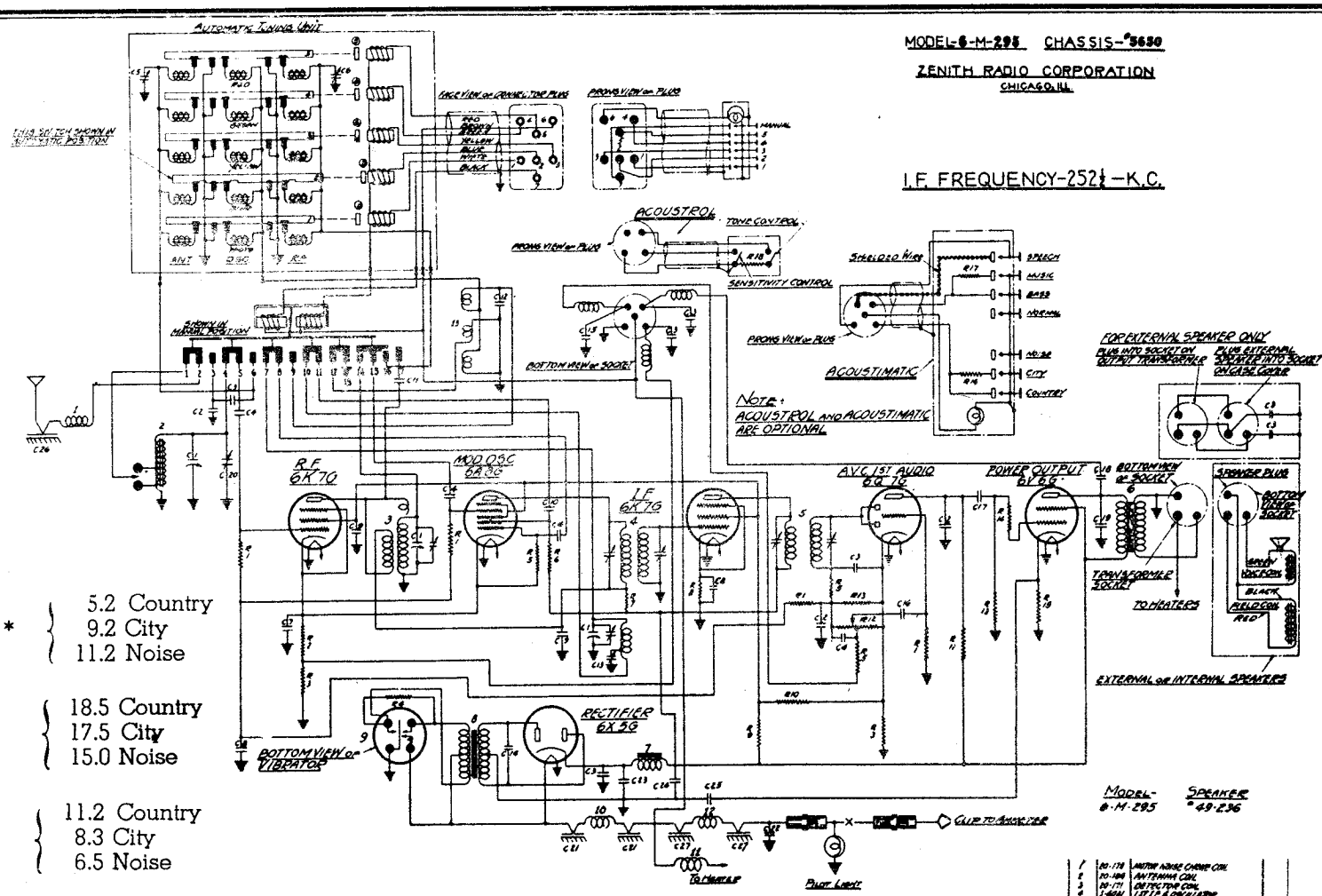
# ZENITH RADIO CORP.

MODEL 6M295
Chassis 5650
Schematic, Voltage




Sensitivity *
- 5.2 Country
- 9.2 City
- 11.2 Noise

** Manual
- 18.5 Country
- 17.5 City
- 15.0 Noise

** Automatic
- 11.2 Country
- 8.3 City
- 6.5 Noise

| Tube | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 6K7G | 0 | 6.1 | 245 | 100 | 0 | — | 0 | * | |
| 6A8G | 0 | 6.1 | 245 | 100 | ** | 128 | 0 | * | |
| 6K7G | 0 | 0 | 250 | 100 | 4.2 | — | 6.1 | 4.2 | |
| 6Q7G | 0 | 0 | 155 | 0 | 0 | — | 6.1 | 1.9 | |
| 6V6G | 0 | 6.1 | 240 | 250 | 0 | — | 0 | 12.5 | |
| 6X5G | — | 0 | — | — | — | — | 6.1 | 255 | |

MODEL 6M295
Chassis 5650
Socket, Trimmers
Antenna Data, Tuner

# ZENITH RADIO CORP.

## ANTENNA ALIGNMENT

**Manual Tuning:** Press the MANUAL button on the automatic key board. This disconnects the automatic system and allows operation of the receiver from the standard tuning mechanism. After adjusting the dial calibration accurately, turn the volume control up full and tune to a weak station near 1400 K.C. Adjust the antenna trimmer A (Fig. 8) to the point of greatest volume. This completes antenna alignment for manual operation. The trimmer does not have to be adjusted at any other point on the dial.

**Automatic Tuning:** Press automatic button 2 (Fig. 8) This will disconnect the manual tuning mechanism and place the automatic buttons into service. After button 2 has been pressed, turn adjusting screw 2 in either direction until a weak station between 1100 to 1000 K.C. is heard. Now adjust trimmers B and C on the automatic assembly for maximum signal strength of the weak station tuned in by the number 2 adjusting screw. The automatic is in complete resonance with the antenna over the entire automatic button range and need not be resonated at any other button setting. Adjusting screw 2 may now be tuned to a local station as outlined under "AUTOMATIC" with no further attention to adjustments B or C.

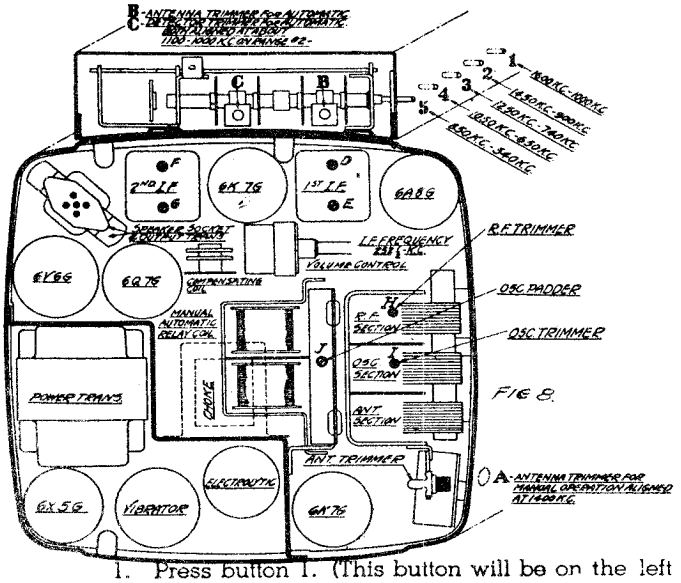


FIG 8.

## AUTOMATIC

Study Fig. 8 carefully. Although simple in adjustment, best results will only be obtained if made accurately and by the following procedure.

1. Press button 1. (This button will be on the left if automatic unit is mounted on edge of instrument panel.)

2. Adjust automatic trimmer screw (until a desired local station between 1600 and 1000 K.C. is heard. Turn the screw slowly back and forth over the station as if tuning the dial of a receiver, for clearest reception and best tone quality and allow the screw setting to remain at that point.

3. Press button 2 and tune for a station between 1450 and 900 K.C. on automatic adjusting screw 2.

4. Follow above procedure for buttons 3, 4 and 5 using the ranges shown on Fig. 8.

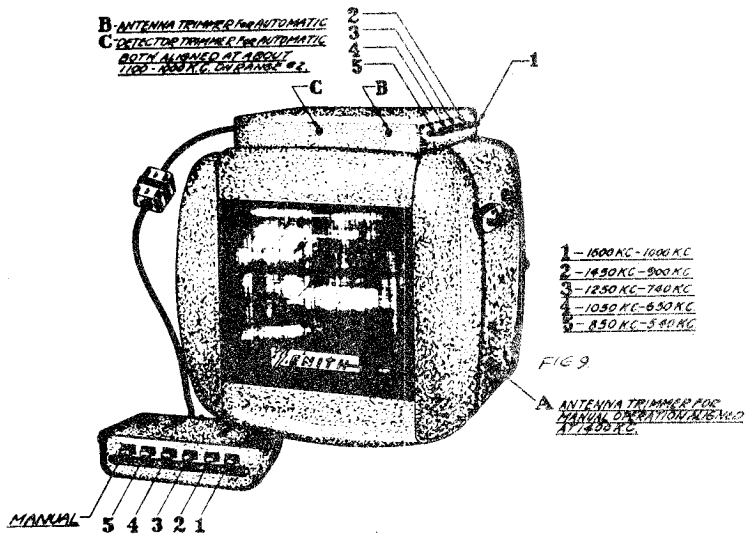


FIG 9

5. Remove the chrome bezel over the parts adjacent to the automatic buttons and insert the station call letters cut from the sheet supplied. After placing the proper station calls in correct order over the port holes, fasten the escutcheon back in place.

6. Repeat careful adjustment of each automatic trimmer pressing the corresponding button in order from 1 to 5 to obtain best tone, loudest signal and greatest freedom from noise.

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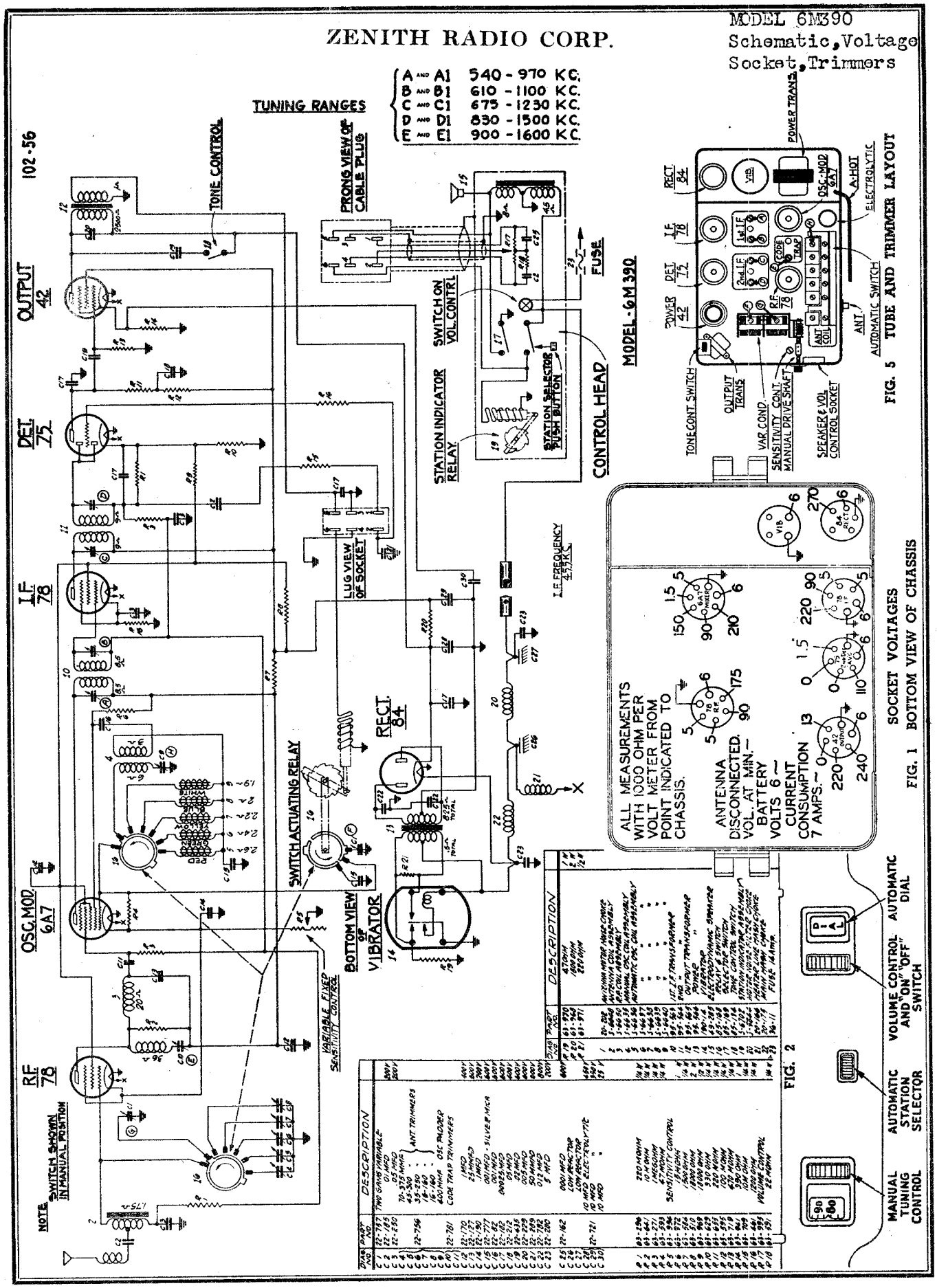


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MODEL 6M390
Alignment, Trimmers
Tuner Data

# ZENITH RADIO CORP.

**NOTE:** This receiver is equipped with a fixed-variable sensitivity control located on the chassis base below the tuning control shaft of the variable condenser. (See Fig. 5.) The control can be adjusted with a screw driver either from above or below the chassis, and is set at the factory to a position which gives a sensitivity of 10 microvolts at 1 watt output. In practice it is found advisable to hold the receiver to this level as any higher sensitivity might result in increased motor noise or excessive background noise. Unless laboratory equipment capable of accurately measuring the input and output of the receiver is available, it is not advisable to alter this setting.

**MANUAL DIAL ADJUSTMENT:** The manual control dial must be aligned with the receiver for correct calibration. To do this, turn the manual tuning knob in one direction as far as it will go. Now do the same in the opposite direction. Then tune in a station of known frequency, and note if the dial reading corresponds. If the frequency reading is not correct, hold the tuning knob firmly and move the dial drum with your fingers through the bezel to the correct frequency reading of the station being received.

**AUTOMATIC DIAL SYNCHRONIZATION:** Before setting the station adjusting screws for automatic tuning, it may be necessary to synchronize the automatic dial to the receiver which is done as follows: Turn on the receiver, and try to tune in a station with the manual tuning control. If no station can be picked up, push the automatic station selector button until a position is found where stations can be tuned in manually. Remove the automatic dial assembly by pulling out from the rear and turn the station indicator drum downward until the word "Dial" appears in the opening. The adjusting screws in the receiver can now be resonated for the stations shown around the automatic dial as the automatic button is operated. It is very important that these adjusting screws be set on a weak signal from the station so that the circuit may be sharply tuned. A very short piece of wire used as an antenna will hold down the signal strength. Always be sure the antenna characteristics are similar to actual car conditions. A 38 mmfd. condenser from antenna to ground will provide the necessary input capacity.

**AUTOMATIC TUNING ADJUSTMENTS:** 1. Turn the receiver on and allow it to operate until thoroughly heated. Loosen the screws holding the cover plate over the automatic adjustments, and slide it upward exposing the adjusting screws and recording strip. This plate is on the front of the receiver. (See Fig. 4.)

2. Push the automatic station selector button until the word "Dial" is at the automatic dial window. Tune in manually the station whose call letters are in the No. 1 position on the dial (the lowest frequency station—see Fig. 3) and note the program so that it can be identified. Push the automatic station selector button once, and this station's call letters will appear at the automatic window.

3. With a small screw driver, turn the station setting screw A (see Fig. 4) in the upper row to the right or left until that station is tuned in accurately. Now adjust the corresponding screw A1 in the lower row until maximum volume is obtained. Make these adjustments very carefully as it is quite easy to pass the resonant point due to the unusual selectivity of the receiver.

4. Press the automatic station selector button until "Dial" again is at the automatic window and tune in manually the station whose call letters are in the No. 2 position (the next higher frequency) on the automatic dial. Press the automatic station selector button twice to bring the No. 2 station's call letters in view, and adjust B and B1 screws to this station. Repeat this procedure until each of the five pairs of adjusting screws have been carefully set to their respective stations. It is necessary that the

**IMPORTANT:** Unless certain dummy antenna capacities are employed with either the signal generator or in making adjustments on stations, the receiver will not respond properly. The values provided in the Zenith dummy antenna unit shown in Fig. 6 are identical with the conditions in the Ford car, and if adjusted accordingly the instrument will operate properly when reinstalled in the automobile. The Zenith dummy antenna S6740 is especially priced at 25c net to service stations, and should be purchased for use in servicing Zenith built Ford receivers.

setting of the adjusting screws be repeated in the order given to be sure that they are properly set for maximum performance.

If the station setup on the automatic tuning dial should appear in the wrong position, the dial can easily be re-synchronized to the receiver as explained under "Dial Synchronization." If it is necessary to examine the automatic dial mechanism or change call letters it may easily be removed from the speaker housing by pressing the spring catch directly beneath the assembly and pulling out from the rear.

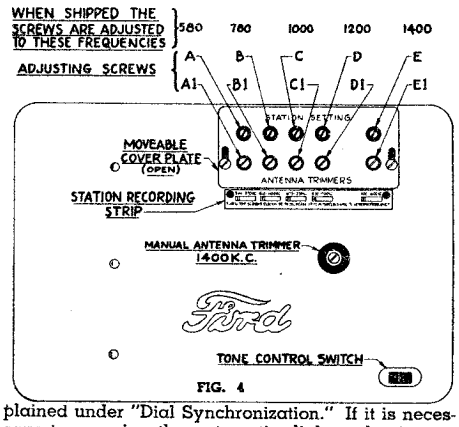

FIG. 4

If difficulty is experienced in setting the adjusting screws for the desired station, first turn the antenna trimmer screw down tight, and then adjust the station setting screw (oscillator) to the station, and follow with a readjustment of the antenna trimmer screw for resonance.

**ALIGNMENT: I. F.** Connect signal generator set at 455 K. C. through .1 mfd. condenser direct to 6A7 grid cap. Adjust I. F. trimmers A, B, C, D, (Fig. 5) to resonance. This should be done with the volume control of the receiver on full, and the generator signal reduced to a weak level.

**Wave Trap:** Remove signal generator lead from 6A7 grid, and attach to 78 R. F. tube grid. Using the same signal frequency of 455 K. C. carefully adjust the wave trap trimmer E for minimum response with a strong generator signal.

**R. F.** Press the automatic button to where the "Dial" position shows, or until the set can be tuned manually. Now rotate the manual tuning control until the condenser plates are completely out of mesh. Remove the generator lead from the 78 R. F. tube and connect it direct through a Zenith dummy antenna unit (Zenith part No. S6740) to the antenna socket on the receiver. Set the signal generator to 1580 K. C., and adjust the oscillator trimmer F on the gang condenser to resonance. Reset the signal generator to 1400 K. C. turn the dial until the signal is heard and adjust the gang condenser trimmer G to maximum response. Reset the signal generator to 600 K. C., and again turn the manual dial until the signal is heard. Rock the condenser gang slightly while adjusting padder H to maximum response at this point.

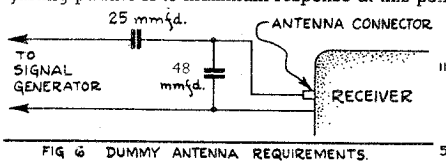

FIG 6 DUMMY ANTENNA REQUIREMENTS.

Figure 6 shows the dummy antenna requirements necessary where the special Zenith dummy connector S6740 is not available.

**ELECTRICAL SPECS:** Rotomatic Tuning—Provides a means of selecting either manual or any one of five pre-selected stations using a single push-button. The automatically controlled circuits consist essentially of permeability tuned inductances in the oscillator circuit and mica type trimmers in the detector stage. Switching is accomplished electrically by coincidental solenoid operation of band-switch type segments.

**Sensitivity**—10 microvolts at 1 watt output. **Tuning range** 540—1580 K.C. **Power output**—3 watts measured at voice coil. **Speaker**—8" dynamic. **I.F.**—455 K.C. **Automatic**—Five positions and "Dial." **Tube complement**—78 R.F., 6A7 mixer, 78 I.F., 75 2nd det. and audio, 42 output, 84 rectifier. **Current Consumption**—7 amp. at 6 volts.

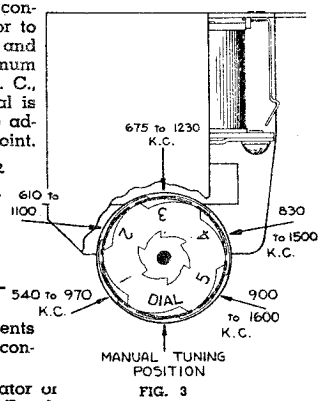

FIG. 3

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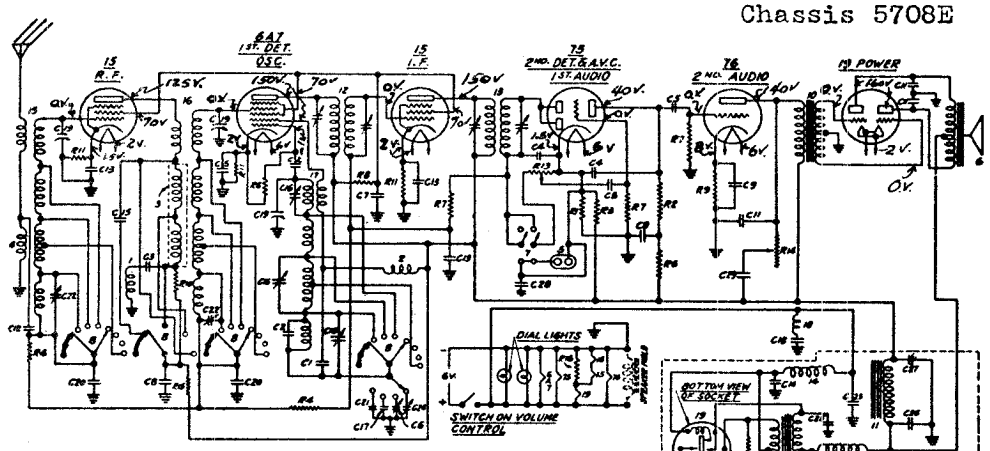
Schematics, Voltage

# ZENITH RADIO CORP.

MODELS 6VA27, 6VA62
Chassis 5629
MODELS 7DA119, 7DA126
7DA127, 7DA138, 7DA148
7DA162, 7DA168
Chassis 5708E

| Band | Color | Kilocycles | Megacycles | Meters |
|---|---|---|---|---|
| A | Green | 550- 1,740 | 55- 1.74 | 545 -172 |
| B | Yellow | 2,000- 7,000 | 2 - 7 | 150 - 42.8 |
| C | Orange | 150- 370 | .15- .37 | 2,000 -800 |
| D | Red | 7,000-22,500 | 7 -22.5 | 42.8- 13.3 |




| DIAG. PART NO. | DESCRIPTION | | |
|---|---|---|---|
| C1 | 22-82 .001 MFD | | 600 V. |
| C2 | 22-83 .1 | MMFD | 600 V. |
| C3 | 22-84 .0001 | MFD | 600 V. |
| C4 | 22-85 .00025 | | 600 V. |
| C5 | 22-88 .02 | | 600 V. |
| C6 | 22-288 200-350 | MMFD PADDER | |
| C7 | 22-212 .05 | MFD. | 600 V. |
| C8 | 22-214 .1 | " | 600 V. |
| C9 | 22-215 .5 | " | 25 V. |
| C10 | 22-218 .5 | " | 600 V. |
| C11 | 22-223 .005 | " | 600 V. |
| C12 | 22-224 .01 | " | 600 V. |
| C13 | 22-290 .05 | " | 200 V. |
| C14 | 22-291 .1 | " | 200 V. |
| C15 | 22-293 .00025 | " | 600 V. |
| C16 | 22-264 2-35 | MMFD 3.54MS | |
| C17 | 22-345 .0001 | MFD. | 600 V. |
| C18 | 22-330 .25 | " | 200 V. |
| C19 | 22-209 4.56 | MMFD. VARIABLE CONDENSER | |
| C20 | 22-410 .005 | MFD | 600 V. |
| C21 | 22-411 .0025 | " | 600 V. |
| C22 | 22-418 2-35 | MMFD PADDER | |
| C23 | 22-420 .10 | MFD | 25 V. |
| C24 | 22-426 50-180 | MMFD PADDER | |
| C25 | 22-455 .01 | MFD | 1000 V. |
| C26 | (CR-459) 2 | " | 250 V. |
| C27 | " 8 | " | 250 V. |

| DIAG. PART NO. | DESCRIPTION | | |
|---|---|---|---|
| C28 | 22-190 .1 | MFD | 200 V. |
| C29 | 22-171 .05 | " | 600 V. |
| R1 | 63-238 1 M | OHMS | 1/4 W. |
| R2 | 63-258 490 M | " | 1/8 W. |
| R3 | 63-160 .40 M | " | 1/4 W. |
| R4 | 63-278 .99 M | " | 1/4 W. |
| R5 | 63-280 .99 M | " | 1/4 W. |
| R6 | 63-290 .260 M | " | 1/4 W. |
| R7 | 63-293 .590 M | " | 1/4 W. |
| R8 | 63-353 .19 M | " | 1/2 W. |
| R9 | 63-360 .3 M | " | 1/4 W. |
| R10 | 63-362 .3 M | " | 1/4 W. |
| R11 | 63-362 .400 | " | 1/2 W. |
| R12 | 63-394 .700 | " | |
| R13 | 63-454 .200 M | VOL. CONTROL | |
| R14 | 63-458 .50 M. | TONE CONTROL | |
| R15 | 63-541 .34 | OHMS | 1/2 W. |
| R16 | 63-477 .100 | " | WIRE WOUND 10 W. |

| DIAG. PART NO. | DESCRIPTION | |
|---|---|---|
| 1 | 20-82 R.F. CHOKE | (1 M.H.) |
| 2 | 20-88 R.F. CHOKE | (.2 M.H.) |
| 3 | 20-113 R.F. PLATE CHOKE | |
| 4 | 20-124 ANTENNA CHOKE | |
| 5 | 44-7 PHONO JACK | |
| 6 | 49-122 8" MAG. SPEAKER | |
| 7 | 88-99 PHONO. SWITCH | |
| 8 | 88-79 BAND SELECTOR SWITCH | |
| 9 | 33-303 RECTIFIER TRANSFORMER | |
| 10 | 88-31 AUDIO TRANSFORMER | |
| 11 | 33-324 FILTER CHOKE | |
| 12 | 33-323 1ST I.F. TRANSFORMER UNIT | |
| 13 | 33-328 2 ND I.F. TRANSFORMER (456 KC) | |
| 14 | S-413 R.F. CHOKE ASSEMBLY | |
| 15 | S-460 ANTENNA COIL ASSEMBLY | |
| 16 | S-461 DETECTOR COIL ASSEMBLY | |
| 17 | S-462 OSCILLATOR COIL ASSEMBLY | |
| 18 | S-2778 R.F. CHOKE ASSEMBLY | |
| 19 | 190-6 VIBRATOR | |

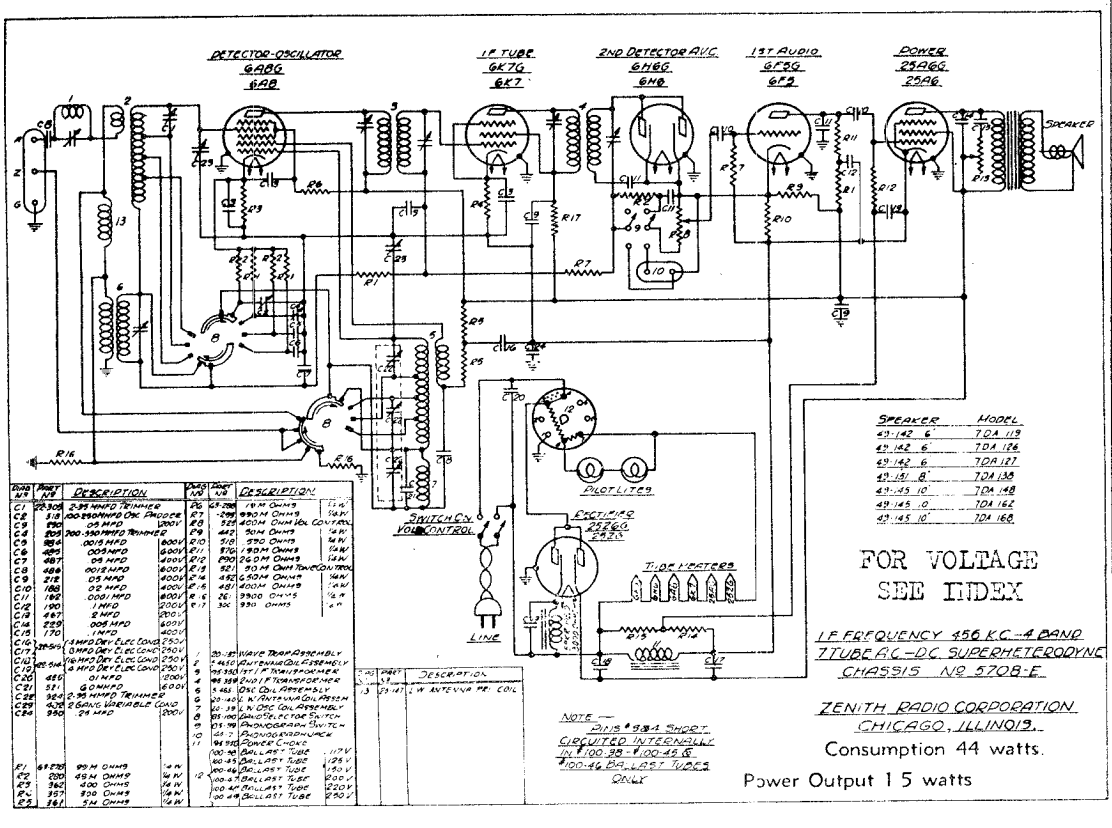
I.F. FREQUENCY 456-K.C.
6 TUBE SUPERHETERODYNE-4 BANDS-ALL WAVE
CHASSIS No 5629
MODEL 6VA27
ZENITH RADIO CORPORATION
CHICAGO, ILL.
DECEMBER 30, 1935.

VOLTAGES AT SOCKET TERMINALS:- ANTENNA AND GROUND DISCONNECTED
MEASURED FROM SOCKET TERMINALS TO GROUND WITH 1000 OHM PER VOLT D.C. METER.

FOR OTHER DATA
SEE INDEX

The tuning is divided into four bands represented by the four scales A B C and D on the dial. These letters correspond to the letters above the band indicator knob and show the range and scale in use.

| BAND | COLOR | KILOCYCLES | MEGACYCLES | METERS |
|---|---|---|---|---|
| A | Green | 492-1640 | .492-1.640 | 610-183 |
| B | Yellow | 1750-6040 | 1.75-6.04 | 171-49.6 |
| C | Red | 5520-19000 | 5.52-19 | 54.4-15.8 |
| D | Blue | 148-400 | | 2025-750 |




| SPEAKER | MODEL |
|---|---|
| 49-142 6" | 7DA 119 |
| 49-142 6" | 7DA 126 |
| 49-142 6" | 7DA 127 |
| 49-151 8" | 7DA 138 |
| 49-145 10" | 7DA 148 |
| 49-145 10" | 7DA 162 |
| 49-145 10" | 7DA 168 |

FOR VOLTAGE
SEE INDEX

I.F. FREQUENCY 456 K.C.-4 BAND
7 TUBE A.C.-D.C. SUPERHETERODYNE
CHASSIS No 5708-E
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS.
Consumption 44 watts.
Power Output 1.5 watts

NOTE — PINS #9 & 4 SHORT CIRCUITED INTERNALLY IN #100-38 - #100-45 & #100-46 BALLAST TUBES ONLY

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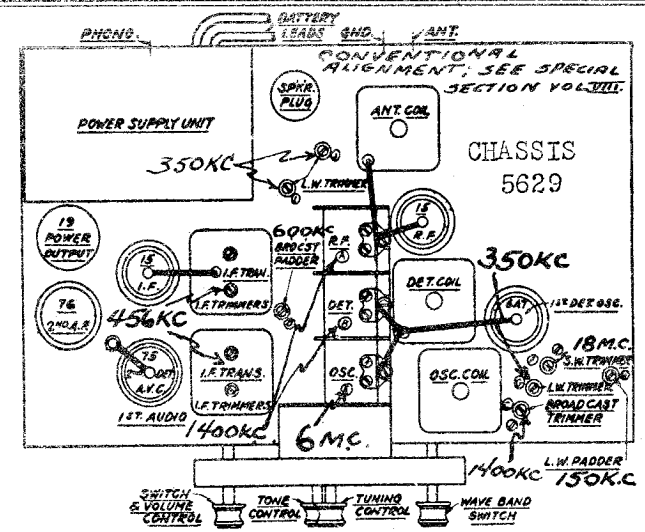



## CHASSIS 5517A ALIGNMENT PROCEDURE

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver ground. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K.C. and carefully adjust the four I.F. trimmers to the point giving the highest reading of the output meter. These adjustments should be repeated several times to secure the greatest accuracy.

All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A.V.C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Adjust the wave trap (located on rear of chassis) for minimum output reading.

(5) Set signal generator at 6 M.C. Switch receiver to band B and adjust osc. trimmer on gang for correct dial reading at 50 meters.

(6) Set signal generator at 1400 K.C. Switch receiver to band A and adjust broadcast trimmer (see diagram) for correct dial reading at 215 meters. Also adjust det. trimmer on gang for greatest output reading.

(7) Set signal generator to 600 K.C. and rock pointer past 500 meters on dial while adjusting the broadcast padder (adjacent to gang) to combination giving the greatest output reading.

(8) Repeat operation No. 6.

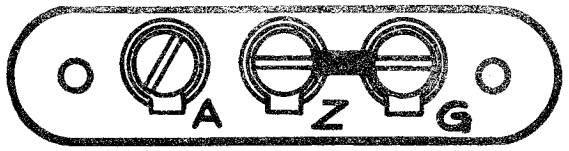
(9) Set the signal generator at 17 M.C. Switch the receiver to band C and adjust short wave trimmer while rocking pointer past 17.5 meters on dial to combination giving the greatest output.

(10) Set the signal generator at 375 K.C. Switch receiver to Band D and adjust the long wave trimmer for correct dial reading at 800 meters. Also adjust the long wave ant. trimmer to resonance.

(11) Set the signal generator at 167 K.C. Rock the pointer past 1800 meters on dial and adjust the long wave padder to point giving the highest output.

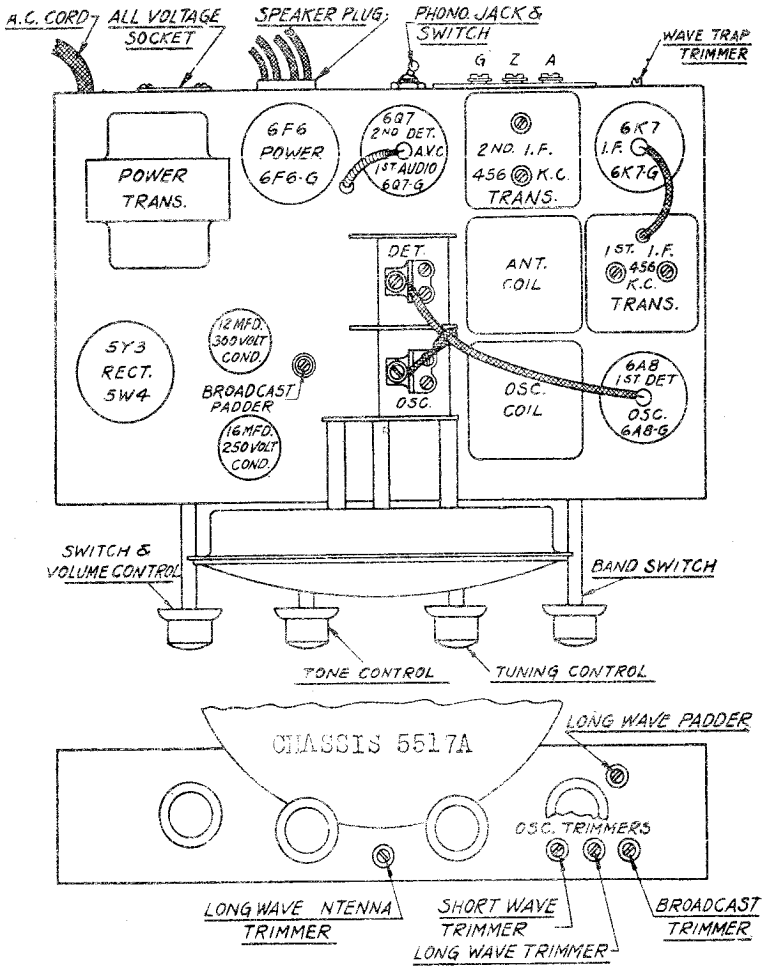
(12) Repeat operation No. 10.

CHASSIS 5517A **IMPORTANT!**




Connect ordinary single wire antenna to A. Jumper wire placed between Z and G (shipped from factory in this manner.)

When using a ZENITH DOUBLET ANTENNA, remove jumper wire between Z and G and attach doublet lead-in to A and Z.

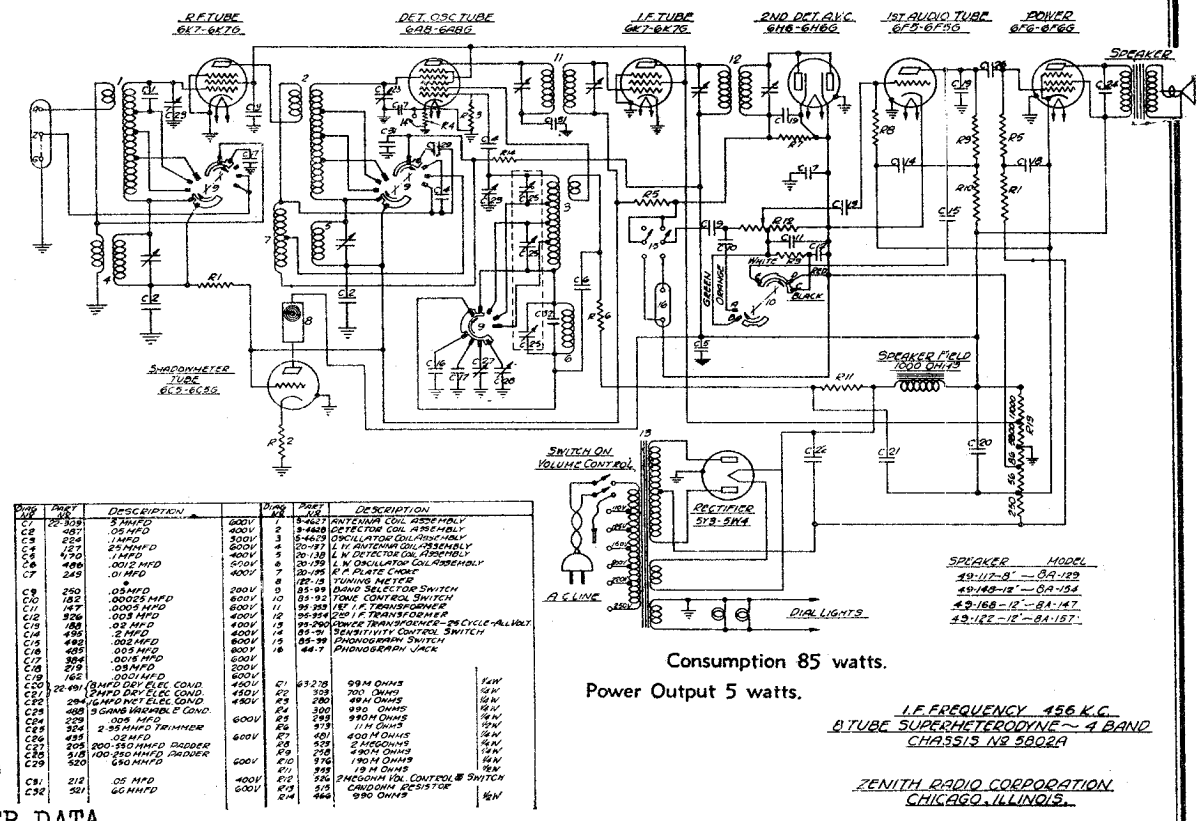


MODELS 8A232, 8A242, 8A244
8A262, Chassis 5804AT
Schematics

# ZENITH RADIO CORP.

MODELS 8A129, 8A154, 8A147
8A157, Chassis 5802A

| BAND | COLOR | KILOCYCLES | MEGACYCLES | METERS |
|---|---|---|---|---|
| A | Green | 492-1640 | .492- 1.640 | 610 -183 |
| B | Yellow | 1750-6040 | 1.75 - 6.04 | 171 - 49.6 |
| C | Red | 5520-19000 | 5.52 -19 | 54.4- 15.8 |
| D | Blue | 148-400 | | 2025 -750 |




| Ckt. No. | Part No. | Description | | Ckt. No. | Part No. | Description | |
|---|---|---|---|---|---|---|---|
| C1 | 22-309 | 5 MMFD | 600V | 1 | 5-4627 | ANTENNA COIL ASSEMBLY | |
| C2 | 487 | .05 MFD | 400V | 2 | 5-4628 | DETECTOR COIL ASSEMBLY | |
| C3 | 224 | .1 MFD | 200V | 3 | 5-4629 | OSCILLATOR COIL ASSEMBLY | |
| C4 | 127 | 25 MMFD | 600V | 4 | 20-197 | L.W. ANTENNA COIL ASSEMBLY | |
| C5 | 470 | .1 MFD | 400V | 5 | 20-198 | L.W. DETECTOR COIL ASSEMBLY | |
| C6 | 469 | .0012 MFD | 600V | 6 | 20-199 | L.W. OSCILLATOR COIL ASSEMBLY | |
| C7 | 249 | .01 MFD | 400V | 7 | 20-195 | R.F. PLATE CHOKE | |
| C8 | | * | | 8 | 22-15 | TUNING METER | |
| C9 | 250 | .05 MFD | 200V | 9 | 85-99 | BAND SELECTOR SWITCH | |
| C10 | 182 | .00025 MFD | 600V | 10 | 85-93 | TONE CONTROL SWITCH | |
| C11 | 147 | .0003 MFD | 600V | 11 | 95-359 | 1ST I.F. TRANSFORMER | |
| C12 | 326 | .005 MFD | 400V | 12 | 95-354 | 2ND I.F. TRANSFORMER | |
| C13 | 188 | .02 MFD | 400V | 13 | 95-290 | POWER TRANSFORMER-25 CYCLE-ALL VOLT. | |
| C14 | 496 | .2 MFD | 400V | 14 | 85-91 | SENSITIVITY CONTROL SWITCH | |
| C15 | 492 | .002 MFD | 600V | 15 | 85-99 | PHONOGRAPH SWITCH | |
| C16 | 495 | .005 MFD | 600V | 16 | 44-7 | PHONOGRAPH JACK | |
| C17 | 364 | .0015 MFD | 600V | | | | |
| C18 | 279 | .05 MFD | 200V | | | | |
| C19 | 165 | .0001 MFD | 600V | | | | |
| C20 | 22-491 | 8 MFD DRY ELEC. COND. | 450V | C1 | 63-278 | 99.4 OHMS | 1/4W |
| C21 | | 2 MFD DRY ELEC. COND. | 450V | 2 | 330 | 700 OHMS | 1/4W |
| C22 | 294-1/6 | MFD WET ELEC. COND. | 450V | 3 | 390 | 484 OHMS | 1/4W |
| C23 | 488 | 3 GANG VARIABLE COND. | | R4 | 300 | 990 OHMS | 1/4W |
| C24 | 229 | .005 MFD | 600V | R5 | 293 | 980 M OHMS | 1/4W |
| C25 | 324 | 2-55 MMFD TRIMMER | | R6 | 973 | 1.1 M OHMS | 1/4W |
| C26 | 495 | .02 MFD | 600V | R7 | 401 | 400 M OHMS | 1/4W |
| C27 | 205 | 200-550 MMFD PADDER | | R8 | 523 | 2 M OHMS | 1/4W |
| C28 | 518 | 100-250 MMFD PADDER | | R9 | 258 | 490 M OHMS | 1/4W |
| C29 | 520 | 650 MMFD | 600V | R10 | 976 | 1.90 M OHMS | 1/4W |
| | | | | R11 | 995 | 19 M OHMS | 1/4W |
| C31 | 212 | .05 MFD | 400V | R12 | 526 | 2 MEGOHM VOL. CONTROL & SWITCH | |
| C32 | 521 | 66 MMFD | 600V | R13 | 518 | CARBOHM RESISTOR | 1/4W |
| | | | | R14 | 466 | 990 OHMS | 1/4W |

Consumption 85 watts.
Power Output 5 watts.

| SPEAKER | MODEL |
|---|---|
| 49-117-8" | 8A-129 |
| 49-148-12" | 8A-154 |
| 49-168-12" | 8A-147 |
| 49-122-12" | 8A-157 |

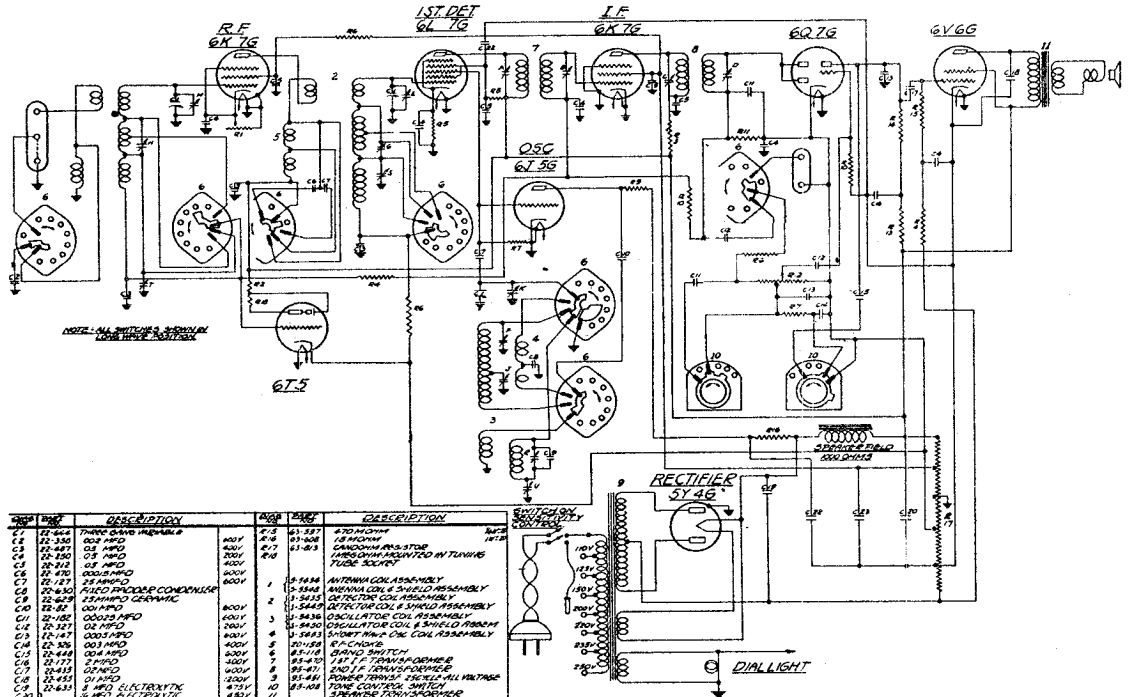
I.F. FREQUENCY 456 K.C.
8 TUBE SUPERHETERODYNE — 4 BAND
CHASSIS NO 5802A

ZENITH RADIO CORPORATION.
CHICAGO, ILLINOIS.

FOR OTHER DATA
SEE INDEX

The total consumption is 70 watts. Power output 4.5 watts.

| BAND | KILOCYCLES | MEGACYCLES | METERS |
|---|---|---|---|
| Short Wave | 23,076 — 5660 | 23 — 5.6 | 13 — 53 |
| Standard Broadcast | 1538 — 499 | 1.5 — .49 | 195 — 601 |
| Long Wave | 411 — 150 | .41 — .15 | 729 — 1987 |
| Phono — | | | |




| Ckt. No. | Part No. | Description | | Ckt. No. | Part No. | Description | |
|---|---|---|---|---|---|---|---|
| C1 | 22-644 | THREE GANG VARIABLE | | R1 | 63-331 | 470 OHM | 1/2W |
| C2 | 22-358 | .001 MFD | 400V | R2 | 63-308 | 1.8 OHM | 1/2W |
| C3 | 22-487 | .05 MFD | 400V | R3 | 63-813 | CARBOHM RESISTOR | |
| C4 | 22-180 | .05 MFD | 200V | R4 | | 1 MEGOHM MOUNTED IN TUNING TUBE SOCKET | |
| C5 | 20-216 | .05 MFD | 400V | | | | |
| C6 | 22-170 | .00035 MFD | | | | | |
| C7 | 22-187 | 25 MMFD | 600V | 1 | 5-4636 | ANTENNA COIL ASSEMBLY | |
| C8 | 20-630 | FIXED PADDER CONDENSER | | 2 | 5-4644 | ANTENNA COIL & SHIELD ASSEMBLY | |
| C9 | 22-629 | 25 MMFD CERAMIC | | 3 | 5-4633 | 2ND DETECTOR COIL ASSEMBLY | |
| C10 | 22-82 | .001 MFD | 600V | 4 | 5-4643 | DETECTOR COIL & SHIELD ASSEMBLY | |
| C11 | 22-182 | .00025 MFD | 600V | 5 | 5-4636 | OSCILLATOR COIL ASSEMBLY | |
| C12 | 22-327 | .02 MFD | 200V | 6 | 5-4630 | OSCILLATOR COIL & SHIELD ASSEMBLY | |
| C13 | 22-147 | .0003 MFD | 600V | 7 | 5-5883 | SHORT WAVE OSC. COIL ASSEMBLY | |
| C14 | 22-326 | .003 MFD | 400V | 8 | 20-158 | R.F. CHOKE | |
| C15 | 22-448 | .004 MFD | 600V | 9 | 85-116 | BAND SWITCH | |
| C16 | 22-177 | .5 MFD | 400V | 10 | 95-470 | 1ST I.F. TRANSFORMER | |
| C17 | 22-413 | .02 MFD | 600V | 11 | 95-471 | 2ND I.F. TRANSFORMER | |
| C18 | 22-453 | .01 MFD | 1200V | 9 | 95-486 | POWER TRANS. 25 CYCLE ALL VOLTAGE | |
| C19 | 22-633 | 8 MFD ELECTROLYTIC | 475V | 10 | 85-108 | TONE CONTROL SWITCH | |
| C20 | | 16 MFD ELECTROLYTIC | 450V | 11 | | 3 GANG R.F. TRANSFORMER | |
| C21 | 22-636 | 8 MFD ELECTROLYTIC | 450V | | | | |
| C22 | | 8 MFD ELECTROLYTIC | 350V | | | VARIABLE TRIMMERS | |
| C23 | | 8 MFD ELECTROLYTIC | 250V | | | 1ST R.F. TRANS. PRIMARY | |
| | | | | A | | 1ST I.F. TRANS. SECONDARY | |
| | | | | B | | 2ND I.F. TRANS. PRIMARY | |
| | | | | C | | 2ND I.F. TRANS. SECONDARY | |
| R1 | 63-814 | SENSITIVITY CONTROL | | D | | BROADCAST OSC. (SEE NOTE) | |
| R2 | 63-609 | 17 MEGOHM | 1/4W 1% | E | | DETECTOR & BROADCAST (SEE NOTE) | |
| R3 | 63-609 | 1000 OHM | 1/4W 1% | F | | ANTENNA BROADCAST (SEE NOTE) | |
| R4 | 63-595 | 100 OHM | 1/4W 1% | G | | BROADCAST PRIMARY | |
| R5 | 63-551 | 330 OHM | 1/4W 1% | H | 22-528 | SHORT WAVE OSC. | |
| R6 | 63-551 | 1000 OHM | 1/4W 1% | J | 22-581 | SHORT WAVE DETECTOR (ON GANG) | |
| R7 | 63-593 | 4.7 MOHM | 1/4W 1% | K | | SHORT WAVE ANTENNA (ON GANG) | |
| R8 | 63-551 | 1.2 M OHM | 1/4W 1% | L | | LONG WAVE OSC. (SEE NOTE) | |
| R9 | 63-600 | 10 M OHM | 1/4W 1% | M | | LONG WAVE DETECTOR | |
| R10 | 63-27 | 1.9 MEGOHM | 1/4W 1% | N | 22-440 | LONG WAVE ANTENNA (SEE NOTE) | |
| R11 | 63-638 | 380 M OHM | 1/4W 1% | O | 22-528 | LONG WAVE TRIMMER | |
| R12 | 63-931 | 2 MEGOHM VOL. CONTROL | | P | | NOTE - TOWARDS (+) END OF CONDENSER | |
| R13 | 63-44 | 470 OHM | 1/4W 1% | | | MOUNTED ON CHASSIS | |
| R14 | 63-595 | 990 OHM | 1/4W 1% | | | | |

| MODEL | SPEAKER |
|---|---|
| 8-A-232 | 49-226-8 IN |
| 8-A-242 | 49-226-8 |
| 8-A-244 | 49-227-10 |
| 8-A-262 | 49-228-12 |

I.F. FREQUENCY 456 K.C.
8 TUBE SUPERHETERODYNE
3 BAND LONG WAVE
CHASSIS NO 5804AT
ZENITH RADIO CORPORATION
CHICAGO, ILLINOIS

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MODELS 5L228,5L237
Chassis 5525
MODELS 8A129,8A147
8A154,8A157
Chassis 5802A
Alignment,Socket
Trimmers

# ZENITH RADIO CORP.




CHASSIS 5525 **Alignment Procedure**

| Operation | Sig. Gen. Connected to | Dummy | Gen. Freq. | Band Switch | Receiver Dial | Trimmer | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | 1st Det. Grid | ½ mfd. | 456KC | Med. Wave | 550 | ABCD | I F Alignment |
| 2 | Rec. Ant. Lead | 200 mmfd | 1500 | Med. Wave | 1500 | F | Set Osc to scale |
| 3 | Rec. Ant. Lead | 200 mmfd | 1500 | Med. Wave | 1500 | G | Adj. for Max. Output |
| 4 | " " " | " " " | 550 | " " " | 550 | J | Rock gang and adjust. for max. Output |
| 5 | " " " | " " " | 1500 | " " " | 1500 | F—G | Repeat two and three |
| 6 | " " " | " " " | 400 | L. W. | 400 | R | Ser. Osc. to Scale |
| 7 | " " " | " " " | 400 | L. W. | 400 | S | Adjust for Max. Output |
| 8 | " " " | " " " | 166.7 | L. W. | 166.7 | U | Rock Gang while adjusting for Max. Output |
| 9 | " " " | " " " | 400 | L. W. | 400 | R—S | Repeat six and seven |




CHASSIS 5525




Location of Tubes and Trimmers

## ALIGNMENT PROCEDURE

**Chassis 5802-A**

(1) Connect the output leads of the signal generator to the grid of the first detector and receiver chassis. Also connect an output meter across the speaker transformer leads.

(2) Set the signal generator at 456 K. C. and carefully adjust the four I. F. trimmers to the point giving the highest reading on the output meter. The output transformers are of a very high gain, selective type, and these adjustments should be repeated several times in order to secure maximum accuracy. All adjustments should be made using as weak an output from the signal generator as possible in order to prevent the A. V. C. action from affecting the output readings.

(3) Change the signal generator leads to the antenna and ground terminals of the receiver.

(4) Set signal generator at 6 M. C.—Switch receiver to Band B and adjust osc. trimmer on gang for correct dial reading at 50 meters.

(5) Set signal generator at 1500 K. C.—Switch receiver to band A and adjust broadcast trimmer for correct dial reading at 200 meters. Also adjust ant. and det. trimmer on gang to resonance.

(6) Set signal generator at 17.5 M. C.—Switch receiver to band C and adjust the short wave trimmer while rocking the pointer past 17 meters on the dial to the combination giving the greatest output.

(7) Set signal generator at 600 K. C.—Switch receiver to band A, and rock pointer past 500 meters on dial while adjusting the broadcast padder (located adjacent to gang condenser) to combination giving the greatest output reading.

(8) Repeat operation No. 5.

(9) Set signal generator at 375 K. C. Switch receiver to Band D and adjust long wave osc. trimmer for correct dial reading at 800 meters. Also adjust long wave det. and ant. trimmers (located on side and rear of chassis), for maximum output reading.

(10) Set signal generator at 150 K. C. and rock pointer past 2000 meters on dial while adjusting the long wave osc. padder to combination giving the highest output reading.

(11) Repeat operation No. 9.

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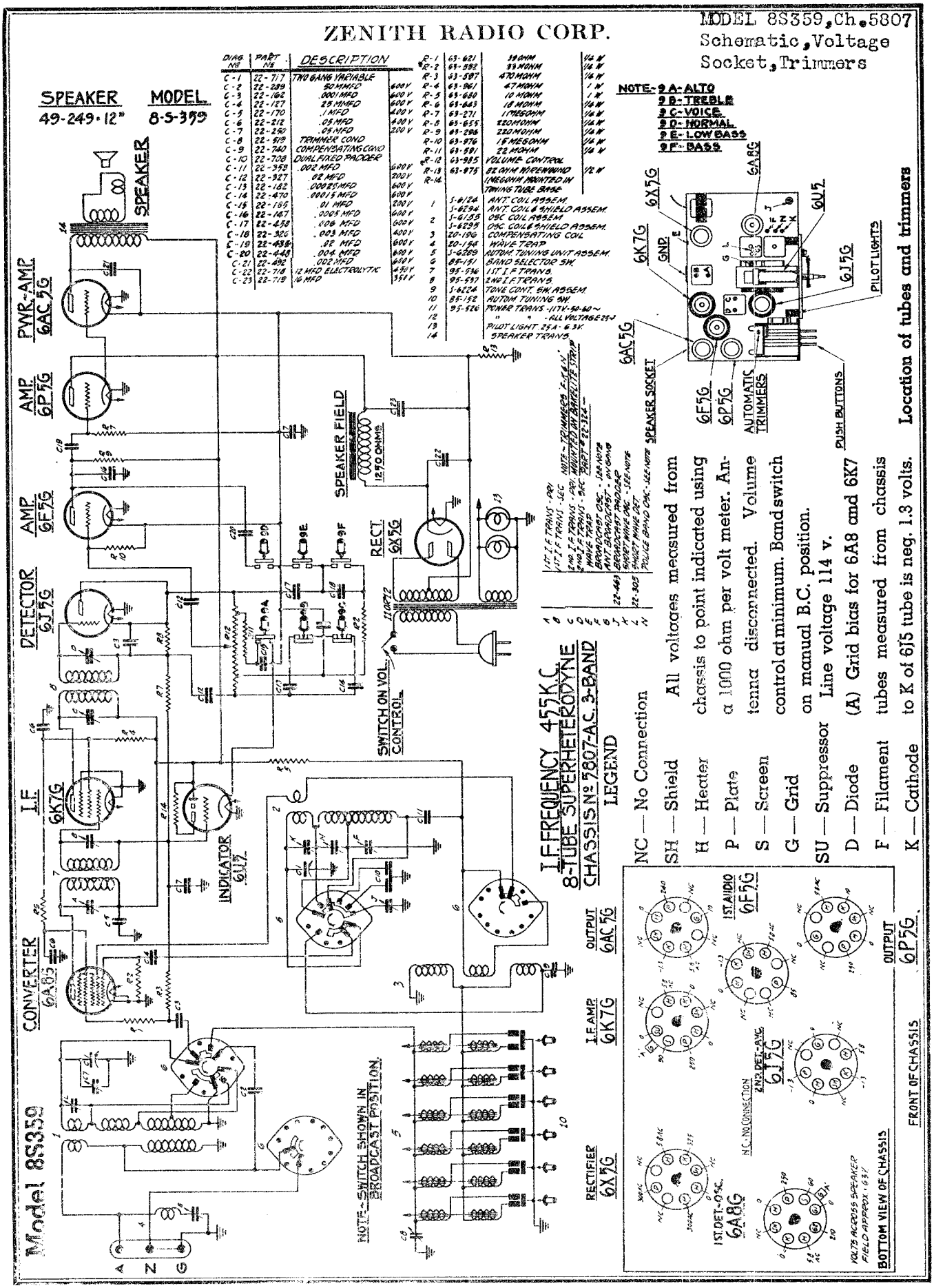
# ZENITH RADIO CORP.

MODEL 8S359, Ch. 5807
Schematic, Voltage
Socket, Trimmers

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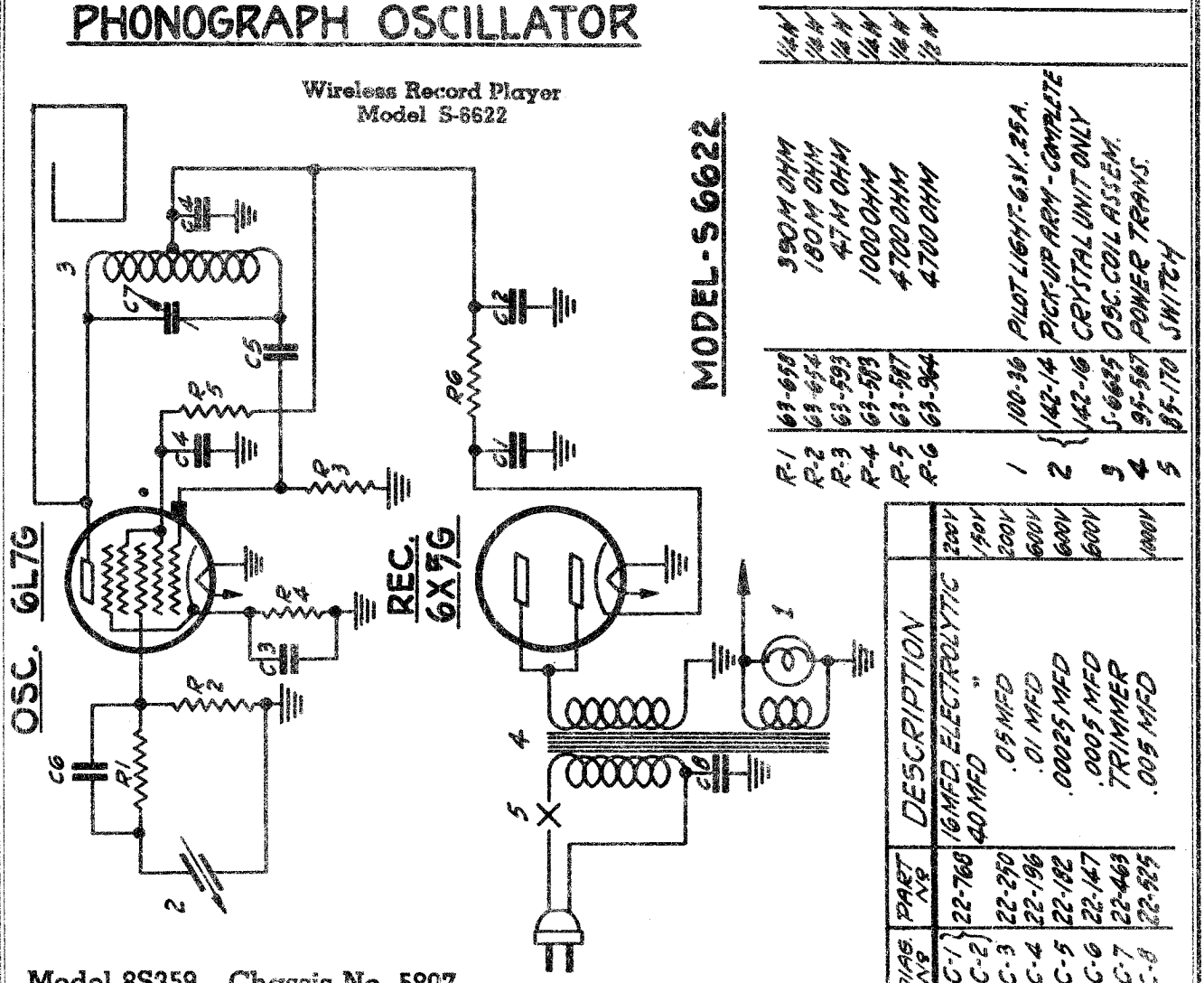
MODEL 8S359,Ch.5807
Alignment
MODEL S-6622
Wireless Record Player
Schematic

ZENITH RADIO CORP.

# PHONOGRAPH OSCILLATOR




| DIAG. No | PART No | DESCRIPTION | 200V | 150V | 300V | 600V | 600V | 600V | 1000V |
|---|---|---|---|---|---|---|---|---|---|
| C-1 | 22-768 | 16MFD ELECTROLYTIC | | | | | | | |
| C-2 | | 40 MFD " | | | | | | | |
| C-3 | 22-250 | .05 MFD | | | | | | | |
| C-4 | 22-196 | .01 MFD | | | | | | | |
| C-5 | 22-182 | .00025 MFD | | | | | | | |
| C-6 | 22-147 | .0005 MFD | | | | | | | |
| C-7 | 22-463 | TRIMMER | | | | | | | |
| C-8 | 22-525 | .005 MFD | | | | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| R-1 | 63-650 | 390M OHM | | | | | | 1/2 W |
| R-2 | 63-654 | 180M OHM | | | | | | 1/2 W |
| R-3 | 63-593 | 47M OHM | | | | | | 1/2 W |
| R-4 | 63-583 | 1000 OHM | | | | | | 1/2 W |
| R-5 | 63-587 | 4700 OHM | | | | | | 1/2 W |
| R-6 | 63-364 | 4700 OHM | | | | | | |
| | | | 1 | 2 | 3 | 4 | 5 | |
| | 100-36 | PILOT LIGHT 6.3V. .25A. | | | | | | |
| | 142-14 | PICK-UP ARM - COMPLETE | | | | | | |
| | 142-16 | CRYSTAL UNIT ONLY | | | | | | |
| | S-6625 | OSC. COIL ASSEM. | | | | | | |
| | 95-567 | POWER TRANS. | | | | | | |
| | 85-170 | SWITCH | | | | | | |

Model 8S359. Chassis No. 5807

## ALIGNMENT PROCEDURE

| Operation | Connect Test Oscillator to | Dummy Antenna | Set Test Osc. to | Band | Set Dial At | Adjust Trimmers | Purpose |
|---|---|---|---|---|---|---|---|
| 1 | 1st Def. Grid | 1/2 Mfd. | 455 | Br'dc't | 600 | ABCD | I. F. Alignment |
| 2 | Rec. Ant. Post | 200 Mmfd. | 455 | " | 600 | E | See Note |
| 3 | " " " | 200 Mmfd. | 1500 | " | 1500 | F | Set Osc. to Scale |
| 4 | " " " | 200 Mmfd. | 1500 | " | 1500 | G | Al'gment of Ant. |
| 5 | " " " | 200 Mmfd. | 600 | " | 600 | J | Rock gang & adj. for max. output. |
| 6 | " " " | 200 Mmfd. | | " | | FG | Repea 3 & 4 |
| 7 | " " " | 400 Ohms | 18000 | S.W. | 18000 | K | Set Osc. to Scale |
| 8 | " " " | 400 Ohms | 18000 | S.W. | 18000 | L | Rock Gang & adj. for max. output. |
| 9 | " " " | 400 Ohms | 6000 | Police | 6000 | N | Rock Gang & adj. for max. output. |

NOTE: If receiver is used in location subject to code interference adjust wave trap (E) for minimum interference with antenna connected and receiver operating in broadcast band.

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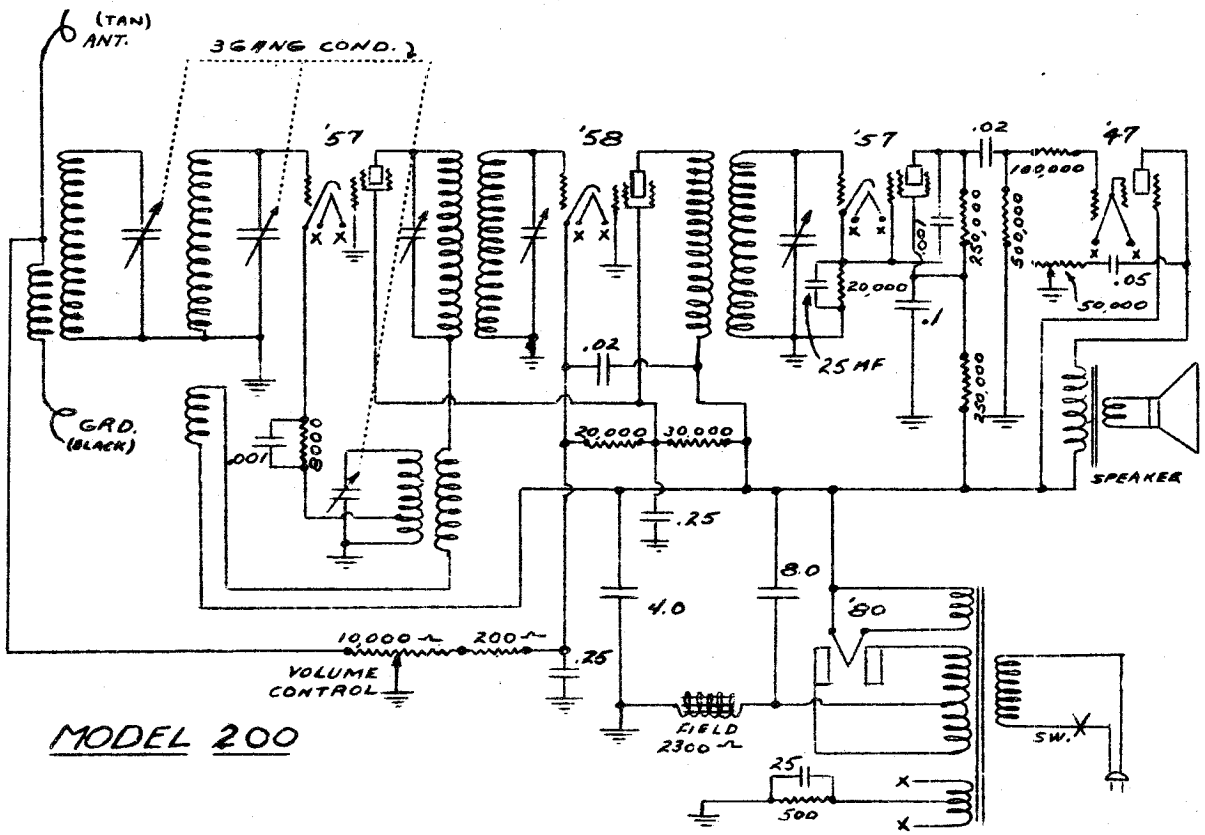
MODELS 834,1102,1106
Chassis 1002
Alignment,Notes

# ZENITH RADIO CORP.

MODEL 200
Schematic




MODELS 1102,1106,and 834. CHASSIS 1002

All components used in these models as the same as those used in Zenith Chassis 1001 - 1001A excepting the following changes.

| Parts added | Parts Deducted |
|---|---|
| 26-75 Complete Dial and Drive Assem. | (26-66 Dial and Drive) |
| 26-73 Dial scale only | (26-67 Dial Scale only) |
| 22-305 (2) 35 mfd. Condensers | (22-289 Condenser) |
| 22-245 Padder | (22-225 Condenser) |
| S-3317 Long wave ant coil Assem. | (20-84 7 Meter coil) |
| S-3318 Long wave osc. coil .. | (S-3115 7 Meter coil) |
| S-3321 Long Wave Deotector Coil Assem. | |

The long wave band has two trimmers on each stage. The oscillator stage has a trimmer and padder assembly of the nut and screw type. The nut is the trimmer and the screw is the padder.
The detector and R.F. stages each have two trimmers whose actions are dependent. The arrangement consists of a coupling condenser and a coil trimmer.
The coil trimmer can be distinguished in that one side is grounded. Maximum gain with this system is obtained by having the coupling condenser with as much capacity as possible and still be able to obtain a peak on the coil trimmer.

BALANCING PROCEDURE FOR LONG WAVE

Connect service oscillator to antenna post and set at 375 KC. Set dial at 375 KC. Adjust nut on oscillator trimmer assembly to bring in signal. Open R.F. and detector coil trimmers as far as possible and still leave enough capacity for peaking (about 2 or 3 turns). Open coupling condensers until what appears to be resonence is obtained. Then repeak coil trimmers to resonance. Remember the resonance obtained by means od the coupling condensers is not true resonance and the coil trimmers must be re-adjusted for true resonance.
Move I.F. selector switch to 160 KC. and set dial at this point. Adjust padder screw in oscillator coil assembly for maximum gain, rocking condenser to reach this point, wheresever it happens to fall. Repeak 375 KC. as it will be thrown off by the movements of the padder.

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MODEL 804
Schematic, Alignment

# ZENITH RADIO CORP.

Socket, Trimmers




To align receiver, proceed as follows:

1. Peak I F transformer, applying a 456 KC note on the 6A7 control grid.
2. Turn variable condenser all the way open and apply a 1712 KC note to the antenna. Set oscillator trimmer on oscillator section of variable condenser first, then line up R F section.
3. Adjust low frequency padder at 600 KC, rocking condenser back and forth across 600 KC signal and adjust for maximum gain.
4. Go back and check 1400 KC alignment.
5. Long Wave- Apply 150 KC note to antenna. Set long wave oscillator and R F trimmers, through holes at front of chassis, for maximum gain.
6. Apply a 300 KC note to the antenna and adjust long wave padder, through hole on front of chassis, for maximum gain - rocking condenser back and forth while adjusting.
7. Go back and check 150 KC again for alignment.

NOTE: Supply cord of set gets warm while operating set, this is normal.
Make sure that all tubes are pushed firmly in their proper sockets.
Unreel antenna supplied with set, to full length and place along the floor or drop out of window, if an outdoor antenna is used, make sure connection to set antenna (brown wire) is good.
DO NOT ATTACH A GROUND WIRE TO THIS SET.
If necessary to service chassis, under no circumstances remove the chassis without first removing plug from receptacle.

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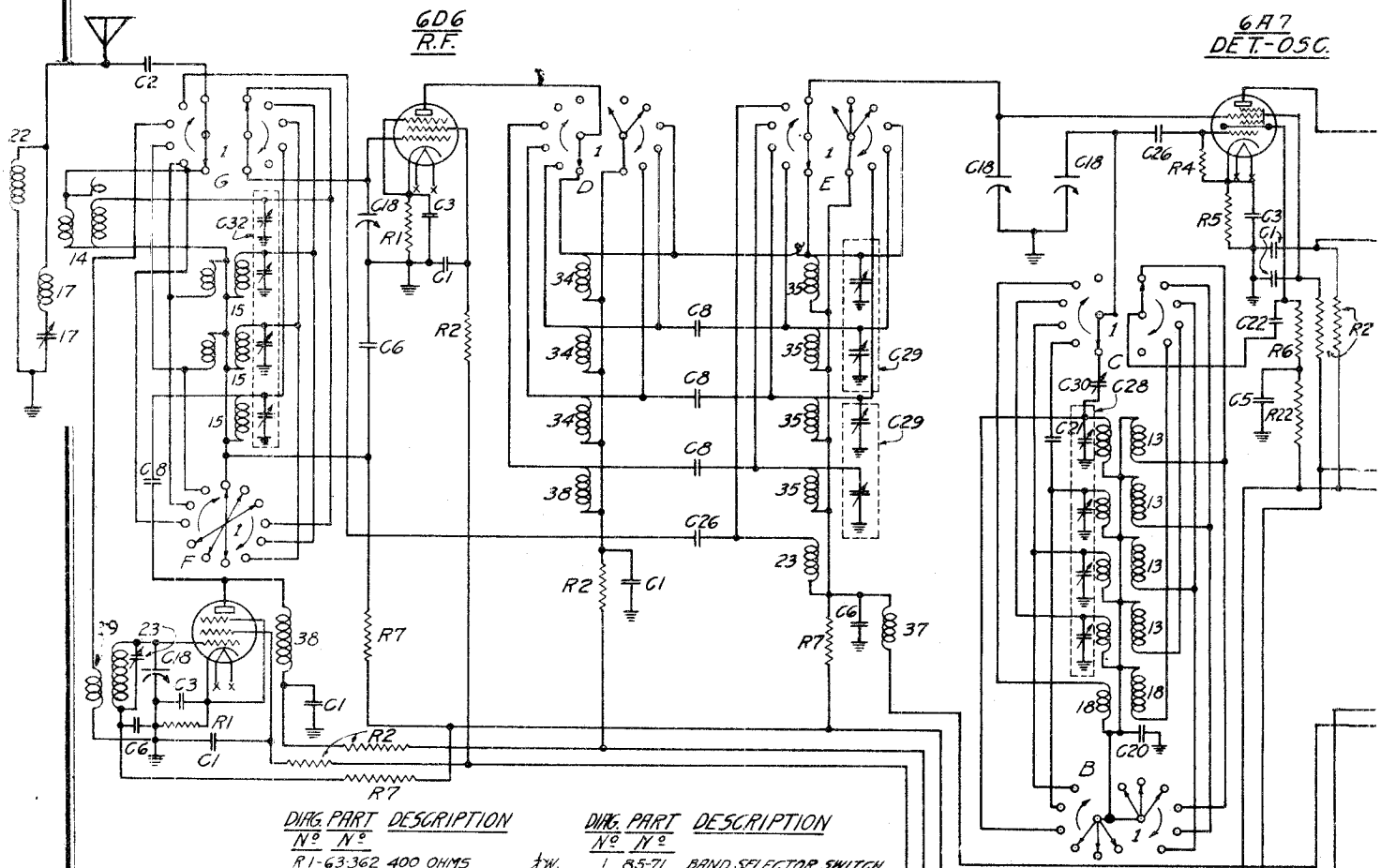
# ZENITH F




| DIAG. Nº | PART Nº | DESCRIPTION | |
|---|---|---|---|
| R1 | 63-362 | 400 OHMS | ½W. |
| R2 | 63-416 | 1400 " | ½W. |
| R3 | 63-258 | 490M " | ½W. |
| R4 | 63-136 | 50M " | 2W. |
| R5 | 63-357 | 300 " | ½W. |
| R6 | 63-291 | 29M " | ½W. |
| R7 | 63-260 | 100M " | ½W. |
| R8 | 63-412 | 3500 " | ½W. |
| R9 | 63-390 | 1MEG. DUAL VOL.C | |
| R10 | 63-391 | " T.C. | |
| R11 | 63-387 | 4M OHMS CANDOHM | |
| R12 | 63-389 | 1M-18.5T- CANDOHMS | |
| R13 | 63-406 | 5M OHMS CANDOHM | |
| R14 | 63-413 | 4M " | ½W |
| R15 | 63-405 | 330 " CANDOHM | |
| R16 | 63-408 | 500M " Q CONTROL | |
| R17 | 63-404 | 60 OHMS CANDOHM | |
| R18 | 63-279 | 3M " | ½W. |
| R19 | 63-414 | 99M OHMS | ½W. |
| R20 | 63-417 | 99 OHMS | ½W. |
| R21 | 63-326 | 4M " | ½W. |
| R22 | 63-407 | 10M OHMS CANDOHM | |
| R23 | 63-396 | 10M " | ½W. |
| R24 | 63-442 | 50M " | ½W. |
| R25 | 63-440 | 200M " | ½W. |
| R26 | 63-441 | 1MEG. " | ½W. |
| R27 | 63-290 | 260M " | ½W. |
| R28 | 63-241 | 5M " | ½W. |
| R29 | 63-432 | 5 OHMS CANDOHM | |
| R30 | 63-438 | 20M OHMS | ½W. |
| R31 | 63-439 | 2700 OHMS | ½W. |
| R32 | 63-378 | 250 | ½W. |

| DIAG. Nº | PART Nº | DESCRIPTION | |
|---|---|---|---|
| C1 | 22-371 | .01 MFD. | 600V. |
| C2 | 22-374 | .01 " | 300V. |
| C3 | 22-373 | .05 " | 300V. |
| C4 | 22-377 | .1 " | 600V. |
| C5 | 22-361 | .16 " | 450V. |
| C6 | 22-372 | .01 " | 300V. |
| C7 | 22-365 | .0001 " | 600V. |
| C8 | 22-127 | .000025 MFD. | 600V. |
| C9 | 22-375 | .1 MFD. | 300V. |
| C10 | 22-367 | .00005 MFD. | 600V. |
| C11 | 22-189 | 20 MFD. | 25V. |
| C12 | 22-378 | .04 " | 600V. |
| C13 | 22-362 | 8 MFD. | 300V |
| C14 | 22-225 | 5 " | 25V. |
| C15 | 22-360 | 4 " | 600V |
| C16 | 22-379 | .002 MFD. | 600V. |
| C17 | 22-289 | .0005 " | 600V |
| C18 | 22-395 | 450 MMFD. | 4GANG |
| C19 | 22-287 | .03 MFD. | 600V. |

| DIAG. Nº | PART Nº | DESCRIPTION |
|---|---|---|
| 1 | 85-71 | BAND SELECTOR SWITCH |
| 2 | 95-250 | DRIVER TRANS. |
| 3 | 95-251 | LOW BOOST AUDIO TRANS. |
| 4 | 95-252 | HIGH FREQUENCY TRANS. |
| 5 | 95-253 | SPEAKER OUTPUT TRANS. |
| 6 | 95-254 | POWER CHOKE |
| 7 | 95-255 | " " |
| 8 | 95-256 | OUTPUT "B" SUPPLY TRANS. |
| 9 | 95-257 | POWER TRANS. |
| 10 | 95-264 | 3RD I.F. TRANS. |
| 11 | 122-9 | SHADOWGRAPH |
| 12 | 195-1 | SINGLE CONTACT RELAY |
| 13 | 5-3587 | OSC. COIL ASSEM. |
| 14 | 5-3593 | ANT. COIL |
| 15 | 5-3589 | R.F. COIL ASSEM. |
| 16 | 5-3358 | VAR. SELECT. I.F. ASSEM. |
| 17 | 20-109 | WAVE TRAP COIL ASSEM. |
| 18 | 5-3115 | H.F. OSC. COIL ASSEM |
| 19 | 20-99 | DET. FILTER CHOKE |
| 20 | 20-100 | UNTUNED I.F. COIL |
| 21 | 5-3367 | LINE FILTER COIL ASSEM. |
| 22 | 20-88 | ANT. CHOKE |
| 23 | 20-114 | 7 METER DET. COIL |
| 24 | 85-69 | PHONO. SWITCH |
| 25 | | SPKR. FIELD 49-102-49-103 |
| 26 | | " " 49-99 |
| 27 | 49-99 | SPEAKER |
| 28 | 49-102 | #2 JENSEN SPEAKER |
| 29 | 49-103 | #1 " |
| 30 | 85-64 | TOGGLE SWITCH |
| 31 | 95-266 | ORDER BY PART Nº ONLY |
| 32 | 95-265 | SPECIAL TOLERANCES |
| 33 | 95-267 | |
| 34 | 20-81 | R.F. PLATE CHOKE ASSEM. |
| 35 | 5-3588 | DET. COIL ASSEM. |
| 36 | 20-79 | DET. BROADCAST BAND COIL |
| 37 | 20-71 | R.F. CHOKE |
| 38 | 5-3538 | R.F. PLATE CHOKE ASSEM. |
| 39 | 5-3591 | 10-23 MEGACYCLE COIL |
| 40 | 85-75 | TWEETER SWITCH ASSEM. |
| 41 | 85-75 | SWITCH |
| 42 | 20-118 | SCRATCH FILTER COIL |

| | | | |
|---|---|---|---|
| C20 | 22-342 | .0029 MFD. | 600V |
| C21 | 22-341 | .00092 " | 600V. |
| C22 | 22-147 | .0003 " | 600V. |
| C23 | 22-305 | 2-35 MFD. | |
| C24 | 22-383 | ORDER BY PART Nº ONLY | |
| C25 | 22-338 | SPECIAL TOLERANCES. | |
| C26 | 22-289 | .00005 MFD. | 600 |
| C27 | 22-199 | .5 MFD. " | 200V. |
| C28 | 22-397 | 2-35 MMFD. | 4GANG |
| C29 | 22-398 | 2-35 " | 2GANG. |
| C30 | 22-205 | 200-500 MMFD. | PADDER |
| C31 | 22-321 | 8 MFD. | 450V. |
| C32 | 22-396 | 2-35 MMFD. | 4GANG |
| C33 | 22-229 | .005 | 600V. |

NOTE:

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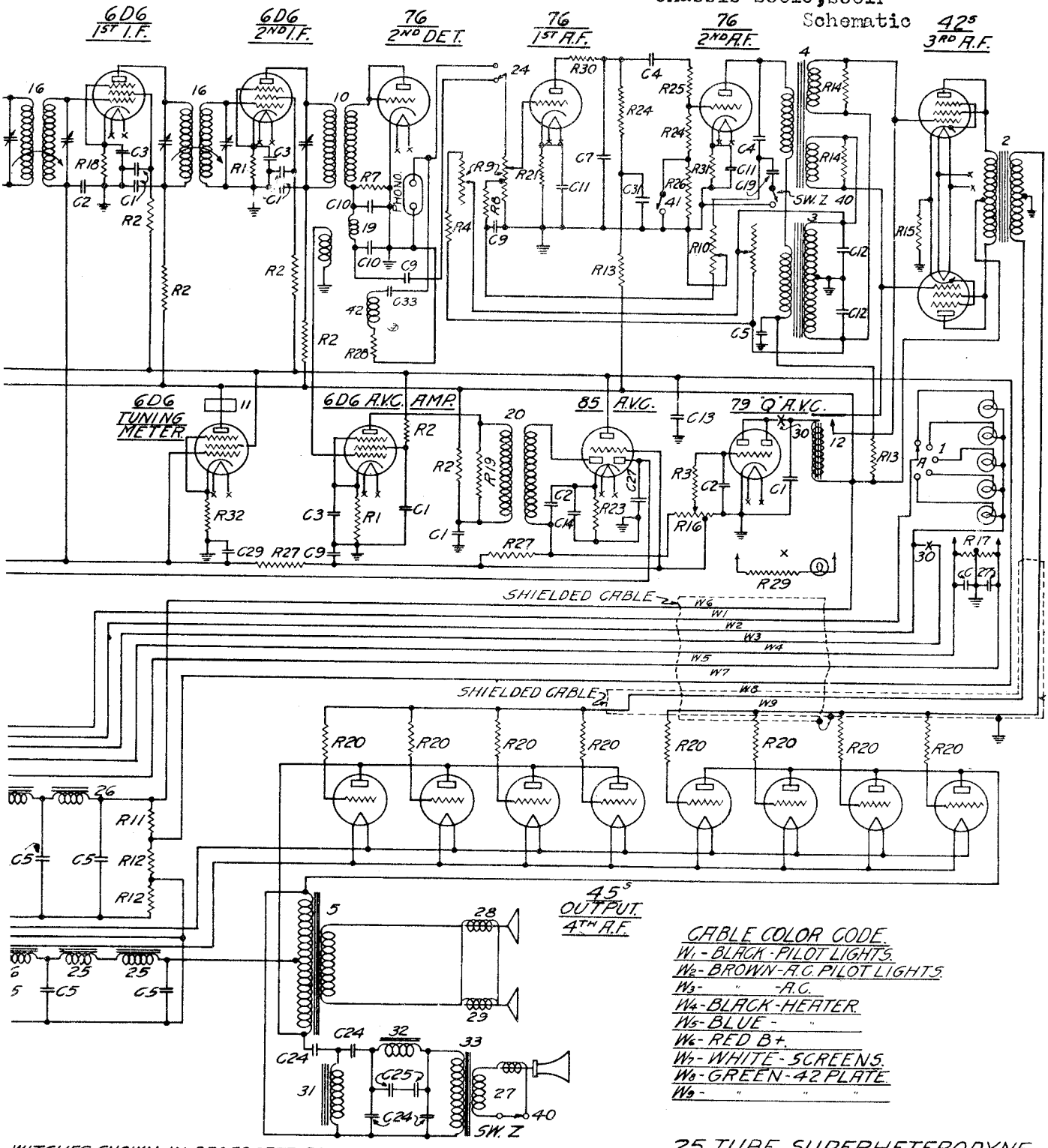
ADIO CORP.

MODEL 1000Z Stratosphere Revised
Chassis 2501C, 2501P
Schematic




CABLE COLOR CODE.
W1 - BLACK - PILOT LIGHTS.
W2 - BROWN - A.C. PILOT LIGHTS.
W3 - " - A.C.
W4 - BLACK - HEATER.
W5 - BLUE - "
W6 - RED B+.
W7 - WHITE - SCREENS.
W8 - GREEN - 42 PLATE.
W9 - " " "

WITCHES SHOWN IN BROADCAST POSITION.

REVISED MODEL Nº 1000Z.

SECTIONS OF SWITCH ARE IN ALPHABETICAL ORDER FROM FRONT TO REAR OF CHASSIS.
A = SECTION Nº 1.
B = " " 2
C = " " 3
D = " " 4
E = " " 5
F = " " 6
G = " " 7

25 TUBE SUPERHETERODYNE.
I.F. FREQUENCY 485 KC.
CHASSIS Nº 2501-C & 2501-P

The chassis and power pack layout are the same as for the early model, for which see the Index

ZENITH RADIO CORP.
CHICAGO, ILL.
U.S.A.

W.D. 2-22-34

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## Socket Voltages

| TUBE | POSITION | Ef | Ek | Eg1 | Eg2 [4] | Eg3 | Ep |
|---|---|---|---|---|---|---|---|
| 6D6 | 1st R. F. | 6.3 | 3 | 0 | 100 | 3 | 300 |
| 6D6 | 2nd R. F. | 6.3 | 3 | 0 | 100 | 3 | 300 |
| 6A7 | 1st Det. | 6.3 | 3 | 0 | 100 | - | 300 |
| | Osc. | | | 3 | - | - | 130 |
| 6D6 | 1st I. F. | 6.3 | 7 | 0 | 100 | 7 | 300 |
| 6D6 | 2nd I. F. | 6.3 | 3 | 0 | 100 | 3 | 300 |
| 76 | 2nd Det. | 6.3 | 0 | 0 | - | - | 0 |
| 76 | 1st A.F. | 6.3 | 8 | 0 | - | - | 140 |
| 76 | 2nd A. F. | 6.3 | 14 | 0 | - | - | 270 |
| 42 | Driver | 6.3 | 22 | 0 | 300 | - | 300 |
| 45 | Power A.F. | 2.5 | 63 | 0 | - | - | 330 |
| 79 | Q.A.V.C. | 6.3 | 0 | 0 | - | - | 250 Q on<br>0 Q off |
| 6D6 | Shadowmeter Amplifier | 6.3 | 3 | 0 | 100 | 3 | 300 |
| 6D6 | A.V.C.Amplf. | 6.3 | 3 | 0 | 100 | 3 | 300 |
| 85 | A.V.C. | 6.3 | 0 | 0 | - | - | 100 |
| 523 | Rect. Power Amplifier | 5 | - | - | - | - | - |
| 523 | Rect.for Upper Chassis | 5 | - | - | - | - | - |

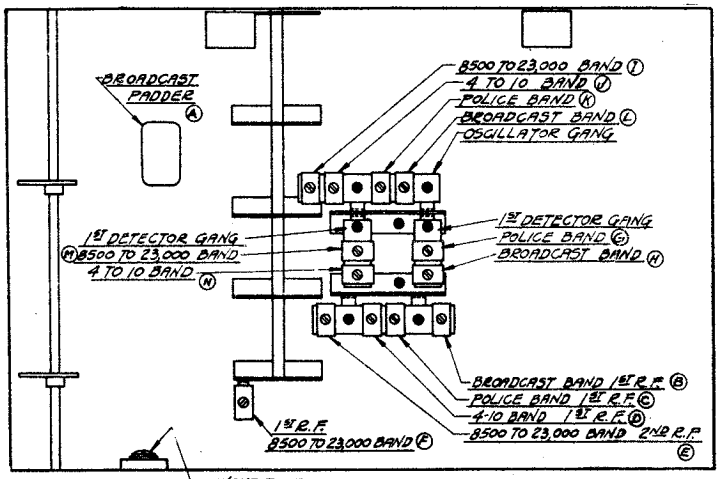
Line Voltage 112. Antenna and Ground shorted.

f - filament; k - cathode; g1 - control grid; g2 - screen grid; g3 - suppressor grid; p - plate.

Balance Procedure: Caution - Test set thoroughly for defective tubes, antenna and ground, check line voltage and chassis voltages before any attempt is made to rebalance. All balancing should be done with a calibrated oscillator capable of a steady signal and minimum attenuation of signal input strength. The screw driver used should be of non metallic type and output meter usually connected across plates of 45 tubes at point where the two green speaker wires come out of power pack.

Warning. Do not rebalance this chassis unless absolutely necessary as all chassis are balanced on an accurate signal generator before shipment. Set volume control in full on position, tone control on treble, high fidelity control in selective position. Band switch set on broadcast position, gang 580 K.C., approximately. Connect 485 K.C. service oscillator to grid of 6A7 and chassis ground, adjust I.F.transformers, to maximum output with minimum input signal. Rotate selectivity control to broad position, I.F. output should remain constant 6 K.C. plus and minus 485 K. C. Next, connect the same 485 K.C. signal directly across aerial and ground binding post. Balance wave trap to minimum signal. Gang set at 550.

Notes: Refer to drawing of trimmer assembly to identify trimmers.
Set service oscillator at 600 K.C. Adjust broadcast padder "A" meanwhile rocking pointer past 600 K.C. on dial to combination giving greatest output.
Set chassis dial to exactly 1400 K.C., and service oscillator to 1400 K.C. Balance "L" oscillator trimmer to scale. Reset oscillator to 600 K.C., rotate gang to 600 and re-check 600 padder for maximum output. Next, retune oscillator trimmer at 1400 K.C. Adjust detector trimmer "H" and R.F. trimmer "B" to maximum output.
Police or Orange band. Rotate chassis band switch to police band, gang should be rotated to 3 megacycles, oscillator to 3 megacycles also. Adjust oscillator trimmer "K" to scale, peak "G" detector and "C" R.F. trimmers to maximum peak.
Yellow band. Set dial and oscillator to 9 megacycles. Peak oscillator trimmer "J" for scale, "M" detector and "D" R. F. trimmers for maximum peak.
Red band. Set dial and oscillator at 21 megacycles, peak "I" oscillator for scale, "M" detector and "E" R.F., and trimmer "F" located at back of band switch for maximum peak. There are no adjustments on the Blue band.
On all short wave adjustments be careful not to balance the oscillator circuit to the image frequency of the signal. This is equal to signal frequency minus twice the I.F. frequency.


BROADCAST PADDER (A)
8500 TO 23,000 BAND (I)
4 TO 10 BAND (J)
POLICE BAND (K)
BROADCAST BAND (L)
OSCILLATOR GANG
1ST DETECTOR GANG
8500 TO 23,000 BAND (M)
4 TO 10 BAND (N)
1ST DETECTOR GANG
POLICE BAND (G)
BROADCAST BAND (H)
BROADCAST BAND 1ST R.F. (B)
POLICE BAND 1ST R.F. (C)
4-10 BAND 1ST R.F. (D)
8500 TO 23,000 BAND 2ND R.F. (E)
1ST R.F. 8500 TO 23,000 BAND (F)
WAVE TRAP ADJUST AT EXTREME LOW FREQUENCY END OF BROADCAST BAND

ADJUSTMENT DIAGRAM

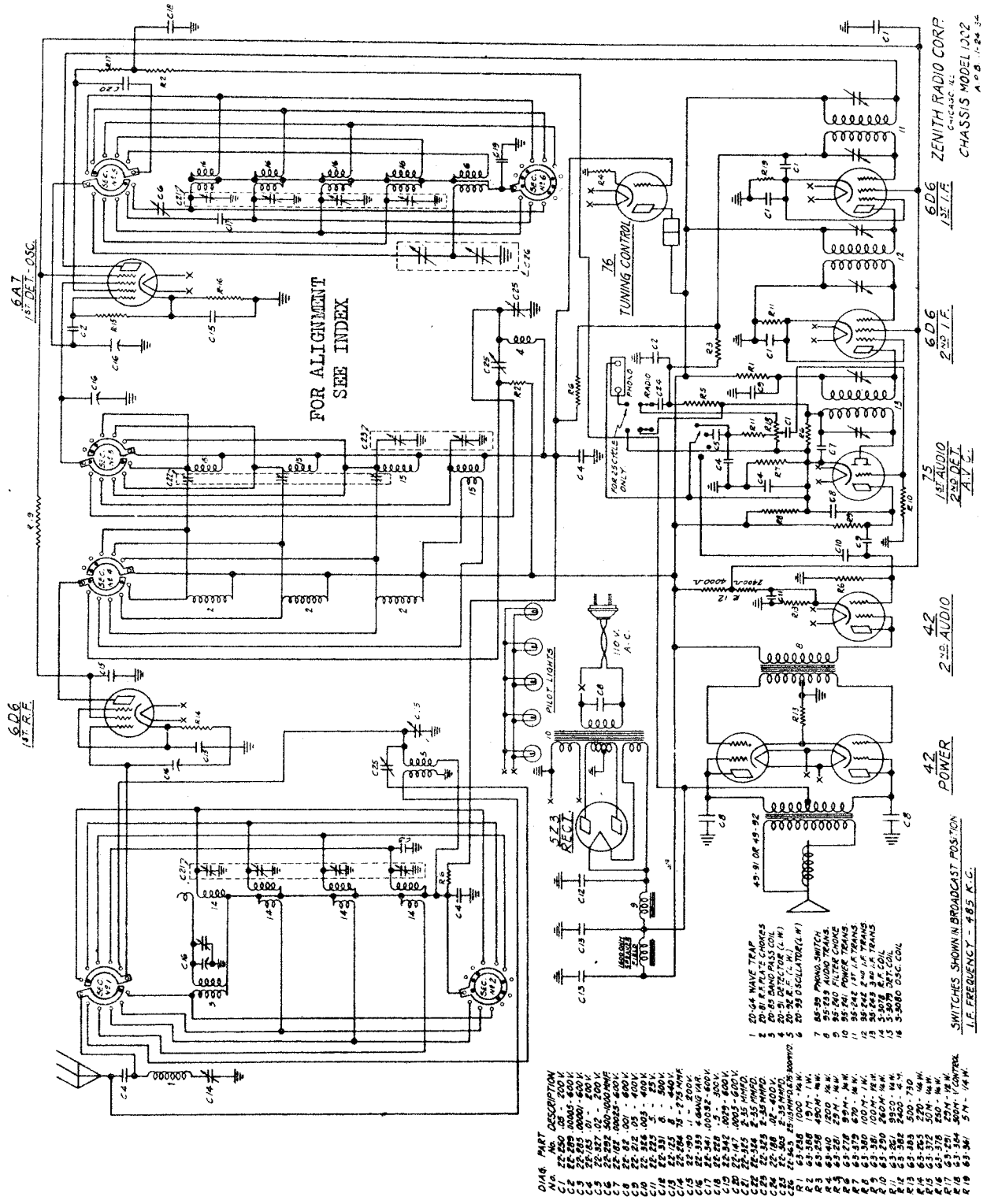
RESISTANCE MEASUREMENTS - UPPER CHASSIS

| TUBE | POSITION | HEATER | CATHODE | GRID | SCREEN | SUPPRESSOR | PLATE |
|---|---|---|---|---|---|---|---|
| 6D6 | 1st. R. F. | 20 | 350 | 600 M. | 5 Meg. | 350 | 1 Meg. |
| 6D6 | 2nd. R. F. | 20 | 350 | 600 M. | 5 Meg. | 350 | 1 Meg. |
| 6A7 | 1st. Det. | 20 | 275 | 600 M. | 5 Meg. | - | 1 Meg. |
| | Osc. | | | 50 M. | - | - | 1 Meg. |
| 6D6 | 1st. I. F. | 20 | 350 | 2 | 5 Meg. | 350 | 1 Meg. |
| 6D6 | 2nd. I. F. | 20 | 3000 | 500 M. | 5 Meg. | 3000 | 1 Meg. |
| 76 | 2nd Det. | 20 | 0 | 100 M. | - | - | 100 M. |
| 76 | 1st. Aud. | 20 | 4000 | 8000 | - | - | 1 Meg. |
| 76 | 2nd. Aud. | 20 | 3000 | 1 Meg. | - | - | 1 Meg. |
| 42 | Driver | 20 | 325 | 3000 | - | - | 1 Meg. |
| 79 | Q.A.V.C. | 20 | 0 | 1 Meg. | - | - | 1 Meg. Q on |
| 6D6 | Shadowmeter Amplifier | 20 | 250 | 500 M. | 5 Meg. | 250 | 1 Meg. |
| 6D6 | A.V.C.Amplf. | 20 | 250 | 2 | 5 Meg. | 250 | 1 Meg. |
| 85 | A.V.C. | 20 | 10M | 250 M. | 400 M. | 500 M. | 5 Meg. |

All Measurements Made With Lower Chassis Disconnected.

MODELS 834,1102,1106
Chassis 1002
Schematic

# ZENITH RADIO CORP.




| DIAG. No. | PART No. | DESCRIPTION |
|---|---|---|
| C1 | 25-250 | .0045 - 200 V. |
| C2 | 25-285 | .0045 - 600 V. |
| C3 | 25-285 | .00001 - 600 V. |
| C4 | 25-183 | .01 - 200 V. |
| C5 | 25-327 | .02 - 200 V. |
| C6 | 25-282 | 500-1000 MMF. |
| C7 | 25-282 | .0025 - 400 V. |
| C8 | 25-212 | .05 - 400 V. |
| C9 | 25-212 | .05 - 400 V. |
| C10 | 25-324 | .003 - 400 V. |
| C11 | 25-233 | 5 - 25 V. |
| C12 | 25-232 | 8 - 450 V. |
| C13 | 25-331 | 8 - 275 V. |
| C14 | 25-232 | 15 - 275 V. |
| C15 | 22-290 | .1 - 200 V. |
| C16 | 22-333 | 4 GANG VAR. |
| C17 | 25-341 | .00032 - 600 V. |
| C18 | 25-228 | .1 - 300 V. |
| C19 | 25-342 | .005 - 600 V. |
| C20 | 25-342 | .005 - 600 V. |
| C21 | 25-325 | 2-35 MMFD. |
| C22 | 25-325 | 2-35 MMFD. |
| C23 | 25-323 | 2-35 MMFD. |
| C24 | 25-188 | .02 - 400 V. |
| C25 | 25-280 | 25-35 MFD. 25 V. |
| C26 | 25-343 | 1000 - 14 W. |
| R1 | 63-258 | 19 M - 1 W. |
| R2 | 63-388 | 4 M - 1 W. |
| R3 | 63-256 | 4 M - 1/4 W. |
| R4 | 63-410 | 1200 - 1/4 W. |
| R5 | 63-228 | 1 M - 1/4 W. |
| R6 | 63-227 | 2.2 M - 1/4 W. |
| R7 | 63-373 | 470 - 1/4 W. |
| R8 | 63-380 | 100 M - 1 W. |
| R9 | 63-381 | 100 M - 1/2 W. |
| R10 | 63-250 | 2400 - 1/4 W. |
| R11 | 63-367 | 3200 - 1/4 W. |
| R12 | 63-382 | 3200 - 1/4 W. |
| R13 | 63-383 | 500 - 730 |
| R14 | 63-253 | 270 - 1/4 W. |
| R15 | 63-372 | 50 M - 1/4 W. |
| R16 | 63-378 | 250 - 1/4 W. |
| R17 | 63-251 | 2.2 M - 1/2 W. |
| R18 | 63-384 | 10 M - 1/4 W. |
| R19 | 63-361 | 5 M - 1/4 W. |

| | | |
|---|---|---|
| 1 | 20-64 | WAVE TRAP |
| 2 | 20-81 | R.F. PLATE CHOKES |
| 3 | 20-85 | BAND PASS COIL |
| 4 | 20-92 | R.F. COIL (L.W.) |
| 5 | 20-93 | OSCILLATOR (L.W.) |
| 7 | 85-89 | PHONO. SWITCH |
| 8 | 95-239 | AUDIO TRANS. |
| 9 | 95-240 | R.F. CHOKE |
| 10 | 95-241 | POWER TRANS. |
| 11 | 95-242 | 1ST I.F. TRANS. |
| 12 | 95-242 | 2ND I.F. TRANS. |
| 13 | 95-243 | 3RD I.F. TRANS. |
| 14 | 3-3078 | ANT. COIL |
| 15 | 3-3079 | R.F. COIL |
| 16 | 3-3080 | OSC. COIL |

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## CHASSIS 5636 SOCKET VOLTAGES

| Tube | Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6A8 | 1st Det Osc. | 0 | AC | 100 | 50 | -5 | 100 | AC | 1 | -1 |
| 6K7 | I. F | 0 | AC | 100 | 100 | 5 | — | AC | 5 | 0 |
| 6Q7 | 2nd Det. A.V.C. | 0 | AC | 50 | 0 | 0 | — | AC | 1 | 0 |
| 25A6 | Power | 0 | AC | 90 | 100 | 1 | — | AC | 0 | — |
| 25Z6 | Rectifier | 0 | AC | AC | AC | 100 | — | AC | 125 | — |
| 100-37 | 115 Volt Ballast | — | — | — | — | — | — | — | — | — |

All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected.

Line Voltage 112V (A.C.)

## CHASSIS 5525A Socket Voltages

| Tube | Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6A8 | Converter Osc. | 0 | 6.3 | 244 | 97 | —9 | 149 | 0 | 0 | —.5 |
| 6K7 | I. F. | 0 | 6.3 | 246 | 97 | 0 | — | 0 | 0 | —.5 |
| 6Q7 | 2nd Det. AVC 1st Audio | 0 | 0 | 71 | —2.5 | —2.5 | — | 6.3 | —2.5 | —2.5 |
| 6F6 | Power | 0 | 0 | 231 | 246 | —3.5 | — | 6.3 | —2.5 | — |
| 5Y4 | Rect. | 0 | — | AC | — | AC | — | 316 | 316 | — |

All voltages measured from point indicated to ground using a 1000 ohm per volt meter, antenna and ground disconnected. Line voltage 117 v.

## CHASSIS 5708E SOCKET VOLTAGES

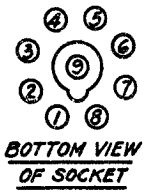
| Tube | Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6A8 | 1st Det Osc. | 0 | AC | 125 | 80 | 20 | 100 | AC | 25 | 15 |
| 6K7 | I F | 0 | AC | 125 | 125 | 25 | — | AC | 25 | 10 |
| 6H6 | 2nd Det A.V.C. | 0 | AC | 10 | 25 | 10 | — | AC | 25 | — |
| 6F5 | 1st Audio | 0 | AC | — | 60 | — | — | AC | 25 | 5 |
| 25A6 | Power | 0 | AC | 110 | 125 | 1 | — | AC | 25 | — |
| 25Z6 | Rectifier | 0 | 0 | AC | AC | 105 | — | AC | 125 | — |
| | Ballast | — | — | — | — | — | — | — | — | — |

Measured from point indicated to junction of filter choke and speaker field using a 1000 ohm per volt meter

Line Voltage 112 (A.C.)

## CHASSIS 5640AT Socket Voltages

| Tube | Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6L7 | 1st Det | 0 | 0 | 231 | 141 | —10 | — | 6.3 | 2.5 | 0 |
| 6J5 | Osc | 0 | 6.3 | 129 | — | —17 | — | 0 | 0 | — |
| 6K7 | IF | 0 | 6.3 | 234 | 65 | 0 | — | 0 | 0 | 0 |
| 6Q7 | 2nd Det Audio | 0 | 0 | 88 | —5 | —5 | — | 6.3 | —1 | —2 |
| 6V6 | Power | 0 | 0 | 210 | 234 | —2 | — | 6.3 | —1.5 | — |
| 5Y4 | Rect. | 0 | — | AC | — | AC | 188? | 288 | 288 | — |




## CHASSIS 5802A SOCKET VOLTAGES

| Tube | Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6K7 | R. F. | 0 | 6AC | 250 | 68 | 0 | — | 0 | 0 | 0 |
| 6A8 | 1st Det. Osc. | 0 | 6AC | 250 | 68 | —4 | 150 | 0 | 0 | 0 |
| 6K7 | I. F. | 0 | 6AC | 250 | 68 | 0 | — | 0 | Local 5 | 0 |
| 6H6 | 2nd Det. A.V.C. | 0 | 6AC | —3 | —3 | —3 | — | 0 | —3 | — |
| 6F5 | 1st Audio | 0 | 6AC | — | 70 | 0 | 0 | 0 | —3 | —3 |
| 6F6 | Power | 0 | 6AC | 235 | 250 | —4 | — | 0 | —4 | — |
| 6C5 | Target Tuning Amp. | 0 | 6AC | 250 | — | —5 | — | 0 | 4 | — |
| 5Y3 5W4 | Rectifier | 0 | 310 | — | AC | — | AC | — | 310 | — |

All voltages measured from point indicated to ground, using a 1000 ohm per volt meter. Antenna and ground disconnected

Line Voltage 112V.

## CHASSIS 5804AT Socket Voltages

| Tube | Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 6K7 | RF | 0 | 0 | 216 | 90 | 0 | — | 6.2 | 0 | 0 |
| 6L7 | 1st Det | 0 | 0 | 216 | 130 | —3 | — | 6.2 | 2 | 0 |
| 6J5 | Osc | 0 | 6.2 | 116 | — | —3 | — | 0 | 0 | — |
| 6K7 | IF | 0 | 6.2 | 212 | 90 | 0 | — | 0 | 0 | 0 |
| 6Q7 | 2nd Det Audio | 0 | 0 | 70 | —2 | —2 | — | 6.2 | —2 | —2 |
| 6V6 | Power | 0 | 0 | 210 | 216 | —3 | — | 6.2 | —4 | — |
| 5Y4 | Rect | 0 | — | AC | — | AC | — | 276 | 276 | — |
| 6T5 | Eye | | 0 | 10 | —2 | 216 | —2 | 6.2 | | |
| | | | H | P | C.G | T | K | H | | |

## CHASSIS 5517A SOCKET VOLTAGES

| Tube | Position | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 5Y3 5W4 | Rectifier | 0 | 240 | — | AC | — | AC | — | 240 | — |
| 6F6 | Power | 0 | 0 | 230 | 240 | -5 | — | 6ac | 0 | — |
| 6Q7 | 2nd Det A.V.C. | 0 | 0 | 75 | 1 | 1 | — | 6ac | 1.5 | 0 |
| 6A8 | 1st Det. Osc. | 0 | 0 | 240 | 85 | -1 | 166 | 6ac | 4 | 0 |
| 6K7 | I. F | 0 | 0 | 240 | 85 | 3 | — | 6ac | 3 | 0 |

Voltage

# WIRING CHANGES NECESSARY FOR PHONO PICKUP

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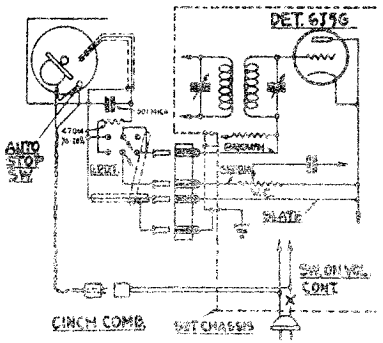
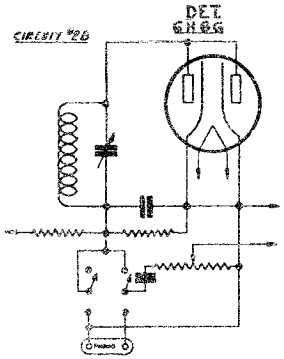
CIRCUIT #3B
MODEL #65-301 & MODEL #65-303
CHASSIS #5631

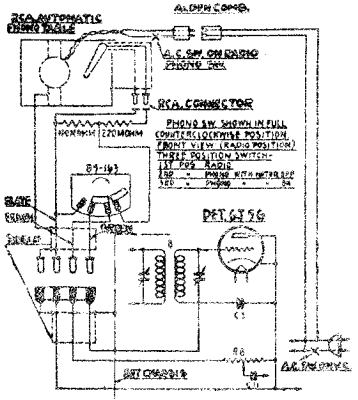



CIRCUIT #2B

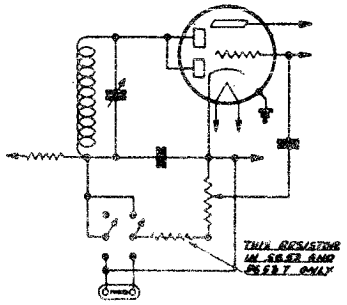



CIRCUIT CHANGES FOR PHONOGRAPH INSTALLATIONS ON CHASSIS MODELS 7649-5906

CIRCUIT #5A
MODEL 65-306 CHASSIS #5651

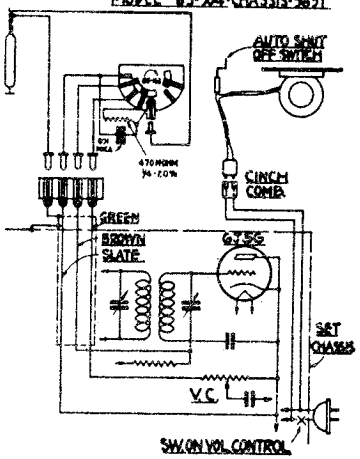



CIRCUIT #1A

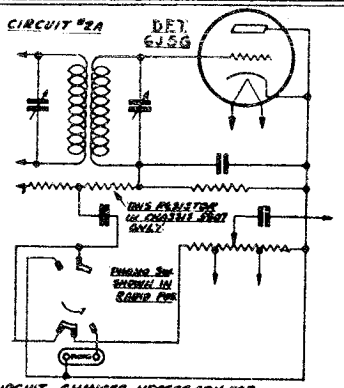



CIRCUIT CHANGES FOR PHONOGRAPH INSTALLATIONS ON CHASSIS MODELS 5610-5611-5628-5628AT-5629-5629AT 5546-5547-5653-5653T AND 5654

CIRCUIT #4B MODEL #65-304-CHASSIS-5651



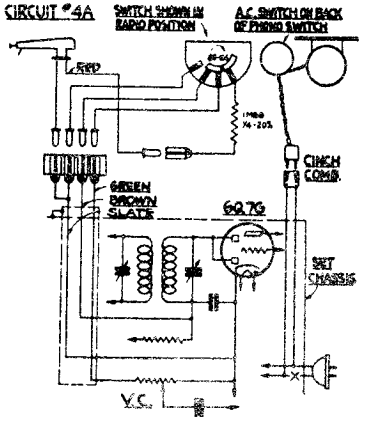

CIRCUIT #2A



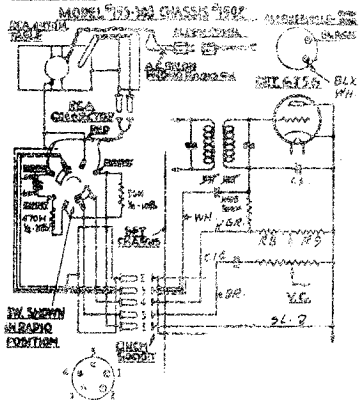

CIRCUIT CHANGES NECESSARY FOR INSTALLATION OF PHONO A.C. OUTLET ON CHASSIS #7116-5907-5756 (ARTIST SAME EXCEPT 6T7G DETAMP TUBE

MODEL #5R303-CHASSIS-5528

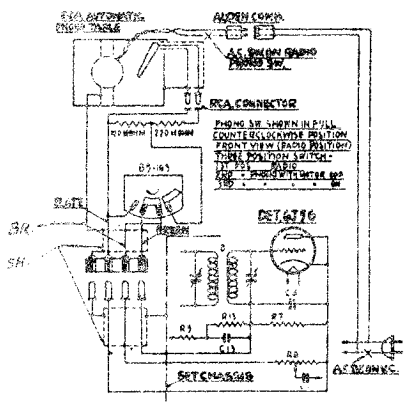
CIRCUIT #4A



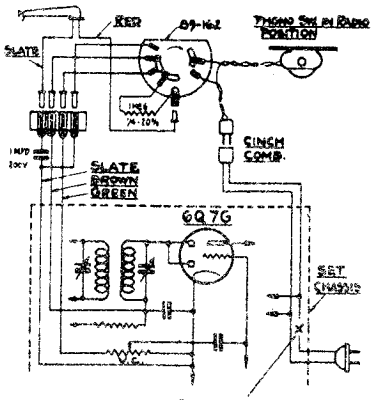

CIRCUIT #6A
MODEL #65-302 CHASSIS #5902



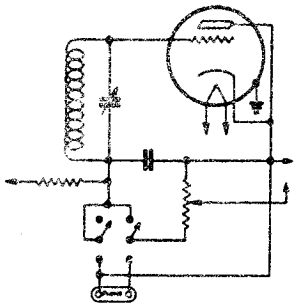

CIRCUIT #5B
MODEL #65-307 CHASSIS #5907




CIRCUIT #3A
MODEL #60-302 · CHASSIS #5646
WIRING OF PHONO CKT. COMPONENTS




CIRCUIT #1B

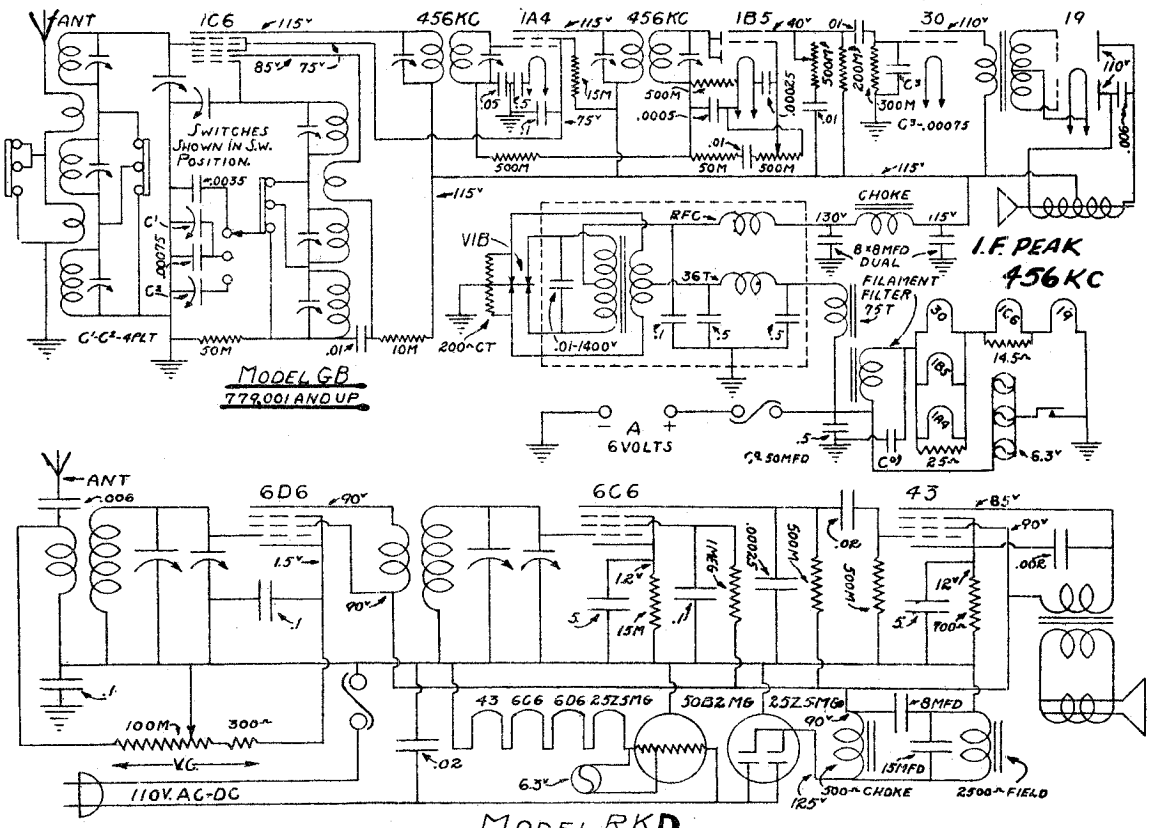


CIRCUIT CHANGES FOR PHONOGRAPH INSTALLATIONS ON CHASSIS MODELS 5651-5551AT. 5648 SAME AS SHOWN EXCEPT PROBE TUBE IS 6N8G

Schematics, Voltage

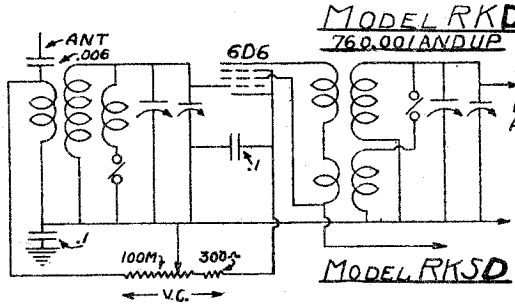
# ZEPHYR RADIO CO.

MODEL GB, Above Ser. 779001
MODELS DB, DF, Above 775,001
MODEL RKD, Above Ser. 760,001
MODEL RKSD



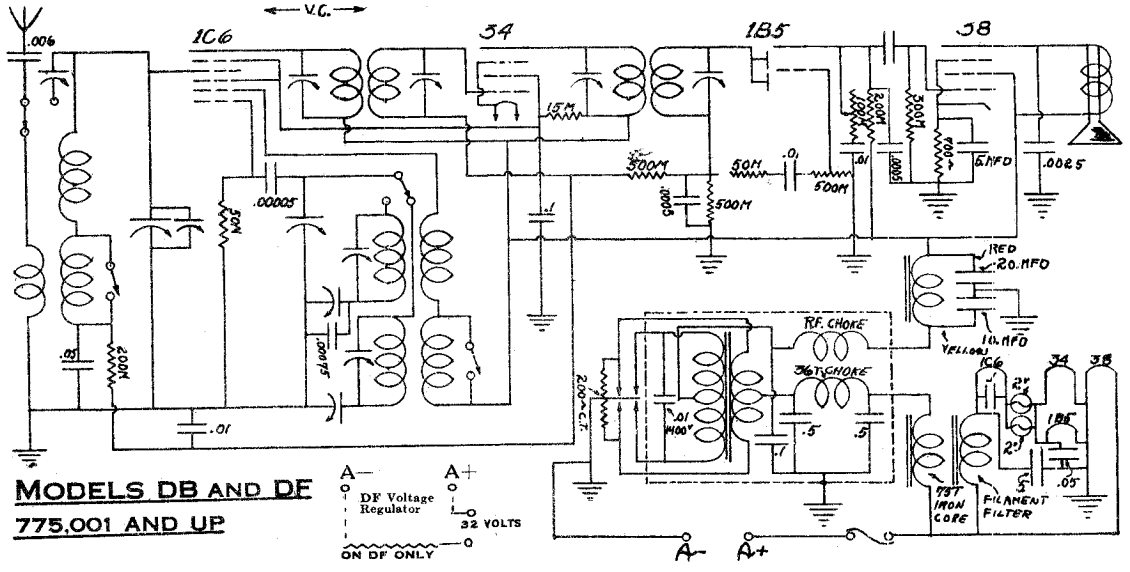







ALL OTHER CONSTANTS ON MODEL RKS SAME AS MODEL RK.

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII

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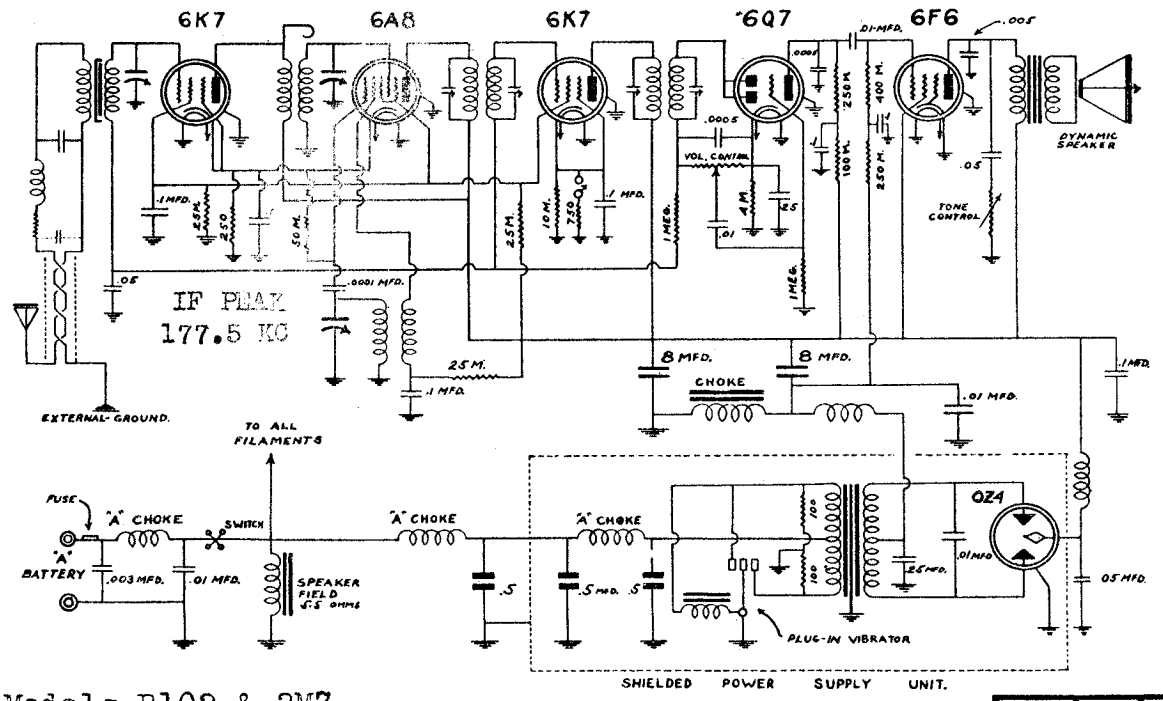
MODELS 2M7, B102
Schematic

# ZEPHYR RADIO CO.

MODEL TSA105
Schematic, Socket
Trimmers, Alignment

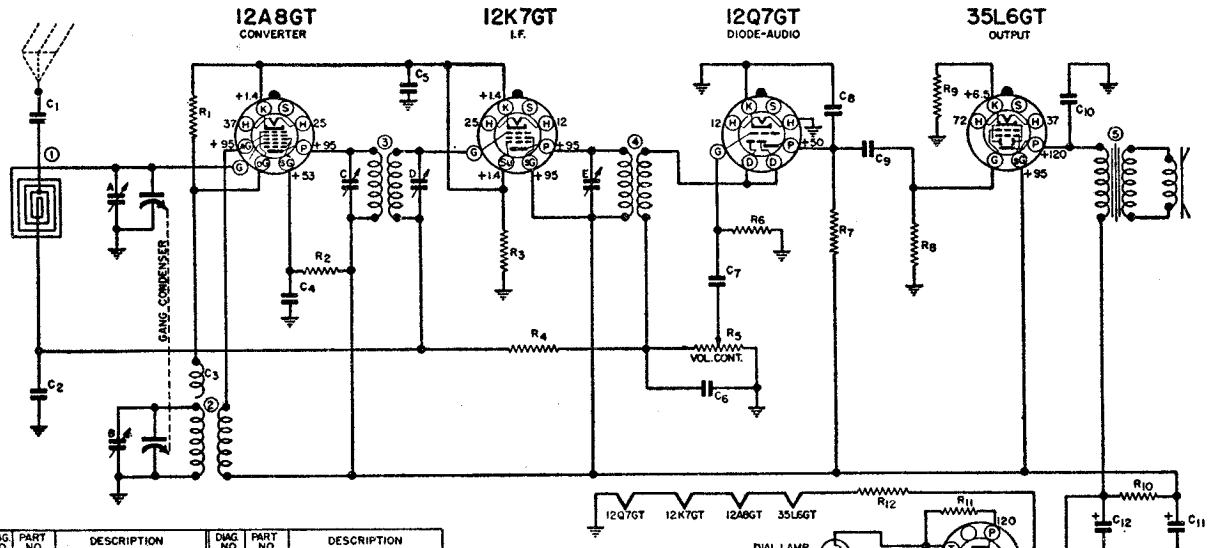



Models B102 & 2M7

## CONVENTIONAL ALIGNMENT

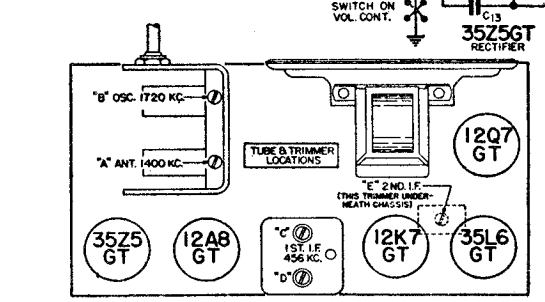
SEE SPECIAL SECTION VOL. VIII.

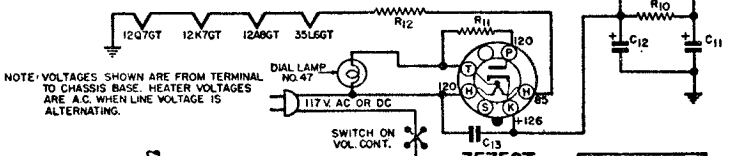
| App. by | dr. by | 1936 |
|---|---|---|




| DIAG. NO. | PART NO. | DESCRIPTION | DIAG. NO. | PART NO. | DESCRIPTION |
|---|---|---|---|---|---|
| R 1 | N-1260 | 50,000 OHM .5W. 20% | C 7 | N-1344 | .01 MFD. 400 V. |
| R 2 | N-1460 | 30,000 OHM .5W. 20% | C 8 | N-1447 | .0005 MFD. 400 V. |
| R 3 | N-1615 | 100 OHM .5W. 10% | C 9 | N-1344 | .01 MFD. 400 V. |
| R 4 | N-1262 | 1 MEGOHM .5W. 20% | C 10 | N-1376 | .02 MFD. 400 V. |
| R 5 | N-1595 | 0.5 MEGOHM VOL. CONT. | C 11 | N-1366 | 25 MFD. 150 V. ELECTRO. |
| R 6 | N-1263 | 10 MEGOHM .5W. 20% | C 12 | | 15 MFD. 150 V. |
| R 7 | N-1377 | 200,000 OHM .5W. 20% | C 13 | N-1346 | .05 MFD. 400 V. |
| R 8 | N-1264 | 500,000 OHM .5W. 20% | | | |
| R 9 | N-1616 | 250 OHM .5W. 10% | | | |
| R 10 | N-1617 | 2500 OHM .5W. 20% | 1 | N-1594 | ANTENNA COIL LOOP |
| R 11 | N-1614 | 50 OHM .5W. 20% | 2 | N-1452 | OSCILLATOR COIL |
| R 12 | N-1618 | 80 OHM 2W. 10% | 3 | N-1598 | 1ST. I.F. TRANSFORMER |
| | | | 4 | N-1596 | 2ND. I.F. TRANSFORMER |
| | | | 5 | N-1585 | 4" P.M. SPEAKER & TRANS. |
| C 1 | N-1344 | .01 MFD. 400 V. | E | N-1597 | 2ND I.F. TRIMMING COND. |
| C 2 | N-1345 | .05 MFD. 200 V. | | | |
| C 3 | | CAPACITY INCLUDED IN OSCILLATOR COIL | | N-1431 | GANG CONDENSER |
| C 4 | N-1345 | .05 MFD. 200 V. | | | |
| C 5 | N-1351 | .1 MFD. 200 V. | | | |
| C 6 | N-1374 | 100 MMFD. | | | |

NOTE: VOLTAGES SHOWN ARE FROM TERMINAL TO CHASSIS BASE. HEATER VOLTAGES ARE A.C. WHEN LINE VOLTAGE IS ALTERNATING.




I.F. 456 KC.

MODEL TSA105

5 TUBE AC-DC
SUPERHETERODYNE
SINGLE BAND

DRN. J.B. APP. 2-25-39

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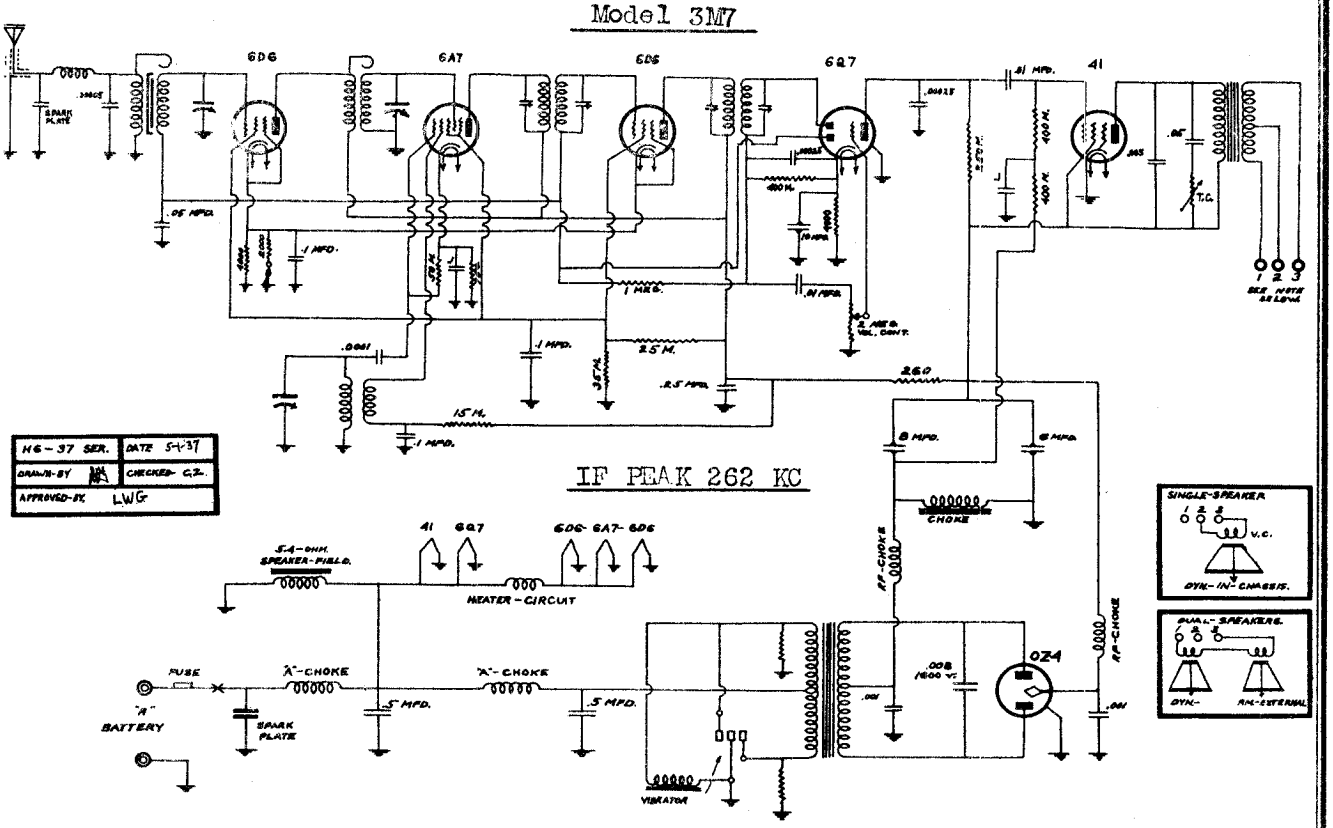
# ZEPHYR RADIO CO.

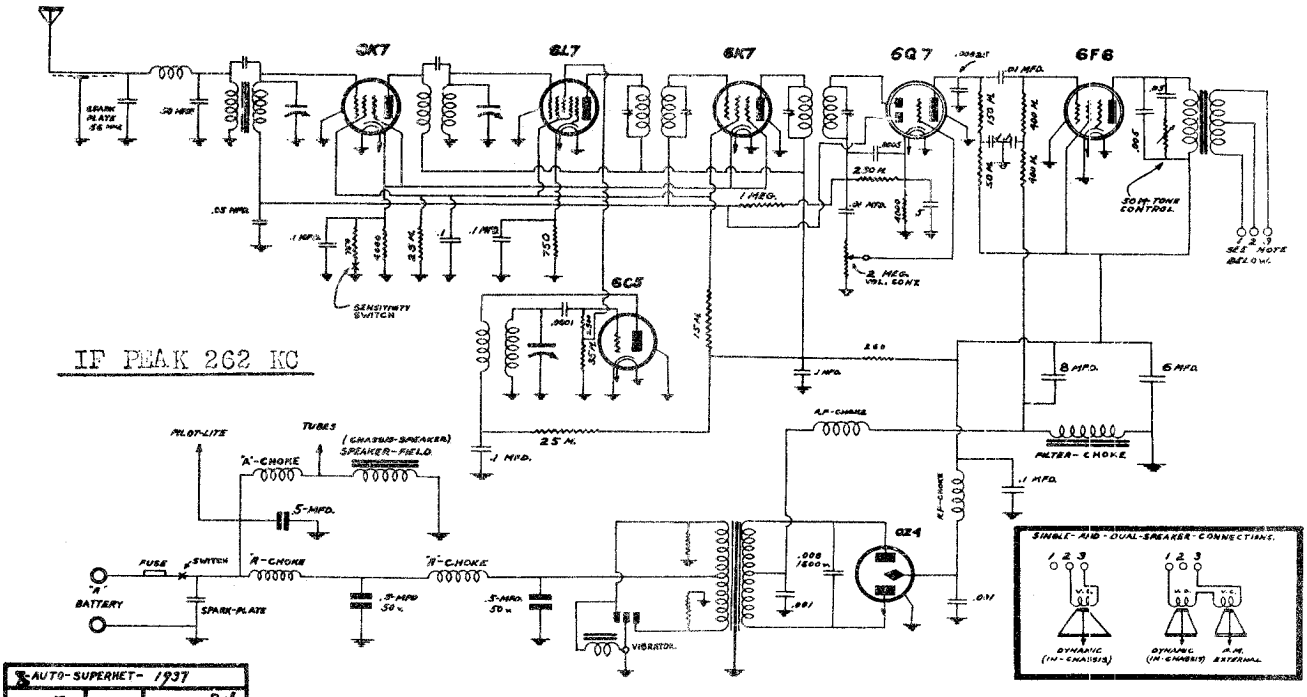
MODEL 3M7
MODEL 3M8
Schematics

## Model 3M7




CONVENTIONAL ALIGNMENT, SEE SPECIAL SECTION VOL. VIII.

## Model 3M8

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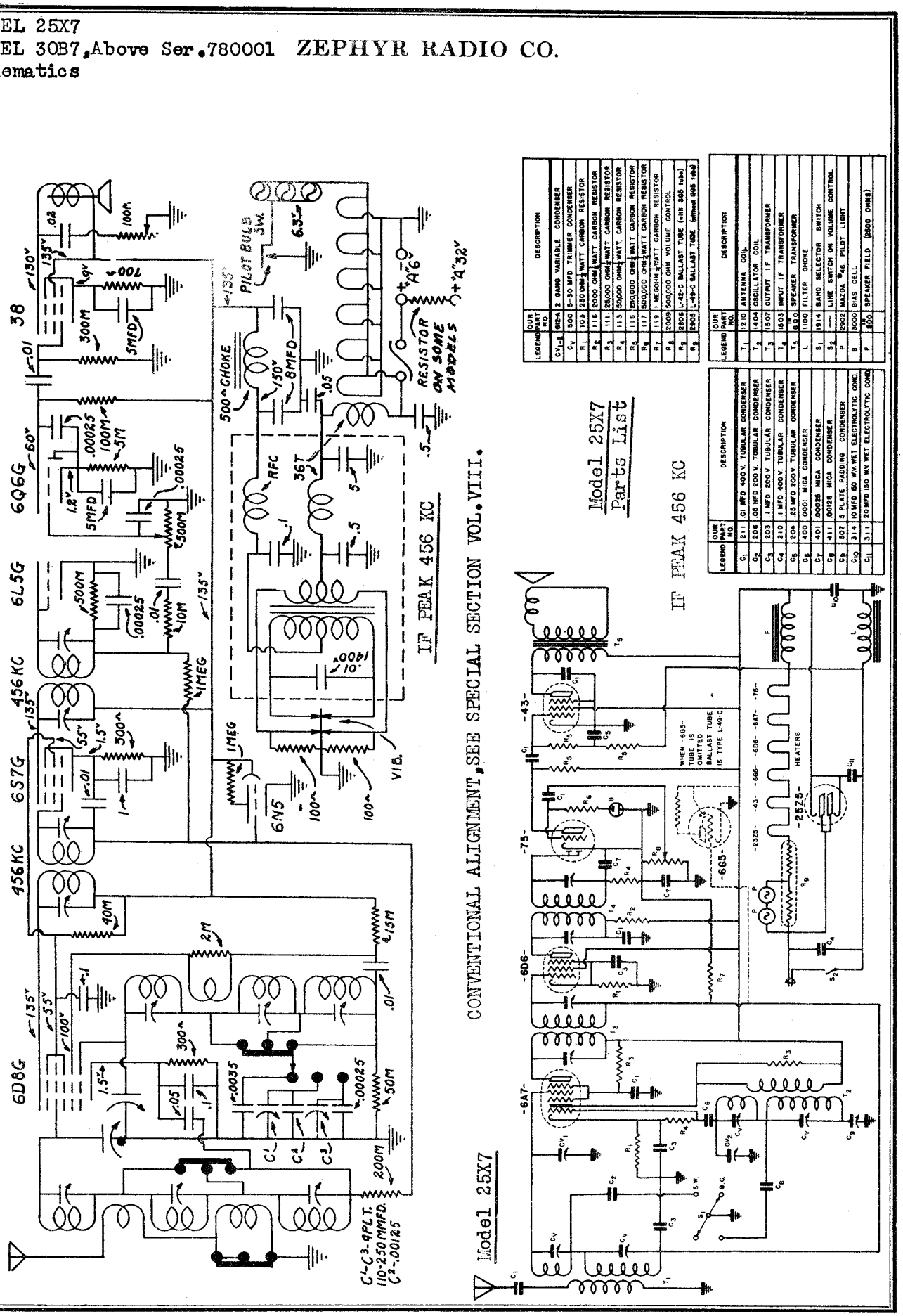
MODEL 25X7
MODEL 30B7, Above Ser. 780001 ZEPHYR RADIO CO.
Schematics




| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $C_{V1-3}$ | 616-2 | 2 GANG VARIABLE CONDENSER |
| $C_V$ | 500 | 5-30 MFD TRIMMER CONDENSER |
| $R_1$ | 103 | 250 OHMS WATT CARBON RESISTOR |
| $R_2$ | 116 | 2000 OHMS WATT CARBON RESISTOR |
| $R_3$ | 111 | 25,000 OHMS WATT CARBON RESISTOR |
| $R_4$ | 113 | 50,000 OHMS WATT CARBON RESISTOR |
| $R_5$ | 116 | 250,000 OHMS WATT CARBON RESISTOR |
| $R_6$ | 117 | 500,000 OHMS WATT CARBON RESISTOR |
| $R_7$ | 119 | 1 MEGOHM WATT CARBON RESISTOR |
| $R_8$ | 2009 | 500,000 OHM VOLUME CONTROL |
| $R_9$ | 2908 | L-42-G BALLAST TUBE (with 665 tube) |
| $R_9$ | 2908 | L-49-G BALLAST TUBE (without 665 tube) |

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $T_1$ | 1210 | ANTENNA COIL |
| $T_2$ | 1404 | OSCILLATOR COIL |
| $T_3$ | 1501 | OUTPUT I.F. TRANSFORMER |
| $T_4$ | 1503 | INPUT I.F. TRANSFORMER |
| $T_5$ | 800 | SPEAKER TRANSFORMER |
| L | 1100 | FILTER CHOKE |
| $S_1$ | 1914 | BAND SELECTOR SWITCH |
| $S_2$ | — | LINE SWITCH ON VOLUME CONTROL |
| P | 2902 | MAZDA #46 PILOT LIGHT |
| B | 3000 | BIAS CELL |
| F | 1R 800 | SPEAKER FIELD (2500 OHMS) |

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $C_1$ | 211 | .01 MFD 400 V. TUBULAR CONDENSER |
| $C_2$ | 208 | .05 MFD 200 V. TUBULAR CONDENSER |
| $C_3$ | 203 | .1 MFD 200 V. TUBULAR CONDENSER |
| $C_4$ | 210 | .1 MFD 400 V. TUBULAR CONDENSER |
| $C_5$ | 204 | .25 MFD 200 V. TUBULAR CONDENSER |
| $C_6$ | 400 | .0001 MICA CONDENSER |
| $C_7$ | 401 | .00025 MICA CONDENSER |
| $C_8$ | 411 | .00128 MICA CONDENSER |
| $C_9$ | 507 | 5 PLATE PADDING CONDENSER |
| $C_{10}$ | 314 | 10 MFD 50 W.V. WET ELECTROLYTIC COND. |
| $C_{11}$ | 311 | 20 MFD 150 W.V. WET ELECTROLYTIC COND. |

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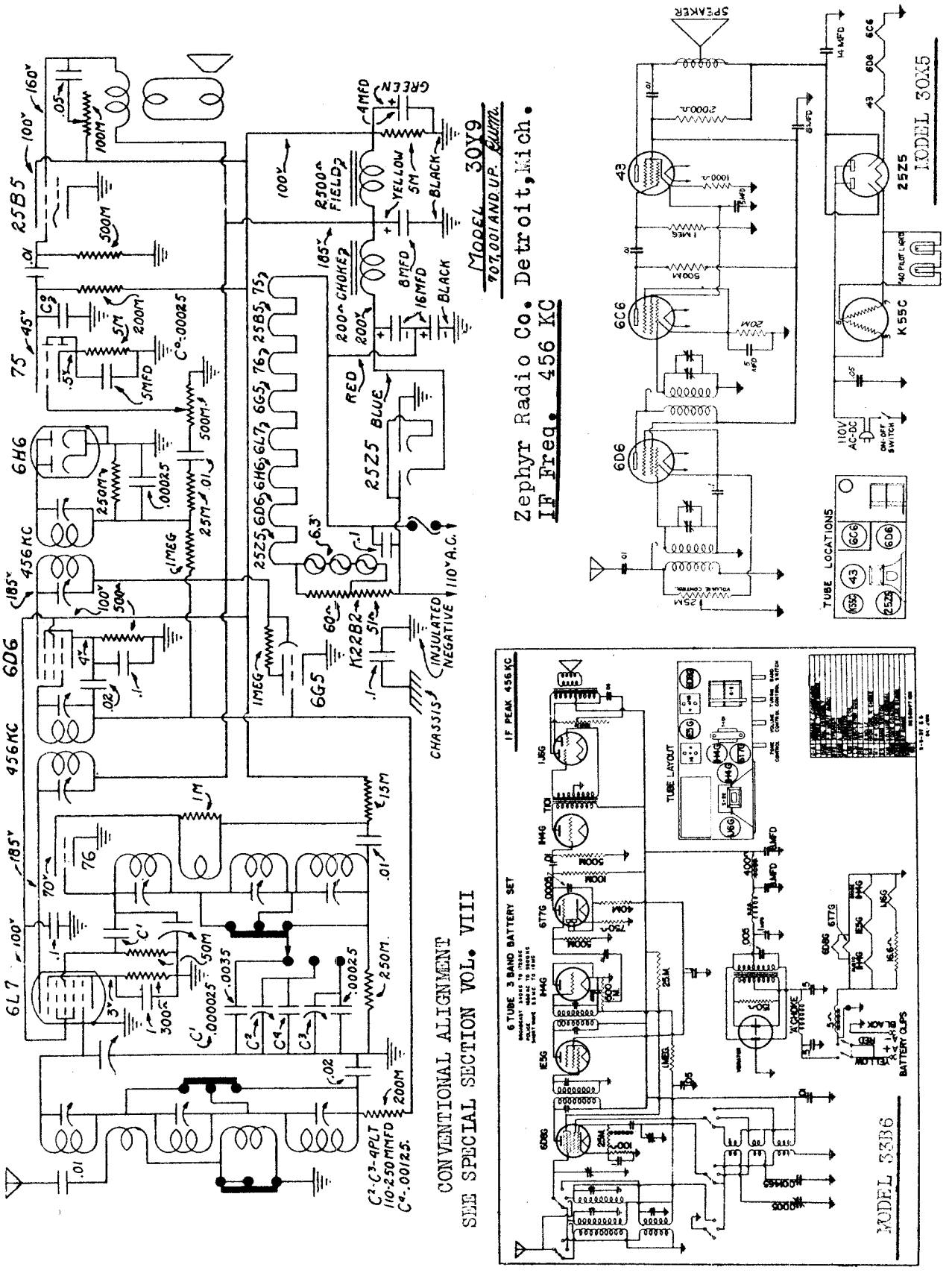
MODEL 33B6
Schematics, Socket

# ZEPHYR RADIO CO.

MODEL 30X5
MODEL 30Y9
Above Ser. 707001

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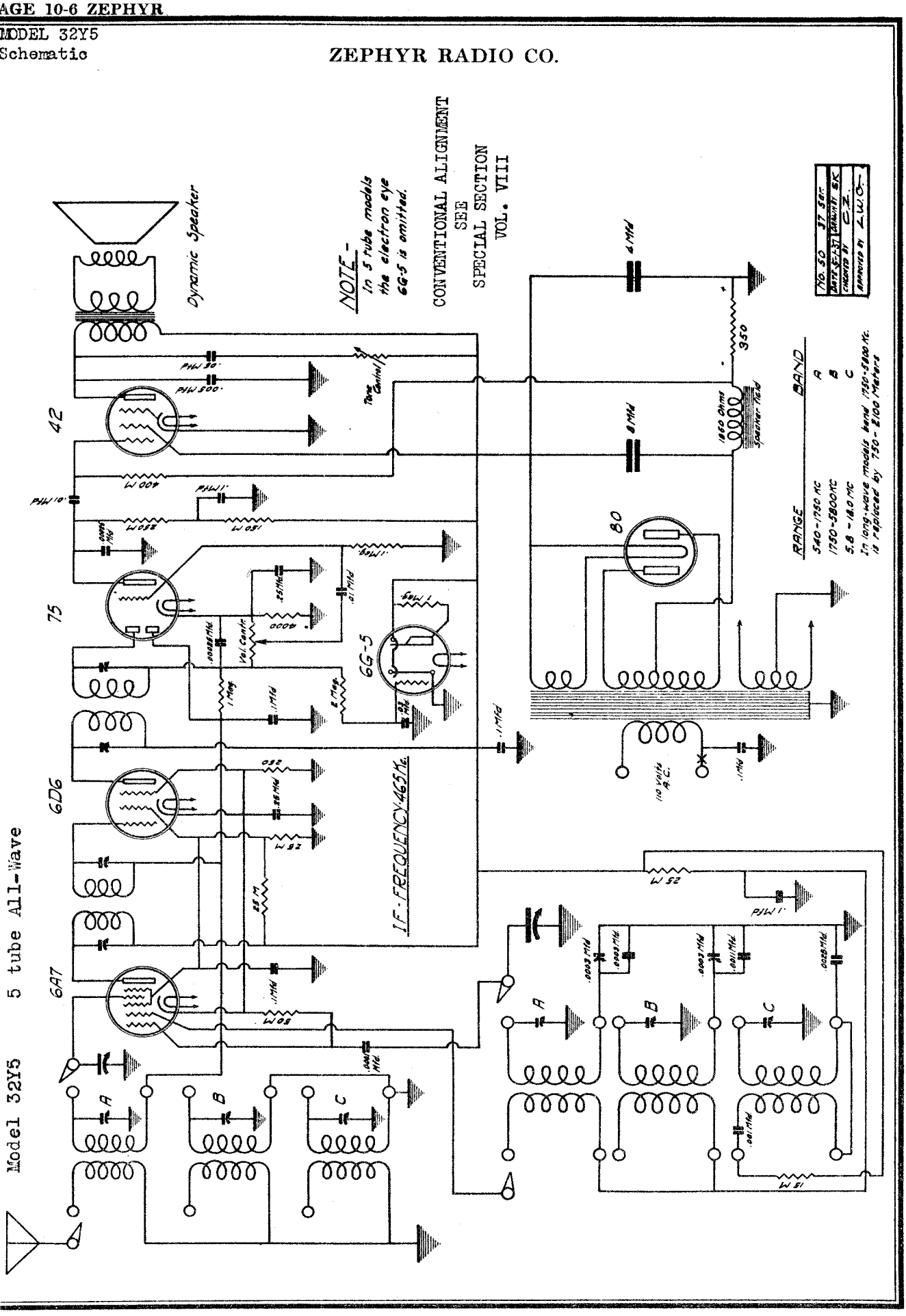
MODEL 32Y5
Schematic

# ZEPHYR RADIO CO.

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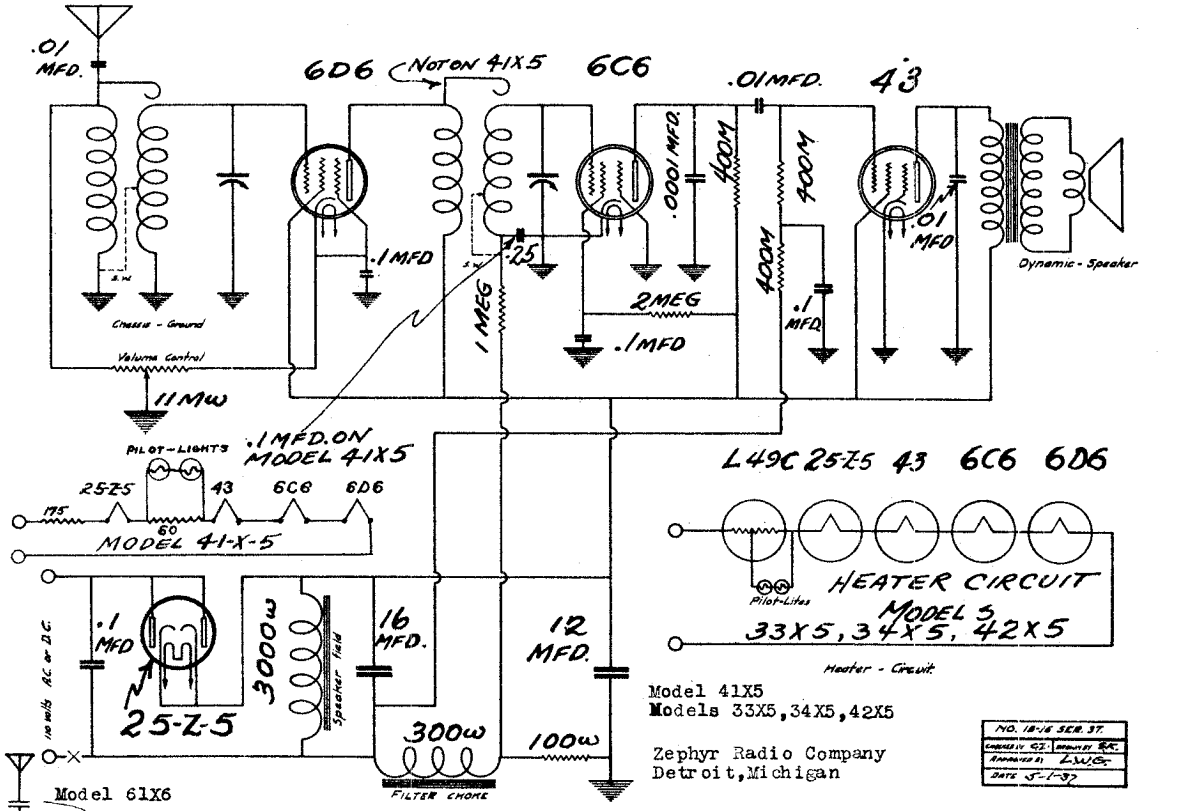
# ZEPHYR RADIO CO.

MODELS 33X5, 34X5, 42X5
MODEL 41X5
MODEL 61X6
Schematics

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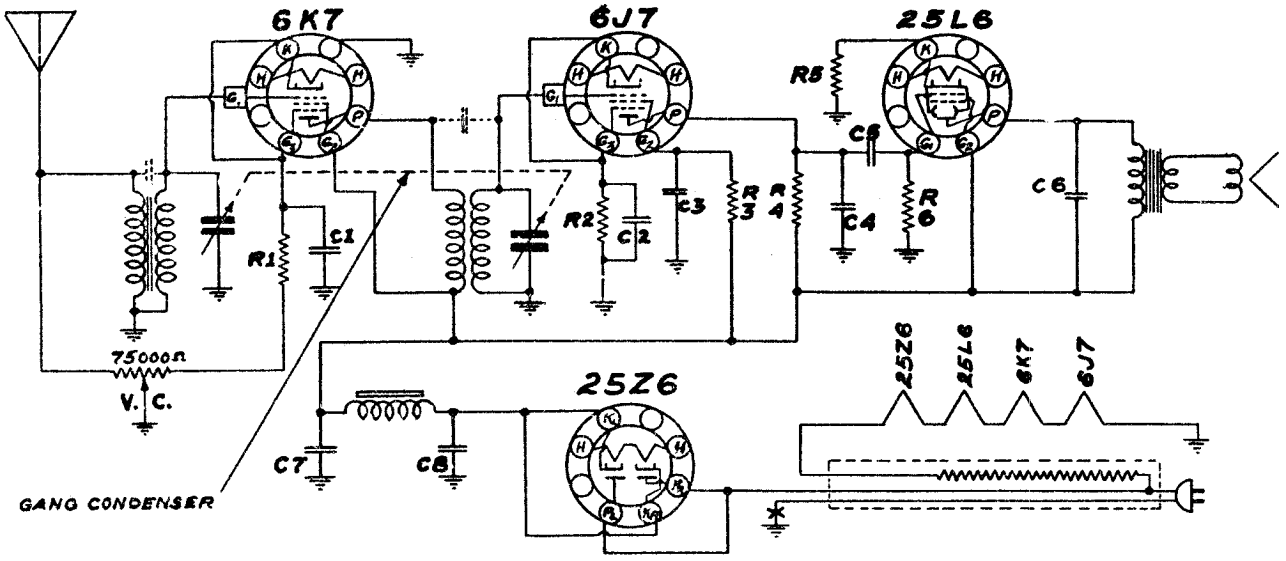
MODEL 39X4
MODEL 39Y6
Schematics

# ZEPHYR RADIO CO.




## CAPACITORS

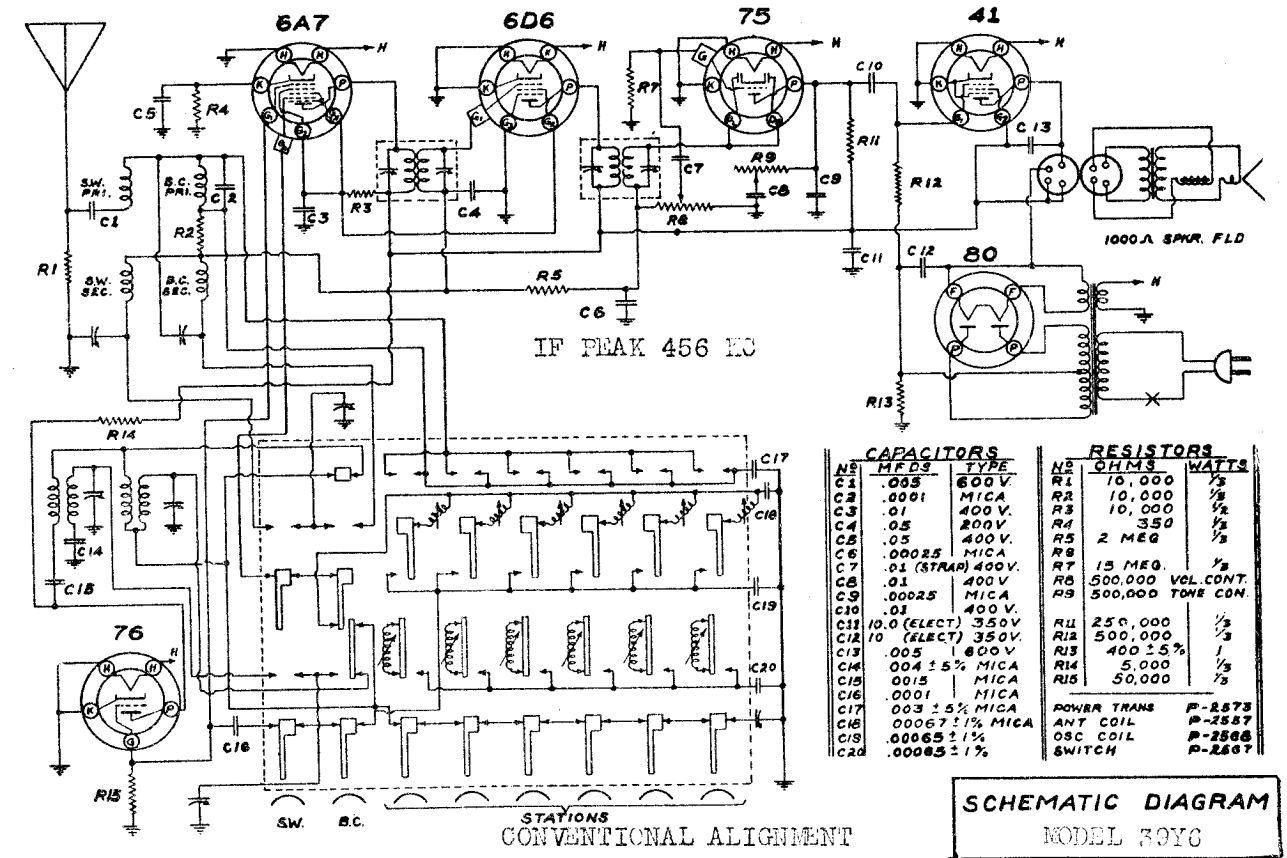
| No | MFD. | TYPE | No | MFD. | TYPE |
|---|---|---|---|---|---|
| C1 | .1 | 200V. | C5 | .01 | 400V. |
| C2 | .25 | 200V. | C6 | .02 | 400V. |
| C3 | .1 | 200V. | C7 | 10.0 | } ELECT. |
| C4 | .00025 | MICA | C8 | 30.0 | } ELECT. |

## RESISTORS

| No | OHMS | WATTS | No | OHMS | WATTS |
|---|---|---|---|---|---|
| R1 | 250 | ¼ | R4 | 500,000 | ¼ |
| R2 | 25,000 | ¼ | R5 | 110 | ½ |
| R3 | 2,000,000 | ¼ | R6 | 500,000 | ¼ |

RESISTANCE OF LINE CORD 173 OHMS

SCHEMATIC DIAGRAM
MODEL 39X4




## CAPACITORS

| No | MFDS | TYPE |
|---|---|---|
| C1 | .005 | 600 V. |
| C2 | .0001 | MICA |
| C3 | .01 | 400 V. |
| C4 | .05 | 200V. |
| C5 | .05 | 400 V. |
| C6 | .00025 | MICA |
| C7 | .01 (STRAP) | 400 V. |
| C8 | .01 | 400 V |
| C9 | .00025 | MICA |
| C10 | .01 | 400 V. |
| C11 | 10.0 (ELECT) | 350 V |
| C12 | 10 (ELECT) | 350 V. |
| C13 | .005 | 600 V |
| C14 | .004 ± 5% | MICA |
| C15 | .0015 | MICA |
| C16 | .0001 | MICA |
| C17 | .003 ± 5% | MICA |
| C18 | .00067 ± 1% | MICA |
| C19 | .00065 ± 1% | |
| C20 | .00085 ± 1% | |

## RESISTORS

| No | OHMS | WATTS |
|---|---|---|
| R1 | 10,000 | ⅓ |
| R2 | 10,000 | ⅓ |
| R3 | 10,000 | ½ |
| R4 | 350 | ⅓ |
| R5 | 2 MEG | ⅓ |
| R6 | | |
| R7 | 15 MEG. | ⅓ |
| R8 | 500,000 | VOL. CONT. |
| R9 | 500,000 | TONE CON. |
| R11 | 250,000 | ⅓ |
| R12 | 500,000 | ⅓ |
| R13 | 400 ± 5% | 1 |
| R14 | 5,000 | ⅓ |
| R15 | 50,000 | ⅓ |

| | |
|---|---|
| POWER TRANS | P-2573 |
| ANT COIL | P-2557 |
| OSC COIL | P-2566 |
| SWITCH | P-2567 |

CONVENTIONAL ALIGNMENT
SEE SPECIAL SECTION VOL. VIII.

SCHEMATIC DIAGRAM
MODEL 39Y6

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MODEL 39Y6
Tuner
MODELS 40Y8, 40Y8C
Alignment, Tuner
Socket, Trimmers

# ZEPHYR RADIO CO.

MODEL 39X4
MODEL 39YP5
Socket, Trimmers




Fig. 1

MODEL 39Y6
MODELS 40Y8, 40Y8C

## PROCEDURE FOR SETTING UP AUTOMATIC PUSH BUTTONS

A glance at Fig. 1 will show that there are eight (8) push buttons, six (6) of which are for automatic use; the adjusting screws are located directly below these.

Fig. 1 also shows the tuning range or frequencies covered by each button.

The remaining two (2) push buttons, located at the extreme left hand end of the push button plate are for tone control.

1. Choose a station having a frequency within the range of button No. 1 (540 K.C. to 980 K.C.)
2. With the middle knob in the "broadcast" position, tune this station conventionally by using the selector knob.
3. Now turn the middle knob to the "automatic" position and press button No. 1 and turn the adjusting screw in either direction until the previously selected station is heard. Adjust the screw for maximum volume and sensitivity.
4. Remove the call letters of the station from the call letter sheet furnished and insert in the window of the adjusting screw. Insert "Med" and "Bass" tabs in windows as shown in Fig. 1.
5. Repeat the above procedure for the remaining five (5) stations.

**NOTE:** It is advisable to retain the call letter sheet in case of station change later on.

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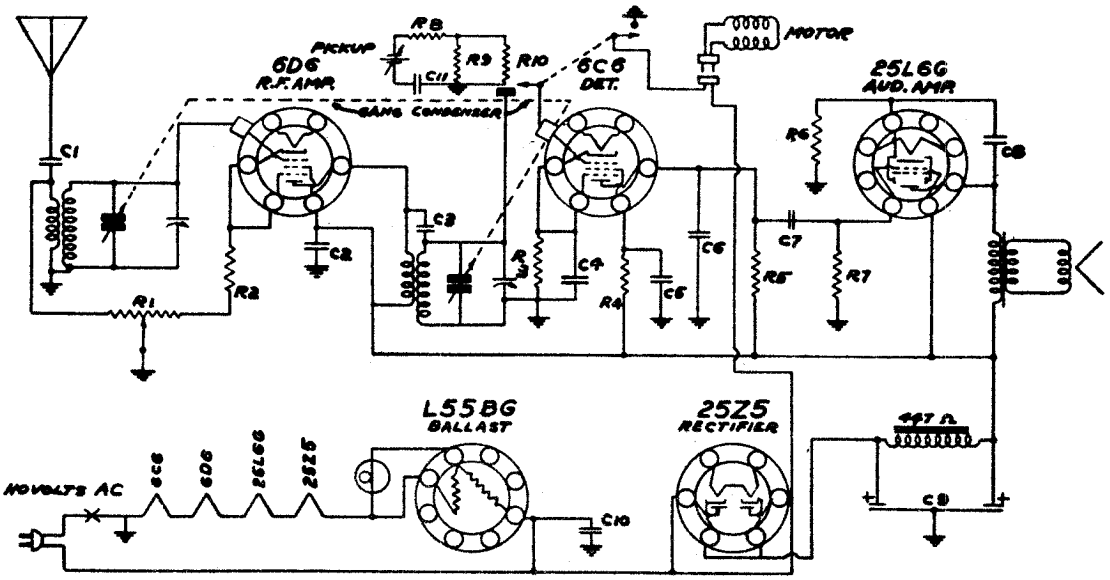
MODEL 39YP5
MODELS 40Y8,40Y8C
Schematics

# ZEPHYR RADIO CO.

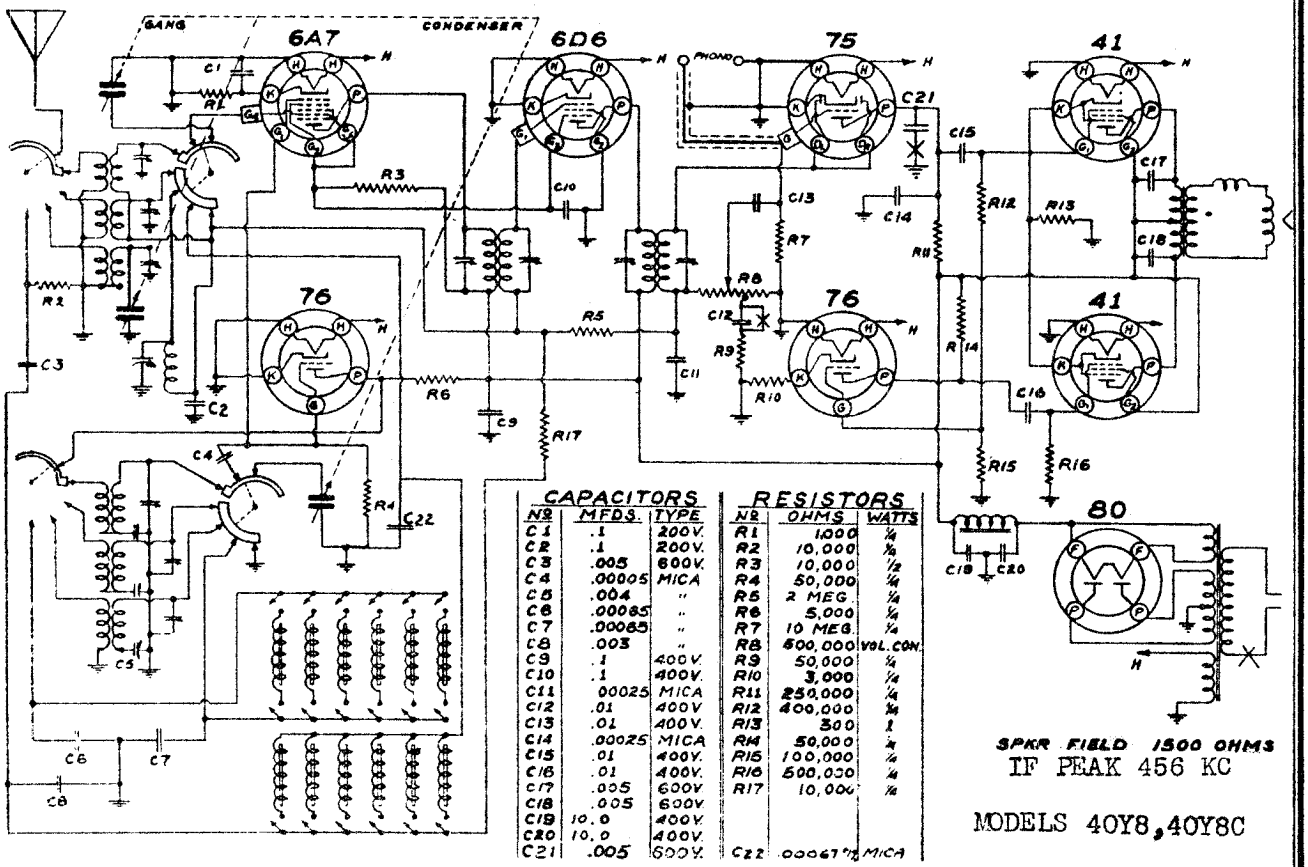



| CONDENSERS | | |
|---|---|---|
| NO | CAPACITY | TYPE |
| C1 | .002 MFD | 400 V. |
| C2 | .1 " | 200 V. |
| C3 | 1.5 uuf. | GIMMIK |
| C4 | .25 MFD | 200 V. |
| C5 | .1 " | 200 V. |
| C6 | .0002 " | 600 V. |
| C7 | .01 " | 400 V. |
| C8 | .02 " | 400 V. |
| C9 | 16-16 " | 150 V. ELECT. |
| C10 | .1 " | 600 V. |
| C11 | .005 " | 600 V. |

| RESISTORS | | | |
|---|---|---|---|
| NO | OHMS | WATTS | |
| R1 | 15,000 | | VOL. CONT. |
| R2 | 250 | ½ | |
| R3 | 25,000 | ½ | |
| R4 | 2,000,000 | ½ | |
| R5 | 500,000 | ½ | |
| R6 | 110 | ½ | WIRE WOUND |
| R7 | 500,000 | ½ | |
| R8 | 1,000,000 | ½ | |
| R9 | 250,000 | ½ | |
| R10 | 500,000 | | PHONO VOL. CONT. |

**PHONO COMBINATION**

MODEL 39YP5




| CAPACITORS | | |
|---|---|---|
| NO | MFDS. | TYPE |
| C1 | .1 | 200 V. |
| C2 | .1 | 200 V. |
| C3 | .005 | 600 V. |
| C4 | .00005 | MICA |
| C5 | .004 | " |
| C6 | .00085 | " |
| C7 | .00065 | " |
| C8 | .003 | " |
| C9 | .1 | 400 V. |
| C10 | .1 | 400 V. |
| C11 | .00025 | MICA |
| C12 | .01 | 400 V |
| C13 | .01 | 400 V. |
| C14 | .00025 | MICA |
| C15 | .01 | 400 V. |
| C16 | .01 | 400 V. |
| C17 | .005 | 600 V |
| C18 | .005 | 600 V |
| C19 | 10.0 | 400 V. |
| C20 | 10.0 | 400 V. |
| C21 | .005 | 600 V. |
| C22 | .00067 | MICA |

| RESISTORS | | |
|---|---|---|
| NO | OHMS | WATTS |
| R1 | 1,000 | ¼ |
| R2 | 10,000 | ½ |
| R3 | 10,000 | ½ |
| R4 | 50,000 | ¼ |
| R5 | 2 MEG. | ¼ |
| R6 | 5,000 | ½ |
| R7 | 10 MEG. | ¼ |
| R8 | 500,000 | VOL. CON. |
| R9 | 50,000 | ½ |
| R10 | 3,000 | ¼ |
| R11 | 250,000 | ¼ |
| R12 | 400,000 | ¼ |
| R13 | 300 | 1 |
| R14 | 50,000 | ¼ |
| R15 | 100,000 | ¼ |
| R16 | 500,000 | ¼ |
| R17 | 10,000 | ½ |

SPKR FIELD 1500 OHMS
IF PEAK 456 KC

MODELS 40Y8,40Y8C

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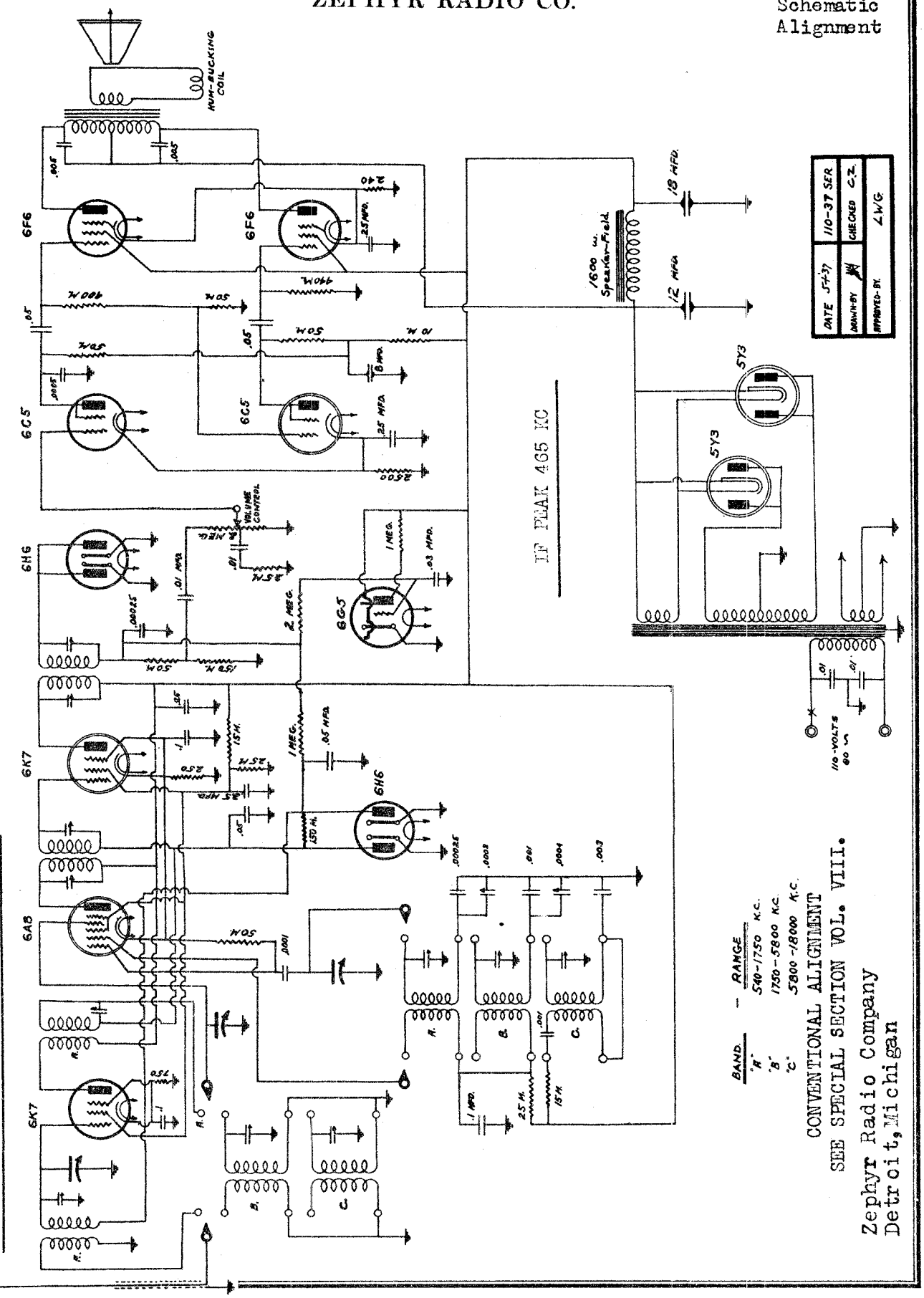
# ZEPHYR RADIO CO.

MODEL 35Y12
Schematic
Alignment




Model 35Y12 12 Tube All-Wave

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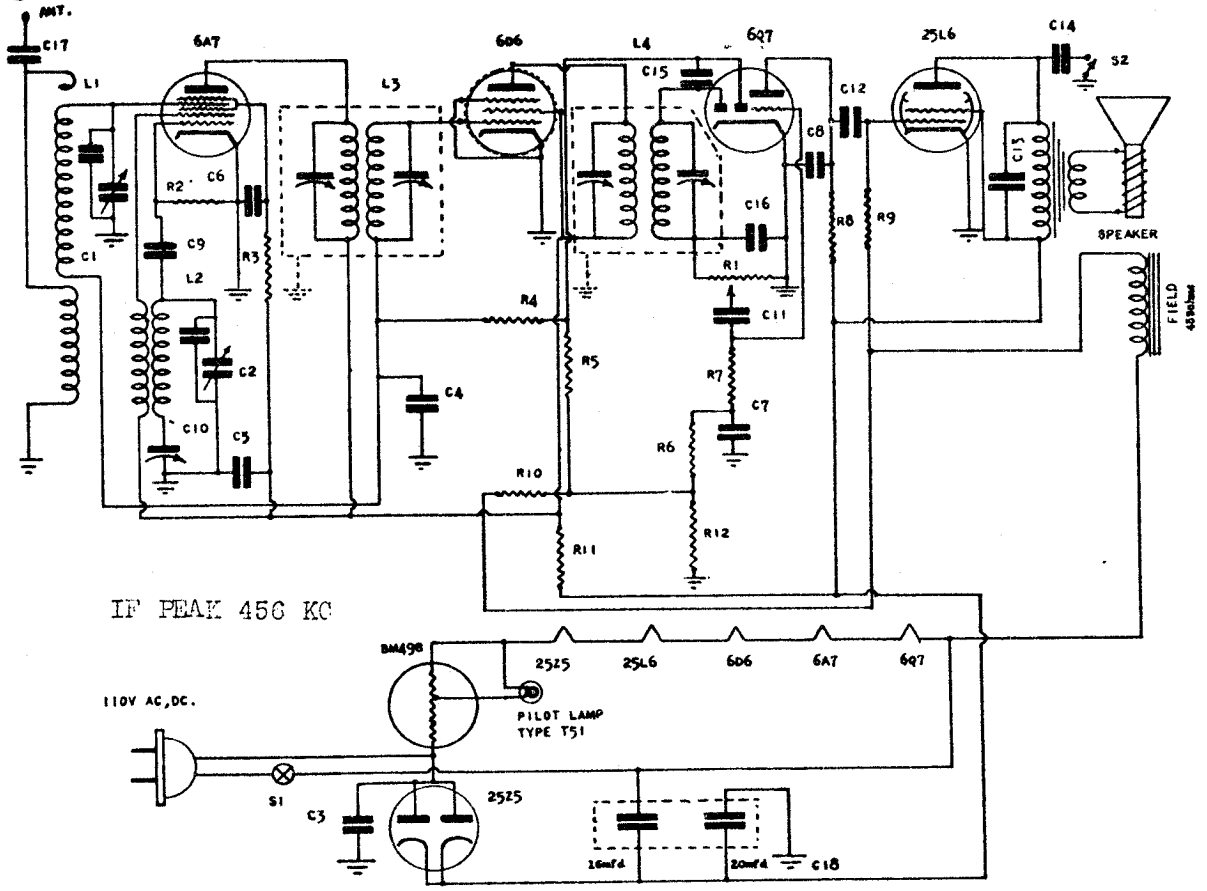
MODEL 41X6
Schematic
Alignment

# ZEPHYR RADIO CO.




## ALIGNMENT PROCEDURE

**I. F. Alignment.** Connect a signal generator set at 456kc to the 6A7 input and connect an output meter to the speaker output. Using a weak signal tune the two I. F. condensers on the first I. F. coil and the two I. F. condensers on the output I. F. coil for maximum response.

**R. F. Alignment.** Connect the signal generator set at 1400kc to the antenna lead using a dummy antenna of 200mmf. Tune the set by means of the dial to 1400kc position. Adjust oscillator trimmer for this frequency. Pad at 600kc. Recheck 1400kc and trim antenna stage for maximum response. Repeating the alignment may result in improved sensitivity.

| SCHEMATIC LOCATION | DESCRIPTION | | PART NO. | LIST PRICE |
|---|---|---|---|---|
| L1 | Antenna Coil | | BA110 | $0.50 |
| L2 | Oscillator Coil | | BO110 | .40 |
| L3 | 1st I.F. Coil | | LC110 | .80 |
| L4 | 2nd I.F. Coil | | LC112 | .80 |
| —— | Speaker | | SD23 | 3.50 |
| C1, C2 | Tuning Condenser | | CV25 | 1.80 |
| C3, C4, C5, C6, C7 | Fixed | " .1mfd—200v | —— | .20 |
| C8, C9, C16 | Mica | " 200mmfd | —— | .20 |
| C15 | Mica | " 100mmfd | —— | .20 |
| C10 | Variable Padder | 550mmfd | —— | .40 |
| C11, C12, C13 | Fixed Condenser | .01mfd—200v | —— | .20 |
| C14 | Fixed | " .02mfd—600v | —— | .20 |
| C17 | Fixed | " .002mfd—600v | —— | .25 |
| C18 | Electrolytic Condenser Block | | CE20 | 1.40 |
| S1 | Line Switch (On Vol. Control) | | —— | —— |
| S2 | Tone Control Switch | | S12 | .40 |
| R1 | Volume Control ¼ megohm | | RV18 | .80 |
| R2 | Resistors | 50,000 ohms—¼ Watt | —— | .15 |
| R3 | " | 25,000 ohms—¼ Watt | —— | .20 |
| R4, R5 | " | 2 megohms—¼ Watt | —— | .15 |
| R6, R7 | " | 1 megohm—¼ Watt | —— | .15 |
| R8, | " | ¼ megohm—¼ Watt | —— | .15 |
| R9 | " | ½ megohm—¼ Watt | —— | .15 |
| R10 | " | 100 ohms—½ Watt | —— | .20 |
| R11 | " | 30 ohms—¼ Watt | —— | .20 |
| R12 | " | 25 ohms—¼ Watt | —— | .20 |

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

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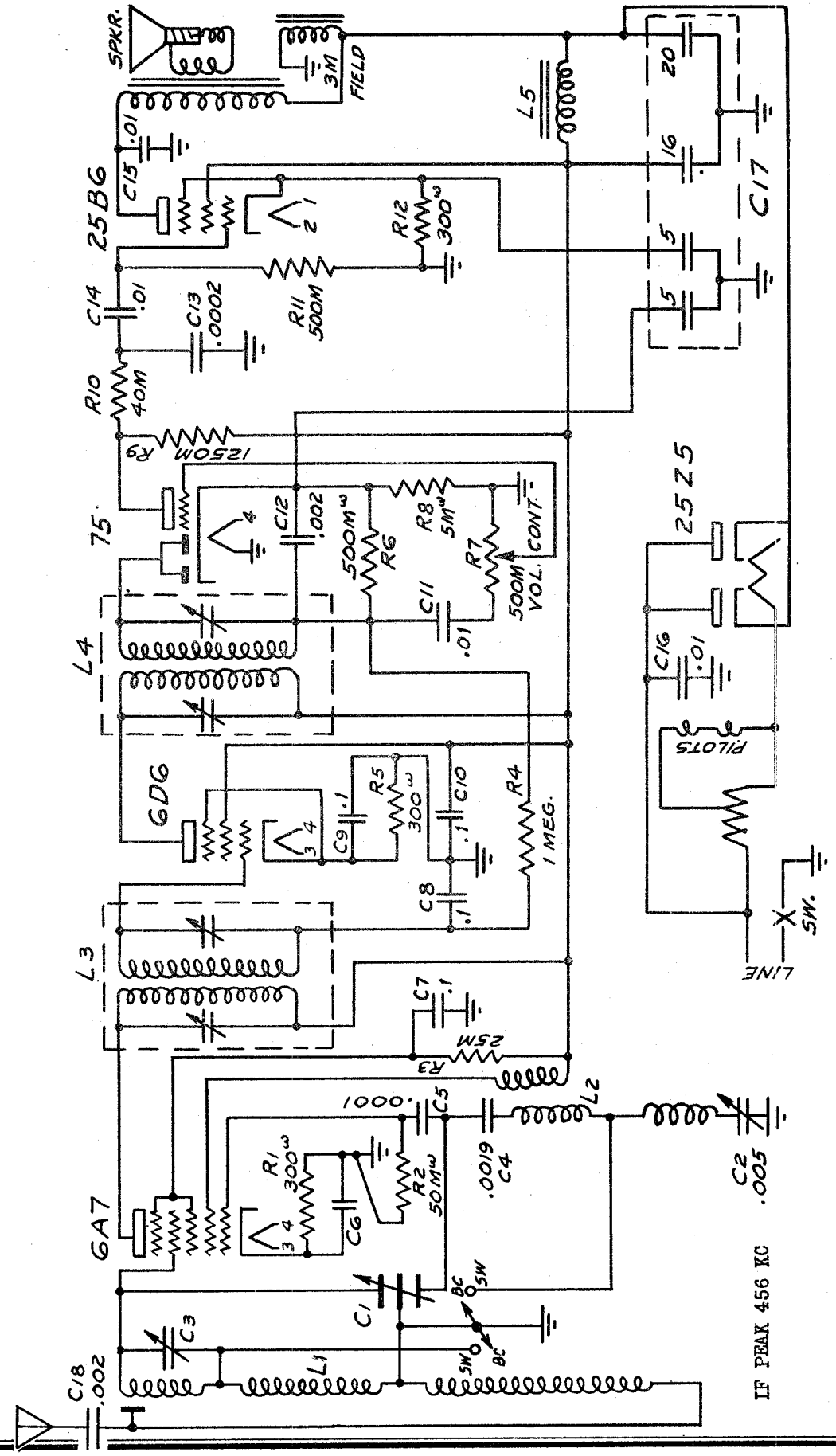
MODEL R6
Schematic

AUTOMATIC RADIO MFG. CO., INC.

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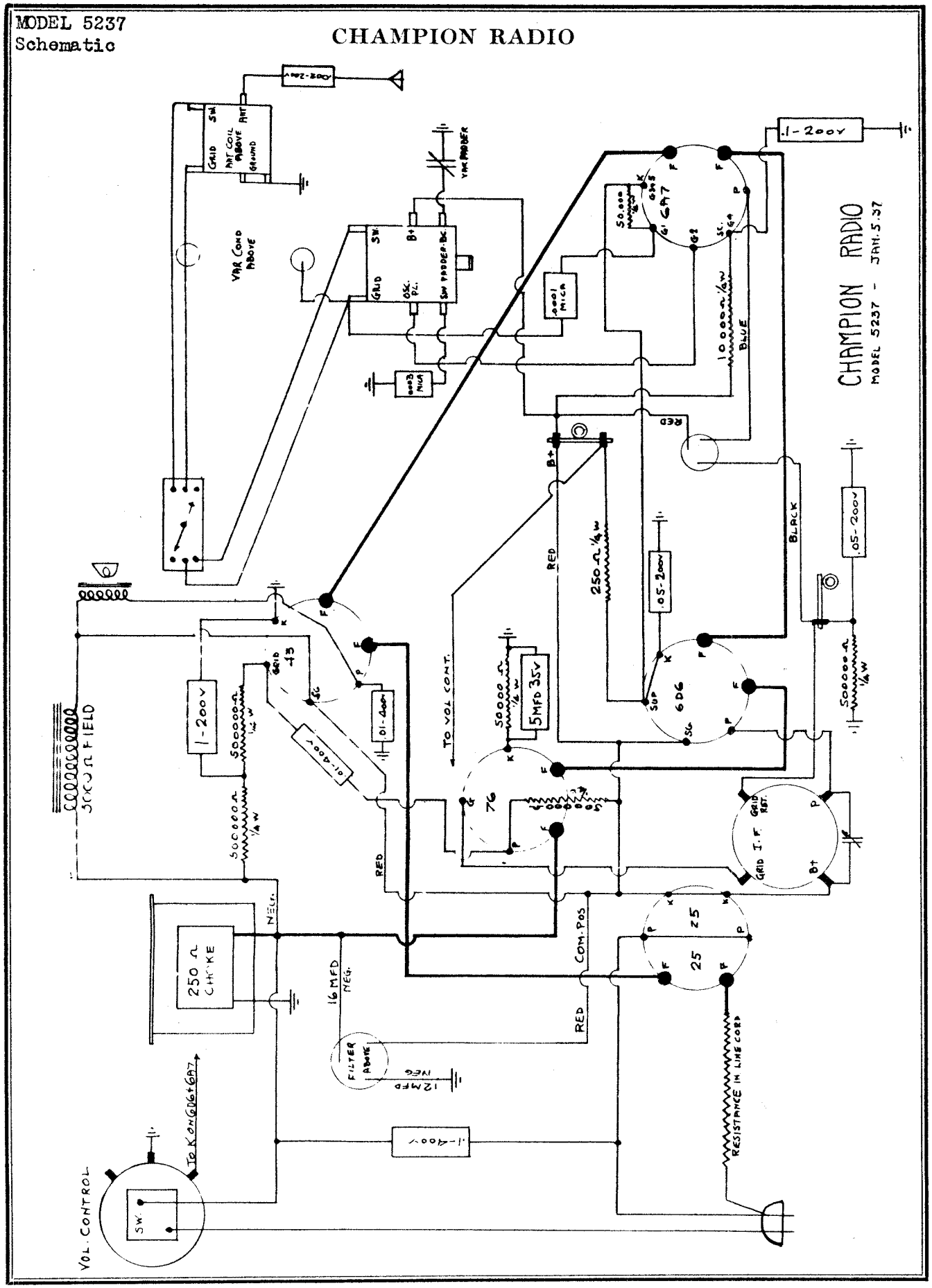
MODEL 5237
Schematic

# CHAMPION RADIO

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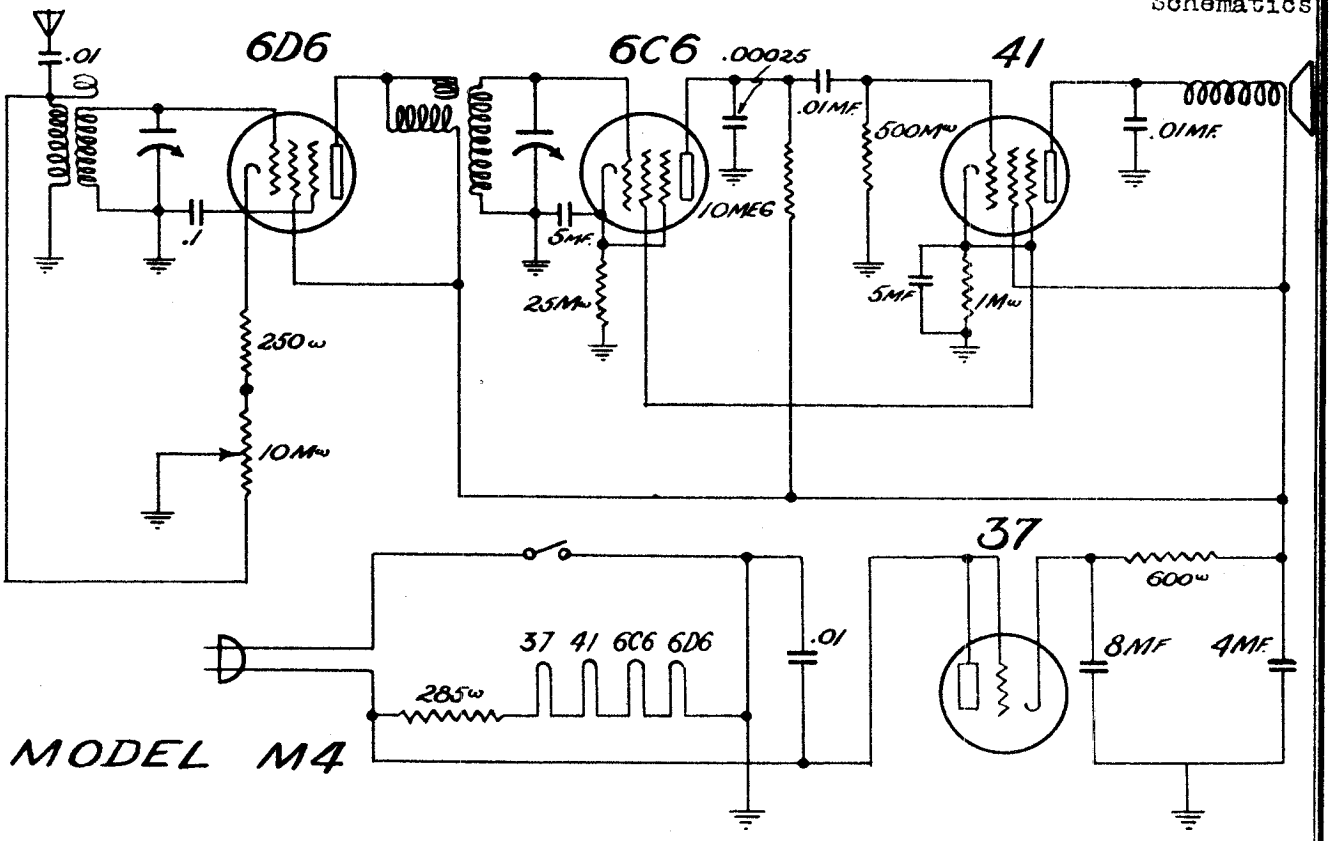
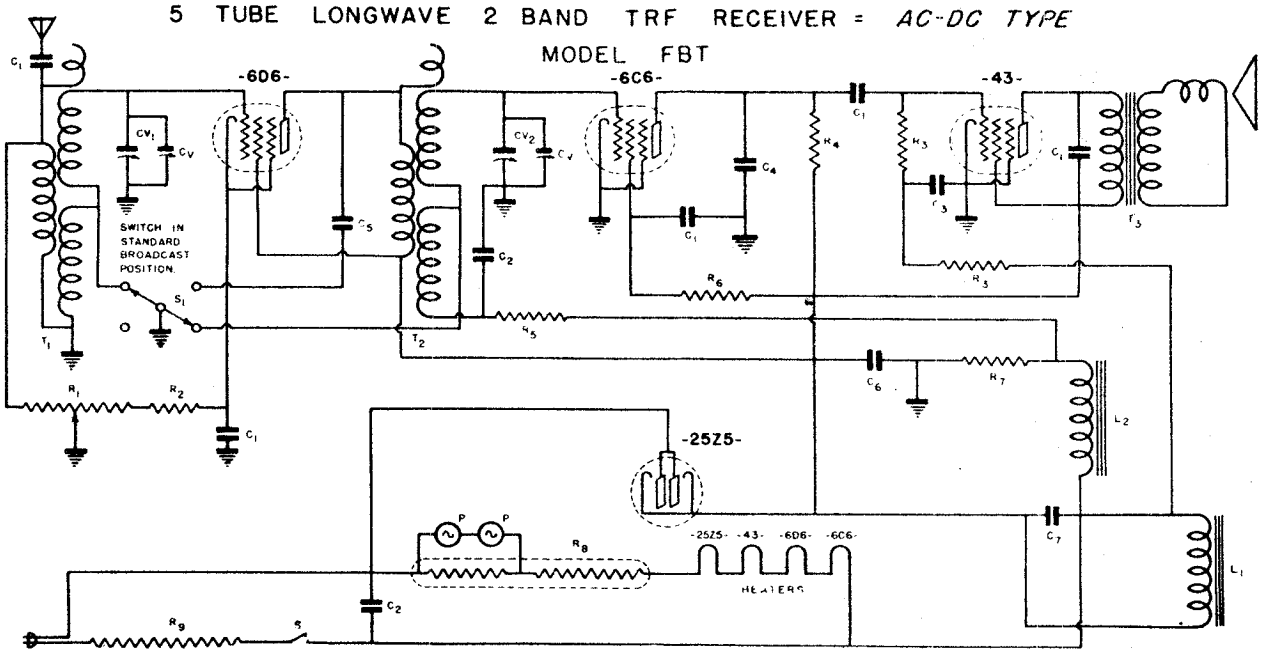
# CLIMAX RADIO & TELEVISION CO., INC.

MODEL FBT
MODEL M4
late
Schematics




## 5 TUBE LONGWAVE 2 BAND TRF RECEIVER = *AC-DC TYPE*

MODEL FBT




| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $C_1$ | 211 | .01 MFD-400 V. TUBULAR CONDENSER |
| $C_2$ | 210 | .1 MFD-400 V. TUBULAR CONDENSER |
| $C_3$ | 204 | .25 MFD-400 V. TUBULAR CONDENSER |
| $C_4$ | 401 | .00025 MICA CONDENSER |
| $C_5$ | 405 | .0004 MICA CONDENSER |
| $C_6$ | 314 | 10 MFD 150 W.V. ELECTROLYTIC COND. |
| $C_7$ | 311 | 20 MFD 150 W.V. ELECTROLYTIC COND. |
| $CV_1$ $CV_2$ | 615 | 2 GANG VARIABLE CONDENSER |
| $C_V$ | OH 613 | VARIABLE CONDENSER TRIMMER |

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $R_1$ | 2006 | 10,000 OHM VOLUME CONTROL |
| $R_2$ | — | 250 OHM (Minimum on Volume Control) |
| $R_3$ | 116 | 250,000 OHM ½ WATT CARBON RESISTOR |
| $R_4$ | 117 | 500,000 OHM ½ WATT CARBON RESISTOR |
| $R_5$ | 119 | 1 MEGOHM ½ WATT CARBON RESISTOR |
| $R_6$ | 120 | 3 MEGOHM ½ WATT CARBON RESISTOR |
| $R_7$ | 139 | 65 OHM ½ WATT CARBON RESISTOR |
| $R_8$ | 2904 | L-55-C BALLAST TUBE |
| | | |

| LEGEND | OUR PART NO. | DESCRIPTION |
|---|---|---|
| $R_9$ | 18 1 | 285 OHM RESISTOR CORD |
| $T_1$ | 1208 | LONG WAVE ANTENNA COIL |
| $T_2$ | 1307 | LONG WAVE R.F. COIL |
| $T_3$ | IN 800 | SPEAKER TRANSFORMER |
| $L_1$ | 1100 | FILTER CHOKE |
| $L_2$ | IN 800 | SPEAKER FIELD (2500 OHMS) |
| $S_1$ | 1914 | BAND SELECTOR SWITCH |
| S | — | SWITCH ON VOLUME CONTROL |
| P | 2902 | MAZDA #46 PILOT LIGHT |

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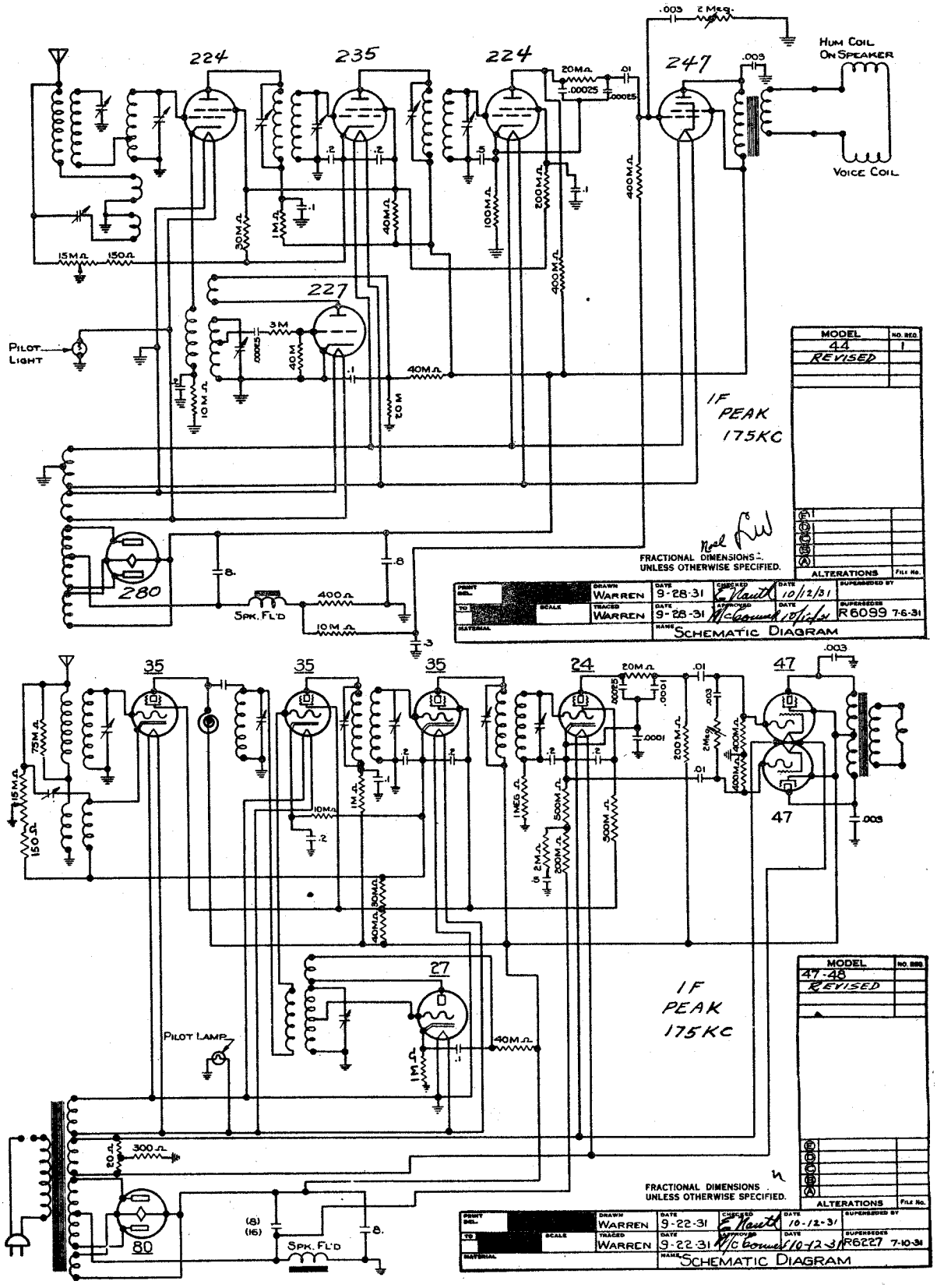
MODEL 44 Revised
MODELS 47,48 Revised
Schematics

# COLONIAL RADIO CORP.

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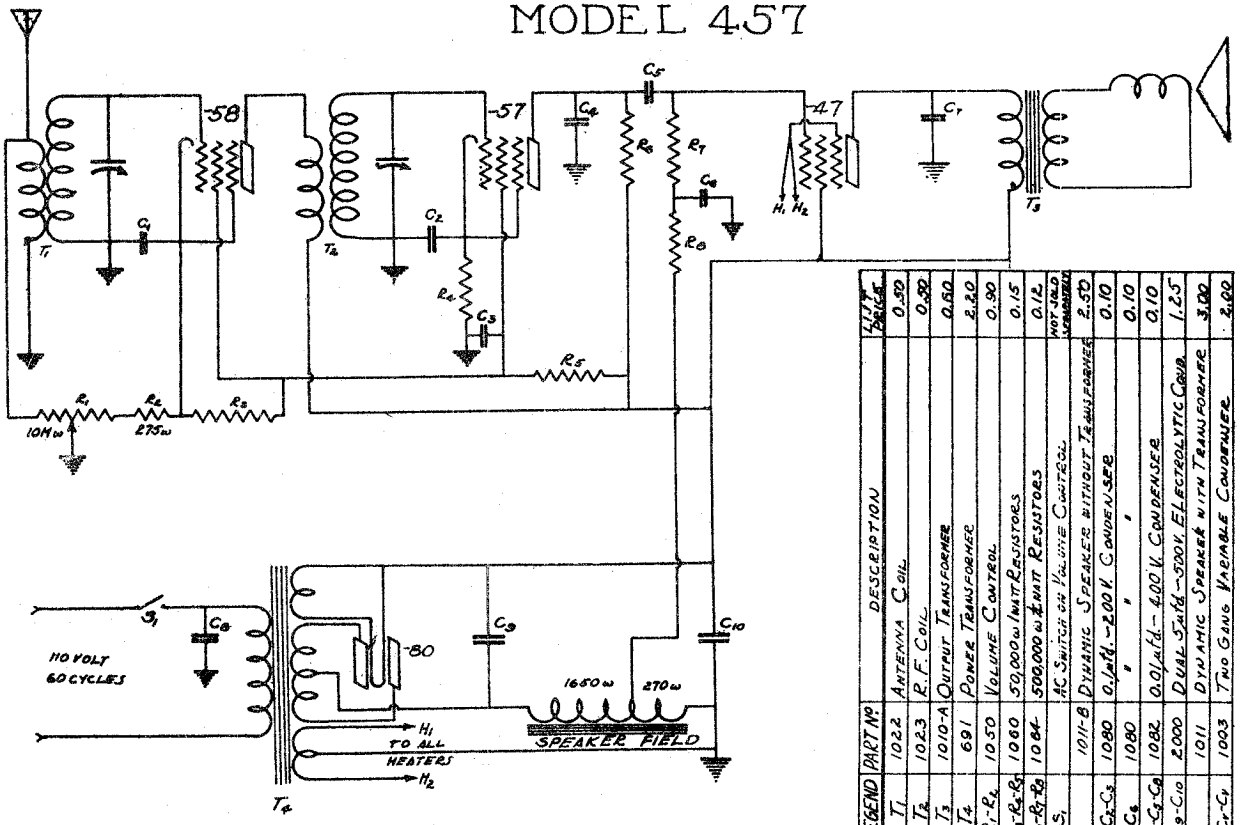
MODEL 457
MODEL 557
Schematics

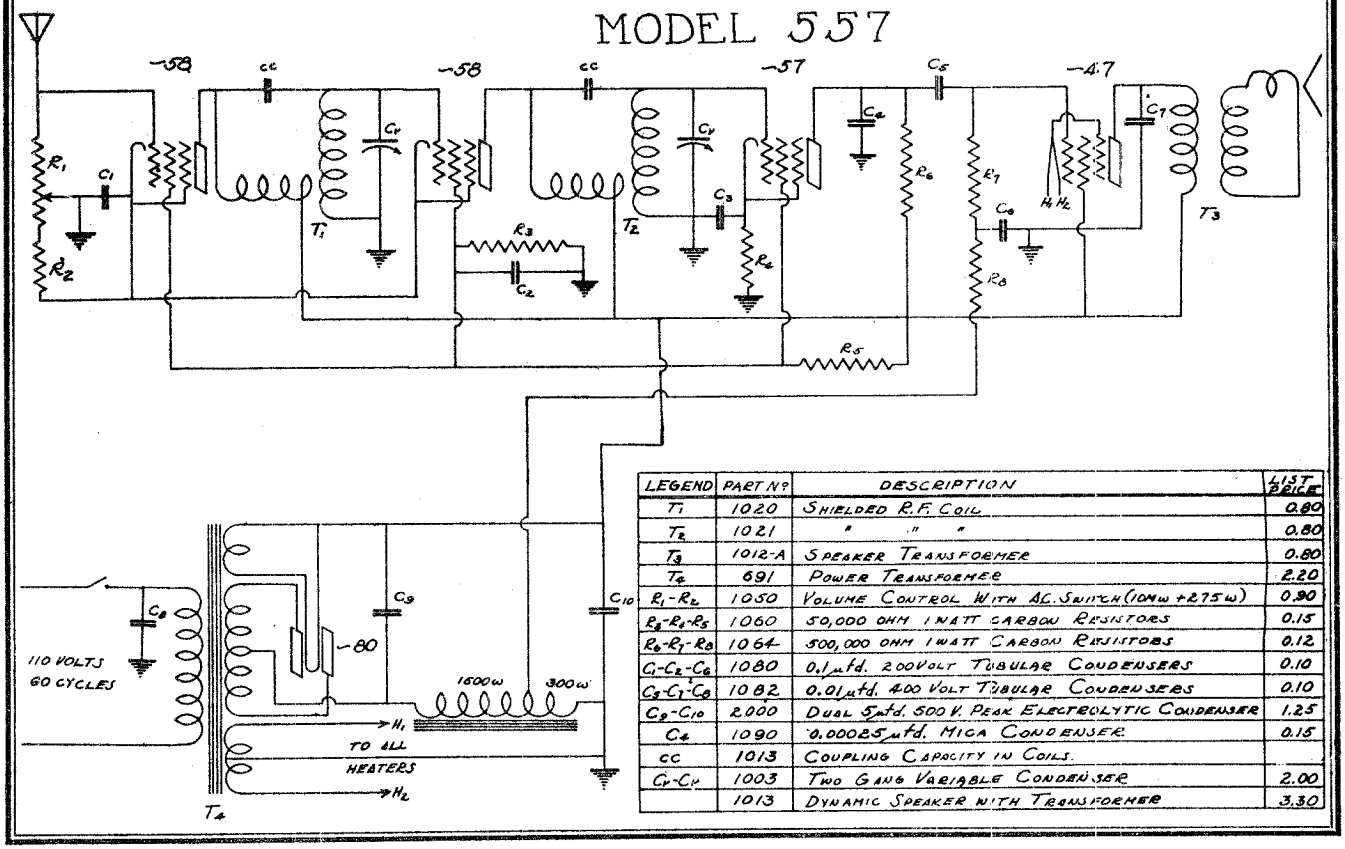
# GENERAL TELEVISION, INC.

## MODEL 457




| LEGEND | PART Nº | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| $T_1$ | 1022 | Antenna Coil | 0.50 |
| $T_2$ | 1023 | R.F. Coil | 0.80 |
| $T_3$ | 1010-A | Output Transformer | 0.60 |
| $T_4$ | 691 | Power Transformer | 2.20 |
| $R_1$-$R_2$ | 1050 | Volume Control | 0.90 |
| $R_3$-$R_4$-$R_5$ | 1060 | 50,000 ω ½ Watt Resistors | 0.15 |
| $R_6$-$R_7$-$R_8$ | 1064 | 500,000 ω ½ Watt Resistors | 0.12 |
| $S_1$ | | AC Switch on Volume Control | NOT SOLD SEPARATELY |
| | 1011-B | Dynamic Speaker without Transformer | 2.50 |
| $C_1$-$C_2$-$C_6$ | 1080 | 0.1 Mfd. - 200 V. Condenser | 0.10 |
| $C_6$ | 1080 | " " " | 0.10 |
| $C_4$-$C_7$-$C_8$ | 1082 | 0.01 Mfd. - 400 V. Condenser | 0.10 |
| $C_9$-$C_{10}$ | 2000 | Dual 5 Mfd. - 350 V. Electrolytic Cond. | 1.25 |
| | 1011 | Dynamic Speaker with Transformer | 3.00 |
| $C_1$-$C_7$ | 1003 | Trio Gang Variable Condenser | 2.00 |

## MODEL 557




| LEGEND | PART Nº | DESCRIPTION | LIST PRICE |
|---|---|---|---|
| $T_1$ | 1020 | Shielded R.F. Coil | 0.80 |
| $T_2$ | 1021 | " " " | 0.80 |
| $T_3$ | 1012-A | Speaker Transformer | 0.80 |
| $T_4$ | 691 | Power Transformer | 2.20 |
| $R_1$-$R_2$ | 1050 | Volume Control With AC Switch (10MΩ + 275Ω) | 0.90 |
| $R_3$-$R_4$-$R_5$ | 1060 | 50,000 ohm 1 watt carbon Resistors | 0.15 |
| $R_6$-$R_7$-$R_8$ | 1064 | 500,000 ohm 1 watt carbon Resistors | 0.12 |
| $C_1$-$C_2$-$C_6$ | 1080 | 0.1 mfd. 200 Volt Tubular Condensers | 0.10 |
| $C_3$-$C_7$-$C_8$ | 1082 | 0.01 mfd. 400 Volt Tubular Condensers | 0.10 |
| $C_9$-$C_{10}$ | 2000 | Dual 5 mfd. 500 V. Peak Electrolytic Condenser | 1.25 |
| $C_4$ | 1090 | 0.00025 mfd. Mica Condenser | 0.15 |
| CC | 1013 | Coupling Capacity in Coils. | |
| $C_1$-$C_7$ | 1003 | Two Gang Variable Condenser | 2.00 |
| | 1013 | Dynamic Speaker with Transformer | 3.30 |

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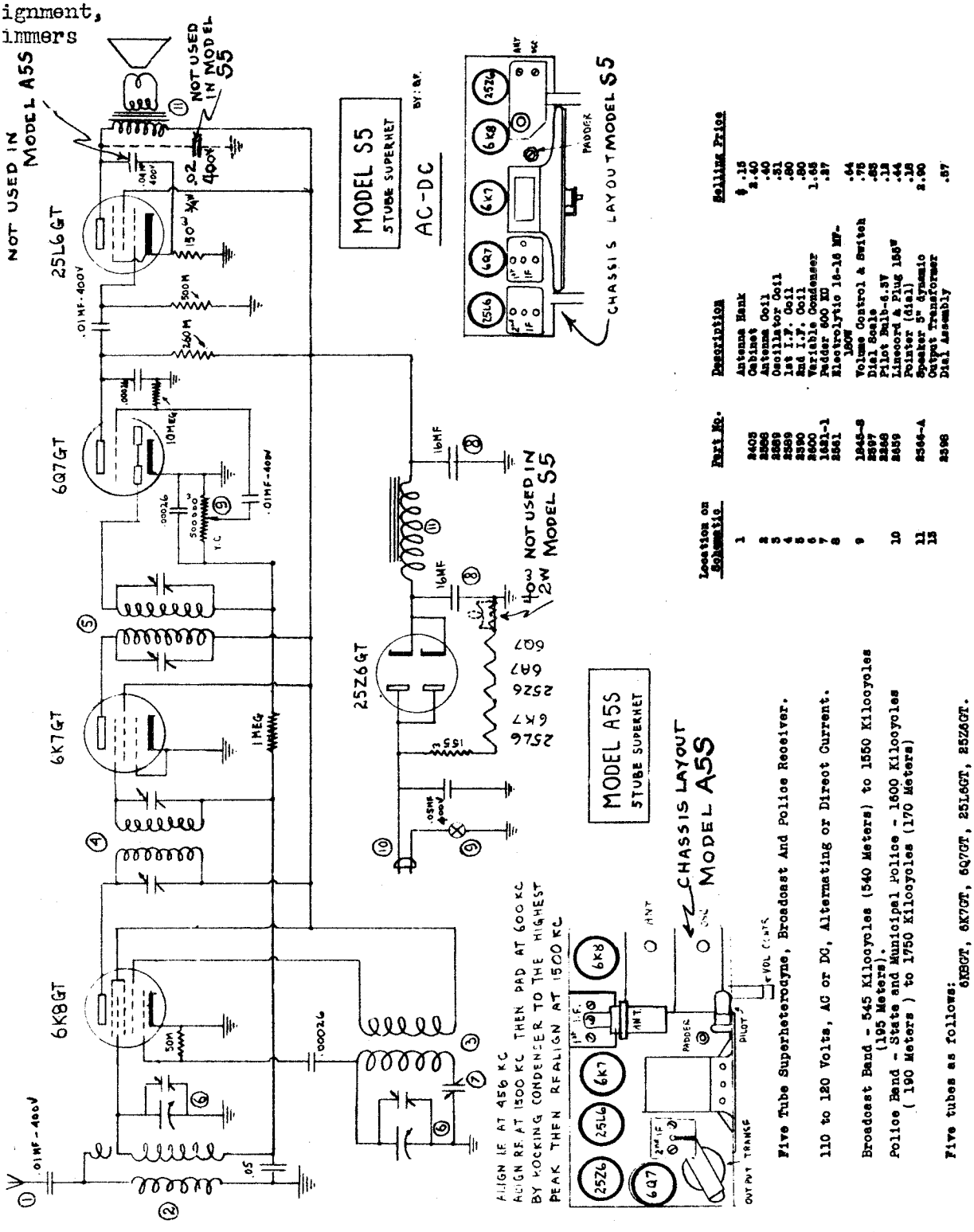
MODELS A5S, S5
Schematic, Socket
Alignment,
Trimmers

# HALSON RADIO & TELEVISION, INC.




| Location on Schematic | Part No. | Description | Selling Price |
|---|---|---|---|
| 1 | | Antenna Mank | $ .15 |
| 2 | 2405 | Cabinet | 2.40 |
| 3 | 2566 | Antenna Coil | .40 |
| 4 | 2569 | Oscillator Coil | .51 |
| 5 | 2589 | 1st I.F. Coil | .80 |
| 6 | 2590 | 2nd I.F. Coil | .80 |
| 7 | 2600 | Variable Condenser | 1.45 |
| 8 | 1431-1 | Padder 600 MU | .87 |
| 8 | 2561 | Electrolytic 16-16 MF-150V | .64 |
| 9 | 1845-S | Volume Control & Switch | .76 |
| | 2597 | Dial Scale | .85 |
| | 2568 | Pilot Bulb-6.3V | .13 |
| | 2459 | Linecord & Plug 125V | .44 |
| 10 | | Pointer (dial) | .15 |
| | 2564-A | Speaker 5" dynamic | 2.90 |
| 11 | | Output Transformer | |
| 12 | 2598 | Dial Assembly | .87 |

Five Tube Superheterodyne, Broadcast And Police Receiver.

**LINE VOLTAGE** 110 to 120 Volts, AC or DC, Alternating or Direct Current.

**TUNING RANGES** Broadcast Band - 545 Kilocycles (540 Meters) to 1550 Kilocycles (195 Meters).
Police Band - State and Municipal Police - 1600 Kilocycles (190 Meters) to 1750 Kilocycles (170 Meters)

**TUBES** Five tubes as follows:
6K8GT, 6K7GT, 6Q7GT, 25L6GT, 25Z6GT.

**ANTENNA**

The antenna built into this set will perform with best results in most localities. However, in localities more than 100 miles from a broadcasting station an outdoor antenna of 50 to 75 feet attached to the end of the built-in antenna will be sufficient to give the best performance. THIS RECEIVER WAS DESIGNED TO OPERATE WITHOUT A GROUND. UNDER NO CIRCUMSTANCES SHOULD A GROUND WIRE BE PERMITTED TO COME IN CONTACT WITH ANY METAL PART OF THIS RECEIVER.

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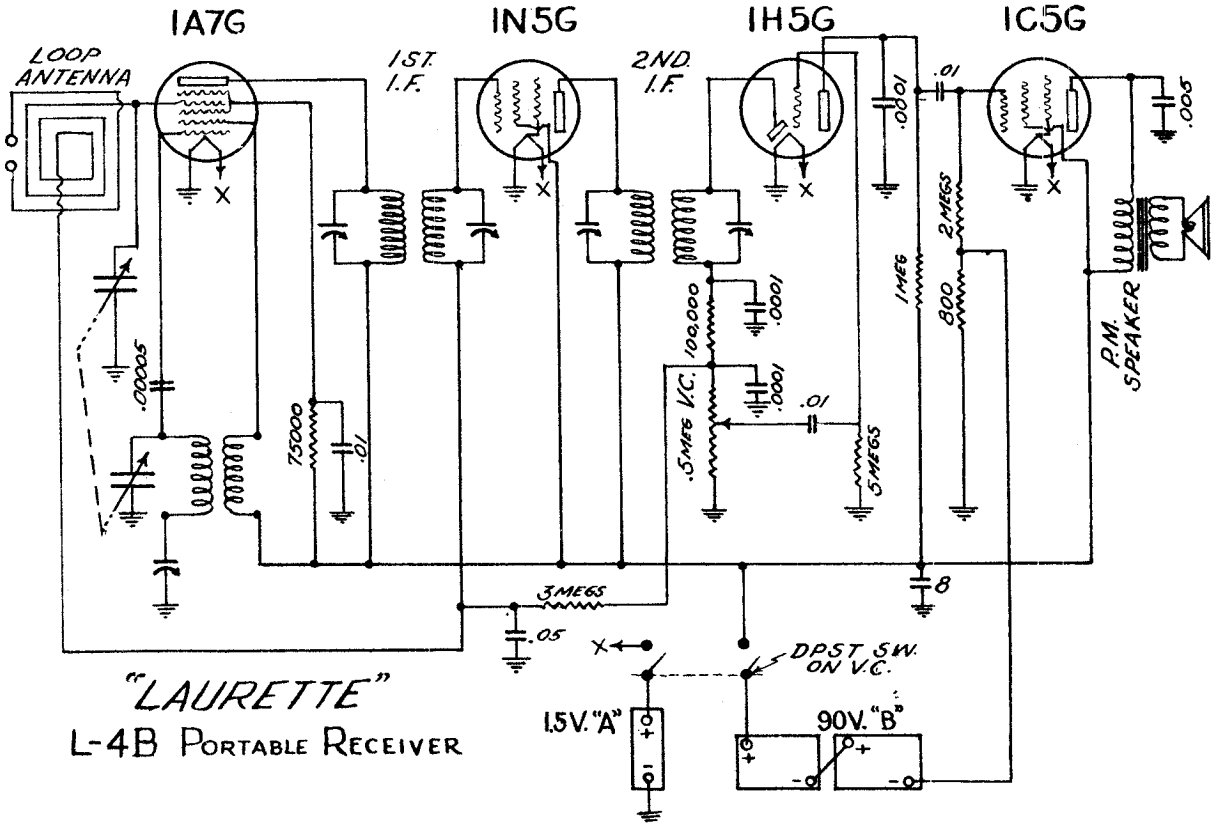
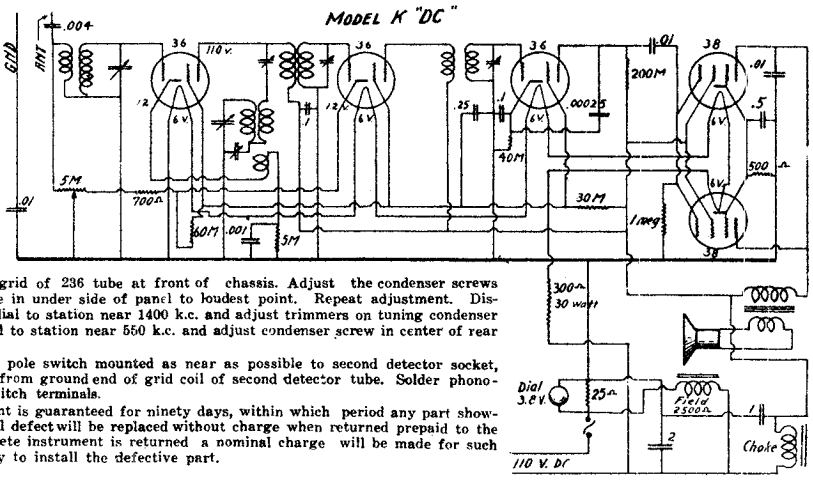
# LAUREHK MFG. CO.
# SIMPLEX RADIO CO.

MODEL L-4B Laurette
MODEL K D-C
Schematics




SIMPLEX

MODEL K "DC"




**CAUTION**: *DO NOT ATTEMPT TO OPERATE ON CURRENT OTHER THAN THAT NOTED ON INSTRUMENT. IF RECEIVER DOES NOT START WORKING IN ABOUT ONE MINUTE AFTER BEING TURNED ON REVERSE ATTACHMENT PLUG.*

**INSTALLATION**: "Ant" lead may be fed from indoor or outdoor aerial, radiator, bed springs or any large metal object, if desired.

**BALANCING**: Attach output of 175 k.c. oscillator to grid of 236 tube at front of chassis. Adjust the condenser screws in top of tall can and one in under side of panel to loudest point. Repeat adjustment. Disconnect oscillator. Turn dial to station near 1400 k.c. and adjust trimmers on tuning condenser to loudest signal. Turn dial to station near 550 k.c. and adjust condenser screw in center of rear flange to loudest point.

**PHONOGRAPH**: Use a single pole switch mounted as near as possible to second detector socket, connect in series with lead from ground end of grid coil of second detector tube. Solder phonograph pickup leads to switch terminals.

**GUARANTEE**: This instrument is guaranteed for ninety days, within which period any part showing electrical or mechanical defect will be replaced without charge when returned prepaid to the factory, but if the complete instrument is returned a nominal charge will be made for such labor as may be necessary to install the defective part.

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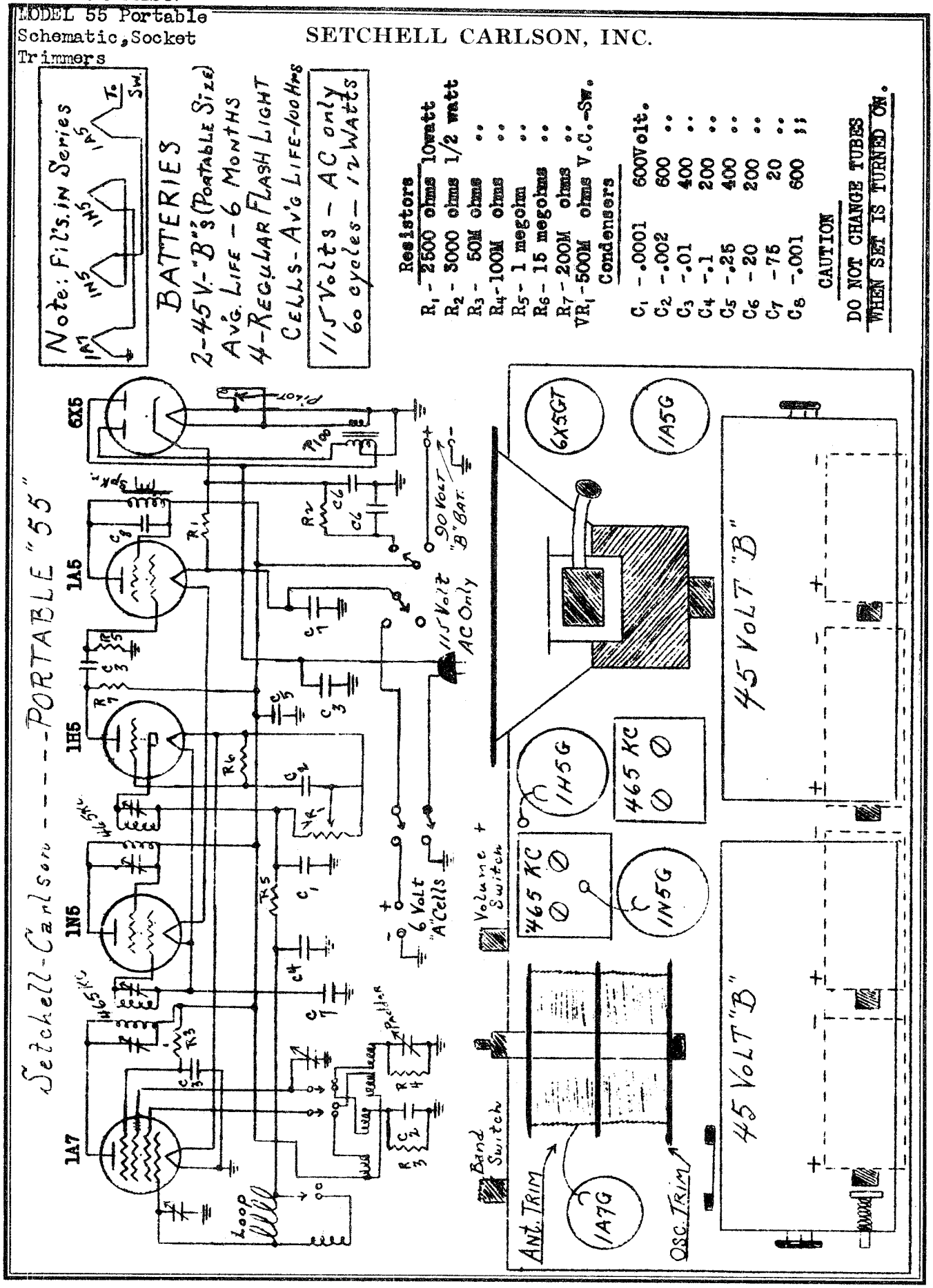
MODEL 55 Portable
Schematic, Socket
Trimmers

SETCHELL CARLSON, INC.

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### Arvin 618, 618A, etc.

In order to eliminate the hum in the chassis used in these and other six-tube models, follow this procedure:

Remove the chassis from the cabinet. Locate the ground lug on the 6Q7G tube socket (see chassis layout on *page 8-16 of Rider's Volume VIII*). This lug is fastened to the chassis by a rivet which attaches the 6Q7G socket to the chassis. Bend this lug over and *solder it to the chassis* and then recheck for hum. If this is soldered correctly, the hum level should be brought to a minimum.

### Pilot X114, X115

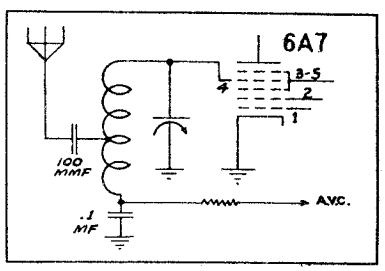
Changes have been made in the chassis used in these models, which have a similar schematic to the one shown on *page 6-15 in Rider's Volume VI*. The condensers C32 and C33 in the plate circuit of the second detector have been removed from the circuit, so that now the switch S3 is used to short out only the one condenser, C34, which now has a value of 250 mmf.

The value of the 10,000-ohm resistor No. 26 has been changed to 6,000 ohms. This is in the primary circuit of the pushpull input transformer.

A line condenser (1000-volt, paper) has been added across the primary of the power transformer. This is a dual condenser, grounded between the 0.01-0.01 mf sections.

### Automatic 960A

The accompanying partial schematic shows a change which was incorporated in the 960 series, the schematic of which is shown on *page 9-2 in Rider's Volume IX*. Note also that the receivers in which this change has been made have an i-f peak of 480 kc, instead of 456 kc and that they are identified by the letter "A" after the model number.




New antenna circuit of the Automatic 960 A Series.

### Arvin 818, 828, etc.

In order to reduce the hum level of the models in which the 8-tube chassis is used, follow this procedure:

Remove the chassis from the cabinet. Unsolder the 250,000-ohm plate resistor of the 6F5G tube from the B+ terminal, which is the lug on the 16-mf—300 volt electrolytic condenser. See chassis layout on *page 8-20 of Rider's Volume VIII*. Connect this resistor to the first tap down from B+ on the voltage divider resistor R87. This voltage tap supplies the potential for the 6A8G anode grid. Recheck for hum, which now should be reduced to a satisfactory level.

### Oldsmobile 982043

In some of the early receivers (under serial A-20,000) of this model, several differences exist which should be noted on *page 9-1 in Rider's Volume IX*.

Resistor No. 46 is 100,000-ohms instead of 20,000.

Resistor No. 54 is 125,000 instead of 100,000-ohms and No. 55 is 75,000 instead of 100,000-ohms.

Resistor No. 44 and condenser No. 26 have been transposed, i.e. the resistor is connected to the grounded end of resistor No. 53 instead of the condenser.

The value of condenser No. 82 is indicated as 0.000063-mf and its connections are as follows: one terminal is connected to the junction of condenser No. 26 and the tap from resistor No. 58 and the other termnial is connected to the junction of condenser No. 18 and the left end of resistor No. 58.

### Emerson Chassis AF

Receivers using this chassis and bearing serial numbers above 1,244,716 differ from the schematic shown on *page 8-45 in Rider's Volume VIII*. The condenser C-17 is omitted and the negative side of the filament circuit is grounded to the chassis.

### Fairbanks-Morse 9A

Refer to the schematic shown on *page 8-9 of Rider's Volume VIII*. During production, the 47,000-ohm resistor (8) and the filter condenser (7) were removed and the r-f secondary was grounded directly, thus removing AVC from the 6L7G mixer tube. The bottom of the antenna coil secondary was then connected directly to the 1-meg-ohm resistor (9). A 1000-ohm variable resistor was added in the cathode circuit of the 6J7G AFC control tube (at 37) to make possible compensation for variation in calibration due to variation in tube characteristics. This control was found unnecessary and was removed in later runs.

### Fairbanks-Morse 8A

Refer to schematic shown on *page 8-7 of Rider's Volume VIII*. During production, the 47,000-ohm resistor (16) and the 0.05-mf condenser (7) were removed and the r-f secondary was grounded directly, thus removing AVC from the 6L7G mixer tube. The bottom of the antenna coil secondary was then connected directly to the 470,-000-ohm resistor (17).

### G.E. G-57

This model is identical to model G-55, except for the cabinet and the loud speaker, which has a part number RS-095. The 12-inch cone of this unit has a part number RC-943.

The servicing data for model G-55, found on *pages 9-3, 9-4, and 9-5 of Rider's Volume IX*, apply to the G-57. This additional model number should be added to the listing in your Index.

### Stromberg-Carlson Push-Button Tuners

The push buttons on all the new receivers, such as those whose servicing data are found in *Rider's Volume IX*, which employ padding condensers for tuning purposes are set up from the front of the chassis. It is unnecessary to get into the back of the receiver to set up the desired stations, except to adjust the electric tuning switch on the rear of the chassis.

To set up the stations, it is only necessary to remove the escutcheon over the push buttons and the adjusting screws become readily accessible. These escutcheons are held in place by several Phillips type screws, which can be removed with any small pointed instrument, such as a small nailfile or an old knife blade. However, the use of a special tool is recommended, as this will not mar the surface of the screw head.

### DeWald 1106

This model is identical with the Models 1104 and 1105, shown on *pages 9-1 and 9-10 of Rider's Volume IX*, except that the new model has an additional short-wave band for the 14-40 mc range, giving it a total of five bands.

### RCA 8M3, 8M4

On 8M3 and 8M4 receivers, it is often advantageous to connect the 22-mmf condenser (C1, on *page 9-37 of Rider's Volume IX*) from the output end of coil L1 to ground, instead of from the antenna end. Later runs of sets include this change. Note also that good electrical contact is required between vibrator-transformer and chassis to minimize internal noise.

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## Majestic 11356

This model is found on *pages 9-8, 9-11 and 9-12 of Rider's Volume IX.* A new electric tuning system has been incorporated in later runs of this receiver and is illustrated in Fig. 1. The procedure for indexing this tuning system for desired stations is as follows:

(1) Set receiver to Standard Broadcast band.
(2) Place "Manual-Electric" lever in "Manual" position, which is extreme counter-clockwise. Be sure the tone control is in the "Normal" position as shown by the indicator.
(3) Pull out Indexing Rod located at center bottom half of the escutcheon. This rod has numbers on it which correspond to the push buttons (counting from left to right.)
(4) Set Indexing Rod so that the number on the rod corresponding to the push button you wish to index is in line with the escutcheon plate.
(5) Turn tuning knob until the pointer has covered the entire dial. This is essential to engage the tuning disc.
(6) Tune in the desired station accurately, using the tuning eye.
(7) Push Indexing Rod all the way in, and that particular station will always be tuned in automatically when that particular button is depressed while the "Manual-Electric" lever is in the "Electric" position.

To index more than one station, go through steps (3) to (6) for each station desired and when finished, push the Indexing Rod back as far as it will go.

Caution: When using electric tuning, do not depress more than one button at a time. Depressing two buttons will cause the motor to run continuously or until the automatic thermal switch operates to prevent the motor from burning out. If this happens, it may take fifteen minutes for the motor to become cool enough for the electric tuning to become operative again.

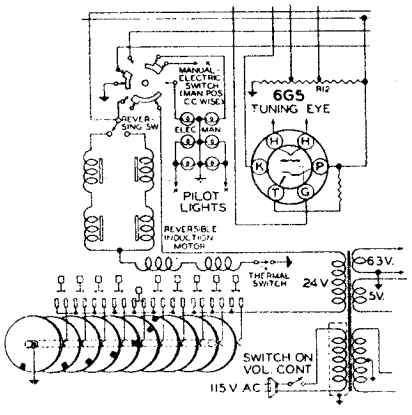


Fig. 1. How the new electric tuning unit is connected in the Majestic Model 11356.

## Philco 38-10 (121, 124)

*Run No. 5.* Resistor No. 11, 70,000-ohms changed to 40,000-ohms, Part No. 33-340339 in order to improve the oscillator circuit performance. See *page 8-67 in Rider's Volume VIII*

## Spiegel Chassis X1

This chassis is used in the following models: 1900, 1920, 1931, 1970, 4502, 9922, and 9925. It is quite similar to the chassis used in the Spiegel Model 100 found on *page 9-1 of Rider's Volume IX,* the difference being as follows:

The 250,000-ohm resistor in the plate circuit of the 75 second detector is connected directly to +B. This means that the 100,000-ohm resistor and the 0.1-mf by-pass condenser are not used in this chassis. An 0.05-mf condenser is used across the 110-volt a-c leads to the power transformer primary instead of one with a value of 0.02 mf.

No wave trap is used in the X1 chassis, such as is shown in the broadcast-band antenna coil. Also no condenser is shunted across the short-wave oscillator coil. The value of the fixed condenser connected between the Police-band oscillator coil and ground is 0.005 mf instead of 0.012 mf.

●

## RCA 10K11, 10T11

The chassis and speakers of these two models are identical to models 10K and 10T, which will be found in *Rider's Volume VII on page* 7-132. The service data starting on that page applies to these new model numbers with the exception of some minor replacement parts for the new cabinets in which these chassis are housed.

●

## Majestic 11056, 11057, 11058

Models 11056 and 11058 are found on *pages 9-8 to 9-10 of Rider's Volume IX.* The data given there also apply to Model 11057. Alignment instructions for these three models are given in the table below.

| Signal Generator Connection | Signal Generator Frequency | Band Switch Position | Dial Position | Trimmer Designation | Output Signal |
|---|---|---|---|---|---|
| 6A8G Mixer Control Grid | 455 kc (1) | BC | (2) | Trim 455 kc | Max. |
| Antenna (3) | 18 mc | SW | 18 mc | Osc— 18 mc | (4) |
| | | | | R-F— 18 mc | Max. |
| | | | | Ant— 18 mc | Max. |
| | 11 mc | SW | To Gen. | | (5) |
| | 6 mc | SW | To Gen. | | (5) |
| | 19 mc | SW | 18 mc | | (6) |
| Antenna (3) | 6 mc | POL | 6 mc | Osc— 6 mc | (4) |
| | | | | R-F— 6 mc | Max. |
| | | | | Ant— 6 mc | Max. |
| | 7 mc | POL | 6 mc | | (6) |
| Antenna (7) | 1500 kc | BC | 1500 kc | Osc—1500 kc | (4) |
| | | | | R-F—1500 kc | Max. |
| | | | | Ant—1500 kc | Max. |
| Antenna (7) | 600 kc | BC | 600 kc | Pad— 600 kc | Max. (8) |
| Antenna (7) | 1500 kc | BC | 1500 kc | Osc—1500 kc | (4) |
| | | | | R-F—1500 kc | Max. |
| | | | | Ant—1500 kc | Max. |
| Antenna (7) | 600 kc | BC | 600 kc | Pad— 600 kc | Max. (8) |

Note (1)—Apply through 0.1-mf condenser; use smallest possible signal from generator to prevent AVC action from affecting output readings.
Note (2)—Gang condenser about 50% engaged; if a squeal is heard, rotate gang until squeal is removed.
Note (3)—Apply through 400-ohm dummy antenna.
Note (4)—Unscrew trimmer to minimum, then slowly turn screw to increase capacity until the signal is heard.
Note (5)—Check sensitivity.
Note (6)—Image check: If alignment is correct, about 10 times as much signal-generator input will be required to give image same output reading as did the desired signal.
Note (7)—Apply through 200-mmf mica condenser as dummy antenna.
Note (8)—While rocking gang condenser.

## DeWald 1004

This model is identical with the Models 1002 and 1003, shown on *page 9-6 of Rider's Volume IX,* except that the new model has an additional short-wave band for the 14-40 mc range, giving it a total of five bands.

●

## Fairbanks-Morse 5A

During production runs, a 10-mf, 25-volt condenser was added across the cathode resistor of the type-41 output tube to increase sensitivity. In the schematic shown on *page 9-5 of Rider's Volume IX,* the cathode resistor mentioned bears the number, 21.

●

## Fairbanks-Morse 6C

Referring to the schematic shown on *page 8-5 of Rider's Volume VIII,* the 10,000-ohm resistor (15), in the screen circuit of the 6D8G and 15 tubes, was changed during production to 22,000 ohms. Both resistors are of 2-watts rating.

●

## Silvertone 4600, 4601

A receiver is occasionally encountered in which the volume goes to a low value as the volume control is turned down, but then increases again as the control is turned still lower. This can usually be corrected as follows: Remove the chassis from its case and remove the connections to the two outside terminals of the volume control. Then connect a 22.5-volt "B" battery between the center terminal and the case of the control. Rotate the control a couple of times throughout its range. This should repair the control and the connections should be soldered back onto the outside terminals.

●

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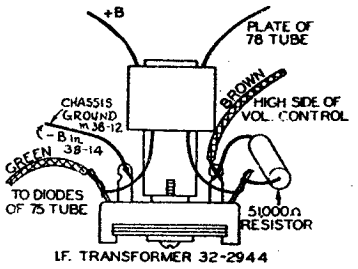
### Philco 38-12

Run No. 3. It is important that the following leads be dressed in order to eliminate hum:

Dress the green wire connecting the diodes of the 75 tube to the 2nd i-f transformer as far as possible from the filament prongs of the 75.

The brown wire connecting the 51,000-ohm resistor to the high side of the volume control should be dressed under the coil of the 2nd i-f transformer.

The grid lead of the 75 tube should be dressed toward the back of the receiver and between the tube and shield.




New i-f transformer for Philco models 38-12 and 38-14.

The second i-f transformer, No. 12 in the schematic on *page 8-69 of Rider's Volume VIII*, has been changed from Part No. 32-2674 to No. 32-2944. Note that condenser 12B and 12C are part of the padder in these transformers. The wiring of this new transformer is shown in the accompanying illustration.

•

### Philco 38-14

In the list of parts on *page 8-72 in Rider's Volume VIII*, the parts numbers of the following are incorrect:

| *Schematic No.* | *Incorrect No.* | *Correct No.* |
|---|---|---|
| 12—Compensator | 31-6209 | 31-6100 |
| 20—Volume Control | 33-5236 | 33-5230 |

A condenser, 5 mmf, was connected across the secondary of the short-wave transformer, No. 2. This condenser is connected to lugs Nos. 3 and 4 of the transformer shown on the schematic. *See page 8-71 of Rider's Volume VIII.*

Run No. 2. The second i-f transformer, No. 17, was changed from Part No. 32-2674 to No. 32-2944. The wiring lugs on the new transformer are slightly changed. The drawing of this transformer is shown in the preceding change notice covering Philco 38-12. Note that in the case of Model 38-12, the middle left-hand lead in the sketch goes to chassis ground, but in the Model 38-14, this same lead goes to -B.

### Philco 38-4

*Run No. 5.* The two condensers, Part No. 30-1097, which were connected in parallel with the new air padder, No. 16 in Run No. 3 receivers (see SUCCESSFUL SERVICING, July 1938, page 2) have been removed, starting with Run No. 5. For schematic see *page 8-61 in Rider's Volume VIII.* In place of these condensers, a thermal compensator, Part No. 31-6227 is connected in parallel with the air padder. The air padder, No. 16, Part No. 31-6206, has also been relocated and is now mounted between the 6U7G r-f tube and the 6F6G output tube. (*See page 8-63 for chassis layout*). The thermal compensator, Part No. 31-6227, is also mounted in the same position with the thermostatic plate facing the power transformer.

The oscillator transformer, No. 15, was changed from Part No. 32-2631 to 32-2894. Connection No. 1 of the new transformer has been increased in length for soldering to the air padder in the new location.

•

### Philco 38-14 (121, 124)

*Run No. 4, Code 121.* In order to eliminate hum modulation, the electrolytic condenser, No. 32, was changed from 16-mf to 40-mf, Part No. 30-2237. The electrolytic condenser in Code 124 receivers was also changed from 16- to 40-mf, Part No. 30-2256. The oscillator blocking condenser No. 8, 250-mmf was changed to 50-mmf, Part No. 30-1029.

See *page 8-71 in Rider's Volume VIII* for schematic of both codes.

•

### Philco 38-33 (121)

*Run No. 3.* Resistor No. 20, 8000-ohms, was changed to 20,000-ohms, Part No. 33-320339. It was removed from the 90-volt wire (see schematic on *page 9-3 of Rider's Volume IX*) and reconnected to the 135-volt wire of the battery cable. The battery cable assembly was also changed to Part No. 41-3402.

### Belmont 665,765

It will be noticed that another model number, 765, has been added to 665, which appears in the Index to Rider's Volume IX. This new series starts with serial 9A532400 for which the model numbers are 665 Series A, Issue B and 765 Series A. The servicing data on both these models are the same as the information published in Rider's Volume IX with the following changes:

A 6U5 tuning indicator tube has been added in the model 765. The grid of the 6U5 is connected to the junction of No. 5 terminal of the 6Q7G and R8; the target to +B; and the cathode to the junction of R10 and R12. See schematic on *page 9-21 in Rider's Volume IX.*

The short pieces of wire on the antenna coil, which are designated as CA and CB in the schematic, have been removed.

A resistor, R17, 2000 ohms, has been shunted across the P and H terminals of the oscillator coil.

A 0.008-mf, 800-volt condenser, C21, has been added between the plate of the output tube, 6AC5G, and ground.

The short-wave oscillator padder, C12, was not shown on the bottom view of the chassis. This is located on the layout just above and between the trimmers C8 and C11. Note that this padder C12 is adjusted at the factory and needs no other adjustment.

•

### Zenith Chassis 5516, 5634, 5707

The alignment instructions for the three chassis mentioned above are identical and will be found below. The model numbers of the receivers in which these chassis are used will be found on the pages of *Rider's Volume VII.* The schematics and trimmer locations for the respective chassis will be found on these pages: Chassis 5516, schematic *page 7-7*, trimmers *page 7-2;* Chassis 5634, schematic *page 7-17*, trimmers *page 7-9;* Chassis 5707, schematic *page 7-18*, trimmers *page 7-11.*

| Signal Generator Connection | Signal Generator Frequency | Dial Position | Wave-Band Switch Position | Trimmer Number | Output Signal |
|---|---|---|---|---|---|
| Det.-Osc. | 456 kc[1] | ——— | ——— | 4 I-F Trimmers | Max. |
| Control Grid Antenna | 456 kc | ——— | ——— | Wave-Trap Trim. (Rear of chassis) | Min. |
| Antenna | 6 mc | 6 mc | Band B | Osc. Trim.[2] | ——— |
| Antenna | 1400 kc | 1400 kc | Band A | Broadcast Trim.[2] | ——— |
| | | | | Antenna Trim. | Max. |
| Antenna | 18 mc | 18 mc | Band C | Short-Wave Trim. | Max.[3] |
| Antenna | 600 kc | 600 kc | Band A | Broadcast Pad. | Max.[3] |
| Antenna | 1400 kc | 1400 kc | Band A | Broadcast Trim.[2] | ——— |
| | | | | Antenna Trim. | Max. |

Note 1—Use smallest possible signal from generator to prevent AVC action from affecting output readings.
Note 2—Adjust for correct dial reading.
Note 3—While rocking.

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## RCA U-112, Late U-111 and U-112

The U-112 is a 5-tube superheterodyne-Victrola combination similar to U-111 except that the cabinet has been enlarged to permit the playing of 12-inch records. The service data for the U-111 found on *pages 9-169 and 9-170 of Rider's Volume IX* apply to these later models, with the following exceptions:

In the U-112, the rectifier has been changed to a 5W4.

A 12,000-ohm resistor, R18, has been added in series with the 0.005-mf condenser across the pickup in U-112.

Model U-112 is made in three power supply ratings, all 105-125 volts with 80 watts consumption:

| Rating | Frequency |
|---|---|
| A-6 | 60 cycles |
| A-5 | 50 " |
| B-2 | 25 " |

The 25-cycle power transformer for U-112 has a d-c resistance of 13.7 ohms in its primary and 1190 ohms in the secondary. The speaker in this model, 84265-4, has the following d-c resistances: Field coil—1300 ohms; Primary of output transformer—420 ohms; Voice coil—2 ohms.

Later production of both the U-111 and U-112 models have the following changes:

The antenna coil has been changed from stock number 30894 (1-ohm primary) to 32338 (35-ohm primary). This last coil may be used to replace the former.

A 270-mmf condenser, C23, is connected from the triode plate of the 6Q7G to the chassis.

The following additional alignment data apply to both models: On r-f alignment, turn the gang condenser all the way out of mesh and with the test oscillator tuned to 1720 kc, align the oscillator trimmer C18. Set the test oscillator to 1500 kc, tune the receiver to the 1500-kc signal and align the antenna trimmer C3 for maximum output.

Note that the connections for the motor coil assembly, shown on *page 9-170,* has been revised. The connections shown in the left-hand view of the stator are used for both 25-cycle and 60-cycle operation on 110 volts and are unchanged. For 110-volt, 50-cycle operation, the red and yellow designations in the right-hand sketch should be reversed; in other words, the yellow of the left-hand coil is connected to the red of the right coil, making the leads at the bottom red from the left coil and yellow from the right. Note also that the d-c resistance of each coil for 25-cycles in 250 ohms, those for 50- and 60-cycles remaining 82 ohms. These notes apply to both U-111 and U-112.

## RCA 5T

Two different speakers are used on Model 5T, and are identified by the numbers stamped on them as follows: (1) RL-63C1 and (2) 72203-5. Replacement parts for No. RL-63C1 are listed in the service data for Model 5T, shown on *page 7-14 of Rider's Volume VII,* and the replacement parts for No. 72203-5 are listed below:

| *Stock No.* | *Description* |
|---|---|
| 9579 | Coil—Field coil |
| 9533 | Cone—Reproducer cone mounted and centered in housing |
| 5118 | Connector—3-contact male connector for reproducer |
| 9578 | Reproducer complete |
| 4818 | Transformer—Output transformer |

## RCA 5X

**Late-production Model 5X receivers include the following minor changes from the original Model 5X which is found on *pages 7-18 to 7-20 of Rider's Volume VII:* (1) a fixed-tuned wave-trap is used in place of the adjustable wave-trap and (2) a few changes in component parts which are listed below. For late-production Model 5X, under "Alignment Procedure," omit the wave-trap adjustment. Early- and late-production receivers can be distinguished readily by inspection of the wave-trap. Component part changes for late-production models are as follows:**

| *Stock No.* | *Description* |
|---|---|
| 11414 | Capacitor—0.1 mf (C19) |
| 13837 | Capacitor pack—Comprising one 10-mf and two 16-mf sections (C23, C24, C26) |
| 12695 | Resistor—15,000 ohms, insulated, ¼ watt (R2) |
| 12679 | Resistor—2.2 megohms, insulated, ¼ watt (R3, R7) |
| 13836 | Switch—Range switch (S2, S3, S4, S5) |
| 13838 | Trap—Wave trap (L1, C1) |
| 13149 | Coil—Reproducer field coil (L13, L15) |

**Stock Nos. 12537, 4835, 12398, 12410, 12411, 12399, 3404, 12402, 12395, 12497, 12499, 12731, 12498, 9684, 12500, 13150, 13071, 12936 and 12937 are not used in Model 5X with fixed wave-trap.**

●

## RCA 8T2

Four different speakers are used with Model 8T2 receiver, and are identified by the numbers stamped on them as follows: (1) RL-63-4, (2) 76365-1, (3) 76365-3 and (4) RL-63E2. Replacement parts for Nos. RL-63-4 and 76365-1 are listed on *page 8-40 of Rider's Volume VIII,* and No. 76365-3 is listed on the schematic on *page 8-41.* The replacement parts for No. RL-63E2 are listed below:

| *Stock No.* | *Description* |
|---|---|
| 12641 | Board—Reproducer terminal board |
| 12640 | Bracket—Output transformer mounting bracket |
| 11254 | Coil—Field coil |
| 11233 | Coil—Hum neutralizing coil |
| 12642 | Cone—Reproducer cone and dust cap |
| 5118 | Connector—3-contact male connector for reproducer |
| 9773 | Reproducer complete |
| 11253 | Transformer—Output transformer |

●

## RCA 8U

Two different phonograph turntable motors are used on Model 8U, and are distinguished by the numbers stamped on the motor name plate as follows: (1) 72444-1 and (2) 56992-1. No. 72444-1 is an induction motor with a governor-type speed regulator; No. 56992-1 is a synchronous motor. Replacement parts for No. 72444-1 are listed on *page 8-51 of Rider's Volume VIII;* replacement parts for No. 56992-1 are listed below:

| *Stock No.* | *Description* |
|---|---|
| 8989 | Motor complete, 105-125 volts, 60 cycles |
| 8993 | Rotor and shaft for Stock No. 8989 |
| 3398 | Spring—Motor mounting spring assembly |
| 3817 | Stud—Motor mounting stud |

●

## RCA 87K1, 87K2, 87T2

The service data and replacement parts for the Model 87K1 are shown on *pages 9-83 to 9-86 of Rider's Volume IX.* Three replacement parts have been added as follows:

| *Stock No.* | *Description* |
|---|---|
| 30846 | Core—Inductance adjustment for instantaneous tuning coils |
| 12007 | Spring—Retaining spring for core Stock No. 30846 |
| 30695 | Card—Station call-letter card for push buttons |

All service data and replacement parts for Model 87K1 apply directly to Model 87K2, including the three additional replacement parts listed above for Model 87K1.

All service data and replacement parts for Model 87K2 apply directly to Model 87T2, except that the Reproducer Replacement Parts listed below should be used instead of those listed for Model 87K1.

| *Stock No.* | *Description* |
|---|---|
| 14614 | Cone—Reproducer cone and dust cap (L17) (for speaker marked 84091-1 or 84001-3) |
| 14934 | Cone—Reproducer cone and dust cap (L17) (for speaker marked 84091-2 or 84001-6) |
| 5118 | Plug—3-contact male plug for reproducer |
| 14613 | Reproducer complete (marked 84001-3 or 84001-6 but interchangeable with speaker marked 84091-1 or 84091-2 respectively) |
| 14615 | Transformer — Output transformer (T2) (for speaker marked 84091-1 or 84001-3) |
| 14935 | Transformer — Output transformer (T2) (for speaker marked 84091-2 or 84001-6) |

Stock Nos. 13866, 14354, 11469, 12667, 14395, 14358, 14355 and 14357 for Model 87K1 Reproducer Assemblies are not used in Model 87T2.

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### Silvertone 7127, 7133

The schematic for tle chassis used in these models will be ound on *Sears page 7-63 in Rider's Voume VII.* The alignment has just beer obtained and will be found below.

Apply a 456-kc signal at the control grid of the 2A7 and adjust the i-f trimmers.

Apply a 1712-kc signal at the antenna. Turn condenser all the way open. First adjust oscillator trimmer on the oscillator coil, then the r-f trimmer on the condenser.

Adjust the low-frequency padder at 600 kc while rocking the condenser.

Check at 1400 kc for alignment.

Short-wave Adjustment: adjust the small trimmer found under the chassis on short-wave antenna coil for maximum output. If short wave does not track with dial, adjust trimmer on oscillator section of variable condenser until correct. Make all adjustments for short wave with the variable condenser turned to center of 25-meter location on scale.

### Silvertone 4600

A .1-mf condenser should be added to eliminate bad chassis pickup as shown in Fig. 1, the partial schematic. This type of pickup is heard as noise when the car engine is running and the antenna is disconnected from the receiver.

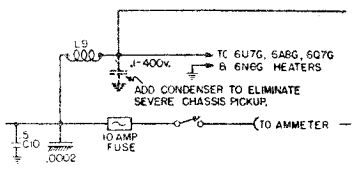


**Fig. 1. Partial schematic of Silvertone model 4600 in which is shown where the .1-mf condenser is connected to eliminate chassis pickup.**

This instruction applies to sets having identification number 101.458 on the label inside the receiver case cover; the condenser has been added at the factory when the number reads 101.458B or a subsequen: letter. See location in Fig. 2. Note that the schematic is shown on *Sears page 9-35 of Rider's Volume IX.*

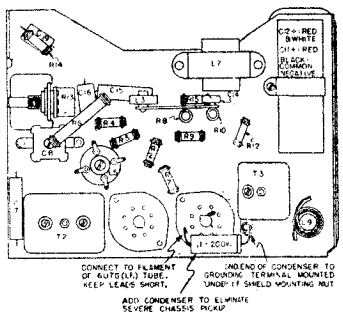
CONNECT TO FILAMENT OF 6U7G (L6) TUBE. KEEP LEADS SHORT.
GND. END OF CONDENSER TO GROUNDING TERMINAL MOUNTED UNDER I.F. SHIELD MOUNTING NUT.
ADD CONDENSER TO ELIMINATE SEVERE CHASSIS PICKUP

**Fig. 2. Bottom of chassis showing location of the added condenser.**

### Silvertone 4601

A .1-mf condenser should be added to eliminate bad chassis pickup, as shown in the partial schematic of Fig. 1. This type of pickup is heard as

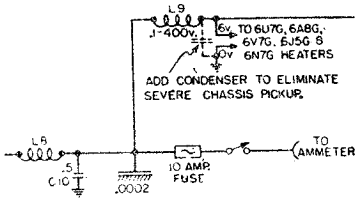


**Fig. 1. Where the 0.1-mf condenser is added in Silvertone 4601 to eliminate chassis pickup.**

noise when the car engine is running and the antenna is disconnected from the receiver. This instruction applies to sets having identification number 101.463 on the label inside the receiver case cover; the condenser has been added at the factory when the number reads 101.463B or a subsequent letter.

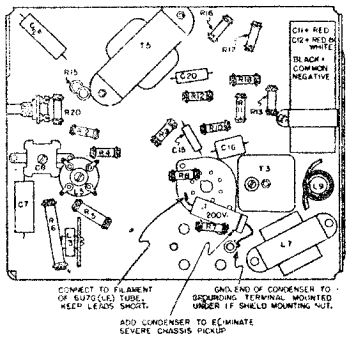
CONNECT TO FILAMENT OF 6U7G (L6) TUBE. KEEP LEADS SHORT.
GND. END OF CONDENSER TO GROUNDING TERMINAL MOUNTED UNDER I.F. SHIELD MOUNTING NUT.
ADD CONDENSER TO ELIMINATE SEVERE CHASSIS PICKUP

**Fig. 2. Location of added condenser.**

The location of this condenser is shown in Fig. 2, the bottom view of the chassis. Note that the Silvertone 4601, shown on *Sears page 8-75 of Rider's Volume VIII,* does not show this condenser; it may be assumed, therefore, that this is Chassis 101.463.

### Silvertone 4414, 4415, etc.

The original production of this chassis (No. 101,393) used part number 1012814032, r-f coil and detector coil (iron core). Later production, which can be identified by the letter "C" or a subsequent letter rubber-stamped on the chassis, used part number 1012818509 detector coil and number 1012818510, r-f coil (air core). When the new air-core type coils are used, the 350-ohm resistor, R2, in series with the volume control, is changed to 150 ohms.

Later production used part number 1012418344 as volume control, instead of the one used originally. The new control incorporates the 150-ohm resistor, R2, mentioned above, as a tap on the resistance element, eliminating R2 as an external resistor. The new control can be used to replace the old one in those sets using a 350-ohm R2 by substituting a 200-ohm resistor, as the 150 ohms are incorporated in the control itself. It can be used to replace the original control in those sets that use a 150-ohm external resistor for R2 by removing R2 and connecting to the tap on the volume control.

Please notice that three more model numbers have been added to this chassis and these should be added to the listing in the Index, which should now read: 4414,4415,4500,4505,4506, 4509,4510,4511, Chassis 101.393. The schematic for this chassis will be found on *page 8-15 in Rider's Volume VIII.*

### Silvertone 4502, 4504, etc.

The same changes relating to Chassis 101.393 also apply to these models, with the exception that the later production is identified by the letter "A" or a subsequent letter rubber-stamped on the chassis.

New model numbers have also been added to this chassis and they should be incorporated in your Index, which should read: 4502, 4502A, 4504, 4508, 4512, 4513, 4514, Chassis 101.427. The schematic of this chassis will be found on *page 8-58 in Rider's Volume VIII.*

### Silvertone 4487, 4587, 4587A

If one of these models has been out of service for several months, the 25-mf electrolytic condenser may lose its formation, causing the 5Y3G rectifier tube plates to become redhot or the tube to burn out. While this condition seldom occurs, the electrolytic can be reformed and the condition remedied as follows:

Using a 5Y3 plug and a 5X4 socket, make an adapter by connecting together the prongs indicated below. Then put a 5X4G rectifier tube in the adapter socket and push the adapter plug into the rectifier socket of the receiver. (It is advisable to remove the output tubes from their sockets during the reforming period.) The receiver should be turned on for about five minutes, the 5X4G tube being used to reform the electrolytic. After this period, the 5Y3G tube can be replaced in its socket and the receiver will perform normally.

This same remedy can be applied to other chassis, although it is very unlikely that this condition will be often encountered.

| *5X4G Plug* | | *5Y3G Socket* |
|---|---|---|
| 3 | connects to | 2 |
| 5 | " " | 4 |
| 7 | " " | 6 |
| 8 | " " | 8 |

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### Stewart-Warner-Firestone R-1332

The filter system and rectifier tube are protected against breakdown during the warming up period by the Globar resistor (No. 15 in the schematic on *page 6-16 in Rider's Volume VI*), which functions as follows: The resistance of this unit drops rapidly as the voltage across it rises, so that it acts as a load on the power transformer during the warm-up period and keeps the voltage under the danger point until the tubes are heated and take their normal current. Because of its unique voltage characteristics, this resistor can not be checked with an ordinary ohmmeter as it will show a resistance of several megohms.

*I-F Alignment:*

This is conventional, the i-f peak being 456-kc. The trimmers are located on the top of the i-f transformers and may be reached by removing the top cover. The signal generator is connected between the control grid of the 6A7 and ground.

*Dial Calibration:*

Tune in a station of known frequency between 800 and 1000-kc. Insert a screwdriver in the slotted end of the dial shaft projecting through the back of the control head. Hold the tuning control knob so that the station remains tuned in properly and adjust the dial pointer with the screwdriver so that the exact station frequency is indicated.

If the set is badly out of calibration, such that it calibrates correctly at one part of the dial but not at another, it is necessary to adjust the oscillator shunt trimmer. In order to reach this trimmer the chassis must be removed from the case as follows:

Remove the flexible shafts and dismount the receiver.

Remove the four terminals of the speaker cable from the speaker.

Remove the black antenna lead from the coil and unsolder the coil shield grounding braid.

Remove the blue dial-light lead from the socket terminal.

Remove the yellow tone-control lead from the tone control switch.

Remove the six slotted chassis fastening screws and slide the chassis from the case.

Reconnect the red and yellow leads of the speaker cable to the speaker.

Insert the tuning shaft in the gang condenser fitting and reconnect the battery lead.

Set the chassis on a flat metal plate and adjust as follows:

Connect a 0.00025-mf condenser in series with the output of the signal generator and the antenna lead plug on the antenna coil and the ground lead of the signal generator to the chassis of the set. Set signal generator to 600-kc and tune the receiver to maximum volume and set the dial to read exactly 6.0 (600-kc). Set the signal generator to 1400-kc and turn the tuning knob until the dial pointer reaches 14.0 (1400-kc). Adjust the oscillator shunt trimmer (on the gang condenser second from the control end) until the meter indicates maximum output. Then adjust the other gang trimmer as directed below.

*R-F Alignment:*

With the signal generator tuned to 1400 kc, tune the receiver carefully for maximum output. Adjust the output of the signal generator to minimum value which will give sufficient output meter deflection. Adjust the trimmer nearest to the shaft end of the gang condenser for maximum output.

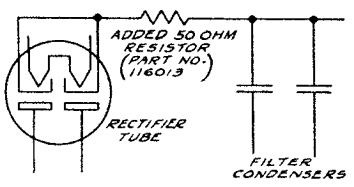
●

### Stewart-Warner AC-DC Receivers

There is a tendency for filter condensers and rectifier tubes in AC-DC receivers to fail prematurely. The Stewart-Warner Engineering Department has developed a simple remedy which will be incorporated in all future production of Stewart-Warner AC-DC receivers, and which can be applied easily by the serviceman to existing receivers.

With certain power-line impedances, extremely high surge voltages are developed across the filter condenser. These voltages may be as high as 300 volts, and occur only if the set is turned off on a particular part of the a-c cycle of the power-line current. Such a surge often punctures the filter condenser, and this causes the rectifier tube to fail. Since this difficulty is caused by a power-line condition, if it happens once in a certain customer's home, it is very likely to happen again.

The remedy for this trouble is to connect an inexpensive 50-ohm 1-watt resistor in series with the connection from the rectifier-tube cathodes to the electrolytic filter condensers. The proper connection of the resistor is shown in the accompanying diagram. The Stewart-Warner part number for this resistor is 116013.




The 50-ohm resistor added in the rectifier circuit for line surge protection.

### Firestone-Stewart-Warner R-1322

The alignment instructions for this receiver are practically the same as those which will be found on *page 8-16 in Rider's Volume VIII*. As this set is used with a steering column control head, the portion of the instructions pertaining to the dash control head can be disregarded. Also the trimmers on the gang condenser are reached by removing the *back cover* instead of the bottom cover.

A note is contained in the circuit description which should be observed. The correct position of the vibrator in its socket depends upon which car battery terminal is grounded. If the negative terminal is grounded, the vibrator should be inserted so that the arrow *points away* from the adjacent transformer cover. If the positive side of the battery is grounded, this arrow should point *towards* the transformer cover. The schematic for this receiver will be found on *Stewart-Warner page 6-15 in Rider's Volume VI*.

●

### Stewart Warner R-160 Chassis

The circuit description and alignment notes found on *page 8-16 in Rider's Volume VIII*, are practically the same as those which apply to models 1601 to 1609 inclusive, the major difference occuring in the section devoted to dial calibration. In the instructions for calibrating a dial for receivers having a dash control head, only the 1400-kc adjustment is used, the 600-kc setting being neglected. The schematic for the R-160 chassis will be found on *page 7-8 in Rider's Volume VII*.

●

### RCA 262,263

The a-f driver transformer, T3 has a revised coil design, the d-c resistance of the primary now being 1350 ohms and that of the secondary being 2000 ohms. An extra connection has also been provided on this unit for equalizing the primary and core potentials so that electrolysis between these parts will be reduced. This additional lead is colored red-green and it should be connected to plug "B" of the primary circuit. See schematic diagrams of the early models on *pages 5-102 and 5-103 of Rider's Volume V and the late models on pages 6-51 and 6-53 of Rider's Volume VI*.

### Bosch 376BT, 376F, 376S

Please make a note in the table of socket voltages on *page 6-2 in Rider's Volume VI* that the filament voltages should be 2.0 instead of 6.2 volts.

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